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**Kennecott
Minerals**

December 18, 1997

Mr. Lawrence J. Lynch
Mine Reclamation Unit
Bureau of Waste Management
Wisconsin Department of Natural Resources
101 S. Webster St., GEF II
Madison, WI 53707

Dear Mr. Lynch:

Re: Supplement to Surface Reclamation Plan (December 1997)
and Golf Course Option - Flambeau Mining Company

The Flambeau Mining Company (Flambeau) is providing the Supplement to Surface Reclamation Plan for the Flambeau Mine (December 1997) and the proposed layout for the Golf Course Plan option.

Supplement to Surface Reclamation Plan (Supplement)

The Supplement to Surface Reclamation is a document which identifies and summarizes proposed adjustments to the approved reclamation plan, Section 5, Mine Permit Application (MPA) (December 1989). The Supplement also provides additional detail regarding reclaimed mine site hydrology and vegetation zones. There is limited discussion provided on reclamation activities and plans which remain consistent with the approved 1989 MPA reclamation plan.

The proposed adjustments are consistent with the original intent of the approved MPA reclamation plan which is to reclaim the Flambeau Mine site to an environmentally stable site which meets or exceeds the criteria established in NR 132.08. The majority of the adjustments are not substantial and should not require a permit modification.

Those components of the Supplement which do require a permit modification should be limited in number. Flambeau is requesting that the Wisconsin Department of Natural Resources (WDNR) provide approval of the Supplement to Surface Reclamation in appropriate related sections. This will allow Flambeau to definitively identify reclamation supplies such as seed and nursery stock and



Mr. Lawrence J. Lynch

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allow appropriate time for procurement of supplies. Procurement of supplies is also contingent upon approval of the final reclaimed mine site topography since the topography defines the vegetation zones.

Golf Course Plan (GCP)

As you are aware, Flambeau has been considering the development of an eighteen hole, 6820 yard, championship golf course. The GCP is currently in the final stages of feasibility study. As outlined in the preliminary routing plan (See attachment to this letter), this option offers unique enhancements to the enclosed Supplement in that it utilizes the adjoining abandoned gravel pits to the north and west of the mine site. While the advantages of reclaiming the Flambeau Mine site as a golf course are numerous, the primary benefit will be to the community of Ladysmith.

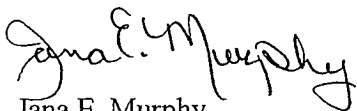
Since this submission precedes final Kennecott Minerals Company (Kennecott) approval of the golf course option, we request that review begin on the Supplement with emphasis on design features including wetland relocation, site hydrology, and general topography as these features are common to both plans. The golf course will include additional features such as a watering system, clubhouse with access road and parking area, tees, greens, sand traps, and other features typical of most golf courses. Preliminary plans include utilizing native species in the open "rough" areas as specified in the Supplement. Additional water features may be added if they will not adversely affect the site. Financial planning and design work is continuing, therefore, should you detect any major problems with the concept or the preliminary routing plan, please notify us as soon as possible. If and when final approval is granted by Kennecott, the details of the GCP will be submitted to the WDNR for your approval.

Summary

The Supplement to Surface Reclamation is being submitted for WDNR review of adjustments to the approved MPA reclamation plan. The Golf Course Plan is being provided for informational purposes only, but not for formal review at this time. WDNR review and approval of appropriate sections of the Supplement will allow Flambeau to continue with the procurement of supplies for the 1998 reclamation activities.

Please let us know if we can be of any further assistance in your review of the enclosed Supplement.

Sincerely,



Jana E. Murphy

Environmental & Reclamation Manager

Mr. Lawrence J. Lynch

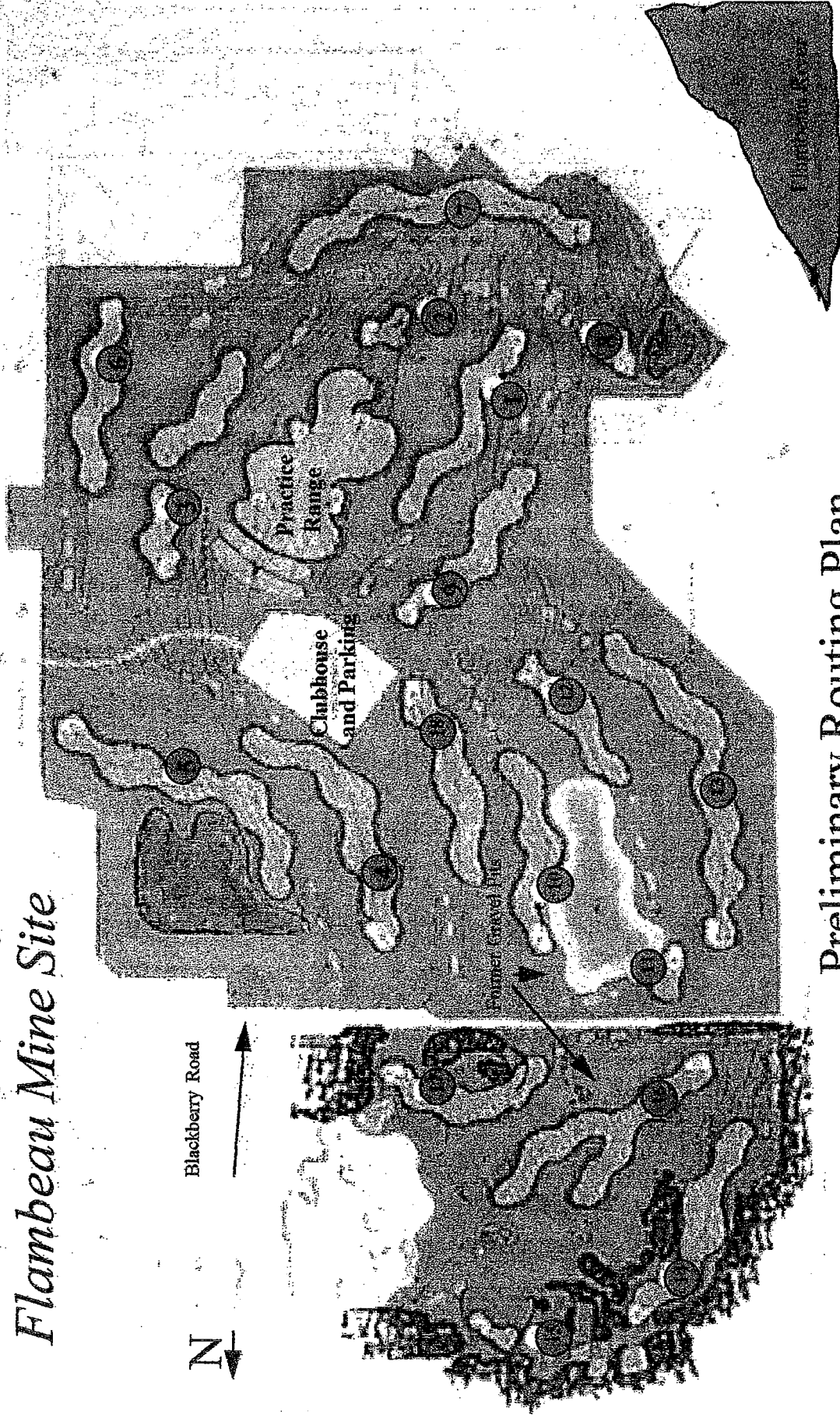
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Attachment/Enclosure

cc: Al Christianson, City of Ladysmith
Richard Dachel, Flambeau Mining Co.
Jeff Earnshaw, Flambeau Mining Co.
Fred Fox, Kennecott Mineral Co.
Jim Hutchison, Foth & Van Dyke
Paul Kent, DeWitt, Ross & Stevens
Ken Markart, WDNR
Thure Osuldsen, Rusk County
Tom Portle, WDNR
Tom Riegel, Town of Grant
Melvin Spencer, Rusk Co. Zoning

*Copper Eagle Golf Course
Flambeau Mine Site*



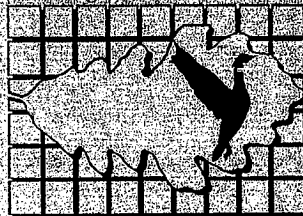
Preliminary Routing Plan

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**SUPPLEMENT TO THE
SURFACE RECLAMATION PLAN
FOR THE FLAMBEAU MINE,
FLAMBEAU MINING COMPANY,
LADYSMITH, WISCONSIN
DECEMBER 1997**

Book B

**A P P L I E D
E C O L O G I C A L
S E R V I C E S**



I N C.

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**SUPPLEMENT TO THE
SURFACE RECLAMATION PLAN
FOR THE FLAMBEAU MINE,
FLAMBEAU MINING COMPANY,
LADYSMITH, WISCONSIN**

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December 1997

EXECUTIVE SUMMARY

Flambeau Mining Company (Flambeau) is in the process of reclaiming its mine site located in Ladysmith, Wisconsin, in accordance with its approved reclamation plan. Reclamation activities to date have primarily consisted of backfilling the open pit, removal of some minor surface facilities, and rough surface grading. Final surface grading and revegetation activities will begin in 1998.

Flambeau has been approaching its reclamation activities according to the reclamation plan presented in its 1989 Mine Permit Application, which was approved by the Wisconsin Department of Natural Resources (WDNR) during the permitting process. Based on discussions held with the WDNR since active planning of its reclamation activities began in 1996, Flambeau has concluded that some adjustments to the approved reclamation plan based on current data may be appropriate.

Proposed adjustments to the surface reclamation plan include the addition of an industrial outlot, site grading, wetland establishment, site hydrology, building reclamation, and use of the visitor center. In addition, Flambeau is proposing refinements to its revegetation plan based on data collected since the original revegetation plan was developed. Some refinements to the monitoring plans as related to diversity, survivorship of woody plant stock, and wildlife habitat are also proposed.

The proposed adjustments and refinements to portions of the Flambeau surface reclamation and revegetation plan are consistent with the reclamation goal, established during permitting, which is to provide an environmentally stable site which meets or exceeds the criteria established in NR 132.08.

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1 INTRODUCTION

Flambeau Mining Company (Flambeau) has operated an open pit copper mine adjacent to Ladysmith, Wisconsin since 1993. Production mining was completed in early 1997. Reclamation of the open pit using stockpiled material began early in 1997. Topsoiling and revegetation is anticipated to begin in the spring of 1998.

Flambeau began planning for the implementation of the surface reclamation plan in 1996. These efforts involved discussions with local officials, completion of earthwork balances, an assessment of the data collected from the test wetland and seed test plots, and discussions with representatives of the Wisconsin Department of Natural Resources (WDNR). The focus of these efforts was to determine if it was appropriate to make adjustments to the approved plan based on current information. It should be noted it was acknowledged during the permitting process that making adjustments to the reclamation plan as part of the implementation process may be desirable based on the information available at that time.

The purpose of this report is to describe the adjustments Flambeau is proposing to its approved surface reclamation plan and to provide additional detail regarding site revegetation. The report is organized as a supplement to the approved reclamation plan. Only those areas of that plan for which adjustments are proposed or for which additional detail is provided are discussed. All other portions of the plan as described in previously approved documents remain in effect.

A premise Flambeau used in the completion of its evaluation of the approved reclamation plan was that the reclamation goal established during permitting, i.e., to provide an environmentally stable site that meets or exceeds the criteria established in NR 132.08, not be compromised. The proposed adjustments which are discussed below, are consistent with that goal. In addition, with the exception of the incorporation of an industrial outlot on the south side of the site, the planned final use of the site also remains consistent with the original approved concept of developing a non-consumptive, passive recreational area which will provide wildlife habitat. The concept of possibly converting a portion of the site into an industrial park was mentioned in the project's 1989 Mine Permit Application.

In reviewing the proposed list of amendments, it is important to note a sizeable majority of the project's overall approved reclamation plan, such as open pit reclamation, the reclamation sequencing and schedule, reclamation materials and earthwork balances, erosion control procedures and revegetation goals, remain substantially unchanged. Areas that would change, if approved by the Department, are as follows.

- Industrial Outlot

An approximately 28-acre outlot is proposed to be located west of State Trunk Highway (STH) 27 on the southern portion of the site. Ancillary facilities such as the administration building, wastewater treatment plant, utilities, and railroad spur not underlain with HDPE liner will be left in place to service the planned industrial park. The decision to leave these facilities in-place and incorporate the industrial park into the reclamation plan is based on the desire of local officials.

In addition, stormwater from the industrial outlot would be directed to a constructed biofilter located in the area of the former surge pond. Flow from the biofilter would be directed to Stream C.

- Wetland Establishment
Flambeau is proposing to locate the entire 8.5-acre wetland system planned as part of reclamation in the northeast corner of the site versus locating 1.0-acre to the northeast and 7.5 acres over the west end of the reclaimed pit. Installing the entire wetland in the proposed area will improve wetland hydrology and avoid the wetland intercepting the recovered groundwater table within the area of the former pit.
- Intermittent Stream B
To support the hydrology of the wetland proposed for the northeast corner of the site, Flambeau proposes to direct into Intermittent Stream A that portion of the flow from intermittent Stream B originating to the east of the former open pit. The combined intermittent Stream A and B flows would be directed to the proposed 8.5-acre wetland. The outlet from the wetland would connect to a reconstructed intermittent Stream A channel which would then connect to the existing Intermittent Stream A channel located on the northwest side of the site. Also, the Intermittent Stream B outlet will be changed to the location of the former outfall 002. The former outfall 002 channel configuration will be retained.
- H&H Building
The H&H building which existed prior to mine development is proposed to be left in place for use in storing equipment for use in long-term site maintenance and monitoring.
- Site Grading
To accommodate the addition of the industrial outlot to the reclamation plan, and the location of the 8.5-acre wetland on the northeast corner of the site, a revision to the site grading plan is required. The basic concepts included in the approved plan (e.g., high areas to the north and south, backfill of the pit to accommodate potential settling, recreation of Intermittent Streams A and B, etc.) will remain the same. Adjustments will primarily relate to the shape of site features and final elevations.
- Visitor Center Parking Lot
The existing visitor center parking lot is proposed to be left in-place at the request of local officials for use by tourists and the local community.

Section 2 of this report provides a description of the current estimated sequence and schedule for the surface reclamation program. Section 3 provides details regarding proposed adjustments to the surface reclamation program. Section 4 addresses revegetation. Full size figures are provided in Appendix A. Appendix B contains a detailed report on the hydrologic evaluations completed to support plan design. Seed mixes are provided in Appendix C.

2 OVERVIEW OF PLANNED SURFACE RECLAMATION SEQUENCE

The focus of site reclamation activities in 1997 has been the backfilling of the open pit with material from the Type II and Type I stockpiles. Backfilling plans were previously approved by the WDNR and are not discussed in this report.

In addition to pit backfilling, other surface reclamation activities such as removal of the crusher, the ore storage area liner, a portion of the rail spur line west of STH 27, cleaning of the surge and runoff ponds, rough surface grading, etc., were completed in the 1997 construction season. During the 1998 construction season, the remaining rough surface grading, fine grading, topsoil placement, wetland construction, and revegetation of major portions of the site will be completed. In addition, facilities such as the wastewater treatment plant, runoff pond and sedimentation basins will be decommissioned. Final revegetation with woody stock will take place in the 1999 construction season.

Details regarding planned reclamation activities, including project schedules, will continue to be provided in the annual report of planned reclamation activities submitted to the WDNR by Flambeau in January of each year. In addition, information pertaining to actual reclamation work accomplished in a given year will continue to be provided to WDNR in the November annual reclamation report.

3 ADJUSTMENTS TO THE SURFACE RECLAMATION PLAN

Flambeau is proposing to adjust its approved surface reclamation plan in the areas of final use, site grading, and wetland establishment. In addition, minor changes in site hydrology, building reclamation and visitor center use are planned. Details regarding each of these adjustments are discussed below.

3.1 Final Land Use

Approximately 32 acres of the approximate 181-acre mine site will be reclaimed or retained for industrial development. The 32 acres includes the 28-acre industrial outlot and the 4-acre rail spur corridor located east of the mine site. The remainder of the area will be reclaimed and revegetated as proposed in the approved reclamation plan. A description of the two areas follows.

3.1.1 Industrial Site

As shown on Figure 1 (Appendix A), the 28-acre industrial outlot is located in the southeast portion of the project site. The industrial outlot is proposed to be included in the surface reclamation plan based on the desire of the Ladysmith Community Industrial Development Corporation (LCIDC) to use a portion of the project area to promote industrial growth. Flambeau has entered into a lease agreement with the LCIDC pertaining to industrial development on this 28-acre area. Also, Flambeau is proposing to leave the 4-acre rail spur corridor located east of the mine site in place to provide rail service to the industrial outlot.

The outlot is divided into two areas: one is already developed, including the on-site rail spur and the area to the south of the rail spur; and a second area, for expansion to the north. Within the southern portion of the outlot the existing access road, parking lot, administration and laboratory building, rail spur, maintenance shop foundation, sanitary wastewater holding tanks, and wastewater treatment plant (WWTP) building will be retained. The contractor office, mobile vehicle maintenance shop, and fuel storage area will be removed. The foundation for the contractor's maintenance shop will be left in place for use by potential industry that would locate to the site. Per the conditions of the lease with the LCIDC, if a new use for the retained facilities is not found by December 31, 2004, mine site improvements left in place at the time of reclamation will be removed and the area reclaimed by Flambeau. The outlot area north of the rail spur (~9 acres) will be used to locate new industrial facilities and is covered by the same lease with the LCIDC.

The rail, ties and ballast for the portion of the rail spur line located over the former HDPE liners have been removed as part of pit backfilling activities. The spur alignment will be left in place and the removed rail and ties have been stockpiled on site for future use by the LCIDC. Several miscellaneous areas, notably the rail spur corridor between STH 27 and the site perimeter, the site entry, and the area around the potable water well are considered part of the industrial outlot.

3.1.2 Reclamation Area

As outlined in the approved site reclamation plan, the majority of the mine site (~149 acres) will be reclaimed for use as a non-consumptive, passive recreational area providing wildlife habitat. This reclaimed area will provide an enhanced ecosystem diversity as compared to the pre-mining land use. The reclaimed area will be environmentally stable until such time, if ever, the site is put to another use.

3.2 Final Site Grading Plan

To accommodate the industrial outlot into the surface reclamation plan and the location of the replacement wetland to the northeast corner of the mine site, Flambeau is proposing an adjustment to site final grades. The final grading concepts included in the approved grading plan, such as high areas to the north and south of the backfilled pit, recreation of Intermittent Streams A and B, etc., remain part of the plan. Adjustments relate primarily to the shape of site features and to final elevations. The following sections discuss final grades, site hydrology, and other miscellaneous topics relating to site grading.

3.2.1 Final Grades

Figure 1 (Appendix A) illustrates the proposed final contours for the site. The final contours are based on a site material balance performed in early November 1997, after 1997 rough grading work was completed. Minor adjustments to the proposed grades may be made during 1998 fine grading based on final material volumes. After grading has been completed, stockpiled topsoil will be distributed over the disturbed areas to prepare for revegetation.

An 8.5-acre wetland restoration is proposed to be located in the northeast corner of the project site. The 1.0-acre wetland test plot now located in that area will be

incorporated into the reconstructed wetland. Additional details regarding wetland design and construction are contained in Section 3.3.

The proposed grading plan involves reestablishing drainage patterns so water is moved off site primarily by intermittent Streams A, B, and C. A reconstructed portion of intermittent Stream A will connect the outlet from the 8.5-acre reconstructed wetland located in the northeast corner of the site to the natural existing stream course located on the western site perimeter. Intermittent Stream B will be reconstructed in the form of two watercourses located to the north and south of the backfilled pit that will flow into a 1.7-acre biofilter located in the area currently occupied by the hydric soil stockpile. The outlet for the biofilter will direct water to the Flambeau River through the reclaimed south watershed drainage channel. Runoff in the industrial outlot area will be directed to a biofilter to be located in the area of the former surge pond. The outlet from this biofilter will direct water to the existing intermittent Stream C channel located in that area of the site.

As shown on Figure 1 (Appendix A), minimal grading is planned for the southern portion of the industrial outlot. The northern portion will be graded to provide positive drainage to the south. The rail spur in this area will be graded as discussed in Section 3.1.1. The runoff pond HDPE liner will be punctured and the pond filled to the grades shown. The surge pond will be converted to a biofilter as discussed in Section 3.2.2.4.

3.2.2 Site Hydrology

As shown in Figure 2 (Appendix A), three watersheds will be created by site final grading. An overview of site hydrology is presented below followed by a detailed discussion of the hydrology of each individual watershed. A detailed discussion of the surface water hydrology of the site is contained in Appendix B.

3.2.2.1 Overview

Surface water management in the upgradient areas over the former mine site will be completed through the use of grassed swales carrying water to biofilters or the replacement wetland prior to flowing to natural features. Surface waters flowing onto the site from the east side of STH 27 will be directed to intermittent Streams A and C, recreating pre-mining conditions. The permanent 8.5-acre wetland to the northeast of the pit will receive surface water during runoff events and is expected to have standing water from snow melt through mid-summer.

The grading plan has been designed to provide landscape diversity with final elevations ranging from ~1152 on the ridge near STH 27, to ~1100 at the west end of the pit. The broad swales and streams have been designed at a maximum slope of 2%. Swales will have gentle in-slopes of 5 or 6:1 and approximate 10-foot wide bottoms with the bottom graded about 2 feet below the top of the in-slope, providing broad water courses. Stream bends will be reinforced with 6-8 inch rock (or larger) as needed and soil bioengineering plantings (see Section 4.3). These areas have been designed for the 100-year storm event (Appendix B) and will act to dissipate the energy of the moving water and thus control erosion.

3.2.2.2 Northern Watershed

The drainage features for the northern watershed are shown on Figure 3. Drainage from the eastern portion of the watershed will be directed through the reconstructed wetland. In addition, drainage from an approximate 51.3-acre area to the east of the northern watershed will also flow through the wetland.

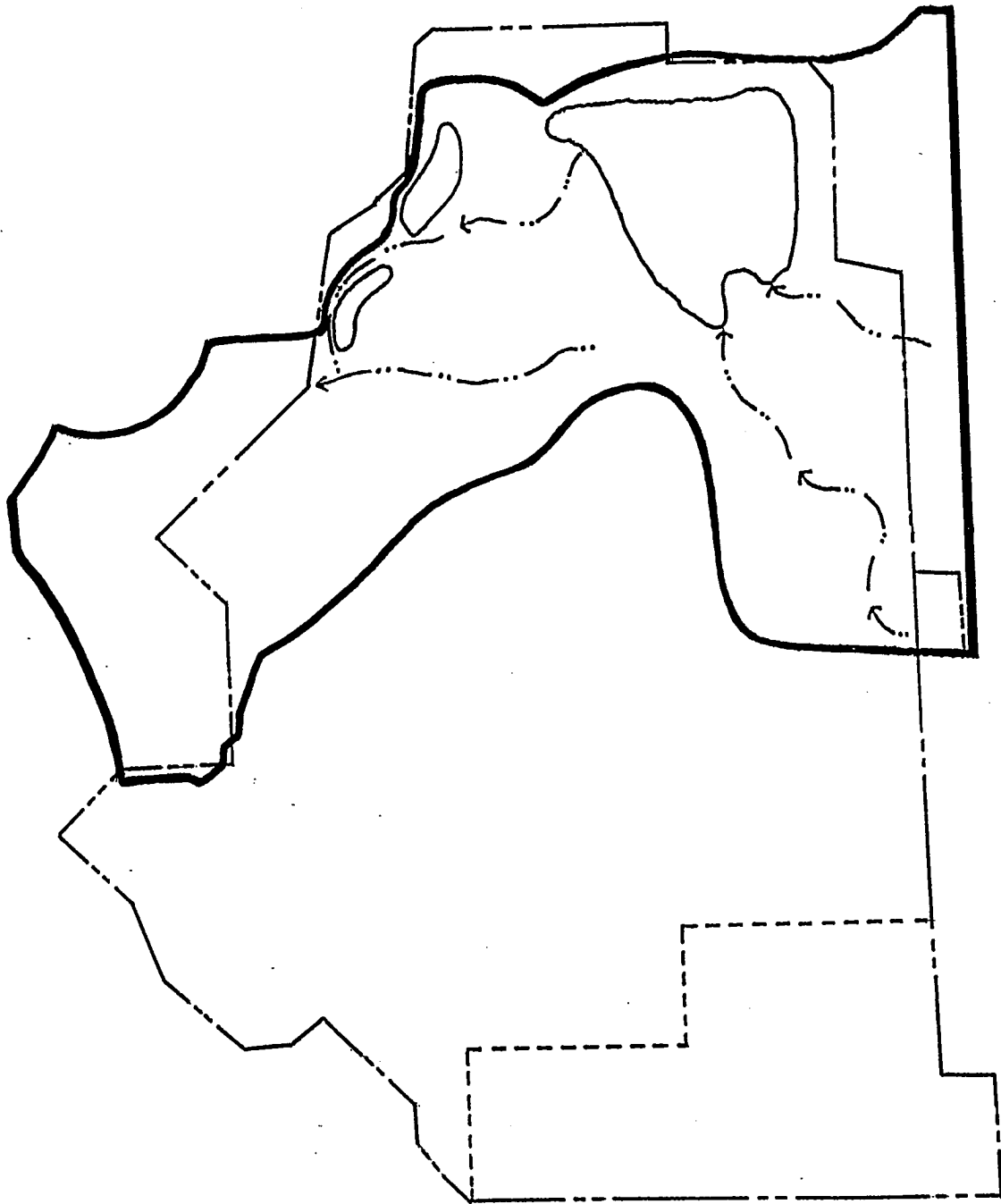
Water flowing from the wetland will be carried by the reconstructed intermittent Stream A channel to a point where the reconstructed channel connects with the historical intermittent Stream A channel located on the northwestern perimeter of the site. The reconstructed intermittent Stream A channel has been sized for a 100-year storm event (Appendix B). The sequence of the restored 8.5-acre wetland, a broadly grassed swale system, and wet prairie association in the intermittent Stream A watercourse, is expected to provide more water storage and slower rates of movement from larger storms than existed before the mine was developed.

Surface water drainage from the portion of the site now containing the temporary nursery, powder magazine, and a portion of the two runoff settling ponds will flow to existing drainage features in the area (Figure 2 – Appendix A). Given the relatively small sizes of these areas and shallow slopes, erosion is not expected to be a concern.

3.2.2.3 Southern Watershed

The south watershed (Figure 2 – Appendix A and Figure 4) will drain to a 1.7-acre biofilter located near the west end of the former open pit in the area now occupied by the hydric soil stockpile. This watershed will be separated from the north and industrial outlot watersheds by separate ridges, running generally northeast to southwest. Runoff originating in this watershed will be conveyed to the biofilter by two separate intermittent stream channels located in the northern and southern portions of the watershed. The biofilter (see Section 4.3) will function to settle and clarify water before it flows to the Flambeau River. The biofilter outlet elevation as shown on Figure 1 is 1099.4 feet. Water leaving the biofilter will be conveyed to the Flambeau River via the south watershed drainage channel. This channel will be located within the former 002 outfall structure, which will be left in place. As discussed in Appendix B, the intermittent stream channels and the biofilter in the southern watershed have been sized for a 100-year storm event.

Figure 3. Drainage Features of the Northern Watershed.



3.2.2.4 Industrial Outlot Watershed

The industrial outlot watershed will consist of about 28 acres (Figures 2 and 5). The outlot will be graded to direct runoff into the area of the former surge pond where a biofilter will be installed (Figure 6). The existing transfer pipe and two manholes that conveyed runoff from the Type II material stockpile will be maintained for conveyance of runoff from the outlot area north of the rail spur to the biofilter. To construct the biofilter, the edges of the surge pond HDPE liner will be repositioned, and the depression partially filled with till, capped with 12 inches of topsoil, and inoculated from the hydric soil stockpile to reach elevation ~1136. The biofilter, which has been designed for a 100-year storm event (Appendix B), will be used to clarify collected runoff before it flows to Stream C (see Section 4.3). Referring to Figure 2 (Appendix A), note that a small area within the industrial outlot, designated as basin 05 on the figure, will drain to existing drainageways and not to the biofilter. Also note that a small portion of the drainage basin at the western end of the outlot is not included in basins 07 and 08 as shown on Figure 2. Water from this small area will flow to the southern watershed biofilter as shown on Figure 2. Not having this small area included in the hydraulic analysis contained in Appendix B does not materially affect the analysis.

3.2.3 Slurry Wall, Flood Control Dike, and Diaphragm Wall

The slurry wall, flood control dike, and diaphragm wall will be left in place. The flood control dike along with erosion and sedimentation control programs will restrict uncontrolled movement of sediments and water from the site to the Flambeau River. The diaphragm wall will be completely covered with soil as part of site regrading.

3.2.4 Settling Ponds

The settling ponds associated with the Type I stockpile will be kept operational until the Type I stockpile earthwork has been completed. The PVC liner in the settling ponds will be punctured and left in place. The settling ponds will be filled and the associated area brought to the grades shown on Figure 1 (Appendix A).

3.2.5 Erosion Control During Reclamation

The same erosion control techniques and procedures applied to the construction phase of the project will be applied during reclamation. These techniques are detailed in the project's May 1991 Surface Water Management Plan (Foth & Van Dyke, 1991). A construction phasing plan proposed for implementation during the reclamation earthwork process was submitted to the WDNR on September 19, 1997, and therefore is not discussed in this report.

3.2.6 Monitoring Well Maintenance

The casings around retained groundwater monitoring wells will be adjusted (cut off or added to) as required by the final grading. Restored wells will be resurveyed for elevations.

Figure 4. Drainage Features of the Southern Watershed.

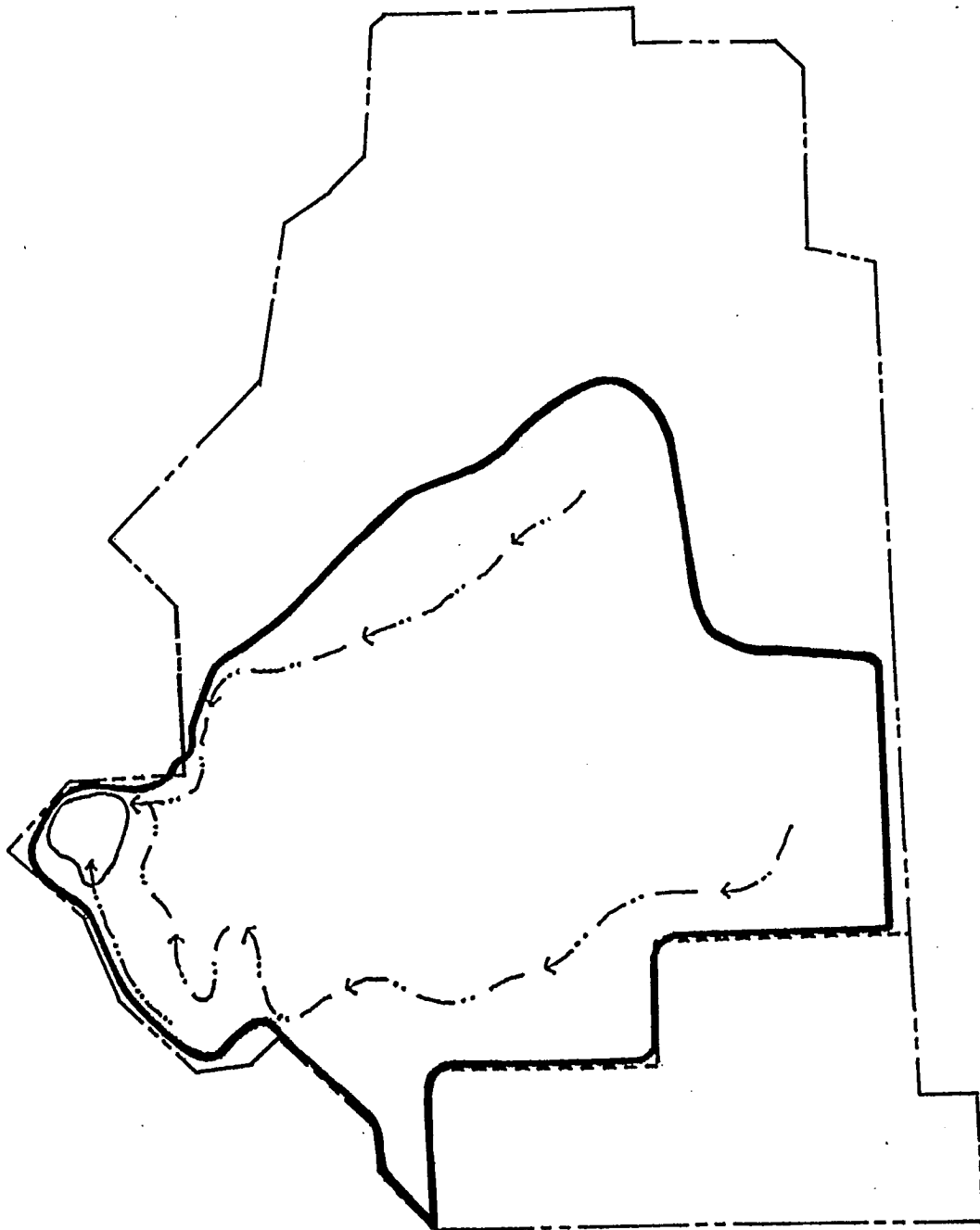


Figure 5. Drainage Features of Industrial Outlot Watershed.

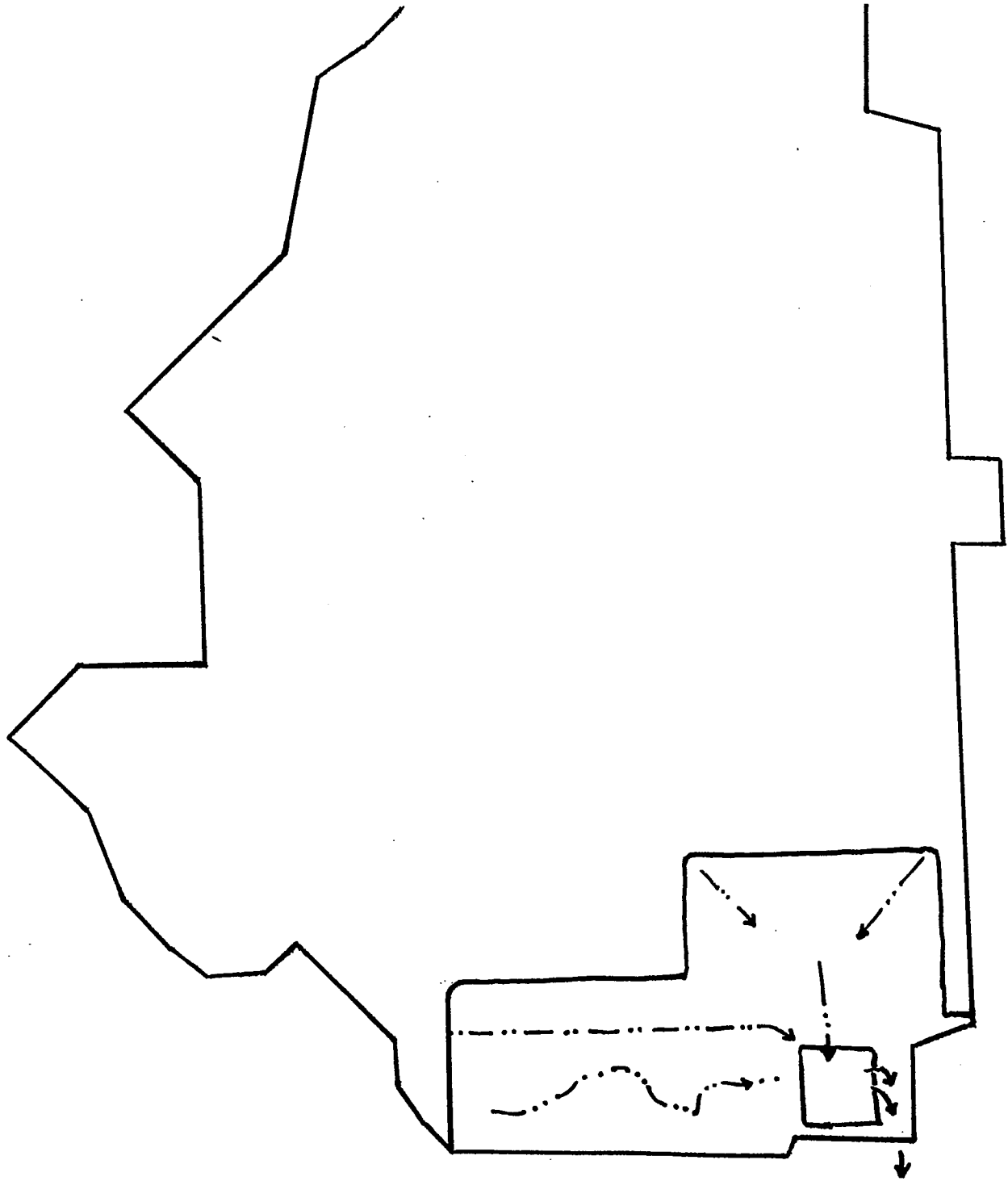
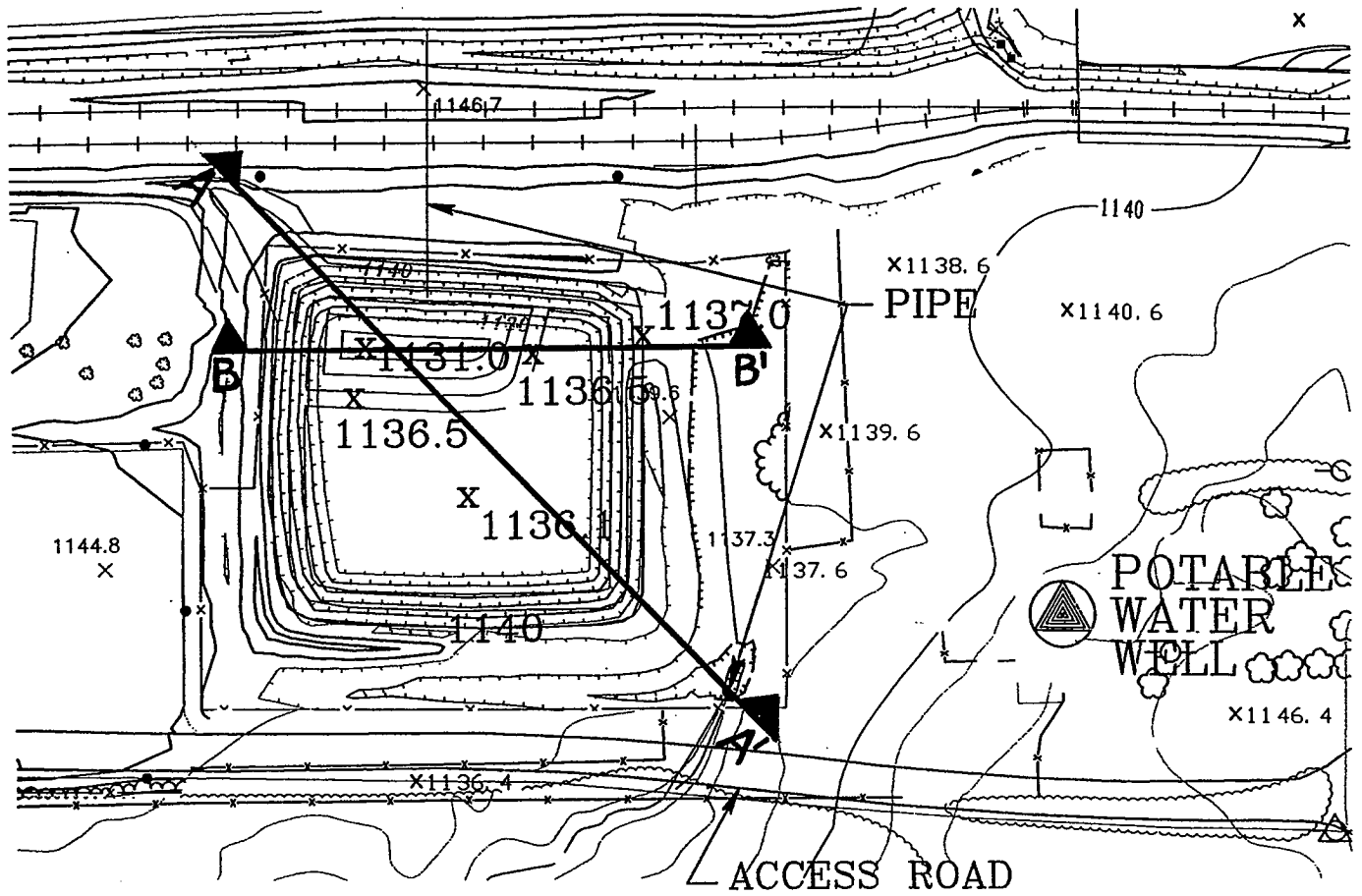


Figure 6. Detail Plan and Typical Section through the Surge Pond Biofilter in Industrial Outlot Watershed (Not to scale).



SECTION A-A'



SECTION B-B'

3.3 Wetland Replacement

Approximately 8.3 acres of low, moderate and high quality wetlands were taken by the project. To replace these areas, a new 8.5-acre wetland is proposed to be located in the northeast corner of the project site (Figure 1 – Appendix A). The 1.0-acre wetland test plot will be incorporated into the 8.5-acre wetland. Details relating to the characteristics of the wetlands to be replaced are contained in Section 5.11.2 of the project's approved Mine Permit Application (MPA) (Foth & Van Dyke, 1989).

The seasonally flooded wetland type proposed was selected to replace the same wetland types taken during mine development. The wetlands taken by the project had low to moderate wetland functions and values (see pages 160-161 of the MPA) and were present in five disconnected areas. The proposed design of the replacement wetland will produce a single seasonally flooded wetland of 8.5 acres. Approximately 4.5 acres will be flooded to a depth of 24-30 inches and 4 acres from 1-24 inches when fully recharged in the spring of the year. The rate of water loss through the base of the wetland has been calculated as ~0.17 inches per day based on a till permeability of 10^{-5} cm/sec. Simple evaporation from open water surfaces consumes approximately 30 inches per year and plant transpiration from regional marshlands has been measured at approximately 50 inches per year, principally in the mid-June to mid-September period. The above data indicate that the wetland will be typically inundated from early spring to mid-summer and substantially dry by late summer each year. The vegetation communities which develop are expected to occur as concentric zones. The core which remains flooded longest will be dominated by obligate wetland species with the edge zones supporting both obligate and facultative wetland species. The U.S. Army Corps of Engineers reference manual (USCOE, 1987) defines wetlands as having equal to or greater than 50% obligate and facultative wetland plant species and water inundation for 21 days or more during the growing season. The proposed wetland is expected to meet these criteria.

Water sources for the proposed 8.5-acre wetland are discussed in Section 3.2.2.2. The outlet for the wetland is located near the northwest corner of the feature. The outlet will be graded to have an outfall elevation of 1136.0. The outlet will be reinforced and bioengineered to prevent downcutting and erosion during storms and periods of high seasonal runoff. The wetland outlet will direct water into a continuation of intermittent Stream A. A section through the wetland area is shown in Figure 7. The wetland will be constructed by excavating the area to subbase grades. Areas where coarse grained permeable soils are encountered will be over excavated by 1 foot and one lift of recompacted on-site tills will be installed. A 12-inch lift of topsoil from the topsoil stockpile will be placed over the prepared subbase. A minimum of 1 inch of hydric soils will be placed over the topsoil to provide wetland species seeds and propagules. The source of the hydric soils will be the hydric soil stockpile or the hydric soils salvaged from the 1.0-acre wetland test plot.

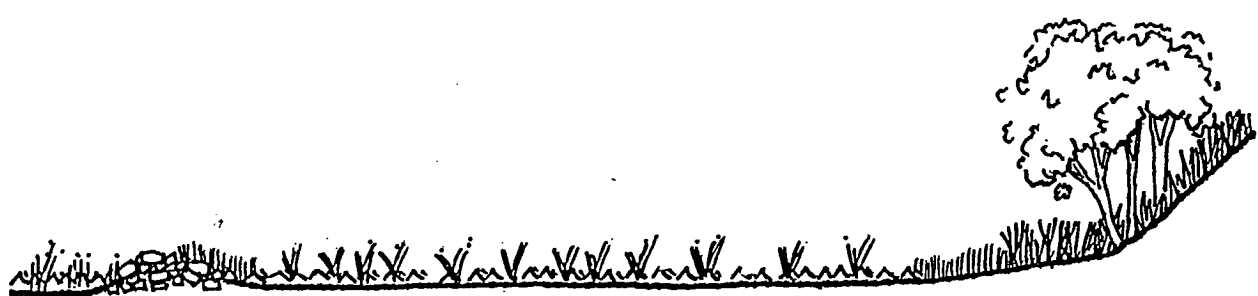
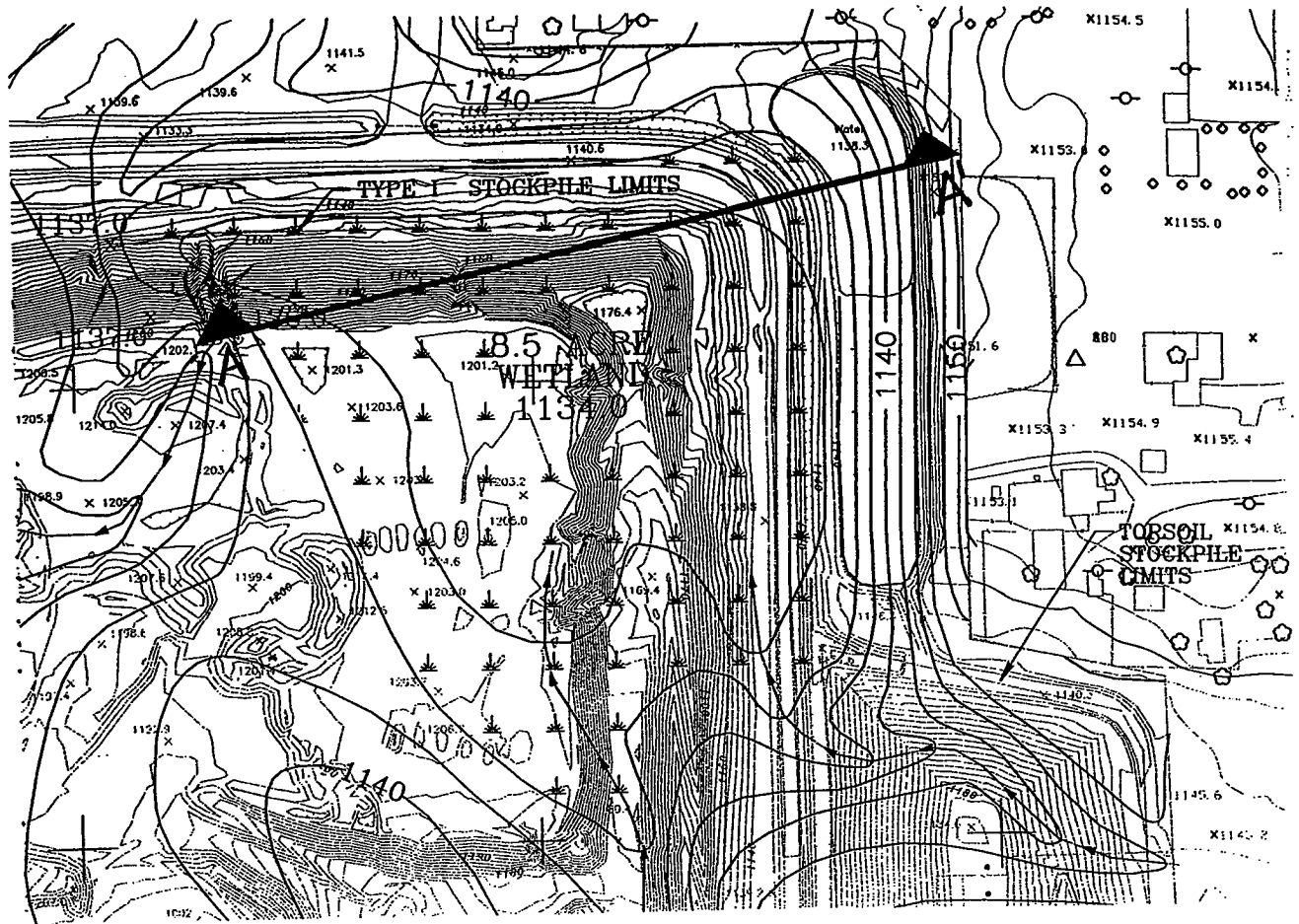
The 1.0-acre wetland test plot will be incorporated into the 8.5-acre wetland by salvaging the hydric soil currently in-place in that location. The subbase will then be excavated and the north and east slopes regraded to a very gently sloping 10-20:1 grade to minimize erosion potential. The subbase for the 1.0-acre wetland test plot will be integrated into the remainder of the 8.5-acre replacement wetland.

3.4 Miscellaneous and Ancillary Facilities

In addition to the surface reclamation plan adjustments discussed above, Flambeau is proposing to add or leave the following additional miscellaneous ancillary facilities in place.

- A light-duty accessway will be constructed to allow intermittent access to groundwater monitoring wells and vegetation monitoring sites.
- Fencing will be retained around the industrial outlot area and the H&H Haulers area. All other fencing will be removed following reclamation and receipt of the certificate of completion from WDNR.
- The power supply to the mine site will be retained to service the industrial area and to provide power to the vicinity of the west pit wall for use during monitoring.
- To provide access to the topsoil stockpile, the visitor's center building will be relocated. The visitor's center parking lot will be retained until the end of the summer of 1998, at which time a decision will be made whether to remove it or to keep it in place as parking for access to a potential hiking trail. The final resolution of the parking lot will be discussed with WDNR before any decisions are made.
- The H & H Haulers concrete block building is proposed to be retained by Flambeau as a place to store monitoring and various site maintenance equipment and supplies. This facility will be fenced to enclose a small outlot of approximately 150 x 258' (~0.89 acres).

Figure 7. Plan and Section Through 8.5 Acre Mitigation Wetland in Northern Watershed
(Not to scale).



SECTION A-A'

4 REVEGETATION PLANS

As part of its planning for surface reclamation Flambeau evaluated the approved revegetation plan described in the project's MPA and considered the results of data collected from planned on-site test plot work and advances in the science since the original revegetation plan was developed. The evaluation has resulted in the development of a series of refinements to the original revegetation plan. A discussion of these refinements is presented below.

4.1 Test Plots

Flambeau installed two sets of prairie test plots in 1993 and the 1.0-acre wetland test plot in 1991 in order to test site-specific reclamation strategies, seed mixes, and various management options. The purpose was to assess combinations of management strategies and native plant species most applicable for the Ladysmith area which is in the tension zone between drier prairie/savanna associations to the south and the northern forest biome. Pre-mine studies had documented elements of both biome types on site. Final land reclamation would depend on site-specific data which addressed both biome types.

The prairie test plots were established with variations of seed mixes, fertilization strategies, and various management options of mulching and mowing tested side by side in a randomized plot design. The wetland test plot was constructed in 1991 using stored mine site hydric soils and then hand planted with selected desirable native wetland species.

Monitoring data collected from the prairie test plots varied from year to year due to climatic variation and successional processes. However, by years three and four, clearly discernible results were evident. First, the two seed mixes performed comparably. Native grasses all established populations, but only half the seeded forbs grew and survived to establish populations. Neither mulching nor mowing affected the native species, but native grasses performed best with no fertilizer of any type. A very slight beneficial effect of organic fertilizer on prairie forbs was seen. Some prairie test plots were extensively invaded by cool season agronomic grasses after 4 years. The south group of test plots were considerably less successful than the north plots for no discernible reason.

The wetland test plot monitoring data collected in 1995 and 1996 showed the robust occurrence and dominance by species not planted which apparently came from the hydric soil inoculation of the test plot. Importantly, sedge meadow areas with varied and unpredictable inundation frequencies developed the greatest diversity and cover values after 4 years. Perpetually flooded open water zones were much less diverse and productive.

From these monitoring data and related reclamation experience, it was concluded that:

- The prairie test plot data suggest little or no fertilizer is needed to start mesic grassland communities and that many perennial prairie forbs that thrive to the south and west failed on the Ladysmith site.
- Mowing and fertilization effects on native prairie species survivorship were less than expected.
- Neither fertilizer use nor extensive management improved species performance.
- The wetland test plot data suggested that persistent deeper water and steep basin side slopes acted as restrictions to development of high diversity. Deeper water areas were less diverse and productive than were areas flooded part of the year.
- The hands-off approach to management rather than micro-management of these resources was seen to be beneficial.

These conclusions have been used to refine the Flambeau surface reclamation plan in the following ways:

- Seed mixes for the grassland communities have been adjusted to use combinations of the most successful prairie species based on test plot work.
- Mowing, as needed, has been incorporated into the plan in lieu of management of the grasslands by periodic burning. The lack of deleterious impacts on the native species by mowing supports this concept as a means to protect the woodland areas from escaped fires.
- Extensive use of soil amendments such as fertilizers are not planned since test plot work showed they are not necessary.
- Wetland test plot data clearly show that a wetland mitigation area with lower water levels and lower frequency of flooding will produce a wetland association which is more diverse and productive and which more closely approximates the type of wetlands displaced by mining.
- Stockpiled hydric soils which were shown to be a rich source of seed and propagules have been specified for use in revegetating sedge meadow swales and biofilters in addition to the 8.5-acre replacement wetland.

4.2 Temporary Nursery

About 56 small trees were recovered from the site as it was developed for mining and moved to the temporary nursery. In addition, trees from a local nursery were purchased and planted in the temporary nursery in 1993 and 1995. There are approximately 600 trees that have grown appreciably and were generally 4'-9' tall specimens by 1997. These trees will be relocated during surface reclamation, especially to areas where tree screening or larger specimen trees are desired.

4.3 Community Types and Vegetation Associations

The approved revegetation plan includes three general plant community types (e.g., grasslands, forest/savanna, and wetlands). As shown in Table 1, for the approved plan, grasslands dominated the distribution of these communities over the site. With the addition of the industrial outlot to the surface reclamation plan, the distribution of plant community types will shift somewhat. This is also illustrated in Table 1, which shows that for the 1997 plan refinement, grasslands and forest/savanna community types have been reduced to compensate for the industrial outlot. It should be noted that initially about 50% of the industrial outlot area will be undeveloped. This area will be revegetated with grassland community types.

TABLE 1. COMPARISON OF 1989 AND 1997 RECLAMATION PLANS BY GENERAL PLANT COMMUNITY TYPES

Community Types	1989 Approved Plan		1997 Refined Plan	
	Acres	%	Acres	%
Grasslands	140	77	127	70
Forest/Savanna	32.5	18	13.5	7
Mitigation Wetlands	8.5	5	8.5	5
Industrial Outlot @ ~28 acres and the 4 acres of off-site rail spur *	0	0	32	18
TOTAL	181	100	181	100

*Includes grasslands within limits of the outlot.

Twelve vegetation associations within the specific community types referenced above have been identified as being appropriate for use at the site. These associations are as follows:

- A. **Wet Prairie or Moist Grassland.** An association of many prairie species well-adapted to high soil moisture conditions. Typically associated with water courses and edges of wetland with intermittent saturated conditions.
- B. **Constructed Swale.** A lower topographic area which persists moist during most of the year and grades into typical wet prairie areas. Often associated with stream courses.
- C. **Emergent/Aquatic.** Dominated by such species as wild iris and calamus and designed to be drought adapted and able to endure prolonged periods of inundation.
- D. **Upland (or Mesic) Grassland (prairie).** Dominated by perennial warm season Wisconsin-native grasses, this community is a complex association of grasses and forbs that prefers soils of moderate to lower water content.
- E. **Moist grassland.** Dominated by cool season sedges and grasses able to tolerate cool, wet springs and droughty midsummers.
- F. **Biofilter.** Specialized communities dominated by coarse native moist site species capable of filtering sediment and nutrients in stormwater runoff.
- G. **Soil Bioengineering.** A specialized plant community sited in stream courses and capable of resisting the erosive forces of moving water.
- H. **Sedge Meadow.** A category of moist-soiled depressional areas which is strongly dominated with sedge species, (*Carex* species).
- I. **Mesophytic Woodland.** A forest association generally found on north and east facing slopes, this association includes hemlock and sugar maple and is less tolerant of drought, high temperature or fire.
- J. **Dry Woodland.** A forest association generally found on the drier south and west facing slopes, this plant grouping includes such species as red oak and bur oak, that tolerate drought, higher ground temperatures and fire.
- K. **Erosion Control Cover.** Designed for very rapid germination and establishing control of erosional forces, this temporary ground cover of agronomic grasses will behave as annuals by showing rapid one year growth, but no persistence over time.
- L. **Industrial Outlot.** A native compatible community of aggressive native grasses designed for use in all industrial areas.

Table 2 identifies how the vegetation associations relate to the four community types planned for use at the site.

TABLE 2. COMMUNITY TYPES AND VEGETATION ASSOCIATIONS

Community Type	Vegetation Associations ¹
Grasslands	A, B, D, E, F, G, H
Forest Savanna	I, J
Mitigation Wetlands	A, C, H
Industrial Outlot/Rail Spur	K, L

¹Due to their nature, some vegetation associations pertain to more than one community type.

4.4 Planting Plans and Implementation

The general planting plans call for the planting of regraded areas with erosion-controlling plants and mulching soon after grading is completed. Plantings are to be limited to three windows, a spring seeding and transplant season (May 1 – July 1), an early fall seeding season (August 25 – September 15), and winter dormant seedings and transplant window (November 1 to freeze-up, or about November 20). Revegetation in the drier summer period will be avoided. Information regarding species selection by association and general installation methods are discussed below. Details regarding these topics are presented in the project specifications presented in Appendix C.

4.4.1 Species Selection By Vegetation Association

Figure 8 (Appendix A) shows the planned distribution of vegetation associations across the site. Upland ridges are generally devoted to woodlands with dry woodlands proposed for the drier, warmer, south and west-facing slopes, and mesophytic woodland for moister, cooler, north and east-facing slopes. Grasslands include moist grasslands, upland grasslands, temporary specialized erosion control plantings, and a unique aggressive native species community for use on the industrial outlot which is designed to resist tree and shrub invasions. Intermittent Stream bottoms, which are treated as a form of grasslands, will be stabilized with wet prairie, moist grasslands, sedge meadow, constructed swale and soil bioengineered associations. The soil bioengineering association is planned for use in streams at bends and at higher velocity sections. The sedge meadow association is planned for use in areas within the stream bottoms that will flood periodically.

The biofilter association will be used at the outlet for intermittent Streams A and B, and also at the outlet for surface water runoff originating within the industrial outlet. Various species will be installed in each biofilter depending upon the loading expected. Ultimately, the species mix in the biofilters could change over time depending on climatic conditions and, in the case of the industrial outlet, land use.

Wet prairie, sedge meadow and emergent/aquatic associations will be used in the 8.5-acre mitigation wetland. The emergent/aquatic association is the largest of the three, and is unique to the mitigation wetland.

Representative species lists for each vegetation association can be found in Appendix C. Final choice of individual species for each association will depend on availability and site specific assignments of plant materials. Supplemental seed has been collected in August through October 1997. Additional seed will be collected near the mine site during June through September in 1998 and 1999. Seeds and propagules will be harvested by routine methods: Use of collected materials will diversify the plantings, particularly wetland/upland transitional ecotones in order to blend the site into the local plant communities. All seeds and propagules collected and used will be recorded. These data will be supplied to WDNR in annual monitoring reports.

4.4.2 Seed And Tree Stock Sources, Including The Temporary Nursery

All wetland and prairie grass, sedge and herbaceous plants and seeds used on the site will be Wisconsin or Minnesota source materials except cover crops. Tree seedlings will come from upper midwest tree nurseries within 300 miles of the site. Tree seeds will also be collected within 50 miles of the site and distributed in upland communities to accelerate plant succession in reforested areas. Usable trees in the temporary nursery will be relocated to ecologically appropriate sites for permanent planting. Since these native trees are large specimens, they will be used where larger trees are appropriate.

Hydric soils from the wetland test plot (estimated at ~800 cubic yards) and the hydric soils stockpile (estimated at ~8,500 cubic yards) will be used during revegetation as a seed bank. The available quantity will be divided among the mitigation wetland, biofilters, and other wet site associations.

4.4.3 Topsoiling and Seedbed/Plantbed Preparation

Topsoil will be excavated from the stockpile and respread over the upland areas to a range of depths of 3-6 inches with 6-12 inches applied under specific wetland and biofilter community types. The industrial outlet will receive minimal or no topsoil. Generally, seedbeds will be prepared by limiting the compaction of topsoil during regrading. After topsoil is placed samples will be collected for analysis (see Section 4.4.5). Once in place, a friable seedbed will be prepared by disking and rotovating prior to drill, cyclone or hydroseeding. When hydroseeding or cyclone seeding are used, a three-step application will be followed with seed applied first, followed by dragging (or raking) to incorporate the seed, then mulching with tackifier applied in a third step. Amendments will be applied by cyclone spreader if needed.

4.4.4 Seeding and Planting Methods

As far as possible and safe, most unsloped grassland areas will be seeded by drilling of the specified plant species seeds, followed by mulching. The mitigation wetland and wet associations may be cyclone-seeded, drilled or hydroseeded (listed in the preferred order of method) depending on soil moisture levels. The method used in any given area will depend entirely on the weather and time available for stabilization.

4.4.5 Soil Testing, Fertilization and Mulching

As landforms are completed and topsoiled, soil samples will be taken and analyzed for pH, cation exchange capacity, N-P-K levels, and percent organic matter. These data will be used to establish appropriate amendment levels as needed for planting. Based on results of the prairie test plots, it is anticipated that little or no fertilizer will be prescribed, except enough nitrogen to start nurse crops and slow release fertilizer pellets or spikes for trees, applied in the year after transplanting.

Straw mulch will be crimped in place using a disc. Hydroseed mulches will be tacked with guar gum. Chips and bark stored on the site will be distributed and incorporated in areas to be forested. These woody materials are expected to provide sources of mycorrhizal symbionts for trees.

4.5 Integration Into the Established Local Landscape

The reclaimed mine site will be a part of the northern Wisconsin landscape. The revegetation goal is to create a system with plant communities that integrate with other local plant communities. How this will be achieved and how plantings and landscapes were chosen to further this goal are discussed below.

NR 132, Wis. Admin. Code, and ss 293, Wis. Stats., were predicated on the idea of using native species as the basis for surface reclamation, as has been incorporated into this plan. Rusk County's plant communities are part of a major transition (ecotone) between the typically dry-site prairies of nearby Jackson and Clark counties to the south and the typical northern forests of the counties to the north and west with many discrete small wetlands where drainage is poor. The land forms of the area are varied, but include the typical pitted glacial outwash and rolling topography which the grading plan seeks to duplicate. Along the Flambeau River, nearby lands drop from about 30 - 60 feet above the river into the glacially-incised Flambeau River channel. Many perched small wetlands occur in loess and clay deposits on the table lands above the river and in association with seeps along the river's banks.

The natural areas include remnants of second growth forests, grassland and wetland communities altered significantly by invasions of alien plant species. For example, many local wetlands are infested by alien reed canary grass (*Phalaris arundinacea*), grasslands with tall fescue (*Festuca elatior*), European brome grass (*Bromus inermis*), many herbaceous aliens, and woodlands with tartarian honeysuckle (*Lonicera tartarica*). Although these and other aggressive alien species will not be planted on the mine site and reasonable strategies will be employed to favor native species, it is inevitable that alien and

some local native species not planted will invade and establish populations on the reclaimed site. In part, these plant invasions are the predictable result of natural succession. The invasions of undesirable alien species can be limited with careful soil preparation, judicious use of herbicides and seed and plants free of alien seed sources. Because mine sites are essentially places of primary plant succession, the success of reclamation and alien invasion rates are strongly dependent on the species planted and the replanting techniques employed on a site.

In the long term (> 50 years), certain plant species invasions are inevitable and predictable. The common aggressive aliens like reed canary grass will establish in the wetland on the site from nearby upgradient areas. In general, grasslands will tend to be invaded by trees through in-seeding from adjacent sources. Early successional tree species such as aspens (*Populus spp.*), red maple (*Acer rubrum*), American basswood (*Tilia americana*) with wind disseminated seeds will arrive and establish within a decade or two in both replanted forests and grasslands. Other slower growing species such as oaks (*Quercus spp.*) and hemlock (*Pseudotsuga canadensis*) will take longer to invade but will eventually become the dominant species.

Fire frequency and regional climate will likely determine the time required for the grasslands to convert to forestlands and the specific type of forests that become established on the site. Similarly, the extent of wetlands and the specific dominant vegetation in these areas will be influenced strongly by fire frequency, temperature and rainfall patterns of the future. Early in the natural successional process the site should have exceptional wildlife values, particularly for the hunted species (deer and grouse) owing to its ecotonal nature. Wildlife species will change over time. There is every reason to expect that the site will no longer be easily recognizable as a mine site within 50 years, and possibly much sooner. These processes should result in a seamless transition from the site to the surrounding area.

4.6 Monitoring

Section 5.11.4.8 of the project's approved reclamation plan in the MPA includes a discussion of vegetative monitoring. Flambeau is suggesting the following refinements to clarify monitoring techniques and standards as related to diversity, survivorship of woody plant stock, wildlife habitat, wetlands, and biomass.

4.6.1 Diversity

The specific methodology to measure diversity is not specified in the approved monitoring plan. Therefore, the following refinement for the measurement of diversity is proposed.

Timed-meander searches will be conducted for each restored community. This technique measures diversity of each community type. These data and the quadrat percent cover data will be used to compile species lists by community type. Each community type, except the industrial outlot shall have at least 15 native volunteer or planted species, at a 90% statistical confidence level, present at the time of certificate of completion.

4.6.2 Survivorship of Woody Plant Stock

The measurement for success for woody plant stock is unclear as written in the approved plan. Flambeau proposes that the second sentence of the discussion under the description of "Survivorship of Woody Plant Stock" on page 175 of the MPA be refined to read as follows: "Trees and shrubs present will number no less than 80 percent of the total number of trees and shrubs planted, using established transects, and show signs of vigor and health."

4.6.3 Animal Species Monitoring

The approved reclamation plan specifies the use of Habitat Evaluation Procedures (HEP analysis) to assess overall wildlife habitat. Since the plan was prepared in 1989, the weakness and limits of HEP techniques have been documented, especially the fact that HEP is typically targeted to the habitat of single species. Given this fact, the HEP analysis is not appropriate for the stated monitoring goal. Therefore in lieu of the HEP analysis, Flambeau proposes that representative areas of each community type will be evaluated as described below for animal use and re-colonization focusing on small mammals and birds.

Birds.

- During June of years when monitoring is conducted, larger more homogeneous units of each community type will be sampled using point-plot bird species census techniques (Reynolds et al. 1980). This technique is similar to the vegetation timed-meander search discussed above except that bird species are recorded when seen or heard during timed searches in specific community types. Species occurrence and relative abundance are recorded during the timed searches.

Small Mammals.

- During the fall of years when monitoring is conducted, traplines of snap traps will be laid out for four successive 24 hour periods along the vegetation transects in the upland community types, or around the edges of the wet sites. A total of 250 snap traps will be set each year for four nights giving a trap sample size of 1,000 trap-nights/year.

4.6.4 Wetlands

Diversity will be measured and reported as identified in 4.6.1; no additional methods will be used.

4.6.5 Biomass

Previous prairie test data suggested biomass sampling provides no additional information on plant community development compared to the methods proposed under 4.6.1 and percent cover measurements currently required in the permit. Data from test plots documented weedy species were measured and contributed to high levels of biomass.

4.7 Long Term Management

As discussed in Section 4.4.1 the overall succession of the vegetation at the reclaimed site will be to forestland. In light of this fact, controlled burning of grasslands for 10 years is inconsistent with the overall revegetation goal. As a result, Flambeau proposes to delete controlled burning as a management tool from the approved reclamation plan.

5 REFERENCES EXAMINED AND CITED

Foth and Van Dyke. 1989. Mining Permit Application for the Flambeau Mine, Ladysmith, Wisconsin.

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Kotar, J. and T. Burger. 1995. A Field Guide to Forest Communities and Site Types of Southern Wisconsin - The Habitat Type Approach. Region 6 [St. Croix, Pierce, Dunn, Chippewa, Eau Claire, Pepin, Buffalo, Trempealeau and Jackson Counties]. Draft final report, Department of Forestry, University of Wisconsin-Madison,

Murphy, J. 1996. 1996 Annual Reclamation Report - Flambeau Mining Company.

Reynolds, R. T., J. M. Scott and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82:309-313.

U.S. Army Corps of Engineers. Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

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Keninecott
Minerals

**Supplement to Surface Reclamation Plan Meeting
December 18, 1997, 7:30 - ~9:30 AM**

Agenda

Location: Wisconsin Dept. of Natural Resources, 101 South Webster St., GEF II, Room 324

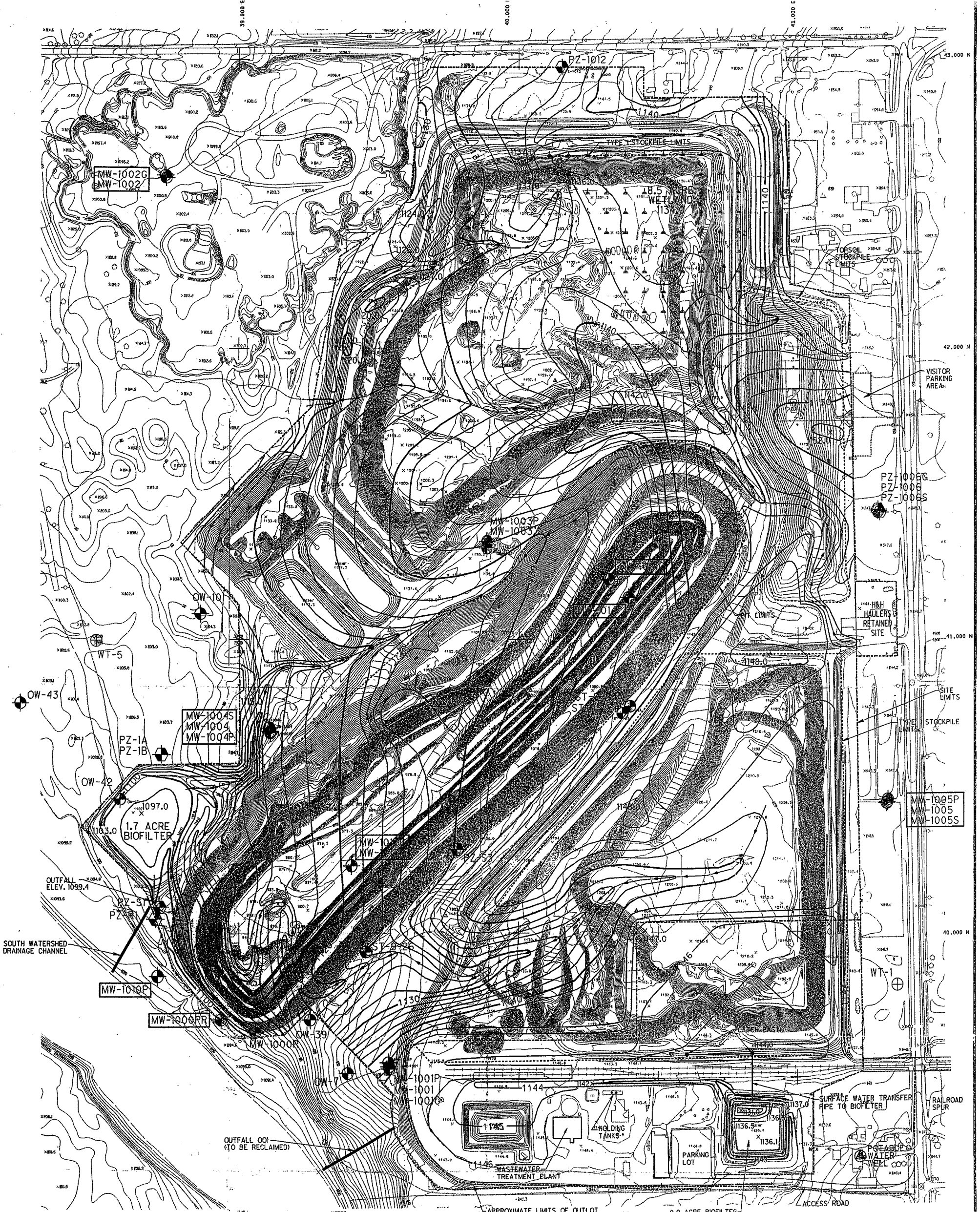
Participants: WDNR: Larry Lynch, Tom Portle, Ken Markart (via phone)
Flambeau: Jeff Earnshaw, Jana Murphy, Richard Dachel
AES: Steve Apfelbaum, Carl Korfmacher

Topics for Discussion:

- I. Introduction
- II. Intent of "Supplement to Surface Reclamation Plan"
- III. Adjustments to 1989 Reclamation Plan
- IV. Reclamation Schedule
 - A. Fall 1997 Rough Grade
 - B. Winter/Spring 1998 Reclamation Schedule
- V. WDNR Review and Approval
- VI. Other Issues
QA/QC

Appendix A

Figures 1, 2, and 8



LEGEND

- EXISTING GROUND CONTOUR
- EXISTING SPOT ELEVATION
- DEPRESSION
- TREES AND/OR BRUSH
- EXISTING ROAD
- EXISTING BUILDING
- EXISTING FENCE
- MW-1003 MONITORING WELL
- MW-1005 WELL ON THE WATER QUALITY MONITORING PROGRAM
- PZ-S3 PIEZOMETER
- WT-5 WETLAND STAFF GAUGE
- POTABLE WATER WELL
- 1130 RECLAMATION CONTOUR (TOP OF 6" TOPSOIL GRADE)
- DRAINAGE SWALE

NOTES

1. SITE LOCATION THE NE 1/4 OF SECTION 9 T34N R14W, RUSA COUNTY, WISCONSIN.
2. TOPOGRAPHIC BASE MAP INSIDE DISTURBANCE LIMITS PREPARED FROM AERIAL SURVEY BY HORIZONS, INC., 3100 JET DR., RAPID CITY, SOUTH DAKOTA. DATE OF PHOTOGRAPH JULY 3, 1976. TOPOGRAPHIC BASE MAP OUTSIDE DISTURBANCE LIMITS PREPARED FROM AERIAL SURVEY BY SURDEX CORP., CHESTERFIELD, MISSOURI. DATE OF PHOTOGRAPH APRIL 24, 1970. ROADS, TREES AND BUILDINGS WERE UPDATED AS PER AERIAL PHOTOGRAPH TAKEN BY MARSHFIELD CORP., MINNEAPOLIS, MINNESOTA. DATE OF PHOTOGRAPH SEPTEMBER 14, 1987.
3. ELEVATIONS BASED ON MEAN SEA LEVEL DATUM. CONTOUR INTERVAL IS TWO FEET.
4. HORIZONTAL DATUM BASED ON PROJECT SITE GRID SYSTEM. SITE GRID COORDINATES CORRELATION TO STATE PLANE COORDINATES DERIVED AS FOLLOWS:

SITE GRID COORDINATES	STATE PLANE COORDINATES
40000 N =	587,357,800 N
40000 E =	1,713,536,329 E

 THE ANGULAR ROTATION FROM STATE PLANE BEARINGS TO GRID BEARINGS IS 350°21'23" RIGHT WITH CONTROL POINT F-1 AS THE BASE POINT.

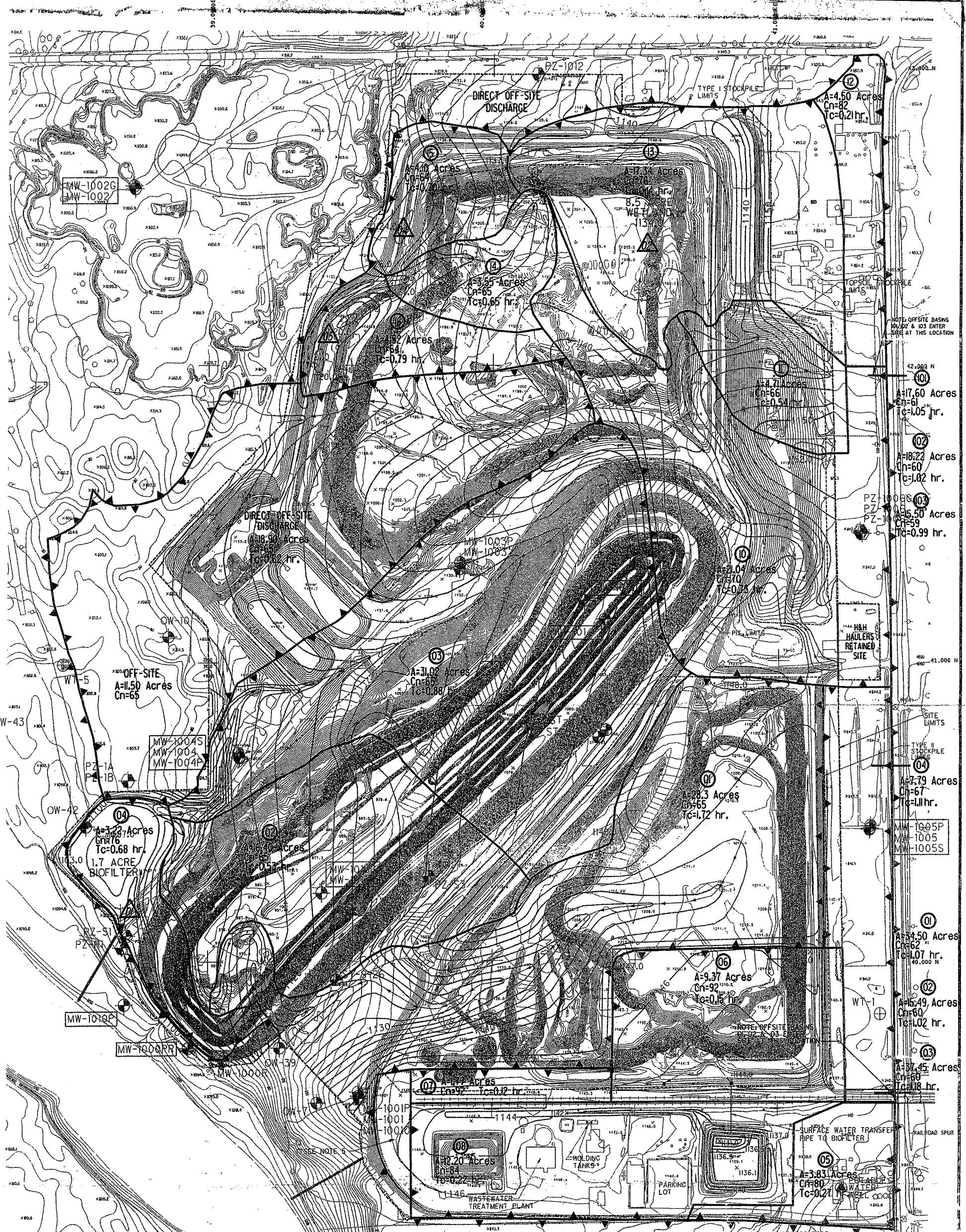


FLAMBEAU MINING COMPANY
 LADYSMITH, WISCONSIN
 FLAMBEAU MINE RECLAMATION
 GRADING PLAN

NOVEMBER 24, 1997 FIGURE 1 ABS #96-281



APPLIED ECOLOGICAL SERVICES
 1100 N. C. STREET
 WISCONSIN

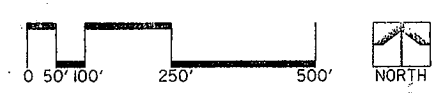


- LEGEND**
- EXISTING GROUND CONTOUR
 - EXISTING SPOT ELEVATION
 - DEPRESSION
 - TREES AND/OR BRUSH
 - EXISTING ROAD
 - EXISTING BUILDING
 - EXISTING FENCE
 - ⊕ MW-1003 MONITORING WELL
 - ⊕ MW-1005 WELL ON THE WATER QUALITY MONITORING PROGRAM
 - ⊕ PZ-53 PIEZOMETER
 - ⊕ WT-5 WETLAND STAFF GAUGE
 - ⊕ POTABLE WATER WELL
 - 1130 RECLAMATION CONTOUR
 - DRAINAGE SWALE
 - SUB-WATERSHED NUMBER
 - DETENTION BASIN NUMBER
 - Cn RUN-OFF CURVE NUMBER
 - A AREA IN ACRES
 - Tc TIME OF CONCENTRATION
 - WATERSHED DIVIDE

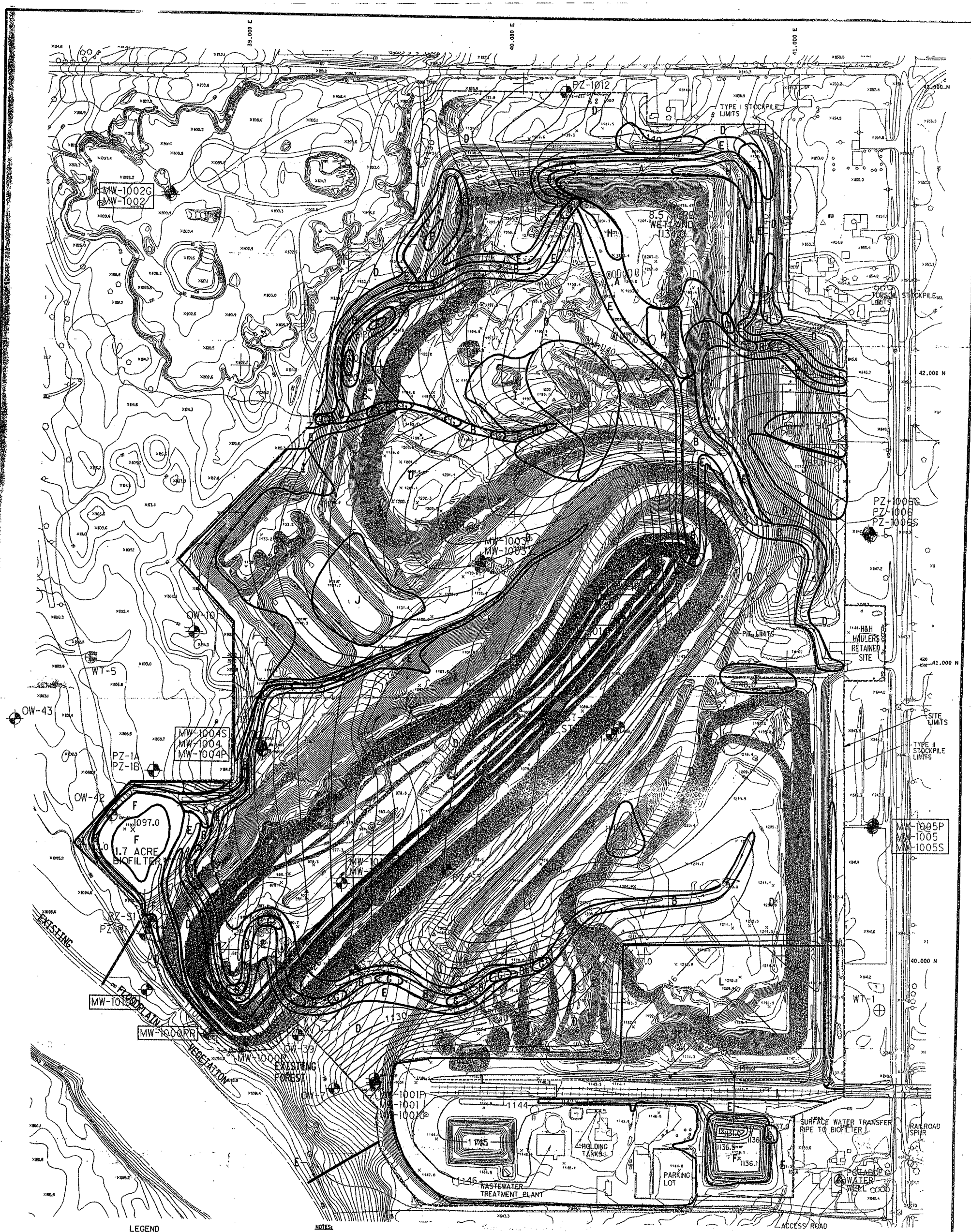
NOTES

1. SITE LOCATION THE NE 1/4 OF SECTION 9 T34N, R10W, N28E COUNTY, WISCONSIN.
2. TOPOGRAPHIC BASE MAP WEDGE DISTURBANCE LIMITS PREPARED FROM AERIAL SURVEY BY HORIZONS, INC., 3500 IET DR, RAPID CITY, SOUTH DAKOTA, DATE OF PHOTOGRAPH JULY 3, 1996.
3. ELEVATIONS BASED ON MEAN SEA LEVEL DATUM. CONTOUR INTERVAL IS TWO FEET.
4. HORIZONTAL DATUM BASED ON PROJECT SITE GRID SYSTEM. SITE GRID COORDINATES CORRELATION TO STATE PLANE COORDINATES DERIVED AS FOLLOWS:
 SITE GRID COORDINATES STATE PLANE COORDINATES
 40000 N 587,357.8087 N
 40000 E 1,713,516.1229 E
 THE ANGULAR ROTATION FROM STATE PLANE BEARINGS TO GRID BEARINGS IS 23° 23' 23" RIGHT WITH CONTROL POINT #1 AS THE BASE POINT.

5. THIS PORTION OF THE INDUSTRIAL OULET DRAINAGE BASIN IS NOT INCLUDED IN BASINS 01 AND 02. WATER FROM THIS AREA WILL ALSO FLOW TO THE SOUTHERN WATERSHED BIOFILTER.



FLAMBEAU MINING COMPANY		APPLIED ECOLOGICAL SERVICES I N C. <small>1996 STATE ROAD P.O. BOX 296 14001 10th Street, Rapid City, SD 57701</small>
LADYSMITH, WISCONSIN		
FLAMBEAU HMB RECLAMATION DRAINAGE PLAN		
NOVEMBER 24, 1997	FIGURE 2	ABS 996-281



LEGEND

- EXISTING GROUND CONTOUR
- EXISTING SPOT ELEVATION
- DEPRESSION
- TREES AND/OR BRUSH
- EXISTING ROAD
- EXISTING BUILDING
- EXISTING FENCE
- ⊕ MW-1003 MONITORING WELL
- ⊕ MW-1005 WELL ON THE WATER QUALITY MONITORING PROGRAM
- ⊕ PZ-S3 PIEZOMETER
- ⊕ WT-5 WETLAND STAFF GAUGE
- ⊕ POTABLE WATER WELL
- 1130 RECLAMATION CONTOUR
- DRAINAGE SWALE

NOTES

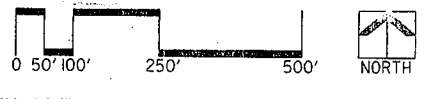
1. SITE LOCATION THE NE 1/4 OF SECTION 9 T54N, R5W, T63E, COUNTY, WISCONSIN.
2. TOPOGRAPHIC BASE MAP INSIDE DISTURBANCE LIMITS PREPARED FROM AERIAL SURVEY BY HORIZONS, INC., 3600 JET DR., RAPID CITY, SOUTH DAKOTA, DATE OF PHOTOGRAPH JULY 3, 1996. TOPOGRAPHIC BASE MAP OUTSIDE DISTURBANCE LIMITS PREPARED FROM AERIAL SURVEY BY SURVEY CORP., ORESTON, IOWA, DATE OF PHOTOGRAPH APRIL 24, 1970. ROADS, TREES AND BUILDINGS WERE UPDATED AS PER AERIAL PHOTOGRAPH TAKEN BY HARRIGARD CORP., MINNEAPOLIS, MINNESOTA, DATE OF PHOTOGRAPH SEPTEMBER 14, 1997.
3. ELEVATIONS BASED ON MEAN SEA LEVEL DATUM. CONTOUR INTERVAL IS TWO FEET.
4. HORIZONTAL DATUM BASED ON PROJECT SITE GRID SYSTEM. SITE GRID COORDINATES CORRELATION TO STATE PLANE COORDINATES DERIVED AS FOLLOWS:

SITE GRID COORDINATES	STATE PLANE COORDINATES
40000 N	587,337.8168 N
40000 E	1,723,535.1229 E

THE ANGULAR ROTATION FROM STATE PLANE BEARINGS TO GRID BEARINGS IS 39°-13'-23" RIGHT WITH CONTROL POINT 1-1 AS THE BASE POINT.

VEGETATION LEGEND

- | | | |
|--------------------------------------|------------------------|-------------------------------------|
| A WET PRAIRIE | G SOIL BIOENGINEERING | J DRY WOODLAND |
| B CONSTRUCTED SWALES | H SEDGE MEADOW | K EROSION CONTROL COVER (AS NEEDED) |
| C EMERGENT/AQUATIC ZONE | I MESOPHYTTIC WOODLAND | L INDUSTRIAL OUTLOT |
| D UPLAND GRASSLAND (MESIC GRASSLAND) | | |
| E MOIST GRASSLAND | | |
| F BIOFILTER | | |



FLAMBEAU MINING COMPANY

LADYSMITH, WISCONSIN
 FLAMBEAU MINE RECLAMATION
 PLANTING PLAN

NOVEMBER 14, 1997

FIGURE 8

AES #96-181

APPLIED ECOLOGICAL SERVICES



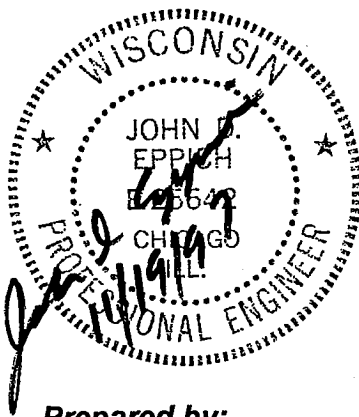
Appendix B

**Surface Water Analysis
Flambeau Mine Reclamation
Ladysmith, Wisconsin**

SURFACE WATER ANALYSIS

FLAMBEAU MINE RECLAMATION

LADYSMITH, WISCONSIN



Prepared by:

John D. Eppich, P.E.
for
Applied Ecological Services, Inc.
Brodhead, Wisconsin
Revised: November 19, 1997

Prepared for:

Flambeau Mining Company
Ladysmith, Wisconsin

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INTRODUCTION

The tributary area for the Flambeau Mine site which will be reclaimed as a combination of wetlands, prairie, and meadows is limited and is expected to provide only marginal stormwater runoff to support wetland vegetation in the reclaimed area. This analysis will therefore focus on the reclaimed area hydrology and hydraulics and will define the runoff expectations for the area tributary to the reclaimed natural area. The southeastern 23.4 acres of the site (outside of the reclaim area) is proposed to be developed. This area is tributary to Stream C, so analysis of the major storm runoff rates in Stream C after the area would be fully developed were also required. All streams included in this analysis are intermittent systems. The Flambeau River is not addressed in this analysis.

Existing Conditions

The general tributary area for the Flambeau Mine is shown on the General Area Map (Figure 1). The Map shows that the natural land use area is planned to be divided into north and south sections, with similar topography to that which existed prior to commencement of the mining operations. Each section will include a stream which will be routed through the section to distribute water to and collect excess runoff from the sub-areas within the section and to also convey water through the section.

Approximately 138.7 acres east of Highway 27 is tributary to the site; 51.3 acres now flows into the northern area of the site through a 24-inch culvert under Highway 27 and 87.4 acres flows into the southeastern corner of the site through a 30-inch culvert under Highway 27 as shown on the Figure in Appendix A. The flow to the southeastern corner of the site is presently ditched to the southern boundary of the site. Land use for the offsite tributary area is open woods and meadow except for the frontage along Highway 27 which has low density residential and commercial development.

Hydric soil from the mine area is being stored at the southwestern corner of the site in a temporary wetland area. An outlet structure (Figure 1), which includes a rip-rapped channel, is an outlet point into the Flambeau River. This structure also includes a rectangular opening 3.5 feet wide and a V-notch weir within the opening. The bottom of the rectangular opening is at elevation 1099.15 and the top of the opening is at elevation 1100.9. The bottom of the V-notch is presently set at elevation 1099.4.

A wetland was also constructed at the northeastern corner of the mine site during the development of the mine. Runoff from 51.3 acres of the offsite tributary area east of Highway 27 and 13 acres within the mine site property (including the wetland) is presently routed through this wetland using an adjustable diversion structure. A ditch has been routed around the north and west sides of the mine property to convey water from the wetland. This water presently is discharged to an existing offsite gravel pit.

Proposed Conditions

The reclaimed Flambeau Mine site is planned to be reconstructed with a central ridge, which will divide the site into north and south drainage areas similar to that which existed prior to the mining operation. Channels will be constructed through both the north and south drainage areas to convey stormwater runoff both from the offsite area east of Highway 27 and the runoff from the site through the reclaimed area. The south channel will discharge into a 1.7 acre biofilter wetland at the southwestern corner of the reclaimed area. Overflow from this biofilter will be routed to the Flambeau River using the 002 route (Figure 1). The north channel will route offsite runoff first into a 8.5 acre mitigation wetland and then to intermittent stream A at the western boundary of the Flambeau Mine site (Figure 1). The southeastern part of the site (not included in the reclaimed area) will be developed and graded as a separate tributary area; its drainage will not be routed through the reclaimed site, but will be routed into Stream C from a biofilter/detention basin. Tributary areas for the Flambeau Mine reclamation area are shown in the Drainage Area Map (Appendix A) for the onsite sub-areas and the offsite tributary areas.

Within the north section of the reclaimed area, several small depressed areas will be constructed and vegetated as sedge meadow or wet prairies. Approximately 1.5 acres of the site will be used for these depressed retention areas. Depressional storage will provide a supply of water for this vegetation during dry periods. The sources of this supply will be:

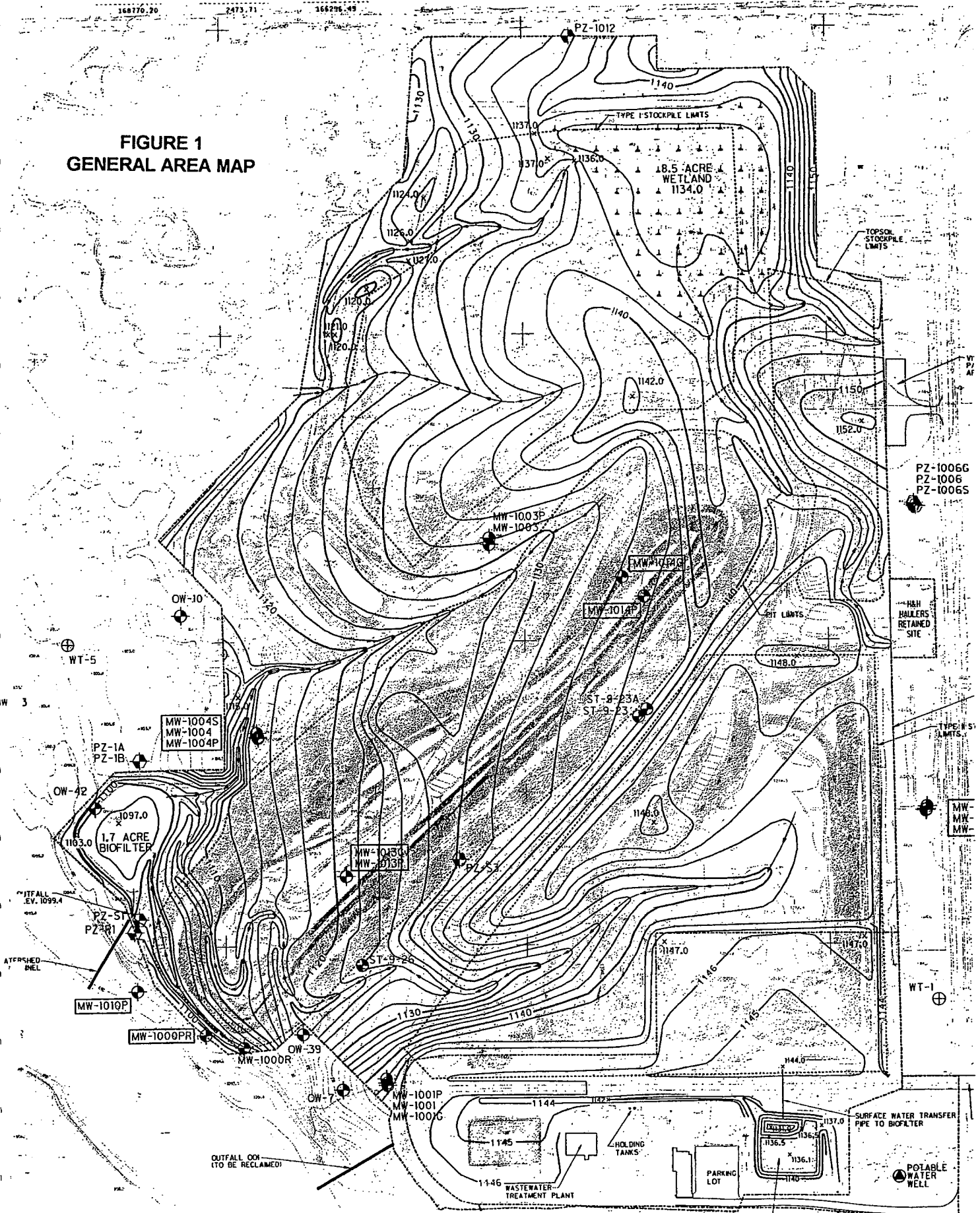
- snow melt
- rainfall runoff from areas tributary to the depressions
- flow diverted from the north channel

Runoff from 78.9 acres within the reclamation area will be tributary to the south biofilter. The 87.4 acres of offsite tributary area which presently drains to the site through the 30-inch diameter culvert under Highway 27 will continue to be routed in its present drainage pattern in Stream C and will not be diverted to the reclamation area.

The 111.1-acre area tributary to the north channel includes 51.3 acres from east of Highway 27, 45.8 acres of the reclaimed mining site and 14.0 acres from offsite areas northeast of the site and west of Highway 27. Nine acres of the area tributary to the north channel will be first routed through depressional storage areas. These northern depressional storage areas will retain the normal rainfall runoff.

Two wetland areas are proposed within the reclamation area which will require a water supply. At the northeast corner of the site, the existing wetland will be enlarged, relocated, and lowered to provide the necessary mitigation wetland area. The proposed wetland area will be 8.5 acres below the proposed overflow elevation of 1136. The wetland will benefit from a lowered elevation by the additional 5 acres of offsite tributary area which can be routed to a lowered wetland. The northeast mitigation wetland will be constructed to a control water level at elevation 1136.0; its overflow is proposed to be regulated by a 10-foot long earthen overflow weir located at the western edge of the wetland (Appendix C). At the southwestern corner of the site, the present hydric soils stockpile area will be regraded as a 1.7-acre biofilter with a normal water elevation of 1099. Excess water from this biofilter will be discharged through the existing

**FIGURE 1
GENERAL AREA MAP**



overflow structure located on the south edge of the present hydric soils stockpile area. The V-notch weir system will be retained, with the plate modified to lower the normal water elevation to 1099.0. Discharge - stage - storage volume relations for the southwestern biofilter are tabulated in Appendix C.

Drainage from the future industrial area of the Flambeau Mine property (south of the reclaimed area) will be conveyed to the existing surge pond at the east side of the site. This surge pond will be reconstructed as a biofilter/detention basin, to improve the water quality and decrease the peak flow rates of runoff from the developed area prior to its discharge into Stream C.

METHODOLOGY

Hydrologic Model

The hydrologic model, Technical Release No. 20 (TR-20) was used to evaluate the surface water flows for the proposed reclamation area. TR-20 was developed and is supported by the United States Soil Conservation Service. Several rainfall events were evaluated in this analysis to define the stormwater runoff impacts and water supply availability for the reclaimed mine area. A rainfall event expected to occur once a year (one year design storm) was modeled to determine the expected water levels and storage which could be expected to occur once annually. Both 10-year and 100- year design storms were modeled to define the flooding effects of larger rainfall events on channel and overflow structure designs. A 2-year design storm was modeled to define water levels and storage for stream bankfull situations (natural stream channels typically flow full while carrying runoff from a two-year flood event). Finally, 1-inch and 1.5-inch rainfall events were modeled to define the available water from the smaller storm events which would be expected to occur frequently during the year. For the smaller rainfall events, some interpretation of the output data (Appendices E and F) was necessary, since the model gave occasional inconsistent results with the smaller rainfall values.

Rainfall Parameters

Rainfall events were modeled for twenty-four hour duration storms. The rainfall values for these events were obtained from the United States Weather Bureau's Technical Paper 40. This document defines the rainfall amounts for the Ladysmith area as shown in Table 1.

Table 1
24 Hour Storm Rainfall Amounts

<i>Storm Frequency</i>	<i>Rainfall Amount</i>
1 yr.	2.3 inches
2 yr.	2.7 inches
10 yr.	4.0 inches
100 yr.	5.6 inches

The rainfall was modeled using a Type II distribution of rainfall over the 24 hour storm period, consistent with the recommendations for TR-20 use in Midwestern states.

Tributary Area Parameters

The predominant soil types in the tributary area were shown in the "Surface Water Management Plan" (Foth and Van Dyke, 1991) to be classified as Type B soils by the United States Soil Conservation Service. The runoff coefficients for the type B soils as used in this analysis are tabulated below for the different land uses within the tributary area.

Table 2
TR-20 Model - Runoff Coefficients

<i>Land Use</i>	<i>Runoff Coefficient (Cn)</i>
Woods/Grass	60/65
Pond	98
Roadway and Pavement	98
Meadow	58
Agriculture	81
Developed	92

Concentration times for the stormwater runoff from the various tributary areas were calculated according to the methodology defined in the Soil Conservation Service Technical Release No. 55 (Appendix B). Tributary areas were quantified by planimeter measurement made on the proposed grading plan. The areas, concentration times (Tc), and the runoff coefficients for the various tributaries within and draining into the Flambeau Mine site are shown on the Drainage Area Map in Appendix A.

The depressional areas which will be planted as sedge meadows or wet prairie will typically retain up to 1-foot of water before beginning to overflow. The retained water will primarily be runoff from the sub-area tributary to the depression. Outflow from the depressional areas above the retention volume was modeled as discharge from a

trapezoidal Cipolletti weir. The weir lengths, storage volumes and discharges for each of the depressional areas are shown in Appendix C.

Stream Channel Capacity

Hydraulic capacities of the stream channels were calculated using the Manning's equation for open channel flow. A ten-foot wide channel was used in the calculations consistent with the expected stormwater discharges through the system. The slope of the south channel varies from slightly less than 1 percent at the eastern beginning of the channel to 1.5 percent at the discharge to the wetland. The elevation of the north channel bottom varies from 1136.0 at the outlet from the northeast wetland to 1120 at the western boundary of the site where the channel connects with intermittent Stream A. The slope of the north channel bottom varies from 1.5 percent at the wetland outlet to 0.5 percent at the western outlet. The Manning's n value used in the calculations for both the north and south channels was 0.035 to reflect the grassed nature of these channels in the reclaimed area.

The calculated hydraulic capacities for both the north and south channels with various depths of flow are included as Appendix B.

The north channel is designed to partially divert larger flows into the depressional areas. This diversion will begin when the water depth in the channel is 0.5 feet (between 11 and 17 cfs). The TR-20 model incorporates this diversion.

Snowfall Analysis

Snow melt in the spring will be required to contribute most of the water required for the sedge meadow vegetation in the depressional storage areas. This vegetation requires saturated soils during the spring growing season. The National Climatic Data Center maintains records of snow pack at Eau Claire, Wisconsin and Duluth, Minnesota (the closest sites to Ladysmith). Five years of record between 1990 and 1994 (Appendix G) were studied to determine expected water availability in the sedge meadow areas. The lowest spring snow pack in Duluth was 11 inches for the five-year time period between 1990 and 1994 and the lowest spring snow pack in Eau Claire was 8 inches during the same 5-year period. For the water analysis, eight inches of snow was assumed to be equivalent to 1.4 inches of moisture (interpolated from Figure 3 in "Estimating Water Equivalent Snow Depth from Related Meteorological Variables", National Oceanic and Atmospheric Administration, 1980).

RESULTS AND CONCLUSIONS

The results of the hydraulic and hydrologic analyses for the north and south areas of the Flambeau Mine reclamation site are discussed separately. Both the north and south areas include a conveyance channel, biofilters, and offsite water release point as shown by Figure 1. Additionally, the north area includes three depressional areas. The detailed calculations supporting these results are included in the appendices at the end of this report.

North Area

The detailed results for the TR-20 model analysis of the north drainage area are included in Appendix E. Significant results from this analysis are discussed in the following sections.

Northeast Mitigation Wetland

The northeast mitigation wetland will be constructed with a surface area of 8.5 acres below the control water elevation of 1136.0. Table 3 shows the impacts of the various rainfall events on this wetland with the proposed grading plan.

Table 3

Northeast Mitigation Wetland Hydrologic Characteristics

<i>Rainfall Amount (inches)</i>	<i>Design Storm (year)</i>	<i>High Water Elevation</i>	<i>Maximum Discharge (cfs)</i>	<i>Water Volume Discharged (acre-feet)</i>
1.0	-	1136.00	0.1	0.1
1.5	-	1136.02	0.5	0.6
2.3	1	1136.09	2.3	2.4
2.7	2	1136.14	3.8	3.7
4.0	10	1136.40	10.7	9.6
5.6	100	1136.82	22.0	18.0

Depressional Areas

Locations for the northern depressional areas are shown on Figure 1 and shown with more detail in Appendix A. The rainfall amounts required to fill the depressional areas and the volumes of snowmelt water available (assuming an 8-inch spring snow pack as previously discussed) for the spring growing in these northern depressional areas are listed following in Table 4. The table shows that a 2.7-inch rain (2-year design storm) will be needed to fill both areas 4 and 5. The Table also shows that the melt from a snow pack of 8 inches will provide adequate moisture to inundate both depressional areas during the spring growing season as required for the planned depressional area vegetation.

Table 4

**North Drainage Area
Depressional Area Hydrologic Characteristics**

<i>Reservoir No.</i>	<i>Ponded Depth Below Overflow (feet)</i>	<i>Retention Volume Capacity (acre-feet)</i>	<i>Rainfall Required to Fill Reservoir (inches)</i>	<i>8" Snow Pack Equivalent Water Volume (acre-feet)</i>	<i>Tributary Area (Acres)</i>
4	1.0	0.05	2.7	0.48	4.10
5	1.0	0.16	2.7	0.53	4.52

Conveyance Channel and Offsite Release

Table 5 shows the peak discharges, water depths, and the volume of water discharged at the west end of the site into intermittent Stream A for the north area conveyance channel. The Table shows that no significant flow will be carried in the channel after either a 1-inch or 1.5-inch rainfall. The required channel capacity is 27.8 cfs to convey runoff from a 100-year design storm. With a 10-foot wide channel, the water depth for the 100-year design storm will be 0.83 feet. Thus, the 100-year design flow in the north channel is well within the capacity of the channel. The water velocity for the 27.8 cfs discharge in the north channel will be 2.36 feet per second which will not erode the channel if the channel vegetation is established as planned.

Table 5

North Channel Hydrologic Characteristics

<i>Rainfall Amount (inches)</i>	<i>Design Storm (year)</i>	<i>Maximum Discharge at the West Boundary (cfs)</i>
1	-	0.0
1.5	-	0.5
2.3	1	2.5
2.7	2	4.3
4.0	10	13.0
5.6	100	27.8

South Area

The detailed results for the TR-20 model analysis of the south drainage area are provided in Appendix F. Significant results from this analysis are discussed in the following section.

Southwestern Biofilter

The southwest biofilter will be constructed with an emergent area of 1.24 acres at the outlet discharge elevation of 1099 and a total biofilter area of 1.7 acres below elevation 1100. Table 6 shows the impacts of the various rainfall events on this biofilter for the proposed plan. The table also shows the water release rates from this biofilter to the Flambeau River for the various rainfall events using the existing outlet control structure with the modified V-notch weir previously discussed. Table 6 shows that no excess water will be provided for a 1-inch rainfall and that only a slight (0.2 acre-feet) excess of water will be discharged to the Flambeau River after a 1.5-inch rainfall event. The table also shows that the maximum discharge from the wetland after a 100-year rainfall event would be 48.0 cfs. The hydrologic analysis shows that the 1.7 acre biofilter proposed can be supported by the water supply available from the onsite tributary area to provide a high quality wetland. The analysis also shows that the proposed biofilter is properly sized for its tributary area.

Table 6

Southwest Biofilter Wetland Hydrologic Characteristics

<i>Rainfall Amount (inches)</i>	<i>Design Storm (year)</i>	<i>High Water Elevation</i>	<i>Maximum Discharge (cfs)</i>	<i>Water Volume Discharged (acre-feet)</i>
1.0	-	1099.00	0	0
1.5	-	1099.07	0.2	0.2
2.3	1	1099.44	1.1	1.6
2.7	2	1099.74	1.8	2.6
4.0	10	1100.60	9.2	6.9
5.6	100	1101.09	48.0	13.7

Conveyance Channel

Table 7 shows the peak discharges where the southern conveyance channel discharges into the southwest biofilter. The Table shows that no significant flow will be carried in the channel after a 1.5-inch rainfall and that a maximum flow of 72.9cfs will be conveyed in the south channel as it discharges into the mitigation wetland after a 100-year rainfall event. This 72.9 cfs flow will cause a water depth of 1.06 feet in the 10-foot wide channel which is also well within the capacity of the channel. The water velocity will be 4.51 feet per second in the channel (for a 100-year design storm) near the outlet and this velocity will not erode the channel if the channel vegetation is established as planned.

Table 7

South Channel Hydrologic Characteristics

<i>Rainfall Amount (inches)</i>	<i>Design Storm (year)</i>	<i>Maximum Discharge at the West Boundary (cfs)</i>
1	-	0
1.5	-	0
2.3	1	4.6
2.7	2	9.1
4.0	10	33.0
5.6	100	72.9

Stream C

Appendix H shows the TR-20 model results for the 10 and 100-year design storm events for the area tributary to Stream C above and including the discharge point from the proposed biofilter assuming the 23.4 acre area on the Flambeau site proposed for development becomes fully developed with an industrial land use. The Appendix shows that the conversion of the surge pond to a biofilter/detention basin will reduce the peak flows into Stream C from the 23.4 acre area from 126.1 cfs to 62.5 cfs for the 100-year design storm event and from 80.9 cfs to 36.7 cfs for the 10-year design storm event. The total peak flow in Stream C south of the surge pond outlet would be 89.9 cfs for the 100-year design storm and 48.4 cfs for the 10-year design storm after the completion of the developed construction with the total tributary area discharging into the Stream.

APPENDIX B-a

DRAINAGE AREA MAP

(See Figure 2 from report entitled "Supplement to the Reclamation Plan for the Flambeau Mine, Flambeau Mining Company, Ladysmith, Wisconsin, November 1997)

APPENDIX B-b

**NORTH AND SOUTH CHANNEL
CAPACITY CALCULATIONS**

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 02

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0147 ft/ft
Depth.....	0.10 ft

Computed Results:

Discharge.....	1.13 cfs
Velocity.....	1.07 fps
Flow Area.....	1.05 sf
Flow Top Width...	11.00 ft
Wetted Perimeter.	11.02 ft
Critical Depth...	0.07 ft
Critical Slope...	0.04 ft/ft
Froude Number....	0.61 (flow is Subcritical)

$$\text{slope} = \frac{1135.5 - 1124.5}{750} = 0.0147/\text{ft}$$

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 02

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0147 ft/ft
Depth.....	0.50 ft

Computed Results:

Discharge.....	17.87 cfs
Velocity.....	2.86 fps
Flow Area.....	6.25 sf
Flow Top Width...	15.00 ft
Wetted Perimeter.	15.10 ft
Critical Depth...	0.43 ft
Critical Slope...	0.03 ft/ft
Froude Number....	0.78 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 02

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0147 ft/ft
Depth.....	1.00 ft

Computed Results:

Discharge.....	63.32 cfs
Velocity.....	4.22 fps
Flow Area.....	15.00 sf
Flow Top Width...	20.00 ft
Wetted Perimeter.	20.20 ft
Critical Depth...	0.92 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.86 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 02

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0147 ft/ft
Depth.....	2.00 ft

Computed Results:

Discharge.....	247.27 cfs
Velocity.....	6.18 fps
Flow Area.....	40.00 sf
Flow Top Width...	30.00 ft
Wetted Perimeter.	30.40 ft
Critical Depth...	1.94 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.94 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 03, 04, 07

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0056 ft/ft
Depth.....	0.10 ft

Computed Results:

Discharge.....	0.70 cfs
Velocity.....	0.66 fps
Flow Area.....	1.05 sf
Flow Top Width...	11.00 ft
Wetted Perimeter.	11.02 ft
Critical Depth...	0.05 ft
Critical Slope...	0.05 ft/ft
Froude Number....	0.38 (flow is Subcritical)

Reach 3 = 150'
Reach 4 = 400'
Reach 7 = 250'

$$\text{Slope} = \frac{1124.5 - 1120.0}{800'} = 0.005625 \text{ ft/ft}$$

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 03,04,07

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0056 ft/ft
Depth.....	0.50 ft

Computed Results:

Discharge.....	11.03 cfs
Velocity.....	1.76 fps
Flow Area.....	6.25 sf
Flow Top Width...	15.00 ft
Wetted Perimeter.	15.10 ft
Critical Depth...	0.32 ft
Critical Slope...	0.03 ft/ft
Froude Number....	0.48 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 03,04,07

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope..	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0056 ft/ft
Depth.....	1.00 ft

Computed Results:

Discharge.....	39.08 cfs
Velocity.....	2.61 fps
Flow Area.....	15.00 sf
Flow Top Width...	20.00 ft
Wetted Perimeter.	20.20 ft
Critical Depth...	0.69 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.53 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: flambeau mine

Comment: north channel reach 03,04,07

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0056 ft/ft
Depth.....	2.00 ft

Computed Results:

Discharge.....	152.62 cfs
Velocity.....	3.82 fps
Flow Area.....	40.00 sf
Flow Top Width...	30.00 ft
Wetted Perimeter.	30.40 ft
Critical Depth...	1.50 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.58 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: north channel

Comment: 100 year flow at west boundary line

Solve For Depth

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0056 ft/ft
Discharge.....	27.80 cfs

Computed Results:

Depth.....	0.83 ft
Velocity.....	2.36 fps
Flow Area.....	11.80 sf
Flow Top Width...	18.33 ft
Wetted Perimeter.	18.50 ft
Critical Depth...	0.56 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.52 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: south channel

Comment: flambeau mine south channel

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0158 ft/ft
Depth.....	0.10 ft

Computed Results:

Discharge.....	1.17 cfs
Velocity.....	1.11 fps
Flow Area.....	1.05 sf
Flow Top Width...	11.00 ft
Wetted Perimeter.	11.02 ft
Critical Depth...	0.07 ft
Critical Slope...	0.04 ft/ft
Froude Number....	0.64 (flow is Subcritical)

$$\begin{aligned} \text{Reach} &= 600' \\ \text{slope} &= \frac{1109 - 1097.5}{600} = 0.0158 \end{aligned}$$

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: south channel

Comment: flambeau mine south channel

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0158 ft/ft
Depth.....	0.50 ft

Computed Results:

Discharge.....	18.53 cfs
Velocity.....	2.96 fps
Flow Area.....	6.25 sf
Flow Top Width...	15.00 ft
Wetted Perimeter.	15.10 ft
Critical Depth...	0.44 ft
Critical Slope...	0.03 ft/ft
Froude Number....	0.81 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: south channel

Comment: flambeau mine south channel

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0158 ft/ft
Depth.....	1.00 ft

Computed Results:

Discharge.....	65.65 cfs
Velocity.....	4.38 fps
Flow Area.....	15.00 sf
Flow Top Width...	20.00 ft
Wetted Perimeter.	20.20 ft
Critical Depth...	0.94 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.89 (flow is Subcritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: south channel

Comment: flambeau mine south channel

Solve For Discharge

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0158 ft/ft
Depth.....	2.00 ft

Computed Results:

Discharge.....	256.35 cfs
Velocity.....	6.41 fps
Flow Area.....	40.00 sf
Flow Top Width...	30.00 ft
Wetted Perimeter.	30.40 ft
Critical Depth...	1.98 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.98 (flow is Subcritical)

Open Channel Flow Module, Version 2.01 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 0

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: south channel

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: south channel

Comment: 100 year design flow at biofilter

Solve For Depth

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	5.00:1 (H:V)
Right Side Slope.	5.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0158 ft/ft
Discharge.....	72.90 cfs

Computed Results:

Depth.....	1.06 ft
Velocity.....	4.51 fps
Flow Area.....	16.16 sf
Flow Top Width...	20.57 ft
Wetted Perimeter.	20.78 ft
Critical Depth...	0.99 ft
Critical Slope...	0.02 ft/ft
Froude Number....	0.90 (flow is Subcritical)

APPENDIX B-c

**WETLAND AND MEADOWS
STAGE-STORAGE-DISCHARGE DATA**

Ladysmith Mine - Wetland Outlet Capacity Calculations
 revised 8/1/97

Outlets are assumed to be trapezodial wiers with approximately
 4:1 sideslopes of variable length

capacity of Cipolletti weir (trapezodial wier with 4:1 sideslopes)
 $Q=3.367LH^{2/3}$
 (Reference: Hydraulic and Excavation Tables by U.S. Bureau of Reclamation)

watershed "b"

Modified Northeast Wetland (Reservoir 02)

Elev.	Head	Length	Discharge	Area	Vol. (ac.ft.)
1136.0	0.00	10.00	0.00	8.90	0.00
1138.0	2.00	10.00	53.45	11.71	20.61

watershed "a"

Modified Southwest Wetland (Reservoir 01)

Elev.	Head	Length	Discharge	Area	Vol. (ac.ft.)
1099.0	0.00	0.00	0.00	1.24	0.00
1100.0	1.00	0.00	2.50	1.97	1.61
1100.9	0.90	3.52	12.62	2.17	3.47
1101.0	0.10	30.00	34.38	2.20	3.69
1101.5	0.60	30.00	106.24	2.31	4.81

Ladysmith Mine - Sedge Meadow Outlet Capacity Calculations
 revised 7/21/97

Outlets are assumed to be trapezodial wiers with approximately
 4:1 sideslopes of variable length

capacity of Cipolletti weir (trapezodial wier with 4:1 sideslopes)
 $Q=3.367LH^{2/3}$

(Reference: Hydraulic and Excavation Tables by U.S. Bureau of Reclamation)

watershed "b"

Sedge Meadow (03)

Elev.	Head	Length	Discharge	Area	Vol. (ac.ft.)
1119.0	0.00		0.00	0.01	0.00
1120.0	0.00	10.00	0.00	0.11	0.06
1121.0	1.00	10.00	33.67 (1' w/ 10')	0.20	0.22

Sedge Meadow (04)

Elev.	Head	Length	Discharge	Area	Vol. (ac.ft.)
1123.0	0.00	0.00	0.00	0.00	0.00
1124.0	0.00	10.00	0.00	0.09	0.05
1125.0	1.00	10.00	33.67	0.44	0.31

Sedge Meadow (05)

Elev.	Head	Length	Discharge	Area	Vol. (ac.ft.)
1120.0	0.00	10.00	0.00	0.02	0.00
1121.0	1.00	10.00	33.67	0.29	0.16
1122.0	1.00	80.00	269.36	0.56	0.58

Ladysmith Mine - Modified Surge Pond Outlet Capacity Calculations
8/1/1997

Outlets are assumed to be trapezoidal weirs with approximately
4:1 sideslopes of variable length

capacity of Cipolletti weir (trapezoidal weir with 4:1 sideslopes)

$$Q=3.367LH^{2/3}$$

(Reference: Hydraulic and Excavation Tables by U.S. Bureau of Reclamation)

watershed "c"

Surge Pond Biofilter

Elev.	Head	Length	Discharge	Area	Vol. (ac.ft.)
1137.0	0.00		0.00	0.80	0.00
1138.0	1.00	5.00	16.84	0.90	0.85
1139.0	2.00	5.00	43.56	0.98	1.79
1140.0	3.00	5.00	78.58	1.06	2.81
1141.0	1.00	250.00	920.33	1.15	3.92

APPENDIX B-d

TIME OF CONCENTRATION CALCULATIONS

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 unty : State:
 subtitle: watershed a tributary area 1

User: jde Date: 07-20-97
 Checked: _____ Date: _____

----- Subarea #2 -----									
Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	0.003	f					1.332
Shallow Concent'd		300	0.013	u					0.045
Open Channel		2500	.0132			.0505	11		0.343
Time of Concentration = 1.72*									=====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 unty : State:
 subtitle: watershed a tributary area 2

User: jde Date: 07-20-97
 Checked: _____ Date: _____

----- Subarea #1 - 16.4 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	.0533	f					0.421
Shallow Concent'd		1000	.0233	u					0.113
									Time of Concentration = 0.53*
									=====

----- Subarea #2 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	0.003	f					1.332
Shallow Concent'd		300	0.013	u					0.045
Open Channel		2500	.0132		.0505		11		0.343
									Time of Concentration = 1.72*
									=====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Bermuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County : State:
 Subtitle: watershed a tributary area 3

User: jde Date: 11-19-97
 Checked: _____ Date: _____

----- Subarea #1 - 31.02 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	.0167	f					0.670
Shallow Concent'd		400	.0175	u	<i>n → A</i>				0.052
Open Channel		1350	.0181			.0505.00	11		0.158
Time of Concentration = 0.88*									=====

- Sheet Flow Surface Codes ---
- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

note: Tc calculated from longest travel time (1140 contour, ridge line on NE side)

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County : State:
 Subtitle: watershed a tributary area 4

User: jde Date: 07-20-97
 Checked: _____ Date: _____

----- Subarea #1 - 3.22 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	150	.1000	f					0.188
Sheet		50	.001	f					0.493
									Time of Concentration = 0.68*
									=====

----- Subarea #2 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	0.003	f					1.332
Shallow Concent'd		300	0.013	u					0.045
Open Channel		2500	.0132			.0505	11		0.343
									Time of Concentration = 1.72*
									=====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County : State:
 Subtitle: watershed b tributary area 10

User: jde Date: 11-19-97
 Checked: _____ Date: _____

----- Subarea #1 - 21.04 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	200	.0050	c					0.259
Open Channel		1050	.005			.0352.00	5		0.178
Open Channel		1600	.0067			.0505.00	11		0.308
Time of Concentration = 0.75*									=====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County : State:
 subtitle: watershed b tributary area 11

User: jde Date: 07-20-97
 Checked: _____ Date: _____

----- Subarea #1 - 5.06 -----									
Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	.0333	f					0.509
Shallow Concent'd		350	.0333	u					0.033

Time of Concentration = 0.54*
 =====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County :
 Subtitle: watershed b tributary area 12

User: jde
 Checked: _____
 Date: 07-20-97
 Date: _____

----- Subarea #1 - 4.50 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.70	150	.0133	a					0.036
Open Channel		1000	.005			.0352	5		0.170
Time of Concentration = 0.21*									=====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County :
 Subtitle: watershed b tributary area 13

User: jde
 Checked: _____
 Date: 07-20-97
 Date: _____

----- Subarea #1 - 14.6 -----									
Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	250	.012	a					0.056
Sheet		50	.10	f					0.078
Shallow Concent'd		100	.1	u					0.005

Time of Concentration = 0.14*
 =====

--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County :
 Subtitle: area c

State:

User: jde
 Checked: _____

Date: 08-01-97
 Date: _____

----- Subarea #1 - 3.83 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	.167	f					0.265
									Time of Concentration = 0.27*
									=====

----- Subarea #2 - 12.2 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	.005	a					0.092
Shallow Concent'd		50	.005	p					0.010
Open Channel		1000	.005			.0354	6		0.121
									Time of Concentration = 0.22*
									=====

----- Subarea #3 - 6.94 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	170	.004	f					0.754
Shallow Concent'd		1440	.0049	u					0.354
									Time of Concentration = 1.11*
									=====

----- Subarea #4 - 9.37 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	2.7	300	.005	a					0.092
Shallow Concent'd		300	.005	p					0.058
									Time of Concentration = 0.15*
									=====

TIME OF CONCENTRATION AND TRAVEL TIME

Version 2.00

Project : flambeau mine
 County :
 Subtitle: area c

State:

User: jde
 Checked: _____

Date: 08-01-97
 Date: _____

----- Subarea #5 - 1.77 -----

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Tim (hr)
Sheet	2.7	100	.005	a					0.03
Shallow Concent'd		400	.005	p					0.07

Time of Concentration = 0.12*
 =====

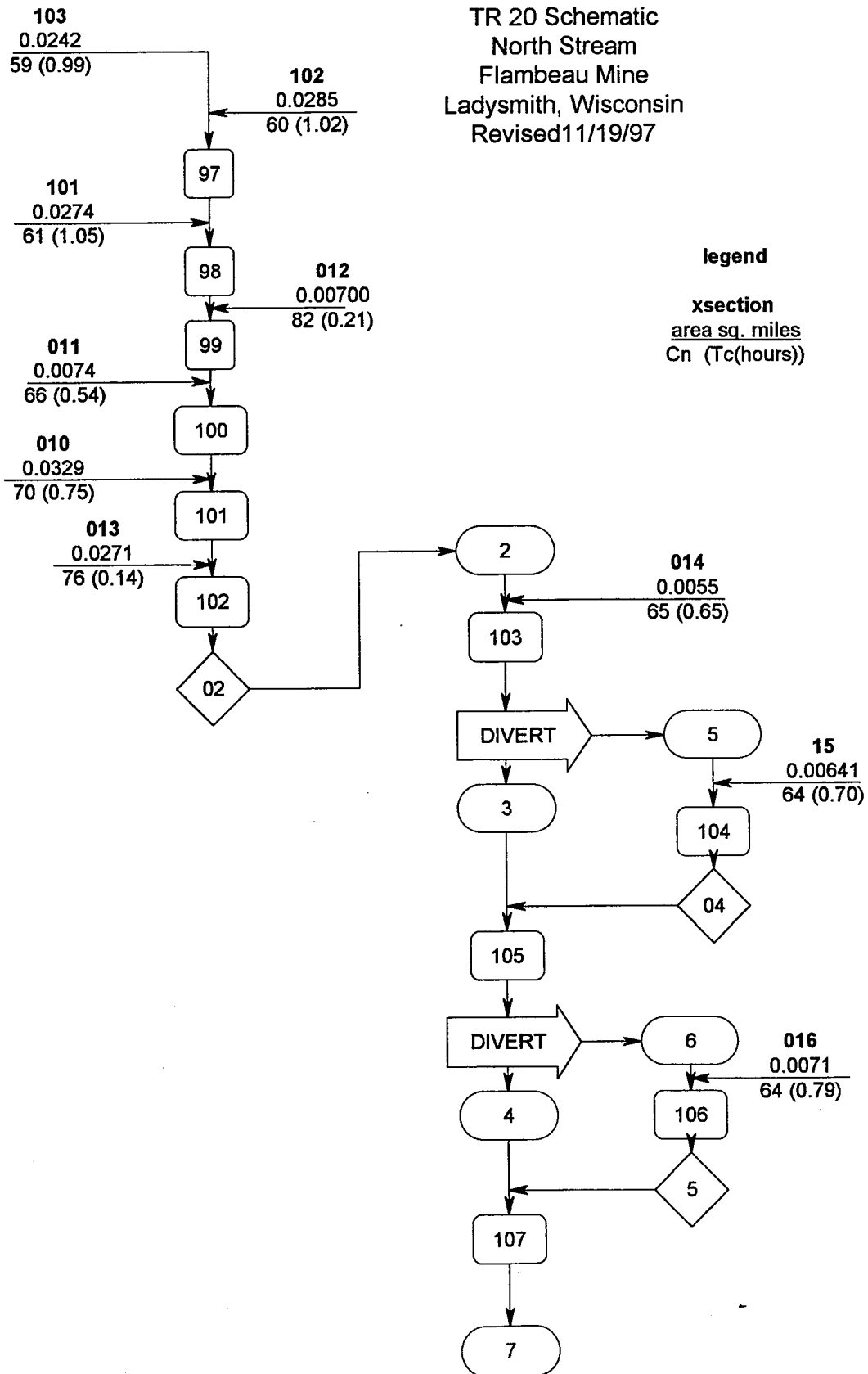
--- Sheet Flow Surface Codes ---

- | | | |
|--------------------------|------------------|------------------------------|
| A Smooth Surface | F Grass, Dense | --- Shallow Concentrated --- |
| B Fallow (No Res.) | G Grass, Burmuda | --- Surface Codes --- |
| C Cultivated < 20 % Res. | H Woods, Light | P Paved |
| D Cultivated > 20 % Res. | I Woods, Dense | U Unpaved |
| E Grass-Range, Short | J Range, Natural | |

APPENDIX B-e

**NORTH CHANNEL
TR-20 INPUT AND OUTPUT**

TR 20 Schematic
 North Stream
 Flambeau Mine
 Ladysmith, Wisconsin
 Revised 11/19/97



WATERSHED "A"

Cn calculations	land use	Cn	Tributary Area												
			103	102	101	10	11	12	13	14	15	16			
	meadow	58	4.38	2.40										0.79	0.56
	wetland	58										4.20			
	woods	60	11.12	15.82	17.20										
	roadway	98			0.36	0.23				0.34					
	comm/indus	92				0.86									
	cultivated	81				4.00	0.41	4.16	4.02						
	grass	65				15.95	4.30		4.32	3.53	3.31	3.96			
	water	98							4.80						
	TOTAL AREA (AC)		15.50	18.22	17.56	21.04	4.71	4.50	17.34	3.53	4.10	4.52			
	TOTAL AREA (SQ MI)		0.0242	0.0285	0.0274	0.0329	0.0074	0.0070	0.0271	0.0055	0.0064	0.0071			
	COMPOSITE Cn		59	60	61	70	66	82	76	65	64	64			

Areas and land uses for tributary areas 101, 102, and 103 are from Foth and Van Dyke 1991 Surface Water Management Plan

Calculations dated: 11/19/97

Type B soils are used

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			1121.4	0.0	0.0			
8			1121.5	0.70	1.05			
8			1121.9	11.03	6.25			
8			1122.4	39.08	15.00			
8			1123.4	152.62	40.00			
9	ENDTBL							
6	RUNOFF	1 103	1 .0242	59.	0.99			1
6	RUNOFF	1 102	2 .0285	60.	1.02			1
6	ADDHYD	4 097	1 2 3					1
6	RUNOFF	1 101	1 .0274	61.	1.05			1
6	ADDHYD	4 098	3 1 2					1
6	RUNOFF	1 012	1 .0070	82.	0.21			1
6	ADDHYD	4 099	2 1 3					1
6	RUNOFF	1 011	2 .0074	66.	0.54			1
6	ADDHYD	4 100	3 2 4					1
6	RUNOFF	1 010	1 .0329	70.	0.75			1
6	ADDHYD	4 101	4 1 5					1
6	RUNOFF	1 013	1 .0271	76.	0.14			1
6	ADDHYD	4 102	5 1 4					1
6	RESVOR	2	2 4 2 1136.0					1 1 1 1
6	RUNOFF	1 014	1 .0055	65.	0.65			1
6	ADDHYD	4 103	2 1 3					1
6	REACH	3 002	3 1 750.0					1 1 1 1
6	DIVERT	6 003	1 3 2 17.0	0.50	005.			1
6	REACH	3 003	3 4 150.0					1 1 1 1
6	RUNOFF	1 015	5 .0064	64.	0.70			1
6	ADDHYD	4 104	2 5 1					1
6	RESVOR	2	4 1 2 1123.0					1 1 1 1
6	ADDHYD	4 105	4 2 1					1
6	DIVERT	6 004	1 3 2 11.0	0.50	006.			1
6	REACH	3 004	3 4 400.0					1 1 1 1
6	RUNOFF	1 016	1 .0071	64.	0.79			1
6	ADDHYD	4 106	2 1 5					1
6	RESVOR	2	5 5 2 1120.0					1 1 1 1
6	ADDHYD	4 107	4 2 1					1
6	REACH	3 007	1 2 250.0					1 1 1 1
	ENDATA							
7	INCREM	6	0.10					
7	COMPUT	7 103	007 0.0	1.00	1.0			2 2 01 01
	ENDCMP	1						
	ENDJOB	2						

*****END OF 80-80 LIST*****

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 1012 FULLPRINT SUMMARY NOPLOTS
 TITLE NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 revised)
 TITLE 1 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL

STRUCT					
3	STRUCT	2			
8			1136.0	0.00	0.00
8			1138.0	53.4	20.6
9	ENDTBL				
3	STRUCT	4			
8			1123.0	0.00	0.00
8			1124.0	0.01	0.05
8			1125.0	33.7	0.31
9	ENDTBL				
3	STRUCT	5			
8			1119.0	0.00	0.00
8			1120.0	0.01	0.05
8			1121.0	33.7	0.16
8			1133.0	269.4	0.58
9	ENDTBL				
2	XSECTN	002	1.0	1128.0	1129.0
8			1126.0	0.0	0.0
8			1126.1	1.13	1.05
8			1126.5	17.87	6.25
8			1127.0	63.32	15.00
8			1128.0	247.27	40.00
9	ENDTBL				
2	XSECTN	003	1.0	1126.5	1128.5
8			1124.5	0.0	0.0
8			1124.6	0.70	1.05
8			1125.0	11.03	6.25
8			1125.5	39.08	15.00
8			1126.5	152.62	40.00
9	ENDTBL				
2	XSECTN	004	1.0	1125.7	1127.7
8			1123.7	0.0	0.0
8			1123.8	0.70	1.05
8			1124.2	11.03	6.25
8			1124.7	39.08	15.00
8			1125.7	152.62	40.00
9	ENDTBL				
2	XSECTN	005	1.0	1126.0	1128.0
8			1124.0	0.0	0.0
8			1125.0	33.67	14.00
8			1126.0	269.36	36.00
9	ENDTBL				
2	XSECTN	006	1.0	1122.0	1124.0
8			1120.0	0.0	0.0
8			1121.0	33.67	14.00
8			1122.0	269.36	36.00
9	ENDTBL				
2	XSECTN	007	1.0	1123.4	1125.4
					1121.4

TR20 ----- SCS -
1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (8/1/97 revis VERSION
11/19/97 1 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
14:08:41 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 103 TO XSECTION 7
STARTING TIME = .00 RAIN DEPTH = 1.00 RAIN DURATION = 1.00
ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 103
OUTPUT HYDROGRAPH = 1 AREA = .02 SQ MI
INPUT RUNOFF CURVE = 59. TIME OF CONCENTRATION = .99 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 102
OUTPUT HYDROGRAPH = 2 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.02 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 97
INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 101
OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 61. TIME OF CONCENTRATION = 1.05 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 98
INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

TR20 ----- SCS -
1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (8/1/97 revis VERSION
11/19/97 1 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
14:08:41 PASS 1 JOB NO. 1 PAGE 2

OPERATION RUNOFF XSECTION 12
OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 82. TIME OF CONCENTRATION = .21 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0280 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 130 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 99
INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 130 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 11
OUTPUT HYDROGRAPH = 2 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = .54 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0720 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
INPUT HYDROGRAPHS 3,2 OUTPUT HYDROGRAPH 4

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 130 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 70. TIME OF CONCENTRATION = .75 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 112 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 5

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 145 CFS-HRS; .0 ACRE-FEET.

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (8/1/97 revis VERSION
 11/19/97 1 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
 14:08:41 PASS 1 JOB NO. 1 PAGE 3

OPERATION RUNOFF XSECTION 13
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .14 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0187 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 127 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 5,1 OUTPUT HYDROGRAPH 4

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 145 CFS-HRS; .0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH 4 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1136.00

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
18.50	.1	1136.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .01 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION RUNOFF XSECTION 14
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .65 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0866 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 218 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 2
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 CHANNEL LENGTH = 750.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (8/1/97 revis VERSION
 11/19/97 1 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
 14:08:41 PASS 1 JOB NO. 1 PAGE 4

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.048, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .28, PEAK TRAVEL TIME = .31 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 221 CFS-HRS; .0 ACRE-FEET.

OPERATION DIVERT XSECTION 3
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 3 XSECTION 3 XSECTION 5

OUTPUT #1 HYDROGRAPH

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 221 CFS-HRS; .0 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 5)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 3
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 150.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .73, PEAK TRAVEL TIME = .10 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 222 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 15
 OUTPUT HYDROGRAPH = 5 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .70 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0933 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 104
 INPUT HYDROGRAPHS 2,5 OUTPUT HYDROGRAPH 1

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1123.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; -1 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 105
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 222 CFS-HRS; .0 ACRE-FEET.

OPERATION DIVERT XSECTION 4
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 4 XSECTION 4 XSECTION 6

OUTPUT #1 HYDROGRAPH

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 222 CFS-HRS; .0 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 6)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 4
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 400.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .36, PEAK TRAVEL TIME = .23 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 223 CFS-HRS; .0 ACRE-FEET.

TR20 ----- SCS -
[012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (8/1/97 revis VERSION
11/19/97 1 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
14:08:41 PASS 1 JOB NO. 1 PAGE 6

OPERATION RUNOFF XSECTION 16
OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .79 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 106
INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 5

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 5
INPUT HYDROGRAPH 5 OUTPUT HYDROGRAPH 2
SURFACE ELEVATION = 1120.00

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.10	.0	1120.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 107
INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 224 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 7
INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
CHANNEL LENGTH = 250.00 FT
INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
MODIFIED ATT-KIN ROUTING COEFFICIENT = .53, PEAK TRAVEL TIME = .14 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 225 CFS-HRS; .0 ACRE-FEET.

TR20 ----- SCS -
1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (8/1/97 revis VERSION
11/19/97 1 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
14:08:41 PASS 2 JOB NO. 1 PAGE 7

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF 1.00 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 2, ARC 2							
MAIN TIME INCREMENT .100 HOURS							
ALTERNATE 1 STORM 1							
XSECTION 103	RUNOFF	.02	.00	---	.00	0	.0
XSECTION 102	RUNOFF	.03	.00	---	.00	0	.0
XSECTION 97	ADDHYD	.05	.00	---	.00	0	.0
XSECTION 101	RUNOFF	.03	.00	---	.00	0	.0
XSECTION 98	ADDHYD	.08	.00	---	.00	0	.0
XSECTION 12	RUNOFF	.01	.00	---	.00	0	.0
XSECTION 99	ADDHYD	.09	.00	---	.00	0	.0
XSECTION 11	RUNOFF	.01	.00	---	.00	0	.0
XSECTION 100	ADDHYD	.09	.00	---	.00	0	.0
XSECTION 10	RUNOFF	.03	.00	---	.00	0	.0
XSECTION 101	ADDHYD	.13	.00	---	.00	0	.0
XSECTION 13	RUNOFF	.03	.00	---	.00	0	.0
XSECTION 102	ADDHYD	.15	.00	---	.00	0	.0
STRUCTURE 2	RESVOR	.15	.01	---	.00	0	.0
XSECTION 14	RUNOFF	.01	.00	---	.00	0	.0
XSECTION 103	ADDHYD	.16	.00	---	.00	0	.0
XSECTION 2	REACH	.16	.00	---	.00	0	.0
XSECTION 3	DIVERT	.08	.00	---	.00	0	.0
XSECTION 5	DIVERT	.08	.00	---	.00	0	.0
XSECTION 3	REACH	.08	.00	---	.00	0	.0
XSECTION 15	RUNOFF	.01	.00	---	.00	0	.0
XSECTION 104	ADDHYD	.09	.00	---	.00	0	.0
STRUCTURE 4	RESVOR	.09	.00	---	.00	0	.0
XSECTION 105	ADDHYD	.17	.00	---	.00	0	.0
XSECTION 4	DIVERT	.08	.00	---	.00	0	.0
XSECTION 6	DIVERT	.08	.00	---	.00	0	.0
XSECTION 4	REACH	.08	.00	---	.00	0	.0
XSECTION 16	RUNOFF	.01	.00	---	.00	0	.0

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE	1	STORM	1				
XSECTION 106	ADDHYD	.09	.00	---	.00	0	.0
STRUCTURE 5	RESVOR	.09	.00	---	.00	0	.0
XSECTION 107	ADDHYD	.17	.00	---	.00	0	.0
XSECTION 7	REACH	.17	.00	---	.00	0	.0

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION							ROUTING PARAMETERS				
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS			.0 CFS								
ALTERNATE			1	STORM	1						
2	750		0	18.5	0	17.9	1.05	1.55	.005	.962	.28
3	150		0	17.9	0	18.0	.65	1.55	.001	.988	.73?
4	400		0	18.0	0	18.2	.65	1.55	.003	.975	.36
7	250		0	18.2	0	18.3	.65	1.55	.001	.988	.53

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	1012	FULLPRINT		SUMMARY	NOPLOTS	
TITLE	NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 revised)					
TITLE	1.5 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	2				
8			1136.0	0.00	0.00	
8			1138.0	53.4	20.6	
9	ENDTBL					
3	STRUCT	4				
8			1123.0	0.00	0.00	
8			1124.0	0.01	0.05	
8			1125.0	33.7	0.31	
9	ENDTBL					
3	STRUCT	5				
8			1119.0	0.00	0.00	
8			1120.0	0.01	0.05	
8			1121.0	33.7	0.16	
8			1133.0	269.4	0.58	
9	ENDTBL					
2	XSECTN	002	1.0	1128.0	1129.0	1126.0
8			1126.0	0.0	0.0	
8			1126.1	1.13	1.05	
8			1126.5	17.87	6.25	
8			1127.0	63.32	15.00	
8			1128.0	247.27	40.00	
9	ENDTBL					
2	XSECTN	003	1.0	1126.5	1128.5	1124.5
8			1124.5	0.0	0.0	
8			1124.6	0.70	1.05	
8			1125.0	11.03	6.25	
8			1125.5	39.08	15.00	
8			1126.5	152.62	40.00	
9	ENDTBL					
2	XSECTN	004	1.0	1125.7	1127.7	1123.7
8			1123.7	0.0	0.0	
8			1123.8	0.70	1.05	
8			1124.2	11.03	6.25	
8			1124.7	39.08	15.00	
8			1125.7	152.62	40.00	
9	ENDTBL					
2	XSECTN	005	1.0	1126.0	1128.0	1124.0
8			1124.0	0.0	0.0	
8			1125.0	33.67	14.00	
8			1126.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	006	1.0	1122.0	1124.0	1120.0
8			1120.0	0.0	0.0	
8			1121.0	33.67	14.00	
8			1122.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	007	1.0	1123.4	1125.4	1121.4

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			1121.4	0.0	0.0				
8			1121.5	0.70	1.05				
8			1121.9	11.03	6.25				
8			1122.4	39.08	15.00				
8			1123.4	152.62	40.00				
9	ENDTBL								
6	RUNOFF	1 103	1 .0242	59.	0.99				1
6	RUNOFF	1 102	2 .0285	60.	1.02				1
6	ADDHYD	4 097	1 2 3						1
6	RUNOFF	1 101	1 .0274	61.	1.05				1
6	ADDHYD	4 098	3 1 2						1
6	RUNOFF	1 012	1 .0070	82.	0.21				1
6	ADDHYD	4 099	2 1 3						1
6	RUNOFF	1 011	2 .0074	66.	0.54				1
6	ADDHYD	4 100	3 2 4						1
6	RUNOFF	1 010	1 .0329	70.	0.75				1
6	ADDHYD	4 101	4 1 5						1
6	RUNOFF	1 013	1 .0271	76.	0.14				1
6	ADDHYD	4 102	5 1 4						1
6	RESVOR	2	2 4 2 1136.0						1 1 1 1
6	RUNOFF	1 014	1 .0055	65.	0.65				1
6	ADDHYD	4 103	2 1 3						1
6	REACH	3 002	3 1 750.0						1 1 1 1
6	DIVERT	6 003	1 3 2 17.0	0.50	005.				1
6	REACH	3 003	3 4 150.0						1 1 1 1
6	RUNOFF	1 015	5 .0064	64.	0.70				1
6	ADDHYD	4 104	2 5 1						1
6	RESVOR	2	4 1 2 1123.0						1 1 1 1
6	ADDHYD	4 105	4 2 1						1
6	DIVERT	6 004	1 3 2 11.0	0.50	006.				1
6	REACH	3 004	3 4 400.0						1 1 1 1
6	RUNOFF	1 016	1 .0071	64.	0.79				1
6	ADDHYD	4 106	2 1 5						1
6	RESVOR	2	5 5 2 1120.0						1 1 1 1
6	ADDHYD	4 107	4 2 1						1
6	REACH	3 007	1 2 250.0						1 1 1 1
	ENDATA								
7	INCREM	6	0.10						
7	COMPUT	7 103	007 0.0	1.50	1.0				2 2 01 01
	ENDCMP	1							
	ENDJOB	2							

*****END OF 80-80 LIST*****

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 103 TO XSECTION 7
STARTING TIME = .00 RAIN DEPTH = 1.50 RAIN DURATION = 1.00
ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 103
OUTPUT HYDROGRAPH = 1 AREA = .02 SQ MI
INPUT RUNOFF CURVE = 59. TIME OF CONCENTRATION = .99 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1080 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 88 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 102
OUTPUT HYDROGRAPH = 2 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.02 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0942 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 109 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 97
INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 109 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 101
OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 61. TIME OF CONCENTRATION = 1.05 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0969 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 124 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 98
INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.00 WATERSHED INCHES; 124 CFS-HRS; .0 ACRE-FEET.

TR20

1012

11/19/97 14:15:46

----- SCS -
NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
1.5 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
PASS 1 JOB NO. 1 PAGE 2

OPERATION RUNOFF XSECTION 12
OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 82. TIME OF CONCENTRATION = .21 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0280 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.04	1.7	(RUNOFF)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
.35 WATERSHED INCHES; 2 CFS-HRS;		.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 99
INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.04	1.7	(NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
.03 WATERSHED INCHES; 2 CFS-HRS;		.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 11
OUTPUT HYDROGRAPH = 2 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = .54 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0720 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
.03 WATERSHED INCHES; 137 CFS-HRS;		.1 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
INPUT HYDROGRAPHS 3,2 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.04	1.7	(NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
.03 WATERSHED INCHES; 2 CFS-HRS;		.2 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 70. TIME OF CONCENTRATION = .75 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
.03 WATERSHED INCHES; 144 CFS-HRS;		.2 ACRE-FEET.

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1.5 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
 14:15:46 PASS 1 JOB NO. 1 PAGE 3

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 5

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.05 1.8 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .05 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

OPERATION RUNOFF XSECTION 13
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .14 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0187 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.02 3.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .19 WATERSHED INCHES; 3 CFS-HRS; .3 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 5,1 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.03 4.8 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .07 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH 4 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1136.00

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 15.40 .5 1136.02

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 HRS MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .15 SQ.MI.
 11.80 CFS .00 .03 .10 .19 .25 .29 .32 .34
 11.80 ELEV 1136.00 1136.00 1136.00 1136.01 1136.01 1136.01 1136.01 1136.01
 12.60 CFS .36 .38 .39 .41 .42 .43 .44 .45
 12.60 ELEV 1136.01 1136.01 1136.01 1136.02 1136.02 1136.02 1136.02 1136.02
 13.40 CFS .46 .47 .47 .48 .48 .49 .49 .50
 13.40 ELEV 1136.02 1136.02 1136.02 1136.02 1136.02 1136.02 1136.02 1136.02
 14.20 CFS .50 .50 .50 .51 .51 .51 .51 .51

34.20	CFS	.04	.04	.04	.04	.04	.04	.04	.04
34.20	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
35.00	CFS	.04	.03	.03	.03	.03	.03	.03	.03
35.00	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
35.80	CFS	.03	.03	.03	.03	.03	.03	.03	.03
35.80	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
36.60	CFS	.03	.02	.02	.02	.02	.02	.02	.02
36.60	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
37.40	CFS	.02	.02	.02	.02	.02	.02	.02	.02
37.40	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
38.20	CFS	.02	.02	.02	.02	.02	.02	.02	.02
38.20	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
39.00	CFS	.02	.01	.01	.01	.01	.01	.01	.01
39.00	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
39.80	CFS	.01	.01	.01	.01	.01	.01	.01	.01
39.80	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
40.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01
40.60	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .07 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

DURATION(HRS) 2 3
 FLOW(CFS) 1 0

OPERATION RUNOFF XSECTION 14
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .65 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0867 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .07 WATERSHED INCHES; 138 CFS-HRS; .6 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME(HRS) 15.40 PEAK DISCHARGE(CFS) .5 PEAK ELEVATION(FEET)
 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .07 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

OPERATION REACH XSECTION 2
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 CHANNEL LENGTH = 750.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.048, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .47, PEAK TRAVEL TIME = .16 HOURS

PEAK TIME (HRS) 15.50
 PEAK DISCHARGE (CFS) .5
 PEAK ELEVATION (FEET) 1126.05

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .16 SQ. MI.

HRS	MAIN	TIME	INCREMENT	=	.100	hr,	DRAINAGE	AREA	=	.16	SQ. MI.
14.30	CFS	.50	.50	.51	.51	.51	.51	.51	.51	.52	.52
14.30	ELEV	1126.04	1126.04	1126.04	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05
15.10	CFS	.52	.52	.52	.52	.52	.52	.52	.52	.52	.52
15.10	ELEV	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05
15.90	CFS	.52	.52	.52	.52	.52	.52	.52	.52	.52	.52
15.90	ELEV	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05
16.70	CFS	.52	.51	.51	.51	.51	.51	.51	.51	.51	.50
16.70	ELEV	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.04	1126.04	1126.04
17.50	CFS	.50	.50	.50							
17.50	ELEV	1126.04	1126.04	1126.04							

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .07 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

DURATION (HRS) 2 3
 FLOW (CFS) 1 0

OPERATION DIVERT XSECTION 3
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 3 XSECTION 3 XSECTION 5

OUTPUT #1 HYDROGRAPH

PEAK TIME (HRS) 15.50
 PEAK DISCHARGE (CFS) .5
 PEAK ELEVATION (FEET) 1124.57

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .14 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 5)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 3
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 150.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) 15.50 PEAK DISCHARGE (CFS) .5 PEAK ELEVATION (FEET) 1124.57

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .08 SQ.MI.

HRS	CFS	ELEV	CFS	ELEV	CFS	ELEV	CFS	ELEV	CFS	ELEV
14.30	.50	1124.57	.50	1124.57	.51	1124.57	.51	1124.57	.51	1124.57
14.30	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57
15.10	.52	1124.57	.52	1124.57	.52	1124.57	.52	1124.57	.52	1124.57
15.10	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57
15.90	.52	1124.57	.52	1124.57	.52	1124.57	.52	1124.57	.52	1124.57
15.90	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57
16.70	.51	1124.57	.51	1124.57	.51	1124.57	.51	1124.57	.51	1124.57
16.70	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57
17.50	.50	1124.57	.50	1124.57	.50	1124.57				
17.50	ELEV	1124.57	ELEV	1124.57	ELEV	1124.57				

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .14 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

DURATION (HRS) 2 3
 FLOW (CFS) 1 0

OPERATION RUNOFF XSECTION 15
 OUTPUT HYDROGRAPH = 5 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .70 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0933 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .14 WATERSHED INCHES; 137 CFS-HRS; .6 ACRE-FEET.

OPERATION ADDHYD XSECTION 104
 INPUT HYDROGRAPHS 2,5 OUTPUT HYDROGRAPH 1

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .14 WATERSHED INCHES; 297 CFS-HRS; .6 ACRE-FEET.

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1123.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .14 WATERSHED INCHES; 296 CFS-HRS; .6 ACRE-FEET.

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1.5 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
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16.10 ELEV 1123.77 1123.77 1123.77 1123.77 1123.77 1123.77 1123.77 1123.77
 16.90 CFS .51 .51 .51 .51 .51 .51 .50 .50
 16.90 ELEV 1123.77 1123.77 1123.77 1123.77 1123.77 1123.77 1123.77 1123.77
 17.70 CFS .50 .50
 17.70 ELEV 1123.77 1123.77

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .13 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

DURATION(HRS) 2 3
 FLOW(CFS) 1 0

OPERATION RUNOFF XSECTION 16
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .79 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1053 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .13 WATERSHED INCHES; 140 CFS-HRS; .6 ACRE-FEET.

OPERATION ADDHYD XSECTION 106
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 5

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .13 WATERSHED INCHES; 297 CFS-HRS; .6 ACRE-FEET.

OPERATION RESVOR STRUCTURE 5
 INPUT HYDROGRAPH 5 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1120.00

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 11.60 .0 1120.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 107
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 16.20 .5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .07 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1.5 - INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
 14:15:46 PASS 1 JOB NO. 1 PAGE 10

OPERATION REACH XSECTION 7
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 250.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .81, PEAK TRAVEL TIME = .07 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 15.90 .5 1121.48

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .17 SQ. MI.
 HRS CFS ELEV CFS ELEV CFS ELEV CFS ELEV CFS ELEV CFS ELEV CFS ELEV
 14.50 CFS .50 .50 .51 .51 .51 .52 .52 .52
 14.50 ELEV 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47
 15.30 CFS .52 .52 .53 .53 .53 .53 .53 .53
 15.30 ELEV 1121.47 1121.47 1121.48 1121.48 1121.48 1121.48 1121.48 1121.48
 16.10 CFS .53 .53 .53 .53 .53 .53 .53 .53
 16.10 ELEV 1121.48 1121.48 1121.48 1121.48 1121.48 1121.48 1121.48 1121.48
 16.90 CFS .53 .52 .52 .52 .52 .52 .52 .52
 16.90 ELEV 1121.48 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47
 17.70 CFS .51 .51 .51 .51 .51 .50 .50 .50
 17.70 ELEV 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47 1121.47
 18.50 CFS .50
 18.50 ELEV 1121.47

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .06 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

DURATION (HRS) 2 4
 FLOW (CFS) 1 0

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 1.50 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .100 HOURS

ALTERNATE 1 STORM 1

XSECTION 103	RUNOFF	.02	.00	---	.00	0	.0
XSECTION 102	RUNOFF	.03	.00	---	.00	0	.0
XSECTION 97	ADDHYD	.05	.00	---	.00	0	.0
XSECTION 101	RUNOFF	.03	.00	---	.00	0	.0
XSECTION 98	ADDHYD	.08	.00	---	.00	0	.0
XSECTION 12	RUNOFF	.01	.35	---	12.04T	2T	200.0
XSECTION 99	ADDHYD	.09	.03	---	12.04T	2T	22.2
XSECTION 11	RUNOFF	.01	.03	---	.00	0	.0
XSECTION 100	ADDHYD	.09	.03	---	12.04T	2T	22.2
XSECTION 10	RUNOFF	.03	.03	---	.00	0	.0
XSECTION 101	ADDHYD	.13	.05	---	12.05T	2T	15.4
XSECTION 13	RUNOFF	.03	.19	---	12.02T	3T	100.0
XSECTION 102	ADDHYD	.15	.07	---	12.03T	5T	33.3
STRUCTURE 2	RESVOR	.15	.07	1136.02	15.40R	1R	6.7
XSECTION 14	RUNOFF	.01	.07	---	.00	0	.0
XSECTION 103	ADDHYD	.16	.07	---	15.40R	1R	6.3
XSECTION 2	REACH	.16	.07	1126.05	15.50R	1R	6.3
XSECTION 3	DIVERT	.08	.14	1124.57	15.50R	1R	12.5
XSECTION 5	DIVERT	.08	.00	---	.00	0	.0
XSECTION 3	REACH	.08	.14	1124.57	15.50R	1R	12.5
XSECTION 15	RUNOFF	.01	.14	---	.00	0	.0
XSECTION 104	ADDHYD	.09	.14	---	.00	0	.0
STRUCTURE 4	RESVOR	.09	.14	---	.00	0	.0
XSECTION 105	ADDHYD	.17	.07	---	15.50R	1R	5.9
XSECTION 4	DIVERT	.08	.13	1123.77	15.50R	1R	12.5
XSECTION 6	DIVERT	.08	.00	---	.00	0	.0
XSECTION 4	REACH	.08	.13	1123.77	15.70R	1R	12.5
XSECTION 16	RUNOFF	.01	.13	---	.00	0	.0

SUMMARY TABLE 1

 SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE 1 STORM 1				-----			
XSECTION 106	ADDHYD	.09	.13	---	.00	0	.0
STRUCTURE 5	RESVOR	.09	.00	---	.00	0	.0
XSECTION 107	ADDHYD	.17	.07	---	16.20R	1R	5.9
XSECTION 7	REACH	.17	.06	1121.48	15.90R	1R	5.9

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION							ROUTING PARAMETERS				
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I	ATT- KIN COEFF
		LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)		(Q*)	(C)
BASEFLOW IS		.0 CFS									
ALTERNATE		1	STORM		1						
2	750		1	15.4	1	15.5	1.05	1.55	.002	.997	.47
3	150		1	15.5	1	15.5	.65	1.55	.000	1.000	1.00?
4	400		1	15.5	1	15.7	.65	1.55	.001	.998	.59
7	250		1	16.2	1	15.9	.65	1.55	.001	.999	.81?

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	1012	FULLPRINT		SUMMARY	NOPLOTS
TITLE	NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 revised)					
TITLE	1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	2				
8			1136.0	0.00	0.00	
8			1138.0	53.4	20.6	
9	ENDTBL					
3	STRUCT	4				
8			1123.0	0.00	0.00	
8			1124.0	0.01	0.05	
8			1125.0	33.7	0.31	
9	ENDTBL					
3	STRUCT	5				
8			1119.0	0.00	0.00	
8			1120.0	0.01	0.05	
8			1121.0	33.7	0.16	
8			1133.0	269.4	0.58	
9	ENDTBL					
2	XSECTN	002	1.0	1128.0	1129.0	1126.0
8			1126.0	0.0	0.0	
8			1126.1	1.13	1.05	
8			1126.5	17.87	6.25	
8			1127.0	63.32	15.00	
8			1128.0	247.27	40.00	
9	ENDTBL					
2	XSECTN	003	1.0	1126.5	1128.5	1124.5
8			1124.5	0.0	0.0	
8			1124.6	0.70	1.05	
8			1125.0	11.03	6.25	
8			1125.5	39.08	15.00	
8			1126.5	152.62	40.00	
9	ENDTBL					
2	XSECTN	004	1.0	1125.7	1127.7	1123.7
8			1123.7	0.0	0.0	
8			1123.8	0.70	1.05	
8			1124.2	11.03	6.25	
8			1124.7	39.08	15.00	
8			1125.7	152.62	40.00	
9	ENDTBL					
2	XSECTN	005	1.0	1126.0	1128.0	1124.0
8			1124.0	0.0	0.0	
8			1125.0	33.67	14.00	
8			1126.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	006	1.0	1122.0	1124.0	1120.0
8			1120.0	0.0	0.0	
8			1121.0	33.67	14.00	
8			1122.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	007	1.0	1123.4	1125.4	1121.4

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8				1121.4	0.0	0.0			
8				1121.5	0.70	1.05			
8				1121.9	11.03	6.25			
8				1122.4	39.08	15.00			
8				1123.4	152.62	40.00			
9	ENDTBL								
6	RUNOFF	1	103	1	.0242	59.	0.99		1
6	RUNOFF	1	102	2	.0285	60.	1.02		1
6	ADDHYD	4	097	1 2 3					1
6	RUNOFF	1	101	1	.0274	61.	1.05		1
6	ADDHYD	4	098	3 1 2					1
6	RUNOFF	1	012	1	.0070	82.	0.21		1
6	ADDHYD	4	099	2 1 3					1
6	RUNOFF	1	011	2	.0074	66.	0.54		1
6	ADDHYD	4	100	3 2 4					1
6	RUNOFF	1	010	1	.0329	70.	0.75		1
6	ADDHYD	4	101	4 1 5					1
6	RUNOFF	1	013	1	.0271	76.	0.14		1
6	ADDHYD	4	102	5 1 4					1
6	RESVOR	2		2 4 2	1136.0				1 1 1 1
6	RUNOFF	1	014	1	.0055	65.	0.65		1
6	ADDHYD	4	103	2 1 3					1
6	REACH	3	002	3 1	750.0				1 1 1 1
6	DIVERT	6	003	1 3 2	17.0	0.50	005.		1
6	REACH	3	003	3 4	150.0				1 1 1 1
6	RUNOFF	1	015	5	.0064	64.	0.70		1
6	ADDHYD	4	104	2 5 1					1
6	RESVOR	2		4 1 2	1123.0				1 1 1 1
6	ADDHYD	4	105	4 2 1					1
6	DIVERT	6	004	1 3 2	11.0	0.50	006.		1
6	REACH	3	004	3 4	400.0				1 1 1 1
6	RUNOFF	1	016	1	.0071	64.	0.79		1
6	ADDHYD	4	106	2 1 5					1
6	RESVOR	2		5 5 2	1120.0				1 1 1 1
6	ADDHYD	4	107	4 2 1					1
6	REACH	3	007	1 2	250.0				1 1 1 1
	ENDATA								
7	INCREM	6			0.10				
7	COMPUT	7	103	007	0.0	2.30	1.0	2 2	01 01
	ENDCMP	1							
	ENDJOB	2							

*****END OF 80-80 LIST*****

----- SCS -
 TR20 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 103 TO XSECTION 7
 STARTING TIME = .00 RAIN DEPTH = 2.30 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 103
 OUTPUT HYDROGRAPH = 1 AREA = .02 SQ MI
 INPUT RUNOFF CURVE = 59. TIME OF CONCENTRATION = .99 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1080 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 152 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 102
 OUTPUT HYDROGRAPH = 2 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.02 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0942 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 153 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 97
 INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
13.10	.6	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .11 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

OPERATION RUNOFF XSECTION 101
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 61. TIME OF CONCENTRATION = 1.05 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0969 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .11 WATERSHED INCHES; 155 CFS-HRS; .3 ACRE-FEET.

OPERATION ADDHYD XSECTION 98
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

----- SCS -
 TR20 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 13.00 1.1 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .12 WATERSHED INCHES; 6 CFS-HRS; .5 ACRE-FEET.

OPERATION RUNOFF XSECTION 12
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 82. TIME OF CONCENTRATION = .21 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0280 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.02 4.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .85 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

OPERATION ADDHYD XSECTION 99
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.03 4.8 (NULL)
 12.88 1.5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .18 WATERSHED INCHES; 10 CFS-HRS; .8 ACRE-FEET.

OPERATION RUNOFF XSECTION 11
 OUTPUT HYDROGRAPH = 2 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = .54 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0720 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.30 .5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .25 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
 INPUT HYDROGRAPHS 3,2 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.03 4.9 (NULL)

FR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .19 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 70. TIME OF CONCENTRATION = .75 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET) (RUNOFF)
12.44	3.4	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .36 WATERSHED INCHES; 8 CFS-HRS; .6 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 5

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET) (NULL)
12.40	5.4	(NULL)
12.10	5.9	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .23 WATERSHED INCHES; 19 CFS-HRS; 1.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 13
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .14 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0187 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET) (RUNOFF)
11.99	13.1	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .58 WATERSHED INCHES; 10 CFS-HRS; .8 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 5,1 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET) (NULL)
12.01	18.6	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .29 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH 4 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1136.00

PEAK TIME (HRS) 14.70
 PEAK DISCHARGE (CFS) 2.3 *
 PEAK ELEVATION (FEET) 1136.09
 * FIRST POINT OF FLAT PEAK

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 DRAINAGE AREA = .15 SQ. MI.

HRS	MAIN TIME INCREMENT = .100 hr,	.00	.01	.01	.01	.02	.04	.10	.27
11.20 CFS		.00	.01	.01	.01	.02	.04	.10	.27
11.20 ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.01
12.00 CFS		.59	.92	1.15	1.31	1.45	1.57	1.69	1.78
12.00 ELEV	1136.02	1136.03	1136.04	1136.05	1136.05	1136.05	1136.06	1136.06	1136.07
12.80 CFS		1.87	1.94	2.01	2.06	2.11	2.15	2.19	2.22
12.80 ELEV	1136.07	1136.07	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08
13.60 CFS		2.25	2.27	2.29	2.30	2.32	2.33	2.34	2.34
13.60 ELEV	1136.08	1136.08	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09
14.40 CFS		2.35	2.35	2.35	2.35	2.35	2.35	2.34	2.34
14.40 ELEV	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09
15.20 CFS		2.34	2.33	2.33	2.32	2.31	2.30	2.30	2.29
15.20 ELEV	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09
16.00 CFS		2.28	2.27	2.26	2.25	2.23	2.22	2.21	2.20
16.00 ELEV	1136.09	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08
16.80 CFS		2.19	2.17	2.16	2.15	2.13	2.12	2.11	2.10
16.80 ELEV	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08
17.60 CFS		2.08	2.07	2.06	2.04	2.03	2.02	2.01	1.99
17.60 ELEV	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.08	1136.07
18.40 CFS		1.98	1.97	1.95	1.94	1.93	1.91	1.90	1.89
18.40 ELEV	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07
19.20 CFS		1.87	1.86	1.85	1.83	1.82	1.80	1.79	1.78
19.20 ELEV	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07
20.00 CFS		1.76	1.75	1.73	1.72	1.71	1.69	1.68	1.67
20.00 ELEV	1136.07	1136.07	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06
20.80 CFS		1.65	1.64	1.63	1.61	1.60	1.59	1.58	1.56
20.80 ELEV	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06
21.60 CFS		1.55	1.54	1.53	1.52	1.51	1.49	1.48	1.47
21.60 ELEV	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06
22.40 CFS		1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39
22.40 ELEV	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05
23.20 CFS		1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32
23.20 ELEV	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05
24.00 CFS		1.32	1.31	1.29	1.28	1.26	1.24	1.22	1.20
24.00 ELEV	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05
24.80 CFS		1.18	1.16	1.14	1.12	1.10	1.07	1.05	1.03
24.80 ELEV	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04
25.60 CFS		1.01	.99	.97	.95	.93	.91	.89	.87
25.60 ELEV	1136.04	1136.04	1136.04	1136.04	1136.04	1136.03	1136.03	1136.03	1136.03

NR20 012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST PAGE 5 14:20:50 PASS 1 JOB NO. 1

Table with 10 columns of numerical data. Rows include values for CFS and ELEV at various elevations from 26.40 to 45.60. The data shows a general trend of decreasing values as elevation increases, with many values converging to 1136.00 or lower.

FR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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45.60 ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
46.40 CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01
46.40 ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .29 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	2	2	2	2	1	1	1	1

DURATION (HRS) 17
 FLOW (CFS) 0

OPERATION RUNOFF XSECTION 14
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .65 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0867 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .29 WATERSHED INCHES; 143 CFS-HRS; 2.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) 14.50
 PEAK DISCHARGE (CFS) 2.4 *
 PEAK ELEVATION (FEET) (NULL)
 * FIRST POINT OF FLAT PEAK

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .29 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

OPERATION REACH XSECTION 2
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 CHANNEL LENGTH = 750.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.048, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .69, PEAK TRAVEL TIME = .10 HOURS

PEAK TIME (HRS) 14.60
 PEAK DISCHARGE (CFS) 2.4 *
 PEAK ELEVATION (FEET) 1126.13
 * FIRST POINT OF FLAT PEAK

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 HRS MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .16 SQ.MI.
 12.00 CFS .21 .50 .87 1.19 1.45 1.64 1.78 1.89

FR20
1012

NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION

11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST

14:20:50

PASS 1 JOB NO. 1

12.00	ELEV	1126.02	1126.04	1126.08	1126.10	1126.11	1126.11	1126.12	1126.12
12.80	CFS	1.97	2.04	2.10	2.15	2.19	2.23	2.27	2.30
12.80	ELEV	1126.12	1126.12	1126.12	1126.12	1126.13	1126.13	1126.13	1126.13
13.60	CFS	2.32	2.35	2.37	2.38	2.39	2.40	2.41	2.42
13.60	ELEV	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13
14.40	CFS	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.41
14.40	ELEV	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13
15.20	CFS	2.41	2.41	2.40	2.39	2.39	2.38	2.37	2.36
15.20	ELEV	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13
16.00	CFS	2.35	2.34	2.33	2.32	2.31	2.29	2.28	2.27
16.00	ELEV	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13
16.80	CFS	2.25	2.24	2.23	2.21	2.20	2.19	2.18	2.16
16.80	ELEV	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.12
17.60	CFS	2.15	2.14	2.12	2.11	2.10	2.08	2.07	2.06
17.60	ELEV	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12
18.40	CFS	2.04	2.03	2.02	2.00	1.99	1.98	1.96	1.95
18.40	ELEV	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12
19.20	CFS	1.93	1.92	1.90	1.89	1.88	1.86	1.85	1.83
19.20	ELEV	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12
20.00	CFS	1.82	1.80	1.79	1.78	1.76	1.75	1.73	1.72
20.00	ELEV	1126.12	1126.12	1126.12	1126.12	1126.12	1126.11	1126.11	1126.11
20.80	CFS	1.71	1.69	1.68	1.66	1.65	1.64	1.63	1.61
20.80	ELEV	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11
21.60	CFS	1.60	1.59	1.58	1.57	1.55	1.54	1.53	1.52
21.60	ELEV	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11
22.40	CFS	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44
22.40	ELEV	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11
23.20	CFS	1.43	1.42	1.41	1.40	1.39	1.38	1.38	1.37
23.20	ELEV	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11
24.00	CFS	1.36	1.35	1.34	1.33	1.31	1.29	1.27	1.24
24.00	ELEV	1126.11	1126.11	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10
24.80	CFS	1.22	1.20	1.17	1.15	1.13	1.11	1.08	1.06
24.80	ELEV	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10	1126.09
25.60	CFS	1.04	1.02	1.00	.98	.95	.94	.92	.89
25.60	ELEV	1126.09	1126.09	1126.09	1126.09	1126.08	1126.08	1126.08	1126.08
26.40	CFS	.88	.86	.84	.82	.80	.79	.77	.75
26.40	ELEV	1126.08	1126.08	1126.07	1126.07	1126.07	1126.07	1126.07	1126.07
27.20	CFS	.74	.72	.71	.69	.68	.66	.65	.63
27.20	ELEV	1126.07	1126.06	1126.06	1126.06	1126.06	1126.06	1126.06	1126.06
28.00	CFS	.62	.61	.60	.58	.57	.56	.55	.54
28.00	ELEV	1126.06	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05
28.80	CFS	.52	.51	.50	.49				
28.80	ELEV	1126.05	1126.05	1126.04	1126.04				

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .29 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 14:20:50 PASS 1 JOB NO. 1 PAGE 8

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	2	2	2	2	1	1	1	1
DURATION (HRS)	17							
FLOW (CFS)	0							

OPERATION DIVERT XSECTION 3
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 3 XSECTION 3 XSECTION 5

OUTPUT #1 HYDROGRAPH

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
14.60	2.4 *	1124.67
	* FIRST POINT OF FLAT PEAK	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .58 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 5)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 3
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 150.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
14.60	2.4 *	1124.67
	* FIRST POINT OF FLAT PEAK	

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .08 SQ.MI.

HRS									
12.00 CFS	.21	.50	.87	1.19	1.45	1.64	1.78	1.89	
12.00 ELEV	1124.53	1124.57	1124.61	1124.62	1124.63	1124.64	1124.64	1124.65	
12.80 CFS	1.97	2.04	2.10	2.15	2.19	2.23	2.27	2.30	
12.80 ELEV	1124.65	1124.65	1124.65	1124.66	1124.66	1124.66	1124.66	1124.66	
13.60 CFS	2.32	2.35	2.37	2.38	2.39	2.40	2.41	2.42	
13.60 ELEV	1124.66	1124.66	1124.66	1124.67	1124.67	1124.67	1124.67	1124.67	

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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14.40	CFS	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.41
14.40	ELEV	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67
15.20	CFS	2.41	2.41	2.40	2.39	2.39	2.38	2.37	2.36
15.20	ELEV	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67	1124.66	1124.66
16.00	CFS	2.35	2.34	2.33	2.32	2.31	2.29	2.28	2.27
16.00	ELEV	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66
16.80	CFS	2.25	2.24	2.23	2.21	2.20	2.19	2.18	2.16
16.80	ELEV	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66
17.60	CFS	2.15	2.14	2.12	2.11	2.10	2.08	2.07	2.06
17.60	ELEV	1124.66	1124.66	1124.66	1124.65	1124.65	1124.65	1124.65	1124.65
18.40	CFS	2.04	2.03	2.02	2.00	1.99	1.98	1.96	1.95
18.40	ELEV	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65
19.20	CFS	1.93	1.92	1.90	1.89	1.88	1.86	1.85	1.83
19.20	ELEV	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65	1124.64	1124.64
20.00	CFS	1.82	1.80	1.79	1.78	1.76	1.75	1.73	1.72
20.00	ELEV	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64
20.80	CFS	1.71	1.69	1.68	1.66	1.65	1.64	1.63	1.61
20.80	ELEV	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64
21.60	CFS	1.60	1.59	1.58	1.57	1.55	1.54	1.53	1.52
21.60	ELEV	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63
22.40	CFS	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44
22.40	ELEV	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63
23.20	CFS	1.43	1.42	1.41	1.40	1.39	1.38	1.38	1.37
23.20	ELEV	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63
24.00	CFS	1.36	1.35	1.34	1.33	1.31	1.29	1.27	1.24
24.00	ELEV	1124.63	1124.63	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62
24.80	CFS	1.22	1.20	1.17	1.15	1.13	1.11	1.08	1.06
24.80	ELEV	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62	1124.61	1124.61
25.60	CFS	1.04	1.02	1.00	.98	.95	.94	.92	.89
25.60	ELEV	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61
26.40	CFS	.88	.86	.84	.82	.80	.79	.77	.75
26.40	ELEV	1124.61	1124.61	1124.61	1124.60	1124.60	1124.60	1124.60	1124.60
27.20	CFS	.74	.72	.71	.69	.68	.66	.65	.63
27.20	ELEV	1124.60	1124.60	1124.60	1124.60	1124.60	1124.59	1124.59	1124.59
28.00	CFS	.62	.61	.60	.58	.57	.56	.55	.54
28.00	ELEV	1124.59	1124.59	1124.59	1124.58	1124.58	1124.58	1124.58	1124.58
28.80	CFS	.52	.51	.50	.49				
28.80	ELEV	1124.57	1124.57	1124.57	1124.57				

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .58 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	2	2	2	2	1	1	1	1
DURATION (HRS)	17							
FLOW (CFS)	0							

----- SCS -
 R20 012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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OPERATION RUNOFF XSECTION 15
 OUTPUT HYDROGRAPH = 5 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .70 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0933 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.5 ACRE-FEET.
 .58 WATERSHED INCHES; 144 CFS-HRS;

OPERATION ADDHYD XSECTION 104
 INPUT HYDROGRAPHS 2,5 OUTPUT HYDROGRAPH 1

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.5 ACRE-FEET.
 .58 WATERSHED INCHES; 372 CFS-HRS;

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1123.00

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
19.80	.0	1124.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .0 ACRE-FEET.
 .01 WATERSHED INCHES; 0 CFS-HRS;

OPERATION ADDHYD XSECTION 105
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
14.70	2.4 *	(NULL)
19.56	1.9	(NULL)

* FIRST POINT OF FLAT PEAK

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.5 ACRE-FEET.
 .28 WATERSHED INCHES; 30 CFS-HRS;

OPERATION DIVERT XSECTION 4
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 4 XSECTION 4 XSECTION 6

OUTPUT #1 HYDROGRAPH

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
14.70	2.4 *	1123.87
19.56	1.9	1123.85

* FIRST POINT OF FLAT PEAK

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.5 ACRE-FEET.
 .57 WATERSHED INCHES; 30 CFS-HRS;

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 6)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .0 ACRE-FEET.
 .00 WATERSHED INCHES; 0 CFS-HRS;

OPERATION REACH XSECTION 4
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 400.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .84, PEAK TRAVEL TIME = .07 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
14.80	2.4 *	1123.87

* FIRST POINT OF FLAT PEAK

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .08 SQ.MI.

HRS	12.30	12.30	13.10	13.10	13.90	13.90	14.70	14.70	15.50	15.50	16.30	16.30	17.10	17.10	17.90	17.90	18.70	18.70	19.50	
CFS	.45	.80	1.13	1.39	1.60	1.75	1.87	1.95	2.03	2.09	2.14	2.18	2.22	2.26	2.29	2.32	2.34	2.36	2.38	2.40
ELEV	1123.76	1123.80	1123.82	1123.83	1123.83	1123.84	1123.85	1123.85	1123.85	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86
CFS	2.03	2.09	2.14	2.18	2.22	2.26	2.29	2.32	2.34	2.36	2.38	2.40	2.41	2.41	2.42	2.42	2.43	2.43	2.43	2.43
ELEV	1123.85	1123.85	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87
CFS	2.43	2.43	2.43	2.43	2.43	2.42	2.42	2.42	2.41	2.41	2.40	2.39	2.39	2.38	2.37	2.36	2.41	2.41	2.40	2.39
ELEV	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87
CFS	2.41	2.41	2.40	2.39	2.39	2.38	2.37	2.36	2.35	2.34	2.33	2.32	2.30	2.29	2.28	2.26	2.35	2.34	2.33	2.32
ELEV	1123.87	1123.87	1123.87	1123.87	1123.87	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86
CFS	2.25	2.24	2.22	2.21	2.20	2.19	2.17	2.16	2.25	2.24	2.22	2.21	2.20	2.19	2.17	2.16	2.25	2.24	2.22	2.21
ELEV	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86
CFS	2.15	2.13	2.12	2.11	2.09	2.08	2.07	2.05	2.15	2.13	2.12	2.11	2.09	2.08	2.07	2.05	2.15	2.13	2.12	2.11
ELEV	1123.86	1123.86	1123.86	1123.85	1123.85	1123.85	1123.85	1123.85	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85
CFS	2.04	2.03	2.01	2.00	1.99	1.97	1.96	1.95	2.04	2.03	2.01	2.00	1.99	1.97	1.96	1.95	2.04	2.03	2.01	2.00
ELEV	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85
CFS	1.93	1.92	1.91	1.91	1.90	1.89	1.88	1.86	1.93	1.92	1.91	1.91	1.90	1.89	1.88	1.86	1.93	1.92	1.91	1.91

----- SCS -
 TR20 -----
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 14:20:50 PASS 1 JOB NO. 1 PAGE 12

19.50	ELEV	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.84
20.30	CFS	1.85	1.83	1.82	1.80	1.79	1.77	1.76	1.74
20.30	ELEV	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84
21.10	CFS	1.73	1.72	1.70	1.69	1.68	1.66	1.65	1.64
21.10	ELEV	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84
21.90	CFS	1.63	1.61	1.60	1.59	1.58	1.57	1.56	1.55
21.90	ELEV	1123.84	1123.84	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83
22.70	CFS	1.54	1.52	1.51	1.50	1.49	1.48	1.48	1.47
22.70	ELEV	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83
23.50	CFS	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39
23.50	ELEV	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83
24.30	CFS	1.38	1.37	1.36	1.34	1.31	1.29	1.26	1.24
24.30	ELEV	1123.83	1123.83	1123.83	1123.82	1123.82	1123.82	1123.82	1123.82
25.10	CFS	1.21	1.19	1.16	1.14	1.12	1.10	1.08	1.05
25.10	ELEV	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82	1123.81	1123.81
25.90	CFS	1.03	1.01	.99	.97	.95	.93	.91	.89
25.90	ELEV	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81
26.70	CFS	.87	.85	.83	.82	.80	.78	.77	.75
26.70	ELEV	1123.81	1123.81	1123.81	1123.80	1123.80	1123.80	1123.80	1123.80
27.50	CFS	.73	.72	.70	.69	.68	.66	.65	.63
27.50	ELEV	1123.80	1123.80	1123.80	1123.80	1123.80	1123.79	1123.79	1123.79
28.30	CFS	.62	.61	.59	.58	.57	.56	.55	.54
28.30	ELEV	1123.79	1123.79	1123.78	1123.78	1123.78	1123.78	1123.78	1123.78
29.10	CFS	.52	.51	.50	.49				
29.10	ELEV	1123.77	1123.77	1123.77	1123.77				

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .56 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	2	2	2	2	2	1	1	1

DURATION (HRS) 17
 FLOW (CFS) 0

OPERATION RUNOFF XSECTION 16
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .79 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1053 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .56 WATERSHED INCHES; 147 CFS-HRS; 2.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 106
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 5

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .56 WATERSHED INCHES; 372 CFS-HRS; 2.5 ACRE-FEET.

OPERATION RESVOR STRUCTURE 5
 INPUT HYDROGRAPH 5 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1120.00

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.60 .3 1120.01

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .02 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION ADDHYD XSECTION 107
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 14.70 2.5 * (NULL)
 * FIRST POINT OF FLAT PEAK

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .28 WATERSHED INCHES; 31 CFS-HRS; 2.6 ACRE-FEET.

OPERATION REACH XSECTION 7
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 250.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 14.70 2.5 * 1121.57
 * FIRST POINT OF FLAT PEAK

HRS	HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1									
	MAIN TIME INCREMENT = .100 hr,					DRAINAGE AREA = .17 SQ.MI.				
12.20 CFS	.20	.57	1.02	1.38	1.66	1.86	2.00	2.09		
12.20 ELEV	1121.43	1121.48	1121.51	1121.53	1121.54	1121.54	1121.55	1121.55		
13.00 CFS	2.16	2.22	2.27	2.31	2.34	2.37	2.40	2.42		
13.00 ELEV	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.57	1121.57		
13.80 CFS	2.44	2.46	2.48	2.49	2.50	2.51	2.51	2.52		
13.80 ELEV	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57		
14.60 CFS	2.52	2.52	2.52	2.52	2.51	2.51	2.51	2.50		

TR20
1012

NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION

11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
14:20:50 PASS 1 JOB NO. 1 PAGE 14

14.60	ELEV	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57
15.40	CFS	2.50	2.49	2.48	2.48	2.47	2.46	2.45	2.44	2.44
15.40	ELEV	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57
16.20	CFS	2.43	2.42	2.40	2.39	2.38	2.37	2.35	2.34	2.34
16.20	ELEV	1121.57	1121.57	1121.57	1121.57	1121.57	1121.56	1121.56	1121.56	1121.56
17.00	CFS	2.33	2.31	2.30	2.28	2.27	2.26	2.25	2.23	2.23
17.00	ELEV	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56
17.80	CFS	2.22	2.20	2.19	2.18	2.16	2.15	2.14	2.12	2.12
17.80	ELEV	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56
18.60	CFS	2.11	2.09	2.08	2.07	2.05	2.04	2.02	2.01	2.01
18.60	ELEV	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55
19.40	CFS	1.99	1.98	1.96	1.96	1.96	1.95	1.94	1.92	1.92
19.40	ELEV	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55
20.20	CFS	1.90	1.89	1.87	1.86	1.84	1.83	1.81	1.80	1.80
20.20	ELEV	1121.55	1121.55	1121.55	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54
21.00	CFS	1.78	1.77	1.75	1.74	1.73	1.72	1.70	1.69	1.69
21.00	ELEV	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54
21.80	CFS	1.68	1.67	1.65	1.64	1.63	1.62	1.61	1.60	1.60
21.80	ELEV	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54
22.60	CFS	1.59	1.57	1.56	1.55	1.54	1.53	1.52	1.51	1.51
22.60	ELEV	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53
23.40	CFS	1.50	1.49	1.48	1.47	1.47	1.46	1.45	1.44	1.44
23.40	ELEV	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53
24.20	CFS	1.43	1.42	1.40	1.38	1.36	1.33	1.30	1.27	1.27
24.20	ELEV	1121.53	1121.53	1121.53	1121.53	1121.53	1121.52	1121.52	1121.52	1121.52
25.00	CFS	1.24	1.22	1.20	1.17	1.15	1.13	1.11	1.08	1.08
25.00	ELEV	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52
25.80	CFS	1.06	1.04	1.02	1.00	.98	.96	.94	.92	.92
25.80	ELEV	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51
26.60	CFS	.90	.88	.86	.84	.83	.81	.79	.78	.78
26.60	ELEV	1121.51	1121.51	1121.51	1121.51	1121.50	1121.50	1121.50	1121.50	1121.50
27.40	CFS	.76	.74	.73	.71	.70	.68	.67	.66	.66
27.40	ELEV	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50
28.20	CFS	.64	.63	.62	.60	.59	.58	.57	.56	.56
28.20	ELEV	1121.49	1121.49	1121.49	1121.49	1121.48	1121.48	1121.48	1121.48	1121.48
29.00	CFS	.54	.53	.52	.51	.50	.49	.49	.49	.49
29.00	ELEV	1121.48	1121.48	1121.47	1121.47	1121.47	1121.47	1121.47	1121.47	1121.47

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.28 WATERSHED INCHES; 31 CFS-HRS; 2.6 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	2	2	2	2	2	1	1	1
DURATION (HRS)	17							
FLOW (CFS)	0							

----- SCS -
TR20 -----
1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
14:20:50 PASS 2 JOB NO. 1 PAGE 15

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF 2.30 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 2, ARC 2							
MAIN TIME INCREMENT .100 HOURS							
ALTERNATE 1 STORM 1							
XSECTION 103	RUNOFF	.02	.00	---	.00	0	.0
XSECTION 102	RUNOFF	.03	.00	---	.00	0	.0
XSECTION 97	ADDHYD	.05	.11	---	13.10R	1R	20.0
XSECTION 101	RUNOFF	.03	.11	---	.00	0	.0
XSECTION 98	ADDHYD	.08	.12	---	13.00T	1T	12.5
XSECTION 12	RUNOFF	.01	.85	---	12.02T	5T	500.0
XSECTION 99	ADDHYD	.09	.18	---	12.03T	5T	55.6
XSECTION 11	RUNOFF	.01	.25	---	12.30R	1R	100.0
XSECTION 100	ADDHYD	.09	.19	---	12.03T	5T	55.6
XSECTION 10	RUNOFF	.03	.36	---	12.44T	3T	100.0
XSECTION 101	ADDHYD	.13	.23	---	12.10	6	46.2
XSECTION 13	RUNOFF	.03	.58	---	11.99	13	433.3
XSECTION 102	ADDHYD	.15	.29	---	12.01	19	126.7
STRUCTURE 2	RESVOR	.15	.29	1136.09	14.70F	2F	13.3
XSECTION 14	RUNOFF	.01	.29	---	.00	0	.0
XSECTION 103	ADDHYD	.16	.29	---	14.50F	2F	12.5
XSECTION 2	REACH	.16	.29	1126.13	14.60F	2F	12.5
XSECTION 3	DIVERT	.08	.58	1124.67	14.60F	2F	25.0
XSECTION 5	DIVERT	.08	.00	---	.00	0	.0
XSECTION 3	REACH	.08	.58	1124.67	14.60F	2F	25.0
XSECTION 15	RUNOFF	.01	.58	---	.00	0	.0
XSECTION 104	ADDHYD	.09	.58	---	.00	0	.0
STRUCTURE 4	RESVOR	.09	.01	---	.00	0	.0
XSECTION 105	ADDHYD	.17	.28	---	14.70F	2F	11.8
XSECTION 4	DIVERT	.08	.57	1123.87	14.70F	2F	25.0
XSECTION 6	DIVERT	.08	.00	---	.00	0	.0
XSECTION 4	REACH	.08	.56	1123.87	14.80F	2F	25.0
XSECTION 16	RUNOFF	.01	.56	---	.00	0	.0

TR20 - NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 .012 11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 14:20:50 SUMMARY, JOB NO. 1 PAGE 17

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	ELEVATION (FT)	PEAK DISCHARGE		
					TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE	1	STORM	1				
XSECTION 106	ADDHYD	.09	.56	---	.00	0	.0
STRUCTURE 5	RESVOR	.09	.02	---	.00	0	.0
XSECTION 107	ADDHYD	.17	.28	---	14.70F	3F	17.6
XSECTION 7	REACH	.17	.28	1121.57	14.70F	3F	17.6

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION						ROUTING PARAMETERS					
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT-KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS			.0 CFS								
ALTERNATE	1	STORM	1								
2	750		2	14.5	2	14.6	1.05	1.55	.001	1.000	.69?
3	150		2	14.6	2	14.6	.65	1.55	.000	1.000	1.00?
4	400		2	14.7	2	14.8	.65	1.55	.001	1.000	.84?
7	250		3	14.7	3	14.7	.65	1.55	.000	1.000	1.00?

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	1012	FULLPRINT	SUMMARY	NOLOTS	
TITLE	NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 revised)					
TITLE	2 YEAR (2.7 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	2	1136.0	0.00	0.00	
8			1138.0	53.4	20.6	
8						
9	ENDTBL					
3	STRUCT	4	1123.0	0.00	0.00	
8			1124.0	0.01	0.05	
8			1125.0	33.7	0.31	
8						
9	ENDTBL					
3	STRUCT	5	1119.0	0.00	0.00	
8			1120.0	0.01	0.05	
8			1121.0	33.7	0.16	
8			1133.0	269.4	0.58	
8						
9	ENDTBL					
2	XSECTN	002	1.0	1128.0	1129.0	1126.0
8			1126.0	0.0	0.0	
8			1126.1	1.13	1.05	
8			1126.5	17.87	6.25	
8			1127.0	63.32	15.00	
8			1128.0	247.27	40.00	
8						
9	ENDTBL					
2	XSECTN	003	1.0	1126.5	1128.5	1124.5
8			1124.5	0.0	0.0	
8			1124.6	0.70	1.05	
8			1125.0	11.03	6.25	
8			1125.5	39.08	15.00	
8			1126.5	152.62	40.00	
8						
9	ENDTBL					
2	XSECTN	004	1.0	1125.7	1127.7	1123.7
8			1123.7	0.0	0.0	
8			1123.8	0.70	1.05	
8			1124.2	11.03	6.25	
8			1124.7	39.08	15.00	
8			1125.7	152.62	40.00	
8						
9	ENDTBL					
2	XSECTN	005	1.0	1126.0	1128.0	1124.0
8			1124.0	0.0	0.0	
8			1125.0	33.67	14.00	
8			1126.0	269.36	36.00	
8						
9	ENDTBL					
2	XSECTN	006	1.0	1122.0	1124.0	1120.0
8			1120.0	0.0	0.0	
8			1121.0	33.67	14.00	
8			1122.0	269.36	36.00	
8						
9	ENDTBL					
2	XSECTN	007	1.0	1123.4	1125.4	1121.4

----- SCS -
TR20 -----
1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
11/19/97 1 YEAR (2.3 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST

END OF 1 JOBS IN THIS RUN

SCS TR-20, VERSION 2.04TEST
1012 FILES

INPUT = NFLAM1YR.DAT
OUTPUT = PRN

, GIVEN DATA FILE
, DATED 11/19/97,14:20:50

FILES GENERATED - DATED 11/19/97,14:20:50

FILE NFLAM1YR.TMG CONTAINS MESSAGE + WARNING INFORMATION

TOTAL NUMBER OF WARNINGS = 4, MESSAGES = 16

*** TR-20 RUN COMPLETED ***

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8				1121.4	0.0	0.0			
8				1121.5	0.70	1.05			
8				1121.9	11.03	6.25			
8				1122.4	39.08	15.00			
8				1123.4	152.62	40.00			
9	ENDTBL								
6	RUNOFF	1	103	1	.0242	59.	0.99	1	
6	RUNOFF	1	102	2	.0285	60.	1.02	1	
6	ADDHYD	4	097	1 2 3				1	
6	RUNOFF	1	101	1	.0274	61.	1.05	1	
6	ADDHYD	4	098	3 1 2				1	
6	RUNOFF	1	012	1	.0070	82.	0.21	1	
6	ADDHYD	4	099	2 1 3				1	
6	RUNOFF	1	011	2	.0074	66.	0.54	1	
6	ADDHYD	4	100	3 2 4				1	
6	RUNOFF	1	010	1	.0329	70.	0.75	1	
6	ADDHYD	4	101	4 1 5				1	
6	RUNOFF	1	013	1	.0271	76.	0.14	1	
6	ADDHYD	4	102	5 1 4				1	
6	RESVOR	2		2 4	2 1136.0			1	1 1 1 1
6	RUNOFF	1	014	1	.0055	65.	0.65	1	
6	ADDHYD	4	103	2 1 3				1	
6	REACH	3	002	3	1 750.0			1	1 1 1 1
6	DIVERT	6	003	1 3 2	17.0	0.50	005.	1	
6	REACH	3	003	3	4 150.0			1	1 1 1 1
6	RUNOFF	1	015	5	.0064	64.	0.70	1	
6	ADDHYD	4	104	2 5 1				1	
6	RESVOR	2		4 1	2 1123.0			1	1 1 1 1
6	ADDHYD	4	105	4 2 1				1	
6	DIVERT	6	004	1 3 2	11.0	0.50	006.	1	
6	REACH	3	004	3	4 400.0			1	1 1 1 1
6	RUNOFF	1	016	1	.0071	64.	0.79	1	
6	ADDHYD	4	106	2 1 5				1	
6	RESVOR	2		5 5	2 1120.0			1	1 1 1 1
6	ADDHYD	4	107	4 2 1				1	
6	REACH	3	007	1	2 250.0			1	1 1 1 1
ENDATA									
7	INCREM	6			0.10				
7	COMPUT	7	103	007	0.0	2.70	1.0	2 2	01 01
ENDCMP 1									
ENDJOB 2									

*****END OF 80-80 LIST*****

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 2 YEAR (2.7 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 14:32:08 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 103 TO XSECTION 7
 STARTING TIME = .00 RAIN DEPTH = 2.70 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 103
 OUTPUT HYDROGRAPH = 1 AREA = .02 SQ MI
 INPUT RUNOFF CURVE = 59. TIME OF CONCENTRATION = .99 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1080 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.80 .8 (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .21 WATERSHED INCHES; 3 CFS-HRS; .3 ACRE-FEET.

OPERATION RUNOFF XSECTION 102
 OUTPUT HYDROGRAPH = 2 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.02 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0942 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.78 1.1 (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .23 WATERSHED INCHES; 4 CFS-HRS; .4 ACRE-FEET.

OPERATION ADDHYD XSECTION 97
 INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.79 1.8 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .22 WATERSHED INCHES; 8 CFS-HRS; .6 ACRE-FEET.

OPERATION RUNOFF XSECTION 101
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 61. TIME OF CONCENTRATION = 1.05 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0969 HOURS

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 2 YEAR (2.7 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 14:32:08 PASS 1 JOB NO. 1 PAGE 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.77 1.2 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .4 ACRE-FEET.
 .26 WATERSHED INCHES; 5 CFS-HRS;

OPERATION ADDHYD XSECTION 98
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.78 3.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.0 ACRE-FEET.
 .23 WATERSHED INCHES; 12 CFS-HRS;

OPERATION RUNOFF XSECTION 12
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 82. TIME OF CONCENTRATION = .21 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0280 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.02 6.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .4 ACRE-FEET.
 1.15 WATERSHED INCHES; 5 CFS-HRS;

OPERATION ADDHYD XSECTION 99
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.03 6.7 (NULL)
 12.72 3.7 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.4 ACRE-FEET.
 .31 WATERSHED INCHES; 17 CFS-HRS;

OPERATION RUNOFF XSECTION 11
 OUTPUT HYDROGRAPH = 2 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = .54 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0720 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.29 1.0 (RUNOFF)

R20 ----- SCS -
 .012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 2 YEAR (2.7 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 14:32:08 PASS 1 JOB NO. 1 PAGE 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .41 WATERSHED INCHES; 2 CFS-HRS; .2 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
 INPUT HYDROGRAPHS 3,2 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.04	7.1	(NULL)
12.54	4.3	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .31 WATERSHED INCHES; 19 CFS-HRS; 1.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 70. TIME OF CONCENTRATION = .75 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.41	6.0	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .55 WATERSHED INCHES; 12 CFS-HRS; 1.0 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 5

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.42	10.3	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 31 CFS-HRS; 2.6 ACRE-FEET.

OPERATION RUNOFF XSECTION 13
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .14 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0187 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
11.99	19.3	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .82 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 5,1 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS) 12.01
 PEAK DISCHARGE (CFS) 27.6
 PEAK ELEVATION (FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .45 WATERSHED INCHES; 45 CFS-HRS; 3.7 ACRE-FEET.

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH 4 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1136.00

PEAK TIME (HRS) 14.35
 PEAK DISCHARGE (CFS) 3.8
 PEAK ELEVATION (FEET) 1136.14

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .15 SQ. MI.

HRS	MAIN TIME	INCREMENT	.01	.01	.01	.01	.01	.02	.02
10.60 CFS	.00	.01	.01	.01	.01	.01	.01	.02	.02
10.60 ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
11.40 CFS	.03	.04	.06	.10	.21	.49	.97	1.47	1.47
11.40 ELEV	1136.00	1136.00	1136.00	1136.00	1136.01	1136.02	1136.04	1136.05	1136.05
12.20 CFS	1.82	2.08	2.32	2.55	2.76	2.94	3.09	3.22	3.22
12.20 ELEV	1136.07	1136.08	1136.09	1136.10	1136.10	1136.11	1136.12	1136.12	1136.12
13.00 CFS	3.34	3.43	3.52	3.58	3.64	3.69	3.73	3.76	3.76
13.00 ELEV	1136.13	1136.13	1136.13	1136.13	1136.14	1136.14	1136.14	1136.14	1136.14
13.80 CFS	3.79	3.81	3.82	3.83	3.84	3.84	3.84	3.84	3.84
13.80 ELEV	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14
14.60 CFS	3.83	3.83	3.82	3.81	3.80	3.79	3.77	3.76	3.76
14.60 ELEV	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14
15.40 CFS	3.74	3.73	3.71	3.69	3.67	3.65	3.63	3.61	3.61
15.40 ELEV	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14	1136.14
16.20 CFS	3.59	3.57	3.54	3.52	3.50	3.47	3.45	3.42	3.42
16.20 ELEV	1136.13	1136.13	1136.13	1136.13	1136.13	1136.13	1136.13	1136.13	1136.13
17.00 CFS	3.40	3.38	3.35	3.33	3.30	3.28	3.26	3.23	3.23
17.00 ELEV	1136.13	1136.13	1136.13	1136.12	1136.12	1136.12	1136.12	1136.12	1136.12
17.80 CFS	3.21	3.18	3.16	3.14	3.11	3.09	3.06	3.04	3.04
17.80 ELEV	1136.12	1136.12	1136.12	1136.12	1136.12	1136.12	1136.11	1136.11	1136.11
18.60 CFS	3.02	2.99	2.97	2.95	2.92	2.90	2.88	2.85	2.85
18.60 ELEV	1136.11	1136.11	1136.11	1136.11	1136.11	1136.11	1136.11	1136.11	1136.11
19.40 CFS	2.83	2.80	2.78	2.76	2.73	2.71	2.69	2.66	2.66
19.40 ELEV	1136.11	1136.10	1136.10	1136.10	1136.10	1136.10	1136.10	1136.10	1136.10
20.20 CFS	2.64	2.61	2.59	2.57	2.55	2.52	2.50	2.48	2.48
20.20 ELEV	1136.10	1136.10	1136.10	1136.10	1136.10	1136.09	1136.09	1136.09	1136.09
21.00 CFS	2.46	2.43	2.41	2.39	2.37	2.35	2.33	2.31	2.31
21.00 ELEV	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09	1136.09
21.80 CFS	2.29	2.27	2.26	2.24	2.22	2.20	2.18	2.17	2.17

41.80	CFS	.05	.05	.04	.04	.04	.04	.04	.04	.04
41.80	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
42.60	CFS	.04	.04	.04	.04	.04	.04	.04	.03	.03
42.60	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
43.40	CFS	.03	.03	.03	.03	.03	.03	.03	.03	.03
43.40	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
44.20	CFS	.03	.03	.03	.03	.03	.03	.02	.02	.02
44.20	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
45.00	CFS	.02	.02	.02	.02	.02	.02	.02	.02	.02
45.00	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
45.80	CFS	.02	.02	.02	.02	.02	.02	.01	.01	.01
45.80	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
46.60	CFS	.02	.02	.02	.02	.02	.02	.01	.01	.01
46.60	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
47.40	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01
47.40	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
48.20	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01
48.20	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .45 WATERSHED INCHES; 45 CFS-HRS; 3.7 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	4	3	3	3	2	2	1	1
DURATION (HRS)	18	19						
FLOW (CFS)	1	0						

OPERATION RUNOFF XSECTION 14
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .65 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0867 HOURS

PEAK TIME (HRS) 12.40
 PEAK DISCHARGE (CFS) .6
 PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) 14.18
 PEAK DISCHARGE (CFS) 4.0
 PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .45 WATERSHED INCHES; 47 CFS-HRS; 3.8 ACRE-FEET.

25.60	CFS	1.53	1.50	1.46	1.43	1.40	1.37	1.34	1.32
25.60	ELEV	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.10
26.40	CFS	1.29	1.26	1.23	1.21	1.18	1.16	1.13	1.11
26.40	ELEV	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10
27.20	CFS	1.09	1.06	1.04	1.02	1.00	.98	.95	.93
27.20	ELEV	1126.10	1126.09	1126.09	1126.09	1126.09	1126.09	1126.08	1126.08
28.00	CFS	.91	.89	.88	.86	.84	.82	.80	.79
28.00	ELEV	1126.08	1126.08	1126.08	1126.08	1126.07	1126.07	1126.07	1126.07
28.80	CFS	.77	.75	.74	.72	.71	.69	.68	.66
28.80	ELEV	1126.07	1126.07	1126.07	1126.06	1126.06	1126.06	1126.06	1126.06
29.60	CFS	.65	.63	.62	.61	.60	.58	.57	.56
29.60	ELEV	1126.06	1126.06	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05
30.40	CFS	.55	.54	.52	.51	.50	.49		
30.40	ELEV	1126.05	1126.05	1126.05	1126.05	1126.04	1126.04		

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .45 WATERSHED INCHES; 47 CFS-HRS; 3.8 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	4	4	3	3	2	2	1	1
DURATION (HRS)	18	19						
FLOW (CFS)	1	0						

OPERATION DIVERT XSECTION 3
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 3 XSECTION 3 XSECTION 5

OUTPUT #1 HYDROGRAPH

PEAK TIME (HRS) 14.30
 PEAK DISCHARGE (CFS) 4.0 *
 PEAK ELEVATION (FEET) 1124.73
 * FIRST POINT OF FLAT PEAK

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .90 WATERSHED INCHES; 47 CFS-HRS; 3.8 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 5)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 3

INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 150.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) 14.30 PEAK DISCHARGE (CFS) 4.0 * PEAK ELEVATION (FEET) 1124.73
 * FIRST POINT OF FLAT PEAK

HRS	HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1									
	MAIN TIME INCREMENT = .100 hr,	DRAINAGE AREA = .08 SQ. MI.								
12.00 CFS	.44	.95	1.57	2.12	2.53	2.83	3.05	3.20		
12.00 ELEV	1124.56	1124.61	1124.63	1124.65	1124.67	1124.68	1124.69	1124.70		
12.80 CFS	3.32	3.42	3.52	3.60	3.67	3.73	3.78	3.83		
12.80 ELEV	1124.70	1124.71	1124.71	1124.71	1124.71	1124.72	1124.72	1124.72		
13.60 CFS	3.86	3.89	3.92	3.94	3.95	3.96	3.97	3.97		
13.60 ELEV	1124.72	1124.72	1124.72	1124.73	1124.73	1124.73	1124.73	1124.73		
14.40 CFS	3.97	3.96	3.96	3.95	3.94	3.93	3.92	3.91		
14.40 ELEV	1124.73	1124.73	1124.73	1124.73	1124.73	1124.73	1124.72	1124.72		
15.20 CFS	3.89	3.88	3.87	3.85	3.83	3.81	3.79	3.77		
15.20 ELEV	1124.72	1124.72	1124.72	1124.72	1124.72	1124.72	1124.72	1124.72		
16.00 CFS	3.75	3.73	3.70	3.68	3.66	3.63	3.61	3.58		
16.00 ELEV	1124.72	1124.72	1124.72	1124.72	1124.71	1124.71	1124.71	1124.71		
16.80 CFS	3.56	3.53	3.51	3.48	3.46	3.43	3.41	3.38		
16.80 ELEV	1124.71	1124.71	1124.71	1124.71	1124.71	1124.71	1124.70	1124.70		
17.60 CFS	3.36	3.33	3.31	3.28	3.26	3.23	3.21	3.18		
17.60 ELEV	1124.70	1124.70	1124.70	1124.70	1124.70	1124.70	1124.70	1124.70		
18.40 CFS	3.16	3.14	3.11	3.09	3.06	3.04	3.01	2.99		
18.40 ELEV	1124.70	1124.69	1124.69	1124.69	1124.69	1124.69	1124.69	1124.69		
19.20 CFS	2.97	2.94	2.92	2.89	2.87	2.84	2.82	2.79		
19.20 ELEV	1124.69	1124.69	1124.69	1124.68	1124.68	1124.68	1124.68	1124.68		
20.00 CFS	2.77	2.74	2.72	2.70	2.67	2.65	2.62	2.60		
20.00 ELEV	1124.68	1124.68	1124.68	1124.68	1124.68	1124.68	1124.67	1124.67		
20.80 CFS	2.58	2.55	2.53	2.51	2.49	2.47	2.45	2.42		
20.80 ELEV	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67		
21.60 CFS	2.40	2.38	2.36	2.35	2.33	2.31	2.29	2.27		
21.60 ELEV	1124.67	1124.67	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66		
22.40 CFS	2.25	2.23	2.22	2.20	2.18	2.17	2.15	2.13		
22.40 ELEV	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66	1124.66		
23.20 CFS	2.12	2.10	2.09	2.07	2.06	2.04	2.03	2.02		
23.20 ELEV	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65		
24.00 CFS	2.00	1.99	1.97	1.95	1.92	1.89	1.86	1.83		
24.00 ELEV	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65	1124.64	1124.64		
24.80 CFS	1.79	1.76	1.72	1.69	1.66	1.62	1.59	1.56		
24.80 ELEV	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64	1124.63	1124.63		
25.60 CFS	1.53	1.50	1.46	1.43	1.40	1.37	1.34	1.32		
25.60 ELEV	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.62	1124.62		
26.40 CFS	1.29	1.26	1.23	1.21	1.18	1.16	1.13	1.11		

26.40	ELEV	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62
27.20	CFS	1.09	1.06	1.04	1.02	1.00	.98	.95	.93	
27.20	ELEV	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61
28.00	CFS	.91	.89	.88	.86	.84	.82	.80	.79	
28.00	ELEV	1124.61	1124.61	1124.61	1124.61	1124.61	1124.60	1124.60	1124.60	1124.60
28.80	CFS	.77	.75	.74	.72	.71	.69	.68	.66	
28.80	ELEV	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60	1124.59	1124.59
29.60	CFS	.65	.63	.62	.61	.60	.58	.57	.56	
29.60	ELEV	1124.59	1124.59	1124.59	1124.59	1124.58	1124.58	1124.58	1124.58	1124.58
30.40	CFS	.55	.54	.52	.51	.50	.49			
30.40	ELEV	1124.58	1124.58	1124.57	1124.57	1124.57	1124.57			

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .90 WATERSHED INCHES; 47 CFS-HRS; 3.8 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	4	4	3	3	2	2	1	1
DURATION (HRS)	18	19						
FLOW (CFS)	1	0						

OPERATION RUNOFF XSECTION 15
 OUTPUT HYDROGRAPH = 5 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .70 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0933 HOURS

PEAK TIME (HRS) 12.40
 PEAK DISCHARGE (CFS) .6
 PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .34 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION ADDHYD XSECTION 104
 INPUT HYDROGRAPHS 2,5 OUTPUT HYDROGRAPH 1

PEAK TIME (HRS) 12.40
 PEAK DISCHARGE (CFS) .6
 PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .03 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1123.00

PEAK TIME (HRS) 14.10
 PEAK DISCHARGE (CFS) .2
 PEAK ELEVATION (FEET) 1124.00
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .02 WATERSHED INCHES; 1 CFS-HRS; .1 ACRE-FEET.

OPERATION ADDHYD XSECTION 105
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1
 PEAK TIME (HRS) 14.19
 PEAK DISCHARGE (CFS) 4.1
 PEAK ELEVATION (FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .44 WATERSHED INCHES; 48 CFS-HRS; 3.9 ACRE-FEET.

OPERATION DIVERT XSECTION 4
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 4 XSECTION 4 XSECTION 6
 OUTPUT #1 HYDROGRAPH
 PEAK TIME (HRS) 14.19
 PEAK DISCHARGE (CFS) 4.1
 PEAK ELEVATION (FEET) 1123.93
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .89 WATERSHED INCHES; 48 CFS-HRS; 3.9 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 6)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 4
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 400.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH
 COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, $X = .649$, $M = 1.55$
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .93, PEAK TRAVEL TIME = .10 HOURS
 PEAK TIME (HRS) 14.30
 PEAK DISCHARGE (CFS) 4.1
 PEAK ELEVATION (FEET) 1123.93

TR20
012

NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
11/19/97 2 YEAR (2.7 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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SCS

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1											
HRS	MAIN TIME	INCREMENT = .100 hr,									DRAINAGE AREA = .08 SQ.MI.
12.10	CFS	.42	.91	1.52	2.08	2.50	2.81	3.03	3.19		
12.10	ELEV	1123.76	1123.81	1123.83	1123.85	1123.87	1123.88	1123.89	1123.90		
12.90	CFS	3.32	3.42	3.52	3.60	3.67	3.73	3.79	3.83		
12.90	ELEV	1123.90	1123.91	1123.91	1123.91	1123.92	1123.92	1123.92	1123.92		
13.70	CFS	3.87	3.90	3.93	4.04	4.09	4.11	4.11	4.11		
13.70	ELEV	1123.92	1123.92	1123.92	1123.93	1123.93	1123.93	1123.93	1123.93		
14.50	CFS	4.11	4.10	4.09	4.08	4.07	4.05	4.04	4.03		
14.50	ELEV	1123.93	1123.93	1123.93	1123.93	1123.93	1123.93	1123.93	1123.93		
15.30	CFS	4.01	3.99	3.98	3.96	3.94	3.92	3.90	3.87		
15.30	ELEV	1123.93	1123.93	1123.93	1123.93	1123.93	1123.92	1123.92	1123.92		
16.10	CFS	3.85	3.83	3.80	3.77	3.75	3.72	3.70	3.67		
16.10	ELEV	1123.92	1123.92	1123.92	1123.92	1123.92	1123.92	1123.92	1123.92		
16.90	CFS	3.64	3.62	3.59	3.57	3.54	3.51	3.49	3.46		
16.90	ELEV	1123.91	1123.91	1123.91	1123.91	1123.91	1123.91	1123.91	1123.91		
17.70	CFS	3.44	3.41	3.39	3.36	3.34	3.31	3.29	3.26		
17.70	ELEV	1123.91	1123.91	1123.90	1123.90	1123.90	1123.90	1123.90	1123.90		
18.50	CFS	3.23	3.21	3.18	3.16	3.13	3.11	3.08	3.06		
18.50	ELEV	1123.90	1123.90	1123.90	1123.90	1123.89	1123.89	1123.89	1123.89		
19.30	CFS	3.03	3.01	2.98	2.96	2.93	2.91	2.88	2.86		
19.30	ELEV	1123.89	1123.89	1123.89	1123.89	1123.89	1123.89	1123.88	1123.88		
20.10	CFS	2.83	2.81	2.78	2.75	2.73	2.70	2.68	2.65		
20.10	ELEV	1123.88	1123.88	1123.88	1123.88	1123.88	1123.88	1123.88	1123.88		
20.90	CFS	2.63	2.61	2.59	2.56	2.54	2.52	2.50	2.48		
20.90	ELEV	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87		
21.70	CFS	2.46	2.44	2.42	2.40	2.38	2.36	2.34	2.32		
21.70	ELEV	1123.87	1123.87	1123.87	1123.87	1123.86	1123.86	1123.86	1123.86		
22.50	CFS	2.31	2.29	2.27	2.25	2.23	2.22	2.20	2.19		
22.50	ELEV	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86		
23.30	CFS	2.17	2.15	2.14	2.12	2.11	2.09	2.08	2.07		
23.30	ELEV	1123.86	1123.86	1123.86	1123.86	1123.85	1123.85	1123.85	1123.85		
24.10	CFS	2.05	2.04	2.02	2.00	1.96	1.93	1.89	1.85		
24.10	ELEV	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.84		
24.90	CFS	1.81	1.77	1.73	1.70	1.67	1.63	1.60	1.57		
24.90	ELEV	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.83	1123.83		
25.70	CFS	1.54	1.51	1.48	1.45	1.41	1.38	1.36	1.33		
25.70	ELEV	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.82		
26.50	CFS	1.30	1.27	1.25	1.22	1.19	1.17	1.14	1.12		
26.50	ELEV	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82		
27.30	CFS	1.10	1.07	1.05	1.03	1.01	.99	.96	.94		
27.30	ELEV	1123.82	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81		
28.10	CFS	.93	.90	.89	.87	.85	.83	.81	.80		
28.10	ELEV	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.80	1123.80		
28.90	CFS	.78	.76	.75	.73	.72	.70	.69	.67		
28.90	ELEV	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80		
29.70	CFS	.66	.64	.63	.62	.61	.59	.58	.57		
29.70	ELEV	1123.79	1123.79	1123.79	1123.79	1123.79	1123.78	1123.78	1123.78		
30.50	CFS	.56	.54	.53	.52	.51	.50	.49			
30.50	ELEV	1123.78	1123.78	1123.78	1123.77	1123.77	1123.77	1123.77			

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 3.9 ACRE-FEET.
 .88 WATERSHED INCHES; 48 CFS-HRS;

DURATION(HRS)	2	4	6	8	10	12	14	16
FLOW(CFS)	4	4	3	3	2	2	1	1
DURATION(HRS)	18	19						
FLOW(CFS)	1	0						

OPERATION RUNOFF XSECTION 16
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .79 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1053 HOURS

PEAK TIME(HRS) 12.50
 PEAK DISCHARGE(CFS) .6
 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .1 ACRE-FEET.
 .34 WATERSHED INCHES; 2 CFS-HRS;

OPERATION ADDHYD XSECTION 106
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 5

PEAK TIME(HRS) 12.50
 PEAK DISCHARGE(CFS) .6
 PEAK ELEVATION(FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .1 ACRE-FEET.
 .03 WATERSHED INCHES; 2 CFS-HRS;

OPERATION RESVOR STRUCTURE 5
 INPUT HYDROGRAPH 5 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1120.00

PEAK TIME(HRS) 12.50
 PEAK DISCHARGE(CFS) .6
 PEAK ELEVATION(FEET) 1120.02

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .09 SQ.MI.

HRS	9.40	9.40	10.20	10.20	11.00	11.00	11.80	11.80	12.60
CFS	.01	.01	.01	.01	.01	.01	.01	.01	.58
ELEV	1120.00	1120.00	1119.99	1119.98	1119.97	1119.97	1120.01	1120.01	1120.02
CFS	.01	.01	.01	.01	.01	.01	.24	.44	.58
ELEV	1119.99	1119.99	1119.98	1119.98	1119.97	1119.97	1120.01	1120.01	1120.02
CFS	.01	.01	.01	.01	.01	.01	.24	.44	.58
ELEV	1119.96	1119.96	1119.97	1119.97	1119.97	1119.97	1120.01	1120.01	1120.02
CFS	.58	.54	.49	.44	.39	.35	.32	.29	

TR20

1012

NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION

11/19/97 2 YEAR (2.7 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST

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PASS 1 JOB NO. 1

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32.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
32.60	ELEV	1119.88	1119.88	1119.88	1119.88	1119.88	1119.88	1119.88	1119.87	1119.87	1119.87	1119.87	1119.87
33.40	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
33.40	ELEV	1119.87	1119.87	1119.87	1119.87	1119.87	1119.87	1119.86	1119.86	1119.86	1119.86	1119.86	1119.86
34.20	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
34.20	ELEV	1119.86	1119.86	1119.86	1119.86	1119.86	1119.85	1119.85	1119.85	1119.85	1119.85	1119.85	1119.85
35.00	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
35.00	ELEV	1119.85	1119.85	1119.85	1119.84	1119.84	1119.84	1119.84	1119.84	1119.84	1119.84	1119.84	1119.84
35.80	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
35.80	ELEV	1119.84	1119.84	1119.83	1119.83	1119.83	1119.83	1119.83	1119.83	1119.83	1119.83	1119.83	1119.83
36.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
36.60	ELEV	1119.83	1119.83	1119.82	1119.82	1119.82	1119.82	1119.82	1119.82	1119.82	1119.82	1119.82	1119.82
37.40	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
37.40	ELEV	1119.82	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81
38.20	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
38.20	ELEV	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80
39.00	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
39.00	ELEV	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79
39.80	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
39.80	ELEV	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78
40.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
40.60	ELEV	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77
41.40	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
41.40	ELEV	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76
42.20	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
42.20	ELEV	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75
43.00	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
43.00	ELEV	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74
43.80	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
43.80	ELEV	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73
44.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
44.60	ELEV	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72
45.40	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
45.40	ELEV	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71
46.20	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
46.20	ELEV	1119.71	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70
47.00	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
47.00	ELEV	1119.70	1119.69	1119.69	1119.69	1119.69	1119.69	1119.69	1119.69	1119.69	1119.69	1119.69	1119.69
47.80	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
47.80	ELEV	1119.69	1119.69	1119.68	1119.68	1119.68	1119.68	1119.68	1119.68	1119.68	1119.68	1119.68	1119.68
48.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
48.60	ELEV	1119.68	1119.68	1119.68	1119.67	1119.67	1119.67	1119.67	1119.67	1119.67	1119.67	1119.67	1119.67

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.03 WATERSHED INCHES; 2 CFS-HRS; .1 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	4	4	3	3	2	2	1	1
DURATION (HRS)	18	0						
FLOW (CFS)	1	0						

OPERATION ADDHYD XSECTION 107
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME (HRS) 14.22
 PEAK DISCHARGE (CFS) 4.3
 PEAK ELEVATION (FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .44 WATERSHED INCHES; 49 CFS-HRS; 4.1 ACRE-FEET.

OPERATION REACH XSECTION 7
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 250.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) 14.22
 PEAK DISCHARGE (CFS) 4.3
 PEAK ELEVATION (FEET) 1121.64

ALTERNATE = 1, STORM = 1
 DRAINAGE AREA = .17 SQ.MI.

HRS	MAIN TIME INCREMENT = .100 hr,	1.15	1.96	2.61	3.08	3.39	3.57	3.68
12.10 CFS	.43	1.15	1.96	2.61	3.08	3.39	3.57	3.68
12.10 ELEV	1121.46	1121.52	1121.55	1121.57	1121.59	1121.60	1121.61	1121.62
12.90 CFS	3.75	3.81	3.87	3.92	3.96	4.00	4.04	4.07
12.90 ELEV	1121.62	1121.62	1121.62	1121.62	1121.63	1121.63	1121.63	1121.63
13.70 CFS	4.09	4.11	4.12	4.23	4.27	4.28	4.28	4.27
13.70 ELEV	1121.63	1121.63	1121.63	1121.64	1121.64	1121.64	1121.64	1121.64
14.50 CFS	4.26	4.24	4.23	4.22	4.20	4.19	4.17	4.15
14.50 ELEV	1121.64	1121.64	1121.64	1121.64	1121.64	1121.64	1121.63	1121.63
15.30 CFS	4.14	4.12	4.10	4.08	4.05	4.03	4.01	3.98
15.30 ELEV	1121.63	1121.63	1121.63	1121.63	1121.63	1121.63	1121.63	1121.63
16.10 CFS	3.96	3.93	3.90	3.87	3.85	3.82	3.79	3.76
16.10 ELEV	1121.63	1121.63	1121.62	1121.62	1121.62	1121.62	1121.62	1121.62
16.90 CFS	3.74	3.71	3.68	3.66	3.63	3.60	3.58	3.55
16.90 ELEV	1121.62	1121.62	1121.62	1121.61	1121.61	1121.61	1121.61	1121.61
17.70 CFS	3.52	3.50	3.47	3.45	3.42	3.39	3.37	3.34
17.70 ELEV	1121.61	1121.61	1121.61	1121.61	1121.61	1121.60	1121.60	1121.60
18.50 CFS	3.31	3.29	3.26	3.24	3.21	3.18	3.16	3.13
18.50 ELEV	1121.60	1121.60	1121.60	1121.60	1121.60	1121.60	1121.60	1121.59
19.30 CFS	3.11	3.08	3.05	3.03	3.00	2.97	2.95	2.92

TR20 ----- SCS -
 012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 2 YEAR (2.7 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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19.30	ELEV	1121.59	1121.59	1121.59	1121.59	1121.59	1121.59	1121.59	1121.59
20.10	CFS	2.89	2.87	2.84	2.82	2.79	2.76	2.74	2.71
20.10	ELEV	1121.58	1121.58	1121.58	1121.58	1121.58	1121.58	1121.58	1121.58
20.90	CFS	2.69	2.67	2.64	2.62	2.60	2.58	2.56	2.54
20.90	ELEV	1121.58	1121.58	1121.58	1121.57	1121.57	1121.57	1121.57	1121.57
21.70	CFS	2.51	2.49	2.47	2.46	2.44	2.42	2.40	2.38
21.70	ELEV	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57	1121.57
22.50	CFS	2.36	2.34	2.33	2.31	2.29	2.27	2.26	2.24
22.50	ELEV	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56
23.30	CFS	2.23	2.21	2.19	2.18	2.16	2.15	2.13	2.12
23.30	ELEV	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.56	1121.55
24.10	CFS	2.10	2.09	2.07	2.04	2.00	1.95	1.91	1.86
24.10	ELEV	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55
24.90	CFS	1.82	1.78	1.74	1.71	1.68	1.64	1.61	1.58
24.90	ELEV	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.53
25.70	CFS	1.55	1.52	1.49	1.45	1.42	1.39	1.37	1.34
25.70	ELEV	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.52
26.50	CFS	1.31	1.28	1.25	1.23	1.20	1.18	1.15	1.13
26.50	ELEV	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52
27.30	CFS	1.11	1.08	1.06	1.04	1.02	1.00	.97	.95
27.30	ELEV	1121.52	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51
28.10	CFS	.93	.91	.90	.88	.86	.84	.82	.81
28.10	ELEV	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51	1121.50	1121.50
28.90	CFS	.79	.77	.76	.74	.73	.71	.70	.68
28.90	ELEV	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50
29.70	CFS	.67	.65	.64	.63	.61	.60	.59	.58
29.70	ELEV	1121.50	1121.49	1121.49	1121.49	1121.49	1121.49	1121.48	1121.48
30.50	CFS	.57	.55	.54	.53	.52	.51	.50	
30.50	ELEV	1121.48	1121.48	1121.48	1121.48	1121.47	1121.47	1121.47	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .44 WATERSHED INCHES; 49 CFS-HRS; 4.1 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	4	4	3	3	2	2	1	1
DURATION (HRS)	18	19						
FLOW (CFS)	1	0						

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 2.70 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .100 HOURS

ALTERNATE	1	STORM	1					
XSECTION 103	RUNOFF	.02	.21	---	12.80R	1R	50.0	
XSECTION 102	RUNOFF	.03	.23	---	12.78T	1T	33.3	
XSECTION 97	ADDHYD	.05	.22	---	12.79T	2T	40.0	
XSECTION 101	RUNOFF	.03	.26	---	12.77T	1T	33.3	
XSECTION 98	ADDHYD	.08	.23	---	12.78T	3T	37.5	
XSECTION 12	RUNOFF	.01	1.15	---	12.02	6	600.0	
XSECTION 99	ADDHYD	.09	.31	---	12.03	7	77.8	
XSECTION 11	RUNOFF	.01	.41	---	12.29T	1T	100.0	
XSECTION 100	ADDHYD	.09	.31	---	12.04	7	77.8	
XSECTION 10	RUNOFF	.03	.55	---	12.41	6	200.0	
XSECTION 101	ADDHYD	.13	.38	---	12.42	10	76.9	
XSECTION 13	RUNOFF	.03	.82	---	11.99	19	633.3	
XSECTION 102	ADDHYD	.15	.45	---	12.01	28	186.7	
STRUCTURE 2	RESVOR	.15	.45	1136.14	14.35	4	26.7	
XSECTION 14	RUNOFF	.01	.38	---	12.40R	1R	100.0	
XSECTION 103	ADDHYD	.16	.45	---	14.18T	4T	25.0	
XSECTION 2	REACH	.16	.45	1126.17	14.30F	4F	25.0	
XSECTION 3	DIVERT	.08	.90	1124.73	14.30F	4F	50.0	
XSECTION 5	DIVERT	.08	.00	---	.00	0	.0	
XSECTION 3	REACH	.08	.90	1124.73	14.30F	4F	50.0	
XSECTION 15	RUNOFF	.01	.34	---	12.40R	1R	100.0	
XSECTION 104	ADDHYD	.09	.03	---	12.40R	1R	11.1	
STRUCTURE 4	RESVOR	.09	.02	---	.00	0	.0	
XSECTION 105	ADDHYD	.17	.44	---	14.19T	4T	23.5	
XSECTION 4	DIVERT	.08	.89	1123.93	14.19T	4T	50.0	
XSECTION 6	DIVERT	.08	.00	---	.00	0	.0	
XSECTION 4	REACH	.08	.88	1123.93	14.30T	4T	50.0	
XSECTION 16	RUNOFF	.01	.34	---	12.50R	1R	100.0	

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE	1	STORM	1				
XSECTION 106	ADDHYD	.09	.03	---	12.50R	1R	11.1
STRUCTURE 5	RESVOR	.09	.03	1120.02	12.50R	1R	11.1
XSECTION 107	ADDHYD	.17	.44	---	14.22T	4T	23.5
XSECTION 7	REACH	.17	.44	1121.64	14.22T	4T	23.5

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

		HYDROGRAPH INFORMATION				ROUTING PARAMETERS					
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS		.0 CFS									
ALTERNATE		1	STORM		1						
2	750		4	14.2	4	14.3	1.05	1.55	.001	1.000	.77?
3	150		4	14.3	4	14.3	.65	1.55	.000	1.000	1.00?
4	400		4	14.2	4	14.3	.65	1.55	.001	1.000	.93?
7	250		4	14.2	4	14.2	.65	1.55	.000	1.000	1.00?

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	1012	FULLPRINT		SUMMARY	NOPLOTS
TITLE	NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 revised)					
TITLE	10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	2				
8			1136.0	0.00	0.00	
8			1138.0	53.4	20.6	
9	ENDTBL					
3	STRUCT	4				
8			1123.0	0.00	0.00	
8			1124.0	0.01	0.05	
8			1125.0	33.7	0.31	
9	ENDTBL					
3	STRUCT	5				
8			1119.0	0.00	0.00	
8			1120.0	0.01	0.05	
8			1121.0	33.7	0.16	
8			1133.0	269.4	0.58	
9	ENDTBL					
2	XSECTN	002	1.0	1128.0	1129.0	1126.0
8			1126.0	0.0	0.0	
8			1126.1	1.13	1.05	
8			1126.5	17.87	6.25	
8			1127.0	63.32	15.00	
8			1128.0	247.27	40.00	
9	ENDTBL					
2	XSECTN	003	1.0	1126.5	1128.5	1124.5
8			1124.5	0.0	0.0	
8			1124.6	0.70	1.05	
8			1125.0	11.03	6.25	
8			1125.5	39.08	15.00	
8			1126.5	152.62	40.00	
9	ENDTBL					
2	XSECTN	004	1.0	1125.7	1127.7	1123.7
8			1123.7	0.0	0.0	
8			1123.8	0.70	1.05	
8			1124.2	11.03	6.25	
8			1124.7	39.08	15.00	
8			1125.7	152.62	40.00	
9	ENDTBL					
2	XSECTN	005	1.0	1126.0	1128.0	1124.0
8			1124.0	0.0	0.0	
8			1125.0	33.67	14.00	
8			1126.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	006	1.0	1122.0	1124.0	1120.0
8			1120.0	0.0	0.0	
8			1121.0	33.67	14.00	
8			1122.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	007	1.0	1123.4	1125.4	1121.4

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			1121.4	0.0	0.0				
8			1121.5	0.70	1.05				
8			1121.9	11.03	6.25				
8			1122.4	39.08	15.00				
8			1123.4	152.62	40.00				
9	ENDTBL								
6	RUNOFF	1 103	1 .0242	59.	0.99				1
6	RUNOFF	1 102	2 .0285	60.	1.02				1
6	ADDHYD	4 097	1 2 3						1
6	RUNOFF	1 101	1 .0274	61.	1.05				1
6	ADDHYD	4 098	3 1 2						1
6	RUNOFF	1 012	1 .0070	82.	0.21				1
6	ADDHYD	4 099	2 1 3						1
6	RUNOFF	1 011	2 .0074	66.	0.54				1
6	ADDHYD	4 100	3 2 4						1
6	RUNOFF	1 010	1 .0329	70.	0.75				1
6	ADDHYD	4 101	4 1 5						1
6	RUNOFF	1 013	1 .0271	76.	0.14				1
6	ADDHYD	4 102	5 1 4						1 1 1 1
6	RESVOR	2	2 4 2 1136.0						1
6	RUNOFF	1 014	1 .0055	65.	0.65				1
6	ADDHYD	4 103	2 1 3						1 1 1 1
6	REACH	3 002	3 1 750.0						1
6	DIVERT	6 003	1 3 2 17.0	0.50	005.				1 1 1 1
6	REACH	3 003	3 4 150.0						1
6	RUNOFF	1 015	5 .0064	64.	0.70				1
6	ADDHYD	4 104	2 5 1						1 1 1 1
6	RESVOR	2	4 1 2 1123.0						1
6	ADDHYD	4 105	4 2 1						1
6	DIVERT	6 004	1 3 2 11.0	0.50	006.				1 1 1 1
6	REACH	3 004	3 4 400.0						1
6	RUNOFF	1 016	1 .0071	64.	0.79				1
6	ADDHYD	4 106	2 1 5						1 1 1 1
6	RESVOR	2	5 5 2 1120.0						1
6	ADDHYD	4 107	4 2 1						1 1 1 1
6	REACH	3 007	1 2 250.0						
	ENDATA								
7	INCREM	6	0.10						2 2 01 01
7	COMPUT	7 103	007 0.0	4.00	1.0				
	ENDCMP	1							
	ENDJOB	2							

*****END OF 80-80 LIST*****

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 103 TO XSECTION 7
 STARTING TIME = .00 RAIN DEPTH = 4.00 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 103
 OUTPUT HYDROGRAPH = 1 AREA = .02 SQ MI
 INPUT RUNOFF CURVE = 59. TIME OF CONCENTRATION = .99 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1080 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.61 4.4 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .71 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

OPERATION RUNOFF XSECTION 102
 OUTPUT HYDROGRAPH = 2 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.02 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0942 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.62 5.6 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .76 WATERSHED INCHES; 14 CFS-HRS; 1.2 ACRE-FEET.

OPERATION ADDHYD XSECTION 97
 INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.62 10.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .74 WATERSHED INCHES; 25 CFS-HRS; 2.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 101
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 61. TIME OF CONCENTRATION = 1.05 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0969 HOURS

----- SCS -
 R20 .012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
 14:40:32 PASS 1 JOB NO. 1 PAGE 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.63 5.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 1.2 ACRE-FEET.
 .81 WATERSHED INCHES; 14 CFS-HRS;

OPERATION ADDHYD XSECTION 98
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.62 15.8 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 3.3 ACRE-FEET.
 .76 WATERSHED INCHES; 39 CFS-HRS;

OPERATION RUNOFF XSECTION 12
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 82. TIME OF CONCENTRATION = .21 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0280 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.01 12.6 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .8 ACRE-FEET.
 2.20 WATERSHED INCHES; 10 CFS-HRS;

OPERATION ADDHYD XSECTION 99
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.06 14.9 (NULL)
 12.59 17.2 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 4.1 ACRE-FEET.
 .88 WATERSHED INCHES; 49 CFS-HRS;

OPERATION RUNOFF XSECTION 11
 OUTPUT HYDROGRAPH = 2 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = .54 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0720 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.24 3.7 (RUNOFF)

TR20

.012

11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
14:40:32

NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
PASS 1 JOB NO. 1 PAGE 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.08 WATERSHED INCHES; 5 CFS-HRS; .4 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
INPUT HYDROGRAPHS 3,2 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.10 17.6 (NULL)
12.52 19.3 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.90 WATERSHED INCHES; 55 CFS-HRS; 4.5 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 70. TIME OF CONCENTRATION = .75 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.36 17.0 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.33 WATERSHED INCHES; 28 CFS-HRS; 2.3 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 5

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.42 35.7 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.01 WATERSHED INCHES; 83 CFS-HRS; 6.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 13
OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .14 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0187 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
11.98 42.2 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.74 WATERSHED INCHES; 30 CFS-HRS; 2.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 5,1 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.01 64.3 (NULL)
 12.35 42.1 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 9.4 ACRE-FEET.
 1.13 WATERSHED INCHES; 113 CFS-HRS;

OPERATION RESVOR STRUCTURE 2
 INPUT HYDROGRAPH 4 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1136.00

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 13.97 10.7 1136.40

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 DRAINAGE AREA = .15 SQ.MI.

HRS	MAIN TIME	INCREMENT = .100 hr,	.01	.01	.01	.01	.01	.01	.01
8.80 CFS	.00	.01	.01	.01	.01	.01	.01	.01	.01
8.80 ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
9.60 CFS	.02	.02	.02	.02	.03	.03	.03	.04	.05
9.60 ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
10.40 CFS	.06	.07	.08	.09	.11	.12	.14	.16	.16
10.40 ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.01	1136.01
11.20 CFS	.19	.22	.26	.31	.39	.54	.87	1.58	1.58
11.20 ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.02	1136.03	1136.06	1136.06
12.00 CFS	2.73	3.91	4.82	5.61	6.37	7.11	7.78	8.36	8.36
12.00 ELEV	1136.10	1136.15	1136.18	1136.21	1136.24	1136.27	1136.29	1136.31	1136.31
12.80 CFS	8.85	9.27	9.60	9.87	10.09	10.26	10.39	10.50	10.50
12.80 ELEV	1136.33	1136.35	1136.36	1136.37	1136.38	1136.38	1136.39	1136.39	1136.39
13.60 CFS	10.57	10.63	10.66	10.68	10.68	10.67	10.65	10.62	10.62
13.60 ELEV	1136.40	1136.40	1136.40	1136.40	1136.40	1136.40	1136.40	1136.40	1136.40
14.40 CFS	10.58	10.54	10.49	10.44	10.38	10.32	10.26	10.19	10.19
14.40 ELEV	1136.40	1136.39	1136.39	1136.39	1136.39	1136.39	1136.38	1136.38	1136.38
15.20 CFS	10.12	10.05	9.98	9.91	9.83	9.76	9.68	9.60	9.60
15.20 ELEV	1136.38	1136.38	1136.37	1136.37	1136.37	1136.37	1136.36	1136.36	1136.36
16.00 CFS	9.52	9.44	9.36	9.27	9.19	9.11	9.02	8.94	8.94
16.00 ELEV	1136.36	1136.35	1136.35	1136.35	1136.34	1136.34	1136.34	1136.33	1136.33
16.80 CFS	8.85	8.77	8.69	8.61	8.53	8.44	8.36	8.28	8.28
16.80 ELEV	1136.33	1136.33	1136.33	1136.32	1136.32	1136.32	1136.31	1136.31	1136.31
17.60 CFS	8.21	8.13	8.05	7.97	7.89	7.82	7.74	7.67	7.67
17.60 ELEV	1136.31	1136.30	1136.30	1136.30	1136.30	1136.29	1136.29	1136.29	1136.29
18.40 CFS	7.59	7.52	7.45	7.37	7.30	7.23	7.16	7.08	7.08
18.40 ELEV	1136.28	1136.28	1136.28	1136.28	1136.27	1136.27	1136.27	1136.27	1136.27
19.20 CFS	7.01	6.94	6.87	6.80	6.73	6.66	6.60	6.53	6.53
19.20 ELEV	1136.26	1136.26	1136.26	1136.25	1136.25	1136.25	1136.25	1136.24	1136.24

TR20
012

NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST

14:40:32

PASS 1 JOB NO. 1

20.00	CFS	6.46	6.39	6.32	6.26	6.19	6.13	6.06	6.00
20.00	ELEV	1136.24	1136.24	1136.24	1136.23	1136.23	1136.23	1136.23	1136.22
20.80	CFS	5.93	5.87	5.81	5.75	5.69	5.63	5.58	5.52
20.80	ELEV	1136.22	1136.22	1136.22	1136.22	1136.21	1136.21	1136.21	1136.21
21.60	CFS	5.46	5.41	5.36	5.30	5.25	5.20	5.15	5.10
21.60	ELEV	1136.20	1136.20	1136.20	1136.20	1136.20	1136.19	1136.19	1136.19
22.40	CFS	5.05	5.01	4.96	4.92	4.87	4.83	4.78	4.74
22.40	ELEV	1136.19	1136.19	1136.19	1136.18	1136.18	1136.18	1136.18	1136.18
23.20	CFS	4.70	4.66	4.62	4.58	4.54	4.50	4.46	4.42
23.20	ELEV	1136.18	1136.17	1136.17	1136.17	1136.17	1136.17	1136.17	1136.17
24.00	CFS	4.39	4.34	4.30	4.24	4.19	4.13	4.06	4.00
24.00	ELEV	1136.16	1136.16	1136.16	1136.16	1136.16	1136.15	1136.15	1136.15
24.80	CFS	3.93	3.86	3.78	3.71	3.64	3.56	3.49	3.42
24.80	ELEV	1136.15	1136.14	1136.14	1136.14	1136.14	1136.13	1136.13	1136.13
25.60	CFS	3.35	3.28	3.21	3.14	3.08	3.01	2.95	2.89
25.60	ELEV	1136.13	1136.12	1136.12	1136.12	1136.12	1136.11	1136.11	1136.11
26.40	CFS	2.82	2.76	2.71	2.65	2.59	2.54	2.48	2.43
26.40	ELEV	1136.11	1136.10	1136.10	1136.10	1136.10	1136.10	1136.09	1136.09
27.20	CFS	2.38	2.33	2.28	2.23	2.18	2.14	2.09	2.05
27.20	ELEV	1136.09	1136.09	1136.09	1136.08	1136.08	1136.08	1136.08	1136.08
28.00	CFS	2.00	1.96	1.92	1.88	1.84	1.80	1.76	1.73
28.00	ELEV	1136.08	1136.07	1136.07	1136.07	1136.07	1136.07	1136.07	1136.06
28.80	CFS	1.69	1.65	1.62	1.58	1.55	1.52	1.49	1.45
28.80	ELEV	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.06	1136.05
29.60	CFS	1.42	1.39	1.36	1.33	1.31	1.28	1.25	1.22
29.60	ELEV	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05	1136.05
30.40	CFS	1.20	1.17	1.15	1.12	1.10	1.08	1.05	1.03
30.40	ELEV	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04
31.20	CFS	1.01	.99	.97	.95	.93	.91	.89	.87
31.20	ELEV	1136.04	1136.04	1136.04	1136.04	1136.03	1136.03	1136.03	1136.03
32.00	CFS	.85	.83	.82	.80	.78	.76	.75	.73
32.00	ELEV	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03
32.80	CFS	.72	.70	.69	.67	.66	.64	.63	.62
32.80	ELEV	1136.03	1136.03	1136.03	1136.03	1136.02	1136.02	1136.02	1136.02
33.60	CFS	.60	.59	.58	.57	.55	.54	.53	.52
33.60	ELEV	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02
34.40	CFS	.51	.50	.49	.48	.47	.46	.45	.44
34.40	ELEV	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02
35.20	CFS	.43	.42	.41	.40	.39	.39	.38	.37
35.20	ELEV	1136.02	1136.02	1136.02	1136.02	1136.01	1136.01	1136.01	1136.01
36.00	CFS	.36	.35	.35	.34	.33	.32	.32	.31
36.00	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
36.80	CFS	.30	.30	.29	.29	.28	.27	.27	.26
36.80	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
37.60	CFS	.26	.25	.25	.24	.24	.23	.23	.22
37.60	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
38.40	CFS	.22	.21	.21	.20	.20	.19	.19	.19
38.40	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
39.20	CFS	.18	.18	.17	.17	.17	.16	.16	.16

39.20	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
40.00	CFS	.15	.15	.15	.14	.14	.14	.14	.13	.13
40.00	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.00
40.80	CFS	.13	.13	.12	.12	.12	.12	.12	.11	.11
40.80	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
41.60	CFS	.11	.11	.10	.10	.10	.10	.10	.10	.09
41.60	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
42.40	CFS	.09	.09	.09	.09	.08	.08	.08	.08	.08
42.40	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
43.20	CFS	.08	.08	.07	.07	.07	.07	.07	.07	.07
43.20	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
44.00	CFS	.07	.06	.06	.06	.06	.06	.06	.06	.06
44.00	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
44.80	CFS	.05	.05	.05	.05	.05	.05	.05	.05	.05
44.80	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
45.60	CFS	.05	.05	.04	.04	.04	.04	.04	.04	.04
45.60	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
46.40	CFS	.04	.04	.04	.04	.04	.04	.03	.03	.03
46.40	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
47.20	CFS	.03	.03							
47.20	ELEV	1136.00	1136.00							

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.13 WATERSHED INCHES; 113 CFS-HRS; 9.3 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	10	9	7	6	5	4	3	2
DURATION (HRS)	18	20	22	23				
FLOW (CFS)	1	1	1	0				

OPERATION RUNOFF XSECTION 14
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .65 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0867 HOURS

PEAK TIME (HRS) 12.32 PEAK DISCHARGE (CFS) 2.2 PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.03 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) 13.82 PEAK DISCHARGE (CFS) 11.0 PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 9.6 ACRE-FEET.
 1.13 WATERSHED INCHES; 117 CFS-HRS;

OPERATION REACH XSECTION 2 OUTPUT HYDROGRAPH 1
 INPUT HYDROGRAPH 3
 CHANNEL LENGTH = 750.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.048, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .94, PEAK TRAVEL TIME = .10 HOURS

PEAK TIME (HRS) 13.92
 PEAK DISCHARGE (CFS) 11.0
 PEAK ELEVATION (FEET) 1126.34

HRS	HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1									
	DRAINAGE AREA = .16 SQ. MI.									
	MAIN TIME INCREMENT = .100 hr,									
11.70 CFS	.39	.56	.96	1.87	3.46	5.26	6.73	7.75		
11.70 ELEV	1126.03	1126.05	1126.08	1126.12	1126.16	1126.20	1126.23	1126.26		
12.50 CFS	8.46	8.94	9.29	9.61	9.90	10.16	10.37	10.54		
12.50 ELEV	1126.28	1126.29	1126.29	1126.30	1126.31	1126.32	1126.32	1126.32		
13.30 CFS	10.69	10.80	10.89	10.95	11.00	11.03	11.04	11.03		
13.30 ELEV	1126.33	1126.33	1126.33	1126.33	1126.34	1126.34	1126.34	1126.34		
14.10 CFS	11.02	10.99	10.96	10.91	10.87	10.81	10.76	10.70		
14.10 ELEV	1126.34	1126.34	1126.33	1126.33	1126.33	1126.33	1126.33	1126.33		
14.90 CFS	10.64	10.57	10.50	10.43	10.36	10.28	10.21	10.13		
14.90 ELEV	1126.33	1126.33	1126.32	1126.32	1126.32	1126.32	1126.32	1126.32		
15.70 CFS	10.05	9.97	9.89	9.80	9.72	9.63	9.55	9.46		
15.70 ELEV	1126.31	1126.31	1126.31	1126.31	1126.31	1126.30	1126.30	1126.30		
16.50 CFS	9.37	9.29	9.20	9.11	9.03	8.94	8.86	8.77		
16.50 ELEV	1126.30	1126.29	1126.29	1126.29	1126.29	1126.29	1126.28	1126.28		
17.30 CFS	8.69	8.61	8.53	8.44	8.36	8.28	8.20	8.13		
17.30 ELEV	1126.28	1126.28	1126.28	1126.27	1126.27	1126.27	1126.27	1126.27		
18.10 CFS	8.05	7.97	7.89	7.81	7.74	7.66	7.59	7.51		
18.10 ELEV	1126.27	1126.26	1126.26	1126.26	1126.26	1126.26	1126.25	1126.25		
18.90 CFS	7.44	7.36	7.29	7.22	7.14	7.07	7.00	6.93		
18.90 ELEV	1126.25	1126.25	1126.25	1126.25	1126.24	1126.24	1126.24	1126.24		
19.70 CFS	6.86	6.79	6.72	6.64	6.57	6.51	6.44	6.37		
19.70 ELEV	1126.24	1126.24	1126.23	1126.23	1126.23	1126.23	1126.23	1126.23		
20.50 CFS	6.30	6.23	6.17	6.10	6.04	5.98	5.91	5.86		
20.50 ELEV	1126.22	1126.22	1126.22	1126.22	1126.22	1126.22	1126.21	1126.21		
21.30 CFS	5.80	5.74	5.68	5.62	5.57	5.51	5.46	5.41		
21.30 ELEV	1126.21	1126.21	1126.21	1126.21	1126.21	1126.20	1126.20	1126.20		
22.10 CFS	5.35	5.30	5.25	5.20	5.16	5.11	5.06	5.01		
22.10 ELEV	1126.20	1126.20	1126.20	1126.20	1126.20	1126.20	1126.19	1126.19		
22.90 CFS	4.97	4.92	4.88	4.84	4.80	4.75	4.71	4.67		
22.90 ELEV	1126.19	1126.19	1126.19	1126.19	1126.19	1126.19	1126.19	1126.18		
23.70 CFS	4.63	4.59	4.55	4.52	4.48	4.44	4.38	4.32		
23.70 ELEV	1126.18	1126.18	1126.18	1126.18	1126.18	1126.18	1126.18	1126.18		
24.50 CFS	4.25	4.17	4.10	4.02	3.94	3.87	3.79	3.71		

24.50	ELEV	1126.17	1126.17	1126.17	1126.17	1126.17	1126.17	1126.16	1126.16
25.30	CFS	3.64	3.57	3.49	3.42	3.35	3.28	3.21	3.15
25.30	ELEV	1126.16	1126.16	1126.16	1126.15	1126.15	1126.15	1126.15	1126.15
26.10	CFS	3.08	3.02	2.95	2.89	2.83	2.77	2.71	2.65
26.10	ELEV	1126.15	1126.15	1126.14	1126.14	1126.14	1126.14	1126.14	1126.14
26.90	CFS	2.60	2.54	2.49	2.43	2.38	2.33	2.28	2.23
26.90	ELEV	1126.14	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13	1126.13
27.70	CFS	2.19	2.14	2.10	2.05	2.01	1.96	1.92	1.88
27.70	ELEV	1126.13	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12
28.50	CFS	1.84	1.80	1.76	1.73	1.69	1.65	1.62	1.59
28.50	ELEV	1126.12	1126.12	1126.12	1126.11	1126.11	1126.11	1126.11	1126.11
29.30	CFS	1.55	1.52	1.49	1.46	1.42	1.39	1.37	1.34
29.30	ELEV	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11
30.10	CFS	1.31	1.28	1.25	1.23	1.20	1.17	1.15	1.13
30.10	ELEV	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10	1126.10
30.90	CFS	1.10	1.08	1.05	1.03	1.01	.99	.97	.95
30.90	ELEV	1126.10	1126.10	1126.09	1126.09	1126.09	1126.09	1126.09	1126.09
31.70	CFS	.93	.91	.89	.87	.85	.83	.82	.80
31.70	ELEV	1126.08	1126.08	1126.08	1126.08	1126.08	1126.07	1126.07	1126.07
32.50	CFS	.78	.76	.75	.73	.72	.70	.69	.67
32.50	ELEV	1126.07	1126.07	1126.07	1126.06	1126.06	1126.06	1126.06	1126.06
33.30	CFS	.66	.64	.63	.62	.60	.59	.58	.57
33.30	ELEV	1126.06	1126.06	1126.06	1126.05	1126.05	1126.05	1126.05	1126.05
34.10	CFS	.56	.54	.53	.52	.51	.50		
34.10	ELEV	1126.05	1126.05	1126.05	1126.05	1126.05	1126.04		

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.13 WATERSHED INCHES; 117 CFS-HRS; 9.6 ACRE-FEET.

DURATION(HRS)	2	4	6	8	10	12	14	16
FLOW(CFS)	10	9	8	6	5	4	3	2
DURATION(HRS)	18	20	22	23				
FLOW(CFS)	1	1	1	0				

OPERATION DIVERT XSECTION 3
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 3 XSECTION 3 XSECTION 5

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) 13.92 PEAK DISCHARGE(CFS) 11.0 PEAK ELEVATION(FEET) 1125.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.26 WATERSHED INCHES; 117 CFS-HRS; 9.6 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 5)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .0 ACRE-FEET.
 .00 WATERSHED INCHES; 0 CFS-HRS;

OPERATION REACH XSECTION 3 OUTPUT HYDROGRAPH 4
 INPUT HYDROGRAPH 3
 CHANNEL LENGTH = 150.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) 13.92
 PEAK DISCHARGE (CFS) 11.0
 PEAK ELEVATION (FEET) 1125.00

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .08 SQ.MI.

HRS	CFS	ELEV	CFS	ELEV	CFS	ELEV	CFS	ELEV	CFS	ELEV
11.70	1124.56	1124.58	1124.61	1124.65	1124.71	1124.78	1124.83	1124.87	1124.90	1124.92
11.70	8.46	8.94	9.29	9.61	9.90	10.16	10.37	10.54	10.69	10.80
12.50	1124.90	1124.92	1124.93	1124.94	1124.96	1124.97	1124.97	1124.98	1124.99	1124.99
12.50	10.69	10.80	10.89	10.95	11.00	11.03	11.04	11.03	11.02	10.99
13.30	1124.99	1124.99	1124.99	1125.00	1125.00	1125.00	1125.00	1125.00	1124.99	1124.99
13.30	10.69	10.80	10.89	10.95	11.00	11.03	11.04	11.03	11.02	10.99
14.10	1125.00	1125.00	1125.00	1125.00	1124.99	1124.99	1124.99	1124.99	1125.00	1125.00
14.10	11.02	10.99	10.96	10.91	10.87	10.81	10.76	10.70	11.02	10.99
14.90	1125.00	1125.00	1125.00	1125.00	1124.99	1124.99	1124.99	1124.99	1125.00	1125.00
14.90	10.64	10.57	10.50	10.43	10.36	10.28	10.21	10.13	10.64	10.57
14.90	1124.98	1124.98	1124.98	1124.98	1124.97	1124.97	1124.97	1124.97	1124.98	1124.98
14.90	9.72	9.63	9.55	9.46	9.37	9.28	9.19	9.10	9.72	9.63
15.70	1124.95	1124.95	1124.95	1124.95	1124.95	1124.95	1124.95	1124.95	1124.96	1124.96
15.70	10.05	9.97	9.89	9.80	9.72	9.63	9.55	9.46	10.05	9.97
15.70	1124.96	1124.96	1124.96	1124.96	1124.95	1124.95	1124.95	1124.95	1124.96	1124.96
15.70	9.37	9.29	9.20	9.11	9.03	8.94	8.86	8.77	9.37	9.29
16.50	1124.94	1124.93	1124.93	1124.93	1124.92	1124.92	1124.92	1124.91	1124.94	1124.93
16.50	8.69	8.61	8.53	8.44	8.36	8.28	8.20	8.13	8.69	8.61
17.30	1124.91	1124.91	1124.90	1124.90	1124.90	1124.89	1124.89	1124.89	1124.91	1124.91
17.30	8.05	7.97	7.89	7.81	7.74	7.66	7.59	7.51	8.05	7.97
18.10	1124.88	1124.88	1124.88	1124.88	1124.87	1124.87	1124.87	1124.87	1124.88	1124.88
18.10	7.44	7.36	7.29	7.22	7.14	7.07	7.00	6.93	7.44	7.36
18.90	1124.86	1124.86	1124.86	1124.85	1124.85	1124.85	1124.85	1124.84	1124.86	1124.86
18.90	6.86	6.79	6.72	6.64	6.57	6.51	6.44	6.37	6.86	6.79
19.70	1124.84	1124.84	1124.83	1124.83	1124.83	1124.82	1124.82	1124.82	1124.84	1124.84
19.70	6.30	6.23	6.17	6.10	6.04	5.98	5.91	5.86	6.30	6.23
20.50	1124.82	1124.81	1124.81	1124.81	1124.81	1124.80	1124.80	1124.80	1124.82	1124.81
20.50	5.80	5.74	5.68	5.62	5.57	5.51	5.46	5.41	5.80	5.74
21.30	1124.80	1124.80	1124.79	1124.79	1124.79	1124.79	1124.78	1124.78	1124.80	1124.80
21.30	5.35	5.30	5.25	5.20	5.16	5.11	5.06	5.01	5.35	5.30
22.10	1124.78	1124.78	1124.78	1124.77	1124.77	1124.77	1124.77	1124.77	1124.78	1124.78
22.10	4.97	4.92	4.88	4.84	4.80	4.75	4.71	4.67	4.97	4.92
22.90	1124.77	1124.76	1124.76	1124.76	1124.76	1124.76	1124.76	1124.76	1124.77	1124.76
22.90	4.97	4.92	4.88	4.84	4.80	4.75	4.71	4.67	4.97	4.92

23.70	CFS	4.63	4.59	4.55	4.52	4.48	4.44	4.38	4.32
23.70	ELEV	1124.75	1124.75	1124.75	1124.75	1124.75	1124.74	1124.74	1124.74
24.50	CFS	4.25	4.17	4.10	4.02	3.94	3.87	3.79	3.71
24.50	ELEV	1124.74	1124.73	1124.73	1124.73	1124.73	1124.72	1124.72	1124.72
25.30	CFS	3.64	3.57	3.49	3.42	3.35	3.28	3.21	3.15
25.30	ELEV	1124.71	1124.71	1124.71	1124.71	1124.70	1124.70	1124.70	1124.69
26.10	CFS	3.08	3.02	2.95	2.89	2.83	2.77	2.71	2.65
26.10	ELEV	1124.69	1124.69	1124.69	1124.68	1124.68	1124.68	1124.68	1124.68
26.90	CFS	2.60	2.54	2.49	2.43	2.38	2.33	2.28	2.23
26.90	ELEV	1124.67	1124.67	1124.67	1124.67	1124.67	1124.66	1124.66	1124.66
27.70	CFS	2.19	2.14	2.10	2.05	2.01	1.96	1.92	1.88
27.70	ELEV	1124.66	1124.66	1124.65	1124.65	1124.65	1124.65	1124.65	1124.65
28.50	CFS	1.84	1.80	1.76	1.73	1.69	1.65	1.62	1.59
28.50	ELEV	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64	1124.63
29.30	CFS	1.55	1.52	1.49	1.46	1.42	1.39	1.37	1.34
29.30	ELEV	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.62
30.10	CFS	1.31	1.28	1.25	1.23	1.20	1.17	1.15	1.13
30.10	ELEV	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62
30.90	CFS	1.10	1.08	1.05	1.03	1.01	.99	.97	.95
30.90	ELEV	1124.62	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61
31.70	CFS	.93	.91	.89	.87	.85	.83	.82	.80
31.70	ELEV	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.60	1124.60
32.50	CFS	.78	.76	.75	.73	.72	.70	.69	.67
32.50	ELEV	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60
33.30	CFS	.66	.64	.63	.62	.60	.59	.58	.57
33.30	ELEV	1124.59	1124.59	1124.59	1124.59	1124.59	1124.58	1124.58	1124.58
34.10	CFS	.56	.54	.53	.52	.51	.50		
34.10	ELEV	1124.58	1124.58	1124.58	1124.57	1124.57	1124.57		

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.26 WATERSHED INCHES; 117 CFS-HRS; 9.6 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	10	9	8	6	5	4	3	2
DURATION (HRS)	18	20	22	23				
FLOW (CFS)	1	1	1	0				

OPERATION RUNOFF XSECTION 15
 OUTPUT HYDROGRAPH = 5 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .70 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0933 HOURS

PEAK TIME (HRS) 12.37
 PEAK DISCHARGE (CFS) 2.3
 PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .97 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

OPERATION ADDHYD XSECTION 104
 INPUT HYDROGRAPHS 2,5 OUTPUT HYDROGRAPH 1

PEAK TIME (HRS) 12.37
 PEAK DISCHARGE (CFS) 2.3
 PEAK ELEVATION (FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .07 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

OPERATION RESVOR STRUCTURE 4
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1123.00

PEAK TIME (HRS) 12.57
 PEAK DISCHARGE (CFS) 1.9
 PEAK ELEVATION (FEET) 1124.06

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .09 SQ.MI.

HRS	MAIN TIME INCREMENT = .100 hr,	1.16	1.85	1.90	1.71	1.47
12.10 CFS	.00	.01	.01	1.16	1.85	1.90
12.10 ELEV	1123.00	1123.57	1123.91	1124.03	1124.05	1124.06
12.90 CFS	1.25	1.07	.93	.81	.72	.64
12.90 ELEV	1124.04	1124.03	1124.03	1124.02	1124.02	1124.02
13.70 CFS	.50	.46	.44	.41	.39	.37
13.70 ELEV	1124.01	1124.01	1124.01	1124.01	1124.01	1124.01
14.50 CFS	.32	.31	.30	.29	.29	.28
14.50 ELEV	1124.01	1124.01	1124.01	1124.01	1124.01	1124.01
15.30 CFS	.26	.26	.25	.25	.24	.24
15.30 ELEV	1124.01	1124.01	1124.01	1124.01	1124.01	1124.01
16.10 CFS	.22	.22	.21	.21	.20	.20
16.10 ELEV	1124.01	1124.01	1124.01	1124.01	1124.01	1124.01
16.90 CFS	.19	.19	.19	.18	.18	.18
16.90 ELEV	1124.01	1124.01	1124.01	1124.01	1124.01	1124.01
17.70 CFS	.17	.17	.17	.17	.17	.17
17.70 ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
18.50 CFS	.16	.16	.16	.15	.15	.15
18.50 ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
19.30 CFS	.14	.14	.14	.14	.14	.13
19.30 ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
20.10 CFS	.13	.13	.12	.12	.12	.12
20.10 ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
20.90 CFS	.12	.12	.12	.11	.11	.11
20.90 ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
21.70 CFS	.11	.11	.11	.11	.11	.11
21.70 ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
22.50 CFS	.11	.11	.11	.11	.11	.11
22.50 ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
23.30 CFS	.11	.11	.11	.11	.11	.10

TR20

SCS -

1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
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23.30	ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
24.10	CFS	.10	.10	.09	.08	.07	.05	.04	.03
24.10	ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00
24.90	CFS	.02	.01	.01	.01	.01	.01	.01	.01
24.90	ELEV	1124.00	1124.00	1124.00	1124.00	1124.00	1124.00	1123.99	1123.99
25.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
25.70	ELEV	1123.99	1123.99	1123.99	1123.99	1123.98	1123.98	1123.98	1123.98
26.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
26.50	ELEV	1123.98	1123.98	1123.97	1123.97	1123.97	1123.97	1123.97	1123.97
27.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
27.30	ELEV	1123.96	1123.96	1123.96	1123.96	1123.96	1123.96	1123.96	1123.95
28.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
28.10	ELEV	1123.95	1123.95	1123.95	1123.95	1123.95	1123.94	1123.94	1123.94
28.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
28.90	ELEV	1123.94	1123.94	1123.94	1123.93	1123.93	1123.93	1123.93	1123.93
29.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
29.70	ELEV	1123.93	1123.93	1123.92	1123.92	1123.92	1123.92	1123.92	1123.92
30.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
30.50	ELEV	1123.91	1123.91	1123.91	1123.91	1123.91	1123.91	1123.91	1123.90
31.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
31.30	ELEV	1123.90	1123.90	1123.90	1123.90	1123.90	1123.90	1123.89	1123.89
32.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
32.10	ELEV	1123.89	1123.89	1123.89	1123.89	1123.89	1123.88	1123.88	1123.88
32.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
32.90	ELEV	1123.88	1123.88	1123.88	1123.88	1123.87	1123.87	1123.87	1123.87
33.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
33.70	ELEV	1123.87	1123.87	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86
34.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
34.50	ELEV	1123.86	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85
35.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
35.30	ELEV	1123.85	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84
36.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
36.10	ELEV	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.82
36.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
36.90	ELEV	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82	1123.81	1123.81
37.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
37.70	ELEV	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.80	1123.80
38.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
38.50	ELEV	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80	1123.79	1123.79
39.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
39.30	ELEV	1123.79	1123.79	1123.79	1123.79	1123.79	1123.78	1123.78	1123.78
40.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
40.10	ELEV	1123.78	1123.78	1123.78	1123.78	1123.78	1123.77	1123.77	1123.77
40.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
40.90	ELEV	1123.77	1123.77	1123.77	1123.77	1123.77	1123.76	1123.76	1123.76
41.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
41.70	ELEV	1123.76	1123.76	1123.76	1123.76	1123.76	1123.75	1123.75	1123.75
42.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
42.50	ELEV	1123.75	1123.75	1123.75	1123.75	1123.75	1123.74	1123.74	1123.74

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
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43.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
43.30	ELEV	1123.74	1123.74	1123.74	1123.74	1123.74	1123.73	1123.73	1123.73
44.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
44.10	ELEV	1123.73	1123.73	1123.73	1123.73	1123.73	1123.72	1123.72	1123.72
44.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
44.90	ELEV	1123.72	1123.72	1123.72	1123.72	1123.72	1123.72	1123.71	1123.71
45.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
45.70	ELEV	1123.71	1123.71	1123.71	1123.71	1123.71	1123.71	1123.70	1123.70
46.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
46.50	ELEV	1123.70	1123.70	1123.70	1123.70	1123.70	1123.70	1123.70	1123.69

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .06 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	10	9	8	6	5	4	3	2
DURATION (HRS)	18	20	22	1				
FLOW (CFS)	1	1	1	0				

OPERATION ADDHYD XSECTION 105
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME (HRS)	13.70	PEAK DISCHARGE (CFS)	11.5	PEAK ELEVATION (FEET)	(NULL)
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RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.12 WATERSHED INCHES; 120 CFS-HRS; 9.9 ACRE-FEET.

OPERATION DIVERT XSECTION 4
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2
 XSECTION 4 XSECTION 4 XSECTION 6

OUTPUT #1 HYDROGRAPH

PEAK TIME (HRS)	12.80	PEAK DISCHARGE (CFS)	11.0 *	PEAK ELEVATION (FEET)	1124.20
				* FIRST POINT OF FLAT PEAK	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.23 WATERSHED INCHES; 120 CFS-HRS; 9.9 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 6)

----- SCS -
 TR20 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
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RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.23 WATERSHED INCHES; 399 CFS-HRS; 9.9 ACRE-FEET.

OPERATION REACH XSECTION 4
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 400.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.80 11.0 * 1124.20
 * FIRST POINT OF FLAT PEAK

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .08 SQ.MI.

HRS	MAIN TIME	INCREMENT	.39	.56	.96	1.87	3.46	5.27	6.74	8.91
11.70 CFS										
11.70 ELEV	1123.76	1123.78	1123.81	1123.85	1123.91	1123.98	1124.03	1124.12		
12.50 CFS	10.31	10.84	10.99	11.00	11.00	11.00	11.00	11.00		
12.50 ELEV	1124.17	1124.19	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20		
13.30 CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00		
13.30 ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20		
14.10 CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00		
14.10 ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20		
14.90 CFS	10.92	10.85	10.77	10.70	10.62	10.54	10.46	10.38		
14.90 ELEV	1124.20	1124.19	1124.19	1124.19	1124.18	1124.18	1124.18	1124.17		
15.70 CFS	10.29	10.21	10.12	10.03	9.94	9.85	9.76	9.67		
15.70 ELEV	1124.17	1124.17	1124.16	1124.16	1124.16	1124.15	1124.15	1124.15		
16.50 CFS	9.58	9.49	9.40	9.31	9.22	9.13	9.05	8.96		
16.50 ELEV	1124.14	1124.14	1124.14	1124.13	1124.13	1124.13	1124.12	1124.12		
17.30 CFS	8.87	8.79	8.71	8.62	8.54	8.46	8.37	8.29		
17.30 ELEV	1124.12	1124.11	1124.11	1124.11	1124.10	1124.10	1124.10	1124.09		
18.10 CFS	8.21	8.13	8.05	7.98	7.90	7.82	7.74	7.67		
18.10 ELEV	1124.09	1124.09	1124.08	1124.08	1124.08	1124.08	1124.07	1124.07		
18.90 CFS	7.59	7.51	7.44	7.36	7.29	7.21	7.14	7.07		
18.90 ELEV	1124.07	1124.06	1124.06	1124.06	1124.06	1124.05	1124.05	1124.05		
19.70 CFS	6.99	6.92	6.85	6.77	6.70	6.63	6.56	6.49		
19.70 ELEV	1124.04	1124.04	1124.04	1124.04	1124.03	1124.03	1124.03	1124.02		
20.50 CFS	6.42	6.35	6.29	6.22	6.16	6.09	6.03	5.97		
20.50 ELEV	1124.02	1124.02	1124.02	1124.01	1124.01	1124.01	1124.01	1124.00		
21.30 CFS	5.91	5.85	5.79	5.74	5.68	5.62	5.57	5.52		
21.30 ELEV	1124.00	1124.00	1124.00	1123.99	1123.99	1123.99	1123.99	1123.99		
22.10 CFS	5.47	5.41	5.36	5.31	5.26	5.22	5.17	5.12		
22.10 ELEV	1123.98	1123.98	1123.98	1123.98	1123.98	1123.97	1123.97	1123.97		
22.90 CFS	5.08	5.03	4.99	4.94	4.90	4.86	4.82	4.78		
22.90 ELEV	1123.97	1123.97	1123.97	1123.96	1123.96	1123.96	1123.96	1123.96		
23.70 CFS	4.74	4.70	4.66	4.62	4.58	4.54	4.48	4.40		

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
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23.70	ELEV	1123.96	1123.95	1123.95	1123.95	1123.95	1123.95	1123.95	1123.94
24.50	CFS	4.31	4.22	4.13	4.05	3.96	3.88	3.80	3.72
24.50	ELEV	1123.94	1123.94	1123.93	1123.93	1123.93	1123.92	1123.92	1123.92
25.30	CFS	3.65	3.58	3.50	3.43	3.36	3.29	3.22	3.16
25.30	ELEV	1123.91	1123.91	1123.91	1123.91	1123.90	1123.90	1123.90	1123.90
26.10	CFS	3.09	3.02	2.96	2.90	2.84	2.78	2.72	2.66
26.10	ELEV	1123.89	1123.89	1123.89	1123.89	1123.88	1123.88	1123.88	1123.88
26.90	CFS	2.61	2.55	2.50	2.44	2.39	2.34	2.29	2.24
26.90	ELEV	1123.87	1123.87	1123.87	1123.87	1123.87	1123.86	1123.86	1123.86
27.70	CFS	2.20	2.15	2.10	2.06	2.02	1.97	1.93	1.89
27.70	ELEV	1123.86	1123.86	1123.85	1123.85	1123.85	1123.85	1123.85	1123.85
28.50	CFS	1.85	1.81	1.77	1.74	1.70	1.66	1.63	1.60
28.50	ELEV	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.84	1123.83
29.30	CFS	1.56	1.53	1.50	1.46	1.43	1.40	1.37	1.35
29.30	ELEV	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83	1123.83
30.10	CFS	1.32	1.29	1.26	1.24	1.21	1.18	1.16	1.13
30.10	ELEV	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82	1123.82
30.90	CFS	1.11	1.09	1.06	1.04	1.02	1.00	.98	.96
30.90	ELEV	1123.82	1123.82	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81
31.70	CFS	.94	.92	.90	.88	.86	.84	.82	.81
31.70	ELEV	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.80	1123.80
32.50	CFS	.79	.77	.76	.74	.73	.71	.70	.68
32.50	ELEV	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80
33.30	CFS	.67	.65	.64	.63	.61	.60	.59	.58
33.30	ELEV	1123.80	1123.79	1123.79	1123.79	1123.79	1123.79	1123.78	1123.78
34.10	CFS	.56	.55	.54	.53	.52	.51	.50	
34.10	ELEV	1123.78	1123.78	1123.78	1123.78	1123.77	1123.77	1123.77	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.23 WATERSHED INCHES; 120 CFS-HRS; 9.9 ACRE-FEET.

DURATION(HRS)	2	4	6	8	10	12	14	16
FLOW(CFS)	11	10	8	7	5	5	3	2

DURATION(HRS)	18	20	22	23
FLOW(CFS)	1	1	1	0

OPERATION RUNOFF XSECTION 16
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .79 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1053 HOURS

PEAK TIME(HRS) 12.43 PEAK DISCHARGE(CFS) 2.3 PEAK ELEVATION(FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .97 WATERSHED INCHES; 4 CFS-HRS; .4 ACRE-FEET.

----- SCS -
 TR20 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
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OPERATION ADDHYD XSECTION 106
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 5

PEAK TIME(HRS) 12.43
 PEAK DISCHARGE(CFS) 2.3
 PEAK ELEVATION(FEET) (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .09 WATERSHED INCHES; 5 CFS-HRS; .4 ACRE-FEET.

OPERATION RESVOR STRUCTURE 5
 INPUT HYDROGRAPH 5 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1120.00

PEAK TIME(HRS) 12.47
 PEAK DISCHARGE(CFS) 2.3
 PEAK ELEVATION(FEET) 1120.07

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .09 SQ.MI.

HRS	CFS	ELEV	CFS	ELEV	CFS	ELEV	CFS	ELEV	CFS	ELEV
7.40	.01	1120.00	.01	1120.00	.01	1120.00	.01	1120.00	.01	1120.00
7.40	.01	1120.00	.01	1120.00	.01	1120.00	.01	1120.00	.01	1120.00
8.20	.01	1119.99	.01	1119.99	.01	1119.99	.01	1119.99	.01	1119.99
8.20	.01	1119.99	.01	1119.99	.01	1119.99	.01	1119.99	.01	1119.99
9.00	.01	1119.97	.01	1119.97	.01	1119.97	.01	1119.97	.01	1119.97
9.00	.01	1119.97	.01	1119.97	.01	1119.97	.01	1119.97	.01	1119.97
9.80	.01	1119.96	.01	1119.96	.01	1119.96	.01	1119.96	.01	1119.96
9.80	.01	1119.96	.01	1119.96	.01	1119.96	.01	1119.96	.01	1119.96
10.60	.01	1119.95	.01	1119.95	.01	1119.95	.01	1119.95	.01	1119.95
10.60	.01	1119.95	.01	1119.95	.01	1119.95	.01	1119.95	.01	1119.95
11.40	.01	1119.94	.01	1119.94	.01	1119.94	.01	1119.94	.01	1119.94
11.40	.01	1119.94	.01	1119.94	.01	1119.94	.01	1119.94	.01	1119.94
12.20	1.50	1120.04	1.97	1120.06	2.24	1120.07	2.28	1120.07	2.14	1120.06
12.20	1.50	1120.04	1.97	1120.06	2.24	1120.07	2.28	1120.07	2.14	1120.06
13.00	1.40	1120.04	1.32	1120.04	1.25	1120.04	1.21	1120.04	1.17	1120.03
13.00	1.40	1120.04	1.32	1120.04	1.25	1120.04	1.21	1120.04	1.17	1120.03
13.80	1.03	1120.03	.98	1120.03	.92	1120.03	.86	1120.03	.80	1120.02
13.80	1.03	1120.03	.98	1120.03	.92	1120.03	.86	1120.03	.80	1120.02
14.60	.50	1120.01	.42	1120.01	.35	1120.01	.32	1120.01	.31	1120.01
14.60	.50	1120.01	.42	1120.01	.35	1120.01	.32	1120.01	.31	1120.01
15.40	.29	1120.01	.28	1120.01	.28	1120.01	.27	1120.01	.26	1120.01
15.40	.29	1120.01	.28	1120.01	.28	1120.01	.27	1120.01	.26	1120.01
16.20	.24	1120.01	.24	1120.01	.23	1120.01	.23	1120.01	.22	1120.01
16.20	.24	1120.01	.24	1120.01	.23	1120.01	.23	1120.01	.22	1120.01
17.00	.21	1120.01	.21	1120.01	.20	1120.01	.20	1120.01	.20	1120.01
17.00	.21	1120.01	.21	1120.01	.20	1120.01	.20	1120.01	.20	1120.01
17.80	.19	1120.01	.19	1120.01	.19	1120.01	.19	1120.01	.18	1120.01
17.80	.19	1120.01	.19	1120.01	.19	1120.01	.19	1120.01	.18	1120.01
18.60	.18	1120.01	.17	1120.01	.17	1120.01	.17	1120.01	.16	1120.01
18.60	.18	1120.01	.17	1120.01	.17	1120.01	.17	1120.01	.16	1120.01

TR20 ----- SCS -
 012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 1/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
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38.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01
38.60	ELEV	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.79	1119.79
39.40	CFS	.01	.01	.01	.01	.01	.01	.01	.01
39.40	ELEV	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.78	1119.78
40.20	CFS	.01	.01	.01	.01	.01	.01	.01	.01
40.20	ELEV	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.77	1119.77
41.00	CFS	.01	.01	.01	.01	.01	.01	.01	.01
41.00	ELEV	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.76	1119.76
41.80	CFS	.01	.01	.01	.01	.01	.01	.01	.01
41.80	ELEV	1119.76	1119.76	1119.76	1119.76	1119.76	1119.75	1119.75	1119.75
42.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01
42.60	ELEV	1119.75	1119.75	1119.75	1119.75	1119.75	1119.74	1119.74	1119.74
43.40	CFS	.01	.01	.01	.01	.01	.01	.01	.01
43.40	ELEV	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.73	1119.73
44.20	CFS	.01	.01	.01	.01	.01	.01	.01	.01
44.20	ELEV	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.72	1119.72
45.00	CFS	.01	.01	.01	.01	.01	.01	.01	.01
45.00	ELEV	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.71	1119.71
45.80	CFS	.01	.01	.01	.01	.01	.01	.01	.01
45.80	ELEV	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.71	1119.70
46.60	CFS	.01	.01	.01	.01	.01	.01	.01	.01
46.60	ELEV	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70	1119.70

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .09 WATERSHED INCHES; 5 CFS-HRS; .4 ACRE-FEET.

DURATION (HRS) 2 3
 FLOW (CFS) 1 0

OPERATION ADDHYD XSECTION 107
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME (HRS) 12.63 PEAK DISCHARGE (CFS) 13.0 PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.11 WATERSHED INCHES; 125 CFS-HRS; 10.3 ACRE-FEET.

OPERATION REACH XSECTION 7
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 250.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .654, M = 1.54
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) 12.63
 PEAK DISCHARGE (CFS) 13.0
 PEAK ELEVATION (FEET) 1121.94

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .17 SQ.MI.

HRS	MAIN TIME	INCREMENT	.40	.57	.97	2.14	4.43	6.76	8.71	11.15
11.70	CFS									
11.70	ELEV	1121.46	1121.48	1121.51	1121.56	1121.64	1121.73	1121.81	1121.90	
12.50	CFS	12.59	12.98	12.89	12.67	12.51	12.40	12.32	12.25	
12.50	ELEV	1121.93	1121.93	1121.93	1121.93	1121.93	1121.92	1121.92	1121.92	
13.30	CFS	12.21	12.17	12.14	12.10	12.07	12.03	11.98	11.92	
13.30	ELEV	1121.92	1121.92	1121.92	1121.92	1121.92	1121.92	1121.92	1121.92	
14.10	CFS	11.86	11.80	11.72	11.65	11.57	11.50	11.42	11.34	
14.10	ELEV	1121.91	1121.91	1121.91	1121.91	1121.91	1121.91	1121.91	1121.91	
14.90	CFS	11.24	11.16	11.08	11.00	10.91	10.83	10.74	10.65	
14.90	ELEV	1121.90	1121.90	1121.90	1121.90	1121.90	1121.89	1121.89	1121.89	
15.70	CFS	10.56	10.47	10.38	10.28	10.19	10.09	9.99	9.90	
15.70	ELEV	1121.88	1121.88	1121.87	1121.87	1121.87	1121.86	1121.86	1121.86	
16.50	CFS	9.80	9.71	9.61	9.52	9.43	9.34	9.25	9.16	
16.50	ELEV	1121.85	1121.85	1121.85	1121.84	1121.84	1121.83	1121.83	1121.83	
17.30	CFS	9.08	8.99	8.90	8.82	8.73	8.65	8.56	8.48	
17.30	ELEV	1121.82	1121.82	1121.82	1121.81	1121.81	1121.81	1121.80	1121.80	
18.10	CFS	8.40	8.32	8.24	8.15	8.07	7.99	7.92	7.84	
18.10	ELEV	1121.80	1121.80	1121.79	1121.79	1121.79	1121.78	1121.78	1121.78	
18.90	CFS	7.76	7.68	7.60	7.53	7.45	7.37	7.30	7.22	
18.90	ELEV	1121.77	1121.77	1121.77	1121.76	1121.76	1121.76	1121.76	1121.75	
19.70	CFS	7.14	7.07	6.99	6.92	6.84	6.77	6.70	6.63	
19.70	ELEV	1121.75	1121.75	1121.74	1121.74	1121.74	1121.74	1121.73	1121.73	
20.50	CFS	6.55	6.49	6.42	6.35	6.29	6.22	6.16	6.10	
20.50	ELEV	1121.73	1121.72	1121.72	1121.72	1121.72	1121.71	1121.71	1121.71	
21.30	CFS	6.04	5.98	5.92	5.86	5.80	5.75	5.69	5.64	
21.30	ELEV	1121.71	1121.70	1121.70	1121.70	1121.70	1121.70	1121.69	1121.69	
22.10	CFS	5.59	5.54	5.49	5.44	5.39	5.34	5.29	5.24	
22.10	ELEV	1121.69	1121.69	1121.69	1121.68	1121.68	1121.68	1121.68	1121.68	
22.90	CFS	5.20	5.15	5.11	5.06	5.02	4.98	4.94	4.90	
22.90	ELEV	1121.67	1121.67	1121.67	1121.67	1121.67	1121.67	1121.66	1121.66	
23.70	CFS	4.85	4.82	4.78	4.74	4.70	4.65	4.58	4.49	
23.70	ELEV	1121.66	1121.66	1121.66	1121.66	1121.65	1121.65	1121.65	1121.65	
24.50	CFS	4.39	4.28	4.18	4.08	3.99	3.90	3.82	3.73	
24.50	ELEV	1121.64	1121.64	1121.63	1121.63	1121.63	1121.62	1121.62	1121.62	
25.30	CFS	3.66	3.59	3.51	3.44	3.37	3.30	3.23	3.17	
25.30	ELEV	1121.61	1121.61	1121.61	1121.61	1121.60	1121.60	1121.60	1121.60	
26.10	CFS	3.10	3.03	2.97	2.91	2.85	2.79	2.73	2.67	
26.10	ELEV	1121.59	1121.59	1121.59	1121.59	1121.58	1121.58	1121.58	1121.58	
26.90	CFS	2.62	2.56	2.51	2.45	2.40	2.35	2.30	2.25	
26.90	ELEV	1121.57	1121.57	1121.57	1121.57	1121.57	1121.56	1121.56	1121.56	
27.70	CFS	2.21	2.16	2.11	2.07	2.03	1.98	1.94	1.90	
27.70	ELEV	1121.56	1121.56	1121.55	1121.55	1121.55	1121.55	1121.55	1121.55	
28.50	CFS	1.86	1.82	1.78	1.75	1.71	1.67	1.64	1.60	
28.50	ELEV	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	1121.54	
29.30	CFS	1.57	1.54	1.51	1.47	1.44	1.41	1.38	1.35	

----- SCS -
 TR20 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 10 YEAR (4.0 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS R2.04TEST
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29.30	ELEV	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53	1121.53
30.10	CFS	1.33	1.30	1.27	1.24	1.22	1.19	1.17	1.14
30.10	ELEV	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52	1121.52
30.90	CFS	1.12	1.10	1.07	1.05	1.03	1.01	.99	.97
30.90	ELEV	1121.52	1121.52	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51
31.70	CFS	.95	.93	.91	.89	.87	.85	.83	.82
31.70	ELEV	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51	1121.51	1121.50
32.50	CFS	.80	.78	.77	.75	.73	.72	.70	.69
32.50	ELEV	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50	1121.50
33.30	CFS	.68	.66	.65	.63	.62	.61	.60	.58
33.30	ELEV	1121.50	1121.49	1121.49	1121.49	1121.49	1121.49	1121.49	1121.48
34.10	CFS	.57	.56	.55	.54	.53	.52	.51	.49
34.10	ELEV	1121.48	1121.48	1121.48	1121.48	1121.48	1121.47	1121.47	1121.47

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.11 WATERSHED INCHES; 125 CFS-HRS; 10.3 ACRE-FEET.

DURATION(HRS)	2	4	6	8	10	12	14	16
FLOW(CFS)	12	10	8	7	6	5	3	2
DURATION(HRS)	18	20	22	23				
FLOW(CFS)	1	1	1	0				

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 4.00 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .100 HOURS

ALTERNATE 1 STORM 1

XSECTION 103	RUNOFF	.02	.71	---	12.61T	4T	200.0
XSECTION 102	RUNOFF	.03	.76	---	12.62	6	200.0
XSECTION 97	ADDHYD	.05	.74	---	12.62	10	200.0
XSECTION 101	RUNOFF	.03	.81	---	12.63	6	200.0
XSECTION 98	ADDHYD	.08	.76	---	12.62	16	200.0
XSECTION 12	RUNOFF	.01	2.20	---	12.01	13	1300.0
XSECTION 99	ADDHYD	.09	.88	---	12.59	17	188.9
XSECTION 11	RUNOFF	.01	1.08	---	12.24T	4T	400.0
XSECTION 100	ADDHYD	.09	.90	---	12.52	19	211.1
XSECTION 10	RUNOFF	.03	1.33	---	12.36	17	566.7
XSECTION 101	ADDHYD	.13	1.01	---	12.42	36	276.9
XSECTION 13	RUNOFF	.03	1.74	---	11.98	42	1400.0
XSECTION 102	ADDHYD	.15	1.13	---	12.01	64	426.7
STRUCTURE 2	RESVOR	.15	1.13	1136.40	13.97	11	73.3
XSECTION 14	RUNOFF	.01	1.03	---	12.32T	2T	200.0
XSECTION 103	ADDHYD	.16	1.13	---	13.82	11	68.8
XSECTION 2	REACH	.16	1.13	1126.34	13.92	11	68.8
XSECTION 3	DIVERT	.08	2.26	1125.00	13.92	11	137.5
XSECTION 5	DIVERT	.08	.00	---	.00	0	.0
XSECTION 3	REACH	.08	2.26	1125.00	13.92	11	137.5
XSECTION 15	RUNOFF	.01	.97	---	12.37T	2T	200.0
XSECTION 104	ADDHYD	.09	.07	---	12.37T	2T	22.2
STRUCTURE 4	RESVOR	.09	.06	1124.06	12.57	2	22.2
XSECTION 105	ADDHYD	.17	1.12	---	13.70	11	64.7
XSECTION 4	DIVERT	.08	2.23	1124.20	12.80F	11F	137.5
XSECTION 6	DIVERT	.08	2.23	---	.00	0	.0
XSECTION 4	REACH	.08	2.23	1124.20	12.80F	11F	137.5
XSECTION 16	RUNOFF	.01	.97	---	12.43T	2T	200.0

SUMMARY TABLE 1

 SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE	1	STORM	1				
XSECTION 106	ADDHYD	.09	.09	---	12.43T	2T	22.2
STRUCTURE 5	RESVOR	.09	.09	1120.07	12.47	2	22.2
XSECTION 107	ADDHYD	.17	1.11	---	12.63	13	76.5
XSECTION 7	REACH	.17	1.11	1121.94	12.63	13	76.5

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS .0 CFS											
	ALTERNATE		1	STORM	1						
2	750		11	13.8	11	13.9	1.05	1.55	.001	1.000	.94?
3	150		11	13.9	11	13.9	.65	1.55	.000	1.000	1.00?
4	400		11	12.8	11	12.8	.65	1.55	.000	1.000	1.00?
7	250		13	12.6	13	12.6	.65	1.54	.000	1.000	1.00?

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	1012	FULLPRINT	SUMMARY	NOPLOTS	
TITLE	NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 revised)					
TITLE	100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	2				
8			1136.0	0.00	0.00	
8			1138.0	53.4	20.6	
9	ENDTBL					
3	STRUCT	4				
8			1123.0	0.00	0.00	
8			1124.0	0.01	0.05	
8			1125.0	33.7	0.31	
9	ENDTBL					
3	STRUCT	5				
8			1119.0	0.00	0.00	
8			1120.0	0.01	0.05	
8			1121.0	33.7	0.16	
8			1133.0	269.4	0.58	
9	ENDTBL					
2	XSECTN	002	1.0	1128.0	1129.0	1126.0
8			1126.0	0.0	0.0	
8			1126.1	1.13	1.05	
8			1126.5	17.87	6.25	
8			1127.0	63.32	15.00	
8			1128.0	247.27	40.00	
9	ENDTBL					
2	XSECTN	003	1.0	1126.5	1128.5	1124.5
8			1124.5	0.0	0.0	
8			1124.6	0.70	1.05	
8			1125.0	11.03	6.25	
8			1125.5	39.08	15.00	
8			1126.5	152.62	40.00	
9	ENDTBL					
2	XSECTN	004	1.0	1125.7	1127.7	1123.7
8			1123.7	0.0	0.0	
8			1123.8	0.70	1.05	
8			1124.2	11.03	6.25	
8			1124.7	39.08	15.00	
8			1125.7	152.62	40.00	
9	ENDTBL					
2	XSECTN	005	1.0	1126.0	1128.0	1124.0
8			1124.0	0.0	0.0	
8			1125.0	33.67	14.00	
8			1126.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	006	1.0	1122.0	1124.0	1120.0
8			1120.0	0.0	0.0	
8			1121.0	33.67	14.00	
8			1122.0	269.36	36.00	
9	ENDTBL					
2	XSECTN	007	1.0	1123.4	1125.4	1121.4

*****80-80 LIST OF INPUT DATA (CONTINUED)*****

8			1121.4	0.0	0.0				
8			1121.5	0.70	1.05				
8			1121.9	11.03	6.25				
8			1122.4	39.08	15.00				
8			1123.4	152.62	40.00				
9	ENDTBL								
6	RUNOFF	1 103	1 .0242	59.	0.99				1
6	RUNOFF	1 102	2 .0285	60.	1.02				1
6	ADDHYD	4 097	1 2 3						1
6	RUNOFF	1 101	1 .0274	61.	1.05				1
6	ADDHYD	4 098	3 1 2						1
6	RUNOFF	1 012	1 .0070	82.	0.21				1
6	ADDHYD	4 099	2 1 3						1
6	RUNOFF	1 011	2 .0074	66.	0.54				1
6	ADDHYD	4 100	3 2 4						1
6	RUNOFF	1 010	1 .0329	70.	0.75				1
6	ADDHYD	4 101	4 1 5						1
6	RUNOFF	1 013	1 .0271	76.	0.14				1
6	ADDHYD	4 102	5 1 4						1
6	RESVOR	2	2 4 2 1136.0						1 1 1 1
6	RUNOFF	1 014	1 .0055	65.	0.65				1
6	ADDHYD	4 103	2 1 3						1
6	REACH	3 002	3 1 750.0						1 1 1 1
6	DIVERT	6 003	1 3 2 17.0	0.50	005.				1
6	REACH	3 003	3 4 150.0						1 1 1 1
6	RUNOFF	1 015	5 .0064	64.	0.70				1
6	ADDHYD	4 104	2 5 1						1
6	RESVOR	2	4 1 2 1123.0						1 1 1 1
6	ADDHYD	4 105	4 2 1						1
6	DIVERT	6 004	1 3 2 11.0	0.50	006.				1
6	REACH	3 004	3 4 400.0						1 1 1 1
6	RUNOFF	1 016	1 .0071	64.	0.79				1
6	ADDHYD	4 106	2 1 5						1
6	RESVOR	2	5 5 2 1120.0						1 1 1 1
6	ADDHYD	4 107	4 2 1						1
6	REACH	3 007	1 2 250.0						1 1 1 1
	ENDATA								
7	INCREM	6	0.10						
7	COMPUT	7 103 007	0.0	5.60	1.0				2 2 01 01
	ENDCMP	1							
	ENDJOB	2							

*****END OF 80-80 LIST*****

----- SCS -
 TR20 -----
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 .1/19/97 100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
 14:47:11 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 103 TO XSECTION 7
 STARTING TIME = .00 RAIN DEPTH = 5.60 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 103
 OUTPUT HYDROGRAPH = 1 AREA = .02 SQ MI
 INPUT RUNOFF CURVE = 59. TIME OF CONCENTRATION = .99 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1080 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.54 11.7 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.1 ACRE-FEET.
 1.59 WATERSHED INCHES; 25 CFS-HRS;

OPERATION RUNOFF XSECTION 102
 OUTPUT HYDROGRAPH = 2 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.02 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0942 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.56 14.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.5 ACRE-FEET.
 1.67 WATERSHED INCHES; 31 CFS-HRS;

OPERATION ADDHYD XSECTION 97
 INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.55 26.2 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 4.6 ACRE-FEET.
 1.63 WATERSHED INCHES; 55 CFS-HRS;

OPERATION RUNOFF XSECTION 101
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 61. TIME OF CONCENTRATION = 1.05 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0969 HOURS

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 1/19/97 100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
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PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.58 14.4 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.74 WATERSHED INCHES; 31 CFS-HRS; 2.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 98
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.56 40.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.67 WATERSHED INCHES; 86 CFS-HRS; 7.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 12
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 82. TIME OF CONCENTRATION = .21 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0280 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.01 20.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.62 WATERSHED INCHES; 16 CFS-HRS; 1.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 99
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.54 43.2 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.82 WATERSHED INCHES; 103 CFS-HRS; 8.5 ACRE-FEET.

OPERATION RUNOFF XSECTION 11
 OUTPUT HYDROGRAPH = 2 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 66. TIME OF CONCENTRATION = .54 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0720 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.23 7.9 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.15 WATERSHED INCHES; 10 CFS-HRS; .8 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
 INPUT HYDROGRAPHS 3,2 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.49	47.9	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.85 WATERSHED INCHES; 113 CFS-HRS; 9.3 ACRE-FEET.

OPERATION RUNOFF XSECTION 10
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 70. TIME OF CONCENTRATION = .75 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.34	33.8	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.49 WATERSHED INCHES; 53 CFS-HRS; 4.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 5

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.41	80.3	(NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.01 WATERSHED INCHES; 166 CFS-HRS; 13.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 13
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .14 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0187 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
11.98	73.7	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.03 WATERSHED INCHES; 53 CFS-HRS; 4.4 ACRE-FEET.

TR20
1012

NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION

1/19/97 100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
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18.30	CFS	14.68	14.52	14.36	14.20	14.04	13.89	13.73	13.58
18.30	ELEV	1136.55	1136.54	1136.54	1136.53	1136.53	1136.52	1136.51	1136.51
19.10	CFS	13.43	13.28	13.13	12.99	12.84	12.69	12.55	12.41
19.10	ELEV	1136.50	1136.50	1136.49	1136.49	1136.48	1136.48	1136.47	1136.46
19.90	CFS	12.27	12.13	11.99	11.85	11.71	11.58	11.44	11.31
19.90	ELEV	1136.46	1136.45	1136.45	1136.44	1136.44	1136.43	1136.43	1136.42
20.70	CFS	11.18	11.05	10.93	10.80	10.68	10.56	10.44	10.32
20.70	ELEV	1136.42	1136.41	1136.41	1136.40	1136.40	1136.40	1136.39	1136.39
21.50	CFS	10.21	10.10	9.99	9.88	9.77	9.67	9.57	9.46
21.50	ELEV	1136.38	1136.38	1136.37	1136.37	1136.37	1136.36	1136.36	1136.35
22.30	CFS	9.37	9.27	9.17	9.08	8.99	8.90	8.81	8.72
22.30	ELEV	1136.35	1136.35	1136.34	1136.34	1136.34	1136.33	1136.33	1136.33
23.10	CFS	8.63	8.55	8.46	8.38	8.30	8.22	8.15	8.07
23.10	ELEV	1136.32	1136.32	1136.32	1136.31	1136.31	1136.31	1136.31	1136.30
23.90	CFS	7.99	7.92	7.84	7.75	7.65	7.55	7.44	7.32
23.90	ELEV	1136.30	1136.30	1136.29	1136.29	1136.29	1136.28	1136.28	1136.27
24.70	CFS	7.20	7.07	6.94	6.81	6.68	6.55	6.42	6.29
24.70	ELEV	1136.27	1136.26	1136.26	1136.26	1136.25	1136.25	1136.24	1136.24
25.50	CFS	6.16	6.03	5.90	5.78	5.66	5.54	5.42	5.31
25.50	ELEV	1136.23	1136.23	1136.22	1136.22	1136.21	1136.21	1136.20	1136.20
26.30	CFS	5.20	5.09	4.98	4.87	4.77	4.67	4.57	4.47
26.30	ELEV	1136.19	1136.19	1136.19	1136.18	1136.18	1136.17	1136.17	1136.17
27.10	CFS	4.38	4.29	4.20	4.11	4.02	3.93	3.85	3.77
27.10	ELEV	1136.16	1136.16	1136.16	1136.15	1136.15	1136.15	1136.14	1136.14
27.90	CFS	3.69	3.61	3.53	3.46	3.39	3.31	3.24	3.18
27.90	ELEV	1136.14	1136.14	1136.13	1136.13	1136.13	1136.12	1136.12	1136.12
28.70	CFS	3.11	3.04	2.98	2.91	2.85	2.79	2.73	2.68
28.70	ELEV	1136.12	1136.11	1136.11	1136.11	1136.11	1136.10	1136.10	1136.10
29.50	CFS	2.62	2.56	2.51	2.46	2.40	2.35	2.30	2.25
29.50	ELEV	1136.10	1136.10	1136.09	1136.09	1136.09	1136.09	1136.09	1136.08
30.30	CFS	2.21	2.16	2.11	2.07	2.03	1.98	1.94	1.90
30.30	ELEV	1136.08	1136.08	1136.08	1136.08	1136.08	1136.07	1136.07	1136.07
31.10	CFS	1.86	1.82	1.78	1.74	1.71	1.67	1.63	1.60
31.10	ELEV	1136.07	1136.07	1136.07	1136.07	1136.06	1136.06	1136.06	1136.06
31.90	CFS	1.57	1.53	1.50	1.47	1.44	1.41	1.38	1.35
31.90	ELEV	1136.06	1136.06	1136.06	1136.06	1136.05	1136.05	1136.05	1136.05
32.70	CFS	1.32	1.29	1.26	1.24	1.21	1.19	1.16	1.14
32.70	ELEV	1136.05	1136.05	1136.05	1136.05	1136.05	1136.04	1136.04	1136.04
33.50	CFS	1.11	1.09	1.06	1.04	1.02	1.00	.98	.96
33.50	ELEV	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04	1136.04
34.30	CFS	.94	.92	.90	.88	.86	.84	.82	.81
34.30	ELEV	1136.04	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03
35.10	CFS	.79	.77	.76	.74	.72	.71	.69	.68
35.10	ELEV	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03	1136.03
35.90	CFS	.66	.65	.64	.62	.61	.60	.58	.57
35.90	ELEV	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02
36.70	CFS	.56	.55	.54	.53	.51	.50	.49	.48
36.70	ELEV	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02
37.50	CFS	.47	.46	.45	.44	.43	.42	.41	.41

37.50	ELEV	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02	1136.02
38.30	CFS	.40	.39	.38	.37	.36	.36	.35	.34
38.30	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
39.10	CFS	.33	.33	.32	.31	.31	.30	.29	.29
39.10	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
39.90	CFS	.28	.28	.27	.26	.26	.25	.25	.24
39.90	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
40.70	CFS	.24	.23	.23	.22	.22	.21	.21	.20
40.70	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
41.50	CFS	.20	.20	.19	.19	.18	.18	.18	.17
41.50	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
42.30	CFS	.17	.17	.16	.16	.15	.15	.15	.15
42.30	ELEV	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01	1136.01
43.10	CFS	.14	.14	.14	.13	.13	.13	.12	.12
43.10	ELEV	1136.01	1136.01	1136.01	1136.01	1136.00	1136.00	1136.00	1136.00
43.90	CFS	.12	.12	.11	.11	.11	.11	.11	.10
43.90	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
44.70	CFS	.10	.10	.10	.09	.09	.09	.09	.09
44.70	ELEV	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00	1136.00
45.50	CFS	.08	.08	.08	.08				
45.50	ELEV	1136.00	1136.00	1136.00	1136.00				

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.19 WATERSHED INCHES; 218 CFS-HRS; 18.0 ACRE-FEET.

DURATION(HRS)	3	6	9	12	15	18	21	24
FLOW(CFS)	19	14	10	8	4	2	1	1

DURATION(HRS) 26
 FLOW(CFS) 0

OPERATION RUNOFF XSECTION 14
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .65 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0867 HOURS

PEAK TIME(HRS) 12.30 PEAK DISCHARGE(CFS) 4.9 PEAK ELEVATION(FEET)
 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.06 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME(HRS) 13.66 PEAK DISCHARGE(CFS) 22.7 PEAK ELEVATION(FEET)
 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.19 WATERSHED INCHES; 226 CFS-HRS; 18.7 ACRE-FEET.

OPERATION REACH XSECTION 2
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 CHANNEL LENGTH = 750.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.060, M = 1.53
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 13.66 22.7 1126.55

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .16 SQ.MI.

HRS	CFS	ELEV	.48	.55	.62	.70	.80	.92	1.05	1.21
10.80	CFS									
10.80	ELEV	1126.04	1126.05	1126.05	1126.06	1126.07	1126.08	1126.09	1126.10	
11.60	CFS	1.45	1.91	2.90	4.92	8.16	11.71	14.58	16.53	
11.60	ELEV	1126.11	1126.12	1126.14	1126.19	1126.27	1126.35	1126.42	1126.47	
12.40	CFS	17.87	18.80	19.51	20.15	20.74	21.25	21.66	21.99	
12.40	ELEV	1126.50	1126.51	1126.52	1126.53	1126.53	1126.54	1126.54	1126.55	
13.20	CFS	22.24	22.42	22.56	22.64	22.68	22.69	22.66	22.60	
13.20	ELEV	1126.55	1126.55	1126.55	1126.55	1126.55	1126.55	1126.55	1126.55	
14.00	CFS	22.52	22.41	22.30	22.17	22.03	21.88	21.72	21.56	
14.00	ELEV	1126.55	1126.55	1126.55	1126.55	1126.55	1126.54	1126.54	1126.54	
14.80	CFS	21.39	21.22	21.04	20.86	20.68	20.49	20.30	20.12	
14.80	ELEV	1126.54	1126.54	1126.53	1126.53	1126.53	1126.53	1126.53	1126.52	
15.60	CFS	19.93	19.73	19.54	19.34	19.15	18.95	18.75	18.55	
15.60	ELEV	1126.52	1126.52	1126.52	1126.52	1126.51	1126.51	1126.51	1126.51	
16.40	CFS	18.36	18.16	17.97	17.77	17.58	17.39	17.21	17.02	
16.40	ELEV	1126.51	1126.50	1126.50	1126.50	1126.49	1126.49	1126.48	1126.48	
17.20	CFS	16.84	16.65	16.47	16.29	16.12	15.94	15.77	15.60	
17.20	ELEV	1126.48	1126.47	1126.47	1126.46	1126.46	1126.45	1126.45	1126.45	
18.00	CFS	15.43	15.26	15.09	14.92	14.76	14.60	14.44	14.28	
18.00	ELEV	1126.44	1126.44	1126.43	1126.43	1126.43	1126.42	1126.42	1126.41	
18.80	CFS	14.12	13.96	13.81	13.65	13.50	13.35	13.20	13.05	
18.80	ELEV	1126.41	1126.41	1126.40	1126.40	1126.40	1126.39	1126.39	1126.38	
19.60	CFS	12.90	12.75	12.61	12.46	12.32	12.18	12.04	11.90	
19.60	ELEV	1126.38	1126.38	1126.37	1126.37	1126.37	1126.36	1126.36	1126.36	
20.40	CFS	11.76	11.62	11.49	11.36	11.23	11.10	10.98	10.85	
20.40	ELEV	1126.35	1126.35	1126.35	1126.34	1126.34	1126.34	1126.34	1126.33	
21.20	CFS	10.73	10.61	10.50	10.38	10.27	10.16	10.05	9.94	
21.20	ELEV	1126.33	1126.33	1126.32	1126.32	1126.32	1126.32	1126.31	1126.31	
22.00	CFS	9.84	9.73	9.63	9.53	9.43	9.34	9.24	9.15	
22.00	ELEV	1126.31	1126.31	1126.30	1126.30	1126.30	1126.30	1126.29	1126.29	
22.80	CFS	9.06	8.97	8.88	8.80	8.71	8.63	8.54	8.46	
22.80	ELEV	1126.29	1126.29	1126.29	1126.28	1126.28	1126.28	1126.28	1126.28	
23.60	CFS	8.38	8.30	8.23	8.15	8.08	7.99	7.89	7.77	

TR20 ----- SCS -
 '012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 1/19/97 100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
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23.60	ELEV	1126.27	1126.27	1126.27	1126.27	1126.27	1126.26	1126.26	1126.26
24.40	CFS	7.64	7.51	7.37	7.23	7.10	6.96	6.82	6.69
24.40	ELEV	1126.26	1126.25	1126.25	1126.25	1126.24	1126.24	1126.24	1126.23
25.20	CFS	6.55	6.42	6.29	6.16	6.03	5.90	5.78	5.66
25.20	ELEV	1126.23	1126.23	1126.22	1126.22	1126.22	1126.21	1126.21	1126.21
26.00	CFS	5.54	5.42	5.31	5.20	5.09	4.98	4.87	4.77
26.00	ELEV	1126.21	1126.20	1126.20	1126.20	1126.19	1126.19	1126.19	1126.19
26.80	CFS	4.67	4.57	4.47	4.38	4.29	4.20	4.11	4.02
26.80	ELEV	1126.18	1126.18	1126.18	1126.18	1126.18	1126.17	1126.17	1126.17
27.60	CFS	3.93	3.85	3.77	3.69	3.61	3.53	3.46	3.39
27.60	ELEV	1126.17	1126.17	1126.16	1126.16	1126.16	1126.16	1126.16	1126.15
28.40	CFS	3.31	3.24	3.18	3.11	3.04	2.98	2.91	2.85
28.40	ELEV	1126.15	1126.15	1126.15	1126.15	1126.15	1126.14	1126.14	1126.14
29.20	CFS	2.79	2.73	2.68	2.62	2.56	2.51	2.46	2.40
29.20	ELEV	1126.14	1126.14	1126.14	1126.14	1126.13	1126.13	1126.13	1126.13
30.00	CFS	2.35	2.30	2.25	2.21	2.16	2.11	2.07	2.03
30.00	ELEV	1126.13	1126.13	1126.13	1126.13	1126.12	1126.12	1126.12	1126.12
30.80	CFS	1.98	1.94	1.90	1.86	1.82	1.78	1.74	1.71
30.80	ELEV	1126.12	1126.12	1126.12	1126.12	1126.12	1126.12	1126.11	1126.11
31.60	CFS	1.67	1.63	1.60	1.57	1.53	1.50	1.47	1.44
31.60	ELEV	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11	1126.11
32.40	CFS	1.41	1.38	1.35	1.32	1.29	1.26	1.24	1.21
32.40	ELEV	1126.11	1126.11	1126.11	1126.10	1126.10	1126.10	1126.10	1126.10
33.20	CFS	1.19	1.16	1.14	1.11	1.09	1.06	1.04	1.02
33.20	ELEV	1126.10	1126.10	1126.10	1126.10	1126.10	1126.09	1126.09	1126.09
34.00	CFS	1.00	.98	.96	.94	.92	.90	.88	.86
34.00	ELEV	1126.09	1126.09	1126.08	1126.08	1126.08	1126.08	1126.08	1126.08
34.80	CFS	.84	.82	.81	.79	.77	.76	.74	.72
34.80	ELEV	1126.07	1126.07	1126.07	1126.07	1126.07	1126.07	1126.07	1126.06
35.60	CFS	.71	.69	.68	.66	.65	.64	.62	.61
35.60	ELEV	1126.06	1126.06	1126.06	1126.06	1126.06	1126.06	1126.06	1126.05
36.40	CFS	.60	.58	.57	.56	.55	.54	.53	.51
36.40	ELEV	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05	1126.05
37.20	CFS	.50	.49						
37.20	ELEV	1126.04	1126.04						

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.19 WATERSHED INCHES; 226 CFS-HRS; 18.7 ACRE-FEET.

DURATION(HRS)	3	6	9	12	15	18	21	24
FLOW(CFS)	20	15	11	8	5	2	1	1
DURATION(HRS)	26							
FLOW(CFS)	0							

OPERATION DIVERT XSECTION 3
 INPUT HYDROGRAPH 1 OUTPUT #1 HYDROGRAPH 3 #2 HYDROGRAPH 2

XSECTION 3 XSECTION 3 XSECTION 5

OUTPUT #1 HYDROGRAPH

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.40 17.0 * 1125.11
 * FIRST POINT OF FLAT PEAK
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.05 WATERSHED INCHES; 209 CFS-HRS; 17.3 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 5)

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 13.66 5.7 1124.17
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .32 WATERSHED INCHES; 16 CFS-HRS; 1.4 ACRE-FEET.

OPERATION REACH XSECTION 3
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 4
 CHANNEL LENGTH = 150.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .665, M = 1.52
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.40 17.0 * 1125.11
 * FIRST POINT OF FLAT PEAK

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .08 SQ.MI.

HRS	10.80	11.60	12.40	13.20	14.00	14.80	15.60
CFS	.48	1.45	17.00	17.00	17.00	17.00	17.00
ELEV	1124.57	1124.63	1125.11	1125.11	1125.11	1125.11	1125.11
CFS	.55	1.91	17.00	17.00	17.00	17.00	17.00
ELEV	1124.58	1124.65	1125.11	1125.11	1125.11	1125.11	1125.11
CFS	.62	2.90	17.00	17.00	17.00	17.00	17.00
ELEV	1124.59	1124.69	1125.11	1125.11	1125.11	1125.11	1125.11
CFS	.70	4.92	17.00	17.00	17.00	17.00	17.00
ELEV	1124.60	1124.76	1125.11	1125.11	1125.11	1125.11	1125.11
CFS	.80	8.16	17.00	17.00	17.00	17.00	17.00
ELEV	1124.60	1124.89	1125.11	1125.11	1125.11	1125.11	1125.11
CFS	.92	11.71	17.00	17.00	17.00	17.00	17.00
ELEV	1124.61	1125.01	1125.11	1125.11	1125.11	1125.11	1125.11
CFS	1.05	14.58	17.00	17.00	17.00	17.00	17.00
ELEV	1124.61	1125.06	1125.11	1125.11	1125.11	1125.11	1125.11
CFS	1.21	16.53	17.00	17.00	17.00	17.00	17.00
ELEV	1124.62	1125.10	1125.11	1125.11	1125.11	1125.11	1125.11

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1/19/97
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----- SCS -
NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
PASS 1 JOB NO. 1 PAGE 10

16.40	CFS	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00
16.40	ELEV	1125.11	1125.11	1125.11	1125.11	1125.11	1125.11	1125.11	1125.11	1125.11
17.20	CFS	16.84	16.65	16.47	16.29	16.12	15.94	15.77	15.60	15.60
17.20	ELEV	1125.10	1125.10	1125.10	1125.09	1125.09	1125.09	1125.08	1125.08	1125.08
18.00	CFS	15.43	15.26	15.09	14.92	14.76	14.60	14.44	14.28	14.28
18.00	ELEV	1125.08	1125.08	1125.07	1125.07	1125.07	1125.06	1125.06	1125.06	1125.06
18.80	CFS	14.12	13.96	13.81	13.65	13.50	13.35	13.20	13.05	13.05
18.80	ELEV	1125.06	1125.05	1125.05	1125.05	1125.04	1125.04	1125.04	1125.04	1125.04
19.60	CFS	12.90	12.75	12.61	12.46	12.32	12.18	12.04	11.90	11.90
19.60	ELEV	1125.03	1125.03	1125.03	1125.03	1125.02	1125.02	1125.02	1125.02	1125.02
20.40	CFS	11.76	11.62	11.49	11.36	11.23	11.10	10.98	10.85	10.85
20.40	ELEV	1125.01	1125.01	1125.01	1125.01	1125.00	1125.00	1125.00	1124.99	1124.99
21.20	CFS	10.73	10.61	10.50	10.38	10.27	10.16	10.05	9.94	9.94
21.20	ELEV	1124.99	1124.98	1124.98	1124.97	1124.97	1124.97	1124.96	1124.96	1124.96
22.00	CFS	9.84	9.73	9.63	9.53	9.43	9.34	9.24	9.15	9.15
22.00	ELEV	1124.95	1124.95	1124.95	1124.94	1124.94	1124.93	1124.93	1124.93	1124.93
22.80	CFS	9.06	8.97	8.88	8.80	8.71	8.63	8.54	8.46	8.46
22.80	ELEV	1124.92	1124.92	1124.92	1124.91	1124.91	1124.91	1124.90	1124.90	1124.90
23.60	CFS	8.38	8.30	8.23	8.15	8.08	7.99	7.89	7.77	7.77
23.60	ELEV	1124.90	1124.89	1124.89	1124.89	1124.89	1124.88	1124.88	1124.87	1124.87
24.40	CFS	7.64	7.51	7.37	7.23	7.10	6.96	6.82	6.69	6.69
24.40	ELEV	1124.87	1124.86	1124.86	1124.85	1124.85	1124.84	1124.84	1124.83	1124.83
25.20	CFS	6.55	6.42	6.29	6.16	6.03	5.90	5.78	5.66	5.66
25.20	ELEV	1124.83	1124.82	1124.82	1124.81	1124.81	1124.80	1124.80	1124.79	1124.79
26.00	CFS	5.54	5.42	5.31	5.20	5.09	4.98	4.87	4.77	4.77
26.00	ELEV	1124.79	1124.78	1124.78	1124.77	1124.77	1124.77	1124.76	1124.76	1124.76
26.80	CFS	4.67	4.57	4.47	4.38	4.29	4.20	4.11	4.02	4.02
26.80	ELEV	1124.75	1124.75	1124.75	1124.74	1124.74	1124.74	1124.73	1124.73	1124.73
27.60	CFS	3.93	3.85	3.77	3.69	3.61	3.53	3.46	3.39	3.39
27.60	ELEV	1124.73	1124.72	1124.72	1124.72	1124.71	1124.71	1124.71	1124.70	1124.70
28.40	CFS	3.31	3.24	3.18	3.11	3.04	2.98	2.91	2.85	2.85
28.40	ELEV	1124.70	1124.70	1124.70	1124.69	1124.69	1124.69	1124.69	1124.68	1124.68
29.20	CFS	2.79	2.73	2.68	2.62	2.56	2.51	2.46	2.40	2.40
29.20	ELEV	1124.68	1124.68	1124.68	1124.67	1124.67	1124.67	1124.67	1124.67	1124.67
30.00	CFS	2.35	2.30	2.25	2.21	2.16	2.11	2.07	2.03	2.03
30.00	ELEV	1124.66	1124.66	1124.66	1124.66	1124.66	1124.65	1124.65	1124.65	1124.65
30.80	CFS	1.98	1.94	1.90	1.86	1.82	1.78	1.74	1.71	1.71
30.80	ELEV	1124.65	1124.65	1124.65	1124.64	1124.64	1124.64	1124.64	1124.64	1124.64
31.60	CFS	1.67	1.63	1.60	1.57	1.53	1.50	1.47	1.44	1.44
31.60	ELEV	1124.64	1124.64	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63	1124.63
32.40	CFS	1.41	1.38	1.35	1.32	1.29	1.26	1.24	1.21	1.21
32.40	ELEV	1124.63	1124.63	1124.63	1124.62	1124.62	1124.62	1124.62	1124.62	1124.62
33.20	CFS	1.19	1.16	1.14	1.11	1.09	1.06	1.04	1.02	1.02
33.20	ELEV	1124.62	1124.62	1124.62	1124.62	1124.61	1124.61	1124.61	1124.61	1124.61
34.00	CFS	1.00	.98	.96	.94	.92	.90	.88	.86	.86
34.00	ELEV	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61	1124.61
34.80	CFS	.84	.82	.81	.79	.77	.76	.74	.72	.72
34.80	ELEV	1124.61	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60	1124.60
35.60	CFS	.71	.69	.68	.66	.65	.64	.62	.61	.61

32.70	ELEV	1123.88	1123.88	1123.88	1123.88	1123.88	1123.88	1123.88	1123.87
33.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
33.50	ELEV	1123.87	1123.87	1123.87	1123.87	1123.87	1123.87	1123.86	1123.86
34.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
34.30	ELEV	1123.86	1123.86	1123.86	1123.86	1123.86	1123.85	1123.85	1123.85
35.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
35.10	ELEV	1123.85	1123.85	1123.85	1123.85	1123.84	1123.84	1123.84	1123.84
35.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
35.90	ELEV	1123.84	1123.84	1123.84	1123.84	1123.83	1123.83	1123.83	1123.83
36.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
36.70	ELEV	1123.83	1123.83	1123.83	1123.82	1123.82	1123.82	1123.82	1123.82
37.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
37.50	ELEV	1123.82	1123.82	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81
38.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
38.30	ELEV	1123.81	1123.81	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80
39.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
39.10	ELEV	1123.80	1123.79	1123.79	1123.79	1123.79	1123.79	1123.79	1123.79
39.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
39.90	ELEV	1123.79	1123.78	1123.78	1123.78	1123.78	1123.78	1123.78	1123.78
40.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
40.70	ELEV	1123.78	1123.77	1123.77	1123.77	1123.77	1123.77	1123.77	1123.77
41.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
41.50	ELEV	1123.77	1123.76	1123.76	1123.76	1123.76	1123.76	1123.76	1123.76
42.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
42.30	ELEV	1123.76	1123.75	1123.75	1123.75	1123.75	1123.75	1123.75	1123.75
43.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
43.10	ELEV	1123.75	1123.74	1123.74	1123.74	1123.74	1123.74	1123.74	1123.74
43.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
43.90	ELEV	1123.74	1123.73	1123.73	1123.73	1123.73	1123.73	1123.73	1123.73
44.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
44.70	ELEV	1123.73	1123.72	1123.72	1123.72	1123.72	1123.72	1123.72	1123.72
45.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
45.50	ELEV	1123.72	1123.71	1123.71					

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .43 WATERSHED INCHES; 24 CFS-HRS; 2.0 ACRE-FEET.

DURATION(HRS)	2	4	5
FLOW(CFS)	6	2	0

OPERATION ADDHYD XSECTION 105
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME(HRS)	13.48	PEAK DISCHARGE(CFS)	23.7	PEAK ELEVATION(FEET)	(NULL)
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TR20 1012 1/19/97 14:47:11
 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION 2.04 TEST)
 100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS
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RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.17 WATERSHED INCHES; 233 CFS-HRS; 19.3 ACRE-FEET.

OPERATION DIVERT. XSECTION 4
 INPUT HYDROGRAPH 1 XSECTION 4
 OUTPUT #1 HYDROGRAPH 3 XSECTION 4
 #2 HYDROGRAPH 2 XSECTION 6

OUTPUT #1 HYDROGRAPH
 PEAK TIME (HRS) 12.10
 PEAK DISCHARGE (CFS) 11.0 *
 PEAK ELEVATION (FEET) 1124.20
 * FIRST POINT OF FLAT PEAK

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.16 WATERSHED INCHES; 170 CFS-HRS; 14.0 ACRE-FEET.

OUTPUT #2 DIVERTED HYDROGRAPH (XSECTION 6)
 PEAK TIME (HRS) 13.48
 PEAK DISCHARGE (CFS) 12.7
 PEAK ELEVATION (FEET) 1120.38

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.19 WATERSHED INCHES; 64 CFS-HRS; 5.3 ACRE-FEET.

OPERATION REACH XSECTION 4
 INPUT HYDROGRAPH 3
 CHANNEL LENGTH = 400.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH
 OUTPUT HYDROGRAPH 4

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .649, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS) 12.10
 PEAK DISCHARGE (CFS) 11.0 *
 PEAK ELEVATION (FEET) 1124.20
 * FIRST POINT OF FLAT PEAK

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .08 SQ. MI.

HRS	10.80	11.60	12.40	10.80	11.60	12.40	10.80	11.60	12.40	10.80	11.60	12.40
CFS	.48	.55	.62	.70	.80	.92	1.05	1.21				
ELEV	1123.77	1123.78	1123.79	1123.80	1123.80	1123.81	1123.81	1123.82				
CFS	1.45	1.91	2.90	4.92	8.16	11.00	11.00	11.00				
ELEV	1123.83	1123.85	1123.89	1123.96	1124.09	1124.20	1124.20	1124.20				
CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00				
ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20				

13.20	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
13.20	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
14.00	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
14.00	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
14.80	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
14.80	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
15.60	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
15.60	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
16.40	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
16.40	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
17.20	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
17.20	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
18.00	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
18.00	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
18.80	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
18.80	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
19.60	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
19.60	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
20.40	CFS	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
20.40	ELEV	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20	1124.20
21.20	CFS	10.93	10.81	10.69	10.58	10.46	10.35	10.24	10.14
21.20	ELEV	1124.20	1124.19	1124.19	1124.18	1124.18	1124.17	1124.17	1124.17
22.00	CFS	10.03	9.93	9.82	9.72	9.63	9.53	9.43	9.34
22.00	ELEV	1124.16	1124.16	1124.15	1124.15	1124.15	1124.14	1124.14	1124.13
22.80	CFS	9.25	9.16	9.07	8.98	8.90	8.81	8.73	8.65
22.80	ELEV	1124.13	1124.13	1124.12	1124.12	1124.12	1124.11	1124.11	1124.11
23.60	CFS	8.57	8.49	8.41	8.33	8.26	8.17	8.06	7.93
23.60	ELEV	1124.10	1124.10	1124.10	1124.10	1124.09	1124.09	1124.09	1124.08
24.40	CFS	7.78	7.62	7.46	7.30	7.14	6.99	6.85	6.70
24.40	ELEV	1124.07	1124.07	1124.06	1124.06	1124.05	1124.04	1124.04	1124.03
25.20	CFS	6.56	6.43	6.30	6.17	6.04	5.91	5.79	5.67
25.20	ELEV	1124.03	1124.02	1124.02	1124.01	1124.01	1124.00	1124.00	1123.99
26.00	CFS	5.55	5.43	5.32	5.21	5.10	4.99	4.88	4.78
26.00	ELEV	1123.99	1123.98	1123.98	1123.97	1123.97	1123.97	1123.96	1123.96
26.80	CFS	4.68	4.58	4.48	4.39	4.30	4.21	4.12	4.03
26.80	ELEV	1123.95	1123.95	1123.95	1123.94	1123.94	1123.94	1123.93	1123.93
27.60	CFS	3.94	3.86	3.78	3.70	3.62	3.54	3.47	3.40
27.60	ELEV	1123.93	1123.92	1123.92	1123.92	1123.91	1123.91	1123.91	1123.90
28.40	CFS	3.32	3.25	3.19	3.12	3.05	2.99	2.92	2.86
28.40	ELEV	1123.90	1123.90	1123.90	1123.89	1123.89	1123.89	1123.89	1123.88
29.20	CFS	2.80	2.74	2.68	2.63	2.57	2.52	2.46	2.41
29.20	ELEV	1123.88	1123.88	1123.88	1123.87	1123.87	1123.87	1123.87	1123.87
30.00	CFS	2.36	2.31	2.26	2.22	2.17	2.12	2.08	2.03
30.00	ELEV	1123.86	1123.86	1123.86	1123.86	1123.86	1123.86	1123.85	1123.85
30.80	CFS	1.99	1.95	1.91	1.87	1.83	1.79	1.75	1.72
30.80	ELEV	1123.85	1123.85	1123.85	1123.85	1123.84	1123.84	1123.84	1123.84
31.60	CFS	1.68	1.64	1.61	1.57	1.54	1.51	1.48	1.45
31.60	ELEV	1123.84	1123.84	1123.84	1123.83	1123.83	1123.83	1123.83	1123.83
32.40	CFS	1.42	1.39	1.36	1.33	1.30	1.27	1.25	1.22

32.40	ELEV	1123.83	1123.83	1123.83	1123.82	1123.82	1123.82	1123.82	1123.82
33.20	CFS	1.19	1.17	1.14	1.12	1.10	1.07	1.05	1.03
33.20	ELEV	1123.82	1123.82	1123.82	1123.82	1123.82	1123.81	1123.81	1123.81
34.00	CFS	1.01	.99	.97	.95	.93	.91	.89	.87
34.00	ELEV	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81	1123.81
34.80	CFS	.85	.83	.81	.80	.78	.76	.75	.73
34.80	ELEV	1123.81	1123.81	1123.80	1123.80	1123.80	1123.80	1123.80	1123.80
35.60	CFS	.72	.70	.69	.67	.66	.65	.63	.62
35.60	ELEV	1123.80	1123.80	1123.80	1123.80	1123.79	1123.79	1123.79	1123.79
36.40	CFS	.61	.59	.58	.57	.56	.54	.53	.52
36.40	ELEV	1123.79	1123.78	1123.78	1123.78	1123.78	1123.78	1123.78	1123.77
37.20	CFS	.51	.50	.49					
37.20	ELEV	1123.77	1123.77	1123.77					

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.16 WATERSHED INCHES; 170 CFS-HRS; 14.0 ACRE-FEET.

DURATION (HRS)	3	6	9	12	15	18	21	24
FLOW (CFS)	11	11	11	8	5	2	1	1
DURATION (HRS)	27							
FLOW (CFS)	0							

OPERATION RUNOFF XSECTION 16
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 64. TIME OF CONCENTRATION = .79 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1053 HOURS

PEAK TIME (HRS) 12.39 PEAK DISCHARGE (CFS) 5.3 PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.98 WATERSHED INCHES; 9 CFS-HRS; .8 ACRE-FEET.

OPERATION ADDHYD XSECTION 106
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 5

PEAK TIME (HRS) 12.51 PEAK DISCHARGE (CFS) 16.9 PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.25 WATERSHED INCHES; 73 CFS-HRS; 6.0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 5
 INPUT HYDROGRAPH 5 OUTPUT HYDROGRAPH 2
 SURFACE ELEVATION = 1120.00

23.50	ELEV	1120.01	1120.01	1120.01	1120.01	1120.01	1120.01	1120.01	1120.01
24.30	CFS	.18	.15	.13	.10	.08	.06	.04	.03
24.30	ELEV	1120.00	1120.00	1120.00	1120.00	1120.00	1120.00	1120.00	1120.00
25.10	CFS	.02	.02	.01	.01	.01	.01	.01	.01
25.10	ELEV	1120.00	1120.00	1120.00	1120.00	1120.00	1120.00	1120.00	1119.99
25.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
25.90	ELEV	1119.99	1119.99	1119.99	1119.99	1119.99	1119.98	1119.98	1119.98
26.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
26.70	ELEV	1119.98	1119.98	1119.98	1119.98	1119.97	1119.97	1119.97	1119.97
27.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
27.50	ELEV	1119.97	1119.97	1119.96	1119.96	1119.96	1119.96	1119.96	1119.96
28.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
28.30	ELEV	1119.95	1119.95	1119.95	1119.95	1119.95	1119.95	1119.94	1119.94
29.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
29.10	ELEV	1119.94	1119.94	1119.94	1119.94	1119.94	1119.93	1119.93	1119.93
29.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
29.90	ELEV	1119.93	1119.93	1119.93	1119.92	1119.92	1119.92	1119.92	1119.92
30.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
30.70	ELEV	1119.92	1119.92	1119.91	1119.91	1119.91	1119.91	1119.91	1119.91
31.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
31.50	ELEV	1119.91	1119.90	1119.90	1119.90	1119.90	1119.90	1119.90	1119.89
32.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
32.30	ELEV	1119.89	1119.89	1119.89	1119.89	1119.89	1119.89	1119.88	1119.88
33.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
33.10	ELEV	1119.88	1119.88	1119.88	1119.88	1119.88	1119.87	1119.87	1119.87
33.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
33.90	ELEV	1119.87	1119.87	1119.87	1119.87	1119.86	1119.86	1119.86	1119.86
34.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
34.70	ELEV	1119.86	1119.86	1119.86	1119.85	1119.85	1119.85	1119.85	1119.85
35.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
35.50	ELEV	1119.85	1119.85	1119.84	1119.84	1119.84	1119.84	1119.84	1119.84
36.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
36.30	ELEV	1119.84	1119.83	1119.83	1119.83	1119.83	1119.83	1119.83	1119.83
37.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
37.10	ELEV	1119.83	1119.82	1119.82	1119.82	1119.82	1119.82	1119.82	1119.82
37.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
37.90	ELEV	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81	1119.81	1119.80
38.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
38.70	ELEV	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.80	1119.79
39.50	CFS	.01	.01	.01	.01	.01	.01	.01	.01
39.50	ELEV	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.79	1119.78
40.30	CFS	.01	.01	.01	.01	.01	.01	.01	.01
40.30	ELEV	1119.78	1119.78	1119.78	1119.78	1119.78	1119.78	1119.77	1119.77
41.10	CFS	.01	.01	.01	.01	.01	.01	.01	.01
41.10	ELEV	1119.77	1119.77	1119.77	1119.77	1119.77	1119.77	1119.76	1119.76
41.90	CFS	.01	.01	.01	.01	.01	.01	.01	.01
41.90	ELEV	1119.76	1119.76	1119.76	1119.76	1119.76	1119.76	1119.75	1119.75
42.70	CFS	.01	.01	.01	.01	.01	.01	.01	.01
42.70	ELEV	1119.75	1119.75	1119.75	1119.75	1119.75	1119.75	1119.74	1119.74

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 1/19/97 100 YEAR (5.6 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
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43.50 CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01
43.50 ELEV	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.74	1119.73	1119.73
44.30 CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01
44.30 ELEV	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.73	1119.72
45.10 CFS	.01	.01	.01	.01	.01	.01	.01	.01	.01
45.10 ELEV	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72	1119.72

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.25 WATERSHED INCHES; 73 CFS-HRS; 6.0 ACRE-FEET.

DURATION(HRS)	2	4	6	8	9
FLOW(CFS)	13	9	5	2	0

OPERATION ADDHYD XSECTION 107
 INPUT HYDROGRAPHS 4,2 OUTPUT HYDROGRAPH 1

PEAK TIME(HRS)	12.55	PEAK DISCHARGE(CFS)	27.8	PEAK ELEVATION(FEET)	(NULL)
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RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.17 WATERSHED INCHES; 243 CFS-HRS; 20.1 ACRE-FEET.

OPERATION REACH XSECTION 7
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 250.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = .694, M = 1.49
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME(HRS)	12.55	PEAK DISCHARGE(CFS)	27.8	PEAK ELEVATION(FEET)	1122.20
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HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .17 SQ.MI.

HRS									
10.80 CFS	.49	.56	.63	.71	.81	.92	1.06	1.22	
10.80 ELEV	1121.47	1121.48	1121.49	1121.50	1121.50	1121.51	1121.51	1121.52	
11.60 CFS	1.46	2.06	3.33	5.75	9.74	14.15	18.91	24.44	
11.60 ELEV	1121.53	1121.55	1121.60	1121.70	1121.85	1121.96	1122.04	1122.14	
12.40 CFS	26.95	27.73	27.73	27.26	26.66	26.18	25.83	25.58	
12.40 ELEV	1122.18	1122.20	1122.20	1122.19	1122.18	1122.17	1122.16	1122.16	
13.20 CFS	25.38	25.21	25.08	24.95	24.83	24.70	24.56	24.41	
13.20 ELEV	1122.16	1122.15	1122.15	1122.15	1122.15	1122.14	1122.14	1122.14	
14.00 CFS	24.25	24.08	23.90	23.71	23.52	23.32	23.12	22.93	
14.00 ELEV	1122.14	1122.13	1122.13	1122.13	1122.12	1122.12	1122.12	1122.11	
14.80 CFS	22.74	22.54	22.34	22.14	21.94	21.74	21.53	21.33	
14.80 ELEV	1122.11	1122.11	1122.10	1122.10	1122.09	1122.09	1122.09	1122.08	
15.60 CFS	21.12	20.91	20.70	20.48	20.27	20.05	19.83	19.62	

TR20 ----- SCS -
 1012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 11/19/97 100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
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35.60 CFS	.73	.71	.70	.68	.67	.65	.64	.63
35.60 ELEV	1121.50	1121.50	1121.50	1121.50	1121.50	1121.49	1121.49	1121.49
36.40 CFS	.61	.60	.59	.58	.56	.55	.54	.53
36.40 ELEV	1121.49	1121.49	1121.48	1121.48	1121.48	1121.48	1121.48	1121.48
37.20 CFS	.52	.51	.50					
37.20 ELEV	1121.47	1121.47	1121.47					

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.17 WATERSHED INCHES; 243 CFS-HRS; 20.1 ACRE-FEET.

DURATION(HRS)	3	6	9	12	15	18	21	24
FLOW(CFS)	22	16	11	8	5	2	1	1
DURATION(HRS)	27							
FLOW(CFS)	0							

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF 5.60 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 2, ARC 2							
MAIN TIME INCREMENT .100 HOURS							
ALTERNATE 1 STORM 1							
XSECTION 103	RUNOFF	.02	1.59	---	12.54	12	600.0
XSECTION 102	RUNOFF	.03	1.67	---	12.56	15	500.0
XSECTION 97	ADDHYD	.05	1.63	---	12.55	26	520.0
XSECTION 101	RUNOFF	.03	1.74	---	12.58	14	466.7
XSECTION 98	ADDHYD	.08	1.67	---	12.56	41	512.5
XSECTION 12	RUNOFF	.01	3.62	---	12.01	21	2100.0
XSECTION 99	ADDHYD	.09	1.82	---	12.54	43	477.8
XSECTION 11	RUNOFF	.01	2.15	---	12.23	8	800.0
XSECTION 100	ADDHYD	.09	1.85	---	12.49	48	533.3
XSECTION 10	RUNOFF	.03	2.49	---	12.34	34	1133.3
XSECTION 101	ADDHYD	.13	2.01	---	12.41	80	615.4
XSECTION 13	RUNOFF	.03	3.03	---	11.98	74	2466.7
XSECTION 102	ADDHYD	.15	2.19	---	12.01	121	806.7
STRUCTURE 2	RESVOR	.15	2.19	1136.82	13.80	22	146.7
XSECTION 14	RUNOFF	.01	2.06	---	12.30	5	500.0
XSECTION 103	ADDHYD	.16	2.19	---	13.66	23	143.8
XSECTION 2	REACH	.16	2.19	1126.55	13.66	23	143.8
XSECTION 3	DIVERT	.08	4.05	1125.11	12.40F	17F	212.5
XSECTION 5	DIVERT	.08	.32	1124.17	13.66	6	75.0
XSECTION 3	REACH	.08	4.05	1125.11	12.40F	17F	212.5
XSECTION 15	RUNOFF	.01	1.98	---	12.33	5	500.0
XSECTION 104	ADDHYD	.09	.44	---	13.39	7	77.8
STRUCTURE 4	RESVOR	.09	.43	1124.20	13.48	7	77.8
XSECTION 105	ADDHYD	.17	2.17	---	13.48	24	141.2
XSECTION 4	DIVERT	.08	3.16	1124.20	12.10F	11F	137.5
XSECTION 6	DIVERT	.08	1.19	1120.38	13.48	13	162.5
XSECTION 4	REACH	.08	3.16	1124.20	12.10F	11F	137.5
XSECTION 16	RUNOFF	.01	1.98	---	12.39	5	500.0

TR20 ----- SCS -
 '012 NORTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN (11/19/97 rev VERSION
 1/19/97 100 YEAR (5.6 - INCH) STORM USING TYPE II DISTRIBUTION 24 HRS 2.04TEST
 14:47:11 SUMMARY, JOB NO. 1 PAGE 23

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE	1	STORM	1				
XSECTION 106	ADDHYD	.09	1.25	---	12.51	17	188.9
STRUCTURE 5	RESVOR	.09	1.25	1120.50	12.55	17	188.9
XSECTION 107	ADDHYD	.17	2.17	---	12.55	28	164.7
XSECTION .7	REACH	.17	2.17	1122.20	12.55	28	164.7

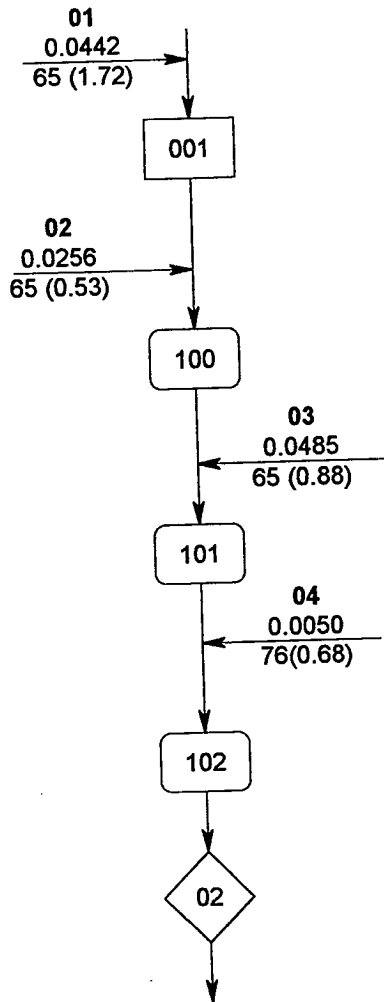
SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A EQ.		LENGTH	PEAK RATIO	ATT- KIN
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)	FACTOR (k*)	Q/I (Q*)	COEFF (C)
BASEFLOW IS .0 CFS											
ALTERNATE		1	STORM	1							
2	750		23	13.7	23	13.7	1.06	1.53	.000	1.000	1.00?
3	150		17	12.4	17	12.4	.67	1.52	.000	1.000	1.00?
4	400		11	12.1	11	12.1	.65	1.55	.000	1.000	1.00?
7	250		28	12.5	28	12.5	.69	1.49	.000	1.000	1.00?

APPENDIX B-f
SOUTH CHANNEL
TR-20 INPUT AND OUTPUT

TR 20 Schematic
 South Stream
 Flambeau Mine
 Ladysmith, Wisconsin
 Revised 11/19/97



legend

xsection
area sq. miles
 Cn (Tc (hours))

WATERSHED "B"

Cn calculations

land use	Cn	Tributary Area			
		1	2	3	4
meadow	58				
wetland	58				0.73
woods	60				
roadway	98				
cultivated	81				
pasture	70				
residential	68				
grass	65	28.30	16.40	31.02	1.25
water	98				1.24

TOTAL AREA (AC)

28.30	16.40	31.02	3.22
-------	-------	-------	------

Total Area (SQ MI)

0.0442	0.0256	0.0485	0.0050
--------	--------	--------	--------

COMPOSITE Cn

65	65	65	76
----	----	----	----

calculations dated:

11/19/97

Type B soils are used

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	1012	FULLPRINT		SUMMARY	NOPLOTS
TITLE	SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN					
TITLE	1 INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT		1			
8				1099.00	0.00	0.00
8				1100.0	2.50	1.61
8				1100.9	12.6	3.47
8				1101.0	34.4	3.69
8				1101.5	106.2	4.84
9	ENDTBL					
2	XSECTN	001		1.0	1111.0	1113.0
8				1109.0	0.00	1109.0
8				1109.1	1.17	1.05
8				1109.5	18.53	6.25
8				1110.0	65.65	15.00
8				1111.0	256.35	40.00
9	ENDTBL					
6	RUNOFF	1 01	1	.0442	65.	1.72
6	REACH	3 001	1	2 600.		1
6	RUNOFF	1 02	1	.0256	65.	0.53
6	ADDHYD	4 100	2 1 3			1
6	RUNOFF	1 03	1	.0485	65.	0.88
6	ADDHYD	4 101	3 1 2			1
6	RUNOFF	1 04	1	.0050	76.	0.68
6	ADDHYD	4 102	2 1 3			1
6	RESVOR	2	1 3	1 1099.0		1 1 1 1
	ENDATA					
7	INCREM	6		0.10		
7	COMPUT	7 001	1	0.0	1.00	1.0
	ENDCMP	1				2 2 01 01
	ENDJOB	2				

*****END OF 80-80 LIST*****

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 1
 STARTING TIME = .00 RAIN DEPTH = 1.00 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .04 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = 1.72 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 1
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 600.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .53 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0706 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 3
 OUTPUT HYDROGRAPH = 1 AREA = .05 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .88 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1000 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

TR20 ----- SCS -
 012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 1/19/97 1 INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
 12:04:17 PASS 1 JOB NO. 1 PAGE 2

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
 OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .68 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0907 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 143 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 143 CFS-HRS; .0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 SURFACE ELEVATION = 1099.00

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
23.90	.0	1099.00

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 0 CFS-HRS; .0 ACRE-FEET.

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 1.00 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .100 HOURS

ALTERNATE		1	STORM	1				
XSECTION	1	RUNOFF	.04	.00	---	.00	0	.0
XSECTION	1	REACH	.04	.00	---	.00	0	.0
XSECTION	2	RUNOFF	.03	.00	---	.00	0	.0
XSECTION	100	ADDHYD	.07	.00	---	.00	0	.0
XSECTION	3	RUNOFF	.05	.00	---	.00	0	.0
XSECTION	101	ADDHYD	.12	.00	---	.00	0	.0
XSECTION	4	RUNOFF	.00	.00	---	.00	0	*****
XSECTION	102	ADDHYD	.12	.00	---	.00	0	.0
STRUCTURE	1	RESVOR	.12	.00	---	.00	0	.0

TR20
1012
11/19/97
12:04:17

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
1 INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL
SUMMARY, JOB NO. 1

SCS -
VERSION
2.04TEST
PAGE 4

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION						ROUTING PARAMETERS					
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS			.0 CFS								
ALTERNATE			1	STORM	1						
1	600		0	.0	0	.0	.000	.00	.000	.000	.00

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	1012	FULLPRINT		SUMMARY	NOPLOTS
TITLE	SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN					
TITLE	1.5 INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	1				
8			1099.00	0.00	0.00	
8			1100.0	2.50	1.61	
8			1100.9	12.6	3.47	
8			1101.0	34.4	3.69	
8			1101.5	106.2	4.84	
9	ENDTBL					
2	XSECTN	001	1.0	1111.0	1113.0	1109.0
8			1109.0	0.00	0.00	
8			1109.1	1.17	1.05	
8			1109.5	18.53	6.25	
8			1110.0	65.65	15.00	
8			1111.0	256.35	40.00	
9	ENDTBL					
6	RUNOFF	1 01	1 .0442	65.	1.72	1
6	REACH	3 001	1 2 600.			1
6	RUNOFF	1 02	1 .0256	65.	0.53	1
6	ADDHYD	4 100	2 1 3			1
6	RUNOFF	1 03	1 .0485	65.	0.88	1
6	ADDHYD	4 101	3 1 2			1
6	RUNOFF	1 04	1 .0050	76.	0.68	1
6	ADDHYD	4 102	2 1 3			1
6	RESVOR	2 1 3	1 1099.0			1 1 1 1
	ENDATA					
7	INCREM	6	0.10			
7	COMPUT	7 001	1 0.0	1.50	1.0	2 2 01 01
	ENDCMP	1				
	ENDJOB	2				

*****END OF 80-80 LIST*****

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 1
 STARTING TIME = .00 RAIN DEPTH = 1.50 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .04 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = 1.72 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0983 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 172 CFS-HRS; .0 ACRE-FEET.

OPERATION REACH XSECTION 1
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 600.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.085, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .34, PEAK TRAVEL TIME = .24 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 143 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .53 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0707 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 134 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 100
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 145 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 3

OUTPUT HYDROGRAPH = 1 AREA = .05 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .88 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 144 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 145 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
 OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .68 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0907 HOURS

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 146 CFS-HRS; .0 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .00 WATERSHED INCHES; 152 CFS-HRS; .0 ACRE-FEET.

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 SURFACE ELEVATION = 1099.00

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
24.30	.2	1099.07

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .04 WATERSHED INCHES; 3 CFS-HRS; .2 ACRE-FEET.

TR20 ----- SCS -
 1012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 1.5 INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
 12:06:12 SUMMARY, JOB NO. 1 PAGE 3

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF 1.50 inches AND 24.00 hr DURATION, BEGINS AT				.0 hrs.			
RAINTABLE NUMBER 2, ARC 2							
MAIN TIME INCREMENT .100 HOURS							

ALTERNATE 1 STORM 1

XSECTION	1	RUNOFF	.04	.00	---	.00	0	.0
XSECTION	1	REACH	.04	.00	---	.00	0	.0
XSECTION	2	RUNOFF	.03	.00	---	.00	0	.0
XSECTION	100	ADDHYD	.07	.00	---	.00	0	.0
XSECTION	3	RUNOFF	.05	.00	---	.00	0	.0
XSECTION	101	ADDHYD	.12	.00	---	.00	0	.0
XSECTION	4	RUNOFF	.00	.00	---	.00	0	*****
XSECTION	102	ADDHYD	.12	.00	---	.00	0	.0
STRUCTURE	1	RESVOR	.12	.04	---	.00	0	.0

TR20 ----- SCS -
 1012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 1.5 INCH STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL 2.04TEST
 12:06:12 SUMMARY, JOB NO. 1 PAGE 4

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR	PEAK RATIO	ATT-KIN COEFF
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)	(k*)	Q/I (Q*)	(C)
BASEFLOW IS			.0 CFS								
ALTERNATE		1	STORM		1						
1	600		0	16.2	0	16.2	1.09	1.55	.006	.971	.34

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20	1012	FULLPRINT	SUMMARY	NOPLOTS	
TITLE	SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN				
TITLE	1 YEAR (2.3 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL				
3 STRUCT	1				
8		1099.00	0.00	0.00	
8		1100.0	2.50	1.61	
8		1100.9	12.6	3.47	
8		1101.0	34.4	3.69	
8		1101.5	106.2	4.84	
9 ENDTBL					
2 XSECTN	001	1.0	1111.0	1113.0	1109.0
8		1109.0	0.00	0.00	
8		1109.1	1.17	1.05	
8		1109.5	18.53	6.25	
8		1110.0	65.65	15.00	
8		1111.0	256.35	40.00	
9 ENDTBL					
6 RUNOFF	1 01	1 .0442	65.	1.72	1
6 REACH	3 001	1 2 600.			1
6 RUNOFF	1 02	1 .0256	65.	0.53	1
6 ADDHYD	4 100	2 1 3			1
6 RUNOFF	1 03	1 .0485	65.	0.88	1
6 ADDHYD	4 101	3 1 2			1
6 RUNOFF	1 04	1 .0050	76.	0.68	1
6 ADDHYD	4 102	2 1 3			1
6 RESVOR	2	1 3 1 1099.0			1 1 1 1
ENDATA					
7 INCREM	6	0.10			
7 COMPUT	7 001	1 0.0	2.30	1.0	2 2 01 01
ENDCMP	1				
ENDJOB	2				

*****END OF 80-80 LIST*****

TR20
1012

----- SCS -
SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
11/19/97 1 YEAR (2.3 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAIN2.04TEST
12:22:53 PASS 1 JOB NO. 1 PAGE 1

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 1
STARTING TIME = .00 RAIN DEPTH = 2.30 RAIN DURATION = 1.00
ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 1
OUTPUT HYDROGRAPH = 1 AREA = .04 SQ MI
INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = 1.72 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0983 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET) (RUNOFF)
13.33	1.3	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.23 WATERSHED INCHES; 6 CFS-HRS; .5 ACRE-FEET.

OPERATION REACH XSECTION 1
INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
CHANNEL LENGTH = 600.00 FT
INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.085, M = 1.55
MODIFIED ATT-KIN ROUTING COEFFICIENT = .70, PEAK TRAVEL TIME = .20 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET) (RUNOFF)
13.47	1.3	1109.10

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.23 WATERSHED INCHES; 6 CFS-HRS; .5 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .53 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0707 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET) (RUNOFF)
12.33	1.5	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.23 WATERSHED INCHES; 4 CFS-HRS; .3 ACRE-FEET.

OPERATION ADDHYD XSECTION 100

TR20 ----- SCS -
 1012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 1 YEAR (2.3 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAIN2.04TEST
 12:22:53 PASS 1 JOB NO. 1 PAGE 2

INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 13.32 1.9 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .23 WATERSHED INCHES; 10 CFS-HRS; .8 ACRE-FEET.

OPERATION RUNOFF XSECTION 3
 OUTPUT HYDROGRAPH = 1 AREA = .05 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .88 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.63 2.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .23 WATERSHED INCHES; 7 CFS-HRS; .6 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.66 3.7 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .23 WATERSHED INCHES; 17 CFS-HRS; 1.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
 OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .68 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0907 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.34 1.1 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .58 WATERSHED INCHES; 2 CFS-HRS; .2 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.50 4.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .24 WATERSHED INCHES; 19 CFS-HRS; 1.6 ACRE-FEET.

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 SURFACE ELEVATION = 1099.00

PEAK TIME (HRS) 18.20
 PEAK DISCHARGE (CFS) 1.1 *
 PEAK ELEVATION (FEET) 1099.44
 * FIRST POINT OF FLAT PEAK

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .12 SQ.MI.

HRS	MAIN	TIME	INCREMENT	=	.100	hr,	DRAINAGE	AREA	=	.12	SQ.MI.
11.90	CFS	.00	.01	.03	.06	.11	.16	.21	.27		
11.90	ELEV	1099.00	1099.00	1099.01	1099.02	1099.04	1099.06	1099.09	1099.11		
12.70	CFS	.32	.37	.42	.46	.51	.55	.58	.62		
12.70	ELEV	1099.13	1099.15	1099.17	1099.19	1099.20	1099.22	1099.23	1099.25		
13.50	CFS	.65	.69	.72	.74	.77	.79	.82	.84		
13.50	ELEV	1099.26	1099.27	1099.29	1099.30	1099.31	1099.32	1099.33	1099.33		
14.30	CFS	.86	.87	.89	.91	.92	.94	.95	.96		
14.30	ELEV	1099.34	1099.35	1099.36	1099.36	1099.37	1099.37	1099.38	1099.38		
15.10	CFS	.97	.98	.99	1.00	1.01	1.02	1.02	1.03		
15.10	ELEV	1099.39	1099.39	1099.40	1099.40	1099.40	1099.41	1099.41	1099.41		
15.90	CFS	1.04	1.04	1.05	1.05	1.06	1.06	1.07	1.07		
15.90	ELEV	1099.42	1099.42	1099.42	1099.42	1099.42	1099.43	1099.43	1099.43		
16.70	CFS	1.07	1.08	1.08	1.08	1.08	1.08	1.09	1.09		
16.70	ELEV	1099.43	1099.43	1099.43	1099.43	1099.43	1099.43	1099.43	1099.43		
17.50	CFS	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09		
17.50	ELEV	1099.44	1099.44	1099.44	1099.44	1099.44	1099.44	1099.44	1099.44		
18.30	CFS	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09		
18.30	ELEV	1099.44	1099.44	1099.44	1099.44	1099.44	1099.44	1099.44	1099.43		
19.10	CFS	1.09	1.08	1.08	1.08	1.08	1.08	1.08	1.07		
19.10	ELEV	1099.43	1099.43	1099.43	1099.43	1099.43	1099.43	1099.43	1099.43		
19.90	CFS	1.07	1.07	1.07	1.06	1.06	1.06	1.06	1.05		
19.90	ELEV	1099.43	1099.43	1099.43	1099.43	1099.42	1099.42	1099.42	1099.42		
20.70	CFS	1.05	1.05	1.04	1.04	1.04	1.03	1.03	1.03		
20.70	ELEV	1099.42	1099.42	1099.42	1099.42	1099.41	1099.41	1099.41	1099.41		
21.50	CFS	1.02	1.02	1.02	1.01	1.01	1.01	1.00	1.00		
21.50	ELEV	1099.41	1099.41	1099.41	1099.41	1099.40	1099.40	1099.40	1099.40		
22.30	CFS	1.00	.99	.99	.99	.99	.98	.98	.98		
22.30	ELEV	1099.40	1099.40	1099.40	1099.40	1099.39	1099.39	1099.39	1099.39		
23.10	CFS	.97	.97	.97	.96	.96	.96	.95	.95		
23.10	ELEV	1099.39	1099.39	1099.39	1099.39	1099.38	1099.38	1099.38	1099.38		
23.90	CFS	.95	.95	.94	.94	.94	.93	.93	.92		
23.90	ELEV	1099.38	1099.38	1099.38	1099.38	1099.37	1099.37	1099.37	1099.37		
24.70	CFS	.91	.91	.90	.89	.88	.87	.86	.85		
24.70	ELEV	1099.37	1099.36	1099.36	1099.36	1099.35	1099.35	1099.35	1099.34		
25.50	CFS	.84	.84	.83	.82	.81	.80	.79	.78		

TR20

SCS -

012

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN

VERSION

11/19/97 1 YEAR (2.3 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAIN2.04TEST
12:22:53 PASS 1 JOB NO. 1 PAGE 5

45.50	CFS	.07	.06	.06	.06	.06	.06	.06	.06
45.50	ELEV	1099.03	1099.03	1099.03	1099.03	1099.02	1099.02	1099.02	1099.02
46.30	CFS	.06	.06	.06	.06	.06	.06	.05	.05
46.30	ELEV	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02
47.10	CFS	.05	.05	.05	.05	.05	.05	.05	.05
47.10	ELEV	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02
47.90	CFS	.05	.05	.05	.05	.05	.05	.04	.04
47.90	ELEV	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02
48.70	CFS	.04	.04	.04	.04	.04	.04	.04	.04
48.70	ELEV	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02
49.50	CFS	.04	.04	.04	.04	.04	.04	.04	.04
49.50	ELEV	1099.02	1099.02	1099.02	1099.02	1099.01	1099.01	1099.01	1099.01
50.30	CFS	.04	.03	.03	.03	.03	.03	.03	.03
50.30	ELEV	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01
51.10	CFS	.03	.03	.03					
51.10	ELEV	1099.01	1099.01	1099.01					

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.24 WATERSHED INCHES; 19 CFS-HRS; 1.6 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	1	1	1	1	1	1	1	1
DURATION (HRS)	17							
FLOW (CFS)	0							

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 2.30 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs..
 RAIN TABLE NUMBER 2, ARC 2
 MAIN TIME INCREMENT .100 HOURS

ALTERNATE 1 STORM 1

XSECTION	1	RUNOFF	.04	.23	---	13.33T	1T	25.0
XSECTION	1	REACH	.04	.23	1109.10	13.47T	1T	25.0
XSECTION	2	RUNOFF	.03	.23	---	12.33T	1T	33.3
XSECTION	100	ADDHYD	.07	.23	---	13.32T	2T	28.6
XSECTION	3	RUNOFF	.05	.23	---	12.63T	2T	40.0
XSECTION	101	ADDHYD	.12	.23	---	12.66T	4T	33.3
XSECTION	4	RUNOFF	.00	.58	---	12.34T	1T*****	
XSECTION	102	ADDHYD	.12	.24	---	12.50T	5T	41.7
STRUCTURE	1	RESVOR	.12	.24	1099.44	18.20F	1F	8.3

TR20 ----- SCS -
 012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 1/19/97 1 YEAR (2.3 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAIN2.04TEST
 12:22:53 SUMMARY, JOB NO. 1 PAGE 7

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC ID	REACH LENGTH (FT)	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
		FLOOD PLAIN LENGTH (FT)	INFLOW PEAK (CFS)	TIME (HR)	OUTFLOW PEAK (CFS)	TIME (HR)	Q-A EQ. COEFF (X)	POWER (M)	LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)
BASEFLOW IS		.0 CFS								
ALTERNATE		1	STORM	1						
1	600		1	13.3	1	13.5	1.09	1.55	.004	.994 .70?

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

			FULLPRINT	SUMMARY	NOPLOTS
JOB	TR-20	1012			
TITLE	SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN				
TITLE	2-YEAR (2.7 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL				
3	STRUCT	1			
8			1099.00	0.00	0.00
8			1100.0	2.50	1.61
8			1100.9	12.6	3.47
8			1101.0	34.4	3.69
8			1101.5	106.2	4.84
9	ENDTBL				
2	XSECTN	001	1.0	1111.0	1113.0 1109.0
8			1109.0	0.00	0.00
8			1109.1	1.17	1.05
8			1109.5	18.53	6.25
8			1110.0	65.65	15.00
8			1111.0	256.35	40.00
9	ENDTBL				
6	RUNOFF	1 01	1 .0442	65.	1.72 1
6	REACH	3 001	1 2 600.		1
6	RUNOFF	1 02	1 .0256	65.	0.53 1
6	ADDHYD	4 100	2 1 3		1
6	RUNOFF	1 03	1 .0485	65.	0.88 1
6	ADDHYD	4 101	3 1 2		1
6	RUNOFF	1 04	1 .0050	76.	0.68 1
6	ADDHYD	4 102	2 1 3		1
6	RESVOR	2 1 3	1 1099.0		1 1 1 1
	ENDATA				
7	INCREM	6	0.10		
7	COMPUT	7 001	1 0.0	2.70	1.0 2 2 01 01
	ENDCMP	1			
	ENDJOB	2			

*****END OF 80-80 LIST*****

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 1
 STARTING TIME = .00 RAIN DEPTH = 2.70 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .04 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = 1.72 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0983 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
13.21	2.6	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

OPERATION REACH XSECTION 1
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 600.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.085, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = .82, PEAK TRAVEL TIME = .10 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
13.33	2.6	1109.13

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 11 CFS-HRS; .9 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .53 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0707 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.29	3.2	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 6 CFS-HRS; .5 ACRE-FEET.

OPERATION ADDHYD XSECTION 100

INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 13.17 3.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 17 CFS-HRS; 1.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 3
 OUTPUT HYDROGRAPH = 1 AREA = .05 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .88 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.56 4.4 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 12 CFS-HRS; 1.0 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.53 7.6 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .38 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
 OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .68 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0907 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.33 1.6 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .82 WATERSHED INCHES; 3 CFS-HRS; .2 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.45 9.1 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .39 WATERSHED INCHES; 31 CFS-HRS; 2.6 ACRE-FEET.

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 SURFACE ELEVATION = 1099.00

PEAK TIME (HRS) 17.00
 PEAK DISCHARGE (CFS) 1.8 *
 PEAK ELEVATION (FEET) 1099.74
 * FIRST POINT OF FLAT PEAK

HRS	HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1									
	DRAINAGE AREA = .12 SQ. MI.									
	MAIN TIME INCREMENT = .100 hr,									
	.00	.01	.03	.07	.14	.24	.34	.46		
11.80 CFS	.00	.01	.03	.07	.14	.24	.34	.46		
11.80 ELEV	1099.00	1099.00	1099.01	1099.03	1099.06	1099.09	1099.14	1099.18		
12.60 CFS	.56	.67	.76	.85	.93	1.01	1.08	1.15		
12.60 ELEV	1099.23	1099.27	1099.30	1099.34	1099.37	1099.40	1099.43	1099.46		
13.40 CFS	1.21	1.27	1.32	1.37	1.42	1.46	1.49	1.53		
13.40 ELEV	1099.48	1099.51	1099.53	1099.55	1099.57	1099.58	1099.60	1099.61		
14.20 CFS	1.56	1.59	1.61	1.64	1.66	1.68	1.70	1.71		
14.20 ELEV	1099.62	1099.64	1099.65	1099.66	1099.66	1099.67	1099.68	1099.69		
15.00 CFS	1.73	1.74	1.76	1.77	1.78	1.79	1.80	1.81		
15.00 ELEV	1099.69	1099.70	1099.70	1099.71	1099.71	1099.72	1099.72	1099.72		
15.80 CFS	1.81	1.82	1.82	1.83	1.83	1.84	1.84	1.84		
15.80 ELEV	1099.72	1099.73	1099.73	1099.73	1099.73	1099.73	1099.74	1099.74		
16.60 CFS	1.84	1.85	1.85	1.85	1.85	1.85	1.85	1.85		
16.60 ELEV	1099.74	1099.74	1099.74	1099.74	1099.74	1099.74	1099.74	1099.74		
17.40 CFS	1.84	1.84	1.84	1.84	1.84	1.84	1.83	1.83		
17.40 ELEV	1099.74	1099.74	1099.74	1099.74	1099.73	1099.73	1099.73	1099.73		
18.20 CFS	1.83	1.82	1.82	1.82	1.81	1.81	1.81	1.80		
18.20 ELEV	1099.73	1099.73	1099.73	1099.73	1099.73	1099.72	1099.72	1099.72		
19.00 CFS	1.80	1.79	1.79	1.78	1.78	1.77	1.77	1.76		
19.00 ELEV	1099.72	1099.72	1099.72	1099.71	1099.71	1099.71	1099.71	1099.71		
19.80 CFS	1.76	1.75	1.75	1.74	1.73	1.73	1.72	1.71		
19.80 ELEV	1099.70	1099.70	1099.70	1099.70	1099.69	1099.69	1099.69	1099.69		
20.60 CFS	1.71	1.70	1.69	1.69	1.68	1.67	1.67	1.66		
20.60 ELEV	1099.68	1099.68	1099.68	1099.67	1099.67	1099.67	1099.67	1099.66		
21.40 CFS	1.65	1.64	1.64	1.63	1.62	1.62	1.61	1.60		
21.40 ELEV	1099.66	1099.66	1099.65	1099.65	1099.65	1099.65	1099.64	1099.64		
22.20 CFS	1.60	1.59	1.58	1.58	1.57	1.56	1.56	1.55		
22.20 ELEV	1099.64	1099.64	1099.63	1099.63	1099.63	1099.63	1099.62	1099.62		
23.00 CFS	1.54	1.54	1.53	1.53	1.52	1.51	1.51	1.50		
23.00 ELEV	1099.62	1099.62	1099.61	1099.61	1099.61	1099.61	1099.60	1099.60		
23.80 CFS	1.49	1.49	1.48	1.48	1.47	1.46	1.46	1.45		
23.80 ELEV	1099.60	1099.60	1099.59	1099.59	1099.59	1099.59	1099.58	1099.58		
24.60 CFS	1.44	1.42	1.41	1.40	1.39	1.37	1.36	1.34		
24.60 ELEV	1099.57	1099.57	1099.57	1099.56	1099.55	1099.55	1099.54	1099.54		
25.40 CFS	1.33	1.32	1.30	1.29	1.27	1.26	1.24	1.23		

TR20
1012
11/19/97 2-YEAR
12:13:13

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
STORM USING TYPE II DISTRIBUTION 24 HRS RAIN
PASS 1 JOB NO. 1

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TEST
PAGE 4

25.40	ELEV	1099.53	1099.53	1099.52	1099.51	1099.51	1099.50	1099.50	1099.49
26.20	CFS	1.21	1.20	1.18	1.17	1.15	1.14	1.12	1.11
26.20	ELEV	1099.48	1099.48	1099.47	1099.47	1099.46	1099.45	1099.45	1099.44
27.00	CFS	1.09	1.08	1.07	1.05	1.04	1.03	1.01	1.00
27.00	ELEV	1099.44	1099.43	1099.43	1099.42	1099.42	1099.41	1099.41	1099.40
27.80	CFS	.99	.98	.96	.95	.94	.93	.92	.90
27.80	ELEV	1099.40	1099.39	1099.39	1099.38	1099.38	1099.37	1099.37	1099.36
28.60	CFS	.89	.88	.87	.86	.85	.84	.83	.82
28.60	ELEV	1099.36	1099.35	1099.35	1099.34	1099.34	1099.33	1099.33	1099.33
29.40	CFS	.80	.79	.78	.77	.76	.75	.75	.74
29.40	ELEV	1099.32	1099.32	1099.31	1099.31	1099.31	1099.30	1099.30	1099.29
30.20	CFS	.73	.72	.71	.70	.69	.68	.67	.66
30.20	ELEV	1099.29	1099.29	1099.28	1099.28	1099.28	1099.27	1099.27	1099.27
31.00	CFS	.66	.65	.64	.63	.62	.61	.61	.60
31.00	ELEV	1099.26	1099.26	1099.26	1099.25	1099.25	1099.25	1099.24	1099.24
31.80	CFS	.59	.58	.58	.57	.56	.55	.55	.54
31.80	ELEV	1099.24	1099.23	1099.23	1099.23	1099.22	1099.22	1099.22	1099.22
32.60	CFS	.53	.53	.52	.51	.51	.50	.49	.49
32.60	ELEV	1099.21	1099.21	1099.21	1099.21	1099.20	1099.20	1099.20	1099.20
33.40	CFS	.48	.48	.47	.46	.46	.45	.45	.44
33.40	ELEV	1099.19	1099.19	1099.19	1099.19	1099.18	1099.18	1099.18	1099.18
34.20	CFS	.43	.43	.42	.42	.41	.41	.40	.40
34.20	ELEV	1099.17	1099.17	1099.17	1099.17	1099.17	1099.16	1099.16	1099.16
35.00	CFS	.39	.39	.38	.38	.37	.37	.36	.36
35.00	ELEV	1099.16	1099.15	1099.15	1099.15	1099.15	1099.15	1099.15	1099.14
35.80	CFS	.35	.35	.35	.34	.34	.33	.33	.32
35.80	ELEV	1099.14	1099.14	1099.14	1099.14	1099.13	1099.13	1099.13	1099.13
36.60	CFS	.32	.32	.31	.31	.30	.30	.30	.29
36.60	ELEV	1099.13	1099.13	1099.12	1099.12	1099.12	1099.12	1099.12	1099.12
37.40	CFS	.29	.28	.28	.28	.27	.27	.27	.26
37.40	ELEV	1099.12	1099.11	1099.11	1099.11	1099.11	1099.11	1099.11	1099.11
38.20	CFS	.26	.26	.25	.25	.25	.24	.24	.24
38.20	ELEV	1099.10	1099.10	1099.10	1099.10	1099.10	1099.10	1099.10	1099.10
39.00	CFS	.23	.23	.23	.23	.22	.22	.22	.21
39.00	ELEV	1099.09	1099.09	1099.09	1099.09	1099.09	1099.09	1099.09	1099.09
39.80	CFS	.21	.21	.21	.20	.20	.20	.20	.19
39.80	ELEV	1099.08	1099.08	1099.08	1099.08	1099.08	1099.08	1099.08	1099.08
40.60	CFS	.19	.19	.19	.18	.18	.18	.18	.17
40.60	ELEV	1099.08	1099.08	1099.07	1099.07	1099.07	1099.07	1099.07	1099.07
41.40	CFS	.17	.17	.17	.17	.16	.16	.16	.16
41.40	ELEV	1099.07	1099.07	1099.07	1099.07	1099.07	1099.06	1099.06	1099.06
42.20	CFS	.16	.15	.15	.15	.15	.15	.14	.14
42.20	ELEV	1099.06	1099.06	1099.06	1099.06	1099.06	1099.06	1099.06	1099.06
43.00	CFS	.14	.14	.14	.14	.13	.13	.13	.13
43.00	ELEV	1099.06	1099.06	1099.05	1099.05	1099.05	1099.05	1099.05	1099.05
43.80	CFS	.13	.13	.12	.12	.12	.12	.12	.12
43.80	ELEV	1099.05	1099.05	1099.05	1099.05	1099.05	1099.05	1099.05	1099.05
44.60	CFS	.11	.11	.11	.11	.11	.11	.11	.10
44.60	ELEV	1099.05	1099.05	1099.04	1099.04	1099.04	1099.04	1099.04	1099.04

TR20 ----- SCS -
 1012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 2-YEAR (2.7 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAIN2.04TEST
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45.40	CFS	.10	.10	.10	.10	.10	.10	.10	.09
45.40	ELEV	1099.04	1099.04	1099.04	1099.04	1099.04	1099.04	1099.04	1099.04
46.20	CFS	.09	.09	.09	.09	.09	.09	.09	.09
46.20	ELEV	1099.04	1099.04	1099.04	1099.04	1099.04	1099.03	1099.03	1099.03
47.00	CFS	.08	.08	.08	.08	.08	.08	.08	.08
47.00	ELEV	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03
47.80	CFS	.08	.07	.07	.07	.07	.07	.07	.07
47.80	ELEV	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03
48.60	CFS	.07	.07	.07	.07	.07	.06	.06	.06
48.60	ELEV	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03	1099.03
49.40	CFS	.06	.06	.06	.06	.06	.06	.06	.06
49.40	ELEV	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02
50.20	CFS	.06	.06	.05	.05	.05	.05	.05	.05
50.20	ELEV	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02	1099.02

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .39 WATERSHED INCHES; 31 CFS-HRS; 2.6 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	2	2	2	2	1	1	1	1
DURATION (HRS)	18	20	21					
FLOW (CFS)	1	1	0					

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 2.70 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.
 RAINFALL NUMBER 2, ARC 2
 MAIN TIME INCREMENT .100 HOURS

ALTERNATE 1 STORM 1

XSECTION 1	RUNOFF	.04	.38	---	13.21T	3T	75.0
XSECTION 1	REACH	.04	.38	1109.13	13.33T	3T	75.0
XSECTION 2	RUNOFF	.03	.38	---	12.29T	3T	100.0
XSECTION 100	ADDHYD	.07	.38	---	13.17T	4T	57.1
XSECTION 3	RUNOFF	.05	.38	---	12.56T	4T	80.0
XSECTION 101	ADDHYD	.12	.38	---	12.53	8	66.7
XSECTION 4	RUNOFF	.00	.82	---	12.33T	2T*****	
XSECTION 102	ADDHYD	.12	.39	---	12.45	9	75.0
STRUCTURE 1	RESVOR	.12	.39	1099.74	17.00F	2F	16.7

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	HYDROGRAPH INFORMATION				ROUTING PARAMETERS				
			INFLOW		OUTFLOW		Q-A	EQ.	LENGTH	PEAK	ATT-
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)	FACTOR (k*)	RATIO Q/I (Q*)	KIN COEFF (C)
BASEFLOW IS .0 CFS											
ALTERNATE 1 STORM 1											
1	600		3	13.2	3	13.3	1.09	1.55	.004	.997	.82?

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

				FULLPRINT	SUMMARY	NOPLOTS
OB TR-20	1012					
TITLE	SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN					
TITLE	10-YEAR (4.0 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	1				
8				1099.00	0.00	0.00
8				1100.0	2.50	1.61
8				1100.9	12.6	3.47
8				1101.0	34.4	3.69
8				1101.5	106.2	4.84
9	ENDTBL					
2	XSECTN	001		1.0	1111.0	1113.0 1109.0
8				1109.0	0.00	0.00
8				1109.1	1.17	1.05
8				1109.5	18.53	6.25
8				1110.0	65.65	15.00
8				1111.0	256.35	40.00
9	ENDTBL					
6	RUNOFF	1 01	1	.0442	65.	1.72 1
6	REACH	3 001	1	2 600.		1
6	RUNOFF	1 02	1	.0256	65.	0.53 1
6	ADDHYD	4 100	2 1 3			1
6	RUNOFF	1 03	1	.0485	65.	0.88 1
6	ADDHYD	4 101	3 1 2			1
6	RUNOFF	1 04	1	.0050	76.	0.68 1
6	ADDHYD	4 102	2 1 3			1
6	RESVOR	2	1 3	1 1099.0		1 1 1 1
	ENDATA					
7	INCREM	6		0.10		
7	COMPUT	7 001	1	0.0	4.00	1.0 2 2 01 01
	ENDCMP	1				
	ENDJOB	2				

*****END OF 80-80 LIST*****

TR20 ----- SCS -
 .012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 10-YEAR (4.0 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAI2.04TEST
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EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 1
 STARTING TIME = .00 RAIN DEPTH = 4.00 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .04 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = 1.72 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0983 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
13.07	9.2	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.03 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

OPERATION REACH XSECTION 1
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 600.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.085, M = 1.55
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
13.07	9.2	1109.29

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.03 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .53 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0707 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.24	12.0	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.03 WATERSHED INCHES; 17 CFS-HRS; 1.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 100

TR20
012
1/19/97 10-YEAR (4.0 INCH)
12:15:52

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
STORM USING TYPE II DISTRIBUTION 24 HRS RAI2.04TEST
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INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.30 14.5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.03 WATERSHED INCHES; 46 CFS-HRS; 3.8 ACRE-FEET.

OPERATION RUNOFF XSECTION 3
OUTPUT HYDROGRAPH = 1 AREA = .05 SQ MI
INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .88 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.49 16.0 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.03 WATERSHED INCHES; 32 CFS-HRS; 2.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.42 29.5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.03 WATERSHED INCHES; 78 CFS-HRS; 6.5 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .68 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0907 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.31 3.8 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.74 WATERSHED INCHES; 6 CFS-HRS; .5 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
12.40 33.0 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.06 WATERSHED INCHES; 84 CFS-HRS; 6.9 ACRE-FEET.

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 SURFACE ELEVATION = 1099.00

PEAK TIME (HRS) 14.26
 PEAK DISCHARGE (CFS) 9.2
 PEAK ELEVATION (FEET) 1100.60

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .12 SQ. MI.

HRS	MAIN TIME	INCREMENT = .01	.01	.01	.01	.01	.01	.01	.02
11.00	CFS	.00	.01	.01	.01	.01	.01	.01	.02
11.00	ELEV	1099.00	1099.00	1099.00	1099.00	1099.00	1099.00	1099.01	1099.01
11.80	CFS	.04	.08	.19	.39	.70	1.07	1.47	1.87
11.80	ELEV	1099.01	1099.03	1099.08	1099.16	1099.28	1099.43	1099.59	1099.75
12.60	CFS	2.24	2.81	3.89	4.82	5.63	6.33	6.93	7.45
12.60	ELEV	1099.90	1100.03	1100.12	1100.21	1100.28	1100.34	1100.39	1100.44
13.40	CFS	7.88	8.24	8.53	8.76	8.93	9.06	9.15	9.20
13.40	ELEV	1100.48	1100.51	1100.54	1100.56	1100.57	1100.58	1100.59	1100.60
14.20	CFS	9.23	9.23	9.21	9.17	9.12	9.05	8.97	8.89
14.20	ELEV	1100.60	1100.60	1100.60	1100.59	1100.59	1100.58	1100.58	1100.57
15.00	CFS	8.79	8.69	8.59	8.48	8.37	8.25	8.14	8.02
15.00	ELEV	1100.56	1100.55	1100.54	1100.53	1100.52	1100.51	1100.50	1100.49
15.80	CFS	7.90	7.78	7.66	7.54	7.42	7.30	7.18	7.07
15.80	ELEV	1100.48	1100.47	1100.46	1100.45	1100.44	1100.43	1100.42	1100.41
16.60	CFS	6.95	6.83	6.72	6.60	6.49	6.38	6.27	6.17
16.60	ELEV	1100.40	1100.39	1100.38	1100.37	1100.36	1100.35	1100.34	1100.33
17.40	CFS	6.07	5.97	5.87	5.77	5.68	5.59	5.50	5.41
17.40	ELEV	1100.32	1100.31	1100.30	1100.29	1100.28	1100.27	1100.27	1100.26
18.20	CFS	5.32	5.24	5.16	5.08	5.00	4.92	4.85	4.78
18.20	ELEV	1100.25	1100.24	1100.24	1100.23	1100.22	1100.22	1100.21	1100.20
19.00	CFS	4.70	4.63	4.56	4.50	4.43	4.36	4.30	4.24
19.00	ELEV	1100.20	1100.19	1100.18	1100.18	1100.17	1100.17	1100.16	1100.15
19.80	CFS	4.17	4.11	4.05	3.99	3.93	3.87	3.82	3.76
19.80	ELEV	1100.15	1100.14	1100.14	1100.13	1100.13	1100.12	1100.12	1100.11
20.60	CFS	3.71	3.65	3.60	3.55	3.50	3.45	3.40	3.36
20.60	ELEV	1100.11	1100.10	1100.10	1100.09	1100.09	1100.08	1100.08	1100.08
21.40	CFS	3.31	3.27	3.23	3.19	3.15	3.11	3.08	3.04
21.40	ELEV	1100.07	1100.07	1100.06	1100.06	1100.06	1100.05	1100.05	1100.05
22.20	CFS	3.01	2.97	2.94	2.91	2.88	2.85	2.82	2.80
22.20	ELEV	1100.05	1100.04	1100.04	1100.04	1100.03	1100.03	1100.03	1100.03
23.00	CFS	2.77	2.75	2.72	2.70	2.67	2.65	2.63	2.61
23.00	ELEV	1100.02	1100.02	1100.02	1100.02	1100.02	1100.01	1100.01	1100.01
23.80	CFS	2.59	2.57	2.55	2.53	2.51	2.49	2.48	2.47
23.80	ELEV	1100.01	1100.01	1100.00	1100.00	1100.00	1100.00	1099.99	1099.99
24.60	CFS	2.46	2.44	2.42	2.40	2.38	2.36	2.33	2.31
24.60	ELEV	1099.98	1099.98	1099.97	1099.96	1099.95	1099.94	1099.93	1099.92
25.40	CFS	2.28	2.26	2.23	2.21	2.18	2.16	2.13	2.10

TR20
012

1/19/97
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SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
10-YEAR (4.0 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAI
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25.40	ELEV	1099.91	1099.90	1099.89	1099.88	1099.87	1099.86	1099.85	1099.84
26.20	CFS	2.08	2.05	2.03	2.00	1.98	1.95	1.93	1.91
26.20	ELEV	1099.83	1099.82	1099.81	1099.80	1099.79	1099.78	1099.77	1099.76
27.00	CFS	1.88	1.86	1.83	1.81	1.79	1.77	1.74	1.72
27.00	ELEV	1099.75	1099.74	1099.73	1099.72	1099.72	1099.71	1099.70	1099.69
27.80	CFS	1.70	1.68	1.66	1.63	1.61	1.59	1.57	1.55
27.80	ELEV	1099.68	1099.67	1099.66	1099.65	1099.65	1099.64	1099.63	1099.62
28.60	CFS	1.53	1.51	1.49	1.48	1.46	1.44	1.42	1.40
28.60	ELEV	1099.61	1099.61	1099.60	1099.59	1099.58	1099.58	1099.57	1099.56
29.40	CFS	1.38	1.37	1.35	1.33	1.31	1.30	1.28	1.26
29.40	ELEV	1099.55	1099.55	1099.54	1099.53	1099.53	1099.52	1099.51	1099.51
30.20	CFS	1.25	1.23	1.22	1.20	1.19	1.17	1.16	1.14
30.20	ELEV	1099.50	1099.49	1099.49	1099.48	1099.47	1099.47	1099.46	1099.46
31.00	CFS	1.13	1.11	1.10	1.08	1.07	1.06	1.04	1.03
31.00	ELEV	1099.45	1099.44	1099.44	1099.43	1099.43	1099.42	1099.42	1099.41
31.80	CFS	1.02	1.00	.99	.98	.97	.95	.94	.93
31.80	ELEV	1099.41	1099.40	1099.40	1099.39	1099.39	1099.38	1099.38	1099.37
32.60	CFS	.92	.91	.89	.88	.87	.86	.85	.84
32.60	ELEV	1099.37	1099.36	1099.36	1099.35	1099.35	1099.34	1099.34	1099.34
33.40	CFS	.83	.82	.81	.80	.79	.78	.77	.76
33.40	ELEV	1099.33	1099.33	1099.32	1099.32	1099.31	1099.31	1099.31	1099.30
34.20	CFS	.75	.74	.73	.72	.71	.70	.69	.68
34.20	ELEV	1099.30	1099.30	1099.29	1099.29	1099.28	1099.28	1099.28	1099.27
35.00	CFS	.67	.67	.66	.65	.64	.63	.62	.62
35.00	ELEV	1099.27	1099.27	1099.26	1099.26	1099.26	1099.25	1099.25	1099.25
35.80	CFS	.61	.60	.59	.59	.58	.57	.56	.56
35.80	ELEV	1099.24	1099.24	1099.24	1099.23	1099.23	1099.23	1099.23	1099.22
36.60	CFS	.55	.54	.54	.53	.52	.52	.51	.50
36.60	ELEV	1099.22	1099.22	1099.21	1099.21	1099.21	1099.21	1099.20	1099.20
37.40	CFS	.50	.49	.48	.48	.47	.46	.46	.45
37.40	ELEV	1099.20	1099.20	1099.19	1099.19	1099.19	1099.19	1099.18	1099.18
38.20	CFS	.45	.44	.44	.43	.42	.42	.41	.41
38.20	ELEV	1099.18	1099.18	1099.17	1099.17	1099.17	1099.17	1099.17	1099.16
39.00	CFS	.40	.40	.39	.39	.38	.38	.37	.37
39.00	ELEV	1099.16	1099.16	1099.16	1099.16	1099.15	1099.15	1099.15	1099.15
39.80	CFS	.36	.36	.36	.35	.35	.34	.34	.33
39.80	ELEV	1099.15	1099.14	1099.14	1099.14	1099.14	1099.14	1099.13	1099.13
40.60	CFS	.33	.32	.32	.32	.31	.31	.30	.30
40.60	ELEV	1099.13	1099.13	1099.13	1099.13	1099.12	1099.12	1099.12	1099.12
41.40	CFS	.30	.29	.29	.29	.28	.28	.27	.27
41.40	ELEV	1099.12	1099.12	1099.12	1099.11	1099.11	1099.11	1099.11	1099.11
42.20	CFS	.27	.26	.26	.26	.25	.25	.25	.24
42.20	ELEV	1099.11	1099.11	1099.10	1099.10	1099.10	1099.10	1099.10	1099.10
43.00	CFS	.24	.24	.24	.23	.23	.23	.22	.22
43.00	ELEV	1099.10	1099.10	1099.09	1099.09	1099.09	1099.09	1099.09	1099.09
43.80	CFS	.22	.22	.21	.21	.21	.20	.20	.20
43.80	ELEV	1099.09	1099.09	1099.08	1099.08	1099.08	1099.08	1099.08	1099.08
44.60	CFS	.20	.19	.19	.19	.19	.18	.18	.18
44.60	ELEV	1099.08	1099.08	1099.08	1099.08	1099.07	1099.07	1099.07	1099.07

TR20 ----- SCS -
 7012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 1/19/97 10-YEAR (4.0 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAI2.04TEST
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45.40	CFS	.18	.18	.17	.17	.17	.17	.16	.16
45.40	ELEV	1099.07	1099.07	1099.07	1099.07	1099.07	1099.07	1099.07	1099.06
46.20	CFS	.16	.16	.16	.15	.15	.15	.15	.15
46.20	ELEV	1099.06	1099.06	1099.06	1099.06	1099.06	1099.06	1099.06	1099.06
47.00	CFS	.14	.14	.14	.14	.14	.14	.13	.13
47.00	ELEV	1099.06	1099.06	1099.06	1099.06	1099.05	1099.05	1099.05	1099.05
47.80	CFS	.13	.13	.13	.13	.12	.12	.12	.12
47.80	ELEV	1099.05	1099.05	1099.05	1099.05	1099.05	1099.05	1099.05	1099.05
48.60	CFS	.12	.12	.11	.11	.11	.11	.11	.11
48.60	ELEV	1099.05	1099.05	1099.05	1099.05	1099.04	1099.04	1099.04	

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.05 WATERSHED INCHES; 83 CFS-HRS; 6.9 ACRE-FEET.

DURATION(HRS)	3	6	9	12	15	18	21	24
FLOW(CFS)	7	5	3	2	2	1	1	1
DURATION(HRS)	25							
FLOW(CFS)	0							

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
RAINFALL OF 4.00 inches AND 24.00 hr DURATION, BEGINS AT				.0 hrs.				
RAINTABLE NUMBER 2, ARC 2								
MAIN TIME INCREMENT .100 HOURS								
ALTERNATE 1 STORM 1								
XSECTION	1	RUNOFF	.04	1.03	---	13.07	9	225.0
XSECTION	1	REACH	.04	1.03	1109.29	13.07	9	225.0
XSECTION	2	RUNOFF	.03	1.03	---	12.24	12	400.0
XSECTION	100	ADDHYD	.07	1.03	---	12.30	15	214.3
XSECTION	3	RUNOFF	.05	1.03	---	12.49	16	320.0
XSECTION	101	ADDHYD	.12	1.03	---	12.42	29	241.7
XSECTION	4	RUNOFF	.00	1.74	---	12.31T	4T*****	
XSECTION	102	ADDHYD	.12	1.06	---	12.40	33	275.0
STRUCTURE	1	RESVOR	.12	1.05	1100.60	14.26	9	75.0

TR20 ----- SCS -
 012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 1/19/97 10-YEAR (4.0 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAI2.04TEST
 12:15:52 SUMMARY, JOB NO. 1 PAGE 7

SUMMARY TABLE 2

MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION							ROUTING PARAMETERS				
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS .0 CFS											
	ALTERNATE	1	STORM	1							
1	600		9	13.1	9	13.1	1.09	1.55	.003	1.000	1.00?

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB	TR-20	1012	FULLPRINT		SUMMARY	NO PLOTS
TITLE	SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN					
TITLE	100-YEAR (5.6 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL					
3	STRUCT	1				
8			1099.00	0.00	0.00	
8			1100.0	2.50	1.61	
8			1100.9	12.6	3.47	
8			1101.0	34.4	3.69	
8			1101.5	106.2	4.84	
9	ENDTBL					
2	XSECTN	001	1.0	1111.0	1113.0	1109.0
8			1109.0	0.00	0.00	
8			1109.1	1.17	1.05	
8			1109.5	18.53	6.25	
8			1110.0	65.65	15.00	
8			1111.0	256.35	40.00	
9	ENDTBL					
6	RUNOFF	1 01	1 .0442	65.	1.72	1
6	REACH	3 001	1 2 600.			1
6	RUNOFF	1 02	1 .0256	65.	0.53	1
6	ADDHYD	4 100	2 1 3			1
6	RUNOFF	1 03	1 .0485	65.	0.88	1
6	ADDHYD	4 101	3 1 2			1
6	RUNOFF	1 04	1 .0050	76.	0.68	1
6	ADDHYD	4 102	2 1 3			1
6	RESVOR	2 1 3	1 1099.0			1 1 1 1
	ENDATA					
7	INCREM	6	0.10			
7	COMPUT	7 001	1 0.0	5.60	1.0	2 2 01 01
	ENDCMP	1				
	ENDJOB	2				

*****END OF 80-80 LIST*****

TR20 ----- SCS -
 1012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 100-YEAR (5.6 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO STRUCTURE 1
 STARTING TIME = .00 RAIN DEPTH = 5.60 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .04 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = 1.72 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0983 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
13.01	20.4	(RUNOFF)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
2.06 WATERSHED INCHES; 59 CFS-HRS;		4.9 ACRE-FEET.

OPERATION REACH XSECTION 1
 INPUT HYDROGRAPH 1 OUTPUT HYDROGRAPH 2
 CHANNEL LENGTH = 600.00 FT
 INPUT = RATING CURVE REPRESENTATIVE OF REACH

COMPUTED COEFFICIENTS RELATED TO CROSS SECTION AREA, X = 1.089, M = 1.54
 MODIFIED ATT-KIN ROUTING COEFFICIENT = 1.00, PEAK TRAVEL TIME = .00 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
13.01	20.4	1109.52
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
2.06 WATERSHED INCHES; 59 CFS-HRS;		4.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 2
 OUTPUT HYDROGRAPH = 1 AREA = .03 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .53 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0707 HOURS

PEAK TIME (HRS)	PEAK DISCHARGE (CFS)	PEAK ELEVATION (FEET)
12.22	26.2	(RUNOFF)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)		
2.06 WATERSHED INCHES; 34 CFS-HRS;		2.8 ACRE-FEET.

OPERATION ADDHYD XSECTION 100

TR20 ----- SCS -
 .012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 100-YEAR (5.6 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 12:19:23 PASS 1 JOB NO. 1 PAGE 2

INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.28 32.8 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.06 WATERSHED INCHES; 93 CFS-HRS; 7.7 ACRE-FEET.

OPERATION RUNOFF XSECTION 3
 OUTPUT HYDROGRAPH = 1 AREA = .05 SQ MI
 INPUT RUNOFF CURVE = 65. TIME OF CONCENTRATION = .88 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.45 35.7 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.07 WATERSHED INCHES; 65 CFS-HRS; 5.3 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.39 66.5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.06 WATERSHED INCHES; 158 CFS-HRS; 13.0 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
 OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
 INPUT RUNOFF CURVE = 76. TIME OF CONCENTRATION = .68 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0907 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.30 6.7 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.04 WATERSHED INCHES; 10 CFS-HRS; .8 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.37 72.9 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.10 WATERSHED INCHES; 167 CFS-HRS; 13.8 ACRE-FEET.

OPERATION RESVOR STRUCTURE 1
 INPUT HYDROGRAPH 3 OUTPUT HYDROGRAPH 1
 SURFACE ELEVATION = 1099.00

PEAK TIME (HRS) 12.96
 PEAK DISCHARGE (CFS) 48.0
 PEAK ELEVATION (FEET) 1101.09

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .12 SQ.MI.

HRS	MAIN	TIME	INCREMENT	=	.100	hr,	DRAINAGE	AREA	=	.12	SQ.MI.
9.50	CFS	.00	.01	.01	.01	.01	.01	.01	.01	.01	.01
9.50	ELEV	1099.00	1099.00	1099.00	1099.00	1099.00	1099.00	1099.00	1099.00	1099.00	1099.00
10.30	CFS	.01	.01	.02	.02	.02	.02	.03	.03	.04	.04
10.30	ELEV	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01	1099.01
11.10	CFS	.05	.06	.07	.09	.12	.16	.21	.21	.29	.29
11.10	ELEV	1099.02	1099.02	1099.03	1099.04	1099.05	1099.06	1099.08	1099.08	1099.12	1099.12
11.90	CFS	.46	.77	1.29	2.00	3.69	6.70	9.54	9.54	12.09	12.09
11.90	ELEV	1099.18	1099.31	1099.51	1099.80	1100.11	1100.37	1100.63	1100.63	1100.85	1100.85
12.70	CFS	35.12	44.37	47.73	47.92	46.48	44.22	41.59	41.59	38.80	38.80
12.70	ELEV	1101.01	1101.07	1101.09	1101.09	1101.08	1101.07	1101.05	1101.05	1101.03	1101.03
13.50	CFS	35.99	32.74	29.29	26.62	24.43	22.58	20.98	20.98	19.57	19.57
13.50	ELEV	1101.01	1100.99	1100.98	1100.96	1100.95	1100.95	1100.94	1100.94	1100.93	1100.93
14.30	CFS	18.32	17.20	16.21	15.32	14.53	13.82	13.20	13.20	12.66	12.66
14.30	ELEV	1100.93	1100.92	1100.92	1100.91	1100.91	1100.91	1100.90	1100.90	1100.90	1100.90
15.10	CFS	12.57	12.52	12.45	12.37	12.28	12.18	12.08	12.08	11.96	11.96
15.10	ELEV	1100.90	1100.89	1100.89	1100.88	1100.87	1100.86	1100.85	1100.85	1100.84	1100.84
15.90	CFS	11.84	11.72	11.59	11.45	11.31	11.17	11.02	11.02	10.88	10.88
15.90	ELEV	1100.83	1100.82	1100.81	1100.80	1100.79	1100.77	1100.76	1100.76	1100.75	1100.75
16.70	CFS	10.73	10.58	10.44	10.29	10.14	10.00	9.86	9.86	9.72	9.72
16.70	ELEV	1100.73	1100.72	1100.71	1100.69	1100.68	1100.67	1100.66	1100.66	1100.64	1100.64
17.50	CFS	9.58	9.44	9.31	9.18	9.05	8.92	8.80	8.80	8.67	8.67
17.50	ELEV	1100.63	1100.62	1100.61	1100.60	1100.58	1100.57	1100.56	1100.56	1100.55	1100.55
18.30	CFS	8.55	8.43	8.32	8.20	8.09	7.98	7.87	7.87	7.76	7.76
18.30	ELEV	1100.54	1100.53	1100.52	1100.51	1100.50	1100.49	1100.48	1100.48	1100.47	1100.47
19.10	CFS	7.66	7.55	7.45	7.35	7.25	7.15	7.05	7.05	6.95	6.95
19.10	ELEV	1100.46	1100.45	1100.44	1100.43	1100.42	1100.41	1100.41	1100.41	1100.40	1100.40
19.90	CFS	6.85	6.76	6.67	6.57	6.48	6.39	6.30	6.30	6.21	6.21
19.90	ELEV	1100.39	1100.38	1100.37	1100.36	1100.35	1100.35	1100.34	1100.34	1100.33	1100.33
20.70	CFS	6.13	6.04	5.96	5.88	5.80	5.72	5.65	5.65	5.58	5.58
20.70	ELEV	1100.32	1100.32	1100.31	1100.30	1100.29	1100.29	1100.28	1100.28	1100.27	1100.27
21.50	CFS	5.51	5.44	5.38	5.31	5.25	5.19	5.14	5.14	5.08	5.08
21.50	ELEV	1100.27	1100.26	1100.26	1100.25	1100.25	1100.24	1100.23	1100.23	1100.23	1100.23
22.30	CFS	5.03	4.97	4.92	4.87	4.83	4.78	4.74	4.74	4.69	4.69
22.30	ELEV	1100.23	1100.22	1100.22	1100.21	1100.21	1100.20	1100.20	1100.20	1100.20	1100.20
23.10	CFS	4.65	4.61	4.57	4.53	4.49	4.46	4.42	4.42	4.39	4.39
23.10	ELEV	1100.19	1100.19	1100.18	1100.18	1100.18	1100.17	1100.17	1100.17	1100.17	1100.17
23.90	CFS	4.35	4.32	4.29	4.25	4.21	4.15	4.08	4.08	4.00	4.00

TR20
1012
11/19/97
12:19:23

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
100-YEAR (5.6 INCH) STORM USING TYPE II DISTRIBUTION
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VERSION
24 HRS RA2.04TEST
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23.90	ELEV	1100.17	1100.16	1100.16	1100.16	1100.15	1100.15	1100.14	1100.13
24.70	CFS	3.91	3.81	3.70	3.59	3.48	3.37	3.25	3.13
24.70	ELEV	1100.13	1100.12	1100.11	1100.10	1100.09	1100.08	1100.07	1100.06
25.50	CFS	3.02	2.91	2.80	2.69	2.58	2.49	2.46	2.43
25.50	ELEV	1100.05	1100.04	1100.03	1100.02	1100.01	1100.00	1099.99	1099.97
26.30	CFS	2.41	2.38	2.35	2.32	2.29	2.26	2.23	2.21
26.30	ELEV	1099.96	1099.95	1099.94	1099.93	1099.92	1099.90	1099.89	1099.88
27.10	CFS	2.18	2.15	2.12	2.10	2.07	2.04	2.02	1.99
27.10	ELEV	1099.87	1099.86	1099.85	1099.84	1099.83	1099.82	1099.81	1099.80
27.90	CFS	1.97	1.94	1.92	1.89	1.87	1.85	1.82	1.80
27.90	ELEV	1099.79	1099.78	1099.77	1099.76	1099.75	1099.74	1099.73	1099.72
28.70	CFS	1.78	1.75	1.73	1.71	1.69	1.67	1.64	1.62
28.70	ELEV	1099.71	1099.70	1099.69	1099.68	1099.67	1099.67	1099.66	1099.65
29.50	CFS	1.60	1.58	1.56	1.54	1.52	1.50	1.48	1.46
29.50	ELEV	1099.64	1099.63	1099.62	1099.62	1099.61	1099.60	1099.59	1099.59
30.30	CFS	1.45	1.43	1.41	1.39	1.37	1.36	1.34	1.32
30.30	ELEV	1099.58	1099.57	1099.56	1099.56	1099.55	1099.54	1099.54	1099.53
31.10	CFS	1.30	1.29	1.27	1.26	1.24	1.22	1.21	1.19
31.10	ELEV	1099.52	1099.52	1099.51	1099.50	1099.50	1099.49	1099.48	1099.48
31.90	CFS	1.18	1.16	1.15	1.13	1.12	1.10	1.09	1.08
31.90	ELEV	1099.47	1099.46	1099.46	1099.45	1099.45	1099.44	1099.44	1099.43
32.70	CFS	1.06	1.05	1.04	1.02	1.01	1.00	.98	.97
32.70	ELEV	1099.43	1099.42	1099.41	1099.41	1099.40	1099.40	1099.39	1099.39
33.50	CFS	.96	.95	.93	.92	.91	.90	.89	.88
33.50	ELEV	1099.38	1099.38	1099.37	1099.37	1099.36	1099.36	1099.36	1099.35
34.30	CFS	.87	.85	.84	.83	.82	.81	.80	.79
34.30	ELEV	1099.35	1099.34	1099.34	1099.33	1099.33	1099.32	1099.32	1099.32
35.10	CFS	.78	.77	.76	.75	.74	.73	.72	.71
35.10	ELEV	1099.31	1099.31	1099.30	1099.30	1099.30	1099.29	1099.29	1099.29
35.90	CFS	.70	.70	.69	.68	.67	.66	.65	.64
35.90	ELEV	1099.28	1099.28	1099.27	1099.27	1099.27	1099.26	1099.26	1099.26
36.70	CFS	.64	.63	.62	.61	.60	.60	.59	.58
36.70	ELEV	1099.25	1099.25	1099.25	1099.24	1099.24	1099.24	1099.24	1099.23
37.50	CFS	.57	.57	.56	.55	.55	.54	.53	.52
37.50	ELEV	1099.23	1099.23	1099.22	1099.22	1099.22	1099.22	1099.21	1099.21
38.30	CFS	.52	.51	.50	.50	.49	.49	.48	.47
38.30	ELEV	1099.21	1099.20	1099.20	1099.20	1099.20	1099.19	1099.19	1099.19
39.10	CFS	.47	.46	.46	.45	.44	.44	.43	.43
39.10	ELEV	1099.19	1099.18	1099.18	1099.18	1099.18	1099.18	1099.17	1099.17
39.90	CFS	.42	.42	.41	.41	.40	.40	.39	.39
39.90	ELEV	1099.17	1099.17	1099.16	1099.16	1099.16	1099.16	1099.16	1099.15
40.70	CFS	.38	.38	.37	.37	.36	.36	.35	.35
40.70	ELEV	1099.15	1099.15	1099.15	1099.15	1099.14	1099.14	1099.14	1099.14
41.50	CFS	.34	.34	.33	.33	.33	.32	.32	.31
41.50	ELEV	1099.14	1099.14	1099.13	1099.13	1099.13	1099.13	1099.13	1099.13
42.30	CFS	.31	.31	.30	.30	.29	.29	.29	.28
42.30	ELEV	1099.12	1099.12	1099.12	1099.12	1099.12	1099.12	1099.11	1099.11
43.10	CFS	.28	.28	.27	.27	.27	.26	.26	.26
43.10	ELEV	1099.11	1099.11	1099.11	1099.11	1099.11	1099.10	1099.10	1099.10

TR20 ----- SCS -
 1012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 11/19/97 100-YEAR (5.6 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
 12:19:23 PASS 1 JOB NO. 1 PAGE 5

43.90	CFS	.25	.25	.25	.24	.24	.24	.23	.23
43.90	ELEV	1099.10	1099.10	1099.10	1099.10	1099.10	1099.09	1099.09	1099.09
44.70	CFS	.23	.22	.22	.22	.22	.21	.21	.21
44.70	ELEV	1099.09	1099.09	1099.09	1099.09	1099.09	1099.09	1099.08	1099.08
45.50	CFS	.21	.20	.20	.20	.20	.19	.19	.19
45.50	ELEV	1099.08	1099.08	1099.08	1099.08	1099.08	1099.08	1099.08	1099.08
46.30	CFS	.19	.18	.18	.18	.18	.17	.17	.17
46.30	ELEV	1099.07	1099.07	1099.07	1099.07	1099.07	1099.07	1099.07	1099.07
47.10	CFS	.17	.17	.16	.16				
47.10	ELEV	1099.07	1099.07	1099.07	1099.06				

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.08 WATERSHED INCHES; 166 CFS-HRS; 13.7 ACRE-FEET.

DURATION(HRS)	3	6	9	12	15	18	21	24
FLOW(CFS)	12	8	6	4	2	1	1	1
DURATION(HRS)	27							
FLOW(CFS)	0							

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE				
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)	
RAINFALL OF 5.60 inches AND 24.00 hr DURATION, BEGINS AT				.0 hrs.				
RAINTABLE NUMBER 2, ARC 2								
MAIN TIME INCREMENT .100 HOURS								
ALTERNATE 1		STORM 1						
XSECTION	1	RUNOFF	.04	2.06	---	13.01	20	500.0
XSECTION	1	REACH	.04	2.06	1109.52	13.01	20	500.0
XSECTION	2	RUNOFF	.03	2.06	---	12.22	26	866.7
XSECTION	100	ADDHYD	.07	2.06	---	12.28	33	471.4
XSECTION	3	RUNOFF	.05	2.07	---	12.45	36	720.0
XSECTION	101	ADDHYD	.12	2.06	---	12.39	66	550.0
XSECTION	4	RUNOFF	.00	3.04	---	12.30	7	*****
XSECTION	102	ADDHYD	.12	2.10	---	12.37	73	608.3
STRUCTURE	1	RESVOR	.12	2.08	1101.09	12.96	48	400.0

SUMMARY TABLE 2

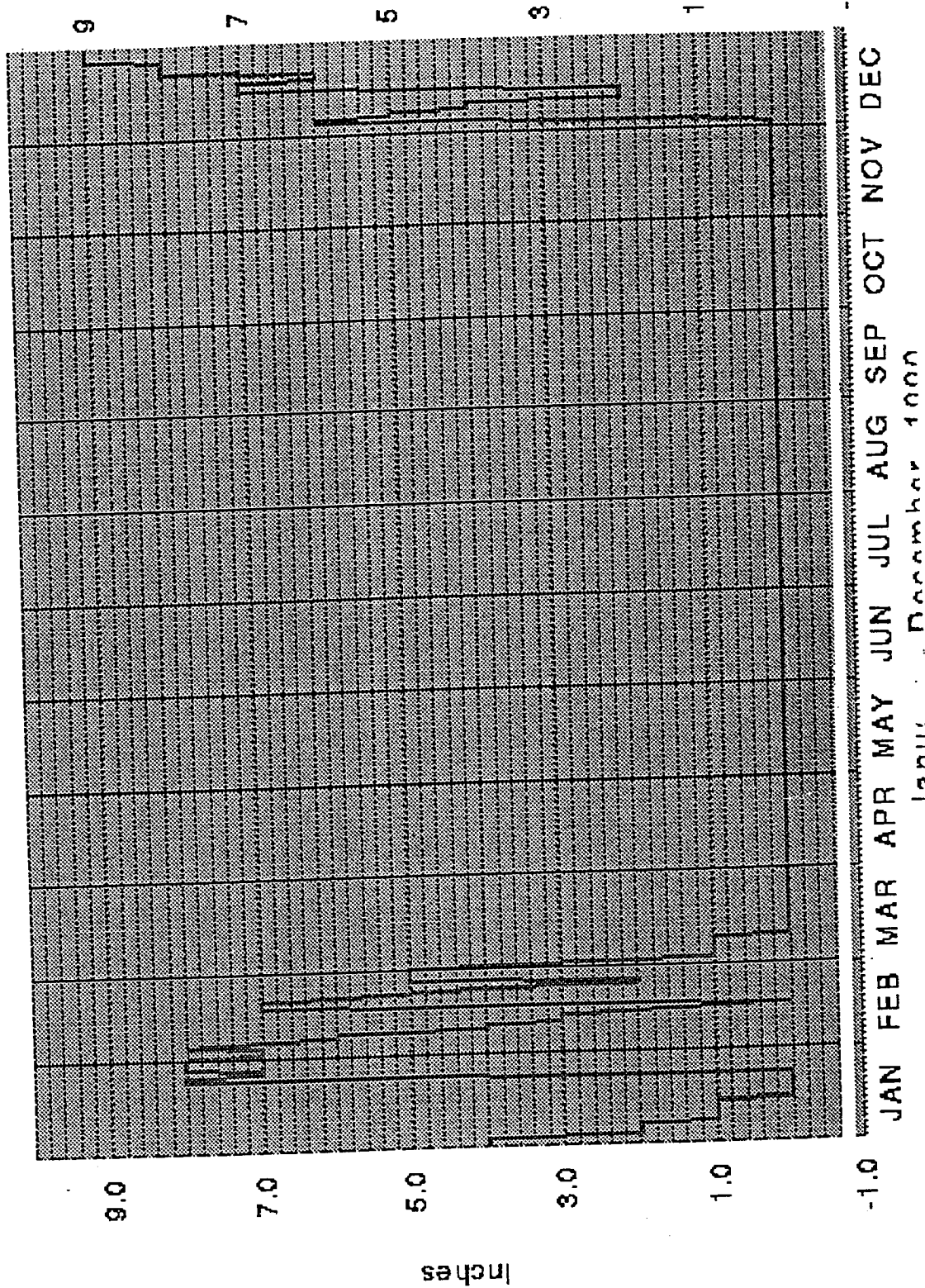
MODIFIED ATT-KIN REACH ROUTING IN ORDER PERFORMED.
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - MAX. NUMBER ROUTING ITERATIONS USED;
 LENGTH FACTOR - VALUE K* GREATER THAN 1.0;
 ATT-KIN COEFF - VALUE C GREATER THAN 0.667.

HYDROGRAPH INFORMATION						ROUTING PARAMETERS					
XSEC ID	REACH LENGTH (FT)	FLOOD PLAIN LENGTH (FT)	INFLOW		OUTFLOW		Q-A EQ.		LENGTH FACTOR (k*)	PEAK RATIO Q/I (Q*)	ATT- KIN COEFF (C)
			PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	COEFF (X)	POWER (M)			
BASEFLOW IS .0 CFS											
	ALTERNATE	1	STORM	1							
1	600		20	13.0	20	13.0	1.09	1.54	.002	1.000	1.00?

APPENDIX B-g

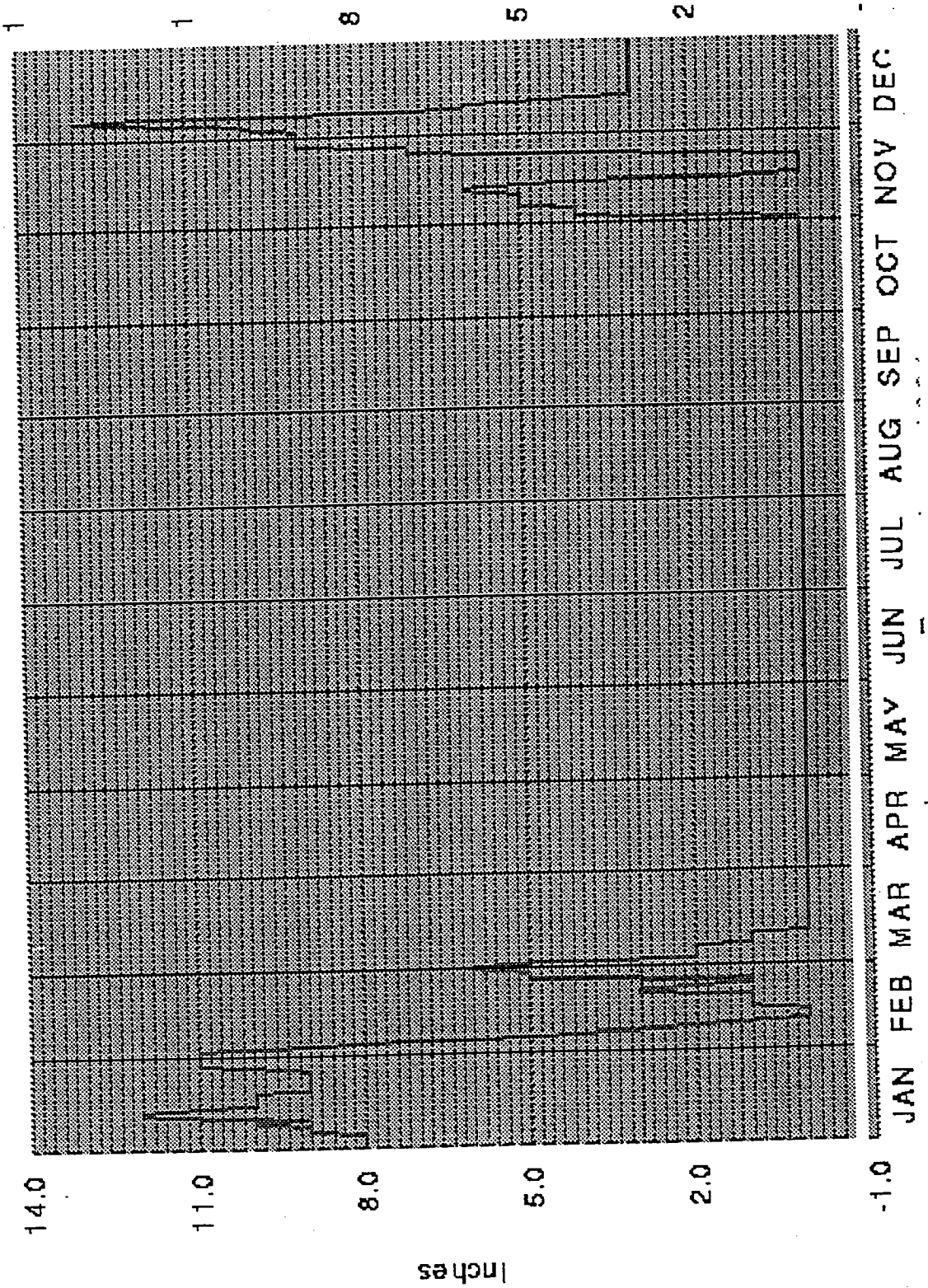
**NOAA SNOWFALL RECORDS
EAU CLAIRE, WI. & DULUTH, MN.**

(E) Snow Depth at Observation Time WIEAU CLAIRE COUNTY A

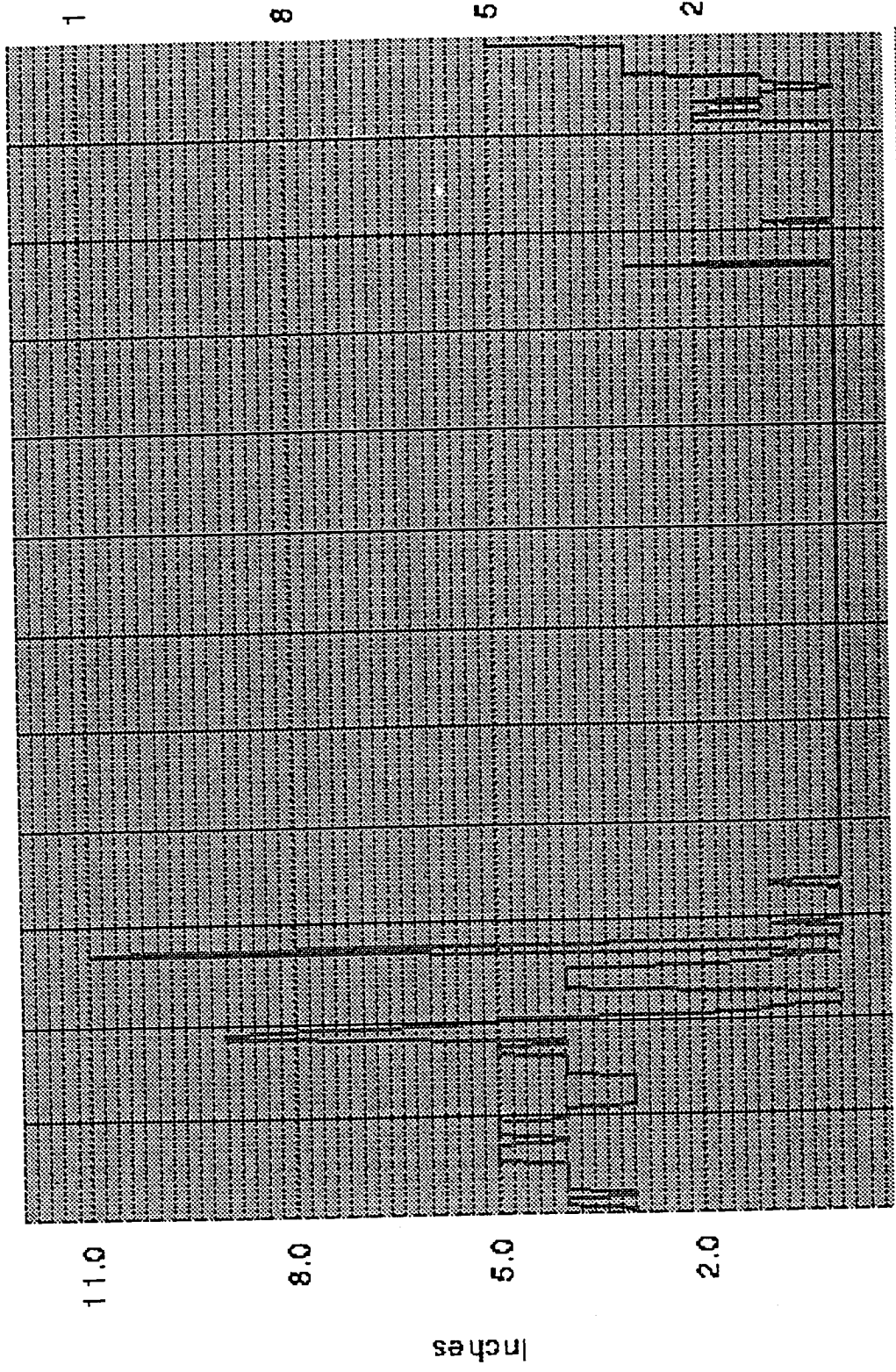


January - December 1900

(E) Snow Depth at Observation Time WIEAU CLAIRE COUNTY A

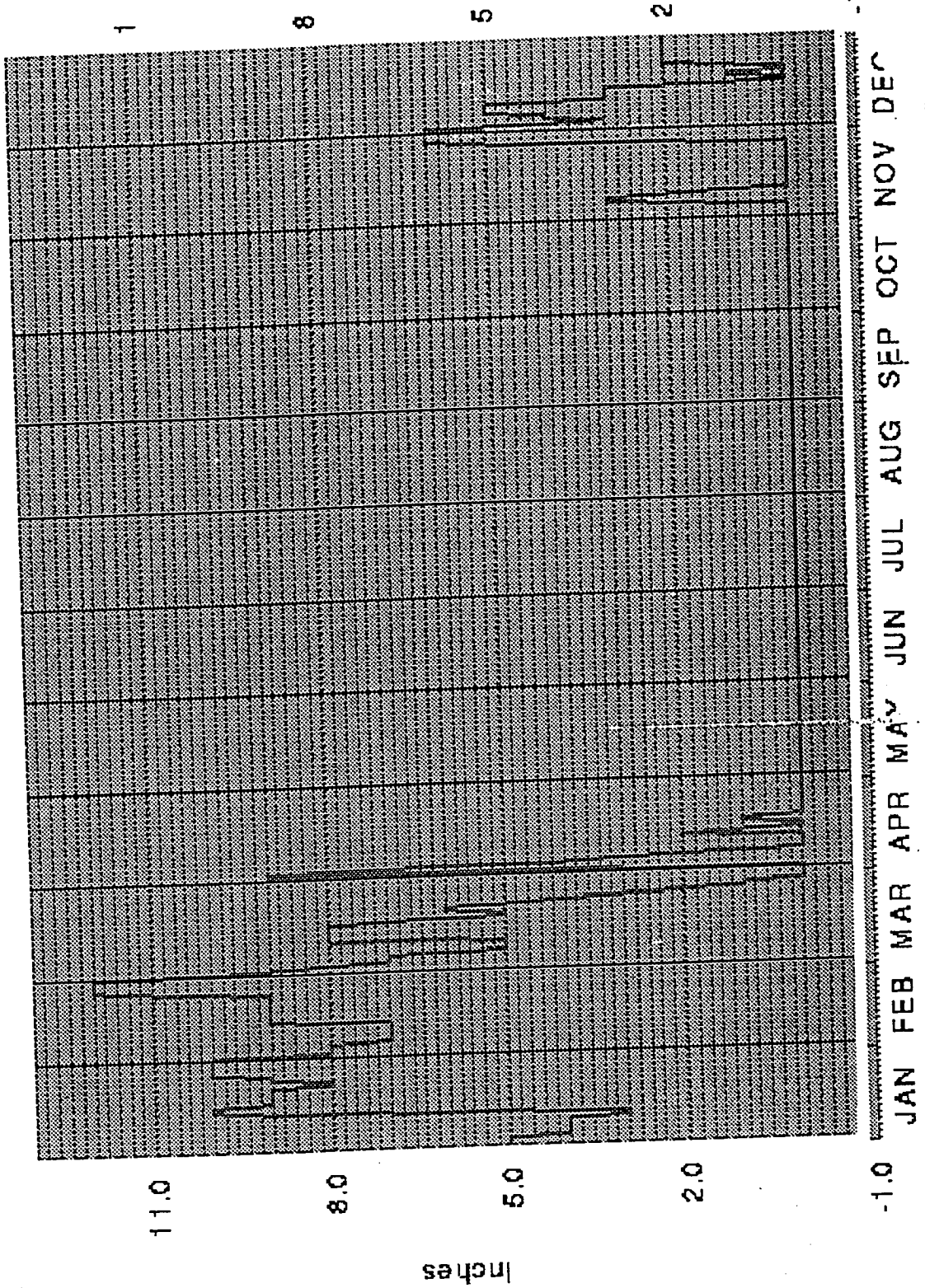


(E) Snow Depth at Observation Time WIEAU CLAIRE COUNTY A

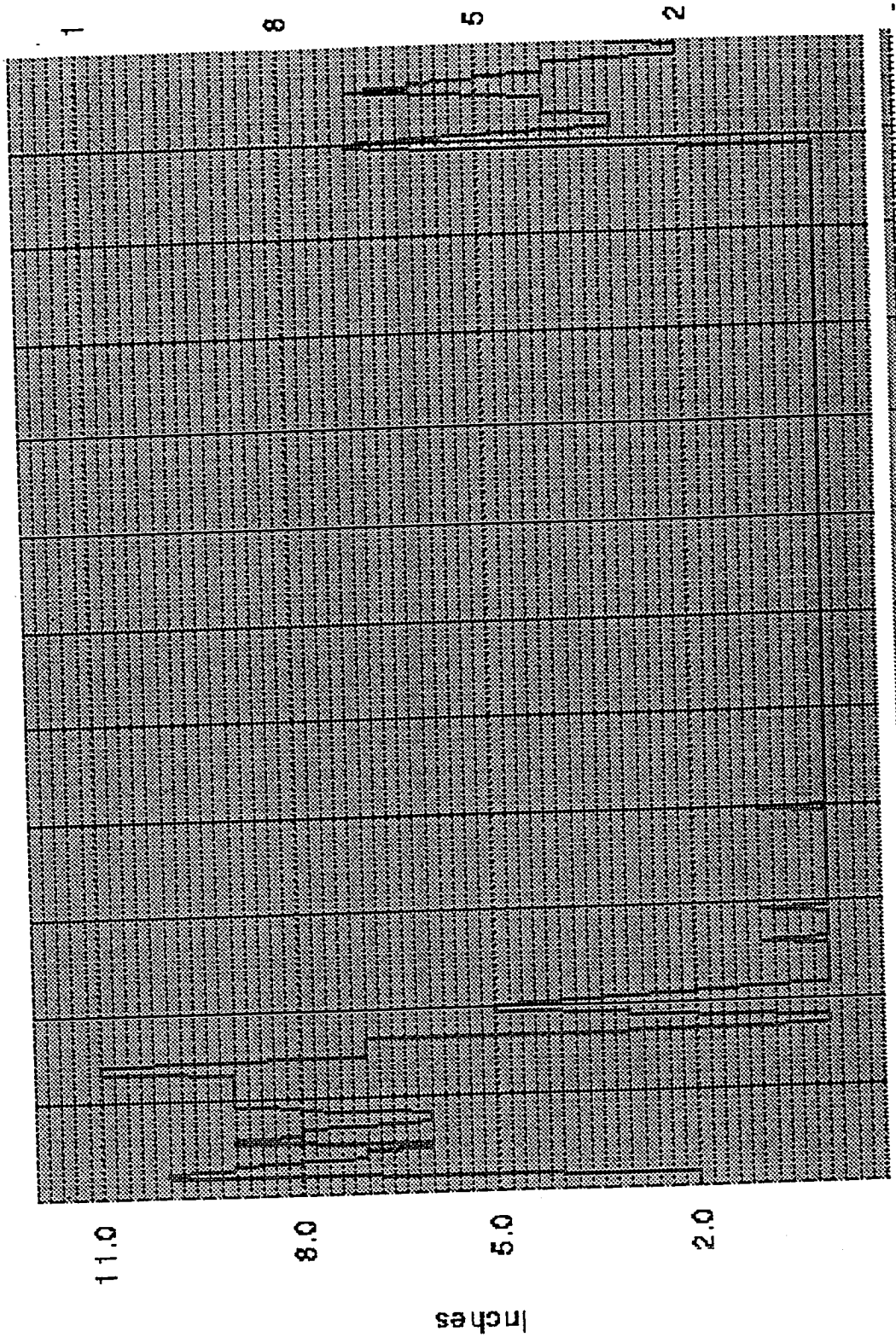


JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

(E) Snow Depth at Observation Time
WIEAU CLAIRE COUNTY A

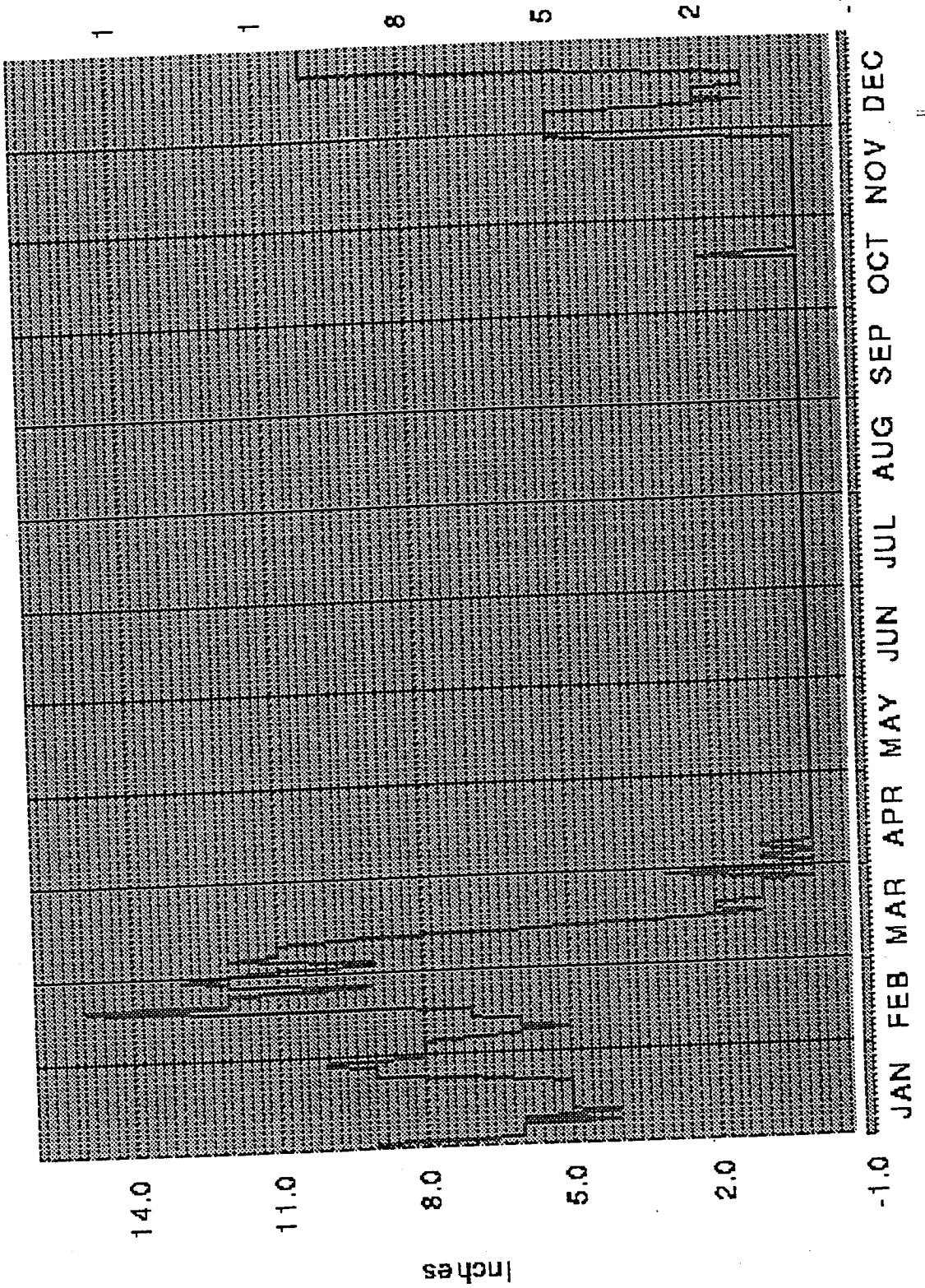


(E) Snow Depth at Observation Time WIEAU CLAIRE COUNTY A

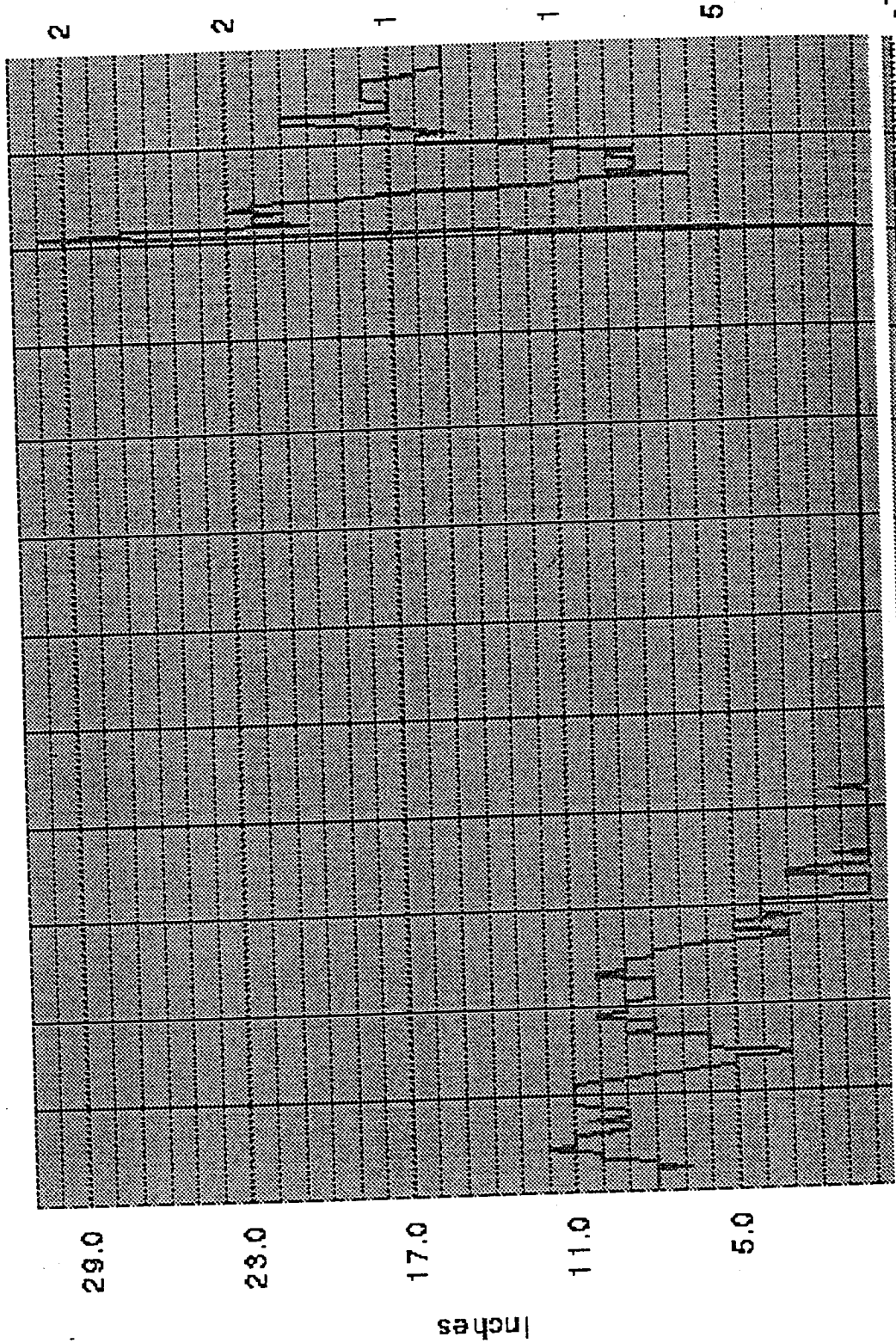


-1.0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

(E) Snow Depth at Observation Time MNDULUTH INTL AP

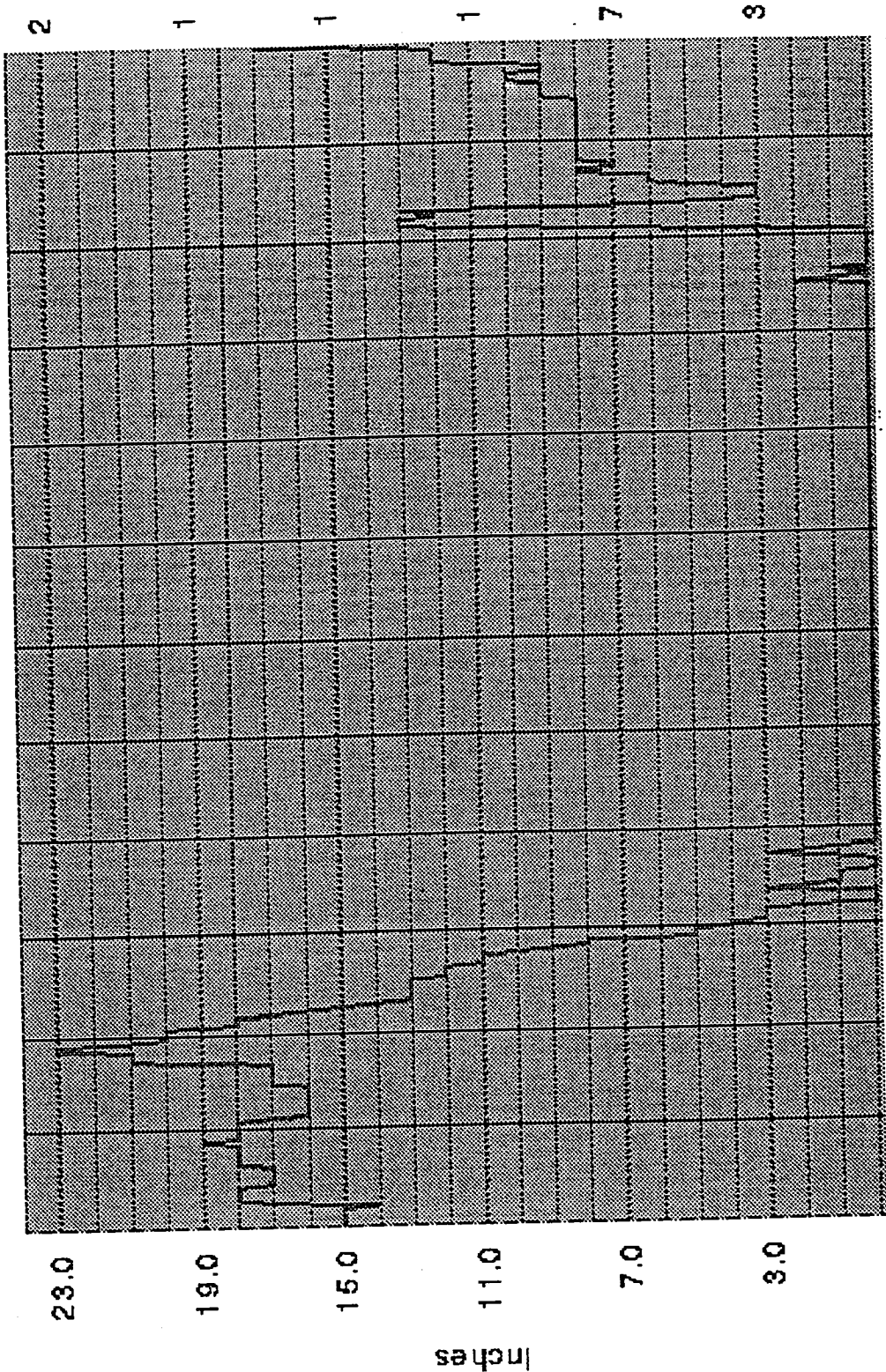


(E) Snow Depth at Observation Time MN DULUTH INTL AP



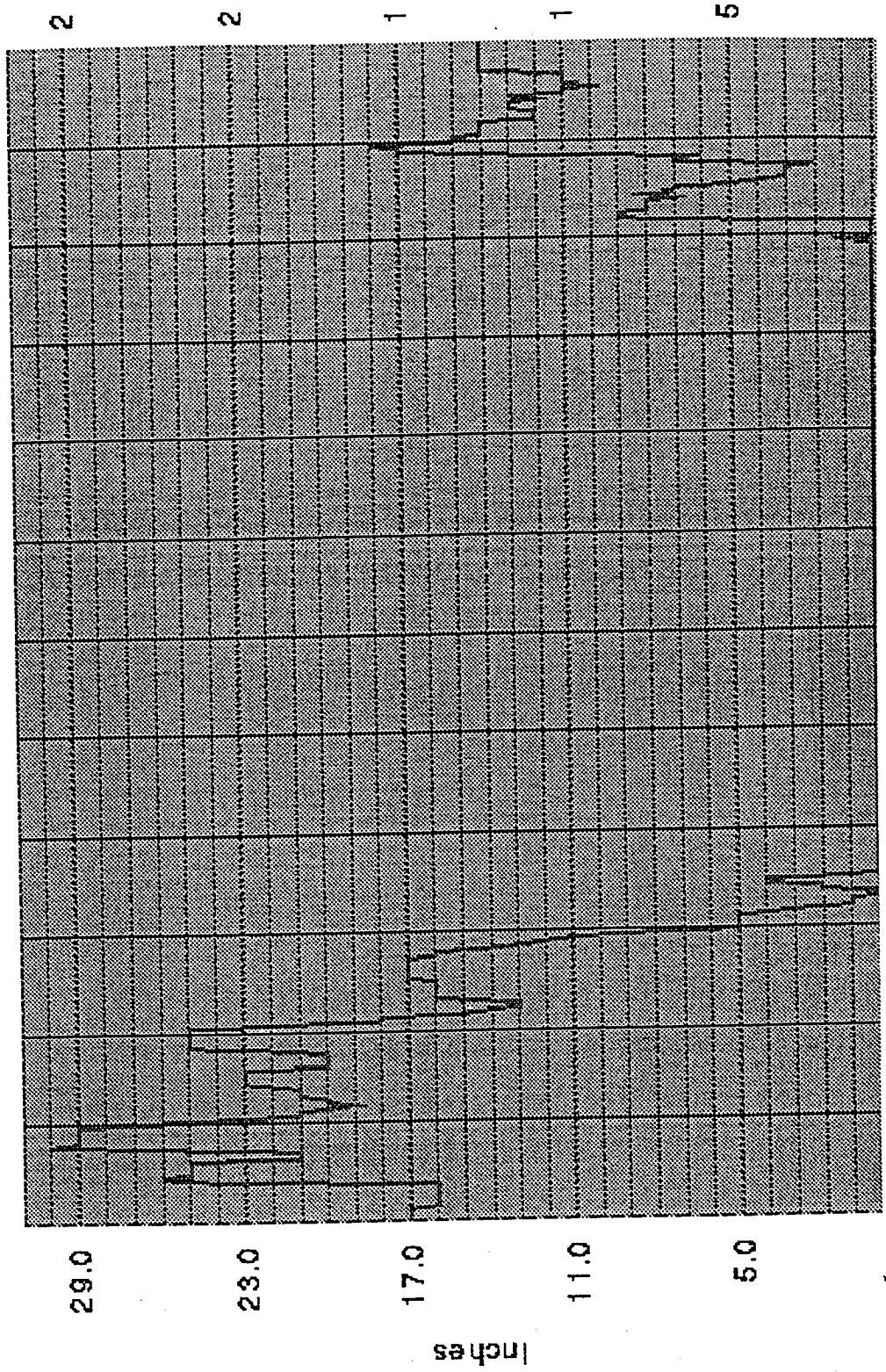
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

(E) Snow Depth at Observation Time MN DULUTH INTL AP



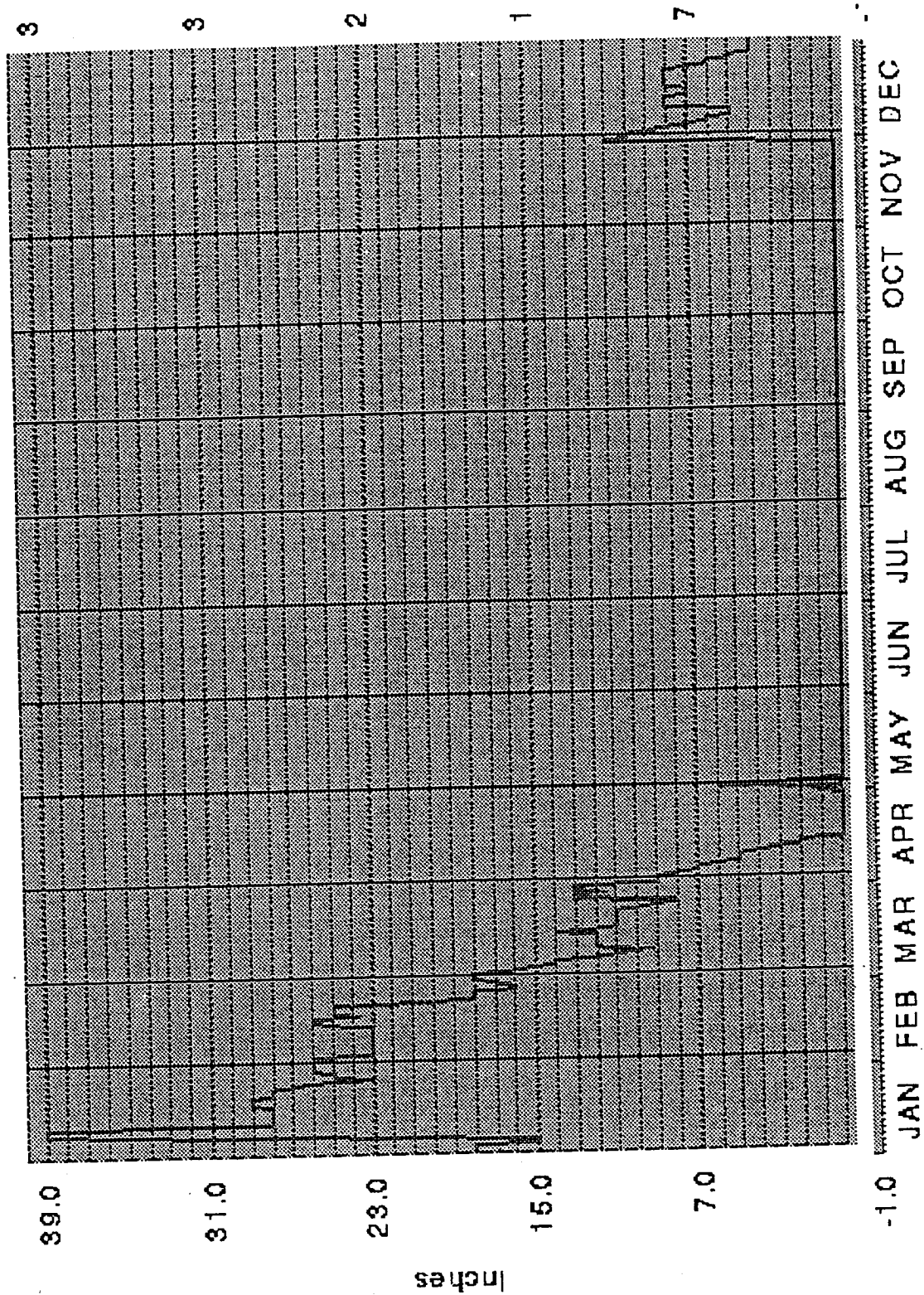
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

(E) Snow Depth at Observation Time MNDULUTH INTL AP



JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

(E) Snow Depth at Observation Time MNDULUTH INTL AP



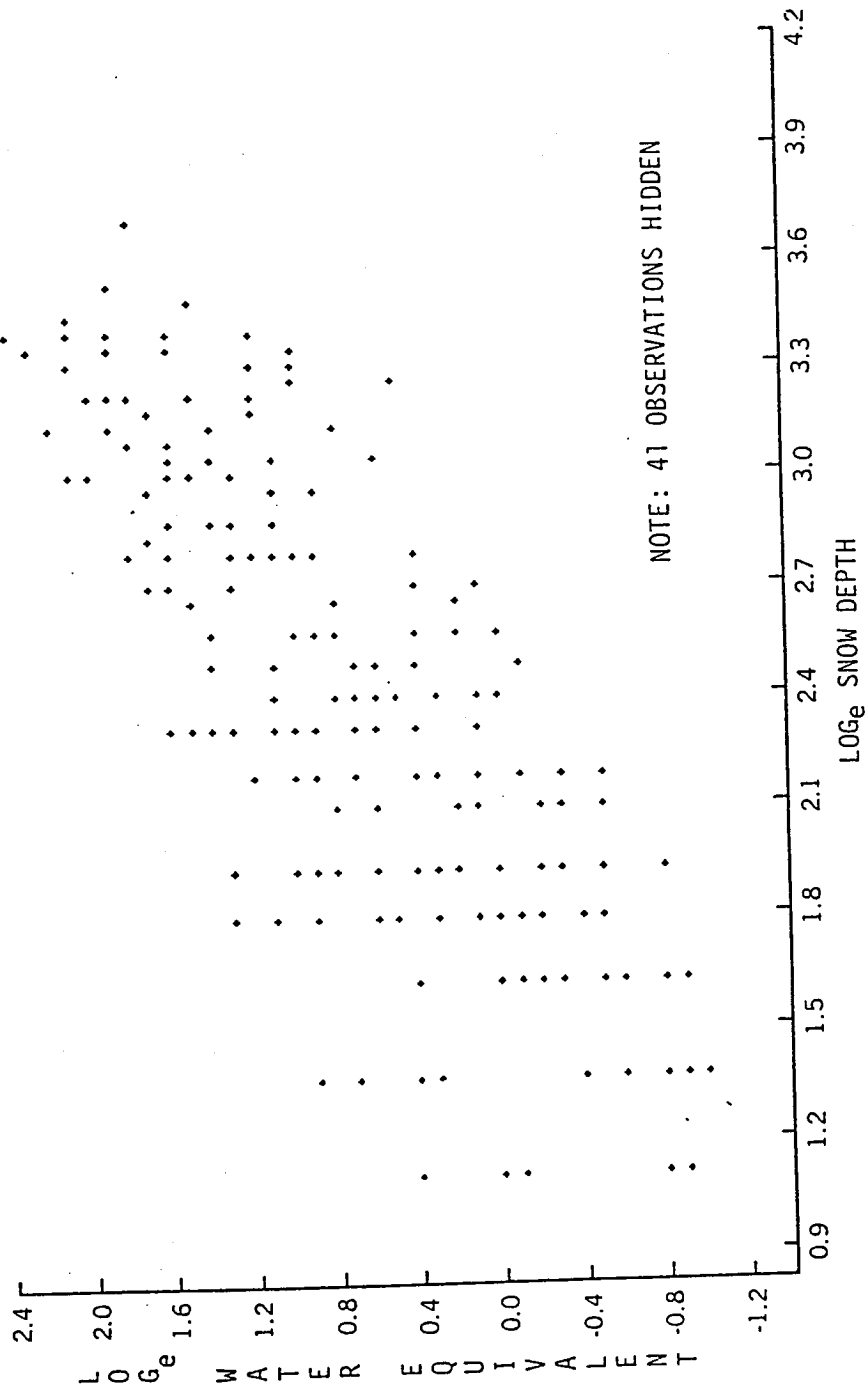


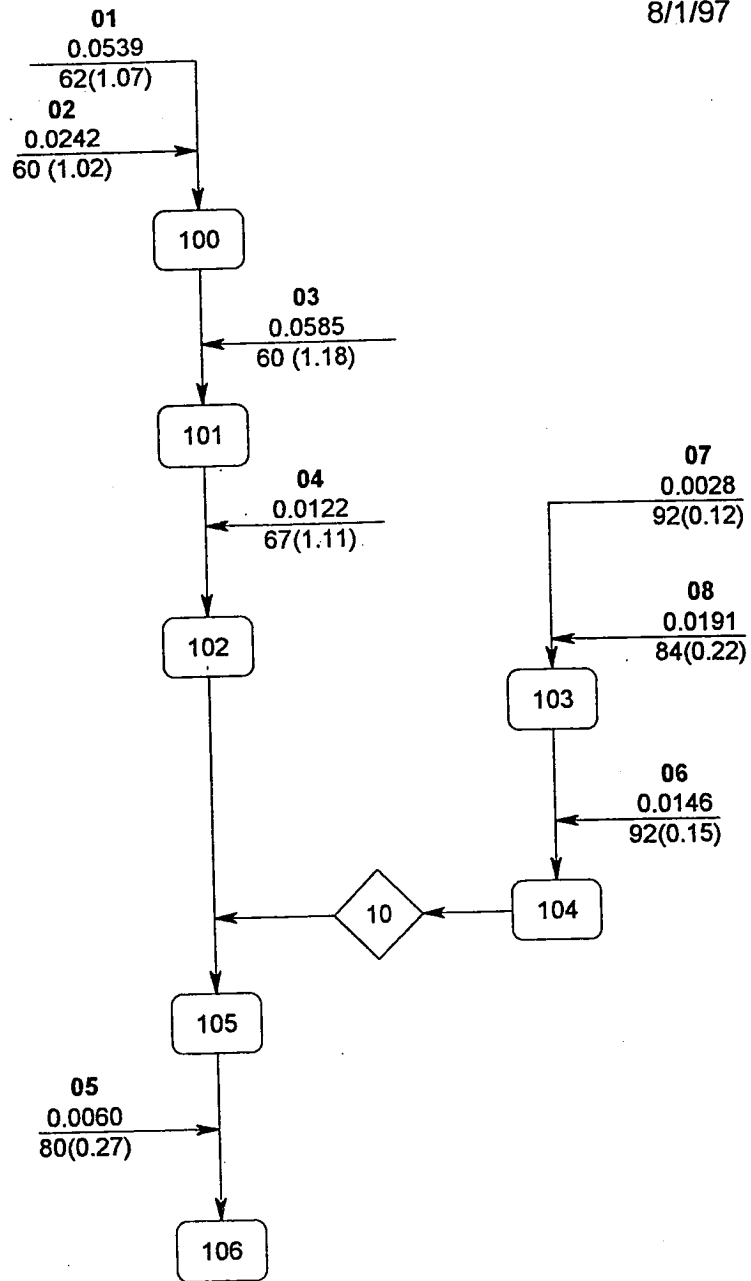
Figure 3. The natural logarithm of water equivalent vs natural logarithm of snow depth for Region 7.

APPENDIX B-h

**STREAM C
TR-20 INPUT AND OUTPUT**

11-11-11

TR 20 Schematic
 Stream C
 Flambeau Mine
 Ladysmith, Wisconsin
 8/1/97



legend
 xsection
 area sq. miles
 Cn (Tc (hours))

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

JOB TR-20 1012		FULLPRINT		SUMMARY	NOLOTS	
TITLE		SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN				
TITLE		10-YEAR (4.0 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL				
3	STRUCT	10				
8			1137.00	0.00	0.00	
8			1138.0	16.84	0.85	
8			1139.0	43.56	1.79	
8			1140.0	78.58	2.81	
8			1141.0	920.33	3.92	
9	ENDTBL					
6	RUNOFF	1 01	1 .0539	62.	1.07	1
6	RUNOFF	1 02	2 .0242	60.	1.02	1
6	ADDHYD	4 100	1 2 3			1
6	RUNOFF	1 03	1 .0585	60.	1.18	1
6	ADDHYD	4 101	3 1 2			1
6	RUNOFF	1 04	1 .0122	67.	1.11	1
6	ADDHYD	4 102	2 1 3			1
6	RUNOFF	1 07	1 .0028	92.	0.12	1
6	RUNOFF	1 08	2 .0191	84.	0.22	1
6	ADDHYD	4 103	1 2 4			1
6	RUNOFF	1 06	1 .0146	92.	0.15	1
6	ADDHYD	4 104	4 1 2			1
6	RESVOR	2 10 2	1 1137.0			1 1 1 1
6	ADDHYD	4 105	3 1 2			1
6	RUNOFF	1 05	1 .0060	80.	0.27	1
6	ADDHYD	4 106	2 1 3			1
ENDATA						
7	INCREM	6	0.10			
7	COMPUT	7 100 106	0.0	4.00	1.0	2 2 01 01
ENDCMP 1						
ENDJOB 2						

*****END OF 80-80 LIST*****

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 100 TO XSECTION 106
 STARTING TIME = .00 RAIN DEPTH = 4.00 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION ADDHYD XSECTION 100
 INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 3

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 0 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 3
 OUTPUT HYDROGRAPH = 1 AREA = .06 SQ MI
 INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.18 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0944 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.74 10.5 (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .76 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 101
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.74 10.5 (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 .76 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 67. TIME OF CONCENTRATION = 1.11 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .1025 HOURS

PEAK TIME(HRS) PEAK DISCHARGE(CFS) PEAK ELEVATION(FEET)
 12.63 4.0 (RUNOFF)

FR20
1012
08/03/97 10-YEAR (4.0 INCH)
21:22:40

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
STORM USING TYPE II DISTRIBUTION 24 HRS
PASS 1 JOB NO. 1

SCS -
VERSION
RAI2.04TEST
PAGE 2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.14 WATERSHED INCHES; 9 CFS-HRS; .7 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) 12.71
PEAK DISCHARGE (CFS) 14.3
PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
.83 WATERSHED INCHES; 38 CFS-HRS; 3.1 ACRE-FEET.

OPERATION RUNOFF XSECTION 7
OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
INPUT RUNOFF CURVE = 92. TIME OF CONCENTRATION = .12 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0206 HOURS

PEAK TIME (HRS) 11.95
PEAK DISCHARGE (CFS) 7.5
PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
3.11 WATERSHED INCHES; 6 CFS-HRS; .5 ACRE-FEET.

OPERATION RUNOFF XSECTION 8
OUTPUT HYDROGRAPH = 2 AREA = .02 SQ MI
INPUT RUNOFF CURVE = 84. TIME OF CONCENTRATION = .22 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0293 HOURS

PEAK TIME (HRS) 12.02
PEAK DISCHARGE (CFS) 36.2
PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.37 WATERSHED INCHES; 29 CFS-HRS; 2.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS) 12.01
PEAK DISCHARGE (CFS) 43.0
PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.46 WATERSHED INCHES; 35 CFS-HRS; 2.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 6
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 92. TIME OF CONCENTRATION = .15 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0200 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 11.97 38.4 (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 2.4 ACRE-FEET.
 3.12 WATERSHED INCHES; 29 CFS-HRS;

OPERATION ADDHYD XSECTION 104
 INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 11.99 80.9 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 5.3 ACRE-FEET.
 2.72 WATERSHED INCHES; 64 CFS-HRS;

OPERATION RESVOR STRUCTURE 10
 INPUT HYDROGRAPH 2 OUTPUT HYDROGRAPH 1
 SURFACE ELEVATION = 1137.00

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.18 36.7 1138.74

HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1
 MAIN TIME INCREMENT = .100 hr, DRAINAGE AREA = .04 SQ.MI.

HRS	MAIN TIME	INCREMENT	.01	.02	.03	.03	.04	.04	.04
4.10 CFS	.00	.01	.01	.02	.03	.03	.04	.04	.04
4.10 ELEV	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00
4.90 CFS	.05	.06	.06	.07	.08	.09	.10	.11	.11
4.90 ELEV	1137.00	1137.00	1137.00	1137.00	1137.00	1137.01	1137.01	1137.01	1137.01
5.70 CFS	.12	.12	.13	.14	.15	.16	.17	.18	.18
5.70 ELEV	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01
6.50 CFS	.19	.20	.22	.23	.24	.25	.26	.27	.27
6.50 ELEV	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.02	1137.02	1137.02
7.30 CFS	.29	.30	.32	.33	.35	.37	.39	.41	.41
7.30 ELEV	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02
8.10 CFS	.43	.45	.47	.50	.53	.56	.60	.63	.63
8.10 ELEV	1137.03	1137.03	1137.03	1137.03	1137.03	1137.03	1137.04	1137.04	1137.04
8.90 CFS	.67	.72	.76	.81	.85	.89	.93	.97	.97
8.90 ELEV	1137.04	1137.04	1137.05	1137.05	1137.05	1137.05	1137.06	1137.06	1137.06
9.70 CFS	1.01	1.06	1.11	1.17	1.23	1.30	1.38	1.47	1.47
9.70 ELEV	1137.06	1137.06	1137.07	1137.07	1137.07	1137.08	1137.08	1137.09	1137.09
10.50 CFS	1.57	1.68	1.80	1.94	2.09	2.26	2.45	2.68	2.68
10.50 ELEV	1137.09	1137.10	1137.11	1137.12	1137.12	1137.13	1137.15	1137.16	1137.16

TR20
1012
08/03/97
21:22:40

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
STORM USING TYPE II DISTRIBUTION 24 HRS RAI2.04TEST
PASS 1 JOB NO. 1

SCS --
VERSION
PAGE 4

11.30	CFS	2.95	3.26	3.63	4.25	5.72	8.89	15.07	26.49
11.30	ELEV	1137.17	1137.19	1137.22	1137.25	1137.34	1137.53	1137.89	1138.36
12.10	CFS	35.29	36.65	33.62	29.68	25.84	22.35	19.28	16.73
12.10	ELEV	1138.69	1138.74	1138.63	1138.48	1138.34	1138.21	1138.09	1137.99
12.90	CFS	15.16	13.76	12.51	11.40	10.41	9.53	8.75	8.06
12.90	ELEV	1137.90	1137.82	1137.74	1137.68	1137.62	1137.57	1137.52	1137.48
13.70	CFS	7.44	6.88	6.39	5.94	5.54	5.18	4.86	4.58
13.70	ELEV	1137.44	1137.41	1137.38	1137.35	1137.33	1137.31	1137.29	1137.27
14.50	CFS	4.33	4.11	3.92	3.74	3.59	3.45	3.32	3.20
14.50	ELEV	1137.26	1137.24	1137.23	1137.22	1137.21	1137.20	1137.20	1137.19
15.30	CFS	3.09	2.99	2.90	2.81	2.72	2.64	2.57	2.49
15.30	ELEV	1137.18	1137.18	1137.17	1137.17	1137.16	1137.16	1137.15	1137.15
16.10	CFS	2.42	2.35	2.29	2.23	2.18	2.14	2.09	2.05
16.10	ELEV	1137.14	1137.14	1137.14	1137.13	1137.13	1137.13	1137.12	1137.12
16.90	CFS	2.02	1.98	1.95	1.92	1.89	1.87	1.84	1.81
16.90	ELEV	1137.12	1137.12	1137.12	1137.11	1137.11	1137.11	1137.11	1137.11
17.70	CFS	1.79	1.76	1.74	1.72	1.69	1.67	1.65	1.63
17.70	ELEV	1137.11	1137.10	1137.10	1137.10	1137.10	1137.10	1137.10	1137.10
18.50	CFS	1.60	1.58	1.56	1.54	1.52	1.49	1.47	1.45
18.50	ELEV	1137.10	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09
19.30	CFS	1.43	1.41	1.39	1.37	1.35	1.32	1.30	1.28
19.30	ELEV	1137.08	1137.08	1137.08	1137.08	1137.08	1137.08	1137.08	1137.08
20.10	CFS	1.26	1.24	1.22	1.20	1.19	1.18	1.17	1.15
20.10	ELEV	1137.07	1137.07	1137.07	1137.07	1137.07	1137.07	1137.07	1137.07
20.90	CFS	1.15	1.14	1.13	1.12	1.11	1.11	1.10	1.10
20.90	ELEV	1137.07	1137.07	1137.07	1137.07	1137.07	1137.07	1137.07	1137.07
21.70	CFS	1.09	1.08	1.08	1.07	1.07	1.06	1.06	1.06
21.70	ELEV	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06
22.50	CFS	1.05	1.05	1.04	1.04	1.03	1.03	1.02	1.02
22.50	ELEV	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06
23.30	CFS	1.02	1.01	1.01	1.00	1.00	.99	.99	.99
23.30	ELEV	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06	1137.06
24.10	CFS	.96	.87	.76	.65	.55	.47	.40	.34
24.10	ELEV	1137.06	1137.05	1137.05	1137.04	1137.03	1137.03	1137.02	1137.02
24.90	CFS	.29	.24	.21	.18	.15	.13	.11	.09
24.90	ELEV	1137.02	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01
25.70	CFS	.08	.07	.06	.05	.04	.03	.03	.02
25.70	ELEV	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00
26.50	CFS	.02	.02	.01	.01	.01			
26.50	ELEV	1137.00	1137.00	1137.00	1137.00	1137.00			

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.72 WATERSHED INCHES; 64 CFS-HRS; 5.3 ACRE-FEET.

DURATION (HRS)	2	4	6	8	10	12	14	16
FLOW (CFS)	7	3	2	2	1	1	1	1
DURATION (HRS)	16							
FLOW (CFS)	0							

TR20 ----- SCS -
 1012 SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN VERSION
 08/03/97 10-YEAR (4.0 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAI2.04TEST
 21:22:40 PASS 1 JOB NO. 1 PAGE 5

OPERATION ADDHYD XSECTION.105
 INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.24 42.8 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 8.4 ACRE-FEET.
 1.47 WATERSHED INCHES; 102 CFS-HRS;

OPERATION RUNOFF XSECTION 5
 OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
 INPUT RUNOFF CURVE = 80. TIME OF CONCENTRATION = .27 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0360 HOURS

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.06 9.0 (RUNOFF)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) .7 ACRE-FEET.
 2.04 WATERSHED INCHES; 8 CFS-HRS;

OPERATION ADDHYD XSECTION 106
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) PEAK DISCHARGE (CFS) PEAK ELEVATION (FEET)
 12.17 48.4 (NULL)
 RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS) 9.1 ACRE-FEET.
 1.50 WATERSHED INCHES; 110 CFS-HRS;

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF .00 inches AND .00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 2, ARC 2							
MAIN TIME INCREMENT .100 HOURS							
ALTERNATE 1 STORM 1							
XSECTION 100	ADDHYD	.00	.00	---	.00	0	*****
RAINFALL OF 4.00 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
XSECTION 3	RUNOFF	.06	.76	---	12.74	10	166.7
XSECTION 101	ADDHYD	.06	.76	---	12.74	10	166.7
XSECTION 4	RUNOFF	.01	1.14	---	12.63T	4T	400.0
XSECTION 102	ADDHYD	.07	.83	---	12.71	14	200.0
XSECTION 7	RUNOFF	.00	3.11	---	11.95	7	*****
XSECTION 8	RUNOFF	.02	2.37	---	12.02	36	1800.0
XSECTION 103	ADDHYD	.02	2.46	---	12.01	43	2150.0
XSECTION 6	RUNOFF	.01	3.12	---	11.97	38	3800.0
XSECTION 104	ADDHYD	.04	2.72	---	11.99	81	2025.0
STRUCTURE 10	RESVOR	.04	2.72	1138.74	12.18	37	925.0
XSECTION 105	ADDHYD	.11	1.47	---	12.24	43	390.9
XSECTION 5	RUNOFF	.01	2.04	---	12.06	9	900.0
XSECTION 106	ADDHYD	.11	1.50	---	12.17	48	436.4

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

	FULLPRINT	SUMMARY	NOLOTS
JOB TR-20 1012			
TITLE	SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN		
TITLE	100-YEAR (5.7 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RAINFALL		
3 STRUCT	10		
8	1137.00	0.00	0.00
8	1138.0	16.84	0.85
8	1139.0	43.56	1.79
8	1140.0	78.58	2.81
8	1141.0	920.33	3.92
9 ENDTBL			
6 RUNOFF 1 01	1 .0539	62.	1.07
6 RUNOFF 1 02	2 .0242	60.	1.02
6 ADDHYD 4 100	1 2 3		
6 RUNOFF 1 03	1 .0585	60.	1.18
6 ADDHYD 4 101	3 1 2		
6 RUNOFF 1 04	1 .0122	67.	1.11
6 ADDHYD 4 102	2 1 3		
6 RUNOFF 1 07	1 .0028	92.	0.12
6 RUNOFF 1 08	2 .0191	84.	0.22
6 ADDHYD 4 103	1 2 4		
6 RUNOFF 1 06	1 .0146	92.	0.15
6 ADDHYD 4 104	4 1 2		
6 RESVOR 2 10	2 1 1137.0		
6 ADDHYD 4 105	3 1 2		
6 RUNOFF 1 05	1 .0060	80.	0.27
6 ADDHYD 4 106	2 1 3		
ENDATA			
7 INCREM 6	0.10		
7 COMPUT 7 100	106 0.0	5.70	1.0
ENDCMP 1			
ENDJOB 2			

*****END OF 80-80 LIST*****

NR20
1012
8/03/97
1:15:12

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04TEST
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EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 100 TO XSECTION 106
STARTING TIME = .00 RAIN DEPTH = 5.70 RAIN DURATION = 1.00
ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
ALTERNATE NO. = 1 STORM NO. = 1 RAIN TABLE NO. = 2

OPERATION ADDHYD XSECTION 100 OUTPUT HYDROGRAPH 3
INPUT HYDROGRAPHS 1,2

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
0 CFS-HRS; .0 ACRE-FEET.

OPERATION RUNOFF XSECTION 3
OUTPUT HYDROGRAPH = 1 AREA = .06 SQ MI
INPUT RUNOFF CURVE = 60. TIME OF CONCENTRATION = 1.18 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0944 HOURS

PEAK TIME (HRS) 12.67
PEAK DISCHARGE (CFS) 28.2
PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.73 WATERSHED INCHES; 65 CFS-HRS; 5.4 ACRE-FEET.

OPERATION ADDHYD XSECTION 101 OUTPUT HYDROGRAPH 2
INPUT HYDROGRAPHS 3,1

PEAK TIME (HRS) 12.67
PEAK DISCHARGE (CFS) 28.2
PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
1.73 WATERSHED INCHES; 65 CFS-HRS; 5.4 ACRE-FEET.

OPERATION RUNOFF XSECTION 4
OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 67. TIME OF CONCENTRATION = 1.11 HOURS
COMPUTED INTERNAL TIME INCREMENT = .1025 HOURS

PEAK TIME (HRS) 12.60
PEAK DISCHARGE (CFS) 8.7
PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 2.30 WATERSHED INCHES; 18 CFS-HRS; 1.5 ACRE-FEET.

OPERATION ADDHYD XSECTION 102
 INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME (HRS) 12.65
 PEAK DISCHARGE (CFS) 36.8
 PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.83 WATERSHED INCHES; 83 CFS-HRS; 6.9 ACRE-FEET.

OPERATION RUNOFF XSECTION 7
 OUTPUT HYDROGRAPH = 1 AREA = .00 SQ MI
 INPUT RUNOFF CURVE = 92. TIME OF CONCENTRATION = .12 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0206 HOURS

PEAK TIME (HRS) 11.95
 PEAK DISCHARGE (CFS) 11.2
 PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.77 WATERSHED INCHES; 9 CFS-HRS; .7 ACRE-FEET.

OPERATION RUNOFF XSECTION 8
 OUTPUT HYDROGRAPH = 2 AREA = .02 SQ MI
 INPUT RUNOFF CURVE = 84. TIME OF CONCENTRATION = .22 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0293 HOURS

PEAK TIME (HRS) 12.01
 PEAK DISCHARGE (CFS) 59.3
 PEAK ELEVATION (FEET) (RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 3.91 WATERSHED INCHES; 48 CFS-HRS; 4.0 ACRE-FEET.

OPERATION ADDHYD XSECTION 103
 INPUT HYDROGRAPHS 1,2 OUTPUT HYDROGRAPH 4

PEAK TIME (HRS) 12.00
 PEAK DISCHARGE (CFS) 69.5
 PEAK ELEVATION (FEET) (NULL)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.02 WATERSHED INCHES; 57 CFS-HRS; 4.7 ACRE-FEET.

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1012
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SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
100-YEAR (5.7 INCH) STORM USING TYPE II DISTRIBUTION 24 HRS RA2.04
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OPERATION RUNOFF XSECTION 6
OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 92. TIME OF CONCENTRATION = .15 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0200 HOURS

PEAK TIME (HRS) 11.97
PEAK DISCHARGE (CFS) 57.4
PEAK ELEVATION (FEET) (RUNOFF)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
4.77 WATERSHED INCHES; 45 CFS-HRS; 3.7 ACRE-FEET.

OPERATION ADDHYD XSECTION 104
INPUT HYDROGRAPHS 4,1 OUTPUT HYDROGRAPH 2

PEAK TIME (HRS) 11.99
PEAK DISCHARGE (CFS) 126.1
PEAK ELEVATION (FEET) (NULL)
RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
4.32 WATERSHED INCHES; 102 CFS-HRS; 8.4 ACRE-FEET.

OPERATION RESVOR STRUCTURE 10
INPUT HYDROGRAPH 2 OUTPUT HYDROGRAPH 1
SURFACE ELEVATION = 1137.00

PEAK TIME (HRS) 12.16
PEAK DISCHARGE (CFS) 62.5
PEAK ELEVATION (FEET) 1139.54

HRS	MAIN	HYDROGRAPH POINTS FOR ALTERNATE = 1, STORM = 1									
		DRAINAGE AREA = .04 SQ.MI.									
	TIME	INCREMENT = .100 hr,									
3.00 CFS	.00	.01	.01	.02	.03	.04	.05	.06	.07	.08	.09
3.00 ELEV	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00
3.80 CFS	.07	.08	.09	.10	.11	.13	.14	.15	.16	.17	.18
3.80 ELEV	1137.00	1137.00	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01
4.60 CFS	.16	.18	.19	.21	.22	.24	.25	.27	.28	.29	.30
4.60 ELEV	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01	1137.01
5.40 CFS	.28	.30	.31	.33	.36	.38	.40	.43	.44	.45	.46
5.40 ELEV	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02	1137.02
6.20 CFS	.45	.48	.50	.53	.56	.59	.62	.65	.66	.67	.68
6.20 ELEV	1137.03	1137.03	1137.03	1137.03	1137.03	1137.03	1137.03	1137.03	1137.03	1137.03	1137.03
7.00 CFS	.68	.71	.74	.77	.80	.83	.86	.89	.90	.91	.92
7.00 ELEV	1137.04	1137.04	1137.04	1137.05	1137.05	1137.05	1137.05	1137.05	1137.05	1137.05	1137.05
7.80 CFS	.93	.96	.99	1.03	1.06	1.10	1.15	1.21	1.22	1.23	1.24
7.80 ELEV	1137.06	1137.06	1137.06	1137.06	1137.06	1137.07	1137.07	1137.07	1137.07	1137.07	1137.07
8.60 CFS	1.26	1.33	1.40	1.47	1.55	1.63	1.71	1.78	1.79	1.80	1.81
8.60 ELEV	1137.08	1137.08	1137.08	1137.09	1137.09	1137.09	1137.10	1137.10	1137.10	1137.10	1137.10
9.40 CFS	1.85	1.92	1.98	2.04	2.12	2.20	2.30	2.41	2.42	2.43	2.44
9.40 ELEV	1137.11	1137.11	1137.12	1137.12	1137.13	1137.13	1137.14	1137.14	1137.14	1137.14	1137.14

IR20
1012
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10.20	CFS	2.53	2.66	2.82	2.98	3.16	3.37	3.60	3.85
10.20	ELEV	1137.15	1137.16	1137.17	1137.18	1137.19	1137.20	1137.21	1137.23
11.00	CFS	4.13	4.45	4.82	5.26	5.78	6.39	7.38	9.77
11.00	ELEV	1137.25	1137.26	1137.29	1137.31	1137.34	1137.38	1137.44	1137.58
11.80	CFS	14.85	27.52	46.00	60.99	61.94	55.06	47.01	40.24
11.80	ELEV	1137.88	1138.40	1139.07	1139.50	1139.52	1139.33	1139.10	1138.88
12.60	CFS	34.71	29.88	25.79	22.38	19.55	17.17	15.65	14.39
12.60	ELEV	1138.67	1138.49	1138.33	1138.21	1138.10	1138.01	1137.93	1137.85
13.40	CFS	13.26	12.25	11.34	10.52	9.78	9.12	8.52	7.97
13.40	ELEV	1137.79	1137.73	1137.67	1137.62	1137.58	1137.54	1137.51	1137.47
14.20	CFS	7.48	7.04	6.65	6.31	6.01	5.74	5.49	5.28
14.20	ELEV	1137.44	1137.42	1137.40	1137.37	1137.36	1137.34	1137.33	1137.31
15.00	CFS	5.08	4.89	4.73	4.57	4.43	4.29	4.16	4.04
15.00	ELEV	1137.30	1137.29	1137.28	1137.27	1137.26	1137.25	1137.25	1137.24
15.80	CFS	3.92	3.81	3.70	3.59	3.49	3.40	3.32	3.24
15.80	ELEV	1137.23	1137.23	1137.22	1137.21	1137.21	1137.20	1137.20	1137.19
16.60	CFS	3.17	3.11	3.05	3.00	2.95	2.90	2.86	2.81
16.60	ELEV	1137.19	1137.18	1137.18	1137.18	1137.18	1137.17	1137.17	1137.17
17.40	CFS	2.77	2.73	2.69	2.65	2.62	2.58	2.55	2.51
17.40	ELEV	1137.16	1137.16	1137.16	1137.16	1137.16	1137.15	1137.15	1137.15
18.20	CFS	2.48	2.45	2.41	2.38	2.35	2.31	2.28	2.25
18.20	ELEV	1137.15	1137.15	1137.14	1137.14	1137.14	1137.14	1137.14	1137.13
19.00	CFS	2.22	2.18	2.15	2.12	2.09	2.06	2.03	1.99
19.00	ELEV	1137.13	1137.13	1137.13	1137.13	1137.12	1137.12	1137.12	1137.12
19.80	CFS	1.96	1.93	1.90	1.87	1.84	1.81	1.78	1.76
19.80	ELEV	1137.12	1137.11	1137.11	1137.11	1137.11	1137.11	1137.11	1137.10
20.60	CFS	1.74	1.73	1.71	1.70	1.68	1.67	1.66	1.65
20.60	ELEV	1137.10	1137.10	1137.10	1137.10	1137.10	1137.10	1137.10	1137.10
21.40	CFS	1.64	1.63	1.62	1.61	1.60	1.60	1.59	1.58
21.40	ELEV	1137.10	1137.10	1137.10	1137.10	1137.10	1137.09	1137.09	1137.09
22.20	CFS	1.57	1.57	1.56	1.55	1.55	1.54	1.53	1.53
22.20	ELEV	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09
23.00	CFS	1.52	1.51	1.51	1.50	1.49	1.49	1.48	1.48
23.00	ELEV	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09	1137.09
23.80	CFS	1.47	1.46	1.46	1.41	1.29	1.13	.96	.82
23.80	ELEV	1137.09	1137.09	1137.09	1137.08	1137.08	1137.07	1137.06	1137.05
24.60	CFS	.70	.59	.50	.43	.36	.31	.26	.22
24.60	ELEV	1137.04	1137.04	1137.03	1137.03	1137.02	1137.02	1137.02	1137.01
25.40	CFS	.19	.16	.13	.11	.10	.08	.07	.06
25.40	ELEV	1137.01	1137.01	1137.01	1137.01	1137.01	1137.00	1137.00	1137.00
26.20	CFS	.05	.04	.04	.03	.03	.02	.02	.02
26.20	ELEV	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00	1137.00
27.00	CFS	.01	.01						
27.00	ELEV	1137.00	1137.00						

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
4.32 WATERSHED INCHES; 102 CFS-HRS; 8.4 ACRE-FEET.

TR20
1012
08/03/97
21:15:12

SOUTH STREAM FLAMBEAU MINE, LADYSMITH, WISCONSIN
STORM USING TYPE II DISTRIBUTION 24 HRS
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DURATION(HRS)	2	4	6	8	10	12	14	16
FLOW(CFS)	10	5	3	2	2	2	2	1
DURATION(HRS)	18	19						
FLOW(CFS)	1	0						

OPERATION ADDHYD XSECTION 105
INPUT HYDROGRAPHS 3,1 OUTPUT HYDROGRAPH 2

PEAK TIME(HRS)	12.25	PEAK DISCHARGE(CFS)	81.0	PEAK ELEVATION(FEET)	(NULL)
RUNOFF ABOVE BASEFLOW	(BASEFLOW = .00 CFS)				
	2.68 WATERSHED INCHES;	185 CFS-HRS;		15.3 ACRE-FEET.	

OPERATION RUNOFF XSECTION 5
OUTPUT HYDROGRAPH = 1 AREA = .01 SQ MI
INPUT RUNOFF CURVE = 80. TIME OF CONCENTRATION = .27 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0360 HOURS

PEAK TIME(HRS)	12.05	PEAK DISCHARGE(CFS)	15.4	PEAK ELEVATION(FEET)	(RUNOFF)
RUNOFF ABOVE BASEFLOW	(BASEFLOW = .00 CFS)				
	3.51 WATERSHED INCHES;	14 CFS-HRS;		1.1 ACRE-FEET.	

OPERATION ADDHYD XSECTION 106
INPUT HYDROGRAPHS 2,1 OUTPUT HYDROGRAPH 3

PEAK TIME(HRS)	12.18	PEAK DISCHARGE(CFS)	89.9	PEAK ELEVATION(FEET)	(NULL)
RUNOFF ABOVE BASEFLOW	(BASEFLOW = .00 CFS)				
	2.72 WATERSHED INCHES;	199 CFS-HRS;		16.4 ACRE-FEET.	

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF .00 inches AND .00 hr DURATION, BEGINS AT				.0 hrs.			
RAINTABLE NUMBER 2, ARC 2							
MAIN TIME INCREMENT .100 HOURS							
ALTERNATE 1 STORM 1							
XSECTION 100	ADDHYD	.00	.00	---	.00	0	*****
RAINFALL OF 5.70 inches AND 24.00 hr DURATION, BEGINS AT				.0 hrs.			
XSECTION 3	RUNOFF	.06	1.73	---	12.67	28	466.7
XSECTION 101	ADDHYD	.06	1.73	---	12.67	28	466.7
XSECTION 4	RUNOFF	.01	2.30	---	12.60	9	900.0
XSECTION 102	ADDHYD	.07	1.83	---	12.65	37	528.6
XSECTION 7	RUNOFF	.00	4.77	---	11.95	11	*****
XSECTION 8	RUNOFF	.02	3.91	---	12.01	59	2950.0
XSECTION 103	ADDHYD	.02	4.02	---	12.00	70	3500.0
XSECTION 6	RUNOFF	.01	4.77	---	11.97	57	5700.0
XSECTION 104	ADDHYD	.04	4.32	---	11.99	126	3150.0
STRUCTURE 10	RESVOR	.04	4.32	1139.54	12.16	62	1550.0
XSECTION 105	ADDHYD	.11	2.68	---	12.25	81	736.4
XSECTION 5	RUNOFF	.01	3.51	---	12.05	15	1500.0
XSECTION 106	ADDHYD	.11	2.72	---	12.18	90	818.2

Appendix C

**Seed Mix by Community Type, Flambeau Mine
Flambeau Mining Company
Ladysmith, Wisconsin**

ZONE A - WET PRAIRIE PLANTING

<u>Scientific Name</u>	<u>Common Name</u>	<u>Quantity/acre</u>	
GRASSES/SEDGES/RUSHES:		Seed	Plants
Agrostis alba (stolonifera)	Redtop	5.00 lb	
Calamagrostis canadensis	Canada blue joint grass	0.10 lb	
Carex comosa	Bristly sedge	0.10 lb	
Carex scoparia	Pointed broom sedge	2.00 lb	
Carex stipata	Awl-fruited sedge	1.00 oz	
Carex vulpinoidea	Fox sedge	1.00 oz	
Glyceria striata	Fowl manna grass	1.00 oz	
Juncus sp.	Rush	0.10 oz	
Leersia oryzoides	Rice cut grass	1.00 oz	
Panicum virgatum	Switch grass	2.00 lb	
Spartina pectinata	Cord grass	0.50 lb	
FORBS:			
Acorus calamus	Sweet flag	0.50 oz	
Alisma plantago-aquatica	Water plantain	4.00 oz	
Asclepias incarnata	Marsh milkweed	0.50 oz	
Aster novae-angliae	New England aster	0.50 oz	
Aster puniceus/simplex	Red-stem aster	1.50 oz	
Bidens cernua	Nodding bur marigold	2.00 oz	
Bidens frondosa	Beggar's tick	1.00 oz	
Cacalia suaveolens	Indian plantain	0.20 oz	
Epilobium coloratum	Willow herb	0.20 oz	
Eupatorium maculatum	Joe-pye weed	1.50 oz	
Eupatorium perfoliatum	Boneset	2.50 oz	
Iris versicolor	Wild iris	1.50 oz	
Lobelia cardinalis	Cardinal flower	0.10 oz	
Lobelia siphilitica	Great blue lobelia	0.10 oz	
Lycopus americanus	Water horehound	0.10 oz	
Mimulus ringens	Monkey flower	0.10 oz	
Polygonum spp.	Smartweed	0.50 lbs	
Rumex orbiculatus	Swamp dock	0.10 oz	
Solidago graminifolia	Grass-leaf goldenrod	0.10 oz	
Verbena hastata	Blue vervain	0.25 lb	

**** This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required**

ZONE B - CONSTRUCTED SWALES

<u>Scientific Name</u>	<u>Common Name</u>	<u>Quantity/acre</u>	
GRASSES/SEDGES/RUSHES:		Seed	Plants
Agrostis alba (stolonifera)	Redtop	5.00 lb	
Calamagrostis canadensis	Canada blue joint grass	0.05 lb	
Carex comosa	Bristly sedge	0.05 lb	
Carex scoparia	Pointed broom sedge	1.00 lb	
Carex stipata	Awl-fruited sedge	0.50 oz	
Carex crinita	Fringed sedge	0.50 oz	
Glyceria striata	Fowl manna grass	0.50 oz	
Juncus torreyi	Torrey's rush	1.00 oz	
Leersia oryzoides	Rice cut grass	0.50 oz	
Panicum virgatum	Switch grass	2.00 lb	
Scirpus acutus	Hard stemmed bulrush	0.50 oz	
Scirpus americanus	Common three-square	0.25 oz	
Scirpus atrovirens	Dark green bulrush	5.00 oz	
Scirpus cyperinus	Woolgrass	5.00 oz	
Scirpus validus	Soft-stemmed bulrush	0.10 oz	
Spartina pectinata	Cord grass	0.50 lb	
FORBS:			
Acorus calamus	Sweet flag	0.25 oz	
Alisma plantago-aquatica	Water plantain	2.00 oz	
Asclepias incarnata	Marsh milkweed	0.25 oz	
Aster novae-angliae	New England aster	0.25 oz	
Aster puniceus/simplex	Red-stem aster	0.75 oz	
Bidens cernua	Nodding bur marigold	1.00 oz	
Bidens frondosa	Beggar's tick	1.00 oz	
Epilobium coloratum	Willow herb	0.10 oz	
Eupatorium maculatum	Joe-pye weed	0.75 oz	
Eupatorium perfoliatum	Boneset	1.25 oz	
Iris versicolor	Wild iris	0.75 oz	
Juncus dudleyi	Dudley's rush	0.05 oz	
Lobelia cardinalis	Cardinal flower	0.05 oz	
Lycopus americanus	Water horehound	0.05 oz	
Mimulus ringens	Monkey flower	0.05 oz	
Pycnanthemum virginianum	Mountain mint	0.05 oz	
Rumex orbiculatus	Swamp dock	0.05 oz	
Solidago graminifolia	Grass-leaf goldenrod	0.05 oz	
Verbena hastata	Blue vervain	0.13 lb	

**** This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required**

ZONE C – EMERGENT/AQUATIC ZONE

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
GRASSES/SEDGES/RUSHES:		Seed	Plants
Carex bebbii	Bebb's sedge		100
Eleocharis palustris	Marsh spikerush	0.10 oz	
Juncus torreyi	Torrey's rush	0.10 oz	
Scirpus acutus	Hard stemmed bulrush	0.10 oz	225
Scirpus americanus	Common three-square	0.25 oz	100
Scirpus validus	Soft-stemmed bulrush	0.25 oz	225
Spartina pectinata	Cord grass		225
Zizania aquatica	Wild rice	2.00 oz	100
FORBS:			
Iris virginica shrevei	Blue flag iris		100
Lycopus americanus	Water horehound	0.10 oz	
Mentha arvensis villosa	Wild mint	0.10 oz	
Nymphaea tuberosa	White water lily		50
Pontedaria cordata	Pickeralweed		100
Potamogeton spp.	Pondweed		100
Sagittaria latifolia	Duck potato	0.25 oz	100
Sparganium eurycarpum	Burreed	1.00 oz	100

* For Zone C only, plants are defined as rootstock.

** *This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required*

ZONE D – UPLAND GRASSLAND (MESIC GRASSLAND)

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
SHRUBS:		Seed	Plants
Symphoricarpos albus	Snowberry	0.20 lb	
Viburnum rafinesquianum	Arrowwood	0.20 lb	
Rhus glabra	Smooth sumac	0.20 lb	
GRASSES/SEDGES/RUSHES:			
Andropogon gerardi	Big bluestem	5.00 lb	
Andropogon scoparius	Little bluestem	3.00 lb	
Carex pensylvanica	Pennsylvania sedge	0.05 lb	50
Danthonia spicata	Poverty oats	2.00 lb	
Eleocharis spp.	Spike rush	0.001 lb	
Elymus canadensis	Canada wild rye	2.00 lb	
Hystrix patula	Bottle brush grass	0.10 lb	
Panicum virgatum	Switch grass	0.25 lb	
Phleum pratense	Timothy	1.00 lb	
Sorghastrum nutans	Indian grass	2.00 lb	
FORBS:			
Anemone cylindrica	Thimbleweed	0.50 oz	
Aster macrophyllus	Big-leaved aster	0.10 lb	
Aster novae-angliae	New England aster	2.00 oz	
Aquilegia canadensis	Columbine	0.01 lb	
Desmodium canadense	Canada tick trefoil	2.00 oz	
Fragaria virginiana	Strawberry		50
Heliopsis helianthoides	False sunflower	2.00 oz	
Monarda fistulosa	Wild bergamot	0.50 oz	
Oenothera biennis	Evening primrose	1.50 oz	
Ratibida pinnata	Yellow coneflower	0.10 lb	
Rudbeckia hirta	Black-eyed Susan	0.50 lb	
Solidago nemoralis	Old field goldenrod	0.10 lb	
Solidago rigida	Stiff goldenrod	4.00 oz	

* For Zone D only, plants are defined as 2" potted material.

** *This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required*

ZONE E – MOIST GRASSLAND

<u>Scientific Name</u>	<u>Common Name</u>	<u>Quantity/acre</u>	
		Seed	Plants
GRASSES			
Agrostis stolonifera	Redtop	8.00 lb	
Andropogon gerardi	Big bluestem	4.00 lb	
Calamagrostis canadensis	Bluejoint grass	0.50 lb	
Juncus effusus	Common rush	0.50 oz	
Juncus torreyi	Torrey's rush	1.00 oz	
Luzula multiflora	Wood rush	0.005 oz	
Spartina pectinata	Cord grass	0.10 oz	
FORBS:			
Aster novae-angliae	New England aster	0.10 lb	
Aster simplex	Panicled aster	0.10 lb	
Eupatorium maculatum	Joe pye weed	1.00 lb	
Helianthus grosseserratus	Sawtooth sunflower	0.50 lb	
Monarda fistulosa	Wild bergamot	0.10 oz	
Oxypolis rigidior	Cowbane	0.10 lb	
Pycnanthemum virginianum	Virginia mountain mint	0.10 lb	
Thalictrum dasycarpum	Purple meadow rue	0.10 lb	
Veronicastrum virginicum	Culver's root	0.10 lb	

*** This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required*

ZONE F – BIOFILTER PLANT COMMUNITIES

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
GRASSES/SEDGES/RUSHES:		Seed	Plants
Agrostis alba	Redtop	4.00 oz	
Carex scoparia	Pointed broom sedge	1.00 lb	
Echinochloa crusgalli	Barnyard grass	4.00 oz	
Panicum virgatum	Switchgrass	1.00 lb	
Scirpus atrovirens	Dark green bulrush	1.50 lb	
Scirpus cyperinus	Woolgrass	0.50 lb	
Scirpus validus	Soft-stemmed bulrush		1000
Spartina pectinata	Cord grass		1000
FORBS:			
Acorus calamus	Sweet flag	1.00 oz	
Aster simplex	Panicled aster	0.10 oz	
Bidens frondosa	Beggars tick	4.00 oz	
Eupatorium maculatum	Joe pye weed	1.00 oz	
Eupatorium perfoliatum	Boneset	1.00 oz	
Polygonum spp.	Smartweed	4.00 oz	
Sagittaria latifolia	Arrowhead	0.25 oz	
Typha latifolia	Cattail	1.00 lb	

* For Zone F only, plants are defined as freshly dug rootstock.

** *This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required*

Various additional communities (A, B, C, E) may be specified for use in the biofilters depending on site conditions.

ZONE G – SOIL BIOENGINEERING

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
		Seed	Plants
TREES/SHRUBS:			
Cornus amomum	Silky dogwood		2000
Salix bebbii	Bebb willow		2000
Alnus rugosa	Speckled alder		500
Cornus stolonifera	Redtwig dogwood		500
Salix discolor	Pussy willow		500
Salix interior	Sandbar willow		5000
Spiraea alba	Meadowsweet		500
GRASSES/SEDGES/RUSHES:			
Carex scoparia	Pointed broom sedge	1.00 oz	
Panicum virgatum	Switchgrass	1.00 lb	
Scirpus atrovirens	Dark green bulrush	2.00 oz	
Scirpus validus	Soft-stemmed bulrush	1.00 oz	
Spartina pectinata	Cordgrass		2000
FORBS:			
Asclepias incarnata	Marsh milkweed	0.01 oz	
Aster simplex	Panicled aster	0.01 oz	
Eupatorium maculatum	Joe pye weed	0.01 oz	
Eupatorium perfoliatum	Boneset	0.01 oz	
Typha latifolia	Cattail	1.00 lb	

* For Zone G only, plants are defined as freshly cut, live stake material, with the exception of Spiraea alba. Live stakes shall be 18"-30" in length, and ½"-1" in diameter, planted individually at 24" o.c. Spiraea alba and Spartina pectinata shall be 2" potted material.

** *This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required*

ZONE H – SEDGE MEADOW

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
		Seed	Plants
TREES/SHRUBS:			
Alnus rugosa	Speckled alder		100
Salix bebbiana	Beaked willow		100
GRASSES/SEDGES/RUSHES:			
Calamagrostis canadensis	Bluejoint grass	0.75 lb	
Carex crinita	Fringed sedge	0.50 lb	
Carex rostrata	Sedge	0.50 lb	100
Carex scoparia	Pointed broom sedge	0.50 lb	
Carex stipata	Awl-fruited sedge	0.25 lb	
Carex vulpinoidea	Fox sedge	0.25 lb	
Carex tuckermanii	Bent-seed hop sedge	0.10 lb	
Juncus effusus	Common rush	2.00 oz	
Juncus torreyi	Torrey's rush	2.00 oz	
Scirpus atrovirens	Dark green bulrush	2.00 lb	
FORBS:			
Asclepias incarnata	Marsh milkweed	0.10 lb.	
Aster puniceus	Red-stemmed aster	0.01 lb	
Aster simplex	Panicled aster	0.01 lb	
Eupatorium maculatum	Joe pye weed	0.10 lb	
Eupatorium perfoliatum	Boneset	0.10 lb	
Iris virginica shrevei	Blue flag iris		50
Lycopus americanus	Water horehound	0.01 lb	
Solidago graminifolia	Grass-leaved goldenrod	0.10 lb	
Verbena hastata	Blue vervain	0.10 lb	

* For Zone H only, plants are defined as follows:

Trees/Shrubs: 1-0 Bare root

Grasses: 2" potted material, 6" minimum to growth

Forbs: Dormant rootstock

** *This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required*

ZONE I - MESOPHYTIC WOODLAND

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
		Seed	Plants
TREES/SHRUBS			
Acer rubrum	Red maple	0.25 oz	10
Acer saccharum	Sugar maple	0.25 oz	10
Acer saccharinum	Silver maple		10
Aibes balsamea	Balsam		10
Amelanchier arborea	Serviceberry		10
Betula papyrifera	Paper birch		10
Cornus alternifolia	Pagoda dogwood		20
Corylus americana	Hazelnut		50
Diervilla lonicera	Bush honeysuckle		10
Fraxinus americana	White ash		10
Picea alba	White spruce		20
Populus tremuloides	Quaking aspen		50
Quercus alba	White oak		50
Quercus rubra	Red oak		50
Tilia americana	Basswood		25
Tsuga canadensis	Canadian hemlock		10
Viburnum lentago	Nannyberry		
GRASSES/SEDGES/RUSHES:			
Brachyelytrum erectum	Long-awned wood grass	0.10 oz	
Glyceria striata	Fowl manna grass	1.00 lb	
FORBS:			
Aquilegia canadensis	Wild columbine	1.00 oz	
Aster macrophyllus	Big-leaved aster	1.00 oz	
Fragaria virginiana	Wild strawberry		100
Helianthus strumosus	Woodland sunflower		100
Geranium maculatum	Wild geranium		100
Smilacina racemosa	False Solomon's seal	2.00 oz	
CRYPTOGRAMS:			
Athyrium filix-femina	Lady fern		10
Osmunda claytonia	Interrupted fern		10

* For Zone I only, plants are defined as follows:

Trees/Shrubs: 1-0 bare root material

Forbs: 2" potted material, 6" minimum to growth

** This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required

ZONE J - DRY WOODLAND

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
TREES/SHRUBS		Seed	Plants
Betula papyrifera	Paper birch		20
Corylus americana	Hazelnut	1.00 lb	20
Pinus resinosa	Red pine		20
Pinus strobus	White pine		5
Quercus alba	White oak	5.00 lb	50
Quercus macrocarpa	Bur oak	5.00 lb	50
Quercus rubra	Red oak	5.00 lb	50
GRASSES/SEDGES/RUSHES:			
Carex pensylvanica	Pen sedge	1.00 oz	500
Schizachne purpurascens	False melic	0.10 oz	
FORBS:			
Aquilegia canadensis	Wild columbine		100
Aster macrophyllus	Big-leaved aster	1.00 lb	
Geranium maculatum	Wild geranium		100
Helianthus strumosus	Woodland sunflower		100
Maianthemum canadense	Canada mayflower		100
Smilacina racemosa	False Solomon's seal	2.00 oz	
CRYPTOGRAMS:			
Pteridium aquilinum	Bracken fern		10

* For Zone J only, plants are defined as follows:

Trees/Shrubs: 1-0 bare root material

Grasses and forbs: 2" potted material, 6" minimum to growth

**** This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required**

ZONE K – EROSION CONTROL COVER

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
A. UPLAND CROP – <u>Spring/Summer Planting</u>		Seed	Plants
Hordeum vulgare	Barley	75.00 lb	
Lolium multiflorum	Annual rye grass	10.00 lb	
B. UPLAND CROP – <u>Summer/Fall Planting</u>			
Secale cereale	Winter rye	75.00 lb	
Lolium multiflorum	Annual ryegrass	10.00 lb	
C. LOWLANDS			
Polygonum pensylvanicum	Smartweed	20.00 lb	
Echinochloa crusgalli	Barnyard grass	15.00 lb	

**** This is a representative list. Depending on availability and site specific assignments, some deletions or substitutions may be required**

ZONE L – INDUSTRIAL OUTLOT PLANTING SPECIFICATION

<u>Scientific Name</u>	<u>Common Name</u>	<u>Number/Qty per acre</u>	
GRASSES/SEDGES/RUSHES:			
		Seed	Plants
Elymus canadensis	Canada wild rye grass	10.00 lb	
Panicum virgatum	Switch grass	3.00 lb	
FORBS:			
Ratibida pinnata	Yellow coneflower	0.10 lb	
Rudbeckia hirta	Black-eyed Susan	0.50 lb	
TREES:			
A few larger trees from the Flambeau Nursery may be used for screening purposes on this area.			
NURSE CROPS:			
Avena sativa	Oats	35 lb	
Secale cereale	Cereal rye	50 lb	

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