FERNBANK

COMMUNITY DESIGN PLAN

ENVIRONMENTAL MANAGEMENT PLAN
Volume 2 of 2 (Appendix)

DRAFT

JUNE 2009

FERNBANK
COMMUNITY DESIGN PLAN

ENVIRONMENTAL MANAGEMENT PLAN
Volume 2 of 2 (Appendix)

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LIST OF APPENDICES

APPENDIX A

SCOPE OF WORK & DETAILED WORK PROGRAM

Fernbank Community Design Plan
Environmental Management Plan (EMP) Scope of Work

Introduction

The Fernbank Community is proposed to encompass approximately 675 hectares of land between the established communities of Stittsville, Kanata West and Kanata South, extending south to Fernbank Road within the West Urban Area of the City of Ottawa.

The Trans-Canada Trail runs east-west through the site and is the divide between the Carp River Watershed to the north and Jock River Subwatershed to the south. As such, the site falls under the jurisdiction of both the Mississippi Valley Conservation Authority (Carp River Subwatershed) and the Rideau Valley Conservation Authority (Jock River Subwatershed).

Refer to Figure 1 (attached) for the study area boundary.

The revised scope of work which follows is based on comments and input received through the circulation process, including the City, Mississippi Valley Conservations (MVC), Rideau Valley Conservation Authority (RVCA), Ministry of Natural Resources (MNR), Ministry of the Environment (MOE), Ministry of Transportation (MTO) and the Department of Fisheries and Oceans (DFO). The scope of work is general in nature with the intent that work will be undertaken in a manner that will satisfy the requirements of the planning and engineering process as well as City and agency requirements.

Objectives

The Fernbank Community EMP represents an important opportunity to preserve and enhance existing natural features in the study area in conjunction with the proposed development.

The overall objective of the EMP is to create a blueprint for development that identifies and maps development limits within the study area by establishing buffers and setbacks for environmental features in a manner consistent with the goals, objectives and policies of the City of Ottawa; the MVCA (for lands tributary to the Carp River); the RVCA (for lands tributary to the Jock River) along with other government agencies, including MNR, MOE, DFO and MTO.

The EMP will be completed in conformance with the requirements of the *Environmental Assessment Act* and will be part of the integrated Planning Act and Class EA documentation required for the study area. The EMP will fulfill Phases 1 and 2 of the Municipal Class Environmental Assessment Process, including:

- Inventory of existing conditions, opportunities and constraints;
- Evaluation of Alternatives;
- Selection of preferred alteratives.

The process will include the necessary coordination with the land use plan, transportation master plan, and master servicing plan, as well as the required public contact and documentation.

Development of preferred alternatives will include identification of the specific projects or project modification which will be required, including approval process, costs, and phasing/timing. Interim solutions will also be identified.

Project Components and Scope of Work

Review Existing Background Information

A number of reports are available in the study area. These reports will be used to provide background information in the development of the Environmental Master Plan. The following provides a list of the primary documents:

- Carp River Subwatershed Study (Robinson Consultants / Aquafor Beech)
- Jock River Reach 2 Subwatershed Study – Existing Conditions Report (Marshall Macklin Monaghan, 2006)
- Kanata West Development Area Class EA (City of Ottawa, 2006)
- Carp River, Poole Creek and Feedmill Creek Restoration Class EA (TSH/Parish Geomorphic/Stantec/Beacon, 2006)
- Monahan Drain Master Drainage Plan (Gore and Storrie, 1993)
- Fish Habitat Classifications done for the Monahan Drain and Tributaries by the Rideau Valley Conservation Authority
- Engineer's Report – Repair and Improvements to the Flewellyn Municipal Drain (Novatech Engineering, 1982)
- Engineer's Report – Monahan Creek Municipal Drain Modifications and Improvements (Robinson Consultants, 2002)
- Treatment of Stormwater for the Bridlewood Community and Kanata South Business Park – Environmental Study Screening Report (Gore and Storrie, 1993)
- Monahan Drain Constructed Wetlands Final Design Report (J.L. Richards, 1993)
- Monahan Drain Constructed Wetlands – Phase 2 Final Design Report (Novatech Engineering, 2006)
- City of Ottawa 2003 Official Plan – Section 4.7.3 (1) Urban Natural Areas Environmental Evacuation Study.

Environmental Inventory

An Environmental Inventory will be prepared for the study area based on the existing conditions.

An Environmental Constraints/Opportunities Map will be prepared for the study area based upon the existing conditions detailed in the Carp River Watershed/Subwatershed Study and the Jock River Reach 2 Subwatershed Study.

Opportunities/constraint areas investigations will also include:

- Refine and confirm the floodplain and flood lines for all watercourses – check the 1 in 100 year flood line mapping by cross checking the 1:2000 scale mapping and the water crossing data in the field.
- Significant terrestrial resources (woodlots, woodlands): plot on 1:2000 mapping and refine from available air photos applying the Urban Natural areas Environmental Evaluation criteria.
- Aquatic habitat, barriers to fish passage, significant tributaries – use information from subwatershed studies and new field data.
- Confirmation/selection of specific locations for rehabilitation or enhancement of stream corridors: based upon principles in subwatershed study, map areas for enhancement including linkages, buffers, riparian habitat to be improved.
- Meander belt widths – confirm and calculate base on 1:2000 mapping, plot results of the City's geomorphic surveys on the same mapping, sections of unstable slope identified, Ministry of Natural Resources natural hazards technical guidelines methodology applied to determine conservative stable setbacks, identify areas where detailed slope stability studies are required.

Based on a review of the existing condition components of the above subwatershed studies, a gap analysis will be undertaken to identify additional field investigation requirements. Field investigations will be conducted to identify natural features, as well as relationships and dependencies between these features. It is anticipated that the following investigations of natural features will be completed:

- Spring fish sampling to determine extent of aquatic habitat, drainage to be retained and watercourse setbacks/buffers based upon aquatic, including barriers to fish passage, riparian buffers, erosion concerns, overland flow routes, flood plain and terrestrial habitat. Minor versus significant tributaries will be identified based on fish communities and habitat features. A summer fish nursery habitat will be completed, along with autumn benthic invertebrate sampling. The sampling will be completed for the tributaries and drains associated with the Monaghan Drain, the Carp River in the northeast portion of the study area and tributaries of the Carp River; and,

- Analysis of significant terrestrial resources. Woodlots, hedgerows, riparian cover, meadows, linkages and other features to be surveyed in late spring and summer, including breeding bird and vegetation surveys. Observations of reptiles, amphibians and other wildlife compiled as part of bird, fish and vegetation surveys. The Natural Area west of Shea Road is to be included in the terrestrial analysis. Hedgerows for potential consideration into the land use plans will be identified based on species, connectivity and condition. The forests and adjacent lands will be evaluated using the Evaluation Criteria of the Urban Natural Areas Environmental Evaluation.

- Potential species at risk in the study area will be identified through consultation with the Ministry of Natural Resources, a review of the Natural Heritage Information Database and the Federal Species at Risk Schedules. Emphasis during the field surveys will be placed on searching for these potential species.

The natural environment work and analysis will be completed in conjunction with fluvial geomorphological and geotechnical/slope stability setbacks and issues. The evaluation will include applying the urban natural environmental evaluation study protocol. The analysis will be completed early so natural environment features that require protection can be identified early in the assessment and planning process. For example, the extent and quality of on-site fish habitat will be determined. For each subwatershed, the fish habitat to be protected and enhanced in the land use plan will be identified. Suitable buffers and setbacks will be recommended adjacent to watercourses and other natural environment features to be retained. Detailed descriptions and figures illustrating the recommended stream rehabilitation works, as applicable, will be produced for the watercourses in conjunction with stormwater management solutions.

Locations will be identified for potential rehabilitation or enhancement measures within the study area, including greenspace connections among passive and active parkland. Tree clusters and hedgerows of desirable tree species in good condition will be influential in determining the greenspace connections. Based on the sensitivity of the fish habitat determined as part of the field investigations, it is possible that the aquatic habitat incorporated in the land use plans can either be the existing alignments of tributaries and drains, realigned and rehabilitated to meet the overall greenspace connections and land use plans, or a combination of the two. Any proposals with respect to fish habitat relocation / compensation will be thoroughly evaluated and discussed with the approval agencies and would also be subject to DFO authorization. Recommendations related to fish habitat will consider the "no net loss" approach. Concept designs

Recommendations will be developed to protect natural environment features and functions to ensure compatibility with future development. Management and rehabilitation measures pertaining to aquatic habitat sustainability, passive recreational use including trails and interpretative signs, removal of invasive species and retention and protection of tree cover will be identified for the significant natural environment features.

Areas of archaeological significance and historical significance will be investigated based on provincial data. Areas where further assessment may be required will be identified.

Hydrogeology

Hydrogeologic conditions within the study area will be identified to assist in the protection of groundwater quality and the recharge/discharge functions of the site's hydrogeology.

The Fernbank Community area straddles the watershed divide between the Carp River and Jock River Watersheds. The site's northern half is within the Carp River Watershed and its southern half is within the Jock River Watershed. For both of these watersheds low water levels and flows, and the lack of baseflow in many the tributaries, are of concern. For the Carp River Watershed, it has been reported that a total of 50% of the watershed's groundwater recharge is provided by 30% of the land area, and primarily by lands located in southern part of the watershed. Within the Jock River Watershed greater recharge to the underlying aquifers occurs where the bedrock lies close to the ground surface, and where surficial materials have relatively higher permeability. Bedrock is shallowest to the north, west and south of watershed. The evaluation of the hydrogeological conditions of the Fernbank Community site will focus on identifying the existing recharge potentials and combining that with any existing information on the local groundwater flow systems.

In addition, and particularly for the protection of the groundwater quality, the evaluation will use existing records to identify the following:

- Unused and unmaintained water wells that require proper well abandonment;
- Existing septic systems that will be unused and will require proper decommissioning;
- Sites identified by environmental site assessments as potential sources of groundwater contamination.

The hydrogeologic investigation report will be prepared with consideration given to the findings and recommendations of the other analyses completed as part of the EMP.

Geomorphology

As part of the geomorphologic investigation, a background review of secondary source information will be completed. From this, identification of data gaps and identification of subsequent short-term and long-term monitoring needs will be completed. The stream morphology review will build upon the work completed to date for the Carp River and Jock River Reach 2 Subwatershed Studies.

The geomorphology analysis will include field reconnaissance of the study area to determine the overall stability of each channel reach and possible problems with erosion that may be present in the channel. The field reconnaissance will include:

- Identification of reaches most sensitive to erosion, which will be highlighted for further investigation through detailed fieldwork;
- Measurements of channel and bank characteristics and bankfull flow conditions;
- Analysis and characterization of surficial channel bed materials and sub-pavement materials;
- An evaluation of the bank vegetation, materials, percentage of cover and *in situ* shear stress for both banks at each detailed site;
- Installation of monitoring sites which can be revisited and re-measured for historical changes in the cross sectional area of the channel.

The geomorphology analysis will include an erosion potential analysis based on the erosion data collected, to understand the erosion processes that are occurring, identify areas which are highly prone to erosion or where structures may be at risk, and to determine the threshold flows for erosion at strategic points in the Study Area. Assessments will focus on sites most sensitive to erosion. The erosion potential analysis will include:

- Identification of erosion thresholds that would be applied to the erosion analysis modeling;

- Establishment of erosion control stormwater management criteria for the proposed development to ensure that there is no increase in downstream erosion potential or flood risk;
- Recommendations of appropriate mitigation measures for sections showing a significant increase in erosion potential;
- Recommendations for a monitoring program which will provide data for constraint delineation, and monitor the status of the sensitive reaches and threshold indicators;
- Recommendations for an implementation strategy, which will consider long term goals for rehabilitation and retrofit.

The geomorphology analysis will work on defining cumulative headwater functions through assessing sediment budgets, linkage with local hydrology and connection to larger scale, including input from supporting disciplines.

The recommended stream corridor will be determined using meander belt width and other safety factors. The meander belt width will build upon the procedures followed by the Natural Channel Initiative (NCI) in their generic regulation mapping. The intent is to provide as conservative corridor as possible, with the recognition that it would be refined at the environmental impact report (EIR) stage.

The geomorphology component will also integrate the findings and results with the aquatic habitat and hydrology/hydraulic components in order to provide a more comprehensive understanding of channel processes and functions. This work will also be applied in identifying opportunities with respect to stream restoration and ultimately in the development of restoration concepts.

Geotechnical Analysis

A geotechnical investigation will be performed to assess the geologic conditions to determine design constraints and criteria for the proposed community design plan.

The geotechnical analysis will consist of:

- Test pits throughout the study area;
- Identification of soils type and depths to bedrock;
- Slope stability analysis;
- Identification of grade raise restrictions.

The geotechnical investigation report will be prepared with consideration given to the findings and recommendations of the other analyses completed as part of the EMP.

Stormwater Management Analysis

The impact of the development areas on the receiving waters will be a critical aspect in the development of the stormwater management strategy for the Fernbank Community. The recommended SWM strategy will need to minimize any adverse impacts on downstream watercourses, and demonstrate that the impacts of development can be mitigated through the design of the SWM infrastructure recommended within the study area.

The stormwater management analysis will:

- Divide the study area into subcatchments based on opportunities and constraints to provide stormwater management;
- Develop SWM criteria for the study area, including:
    - Water balance
    - Water quality
    - Erosion control
    - Peak flow control
- Identify the preferred type, size, location, and function of proposed SWM facilities and other SWM measures required to mitigate the impacts of proposed development on the receiving watercourses;
- Provide conceptual design of SWM facilities, including preliminary volumes, land areas, elevations and rating curves;
- Identify constraints within the existing drainage system that could impact the design of future SWM measures;
- Provide conceptual design of any recommended rehabilitation works within the study area;

Event based hydrologic modeling will be performed using the SWMHYMO model using synthetic design storms derived from City of Ottawa IDF data. Hydraulic modeling and floodplain mapping will be performed using HEC-RAS.

Separate stormwater management criteria will be developed for each of the tributary drainage areas, through consultation with the City of Ottawa and the conservation authorities. For lands tributary to the Monahan Drain, it is expected that the dominant water quantity constraints will be found to be related to the built capacity of Monahan Drain Constructed Wetlands.

The work completed for the Carp River and Jock River Subwatershed studies will be critically reviewed and the targets presented in these studies will be evaluated with respect to their application to the Fernbank Community Design Plan.

The stormwater management recommendations will be developed with consideration given to the findings and recommendations of the other analyses completed as part of the EMP.

Process

Through the consolidation of the above project components, the EMP will identify management actions necessary to protect and enhance the study area's natural features and ecological functions, as well as actions necessary to rehabilitate areas where the natural features and ecological functions have been degraded.

The intent is to complete the EMP in parallel with the development of the Land Use Plan, Transportation Plan, and Master Servicing Plan through the integrated planning and EA process. Through this process, an overall preferred environmental management strategy will be identified which includes such factors as:

- Cost;
- Public and Agency acceptance;
- Ease and effectiveness of implementation;
- Potential impact on future land use;
- Potential for preservation and enhancement of natural features.

The relative merits of the management solutions will be weighed against the study objectives. Solution(s) that best achieve the study objectives will be accepted as preferred solution(s). Recommendations will be provided under the following headings:

- Planning and Policy;
- Rehabilitation and Retrofit;
- Research and Development (e.g. recommendations for future studies to reduce management uncertainties and to form detailed constraint mapping at the site specific level);
- Monitoring;
- Phasing and Interim Solutions (e.g. prioritization of solutions based on their degree of urgency); and
- Costing (costing will be provided based on preliminary design of mitigative solutions for use in budgetary considerations).

The Environmental Management Plan will be developed through a step by step process in conjunction with the Community Design Plan, the Transportation Plan, and the Master Servicing Plan. Reporting of alternatives and conclusions will be completed in stages. A consolidated report documenting the process, outlining the solutions, and classifying the various required projects will be the final product.

The resulting documentation will identify timing, costs and staging of recommended works, including any interim solutions. The approval requirements and process for implementation will also be outlined.

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.

May 29, 2006

FERNBANK COMMUNITY DESIGN PLAN & INTEGRATED ENVIRONMENTAL ASSESSMENT
Table 1

DETAILED WORK PROGRAM	TMP	MSP	EMP	CDP	Responsibilities	Completion Dates (Estimate)	Deliverable/Event
STEP 1: Existing Conditions -Phase 1 & 2 Class EA							
Confirm the problem/opportunity/need	✓	✓	✓		Consulting Team	August 2006	
Confirm Background Documentation & Field Work	✓	✓	✓	✓	Consulting Team	August 2006	
CPT Workshop (Existing Conditions & Guiding Principles)				✓	CPT	August 2006	CPT Meeting
Updated Existing Conditions Mapping Presented to CPT	✓	✓	✓	✓	CPT	5-Sep-06	CPT Meeting
Circulate Updated Existing Conditions Mapping to TAC & PAC	✓	✓	✓	✓	WND/City Staff	12-Sep-06	
TAC Meeting #1 & PAC Meeting #1 (Existing Conditions Mapping & Guiding Principles)	✓	✓	✓	✓	TAC/ PAC	26-Sep-06	TAC Meeting #1/ PAC Meeting #1
Public Consultation Open House No. 1 (Process, Existing Conditions, Guiding Principles, Phase 1 Class EA)	✓	✓	✓	✓	City Staff/WND/Cons.Team	17-Oct-06	Public Open House #1
Present Draft Existing Conditions Report to CPT	✓	✓	✓	✓	CPT	24-Oct-06	Draft Existing Conditions - CPT Meeting
Circulate Draft Existing Conditions Report to TAC & PAC	✓	✓	✓	✓	WND/City Staff	31-Oct-06	
TAC Meeting #2 & PAC Meeting #2 (Review Existing Conditions Report for Finalizing)	✓	✓	✓	✓	TAC/ PAC	14-Nov-06	TAC Meeting #2/ PAC Meeting #2
Finalize Existing Conditions Report	✓	✓	✓	✓	Consulting Team	21-Nov-06	Final Existing Conditions Report
STEP 2: Guiding Principles							
CPT Workshop (Existing Conditions & Guiding Principles)				✓	CPT	15-Aug-06	CPT Meeting
CPT Guiding Principles Discussion (Updated Existing Conditions Mapping)				✓	CPT	5-Sep-06	CPT Meeting
Circulate Draft Guiding Principles to TAC & PAC				✓	WND/City Staff	12-Sep-06	
TAC Meeting #1 & PAC Meeting #1 (Existing Conditions Mapping & Guiding Principles)				✓	TAC/ PAC	26-Sep-06	TAC Meeting #1/ PAC Meeting #1
Public Consultation Open House No. 1 (Process, Existing Conditions, Guiding Principles, Phase 1 Class EA)				✓	Consulting Team/City Staff	28-Nov-06	Public Open House #1
Finalize Guiding Principles				✓	Consulting Team	5-Dec-06	Guiding Principles
STEP 3: Preliminary Design Guidelines & Land Use Plans-Phase 2 Class EA							
CPT Workshop to Develop Draft Alternative Land Use Plans/Alternative Solutions & Design Guidelines	✓	✓	✓		Consulting Team	16-Jan-07	
TAC Workshop to Develop Draft Alternative Land Use Plans/Alternative Solutions & Design Guidelines	✓	✓	✓	✓	Consulting Team	16-Jan-07	
Circulate Draft Alternative Land Use Plans/ Alternative Solutions & Design Guidelines to TAC & PAC	✓	✓	✓		Consulting Team	23-Jan-07	
PAC Workshop (Land Use Plans and EA Alternatives))	✓	✓	✓	✓	TAC/ PAC	6-Feb-07	TAC Meeting #3/ PAC Meeting #3
Public Workshop (Land Use Plan and EA Alternatives)	✓	✓	✓	✓	CPT	27-Feb-07	Public Land Use Workshop (Saturday)
Assessment and Evaluation of Alternative Solutions	✓	✓	✓		Consulting Team/TAC/PAC	13-Mar-07	Formal Comments
Select Preliminary Preferred Alternative Solutions	✓	✓	✓		Consulting Team/TAC/PAC	20-Mar-07	
Refine Preferred Land Use Plan with Preliminary Design Guidelines and Preferred Alternative Solutions	✓	✓	✓	✓	Consulting Team	27-Mar-07	Land Use Plan
STEP 4: Demonstration Plan & Detailed Design Guidelines - Phase 3 Class EA							
Draft Design Guidelines, Demonstration Plan & Alternative EA Designs to CPT				✓	WND/Consulting Team	10-Apr-07	Revised Draft Design Guidelines, Demonstration Plan & Alt. EA Designs & CPT Meeting
Circulation of draft Demonstration Plan, Design Guidelines & Alternative EA Designs to TAC & PAC	✓			✓	WND/City/Cons.Team	24-Apr-07	
TAC Meeting #4/ PAC Meeting #4 (Review Design Guidelines, Demonstration Plan & Alternative EA Designs)				✓	TAC/ PAC	15-May-07	TAC Meeting #4/ PAC Meeting #4
Assessment and Evaluation of Alternative EA Designs	✓				Consulting Team/TAC/PAC	22-May-07	Formal Comments
Select Preliminary Preferred Alternative EA Designs	✓				Consulting Team/TAC/PAC	5-Jun-07	TAC/ CPT
Public Open House No. 2 (Design Guidelines, Demonstration Plan, Phase 2 and 3 Class EA)	✓	✓	✓	✓	CPT	26-Jun-07	Public Open House #2
Finalize Design Guidelines, Demonstration Plan and Alternative Designs	✓	✓	✓	✓	WND/ Consulting Team	10-Jul-07	Finalized Design Guidelines & Demonstration Plan
STEP 5: Final Preparation of CDP- Phase 4 Class EA							
Draft CDP, Class EA Studies & Implementing Official Plan Amendment (OPA) endorsed by CPT	✓	✓	✓	✓	WND/CPT/Cons.Team	7-Aug-07	Draft CDP (endorsed by CPT)
Circulate CDP, Class EA Studies & OPA to TAC & PAC	✓	✓	✓	✓	WND/City Staff	8-Aug-07	
TAC Meeting #5/ PAC Meeting #5 (Review of CDP, Class EA Studies & OPA)	✓	✓	✓	✓	TAC/ PAC	21-Aug-07	TAC Meeting #5/ PAC Meeting #5
Public Consultation Open House No. 3 (CDP Presentation, Phase 4 Class EA, Implementing OPA)	✓	✓	✓	✓	WND/City Staff	12-Sep-07	Pub. Open House #3 (Statutory Planning Act Public Meeting)
Finalize Community Design Plan/Class EA Studies/ Official Plan Amendment ("OPA")	✓	✓	✓	✓	WND/CPT/Cons.Team	October 2007	Final CDP/EA Studies/OPA to PEC
Presentation to Planning & Environment Committee	✓	✓	✓	✓	WND/City Staff	November 2007	Direction From PEC
Circulate Final CDP, EA Studies and OPA to TAC	✓	✓	✓	✓	WND/ Consulting Team	November 2007	Revised Final CDP/ EA Studies/ OPA
Council Approval of CDP, Implementing OPA and Class EAs	✓	✓	✓	✓	WND/City Staff	December 2007	Approval/Adoption
Public Notice for CDP, OPA and Class EA Studies	✓	✓	✓	✓	WND/City Staff	December 2007	Notice of EA Study Completion/ OPA Adoption

Note: CPT will meet regularly on a bi-weekly basis.

APPENDIX B

CORRESPONDENCE

Rideau Valley Conservation Authority (RVCA)
Mississippi Valley Conservation Authority (MVC)
Department of Fisheries & Oceans (DFO)
Hydro One

RIDEAU VALLEY
CONSERVATION AUTHORITY

December 17, 2007
File: 06-FERN-CDP

Novatech Engineering Consultants
200 – 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

Attention: John Riddell, P.Eng.

Subject: **Fernbank Master Servicing Plan**

Dear Mr. Riddell:

Please accept this letter as confirmation that the Conservation Authority is satisfied with the general direction that the above noted plan is taking with respect to stormwater servicing in support of the Fernbank Community Design Plan.

The stormwater servicing proposal, as we understand it thus far in the study process, proposes the construction of:

- 1 pond at the headwater of the Monahan Drain, 1 pond at Terry Fox north of the Monahan Drain and 1 pond at Terry Fox south of the Monahan Drain, open channel to be retained between the upper and lower ponds,
- 1 pond on the north side of Fernbank Road at the Faulkner Drain crossing (northwest corner of Fernbank and Shea),
- 1 pond on the Flewellyn Drain on the north side of Fernbank Road and the possible lowering of the Flewellyn Drain south of Fernbank.

The channels being retained are to include natural channel design measures to mitigate potential adverse impacts to fish habitat. Thermal mitigation will likely be required to maintain the cool water status of the Jock River tributaries. Fish habitat compensation measures are not required for any of the stormwater works within the CDP study limits, although a determination has yet to be made regarding the scope of work (if any) on the Flewellyn Drain south of Fernbank Road and the possible impact on fish habitat.

The Rideau Valley Conservation Authority will continue to work with the City and the project consultants through our participation on the Technical Advisory Committee for these studies.

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I trust that the foregoing is satisfactory for you purposes at this time. Meanwhile, if you have any questions or require additional information, please contact me at ext. 1133.

Yours truly,

Glen McDonald MCIP RPP
Senior Planner

RIDEAU VALLEY
CONSERVATION AUTHORITY

3889 Rideau Valley Drive, P.O. Box 599, Manotick, ON K4M 1A5
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February 25, 2009
File: 07-FERN-CDP

Novatech Engineering Consultants Ltd.
200 – 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

Attention: Michael Petepiece, P.Eng.

Subject: **Fernbank Environmental Management Plan**
Flewellyn Drain, Faulkner Drain & Monahan Drain Catchment Areas

Dear Mr. Petepiece:

The Rideau Valley Conservation Authority has considered your proposal, as identified during discussions on the draft Fernbank Environmental Management Plan, for modifications to the existing drainage area boundaries of the Faulkner, Flewellyn and Monahan Drains. The proposed post-development drainage areas scenario is described on Figure 1 (April 2008) as appended to your January 21, 2009 e-mail. Based on this figure, we understand that the proposed diversion will result in the following:

- Faulkner drainage area will increase by 12.1 hectares,
- Flewellyn drainage area will decrease by 21. 7 hectares, and
- Monahan drainage area will increase by 8.6 hectares.

Although we prefer to maintain natural drainage area boundaries as much as possible for the post-development scenario, we are not opposed to these modifications in this particular circumstance, recognizing that these diversions would be occurring on the far upper headwater reaches and that the watercourses are ephemeral to the north of Fernbank Road. From a watershed management perspective that takes into account the overall drainage areas for the three systems under consideration, relative to the areas of the diversions, the modifications are not significant. We also note that the upper reaches of these systems will be eliminated by the development or by the construction of on-line stormwater management facilities. This approach is acceptable based on the ephemeral nature of these watercourses, their status as indirect fish habitat and their highly constrained function as riparian/terrestrial corridors.

…/2

If a decision is made to proceed on the basis of the drainage area diversions, the final EMP shall clearly document the proposed modifications and update the hydrologic modeling accordingly to demonstrate that the diversions have been accounted for in the sizing and ultimate detailed design of the stormwater management facilities.

We also note that all three of these watercourses are municipal drains. We suggest that you contact Dave Ryan (Project Manager –Municipal Drainage) to discuss the possible need for revisions to the drainage reports if the EMP moves forward on the basis of the drainage area boundary modifications.

Please contact me at ext. 1133 if you have any questions or require additional information.

Yours truly,

Glen McDonald MCIP RPP
Senior Planner

cc. City of Ottawa – PGM
Att'n: M. Mahon

City of Ottawa – CSS
Att'n: B. Wright

City of Ottawa – PGM
Att'n: D. Conway

City of Ottawa- WWS
Att'n: D. Ryan

M E M O R A N D U M

DATE: OCTOBER 4, 2007

TO: PAUL LEHMAN / JOHN PRICE

FROM: JOHN RIDDELL

RE: REGULATED CARP RIVER FLOODPLAIN
PROPOSED COLLECTOR ROAD
CONNECTION TO TERRY FOX DRIVE
ACROSS MVC LANDS

Gentlemen:

I wanted to follow-up on our telephone conversations with a memo summarizing our understanding of the discussions.

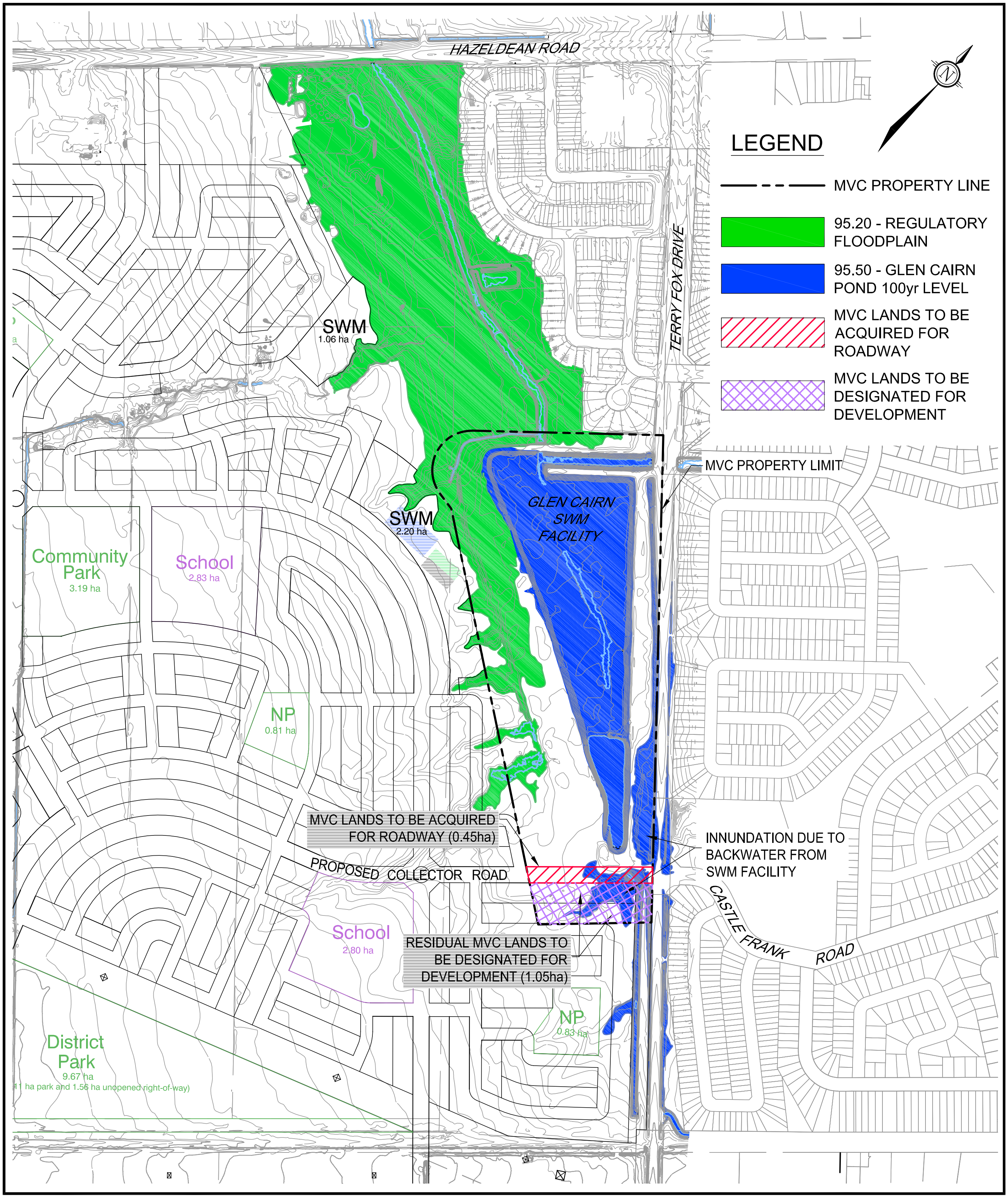
Carp River Floodplain

1. The current regulated 100 year flood plain elevation in the Carp River upstream of Hazeldean Road is 95.2±
2. The demonstration plan should show all development outside of this floodplain limit
3. Upon approval of the latest flood plain analysis (prepared by KWOG) it would be appropriate to revise the development limit to the revised regulated floodplain elevation.

Collector Road

1. As per the attached sketch a collector road is proposed connecting to Terry Fox Drive opposite the existing Castlefrank Road intersection. From a transportation perspective this is a very logical connection.
2. The proposed roadway cuts through MVC owned lands upstream of the southerly limit of the Carp River Headwater Pond.
3. The proposed roadway will not encroach on or impact the operation the SWM Pond however, it will eliminate some backwater ponding upstream of the facility (refer to attached sketch). This backwater storage results from the 100 year level of the pond (95.5), backing up into conveyance ditching and adjacent areas, which are below the 95.5 elevation. Since this storage is backwater and is not part of the pond storage volume, elimination of the storage is not a concern.
4. Conveyance of flows under the roadway to the pond will be accounted for in the roadway design.
5. The proposed roadway will create an isolated parcel of MVC lands south of the roadway. MVC would consider disposing of these lands, therefore they are being shown as development lands.

Suite 200, 240 Michael Cowpland Dr., Ottawa ON K2M 1P6 Tel: (613) 254-9643 Fax: (613) 254-5867 www.novatech-eng.com



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ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
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FERNBANK COMMUNITY DESIGN PLAN

PROPOSED COLLECTOR ROAD CROSSING MVC LANDS

101108 OCT 2007 MVC-1

Mississippi Valley Conservation

File: P09-35

November 5, 2007

Mr. John Riddell
Novatech Engineer Consultants Ltd.
240 Michael Cowpland Drive
Ottawa, ON K1M 1P6

Dear Mr. Riddell:

Re: Carp River Regulatory Flood Plain
Proposed Collector Road Connection to Terry Fox Drive
Fernbank Community Design Plan

In response to your letter of October 4, 2007, Mississippi Valley Conservation (MVC) offers the following comments.

Carp River Flood Plain

MVC confirms that the Carp River Regulatory (1:100 year) flood plain elevation between Hazeldean Road and the berm of the Glen Cairn detention pond is 95.2 metres. Upstream of the berm, the Regulatory (1:100 year) flood plain elevation is 95.5 metres. As detailed in your October 4, 2007 letter, the demonstration plan should show all development outside of this flood plain limit.

Within the Fernbank Community Design Plan study area, the 1:100 year flood plain is the requisite hazard and the Regulation Limit, on schedules that MVC has produced, is based on a 15 metre allowance from the flood plain limit. Therefore any development, as defined in the *Conservation Authorities Act*, would require a permit from MVC under Ontario Regulation 153/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses).

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Proposed Collector Road

MVC supports. in principle, the collector road connection to Terry Fox Drive as detailed in your October 4, 2007 letter. MVC staff presented a report to the Board of Directors at the October meeting, regarding the potential transfer/disposal of the land for the road and isolated parcel that will be created to the south. Before land is transferred or disposed, Conservation Authorities must obtain the approval of the Minister of Natural Resources (MNR). Our Board of Directors have authorized staff to enter into discussions and begin this process.

If you have any questions please contact the undersigned

Yours truly,

John Price, P. Eng.
Watershed Management Coordinator

cc: Miles Mahon, City of Ottawa

Mike Petepiece

From: Van Ingen, Richard [Richard.Vaningen@dfo-mpo.gc.ca]
Sent: Thursday, March 13, 2008 4:16 PM
To: m.petepiece@novatech-eng.com
Subject: RE: Fernbank CDP - Carp River Tributary

Hi Mike,

I think you summarized the discussions/emails accurately.

cheers

richard

Richard Van Ingen

Senior Habitat Biologist / Biologiste principal de l'Habitat
Prescott Office/ Bureau de Prescott
Ontario- Great Lakes Area / Secteur et des Grands Lacs

Fisheries and Oceans Canada / Pêches et Océans Canada
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Email/c. élec : richard.vaningen@dfo-mpo.gc.ca

Government of Canada / Gouvernement du Canada

From: Mike Petepiece [mailto:m.petepiece@novatech-eng.com]
Sent: Wednesday, March 05, 2008 1:05 PM
To: Van Ingen, Richard
Subject: RE: Fernbank CDP - Carp River Tributary

Hi Richard,

Further to your telephone conversation with Mark Bissett, and for the benefit of all parties, we wanted to clarify our understanding of the DFO position and expectations in regard to the proposed entombment of the upper reach of the Carp Tributary. DFO has determined that a HADD application is appropriate based on the proposed works and relative environmental factors that exist at this site. In this particular case, DFO agrees in principal with the concept of habitat compensation for lost watercourse. When a Plan of Subdivision application is filed, some time in the future, additional field investigation and detail drawings will be required to document the specific works and compensation planned for the lost habitat Carp Tributary.

The key issue we wish to clarify is that the HADD application and supplementary design works will be finalized after the CDP has been completed. The intention of the CDP exercise is to prepare a macro community-level design, while micro subdivision-level detail is required to complete a HADD application. Both DFO and this firm concur that the appropriate timeframe for submission of a HADD application is at the Plan of Subdivision design stage. DFO and Muncaster Environmental Planning have undertaken field investigations of the Carp Tributary to evaluate the quality of this watercourse and based on this evaluation, have agreed in principle that compensation within the MVC Carp River corridor would be suitable compensation. Pending the unlikely discovery of a threatened species, or significant change to Federal policy in this area, all parties anticipate that suitable compensation measures can reasonably be developed. The intent of this documentation is to provide a level of comfort to other review agencies that the proposed compensation, while not guaranteed, appears to be both appropriate and approvable.

Please advise if we have misinterpreted DFO intent in any way. We appreciate your time and attention in this matter.

Respectfully yours,

Michael Petepiece, P.Eng
Project Engineer
:::
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From: Van Ingen, Richard [mailto:Richard.Vaningen@dfo-mpo.gc.ca]
Sent: Monday, February 25, 2008 1:01 PM
To: m.petepiece@novatech-eng.com
Subject: RE: Fernbank CDP - Carp River Tributary

Hello Mike,

Sorry for the delay in response but with our current limited resources I cannot respond as quickly as I would like.

At this time, with the very preliminary information provided, it is felt that while the sensitivity of fish and fish habitat is low, scale of negative effects is medium to high and that the proposed project will result in a harmful alteration disruption or destruction of fish habitat. A Fisheries Act authorization should be applied for with supporting documentation. Upon receipt of an Application for Works or Undertaking Affecting Fish Habitat, plans and an environmental report detailing the risk to fish and fish habitat, I will continue my review. Please note that before an authorization may be issued pursuant to the Fisheries Act, a Canadian Environmental Assessment Act screening needs to be conducted. Only upon completion of the screening with a conclusion that the effects will not result in a significant impact to the environment may a

Fisheries Act authorization be issued.

The concept of compensation on the lower reaches for the loss of the watercourse emanating from the Granite Ridge Stormwater Management Facility is acceptable in principle. Please be aware that only upon a detailed examination of the plans, fisheries resources and proposed compensation can a definitive response be offered. Further investigation may reveal aquatic resources or issues that preclude the implementation of the suggested works.

I hope this helps.

cheers

richard

Richard Van Ingen

Senior Habitat Biologist / Biologiste principal de l'Habitat
Prescott Office/ Bureau de Prescott
Ontario- Great Lakes Area / Secteur et des Grands Lacs

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Government of Canada / Gouvernement du Canada

From: Mike Petepiece [mailto:m.petepiece@novatech-eng.com]
Sent: Monday, February 25, 2008 12:10 PM
To: Van Ingen, Richard
Subject: RE: Fernbank CDP - Carp River Tributary

Richard,
We are still hoping to receive written confirmation that the proposed approach for addressing impacts on fish habitat on the Carp River Tributary is acceptable to DFO. For the sake of expediency, a response to this email would be acceptable for our records in lieu of a more formal letter.

The proposed SWM strategy for the Fernbank CDP lands tributary to the Carp River is to enclose approximately 1.5km of the Carp River tributary downstream of the Granite Ridge SWM facility (Refer to attached drawing: FIG-SWM3 GRANITERIDGE.pdf). This reach of the tributary has been designated as marginal fish habitat, and the proposed works will constitute a HADD.

- The proposed works on the Carp River Tributary will constitute a HADD and will require an EA.
- Compensation will be provided through enhancement of existing habitat and creation of additional fish habitat on the lower reach of the tributary.
- The EMP will outline the approval process required for the HADD.
- The EA process required for the HADD will not be completed as part of the EMP, but will be initiated

once development proposal have been initiated in this area.

Michael Petepiece, P.Eng
Project Engineer
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FoTenn
MANAGEMENT INC.

December 18, 2007

Our File: Goulbourn 635.06-2241

Novatech Engineering Consultants Ltd.
Attention: Mr. Michael Petepiece, P.Eng.
240 Michael Cowpland Drive, Suite 200
Ottawa, Ontario K2M 1P6

RE: Hydro One Networks Inc. Preliminary Review Comments for Fernbank CDP – SWM Facilities - Part of Lots 26 and 28, Concession 10, Township of Goulbourn, City of Ottawa

Dear Mr. Petepiece:

Further to your firm's submission dated October 5, 2007 to Hydro One Networks Inc. ("Hydro One"), Hydro One's System Investment stakeholder has undertaken a Preliminary Review of your letter and plans 101108, Oct. 2007, Fig.-SWM1 and Fig.-SWM2. The following comments are the result of this Review.

1. Detailed cross-sectional drawings are required at the locations of towers #618 and #627 (circuit X522A and X523A respectively [500 kv lines] - the 2 towers directly north of Fernbank Road as Shea Road intersects) both along the length and across the Hydro One transmission corridor. These drawings must be submitted to Hydro One, System Investment for review.

2. The grades of the proposed SWM ponds as well as the storm water levels during normal conditions as well as the 100 yr. storm event must be indicated on the drawings.

3. Detailed topographical drawings must also be submitted which show clear grade lines as well as the extent of the 100 yr. storm event.

4. The impact of the dry SWM pond on transmission towers is unlikely to be significant. However, the detailed drawings are required for Hydro One, System Investment to approve construction at the site. This is a 230 kv line.

5. Access to all Hydro One transmission towers must remain in-tact during the construction of the ponds as well as after the ponds are completed. The ROW must be kept clear of all debris (i.e., construction material, earth piles etc.) during all stages of construction.

6. A Hydro One Lines Technician assigned to the area must conduct a site visit to verify that satisfactory line clearances are maintained both during and after the construction.

FoTenn Management Inc.
223 McLeod Street
Ottawa, Ontario K2P 0Z8 Canada
T: 613.231.4733 F: 613.231.5664
robinson1@on.aibn.com

7. Please refer to Hydro One's General Requirements on the attached page.

If there are any questions regarding these comments, or next steps, please call at your convenience.

Yours truly,

Florence Robinson
Real Estate Services Representative
Hydro One Networks Inc.

Attachment

Hydro One Networks Inc. General Requirements

There is/are high voltage Transmission Line(s) in the vicinity of this proposal. The highest voltage(s) is/are indicated above. According to the Occupational Health & Safety Act (OHSA), section 186, the safe working clearance requirements are as follows:

- **For 500 kV lines the minimum clearance is 6.0 meters.**
- **For 230 kV lines the minimum clearance is 4.5 meters.**
- **For 115 kV lines the minimum clearance is 3.0 meters.**

The position of Transmission Line conductors is dynamic. They raise and lower each day as the ambient temperature and the electrical load changes. It is possible for the low point at mid-span to vary by 4.6 meters (15 ft) as conditions change.

All clearance requirements are based on the calculated maximum loaded condition (maximum sag) which can occur at any time due to system operating requirements. **It is the proponent's responsibility to ensure that safe working clearances as specified in The Ontario Occupational Health & Safety Act (OHSA) for workers and equipment are maintained at all times during construction activities.**

The installation of signs warning of overhead high voltage power lines are required as per The Ontario Occupational Health & Safety Act (OHSA). A dedicated signaler may also be required as per OHSA.

Prohibited Activities

- There shall be no storage of any material on the ROW without permission of Hydro One. Any debris on the ROW shall be removed on an ongoing basis.
- There shall be no storage or tipping of garbage dumpsters on the ROW.
- There shall be no storage or dispensing of gasoline or any other combustible substance on the Hydro One ROW.

Light standards, flag poles, power distribution pole lines or other aerial installations are **not** permitted on the Hydro One ROW, whether temporary or permanent, without the written approval from Hydro One, Transmission Lines.

Proponent must maintain a 6 meter wide access route to structures at all times. Failure to do so will result in the proponent's responsibility for any costs incurred by Hydro One in regaining this access to perform maintenance or repairs.

The proponent is responsible for arranging all underground locates prior to digging, auguring or performing any excavation works on the Hydro One ROW.

Hydro One is not responsible for any damages or injuries resulting from the effect of adverse weather conditions. This would include any damages or injuries from ice falling from structures or conductors as a result of an ice storm

All underground utilities have to be designed to allow for vehicular traffic to pass over. Type of vehicles to be accommodated includes large utility vehicles and cranes.

Any Hydro One transmission structure located within 10 meters of any construction activity related to this proposal shall have a temporary orange snow fence erected 3 meters around tower footprint and maintained in an upright position for the duration of construction. Proponent will be responsible for any damage to Hydro One facilities.

The proponent's use of the Hydro One ROW, during construction or post construction, as it relates to this proposal may be interrupted with or without notice for Hydro One to perform maintenance or emergency repairs. Hydro One will not compensate proponent for any lost revenue or any other costs to the proponent due to the interruption.

Plantings shall have a maximum mature height of 4 meters.

NOVATECH ENGINEERING CONSULTANTS LTD.

MINUTES / NOTES OF MEETING

Project: **Fernbank EMP/MSP/CDP SWM & Fluvial Geomorphology Workshop**

Project No.: 101108-0

Location: City of Ottawa, 110 Laurier - RM 5104E

Date: January 8, 2009

Present:

Darlene Conway	City of Ottawa
Roman Diduch	City of Ottawa
Myles Mahon	City of Ottawa
Eva Spal	City of Ottawa
Kevin Cover	City of Ottawa
Alain Gonthier	City of Ottawa
John Parish	Parish Geomorphic
John Price	MVC
Glen McDonald	RVCA
John Riddell	Novatech
Mike Petepiece	Novatech

Distribution: All present.

Next Meeting: TBA

ITEM	DESCRIPTION	ACTION BY
1.0	**General Comments**	
1.1	Implementation Table to be prepared as part of a separate process, not tied to approval of the CDP/EMP/MSS documents.	Consultants
1.2	Coordinate between CDP, EMP & MSS documents	Consultants
1.3	The locations of proposed multi-use pathways will be identified in the CDP/EMP/MSS documents.	Consultants
1.4	Novatech and Parish Geomorphic to review all previous RVCA comments on fluvial geomorphology and ensure that responses have been provided to RVCA on all issues.	Parish / Novatech
2.0	**Carp River Modeling / 3rd Party Review**	
2.1	Figure 4.3 - the difference in runoff volumes for catchments 28/35/36 (CH2MHill model vs. Novatech model) is due mainly to a difference in drainage area between the two models. Novatech feel that their detailed modeling of this catchment provides a more accurate representation of the drainage area. This information has been provided to the consultants performing the 3rd party review.	P.O.R.
2.2	The impact of any works within the Carp River floodplain (ie. increased roughness resulting from proposed riparian plantings) will be considered in the hydraulic analysis.	Novatech

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Consulting Engineers & Planners

3.0	**Riparian Corridor Setbacks & Pathways**	
3.1	Setbacks - Figures 3.12 and 3.13 incorrectly show 20% factor of safety on each side, and will need to be revised. The total factor of safety for aquatic habitat setbacks should be 20% (10% on each side of the watercourse).	Novatech
3.2	Setbacks - John Parish stated that aquatic setbacks should be established at 15 metres from the top of channel bank. Setbacks are to be clarified on the plan and profile drawings and on the figures in the EMP.	Parish / Novatech
3.3	Pathways - Multi-use pathways within the proposed riparian corridors will be 3 metres wide. The pathways can be located within the aquatic habitat setback (only along one side of the corridor) and no additional setbacks will be required.	P.O.R.
3.4	RVCA has stated they will be satisfied by the proposed setbacks, provided that the EMP is clarified as per items 3.1 - 3.3.	P.O.R.
4.0	**Natural Channel Design & Management**	
4.1	The EMP should identify adaptive management techniques for the outlet watercourses, which will address potential issues related to future changes in the channel morphology. This will provide a means of addressing any impacts that may arise in the future that were not identified in the original design.	Parish / Novatech
4.2	Novatech has identified that the Carp River West Tributary is the only existing natural watercourse that will be left to adjust to post-development conditions based on natural processes. The Monahan Drain will be designed based on anticipated post-development conditions, and the Flewellyn & Faulkner Drains are municipal drains that have been previously straightened and disturbed. Carp River Pond #1 is the only proposed SWM facility within the Fernbank Community that will outlet to the Carp River West Tributary.	P.O.R.
4.3	The City will advocate the adaptive management philosophy to the Ministry if they are satisfied with the design of the watercourses.	P.O.R.
4.4	The proposed natural channel designs will be a multi-disciplinary effort that will minimize operations and maintenance requirements. The EMP will identify and outline the design process for the riparian corridors to be followed at the detailed design stage, including: Engineering, Landscaping, Fluvial Geomorphology, Recreation, and Operation & Maintenance.	Novatech
5.0	**Runoff Volumes & Source Controls (Infiltration Targets)**	
5.1	The EMP will be revised to provide additional discussion on the use of source controls to mitigate the impact of increased runoff resulting from development.	Novatech
5.2	The EMP will identify what future analysis will be required at the detailed design stage for each facility.	Novatech

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5.3	Additional supporting calculations will be provided in the EMP for the recommended infiltration targets. The continuous erosion analysis will be revised to incorporate and quantify the proposed BMPs, and provide specific guidance with respect to incorporating any required mitigation measures into draft plan submissions.	
6.0	**Fluvial Geomorphology**	
6.1	The EMP is to identify supporting fluvial geomorphology documentation and calculations used in the design of the Monahan Drain and the evaluation of the Carp River Tributary.	Parish / Novatech
6.2	The design of the Monahan Drain and the proposed riparian corridor should anticipate change in the channel form due to natural processes.	Parish
6.3	The results of the fluvial geomorphology analysis are to be more fully integrated into the SWM criteria outlined in the EMP.	Parish / Novatech
7.0	**Tile Drains**	
7.1	p.53 - Section 5.6: The EMP will be revised to consistently use the term “tile drains” as opposed to “agricultural drains”.	Novatech
7.2	p.92 - Tile Drain Connections: The City has indicated that connection of existing tile drains to storm sewers is not desirable. The revised EMP will outline alternatives for addressing tile drainage.	Novatech
7.3	Kevin Cover to provide tile drainage information from OMAFRA to Novatech (received on January 9th, 2009).	City (completed)
8.0	**Monahan Drain**	
8.1	p.44 - Table 4-1: RVCA to provide hydrograph plots for the Monahan Drain at the Jock River for comparison to the Fernbank models.	RVCA
8.2	The revised EMP will provide a discussion in regard to the impact of development on the Monahan Drains Constructed Wetlands SWMF. Analysis of the downstream system should support/confirm the SWM criteria outlined in the EMP. *Note: Development of the Fernbank Lands was accounted for in the Monahan Drain Constructed Wetlands Phase 2 Final Design Report (Novatech, October 2006).*	Novatech
8.3	The 100-year peak flows in the Monahan Drain at Terry Fox Drive are: Engineer’s Report (Robinson, July 2003): Q_{100} = 5.2 m^3/s Fernbank EMP (Novatech, September 2008): Q_{100} = 4.3 m^3/s The modeled peak flows in the Fernbank EMP are approximately 20% lower than the flows from the Engineer’s report which were used to size the culvert under Terry Fox Drive.	P.O.R.
8.4	p.50 - The existing culvert under Terry Fox Drive has sufficient capacity to convey the 100-year peak flow without surcharging and there will be no significant backwater resulting from this crossing. Revised calculations for the Monahan Drain will be provided in the EMP	Novatech

	that will incorporate any potential backwater effects from the proposed crossings (both on-site and downstream). The analysis will take into account ponding elevations in the downstream Monahan Drain Constructed Wetlands SWMF	
9.0	**Flewellyn Drain**	
9.1	Figure 8.1 - Flewellyn/Faulkner Drainage Diversion: A revised figure has been circulated to RVCA which clearly outlines the proposed drainage diversion. RVCA to provide written confirmation as to whether this diversion is acceptable.	RVCA
9.2	The EMP will incorporate a specific recommendation regarding the lowering of the Flewellyn Drain. The pond size will be unaffected by the proposed lowering, but additional fill will be required within the upstream catchment.	Novatech
10.0	**Granite Ridge Outlet / Carp River Tributary**	
10.1	p.88 and 95 - MVC has indicated that it will be acceptable to direct outflows from the Granite Ridge SWMF to Carp River Pond #1, provided that temperature mitigation techniques are used and temperature criteria are met.	P.O.R.
10.2	Kevin Cover has indicated that the Carp River Tributary will experience increased erosion from development, and will take years to reach a new state of equilibrium. Natural processes should be allowed to control changes to the channel.	P.O.R.
10.3	The design of the riparian corridor should identify the potential for changes to the channel alignment, and the EMP should identify the anticipated scale of the changes to the Carp River Tributary and lay out a framework for a monitoring plan.	Consultants
10.4	Compensation will be provided for enclosing of the upper reach of the Carp River West tributary. The compensation works are not required for mitigation of impacts related to development. The compensation works are proposed along the Carp River corridors not only because the lower reach of the tributary is outside the urban boundary, but because it was deemed that enhancement of fish habitat in the Carp River would be more beneficial than enhancements to the lower reach of the tributary.	P.O.R.
10.5	Appendix J - The legend accompanying the concept plan in Appendix "J" (proposed compensation works along the Carp River) will be revised to clarify that these works are not part of the proposed Carp River Restoration Plan. The proposed works are similar in nature and have been carried over to this project from the Carp River Restoration Plan.	Novatech
10.6	p.89 - Parish to verify whether bank stabilization or erosion protection is required along the lower reach of the Carp River tributary. The reference to these works will be deleted from the EMP if not required.	Parish / Novatech

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10.7	The revised EMP will outline requirements for future DFO HADD application for the proposed enclosing of the upper reach of the Carp River Tributary.	Novatech
11.0	**Erosion Control**	
11.1	p.72 - Erosion Control Criteria: Novatech will provide Darlene Conway with proposed criteria & data set to be used in the erosion assessment (continuous analysis) for review & comment.	Novatech / City
11.2	Lot level and conveyance controls will be related to and/or incorporated in the erosion analysis	Novatech
11.3	p.72 - The erosion control analysis is to be extended downstream of the site.	Novatech
12.0	**Baseflow Enhancement & Temperature Maintenance**	
12.1	p.62 - Enhanced Baseflow: A generic baseflow outlet design will be provided in the EMP (typical to all proposed SWM facilities). Outlet structure details will be provided during detailed design. The baseflow component of SWM facilities will be designed to provide a drawdown time of approximately 48 hours. Additional discussion and rationale will be provided in the EMP (inter-event times, baseflow storage requirements, etc).	Novatech
12.2	p.88 and 95 - Novatech to review and verify temperature data provided in existing conditions reports and in EMP, and provide full data set of temperature monitoring to City and MVC.	Novatech
12.3	p.94 - A standard permanent pool depth of 1.5 metres has been used for the conceptual SWMF designs. It may be possible to make some of the ponds deeper to provide additional temperature mitigation - this will depend on geotechnical issues, mainly depth to bedrock. Pond depths will be confirmed at the detailed design stage.	P.O.R.
13.0	**SWM Design Operation & Maintenance**	
13.1	The conceptual SWM designs are to clearly indicate temporary sediment storage areas in the vicinity of the forebays. The sediment storage areas should be approximately the same size as the forebays and located above the extended detention elevations of the SWM facilities.	Novatech
13.2	The conceptual pond designs included in the EMP will list the minimum storage requirements (based on land use & area) as well as the actual volumes provided by the conceptual designs. The EMP will be revised to indicate the peak flow targets as well as the design outflows for the various return periods to demonstrate that the targets have been met.	Novatech
13.3	The EMP will identify operation & maintenance access for outlet watercourses, particularly along the natural reach of the Carp River Tributary.	Novatech

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13.4	The EMP will include a statement to the effect that “regardless of the desirability of naturalized SWM facilities, they remain first and foremost infrastructure that requires periodic maintenance that may result in disturbance to the naturalized areas of the pond”.	Novatech
14.0	**Aquifer Vulnerability & Protection**	
14.1	The EMP will provide additional information supporting the proposed land use plan in consideration with aquifer vulnerability.	Novatech
15.0	**Project Listings**	
15.1	Novatech will acquire confirmation from MOE whether the proposed works for the Monahan & Flewellyn Drains fall under the Drainage Act or the EA Act.	Novatech
15.2	p.97 - the EMP will be revised to replace “a HADD application to DFO” with “authorization from DFO”	Novatech
15.3	p.97 - the EMP will be revised to provide more detail on the approach to be followed regarding the proposed lowering of the Flewellyn Drain.	Novatech
	Next meeting time: TBA.	

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.

Michael Petepiece, P.Eng
Project Manager

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NOVATECH ENGINEERING CONSULTANTS LTD.

MINUTES / NOTES OF MEETING

Project: **Fernbank EMP Natural Environment Areas** **Project No.:** 101108-0

Location: City of Ottawa, 110 Laurier **Date:** January 13, 2009

Present:

Myles Mahon	City of Ottawa
Judy Flavin	City of Ottawa
Bradley Wright	City of Ottawa
Martha Copestake	City of Ottawa
Bernie Muncaster	Muncaster Environmental
John Riddell	Novatech Engineering
Mark Bissett	Novatech Engineering

Distribution: All present
Roman Diduch City of Ottawa

ITEM	DESCRIPTION	ACTION BY
1.0	**Schedule & Report Edits**	
1.1	Feb.6/09: final comments due from technical and public circulation February 2009: Final version of CDP/EMP/MSS completed Feb.24/09: Carp River EA Peer Review goes before PEC March 2009: Public Open House to present final Demonstration Plan April 2009: CDP staff report to PEC May 2009: CDP submitted to Council for final approval	
1.2	Implementation Table to be prepared as part of a separate process, not tied to approval of the CDP/EMP/MSS documents.	Consultants
1.3	Coordinate between CDP, EMP & MSS documents	Consultants
2.0	**NEA Lands**	
2.1	J. Flavin noted city staff and Council are reviewing NEA acquisition issues.	
2.2	The City is concerned that the south property line of the NEA does not represent the limit of the vegetation community.	
2.3	Muncaster Environmental noted from field visits that the core area of the NEA land is further north of the property line. There is more ice storm and wind-throw damage in the south of the NEA and on the Tartan lands. Moving south, the vegetation community transitions into more scrub-type growth. In the opinion of MEP, the core area of the NEA land is protected within the existing property limits.	
2.4	City wants to ensure an appropriate buffer is established to ensure the long-term viability of the NEA features. Wording to be removed from reports that the NEA lands are self-buffered.	Consultants
2.5	Agreed that an EIS would be prepared at of Plan of Subdivision to establish the south limit of the NEA and an appropriate buffer. The EMP	

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ITEM	DESCRIPTION	ACTION BY
	will include a checklist of requirement for the EIS. The buffer limit will result from field investigation and could be north or south of the property line. There will be no development in this area of the Tartan lands until these issues are resolved.	
3.0	**UNAEE Ratings**	
3.1	Five wooded vegetation communities were evaluated by Muncaster Environmental Planning in the area of Shea Road. Three areas were classified as having low overall significant, while the other two areas are at the low end of a moderate rating. The rating criteria was presented at this meeting, later emailed to city staff for their records and summarized below: Table 1: Southeast Parcel, Rating = 1.67 (Low Rating) Table 2: Northeast Parcel, Rating = 2.22 (Moderate Rating) Table 3: Triangular Parcel East of Shea Road, Rating = 1.55 (Low Rating) Table 4: Southwest Parcel, Rating = 1.67 (Low Rating) Table 5: West Parcel, Rating = 2.22 (Moderate Rating)	
3.2	Woodlots would keep a similar rating over time even as development encroached because the parcels were rated individually; although there might be a slight deterioration in the wildlife score.	
3.3	City will review the UNAEE ratings and respond.	City
3.4	Process for city evaluation and/or acquisition of woodlots: a) Areas of possible retention are identified in the CDP; an EIS checklist for woodlot retention will be included in the EMP. b) Staff takes proposal before Council for consideration c) If woodlot is to be acquired by City, then an EIS is completed during Plan of Subdivision process using the framework in the EMP.	
4.0	**Hydro One Easement**	
4.1	City questions the proposed land uses within the hydro corridor and the calculated allocation of Open Space in the CDP.	
4.2	The corridor will remain predominantly as open space for the transmission of hydro electricity. Proposed ancillary uses include a wet pond, dry pond, hydro-substation, OC Transpo facility, and roadway crossings. Use of the corridor for parking is possible.	
4.3	There is limited apparent need to utilize easement land for the low-density blocks. Low-density residential is the predominant land use on the Demonstration Plan. Utilization of hydro land for parking is more likely with development of the medium and high-density blocks. Development of the District Park may lead to utilization of some easement land for parking.	
4.4	All parties agreed it is reasonable to assume 10% of the hydro easement land might be developed for parking or other ancillary uses. The calculation of Open Space in the CDP will be adjusted accordingly.	Consultants
4.5	Hydro corridor land is privately owned with an easement agreement in favour of Hydro One. The easement agreement does not permit specific development uses, but rather a request can be submitted to Hydro One for	

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ITEM	DESCRIPTION	ACTION BY
	consideration on a case-by-case basis.	
4.6	Ownership of the hydro corridor will be turned over to the City as part of the Plan of Subdivision process. Land use of the corridor will be at the discretion of the city, within the restrictions of the easement agreement. It is understood the City and Hydro One will manage this corridor.	
4.7	Add discussion to the CDP, EMP & MSS documents outlining the proposed land uses of the corridor; this includes both development proposals as outlined above, and a natural corridor system infrequently maintained.	Consultants
5.0	**Pathways**	
5.1	Carp River Tributary buffer does not have a designated pathway.	
5.1	Monahan Drain outlet corridor has a pathway on both sides of the channel.	
5.3	Pathway system is depicted on Figure 10 of the CDP.	
5.4	A pathway is proposed along west property line of the CDP lands from Fernbank Road to the NEA. The City has requested a connection to the Trans-Canada Trail. Two potential footpath routes shall be incorporated into the CDP document. Option 1: Prepare an EIS to evaluate if there is an appropriate footpath route through the NEA that would minimize disturbance to the environment. Option 2: Incorporate an east-west pathway along the southern edge of the NEA towards the Gouldbourn Recreation Centre and Shea Road. The path could then follow the hydro easement north-east to the Trans-Canada Trail.	Consultants
6.0	**Trees**	
6.1	City expressed concern over presentation of Cavanagh Lands. Aerial photo shows this parcel with vegetation.	
6.2	Cleared trees are depicted in Figures 3.2, 3.3, 5.1 and text description in Section 3.3.4 of the EMP.	
6.3	Consultants agreed to update the aerial images to the extent practical so that the Cavanagh parcel is shown as having been cleared of trees.	Consultants
6.4	Individual trees can be saved on a case-by-case basis as permitted along the edge conditions, in neighbourhood parks and school sites as possible. Grade raise conditions for a balanced subdivision preclude the large-scale preservation of trees, except as outlined above.	
6.5	Additional text required to clarify city policy of tree planting in areas sensitive marine clay.	Consultants
7.0	**Narrow-Leafed Vervain**	
7.1	City has requested specific locations where the narrow-leafed vervain could be relocated and a description of the conditions required for its survival.	Consultants

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Consulting Engineers & Planners

APPENDIX C

URBAN NATURAL AREAS EVALUATION

UNA East of Shea Road - Southeast Parcel
UNA East of Shea Road - Southeast Parcel: Native Biodiversity
UNA East of Shea Road - Northeast Parcel
UNA East of Shea Road - Northeast Parcel: Native Biodiversity
UNA East of Shea Road - Adjacent to Shea Road Parcel
UNA East of Shea Road - Adjacent to Shea Road Parcel: Native Biodiversity
UNA West of Shea Road - Southwest Parcel
UNA West of Shea Road - Southwest Parcel: Native Biodiversity
UNA West of Shea Road - West Parcel
UNA West of Shea Road - West Parcel: Native Biodiversity

UNA East of Shea Road – Southeast Parcel

DESCRIPTION:

- young wooded area on clay soils with areas of Paleozoic bedrock near the surface

SITE DETAILS

a) **Size**:
5.9 ha.

b) **Ownership**:
- Private

EVALUATION SUMMARY

Area Evaluation Summary Urban Natural Area: Southeast Parcel East of Shea Road					
Criteria	Rating Assigned				
	1	**2**	**3**	**4**	**5**
Connectivity		X			
Regeneration		X			
Disturbance		X			
Size and Shape		X			
Habitat Maturity		X			
Natural Communities	X				
Representative Flora	X				
Significant Flora and Fauna	X				
Wildlife Habitat		X			
Overall Rating for Site	Low				

ECOLOGICAL FUNCTIONS :

a) **Connectivity:**
- UNA West of Shea Road ca. 450m to west. Other wooded areas to the north and to northwest, the latter adjacent to east side of Shea Road. Thickets, meadows and agricultural activity adjacent to site.

b) **Interior habitat:**
None

c) **Disturbance and condition:**
- low native flora Co-efficient of Conservation rating (2.60), with no high-rated Coefficient of Conservation species;
- historical logging;
- some wind throw and ice storm damage;
- maintained trails through wooded area and extensive dog walking;
- all of site within edge effect influence;
- informal pathways throughout.

d) **Adjacent land use:**
- agricultural lands adjacent to wooded area;
- east portion of wooded area west of Shea Road has been cleared.

e) **Invasive plants:**
- One species with low to moderate impact to date:

Common Buckthorn (*Rhamnus cathartica*) (3)

NATIVE BIODIVERSITY:

a) Habitats (type and dominants):

- submature White Cedar Forest (White Cedar, Trembling Aspen, Balsam Poplar)

b) Representative flora/ fauna:

- low biodiversity;
- generalist faunal utilization.

c) Significant features and species:
- no Regionally Rare or Uncommon plant species observed; natural biodiversity low.

ECOLOGICAL COMMENTS:

a) Management:

- retention of portions of forest habitat.

b) Recommendations:

Research:
- n/a

Passive recreation opportunities:
- continue to provide trails for dog walkers and other recreational activities.

SITE INVESTIGATION DETAILS:

Date(s):

June 30th and August 16th, 2006; June 1st, 2007, August 15th, 2008 and January 6th, 2009

Investigator(s): Bernie Muncaster

OTHER COMMENTS:

- generally young and disturbed remnant forest in general area of agricultural activity.

UNA East of Shea Road – Southeast Parcel: Native biodiversity

a) Vascular flora observed:

Species	Status in Ottawa	Co-efficient of Conservation
Abies balsamea (L.) Mill.	Common	5
Acer saccharum Marsh.	Common	4
Agrimonia gryposepala Wallr.	Common	2
Alnus incana	Common	6
Ambrosia artemisiifolia L.	Common	0
Apocynum androsaemifolium L.	Common	3
Aralia nudicaulis	Common	4
Asclepias syriaca L.	Common	0
Aster lateriflorus	Common	3
Aster novae-angliae	Common	2
Aster macrophyllus L. (*Eurybia macrophylla* (L.) Cass.)	Common	5
Athyrium filix-femina (L.) Roth var. *angustum* (Willd.) Lawson	Common	4
Betula papyrifera Marsh.	Common	2
Carex pensylvanica	Common	5
Cornus stolonifera	Common	2
Circaea lutetiana L. ssp. *canadensis* (L.) Asch. & Magnus	Common	3
Crataegus sp	Common	4
Equisetum arvense	Common	0
Erigeron annuus (L.) Pers.	Common	0
Fraxinus americana Marsh.	Common	4
Fraxinus pennsylvanica	Common	3
Geum aleppicum Jacq.	Common	2
Oenothera biennis L.	Common	0
Onoclea sensibilis	Common	4
Oxalis stricta L. (*O. europea* Jord.; *O. fontana* Bunge)	Common	0

Parthenocissus vitacea (Knerr) Hitchc.	Common	3
Picea glauca (Moench) Voss	Common	6
Pinus strobus	Common	4
Populus balsamifera ssp. balsamifera	Common	4
Populus deltoids ssp. deltoides	Common	4
Populus tremuloides Michx.	Common	2
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw.	Common	2
Rhus hirta (L.) Sudworth (*R. typhina* L.)	Common	1
Rubus idaeus ssp. melanolasius	Common	0
Rubus odoratus	Common	3
Solidago altissima	Common	1
Solidago canadensis L.	Common	1
Thuja occidentalis L.	Common	4
Tilia americana L.	Common	4
Toxicodendron rydbergii (Rydb.) Greene (*Rhus radicans* L. var. *rydbergii* (Sm.) McNeill)	Common	0
Ulmus americana L.	Common	3
Vitis riparia Michx.	Common	0
Zanthoxylum americanum	Common	3
	Aggregate CC	112

Total Species	Regionally Significant (incl. Regionally uncommon)	High CC (>6)	Co-efficient of Conservation (average)	EI rating
43	0	0	2.60	Low

UNA East of Shea Road - Northeast Parcel

DESCRIPTION:

- young wooded area on clay soils with areas of Paleozoic bedrock near the surface

SITE DETAILS

a) **Size**:
7.7 ha.

b) **Ownership**:
- Private

EVALUATION SUMMARY

Area Evaluation Summary Urban Natural Area: Northeast Parcel East of Shea Road					
Criteria	Rating Assigned				
	1	**2**	**3**	**4**	**5**
Connectivity			X		
Regeneration			X		
Disturbance		X			
Size and Shape			X		
Habitat Maturity		X			
Natural Communities	X				
Representative Flora		X			
Significant Flora and Fauna	X				
Wildlife Habitat			X		
Overall Rating for Site	Moderate				

ECOLOGICAL FUNCTIONS :

a) **Connectivity:**
- UNA 182 (Abbott/Iber Woodlot) ca. 550 m northeast; UNA West of Shea Road ca. 450m to west. Other wooded areas to the south and to the west, the latter adjacent to east side of Shea Road. Other Thickets, meadows and agricultural activity adjacent to wooded area.

b) **Interior habitat:**
None

c) **Disturbance and condition:**
- moderate native flora Co-efficient of Conservation rating (3.12), with two high-rated Coefficient of Conservation species;
- all of site within edge effect influence;
- steel tower hydro line adjacent to wooded area;
- historical logging;
- some wind throw and ice storm damage;
- maintained trails through wooded area and extensive dog walking.

d) **Adjacent land use:**
- residential area to the north, with agricultural lands adjacent to natural area.

e) **Invasive plants:**
- Two species with low to moderate impact to date:

Glossy Buckthorn (*Rhamnus frangula*) (2)
Common Buckthorn (*Rhamnus cathartica*) (2)

NATIVE BIODIVERSITY:

a) Habitats (type and dominants):

- submature White Cedar Forest (White Cedar, Trembling Aspen, Balsam Poplar)

b) Representative flora/ fauna:

- low biodiversity;
- faunal representation includes observations of areas sensitive breeding birds

c) Significant features and species:
- no Regionally Rare or Uncommon plant species observed; natural biodiversity low.

ECOLOGICAL COMMENTS:

a) Management:

- retention of portions of forest habitat.

b) Recommendations:

Research:
- n/a

Passive recreation opportunities:
- continue to provide trails for dog walkers and other recreational activities.

SITE INVESTIGATION DETAILS:

Date(s): June 30th and August 16th, 2006; June 1st, 2007, August 15th, 2008 and January 6th, 2009

Investigator(s): Bernie Muncaster

OTHER COMMENTS:

- generally young and disturbed remnant forest in general area of agricultural activity.

UNA East of Shea Road - Northeast Parcel: Native biodiversity

a) Vascular flora observed:

Species	Sites/ status in Ottawa	Co-efficient of Conservation
Abies balsamea (L.) Mill.	Common	5
Acer rubrum L.	Common	4
Acer saccharum Marsh.	Common	4
Actaea rubra (Ait.) Willd.	Common	5
Alnus incana	Common	6
Ambrosia artemisiifolia L.	Common	0
Aralia nudicaulis	Common	4
Asclepias syriaca L.	Common	0
Aster cordifolius	Common	5
Aster lateriflorus	Common	3
Aster macrophyllus L. (*Eurybia macrophylla* (L.) Cass.)	Common	5
Athyrium filix-femina (L.) Roth var. *angustum* (Willd.) Lawson	Common	4
Betula papyrifera Marsh.	Common	2
Carex pensylvanica	Common	5
Cornus stolonifera	Common	2
Circaea lutetiana L. ssp. *canadensis* (L.) Asch. & Magnus	Common	3
Crataegus sp	Common	4
Equisetum arvense	Common	0
Erigeron annuus (L.) Pers.	Common	0
Fraxinus americana Marsh.	Common	4
Fraxinus pennsylvanica	Common	3
Geum aleppicum Jacq.	Common	2
Larix laricina	Common	7
Maianthemum canadense Desf. (*s.str*.)	Common	5
Matteuccia struthiopteris (L.) Todaro	Common	5

Oenothera biennis L.	Common	0
Onoclea sensibilis	Common	4
Oxalis stricta L. (*O. europea* Jord.; *O. fontana* Bunge)	Common	0
Parthenocissus vitacea (Knerr) Hitchc.	Common	3
Picea glauca (Moench) Voss	Common	6
Picea mariana	Common	8
Pinus strobus	Common	4
Populus balsamifera ssp. balsamifera	Common	4
Populus deltoids ssp. deltoides	Common	4
Populus tremuloides Michx.	Common	2
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw.	Common	2
Quercus macrocarpa Michx.	Common	5
Rhus hirta (L.) Sudworth (*R. typhina* L.)	Common	1
Ribes cynosbati L.	Common	4
Rubus idaeus ssp. melanolasius	Common	0
Rubus odoratus	Common	3
Salix petiolaris	Common	3
Solidago altissima	Common	1
Solidago canadensis L.	Common	1
Thuja occidentalis L.	Common	4
Tilia americana L.	Common	4
Toxicodendron rydbergii (Rydb.) Greene (*Rhus radicans* L. var. *rydbergii* (Sm.) McNeill)	Common	0
Ulmus americana L.	Common	3
Vitis riparia Michx.	Common	0
Zanthoxylum americanum	Common	3
	Aggregate CC	156

Total Species	Regionally Significant (incl. Regionally uncommon)	High CC (>6)	Co-efficient of Conservation (average)	EI rating
50	0	2	3.12	Moderate

UNA East of Shea Road – Adjacent to Shea Road Parcel

DESCRIPTION:
- young scrubby wooded area on clay soils with areas of Paleozoic bedrock near the surface

SITE DETAILS
a) **Size**:
5.3 ha.

b) **Ownership**:
- Private

EVALUATION SUMMARY

Area Evaluation Summary Urban Natural Area: East of Shea Road – Adjacent to Shea Road					
Criteria	Rating Assigned				
	1	**2**	**3**	**4**	**5**
Connectivity		X			
Regeneration		X			
Disturbance		X			
Size and Shape		X			
Habitat Maturity	X				
Natural Communities		X			
Representative Flora	X				
Significant Flora and Fauna	X				
Wildlife Habitat	X				
Overall Rating for Site	Low				

ECOLOGICAL FUNCTIONS :

a) **Connectivity:**
- UNA 182 (Abbott/Iber Woodlot) ca. 900 m northeast; UNA West of Shea Road ca. 450m to west. Other wooded areas to the east and southeast.

b) **Interior habitat:**
None

c) **Disturbance and condition:**
- low native flora Co-efficient of Conservation rating (2.67), with no high-rated Coefficient of Conservation species;
- all of site within edge effect influence;
- adjacent to Shea Road;
- extensive historical logging;
- wind throw extensive in west and south portions.

d) **Adjacent land use:**
- residential area to the north, with agricultural lands adjacent to natural area.

e) **Invasive plants:**
- Two species with moderate to severe impact to date:

Glossy Buckthorn (*Rhamnus frangula*) (5)
Common Buckthorn (*Rhamnus cathartica*) (3)

NATIVE BIODIVERSITY:

a) Habitats (type and dominants):

- submature White Cedar and Poplar Mixed Forest (White Cedar, Trembling Aspen, White Spruce, Balsam Poplar, Balsam Fir)
- submature White Cedar Coniferous Forest (White Cedar, White Spruce)

b) Representative flora/ fauna:

- low biodiversity;
- trees too small for cavity utilization

c) Significant features and species:
- no Regionally Rare or Uncommon plant species observed; natural biodiversity low.

ECOLOGICAL COMMENTS:

a) Management:

- n/a

b) Recommendations:

Research:
- n/a

Passive recreation opportunities:
- n/a, very scrubby.

SITE INVESTIGATION DETAILS:

Date(s): June 30th, 2006, June 1st, 2007 and January 6th, 2009

Investigator(s): Bernie Muncaster

OTHER COMMENTS:

- young and disturbed remnant forest

UNA East of Shea Road – Adjacent to Shea Road Parcel: Native biodiversity

a) Vascular flora observed:

Species	Sites/ status in Ottawa	Co-efficient of Conservation
Abies balsamea (L.) Mill.	Common	5
Agrimonia gryposepala Wallr.	Common	2
Alnus incana	Common	6
Apocynum androsaemifolium L.	Common	3
Asclepias syriaca L.	Common	0
Aster cordifolius	Common	5
Aster novae-angliae	Common	2
Aster macrophyllus L. (*Eurybia macrophylla* (L.) Cass.)	Common	5
Betula papyrifera Marsh.	Common	2
Carex pensylvanica	Common	5
Cornus stolonifera	Common	2
Circaea lutetiana L. ssp. *canadensis* (L.) Asch. & Magnus	Common	3
Erigeron annuus (L.) Pers.	Common	0
Eupatorium maculatum	Common	3
Fraxinus pennsylvanica	Common	3
Geum aleppicum Jacq.	Common	2
Impatiens capensis Meerb.	Common	4
Juncus tenuis	Common	0
Juniperus communis	Common	0
Matteuccia struthiopteris (L.) Todaro	Common	5
Onoclea sensibilis	Common	4
Oxalis stricta L. (*O. europea* Jord.; *O. fontana* Bunge)	Common	0
Parthenocissus vitacea (Knerr) Hitchc.	Common	3
Picea glauca (Moench) Voss	Common	6

Populus balsamifera ssp. balsamifera	Common	4
Populus deltoids ssp. deltoides	Common	4
Populus tremuloides Michx.	Common	2
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw.	Common	2
Rhus hirta (L.) Sudworth (*R. typhina* L.)	Common	1
Ribes cynosbati L.	Common	4
Rubus idaeus ssp. melanolasius	Common	0
Rubus odoratus	Common	3
Salix discolor	Common	3
Salix petiolaris	Common	3
Solidago altissima	Common	1
Solidago canadensis L.	Common	1
Spiraea alba	Common	3
Thuja occidentalis L.	Common	4
Tilia americana L.	Common	4
Toxicodendron rydbergii (Rydb.) Greene (*Rhus radicans* L. var. *rydbergii* (Sm.) McNeill)	Common	0
Ulmus americana L.	Common	3
Vitis riparia Michx.	Common	0
	Aggregate CC	112

Total Species	Regionally Significant (incl. Regionally uncommon)	High CC (>6)	Co-efficient of Conservation (average)	EI rating
42	0	0	2.67	Low

UNA West of Shea Road – Southwest Parcel

DESCRIPTION:

- young coniferous forest on shallow sandy soils over Paleozoic bedrock

SITE DETAILS

a) **Size**:
2.7 ha.

b) **Ownership**:
- Private

EVALUATION SUMMARY

Area Evaluation Summary Urban Natural Area: Southwest Parcel West of Shea Road					
Criteria	Rating Assigned				
	1	2	3	4	5
Connectivity		X			
Regeneration		X			
Disturbance			X		
Size and Shape		X			
Habitat Maturity		X			
Natural Communities	X				
Representative Flora	X				
Significant Flora and Fauna	X				
Wildlife Habitat	X				
Overall Rating for Site	Low				

ECOLOGICAL FUNCTIONS :

a) **Connectivity:**
- Wooded area to north, with Natural Environment Area West of Shea Road ca. 600m to north. Other wooded areas are ca. 600m to the east, east of Shea Road.

b) **Interior habitat:**
None

c) **Disturbance and condition:**
- low native flora Co-efficient of Conservation rating (2.92), with one high-rated Coefficient of Conservation species (jack pine likely from adjacent former plantation);
- all of site within edge effect influence;
- tree forts;
- informal pathways throughout.

d) **Adjacent land use:**
- residential areas immediately to the west, with agricultural lands to the south
- recent tree and shrub removal to the east.

e) **Invasive plants:**
- two species with low to moderate impact to date:

Glossy Buckthorn (*Rhamnus frangula*) (2)
Common Buckthorn (*Rhamnus cathartica*) (2)

NATIVE BIODIVERSITY:

a) Habitats (type and dominants):

- submature dry-fresh White Cedar Forest (White Cedar, Jack Pine, White Birch, White Spruce, Trembling Aspen, White Pine)

b) Representative flora/ fauna:

- low biodiversity;
- trees generally too small for cavity use

c) Significant features and species:
- no Regionally Rare or Uncommon plant species observed; natural biodiversity low.

ECOLOGICAL COMMENTS:

a) Management:

- retention of clusters of trees

b) Recommendations:

Research:
- n/a

Passive recreation opportunities:
- formalize low impact trails; potential for interpretation addressing ecological conditions.

SITE INVESTIGATION DETAILS:

Date(s): August 16th, 2006; June 19th, 2007 and January 6th, 2009

Investigator(s): Bernie Muncaster

OTHER COMMENTS:

- small, regenerating wooded area of young cedars

UNA West of Shea Road – Southwest Parcel: Native biodiversity

a) Vascular flora observed:

Species	Sites/ status in Ottawa	Co-efficient of Conservation
Abies balsamea (L.) Mill.	Common	5
Acer negundo	Common	0
Anemone canadensis	Common	3
Apocynum androsaemifolium L.	Common	3
Asclepias syriaca L.	Common	0
Aster cordifolius	Common	5
Aster lateriflorus	Common	3
Aster macrophyllus L. (*Eurybia macrophylla* (L.) Cass.)	Common	5
Betula papyrifera Marsh.	Common	2
Carex pensylvanica	Common	5
Circaea lutetiana L. ssp. *canadensis* (L.) Asch. & Magnus	Common	3
Erigeron strigosus	Common	0
Fragaria virginiana ssp. virginiana	Common	2
Fraxinus americana	Common	4
Fraxinus pennsylvanica	Common	3
Juniperus communis L.	Common	4
Mentha arvensis	Common	3
Onoclea sensibilis L.	Common	4
Parthenocissus vitacea (Knerr) Hitchc.	Common	3
Picea glauca (Moench) Voss	Common	6
Pinus banksiana	Uncommon (plantation)	9
Pinus strobus	Common	4
Populus balsamifera ssp. balsamifera	Common	4
Populus deltoides	Common	4
Populus tremuloides Michx.	Common	2

Prunus virginiana ssp. virginiana	Common	2
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw.	Common	2
Quercus macrocarpa Michx.	Common	5
Rhus hirta (L.) Sudworth (*R. typhina* L.)	Common	1
Ribes cynosbati L.	Common	4
Rubus allegheniensis	Common	2
Rubus strigosus Michx. (*R. idaeus* L. var. *strigosus* (Michx.) Max.)	Common	0
Solidago altissima	Common	1
Solidago canadensis L.	Common	1
Thuja occidentalis L.	Common	4
Toxicodendron rydbergii (Rydb.) Greene (*Rhus radicans* L. var. *rydbergii* (Sm.) McNeill)	Common	0
Ulmus americana L.	Common	3
Vitis riparia Michx.	Common	0
Zanthoxylum americanum	Common	3
	Aggregate CC	114

Total Species	Regionally Significant (incl. Regionally uncommon)	High CC (>6)	Co-efficient of Conservation (average)	EI rating
39	0	1	2.92	Low

UNA West of Shea Road – West Parcel

DESCRIPTION:

- intermediated aged coniferous forest on shallow sandy soils over Paleozoic bedrock

SITE DETAILS

a) **Size**:
7.1 ha.

b) **Ownership**:
- Private

EVALUATION SUMMARY

Area Evaluation Summary Urban Natural Area: West Parcel West of Shea Road					
Criteria	Rating Assigned				
	1	2	3	4	5
Connectivity		X			
Regeneration			X		
Disturbance		X			
Size and Shape			X		
Habitat Maturity			X		
Natural Communities	X				
Representative Flora			X		
Significant Flora and Fauna	X				
Wildlife Habitat		X			
Overall Rating for Site	Moderate				

ECOLOGICAL FUNCTIONS :

a) **Connectivity:**
- Natural Environment Area West of Shea Road ca. 250m to north. Other wooded areas are to the south and ca. 500m to the east, east of Shea Road.

b) **Interior habitat:**
None

c) **Disturbance and condition:**
- moderate native flora Co-efficient of Conservation rating (3.66), with four high-rated Coefficient of Conservation species (a couple of the high-rated conifer were likely from adjacent former plantation);
- all of site within edge effect influence;
- tree forts, some elaborate;
- extensive wind throw and ice storm damage in areas;
- informal pathways throughout.

d) **Adjacent land use:**
- residential area immediately to west, with wooded areas to north and south. Lands to the east have been cleared of woody vegetation.

e) **Invasive plants:**
- two species with low to moderate impact to date:

Glossy Buckthorn (*Rhamnus frangula*) (2)
Common Buckthorn (*Rhamnus cathartica*) (2)

NATIVE BIODIVERSITY:

a) Habitats (type and dominants):

- submature dry-fresh White Cedar Forest (White Cedar, Trembling Aspen, Eastern Hemlock, White Birch, White Spruce, Balsam Fire)

b) Representative flora/ fauna:

- low biodiversity;
- faunal representation includes some cavity utilization.

c) Significant features and species:
- - no Regionally Rare or Uncommon plant species observed

ECOLOGICAL COMMENTS:

a) Management:

- retention of clusters of trees.

b) Recommendations:

Research:
- n/a

Passive recreation opportunities:
- formalize low impact trails; potential for interpretation addressing native diversity.

SITE INVESTIGATION DETAILS:

Date(s): August 16th, 2006; June 19th, 2007, August 15th, 2008 and January 6th, 2009

Investigator(s): Bernie Muncaster

OTHER COMMENTS:

- regenerating wooded area of young and intermediate-aged cedars

UNA West of Shea Road – West Parcel: Native biodiversity

a) Vascular flora observed:

Species	Sites/ status in Ottawa	Co-efficient of Conservation
Abies balsamea (L.) Mill.	Common	5
Acer negundo	Common	0
Anemone Canadensis	Common	3
Apocynum androsaemifolium L.	Common	3
Aralia nudicaulis	Common	4
Aster cordifolius	Common	5
Aster lateriflorus	Common	3
Aster macrophyllus L. (*Eurybia macrophylla* (L.) Cass.)	Common	5
Athyrium filix-femina (L.) Roth var. *angustum* (Willd.) Lawson	Common	4
Betula alleghaniensis Britt.	Common	6
Betula papyrifera Marsh.	Common	2
Carex pensylvanica	Common	5
Circaea lutetiana L. ssp. *canadensis* (L.) Asch. & Magnus	Common	3
Dryopteris marginalis	Common	5
Erigeron strigosus	Common	0
Fragaria virginiana ssp. virginiana	Common	2
Fraxinus americana	Common	4
Fraxinus pennsylvanica	Common	3
Maianthemum canadense Desf. (*s.str*.)	Common	5
Onoclea sensibilis L.	Common	4
Parthenocissus vitacea (Knerr) Hitchc.	Common	3
Picea glauca (Moench) Voss	Common	6
Pinus banksiana	Uncommon (plantation)	9
Pinus resinosa	Uncommon (plantation)	8
Pinus strobus	Common	4

Populus balsamifera ssp. balsamifera	Common	4
Populus deltoides	Common	4
Populus tremuloides Michx.	Common	2
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw.	Common	2
Quercus macrocarpa Michx.	Common	5
Rhus hirta (L.) Sudworth (*R. typhina* L.)	Common	1
Ribes cynosbati L.	Common	4
Rubus allegheniensis	Common	2
Rubus odoratus	Common	3
Rubus strigosus Michx. (*R. idaeus* L. var. *strigosus* (Michx.) Max.)	Common	0
Solidago altissima	Common	1
Solidago canadensis L.	Common	1
Taxus canadensis Marsh.	Common	7
Thuja occidentalis L.	Common	4
Tiarella cordifolia	Common	6
Tilia americana L.	Common	4
Tsuga canadensis	Common	7
Ulmus americana L.	Common	3
Vitis riparia Michx.	Common	0
	Aggregate CC	161

Total Species	Regionally Significant (incl. Regionally uncommon)	High CC (>6)	Co-efficient of Conservation (average)	EI rating
44	0	4	3.66	Moderate

Table 1: Urban Natural Area Environmental Evaluation - East of Shea Road Southeast Parcel (Southeast Vegetation Community 6 Parcel on Figure 2)

Criteria	Rating for Southeast Parcel, East of Shea Road (out of 5)	Southeast of Shea Road Comments
Connectivity	2	Natural Area to the west of Shea Road has been impacted with extensive tree removal. Smaller wooded areas to the north and northwest, east of Shea Road. Linkages cross busy roads and agricultural land.
Regeneration	2	Limited regeneration, but some regeneration on periphery of forest
Ecological Integrity	2	Non-native species, trails, noise from adjacent traffic and historical logging have had an impact on the ecological functions of the natural area
Size and Shape	2	Urban natural area is between two and six hectares in area (5.9 ha)
Habitat Maturity	2	The trees in the woodlot are of an young and intermediate age
Natural Communities	1	Natural Area has one natural community
Representative Flora and Fauna	1	Mean coefficient of conservation is less than 3 (2.60)
Significant Flora and Fauna	1	No nationally, provincially or regionally rare species
Wildlife Habitat	2	Wildlife utilization typical for habitat conditions

The average rating is 1.67, which would place the natural area around the middle of the natural areas considered to have a low overall significance.

**Table 2: Urban Natural Area Environmental Evaluation - East of Shea Road
Northeast Parcel (Northeast Vegetation Community 6 Parcel on Figure 2)**

Criteria	Rating for Northeast Parcel, East of Shea Road (out of 5)	Northeast of Shea Road Comments
Connectivity	3	Natural Area to the west of Shea Road has been impacted with extensive tree removal. Smaller wooded areas to the west and southeast and north of Abbott Street. Linkages cross busy roads and agricultural land.
Regeneration	3	White cedar regeneration good in areas with limited regeneration due to high density of cedars in other areas
Ecological Integrity	2	Non-native species, trails, wind throw and historical logging have had an impact on the ecological functions of the natural area
Size and Shape	3	Urban natural area is between six and ten hectares in area (7.7 ha)
Habitat Maturity	2	The trees in the woodlot are of an young and intermediate age
Natural Communities	1	Natural Area has one natural community
Representative Flora and Fauna	2	Mean coefficient of conservation is between 3 and 3.5 (3.12)
Significant Flora and Fauna	1	No nationally, provincially or regionally rare species
Wildlife Habitat	3	Wildlife habitat of wooded area has some area-sensitive functions

The average rating is 2.22, which would place the natural area at the low end of the natural areas rated with a moderate overall significance.

Table 3: Urban Natural Area Environmental Evaluation - East of Shea Road Adjacent Parcel (Vegetation Community 5 on Figure 2)

Criteria	Rating for Adjacent Area, East of Shea Road (out of 5)	Adjacent and East of Shea Road Comments
Connectivity	2	Natural Area to the west of Shea Road has been impacted with extensive tree removal. Smaller wooded areas to the southeast and east, east of Abbott Street. This area is adjacent to Shea Road and linkages cross busy roads and agricultural land.
Regeneration	2	Limited regeneration, but some cedar and balsam fir regeneration
Ecological Integrity	2	Non-native species, wind throw, noise from adjacent traffic and historical logging have had an impact on the ecological functions of the natural area
Size and Shape	2	Urban natural area is between two and six hectares in area (5.3 ha)
Habitat Maturity	1	The trees in the woodlot are of an young age
Natural Communities	2	Natural Area has two natural communities
Representative Flora and Fauna	1	Mean coefficient of conservation is less than 3 (2.67)
Significant Flora and Fauna	1	No nationally, provincially or regionally rare species
Wildlife Habitat	1	Wildlife habitat of wooded area appears minimal

The average rating is 1.55, which would place the natural area towards the low end of the natural areas considered to have a low overall significance.

Table 4: Urban Natural Area Environmental Evaluation – West of Shea Road Southwest Parcel (Southwest Vegetation Community 6 Parcel on Figure 2)

Criteria	Rating for Southwest Parcel, West of Shea Road (out of 5)	Southwest of Shea Road Comments
Connectivity	2	Natural Area to the north, west of Shea Road. Urban residential to the west, agricultural to the south, and cleared land to the east. Extended linkages cross busy roads and agricultural land.
Regeneration	2	Cedars and balsam fir provide some regeneration, which is limited in many areas due to high density of cedars
Ecological Integrity	3	Noise from adjacent traffic and historical logging have had an impact on the ecological functions of the natural area
Size and Shape	2	Urban natural area is between two and six hectares in area (2.7 ha)
Habitat Maturity	2	The trees in the woodlot are of an young and intermediate age
Natural Communities	1	Natural Area has one natural community
Representative Flora and Fauna	1	Mean coefficient of conservation is less than 3 (2.92)
Significant Flora and Fauna	1	No nationally, provincially or regionally rare species
Wildlife Habitat	1	Wildlife habitat of wooded area appears minimal

The average rating is 1.67, which would place the natural area among the middle of the natural areas considered to have a low overall significance.

Table 5: Urban Natural Area Environmental Evaluation – West of Shea Road West Parcel (West Vegetation Community 6 Parcel on Figure 2)

Criteria	Rating for Area East of Shea Road (out of 5)	East of Shea Road Comments
Connectivity	2	Natural Areas to the north and south, west of Shea Road. Urban residential to the west, agricultural to the south, and cleared land to the east. Extended linkages cross busy roads and agricultural land.
Regeneration	3	Cedar and balsam fir regeneration good in areas
Ecological Integrity	2	Noise from adjacent traffic, wind-throw, tree forts and historical logging have had an impact on the ecological functions of the natural area
Size and Shape	3	Urban natural area is between six and ten hectares in area (7.1 ha)
Habitat Maturity	3	The trees in the woodlots are of an intermediate age
Natural Communities	1	Natural Area has one natural community
Representative Flora and Fauna	3	Mean coefficient of conservation is between 3.5 and 4 (3.66)
Significant Flora and Fauna	1	No nationally, provincially or regionally rare species
Wildlife Habitat	2	Wildlife utilization typical for habitat conditions

The average rating is 2.22, which would place the natural area at the low end of the natural areas rated with a moderate overall significance.

APPENDIX D

HYDROLOGIC CALCULATIONS & MODELING FILES

Existing Conditions Modeling Parameters
Post-Development Conditions Modeling Parameters - Carp River
Post-Development Conditions Modeling Parameters - Jock River

Figure: Monahan Drain Subwatershed (101108-MD1)

SWMHYMO Modeling Files

- *Granite Ridge Subdivision*
- *Carp River - Existing Conditions*
- *Carp River - Post-Development Conditions*
- *Carp River - Post-Development Conditions (with BMPs)*
- *Jock River - Existing Conditions*
- *Jock River - Post-Development Conditions*
- *Jock River - Post-Development Conditions (with BMPs)*

Carp River Subwatershed
Pre-Development Subcatchments: SWMHYMO Modeling Parameters (CR-EX.dat)
Refer to Figure 4.1 (Main Report)

Description	ID	Area (ha)	NASHYD (Undeveloped)			STANDHYD (Developed)								
						Impervious					Pervious			
			CN/C	Ia (mm)	Tp (hrs)	XIMP	TIMP	Length (m)	Slope (%)	Ia (mm)	CN	Length (m)	Slope (%)	Ia (mm)
Hazeldean Creek South of Hazeldean Road	100-1	62.17				0.38	0.45	1,700	0.80	1.57	80.5	1200	1.00	4.67
Hazeldean Creek North of Hazeldean Road	102-1	39.8	78	9.8	1.10									
Fernbank Lands to West Tributary	101-2	88.6	82	9.8	2.25									
Fernbank Lands South of West Tributary	500	77.9	82	9.8	1.30									
Granite Ridge Subdivision	GR	69.53	<-read outflow hydrograph from GR.dat											
Westcreek Meadows	28	12.5				0.38	0.45	205	1.00	1.57	80.5	40	1.00	4.67
Fernbank Lands North of West Tributary	35	32.52	70	9.8	1.10									
Carp River Floodplain U/S of Hazeldean Road	36	24.18	82	9.8	0.50									

Jock River Subwatershed
Pre-Development Subcatchments: SWMHYMO Modeling Parameters (JR-EX3.dat)
Refer to Drawing 101108-MD1: Monahan Drain Watershed (Appendix D)

Description	ID	Area (ha)	NASHYD (Undeveloped)			STANDHYD (Developed)								
						Impervious					Pervious			
			CN/C	Ia (mm)	Tp (hrs)	XIMP	TIMP	Length (m)	Slope (%)	Ia (mm)	CN	Length (m)	Slope (%)	Ia (mm)
Faulkner Drain														
Fernbank Lands U/S of Fernbank Road	FA1	48.5	80.5	9.8	1.36									
Fernbank Rd. to Flewellyn Rd.	FA2	151	81	9.8	3.14									
Flewellyn Rd. to Fallowfield Rd.	FA3	331	83.2	9.8	3.05									
Monahan Drain														
Fernbank Lands U/S of Terry Fox Drive	1	237	80.5	9.8	3.20									
SohoWest Area 2.4	2.4	52.94				0.35	0.48	1400	0.20	2.00	80.2	35	0.20	9.80
SohoWest Area 2.5	2.5	16.9	80.2	4.67	0.25									
SohoWest Area 2.1	2.1	30.0				0.48	0.57	800	1.50	1.57	80.2	35	1.00	4.67
SohoWest Area 2.3	2.3	31.2				0.48	0.57	800	1.50	1.57	80.2	35	1.00	4.67
SohoWest Area 2.2	2.2	8.25				0.48	0.57	600	0.20	1.57	80.2	35	1.00	4.67
Bridlewood Trails Area 4.1	4.1	10.0				0.34	0.57	350	0.60	1.57	78.1	25	0.60	4.67
Bridlewood Trails Area 4.2	4.2	25				0.38	0.62	500	0.60	1.57	78.1	25	0.60	4.67
Bridlewood Trails Area 4.3	4.3	3.7	78.1	4.67	0.25									
New Englanders Area 4.4	4.4	6.5				0.62	0.69	349	0.20	2.00	78.1	50	0.2	9.8
Area to Constructed Wetlands Cell 4	4.5	15.8				0.62	0.69	349	0.20	2.00	78.1	50	0.2	9.8
Bridlewood Subdivision	3.0	285				0.19	0.31	1900	0.20	2.00	78.3	800	0.2	9.8
Emerald Meadows	5	85				0.21	0.35	1600	0.20	2.00	78.5	50	0.2	9.8
North of Hope Side Road	6	73				0.18	0.30	1800	0.20	2.00	78.5	50	0.2	9.8
North of Hope Side Road	7					0.26	0.43	450	0.20	2.00	78.5	20	0.2	9.8
Monahan West Tributaries Fernbank to Flewellyn	8	285	78.5	9.8	3.40									
Faulkner Trail Branch	9	223	78.6	9.8	2.00									
Southeast of Hope Side Road	13	110	75.7	9.8	1.30									
Monahan East U/S of Fallowfield	12	376	75.4	9.8	2.40									
Confluence w / Flewellyn Drain														
Monahan Tributary East of Richmond Rd.	14	50	75	9.8	0.90									
Monahan at Confluence with Jock River	15	44	75	9.8	0.50									
Flewellyn Drain														
Fernbank Lands U/S of Fernbank Road	10a	157.2	80.5	9.8	2.11									
Fernbank Rd. to Flewellyn Rd.	10b	163.7	80.5	9.8	1.20									
Flewellyn Rd. to Eagleson Rd.	10c	271.8	80.5	9.8	3.49									
Eagleson Rd. to Monahan Drain	10d	144	80.5	9.8	3.09									

Carp River Subwatershed

Post-Development Drainage Areas to SWM Facilities
From Storm Drainage Area Plan 101108-SDA (Master Servicing Study)

Granite Ridge 101-3		***P1 Carp Headwater Pond***		***P2 North Pond***		***P3 South Pond***	
ID	**Area (ha)**	**ID**	**Area (ha)**	**ID**	**Area (ha)**	**ID**	**Area (ha)**
1	36.65	**FOREBAY 1**					
2	8.09	1	3.93	1	4.02	1	9.78
3	1.83	2	4.66	2	5.44	2	9.97
4	3.27	3	9.88	3	6.14	3	17.20
5	0.69	4	4.70	4	7.54	4	13.70
6	1.60		23.17		23.14	5	7.27
7	3.46	**FOREBAY 2**				6	9.28
8	2.59	5	17.52			7	6.77
9	2.53	6	6.98			8	11.21
10	2.22	7	7.94			9	6.50
11	6.60	8	3.87				91.68
	69.53	9	13.43				
		15	4.22				
			53.96				
Dev. Area		Dev. Area	77.13	Dev. Area	23.14	Dev. Area	91.68
Pond Area		Pond Area	4.50	Pond Area	0.99	Pond Area	2.60
Total Area:	**69.53**	**Total Area:**	**81.63**	**Total Area:**	**24.13**	**Total Area:**	**94.28**
C'	**-**		**0.59**		**0.61**		**0.50**
%IMP	**-**		**56%**		**59%**		**43%**
MOE WATER QUALITY REQUIREMENTS							
Qual (m3/ha)			**111**		**115**		**98**
Ext. Det Vol			**3085**		**926**		**3667**
Rel. Rate			**0.036**		**0.011**		**0.042**
PP Vol			**5476**		**1736**		**5317**

Post-Development Subcatchments: SWMHYMO Modeling Parameters
Refer to Figure 8.1 (Main Report)

ID	**Area (ha)**	**Impervious XIMP**	**Impervious TIMP**	**CN**	**Major Storage**	**Minor Flow**
P1	77.13	0.45	0.56	80.5	3,857	7.71
SWM1	4.50	-	-	90	-	-
P2	23.14	0.47	0.59	80.5	1,157	2.31
SWM2	0.99	-	-	90	-	-
P3	91.68	0.34	0.43	80.5	4,584	9.17
SWM3	2.60	-	-	90	-	-

Major system storage modeled at 50 m3/ha (road sags on residential streets)
Minor system capture rate modeled at 100 L/s/ha

Jock River Subwatershed

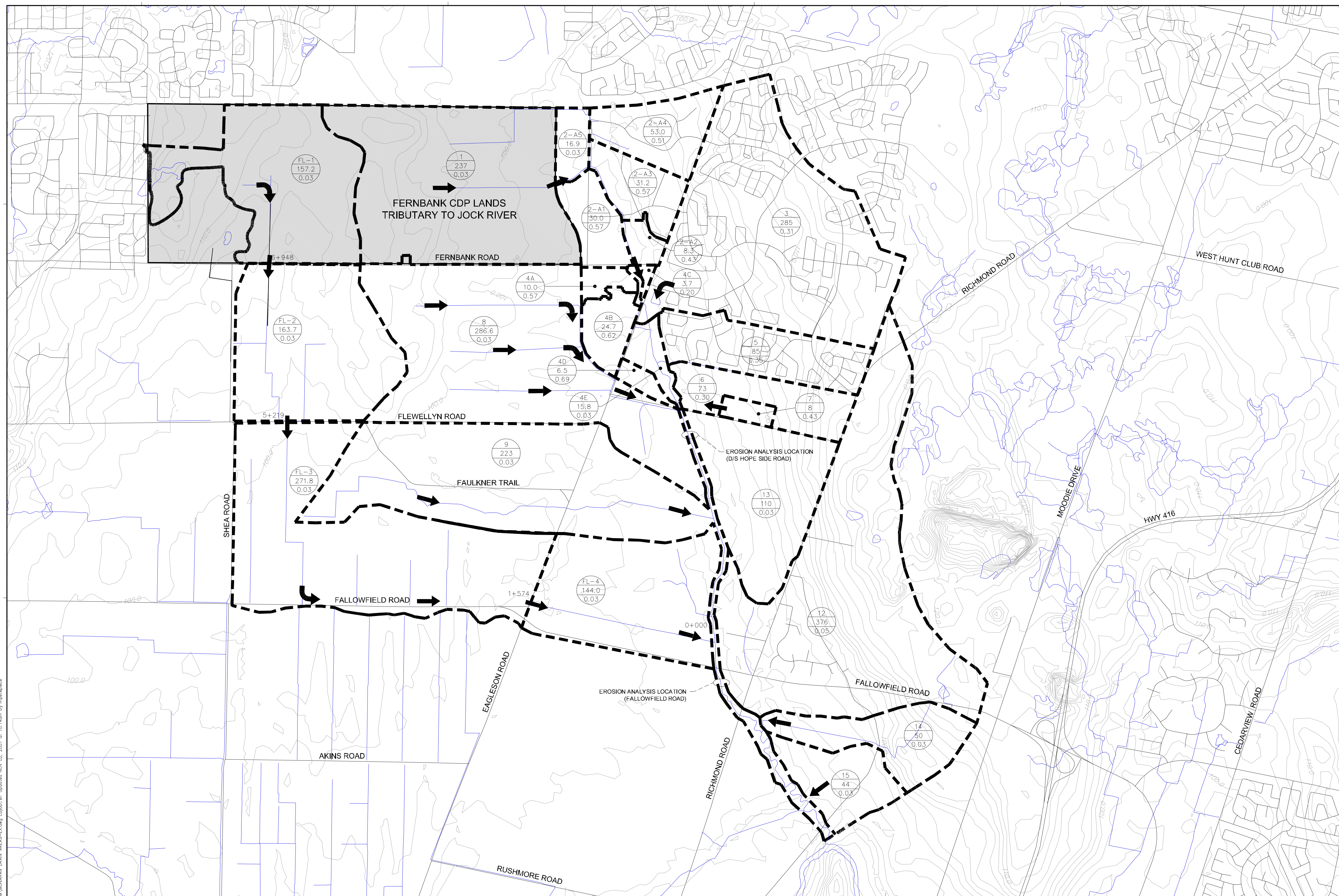
Post-Development Drainage Areas to SWM Facilities
From Storm Drainage Area Plan 101108-SDA (Master Servicing Study)

P4 Faulkner Drain		***P5 Flewellyn Drain***		***P6 Monahan Headwater***		***P7 Monahan North***		***P8 Monahan South***	
ID	**Area (ha)**	**ID**	**Area (ha)**	**ID**	**Area (ha)**	**ID**	**Area (ha)**	**ID**	**Area (ha)**
FOREBAY 1 (P4a)		**FOREBAY 1 (P5a)**		**FOREBAY 1 (P6a)**		**FOREBAY 1 (P7)**		**FOREBAY 1 (P8)**	
1	8.70	1	14.11	1	12.75	1	12.99	1	8.15
2	5.06	2	5.08	2	9.42	2	9.49	2	15.58
3	3.76	3	3.57	3	6.33	3	5.80	3	6.26
4	10.20	4	3.43	4	8.41	4	14.81	4	16.78
5	9.56	5	8.25	5	7.33		43.09	5	8.69
6	5.33	6	2.83	6	11.67			6	7.11
	42.61	7	7.10		55.91				62.57
			44.37						
				FOREBAY 2 (P6b)					
FOREBAY 2 (P4b)		**FOREBAY 2 (P5b)**		7	10.97				
7	9.74	8	9.51	8	11.82				
8	5.59	9	7.29	9	13.92				
	15.33	10	8.94	10	6.03				
		11	10.39		42.74				
		12	8.95						
		13	6.88						
		14	11.94						
		15	2.78						
		16	7.97						
		17	7.76						
		18	7.73						
		19	4.05						
			94.19						
Dev. Area	57.94	Dev. Area	138.56	Dev. Area	98.65	Dev. Area	43.09	Dev. Area	62.57
Pond Area	3.61	Pond Area	7.72	Pond Area	4.75	Pond Area	3.35	Pond Area	4.06
Total Area:	**61.55**	**Total Area:**	**146.28**	**Total Area:**	**103.40**	**Total Area:**	**46.44**	**Total Area:**	**66.63**
'C'	**0.51**		**0.48**		**0.54**		**0.45**		**0.57**
%IMP	**44%**		**40%**		**49%**		**36%**		**53%**
MOE WATER QUALITY REQUIREMENTS									
Qual (m3/ha)	**163**		**153**		**178**		**142**		**185**
Ext. Det Vol	**2318**		**5542**		**3946**		**1724**		**2503**
Rel. Rate	**0.027**		**0.064**		**0.046**		**0.020**		**0.029**
PP Vol	**7127**		**15657**		**13614**		**4395**		**9073**

Post-Development Subcatchments: SWMHYMO Modeling Parameters
Refer to Figure 8.1 (Main Report)

ID	**Area (ha)**	**Impervious XIMP**	**Impervious TIMP**	**CN**	**Major Storage**	**Minor Flow**
P4a	42.61	0.35	0.44	80.5	2,131	4.26
P4b	15.33	0.35	0.44	80.5	767	1.53
SWM4	3.61	-	-	90	-	-
P5a	44.37	0.32	0.40	80.5	2,219	4.44
P5b	94.19	0.32	0.40	80.5	4,710	9.42
SWM5	7.72	-	-	90	-	-
P6a	55.91	0.39	0.49	80.5	2,796	5.59
P6b	42.74	0.39	0.49	80.5	2,137	4.27
SWM6	4.75	-	-	90	-	-
P7	43.09	0.29	0.36	78	2,155	4.31
SWM7	3.35	-	-	90	-	-
P8	62.57	0.42	0.53	78	3,129	6.26
SWM8	4.06	-	-	90	-	-

Major system storage modeled at 50 m3/ha (road sags on residential streets)
Minor system capture rate modeled at 100 L/s/ha



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1	ISSUED W/FERNBANK CDP EXISTING CONDITIONS MODEL	NOV 02/07	MJP

LICENSED PROFESSIONAL ENGINEER M.J. PETEPIECE 100079354 PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email novainfo@novatech-eng.com

DESIGN MJP
CHECKED
DRAWN MJP
CHECKED
APPROVED

SCALE 1:12000

CITY OF OTTAWA
Monahan Drain Watershed
SWMHYMO Modeling Parameters
Fernbank CDP
Existing Conditions

PROJECT No. 103031
DATE NOVEMBER 2007
DRAWING No. 101108-MD1

Drawing:N:\2001\101108\CAD\SWM\MONAHAN DRAIN AREAS-EX.dwg Layout:B1 Updated NOV 02, 2007 at 10:14am by mpetepiece

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2
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*%   #####       FERNBANK CDP: EMP - MARCH 2008        #####
*%   #####  CONTINUOUS SIMULATION (30 MINUTE TIMESTEP) #####
*%
*%   REFERENCE DRAINAGE AREA PLANS:
*%   ------------------------------
*%   EX CONDITIONS-GRANITERIDGE.pdf
*%
*%=========================================================================|
*                           EVENT BASED SIMULATION
*%=========================================================================|
START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                   C25mm-3.stm
*
READ STORM         STORM_FILENAME=["storm.001"]
*%=========================================================================|
DEFAULT VALUES     ICASEdef=[1],  read and print values
                   DEFVAL_FILENAME=["ottawa.def"]
*
COMPUTE API        APII=[20], APIK=[0.9]/day
*%-----------------|-------------------------------------------------------|
*% LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
*% FROM GRANITE RIDGE SUBDIVISION STORMWATER SITE MANAGEMENT PLAN:
*% Refer to Drawing 94-1029-SP3 (Simmering & Associates Ltd.)
*% -------------------------------------------------------------
* Granite Ridge Subdivision
* ------------------------
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                                        LGP=[40](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
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                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
* Business Employment Area
* -----------------------
CONTINUOUS STANDHYD ID=[3], NHYD=["2"], DT=[5]min, AREA=[8.09](ha),
                   XIMP=[0.8], TIMP=[0.8], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[180](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                        LGI=[550](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
ADD HYD            IDsum=[1], NHYD=["1+2"], IDs to add=[2,3]
*%-----------------|-------------------------------------------------------|
* Abbott Street
* ---------------
CONTINUOUS STANDHYD ID=[4], NHYD=["3"], DT=[5]min, AREA=[1.83](ha),
                   XIMP=[0.55], TIMP=[0.55], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[2](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.4](%),
                                        LGI=[900](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
ROUTE CHANNEL      IDout=[5], NHYD=["rt3"], IDin=[4],
                   RDT=[5](min), CHLGTH=[200](m),  CHSLOPE=[0.24](%),
                   FPSLOPE=[0.24](%), SECNUM=[101], NSEG=[3]
                   (SEGROUGH, SEGDIST (m))=[.06,3.5 -.06,4.5 .06,6.3] NSEG time
                   (DISTANCE (m), ELEVATION (m))=[0.0,104.2
                                                  1.0,104.2
                                                  2.0,103.5
                                                  3.5,103.0
                                                  4.5,103.0
                                                  6.3,104.0]
*%-----------------|-------------------------------------------------------|
* Iber Road (Southwest Section)
* ----------------------------
CONTINUOUS STANDHYD ID=[6], NHYD=["5"], DT=[5]min, AREA=[0.69](ha),
                   XIMP=[0.55], TIMP=[0.55], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[35](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.24](%),
                                        LGI=[230](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
* Industrial Area West of Iber
* & South of SWMF
* -----------------------------
CONTINUOUS STANDHYD ID=[2], NHYD=["4"], DT=[5]min, AREA=[3.27](ha),
                   XIMP=[0.55], TIMP=[0.55], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[135](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                        LGI=[220](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR    IDout=[7],   NHYD=["res4"],  IDin=[2],
                   RDT=[5](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                  [  0.0, 0.0  ]
                                  [0.091, 0.045]
                                  [0.183, 0.074]
                                  [ -1  ,  -1  ]  (max twenty pts)
*%-----------------|-------------------------------------------------------|
ADD HYD            IDsum=[2], NHYD=["Ab+Ibr"], IDs to add=[5,6,7]
*%-----------------|-------------------------------------------------------|
ADD HYD            IDsum=[3], NHYD=["GranIb"], IDs to add=[1,2]
*%-----------------|-------------------------------------------------------|
* Granite Ridge North
* -------------------
CONTINUOUS STANDHYD ID=[4], NHYD=["6"], DT=[5]min, AREA=[1.6](ha),
                   XIMP=[0.01], TIMP=[0.35], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[55](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[1.25](%),
                                        LGI=[250](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
ROUTE CHANNEL      IDout=[5], NHYD=["rt6"], IDin=[4],
                   RDT=[5](min), CHLGTH=[350](m), CHSLOPE=[0.4](%),
                   FPSLOPE=[0.4](%), SECNUM=[100], NSEG=[3]
                   (SEGROUGH, SEGDIST (m))=[.1,3.8 -.1,4.5 .1,7.2] NSEG times
                   ( DISTANCE (m), ELEVATION (m))=[0.0,104.75
                                                   1.2,104.5
                                                   1.8,104.25
                                                   3.8,103.69
                                                   4.5,103.69
                                                   5.4,104.25
                                                   6.0,104.5
                                                   7.2,104.75]
*%-----------------|-------------------------------------------------------|
* Industrial Area West of Iber
* & North of SWMF
* -----------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["7"], DT=[5]min, AREA=[3.46](ha),
                   XIMP=[0.55], TIMP=[0.55], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[150](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                        LGI=[250](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR    IDout=[6],   NHYD=["res7"],  IDin=[1], RDT=[5](min),
                   TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                  [ 0.0 , 0.0 ]
                                  [0.083,0.051]
                                  [0.168,0.085]
                                  [ -1  ,  -1 ]  (max twenty pts)
*%-----------------|-------------------------------------------------------|
ROUTE CHANNEL      IDout=[7], NHYD=["rt7"], IDin=[6],
                   RDT=[5](mim), CHLGTH=[170](m), CHSLOPE=[0.2](%),
                   FPSLOPE=[0.2](%), SECNUM=[102], NSEG=[3]
                   ( SEGROUGH, SEGDIST (m))=[.06,3.5 -.06,4.5 .06,6.3] NSEG tim
                   ( DISTANCE (m), ELEVATION (m))=[0.0,104.2
                                                   1.0,104.2
                                                   2.0,103.5
                                                   3.5,103.0
                                                   4.5,103.0
                                                   6.3,104.0]
*%-----------------|-------------------------------------------------------|
* Harry Douglas Drive @ Iber Road
* ------------------------------
CONTINUOUS STANDHYD ID=[8], NHYD=["8"], DT=[5]min, AREA=[2.59](ha),
                   XIMP=[0.55], TIMP=[0.55], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[2](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.2](%),
                                        LGI=[550](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
* Granite Ridge SWMF & Industrial Block
* ------------------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["9"], DT=[5]min, AREA=[2.53](ha),
                   XIMP=[.55], TIMP=[.55], DWF=[0](cms), LOSS=[2], CN=[77],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                        LGP=[70](m), MNP=[0.25], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                        LGI=[150](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR    IDout=[9],   NHYD=["res9"],  IDin=[1],
                   RDT=[5](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                     [ 0.0 , 0.0 ]
                                     [0.061,0.038]
                                     [0.123,0.063]
                                     [ -1  , -1  ]  (max twenty pts)
*%-----------------|-------------------------------------------------------|
ADD HYD            IDsum=[4], NHYD=["GR-IN"], IDs to add=[3+5+7+8+9]
*%-----------------|-------------------------------------------------------|
*% GRANITE RIDGE SWM FACILITY
*% -------------------------
ROUTE RESERVOIR    IDout=[1], NHYD=["GR-OUT"], IDin=[4],
                   RDT=[5](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                     [ 0.0 ,  0.0 ]
                                     [0.025,0.0979]
                                     [0.038,0.1984]
                                     [0.218,0.3092]
                                     [0.393,0.4222]
                                     [0.557,0.5374]
                                     [0.719,0.6549]
                                     [0.875,0.7634]
                                     [1.043,0.8808]
                                     [1.199,1.0006]
                                     [1.351,1.1226]
                                     [1.516,1.2470]
```

```
                                      [1.663,1.3737]
                                      [1.826,1.5028]
                                      [ -1  ,  -1  ]  (max twenty pts)
*%-----------------|----------------------------------------------------------|
* East Side of Iber Road
* -----------------------
CONTINUOUS STANDHYD ID=[5], NHYD=["10"], DT=[5]min, AREA=[2.22](ha),
                    XIMP=[.55], TIMP=[.55], DWF=[0](cms), LOSS=[2], CN=[77],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                         LGP=[2](m), MNP=[0.25], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.2](%),
                                         LGI=[330](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%-----------------|----------------------------------------------------------|
* Industrial Area East of Iber
* ------------------------------
CONTINUOUS STANDHYD ID=[3], NHYD=["11"], DT=[5]min, AREA=[6.60](ha),
                    XIMP=[.55], TIMP=[.55], DWF=[0](cms), LOSS=[2], CN=[77],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[2.0](%),
                                         LGP=[100](m), MNP=[0.25], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[330](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%-----------------|----------------------------------------------------------|
ROUTE RESERVOIR     IDout=[6],   NHYD=["res11"],  IDin=[3],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                      [ 0.0 ,  0.0]
                                      [0.151,0.099]
                                      [0.303,0.164]
                                      [ -1  ,  -1 ]  (max twenty pts)
*%-----------------|----------------------------------------------------------|
ADD HYD             IDsum=[7], NHYD=["EIbInd"], IDs to add=[5,6]
*%-----------------|----------------------------------------------------------|
* Area 101-3 is equivalent to Area GR1-11 from
* Carp River, Poole Creek and Feedmill Creek Report (CH2MHill, June 2006)
* ---------------------------------------------------------------------
ADD HYD             IDsum=[9], NHYD=["101-3"], IDs to add=[1,7]
*
SAVE HYD            ID=[9],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["GRANITE RIDGE AREA 101-3"]
*%-----------------|----------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*                    S2-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[3]
*                    S5-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[4]
*                    S10-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*                    S25-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[6]
*                    S50-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[7]
*                    S100-24.stm
*%-----------------|----------------------------------------------------------|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[8]
                    S2-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[9]
                    S5-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[10]
                    S10-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[11]
                    S25-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[12]
                    S50-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[13]
                    S100-12.stm
*%-----------------|----------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[14]
*                    C2-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[15]
*                    C5-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[16]
*                    C10-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[17]
*                    C25-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[18]
*                    C50-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[19]
*                    C100-3.stm
*%-----------------|----------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[20]
*                    C25mm-3.stm
*%-----------------|----------------------------------------------------------|
FINISH
```

```
==============================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M  OOO       999    888 =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  8   8 =========
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  8   8 Ver. 4.0
     S  W W    M   M  H   H    Y    M   M  O   O      9999   888  Sept 1998
 SSSSS   W W   M   M  H   H    Y    M   M   OOO          9  8   8 =========
                                                      9   9  8   8 # 5320763
      StormWater Management HYdrologic Model         999    888 =========

 *************************************************************************
 ************************** SWMHYMO-98  Ver/4.0 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******      based on the principles of HYMO and its successors     *******
 *******                 OTTHYMO-83 and OTTHYMO-89.                  *******
 *************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199          *******
 *******                  Gatineau, Quebec: (819) 243-6858          *******
 *******                  E-Mail: swmhymo@jfsa.Com                  *******
 *************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD        +++++++
 +++++++                 Nepean             SERIAL#:5320763         +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 *************************************************************************
 *******         ++++++ PROGRAM ARRAY DIMENSIONS ++++++              *******
 *******         Maximum value for ID numbers  :     10              *******
 *******         Max. number of rainfall points:  15000              *******
 *******         Max. number of flow points    :  15000              *******
 *************************************************************************

 *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
 ***---------------------------------------------------------------------***
 ***     ID:  Hydrograph IDentification numbers, (1-10).                 ***
 ***   NHYD:  Hydrograph reference numbers, (6 digits or characters).    ***
 ***   AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  ***
 *** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).     ***
 *** TpeakDate_hh:mm is the date and time of the peak flow.              ***
 ***   R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       ***
 ***   R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       ***
 ***      *:  see WARNING or NOTE message printed at end of run.         ***
 ***     **:  see  ERROR  message printed at end of run.                 ***
 *************************************************************************
 *************************************************************************

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

 *************************************************************************

 ********************    S U M M A R Y   O U T P U T    ********************
 *************************************************************************
 *       DATE: 2009-05-08     TIME: 15:57:56     RUN COUNTER: 001425      *
 *************************************************************************
 * Input   filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\GRdt5.d*
 * Output  filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\GRdt5.o*
 * Summary filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\GRdt5.s*
 * User comments:                                                          *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 *************************************************************************

 RUN:COMMAND#
 013:0001----------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =  13 ]
 013:0002----------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = City of Ottawa:  100yr-12hr SCS Type II (10 min time step)
      [SDT=10.00:SDUR=  12.00:PTOT=  93.91]
 013:0003----------------------------------------------------------------------
     DEFAULT VALUES
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\ottawa.def
      ICASEdv  = 1 (read and print data)
      FileTitle= ------ ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
                 ------ PARAMETER VALUES MUST BE ENTERD AFTER COLUMN 60 ----
      Horton's infiltration equation parameters:
      [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F=  .00 mm]
      Parameters for PERVIOUS surfaces in STANDHYD:
      [IAper=   4.67 mm] [LGP=40.00 m] [MNP= .250]
      Parameters for IMPERVIOUS surfaces in STANDHYD:
      [IAimp=   1.57 mm] [CLI= 1.50]   [MNI= .013]
      Parameters used in NASHYD:
      [Ia=   4.67 mm] [N= 2.00]
 013:0004----------------------------------------------------------------------
     COMPUTE API
      [APIini= 20.00: APIkdy= .9000: APIkdt= .9993]
      {APImax=110.44: APIavg= 66.21: APImin= 20.46}
 013:0005--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD02:1         36.65    5.765 No_date    6:00   74.75 .796
      [XIMP=.20:TIMP=.35]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  40.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 550.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0006--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD03:2          8.09    1.483 No_date    6:00   87.10 .928
      [XIMP=.80:TIMP=.80]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP= 180.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 550.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0007--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            02:1         36.65    5.765 No_date    6:00   74.75  n/a
                      + 03:2          8.09    1.483 No_date    6:00   87.10  n/a
      [DT= 5.00]  SUM=  01:1+2       44.74    7.248 No_date    6:00   76.98  n/a
 013:0008--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD04:3          1.83     .307 No_date    6:05   80.55 .858
```

```
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=   2.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .40:LGI= 900.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0009--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 04:3          1.83     .307 No_date    6:05   80.55  n/a
      [RDT= 5.00] out<- 05:rt3        1.83     .279 No_date    6:10   80.55  n/a
      [L/S/n=  200./ .240/.060]
      {Vmax=  .365:Dmax=  .419}
 013:0010--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD06:5           .69     .128 No_date    6:00   80.55 .858
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  35.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .24:LGI= 230.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0011--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD02:4          3.27     .541 No_date    6:00   80.55 .858
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP= 135.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 220.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0012--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 02:4          3.27     .541 No_date    6:00   80.55  n/a
  *   [RDT= 5.00] out<- 07:res4       3.27     .235 No_date    6:30   80.55  n/a
      {MxStoUsed=.9036E-01}
 013:0013--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            05:rt3        1.83     .279 No_date    6:10   80.55  n/a
                      + 06:5           .69     .128 No_date    6:00   80.55  n/a
                      + 07:res4       3.27     .235 No_date    6:30   80.55  n/a
      [DT= 5.00]  SUM=  02:Ab+Ibr     5.79     .578 No_date    6:05   80.55  n/a
 013:0014--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            01:1+2       44.74    7.248 No_date    6:00   76.98  n/a
                      + 02:Ab+Ibr     5.79     .578 No_date    6:05   80.55  n/a
      [DT= 5.00]  SUM=  03:GranIb    50.53    7.803 No_date    6:00   77.39  n/a
 013:0015--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  *  CONTINUOUS STANDHYD04:6          1.60     .270 No_date    6:00   74.33 .792
      [XIMP=.01:TIMP=.35]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  55.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=1.25:LGI= 250.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0016--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 04:6          1.60     .270 No_date    6:00   74.33  n/a
      [RDT= 5.00] out<- 05:rt6        1.60     .197 No_date    6:10   74.33  n/a
      [L/S/n=  350./ .400/.100]
      {Vmax=  .288:Dmax=  .480}
 013:0017--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:7          3.46     .566 No_date    6:00   80.55 .858
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP= 150.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 250.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0018--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 01:7          3.46     .566 No_date    6:00   80.55  n/a
  *   [RDT= 5.00] out<- 06:res7       3.46     .219 No_date    6:35   80.55  n/a
      {MxStoUsed=.1058E+00}
 013:0019--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 06:res7       3.46     .219 No_date    6:35   80.55  n/a
      [RDT= 5.00] out<- 07:rt7        3.46     .215 No_date    6:40   80.55  n/a
      [L/S/n=  170./ .200/.060]
      {Vmax=  .312:Dmax=  .371}
 013:0020--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD08:8          2.59     .445 No_date    6:00   80.55 .858
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=   2.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .20:LGI= 550.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0021--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  *  CONTINUOUS STANDHYD01:9          2.53     .468 No_date    6:00   80.55 .858
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=  70.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 150.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0022--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 01:9          2.53     .468 No_date    6:00   80.55  n/a
  *   [RDT= 5.00] out<- 09:res9       2.53     .170 No_date    6:25   80.55  n/a
      {MxStoUsed=.8196E-01}
 013:0023--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            03:GranIb    50.53    7.803 No_date    6:00   77.39  n/a
                      + 05:rt6        1.60     .197 No_date    6:10   74.33  n/a
                      + 07:rt7        3.46     .215 No_date    6:40   80.55  n/a
                      + 08:8          2.59     .445 No_date    6:00   80.55  n/a
                      + 09:res9       2.53     .170 No_date    6:25   80.55  n/a
      [DT= 5.00]  SUM=  04:GR-IN     60.71    8.650 No_date    6:00   77.76  n/a
 013:0024--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 04:GR-IN     60.71    8.650 No_date    6:00   77.76  n/a
  *   [RDT= 5.00] out<- 01:GR-OUT    60.71    2.623 No_date    6:55   77.76  n/a
      {MxStoUsed=.2136E+01}
 013:0025--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD05:10         2.22     .427 No_date    6:00   80.55 .858
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP=   2.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .20:LGI= 330.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
 013:0026--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD03:11         6.60    1.130 No_date    6:00   80.55 .858
      [XIMP=.55:TIMP=.55]
      [LOSS= 2 :CN= 77.0]
      [Pervious     area: IAper= 4.67:SLPP=2.00:LGP= 100.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 330.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 31.15: SMAX=207.66: SK=1.000]
```

```
 013:0027---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 03:11         6.60    1.130 No_date    6:00   80.55  n/a
  *   [RDT= 5.00] out<- 06:res11      6.60     .416 No_date    6:35   80.55  n/a
     {MxStoUsed=.2128E+00}
 013:0028---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            05:10         2.22     .427 No_date    6:00   80.55  n/a
                     +  06:res11      6.60     .416 No_date    6:35   80.55  n/a
      [DT= 5.00]  SUM=  07:EIbInd     8.82     .723 No_date    6:05   80.55  n/a
 013:0029---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            01:GR-OUT    60.71    2.623 No_date    6:55   77.76  n/a
                     +  07:EIbInd     8.82     .723 No_date    6:05   80.55  n/a
      [DT= 5.00]  SUM=  09:101-3     69.53    3.093 No_date    6:45   78.11  n/a
 013:0030---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           09:101-3     69.53    3.093 No_date    6:45   78.11  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-101-3.013
      remark:GRANITE RIDGE AREA 101-3
 013:0002-----------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 013:0012 ROUTE RESERVOIR
      *** WARNING: STORAGE-Q values were extrapolated.
                   Increase curve or use overflow option.
 013:0015 CONTINUOUS STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 013:0018 ROUTE RESERVOIR
      *** WARNING: STORAGE-Q values were extrapolated.
                   Increase curve or use overflow option.
 013:0021 CONTINUOUS STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 013:0022 ROUTE RESERVOIR
      *** WARNING: STORAGE-Q values were extrapolated.
                   Increase curve or use overflow option.
 013:0024 ROUTE RESERVOIR
      *** WARNING: STORAGE-Q values were extrapolated.
                   Increase curve or use overflow option.
 013:0027 ROUTE RESERVOIR
      *** WARNING: STORAGE-Q values were extrapolated.
                   Increase curve or use overflow option.
   Simulation ended on 2009-05-08     at 15:58:00
================================================================================
```

```
2
*%=========================================================================|
*%
*%   #####    INPUT FILE FOR CARP RIVER, CITY OF KANATA   #####
*%   #####  FERNBANK CDP: EXISTING CONDITIONS - MAY 2009  #####
*%
*%
*%   DESIGN STORM NAMING CONVENTION:
*%   ------------------------------
*%   Sxxx-24.stm   24hr SCS storm
*%   Sxxx-12.stm   12hr SCS storm
*%   Axxx1230.stm  12hr AES storm (30% Distribution)
*%   RSxxxd10.stm  10day rain on snow event
*%
*%   REFERENCE DRAINAGE AREA PLANS:
*%   -----------------------------
*%   EX CONDITIONS-FERNBANK CDP.pdf
*%=========================================================================|
*                           EVENT BASED SIMULATION
*%=========================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    C25mm-3.stm
*
READ STORM          STORM_FILENAME=["storm.001"]
*%=========================================================================|
DEFAULT VALUES      ICASEdef=[1],  read and print values
                    DEFVAL_FILENAME=["ottawa.def"]
*
COMPUTE API         APII=[20], APIK=[0.9]/day
*%----------------|--------------------------------------------------------|
*% LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
*% -------------------------------------------------
READ HYD            ID=[9],  NHYD=["101-3"],
                    HYD_FILENAME=["H-101-3"]
*%----------------|--------------------------------------------------------|
*% FERNBANK COMMUNITY LANDS TO CARP RIVER TRIBUTARY
*% (GLEN CAIRN SWMF OUTLET CHANNEL)
*% ---------------------------------------------
CONTINUOUS NASHYD   ID=1  NHYD="101-2"  DT=  5.0  AREA= 88.6  HA
                    DWF= 0  CN= 82  IA= 9.8  N=3  TP=2.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*%----------------|--------------------------------------------------------|
* TOTAL FLOW IN CARP RIVER TRIBUTARY AT CARP RIVER
* ---------------------------------------------
ADD HYD             IDsum=[2], NHYD=["101-2"], IDs to add=[9,1]
*%----------------|--------------------------------------------------------|
SAVE HYD            ID=[2],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["Carp Tributary @ Carp River"]
*%----------------|--------------------------------------------------------|
* FERNBANK COMMUNITY LANDS TO SOUTH TRIBUTARY
* (CHANNEL FLOWING NORTH ADJACENT TO GLEN CAIRN POND)
* ------------------------------------------------
CONTINUOUS NASHYD   ID=[3], NHYD=["500"] DT=[5]min, AREA=[77.9](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=3  TP=1.30
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*%----------------|--------------------------------------------------------|
* HEC-RAS inflow hydrograph @ 44751
* NODE 2054
* ------------------------------------
ADD HYD             IDsum=[10], NHYD=["2054"], IDs to add=[2,3]
*
SAVE HYD            ID=[10],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 2054 / Station 44751"]
*%----------------|--------------------------------------------------------|
*% LAND DRAINING TO CARP RIVER @ HAZELDEAN RD (Section 44548)
*% (28/35/36)
*% ---------------------------------------------------------------
CONTINUOUS NASHYD   ID=[3], NHYD=["3536"] DT=[5]min, AREA=[32.52](ha),
                    DWF=[0](cms),  CN/C=[70], IA=[9.8](mm),
                    N=[3], TP=[1.10]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.2]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
SAVE HYD            ID=[3],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["Areas 35 & 36"]
*
CONTINUOUS NASHYD   ID=[4], NHYD=["CRFP"] DT=[5]min, AREA=[24.18](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=2  TP=0.50
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
SAVE HYD            ID=[4],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["CRFP"]
*
CONTINUOUS STANDHYD ID=[5], NHYD=["28"], DT=[5](min), AREA=[12.5](ha),
                    XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
                    Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4](/hr), F=[0](mm),
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.0](%),
                    LGP=[205](m), MNP=[0.10], SCP=[0](min),
                    Impervious surfaces:IAimp=[1.57](mm), SLPI=[1.0](%),
                                        LGI=[700](m), MNI=[0.013], SCI=[0](min),
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
SAVE HYD            ID=[5],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["Area 28-Westcreek Meadows"]
*%----------------|--------------------------------------------------------|
* HEC-RAS inflow hydrograph @ 44548
* NODE 2065
* ------------------------------------
ADD HYD             IDsum=[6], NHYD=["2065"], IDs to add=[3,4,5]
*
SAVE HYD            ID=[6],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 2065 / Station 44548"]
*%----------------|--------------------------------------------------------|
*% LANDS UPSTREAM OF HAZELDEAN ROAD TRIBUTARY TO HAZELDEAN CREEK
*% (INCLUDES NORTHWEST CORNER OF FERNBANK CDP LANDS)
*% ------------------------------------------------------------
CONTINUOUS STANDHYD ID=[7], NHYD=["100-1"], DT=[5](min), AREA=[62.17](ha),
                    XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
                    Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4](/hr), F=[0](mm),
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.8](%),
                    LGP=[1200](m), MNP=[0.10], SCP=[0](min),
                    Impervious surfaces:IAimp=[1.57](mm), SLPI=[0.8](%),
                                        LGI=[1700](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|--------------------------------------------------------|
*% LANDS NORTH OF HAZELDEAN ROAD - TO HAZELDEAN CREEK
*% (USED IN MODEL CALIBRATION)
*% ----------------------------------------------
CONTINUOUS NASHYD   ID=[8], NHYD=["102-1"], DT=[5]min, AREA=[39.8](ha),
                    DWF=[0](cms),  CN/C=[78], IA=[9.8](mm),
                    N=[2], TP=[1.10]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*%----------------|--------------------------------------------------------|
* HEC-RAS inflow hydrograph @ 43966
* NODE 3894
* ------------------------------------
ADD HYD             IDsum=[9], NHYD=["3894"], IDs to add=[7,8]
*
SAVE HYD            ID=[9],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 3894 / Station 43966"]
*%----------------|--------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*                    S2-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[3]
*                    S5-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[4]
*                    S10-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*                    S25-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[6]
*                    S50-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[7]
*                    S100-24.stm
*%----------------|--------------------------------------------------------|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[8]
                    S2-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[9]
                    S5-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[10]
                    S10-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[11]
                    S25-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[12]
                    S50-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[13]
                    S100-12.stm
*%----------------|--------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[14]
*                    C2-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[15]
*                    C5-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[16]
*                    C10-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[17]
*                    C25-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[18]
*                    C50-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[19]
*                    C100-3.stm
*%----------------|--------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[20]
*                    C25mm-3.stm
*%----------------|--------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[13]
*                    A21230.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[14]
*                    A51230.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[15]
*                    A101230.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[16]
*                    A251230.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[17]
*                    A501230.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[18]
*                    A1001230.stm
*%----------------|--------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[19]
*                    RS2d10.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[20]
*                    RS5d10.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[21]
*                    RS10d10.stm
```

```
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[22]
*                   RS25d10.stm
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[23]
*                   RS50d10.stm
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[24]
*                   RS100d10.stm
*%-----------------|-----------------------------------------------------------|
FINISH
```

```
===========================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999   888 =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  8   8 =========
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  8   8 Ver. 4.0
     S   W W   M   M  H   H    Y    M   M  O   O       9999   888  Sept 1998
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9  8   8 =========
                                                      9   9  8   8 # 5320763
      StormWater Management HYdrologic Model           999   888 =========

 *************************************************************************
 ************************** SWMHYMO-98  Ver/4.0 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******      based on the principles of HYMO and its successors      *******
 *******                 OTTHYMO-83 and OTTHYMO-89.                  *******
 *************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
 *******                 Ottawa,  Ontario: (613) 727-5199             *******
 *******                 Gatineau, Quebec: (819) 243-6858             *******
 *******                 E-Mail: swmhymo@jfsa.Com                     *******
 *************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD        +++++++
 +++++++               Nepean              SERIAL#:5320763          +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 *************************************************************************
 *******           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *******
 *******           Maximum value for ID numbers  :     10            *******
 *******           Max. number of rainfall points:  15000            *******
 *******           Max. number of flow points    :  15000            *******
 *************************************************************************

 *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
 ***-------------------------------------------------------------------***
 ***     ID:  Hydrograph IDentification numbers, (1-10).                 ***
 ***  NHYD:  Hydrograph reference numbers, (6 digits or characters).     ***
 ***  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).   ***
 *** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).     ***
 *** TpeakDate_hh:mm is the date and time of the peak flow.              ***
 ***  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).        ***
 ***  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).        ***
 ***     *:  see WARNING or NOTE message printed at end of run.          ***
 ***    **:  see  ERROR  message printed at end of run.                  ***
 *************************************************************************
 *************************************************************************

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 *************************************************************************

 *********************   S U M M A R Y   O U T P U T   *********************
 *************************************************************************
 *       DATE: 2009-05-08     TIME: 15:58:16     RUN COUNTER: 001426      *
 *************************************************************************
 * Input   filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\CR-EX.d*
 * Output  filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\CR-EX.o*
 * Summary filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\CR-EX.s*
 * User comments:                                                          *
 * 1:______________________________________________________________________*
 * 2:______________________________________________________________________*
 * 3:______________________________________________________________________*
 *************************************************************************

 RUN:COMMAND#
 013:0001------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =  13 ]
 013:0002------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = City of Ottawa:  100yr-12hr SCS Type II (10 min time step)
      [SDT=10.00:SDUR=  12.00:PTOT=  93.91]
 013:0003------------------------------------------------------------------
     DEFAULT VALUES
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\ottawa.def
      ICASEdv  = 1 (read and print data)
      FileTitle= ------ ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
                 ------ PARAMETER VALUES MUST BE ENTERD AFTER COLUMN 60 ----
      Horton's infiltration equation parameters:
      [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F=  .00 mm]
      Parameters for PERVIOUS surfaces in STANDHYD:
      [IAper=   4.67 mm] [LGP=40.00 m] [MNP= .250]
      Parameters for IMPERVIOUS surfaces in STANDHYD:
      [IAimp=   1.57 mm] [CLI= 1.50]   [MNI= .013]
      Parameters used in NASHYD:
      [Ia=   4.67 mm] [N= 2.00]
 013:0004------------------------------------------------------------------
     COMPUTE API
      [APIini= 20.00: APIkdy= .9000: APIkdt= .9993]
      {APImax=110.44: APIavg= 66.21: APImin= 20.46}
 013:0005--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     READ HYD           09:101-3     69.53    3.093 No_date    6:45   78.11  n/a
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-101-3.013
      Comment  = GRANITE RIDGE AREA 101-3
 013:0006--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  01:101-2     88.60    3.012 No_date    8:25   65.86 .701
      [CN= 82.0: N= 3.00]
      [Tp= 2.25:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
      [InterEventTime=  12.00]
 013:0007--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            09:101-3     69.53    3.093 No_date    6:45   78.11  n/a
                     +  01:101-2     88.60    3.012 No_date    8:25   65.86  n/a
      [DT= 5.00]  SUM=  02:101-2    158.13    5.427 No_date    7:45   71.25  n/a
 013:0008--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           02:101-2    158.13    5.427 No_date    7:45   71.25  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-101-2.013
      remark:Carp Tributary @ Carp River
 013:0009--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  03:500       77.90    4.076 No_date    7:15   65.86 .701
      [CN= 82.0: N= 3.00]
      [Tp= 1.30:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
      [InterEventTime=  12.00]
 013:0010--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            02:101-2    158.13    5.427 No_date    7:45   71.25  n/a
                     +  03:500       77.90    4.076 No_date    7:15   65.86  n/a
      [DT= 5.00]  SUM=  10:2054     236.03    9.401 No_date    7:25   69.47  n/a
 013:0011--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           10:2054     236.03    9.401 No_date    7:25   69.47  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-2054.013
      remark:HEC-RAS Inflow Node 2054 / Station 44751
 013:0012--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  03:3536      32.52    1.584 No_date    7:10   55.04 .586
      [CN= 70.0: N= 3.00]
      [Tp= 1.10:DT= 5.00]
      [IaREC= 4.00: SMIN= 43.07: SMAX=287.10: SK= .200]
      [InterEventTime=  12.00]
 013:0013--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           03:3536      32.52    1.584 No_date    7:10   55.04  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-3536.013
      remark:Areas 35 & 36
 013:0014--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  04:CRFP      24.18    1.865 No_date    6:30   65.86 .701
      [CN= 82.0: N= 2.00]
      [Tp=  .50:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
      [InterEventTime=  12.00]
 013:0015--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           04:CRFP      24.18    1.865 No_date    6:30   65.86  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-CRFP.013
      remark:CRFP
 013:0016--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD05:28        12.50    1.740 No_date    6:00   57.94 .617
      [XIMP=.38:TIMP=.45]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=1.00:LGP= 205.:MNP=.100:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=1.00:LGI= 700.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
 013:0017--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           05:28        12.50    1.740 No_date    6:00   57.94  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-28.013
      remark:Area 28-Westcreek Meadows
 013:0018--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            03:3536      32.52    1.584 No_date    7:10   55.04  n/a
                     +  04:CRFP      24.18    1.865 No_date    6:30   65.86  n/a
                     +  05:28        12.50    1.740 No_date    6:00   57.94  n/a
      [DT= 5.00]  SUM=  06:2065      69.20    3.966 No_date    6:20   59.34  n/a
 013:0019--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           06:2065      69.20    3.966 No_date    6:20   59.34  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-2065.013
      remark:HEC-RAS Inflow Node 2065 / Station 44548
 013:0020--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD07:100-1     62.17    4.644 No_date    6:05   57.94 .617
      [XIMP=.38:TIMP=.45]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP= .80:LGP=1200.:MNP=.100:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
 013:0021--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  08:102-1     39.80    1.601 No_date    7:10   61.80 .658
      [CN= 78.0: N= 2.00]
      [Tp= 1.10:DT= 5.00]
      [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
      [InterEventTime=  12.00]
 013:0022--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            07:100-1     62.17    4.644 No_date    6:05   57.94  n/a
                     +  08:102-1     39.80    1.601 No_date    7:10   61.80  n/a
      [DT= 5.00]  SUM=  09:3894     101.97    5.425 No_date    6:05   59.45  n/a
 013:0023--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           09:3894     101.97    5.425 No_date    6:05   59.45  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-EX\H-3894.013
      remark:HEC-RAS Inflow Node 3894 / Station 43966
 013:0002------------------------------------------------------------------
      FINISH
---------------------------------------------------------------------------
***************************************************************************
     WARNINGS / ERRORS / NOTES
      -------------------------
   Simulation ended on 2009-05-08     at 15:58:19
===========================================================================
```

```
2
*%=========================================================================|
*%
*%   #####       INPUT FILE FOR CARP RIVER, CITY OF KANATA        #####
*%   #####  FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009  #####
*%   #####       EVENT BASED MODELING (5 MINUTE TIMESTEP)         #####
*%
*%
*%   REFERENCE DRAINAGE AREA PLANS:
*%   ----------------------------
*%   FIGURE 8.1
*%
*%=========================================================================|
*                          EVENT BASED SIMULATION
*%=========================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    C25mm-3.stm
*
READ STORM          STORM_FILENAME=["storm.001"]
*%=========================================================================|
DEFAULT VALUES      ICASEdef=[1],  read and print values
                    DEFVAL_FILENAME=["ottawa.def"]
*
COMPUTE API         APII=[20], APIK=[0.9]/day
***************************************************************************
*% LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
*% -------------------------------------------------
READ HYD            ID=[9],  NHYD=["101-3"],
                    HYD_FILENAME=["H-101-3"]
*%----------------|--------------------------------------------------------|
*% FERNBANK COMMUNITY LANDS TO CARP RIVER TRIBUTARY
*% (GLEN CAIRN SWMF OUTLET CHANNEL)
*% ---------------------------------------------
* HEADWATER P1
**************
CONTINUOUS STANDHYD ID=[1], NHYD=["P1"], DT=[5](min), AREA=[77.13](ha),
                    XIMP=[0.45], TIMP=[0.56], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.0](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[1400](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[7.71](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P1maj"],
                    MINID=[3], MinNHYD=["P1min"],
                    TMJSTO=[3857](cu-m)
*
CONTINUOUS NASHYD   ID=[4], NHYD=["SWM1"] DT=[5]min, AREA=[4.50](ha),
                    DWF= 0  CN= 90  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["P1in"], IDs to add=[2,3,4,9]
*
ROUTE RESERVOIR     IDout=[2],   NHYD=["P1out"],  IDin=[1],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [  0.000 , 0.000 ]
                                    [  0.050 , 0.499 ]
                                    [  1.500 , 2.030 ]
                                    [  2.500 , 2.810 ]
                                    [  4.500 , 2.920 ]
                                    [  4.800 , 3.500 ]
                                    [  5.000 , 3.930 ]
                                    [  5.300 , 4.500 ]
                                    [    -1  ,   -1  ]   (max twenty pts)
*
CONTINUOUS NASHYD   ID=[3], NHYD=["CRTRIB"] DT=[5]min, AREA=[3.69](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
* CARP RIVER TRIBUTARY AT CARP RIVER
* ---------------------------------------------
ADD HYD             IDsum=[9], NHYD=["1012NC"], IDs to add=[1,3]
*
ADD HYD             IDsum=[9], NHYD=["101-2"], IDs to add=[2,3]
*
SAVE HYD            ID=[9],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["Carp Tributary @ Carp River - XP2054"]
*%----------------|--------------------------------------------------------|
* FERNBANK COMMUNITY LANDS TO SOUTH TRIBUTARY
* (CHANNEL FLOWING NORTH ADJACENT TO GLEN CAIRN POND)
* ------------------------------------------------
* SOUTH POND P3
* 10yr control
***************
CONTINUOUS STANDHYD ID=[1], NHYD=["P3"], DT=[5](min), AREA=[91.68](ha),
                    XIMP=[0.34], TIMP=[0.43], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.0](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[1400](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[9.17](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P3maj"],
                    MINID=[3], MinNHYD=["P3min"],
                    TMJSTO=[4584](cu-m)
*
CONTINUOUS NASHYD   ID=[4], NHYD=["SWM3"] DT=[5]min, AREA=[2.60](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["P3in"], IDs to add=[2,3,4]
*
ROUTE RESERVOIR     IDout=[2],   NHYD=["P3out"],  IDin=[1],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [  0.000 , 0.000 ]
                                    [  0.050 , 0.427 ]
                                    [  0.300 , 1.568 ]
                                    [  0.800 , 2.120 ]
                                    [  1.750 , 2.905 ]
                                    [    -1  ,   -1  ]  (max twenty pts)
                          IDovf=[3], NHYDovf=["P3OVF"]
*
* SOUTH POND (P3) AT CARP RIVER
* ---------------------------------------------
ADD HYD             IDsum=[8], NHYD=["500"], IDs to add=[2,3]
*
SAVE HYD            ID=[8],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["South Pond @ Carp River"]
*%----------------|--------------------------------------------------------|
* HEC-RAS inflow hydrograph @ 44751
* NODE 2054
* ------------------------------------
*
ADD HYD             IDsum=[10], NHYD=["2054"], IDs to add=[8,9]
*
SAVE HYD            ID=[10],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 2054 / Station 44751"]
*%----------------|--------------------------------------------------------|
*% LAND DRAINING TO CARP RIVER @ HAZELDEAN RD (Section 44548)
*% (28/35/36)
*% ------------------------------------------------------------------
* NORTH POND P2
* 10yr control
***************
CONTINUOUS STANDHYD ID=[1], NHYD=["P2"], DT=[5](min), AREA=[23.14](ha),
                    XIMP=[0.47], TIMP=[0.59], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.0](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[1400](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[2.31](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P2maj"],
                    MINID=[3], MinNHYD=["P2min"],
                    TMJSTO=[1157](cu-m)
*
CONTINUOUS NASHYD   ID=[4], NHYD=["SWM2"] DT=[5]min, AREA=[0.99](ha),
                    DWF= 0  CN= 90  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["P2in"], IDs to add=[2,3,4]
*%----------------|--------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["P2out"],  IDin=[1],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [  0.000 , 0.000 ]
                                    [  0.030 , 0.130 ]
                                    [  0.150 , 0.277 ]
                                    [  0.350 , 0.441 ]
                                    [  0.700 , 0.675 ]
                                    [    -1  ,   -1  ]  (max twenty pts)
                          IDovf=[3], NHYDovf=["P2OVF"]
* ---------------------------------------------
ADD HYD             IDsum=[6], NHYD=["PND2"], IDs to add=[2,3]
*
* NORTH POND (P2) AT CARP RIVER
*
SAVE HYD            ID=[6],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["POND2-outflow/overflow"]

*
CONTINUOUS NASHYD   ID=[4], NHYD=["CRFP"] DT=[5]min, AREA=[24.18](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=2  TP=0.50
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
CONTINUOUS STANDHYD ID=[5], NHYD=["28"], DT=[5](min), AREA=[12.5](ha),
                    XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
                    Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4](/hr), F=[0](mm),
```

```
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.0](%),
                    LGP=[205](m), MNP=[0.10], SCP=[0](min),
                    Impervious surfaces:IAimp=[1.57](mm), SLPI=[1.0](%),
                                        LGI=[700](m), MNI=[0.013], SCI=[0](min),
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1

*

* HEC-RAS inflow hydrograph @ 44548
* NODE 2065
* (INCLUDES 24.18 HA OF CARP RIVER FLOODPLAIN)
* (INCLUDES 12.50 HA OF WEST CREEK MEADOWS)
* -----------------------------------------------
ADD HYD             IDsum=[7], NHYD=["2065"], IDs to add=[4,5,6]
*
SAVE HYD            ID=[7],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 2065 / Station 44548"]
*%----------------|----------------------------------------------------------|
*% LANDS UPSTREAM OF HAZELDEAN ROAD TRIBUTARY TO HAZELDEAN CREEK
*% (INCLUDES NORTHWEST CORNER OF FERNBANK CDP LANDS)
*% -----------------------------------------------------------------
CONTINUOUS STANDHYD ID=[5], NHYD=["100-1"], DT=[5](min), AREA=[61.17](ha),
                    XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
                    Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4](/hr), F=[0](mm),
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.8](%),
                    LGP=[1200](m), MNP=[0.10], SCP=[0](min),
                    Impervious surfaces:IAimp=[1.57](mm), SLPI=[0.8](%),
                                        LGI=[1700](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|----------------------------------------------------------|
*% LANDS NORTH OF HAZELDEAN ROAD - TO HAZELDEAN CREEK
*% (USED IN MODEL CALIBRATION)
*% -----------------------------------------------------
CONTINUOUS NASHYD   ID=[6], NHYD=["102-1"], DT=[5]min, AREA=[39.8](ha),
                    DWF=[0](cms),  CN/C=[78], IA=[9.8](mm),
                    N=[2], TP=[1.10]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*%----------------|----------------------------------------------------------|
* HEC-RAS inflow hydrograph @ 43966
* (Hazeldean Creek @ Carp River)
* --------------------------------
ADD HYD             IDsum=[10], NHYD=["3894"], IDs to add=[5,6]
*
SAVE HYD            ID=[10],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 3894 / Station 43966"]
*%----------------|----------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*                    S2-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[3]
*                    S5-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[4]
*                    S10-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*                    S25-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[6]
*                    S50-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[7]
*                    S100-24.stm
*%----------------|----------------------------------------------------------|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[8]
                    S2-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[9]
                    S5-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[10]
                    S10-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[11]
                    S25-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[12]
                    S50-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[13]
                    S100-12.stm
*%----------------|----------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[14]
*                    C2-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[15]
*                    C5-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[16]
*                    C10-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[17]
*                    C25-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[18]
*                    C50-3.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[19]
*                    C100-3.stm
*%----------------|----------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[20]
*                    C25mm-3.stm
*%----------------|----------------------------------------------------------|
FINISH
```

```
===========================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    888 =========
 S       W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  8   8 =========
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  8   8 Ver. 4.0
     S   W W   M   M  H   H    Y    M   M  O   O       9999   888  Sept 1998
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9  8   8 =========
                                                      9   9  8   8 # 5320763
      StormWater Management HYdrologic Model          999    888  =========

 **************************************************************************
 ************************** SWMHYMO-98  Ver/4.0 ***************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                OTTHYMO-83 and OTTHYMO-89.                   *******
 **************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199           *******
 *******                  Gatineau, Quebec: (819) 243-6858           *******
 *******                  E-Mail: swmhymo@jfsa.Com                   *******
 **************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD        +++++++
 +++++++                Nepean              SERIAL#:5320763         +++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 **************************************************************************
 *******            ++++++ PROGRAM ARRAY DIMENSIONS ++++++           *******
 *******            Maximum value for ID numbers  :     10           *******
 *******            Max. number of rainfall points:  15000           *******
 *******            Max. number of flow points    :  15000           *******
 **************************************************************************

 *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
 ***-------------------------------------------------------------------***
 ***     ID:  Hydrograph IDentification numbers, (1-10).                ***
 ***   NHYD:  Hydrograph reference numbers, (6 digits or characters).   ***
 ***   AREA:  Drainage area associated with hydrograph, (ac.) or (ha.). ***
 *** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    ***
 *** TpeakDate_hh:mm is the date and time of the peak flow.            ***
 ***   R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).     ***
 ***   R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).     ***
 ***      *:  see WARNING or NOTE message printed at end of run.       ***
 ***     **:  see  ERROR  message printed at end of run.               ***
 **************************************************************************
 **************************************************************************

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

 **************************************************************************

 ********************   S U M M A R Y   O U T P U T   ********************
 **************************************************************************
 *      DATE: 2009-05-12     TIME: 18:32:52     RUN COUNTER: 001638      *
 **************************************************************************
 * Input   filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\CR-DCe.d*
 * Output  filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\CR-DCe.o*
 * Summary filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\CR-DCe.s*
 * User comments:                                                        *
 * 1:______________________________________________________________________*
 * 2:______________________________________________________________________*
 * 3:______________________________________________________________________*
 **************************************************************************


 RUN:COMMAND#
 013:0001------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =  13 ]
 013:0002------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = City of Ottawa:  100yr-12hr SCS Type II (10 min time step)
      [SDT=10.00:SDUR=  12.00:PTOT=  93.91]
 013:0003------------------------------------------------------------------------
     DEFAULT VALUES
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\ottawa.def
      ICASEdv  = 1 (read and print data)
      FileTitle= ------ ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
                 ------ PARAMETER VALUES MUST BE ENTERD AFTER COLUMN 60 ----
      Horton's infiltration equation parameters:
      [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F=  .00 mm]
      Parameters for PERVIOUS surfaces in STANDHYD:
      [IAper=   4.67 mm] [LGP=40.00 m] [MNP= .250]
      Parameters for IMPERVIOUS surfaces in STANDHYD:
      [IAimp=   1.57 mm] [CLI= 1.50]   [MNI= .013]
      Parameters used in NASHYD:
      [Ia=   4.67 mm] [N= 2.00]
 013:0004------------------------------------------------------------------------
     COMPUTE API
      [APIini= 20.00: APIkdy= .9000: APIkdt= .9993]
      {APImax=110.44: APIavg= 66.21: APImin= 20.46}
 013:0005---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     READ HYD            09:101-3      69.53     3.093 No_date    6:45   78.11  n/a
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-101-3.013
      Comment  = GRANITE RIDGE AREA 101-3
 013:0006---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P1        77.13   11.113 No_date    6:05   81.75 .871
      [XIMP=.45:TIMP=.56]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 013:0007---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:P1        77.13   11.113 No_date    6:05   81.75  n/a
        Major System /  02:P1maj       .57     .801 No_date    6:25   81.75  n/a
        Minor System \  03:P1min     76.56    7.710 No_date    5:55   82.15  n/a
      {MjSysSto=.3857E+04, TotOvfVol=.4671E+03, N-Ovf=    1, TotDurOvf=    0.hrs
 013:0008---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  04:SWM1       4.50     .619 No_date    6:05   73.10 .778
      [CN= 90.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
```

```
      [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
      [InterEventTime=  12.00]
 013:0009---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P1maj       .57     .801 No_date    6:25   81.75  n/a
                       + 03:P1min     76.56    7.710 No_date    5:55   82.15  n/a
                       + 04:SWM1       4.50     .619 No_date    6:05   73.10  n/a
                       + 09:101-3     69.53    3.093 No_date    6:45   78.11  n/a
      [DT= 5.00]  SUM=  01:P1in     151.16   11.918 No_date    6:25   80.02  n/a
 013:0010---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 01:P1in     151.16   11.918 No_date    6:25   80.02  n/a
      [RDT= 5.00] out<- 02:P1out    151.16    5.298 No_date    7:20   80.02  n/a
     {MxStoUsed=.4547E+01}
 013:0011---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  03:CRTRIB     3.69     .450 No_date    6:05   65.86 .701
      [CN= 82.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
      [InterEventTime=  12.00]
 013:0012---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             01:P1in     151.16   11.918 No_date    6:25   80.02  n/a
                       + 03:CRTRIB     3.69     .450 No_date    6:05   65.86  n/a
      [DT= 5.00]  SUM=  09:1012NC   154.85   12.267 No_date    6:25   79.68  n/a
 013:0013---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P1out    151.16    5.298 No_date    7:20   80.02  n/a
                       + 03:CRTRIB     3.69     .450 No_date    6:05   65.86  n/a
      [DT= 5.00]  SUM=  09:101-2    154.85    5.415 No_date    7:05   79.68  n/a
 013:0014---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD            09:101-2    154.85    5.415 No_date    7:05   79.68  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-101-2.013
      remark:Carp Tributary @ Carp River - XP2054
 013:0015---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P3        91.68   12.428 No_date    6:05   78.73 .838
      [XIMP=.34:TIMP=.43]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 013:0016---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:P3        91.68   12.428 No_date    6:05   78.73  n/a
        Major System /  02:P3maj       .00     .000 No_date    0:00     .00  n/a
        Minor System \  03:P3min     91.68    9.170 No_date    5:55   79.34  n/a
      {MjSysSto=.4037E+04, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 013:0017---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  04:SWM3       2.60     .317 No_date    6:05   65.86 .701
      [CN= 82.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
      [InterEventTime=  12.00]
 013:0018---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P3maj       .00     .000 No_date    0:00     .00  n/a
                       + 03:P3min     91.68    9.170 No_date    5:55   79.34  n/a
                       + 04:SWM3       2.60     .317 No_date    6:05   65.86  n/a
      [DT= 5.00]  SUM=  01:P3in      94.28    9.487 No_date    6:05   78.97  n/a
 013:0019---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 01:P3in      94.28    9.487 No_date    6:05   78.97  n/a
      [RDT= 5.00] out<- 02:P3out     69.52    1.750 No_date    6:25   78.96  n/a
            overflow <= 03:P3OVF     24.76    7.677 No_date    6:25   78.97  n/a
     {MxStoUsed=.2904E+01, TotOvfVol=.1955E+01, N-Ovf=    3, TotDurOvf=    1.hrs
 013:0020---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P3out     69.52    1.750 No_date    6:25   78.96  n/a
                       + 03:P3OVF     24.76    7.677 No_date    6:25   78.97  n/a
      [DT= 5.00]  SUM=  08:500       94.28    9.427 No_date    6:25   78.96  n/a
 013:0021---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD            08:500       94.28    9.427 No_date    6:25   78.96  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-500.013
      remark:South Pond @ Carp River
 013:0022---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             08:500       94.28    9.427 No_date    6:25   78.96  n/a
                       + 09:101-2    154.85    5.415 No_date    7:05   79.68  n/a
      [DT= 5.00]  SUM=  10:2054     249.13   14.671 No_date    6:55   79.41  n/a
 013:0023---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD            10:2054     249.13   14.671 No_date    6:55   79.41  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-2054.013
      remark:HEC-RAS Inflow Node 2054 / Station 44751
 013:0024---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P2        23.14    3.377 No_date    6:05   82.45 .878
      [XIMP=.47:TIMP=.59]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 013:0025---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:P2        23.14    3.377 No_date    6:05   82.45  n/a
        Major System /  02:P2maj       .26     .442 No_date    6:20   82.45  n/a
        Minor System \  03:P2min     22.88    2.310 No_date    5:55   82.86  n/a
      {MjSysSto=.1157E+04, TotOvfVol=.2135E+03, N-Ovf=    1, TotDurOvf=    0.hrs
 013:0026---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  04:SWM2        .99     .136 No_date    6:05   73.10 .778
      [CN= 90.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
      [InterEventTime=  12.00]
 013:0027---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P2maj       .26     .442 No_date    6:20   82.45  n/a
                       + 03:P2min     22.88    2.310 No_date    5:55   82.86  n/a
                       + 04:SWM2        .99     .136 No_date    6:05   73.10  n/a
      [DT= 5.00]  SUM=  01:P2in      24.13    2.864 No_date    6:20   82.45  n/a
 013:0028---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 01:P2in      24.13    2.864 No_date    6:20   82.45  n/a
      [RDT= 5.00] out<- 02:P2out     18.53     .700 No_date    6:20   82.45  n/a
            overflow <= 03:P2OVF      5.60    2.064 No_date    6:25   82.45  n/a
     {MxStoUsed=.6732E+00, TotOvfVol=.4616E+00, N-Ovf=    1, TotDurOvf=    1.hrs
 013:0029---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P2out     18.53     .700 No_date    6:20   82.45  n/a
                       + 03:P2OVF      5.60    2.064 No_date    6:25   82.45  n/a
      [DT= 5.00]  SUM=  06:PND2      24.13    2.764 No_date    6:25   82.45  n/a
 013:0030---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD            06:PND2      24.13    2.764 No_date    6:25   82.45  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-PND2.013
      remark:POND2-outflow/overflow
 013:0031---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  04:CRFP      24.18    1.865 No_date    6:30   65.86 .701
      [CN= 82.0: N= 2.00]
      [Tp=  .50:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
```

```
      [InterEventTime=  12.00]
 013:0032---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD05:28        12.50    1.740 No_date    6:00   57.94 .617
      [XIMP=.38:TIMP=.45]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP=1.00:LGP= 205.:MNP=.100:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI=1.00:LGI= 700.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
 013:0033---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            04:CRFP      24.18    1.865 No_date    6:30   65.86  n/a
                     +  05:28        12.50    1.740 No_date    6:00   57.94  n/a
                     +  06:PND2      24.13    2.764 No_date    6:25   82.45  n/a
      [DT= 5.00]  SUM=  07:2065      60.81    5.663 No_date    6:20   70.82  n/a
 013:0034---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           07:2065      60.81    5.663 No_date    6:20   70.82  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-2065.013
      remark:HEC-RAS Inflow Node 2065 / Station 44548
 013:0035---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD05:100-1     61.17    4.569 No_date    6:05   57.94 .617
      [XIMP=.38:TIMP=.45]
      [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00:  F= .00]
      [Pervious     area: IAper= 4.67:SLPP= .80:LGP=1200.:MNP=.100:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
 013:0036---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  06:102-1     39.80    1.601 No_date    7:10   61.80 .658
      [CN= 78.0: N= 2.00]
      [Tp= 1.10:DT= 5.00]
      [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
      [InterEventTime=  12.00]
 013:0037---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            05:100-1     61.17    4.569 No_date    6:05   57.94  n/a
                     +  06:102-1     39.80    1.601 No_date    7:10   61.80  n/a
      [DT= 5.00]  SUM=  10:3894     100.97    5.351 No_date    6:05   59.46  n/a
 013:0038---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           10:3894     100.97    5.351 No_date    6:05   59.46  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-3894.013
      remark:HEC-RAS Inflow Node 3894 / Station 43966
 013:0002-----------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------
*******************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2009-05-12     at 18:32:54
===============================================================================
```

```
2
*%=========================================================================|
*%
*%   #####       INPUT FILE FOR CARP RIVER, CITY OF KANATA        #####
*%   #####  FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009  #####
*%               INCLUDES BEST MANAGEMENT PRACTICES
*%   #####       EVENT BASED MODELING (5 MINUTE TIMESTEP)         #####
*%
*%
*%   REFERENCE DRAINAGE AREA PLANS:
*%   ------------------------------
*%   FIGURE 8.1
*%=========================================================================|
*                           EVENT BASED SIMULATION
*%=========================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    C25mm-3.stm

READ STORM          STORM_FILENAME=["storm.001"]
*%=========================================================================|
DEFAULT VALUES      ICASEdef=[1],  read and print values
                    DEFVAL_FILENAME=["ottawa.def"]
*
COMPUTE API         APII=[20], APIK=[0.9]/day
****************************************************************************
*% LANDS UPSTREAM OF FERNBANK COMMUNITY (GRANITE RIDGE)
*% -------------------------------------------------
READ HYD            ID=[9],  NHYD=["101-3"],
                    HYD_FILENAME=["H-101-3"]
*%----------------|---------------------------------------------------------|
*% FERNBANK COMMUNITY LANDS TO CARP RIVER TRIBUTARY
*% (GLEN CAIRN SWMF OUTLET CHANNEL)
*% -----------------------------------------------
* HEADWATER P1
**************
CONTINUOUS STANDHYD ID=[1], NHYD=["P1"], DT=[5](min), AREA=[77.13](ha),
                    XIMP=[0.45], TIMP=[0.56], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[1.0](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[1400](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING OF PERFORATED PIPES
*%----------------|---------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"P1BMP1"/3,"P1STM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                              QIDi       +     QIDii      =     QTOTAL
                         [0.000     +     0.000     =     0.00     ]
                         [0.048     +     0.203     =     0.25     ]
                         [0.095     +     0.405     =     0.50     ]
                         [0.143     +     0.608     =     0.75     ]
                         [0.190     +     0.810     =     1.00     ]
                         [0.285     +     1.215     =     1.50     ]
                         [0.380     +     1.620     =     2.00     ]
                         [0.475     +     2.025     =     2.50     ]
                         [0.570     +     2.430     =     3.00     ]
                         [0.760     +     3.240     =     4.00     ]
                         [0.950     +     4.050     =     5.00     ]
                         [1.140     +     4.860     =     6.00     ]
                         [1.330     +     5.670     =     7.00     ]       end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"P1BMP2"/5,"P1STM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                        QIDi       +     QIDii      =     QTOTAL
                         [ 0.000    +     0.000     =     0.00     ]
                         [ 0.016    +     0.032     =     0.05     ]
                         [0.031     +     0.064    =      0.10     ]
                         [0.047     +     0.095     =     0.14     ]
                         [0.063     +     0.127     =     0.19     ]
                         [0.094     +     0.191     =     0.29     ]
                         [0.126     +     0.254     =     0.38     ]
                         [0.157     +     0.318     =     0.48     ]
                         [0.189     +     0.381     =     0.57     ]
                         [0.252     +     0.508     =     0.76     ]
                         [0.315     +     0.635     =     0.95     ]
                         [0.378     +     0.762     =     1.14     ]
                         [0.441     +     0.889     =     1.33     ]       end
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["P1BMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                   [   0.0   , 0.0    ]
                                   [  0.005  , 0.0086 ]
                                   [  0.007  , 0.0172 ]
                                   [  0.008  , 0.0258 ]
                                   [  0.009  , 0.0344 ]
                                   [  0.0108 , 0.0430 ]
                                   [    -1   ,   -1   ]  (max twenty pts)
                           IDovf=[8], NHYDovf=["P1STM3"]
*%----------------|---------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[7.71](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P1maj"],
                    MINID=[2], MinNHYD=["P1min"],
                    TMJSTO=[3857](cu-m)
*
CONTINUOUS NASHYD   ID=[7], NHYD=["SWM1"] DT=[5]min, AREA=[4.50](ha),
                    DWF= 0  CN= 90  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),    END=-1
*
ADD HYD             IDsum=[10], NHYD=["P1in"], IDs to add=[1,2,5,7,8,9]
```

```
*
ROUTE RESERVOIR     IDout=[2],   NHYD=["P1SWM"],  IDin=[10],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                  [  0.000 , 0.000 ]
                                  [  0.050 , 0.499 ]
                                  [  1.500 , 2.030 ]
                                  [  2.500 , 2.810 ]
                                  [  4.500 , 2.920 ]
                                  [  4.800 , 3.500 ]
                                  [  5.000 , 3.930 ]
                                  [  5.300 , 4.500 ]
                                  [    -1  ,   -1  ](max twenty pts)
*
CONTINUOUS NASHYD   ID=[3], NHYD=["CRTRIB"] DT=[5]min, AREA=[3.69](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),    END=-1
*
* CARP RIVER TRIBUTARY AT CARP RIVER
* ---------------------------------------------
ADD HYD             IDsum=[9], NHYD=["B101-2"], IDs to add=[2,3]
*
*SAVE HYD            ID=[9],   # OF PCYCLES=[1],  ICASEsh=[1]
*                    HYD_COMMENT=["Carp Tributary @ Carp River - XP2054"]
*%----------------|---------------------------------------------------------|
* FERNBANK COMMUNITY LANDS TO SOUTH TRIBUTARY
* (CHANNEL FLOWING NORTH ADJACENT TO GLEN CAIRN POND)
* -----------------------------------------------
* SOUTH POND P3
* 10yr control
***************
CONTINUOUS STANDHYD ID=[1], NHYD=["P3"], DT=[5](min), AREA=[91.68](ha),
                    XIMP=[0.34], TIMP=[0.43], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[1.0](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[1400](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING OF PERFORATED PIPES
*%----------------|---------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"P3BMP1"/3,"P3STM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                          QIDi      +     QIDii      =     QTOTAL
                       [  0.000     +     0.000      =     0.00     ]
                       [  0.065     +     0.194      =     0.25     ]
                       [  0.130     +     0.387      =     0.50     ]
                       [  0.195     +     0.581      =     0.75     ]
                       [  0.260     +     0.774      =     1.00     ]
                       [          0.390      +     1.161      =      1.50     ]
                       [   0.520    +     1.548      =     2.00     ]
                       [  0.650     +     1.935      =     2.50     ]
                       [  0.780     +     2.322      =     3.00     ]
                       [  1.040     +     3.096      =     4.00     ]
                       [  1.300     +     3.870      =     5.00     ]
                       [  1.560     +     4.644      =     6.00     ]
                       [  1.820     +     5.418      =     7.00     ] end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"P3BMP2"/5,"P3STM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                                 QIDi       +     QIDii      =     QTOTAL
                       [  0.000     +     0.000      =     0.00     ]
                       [  0.022     +     0.043      =     0.07     ]
                       [  0.043     +     0.087      =     0.13     ]
                       [  0.065     +     0.130      =     0.20     ]
                       [  0.086     +     0.174     =      0.26     ]
                       [  0.129     +     0.261      =     0.39     ]
                       [  0.172     +     0.348      =     0.52     ]
                       [  0.215     +     0.435      =     0.65     ]
                       [  0.259     +     0.521      =     0.78     ]
                       [  0.345     +     0.695      =     1.04     ]
                       [  0.431     +     0.869      =     1.30     ]
                       [  0.517     +     1.043      =     1.56     ]
                       [  0.603     +     1.217      =     1.82     ] end
*%----------------|---------------------------------------------------------|
ROUTE RESERVOIR     IDout=[7],   NHYD=["P3BMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                       (cms)    -      (ha-m)
                                  [  0.000  ,  0.000  ]
                                  [ 0.0054  ,     0.0093 ]
                                  [ 0.0070  ,     0.0186 ]
                                  [ 0.0085  ,     0.0280 ]
                                  [ 0.0101  ,     0.0373 ]
                                  [ 0.0117  ,     0.0466 ]
                                  [   -1    ,       -1    ]
                           IDovf=[8], NHYDovf=["P3STM3"]
*%----------------|---------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[5.20](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P3maj"],
                    MINID=[2], MinNHYD=["P3min"],
                    TMJSTO=[4250](cu-m)
*
CONTINUOUS NASHYD   ID=[7], NHYD=["SWM3"] DT=[5]min, AREA=[2.60](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
```

```
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[10], NHYD=["P3in"], IDs to add=[1,2,5,7,8]
*
ROUTE RESERVOIR     IDout=[2],   NHYD=["P3SWM"],  IDin=[10],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                 (cms) - (ha-m)
                                [  0.000 , 0.000 ]
                                [  0.050 , 0.427 ]
                                [  0.300 , 1.568 ]
                                [  0.800 , 2.120 ]
                                [  1.750 , 2.905 ]
                                [    -1  ,   -1  ]   (max twenty pts)
                          IDovf=[3], NHYDovf=["P3OVF"]
*
* SOUTH POND (P3) AT CARP RIVER
* -----------------------------------------------
ADD HYD             IDsum=[8], NHYD=["B500"], IDs to add=[2,3]
*
*SAVE HYD            ID=[8],   # OF PCYCLES=[1],  ICASEsh=[1]
*                    HYD_COMMENT=["South Pond @ Carp River"]
*%----------------|------------------------------------------------------------|
* HEC-RAS inflow hydrograph @ 44751
* NODE 2054
* ------------------------------------
ADD HYD             IDsum=[10], NHYD=["B2054"], IDs to add=[8,9]
*
SAVE HYD            ID=[10],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 2054 / Station 44751"]
*%----------------|------------------------------------------------------------|
*% LAND DRAINING TO CARP RIVER @ HAZELDEAN RD (Section 44548)
*% (28/35/36)
*% ---------------------------------------------------------------------
* NORTH POND P2
* 10yr control
***************
CONTINUOUS STANDHYD ID=[1], NHYD=["P2", DT=[5](min), AREA=[23.14](ha),
                    XIMP=[0.47], TIMP=[0.59], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[1.0](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[1400](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"P2BMP1"/3,"P2STM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                                 QIDi      +     QIDii     =     QTOTAL
                        [ 0.000     +     0.000     =     0.00    ]
                        [ 0.048     +     0.203     =     0.25    ]
                        [ 0.095     +     0.405     =     0.50    ]
                        [ 0.143     +     0.608     =     0.75    ]
                        [ 0.190     +     0.810     =     1.00    ]
                        [ 0.285     +     1.215     =     1.50    ]
                        [ 0.380     +     1.620     =     2.00    ]
                        [ 0.475     +     2.025     =     2.50    ]
                        [ 0.570     +     2.430     =     3.00    ]
                        [ 0.760     +     3.240     =     4.00    ]
                        [ 0.950     +     4.050     =     5.00    ]
                        [ 1.140     +     4.860     =     6.00    ]
                        [ 1.330     +     5.670     =     7.00    ] end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"P2BMP2"/5,"P2STM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                              QIDi         +     QIDii     =     QTOTAL
                        [  0.000    +     0.000     =     0.00    ]
                        [  0.016    +     0.032     =     0.05    ]
                        [  0.031    +     0.064     =     0.10    ]
                        [  0.047    +     0.095     =     0.14    ]
                        [  0.063    +     0.127     =     0.19    ]
                        [  0.094    +     0.191     =     0.29    ]
                        [  0.126    +     0.254     =     0.38    ]
                        [  0.157    +     0.318     =     0.48    ]
                        [  0.189    +     0.381     =     0.57    ]
                        [  0.252    +     0.508    =     0.76    ]
                        [  0.315    +     0.635     =     0.95    ]
                        [  0.378    +     0.762     =     1.14    ]
                        [  0.441    +     0.889     =     1.33    ] end
*%----------------|------------------------------------------------------------|
ROUTE RESERVOIR     IDout=[7],   NHYD=["P2BMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                 (cms)  - (ha-m)
                                [  0.000  , 0.000  ]
                                [  0.0015 ,   0.0025 ]
                                [  0.0019 ,   0.0051 ]
                                [  0.0023 ,   0.0076 ]
                                [  0.0027 ,   0.0101 ]
                                [  0.0032 ,   0.0127 ]
                                [    -1   ,   -1     ]
                           IDovf=[8], NHYDovf=["P2STM3"]
*%----------------|------------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[1.79](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P2maj"],
                    MINID=[2], MinNHYD=["P2min"],
                    TMJSTO=[1157](cu-m)
*
CONTINUOUS NASHYD   ID=[7], NHYD=["SWM2"] DT=[5]min, AREA=[0.99](ha),
                    DWF= 0  CN= 90  IA= 9.8  N=2  TP=0.25
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
```

```
ADD HYD             IDsum=[10], NHYD=["P2in"], IDs to add=[1,2,5,7,8]
*
ROUTE RESERVOIR     IDout=[2],   NHYD=["P2out"],  IDin=[10],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                         TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [  0.000 , 0.000 ]
                                    [  0.030 , 0.130 ]
                                    [  0.150 , 0.277 ]
                                    [  0.350 , 0.441 ]
                                    [  0.700 , 0.675 ]
                                    [    -1  ,   -1  ] (max twenty pts)
                          IDovf=[3], NHYDovf=["P2OVF"]
*
ADD HYD             IDsum=[6], NHYD=["PND2"], IDs to add=[2,3]
*
CONTINUOUS NASHYD   ID=[4], NHYD=["CRFP"] DT=[5]min, AREA=[24.18](ha),
                    DWF= 0  CN= 82  IA= 9.8  N=2  TP=0.50
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
CONTINUOUS STANDHYD ID=[5], NHYD=["28"], DT=[5](min), AREA=[12.5](ha),
                    XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
                    Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4](/hr), F=[0](mm),
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.0](%),
                    LGP=[205](m), MNP=[0.10], SCP=[0](min),
                    Impervious surfaces:IAimp=[1.57](mm), SLPI=[1.0](%),
                                        LGI=[700](m), MNI=[0.013], SCI=[0](min),
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
* NORTH POND (P2) AT CARP RIVER
* HEC-RAS inflow hydrograph @ 44548
* NODE 2065
* (INCLUDES 24.18 HA OF CARP RIVER FLOODPLAIN)
* (INCLUDES 12.50 HA OF WEST CREEK MEADOWS)
* -----------------------------------------------
ADD HYD             IDsum=[7], NHYD=["B2065"], IDs to add=[4,5,6]
*
SAVE HYD            ID=[7],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 2065 / Station 44548"]
*%----------------|------------------------------------------------------------|
*% LANDS UPSTREAM OF HAZELDEAN ROAD TRIBUTARY TO HAZELDEAN CREEK
*% (INCLUDES NORTHWEST CORNER OF FERNBANK CDP LANDS)
*% ---------------------------------------------------------------
CONTINUOUS STANDHYD ID=[5], NHYD=["100-1"], DT=[5](min), AREA=[61.17](ha),
                    XIMP=[0.38], TIMP=[0.45], DWF=[0](cms), LOSS=[1],
                    Horton: Fo=[76.2](mm/hr), Fc=[13.2](mm/hr),
                    DCAY=[4](/hr), F=[0](mm),
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.8](%),
                    LGP=[1200](m), MNP=[0.10], SCP=[0](min),
                    Impervious surfaces:IAimp=[1.57](mm), SLPI=[0.8](%),
                                        LGI=[1700](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|------------------------------------------------------------|
*% LANDS NORTH OF HAZELDEAN ROAD - TO HAZELDEAN CREEK
*% (USED IN MODEL CALIBRATION)
*% -----------------------------------------------
CONTINUOUS NASHYD   ID=[6], NHYD=["102-1"], DT=[5]min, AREA=[39.8](ha),
                    DWF=[0](cms),  CN/C=[78], IA=[9.8](mm),
                    N=[2], TP=[1.10]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*%----------------|------------------------------------------------------------|
* HEC-RAS inflow hydrograph @ 43966
* (Hazeldean Creek @ Carp River)
* --------------------------------
ADD HYD             IDsum=[10], NHYD=["B3894"], IDs to add=[5,6]
*
SAVE HYD            ID=[10],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["HEC-RAS Inflow Node 3894 / Station 43966"]
*%----------------|------------------------------------------------------------|
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*                    S2-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[3]
*                    S5-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[4]
*                    S10-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*                    S25-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[6]
*                    S50-24.stm
*START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[7]
*                    S100-24.stm
*%----------------|------------------------------------------------------------|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[8]
                    S2-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[9]
                    S5-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[10]
                    S10-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[11]
                    S25-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[12]
                    S50-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[13]
                    S100-12.stm
*%----------------|------------------------------------------------------------|
```

```
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[14]
*                   C2-3.stm
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[15]
*                   C5-3.stm
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[16]
*                   C10-3.stm
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[17]
*                   C25-3.stm
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[18]
*                   C50-3.stm
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[19]
*                   C100-3.stm
*%-----------------|----------------------------------------------------------|
*START              TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[20]
*                   C25mm-3.stm
*%-----------------|----------------------------------------------------------|
FINISH
```

```
==========================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO       999    888  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  8   8 =========
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  8   8 Ver. 4.0
     S   W W   M   M  H   H    Y    M   M  O   O       9999   888  Sept 1998
 SSSSS   W W   M   M  H   H    Y    M   M   OOO          9  8   8 =========
                                                      9   9  8   8 # 5320763
      StormWater Management HYdrologic Model          999    888  =========

 *************************************************************************
 ************************** SWMHYMO-98  Ver/4.0 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******      based on the principles of HYMO and its successors      *******
 *******                 OTTHYMO-83 and OTTHYMO-89.                    *******
 *************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
 *******                  Ottawa,  Ontario: (613) 727-5199            *******
 *******                  Gatineau, Quebec: (819) 243-6858            *******
 *******                  E-Mail: swmhymo@jfsa.Com                     *******
 *************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD        +++++++
 +++++++               Nepean                 SERIAL#:5320763        +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 *************************************************************************
 *******             ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *******
 *******             Maximum value for ID numbers  :     10            *******
 *******             Max. number of rainfall points:  15000            *******
 *******             Max. number of flow points    :  15000            *******
 *************************************************************************

 *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
 ***-------------------------------------------------------------------***
 ***     ID:  Hydrograph IDentification numbers, (1-10).                 ***
 ***  NHYD:  Hydrograph reference numbers, (6 digits or characters).    ***
 ***  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).   ***
 *** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).     ***
 *** TpeakDate_hh:mm is the date and time of the peak flow.              ***
 ***  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).        ***
 ***  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).        ***
 ***     *:  see WARNING or NOTE message printed at end of run.          ***
 ***    **:  see  ERROR  message printed at end of run.                  ***
 *************************************************************************
 *************************************************************************

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

 *************************************************************************

 ********************   S U M M A R Y   O U T P U T   ********************
 *************************************************************************
 *       DATE: 2009-05-12     TIME: 18:17:28     RUN COUNTER: 001636      *
 *************************************************************************
 * Input   filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\CR-BMPe5*
 * Output  filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\CR-BMPe5*
 * Summary filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\CR-BMPe5*
 * User comments:                                                         *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 *************************************************************************


 RUN:COMMAND#
 013:0001-------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =  13 ]
 013:0002--------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = City of Ottawa:  100yr-12hr SCS Type II (10 min time step)
      [SDT=10.00:SDUR=  12.00:PTOT=  93.91]
 013:0003--------------------------------------------------------------------
     DEFAULT VALUES
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\ottawa.def
      ICASEdv  = 1 (read and print data)
      FileTitle= ------ ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
                 ------ PARAMETER VALUES MUST BE ENTERD AFTER COLUMN 60 ----
      Horton's infiltration equation parameters:
      [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F=  .00 mm]
      Parameters for PERVIOUS surfaces in STANDHYD:
      [IAper=   4.67 mm] [LGP=40.00 m] [MNP= .250]
      Parameters for IMPERVIOUS surfaces in STANDHYD:
      [IAimp=   1.57 mm] [CLI= 1.50]   [MNI= .013]
      Parameters used in NASHYD:
      [Ia=   4.67 mm] [N= 2.00]
 013:0004--------------------------------------------------------------------
     COMPUTE API
      [APIini= 20.00: APIkdy= .9000: APIkdt= .9993]
      {APImax=110.44: APIavg= 66.21: APImin= 20.46}
 013:0005--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     READ HYD            09:101-3     69.53    3.093 No_date    6:45   78.11  n/a
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-101-3.013
      Comment  = GRANITE RIDGE AREA 101-3
 013:0006--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P1        77.13   10.943 No_date    6:05   80.53 .858
      [XIMP=.45:TIMP=.56]
      [LOSS= 2 :CN= 78.0]
      [Pervious     area: IAper= 5.20:SLPP=1.00:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 29.88: SMAX=199.22: SK=1.000]
 013:0007--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  *  DIVERT HYD       -> 01:P1        77.13   10.943 No_date    6:05   80.53  n/a
           diverted <= 02:P1BMP1     14.66    2.079 No_date    6:05   80.53  n/a
           diverted <= 03:P1STM1     62.48    8.864 No_date    6:05   80.53  n/a
 013:0008--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  *  DIVERT HYD       -> 02:P1BMP1    14.66    2.079 No_date    6:05   80.53  n/a
           diverted <= 04:P1BMP2      4.82     .689 No_date    6:05   80.53  n/a
           diverted <= 05:P1STM2      9.74    1.390 No_date    6:05   80.53  n/a
 013:0009--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
```

```
     ROUTE RESERVOIR -> 04:P1BMP2      4.82     .689 No_date    6:05   80.53  n/a
      [RDT= 5.00] out<- 07:P1BMP3      .99     .011 No_date    5:40   80.53  n/a
           overflow <= 08:P1STM3      3.83     .673 No_date    6:10   80.53  n/a
     {MxStoUsed=.4296E-01, TotOvfVol=.3087E+00, N-Ovf=    2, TotDurOvf=    7.hrs
 013:0010--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD     03:P1STM1    62.48    8.864 No_date    6:05   80.53  n/a
        Major System /  01:P1maj       .00     .000 No_date    0:00     .00  n/a
        Minor System \  02:P1min     62.48    7.710 No_date    6:00   80.88  n/a
      {MjSysSto=.8578E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 013:0011--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  07:SWM1       4.50     .619 No_date    6:05   73.10 .778
      [CN= 90.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
      [InterEventTime=  12.00]
 013:0012--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             01:P1maj       .00     .000 No_date    0:00     .00  n/a
                      +  02:P1min     62.48    7.710 No_date    6:00   80.88  n/a
                      +  05:P1STM2     9.74    1.390 No_date    6:05   80.53  n/a
                      +  07:SWM1       4.50     .619 No_date    6:05   73.10  n/a
                      +  08:P1STM3     3.83     .673 No_date    6:10   80.53  n/a
                      +  09:101-3     69.53    3.093 No_date    6:45   78.11  n/a
      [DT= 5.00]  SUM=  10:P1in     150.09   12.923 No_date    6:10   79.33  n/a
 013:0013--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 10:P1in     150.09   12.923 No_date    6:10   79.33  n/a
      [RDT= 5.00] out<- 02:P1SWM    150.09    5.228 No_date    7:20   79.33  n/a
     {MxStoUsed=.4356E+01}
 013:0014--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  03:CRTRIB     3.69     .450 No_date    6:05   65.86 .701
      [CN= 82.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
      [InterEventTime=  12.00]
 013:0015--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P1SWM    150.09    5.228 No_date    7:20   79.33  n/a
                      +  03:CRTRIB     3.69     .450 No_date    6:05   65.86  n/a
      [DT= 5.00]  SUM=  09:B101-2   153.78    5.342 No_date    7:05   79.01  n/a
 013:0016--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P3        91.68   12.170 No_date    6:05   77.19 .822
      [XIMP=.34:TIMP=.43]
      [LOSS= 2 :CN= 78.0]
      [Pervious     area: IAper= 5.20:SLPP=1.00:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 29.88: SMAX=199.22: SK=1.000]
 013:0017--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  *  DIVERT HYD       -> 01:P3        91.68   12.170 No_date    6:05   77.19  n/a
           diverted <= 02:P3BMP1     23.84    3.164 No_date    6:05   77.19  n/a
           diverted <= 03:P3STM1     70.97    9.420 No_date    6:05   77.19  n/a
 013:0018--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  *  DIVERT HYD       -> 02:P3BMP1    23.84    3.164 No_date    6:05   77.19  n/a
           diverted <= 04:P3BMP2      7.87    1.048 No_date    6:05   77.19  n/a
           diverted <= 05:P3STM2     15.87    2.116 No_date    6:05   77.19  n/a
 013:0019--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 04:P3BMP2      7.87    1.048 No_date    6:05   77.19  n/a
      [RDT= 5.00] out<- 07:P3BMP3     1.14     .012 No_date    5:20   77.19  n/a
           overflow <= 08:P3STM3      6.73    1.037 No_date    6:10   77.19  n/a
     {MxStoUsed=.4658E-01, TotOvfVol=.5199E+00, N-Ovf=    2, TotDurOvf=    7.hrs
 013:0020--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD     03:P3STM1    70.97    9.420 No_date    6:05   77.19  n/a
        Major System /  01:P3maj      4.29    3.229 No_date    6:20   77.19  n/a
        Minor System \  02:P3min     66.68    5.200 No_date    5:50   77.11  n/a
      {MjSysSto=.4250E+04, TotOvfVol=.3312E+04, N-Ovf=    1, TotDurOvf=    1.hrs
 013:0021--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  07:SWM3       2.60     .317 No_date    6:05   65.86 .701
      [CN= 82.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
      [InterEventTime=  12.00]
 013:0022--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             01:P3maj      4.29    3.229 No_date    6:20   77.19  n/a
                      +  02:P3min     66.68    5.200 No_date    5:50   77.11  n/a
                      +  05:P3STM2    15.87    2.116 No_date    6:05   77.19  n/a
                      +  07:SWM3       2.60     .317 No_date    6:05   65.86  n/a
                      +  08:P3STM3     6.73    1.037 No_date    6:10   77.19  n/a
      [DT= 5.00]  SUM=  10:P3in      96.17   11.434 No_date    6:20   76.83  n/a
 013:0023--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 10:P3in      96.17   11.434 No_date    6:20   76.83  n/a
      [RDT= 5.00] out<- 02:P3SWM     71.16    1.750 No_date    6:25   76.83  n/a
           overflow <= 03:P3OVF     25.01    9.127 No_date    6:25   76.83  n/a
     {MxStoUsed=.2903E+01, TotOvfVol=.1922E+01, N-Ovf=    3, TotDurOvf=    1.hrs
 013:0024--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             02:P3SWM     71.16    1.750 No_date    6:25   76.83  n/a
                      +  03:P3OVF     25.01    9.127 No_date    6:25   76.83  n/a
      [DT= 5.00]  SUM=  08:B500      96.17   10.877 No_date    6:25   76.83  n/a
 013:0025--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD             08:B500      96.17   10.877 No_date    6:25   76.83  n/a
                      +  09:B101-2   153.78    5.342 No_date    7:05   79.01  n/a
      [DT= 5.00]  SUM=  10:B2054    249.95   15.972 No_date    6:25   78.17  n/a
 013:0026--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD            10:B2054    249.95   15.972 No_date    6:25   78.17  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-B2054.013
      remark:HEC-RAS Inflow Node 2054 / Station 44751
 013:0027--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P2        23.14    3.329 No_date    6:05   81.29 .866
      [XIMP=.47:TIMP=.59]
      [LOSS= 2 :CN= 78.0]
      [Pervious     area: IAper= 5.20:SLPP=1.00:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI=1400.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 29.88: SMAX=199.22: SK=1.000]
 013:0028--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     DIVERT HYD       -> 01:P2        23.14    3.329 No_date    6:05   81.29  n/a
           diverted <= 02:P2BMP1      4.41     .633 No_date    6:05   81.29  n/a
           diverted <= 03:P2STM1     18.76    2.697 No_date    6:05   81.29  n/a
 013:0029--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     DIVERT HYD       -> 02:P2BMP1     4.41     .633 No_date    6:05   81.29  n/a
           diverted <= 04:P2BMP2      1.44     .210 No_date    6:05   81.29  n/a
           diverted <= 05:P2STM2      2.90     .423 No_date    6:05   81.29  n/a
 013:0030--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 04:P2BMP2      1.44     .210 No_date    6:05   81.29  n/a
      [RDT= 5.00] out<- 07:P2BMP3      .29     .003 No_date    5:35   81.28  n/a
           overflow <= 08:P2STM3      1.15     .205 No_date    6:10   81.29  n/a
     {MxStoUsed=.1270E-01, TotOvfVol=.9309E-01, N-Ovf=    2, TotDurOvf=    7.hrs
 013:0031--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD     03:P2STM1    18.76    2.697 No_date    6:05   81.29  n/a
        Major System /  01:P2maj       .07     .154 No_date    6:25   81.29  n/a
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```
       Minor System \  02:P2min     18.68    1.790 No_date    5:55   81.61  n/a
     {MjSysSto=.1157E+04, TotOvfVol=.5964E+02, N-Ovf=    1, TotDurOvf=    0.hrs
 013:0032--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  07:SWM2        .99     .136 No_date    6:05   73.10 .778
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
 013:0033--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P2maj       .07     .154 No_date    6:25   81.29  n/a
                    +  02:P2min     18.68    1.790 No_date    5:55   81.61  n/a
                    +  05:P2STM2     2.90     .423 No_date    6:05   81.29  n/a
                    +  07:SWM2        .99     .136 No_date    6:05   73.10  n/a
                    +  08:P2STM3     1.15     .205 No_date    6:10   81.29  n/a
     [DT= 5.00]  SUM=  10:P2in      23.79    2.550 No_date    6:05   81.20  n/a
 013:0034--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 10:P2in      23.79    2.550 No_date    6:05   81.20  n/a
     [RDT= 5.00] out<- 02:P2out     18.52     .700 No_date    6:20   81.20  n/a
          overflow <= 03:P2OVF      5.27    1.758 No_date    6:25   81.20  n/a
    {MxStoUsed=.6705E+00, TotOvfVol=.4282E+00, N-Ovf=    2, TotDurOvf=    1.hrs
 013:0035--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:P2out     18.52     .700 No_date    6:20   81.20  n/a
                    +  03:P2OVF      5.27    1.758 No_date    6:25   81.20  n/a
     [DT= 5.00]  SUM=  06:PND2      23.79    2.458 No_date    6:25   81.20  n/a
 013:0036--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  04:CRFP      24.18    1.865 No_date    6:30   65.86 .701
     [CN= 82.0: N= 2.00]
     [Tp=  .50:DT= 5.00]
     [IaREC= 4.00: SMIN= 23.09: SMAX=153.94: SK=1.000]
     [InterEventTime=  12.00]
 013:0037--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD05:28        12.50    1.740 No_date    6:00   57.94 .617
     [XIMP=.38:TIMP=.45]
     [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00:  F= .00]
     [Pervious     area: IAper= 4.67:SLPP=1.00:LGP= 205.:MNP=.100:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI=1.00:LGI= 700.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
 013:0038--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            04:CRFP      24.18    1.865 No_date    6:30   65.86  n/a
                    +  05:28        12.50    1.740 No_date    6:00   57.94  n/a
                    +  06:PND2      23.79    2.458 No_date    6:25   81.20  n/a
     [DT= 5.00]  SUM=  07:B2065     60.47    5.464 No_date    6:20   70.26  n/a
 013:0039--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           07:B2065     60.47    5.464 No_date    6:20   70.26  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-B2065.013
     remark:HEC-RAS Inflow Node 2065 / Station 44548
 013:0040--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD05:100-1     61.17    4.569 No_date    6:05   57.94 .617
     [XIMP=.38:TIMP=.45]
     [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.00:  F= .00]
     [Pervious     area: IAper= 4.67:SLPP= .80:LGP=1200.:MNP=.100:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .80:LGI=1700.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
 013:0041--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:102-1     39.80    1.601 No_date    7:10   61.80 .658
     [CN= 78.0: N= 2.00]
     [Tp= 1.10:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
     [InterEventTime=  12.00]
 013:0042--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            05:100-1     61.17    4.569 No_date    6:05   57.94  n/a
                    +  06:102-1     39.80    1.601 No_date    7:10   61.80  n/a
     [DT= 5.00]  SUM=  10:B3894    100.97    5.351 No_date    6:05   59.46  n/a
 013:0043--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           10:B3894    100.97    5.351 No_date    6:05   59.46  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\CR-D\H-B3894.013
     remark:HEC-RAS Inflow Node 3894 / Station 43966
 013:0002----------------------------------------------------------------------
     FINISH
-------------------------------------------------------------------------------
*******************************************************************************
    WARNINGS / ERRORS / NOTES
    -------------------------
   Simulation ended on 2009-05-12     at 18:17:31
===============================================================================
```

```
2
*%=========================================================================|
*%
*%   #####      INPUT FILE FOR MONAHAN DRAIN, CITY OF KANATA      #####
*%   #####  FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009  #####
*%   #####       EVENT BASED MODELING (5 MINUTE TIMESTEP)         #####
*%
*%
*%   REFERENCE DRAINAGE AREA PLANS:
*%   ------------------------------
*%   FIGURE 8.1 (Main Report) / 101108-MD1 (Appendix D)
*%=========================================================================|
*                          EVENT BASED SIMULATION
*%=========================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    C25mm-3.stm
*
READ STORM          STORM_FILENAME=["storm.001"]
*%=========================================================================|
DEFAULT VALUES      ICASEdef=[1],  read and print values
                    DEFVAL_FILENAME=["ottawa.def"]
*
COMPUTE API         APII=[20], APIK=[0.9]/day
*%----------------|--------------------------------------------------------|
*% FAULKNER DRAIN SUBWATERSHED
*% ***************************************************
CONTINUOUS STANDHYD ID=[1], NHYD=["P4a"], DT=[5](min), AREA=[42.61](ha),
                    XIMP=[0.35], TIMP=[0.44], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[2153](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[4.26](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P4amaj"],
                    MINID=[3], MinNHYD=["P4amin"],
                    TMJSTO=[2131](cu-m)
*
CONTINUOUS STANDHYD ID=[1], NHYD=["P4b"], DT=[5](min), AREA=[15.33](ha),
                    XIMP=[0.35], TIMP=[0.44], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[767](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[1.64](cms), NINLET=[1],
                    MAJID=[4], MajNHYD=["P4bmaj"],
                    MINID=[5], MinNHYD=["P4bmin"],
                    TMJSTO=[818](cu-m)
*
CONTINUOUS NASHYD   ID=[6], NHYD=["P4c"], DT=[5]min, AREA=[3.61](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["P4in"], IDs to add=[2,3,4,5,6]
*
ROUTE RESERVOIR     IDout=[2],   NHYD=["P4out"],  IDin=[1],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                (cms) - (ha-m)
                              [   0.000 ,  0.0000 ]
                              [   0.040 ,  0.2400 ]
                              [   0.290 ,  1.3400 ]
                              [   0.450 ,  1.8300 ]
                              [   0.670 ,  2.1300 ]
                              [   1.050 ,  2.4200 ]
                              [   1.350 ,  2.6450 ]
                              [   1.750 ,  2.9600 ]
                              [     -1  ,  -1     ]  (max twenty pts)
*
SAVE HYD            ID=[2],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["P4 Post-Dev"]
*%----------------|--------------------------------------------------------|
*
ROUTE CHANNEL       IDout=[6], NHYD=["R-FA1"], IDin=[2],
                    RDT=[5](min),
                    CHLGTH=[1862](m),   CHSLOPE=[0.35](%),
                                        FPSLOPE=[0.35](%),
                    SECNUM=[3000],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,50 -0.037,56.2 0.075,106.2]
                    ( DISTANCE (m), ELEVATION (m))=[  0.0 , 1.00 ]
                                                   [ 50.0 , 0.60 ]
                                                   [ 51.8 , 0.29 ]
                                                   [ 52.4 , 0.14 ]
                                                   [ 52.6 , 0.05 ]
                                                   [ 53.5 , 0.01 ]
                                                   [ 54.0 , 0.08 ]
                                                   [ 54.4 , 0.25 ]
                                                   [ 56.2 , 0.60 ]
                                                   [106.2 , 1.00 ]
*
CONTINUOUS NASHYD   ID=[2], NHYD=["FA2"], DT=[5]min, AREA=[151](ha),
                    DWF=[0](cms),  CN/C=[81], IA=[9.8](mm),
                    N=[2], TP=[3.14]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
CONTINUOUS NASHYD   ID=[3], NHYD=["FA3"], DT=[5]min, AREA=[331](ha),
                    DWF=[0](cms),  CN/C=[83.2], IA=[9.8](mm),
                    N=[2], TP=[3.05]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[4], NHYD=["FA3"], IDs to add=[6,2,3]
*
***************************************
*  ID=4:  Faulkner Drain @ Flewwllyn  *
***************************************
SAVE HYD            ID=[4],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["FA3"]
*%----------------|--------------------------------------------------------|
*% MONAHAN DRAIN SUBWATERSHED (INCL. FLEWELLYN DRAIN)
*% ***************************************************
*% SUB-AREA 1: Monahan Drain U/S of Terry Fox Drive
*% ---------------------------------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P6a"], DT=[5](min), AREA=[55.91](ha),
                    XIMP=[0.39], TIMP=[0.49], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[2200](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[5.59](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P6amaj"],
                    MINID=[3], MinNHYD=["P6amin"],
                    TMJSTO=[2796](cu-m)
*
CONTINUOUS STANDHYD ID=[1], NHYD=["P6b"], DT=[5](min), AREA=[42.74](ha),
                    XIMP=[0.39], TIMP=[0.49], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[1600](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[4.27](cms), NINLET=[1],
                    MAJID=[4], MajNHYD=["P6bmaj"],
                    MINID=[5], MinNHYD=["P6bmin"],
                    TMJSTO=[2137](cu-m)
*
CONTINUOUS NASHYD   ID=[6], NHYD=["SWM6"], DT=[5]min, AREA=[4.75](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[9], NHYD=["P6in"], IDs to add=[2,3,4,5,6]
*
ROUTE RESERVOIR     IDout=[6],   NHYD=["P6out"],  IDin=[9],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                (cms) -  (ha-m)
                              [   0.000 ,  0.0000 ]
                              [   0.050 ,  0.4000 ]
                              [   0.620 ,  2.1900 ]
                              [   1.080 ,  2.9400 ]
                              [   1.440 ,  3.3800 ]
                              [   1.740 ,  3.9400 ]
                              [   2.030 ,  4.4400 ]
                              [   2.400 ,  5.1600 ]
                              [     -1  ,  -1     ]  (max twenty pts)
*
SAVE HYD            ID=[6],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["P6 Post-Dev"]
*
ROUTE CHANNEL       IDout=[10], NHYD=["P6rte"], IDin=[6],
                    RDT=[5](min),
                    CHLGTH=[700](m),   CHSLOPE=[0.25](%),
                                       FPSLOPE=[0.25](%),
                    SECNUM=[3000],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.200,18 -0.035,24 0.200,40] NSEG
                    ( DISTANCE (m), ELEVATION (m))=[  0.0 , 97.2 ]
                                                   [ 18.0 , 97.0 ]
                                                   [ 20.0 , 94.5 ]
                                                   [ 22.0 , 94.5 ]
                                                   [ 24.0 , 97.0 ]
                                                   [ 40.0 , 97.2 ]
*%----------------|--------------------------------------------------------|
* Monahan P7 (North Pond)
* ----------------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P7"], DT=[5](min), AREA=[43.09](ha),
                    XIMP=[0.29], TIMP=[0.36], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[550](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
```

```
2
*%=========================================================================|
*%
*%   ##### INPUT FILE FOR JOCK RIVER SUBWATERSHED, CITY OF KANATA  #####
*%   #####       FERNBANK CDP: EXISTING CONDITIONS - MAY 2009      #####
*%   #####         EVENT BASED MODELING (5 MINUTE TIMESTEP)        #####
*%
*%
*%   REFERENCE DRAINAGE AREA PLANS:
*%   ----------------------------
*%   FIGURE 4.1 (Main Report) / 101108-MD1 (Appendix D)
*%=========================================================================|
*                              EVENT BASED SIMULATION
*%=========================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    C25mm-3.stm
*
READ STORM          STORM_FILENAME=["storm.001"]
*%=========================================================================|
DEFAULT VALUES      ICASEdef=[1],  read and print values
                    DEFVAL_FILENAME=["ottawa.def"]
*
COMPUTE API         APII=[20], APIK=[0.9]/day
*%----------------|--------------------------------------------------------|
*% FAULKNER DRAIN SUBWATERSHED
*% ***********************************************
CONTINUOUS NASHYD   ID=[10], NHYD=["FA1"], DT=[5.0]min, AREA=[48.5](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[2], TP=[1.36]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
SAVE HYD            ID=[10],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["Faulkner Drain"]
*%----------------|--------------------------------------------------------|
*
ROUTE CHANNEL       IDout=[1], NHYD=["R-FA1"], IDin=[10],
                    RDT=[5](min),
                    CHLGTH=[1862](m),   CHSLOPE=[0.35](%),
                                        FPSLOPE=[0.35](%),
                    SECNUM=[3000],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,50 -0.037,56.2 0.075,106.2]
                    ( DISTANCE (m), ELEVATION (m))=[  0.0 , 1.00 ]
                                                   [ 50.0 , 0.60 ]
                                                   [ 51.8 , 0.29 ]
                                                   [ 52.4 , 0.14 ]
                                                   [ 52.6 , 0.05 ]
                                                   [ 53.5 , 0.01 ]
                                                   [ 54.0 , 0.08 ]
                                                   [ 54.4 , 0.25 ]
                                                   [ 56.2 , 0.60 ]
                                                   [106.2 , 1.00 ]
*
CONTINUOUS NASHYD   ID=[2], NHYD=["FA2"], DT=[5.0]min, AREA=[151](ha),
                    DWF=[0](cms),  CN/C=[81], IA=[9.8](mm),
                    N=[2], TP=[3.14]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
CONTINUOUS NASHYD   ID=[3], NHYD=["FA3"], DT=[5.0]min, AREA=[331](ha),
                    DWF=[0](cms),  CN/C=[83.2], IA=[9.8](mm),
                    N=[2], TP=[3.05]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[4], NHYD=["FA3"], IDs to add=[1,2,3]
*
***************************************
*  ID=4:  Faulkner Drain @ Flewwllyn  *
***************************************
SAVE HYD            ID=[4],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["FA3"]
*%----------------|--------------------------------------------------------|
*% MONAHAN DRAIN SUBWATERSHED (INCL. FLEWELLYN DRAIN)
*% ***********************************************
*% SUB-AREA 1: Monahan Drain U/S of Terry Fox Drive
*%           237 ha (Fernbank CDP Constraints Drawing)
*% ----------------------------------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["1"], DT=[5.0]min, AREA=[237](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[2], TP=[3.20]hrs - from JLR Report
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
SAVE HYD            ID=[1],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["Monahan Drain"]
*
ROUTE CHANNEL       IDout=[2], NHYD=["1"], IDin=[1],
                    RDT=[5](min),
                    CHLGTH=[1150](m),   CHSLOPE=[0.05](%),
                                      FPSLOPE=[0.05](%),
                    SECNUM=[3000],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,48 -0.035,54 0.075,102] NSEG
```

```
                    ( DISTANCE (m), ELEVATION (m))=[  0.0 , 95.0 ]
                                                   [ 30.0 , 95.0 ]
                                                   [ 36.0 , 92.9 ]
                                                   [ 48.0 , 92.9 ]
                                                   [ 51.0 , 92.7 ]
                                                   [ 54.0 , 92.9 ]
                                                   [ 67.0 , 92.9 ]
                                                   [ 72.0 , 95.0 ]
                                                   [ 77.0 , 95.4 ]
                                                   [102.0 , 95.6 ]
*%----------------|--------------------------------------------------------|
*% SUB-AREA 2: SOHO West Lands
*% --------------------------
*% Area 2.4 - 52.94 ha
*% Ex. dev north of SOHO West, incl. 8.27 ha Hydro Easement
*% ----------------------------------------------------
CONTINUOUS STANDHYD ID=3  NHYD=["2.4"]  DT= 5.0  AREA= 52.94 HA
                    XIMP= 0.35  TIMP= 0.48  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        9.80   0.2     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        2.00   0.2   1400  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*% Area 2.5 - 16.9 ha
*% Undeveloped land east of Terry Fox Drive
*% ---------------------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["2.5"], DT=[5.0]min, AREA=[16.9](ha),
                    DWF=[0](cms), CN/C=[80.2], IA=[4.67] (mm)
                    N=[2], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[10], NHYD=["MD-CELL1"], IDs to add=[1,2,3]
*
*% Area 2.1 - 30.0 ha
*% ------------------
CONTINUOUS STANDHYD ID=1  NHYD="2.1"  DT= 5.0  AREA= 30.0  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   1.5    800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[2.550](cms), NINLET=[1],
                    MAJID=[3], MajNHYD=["2.1maj"],
                    MINID=[4], MinNHYD=["2.1min"],
                    TMJSTO=[1600](cu-m)
*
*% Area 2.3 - 31.20 ha
*% ------------------
CONTINUOUS STANDHYD ID=1  NHYD="2.3"  DT= 5.0  AREA= 31.20  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   1.5    800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[2.652](cms), NINLET=[1],
                    MAJID=[5], MajNHYD=["2.3maj"],
                    MINID=[6], MinNHYD=["2.3min"],
                    TMJSTO=[1600](cu-m)
*
*% Area 2.2 - 8.25 ha
*% -----------------
CONTINUOUS STANDHYD ID=1  NHYD="2.2"  DT= 5.0  AREA= 8.25  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   0.2    600  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.701](cms), NINLET=[1],
                    MAJID=[7], MajNHYD=["2.2maj"],
                    MINID=[8], MinNHYD=["2.2min"],
                    TMJSTO=[410](cu-m)
*
ADD HYD             IDsum=[2], NHYD=["2.1-2.3"], IDs to add=[3,4,5,6,7,8]
*
ADD HYD             IDsum=[4], NHYD=["C1-All"], IDs to add=[2,10]
*
*****************************************************
*  ID=4:  Monahan Drain @ East of Terry Fox (Cell 1)  *
*****************************************************
SAVE HYD            ID=[4],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["MD @ Cell 1"]
*%----------------|--------------------------------------------------------|
*% SUB-AREA 4: Bridlewood Trails
*% ----------------------------
*% Area 4.1: Residential Lands West of Eagleson
*% -----------------------------------------
CONTINUOUS STANDHYD ID=1  NHYD="4.1"  DT= 5.0  AREA= 10.0 HA
```

```
                    XIMP= 0.34  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   0.6     25   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        1.57   0.6    350  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.848](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["4.1maj"],
                    MINID=[3], MinNHYD=["4.1min"],
                    TMJSTO=[600](cu-m)
*
*% Area 4.2: Commercial/Residential lands west of Eagleson
*% ---------------------------------------------------------
CONTINUOUS STANDHYD ID=7  NHYD="4.2"  DT= 5.0  AREA= 25.0  HA
                    XIMP= 0.38  TIMP= 0.62  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   0.6     25   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        1.57   0.6    500  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[7], CINLET=[3.3](cms), NINLET=[1],
                    MAJID=[8], MajNHYD=["4.2maj"],
                    MINID=[9], MinNHYD=["4.2min"],
                    TMJSTO=[1250](cu-m)
*
*% Area 4.3: SWM Block
*% -----------------
CONTINUOUS NASHYD   ID=[1], NHYD=["4.3"], DT=[5]min, AREA=[3.7](ha),
                    DWF=[0.0](cms), CN/C=[78.1], IA=[4.67]mm,
                    N=[1.2], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[5], NHYD=["CELL2IN"], IDs to add=[1,2,8]
*
ADD HYD             IDsum=[5], NHYD=["CEL2TOT"], IDs to add=[1,2,3,4,8,9]
*
*% Area 4.4: New Englanders Subdivision - East of Eagleson
*% ----------------------------------------------------------
CONTINUOUS STANDHYD ID=1  NHYD="4.4"  DT= 5.0  AREA= 6.5  HA
                    XIMP= 0.62  TIMP= 0.69  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP    SCP
                                        9.80   0.2     50   0.250  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI    SCI
                                        2.00   0.2    349   0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.553](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=[10531],
                    MINID=[3], MinNHYD=[10532],
                    TMJSTO=[300](cu-m)
*
*% Area 4.5:  Wetland Cell
*% ----------------------
CONTINUOUS STANDHYD ID=4  NHYD="4.5"  DT= 5.0  AREA= 15.8  HA
                    XIMP= 0.62  TIMP= 0.69  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP    SCP
                                        9.80   0.2     50   0.250  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI    SCI
                                        2.00   0.2    349   0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
ADD HYD             IDsum=[10], NHYD=["NEW_ENG"], IDs to add=[2,3,4]
*%----------------|---------------------------------------------------------|
*% SUB-AREA 3: Residential U/S of Cell 3
*% -----------------------------------
CONTINUOUS STANDHYD ID=2  NHYD="3.0"  DT= 5.0  AREA= 285.0  HA
                    XIMP= 0.19  TIMP= 0.31  DWF=0.0 LOSS=2
                    CN= 78.3
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2    800   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1900  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
ADD HYD             IDsum=[3], NHYD=[108], IDs to add=[5,2]
*%----------------|---------------------------------------------------------|
*% SUB-AREA 5: Residential to Wetland Cell North
*% ----------------------------------------
CONTINUOUS STANDHYD ID=4  NHYD="5.0"  DT= 5.0  AREA= 85.0  HA
                    XIMP= 0.21  TIMP= 0.35  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     50   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1600  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
```

```
*%----------------|---------------------------------------------------------|
*% SUB-AREA 6
*% ----------
CONTINUOUS STANDHYD ID=5  NHYD="6.0"  DT= 5.0  AREA= 73.0  HA
                    XIMP= 0.18  TIMP= 0.30  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     50   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|---------------------------------------------------------|
*% SUB-AREA 7
*% ----------
CONTINUOUS STANDHYD ID=6  NHYD="7.0"  DT= 5.0  AREA= 8.0  HA
                    XIMP= 0.26  TIMP= 0.43  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     20   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2    450  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|---------------------------------------------------------|
* Total Inflow to Monahan drain Constructed Wetlands (Areas 1-7)
* -------------------------------------------------------------
ADD HYD             IDsum=[7], NHYD=[110], IDs to add=[3,4,5,6,10]
*%----------------|---------------------------------------------------------|
* Monahan Drain Constructed Wetlands:
* --------------------------------------------------------------------------|
ROUTE RESERVOIR     IDOUT = 5 NHYD=112 IDIN = 7 DT = 5.0
                      Qp(cms)   Vol(ha*m)
                        0.00      0.0
                        0.76      1.50
                        2.11      5.35
                        4.28      9.70
                        8.18     12.84
                       10.50     15.50
                       14.03     18.33
                       18.94     20.67
                       23.24     21.64
                       27.87     22.42
*
****************************************************
* ID=5: HYDROGRAPH U/S OF HOPE SIDE RD BOX CULVERT *
****************************************************
*% SUB-AREA 8
*% ----------
CONTINUOUS NASHYD   ID=[6], NHYD=["8.0"], DT=[5.0]min, AREA=[285](ha),
                    DWF=[0](cms),  CN/C=[78.5], IA=[9.8](mm),
                    N=[1.8], TP=[3.40]hrs - from JLR Report
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=1   NHYD=118   IDI= 5  IDII= 6
*%----------------|---------------------------------------------------------|
* Erosion Potential D/S of Hope Side Road
* --------------------------------------
EROSION INDEX       INDEX_METHOD=[1], QCE=[4.94](cms)
                    IDSerosion=[1]
*
ROUTE CHANNEL       IDOUT=2  NHYD=119  IDIN=1   DT=5.0
                    CHLGTH= 1000 CHSLP= 0.05 FPSLP= 0.05
                    VSN= 4  NSEG= 3
                       N    DIST(M)
                     0.075    37.5
                    -0.035    45.97
                     0.075    67.86
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                        0.00   94.86
                       10.51   94.08
                       23.87   93.41
                       32.46   93.27
                       37.50   92.63
                       40.26   92.11
                       42.38   91.53
                       44.40   91.59
                       45.97   91.67
                       47.71   91.85
                       49.23   92.69
                       51.93   92.96
                       61.03   92.98
                       67.86   93.51
*%----------------|---------------------------------------------------------|
*% SUB-AREA 9
*% ----------
CONTINUOUS NASHYD   ID=[3], NHYD=["9.0"], DT=[5.0]min, AREA=[223.0](ha),
                    DWF=[0](cms),  CN/C=[78.6], IA=[9.8](mm),
                    N=[1.6], TP=[2.0]hrs - from JLR Report
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=4   NHYD=121   IDI= 2  IDII= 3
*%----------------|---------------------------------------------------------|
*% SUB-AREA 13
*% ----------
CONTINUOUS NASHYD   ID=[5], NHYD=["13.0"], DT=[5.0]min, AREA=[110.0](ha),
                    DWF=[0](cms),  CN/C=[75.7], IA=[9.8](mm),
                    N=[1.6], TP=[1.3]hrs - from JLR Report
```

```
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6   NHYD=123   IDI= 4  IDII= 5
*
ROUTE CHANNEL       IDOUT=10  NHYD=124  IDIN=6   DT=5.0
                    CHLGTH= 1000 CHSLP= 0.05 FPSLP= 0.05
                    VSN= 5  NSEG= 3
                       N    DIST(M)
                     0.075    2.55
                    -0.035    11.67
                     0.075    57.85
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00    92.58
                       2.55    91.70
                       3.78    91.17
                      10.99    91.32
                      11.67    91.68
                      20.62    93.08
                      39.00    93.49
                      57.85    93.60
*%-----------------|---------------------------------------------------------|
*% Area 10:  Flewellyn Drain
*% ------------------------
*% 10a - U/S of Station 6+948
*% --------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["10a"], DT=[5.0]min, AREA=[157.20](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[2.0], TP=[2.11]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
COMPUTE VOLUME      ID=[1], STRATE=[2.50](cms), RELRATE=[2.50](cms)
*
*********************************************
*  ID=1:  Flewellyn Drain @ Fernbank Road   *
*********************************************
SAVE HYD            ID=[1],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["FD @ Fernbank"]
*%-----------------|---------------------------------------------------------|
ROUTE CHANNEL       IDout=[2], NHYD=["6+948"], IDin=[1],
                    RDT=[5](min),
                    CHLGTH=[1427](m),  CHSLOPE=[.15](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-1.72 -0.035,1.72 0.075,51.7
                    ( DISTANCE (m), ELEVATION (m))=[[-101.98,36.13
                                                  -1.98,35.63
                                                  -0.46,34.12
                                                   0.46,34.12
                                                   1.98,35.63
                                                   101.98,36.13
                                                     -1,-1]
*
*% 10b - U/S of Station 5+219
*% --------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["10b"], DT=[5.0]min, AREA=[163.70](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[1.20]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[3], NHYD=["5+219"], IDs to add=[1,2]
*
COMPUTE VOLUME      ID=[3], STRATE=[2.80](cms), RELRATE=[2.80](cms)
*********************************************
*  ID=3:  Flewellyn Drain @ Flewellyn Road  *
*********************************************
SAVE HYD            ID=[3],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["FD @ Flewellyn"]
*%-----------------|---------------------------------------------------------|
ROUTE CHANNEL       IDout=[2], NHYD=["5+219"], IDin=[3],
                    RDT=[5](min),
                    CHLGTH=[1685](m),  CHSLOPE=[.15](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-3.48 -0.035,3.48 0.075,53.4
                    ( DISTANCE (m), ELEVATION (m))=[-103.48,102.20
                                                  -3.48,101.70
                                                  -0.76,99.71
                                                   0.76,99.71
                                                   3.48,101.70
                                                  103.48,102.20
                                                     -1,-1]
*
ROUTE CHANNEL       IDout=[3], NHYD=["5+219"], IDin=[2],
                    RDT=[5](min),
                    CHLGTH=[1922](m),  CHSLOPE=[.05](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-3.13 -0.035,4.26  0.075,7.2
                    ( DISTANCE (m), ELEVATION (m))=[-103.13,98.85
                                                  -3.13,98.35
                                                  -0.40,96.53
                                                   0.40,96.53
                                                   4.26,99.10
                                                   7.26,99.16
                                                     -1,-1]
```

```
*% 10c - U/S of Station 1+574
*% --------------------------
CONTINUOUS NASHYD   ID=[4], NHYD=["10c"], DT=[5.0]min, AREA=[271.80](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[3.49]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[5], NHYD=["1+574"], IDs to add=[3,4]
*
COMPUTE VOLUME      ID=[5], STRATE=[3.93](cms), RELRATE=[3.93](cms)
*********************************************
*  ID=5:  Flewellyn Drain @ Eagleson Road  *
*********************************************
ROUTE CHANNEL       IDout=[2], NHYD=["1+574"], IDin=[5],
                    RDT=[5.0](min),
                    CHLGTH=[1590](m),  CHSLOPE=[.10](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-2.19 -0.035,2.19 0.075,52.1
                    ( DISTANCE (m), ELEVATION (m))=[-102.19,95.70
                                                   -2.19,95.20
                                                   -0.61,93.93
                                                    0.61,93.93
                                                    2.19,95.20
                                                  102.19,95.70
                                                     -1,-1]
*
*% 10d - U/S of Station 0+000
*% --------------------------
CONTINUOUS NASHYD   ID=[6], NHYD=["10d"], DT=[5.0]min, AREA=[144.00](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[3.09]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["0+000"], IDs to add=[2,6]
*%-----------------|---------------------------------------------------------|
ADD HYD             IDsum=[3], NHYD=["MD-FL"], IDs to add=[1,10]
*
SAVE HYD            ID=[3],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["Confluence of Monahan & Flewellyn"]
*%-----------------|---------------------------------------------------------|
ROUTE CHANNEL       IDOUT=4 NHYD=127 IDIN=3  DT=5.0
                    CHLGTH= 850 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 6  NSEG= 3
                       N    DIST(M)
                     0.075    24.87
                    -0.035    33.95
                     0.075    68.67
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00    93.21
                      13.87    92.77
                      24.87    91.51
                      30.62    91.09
                      32.86    91.11
                      33.95    91.53
                      38.58    92.48
                      53.68    93.35
                      68.67    93.35
*%-----------------|---------------------------------------------------------|
*% SUB-AREA 12
*% -----------
CONTINUOUS NASHYD   ID=5 NHYD="12.0"  DT= 5.0  AREA=376.0  HA
                    DWF= 0  CN= 75.4  IA= 9.8  N=1.8  TP=2.4 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6  NHYD=129  IDI= 4  IDII= 5
*%-----------------|---------------------------------------------------------|
* Erosion Potential @ Fallowfield Road
* ----------------------------------
EROSION INDEX       INDEX_METHOD=[1], QCE=[10.38](cms)
                    IDSerosion=[6]
*
ROUTE CHANNEL       IDOUT=1  NHYD=130  IDIN=6   DT=5.0
                    CHLGTH= 400 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 7  NSEG= 3
                       N    DIST(M)
                     0.075    20.39
                    -0.035    25.24
                     0.075    57.64
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00    93.37
                      15.07    92.85
                      18.98    91.47
                      20.39    91.07
                      24.12    90.97
                      25.24    91.46
                      28.07    92.15
                      44.18    92.42
                      57.64    92.46
*%-----------------|---------------------------------------------------------|
*% SUB-AREA 14
*% -----------
CONTINUOUS NASHYD   ID=2  NHYD="14.0" DT= 5.0  AREA= 50.0  HA
                    DWF= 0  CN= 75.0  IA= 9.8  N=2  TP=0.9 HRS
```

```
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=3   NHYD=132   IDI= 1  IDII= 2
*
ROUTE CHANNEL       IDOUT=4  NHYD=133  IDIN=3   DT=5.0
                    CHLGTH= 700 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 7  NSEG= 3
                       N    DIST(M)
                    0.075    31.96
                    -0.035    39.90
                     0.075    67.54
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00     92.92
                      15.27     92.79
                      25.71     92.03
                      31.96     90.58
                      32.58     90.61
                      34.04     90.06
                      37.40     89.43
                      39.90     89.77
                      41.05     90.60
                      42.20     91.20
                      55.52     91.11
                      67.54     91.22
*%-----------------|-------------------------------------------------------------|
*% SUB-AREA 15
*% -----------
CONTINUOUS NASHYD   ID=5  NHYD="15.0" DT= 5.0  AREA= 44.0  HA
                    DWF= 0  CN= 75.0  IA= 9.8  N=2  TP=0.5 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6   NHYD=135   IDI= 4  IDII= 5
*
SAVE HYD            ID=[6],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["Monahan Drain-Fernbank"]
*%===============================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
                    S2-24.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[3]
                    S5-12.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[4]
                    S10-24.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
                    S25-24.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[6]
                    S50-24.stm
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[7]
                    S100-24.stm
*%-----------------|-------------------------------------------------------------|
FINISH
```

```
==============================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M  OOO       999   888 =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  8   8 =========
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O ##  9   9  8   8 Ver. 4.0
     S   W W   M   M  H   H    Y    M   M  O   O      9999   888  Sept 1998
 SSSSS   W W   M   M  H   H    Y    M   M   OOO          9  8   8 =========
                                                     9   9  8   8 # 5320763
      StormWater Management HYdrologic Model          999   888  =========

 ***************************************************************************
 ************************** SWMHYMO-98  Ver/4.0 ****************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                OTTHYMO-83 and OTTHYMO-89.                   *******
 ***************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
 *******                 Ottawa,  Ontario: (613) 727-5199            *******
 *******                 Gatineau, Quebec: (819) 243-6858            *******
 *******                 E-Mail: swmhymo@jfsa.Com                    *******
 ***************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD         +++++++
 +++++++             Nepean               SERIAL#:5320763            +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ***************************************************************************
 *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *******
 *******          Maximum value for ID numbers  :     10             *******
 *******          Max. number of rainfall points:  15000             *******
 *******          Max. number of flow points    :  15000             *******
 ***************************************************************************

 *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
 ***-----------------------------------------------------------------------***
 ***     ID:  Hydrograph IDentification numbers, (1-10).                 ***
 ***   NHYD:  Hydrograph reference numbers, (6 digits or characters).    ***
 ***   AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  ***
 *** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).     ***
 *** TpeakDate_hh:mm is the date and time of the peak flow.              ***
 ***   R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       ***
 ***   R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       ***
 ***      *:  see WARNING or NOTE message printed at end of run.         ***
 ***     **:  see  ERROR  message printed at end of run.                 ***
 ***************************************************************************
 ***************************************************************************

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

 ***************************************************************************

 ********************   S U M M A R Y   O U T P U T   ********************
 ***************************************************************************
 *       DATE: 2009-05-12     TIME: 11:56:38     RUN COUNTER: 001585       *
 ***************************************************************************
 * Input   filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\JR-EX3.*
 * Output  filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\JR-EX3.*
 * Summary filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\JR-EX3.*
 * User comments:                                                          *
 * 1:______________________________________________________________________*
 * 2:______________________________________________________________________*
 * 3:______________________________________________________________________*
 ***************************************************************************



 RUN:COMMAND#
 007:0001-----------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   7 ]
 007:0002------------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = City of Ottawa:  100yr-24hr SCS Type II (60 minute time step
      [SDT=60.00:SDUR=  24.00:PTOT= 106.74]
 007:0003------------------------------------------------------------------------
     DEFAULT VALUES
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\ottawa.def
      ICASEdv  = 1 (read and print data)
      FileTitle= ------ ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
                 ------ PARAMETER VALUES MUST BE ENTERD AFTER COLUMN 60 ----
      Horton's infiltration equation parameters:
      [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F=  .00 mm]
      Parameters for PERVIOUS surfaces in STANDHYD:
      [IAper=   4.67 mm] [LGP=40.00 m] [MNP= .250]
      Parameters for IMPERVIOUS surfaces in STANDHYD:
      [IAimp=   1.57 mm] [CLI= 1.50]   [MNI= .013]
      Parameters used in NASHYD:
      [Ia=   4.67 mm] [N= 2.00]
 007:0004------------------------------------------------------------------------
     COMPUTE API
      [APIini= 20.00: APIkdy= .9000: APIkdt= .9956]
      {APImax=119.41: APIavg= 70.87: APImin= 21.51}
 007:0005--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  10:FA1       48.50    1.751 No_date   13:20   76.17 .714
      [CN= 80.5: N= 2.00]
      [Tp= 1.36:DT= 5.00]
      [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK= .100]
      [InterEventTime=  12.00]
 007:0006--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           10:FA1       48.50    1.751 No_date   13:20   76.17  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-FA1.007
      remark:Faulkner Drain
 007:0007--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 10:FA1       48.50    1.751 No_date   13:20   76.17  n/a
      [RDT= 5.00] out<- 01:R-FA1     48.50    1.608 No_date   14:15   76.17  n/a
      [L/S/n= 1862./ .350/.037]
      {Vmax=  .692:Dmax=  .638}
 007:0008--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  02:FA2      151.00    2.875 No_date   15:35   76.87 .720
      [CN= 81.0: N= 2.00]
      [Tp= 3.14:DT= 5.00]
      [IaREC= 4.00: SMIN= 25.21: SMAX=168.09: SK= .100]
      [InterEventTime=  12.00]
 007:0009--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  03:FA3      331.00    6.640 No_date   15:25   78.93 .739
      [CN= 83.2: N= 2.00]
      [Tp= 3.05:DT= 5.00]
      [IaREC= 4.00: SMIN= 22.08: SMAX=147.18: SK= .100]
      [InterEventTime=  12.00]
 007:0010--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            01:R-FA1     48.50    1.608 No_date   14:15   76.17  n/a
                      + 02:FA2      151.00    2.875 No_date   15:35   76.87  n/a
                      + 03:FA3      331.00    6.640 No_date   15:25   78.93  n/a
      [DT= 5.00]  SUM=  04:FA3      530.50   10.945 No_date   15:05   78.09  n/a
 007:0011--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           04:FA3      530.50   10.945 No_date   15:05   78.09  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-FA3.007
      remark:FA3
 007:0012--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  01:1        237.00    4.400 No_date   15:40   76.17 .714
      [CN= 80.5: N= 2.00]
      [Tp= 3.20:DT= 5.00]
      [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK= .100]
      [InterEventTime=  12.00]
 007:0013--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           01:1        237.00    4.400 No_date   15:40   76.17  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-1.007
      remark:Monahan Drain
 007:0014--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 01:1        237.00    4.400 No_date   15:40   76.17  n/a
      [RDT= 5.00] out<- 02:1        237.00    4.110 No_date   16:55   76.17  n/a
      [L/S/n= 1150./ .050/.035]
      {Vmax=  .246:Dmax=  .728}
 007:0015--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD03:2.4       52.94    4.446 No_date   12:15   89.66 .840
      [XIMP=.35:TIMP=.48]
      [LOSS= 2 :CN= 80.2]
      [Pervious    area: IAper= 9.80:SLPP= .20:LGP=  35.:MNP=.250:SCP=   .0]
      [Impervious  area: IAimp= 2.00:SLPI= .20:LGI=1400.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK= .100]
 007:0016--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  01:2.5       16.90    1.741 No_date   12:00   81.11 .760
      [CN= 80.2: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK= .100]
      [InterEventTime=  12.00]
 007:0017--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            01:2.5       16.90    1.741 No_date   12:00   81.11  n/a
                      + 02:1        237.00    4.110 No_date   16:55   76.17  n/a
                      + 03:2.4       52.94    4.446 No_date   12:15   89.66  n/a
      [DT= 5.00]  SUM=  10:MD-CEL   306.84    6.410 No_date   12:10   78.77  n/a
 007:0018--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:2.1       30.00    3.451 No_date   12:00   94.64 .887
      [XIMP=.48:TIMP=.57]
      [LOSS= 2 :CN= 80.2]
      [Pervious    area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=   .0]
      [Impervious  area: IAimp= 1.57:SLPI=1.50:LGI= 800.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK= .100]
 007:0019--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:2.1       30.00    3.451 No_date   12:00   94.64  n/a
        Major System /  03:2.1maj      .00     .000 No_date    0:00     .00  n/a
        Minor System \  04:2.1min    30.00    2.550 No_date   11:30   94.78  n/a
      {MjSysSto=.1556E+04, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 007:0020--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:2.3       31.20    3.589 No_date   12:00   94.64 .887
      [XIMP=.48:TIMP=.57]
      [LOSS= 2 :CN= 80.2]
      [Pervious    area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=   .0]
      [Impervious  area: IAimp= 1.57:SLPI=1.50:LGI= 800.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK= .100]
 007:0021--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:2.3       31.20    3.589 No_date   12:00   94.64  n/a
        Major System /  05:2.3maj      .02     .059 No_date   12:15   94.64  n/a
        Minor System \  06:2.3min    31.18    2.652 No_date   11:30   94.80  n/a
      {MjSysSto=.1600E+04, TotOvfVol=.1782E+02, N-Ovf=    1, TotDurOvf=    0.hrs
 007:0022--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:2.2        8.25     .893 No_date   12:00   94.64 .887
      [XIMP=.48:TIMP=.57]
      [LOSS= 2 :CN= 80.2]
      [Pervious    area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=   .0]
      [Impervious  area: IAimp= 1.57:SLPI= .20:LGI= 600.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK= .100]
 007:0023--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:2.2        8.25     .893 No_date   12:00   94.64  n/a
        Major System /  07:2.2maj      .00     .000 No_date    0:00     .00  n/a
        Minor System \  08:2.2min     8.25     .701 No_date   11:35   94.62  n/a
      {MjSysSto=.2952E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 007:0024--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            03:2.1maj      .00     .000 No_date    0:00     .00  n/a
                      + 04:2.1min    30.00    2.550 No_date   11:30   94.78  n/a
                      + 05:2.3maj      .02     .059 No_date   12:15   94.64  n/a
                      + 06:2.3min    31.18    2.652 No_date   11:30   94.80  n/a
                      + 07:2.2maj      .00     .000 No_date    0:00     .00  n/a
                      + 08:2.2min     8.25     .701 No_date   11:35   94.62  n/a
      [DT= 5.00]  SUM=  02:2.1-2.    69.45    5.962 No_date   12:15   94.77  n/a
 007:0025--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            02:2.1-2.    69.45    5.962 No_date   12:15   94.77  n/a
                      + 10:MD-CEL   306.84    6.410 No_date   12:10   78.77  n/a
      [DT= 5.00]  SUM=  04:C1-All   376.29   12.315 No_date   12:15   81.72  n/a
 007:0026--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           04:C1-All   376.29   12.315 No_date   12:15   81.72  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-C1-All.007
      remark:MD @ Cell 1
 007:0027--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:4.1       10.00    1.176 No_date   12:00   93.38 .875
      [XIMP=.34:TIMP=.57]
      [LOSS= 2 :CN= 78.1]
      [Pervious    area: IAper= 4.67:SLPP= .60:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious  area: IAimp= 1.57:SLPI= .60:LGI= 350.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 29.88: SMAX=199.22: SK= .100]
 007:0028--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:4.1       10.00    1.176 No_date   12:00   93.38  n/a
        Major System /  02:4.1maj      .01     .020 No_date   12:15   93.38  n/a
        Minor System \  03:4.1min     9.99     .848 No_date   11:25   93.39  n/a
```

```
    {MjSysSto=.6000E+03, TotOvfVol=.7139E+01, N-Ovf=    1, TotDurOvf=    0.hrs
007:0029---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD07:4.2       25.00    2.899 No_date   12:00   94.72 .887
     [XIMP=.38:TIMP=.62]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 4.67:SLPP= .60:LGP=  25.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .60:LGI= 500.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK= .100]
007:0030---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    07:4.2       25.00    2.899 No_date   12:00   94.72  n/a
       Major System /  08:4.2maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  09:4.2min    25.00    2.899 No_date   12:00   94.72  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0031---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:4.3        3.70     .204 No_date   12:05   83.13 .779
     [CN= 78.1: N= 1.20]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK= .100]
     [InterEventTime=  12.00]
007:0032---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:4.3        3.70     .204 No_date   12:05   83.13  n/a
                    +  02:4.1maj      .01     .020 No_date   12:15   93.38  n/a
                    +  08:4.2maj      .00     .000 No_date    0:00     .00  n/a
     [DT= 5.00]  SUM=  05:CELL2I     3.71     .220 No_date   12:15   83.15  n/a
007:0033---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:4.3        3.70     .204 No_date   12:05   83.13  n/a
                    +  02:4.1maj      .01     .020 No_date   12:15   93.38  n/a
                    +  03:4.1min     9.99     .848 No_date   11:25   93.39  n/a
                    +  04:C1-All   376.29   12.315 No_date   12:15   81.72  n/a
                    +  08:4.2maj      .00     .000 No_date    0:00     .00  n/a
                    +  09:4.2min    25.00    2.899 No_date   12:00   94.72  n/a
     [DT= 5.00]  SUM=  05:CEL2TO   414.99   16.072 No_date   12:05   82.80  n/a
007:0034---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:4.4        6.50     .698 No_date   12:00   95.03 .890
     [XIMP=.62:TIMP=.69]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 349.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK= .100]
007:0035---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:4.4        6.50     .698 No_date   12:00   95.03  n/a
       Major System /  02:010531      .00     .000 No_date    0:00     .00  n/a
       Minor System \  03:010532     6.50     .553 No_date   11:35   95.52  n/a
     {MjSysSto=.2009E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0036---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD04:4.5       15.80    1.698 No_date   12:00   95.03 .890
     [XIMP=.62:TIMP=.69]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 349.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK= .100]
007:0037---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:010531      .00     .000 No_date    0:00     .00  n/a
                    +  03:010532     6.50     .553 No_date   11:35   95.52  n/a
                    +  04:4.5       15.80    1.698 No_date   12:00   95.03  n/a
     [DT= 5.00]  SUM=  10:NEW_EN    22.30    2.251 No_date   12:00   95.18  n/a
007:0038---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD02:3.0      285.00    7.165 No_date   14:50   83.22 .780
     [XIMP=.19:TIMP=.31]
     [LOSS= 2 :CN= 78.3]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP= 800.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1900.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK= .100]
007:0039---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            05:CEL2TO   414.99   16.072 No_date   12:05   82.80  n/a
                    +  02:3.0      285.00    7.165 No_date   14:50   83.22  n/a
     [DT= 5.00]  SUM=  03:000108   699.99   22.820 No_date   12:05   82.97  n/a
007:0040---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD04:5.0       85.00    6.168 No_date   12:20   84.40 .791
     [XIMP=.21:TIMP=.35]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1600.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK= .100]
007:0041---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD05:6.0       73.00    4.971 No_date   12:25   82.91 .777
     [XIMP=.18:TIMP=.30]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1800.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK= .100]
007:0042---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD06:7.0        8.00     .813 No_date   12:05   86.81 .813
     [XIMP=.26:TIMP=.43]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  20.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 450.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK= .100]
007:0043---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            03:000108   699.99   22.820 No_date   12:05   82.97  n/a
                    +  04:5.0       85.00    6.168 No_date   12:20   84.40  n/a
                    +  05:6.0       73.00    4.971 No_date   12:25   82.91  n/a
                    +  06:7.0        8.00     .813 No_date   12:05   86.81  n/a
                    +  10:NEW_EN    22.30    2.251 No_date   12:00   95.18  n/a
     [DT= 5.00]  SUM=  07:000110   888.29   35.991 No_date   12:10   83.44  n/a
007:0044---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 07:000110   888.29   35.991 No_date   12:10   83.44  n/a
     [RDT= 5.00] out<- 05:000112   888.29   16.730 No_date   14:15   83.44  n/a
    {MxStoUsed=.1962E+02}
007:0045---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:8.0      285.00    4.361 No_date   16:10   73.99 .693
     [CN= 78.5: N= 1.80]
     [Tp= 3.40:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK= .100]
     [InterEventTime=  12.00]
007:0046---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            05:000112   888.29   16.730 No_date   14:15   83.44  n/a
                    +  06:8.0      285.00    4.361 No_date   16:10   73.99  n/a
     [DT= 5.00]  SUM=  01:000118  1173.29   20.731 No_date   14:35   81.14  n/a
007:0047---------------ID:NHYD------QPEAK-----QAVG--DUR.HRS--ERO.HRS-----EXC.%-
```

```
    EROSION INDEX      01:000118   20.731    2.240   118.08    16.67    14.11
     [QCE=  4.940]
007:0048---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 01:000118  1173.29   20.731 No_date   14:35   81.14  n/a
  *  [RDT= 5.00] out<- 02:000119  1173.29   20.494 No_date   15:15   81.14  n/a
     [L/S/n= 1000./ .050/.035]
     {Vmax=  .485:Dmax= 1.979}
007:0049---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  03:9.0      223.00    4.479 No_date   14:25   73.99 .693
     [CN= 78.6: N= 1.60]
     [Tp= 2.00:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK= .100]
     [InterEventTime=  12.00]
007:0050---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:000119  1173.29   20.494 No_date   15:15   81.14  n/a
                    +  03:9.0      223.00    4.479 No_date   14:25   73.99  n/a
     [DT= 5.00]  SUM=  04:000121  1396.29   24.887 No_date   15:05   80.00  n/a
007:0051---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  05:13.0     110.00    2.986 No_date   13:30   71.71 .672
     [CN= 75.7: N= 1.60]
     [Tp= 1.30:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK= .100]
     [InterEventTime=  12.00]
007:0052---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            04:000121  1396.29   24.887 No_date   15:05   80.00  n/a
                    +  05:13.0     110.00    2.986 No_date   13:30   71.71  n/a
     [DT= 5.00]  SUM=  06:000123  1506.29   27.466 No_date   14:55   79.40  n/a
007:0053---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 06:000123  1506.29   27.466 No_date   14:55   79.40  n/a
  *  [RDT= 5.00] out<- 10:000124  1506.29   27.219 No_date   15:25   79.40  n/a
     [L/S/n= 1000./ .050/.035]
     {Vmax=  .607:Dmax= 1.404}
007:0054---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:10a      157.20    4.064 No_date   14:15   76.17 .714
     [CN= 80.5: N= 2.00]
     [Tp= 2.11:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK= .100]
     [InterEventTime=  12.00]
007:0055---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  * COMPUTE VOLUME     01:10a      157.20    4.064 No_date   14:15   76.17  n/a
007:0056---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           01:10a      157.20    4.064 No_date   14:15   76.17  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-10a.007
     remark:FD @ Fernbank
007:0057---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 01:10a      157.20    4.064 No_date   14:15   76.17  n/a
     [RDT= 5.00] out<- 02:6+948    157.20    3.716 No_date   16:15   76.17  n/a
     [L/S/n= 1427./ .150/.035]
     {Vmax=  .361:Dmax= 1.695}
007:0058---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:10b      163.70    3.427 No_date   13:45   76.17 .714
     [CN= 80.5: N= 1.30]
     [Tp= 1.20:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK= .100]
     [InterEventTime=  12.00]
007:0059---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:10b      163.70    3.427 No_date   13:45   76.17  n/a
                    +  02:6+948    157.20    3.716 No_date   16:15   76.17  n/a
     [DT= 5.00]  SUM=  03:5+219    320.90    6.750 No_date   15:30   76.18  n/a
007:0060---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  * COMPUTE VOLUME     03:5+219    320.90    6.750 No_date   15:30   76.18  n/a
007:0061---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           03:5+219    320.90    6.750 No_date   15:30   76.18  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-5+219.007
     remark:FD @ Flewellyn
007:0062---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 03:5+219    320.90    6.750 No_date   15:30   76.18  n/a
     [RDT= 5.00] out<- 02:5+219    320.90    6.709 No_date   15:35   76.18  n/a
     [L/S/n= 1685./ .150/.035]
     {Vmax= 1.030:Dmax= 1.701}
007:0063---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 02:5+219    320.90    6.709 No_date   15:35   76.18  n/a
     [RDT= 5.00] out<- 03:5+219    320.90    6.152 No_date   17:30   76.18  n/a
     [L/S/n= 1922./ .050/.035]
     {Vmax=  .385:Dmax= 2.118}
007:0064---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  04:10c      271.80    2.423 No_date   18:00   76.17 .714
     [CN= 80.5: N= 1.30]
     [Tp= 3.49:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK= .100]
     [InterEventTime=  12.00]
007:0065---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            03:5+219    320.90    6.152 No_date   17:30   76.18  n/a
                    +  04:10c      271.80    2.423 No_date   18:00   76.17  n/a
     [DT= 5.00]  SUM=  05:1+574    592.70    8.567 No_date   17:30   76.17  n/a
007:0066---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  * COMPUTE VOLUME     05:1+574    592.70    8.567 No_date   17:30   76.17  n/a
007:0067---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 05:1+574    592.70    8.567 No_date   17:30   76.17  n/a
     [RDT= 5.00] out<- 02:1+574    592.70    8.009 No_date   19:50   76.17  n/a
     [L/S/n= 1590./ .100/.035]
     {Vmax=  .259:Dmax= 1.642}
007:0068---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:10d      144.00    1.411 No_date   17:25   76.17 .714
     [CN= 80.5: N= 1.30]
     [Tp= 3.09:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK= .100]
     [InterEventTime=  12.00]
007:0069---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:1+574    592.70    8.009 No_date   19:50   76.17  n/a
                    +  06:10d      144.00    1.411 No_date   17:25   76.17  n/a
     [DT= 5.00]  SUM=  01:0+000    736.70    9.370 No_date   19:40   76.17  n/a
007:0070---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:0+000    736.70    9.370 No_date   19:40   76.17  n/a
                    +  10:000124  1506.29   27.219 No_date   15:25   79.40  n/a
     [DT= 5.00]  SUM=  03:MD-FL   2242.99   34.295 No_date   15:55   78.34  n/a
007:0071---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           03:MD-FL   2242.99   34.295 No_date   15:55   78.34  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-MD-FL.007
     remark:Confluence of Monahan & Flewellyn
007:0072---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 03:MD-FL   2242.99   34.295 No_date   15:55   78.34  n/a
  *  [RDT= 5.00] out<- 04:000127  2242.99   34.201 No_date   16:20   78.34  n/a
     [L/S/n=  850./ .100/.035]
     {Vmax=  .757:Dmax= 2.119}
007:0073---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  05:12.0     376.00    7.342 No_date   14:50   71.71 .672
```

```
      [CN= 75.4: N= 1.80]
      [Tp= 2.40:DT= 5.00]
      [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK= .100]
      [InterEventTime=  12.00]
 007:0074---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            04:000127  2242.99   34.201 No_date   16:20   78.34  n/a
                     +  05:12.0     376.00    7.342 No_date   14:50   71.71  n/a
      [DT= 5.00]  SUM=  06:000129  2618.99   41.149 No_date   16:05   77.38  n/a
 007:0075---------------ID:NHYD------QPEAK-----QAVG--DUR.HRS--ERO.HRS-----EXC.%-
     EROSION INDEX     06:000129   41.149    4.605   122.25    17.50    14.31
      [QCE= 10.380]
 007:0076---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 06:000129  2618.99   41.149 No_date   16:05   77.38  n/a
  *   [RDT= 5.00] out<- 01:000130  2618.99   41.123 No_date   16:10   77.38  n/a
      [L/S/n=  400./ .100/.035]
      {Vmax=  .621:Dmax= 1.483}
 007:0077---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  02:14.0      50.00    2.239 No_date   12:50   71.71 .672
      [CN= 75.0: N= 2.00]
      [Tp=  .90:DT= 5.00]
      [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK= .100]
      [InterEventTime=  12.00]
 007:0078---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            01:000130  2618.99   41.123 No_date   16:10   77.38  n/a
                     +  02:14.0      50.00    2.239 No_date   12:50   71.71  n/a
      [DT= 5.00]  SUM=  03:000132  2668.99   41.797 No_date   16:05   77.28  n/a
 007:0079---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 03:000132  2668.99   41.797 No_date   16:05   77.28  n/a
  *   [RDT= 5.00] out<- 04:000133  2668.99   41.738 No_date   16:20   77.28  n/a
      [L/S/n=  700./ .100/.035]
      {Vmax=  .824:Dmax= 1.788}
 007:0080---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  05:15.0      44.00    2.897 No_date   12:15   71.71 .672
      [CN= 75.0: N= 2.00]
      [Tp=  .50:DT= 5.00]
      [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK= .100]
      [InterEventTime=  12.00]
 007:0081---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            04:000133  2668.99   41.738 No_date   16:20   77.28  n/a
                     +  05:15.0      44.00    2.897 No_date   12:15   71.71  n/a
      [DT= 5.00]  SUM=  06:000135  2712.99   42.095 No_date   16:15   77.19  n/a
 007:0082---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           06:000135  2712.99   42.095 No_date   16:15   77.19  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-EX\H-000135.007
      remark:Monahan Drain-Fernbank
 007:0002-----------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 007:0048 ROUTE CHANNEL   ->
      *** WARNING: TRAVEL TIME TABLE was exceeded
 007:0053 ROUTE CHANNEL   ->
      *** WARNING: TRAVEL TIME TABLE was exceeded
 007:0055 COMPUTE VOLUME
      *** WARNING: Calculated volume may not be the maximum.
 007:0060 COMPUTE VOLUME
      *** WARNING: Calculated volume may not be the maximum.
 007:0066 COMPUTE VOLUME
      *** WARNING: Calculated volume may not be the maximum.
 007:0072 ROUTE CHANNEL   ->
      *** WARNING: TRAVEL TIME TABLE was exceeded
 007:0076 ROUTE CHANNEL   ->
      *** WARNING: TRAVEL TIME TABLE was exceeded
 007:0079 ROUTE CHANNEL   ->
      *** WARNING: TRAVEL TIME TABLE was exceeded
   Simulation ended on 2009-05-12     at 11:56:43
================================================================================
```

```
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[4.31](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P7maj"],
                    MINID=[3], MinNHYD=["P7min"],
                    TMJSTO=[2156](cu-m)
*
CONTINUOUS NASHYD   ID=[6], NHYD=["SWM7"], DT=[5]min, AREA=[3.35](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[4], NHYD=["P7in"], IDs to add=[2,3,6]
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["P7out"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                  [   0.000 ,  0.0000 ]
                                  [   0.030 ,  0.200  ]
                                  [   0.185 ,  1.000  ]
                                  [   0.285 ,  1.300  ]
                                  [   0.360 ,  1.600  ]
                                  [   0.480 ,  1.950  ]
                                  [   0.540 ,  2.250  ]
                                  [   0.620 ,  2.650  ]
                                  [     -1  ,  -1     ]  (max twenty pts)
* -----------------------------------
* Monahan P8 (South Pond)
* -----------------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P8"], DT=[5](min), AREA=[62.57](ha),
                    XIMP=[0.42], TIMP=[0.53], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[1.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[950](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[6.25](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P8maj"],
                    MINID=[3], MinNHYD=["P8min"],
                    TMJSTO=[3123](cu-m)
*
CONTINUOUS NASHYD   ID=[6], NHYD=["SWM8"], DT=[5]min, AREA=[4.06](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[5], NHYD=["P8in"], IDs to add=[2,3,6]
*
ROUTE RESERVOIR     IDout=[8],   NHYD=["P8out"],  IDin=[5],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                  [   0.000 ,  0.0000 ]
                                  [   0.040 ,  0.269  ]
                                  [   0.370 ,  1.600  ]
                                  [   0.490 ,  2.150  ]
                                  [   0.680 ,  2.480  ]
                                  [   0.830 ,  3.020  ]
                                  [   0.950 ,  3.300  ]
                                  [   1.250 ,  3.830  ]
                                  [     -1  ,  -1     ]  (max twenty pts)
*
CONTINUOUS NASHYD   ID=[1], NHYD=["MD"], DT=[5]min, AREA=[3.38](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[2], NHYD=["MDpre"], IDs to add=[1,4,5,9]
*
ADD HYD             IDsum=[2], NHYD=["MDpost"], IDs to add=[1,7,8,10]
*
SAVE HYD            ID=[2],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["MD-TFD Post-Dev"]
*%-----------------|-----------------------------------------------------------|
*% SUB-AREA 2: SOHO West Lands
*% --------------------------
*% Area 2.4 - 52.94 ha
*% Ex. dev north of SOHO West, incl. 8.27 ha Hydro Easement
*% -------------------------------------------------------
CONTINUOUS STANDHYD ID=3  NHYD=["2.4"]  DT= 5  AREA= 52.94 HA
                    XIMP= 0.35  TIMP= 0.48  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        9.80   0.2     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        2.00   0.2   1400  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
```

```
                    InterEventTime=[12](hrs),   END=-1
*
*% Area 2.5 - 16.9 ha
*% Undeveloped land east of Terry Fox Drive
*% ----------------------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["2.5"], DT=[5]min, AREA=[16.9](ha),
                    DWF=[0](cms), CN/C=[80.2], IA=[4.67] (mm)
                    N=[2], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[10], NHYD=["MD-CELL1"], IDs to add=[1,2,3]
*
*% Area 2.1 - 30.0 ha
*% -------------------
CONTINUOUS STANDHYD ID=1  NHYD="2.1"  DT= 5  AREA= 30.0  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   1.5    800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[2.550](cms), NINLET=[1],
                    MAJID=[3], MajNHYD=["2.1maj"],
                    MINID=[4], MinNHYD=["2.1min"],
                    TMJSTO=[1600](cu-m)
*
*% Area 2.3 - 31.20 ha
*% -------------------
CONTINUOUS STANDHYD ID=1  NHYD="2.3"  DT= 5  AREA= 31.20  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   1.5    800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[2.652](cms), NINLET=[1],
                    MAJID=[5], MajNHYD=["2.3maj"],
                    MINID=[6], MinNHYD=["2.3min"],
                    TMJSTO=[1600](cu-m)
*
*% Area 2.2 - 8.25 ha
*% -----------------
CONTINUOUS STANDHYD ID=1  NHYD="2.2"  DT= 5  AREA= 8.25  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   0.2    600  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.701](cms), NINLET=[1],
                    MAJID=[7], MajNHYD=["2.2maj"],
                    MINID=[8], MinNHYD=["2.2min"],
                    TMJSTO=[410](cu-m)
*
ADD HYD             IDsum=[2], NHYD=["2.1-2.3"], IDs to add=[3,4,5,6,7,8]
*
ADD HYD             IDsum=[4], NHYD=["C1-All"], IDs to add=[2,10]
*
*******************************************************
*  ID=4:  Monahan Drain @ East of Terry Fox (Cell 1)  *
*******************************************************
SAVE HYD            ID=[4],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["MD @ Cell 1"]
*%-----------------|-----------------------------------------------------------|
*% SUB-AREA 4: Bridlewood Trails
*% ----------------------------
*% Area 4.1: Residential Lands West of Eagleson
*% -----------------------------------------
CONTINUOUS STANDHYD ID=1  NHYD="4.1"  DT= 5  AREA= 10.0 HA
                    XIMP= 0.34  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   0.6     25   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        1.57   0.6    350  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.848](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["4.1maj"],
                    MINID=[3], MinNHYD=["4.1min"],
                    TMJSTO=[600](cu-m)
*
*% Area 4.2: Commercial/Residential lands west of Eagleson
*% ---------------------------------------------------
CONTINUOUS STANDHYD ID=7  NHYD="4.2"  DT= 5  AREA= 25.0  HA
                    XIMP= 0.38  TIMP= 0.62  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   0.6     25   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        1.57   0.6    500  0.013  0.0
                    Continuous simulation parameters:
```

```
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[7], CINLET=[3.3](cms), NINLET=[1],
                    MAJID=[8], MajNHYD=["4.2maj"],
                    MINID=[9], MinNHYD=["4.2min"],
                    TMJSTO=[1250](cu-m)
*
*% Area 4.3: SWM Block
*% -----------------
CONTINUOUS NASHYD   ID=[1], NHYD=["4.3"], DT=[5]min, AREA=[3.7](ha),
                    DWF=[0.0](cms), CN/C=[78.1], IA=[0.25]hrs,
                    N=[1.2], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[5], NHYD=["CELL2IN"], IDs to add=[1,2,8]
*
ADD HYD             IDsum=[5], NHYD=["CEL2TOT"], IDs to add=[1,2,3,4,8,9]
*
*% Area 4.4: New Englanders Subdivision - East of Eagleson
*% ----------------------------------------------------------
CONTINUOUS STANDHYD ID=1  NHYD="4.4"  DT= 5  AREA= 6.5  HA
                    XIMP= 0.62  TIMP= 0.69  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP    SCP
                                        9.80   0.2     50   0.250  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI    SCI
                                        2.00   0.2    349   0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.553](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=[10531],
                    MINID=[3], MinNHYD=[10532],
                    TMJSTO=[300](cu-m)
*
*% Area 4.5:  Wetland Cell
*% -----------------------
CONTINUOUS STANDHYD ID=4  NHYD="4.5"  DT= 5  AREA= 15.8  HA
                    XIMP= 0.62  TIMP= 0.69  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP    SCP
                                        9.80   0.2     50   0.250  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI    SCI
                                        2.00   0.2    349   0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
ADD HYD             IDsum=[10], NHYD=["NEW_ENG"], IDs to add=[2,3,4]
*%----------------|-----------------------------------------------------------|
*% SUB-AREA 3: Residential U/S of Cell 3
*% ------------------------------------
CONTINUOUS STANDHYD ID=2  NHYD="3.0"  DT= 5  AREA= 285.0  HA
                    XIMP= 0.19  TIMP= 0.31  DWF=0.0 LOSS=2
                    CN= 78.3
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2    800   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1900  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
ADD HYD             IDsum=[3], NHYD=[108], IDs to add=[5,2]
*%----------------|-----------------------------------------------------------|
*% SUB-AREA 5: Residential to Wetland Cell North
*% --------------------------------------------
CONTINUOUS STANDHYD ID=4  NHYD="5.0"  DT= 5  AREA= 85.0  HA
                    XIMP= 0.21  TIMP= 0.35  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     50   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1600  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|-----------------------------------------------------------|
*% SUB-AREA 6
*% ----------
CONTINUOUS STANDHYD ID=5  NHYD="6.0"  DT= 5  AREA= 73.0  HA
                    XIMP= 0.18  TIMP= 0.30  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     50   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|-----------------------------------------------------------|
*% SUB-AREA 7
*% ----------
CONTINUOUS STANDHYD ID=6  NHYD="7.0"  DT= 5  AREA= 8.0  HA
                    XIMP= 0.26  TIMP= 0.43  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     20   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2    450  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%----------------|-----------------------------------------------------------|
* Total Inflow to Monahan drain Constructed Wetlands (Areas 1-7)
* ---------------------------------------------------------------
ADD HYD             IDsum=[7], NHYD=[110], IDs to add=[3,4,5,6,10]
*%----------------|-----------------------------------------------------------|
* Monahan Drain Constructed Wetlands:
* ---------------------------------------------------------------------------|
ROUTE RESERVOIR     IDOUT = 5 NHYD=112 IDIN = 7 DT = 5
                      Qp(cms)   Vol(ha*m)
                        0.00      0.0
                        0.76     1.50
                        2.11     5.35
                        4.28     9.70
                        8.18    12.84
                       10.50    15.50
                       14.03    18.33
                       18.94    20.67
                       23.24    21.64
                       27.87    22.42
*
****************************************************
* ID=5: HYDROGRAPH U/S OF HOPE SIDE RD BOX CULVERT *
****************************************************
*% SUB-AREA 8
*% ----------
CONTINUOUS NASHYD   ID=[6], NHYD=["8.0"], DT=[5]min, AREA=[285](ha),
                    DWF=[0](cms),  CN/C=[78.5], IA=[9.8](mm),
                    N=[1.8], TP=[3.40]hrs - from JLR Report
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=1   NHYD=118   IDI= 5  IDII= 6
*%----------------|-----------------------------------------------------------|
* Erosion Potential D/S of Hope Side Road
* -------------------------------------
EROSION INDEX       INDEX_METHOD=[1], QCE=[4.94](cms)
                    IDSerosion=[1]
*
ROUTE CHANNEL       IDOUT=2  NHYD=119  IDIN=1   DT=5
                    CHLGTH= 1000 CHSLP= 0.05 FPSLP= 0.05
                    VSN= 4  NSEG= 3
                       N    DIST(M)
                     0.075    37.5
                    -0.035    45.97
                     0.075    67.86
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                        0.00   94.86
                       10.51   94.08
                       23.87   93.41
                       32.46   93.27
                       37.50   92.63
                       40.26   92.11
                       42.38   91.53
                       44.40   91.59
                       45.97   91.67
                       47.71   91.85
                       49.23   92.69
                       51.93   92.96
                       61.03   92.98
                       67.86   93.51
*%----------------|-----------------------------------------------------------|
*% SUB-AREA 9
*% ----------
CONTINUOUS NASHYD   ID=[3], NHYD=["9.0"], DT=[5]min, AREA=[223.0](ha),
                    DWF=[0](cms),  CN/C=[78.6], IA=[9.8](mm),
                    N=[1.6], TP=[2.0]hrs - from JLR Report
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=4   NHYD=121   IDI= 2  IDII= 3
*%----------------|-----------------------------------------------------------|
*% SUB-AREA 13
*% ----------
CONTINUOUS NASHYD   ID=[5], NHYD=["13.0"], DT=[5]min, AREA=[110.0](ha),
                    DWF=[0](cms),  CN/C=[75.7], IA=[9.8](mm),
                    N=[1.6], TP=[1.3]hrs - from JLR Report
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6   NHYD=123   IDI= 4  IDII= 5
*
ROUTE CHANNEL       IDOUT=10  NHYD=124  IDIN=6   DT=5
                    CHLGTH= 1000 CHSLP= 0.05 FPSLP= 0.05
                    VSN= 5  NSEG= 3
                       N    DIST(M)
                     0.075    2.55
                    -0.035    11.67
                     0.075    57.85
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00    92.58
                       2.55    91.70
                       3.78    91.17
                      10.99    91.32
                      11.67    91.68
                      20.62    93.08
```

```
                    39.00    93.49
                    57.85    93.60
*%----------------|----------------------------------------------------------|
*% Area 10:  Flewellyn Drain (POST-DEV)
*% ------------------------
*% 10a - U/S of Station 6+948 - Now refered to as P5
*% --------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P5a"], DT=[5](min), AREA=[44.37](ha),
                    XIMP=[0.32], TIMP=[0.40], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[700](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[4.44](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P5Amaj"],
                    MINID=[3], MinNHYD=["P5Amin"],
                    TMJSTO=[2219](cu-m)
*
CONTINUOUS STANDHYD ID=[1], NHYD=["P5b"], DT=[5](min), AREA=[94.19](ha),
                    XIMP=[0.32], TIMP=[0.40], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80.5],
                    Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[2400](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[9.42](cms), NINLET=[1],
                    MAJID=[4], MajNHYD=["P5Bmaj"],
                    MINID=[5], MinNHYD=["P5Bmin"],
                    TMJSTO=[4710](cu-m)
*
CONTINUOUS NASHYD   ID=[6], NHYD=["SWMF5"], DT=[5]min, AREA=[7.72](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[7], NHYD=["P5IN"], IDs to add=[2,3,4,5,6]
*
ROUTE RESERVOIR     IDout=[1],   NHYD=["P5out"],  IDin=[7],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [  0.000 , 0.000 ]
                                    [  0.090 , 0.575 ]
                                    [  1.060 , 2.455 ]
                                    [  1.630 , 3.590 ]
                                    [  2.350 , 4.110 ]
                                    [  2.850 , 4.820 ]
                                    [  3.160 , 5.470 ]
                                    [  3.600 , 6.380 ]
                                    [    -1  ,   -1  ]  (max twenty pts)
*
SAVE HYD            ID=[1],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["Post-Dev @ Fernbank Rd"]
*
COMPUTE VOLUME      ID=[1], STRATE=[2.50](cms), RELRATE=[2.50](cms)
*%----------------|----------------------------------------------------------|
ROUTE CHANNEL       IDout=[2], NHYD=["6+948"], IDin=[1],
                    RDT=[5](min),
                    CHLGTH=[1427](m),  CHSLOPE=[.15](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-1.72 -0.035,1.72 0.075,51.7
                    ( DISTANCE (m), ELEVATION (m))=[[-101.98,36.13
                                                     -1.98,35.63
                                                     -0.46,34.12
                                                      0.46,34.12
                                                      1.98,35.63
                                                      101.98,36.13
                                                        -1,-1]
*
*% 10b - U/S of Station 5+219
*% --------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["10b"], DT=[5]min, AREA=[163.70](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[1.20]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[3], NHYD=["5+219"], IDs to add=[1,2]
*
COMPUTE VOLUME      ID=[3], STRATE=[2.80](cms), RELRATE=[2.80](cms)
*********************************************
*  ID=3:  Flewellyn Drain @ Flewellyn Road  *
*********************************************
SAVE HYD            ID=[3],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["FD @ Flewellyn"]
*%----------------|----------------------------------------------------------|
ROUTE CHANNEL       IDout=[2], NHYD=["5+219"], IDin=[3],
                    RDT=[5](min),
                    CHLGTH=[1685](m),  CHSLOPE=[.15](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-3.48 -0.035,3.48 0.075,53.4
                    ( DISTANCE (m), ELEVATION (m))=[-103.48,102.20
                                                     -3.48,101.70
                                                     -0.76,99.71
                                                      0.76,99.71
                                                      3.48,101.70
                                                     103.48,102.20
                                                        -1,-1]
*
ROUTE CHANNEL       IDout=[3], NHYD=["5+219"], IDin=[2],
                    RDT=[5](min),
                    CHLGTH=[1922](m),  CHSLOPE=[.05](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-3.13 -0.035,4.26  0.075,7.2
                    ( DISTANCE (m), ELEVATION (m))=[-103.13,98.85
                                                     -3.13,98.35
                                                     -0.40,96.53
                                                      0.40,96.53
                                                      4.26,99.10
                                                      7.26,99.16
                                                        -1,-1]
*% 10c - U/S of Station 1+574
*% --------------------------
CONTINUOUS NASHYD   ID=[4], NHYD=["10c"], DT=[5]min, AREA=[271.80](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[3.49]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[5], NHYD=["1+574"], IDs to add=[3,4]
*
COMPUTE VOLUME      ID=[5], STRATE=[3.93](cms), RELRATE=[3.93](cms)
********************************************
*  ID=5:  Flewellyn Drain @ Eagleson Road  *
********************************************
*
ROUTE CHANNEL       IDout=[2], NHYD=["1+574"], IDin=[5],
                    RDT=[5](min),
                    CHLGTH=[1590](m),  CHSLOPE=[.10](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-2.19 -0.035,2.19 0.075,52.1
                    ( DISTANCE (m), ELEVATION (m))=[-102.19,95.70
                                                     -2.19,95.20
                                                     -0.61,93.93
                                                      0.61,93.93
                                                      2.19,95.20
                                                     102.19,95.70
                                                        -1,-1]
*
*% 10d - U/S of Station 0+000
*% --------------------------
CONTINUOUS NASHYD   ID=[6], NHYD=["10d"], DT=[5]min, AREA=[144.00](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[3.09]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["0+000"], IDs to add=[2,6]
*%----------------|----------------------------------------------------------|
ADD HYD             IDsum=[3], NHYD=["MD-FL"], IDs to add=[1,10]
*
SAVE HYD            ID=[3],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["Confluence of Monahan & Flewellyn"]
*%----------------|----------------------------------------------------------|
ROUTE CHANNEL       IDOUT=4 NHYD="127" IDIN=3  DT=5
                    CHLGTH= 850 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 6  NSEG= 3
                      N    DIST(M)
                     0.075    24.87
                    -0.035    33.95
                     0.075    68.67
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00     93.21
                      13.87     92.77
                      24.87     91.51
                      30.62     91.09
                      32.86     91.11
                      33.95     91.53
                      38.58     92.48
                      53.68     93.35
                      68.67     93.35
*%----------------|----------------------------------------------------------|
*% SUB-AREA 12
*% ----------
CONTINUOUS NASHYD   ID=5 NHYD="12.0"  DT= 5  AREA=376.0  HA
                    DWF= 0  CN= 75.4  IA= 9.8  N=1.8  TP=2.4 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6  NHYD=129  IDI= 4  IDII= 5
*%----------------|----------------------------------------------------------|
* Erosion Potential @ Fallowfield Road
* ----------------------------------
EROSION INDEX       INDEX_METHOD=[1], QCE=[10.38](cms)
                    IDSerosion=[6]
*
ROUTE CHANNEL       IDOUT=1  NHYD="130"  IDIN=6   DT=5
```

```
                    CHLGTH= 400 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 7  NSEG= 3
                       N    DIST(M)
                     0.075    20.39
                    -0.035    25.24
                     0.075    57.64
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                        0.00    93.37
                       15.07    92.85
                       18.98    91.47
                       20.39    91.07
                       24.12    90.97
                       25.24    91.46
                       28.07    92.15
                       44.18    92.42
                       57.64    92.46
*%-----------------|------------------------------------------------------------|
*% SUB-AREA 14
*% -----------
CONTINUOUS NASHYD   ID=2  NHYD="14.0" DT= 5  AREA= 50.0  HA
                    DWF= 0  CN= 75.0  IA= 9.8  N=2  TP=0.9 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=3   NHYD=132   IDI= 1  IDII= 2
*
ROUTE CHANNEL       IDOUT=4  NHYD="133"  IDIN=3   DT=5
                    CHLGTH= 700 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 7  NSEG= 3
                       N    DIST(M)
                    0.075    31.96
                    -0.035    39.90
                     0.075    67.54
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00     92.92
                      15.27     92.79
                      25.71     92.03
                      31.96     90.58
                      32.58     90.61
                      34.04     90.06
                      37.40     89.43
                      39.90     89.77
                      41.05     90.60
                      42.20     91.20
                      55.52     91.11
                      67.54     91.22
*%-----------------|------------------------------------------------------------|
*% SUB-AREA 15
*% -----------
CONTINUOUS NASHYD   ID=5  NHYD="15.0" DT= 5  AREA= 44.0  HA
                    DWF= 0  CN= 75.0  IA= 9.8  N=2  TP=0.5 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6   NHYD=135   IDI= 4  IDII= 5
*
SAVE HYD            ID=[6],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["MD @ JR"]
*%=============================================================================|
*%                    ID=6: MONAHAN DRAIN @ JOCK RIVER
*%=============================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
                    S2-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[3]
                    S5-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[4]
                    S10-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
                    S25-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[6]
                    S50-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[7]
                    S100-24.stm
*%-----------------|------------------------------------------------------------|
FINISH
```

```
==========================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M  OOO       999    888 =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  8   8 =========
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  8   8 Ver. 4.0
     S   W W   M   M  H   H    Y    M   M  O   O      9999   888  Sept 1998
 SSSSS   W W   M   M  H   H    Y    M   M   OOO          9  8   8 =========
                                                      9   9  8   8 # 5320763
      StormWater Management HYdrologic Model           999    888 =========

 **************************************************************************
 *************************** SWMHYMO-98  Ver/4.0 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                  OTTHYMO-83 and OTTHYMO-89.                 *******
 **************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
 *******                  Ottawa,  Ontario: (613) 727-5199           *******
 *******                  Gatineau, Quebec: (819) 243-6858           *******
 *******                  E-Mail: swmhymo@jfsa.Com                   *******
 **************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD        +++++++
 +++++++                Nepean               SERIAL#:5320763        +++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 **************************************************************************
 *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *******
 *******          Maximum value for ID numbers  :     10             *******
 *******          Max. number of rainfall points:  15000             *******
 *******          Max. number of flow points    :  15000             *******
 **************************************************************************

 *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
 ***-------------------------------------------------------------------***
 ***     ID:  Hydrograph IDentification numbers, (1-10).                ***
 ***  NHYD:  Hydrograph reference numbers, (6 digits or characters).   ***
 ***  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  ***
 *** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    ***
 *** TpeakDate_hh:mm is the date and time of the peak flow.             ***
 ***  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       ***
 ***  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       ***
 ***     *:  see WARNING or NOTE message printed at end of run.         ***
 ***    **:  see  ERROR  message printed at end of run.                 ***
 **************************************************************************
 **************************************************************************

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

 **************************************************************************

 ********************   S U M M A R Y   O U T P U T   ********************
 **************************************************************************
 *       DATE: 2009-05-12     TIME: 19:31:36     RUN COUNTER: 001639      *
 **************************************************************************
 * Input   filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\JR-D3.da*
 * Output  filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\JR-D3.ou*
 * Summary filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\JR-D3.su*
 * User comments:                                                          *
 * 1:______________________________________________________________________*
 * 2:______________________________________________________________________*
 * 3:______________________________________________________________________*
 **************************************************************************

 RUN:COMMAND#
 007:0001------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   7 ]
 007:0002-------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = City of Ottawa:  100yr-24hr SCS Type II (60 minute time step
      [SDT=60.00:SDUR=  24.00:PTOT= 106.74]
 007:0003-------------------------------------------------------------------
     DEFAULT VALUES
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\ottawa.def
      ICASEdv  = 1 (read and print data)
      FileTitle= ------ ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
                 ------ PARAMETER VALUES MUST BE ENTERD AFTER COLUMN 60 ----
      Horton's infiltration equation parameters:
      [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F=  .00 mm]
      Parameters for PERVIOUS surfaces in STANDHYD:
      [IAper=   4.67 mm] [LGP=40.00 m] [MNP= .250]
      Parameters for IMPERVIOUS surfaces in STANDHYD:
      [IAimp=   1.57 mm] [CLI= 1.50]   [MNI= .013]
      Parameters used in NASHYD:
      [Ia=   4.67 mm] [N= 2.00]
 007:0004-------------------------------------------------------------------
     COMPUTE API
      [APIini= 20.00: APIkdy= .9000: APIkdt= .9956]
      {APImax=119.41: APIavg= 70.87: APImin= 21.51}
 007:0005--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P4a       42.61    3.497 No_date   12:15   91.50 .857
      [XIMP=.35:TIMP=.44]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=2153.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 007:0006--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:P4a       42.61    3.497 No_date   12:15   91.50  n/a
        Major System /  02:P4amaj      .00     .000 No_date    0:00     .00  n/a
        Minor System \  03:P4amin    42.61    3.497 No_date   12:15   91.50  n/a
      {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 007:0007--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P4b       15.33    1.531 No_date   12:05   91.50 .857
      [XIMP=.35:TIMP=.44]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .25:LGI= 767.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 007:0008--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
```

```
     COMPUTE DUALHYD    01:P4b       15.33    1.531 No_date   12:05   91.50  n/a
        Major System /  04:P4bmaj      .00     .000 No_date    0:00     .00  n/a
        Minor System \  05:P4bmin    15.33    1.531 No_date   12:05   91.50  n/a
      {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 007:0009--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  06:P4c        3.61     .405 No_date   12:00   90.82 .851
      [CN= 90.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
      [InterEventTime=  12.00]
 007:0010--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            02:P4amaj      .00     .000 No_date    0:00     .00  n/a
                      + 03:P4amin    42.61    3.497 No_date   12:15   91.50  n/a
                      + 04:P4bmaj      .00     .000 No_date    0:00     .00  n/a
                      + 05:P4bmin    15.33    1.531 No_date   12:05   91.50  n/a
                      + 06:P4c        3.61     .405 No_date   12:00   90.82  n/a
      [DT= 5.00]  SUM=  01:P4in      61.55    5.297 No_date   12:10   91.46  n/a
 007:0011--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 01:P4in      61.55    5.297 No_date   12:10   91.46  n/a
      [RDT= 5.00] out<- 02:P4out     61.55    1.749 No_date   13:45   91.46  n/a
      {MxStoUsed=.2959E+01}
 007:0012--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           02:P4out     61.55    1.749 No_date   13:45   91.46  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-P4out.007
      remark:P4 Post-Dev
 007:0013--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 02:P4out     61.55    1.749 No_date   13:45   91.46  n/a
      [RDT= 5.00] out<- 06:R-FA1     61.55    1.593 No_date   14:40   91.46  n/a
      [L/S/n= 1862./ .350/.037]
      {Vmax=  .693:Dmax=  .638}
 007:0014--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  02:FA2      151.00    2.875 No_date   15:35   76.87 .720
      [CN= 81.0: N= 2.00]
      [Tp= 3.14:DT= 5.00]
      [IaREC= 4.00: SMIN= 25.21: SMAX=168.09: SK= .100]
      [InterEventTime=  12.00]
 007:0015--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  03:FA3      331.00    6.640 No_date   15:25   78.93 .739
      [CN= 83.2: N= 2.00]
      [Tp= 3.05:DT= 5.00]
      [IaREC= 4.00: SMIN= 22.08: SMAX=147.18: SK= .100]
      [InterEventTime=  12.00]
 007:0016--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            06:R-FA1     61.55    1.593 No_date   14:40   91.46  n/a
                      + 02:FA2      151.00    2.875 No_date   15:35   76.87  n/a
                      + 03:FA3      331.00    6.640 No_date   15:25   78.93  n/a
      [DT= 5.00]  SUM=  04:FA3      543.55   11.034 No_date   15:15   79.77  n/a
 007:0017--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           04:FA3      543.55   11.034 No_date   15:15   79.77  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-FA3.007
      remark:FA3
 007:0018--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P6a       55.91    4.646 No_date   12:15   92.69 .868
      [XIMP=.39:TIMP=.49]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=2200.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 007:0019--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:P6a       55.91    4.646 No_date   12:15   92.69  n/a
        Major System /  02:P6amaj      .00     .000 No_date    0:00     .00  n/a
        Minor System \  03:P6amin    55.91    4.646 No_date   12:15   92.69  n/a
      {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 007:0020--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P6b       42.74    3.808 No_date   12:10   92.69 .868
      [XIMP=.39:TIMP=.49]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=1600.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 007:0021--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:P6b       42.74    3.808 No_date   12:10   92.69  n/a
        Major System /  04:P6bmaj      .00     .000 No_date    0:00     .00  n/a
        Minor System \  05:P6bmin    42.74    3.808 No_date   12:10   92.69  n/a
      {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 007:0022--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS NASHYD  06:SWM6       4.75     .532 No_date   12:00   90.82 .851
      [CN= 90.0: N= 2.00]
      [Tp=  .25:DT= 5.00]
      [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
      [InterEventTime=  12.00]
 007:0023--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ADD HYD            02:P6amaj      .00     .000 No_date    0:00     .00  n/a
                      + 03:P6amin    55.91    4.646 No_date   12:15   92.69  n/a
                      + 04:P6bmaj      .00     .000 No_date    0:00     .00  n/a
                      + 05:P6bmin    42.74    3.808 No_date   12:10   92.69  n/a
                      + 06:SWM6       4.75     .532 No_date   12:00   90.82  n/a
      [DT= 5.00]  SUM=  09:P6in     103.40    8.866 No_date   12:15   92.60  n/a
 007:0024--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 09:P6in     103.40    8.866 No_date   12:15   92.60  n/a
      [RDT= 5.00] out<- 06:P6out    103.40    2.398 No_date   14:05   92.60  n/a
      {MxStoUsed=.5155E+01}
 007:0025--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     SAVE HYD           06:P6out    103.40    2.398 No_date   14:05   92.60  n/a
      fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-P6out.007
      remark:P6 Post-Dev
 007:0026--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE CHANNEL   -> 06:P6out    103.40    2.398 No_date   14:05   92.60  n/a
      [RDT= 5.00] out<- 10:P6rte    103.40    2.391 No_date   14:15   92.60  n/a
      [L/S/n=  700./ .250/.035]
      {Vmax=  .977:Dmax=  .897}
 007:0027--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P7        43.09    4.717 No_date   12:00   89.61 .840
      [XIMP=.29:TIMP=.36]
      [LOSS= 2 :CN= 80.5]
      [Pervious     area: IAper= 4.67:SLPP=1.50:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 550.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 26.32: SMAX=175.50: SK=1.000]
 007:0028--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     COMPUTE DUALHYD    01:P7        43.09    4.717 No_date   12:00   89.61  n/a
        Major System /  02:P7maj       .00     .000 No_date    0:00     .00  n/a
        Minor System \  03:P7min     43.09    4.310 No_date   11:50   89.70  n/a
      {MjSysSto=.3011E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
 007:0029--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
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    CONTINUOUS NASHYD  06:SWM7       3.35     .375 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0030---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:P7maj       .00     .000 No_date    0:00     .00  n/a
                     + 03:P7min     43.09    4.310 No_date   11:50   89.70  n/a
                     + 06:SWM7       3.35     .375 No_date   12:00   90.82  n/a
     [DT= 5.00]  SUM=  04:P7in      46.44    4.685 No_date   12:00   89.78  n/a
007:0031---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:P7in      46.44    4.685 No_date   12:00   89.78  n/a
 *   [RDT= 5.00] out<- 07:P7out     46.44     .620 No_date   14:10   89.78  n/a
    {MxStoUsed=.2653E+01}
007:0032---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P8        62.57    6.756 No_date   12:00   93.64 .877
     [XIMP=.42:TIMP=.53]
     [LOSS= 2 :CN= 80.5]
     [Pervious     area: IAper= 4.67:SLPP=1.50:LGP=  40.:MNP=.200:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 950.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0033---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:P8        62.57    6.756 No_date   12:00   93.64  n/a
       Major System /  02:P8maj       .00     .000 No_date    0:00     .00  n/a
       Minor System \  03:P8min     62.57    6.250 No_date   11:50   93.90  n/a
    {MjSysSto=.3881E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0034---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:SWM8       4.06     .455 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0035---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:P8maj       .00     .000 No_date    0:00     .00  n/a
                     + 03:P8min     62.57    6.250 No_date   11:50   93.90  n/a
                     + 06:SWM8       4.06     .455 No_date   12:00   90.82  n/a
     [DT= 5.00]  SUM=  05:P8in      66.63    6.705 No_date   12:00   93.71  n/a
007:0036---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 05:P8in      66.63    6.705 No_date   12:00   93.71  n/a
     [RDT= 5.00] out<- 08:P8out     66.63    1.228 No_date   13:45   93.71  n/a
    {MxStoUsed=.3791E+01}
007:0037---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:MD         3.38     .335 No_date   12:00   76.18 .714
     [CN= 80.5: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0038---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:MD         3.38     .335 No_date   12:00   76.18  n/a
                     + 04:P7in      46.44    4.685 No_date   12:00   89.78  n/a
                     + 05:P8in      66.63    6.705 No_date   12:00   93.71  n/a
                     + 09:P6in     103.40    8.866 No_date   12:15   92.60  n/a
     [DT= 5.00]  SUM=  02:MDpre    219.85   20.446 No_date   12:10   92.09  n/a
007:0039---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:MD         3.38     .335 No_date   12:00   76.18  n/a
                     + 07:P7out     46.44     .620 No_date   14:10   89.78  n/a
                     + 08:P8out     66.63    1.228 No_date   13:45   93.71  n/a
                     + 10:P6rte    103.40    2.391 No_date   14:15   92.60  n/a
     [DT= 5.00]  SUM=  02:MDpost   219.85    4.276 No_date   14:05   92.09  n/a
007:0040---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           02:MDpost   219.85    4.276 No_date   14:05   92.09  n/a
    fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-MDpost.007
    remark:MD-TFD Post-Dev
007:0041---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD03:2.4       52.94    4.441 No_date   12:15   89.66 .840
     [XIMP=.35:TIMP=.48]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  35.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1400.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0042---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:2.5       16.90    1.720 No_date   12:00   81.12 .760
     [CN= 80.2: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0043---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:2.5       16.90    1.720 No_date   12:00   81.12  n/a
                     + 02:MDpost   219.85    4.276 No_date   14:05   92.09  n/a
                     + 03:2.4       52.94    4.441 No_date   12:15   89.66  n/a
     [DT= 5.00]  SUM=  10:MD-CEL   289.69    8.257 No_date   12:15   91.00  n/a
007:0044---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:2.1       30.00    3.445 No_date   12:00   94.64 .887
     [XIMP=.48:TIMP=.57]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI=1.50:LGI= 800.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0045---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:2.1       30.00    3.445 No_date   12:00   94.64  n/a
       Major System /  03:2.1maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  04:2.1min    30.00    2.550 No_date   11:30   94.89  n/a
     {MjSysSto=.1550E+04, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0046---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:2.3       31.20    3.583 No_date   12:00   94.64 .887
     [XIMP=.48:TIMP=.57]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI=1.50:LGI= 800.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0047---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:2.3       31.20    3.583 No_date   12:00   94.64  n/a
       Major System /  05:2.3maj      .01     .039 No_date   12:15   94.64  n/a
       Minor System \  06:2.3min    31.19    2.652 No_date   11:30   94.91  n/a
     {MjSysSto=.1600E+04, TotOvfVol=.1164E+02, N-Ovf=    1, TotDurOvf=    0.hrs
007:0048---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:2.2        8.25     .893 No_date   12:00   94.64 .887
     [XIMP=.48:TIMP=.57]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .20:LGI= 600.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
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007:0049---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:2.2        8.25     .893 No_date   12:00   94.64  n/a
       Major System /  07:2.2maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  08:2.2min     8.25     .701 No_date   11:35   94.72  n/a
     {MjSysSto=.2930E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0050---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            03:2.1maj      .00     .000 No_date    0:00     .00  n/a
                     + 04:2.1min    30.00    2.550 No_date   11:30   94.89  n/a
                     + 05:2.3maj      .01     .039 No_date   12:15   94.64  n/a
                     + 06:2.3min    31.19    2.652 No_date   11:30   94.91  n/a
                     + 07:2.2maj      .00     .000 No_date    0:00     .00  n/a
                     + 08:2.2min     8.25     .701 No_date   11:35   94.72  n/a
     [DT= 5.00]  SUM=  02:2.1-2.    69.45    5.942 No_date   12:15   94.88  n/a
007:0051---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:2.1-2.    69.45    5.942 No_date   12:15   94.88  n/a
                     + 10:MD-CEL   289.69    8.257 No_date   12:15   91.00  n/a
     [DT= 5.00]  SUM=  04:C1-All   359.14   14.198 No_date   12:15   91.75  n/a
007:0052---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           04:C1-All   359.14   14.198 No_date   12:15   91.75  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-C1-All.007
     remark:MD @ Cell 1
007:0053---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:4.1       10.00    1.158 No_date   12:00   93.38 .875
     [XIMP=.34:TIMP=.57]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 4.67:SLPP= .60:LGP=  25.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .60:LGI= 350.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0054---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:4.1       10.00    1.158 No_date   12:00   93.38  n/a
       Major System /  02:4.1maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  03:4.1min    10.00     .848 No_date   11:30   93.44  n/a
     {MjSysSto=.5514E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0055---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD07:4.2       25.00    2.892 No_date   12:00   94.72 .887
     [XIMP=.38:TIMP=.62]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 4.67:SLPP= .60:LGP=  25.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .60:LGI= 500.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0056---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    07:4.2       25.00    2.892 No_date   12:00   94.72  n/a
       Major System /  08:4.2maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  09:4.2min    25.00    2.892 No_date   12:00   94.72  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0057---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:4.3        3.70     .201 No_date   12:00   83.14 .779
     [CN= 78.1: N= 1.20]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
     [InterEventTime=  12.00]
007:0058---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:4.3        3.70     .201 No_date   12:00   83.14  n/a
                     + 02:4.1maj      .00     .000 No_date    0:00     .00  n/a
                     + 08:4.2maj      .00     .000 No_date    0:00     .00  n/a
     [DT= 5.00]  SUM=  05:CELL2I     3.70     .201 No_date   12:00   83.14  n/a
007:0059---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:4.3        3.70     .201 No_date   12:00   83.14  n/a
                     + 02:4.1maj      .00     .000 No_date    0:00     .00  n/a
                     + 03:4.1min    10.00     .848 No_date   11:30   93.44  n/a
                     + 04:C1-All   359.14   14.198 No_date   12:15   91.75  n/a
                     + 08:4.2maj      .00     .000 No_date    0:00     .00  n/a
                     + 09:4.2min    25.00    2.892 No_date   12:00   94.72  n/a
     [DT= 5.00]  SUM=  05:CEL2TO   397.84   17.690 No_date   12:05   91.90  n/a
007:0060---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:4.4        6.50     .700 No_date   12:00   95.03 .890
     [XIMP=.62:TIMP=.69]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 349.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0061---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:4.4        6.50     .700 No_date   12:00   95.03  n/a
       Major System /  02:010531      .00     .000 No_date    0:00     .00  n/a
       Minor System \  03:010532     6.50     .553 No_date   11:35   94.99  n/a
     {MjSysSto=.2037E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0062---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD04:4.5       15.80    1.701 No_date   12:00   95.03 .890
     [XIMP=.62:TIMP=.69]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 349.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0063---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:010531      .00     .000 No_date    0:00     .00  n/a
                     + 03:010532     6.50     .553 No_date   11:35   94.99  n/a
                     + 04:4.5       15.80    1.701 No_date   12:00   95.03  n/a
     [DT= 5.00]  SUM=  10:NEW_EN    22.30    2.254 No_date   12:00   95.02  n/a
007:0064---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD02:3.0      285.00    7.135 No_date   14:50   83.22 .780
     [XIMP=.19:TIMP=.31]
     [LOSS= 2 :CN= 78.3]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP= 800.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1900.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0065---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            05:CEL2TO   397.84   17.690 No_date   12:05   91.90  n/a
                     + 02:3.0      285.00    7.135 No_date   14:50   83.22  n/a
     [DT= 5.00]  SUM=  03:000108   682.84   24.499 No_date   12:10   88.28  n/a
007:0066---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD04:5.0       85.00    6.159 No_date   12:20   84.40 .791
     [XIMP=.21:TIMP=.35]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1600.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0067---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD05:6.0       73.00    4.963 No_date   12:25   82.91 .777
     [XIMP=.18:TIMP=.30]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
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     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1800.:MNI=.013:SCI=   .0]
     [IaREComp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0068--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS STANDHYD06:7.0         8.00     .813 No_date   12:00   86.81 .813
     [XIMP=.26:TIMP=.43]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  20.:MNP=.250:SCP=   .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 450.:MNI=.013:SCI=   .0]
     [IaREComp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0069--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            03:000108   682.84   24.499 No_date   12:10   88.28  n/a
                    + 04:5.0       85.00    6.159 No_date   12:20   84.40  n/a
                    + 05:6.0       73.00    4.963 No_date   12:25   82.91  n/a
                    + 06:7.0        8.00     .813 No_date   12:00   86.81  n/a
                    + 10:NEW_EN    22.30    2.254 No_date   12:00   95.02  n/a
     [DT= 5.00]  SUM=  07:000110   871.14   37.780 No_date   12:10   87.61  n/a
007:0070--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE RESERVOIR -> 07:000110   871.14   37.780 No_date   12:10   87.61  n/a
     [RDT= 5.00] out<- 05:000112   871.14   18.730 No_date   14:05   87.61  n/a
     {MxStoUsed=.2057E+02}
007:0071--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  06:8.0      285.00    4.355 No_date   16:10   74.01 .693
     [CN= 78.5: N= 1.80]
     [Tp= 3.40:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
     [InterEventTime=  12.00]
007:0072--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            05:000112   871.14   18.730 No_date   14:05   87.61  n/a
                    + 06:8.0      285.00    4.355 No_date   16:10   74.01  n/a
     [DT= 5.00]  SUM=  01:000118  1156.14   22.612 No_date   14:15   84.26  n/a
007:0073--------------ID:NHYD------QPEAK-----QAVG--DUR.HRS--ERO.HRS-----EXC.%-
   EROSION INDEX     01:000118   22.612    1.070   252.83    16.33     6.46
     [QCE=  4.940]
007:0074--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 01:000118  1156.14   22.612 No_date   14:15   84.26  n/a
 *   [RDT= 5.00] out<- 02:000119  1156.14   22.219 No_date   14:55   84.26  n/a
     [L/S/n= 1000./ .050/.035]
     {Vmax=  .485:Dmax= 1.977}
007:0075--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  03:9.0      223.00    4.468 No_date   14:25   74.01 .693
     [CN= 78.6: N= 1.60]
     [Tp= 2.00:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
     [InterEventTime=  12.00]
007:0076--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            02:000119  1156.14   22.219 No_date   14:55   84.26  n/a
                    + 03:9.0      223.00    4.468 No_date   14:25   74.01  n/a
     [DT= 5.00]  SUM=  04:000121  1379.14   26.650 No_date   14:50   82.60  n/a
007:0077--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  05:13.0     110.00    2.975 No_date   13:25   71.73 .672
     [CN= 75.7: N= 1.60]
     [Tp= 1.30:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0078--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            04:000121  1379.14   26.650 No_date   14:50   82.60  n/a
                    + 05:13.0     110.00    2.975 No_date   13:25   71.73  n/a
     [DT= 5.00]  SUM=  06:000123  1489.14   29.301 No_date   14:45   81.79  n/a
007:0079--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 06:000123  1489.14   29.301 No_date   14:45   81.79  n/a
 *   [RDT= 5.00] out<- 10:000124  1489.14   28.944 No_date   15:15   81.80  n/a
     [L/S/n= 1000./ .050/.035]
     {Vmax=  .607:Dmax= 1.403}
007:0080--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS STANDHYD01:P5a        44.37    4.398 No_date   12:05   90.56 .848
     [XIMP=.32:TIMP=.40]
     [LOSS= 2 :CN= 80.5]
     [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .25:LGI= 700.:MNI=.013:SCI=   .0]
     [IaREComp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0081--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   COMPUTE DUALHYD    01:P5a       44.37    4.398 No_date   12:05   90.56  n/a
      Major System /  02:P5Amaj      .00     .000 No_date    0:00     .00  n/a
      Minor System \  03:P5Amin    44.37    4.398 No_date   12:05   90.56  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0082--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS STANDHYD01:P5b        94.19    7.376 No_date   12:20   90.56 .848
     [XIMP=.32:TIMP=.40]
     [LOSS= 2 :CN= 80.5]
     [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=2400.:MNI=.013:SCI=   .0]
     [IaREComp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0083--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   COMPUTE DUALHYD    01:P5b       94.19    7.376 No_date   12:20   90.56  n/a
      Major System /  04:P5Bmaj      .00     .000 No_date    0:00     .00  n/a
      Minor System \  05:P5Bmin    94.19    7.376 No_date   12:20   90.56  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0084--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  06:SWMF5      7.72     .865 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0085--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            02:P5Amaj      .00     .000 No_date    0:00     .00  n/a
                    + 03:P5Amin    44.37    4.398 No_date   12:05   90.56  n/a
                    + 04:P5Bmaj      .00     .000 No_date    0:00     .00  n/a
                    + 05:P5Bmin    94.19    7.376 No_date   12:20   90.56  n/a
                    + 06:SWMF5      7.72     .865 No_date   12:00   90.82  n/a
     [DT= 5.00]  SUM=  07:P5IN     146.28   12.151 No_date   12:10   90.57  n/a
007:0086--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE RESERVOIR -> 07:P5IN     146.28   12.151 No_date   12:10   90.57  n/a
 *   [RDT= 5.00] out<- 01:P5out    146.28    3.694 No_date   13:55   90.57  n/a
     {MxStoUsed=.6575E+01}
007:0087--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   SAVE HYD           01:P5out    146.28    3.694 No_date   13:55   90.57  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-P5out.007
     remark:Post-Dev @ Fernbank Rd
007:0088--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
 * COMPUTE VOLUME     01:P5out    146.28    3.694 No_date   13:55   90.57  n/a
007:0089--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 01:P5out    146.28    3.694 No_date   13:55   90.57  n/a
     [RDT= 5.00] out<- 02:6+948    146.28    3.424 No_date   15:30   90.57  n/a
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     [L/S/n= 1427./ .150/.035]
     {Vmax=  .412:Dmax= 1.659}
007:0090--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  01:10b      163.70    3.418 No_date   13:45   76.18 .714
     [CN= 80.5: N= 1.30]
     [Tp= 1.20:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0091--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            01:10b      163.70    3.418 No_date   13:45   76.18  n/a
                    + 02:6+948    146.28    3.424 No_date   15:30   90.57  n/a
     [DT= 5.00]  SUM=  03:5+219    309.98    6.567 No_date   15:05   82.97  n/a
007:0092--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
 * COMPUTE VOLUME     03:5+219    309.98    6.567 No_date   15:05   82.97  n/a
007:0093--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   SAVE HYD           03:5+219    309.98    6.567 No_date   15:05   82.97  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-5+219.007
     remark:FD @ Flewellyn
007:0094--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 03:5+219    309.98    6.567 No_date   15:05   82.97  n/a
     [RDT= 5.00] out<- 02:5+219    309.98    6.515 No_date   15:10   82.97  n/a
     [L/S/n= 1685./ .150/.035]
     {Vmax= 1.022:Dmax= 1.679}
007:0095--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 02:5+219    309.98    6.515 No_date   15:10   82.97  n/a
     [RDT= 5.00] out<- 03:5+219    309.98    5.943 No_date   17:40   82.97  n/a
     [L/S/n= 1922./ .050/.035]
     {Vmax=  .391:Dmax= 2.107}
007:0096--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  04:10c      271.80    2.421 No_date   18:00   76.18 .714
     [CN= 80.5: N= 1.30]
     [Tp= 3.49:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0097--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            03:5+219    309.98    5.943 No_date   17:40   82.97  n/a
                    + 04:10c      271.80    2.421 No_date   18:00   76.18  n/a
     [DT= 5.00]  SUM=  05:1+574    581.78    8.360 No_date   17:45   79.80  n/a
007:0098--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
 * COMPUTE VOLUME     05:1+574    581.78    8.360 No_date   17:45   79.80  n/a
007:0099--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 05:1+574    581.78    8.360 No_date   17:45   79.80  n/a
     [RDT= 5.00] out<- 02:1+574    581.78    7.848 No_date   19:40   79.80  n/a
     [L/S/n= 1590./ .100/.035]
     {Vmax=  .260:Dmax= 1.636}
007:0100--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  06:10d      144.00    1.410 No_date   17:25   76.18 .714
     [CN= 80.5: N= 1.30]
     [Tp= 3.09:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0101--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            02:1+574    581.78    7.848 No_date   19:40   79.80  n/a
                    + 06:10d      144.00    1.410 No_date   17:25   76.18  n/a
     [DT= 5.00]  SUM=  01:0+000    725.78    9.212 No_date   19:35   79.08  n/a
007:0102--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            01:0+000    725.78    9.212 No_date   19:35   79.08  n/a
                    + 10:000124  1489.14   28.944 No_date   15:15   81.80  n/a
     [DT= 5.00]  SUM=  03:MD-FL   2214.92   35.790 No_date   15:40   80.91  n/a
007:0103--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   SAVE HYD           03:MD-FL   2214.92   35.790 No_date   15:40   80.91  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-MD-FL.007
     remark:Confluence of Monahan & Flewellyn
007:0104--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 03:MD-FL   2214.92   35.790 No_date   15:40   80.91  n/a
 *   [RDT= 5.00] out<- 04:127     2214.92   35.657 No_date   16:00   80.91  n/a
     [L/S/n=  850./ .100/.035]
     {Vmax=  .757:Dmax= 2.118}
007:0105--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  05:12.0     376.00    7.325 No_date   14:50   71.73 .672
     [CN= 75.4: N= 1.80]
     [Tp= 2.40:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0106--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            04:127     2214.92   35.657 No_date   16:00   80.91  n/a
                    + 05:12.0     376.00    7.325 No_date   14:50   71.73  n/a
     [DT= 5.00]  SUM=  06:000129  2590.92   42.713 No_date   15:50   79.57  n/a
007:0107--------------ID:NHYD------QPEAK-----QAVG--DUR.HRS--ERO.HRS-----EXC.%-
   EROSION INDEX     06:000129   42.713    2.272   252.08    17.58     6.98
     [QCE= 10.380]
007:0108--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 06:000129  2590.92   42.713 No_date   15:50   79.57  n/a
 *   [RDT= 5.00] out<- 01:130     2590.92   42.677 No_date   16:00   79.57  n/a
     [L/S/n=  400./ .100/.035]
     {Vmax=  .622:Dmax= 1.482}
007:0109--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  02:14.0      50.00    2.222 No_date   12:50   71.73 .672
     [CN= 75.0: N= 2.00]
     [Tp=  .90:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0110--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            01:130     2590.92   42.677 No_date   16:00   79.57  n/a
                    + 02:14.0      50.00    2.222 No_date   12:50   71.73  n/a
     [DT= 5.00]  SUM=  03:000132  2640.92   43.405 No_date   15:55   79.43  n/a
007:0111--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ROUTE CHANNEL   -> 03:000132  2640.92   43.405 No_date   15:55   79.43  n/a
 *   [RDT= 5.00] out<- 04:133     2640.92   43.331 No_date   16:05   79.43  n/a
     [L/S/n=  700./ .100/.035]
     {Vmax=  .824:Dmax= 1.788}
007:0112--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   CONTINUOUS NASHYD  05:15.0      44.00    2.871 No_date   12:10   71.73 .672
     [CN= 75.0: N= 2.00]
     [Tp=  .50:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0113--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   ADD HYD            04:133     2640.92   43.331 No_date   16:05   79.43  n/a
                    + 05:15.0      44.00    2.871 No_date   12:10   71.73  n/a
     [DT= 5.00]  SUM=  06:000135  2684.92   43.709 No_date   16:05   79.30  n/a
007:0114--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
   SAVE HYD           06:000135  2684.92   43.709 No_date   16:05   79.30  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-000135.007
     remark:MD @ JR
007:0002----------------------------------------------------------------------
     FINISH
```

```
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2009-05-12     at 19:31:43
================================================================================
```

```
2
*%=========================================================================|
*%
*%   #####      INPUT FILE FOR MONAHAN DRAIN, CITY OF KANATA      #####
*%   #####  FERNBANK CDP: POST-DEVELOPMENT CONDITIONS - MAY 2009  #####
*%                 INCLUDES BEST MANAGEMENT PRACTICES
*%   #####       EVENT BASED MODELING (5 MINUTE TIMESTEP)         #####
*%
*%
*%   REFERENCE DRAINAGE AREA PLANS:
*%   ----------------------------
*%   FIGURE 8.1 (Main Report) / 101108-MD1 (Appendix D)
*%=========================================================================|
*                           EVENT BASED SIMULATION
*%=========================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    C25mm-3.stm
*
READ STORM          STORM_FILENAME=["storm.001"]
*%=========================================================================|
DEFAULT VALUES      ICASEdef=[1],  read and print values
                    DEFVAL_FILENAME=["ottawa.def"]
*
COMPUTE API         APII=[20], APIK=[0.9]/day
*%-----------------|-------------------------------------------------------|
*% FAULKNER DRAIN SUBWATERSHED
*% ***************************************************
CONTINUOUS STANDHYD ID=[1], NHYD=["P4a"], DT=[5](min), AREA=[42.61](ha),
                    XIMP=[0.35], TIMP=[0.44], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[2153](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%-----------------|-------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"4ABMP1"/3,"4ASTM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                          QIDi      +     QIDii     =     QTOTAL
                    [     0.000     +   0.000       =     0.00    ]
                    [     0.071     +     0.179     =     0.25    ]
                    [     0.143     +     0.358     =     0.50    ]
                    [     0.214     +     0.536     =     0.75    ]
                    [     0.285     +     0.715     =     1.00    ]
                    [     0.428     +     1.073     =     1.50    ]
                    [     0.570     +     1.430     =     2.00    ]
                    [     0.713     +     1.788     =     2.50    ]
                    [     0.855     +     2.145     =     3.00    ]
                    [     1.140     +     2.860     =     4.00    ]
                    [     1.425     +     3.575     =     5.00    ]
                    [     1.710     +     4.290     =     6.00    ]
                    [     1.995     +     5.005     =     7.00    ]      end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"4ABMP2"/5,"4ASTM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                        QIDi        +     QIDii     =     QTOTAL
                    [     0.000     +     0.000     =     0.00    ]
                    [     0.024     +     0.048     =     0.07    ]
                    [     0.047     +     0.095     =     0.14    ]
                    [     0.071     +     0.143     =     0.21    ]
                    [     0.094     +     0.191     =     0.29    ]
                    [     0.142     +     0.286     =     0.43    ]
                    [     0.189     +     0.381     =     0.57    ]
                    [     0.236     +     0.476     =     0.71    ]
                    [     0.283     +     0.572     =     0.86    ]
                    [     0.378     +     0.762     =     1.14    ]
                    [     0.472     +     0.953     =     1.43    ]
                    [     0.567     +     1.143     =     1.71    ]
                    [     0.661     +     1.334     =     2.00    ]      end
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["4ABMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values

                                (cms)   - (ha-m)
                            [   0    ,        0   ]
                            [ 0.0028  ,  0.0049 ]
                            [     0.0037  ,  0.0098 ]
                            [     0.0045  ,  0.0146 ]
                            [     0.0053  ,  0.0195 ]
                            [     0.0061  ,  0.0244 ]
                            [       -1      ,      -1   ] (max twenty pts)
                     IDovf=[8], NHYDovf=["4ASTM3"]
*%-----------------|-------------------------------------------------------|
*
COMPUTE DUALHYD     IDin=[3], CINLET=[4.05](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P4amaj"],
                    MINID=[2], MinNHYD=["P4amin"],
                    TMJSTO=[2026](cu-m)
*
ADD HYD             IDsum=[10], NHYD=["P4Ain"], IDs to add=[1,2,5,8]
*%-----------------|-------------------------------------------------------|
CONTINUOUS STANDHYD ID=[1], NHYD=["P4b"], DT=[5](min), AREA=[15.33](ha),
                    XIMP=[0.35], TIMP=[0.44], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[767](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%-----------------|-------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"4BBMP1"/3,"4BSTM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                          QIDi     +      QIDii   =       QTOTAL
                    [  0.000       +      0.000     =     0.00    ]
                    [  0.066       +      0.185     =     0.25    ]
                    [  0.131       +      0.369     =     0.50    ]
                    [  0.197       +      0.554     =     0.75    ]
                    [  0.262       +      0.738     =     1.00    ]
                    [  0.393       +      1.107     =     1.50    ]
                    [  0.524       +      1.476     =     2.00    ]
                    [  0.655       +      1.845     =     2.50    ]
                    [  0.786       +      2.214     =     3.00    ]
                    [  1.048       +      2.952     =     4.00    ]
                    [  1.310       +      3.690     =     5.00    ]
                    [  1.572       +      4.428     =     6.00    ]
                    [  1.834       +      5.166     =     7.00    ]  end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"4BBMP2"/5,"4BSTM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                       QIDi         +     QIDii     =     QTOTAL
                    [  0.000        +     0.000     =     0.00    ]
                    [  0.022        +     0.044     =     0.07    ]
                    [  0.043        +     0.088     =     0.13    ]
                    [  0.065        +     0.131     =     0.20    ]
                    [  0.087        +     0.175     =     0.26    ]
                    [  0.130        +     0.263     =     0.39    ]
                    [  0.174        +     0.350     =     0.52    ]
                    [  0.217        +     0.438     =     0.66    ]
                    [  0.261        +     0.525     =     0.79    ]
                    [  0.347        +     0.701     =     1.05    ]
                    [  0.434        +     0.876     =     1.31    ]
                    [  0.521        +     1.051     =     1.57    ]
                    [  0.608        +     1.226     =     1.83    ]       end
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["4BBMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values

                                (cms)   - (ha-m)
                            [   0    ,        0    ]
                            [ 0.0009  ,    0.0016 ]
                            [      0.0012  ,      0.0032 ]
                            [      0.0015  ,      0.0048 ]
                            [      0.0017  ,      0.0064 ]
                            [      0.0020  ,      0.0079 ]
                            [        -1      ,       -1    ]      (max twenty pts)
                     IDovf=[8], NHYDovf=["4BSTM3"]
*%-----------------|-------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[1.64](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P4bmaj"],
                    MINID=[2], MinNHYD=["P4bmin"],
                    TMJSTO=[818](cu-m)
*
ADD HYD             IDsum=[9], NHYD=["P4Bin"], IDs to add=[1,2,5,8]
*%-----------------|-------------------------------------------------------|
CONTINUOUS NASHYD   ID=[6], NHYD=["P4c"], DT=[5]min, AREA=[3.61](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["BP4in"], IDs to add=[6,9,10]
*
ROUTE RESERVOIR     IDout=[2],   NHYD=["BP4out"],  IDin=[1],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                     (cms) - (ha-m)
                                   [   0.000 ,  0.0000 ]
                                   [   0.040 ,  0.2400 ]
                                   [   0.290 ,  1.3400 ]
                                   [   0.450 ,  1.8300 ]
                                   [   0.670 ,  2.1300 ]
                                   [   1.050 ,  2.4200 ]
                                   [   1.350 ,  2.6450 ]
                                   [   1.750 ,  2.9600 ]
                                   [      -1  ,   -1     ]   (max twenty pts)
*
SAVE HYD            ID=[2],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["P4 Post-Dev"]
*%-----------------|-------------------------------------------------------|
*
ROUTE CHANNEL       IDout=[6], NHYD=["R-FA1"], IDin=[2],
                    RDT=[5](min),
                    CHLGTH=[1862](m),   CHSLOPE=[0.35](%),
                                        FPSLOPE=[0.35](%),
                    SECNUM=[3000],        NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,50 -0.037,56.2 0.075,106.2]
                    ( DISTANCE (m), ELEVATION (m))=[  0.0 , 1.00 ]
                                                [ 50.0 , 0.60 ]
                                                [ 51.8 , 0.29 ]
                                                [ 52.4 , 0.14 ]
                                                [ 52.6 , 0.05 ]
                                                [ 53.5 , 0.01 ]
                                                [ 54.0 , 0.08 ]
                                                [ 54.4 , 0.25 ]
                                                [ 56.2 , 0.60 ]
                                                [106.2 , 1.00 ]
*
CONTINUOUS NASHYD   ID=[2], NHYD=["FA2"], DT=[5.0]min, AREA=[151](ha),
                    DWF=[0](cms),  CN/C=[81], IA=[9.8](mm),
                    N=[2], TP=[3.14]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
```

```
*
CONTINUOUS NASHYD   ID=[3], NHYD=["FA3"], DT=[5.0]min, AREA=[331](ha),
                    DWF=[0](cms),  CN/C=[83.2], IA=[9.8](mm),
                    N=[2], TP=[3.05]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[0.1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[4], NHYD=["BFA3"], IDs to add=[6,2,3]
*
***************************************
*  ID=4:  Faulkner Drain @ Flewwllyn  *
***************************************
SAVE HYD            ID=[4],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["FA3"]
*%-----------------|-----------------------------------------------------------|
*% MONAHAN DRAIN SUBWATERSHED (INCL. FLEWELLYN DRAIN)
*% *************************************************
*% SUB-AREA 1: Monahan Drain U/S of Terry Fox Drive
*% ---------------------------------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P6a"], DT=[5](min), AREA=[55.91](ha),
                    XIMP=[0.39], TIMP=[0.49], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[2200](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%-----------------|-----------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"6ABMP1"/3,"6ASTM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                             QIDi        +      QIDii   =       QTOTAL
                       [  0.000      +    0.000     =     0.00    ]
                       [  0.065    +      0.186     =     0.25    ]
                       [  0.129    +      0.371     =     0.50    ]
                       [  0.194    +      0.557     =     0.75    ]
                       [  0.258    +      0.742     =     1.00    ]
                       [  0.387    +      1.113     =     1.50    ]
                       [  0.516    +      1.484     =     2.00    ]
                       [  0.645    +      1.855     =     2.50    ]
                       [  0.774    +      2.226     =     3.00    ]
                       [  1.032    +      2.968     =     4.00    ]
                       [  1.290    +      3.710     =     5.00    ]
                       [  1.548    +      4.452     =     6.00    ]
                       [  1.806    +      5.194     =     7.00    ]       end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"6ABMP2"/5,"6ASTM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                        QIDi     +      QIDii     =     QTOTAL
                       [   0.000    +     0.000     =     0.00    ]
                       [   0.021    +     0.043   =       0.06    ]
                       [   0.043    +     0.086     =     0.13    ]
                       [   0.064    +     0.129     =     0.19    ]
                       [   0.086    +     0.172     =     0.26    ]
                       [   0.128    +     0.259     =     0.39    ]
                       [   0.171    +     0.345     =     0.52    ]
                       [   0.214    +     0.431     =     0.65    ]
                       [   0.257    +     0.517     =     0.77    ]
                       [   0.342    +     0.690     =     1.03    ]
                       [   0.428    +     0.862     =     1.29    ]
                       [   0.513    +     1.035     =     1.55    ]
                       [   0.599    +     1.207     =     1.81    ]       end
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["6ABMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values

                                 (cms)   -     (ha-m)
                            [    0  ,     0   ]
                            [ 0.0037  ,  0.0063 ]
                            [ 0.0047  ,  0.0126 ]
                            [ 0.0058  ,  0.0189 ]
                            [ 0.0068  ,  0.0251 ]
                            [ 0.0079  ,  0.0314 ]
                            [   -1  ,    -1    ]   (max twenty pts)
                    IDovf=[8], NHYDovf=["6ASTM3"]
*%-----------------|-----------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[5.59](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P6amaj"],
                    MINID=[2], MinNHYD=["P6amin"],
                    TMJSTO=[2796](cu-m)
*
ADD HYD             IDsum=[10], NHYD=["P6Ain"], IDs to add=[1,2,5,8]
*%-----------------|-----------------------------------------------------------|
CONTINUOUS STANDHYD ID=[1], NHYD=["P6b"], DT=[5](min), AREA=[42.74](ha),
                    XIMP=[0.39], TIMP=[0.49], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[0.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                         LGI=[1600](m), MNI=[0.013], SCI=[0](min
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%-----------------|-----------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"6BBMP1"/3,"6BSTM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                         QIDi     +      QIDii   =       QTOTAL
                    [  0.000       +      0.000     =     0.00    ]
                    [  0.044       +      0.206     =     0.25    ]
                    [  0.088       +      0.412     =     0.50    ]
                    [  0.132       +      0.618     =     0.75    ]
                    [  0.176       +      0.824     =     1.00    ]
                    [  0.264       +      1.236     =     1.50    ]
                    [  0.352       +      1.648     =     2.00    ]
                    [  0.440       +      2.060     =     2.50    ]
                    [  0.528       +      2.472     =     3.00    ]
                    [  0.704       +      3.296     =     4.00    ]
                    [  0.880       +      4.120     =     5.00    ]
                    [  1.056       +      4.944     =     6.00    ]
                    [  1.232       +      5.768     =     7.00    ]       end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"6BBMP2"/5,"6BSTM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                        QIDi        +      QIDii     =     QTOTAL
                    [  0.000       +      0.000     =     0.00    ]
                    [  0.015       +      0.029   =       0.04    ]
                    [  0.029       +      0.059     =     0.09    ]
                    [  0.044       +      0.088     =     0.13    ]
                    [  0.058       +      0.118     =     0.18    ]
                    [  0.088       +      0.176     =     0.26    ]
                    [  0.117       +      0.235     =     0.35    ]
                    [  0.146       +      0.294     =     0.44    ]
                    [  0.175       +      0.353     =     0.53    ]
                    [  0.233       +      0.471     =     0.70    ]
                    [  0.292       +      0.588     =     0.88    ]
                    [  0.350       +      0.706     =     1.06    ]
                    [  0.408       +      0.824     =     1.23    ]       end
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["6BBMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values

                                 (cms)   -     (ha-m)
                        [    0     ,     0   ]
                        [ 0.0024  ,  0.0041 ]
                        [ 0.0031  ,  0.0082 ]
                        [ 0.0038  ,  0.0123 ]
                        [ 0.0044  ,  0.0164 ]
                        [ 0.0051  ,  0.0205 ]
                        [   -1     ,    -1    ]        (max twenty pts)
                    IDovf=[8], NHYDovf=["6BSTM3"]
*%-----------------|-----------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[4.27](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["P6bmaj"],
                    MINID=[1], MinNHYD=["P6bmin"],
                    TMJSTO=[2137](cu-m)
*
ADD HYD             IDsum=[9], NHYD=["P6Bin"], IDs to add=[1,2,5,8]
*
CONTINUOUS NASHYD   ID=[6], NHYD=["SWM6"], DT=[5]min, AREA=[4.75](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["P6in"], IDs to add=[6,9,10]
*
ROUTE RESERVOIR     IDout=[6],   NHYD=["BP6out"],  IDin=[1],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                        (cms) -  (ha-m)
                                    [   0.000 ,  0.0000 ]
                                    [   0.050 ,  0.4000 ]
                                    [   0.620 ,  2.1900 ]
                                    [   1.080 ,  2.9400 ]
                                    [   1.440 ,  3.3800 ]
                                    [   1.740 ,  3.9400 ]
                                    [   2.030 ,  4.4400 ]
                                    [   2.400 ,  5.1600 ]
                                    [     -1  ,  -1     ] (max twenty pts)
*
SAVE HYD            ID=[6],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["P6 Post-Dev"]
*
ROUTE CHANNEL       IDout=[10], NHYD=["P6rte"], IDin=[6],
                    RDT=[5](min),
                    CHLGTH=[700](m),   CHSLOPE=[0.25](%),
                                       FPSLOPE=[0.05](%),
                    SECNUM=[3000],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,18 -0.035,24 0.075,40] NSEG
                    ( DISTANCE (m), ELEVATION (m))=[  0.0 , 97.2 ]
                                                  [ 18.0 , 97.0 ]
                                                  [ 20.0 , 94.5 ]
                                                  [ 22.0 , 94.5 ]
                                                  [ 24.0 , 97.0 ]
                                                  [ 40.0 , 97.2 ]
*%-----------------|-----------------------------------------------------------|
* Monahan P7 (North Pond)
* ---------------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P7"], DT=[5](min), AREA=[43.12](ha),
                    XIMP=[0.29], TIMP=[0.36], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[1.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.8](%),
                                         LGI=[550](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%-----------------|-----------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"7BMP1"/3,"7STM1"]
                    flow distribution table: (modify as necessary)
```

```
                    Note: all flows are in (cms)
                          QIDi     +      QIDii    =      QTOTAL
                    [  0.000       +      0.000     =      0.00    ]
                    [     0.079   +      0.171   =      0.25    ]
                    [     0.159   +      0.342   =      0.50    ]
                    [     0.238   +      0.512   =      0.75    ]
                    [     0.317   +      0.683   =      1.00    ]
                    [     0.476   +      1.025   =      1.50    ]
                    [     0.634   +      1.366   =      2.00    ]
                    [     0.793   +      1.708   =      2.50    ]
                    [     0.951   +      2.049   =      3.00    ]
                    [     1.268   +      2.732   =      4.00    ]
                    [     1.585   +      3.415   =      5.00    ]
                    [     1.902   +      4.098   =      6.00    ]
                    [     2.219   +      4.781   =      7.00    ]      end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"7BMP2"/5,"7STM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                       QIDi       +      QIDii     =     QTOTAL
                    [  0.000       +      0.000     =      0.00    ]
                    [     0.026   +      0.053   =      0.08    ]
                    [     0.053   +      0.106   =      0.16    ]
                    [     0.079   +      0.159   =      0.24    ]
                    [     0.105   +      0.212   =      0.32    ]
                    [     0.158   +      0.318   =      0.48    ]
                    [     0.210   +      0.424   =      0.63    ]
                    [     0.263   +      0.530   =      0.79    ]
                    [     0.315   +      0.636   =      0.95    ]
                    [     0.420   +      0.848   =      1.27    ]
                    [     0.525   +      1.060   =      1.59    ]
                    [     0.631   +      1.271   =      1.90    ]
                    [     0.736   +      1.483   =      2.22    ]      end
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["7BMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                (cms)   - (ha-m)
                            [   0   ,      0   ]
                            [ 0.0022  ,  0.0037 ]
                            [ 0.0028  ,  0.0075 ]
                            [ 0.0034  ,  0.0112 ]
                            [ 0.0040  ,  0.0149 ]
                            [ 0.0047  ,  0.0186 ]
                            [   -1  ,      -1   ] (max twenty pts)
                    IDovf=[8], NHYDovf=["7STM3"]
*%----------------|----------------------------------------------------------|
COMPUTE DUALHYD
                    IDin=[3], CINLET=[4.31](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P7maj"],
                    MINID=[2], MinNHYD=["P7min"],
                    TMJSTO=[2156](cu-m)
*
CONTINUOUS NASHYD   ID=[6], NHYD=["SWM7"], DT=[5]min, AREA=[4.18](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[4], NHYD=["P7in"], IDs to add=[1,2,5,8,6]
*
ROUTE RESERVOIR     IDout=[9],   NHYD=["P7out"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                (cms) - (ha-m)
                                [   0.000 ,  0.0000 ]
                                [   0.030 ,  0.200  ]
                                [   0.185 ,  1.000  ]
                                [   0.285 ,  1.300  ]
                                [   0.360 ,  1.600  ]
                                [   0.480 ,  1.950  ]
                                [   0.540 ,  2.250  ]
                                [   0.620 ,  2.650  ]
                                [     -1  ,  -1     ]  (max twenty pts)
* ----------------------------------
* Monahan P8 (South Pond)
* ----------------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P8"], DT=[5](min), AREA=[62.46](ha),
                    XIMP=[0.42], TIMP=[0.53], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[78],
                    Pervious   surfaces: IAper=[5.2](mm), SLPP=[1.5](%),
                                         LGP=[40](m), MNP=[0.20], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.5](%),
                                         LGI=[950](m), MNI=[0.013], SCI=[0](min)
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%----------------|----------------------------------------------------------|
DIVERT HYD          IDin=[1], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[2,"8BMP1"/3,"8STM1"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                          QIDi       +     QIDii    =      QTOTAL
                    [  0.000         +     0.000      =      0.00    ]
                    [     0.052     +     0.199     =      0.25    ]
                    [     0.103     +     0.397     =      0.50    ]
                    [     0.155     +     0.596     =      0.75    ]
                    [     0.206     +     0.794     =      1.00    ]
                    [     0.309     +     1.191     =      1.50    ]
                    [     0.412     +     1.588     =      2.00    ]
                    [     0.515     +     1.985     =      2.50    ]
                    [     0.618     +     2.382     =      3.00    ]
                    [     0.824     +     3.176     =      4.00    ]
                    [     1.030     +     3.970     =      5.00    ]
                    [     1.236     +     4.764     =      6.00    ]
                    [     1.442     +     5.558     =      7.00    ]      end
*
DIVERT HYD          IDin=[2], NIDout=[2]max five,
                    outflow hydrographs (ID, NHYD)=[4,"8BMP2"/5,"8STM2"]
                    flow distribution table: (modify as necessary)
                    Note: all flows are in (cms)
                        QIDi       +      QIDii     =     QTOTAL
                    [  0.000       +      0.000     =      0.00    ]
                    [      0.017   +      0.034   =      0.05    ]
                    [      0.034   +      0.069   =      0.10    ]
                    [      0.051   +      0.103   =      0.15    ]
                    [      0.068   +      0.138   =      0.21    ]
                    [      0.102   +      0.207   =      0.31    ]
                    [      0.137   +      0.275   =      0.41    ]
                    [      0.171   +      0.344   =      0.52    ]
                    [      0.205   +      0.413   =      0.62    ]
                    [      0.273   +      0.551   =      0.82    ]
                    [      0.341   +      0.689   =      1.03    ]
                    [      0.410   +      0.826   =      1.24    ]
                    [      0.478   +      0.964   =      1.44    ]      end
*
ROUTE RESERVOIR     IDout=[7],   NHYD=["8BMP3"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                (cms)   - (ha-m)
                            [   0   ,      0   ]
                            [ 0.0035  ,  0.0060 ]
                            [      0.0045  ,  0.0120 ]
                            [      0.0055  ,  0.0180 ]
                            [      0.0065  ,  0.0240 ]
                            [      0.0075  ,  0.0300 ]
                            [       -1    ,      -1   ] (max twenty pts)
                    IDovf=[8], NHYDovf=["8STM3"]
*%----------------|----------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[6.25](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P8maj"],
                    MINID=[2], MinNHYD=["P8min"],
                    TMJSTO=[3123](cu-m)
*
CONTINUOUS NASHYD   ID=[6], NHYD=["SWM8"], DT=[5]min, AREA=[3.07](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[4], NHYD=["P8in"], IDs to add=[1,2,5,8,6]
*
ROUTE RESERVOIR     IDout=[8],   NHYD=["P8out"],  IDin=[4],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                        (cms) - (ha-m)
                                    [   0.000 ,  0.0000 ]
                                    [   0.040 ,  0.269  ]
                                    [   0.370 ,  1.600  ]
                                    [   0.490 ,  2.150  ]
                                    [   0.680 ,  2.480  ]
                                    [   0.830 ,  3.020  ]
                                    [   0.950 ,  3.300  ]
                                    [   1.250 ,  3.830  ]
                                    [     -1  ,  -1     ]  (max twenty pts)
*
CONTINUOUS NASHYD   ID=[5], NHYD=["MD"], DT=[5.0]min, AREA=[3.38](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[2], NHYD=["BMDpst"], IDs to add=[5,8,9,10]
*
SAVE HYD            ID=[2],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["MD-TFD Post-Dev"]
*%----------------|----------------------------------------------------------|
*% SUB-AREA 2: SOHO West Lands
*% --------------------------
*% Area 2.4 - 52.94 ha
*% Ex. dev north of SOHO West, incl. 8.27 ha Hydro Easement
*% -------------------------------------------------------
CONTINUOUS STANDHYD ID=3  NHYD=["2.4"]  DT= 5.0  AREA= 52.94 HA
                    XIMP= 0.35  TIMP= 0.48  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        9.80   0.2     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        2.00   0.2   1400  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
*% Area 2.5 - 16.9 ha
*% Undeveloped land east of Terry Fox Drive
*% ---------------------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["2.5"], DT=[5.0]min, AREA=[16.9](ha),
                    DWF=[0](cms), CN/C=[80.2], IA=[4.67] (mm)
                    N=[2], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[10], NHYD=["MD-CELL1"], IDs to add=[1,2,3]
*
*% Area 2.1 - 30.0 ha
```

```
*% ------------------
CONTINUOUS STANDHYD ID=1  NHYD="2.1"  DT= 5.0  AREA= 30.0  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   1.5    800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[2.550](cms), NINLET=[1],
                    MAJID=[3], MajNHYD=["2.1maj"],
                    MINID=[4], MinNHYD=["2.1min"],
                    TMJSTO=[1600](cu-m)
*
*% Area 2.3 - 31.20 ha
*% ------------------
CONTINUOUS STANDHYD ID=1  NHYD="2.3"  DT= 5.0  AREA= 31.20  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   1.5    800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[2.652](cms), NINLET=[1],
                    MAJID=[5], MajNHYD=["2.3maj"],
                    MINID=[6], MinNHYD=["2.3min"],
                    TMJSTO=[1600](cu-m)
*
*% Area 2.2 - 8.25 ha
*% -----------------
CONTINUOUS STANDHYD ID=1  NHYD="2.2"  DT= 5.0  AREA= 8.25  HA
                    XIMP= 0.48  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 80.2
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   1.0     35   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLI    LGI   MNI   SCI
                                        1.57   0.2    600  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.701](cms), NINLET=[1],
                    MAJID=[7], MajNHYD=["2.2maj"],
                    MINID=[8], MinNHYD=["2.2min"],
                    TMJSTO=[410](cu-m)
*
ADD HYD             IDsum=[2], NHYD=["2.1-2.3"], IDs to add=[3,4,5,6,7,8]
*
ADD HYD             IDsum=[4], NHYD=["BC1-All"], IDs to add=[2,10]
*
*****************************************************
*  ID=4:  Monahan Drain @ East of Terry Fox (Cell 1)  *
*****************************************************
SAVE HYD            ID=[4],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["MD @ Cell 1"]
*%---------------|-------------------------------------------------------|
*% SUB-AREA 4: Bridlewood Trails
*% ---------------------------
*% Area 4.1: Residential Lands West of Eagleson
*% ------------------------------------------
CONTINUOUS STANDHYD ID=1  NHYD="4.1"  DT= 5.0  AREA= 10.0 HA
                    XIMP= 0.34  TIMP= 0.57  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   0.6     25   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        1.57   0.6    350  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.848](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=["4.1maj"],
                    MINID=[3], MinNHYD=["4.1min"],
                    TMJSTO=[600](cu-m)
*
*% Area 4.2: Commercial/Residential lands west of Eagleson
*% -----------------------------------------------------
CONTINUOUS STANDHYD ID=7  NHYD="4.2"  DT= 5.0  AREA= 25.0  HA
                    XIMP= 0.38  TIMP= 0.62  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                        4.67   0.6     25   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                        1.57   0.6    500  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[7], CINLET=[3.3](cms), NINLET=[1],
                    MAJID=[8], MajNHYD=["4.2maj"],
                    MINID=[9], MinNHYD=["4.2min"],
                    TMJSTO=[1250](cu-m)
*
*% Area 4.3: SWM Block
*% -----------------
CONTINUOUS NASHYD   ID=[1], NHYD=["4.3"], DT=[5]min, AREA=[3.7](ha),
                    DWF=[0.0](cms), CN/C=[78.1], IA=[0.25]hrs,
                    N=[1.2], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
```

```
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[5], NHYD=["CELL2IN"], IDs to add=[1,2,8]
*
ADD HYD             IDsum=[5], NHYD=["CEL2TOT"], IDs to add=[1,2,3,4,8,9]
*
*% Area 4.4: New Englanders Subdivision - East of Eagleson
*% -----------------------------------------------------
CONTINUOUS STANDHYD ID=1  NHYD="4.4"  DT= 5.0  AREA= 6.5  HA
                    XIMP= 0.62  TIMP= 0.69  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP    SCP
                                        9.80   0.2     50   0.250  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI    SCI
                                        2.00   0.2    349   0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
COMPUTE DUALHYD     IDin=[1], CINLET=[0.553](cms), NINLET=[1],
                    MAJID=[2], MajNHYD=[10531],
                    MINID=[3], MinNHYD=[10532],
                    TMJSTO=[300](cu-m)
*
*% Area 4.5:  Wetland Cell
*% ---------------------
CONTINUOUS STANDHYD ID=4  NHYD="4.5"  DT= 5.0  AREA= 15.8  HA
                    XIMP= 0.62  TIMP= 0.69  DWF=0.0 LOSS=2
                    CN= 78.1
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP    SCP
                                        9.80   0.2     50   0.250  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI    SCI
                                        2.00   0.2    349   0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
ADD HYD             IDsum=[10], NHYD=["NEW_ENG"], IDs to add=[2,3,4]
*%---------------|-------------------------------------------------------|
*% SUB-AREA 3: Residential U/S of Cell 3
*% -----------------------------------
CONTINUOUS STANDHYD ID=2  NHYD="3.0"  DT= 5.0  AREA= 285.0  HA
                    XIMP= 0.19  TIMP= 0.31  DWF=0.0 LOSS=2
                    CN= 78.3
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2    800   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1900  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*
ADD HYD             IDsum=[3], NHYD=[108], IDs to add=[5,2]
*%---------------|-------------------------------------------------------|
*% SUB-AREA 5: Residential to Wetland Cell North
*% -------------------------------------------
CONTINUOUS STANDHYD ID=4  NHYD="5.0"  DT= 5.0  AREA= 85.0  HA
                    XIMP= 0.21  TIMP= 0.35  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     50   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1600  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%---------------|-------------------------------------------------------|
*% SUB-AREA 6
*% ---------
CONTINUOUS STANDHYD ID=5  NHYD="6.0"  DT= 5.0  AREA= 73.0  HA
                    XIMP= 0.18  TIMP= 0.30  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     50   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2   1800  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%---------------|-------------------------------------------------------|
*% SUB-AREA 7
*% ---------
CONTINUOUS STANDHYD ID=6  NHYD="7.0"  DT= 5.0  AREA= 8.0  HA
                    XIMP= 0.26  TIMP= 0.43  DWF=0.0 LOSS=2
                    CN= 78.5
                    PERVIOUS AREA       DPSP   SLP    LGP   MNP   SCP
                                         9.8   0.2     20   0.25  0.0
                    IMPERVIOUS AREA     DPSI   SLP    LGI   MNI   SCI
                                         2.0   0.2    450  0.013  0.0
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs),   END=-1
*%---------------|-------------------------------------------------------|
* Total Inflow to Monahan drain Constructed Wetlands (Areas 1-7)
* -------------------------------------------------------------
ADD HYD             IDsum=[7], NHYD=[110], IDs to add=[3,4,5,6,10]
*%---------------|-------------------------------------------------------|
* Monahan Drain Constructed Wetlands:
* ----------------------------------------------------------------------|
ROUTE RESERVOIR     IDOUT = 5 NHYD=112 IDIN = 7 DT = 5.0
                      Qp(cms)   Vol(ha*m)
                        0.00      0.0
                        0.76      1.50
                        2.11      5.35
                        4.28      9.70
                        8.18     12.84
                       10.50     15.50
                       14.03     18.33
                       18.94     20.67
                       23.24     21.64
```

```
                    27.87    22.42
*
****************************************************
* ID=5: HYDROGRAPH U/S OF HOPE SIDE RD BOX CULVERT *
****************************************************
*% SUB-AREA 8
*% ----------
CONTINUOUS NASHYD  ID=[6], NHYD=["8.0"], DT=[5.0]min, AREA=[285](ha),
                   DWF=[0](cms),  CN/C=[78.5], IA=[9.8](mm),
                   N=[1.8], TP=[3.40]hrs - from JLR Report
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs)
                   Baseflow simulation parameters:
                   BaseFlowOption=[1] ,
                   InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                   VHydCond=[10](mm/hr),   END=-1
*
ADD HYD            ID=1   NHYD=118   IDI= 5  IDII= 6
*%----------------|--------------------------------------------------------------|
* Erosion Potential D/S of Hope Side Road
* ---------------------------------------
EROSION INDEX      INDEX_METHOD=[1], QCE=[4.94](cms)
                   IDSerosion=[1]
*
ROUTE CHANNEL      IDOUT=2  NHYD=119  IDIN=1   DT=5.0
                   CHLGTH= 1000 CHSLP= 0.05 FPSLP= 0.05
                   VSN= 4  NSEG= 3
                      N    DIST(M)
                    0.075    37.5
                   -0.035    45.97
                    0.075    67.86
                   CROSS SECTION DATA
                     DIST(M)  ELEV(M)
                       0.00   94.86
                      10.51   94.08
                      23.87   93.41
                      32.46   93.27
                      37.50   92.63
                      40.26   92.11
                      42.38   91.53
                      44.40   91.59
                      45.97   91.67
                      47.71   91.85
                      49.23   92.69
                      51.93   92.96
                      61.03   92.98
                      67.86   93.51
*%----------------|--------------------------------------------------------------|
*% SUB-AREA 9
*% ----------
CONTINUOUS NASHYD  ID=[3], NHYD=["9.0"], DT=[5.0]min, AREA=[223.0](ha),
                   DWF=[0](cms),  CN/C=[78.6], IA=[9.8](mm),
                   N=[1.6], TP=[2.0]hrs - from JLR Report
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs)
                   Baseflow simulation parameters:
                   BaseFlowOption=[1] ,
                   InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                   VHydCond=[10](mm/hr),   END=-1
*
ADD HYD            ID=4   NHYD=121   IDI= 2  IDII= 3
*%----------------|--------------------------------------------------------------|
*% SUB-AREA 13
*% ----------
CONTINUOUS NASHYD  ID=[5], NHYD=["13.0"], DT=[5.0]min, AREA=[110.0](ha),
                   DWF=[0](cms),  CN/C=[75.7], IA=[9.8](mm),
                   N=[1.6], TP=[1.3]hrs - from JLR Report
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs)
                   Baseflow simulation parameters:
                   BaseFlowOption=[1] ,
                   InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                   VHydCond=[10](mm/hr),   END=-1
*
ADD HYD            ID=6   NHYD=123   IDI= 4  IDII= 5
*
ROUTE CHANNEL      IDOUT=10  NHYD=124  IDIN=6   DT=5.0
                   CHLGTH= 1000 CHSLP= 0.05 FPSLP= 0.05
                   VSN= 5  NSEG= 3
                      N    DIST(M)
                    0.075    2.55
                   -0.035    11.67
                    0.075    57.85
                   CROSS SECTION DATA
                     DIST(M)  ELEV(M)
                      0.00    92.58
                      2.55    91.70
                      3.78    91.17
                     10.99    91.32
                     11.67    91.68
                     20.62    93.08
                     39.00    93.49
                     57.85    93.60
*%----------------|--------------------------------------------------------------|
*% Area 10:  Flewellyn Drain (POST-DEV)
*% ------------------------
*% 10a - U/S of Station 6+948 - Now refered to as P5
*% --------------------------
CONTINUOUS STANDHYD ID=[1], NHYD=["P5a"], DT=[5](min), AREA=[44.37](ha),
                   XIMP=[0.32], TIMP=[0.40], DWF=[0](cms), LOSS=[2],
                   SCS curve number CN=[80.5],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                     LGP=[40](m), MNP=[0.20], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                     LGI=[700](m), MNI=[0.013], SCI=[0](min)
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%----------------|--------------------------------------------------------------|
DIVERT HYD         IDin=[1], NIDout=[2]max five,
                   outflow hydrographs (ID, NHYD)=[2,"5ABMP1"/3,"5ASTM1"]
                   flow distribution table: (modify as necessary)
                   Note: all flows are in (cms)
                         QIDi      +     QIDii   =       QTOTAL
                    [  0.000       +     0.000     =     0.00    ]
                    [     0.074    +     0.176     =     0.25    ]
                    [     0.148    +     0.352     =     0.50    ]
                    [     0.222    +     0.528     =     0.75    ]
                    [     0.296    +     0.704     =     1.00    ]
                    [     0.444    +     1.056     =     1.50    ]
                    [     0.592    +     1.408     =     2.00    ]
                    [     0.740    +     1.760     =     2.50    ]
                    [     0.888    +     2.112     =     3.00    ]
                    [     1.184    +     2.816     =     4.00    ]
                    [     1.480    +     3.520     =     5.00    ]
                    [     1.776    +     4.224     =     6.00    ]
                    [     2.072    +     4.928     =     7.00    ]       end
*
DIVERT HYD         IDin=[2], NIDout=[2]max five,
                   outflow hydrographs (ID, NHYD)=[4,"5ABMP2"/5,"5ASTM2"]
                   flow distribution table: (modify as necessary)
                   Note: all flows are in (cms)
                      QIDi         +     QIDii     =     QTOTAL
                    [  0.000       +     0.000     =     0.00    ]
                    [     0.025    +     0.049     =     0.07    ]
                    [     0.049    +     0.099     =     0.15    ]
                    [     0.074    +     0.148     =     0.22    ]
                    [     0.098    +     0.198     =     0.30    ]
                    [     0.147    +     0.297     =     0.44    ]
                    [     0.196    +     0.396     =     0.59    ]
                    [     0.245    +     0.495     =     0.74    ]
                    [     0.294    +     0.594     =     0.89    ]
                    [     0.392    +     0.792     =     1.18    ]
                    [     0.491    +     0.989     =     1.48    ]
                    [     0.589    +     1.187     =     1.78    ]
                    [     0.687    +     1.385     =     2.07    ]       end
*
ROUTE RESERVOIR    IDout=[7],   NHYD=["5ABMP3"],  IDin=[4],
                   RDT=[5](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                (cms)   - (ha-m)
                            [   0    ,     0   ]
                            [ 0.0028  ,  0.0049 ]
                            [ 0.0036  ,  0.0097 ]
                            [ 0.0045  ,  0.0146 ]
                            [ 0.0053  ,  0.0194 ]
                            [ 0.0061  ,  0.0243 ]
                            [   -1   ,      -1   ] (max twenty pts)
                   IDovf=[8], NHYDovf=["5ASTM3"]
*%----------------|--------------------------------------------------------------|
COMPUTE DUALHYD    IDin=[3], CINLET=[4.44](cms), NINLET=[1],
                   MAJID=[1], MajNHYD=["P5Amaj"],
                   MINID=[2], MinNHYD=["P5Amin"],
                   TMJSTO=[2219](cu-m)
*
ADD HYD            IDsum=[6], NHYD=["P5Ain"], IDs to add=[1,2,5,8]
*%----------------|--------------------------------------------------------------|
CONTINUOUS STANDHYD ID=[1], NHYD=["P5b"], DT=[5](min), AREA=[94.19](ha),
                   XIMP=[0.32], TIMP=[0.40], DWF=[0](cms), LOSS=[2],
                   SCS curve number CN=[80.5],
                   Pervious   surfaces: IAper=[4.67](mm), SLPP=[0.5](%),
                                     LGP=[40](m), MNP=[0.20], SCP=[0](min),
                   Impervious surfaces: IAimp=[1.57](mm), SLPI=[0.25](%),
                                     LGI=[2400](m), MNI=[0.013], SCI=[0](min
                   Continuous simulation parameters:
                   IaRECper=[4](hrs),  IaRECimp=[2](hrs),
                   SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                   InterEventTime=[12](hrs),   END=-1
*
*ROUTING FOR PERFORATED PIPES
*%----------------|--------------------------------------------------------------|
DIVERT HYD         IDin=[1], NIDout=[2]max five,
                   outflow hydrographs (ID, NHYD)=[2,"5BBMP1"/3,"5BSTM1"]
                   flow distribution table: (modify as necessary)
                   Note: all flows are in (cms)
                         QIDi      +     QIDii   =       QTOTAL
                    [  0.000       +     0.000     =     0.00    ]
                    [     0.079    +     0.171     =     0.25    ]
                    [     0.158    +     0.343     =     0.50    ]
                    [     0.236  +       0.514     =     0.75    ]
                    [     0.315    +     0.685     =     1.00    ]
                    [     0.473    +     1.028     =     1.50    ]
                    [     0.630    +     1.370     =     2.00    ]
                    [     0.788    +     1.713     =     2.50    ]
                    [     0.945    +     2.055     =     3.00    ]
                    [     1.260    +     2.740     =     4.00    ]
                    [     1.575    +     3.425     =     5.00    ]
                    [     1.890    +     4.110     =     6.00    ]
                    [     2.205    +     4.795     =     7.00    ]       end
*
DIVERT HYD         IDin=[2], NIDout=[2]max five,
                   outflow hydrographs (ID, NHYD)=[4,"5BBMP2"/5,"5BSTM2"]
                   flow distribution table: (modify as necessary)
                   Note: all flows are in (cms)
                      QIDi         +     QIDii     =     QTOTAL
                    [  0.000       +     0.000     =     0.00    ]
                    [     0.026    +     0.053     =     0.08    ]
                    [     0.052    +     0.105     =     0.16    ]
                    [     0.078    +     0.158     =     0.24    ]
                    [     0.104    +     0.211     =     0.32    ]
                    [     0.157    +     0.316     =     0.47    ]
                    [     0.209    +     0.421     =     0.63    ]
                    [     0.261    +     0.526     =     0.79    ]
                    [     0.313    +     0.632     =     0.95    ]
                    [     0.418    +     0.842     =     1.26    ]
                    [     0.522    +     1.053     =     1.58    ]
                    [     0.627    +     1.263     =     1.89    ]
                    [     0.731    +     1.474     =     2.21    ]       end
*
ROUTE RESERVOIR    IDout=[7],   NHYD=["5BBMP3"],  IDin=[4],
                   RDT=[5](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                (cms)   - (ha-m)
                            [      0  ,      0   ]
                            [ 0.0064  ,  0.0111 ]
```

```
                       [ 0.0083  ,  0.0221 ]
                       [ 0.0101  ,  0.0332 ]
                       [ 0.0120  ,  0.0442 ]
                       [ 0.0138  ,  0.0553 ]
                       [   -1    ,    -1   ] (max twenty pts)
                    IDovf=[8], NHYDovf=["5BSTM3"]
*%-----------------|----------------------------------------------------------|
COMPUTE DUALHYD     IDin=[3], CINLET=[9.42](cms), NINLET=[1],
                    MAJID=[1], MajNHYD=["P5Bmaj"],
                    MINID=[2], MinNHYD=["P5Bmin"],
                    TMJSTO=[4710](cu-m)
*
ADD HYD             IDsum=[9], NHYD=["P5Bin"], IDs to add=[1,2,5,6,8]
*
CONTINUOUS NASHYD   ID=[6], NHYD=["P5c"], DT=[5]min, AREA=[7.72](ha),
                    DWF=[0](cms),  CN/C=[90], IA=[4.67](mm),
                    N=[2.0], TP=[0.25]hrs
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[7], NHYD=["BP5IN"], IDs to add=[6,9]
*
ROUTE RESERVOIR     IDout=[1],   NHYD=["BP5out"],  IDin=[7],
                    RDT=[5](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                   (cms) - (ha-m)
                                [  0.000 , 0.000 ]
                                [  0.090 , 0.575 ]
                                [  1.060 , 2.455 ]
                                [  1.630 , 3.590 ]
                                [  2.350 , 4.110 ]
                                [  2.850 , 4.820 ]
                                [  3.160 , 5.470 ]
                                [  3.600 , 6.380 ]
                                [    -1  ,   -1  ]  (max twenty pts)

*
SAVE HYD            ID=[1],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["Post-Dev @ Fernbank Rd"]
*
COMPUTE VOLUME      ID=[1], STRATE=[2.50](cms), RELRATE=[2.50](cms)
*%-----------------|----------------------------------------------------------|
ROUTE CHANNEL       IDout=[2], NHYD=["6+948"], IDin=[1],
                    RDT=[5](min),
                    CHLGTH=[1427](m),  CHSLOPE=[.15](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-1.72 -0.035,1.72 0.075,51.7
                    ( DISTANCE (m), ELEVATION (m))=[[-101.98,36.13
                                                      -1.98,35.63
                                                      -0.46,34.12
                                                       0.46,34.12
                                                       1.98,35.63
                                                       101.98,36.13
                                                         -1,-1]
*
*% 10b - U/S of Station 5+219
*% --------------------------
CONTINUOUS NASHYD   ID=[1], NHYD=["10b"], DT=[5.0]min, AREA=[163.70](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[1.20]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[3], NHYD=["B5+219"], IDs to add=[1,2]
*
COMPUTE VOLUME      ID=[3], STRATE=[2.80](cms), RELRATE=[2.80](cms)
*******************************************
*  ID=3:  Flewellyn Drain @ Flewellyn Road  *
*******************************************
SAVE HYD            ID=[3],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["FD @ Flewellyn"]
*%-----------------|----------------------------------------------------------|
ROUTE CHANNEL       IDout=[2], NHYD=["5+219"], IDin=[3],
                    RDT=[5](min),
                    CHLGTH=[1685](m),  CHSLOPE=[.15](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-3.48 -0.035,3.48 0.075,53.4
                    ( DISTANCE (m), ELEVATION (m))=[-103.48,102.20
                                                      -3.48,101.70
                                                      -0.76,99.71
                                                       0.76,99.71
                                                       3.48,101.70
                                                      103.48,102.20
                                                         -1,-1]
*
ROUTE CHANNEL       IDout=[3], NHYD=["5+219"], IDin=[2],
                    RDT=[5](min),
                    CHLGTH=[1922](m),  CHSLOPE=[.05](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-3.13 -0.035,4.26  0.075,7.2
                    ( DISTANCE (m), ELEVATION (m))=[-103.13,98.85
                                                      -3.13,98.35
                                                      -0.40,96.53
                                                       0.40,96.53
                                                       4.26,99.10
                                                       7.26,99.16
                                                         -1,-1]
*% 10c - U/S of Station 1+574
*% --------------------------
CONTINUOUS NASHYD   ID=[4], NHYD=["10c"], DT=[5.0]min, AREA=[271.80](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[3.49]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[5], NHYD=["1+574"], IDs to add=[3,4]
*
COMPUTE VOLUME      ID=[5], STRATE=[3.93](cms), RELRATE=[3.93](cms)
*******************************************
*  ID=5:  Flewellyn Drain @ Eagleson Road  *
*******************************************
*
ROUTE CHANNEL       IDout=[2], NHYD=["1+574"], IDin=[5],
                    RDT=[5](min),
                    CHLGTH=[1590](m),  CHSLOPE=[.10](%),
                                       FPSLOPE=[.10](%),
                    SECNUM=[100],       NSEG=[3]
                    ( SEGROUGH, SEGDIST (m))=[0.075,-2.19 -0.035,2.19 0.075,52.1
                    ( DISTANCE (m), ELEVATION (m))=[-102.19,95.70
                                                      -2.19,95.20
                                                      -0.61,93.93
                                                       0.61,93.93
                                                       2.19,95.20
                                                      102.19,95.70
                                                         -1,-1]
*
*% 10d - U/S of Station 0+000
*% --------------------------
CONTINUOUS NASHYD   ID=[6], NHYD=["10d"], DT=[5.0]min, AREA=[144.00](ha),
                    DWF=[0](cms),  CN/C=[80.5], IA=[9.8](mm),
                    N=[1.3], TP=[3.09]hrs,
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             IDsum=[1], NHYD=["0+000"], IDs to add=[2,6]
*%-----------------|----------------------------------------------------------|
ADD HYD             IDsum=[3], NHYD=["BMD-FL"], IDs to add=[1,10]
*
SAVE HYD            ID=[3],   # OF PCYCLES=[1],  ICASEsh=[1]
                    HYD_COMMENT=["Confluence of Monahan & Flewellyn"]
*%-----------------|----------------------------------------------------------|
ROUTE CHANNEL       IDOUT=4 NHYD="127" IDIN=3  DT=5.0
                    CHLGTH= 850 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 6  NSEG= 3
                        N    DIST(M)
                     0.075    24.87
                    -0.035    33.95
                     0.075    68.67
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                        0.00     93.21
                       13.87     92.77
                       24.87     91.51
                       30.62     91.09
                       32.86     91.11
                       33.95     91.53
                       38.58     92.48
                       53.68     93.35
                       68.67     93.35
*%-----------------|----------------------------------------------------------|
*% SUB-AREA 12
*% -----------
CONTINUOUS NASHYD   ID=5 NHYD="12.0"  DT= 5.0  AREA=376.0  HA
                    DWF= 0  CN= 75.4  IA= 9.8  N=1.8  TP=2.4 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6  NHYD=129  IDI= 4  IDII= 5
*%-----------------|----------------------------------------------------------|
* Erosion Potential @ Fallowfield Road
* ----------------------------------
EROSION INDEX       INDEX_METHOD=[1], QCE=[10.38](cms)
                    IDSerosion=[6]
*
ROUTE CHANNEL       IDOUT=1  NHYD="130"  IDIN=6   DT=5.0
                    CHLGTH= 400 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 7  NSEG= 3
                        N    DIST(M)
                     0.075    20.39
                    -0.035    25.24
                     0.075    57.64
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                        0.00     93.37
                       15.07     92.85
                       18.98     91.47
                       20.39     91.07
                       24.12     90.97
                       25.24     91.46
                       28.07     92.15
                       44.18     92.42
                       57.64     92.46
*%-----------------|----------------------------------------------------------|
*% SUB-AREA 14
*% -----------
CONTINUOUS NASHYD   ID=2  NHYD="14.0" DT= 5.0  AREA= 50.0  HA
                    DWF= 0  CN= 75.0  IA= 9.8  N=2  TP=0.9 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
```

```
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=3   NHYD=132   IDI= 1  IDII= 2
*
ROUTE CHANNEL       IDOUT=4  NHYD="133"  IDIN=3   DT=5.0
                    CHLGTH= 700 CHSLP= 0.1 FPSLP= 0.1
                    VSN= 7  NSEG= 3
                       N    DIST(M)
                    0.075    31.96
                    -0.035    39.90
                     0.075    67.54
                    CROSS SECTION DATA
                      DIST(M)  ELEV(M)
                       0.00     92.92
                      15.27     92.79
                      25.71     92.03
                      31.96     90.58
                      32.58     90.61
                      34.04     90.06
                      37.40     89.43
                      39.90     89.77
                      41.05     90.60
                      42.20     91.20
                      55.52     91.11
                      67.54     91.22
*%-----------------|-----------------------------------------------------------|
*% SUB-AREA 15
*% -----------
CONTINUOUS NASHYD   ID=5  NHYD="15.0" DT= 5.0  AREA= 44.0  HA
                    DWF= 0  CN= 75.0  IA= 9.8  N=2  TP=0.5 HRS
                    Continuous simulation parameters:
                    IaRECper=[4](hrs),
                    SMIN=[-1](mm),  SMAX=[-1](mm), SK=[1]/(mm),
                    InterEventTime=[12](hrs)
                    Baseflow simulation parameters:
                    BaseFlowOption=[1] ,
                    InitGWResVol=[0](mm), GWResK=[4](mm/day/mm)
                    VHydCond=[10](mm/hr),   END=-1
*
ADD HYD             ID=6   NHYD="B135"   IDI= 4  IDII= 5
*
SAVE HYD            ID=[6],   # OF PCYCLES=[-1],  ICASEsh=[1]
                    HYD_COMMENT=["MD @ JR"]
*%=============================================================================|
*%                    ID=6: MONAHAN DRAIN @ JOCK RIVER
*%=============================================================================|
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[2]
                    S2-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[3]
                    S5-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[4]
                    S10-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
                    S25-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[6]
                    S50-24.stm
*
START               TZERO=[0],  METOUT=[2],  NSTORM=[1],  NRUN=[7]
                    S100-24.stm
*%-----------------|-----------------------------------------------------------|
FINISH
```

```
==========================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M  OOO        999    888 =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  8   8 =========
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  8   8 Ver. 4.0
     S   W W   M   M  H   H    Y    M   M  O   O       9999   888  Sept 1998
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9  8   8 =========
                                                       9  9  8   8 # 5320763
      StormWater Management HYdrologic Model            999    888 =========

 *************************************************************************
 ************************** SWMHYMO-98  Ver/4.0 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******      based on the principles of HYMO and its successors      *******
 *******                  OTTHYMO-83 and OTTHYMO-89.                  *******
 *************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199           *******
 *******                  Gatineau, Quebec: (819) 243-6858           *******
 *******                  E-Mail: swmhymo@jfsa.Com                   *******
 *************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: NOVATECH ENGINEERING CONSULTANTS LTD        +++++++
 +++++++                Nepean              SERIAL#:5320763          +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 *************************************************************************
 *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *******
 *******          Maximum value for ID numbers  :     10             *******
 *******          Max. number of rainfall points:  15000             *******
 *******          Max. number of flow points    :  15000             *******
 *************************************************************************

 *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
 ***---------------------------------------------------------------------***
 ***     ID:  Hydrograph IDentification numbers, (1-10).                ***
 ***  NHYD:  Hydrograph reference numbers, (6 digits or characters).    ***
 ***  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  ***
 *** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    ***
 *** TpeakDate_hh:mm is the date and time of the peak flow.             ***
 ***  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       ***
 ***  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       ***
 ***      *:  see WARNING or NOTE message printed at end of run.        ***
 ***     **:  see  ERROR  message printed at end of run.                ***
 *************************************************************************
 *************************************************************************

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

 *************************************************************************

 ********************   S U M M A R Y   O U T P U T   ********************
 *************************************************************************
 *       DATE: 2009-05-12     TIME: 19:33:44     RUN COUNTER: 001640      *
 *************************************************************************
 * Input   filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\JR-BMPE.*
 * Output  filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\JR-BMPE.*
 * Summary filename: M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\JR-BMPE.*
 * User comments:                                                         *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 *************************************************************************


 RUN:COMMAND#
 007:0001------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   7 ]
 007:0002------------------------------------------------------------------
     READ STORM
      Filename = storm.001
      Comment  = City of Ottawa:  100yr-24hr SCS Type II (60 minute time step
      [SDT=60.00:SDUR=  24.00:PTOT= 106.74]
 007:0003------------------------------------------------------------------
     DEFAULT VALUES
      Filename = M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\ottawa.def
      ICASEdv  = 1 (read and print data)
      FileTitle= ------ ENTER YOUR COMMENTS ON THIS LINE AND THE NEXT ONE ---
                 ------ PARAMETER VALUES MUST BE ENTERD AFTER COLUMN 60 ----
      Horton's infiltration equation parameters:
      [Fo= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 1.66 /hr] [F=  .00 mm]
      Parameters for PERVIOUS surfaces in STANDHYD:
      [IAper=   4.67 mm] [LGP=40.00 m] [MNP= .250]
      Parameters for IMPERVIOUS surfaces in STANDHYD:
      [IAimp=   1.57 mm] [CLI= 1.50]   [MNI= .013]
      Parameters used in NASHYD:
      [Ia=   4.67 mm] [N= 2.00]
 007:0004------------------------------------------------------------------
     COMPUTE API
      [APIini= 20.00: APIkdy= .9000: APIkdt= .9956]
      {APImax=119.41: APIavg= 70.87: APImin= 21.51}
 007:0005---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     CONTINUOUS STANDHYD01:P4a       42.61    3.437 No_date   12:15   89.91 .842
      [XIMP=.35:TIMP=.44]
      [LOSS= 2 :CN= 78.0]
      [Pervious     area: IAper= 5.20:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
      [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=2153.:MNI=.013:SCI=   .0]
      [IaRECimp=   2.00: IaRECper=   4.00]
      [SMIN= 29.88: SMAX=199.22: SK=1.000]
 007:0006---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     DIVERT HYD      -> 01:P4a       42.61    3.437 No_date   12:15   89.91  n/a
            diverted <= 02:4ABMP1    12.14     .979 No_date   12:15   89.91  n/a
            diverted <= 03:4ASTM1    30.48    2.457 No_date   12:15   89.91  n/a
 007:0007---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     DIVERT HYD      -> 02:4ABMP1    12.14     .979 No_date   12:15   89.91  n/a
            diverted <= 04:4ABMP2     4.06     .324 No_date   12:15   89.91  n/a
            diverted <= 05:4ASTM2     8.17     .653 No_date   12:15   89.91  n/a
 007:0008---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
     ROUTE RESERVOIR -> 04:4ABMP2     4.06     .324 No_date   12:15   89.91  n/a
      [RDT= 5.00] out<- 07:4ABMP3      .74     .006 No_date   10:20   89.91  n/a
            overflow <= 08:4ASTM3     3.31     .317 No_date   12:20   89.91  n/a
     {MxStoUsed=.2440E-01, TotOvfVol=.2977E+00, N-Ovf=    2, TotDurOvf=   15.hrs
```

```
007:0009---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:4ASTM1    30.48    2.457 No_date   12:15   89.91  n/a
       Major System /  01:P4amaj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  02:P4amin    30.48    2.457 No_date   12:15   89.91  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0010---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P4amaj      .00     .000 No_date    0:00     .00  n/a
                     + 02:P4amin    30.48    2.457 No_date   12:15   89.91  n/a
                     + 05:4ASTM2     8.17     .653 No_date   12:15   89.91  n/a
                     + 08:4ASTM3     3.31     .317 No_date   12:20   89.91  n/a
     [DT= 5.00]  SUM=  10:P4Ain     41.96    3.427 No_date   12:20   89.91  n/a
007:0011---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P4b       15.33    1.506 No_date   12:05   89.91 .842
     [XIMP=.35:TIMP=.44]
     [LOSS= 2 :CN= 78.0]
     [Pervious     area: IAper= 5.20:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .25:LGI= 767.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0012---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 01:P4b       15.33    1.506 No_date   12:05   89.91  n/a
           diverted <= 02:4BBMP1     4.03     .395 No_date   12:05   89.91  n/a
           diverted <= 03:4BSTM1    11.33    1.111 No_date   12:05   89.91  n/a
007:0013---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 02:4BBMP1     4.03     .395 No_date   12:05   89.91  n/a
           diverted <= 04:4BBMP2     1.31     .132 No_date   12:05   89.91  n/a
           diverted <= 05:4BSTM2     2.63     .266 No_date   12:05   89.91  n/a
007:0014---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:4BBMP2     1.31     .132 No_date   12:05   89.91  n/a
     [RDT= 5.00] out<- 07:4BBMP3      .24     .002 No_date   10:10   89.90  n/a
           overflow <= 08:4BSTM3     1.07     .129 No_date   12:05   89.91  n/a
    {MxStoUsed=.7896E-02, TotOvfVol=.9603E-01, N-Ovf=    2, TotDurOvf=   14.hrs
007:0015---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:4BSTM1    11.33    1.111 No_date   12:05   89.91  n/a
       Major System /  01:P4bmaj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  02:P4bmin    11.33    1.111 No_date   12:05   89.91  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0016---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P4bmaj      .00     .000 No_date    0:00     .00  n/a
                     + 02:P4bmin    11.33    1.111 No_date   12:05   89.91  n/a
                     + 05:4BSTM2     2.63     .266 No_date   12:05   89.91  n/a
                     + 08:4BSTM3     1.07     .129 No_date   12:05   89.91  n/a
     [DT= 5.00]  SUM=  09:P4Bin     15.03    1.506 No_date   12:05   89.91  n/a
007:0017---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:P4c        3.61     .405 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0018---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            06:P4c        3.61     .405 No_date   12:00   90.82  n/a
                     + 09:P4Bin     15.03    1.506 No_date   12:05   89.91  n/a
                     + 10:P4Ain     41.96    3.427 No_date   12:20   89.91  n/a
     [DT= 5.00]  SUM=  01:BP4in     60.60    5.200 No_date   12:10   89.96  n/a
007:0019---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 01:BP4in     60.60    5.200 No_date   12:10   89.96  n/a
     [RDT= 5.00] out<- 02:BP4out    60.60    1.670 No_date   13:45   89.96  n/a
    {MxStoUsed=.2898E+01}
007:0020---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           02:BP4out    60.60    1.670 No_date   13:45   89.96  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-BP4out.007
     remark:P4 Post-Dev
007:0021---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 02:BP4out    60.60    1.670 No_date   13:45   89.96  n/a
     [RDT= 5.00] out<- 06:R-FA1     60.60    1.526 No_date   14:40   89.96  n/a
     [L/S/n= 1862./ .350/.037]
     {Vmax=  .697:Dmax=  .628}
007:0022---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  02:FA2      151.00    2.875 No_date   15:35   76.87 .720
     [CN= 81.0: N= 2.00]
     [Tp= 3.14:DT= 5.00]
     [IaREC= 4.00: SMIN= 25.21: SMAX=168.09: SK= .100]
     [InterEventTime=  12.00]
007:0023---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  03:FA3      331.00    6.640 No_date   15:25   78.93 .739
     [CN= 83.2: N= 2.00]
     [Tp= 3.05:DT= 5.00]
     [IaREC= 4.00: SMIN= 22.08: SMAX=147.18: SK= .100]
     [InterEventTime=  12.00]
007:0024---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            06:R-FA1     60.60    1.526 No_date   14:40   89.96  n/a
                     + 02:FA2      151.00    2.875 No_date   15:35   76.87  n/a
                     + 03:FA3      331.00    6.640 No_date   15:25   78.93  n/a
     [DT= 5.00]  SUM=  04:BFA3     542.60   10.974 No_date   15:15   79.59  n/a
007:0025---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           04:BFA3     542.60   10.974 No_date   15:15   79.59  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-BFA3.007
     remark:FA3
007:0026---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P6a       55.91    4.574 No_date   12:15   91.22 .855
     [XIMP=.39:TIMP=.49]
     [LOSS= 2 :CN= 78.0]
     [Pervious     area: IAper= 5.20:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=2200.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0027---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 01:P6a       55.91    4.574 No_date   12:15   91.22  n/a
           diverted <= 02:6ABMP1    14.45    1.180 No_date   12:15   91.22  n/a
           diverted <= 03:6ASTM1    41.51    3.394 No_date   12:15   91.22  n/a
007:0028---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 02:6ABMP1    14.45    1.180 No_date   12:15   91.22  n/a
           diverted <= 04:6ABMP2     4.84     .392 No_date   12:15   91.22  n/a
           diverted <= 05:6ASTM2     9.77     .789 No_date   12:15   91.22  n/a
007:0029---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:6ABMP2     4.84     .392 No_date   12:15   91.22  n/a
     [RDT= 5.00] out<- 07:6ABMP3      .95     .008 No_date   10:20   91.22  n/a
           overflow <= 08:6ASTM3     3.89     .383 No_date   12:20   91.22  n/a
    {MxStoUsed=.3141E-01, TotOvfVol=.3547E+00, N-Ovf=    2, TotDurOvf=   14.hrs
007:0030---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:6ASTM1    41.51    3.394 No_date   12:15   91.22  n/a
       Major System /  01:P6amaj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  02:P6amin    41.51    3.394 No_date   12:15   91.22  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0031---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P6amaj      .00     .000 No_date    0:00     .00  n/a
                     + 02:P6amin    41.51    3.394 No_date   12:15   91.22  n/a
```

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                 +  05:6ASTM2     9.77     .789 No_date   12:15   91.22  n/a
                 +  08:6ASTM3     3.89     .383 No_date   12:20   91.22  n/a
  [DT= 5.00]  SUM=  10:P6Ain     55.17    4.564 No_date   12:15   91.22  n/a
007:0032---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P6b       42.74    3.750 No_date   12:10   91.22 .855
     [XIMP=.39:TIMP=.49]
     [LOSS= 2 :CN= 78.0]
     [Pervious     area: IAper= 5.20:SLPP= .50:LGP=  40.:MNP=.200:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=1600.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0033---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 01:P6b       42.74    3.750 No_date   12:10   91.22  n/a
           diverted <= 02:6BBMP1     7.52     .660 No_date   12:10   91.22  n/a
           diverted <= 03:6BSTM1    35.22    3.090 No_date   12:10   91.22  n/a
007:0034---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 02:6BBMP1     7.52     .660 No_date   12:10   91.22  n/a
           diverted <= 04:6BBMP2     2.57     .219 No_date   12:10   91.22  n/a
           diverted <= 05:6BSTM2     5.12     .443 No_date   12:10   91.22  n/a
007:0035---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:6BBMP2     2.57     .219 No_date   12:10   91.22  n/a
     [RDT= 5.00] out<- 07:6BBMP3      .60     .005 No_date   10:45   91.22  n/a
           overflow <= 08:6BSTM3     1.96     .214 No_date   12:15   91.22  n/a
    {MxStoUsed=.2050E-01, TotOvfVol=.1790E+00, N-Ovf=    2, TotDurOvf=   14.hrs
007:0036---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:6BSTM1    35.22    3.090 No_date   12:10   91.22  n/a
       Major System /  02:P6bmaj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  01:P6bmin    35.22    3.090 No_date   12:10   91.22  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0037---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P6bmin    35.22    3.090 No_date   12:10   91.22  n/a
                 +  02:P6bmaj      .00     .000 No_date    0:00     .00  n/a
                 +  05:6BSTM2     5.12     .443 No_date   12:10   91.22  n/a
                 +  08:6BSTM3     1.96     .214 No_date   12:15   91.22  n/a
     [DT= 5.00]  SUM=  09:P6Bin     42.30    3.745 No_date   12:10   91.22  n/a
007:0038---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:SWM6       4.75     .532 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0039---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            06:SWM6       4.75     .532 No_date   12:00   90.82  n/a
                 +  09:P6Bin     42.30    3.745 No_date   12:10   91.22  n/a
                 +  10:P6Ain     55.17    4.564 No_date   12:15   91.22  n/a
     [DT= 5.00]  SUM=  01:P6in     102.22    8.726 No_date   12:15   91.21  n/a
007:0040---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 01:P6in     102.22    8.726 No_date   12:15   91.21  n/a
     [RDT= 5.00] out<- 06:BP6out   102.22    2.337 No_date   14:05   91.21  n/a
    {MxStoUsed=.5038E+01}
007:0041---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           06:BP6out   102.22    2.337 No_date   14:05   91.21  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-BP6out.007
     remark:P6 Post-Dev
007:0042---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 06:BP6out   102.22    2.337 No_date   14:05   91.21  n/a
     [RDT= 5.00] out<- 10:P6rte    102.22    2.331 No_date   14:15   91.21  n/a
     [L/S/n=  700./ .250/.035]
     {Vmax=  .970:Dmax=  .884}
007:0043---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P7        43.12    4.697 No_date   12:00   87.83 .823
     [XIMP=.29:TIMP=.36]
     [LOSS= 2 :CN= 78.0]
     [Pervious     area: IAper= 5.20:SLPP=1.50:LGP=  40.:MNP=.200:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .80:LGI= 550.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0044---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 01:P7        43.12    4.697 No_date   12:00   87.83  n/a
           diverted <= 02:7BMP1     13.67    1.489 No_date   12:00   87.83  n/a
           diverted <= 03:7STM1     29.47    3.208 No_date   12:00   87.83  n/a
007:0045---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 02:7BMP1     13.67    1.489 No_date   12:00   87.83  n/a
           diverted <= 04:7BMP2      4.50     .492 No_date   12:00   87.83  n/a
           diverted <= 05:7STM2      9.10     .993 No_date   12:00   87.83  n/a
007:0046---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:7BMP2      4.50     .492 No_date   12:00   87.83  n/a
     [RDT= 5.00] out<- 07:7BMP3       .59     .005 No_date    9:00   87.82  n/a
           overflow <= 08:7STM3      3.91     .481 No_date   12:00   87.83  n/a
    {MxStoUsed=.1858E-01, TotOvfVol=.3437E+00, N-Ovf=    2, TotDurOvf=   15.hrs
007:0047---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:7STM1     29.47    3.208 No_date   12:00   87.83  n/a
       Major System /  01:P7maj       .00     .000 No_date    0:00     .00  n/a
       Minor System \  02:P7min     29.47    3.208 No_date   12:00   87.83  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0048---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:SWM7       4.18     .468 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0049---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P7maj       .00     .000 No_date    0:00     .00  n/a
                 +  02:P7min     29.47    3.208 No_date   12:00   87.83  n/a
                 +  05:7STM2      9.10     .993 No_date   12:00   87.83  n/a
                 +  08:7STM3      3.91     .481 No_date   12:00   87.83  n/a
                 +  06:SWM7       4.18     .468 No_date   12:00   90.82  n/a
     [DT= 5.00]  SUM=  04:P7in      46.66    5.151 No_date   12:00   88.09  n/a
007:0050---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:P7in      46.66    5.151 No_date   12:00   88.09  n/a
     [RDT= 5.00] out<- 09:P7out     46.66     .614 No_date   14:10   88.09  n/a
    {MxStoUsed=.2622E+01}
007:0051---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P8        62.46    6.656 No_date   12:00   92.28 .864
     [XIMP=.42:TIMP=.53]
     [LOSS= 2 :CN= 78.0]
     [Pervious     area: IAper= 5.20:SLPP=1.50:LGP=  40.:MNP=.200:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .50:LGI= 950.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0052---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 01:P8        62.46    6.656 No_date   12:00   92.28  n/a
           diverted <= 02:8BMP1     12.89    1.371 No_date   12:00   92.28  n/a
           diverted <= 03:8STM1     49.62    5.285 No_date   12:00   92.28  n/a
007:0053---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 02:8BMP1     12.89    1.371 No_date   12:00   92.28  n/a
           diverted <= 04:8BMP2      4.31     .455 No_date   12:00   92.28  n/a
           diverted <= 05:8STM2      8.68     .916 No_date   12:00   92.28  n/a
007:0054---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:8BMP2      4.31     .455 No_date   12:00   92.28  n/a
     [RDT= 5.00] out<- 07:8BMP3       .88     .007 No_date   10:00   92.27  n/a
           overflow <= 08:8STM3      3.42     .444 No_date   12:05   92.28  n/a
    {MxStoUsed=.3000E-01, TotOvfVol=.3160E+00, N-Ovf=    2, TotDurOvf=   14.hrs
007:0055---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:8STM1     49.62    5.285 No_date   12:00   92.28  n/a
       Major System /  01:P8maj       .00     .000 No_date    0:00     .00  n/a
       Minor System \  02:P8min     49.62    5.285 No_date   12:00   92.28  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0056---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:SWM8       3.07     .344 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0057---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P8maj       .00     .000 No_date    0:00     .00  n/a
                 +  02:P8min     49.62    5.285 No_date   12:00   92.28  n/a
                 +  05:8STM2      8.68     .916 No_date   12:00   92.28  n/a
                 +  08:8STM3      3.42     .444 No_date   12:05   92.28  n/a
                 +  06:SWM8       3.07     .344 No_date   12:00   90.82  n/a
     [DT= 5.00]  SUM=  04:P8in      64.79    6.985 No_date   12:00   92.21  n/a
007:0058---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:P8in      64.79    6.985 No_date   12:00   92.21  n/a
     [RDT= 5.00] out<- 08:P8out     64.79    1.146 No_date   13:50   92.21  n/a
    {MxStoUsed=.3646E+01}
007:0059---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  05:MD         3.38     .335 No_date   12:00   76.18 .714
     [CN= 80.5: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0060---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            05:MD         3.38     .335 No_date   12:00   76.18  n/a
                 +  08:P8out     64.79    1.146 No_date   13:50   92.21  n/a
                 +  09:P7out     46.66     .614 No_date   14:10   88.09  n/a
                 +  10:P6rte    102.22    2.331 No_date   14:15   91.21  n/a
     [DT= 5.00]  SUM=  02:BMDpst   217.05    4.129 No_date   14:05   90.60  n/a
007:0061---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           02:BMDpst   217.05    4.129 No_date   14:05   90.60  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-BMDpst.007
     remark:MD-TFD Post-Dev
007:0062---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD03:2.4       52.94    4.441 No_date   12:15   89.66 .840
     [XIMP=.35:TIMP=.48]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  35.:MNP=.250:SCP=   .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1400.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0063---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:2.5       16.90    1.720 No_date   12:00   81.12 .760
     [CN= 80.2: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0064---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:2.5       16.90    1.720 No_date   12:00   81.12  n/a
                 +  02:BMDpst   217.05    4.129 No_date   14:05   90.60  n/a
                 +  03:2.4       52.94    4.441 No_date   12:15   89.66  n/a
     [DT= 5.00]  SUM=  10:MD-CEL   286.89    8.158 No_date   12:15   89.87  n/a
007:0065---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:2.1       30.00    3.445 No_date   12:00   94.64 .887
     [XIMP=.48:TIMP=.57]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI=1.50:LGI= 800.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0066---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:2.1       30.00    3.445 No_date   12:00   94.64  n/a
       Major System /  03:2.1maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  04:2.1min    30.00    2.550 No_date   11:30   94.89  n/a
     {MjSysSto=.1550E+04, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0067---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:2.3       31.20    3.583 No_date   12:00   94.64 .887
     [XIMP=.48:TIMP=.57]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI=1.50:LGI= 800.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0068---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:2.3       31.20    3.583 No_date   12:00   94.64  n/a
       Major System /  05:2.3maj      .01     .039 No_date   12:15   94.64  n/a
       Minor System \  06:2.3min    31.19    2.652 No_date   11:30   94.91  n/a
     {MjSysSto=.1600E+04, TotOvfVol=.1164E+02, N-Ovf=    1, TotDurOvf=    0.hrs
007:0069---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:2.2        8.25     .893 No_date   12:00   94.64 .887
     [XIMP=.48:TIMP=.57]
     [LOSS= 2 :CN= 80.2]
     [Pervious     area: IAper= 4.67:SLPP=1.00:LGP=  35.:MNP=.250:SCP=   .0]
     [Impervious   area: IAimp= 1.57:SLPI= .20:LGI= 600.:MNI=.013:SCI=   .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0070---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:2.2        8.25     .893 No_date   12:00   94.64  n/a
       Major System /  07:2.2maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  08:2.2min     8.25     .701 No_date   11:35   94.72  n/a
     {MjSysSto=.2930E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0071---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            03:2.1maj      .00     .000 No_date    0:00     .00  n/a
                 +  04:2.1min    30.00    2.550 No_date   11:30   94.89  n/a
                 +  05:2.3maj      .01     .039 No_date   12:15   94.64  n/a
                 +  06:2.3min    31.19    2.652 No_date   11:30   94.91  n/a
                 +  07:2.2maj      .00     .000 No_date    0:00     .00  n/a
                 +  08:2.2min     8.25     .701 No_date   11:35   94.72  n/a
     [DT= 5.00]  SUM=  02:2.1-2.     69.45    5.942 No_date   12:15   94.88  n/a
007:0072---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:2.1-2.     69.45    5.942 No_date   12:15   94.88  n/a
                 +  10:MD-CEL   286.89    8.158 No_date   12:15   89.87  n/a
     [DT= 5.00]  SUM=  04:BC1-Al   356.34   14.100 No_date   12:15   90.84  n/a
007:0073---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD           04:BC1-Al   356.34   14.100 No_date   12:15   90.84  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-BC1-Al.007
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  remark:MD @ Cell 1
007:0074---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:4.1       10.00    1.158 No_date   12:00   93.38 .875
     [XIMP=.34:TIMP=.57]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 4.67:SLPP= .60:LGP=  25.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .60:LGI= 350.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0075---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:4.1       10.00    1.158 No_date   12:00   93.38  n/a
       Major System /  02:4.1maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  03:4.1min    10.00     .848 No_date   11:30   93.44  n/a
     {MjSysSto=.5514E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0076---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD07:4.2       25.00    2.892 No_date   12:00   94.72 .887
     [XIMP=.38:TIMP=.62]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 4.67:SLPP= .60:LGP=  25.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .60:LGI= 500.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0077---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    07:4.2       25.00    2.892 No_date   12:00   94.72  n/a
       Major System /  08:4.2maj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  09:4.2min    25.00    2.892 No_date   12:00   94.72  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0078---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:4.3        3.70     .201 No_date   12:00   83.14 .779
     [CN= 78.1: N= 1.20]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
     [InterEventTime=  12.00]
007:0079---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:4.3        3.70     .201 No_date   12:00   83.14  n/a
                     + 02:4.1maj      .00     .000 No_date    0:00     .00  n/a
                     + 08:4.2maj      .00     .000 No_date    0:00     .00  n/a
     [DT= 5.00]  SUM=  05:CEL2I      3.70     .201 No_date   12:00   83.14  n/a
007:0080---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:4.3        3.70     .201 No_date   12:00   83.14  n/a
                     + 02:4.1maj      .00     .000 No_date    0:00     .00  n/a
                     + 03:4.1min    10.00     .848 No_date   11:30   93.44  n/a
                     + 04:BC1-Al   356.34   14.100 No_date   12:15   90.84  n/a
                     + 08:4.2maj      .00     .000 No_date    0:00     .00  n/a
                     + 09:4.2min    25.00    2.892 No_date   12:00   94.72  n/a
     [DT= 5.00]  SUM=  05:CEL2TO   395.04   17.589 No_date   12:05   91.08  n/a
007:0081---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:4.4        6.50     .700 No_date   12:00   95.03 .890
     [XIMP=.62:TIMP=.69]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 349.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0082---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    01:4.4        6.50     .700 No_date   12:00   95.03  n/a
       Major System /  02:010531      .00     .000 No_date    0:00     .00  n/a
       Minor System \  03:010532     6.50     .553 No_date   11:35   94.99  n/a
     {MjSysSto=.2037E+03, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0083---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD04:4.5       15.80    1.701 No_date   12:00   95.03 .890
     [XIMP=.62:TIMP=.69]
     [LOSS= 2 :CN= 78.1]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 349.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0084---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:010531      .00     .000 No_date    0:00     .00  n/a
                     + 03:010532     6.50     .553 No_date   11:35   94.99  n/a
                     + 04:4.5       15.80    1.701 No_date   12:00   95.03  n/a
     [DT= 5.00]  SUM=  10:NEW_EN    22.30    2.254 No_date   12:00   95.02  n/a
007:0085---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD02:3.0      285.00    7.135 No_date   14:50   83.22 .780
     [XIMP=.19:TIMP=.31]
     [LOSS= 2 :CN= 78.3]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP= 800.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1900.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0086---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            05:CEL2TO   395.04   17.589 No_date   12:05   91.08  n/a
                     + 02:3.0      285.00    7.135 No_date   14:50   83.22  n/a
     [DT= 5.00]  SUM=  03:000108   680.04   24.417 No_date   12:10   87.79  n/a
007:0087---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD04:5.0       85.00    6.159 No_date   12:20   84.40 .791
     [XIMP=.21:TIMP=.35]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1600.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0088---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD05:6.0       73.00    4.963 No_date   12:25   82.91 .777
     [XIMP=.18:TIMP=.30]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  50.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI=1800.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0089---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD06:7.0        8.00     .813 No_date   12:00   86.81 .813
     [XIMP=.26:TIMP=.43]
     [LOSS= 2 :CN= 78.5]
     [Pervious     area: IAper= 9.80:SLPP= .20:LGP=  20.:MNP=.250:SCP=    .0]
     [Impervious   area: IAimp= 2.00:SLPI= .20:LGI= 450.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 29.88: SMAX=199.22: SK=1.000]
007:0090---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            03:000108   680.04   24.417 No_date   12:10   87.79  n/a
                     + 04:5.0       85.00    6.159 No_date   12:20   84.40  n/a
                     + 05:6.0       73.00    4.963 No_date   12:25   82.91  n/a
                     + 06:7.0        8.00     .813 No_date   12:00   86.81  n/a
                     + 10:NEW_EN    22.30    2.254 No_date   12:00   95.02  n/a
     [DT= 5.00]  SUM=  07:000110   868.34   37.698 No_date   12:10   87.22  n/a
007:0091---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 07:000110   868.34   37.698 No_date   12:10   87.22  n/a
     [RDT= 5.00] out<- 05:000112   868.34   18.579 No_date   14:05   87.22  n/a
     {MxStoUsed=.2050E+02}
007:0092---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:8.0      285.00    4.355 No_date   16:10   74.01 .693
     [CN= 78.5: N= 1.80]
     [Tp= 3.40:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
     [InterEventTime=  12.00]
007:0093---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            05:000112   868.34   18.579 No_date   14:05   87.22  n/a
                     + 06:8.0      285.00    4.355 No_date   16:10   74.01  n/a
     [DT= 5.00]  SUM=  01:000118  1153.34   22.461 No_date   14:15   83.96  n/a
007:0094---------------ID:NHYD------QPEAK-----QAVG--DUR.HRS--ERO.HRS-----EXC.%-
    EROSION INDEX      01:000118   22.461    1.064   252.75    16.25      6.43
     [QCE=  4.940]
007:0095---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 01:000118  1153.34   22.461 No_date   14:15   83.96  n/a
  *  [RDT= 5.00] out<- 02:000119  1153.34   22.071 No_date   14:55   83.96  n/a
     [L/S/n= 1000./ .050/.035]
     {Vmax=  .485:Dmax= 1.974}
007:0096---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  03:9.0      223.00    4.468 No_date   14:25   74.01 .693
     [CN= 78.6: N= 1.60]
     [Tp= 2.00:DT= 5.00]
     [IaREC= 4.00: SMIN= 29.88: SMAX=199.22: SK=1.000]
     [InterEventTime=  12.00]
007:0097---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            02:000119  1153.34   22.071 No_date   14:55   83.96  n/a
                     + 03:9.0      223.00    4.468 No_date   14:25   74.01  n/a
     [DT= 5.00]  SUM=  04:000121  1376.34   26.502 No_date   14:50   82.34  n/a
007:0098---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  05:13.0     110.00    2.975 No_date   13:25   71.73 .672
     [CN= 75.7: N= 1.60]
     [Tp= 1.30:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0099---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            04:000121  1376.34   26.502 No_date   14:50   82.34  n/a
                     + 05:13.0     110.00    2.975 No_date   13:25   71.73  n/a
     [DT= 5.00]  SUM=  06:000123  1486.34   29.153 No_date   14:45   81.56  n/a
007:0100---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 06:000123  1486.34   29.153 No_date   14:45   81.56  n/a
  *  [RDT= 5.00] out<- 10:000124  1486.34   28.796 No_date   15:15   81.56  n/a
     [L/S/n= 1000./ .050/.035]
     {Vmax=  .608:Dmax= 1.409}
007:0101---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P5a       44.37    4.398 No_date   12:05   90.56 .848
     [XIMP=.32:TIMP=.40]
     [LOSS= 2 :CN= 80.5]
     [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .25:LGI= 700.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0102---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 01:P5a       44.37    4.398 No_date   12:05   90.56  n/a
           diverted <= 02:5ABMP1    13.13    1.302 No_date   12:05   90.56  n/a
           diverted <= 03:5ASTM1    31.24    3.096 No_date   12:05   90.56  n/a
007:0103---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    DIVERT HYD      -> 02:5ABMP1    13.13    1.302 No_date   12:05   90.56  n/a
           diverted <= 04:5ABMP2     4.43     .432 No_date   12:05   90.56  n/a
           diverted <= 05:5ASTM2     8.87     .872 No_date   12:05   90.56  n/a
007:0104---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:5ABMP2     4.43     .432 No_date   12:05   90.56  n/a
     [RDT= 5.00] out<- 07:5ABMP3      .74     .006 No_date    9:30   90.55  n/a
           overflow <= 08:5ASTM3     3.69     .426 No_date   12:05   90.56  n/a
     {MxStoUsed=.2429E-01, TotOvfVol=.3338E+00, N-Ovf=    2, TotDurOvf=   15.hrs
007:0105---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:5ASTM1    31.24    3.096 No_date   12:05   90.56  n/a
       Major System /  01:P5Amaj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  02:P5Amin    31.24    3.096 No_date   12:05   90.56  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0106---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P5Amaj      .00     .000 No_date    0:00     .00  n/a
                     + 02:P5Amin    31.24    3.096 No_date   12:05   90.56  n/a
                     + 05:5ASTM2     8.87     .872 No_date   12:05   90.56  n/a
                     + 08:5ASTM3     3.69     .426 No_date   12:05   90.56  n/a
     [DT= 5.00]  SUM=  06:P5Ain     43.79    4.394 No_date   12:05   90.56  n/a
007:0107---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS STANDHYD01:P5b       94.19    7.376 No_date   12:20   90.56 .848
     [XIMP=.32:TIMP=.40]
     [LOSS= 2 :CN= 80.5]
     [Pervious     area: IAper= 4.67:SLPP= .50:LGP=  40.:MNP=.200:SCP=    .0]
     [Impervious   area: IAimp= 1.57:SLPI= .25:LGI=2400.:MNI=.013:SCI=    .0]
     [IaRECimp=   2.00: IaRECper=   4.00]
     [SMIN= 26.32: SMAX=175.50: SK=1.000]
007:0108---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  * DIVERT HYD      -> 01:P5b       94.19    7.376 No_date   12:20   90.56  n/a
           diverted <= 02:5BBMP1    29.69    2.323 No_date   12:20   90.56  n/a
           diverted <= 03:5BSTM1    64.53    5.053 No_date   12:20   90.56  n/a
007:0109---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
  * DIVERT HYD      -> 02:5BBMP1    29.69    2.323 No_date   12:20   90.56  n/a
           diverted <= 04:5BBMP2     9.77     .769 No_date   12:20   90.56  n/a
           diverted <= 05:5BSTM2    19.73    1.550 No_date   12:20   90.56  n/a
007:0110---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 04:5BBMP2     9.77     .769 No_date   12:20   90.56  n/a
     [RDT= 5.00] out<- 07:5BBMP3     1.68     .014 No_date   10:15   90.56  n/a
           overflow <= 08:5BSTM3     8.09     .752 No_date   12:25   90.56  n/a
     {MxStoUsed=.5529E-01, TotOvfVol=.7329E+00, N-Ovf=    2, TotDurOvf=   15.hrs
007:0111---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    COMPUTE DUALHYD    03:5BSTM1    64.53    5.053 No_date   12:20   90.56  n/a
       Major System /  01:P5Bmaj      .00     .000 No_date    0:00     .00  n/a
       Minor System \  02:P5Bmin    64.53    5.053 No_date   12:20   90.56  n/a
     {MjSysSto=.0000E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs
007:0112---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD            01:P5Bmaj      .00     .000 No_date    0:00     .00  n/a
                     + 02:P5Bmin    64.53    5.053 No_date   12:20   90.56  n/a
                     + 05:5BSTM2    19.73    1.550 No_date   12:20   90.56  n/a
                     + 06:P5Ain     43.79    4.394 No_date   12:05   90.56  n/a
                     + 08:5BSTM3     8.09     .752 No_date   12:25   90.56  n/a
     [DT= 5.00]  SUM=  09:P5Bin    136.15   11.360 No_date   12:10   90.56  n/a
007:0113---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:P5c        7.72     .865 No_date   12:00   90.82 .851
     [CN= 90.0: N= 2.00]
     [Tp=  .25:DT= 5.00]
     [IaREC= 4.00: SMIN= 12.64: SMAX= 84.28: SK=1.000]
     [InterEventTime=  12.00]
007:0114---------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
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    ADD HYD           06:P5c        7.72     .865 No_date   12:00   90.82  n/a
                    + 09:P5Bin    136.15   11.360 No_date   12:10   90.56  n/a
     [DT= 5.00]  SUM=  07:BP5IN    143.87   12.122 No_date   12:10   90.57  n/a
007:0115--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE RESERVOIR -> 07:BP5IN    143.87   12.122 No_date   12:10   90.57  n/a
 *   [RDT= 5.00] out<- 01:BP5out   143.87    3.666 No_date   13:55   90.57  n/a
    {MxStoUsed=.6517E+01}
007:0116--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD          01:BP5out   143.87    3.666 No_date   13:55   90.57  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-BP5out.007
     remark:Post-Dev @ Fernbank Rd
007:0117--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
 *  COMPUTE VOLUME    01:BP5out   143.87    3.666 No_date   13:55   90.57  n/a
007:0118--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 01:BP5out   143.87    3.666 No_date   13:55   90.57  n/a
     [RDT= 5.00] out<- 02:6+948    143.87    3.406 No_date   15:35   90.57  n/a
     [L/S/n= 1427./ .150/.035]
     {Vmax=  .417:Dmax= 1.656}
007:0119--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  01:10b      163.70    3.418 No_date   13:45   76.18 .714
     [CN= 80.5: N= 1.30]
     [Tp= 1.20:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0120--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD           01:10b      163.70    3.418 No_date   13:45   76.18  n/a
                    + 02:6+948    143.87    3.406 No_date   15:35   90.57  n/a
     [DT= 5.00]  SUM=  03:B5+219   307.57    6.538 No_date   14:55   82.91  n/a
007:0121--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
 *  COMPUTE VOLUME    03:B5+219   307.57    6.538 No_date   14:55   82.91  n/a
007:0122--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD          03:B5+219   307.57    6.538 No_date   14:55   82.91  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-B5+219.007
     remark:FD @ Flewellyn
007:0123--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 03:B5+219   307.57    6.538 No_date   14:55   82.91  n/a
     [RDT= 5.00] out<- 02:5+219    307.57    6.496 No_date   15:15   82.91  n/a
     [L/S/n= 1685./ .150/.035]
     {Vmax= 1.021:Dmax= 1.676}
007:0124--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 02:5+219    307.57    6.496 No_date   15:15   82.91  n/a
     [RDT= 5.00] out<- 03:5+219    307.57    5.922 No_date   17:40   82.91  n/a
     [L/S/n= 1922./ .050/.035]
     {Vmax=  .392:Dmax= 2.106}
007:0125--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  04:10c      271.80    2.421 No_date   18:00   76.18 .714
     [CN= 80.5: N= 1.30]
     [Tp= 3.49:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0126--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD           03:5+219    307.57    5.922 No_date   17:40   82.91  n/a
                    + 04:10c      271.80    2.421 No_date   18:00   76.18  n/a
     [DT= 5.00]  SUM=  05:1+574    579.37    8.338 No_date   17:45   79.76  n/a
007:0127--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
 *  COMPUTE VOLUME    05:1+574    579.37    8.338 No_date   17:45   79.76  n/a
007:0128--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 05:1+574    579.37    8.338 No_date   17:45   79.76  n/a
     [RDT= 5.00] out<- 02:1+574    579.37    7.821 No_date   19:40   79.76  n/a
     [L/S/n= 1590./ .100/.035]
     {Vmax=  .261:Dmax= 1.635}
007:0129--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  06:10d      144.00    1.410 No_date   17:25   76.18 .714
     [CN= 80.5: N= 1.30]
     [Tp= 3.09:DT= 5.00]
     [IaREC= 4.00: SMIN= 26.32: SMAX=175.50: SK=1.000]
     [InterEventTime=  12.00]
007:0130--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD           02:1+574    579.37    7.821 No_date   19:40   79.76  n/a
                    + 06:10d      144.00    1.410 No_date   17:25   76.18  n/a
     [DT= 5.00]  SUM=  01:0+000    723.37    9.187 No_date   19:30   79.05  n/a
007:0131--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD           01:0+000    723.37    9.187 No_date   19:30   79.05  n/a
                    + 10:000124  1486.34   28.796 No_date   15:15   81.56  n/a
     [DT= 5.00]  SUM=  03:BMD-FL  2209.70   35.625 No_date   15:40   80.74  n/a
007:0132--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD          03:BMD-FL  2209.70   35.625 No_date   15:40   80.74  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-BMD-FL.007
     remark:Confluence of Monahan & Flewellyn
007:0133--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 03:BMD-FL  2209.70   35.625 No_date   15:40   80.74  n/a
 *   [RDT= 5.00] out<- 04:127     2209.70   35.494 No_date   16:00   80.74  n/a
     [L/S/n=  850./ .100/.035]
     {Vmax=  .757:Dmax= 2.119}
007:0134--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  05:12.0     376.00    7.325 No_date   14:50   71.73 .672
     [CN= 75.4: N= 1.80]
     [Tp= 2.40:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0135--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD           04:127     2209.70   35.494 No_date   16:00   80.74  n/a
                    + 05:12.0     376.00    7.325 No_date   14:50   71.73  n/a
     [DT= 5.00]  SUM=  06:000129  2585.71   42.548 No_date   15:50   79.43  n/a
007:0136--------------ID:NHYD------QPEAK-----QAVG--DUR.HRS--ERO.HRS-----EXC.%-
    EROSION INDEX     06:000129   42.548    2.265   251.92    17.50     6.95
     [QCE= 10.380]
007:0137--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 06:000129  2585.71   42.548 No_date   15:50   79.43  n/a
 *   [RDT= 5.00] out<- 01:130     2585.71   42.513 No_date   16:00   79.43  n/a
     [L/S/n=  400./ .100/.035]
     {Vmax=  .619:Dmax= 1.487}
007:0138--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  02:14.0      50.00    2.222 No_date   12:50   71.73 .672
     [CN= 75.0: N= 2.00]
     [Tp=  .90:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0139--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD           01:130     2585.71   42.513 No_date   16:00   79.43  n/a
                    + 02:14.0      50.00    2.222 No_date   12:50   71.73  n/a
     [DT= 5.00]  SUM=  03:000132  2635.70   43.240 No_date   15:55   79.28  n/a
007:0140--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ROUTE CHANNEL   -> 03:000132  2635.70   43.240 No_date   15:55   79.28  n/a
 *   [RDT= 5.00] out<- 04:133     2635.70   43.166 No_date   16:05   79.28  n/a
     [L/S/n=  700./ .100/.035]
     {Vmax=  .826:Dmax= 1.785}
```

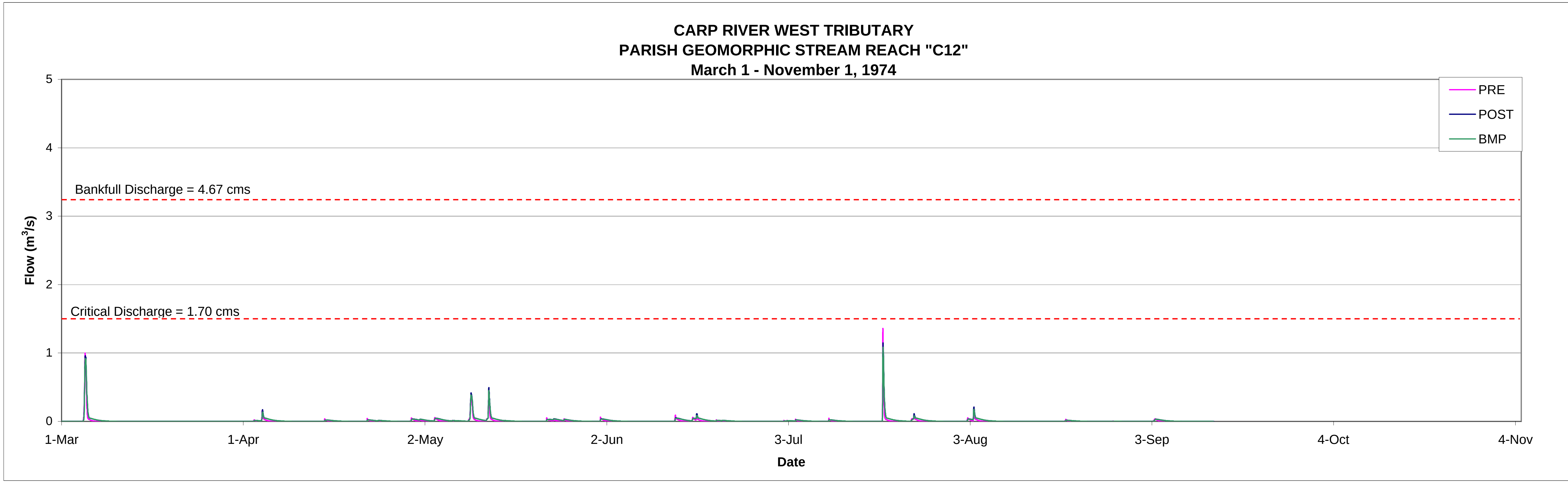
```
007:0141--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    CONTINUOUS NASHYD  05:15.0      44.00    2.871 No_date   12:10   71.73 .672
     [CN= 75.0: N= 2.00]
     [Tp=  .50:DT= 5.00]
     [IaREC= 4.00: SMIN= 33.81: SMAX=225.43: SK=1.000]
     [InterEventTime=  12.00]
007:0142--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    ADD HYD           04:133     2635.70   43.166 No_date   16:05   79.28  n/a
                    + 05:15.0      44.00    2.871 No_date   12:10   71.73  n/a
     [DT= 5.00]  SUM=  06:B135    2679.70   43.544 No_date   16:05   79.16  n/a
007:0143--------------ID:NHYD-------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
    SAVE HYD          06:B135    2679.70   43.544 No_date   16:05   79.16  n/a
     fname :M:\2001\101108\DATA\CALCUL~1\SWM\SWMHYMO\JR-D\H-B135.007
     remark:MD @ JR
007:0002-----------------------------------------------------------------------
     FINISH
-------------------------------------------------------------------------------
*******************************************************************************
    WARNINGS / ERRORS / NOTES
    -------------------------
  Simulation ended on 2009-05-12     at 19:33:52
===============================================================================
```

APPENDIX E

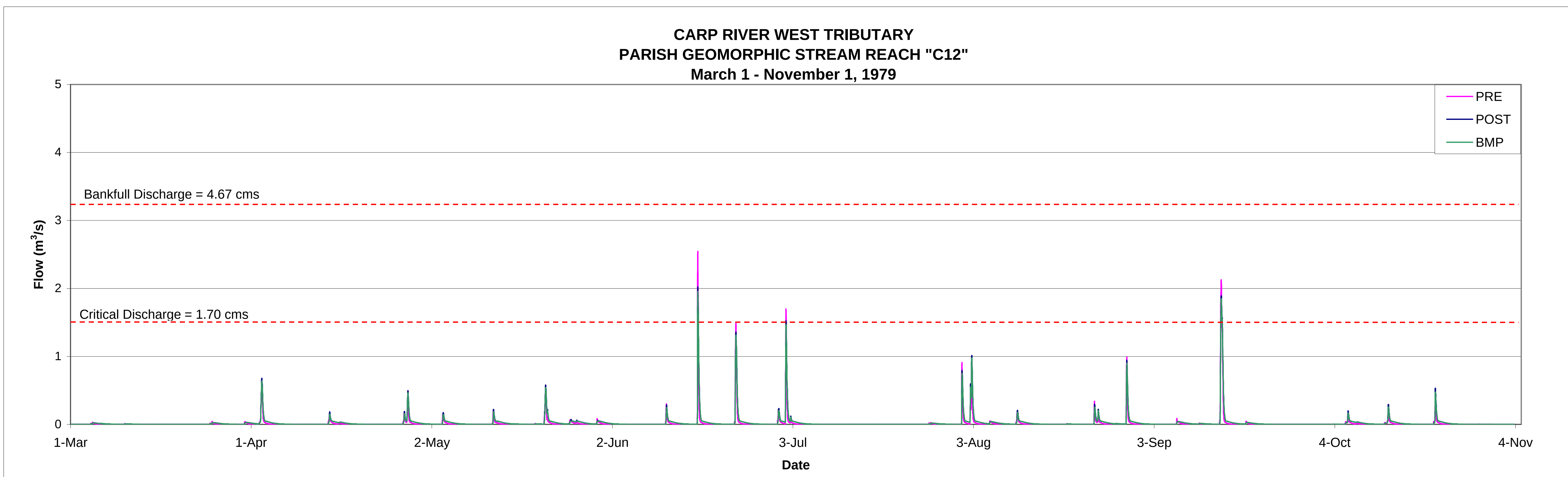
RESULTS OF CONTINUOUS HYDROLOGIC ANALYSIS 1974, 1979, 1981, 1986, 1995, 1997

Pre vs. Post Development Hydrographs

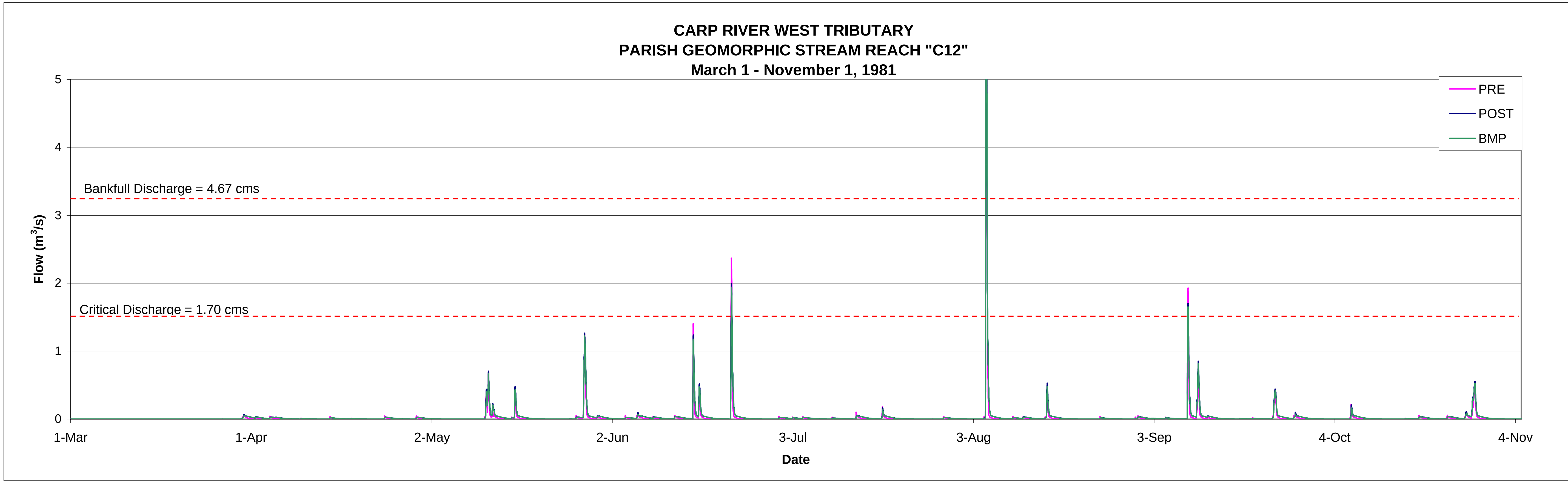
- *Monahan Drain D/S of Terry Fox Drive*
- *Monahan Drain at Confluence with Jock River*
- *Faulkner Drain D/S of Fernbank Road*
- *Faulkner Drain at Flewellyn Road*
- *Flewellyn Drain D/S of Fernbank Road*
- *Flewellyn Drain at Flewellyn Road*
- *Carp River West Tributary*

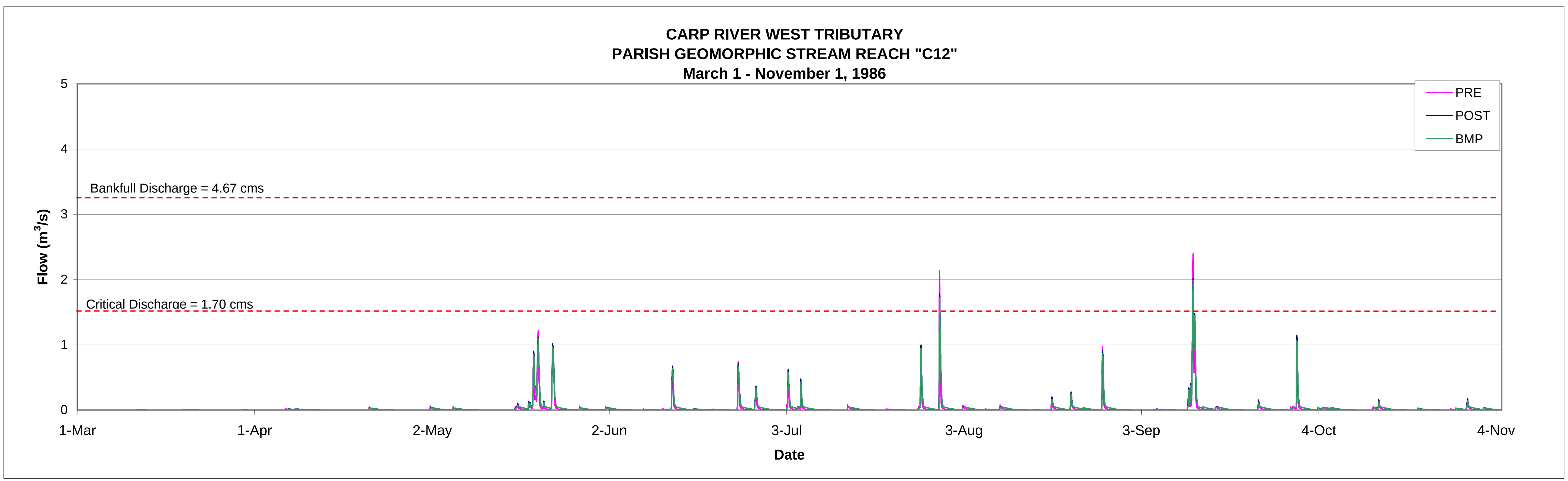


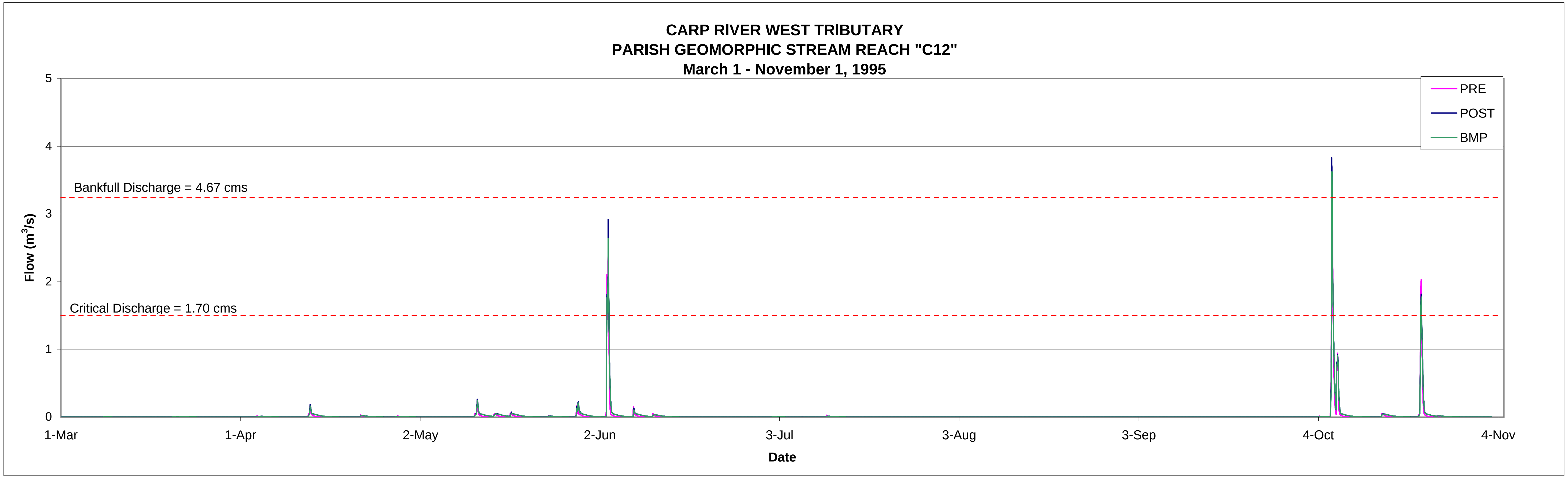
CARP RIVER WEST TRIBUTARY
PARISH GEOMORPHIC STREAM REACH "C12"
March 1 - November 1, 1974
PRE
POST
BMP
Bankfull Discharge = 4.67 cms
Critical Discharge = 1.70 cms
Flow (m3/s)
0
1
2
3
4
5
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

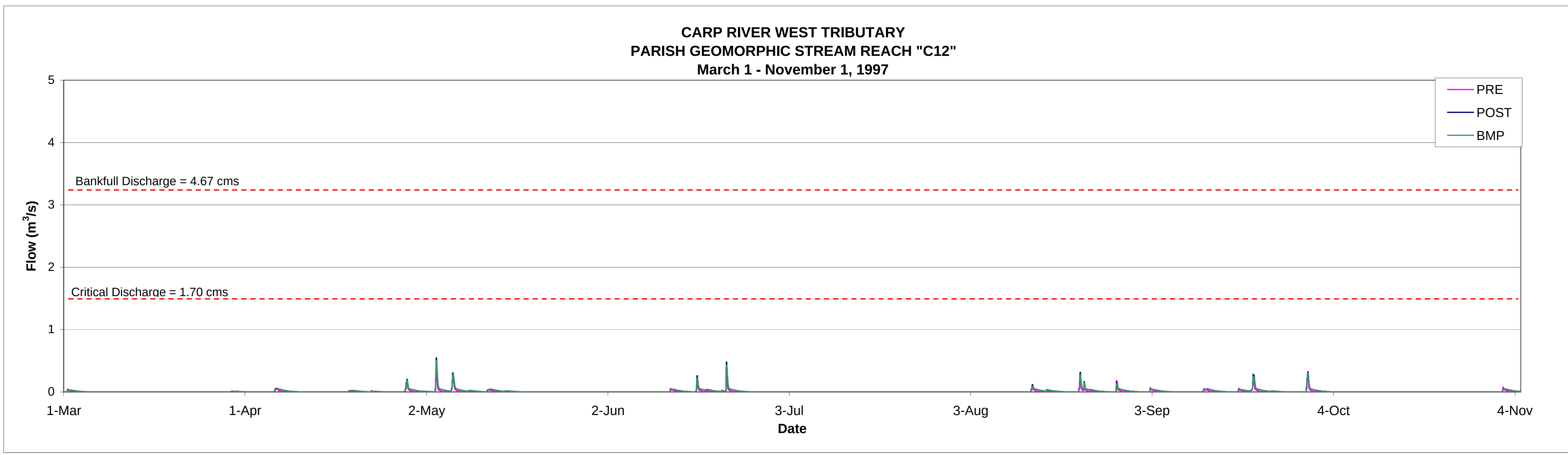


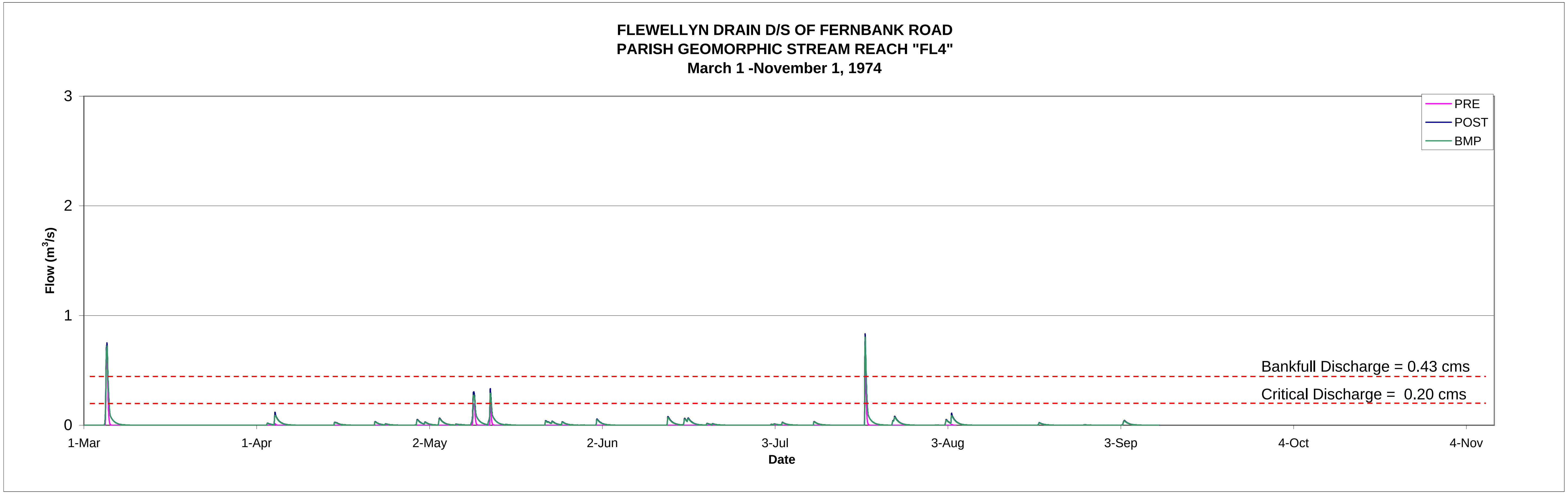
CARP RIVER WEST TRIBUTARY
PARISH GEOMORPHIC STREAM REACH "C12"
March 1 - November 1, 1979
PRE
POST
BMP
Bankfull Discharge = 4.67 cms
Critical Discharge = 1.70 cms
Flow (m3/s)
0
1
2
3
4
5
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

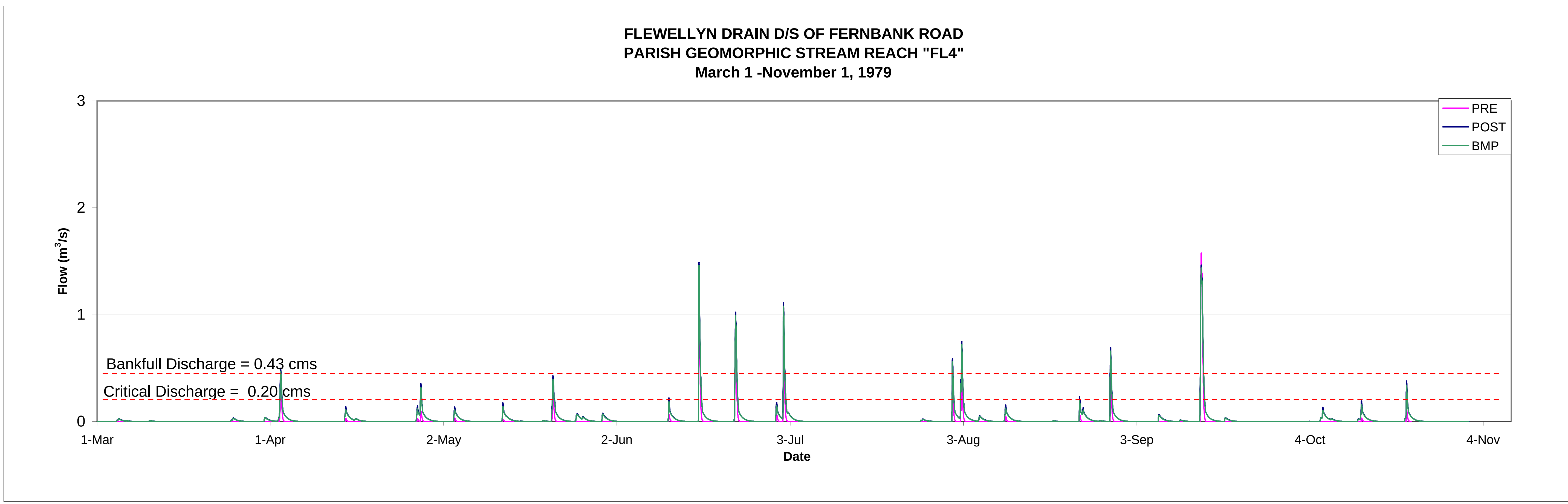

CARP RIVER WEST TRIBUTARY
PARISH GEOMORPHIC STREAM REACH "C12"
March 1 - November 1, 1981
Flow (m3/s)
5
4
3
2
1
0
Bankfull Discharge = 4.67 cms
Critical Discharge = 1.70 cms
PRE
POST
BMP
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

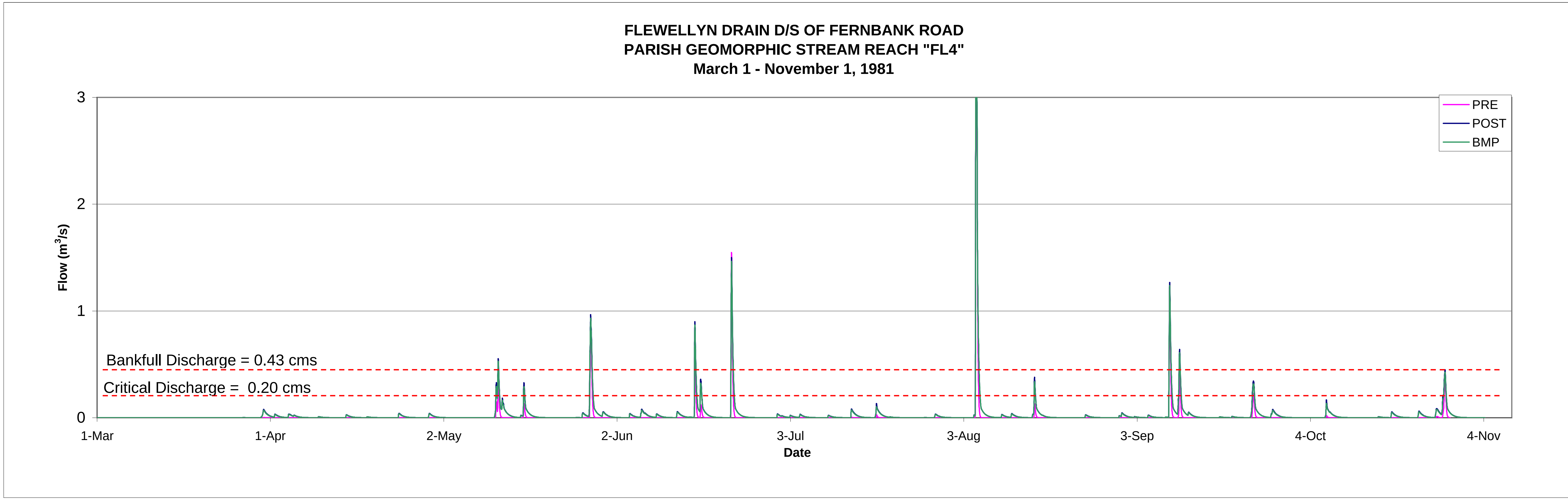

CARP RIVER WEST TRIBUTARY
PARISH GEOMORPHIC STREAM REACH "C12"
March 1 - November 1, 1986
Flow (m3/s)
5
4
3
2
1
0
Bankfull Discharge = 4.67 cms
Critical Discharge = 1.70 cms
PRE
POST
BMP
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

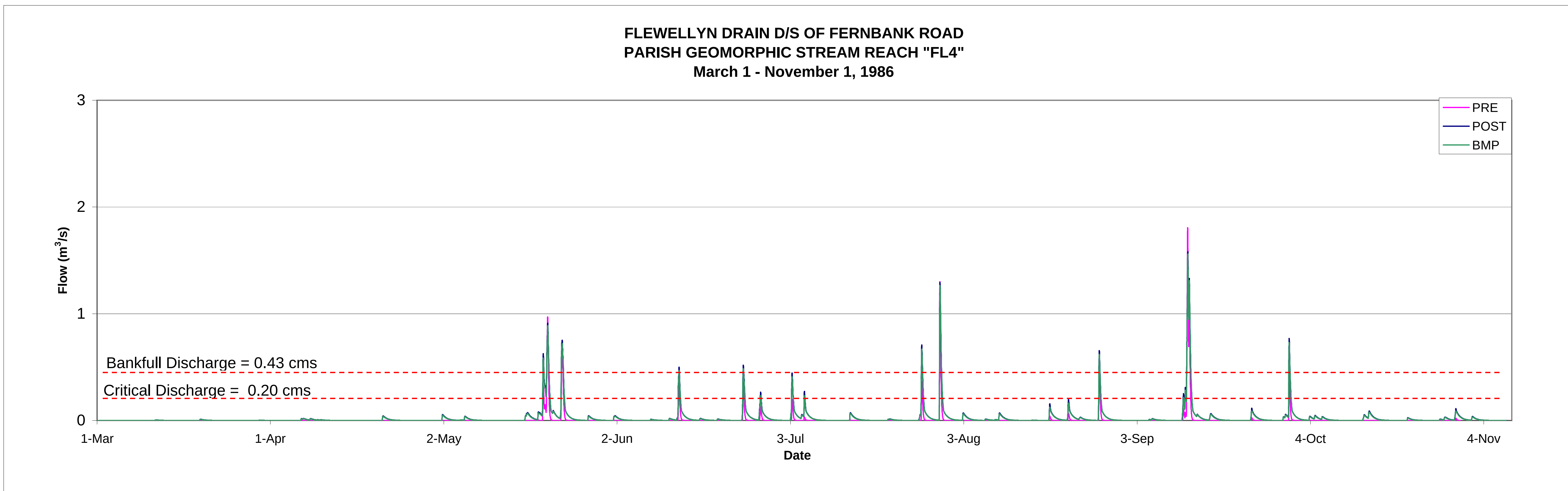

CARP RIVER WEST TRIBUTARY
PARISH GEOMORPHIC STREAM REACH "C12"
March 1 - November 1, 1995
PRE
POST
BMP
Bankfull Discharge = 4.67 cms
Critical Discharge = 1.70 cms
Flow (m3/s)
0
1
2
3
4
5
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

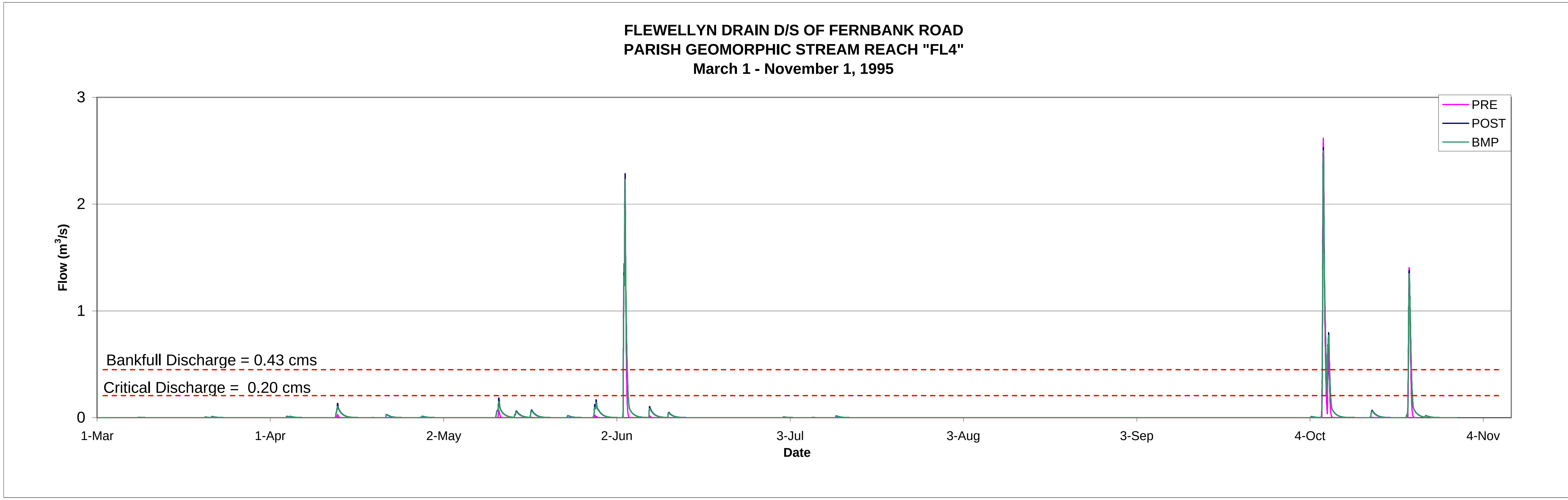

CARP RIVER WEST TRIBUTARY
PARISH GEOMORPHIC STREAM REACH "C12"
March 1 - November 1, 1997
PRE
POST
BMP
Bankfull Discharge = 4.67 cms
Critical Discharge = 1.70 cms
Flow (m3/s)
0
1
2
3
4
5
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

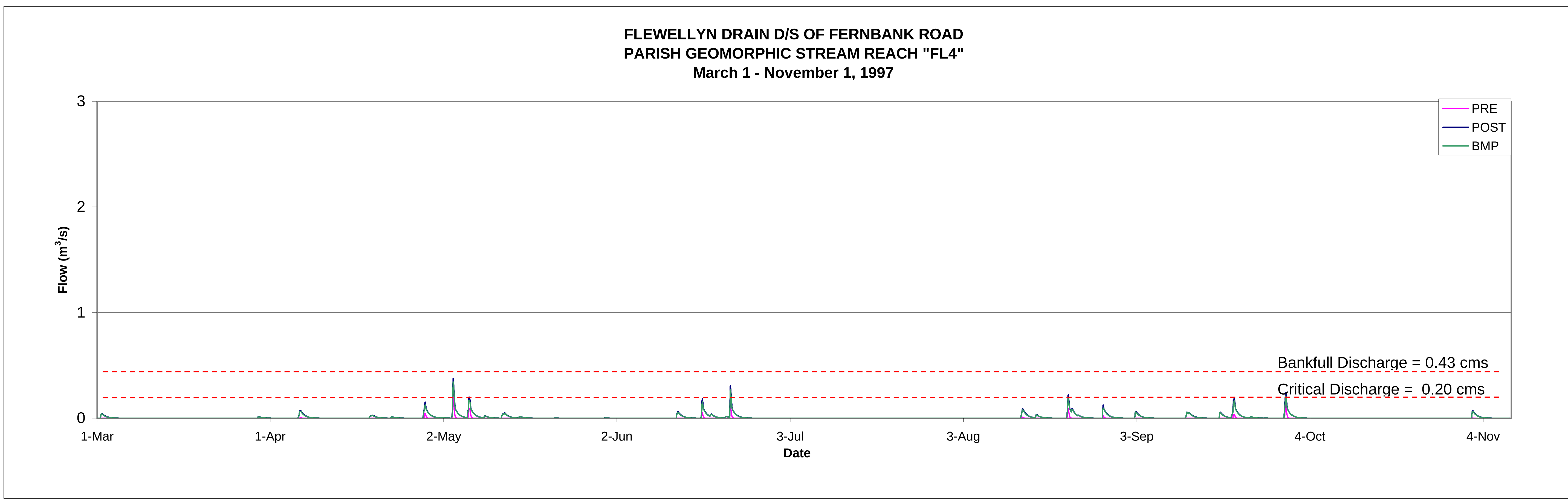

FLEWELLYN DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FL4"
March 1 -November 1, 1974
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
Flow (m3/s)
3
2
1
0
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

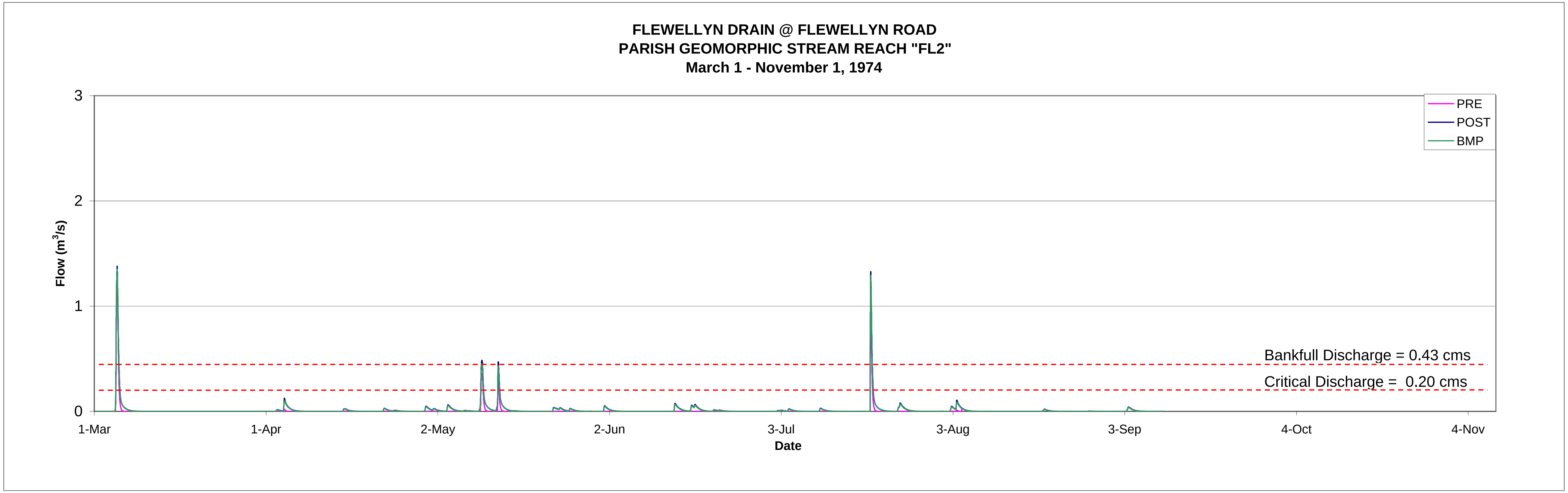

FLEWELLYN DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FL4"
March 1 -November 1, 1979
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
Flow (m3/s)
3
2
1
0
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date


FLEWELLYN DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FL4"
March 1 - November 1, 1981
Flow (m3/s)
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
PRE
POST
BMP
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

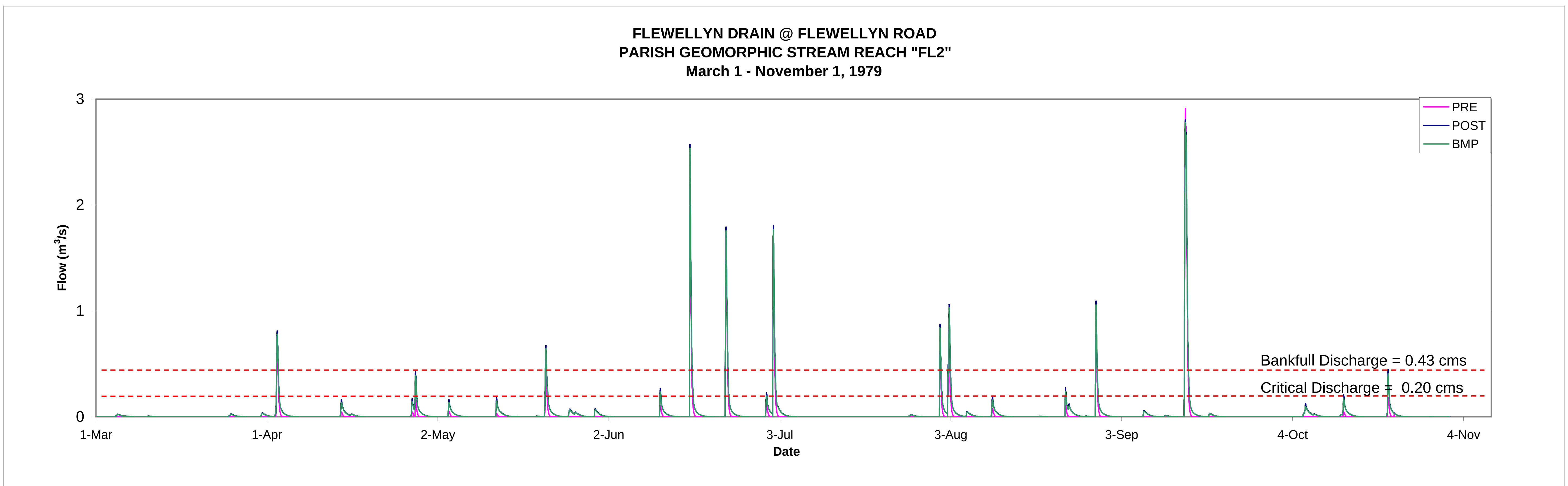

FLEWELLYN DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FL4"
March 1 - November 1, 1986
Flow (m3/s)
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
PRE
POST
BMP
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date


FLEWELLYN DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FL4"
March 1 - November 1, 1995
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
Flow (m3/s)
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

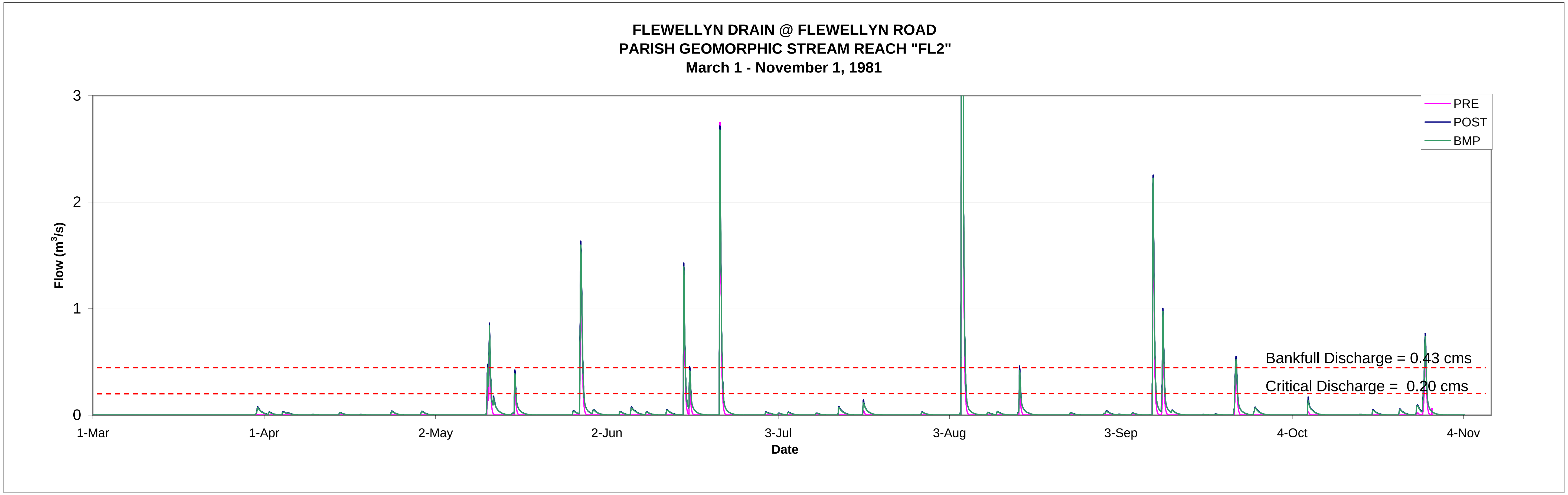

FLEWELLYN DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FL4"
March 1 - November 1, 1997
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
Flow (m3/s)
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

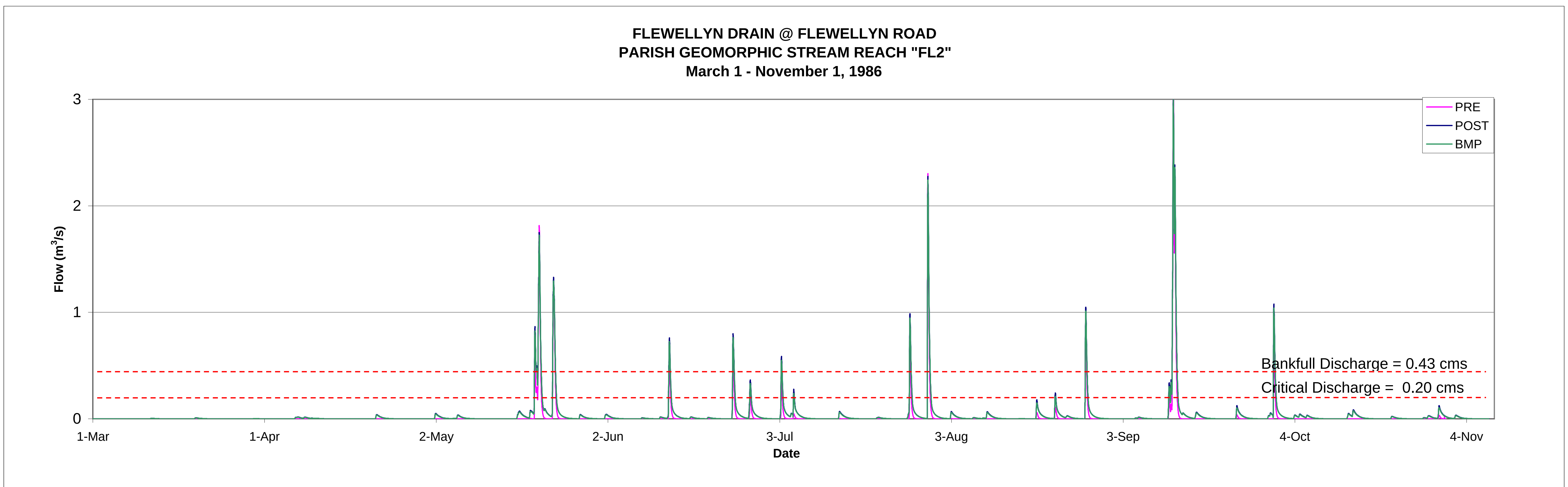


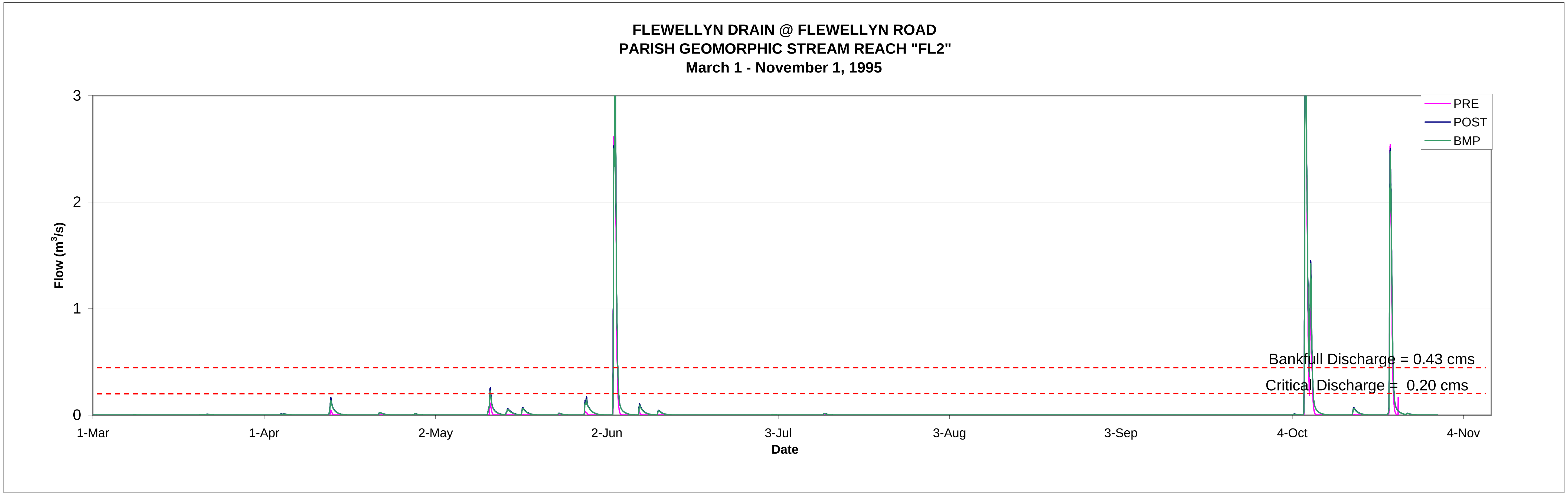
FLEWELLYN DRAIN @ FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FL2"
March 1 - November 1, 1974
Flow (m3/s)
Date
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

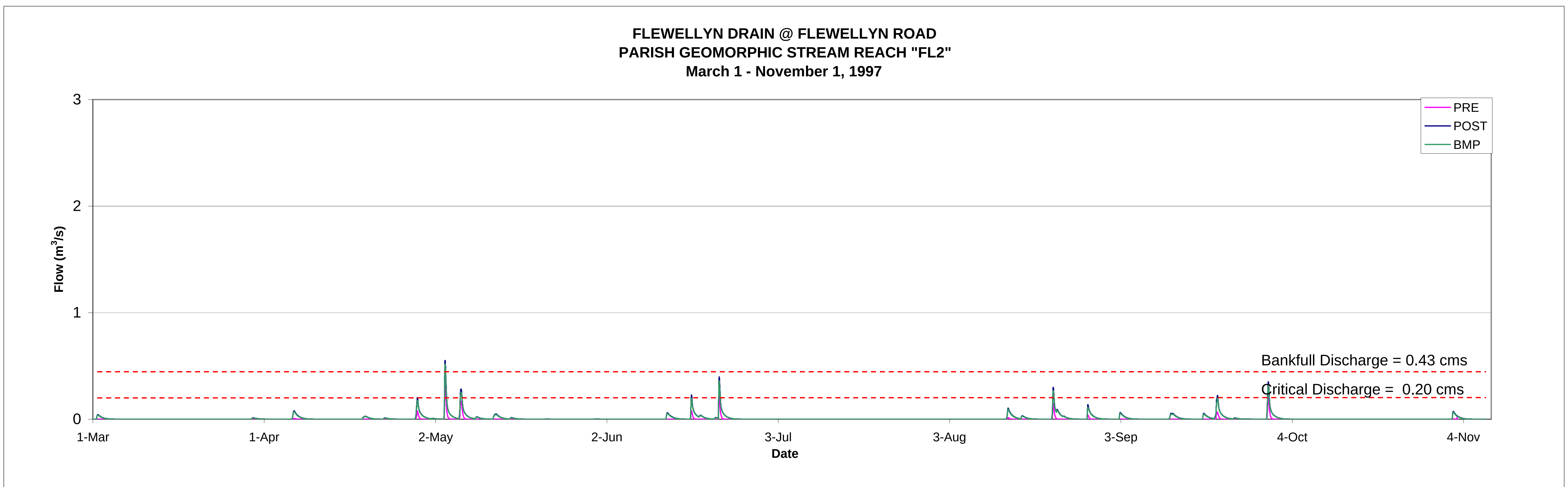


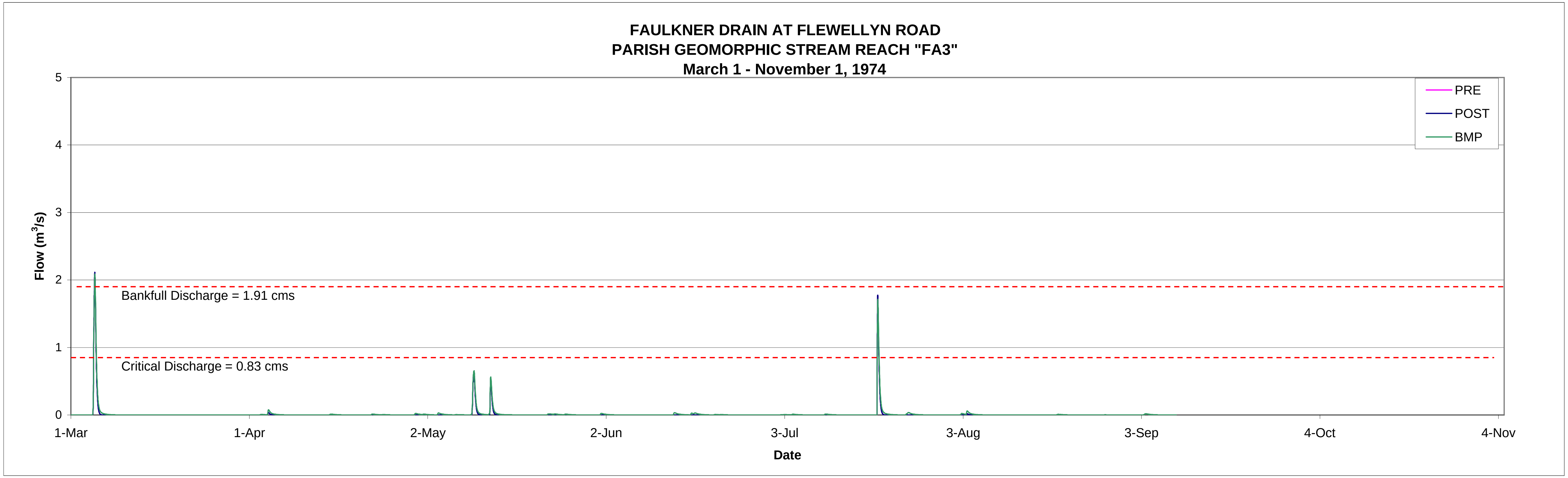
FLEWELLYN DRAIN @ FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FL2"
March 1 - November 1, 1979
Flow (m3/s)
Date
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

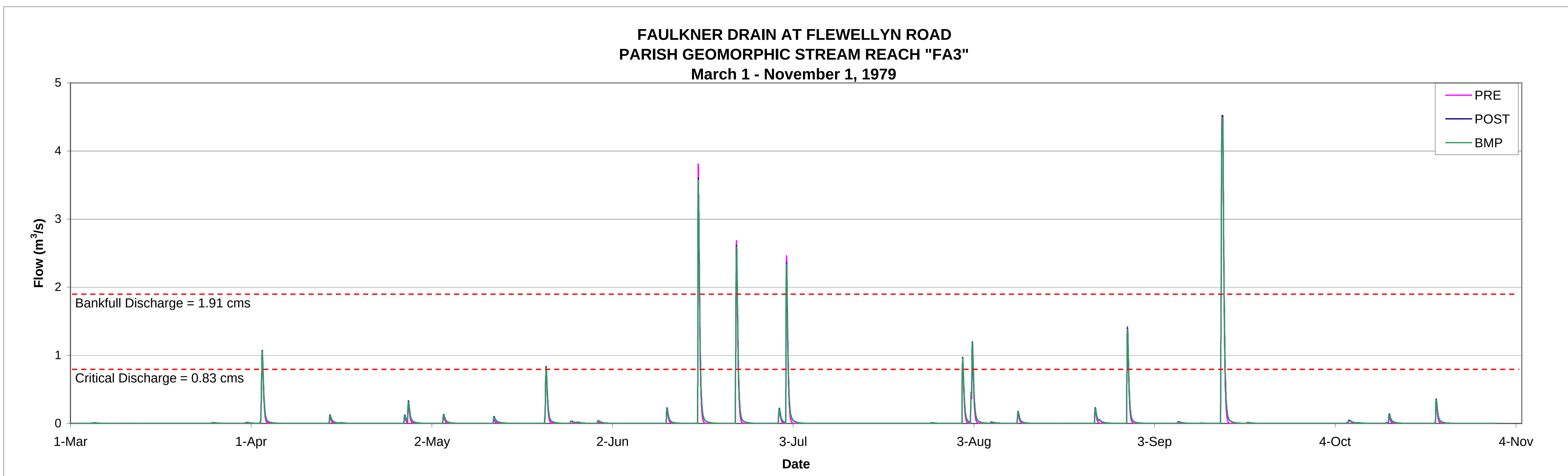

FLEWELLYN DRAIN @ FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FL2"
March 1 - November 1, 1981
Flow (m3/s)
Date
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

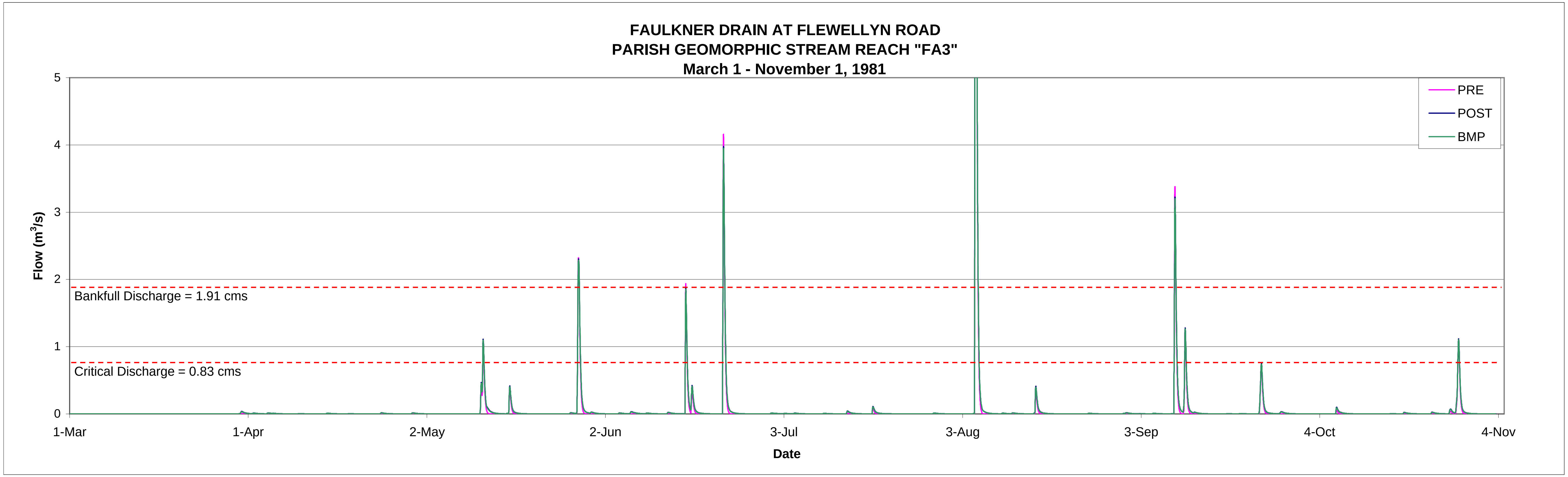

FLEWELLYN DRAIN @ FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FL2"
March 1 - November 1, 1986
Flow (m3/s)
Date
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

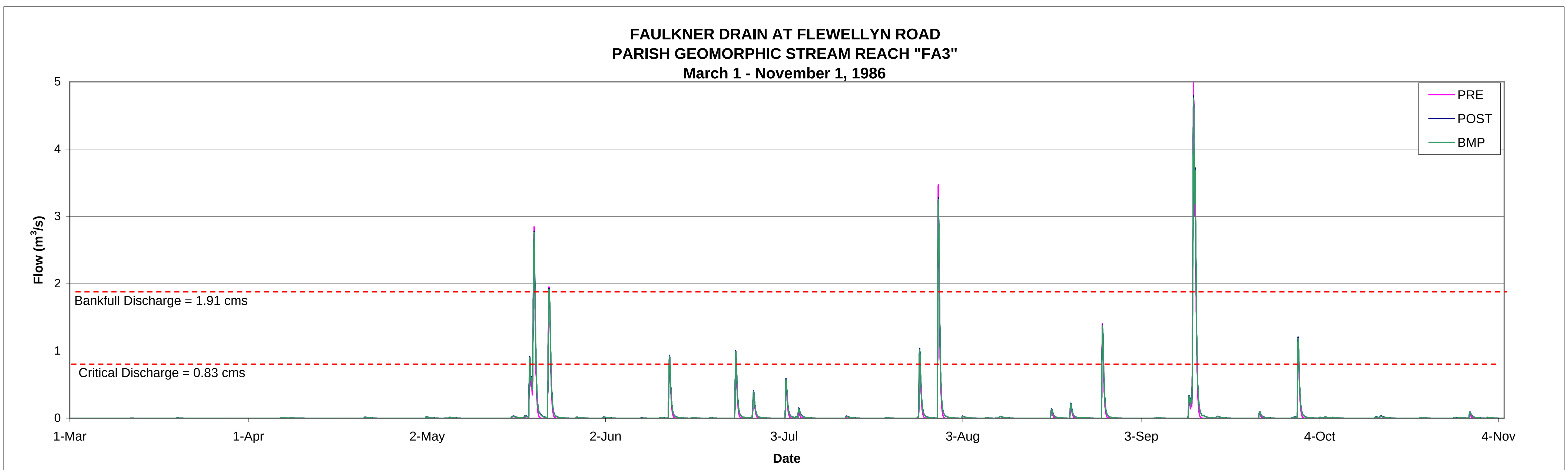

FLEWELLYN DRAIN @ FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FL2"
March 1 - November 1, 1995
Flow (m3/s)
Date
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

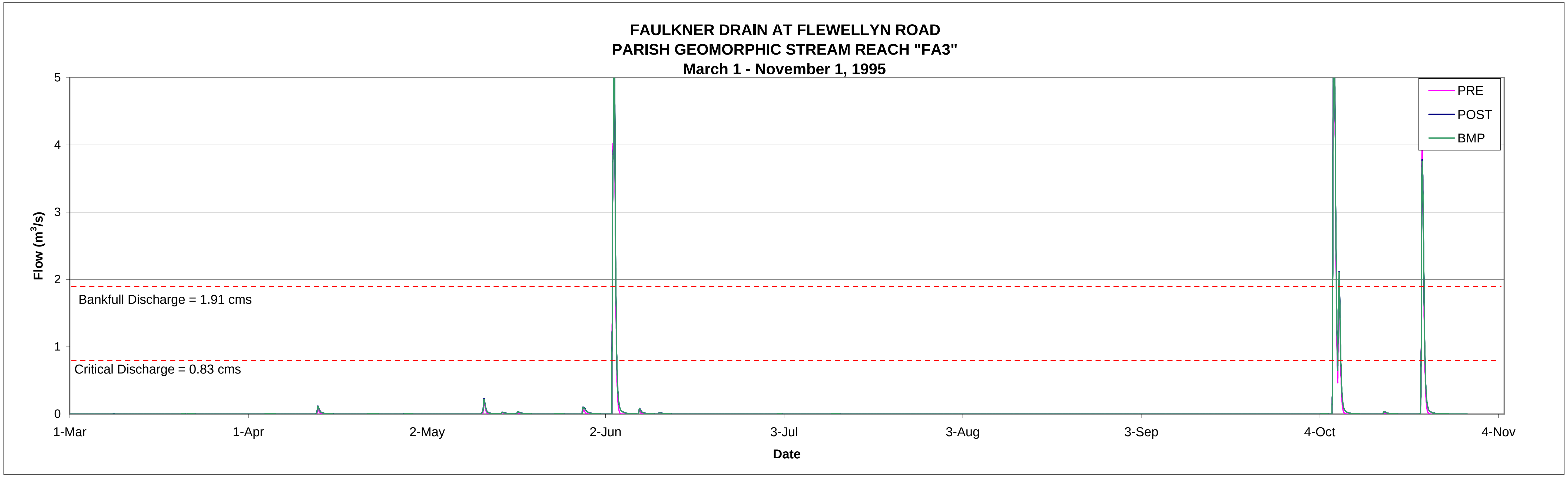

FLEWELLYN DRAIN @ FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FL2"
March 1 - November 1, 1997
Flow (m3/s)
Date
PRE
POST
BMP
Bankfull Discharge = 0.43 cms
Critical Discharge = 0.20 cms
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

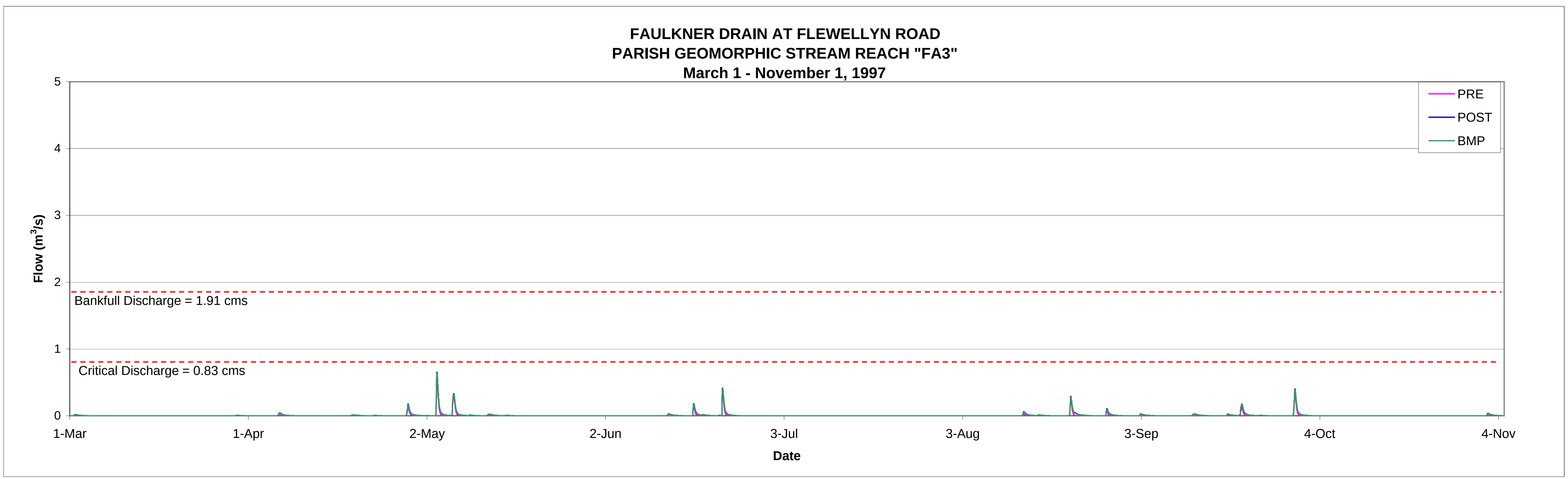

FAULKNER DRAIN AT FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FA3"
March 1 - November 1, 1974
PRE
POST
BMP
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
Flow (m3/s)
0
1
2
3
4
5
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

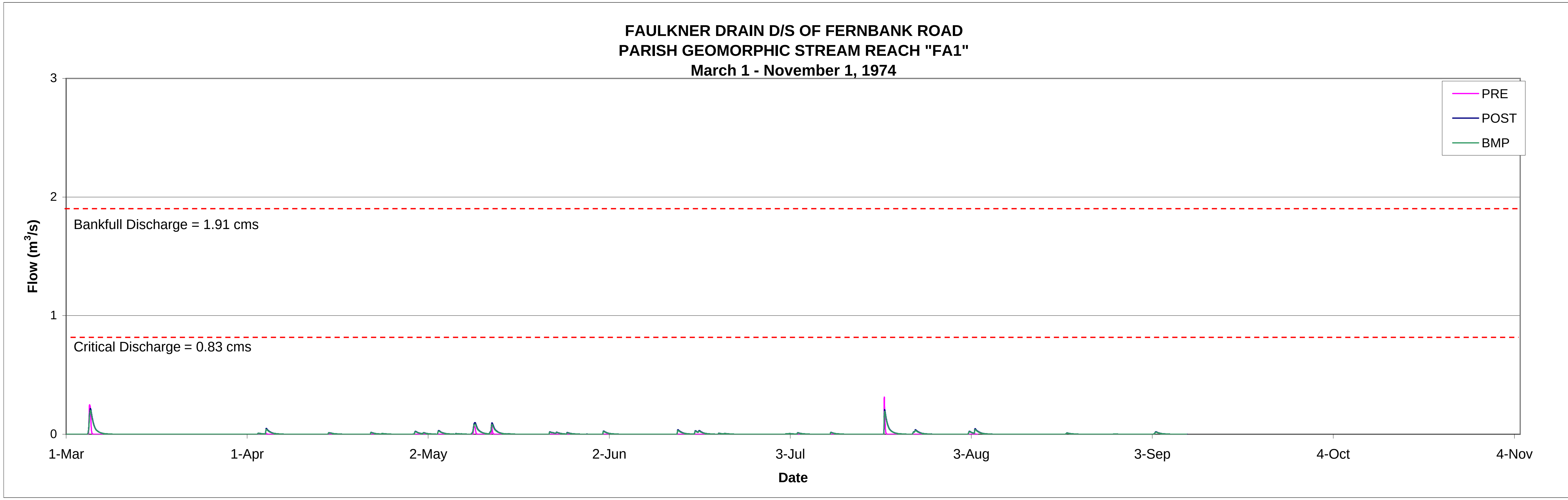

FAULKNER DRAIN AT FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FA3"
March 1 - November 1, 1979
PRE
POST
BMP
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
Flow (m3/s)
0
1
2
3
4
5
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

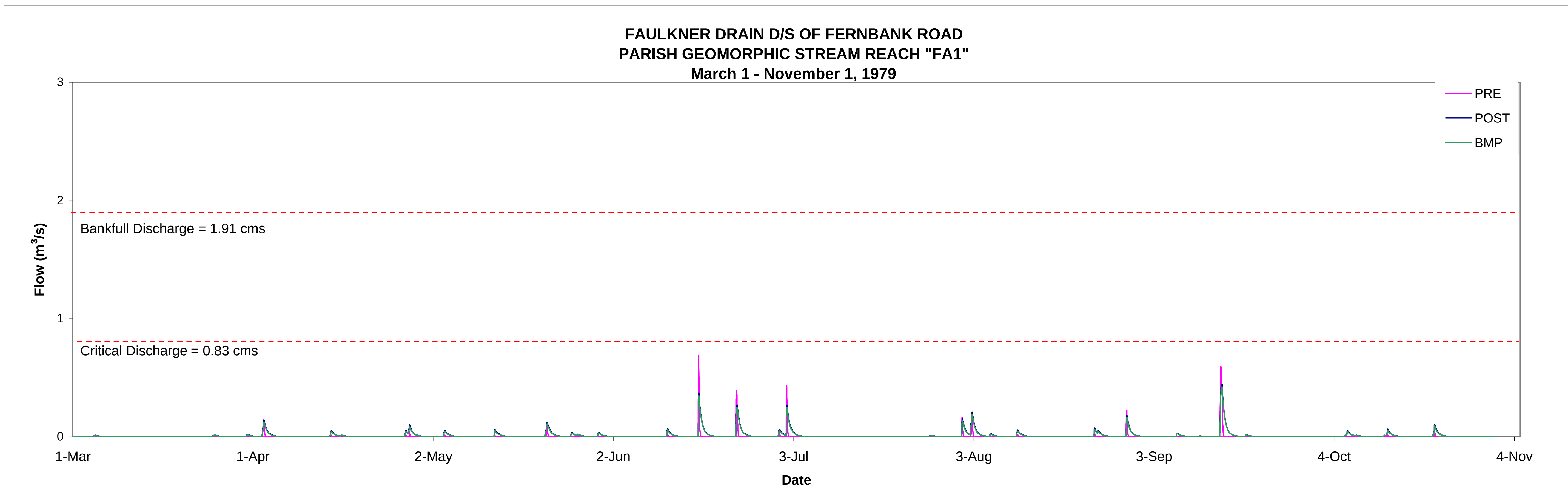

FAULKNER DRAIN AT FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FA3"
March 1 - November 1, 1981
Flow (m^3/s)
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
PRE
POST
BMP
Date
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

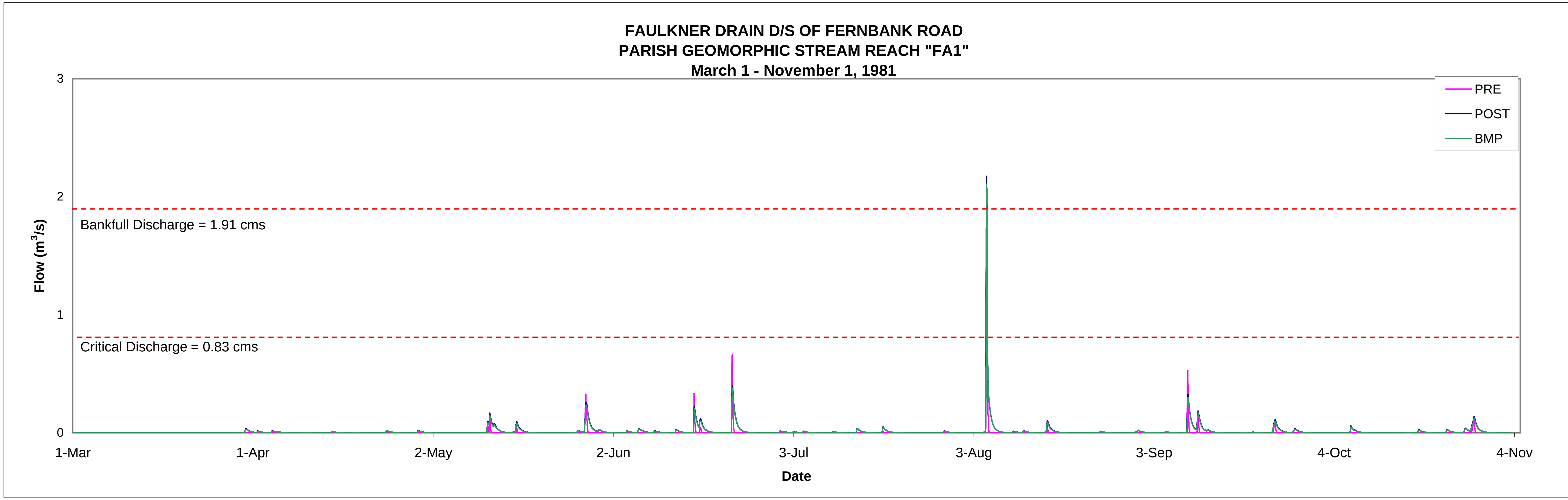

FAULKNER DRAIN AT FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FA3"
March 1 - November 1, 1986
Flow (m^3/s)
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
PRE
POST
BMP
Date
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

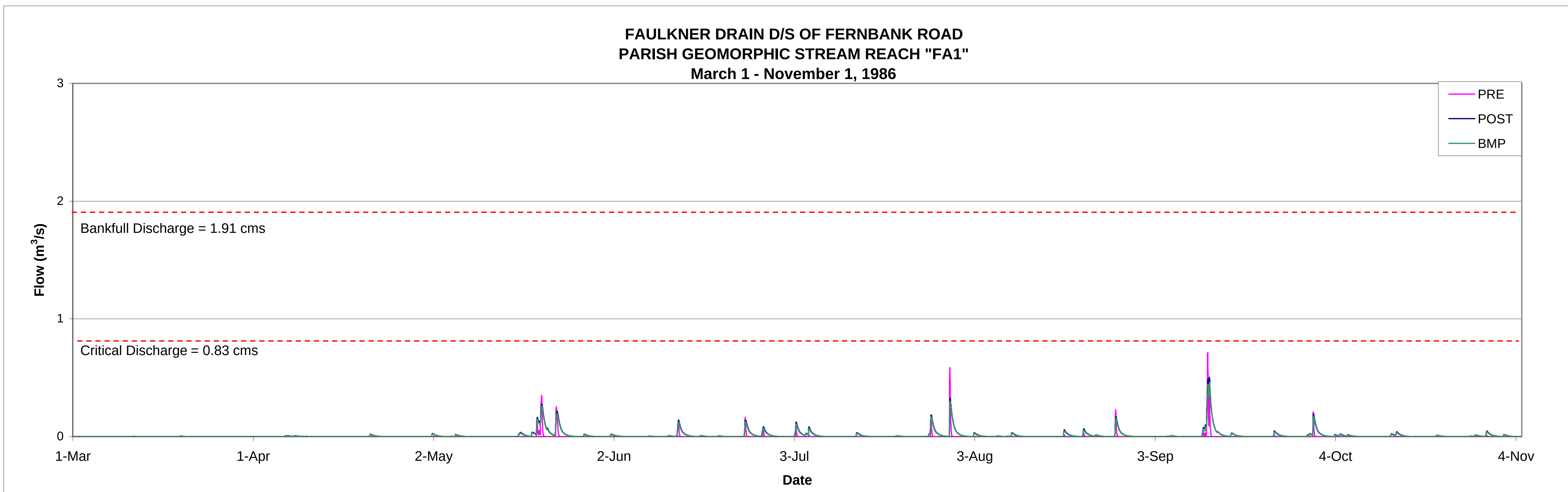

FAULKNER DRAIN AT FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FA3"
March 1 - November 1, 1995
Flow (m^3/s)
0
1
2
3
4
5
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
PRE
POST
BMP
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

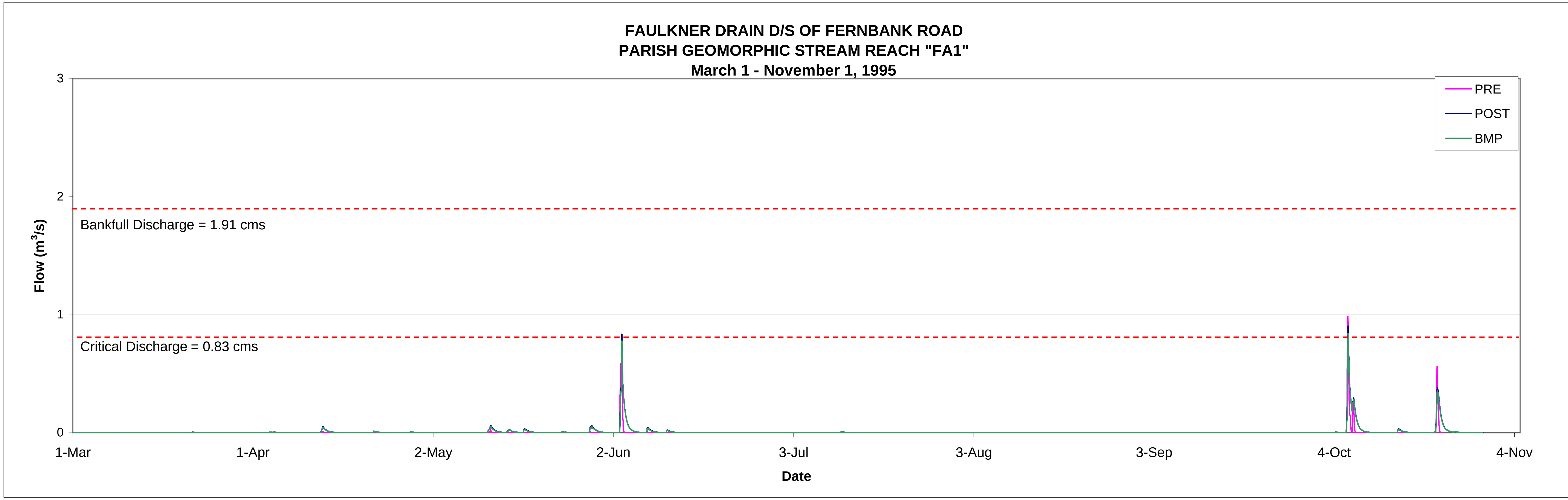

FAULKNER DRAIN AT FLEWELLYN ROAD
PARISH GEOMORPHIC STREAM REACH "FA3"
March 1 - November 1, 1997
Flow (m^3/s)
0
1
2
3
4
5
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
PRE
POST
BMP
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

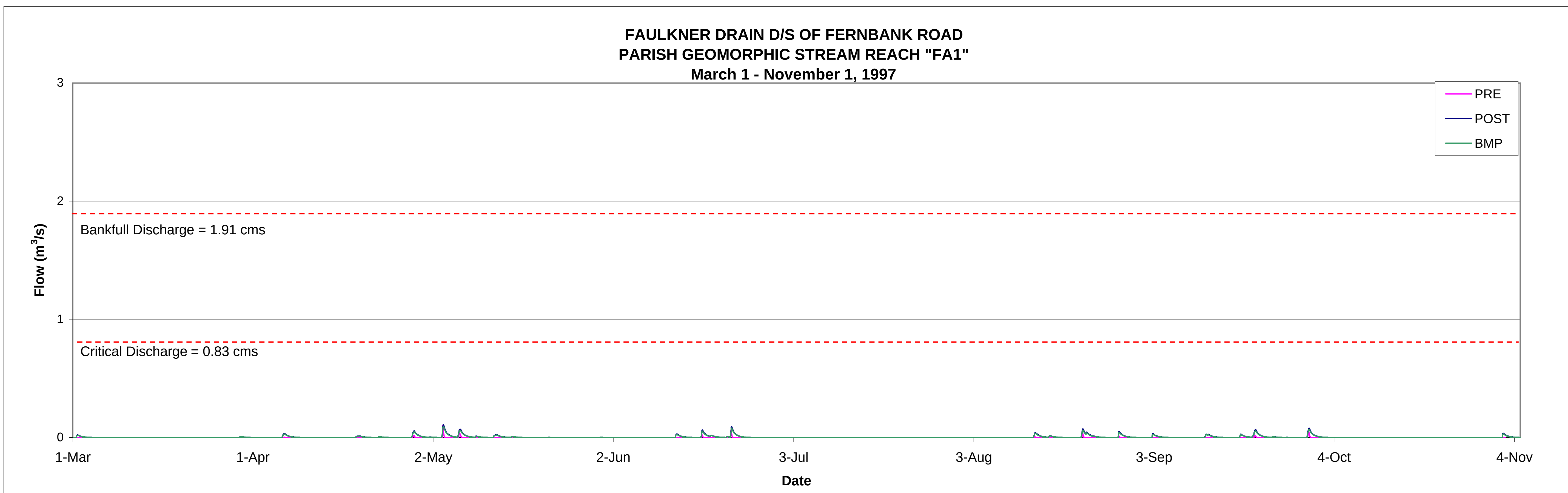

FAULKNER DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FA1"
March 1 - November 1, 1974
Flow (m3/s)
3
2
1
0
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
PRE
POST
BMP
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

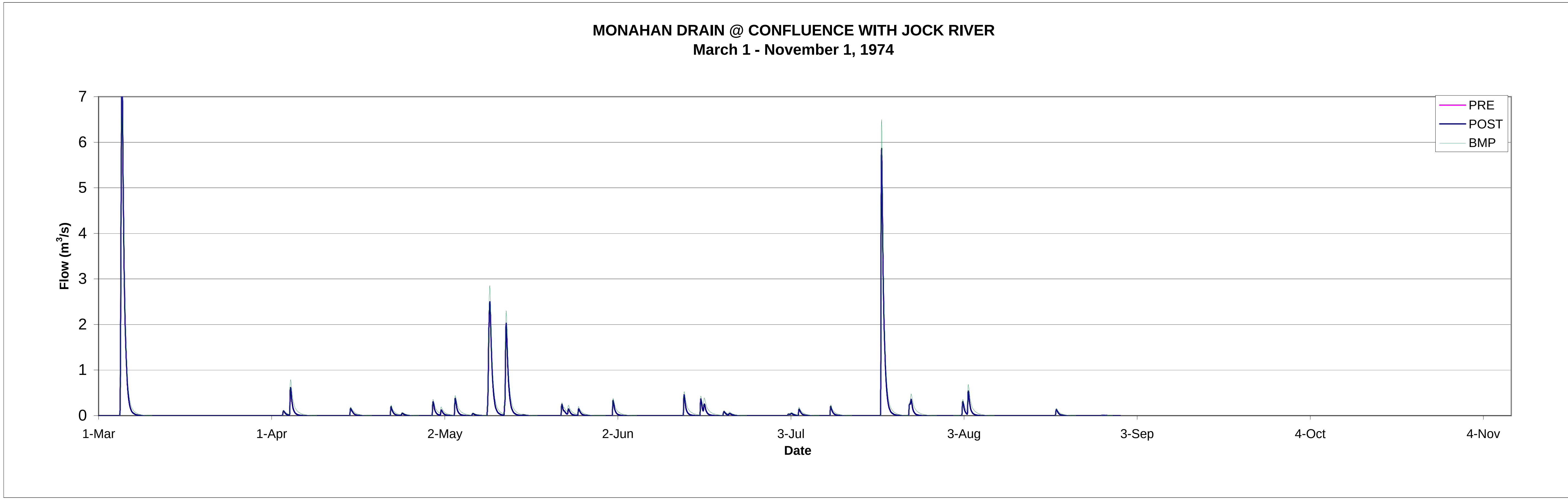

FAULKNER DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FA1"
March 1 - November 1, 1979
Flow (m3/s)
3
2
1
0
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
PRE
POST
BMP
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

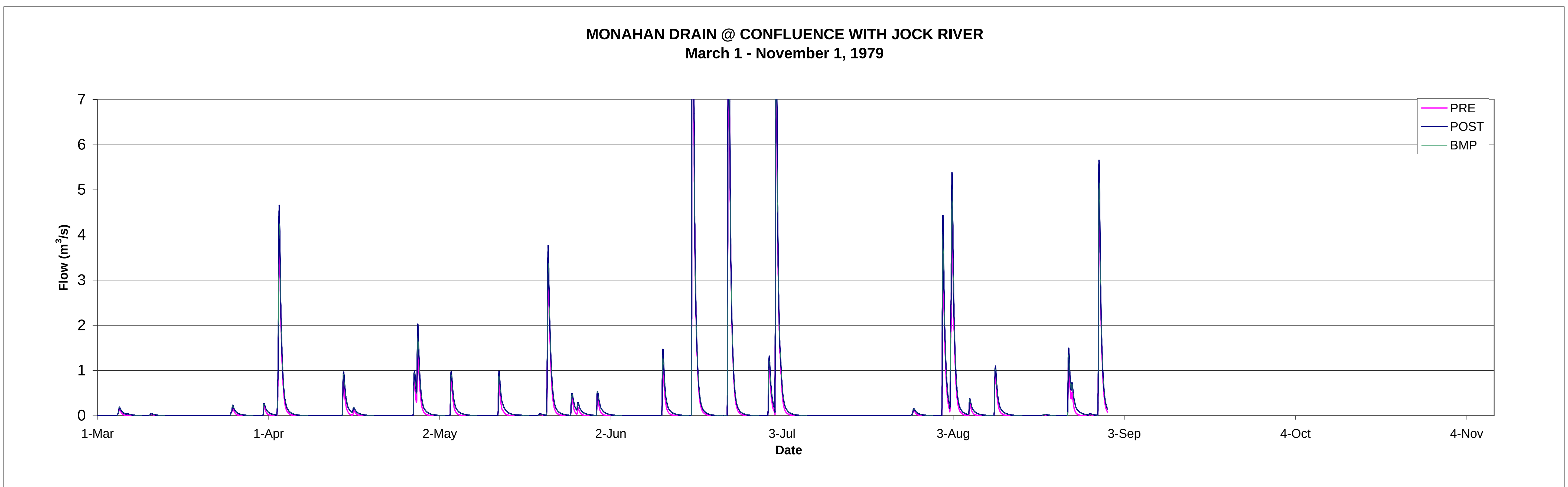

FAULKNER DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FA1"
March 1 - November 1, 1981
PRE
POST
BMP
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
Flow (m3/s)
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

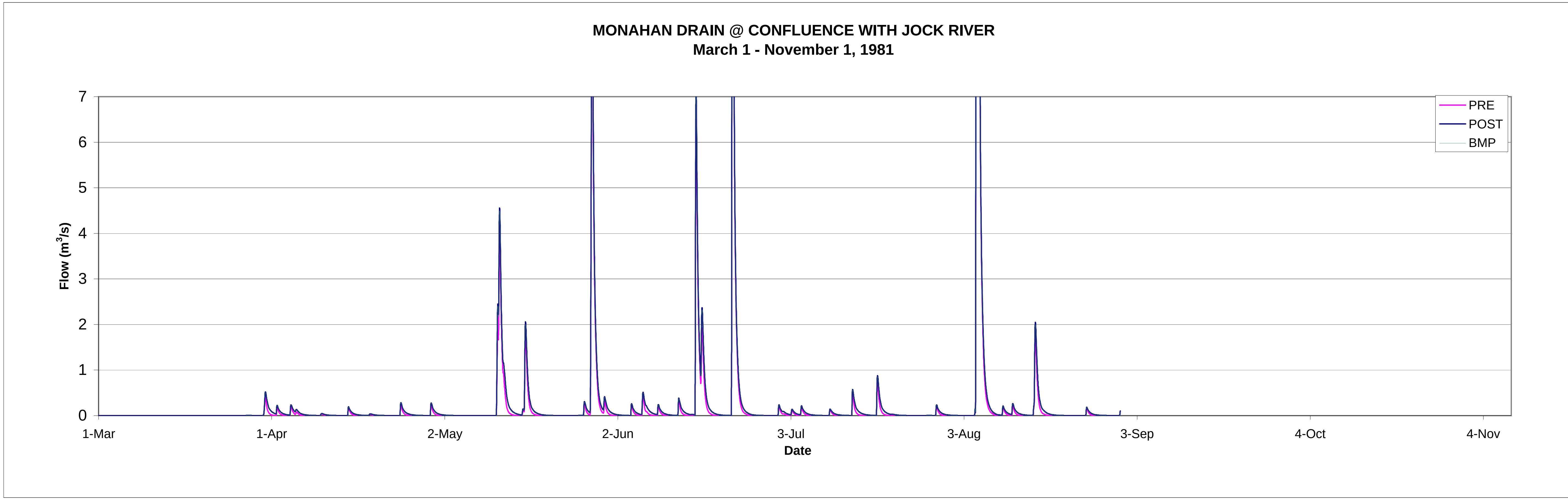

FAULKNER DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FA1"
March 1 - November 1, 1986
PRE
POST
BMP
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
Flow (m3/s)
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

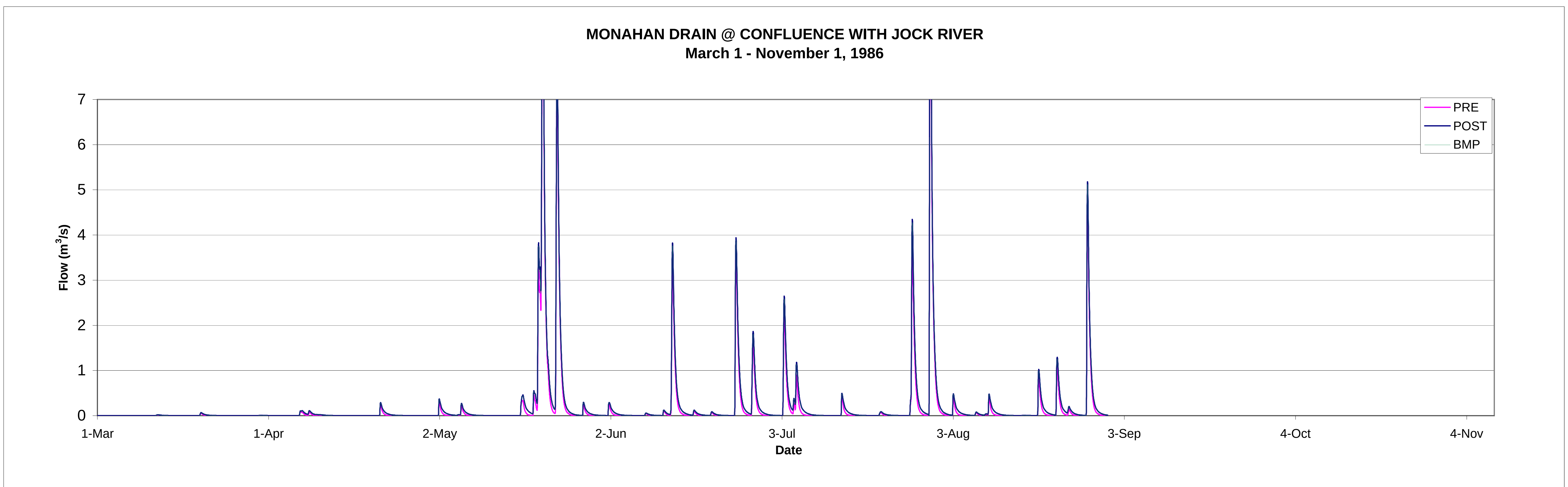

FAULKNER DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FA1"
March 1 - November 1, 1995
PRE
POST
BMP
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
Flow (m^3/s)
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

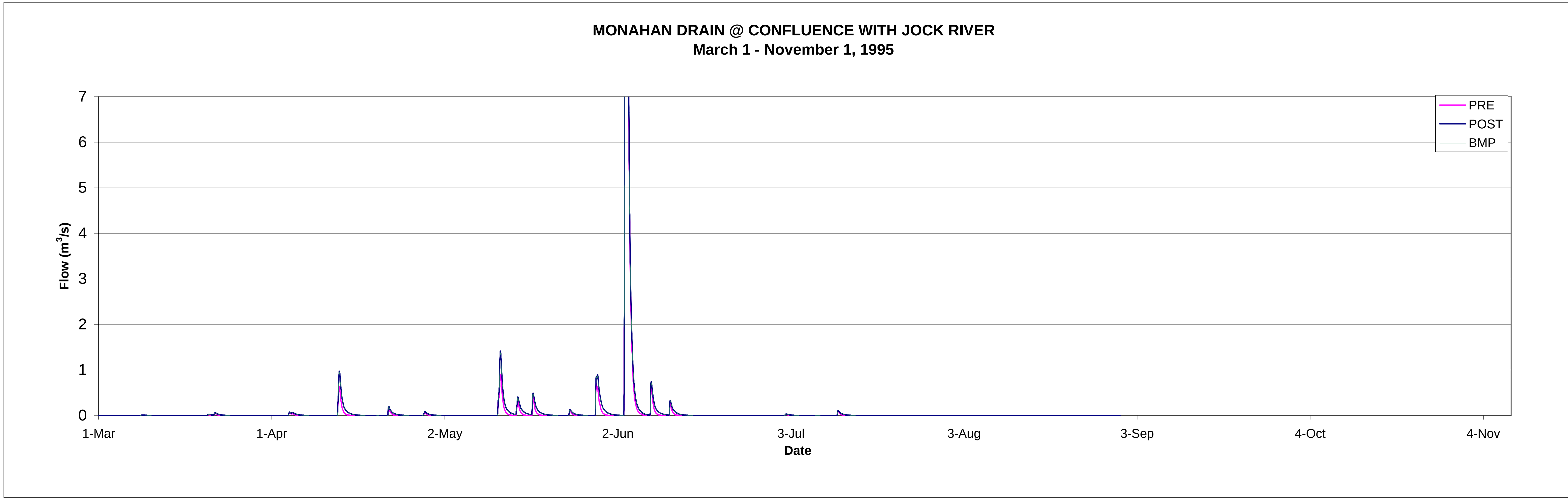

FAULKNER DRAIN D/S OF FERNBANK ROAD
PARISH GEOMORPHIC STREAM REACH "FA1"
March 1 - November 1, 1997
PRE
POST
BMP
Bankfull Discharge = 1.91 cms
Critical Discharge = 0.83 cms
Flow (m^3/s)
0
1
2
3
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date


MONAHAN DRAIN @ CONFLUENCE WITH JOCK RIVER
March 1 - November 1, 1974
PRE
POST
BMP
Flow (m3/s)
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date


MONAHAN DRAIN @ CONFLUENCE WITH JOCK RIVER
March 1 - November 1, 1979
PRE
POST
BMP
Flow (m3/s)
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date


MONAHAN DRAIN @ CONFLUENCE WITH JOCK RIVER
March 1 - November 1, 1981
PRE
POST
BMP
Flow (m3/s)
7
6
5
4
3
2
1
0
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date


MONAHAN DRAIN @ CONFLUENCE WITH JOCK RIVER
March 1 - November 1, 1986
PRE
POST
BMP
Flow (m3/s)
7
6
5
4
3
2
1
0
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date


MONAHAN DRAIN @ CONFLUENCE WITH JOCK RIVER
March 1 - November 1, 1995
Flow (m3/s)
Date
PRE
POST
BMP
0
1
2
3
4
5
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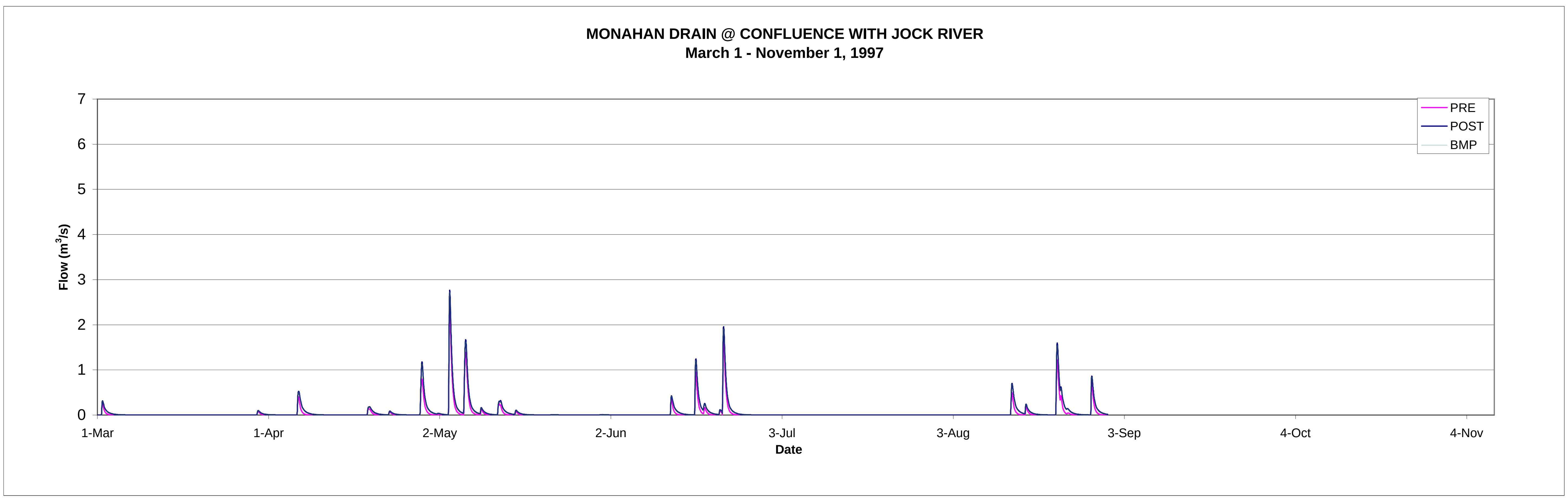
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov


MONAHAN DRAIN @ CONFLUENCE WITH JOCK RIVER
March 1 - November 1, 1997
Flow (m3/s)
Date
PRE
POST
BMP
0
1
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4
5
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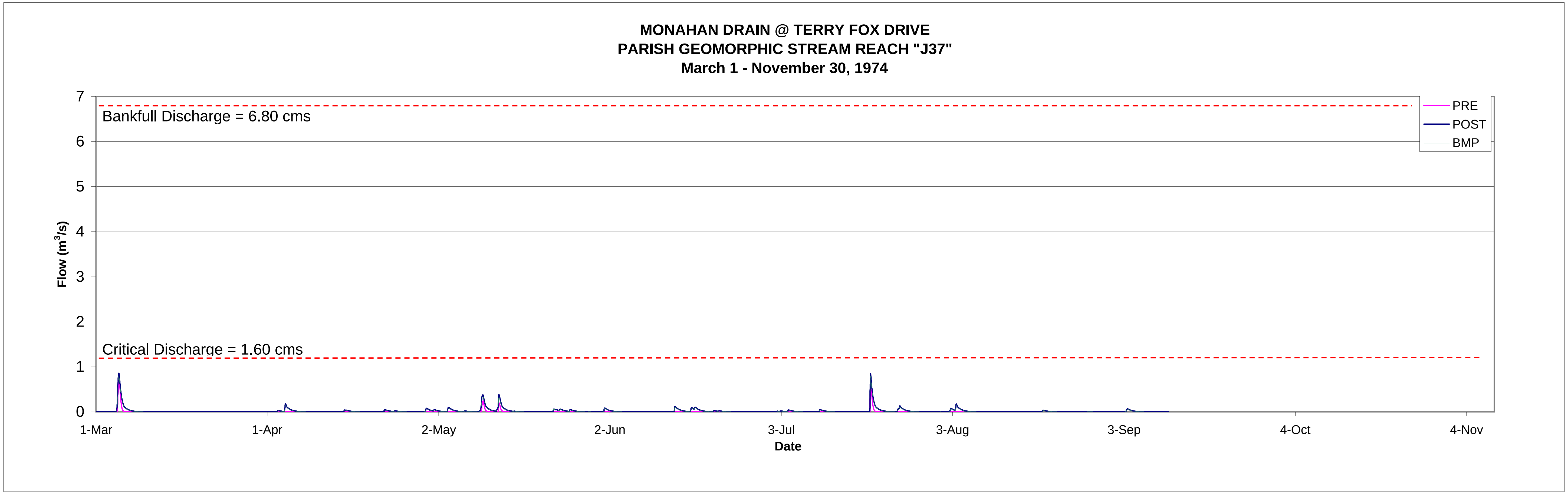
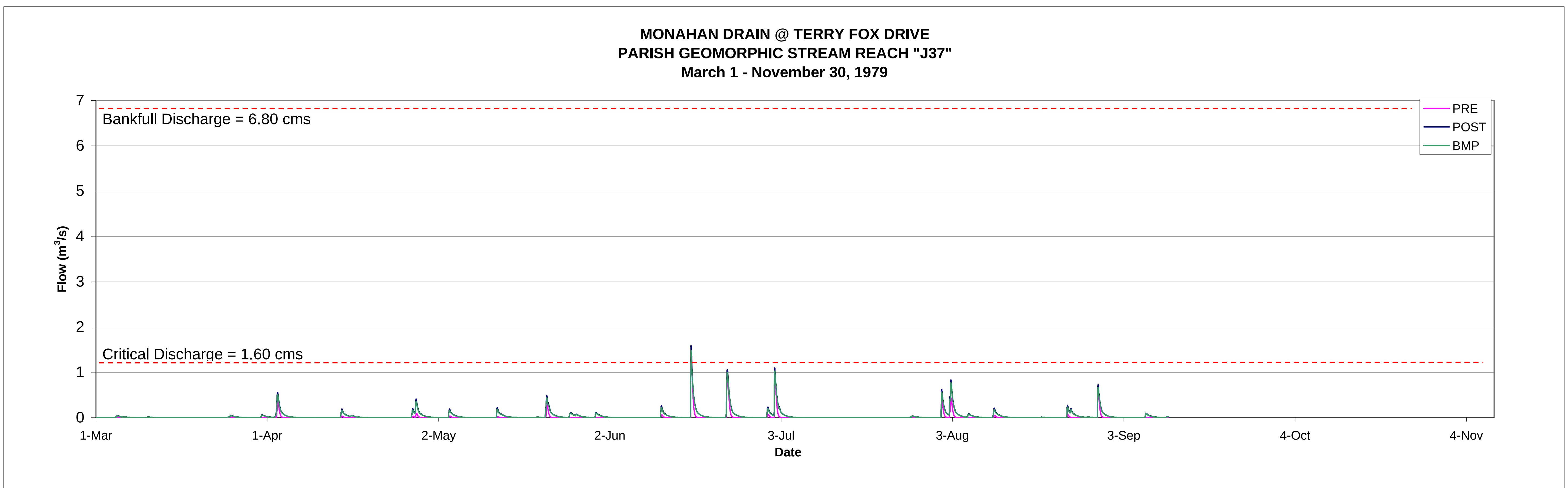
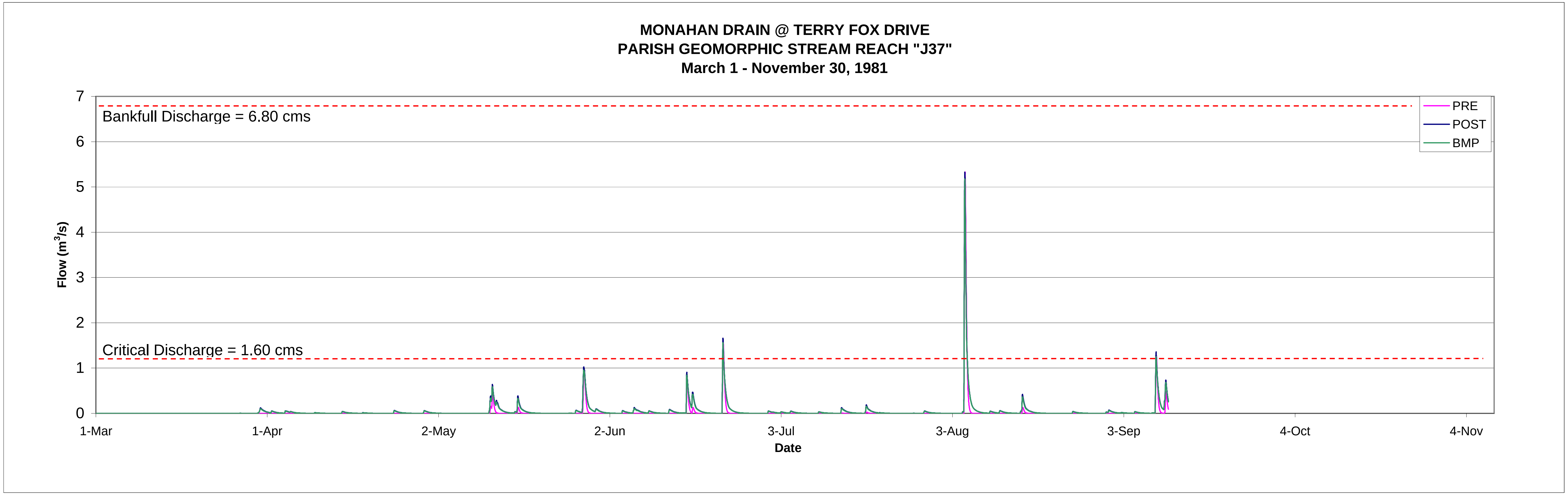
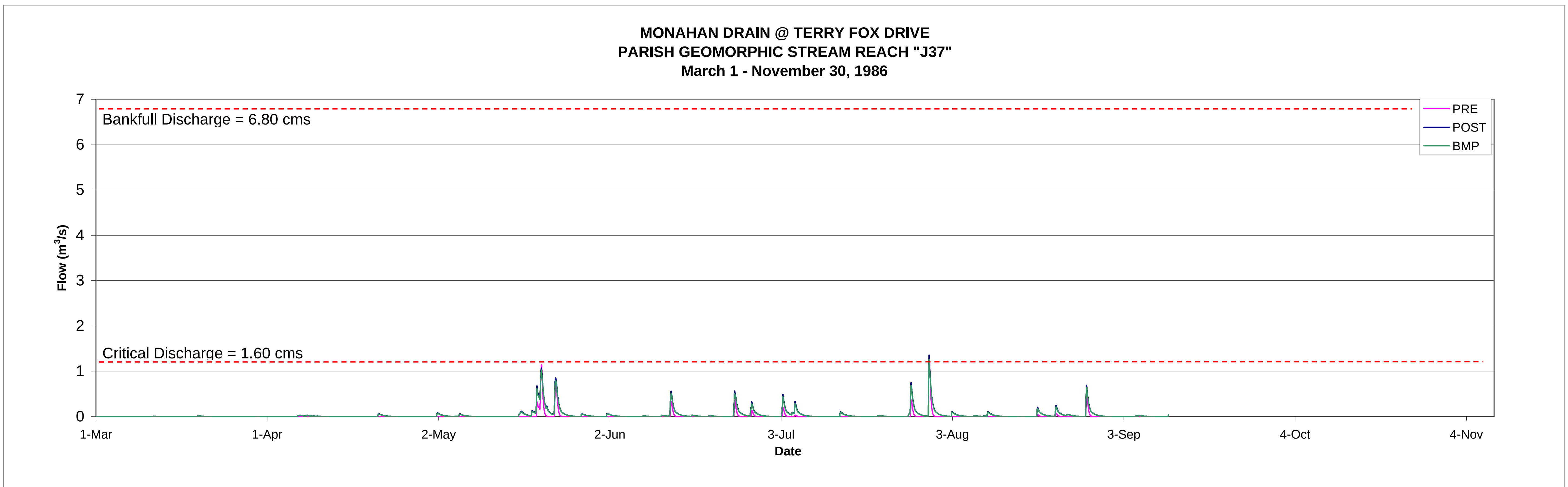
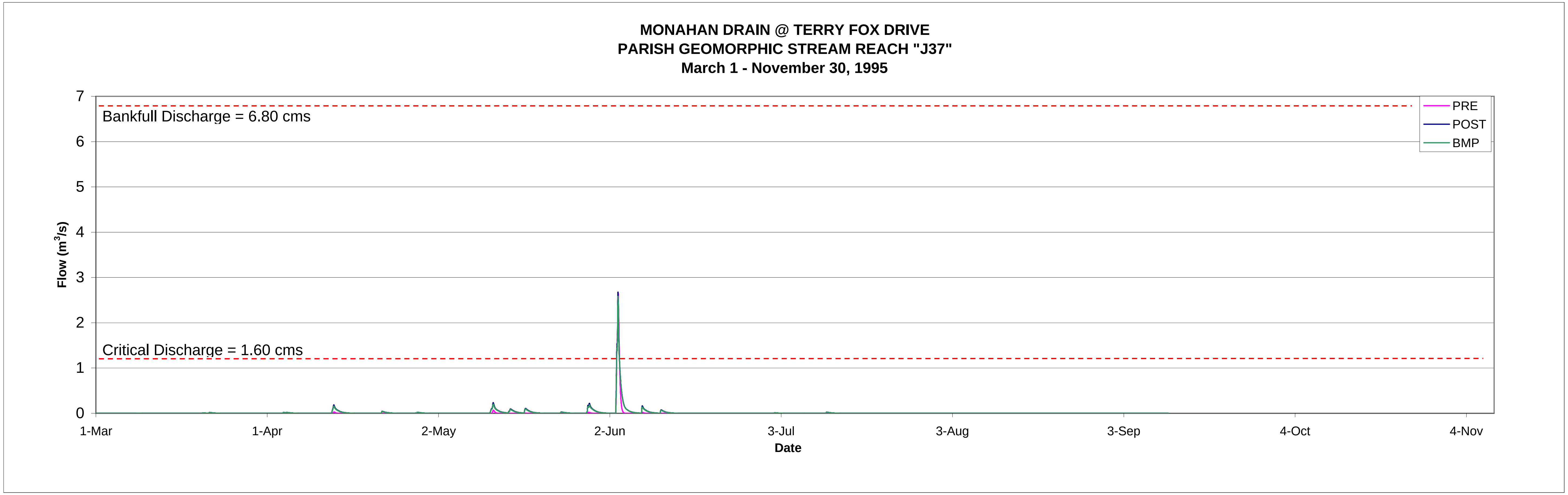
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov


MONAHAN DRAIN @ TERRY FOX DRIVE
PARISH GEOMORPHIC STREAM REACH "J37"
March 1 - November 30, 1974
Bankfull Discharge = 6.80 cms
Critical Discharge = 1.60 cms
PRE
POST
BMP
Flow (m3/s)
Date
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov

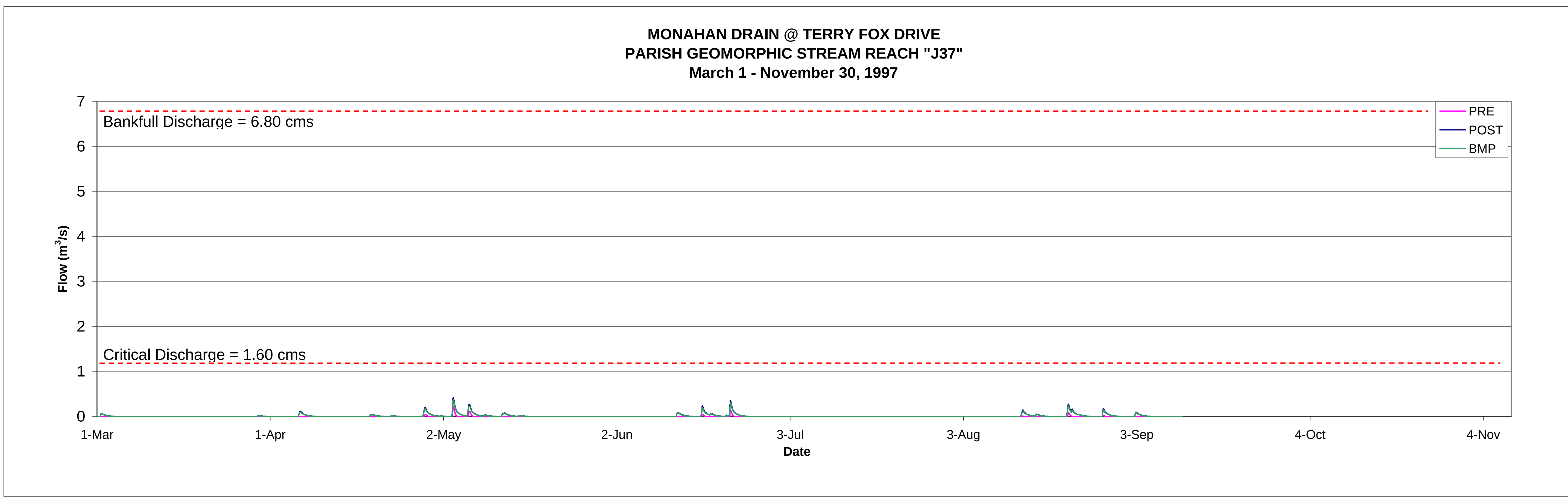

MONAHAN DRAIN @ TERRY FOX DRIVE
PARISH GEOMORPHIC STREAM REACH "J37"
March 1 - November 30, 1979
Bankfull Discharge = 6.80 cms
Critical Discharge = 1.60 cms
PRE
POST
BMP
Flow (m3/s)
Date
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov


MONAHAN DRAIN @ TERRY FOX DRIVE
PARISH GEOMORPHIC STREAM REACH "J37"
March 1 - November 30, 1981
Bankfull Discharge = 6.80 cms
Critical Discharge = 1.60 cms
PRE
POST
BMP
Flow (m3/s)
Date
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov


MONAHAN DRAIN @ TERRY FOX DRIVE
PARISH GEOMORPHIC STREAM REACH "J37"
March 1 - November 30, 1986
Bankfull Discharge = 6.80 cms
Critical Discharge = 1.60 cms
PRE
POST
BMP
Flow (m3/s)
Date
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov



MONAHAN DRAIN @ TERRY FOX DRIVE
PARISH GEOMORPHIC STREAM REACH "J37"
March 1 - November 30, 1995
Bankfull Discharge = 6.80 cms
Critical Discharge = 1.60 cms
PRE
POST
BMP
Flow (m3/s)
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date



MONAHAN DRAIN @ TERRY FOX DRIVE
PARISH GEOMORPHIC STREAM REACH "J37"
March 1 - November 30, 1997
Bankfull Discharge = 6.80 cms
Critical Discharge = 1.60 cms
PRE
POST
BMP
Flow (m3/s)
0
1
2
3
4
5
6
7
1-Mar
1-Apr
2-May
2-Jun
3-Jul
3-Aug
3-Sep
4-Oct
4-Nov
Date

APPENDIX F

TEMPERATURE MONITORING DATA
Granite Ridge SWMF & Carp River West Tributary

September 5, 2007
September 21, 2007
July 31, 2008
August 12, 2008

Figure F-1: Temperature Data Monitoring Locations (August 12, 2008)

Appendix F
Temperature Data

Site Inspection: Fernbank CDP - Granite Ridge Tributary
Date/Time: September 5, 2007 @ 11:30AM
Weather Conditions: 17°C clear and sunny, Relative Humidity 50%

Channel Section: plus/minus 1.0m flat bottom channel with steep side slopes
Vegetation: predominantly long grasses; corn setback 1 m from top of bank

1) Outlet from SWM facility
Water Temperature: 18°C Depth: 200mm Flow: noticeable, low
Fish: Small Fish approx 25mm
Notes: Long grass grown over the flow

2) End of Industrial Land
Water Temperature: 18°C Depth: 25mm Flow: noticeable, low
Fish: None Observed

3) Bend 1
Water Temperature: 19°C Depth: 50mm Flow: trace
Fish: None Observed

4) Bend 2
Water Temperature: 18°C Depth: 25mm Flow: Wide, trace
Fish: Small fish (tadpoles) and larger (tadpoles with legs)
Notes: Pools of deeper water

5) Bend 3
Water Temperature: 17°C Depth: 50mm Flow: Wide, trace
Fish: 1 small fish <25mm observed

Attached: Weather for Ottawa, Ontario: Current Conditions (September 5, 2007)

OTTAWA MACDONALD-CARTIER INT'L A
ONTARIO

Latitude:	45° 19.200' N	Longitude:	75° 40.200' W	Elevation:	114.00 m
Climate ID:	6106000	WMO ID:	71628	TC ID:	YOW

Hourly Data Report for September 05, 2007

Time	Temp	Dew Point Temp	Rel Hum	Wind Dir	Wind Spd	Visibility	Stn Press	Hmdx	Wind Chill	Weather
	°C	°C	%	10's deg	km/h	km	kPa			
0:00	12.8	6.4	65	3	6	25	100.64			Mainly Clear
1:00	12.5	6.5	67	4	7	25	100.65			Mostly Cloudy
2:00	11.7	6.5	70	6	7	25	100.67			Mainly Clear
3:00	10.8	6	72	5	7	25	100.72			Mainly Clear
4:00	10.5	5.9	73		0	25	100.76			Mainly Clear
5:00	10.7	6.1	73	3	9	24.1	100.8			Mostly Cloudy
6:00	10	5.5	74	3	9	24.1	100.88			Mainly Clear
7:00	11.8	6	68	5	7	24.1	100.91			Mainly Clear
8:00	13.4	5.5	59	6	13	24.1	100.95			Mostly Cloudy
9:00	14.6	5.7	55	9	13	24.1	101			Mostly Cloudy
10:00	16	6.1	52	9	9	24.1	100.99			Mainly Clear
11:00	16.3	6.4	52	7	7	24.1	100.93			Mostly Cloudy
12:00	17.6	6.9	49	9	9	24.1	100.9			Mostly Cloudy
13:00	18.4	7.3	48	20	7	24.1	100.87			Mainly Clear
14:00	18.9	7.6	48	13	7	24.1	100.83			Mainly Clear
15:00	**19.1**	7.9	48	13	7	24.1	100.78			Mostly Cloudy
16:00	18.8	7.8	49	16	6	24.1	100.77			Mostly Cloudy
17:00	17.9	8.4	54	10	9	24.1	100.75			Mostly Cloudy
18:00	16.7	8.2	57	12	7	24.1	100.72			Cloudy
19:00	14.7	8.1	65	10	11	24.1	100.7			Cloudy
20:00	15.3	8.2	63	13	11	25	100.75			Mostly Cloudy
21:00	15.3	6.4	55	11	15	25	100.73			Cloudy
22:00	14.4	6.9	61	10	11	25	100.75			Cloudy
23:00	14.1	7.1	63	12	13	25	100.69			Cloudy

Time of Site Inspection

http://climate.weatheroffice.ec.gc.ca/climateData/hourlydata_e.html

Site Inspection: Fernbank CDP - Granite Ridge Tributary
Date/Time: September 21, 2007 @ 3:00PM
Weather Conditions: 24°C clear and sunny, Relative Humidity 61%

1) Flow into the SWMF from Main Inlet only –
Flow noticeable – difficult to quantify - Submerged Pipe – (20mm high 1m across)
Inlet Temperature - 17°C

2) Outlet Temperature Pond Side - 23°C
Water level is below concrete structure – circular opening still fully submerged – flow noticeable

3) Outlet Temperature Ditch Side - 22°C
Flow observed – Water level lower than other site visits, flow is noticeable, smaller cross-section, shallow depth. (approx. 60mm x 12mm)

4) Agricultural/Industrial Border Temperature - 21°C
Water level shallow, flow observed.
No inflow from ditches along the industrial/agricultural boundary, no other noticeable inflow

5) Temperature in the middle of Pond – at bottom but shallow depth (0.25m) - 22°C

Attached: Weather for Ottawa, Ontario: Current Conditions (September 21, 2007)

OTTAWA MACDONALD-CARTIER INT'L A ONTARIO

Latitude:	45° 19.200' N	Longitude:	75° 40.200' W	Elevation:	114.00 m
Climate ID:	6106000	WMO ID:	71628	TC ID:	YOW

Hourly Data Report for September 21, 2007

Time	Temp	Dew Point Temp	Rel Hum	Wind Dir	Wind Spd	Visibility	Stn Press	Hmdx	Wind Chill	Weather
	°C	°C	%	10's deg	km/h	km	kPa			
0:00	14.9	11.2	79	9	11	25	100.73			Clear
1:00	14.2	11.2	82	5	9	25	100.77			Clear
2:00	13.8	10.9	83	5	9	25	100.78			Clear
3:00	13.2	10.7	85	5	11	25	100.77			Clear
4:00	12.6	10.2	85	4	9	25	100.75			Clear
5:00	12.1	10	87	6	7	25	100.78			Mainly Clear
6:00	12.1	10	87	4	11	19.3	100.83			Mainly Clear
7:00	13.2	10.4	83	6	9	19.3	100.85			Mainly Clear
8:00	14.9	11.6	81	9	9	24.1	100.83			Mainly Clear
9:00	17.3	14.4	83	9	9	24.1	100.77			Mainly Clear
10:00	19.7	15.2	75	6	6	24.1	100.76			Mainly Clear
11:00	21.6	15.4	68	8	9	24.1	100.7			Mostly Cloudy
12:00	23.4	15.5	61	13	9	24.1	100.59	28		Mostly Cloudy
13:00	23.8	15.4	59	16	7	24.1	100.47	28		Mainly Clear
14:00	24.8	15.4	56	17	11	24.1	100.41	29		Mostly Cloudy
15:00	**25.3**	15.9	56	15	9	24.1	100.33	30		Mostly Cloudy
16:00	25.2	16.3	58	17	9	24.1	100.32	30		Mainly Clear
17:00	24.8	17.7	65	16	4	19.3	100.25	31		Mostly Cloudy
18:00	21.7	17.4	77	14	7	19.3	100.22			Mainly Clear
19:00	21.6	17.4	77	17	9	16.1	100.22			Mainly Clear
20:00	20.9	17.6	81	18	7	9.7	100.18			Haze
21:00	19.8	17.5	87	17	7	9.7	100.12			Haze
22:00	19.6	17.6	88	18	7	12.9	100.09			Cloudy
23:00	19.5	17.6	89	17	7	12.9	100.03			Mostly Cloudy

Time of Site Inspection

http://climate.weatheroffice.ec.gc.ca/climateData/hourlydata_e.html

Site Inspection: Fernbank CDP - Granite Ridge SWMF
Date/Time: July 31, 2008 @ 3:00PM
Weather Conditions: 26°C, mostly cloudy, Relative Humidity 57%

1) Flow into the SWMF from Main Inlet only –
Flow -low – Submerged Pipe 0.1m
Inlet Temperature - 18°C

2) Outlet Temperature Pond Side - 25°C
Water level is below concrete structure (approx. 25mm) – circular opening still fully submerged – flow low, but noticeable

3) Outlet Temperature Across Iber Road – 24.5°C
Flow observed – Depth approx. 0.23m x culvert width (just inside culvert)

4) Agricultural/Industrial Border Temperature - 24°C
Water level shallow, flow observed – approximately 50mm depth x 1m width
Grass in ditch very high (2.5m) most of the way between Iber and Agricultural lands (there are a few open pools)

Attached: Weather for Ottawa, Ontario: Current Conditions (July 31, 2008)

OTTAWA MACDONALD-CARTIER INT'L A
ONTARIO

Latitude: 45° 19.200' N Longitude: 75° 40.200' W Elevation: 114.00 m

Climate ID: 6106000 WMO ID: 71628 TC ID: YOW

Hourly Data Report for July 31, 2008

Time	Temp	Dew Point Temp	Rel Hum	Wind Dir	Wind Spd	Visibility	Stn Press	Hmdx	Wind Chill	Weather
	°C	°C	%	10's deg	km/h	km	kPa			
0:00	19.2	18.5	96	17	6	16.1	98.79			Mainly Clear
1:00	19.4	18.7	96		0	12.9	98.78			Mostly Cloudy
2:00	18.8	18.7	99	9	4	8	98.74			Fog
3:00	19.1	18.8	98	20	4	6.4	98.72			Fog
4:00	18.6	18.6	100	19	6	0.2	98.73			Fog
5:00	18.2	18.2	100	19	4	0.8	98.77			Fog
6:00	18.4	18.3	99	21	6	3.2	98.82			Fog
7:00	19.8	19	95	19	6	8	98.82			Fog
8:00	20.9	19	89	24	7	12.9	98.82			Mostly Cloudy
9:00	21.5	18.2	81	25	13	19.3	98.81			Mostly Cloudy
10:00	23.2	18.3	74	23	9	24.1	98.79	29		Mostly Cloudy
11:00	23.6	18.9	75	23	9	24.1	98.8	30		Mostly Cloudy
12:00	22.2	17.7	76	27	6	24.1	98.81			Rain Showers
13:00	24.3	18.5	70	25	11	24.1	98.77	31		Mostly Cloudy
14:00	24.9	16.8	61	28	17	24.1	98.77	30		Mostly Cloudy
15:00	26.3	17.1	57	27	19	24.1	98.76	32		Mostly Cloudy
16:00	**26.4**	16.1	53	28	24	24.1	98.76	31		Mostly Cloudy
17:00	25.1	16.2	58	31	20	24.1	98.8	30		Mainly Clear
18:00	24.6	16.7	61	30	20	24.1	98.8	30		Mainly Clear
19:00	23.4	17	67	28	11	24.1	98.83	29		Mainly Clear
20:00	22	17	73	25	6	24.1	98.86			Mainly Clear
21:00	20.4	17.1	81	25	9	25	98.9			Clear
22:00	19.6	16.6	83	25	9	25	98.93			Clear
23:00	18.7	16.4	86	27	9	25	98.94			Clear

Time of Site Inspection (highlighted row: 13:00)

http://climate.weatheroffice.ec.gc.ca/climateData/hourlydata_e.html

Appendix F
Temperature Data

Site Inspection: Fernbank CDP - Granite Ridge SWMF
Date/Time: August 12, 2008 @ 3:30PM
Weather Conditions: 22°C, Sunny, Relative Humidity 50%

1) Flow into the SWMF – 18°C
Flow -low – Submerged Pipe 0.1m

2) Outlet Temperature Pond Side - 25°C
Water level is below concrete structure (approx. 25mm) – circular opening still fully submerged – flow low, but noticeable/steady

3) Outlet Temperature Across Iber Road – 24°C
Flow steady – Depth approx. 0.23m x culvert width (just inside culvert)

4) Agricultural/Industrial Border Temperature – 23.5°C
Water level shallow, flow observed – approximately 50mm depth x 1m width
Grass in ditch very high (2.5m) most of the way between Iber and Agricultural lands (there are a few open pools)

<u>Refer to Figure F-1 for Sampling Locations</u>

5) Bend (1) – 25°C
Steady Flow – 0.1m x 1m

6) Bend (2) (Culvert Outlet) – 25°C
Steady Flow, Large Pool, 0.3m deep x 2m wide
Schools of small fish and frogs

7) Bend (3) – 25.5°C
Steady Flow – 0.1m deep x 1m wide

8) Kick (4) - 23°C
Steady Flow - Ditch gets deeper here

9) Beginning of Natural Channel (5) - 24°C
Steady Flow - 0.25m deep x 1m wide, Well Shaded

Attached: Weather for Ottawa, Ontario: Current Conditions (August 12, 2008)

OTTAWA MACDONALD-CARTIER INT'L A
ONTARIO

Latitude:	45° 19.200' N	Longitude:	75° 40.200' W	Elevation:	114.00 m
Climate ID:	6106000	WMO ID:	71628	TC ID:	YOW

Hourly Data Report for August 12, 2008

Time	Temp	Dew Point Temp	Rel Hum	Wind Dir	Wind Spd	Visibility	Stn Press	Hmdx	Wind Chill	Weather
	°C	°C	%	10's deg	km/h	km	kPa			
0:00	15.8	14.4	91	31	11	24.1	99.61			Mostly Cloudy
1:00	15.5	14.2	92	34	9	25	99.57			Clear
2:00	14.4	14.4	100	29	9	24.1	99.53			Clear
3:00	14.1	14.1	100	31	9	25	99.51			Clear
4:00	14.2	14.1	99	29	7	24.1	99.52			Mainly Clear
5:00	13.1	13	99	32	7	24.1	99.53			Mainly Clear
6:00	14.8	13.7	93	29	6	24.1	99.56			Mainly Clear
7:00	16.4	14.6	89	31	11	24.1	99.58			Mainly Clear
8:00	17.9	14.6	81	30	15	24.1	99.58			Mainly Clear
9:00	19.1	14.9	77	29	19	24.1	99.59			Mainly Clear
10:00	20.5	14.7	69	29	19	24.1	99.6			Mainly Clear
11:00	21.1	13.3	61	28	19	24.1	99.6			Mainly Clear
12:00	21.2	11.6	54	28	19	24.1	99.54			Mainly Clear
13:00	22	11.8	52	29	20	24.1	99.52			Mainly Clear
14:00	22.3	12.1	52	30	24	24.1	99.49			Mainly Clear
15:00	**22.5**	11.7	50	28	17	24.1	99.45			Mainly Clear
16:00	22.1	10.8	49	28	20	24.1	99.43			Mainly Clear
17:00	21.6	10.1	48	29	20	24.1	99.44			Mainly Clear
18:00	20.9	10.2	50	27	17	24.1	99.45			Mainly Clear
19:00	18.7	10.6	59	27	11	24.1	99.48			Mainly Clear
20:00	17.4	10.7	65	28	6	25	99.52			Mainly Clear
21:00	16.4	11.5	73	26	6	25	99.54			Clear
22:00	15.8	11.4	75	24	4	25	99.52			Clear
23:00	14.5	11	79	26	9	25	99.53			Clear

Time of Site Inspection

http://climate.weatheroffice.ec.gc.ca/climateData/hourlydata_e.html

FERNBANK COMMUNITY DESIGN PLAN

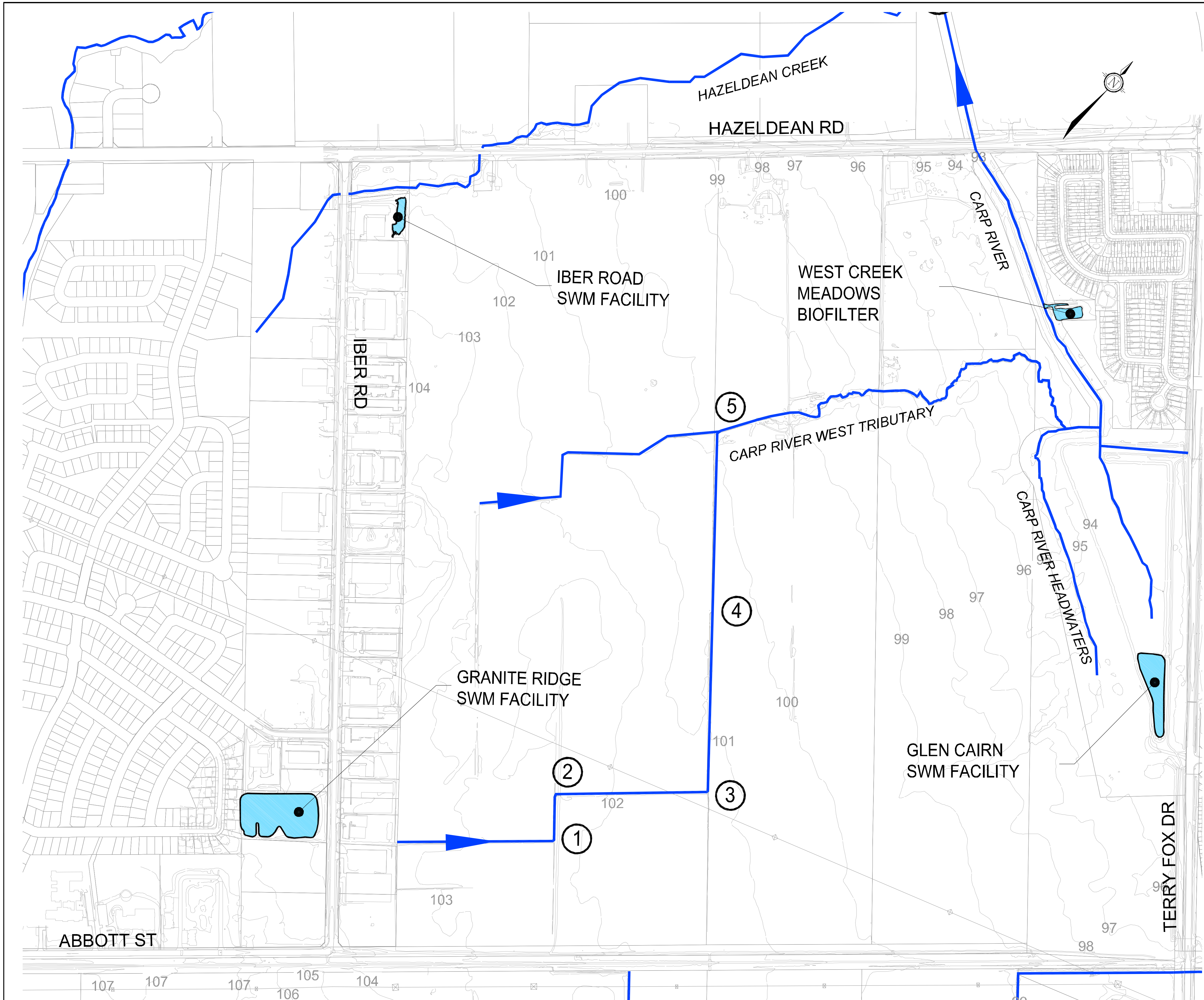
City of Ottawa

ENVIRONMENTAL MANAGEMENT PLAN

FIGURE F-1

Temperature Data

Monitoring Locations



TEMPERATURE SAMPLING STATIONS

0 50 100 200 400 600 metres

SCALE : 1:6000 -B1 Sheet

SCALE : Not to Scale -Report

NOVEMBER 2008

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APPENDIX G

BEST MANAGEMENT PRACTICES MODELING / WATER BALANCE CALCULATIONS

Carp River Subwatershed: Methodology used to model perforated pipes
Example Calculations - Post-Development Drainage Areas to Pond1

SWMHYMO METHODOLOGY:
(MOE Stormwater Management Planning and Design Manual, March 2003 - section 4.9)

Method used to determine the portion of runoff infiltrated using perforated pipes:

Step 1: **Calculate proportion of 5yr and 100yr peak flows for each land use within catchment P1 (using the Rational Method)**

Q = 2.78 CIA I_5 = 85.60 mm/hr (15 min tc)
I_{100} = 146.80 mm/hr (15 min tc)

Pond 1	Mixed Use	Commercial	Major Road	Schools	High Density	Medium Density*	Low Density*	Parks*	Open Space	Total
Area (ha)	11.06	0.61	8.3	9.13	0.00	20.49	22.36	2.42	2.76	74.39
C value	0.80	0.80	0.70	0.60	0.70	0.60	0.50	0.40	0.20	0.61
2.78 AC	24.60	1.36	16.15	15.23	0.00	34.18	31.08	2.69	1.53	126.82
Q_5 (L/s)	2,055	113	1,350	1,273	0	**2,856**	**2,597**	**225**	128	10,597
Q_{100} (L/s)	3,515	194	2,308	2,176	0	**4,884**	**4,441**	**385**	219	18,121

Areas and Runoff Coefficients from storm sewer design sheets (refer to Master Drainage Plan)
** A portion of flow from these areas is directed to perforated pipe system*

Step 2: **Split runoff from P1 into flows going to the perforated pipes (parks/rearyards) and flows to the conventional storm system.**

35% of runoff from low/medium density residential areas directed to rearyard swales /perforated pipe system (refer to Figures G-1 and G-2)
36% of runoff from parks directed to swales / perforated pipe system.
All runoff from remaining areas (roads, commercial, mixed use, schools, etc.) to conventional sewer system.

$Q_{5\ (perf\ pipes)} = 0.35(Q_{medium\ density} + Q_{low\ density}) + 0.36(Q_{parks})$
= 0.35 x (2856 L/s + 2597 L/s) + 0.36 x (225 L/s)
= 1989 L/s

Overall percentage of flow from catchment P1 to perforated pipe system:

% Perf Pipes = $Q_{5\ (perf\ pipes)} / Q_{5\ (total)}$
= 1,989 Lps / 10,597 Lps
= 0.1877
= 18.8%

Therefore, 18.8% of the total runoff from catchment P1 will be directed to the perforated pipe systems.
Use the DIVERT HYD command to split flows between the perforated pipe system (18.8%) and the conventional sewer system (81.2%).

Step 3: **Use MOE equation 4.18 to split flows that are conveyed through the pervious pipes and flows that are exfiltrated into the storage/infiltration media.**

$Q_{exfl} = Q_{in}$ (15A - 0.06S + 0.33)
= Q_{in} [15(0.0032) - 0.06(0.5) + 0.33]
= $0.348Q_{in}$

where A = area of perforations per metre of pipe
= 0.0032 m^2/m (HDPE perforated pipes 300mm - Hancor (TN 1.02, April 2007))
S = Slope of perforated pipe
= 0.5% (assumed)

Therefore, 34.8% of flow through perforated pipes is exfiltrated to storage/infiltration media, and 65.2% is conveyed through to conventional sewers.
Use the DIVERT HYD to model the conveyance/exfiltration ratio in SWMHYMO.

Carp River Subwatershed: Methodology used to model perforated pipes
Example Calculations - Post-Development Drainage Areas to Pond1

Step 4: **Use MOE equation 4.17 to calculate infiltration rate from storage media.**

Flow out of storage media (infiltration trench) represents infiltration into the native soil
Overflows will occur when the infiltration trench storage is full and runoff continues through the perforated pipes to the minor system

Q = f x (P/3 600 000) x (2LD + 2 WD + LW) x n
V = L W D x n x f

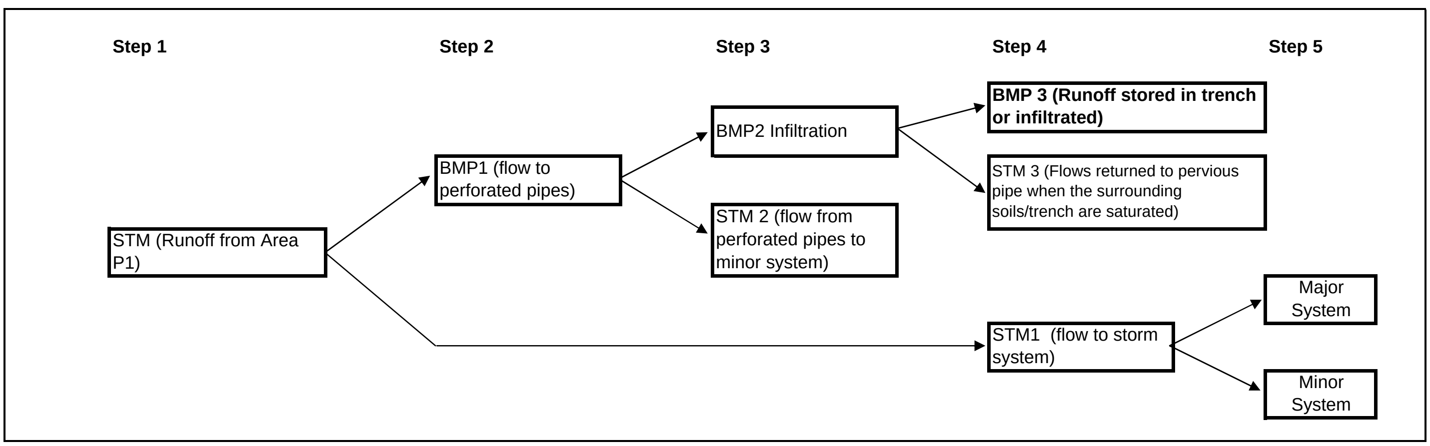
Q = flow rate (m^3/s) for a given storage volume
f = longevity factor - 0.5 (table 4.12 MOE Stormwater Management Planning and Design Manual, March 2003)
P = native soil percolation rate (assume 15mm/h based on soil type)
L = approximate length of pervious pipe in catchment (m)
W = width of pipe trench in (m)
D = depth of water in pipe trench (m)
V = volume of water in pipe trench (m)
n = void space in the trench storage layer

Use the ROUTE RESERVOIR command in SWMHYMO to model infiltration / overflow to conventional sewers.

Step 5: **Split flows in the conventional storm system into minor and major systems.**

Minor System Flow:	6.84	m^3/s	(85 L/s/ha)
Major System Storage:	4,021	m^3	(50 m^3/ha)

Use the COMPUTE DUALHYD command in SWMHYMO to split flows to conventional storm system into minor and major systems



BMP 3 represents the total reduction in runoff volume to the storm sewer system from infiltration through perforated pipes,
all other flows are added together and directed to SWM Facility 1.

Carp River Subwatershed: Methodology used to model perforated pipes
Example Calculations - Post-Development Drainage Areas to Pond1

EXAMPLE CALCULATIONS:

Step 1 - Split flows based on direction of runoff

18.8% of flow to perforated pipes
81.2% of flow to stormwater system

Q_{total} = Total runoff form drainage area

Q_{BMP1} = Flow to perforated pipes
= 0.196 x Q_{total}

Q_{STM1} = Flow to storm sewers
= 0.804 x Q_{total}

DIVERT HYD

Q total m^3/s	Q BMP1 m^3/s	Q STM1 m^3/s
0.000	0.000	0.000
0.250	0.048	0.203
0.500	0.095	0.405
0.750	0.143	0.608
1.000	0.190	0.810
1.500	0.285	1.215
2.000	0.380	1.620
2.500	0.475	2.025
3.000	0.570	2.430
4.000	0.760	3.240
5.000	0.950	4.050
6.000	1.140	4.860
7.000	1.330	5.670

	QIDi	+	QIDii	=	QTOTAL	
[	0.000	+	0.000	=	0.00	]
[	0.048	+	0.203	=	0.25	]
[	0.095	+	0.405	=	0.50	]
[	0.143	+	0.608	=	0.75	]
[	0.190	+	0.810	=	1.00	]
[	0.285	+	1.215	=	1.50	]
[	0.380	+	1.620	=	2.00	]
[	0.475	+	2.025	=	2.50	]
[	0.570	+	2.430	=	3.00	]
[	0.760	+	3.240	=	4.00	]
[	0.950	+	4.050	=	5.00	]
[	1.140	+	4.860	=	6.00	]
[	1.330	+	5.670	=	7.00	]

Step 2 - Exfiltration Discharge

Q_{BMP2} = Q_{BMP1} (15A - 0.06S + 0.33)
A = 0.0021 m^2/m
S = 0.5 %

Q_{BMP1} = Flow to perforated pipes
Q_{BMP2} = Flow exfiltrated from perforated pipes
Q_{STM2} = Flow which is not exfiltrated through perforations and is conveyed to the minor system

DIVERT HYD

Q BMP1 m^3/s	Q BMP2 m^3/s	Q STM2 m^3/s
0.000	0.000	0.000
0.048	0.016	0.032
0.095	0.031	0.064
0.143	0.047	0.095
0.190	0.063	0.127
0.285	0.094	0.191
0.380	0.126	0.254
0.475	0.157	0.318
0.570	0.189	0.381
0.760	0.252	0.508
0.950	0.315	0.635
1.140	0.378	0.762
1.330	0.441	0.889

	QIDi	+	QIDii	=	QTOTAL	
[	0.000	+	0.000	=	0.00	]
[	0.016	+	0.032	=	0.05	]
[	0.031	+	0.064	=	0.10	]
[	0.047	+	0.095	=	0.14	]
[	0.063	+	0.127	=	0.19	]
[	0.094	+	0.191	=	0.29	]
[	0.126	+	0.254	=	0.38	]
[	0.157	+	0.318	=	0.48	]
[	0.189	+	0.381	=	0.57	]
[	0.252	+	0.508	=	0.76	]
[	0.315	+	0.635	=	0.95	]
[	0.378	+	0.762	=	1.14	]
[	0.441	+	0.889	=	1.33	]

Equation 4.18 - MOE Stormwater Management Planning and Design Manual, March 2003

Step 3 - Rating Curve for Exfiltrated Water

V = LWD x n x f
V_{max} = 0.0430
Qexfil = f x (P/360 0000) x (2LD + 2WD + LW) x n

L	8608	m
W	0.5	m
D	0.5	m
n	0.4	
f	0.5	
P	15	mm/ha

ROUTE RESERVOIR

Depth (m)	Storage (ha)	Exfil (m^3/s)
0.1	0.0086	0.0050
0.2	0.0172	0.0065
0.3	0.0258	0.0079
0.4	0.0344	0.0093
0.5	0.0430	0.0108

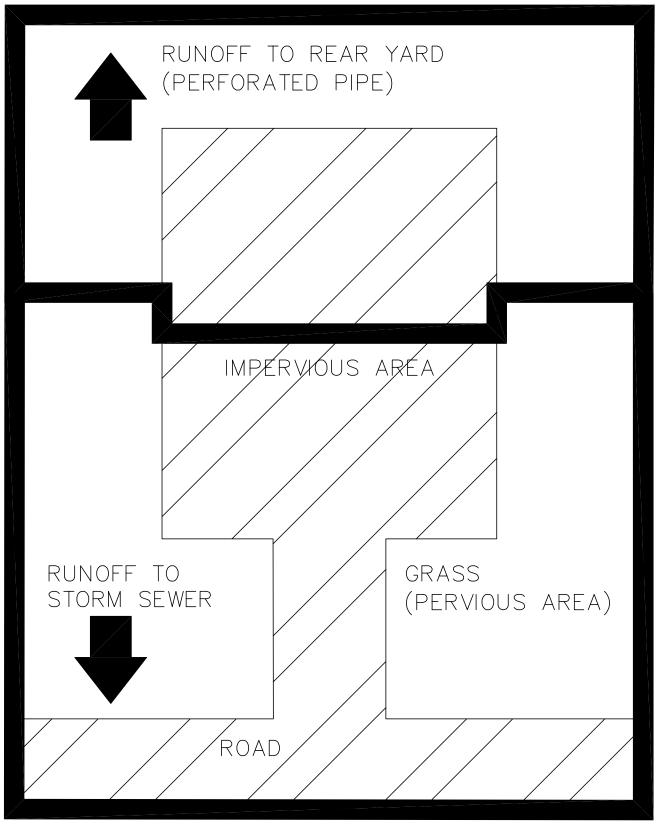
	(cms)	-	(ha-m)	
[	0	,	0	]
[	0.0050	,	0.0086	]
[	0.0065	,	0.0172	]
[	0.0079	,	0.0258	]
[	0.0093	,	0.0344	]
[		,	0.0430	]
[	-1	,	-1	]

IDovf=[8], NHYDovf=["P1STM3"]

Equation 4.17 - MOE Stormwater Management Planning and Design Manual, March 2003

Storage = Flow stored in the trench and surrounding soil
Exfil = Flow which exfiltrates from the perforated pipes into the surrounding soil
Overflow = Once the trench and surrounding soil are saturated water will not exfiltrate through the perforations, this water will be conveyed to the minor system

TYPICAL LOW DENSITY RESIDENTIAL LOT



LOW DENSITY RESIDENTIAL LOT

SPLIT LOT WITH
- 35% OF LOT AREA TO REAR YARD
- HALF OF ROOF AREA TO REAR YARD
(PER CITY OF OTTAWA SEWER DESIGN GUIDELINES, NOV 2004)

Area (m^2)	C	Proposed land use
1186	0.50	Lot
447.3	0.46	Rear yard
738.7	0.53	Front Yard
	0.50	Weighted Average C

Distribution of runoff

I = 83.56 mm/hr
Q = 2.78 CiA

Q (Total) = 2.78 x 0.50 x 83.56 x 0.1186
= 13.77 L/s

Q (Rear yards) = 2.78 x 0.46 x 83.56 x 0.0447
= 4.73 L/s
= 34.3% of total runoff

Q (Front yards) = 2.78 x 0.53 x 83.56 x 0.0739
= 9.04 L/s
= 65.7% of total runoff

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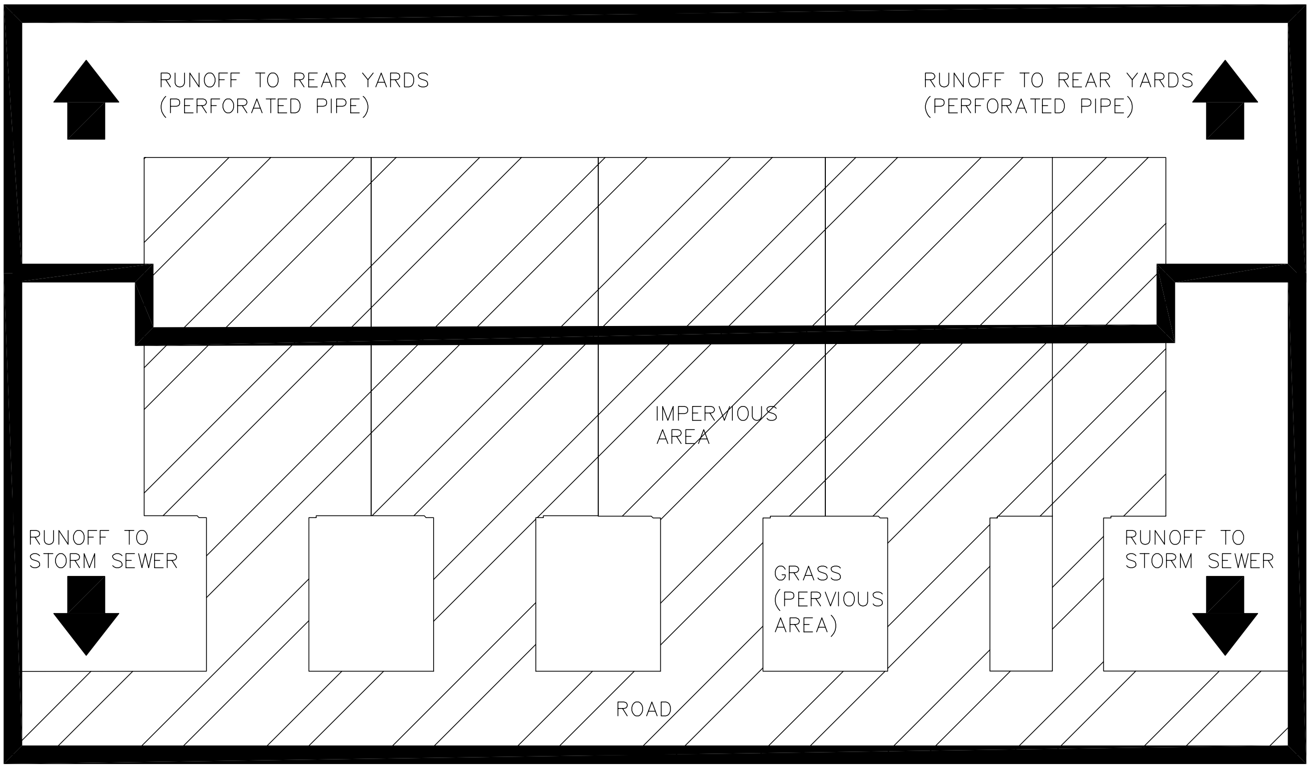
FERNBANK - EMP

DISTRIBUTION OF RUNOFF FOR LOW DENSITY RESIDENTIAL LOTS

MARCH 25 2009 | 101108 | FIGURE G-1

TYPICAL MEDIUM DENSITY RESIDENTIAL LOT



MEDIUM DENSITY RESIDENTIAL LOT

SPLIT LOT WITH
- 35% OF LOT AREA TO REAR YARD
- HALF OF ROOF AREA TO REAR YARD

(PER CITY OF OTTAWA SEWER DESIGN GUIDELINES, NOV 2004)

Area (m^2)	C	Proposed land use
2749	0.60	Lot
1145.7	0.52	Rear yard
1603.3	0.66	Front Yard
	0.60	Weighted Average C

Distribution of runoff

I = 83.56 mm/hr
Q = 2.78 CiA

Q (Total) = 2.78 x 0.60 x 83.56 x 0.2749
= 38.4 L/s

Q (Reare yards) = 2.78 x 0.52 x 83.56 x 0.1146
= 13.9 L/s
= 36.3% of total runoff

Q (Front yards) = 2.78 x 0.66 x 83.56 x 0.1603
= 24.5 L/s
= 63.7% of total runoff

M:\2001\101108\CAD\design\SWMF\Lot Sketch.dwg, Sheet 8x11 portrait, May 21, 2009 - 3:45pm, rarcher

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FERNBANK - EMP

DISTRIBUTION OF RUNOFF FOR MEDIUM DENSITY RESIDENTIAL LOTS

MARCH 25 2009 | 101108 | FIGURE G-2

SHT8X11.DWG - 216mmX278mm

Fernbank Community
108108

Carp River Subwatershed: CN values

The following runoff curve numbers (CN) have been taken from Tables 2-2(a-d) of SCS (1986), which is a comprehensive listing of runoff Curve Numbers. The hydrologic soil group refers to the infiltration potential of the soil after prolonged wetting.

Group A Soils: High infiltration (low runoff). Sand, loamy sand, or sandy loam. Infiltration rate > 0.3 inch/hr when wet.
Group B Soils: Moderate infiltration (moderate runoff). Silt loam or loam. Infiltration rate 0.15 to 0.3 inch/hr when wet.
Group C Soils**:** Low infiltration (moderate to high runoff). Sandy clay loam. Infiltration rate 0.05 to 0.15 inch/hr when wet.
Group D Soils: Very low infiltration (high runoff). Clay loam, silty clay loam, sandy clay, silty clay, or clay. Infiltration rate 0 to 0.05 inch/hr when wet.

Open Spaces (lawns, parks, golf courses, cemeteries, etc.):

Hydrologic soil group	**A**	**B**	**C**	**D**
Fair (grass covers 50-75% of area)	39	61	74	80

The native soil in the Fernbank lands tributary to the Carp River is primairly sensitive marine silty clay, which has a very low infiltration rate.
A Curve Number of 80.5 has been used for sensitive marine clay, which is consistent with previous hydrologic models for this area.

The use of a fine sandy loam topsoil on residential lawn and in parks will increase the infiltration rate, in order to reflect this change the Curve Number (used by SWMHYMO to calculate the runoff for pervious areas) was reduced from 80.5 to 77.0, which reflects a change in hydrologic soil ground from a Group D soil to a Group C/D soil.

	Mixed Use	Commercial	High Density	Major Road	Schools	Medium Density	Low Density	Parks	Open Space		
Area (ha)	11.06	0.61	0.00	8.3	9.13	20.49	22.36	2.42	2.76	74.39 ⟶	Total area (ha)
C value	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.4	0.2	0.61 ⟶	Weighted C
% Impervious	86%	86%	71%	71%	57%	57%	43%	29%	0%		
Pervious Area (ha)	**1.58**	**0.09**	**0.00**	**2.37**	**3.91**	**8.78**	**12.78**	**1.73**	**2.76**	34.00 ⟶	Total pervious Area (ha)
CN pervious	**80.5**	**80.5**	**80.5**	**80.5**	**80.5**	**77**	**77**	**77**	**80.5**	78.10 ⟶	Weighted CN

% impervious values

$$C = \frac{(A_{IMP} \times 0.9)}{A_{TOTAL}} + \frac{(A_{PER} \times 0.2)}{A_{TOTAL}}$$

$A_{total} = A_{IMP} + A_{PER}$ (Assume $A_{TOTAL} = 1$)

$C = 0.9 \times A_{IMP} + (1 - A_{IMP}) \times 0.2$
$C = 0.9 \times A_{IMP} + 0.2 - (0.2 \times A_{IMP})$
$C = 0.7 \times A_{IMP} + 0.2$
$C - 0.2 = 0.7 \times A_{IMP}$

$A_{IMP} = (C - 0.2) / 0.7$ (Multiply by 100 to get % IMP)

Pervious Area (ha) = (1-%IMP) x Area (ha)
CN pervious: 80.5 for areas with native soil; 77 for area with silty sand topsoil

The CN for the site is then calculated as a weighted average

$CN_{site} = [S (CN_{pervious} \times A_{pervious})] / A_{total}$

Appendix G
Water Balance Parameters

Rural Land Use		**ET**	**INFIL**	**RUNOFF**
Pasture / Meadow	Beach Formations (Sand / Sand & Gravel)	510	300	134
	Fine to Medium Sand	520	250	174
	Thick Organic Deposits (Peat)	530	175	239
	Sensitive Marine Silty Clay	530	100	314
	Thin Discontinuous Organic Deposits	530	135	279
	Paleozolic Bedrock	530	120	294
	Glacial Till / Precambrian Bedrock	530	73	341
Agricultural	Beach Formations (Sand / Sand & Gravel)	400	290	254
	Fine to Medium Sand	410	230	304
	Thick Organic Deposits (Peat)	420	160	364
	Sensitive Marine Silty Clay	420	110	414
	Thin Discontinuous Organic Deposits	420	130	394
	Paleozolic Bedrock	420	125	399
	Glacial Till / Precambrian Bedrock	420	80	444
Woodland	Beach Formations (Sand / Sand & Gravel)	530	310	104
	Fine to Medium Sand	540	275	129
	Thick Organic Deposits (Peat)	550	220	174
	Sensitive Marine Silty Clay	550	150	244
	Thin Discontinuous Organic Deposits	550	145	249
	Paleozolic Bedrock	550	140	254
	Glacial Till / Precambrian Bedrock	550	125	269
Water / Wetland	Clay / Silty Clay	660	50	234

Urban Land Use		**ET**	**INFIL**	**RUNOFF**
Open Space / Meadow	Beach Formations (Sand / Sand & Gravel)	510	300	134
	Fine to Medium Sand	520	250	174
	Thick Organic Deposits (Peat)	530	175	239
	Sensitive Marine Silty Clay	530	170	244
	Thin Discontinuous Organic Deposits	530	135	279
	Paleozolic Bedrock	530	120	294
	Glacial Till / Precambrian Bedrock	530	73	341
Urban Grassed Area (w/ Infiltration BMPs)	Beach Formations (Sand / Sand & Gravel)	400	470	74
	Fine to Medium Sand	450	390	104
	Thick Organic Deposits (Peat)	495	300	149
	Sensitive Marine Silty Clay	500	225	219
	Thin Discontinuous Organic Deposits	500	180	264
	Paleozolic Bedrock	500	160	284
	Glacial Till / Precambrian Bedrock	500	120	324
Urban Grassed Area (no Infiltration BMPs)	Beach Formations (Sand / Sand & Gravel)	495	290	159
	Fine to Medium Sand	510	230	204
	Thick Organic Deposits (Peat)	525	160	259
	Sensitive Marine Silty Clay	525	145	274
	Thin Discontinuous Organic Deposits	525	130	289
	Paleozolic Bedrock	525	125	294
	Glacial Till / Precambrian Bedrock	525	90	329
Woodland	Beach Formations (Sand / Sand & Gravel)	530	310	104
	Fine to Medium Sand	540	275	129
	Thick Organic Deposits (Peat)	550	220	174
	Sensitive Marine Silty Clay	550	150	244
	Thin Discontinuous Organic Deposits	550	145	249
	Paleozolic Bedrock	550	140	254
	Glacial Till / Precambrian Bedrock	550	125	269
Water / Wetland / SWMF	Clay / Silty Clay	660	50	234
Impervious Areas	N/A	95	0	849

CARP RIVER WATER BALANCE
Existing Conditions

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Pasture / Meadow	Clay	11.0	4.7%	944	530	100	314	44	25	5	15
	Peat	4.0	1.7%	944	530	175	239	16	9	3	4
Agricultural	Clay	196.0	83.4%	944	420	110	414	787	350	92	345
	Peat	11.0	4.7%	944	420	160	364	44	20	7	17
Woodland	Clay	2.0	0.9%	944	550	150	244	8	5	1	2
	Till	5.0	2.1%	944	550	125	269	20	12	3	6
Water / Wetland	Clay	6.0	2.6%	944	660	50	234	24	17	1	6
Totals		**235.0**	**100.0%**					**944**	**437**	**112**	**395**

CARP RIVER WATER BALANCE
Developed Conditions

Storm Drainage Areas to SWM Facilities
(from Storm Sewer Design Sheets - refer to Fernbank CDP Master Servicing Plan)

	Area (ha)	C	IMP %	A x IMP (ha)
Pond 1	78.89	0.59	0.56	43.95
Pond 2	24.13	0.61	0.59	14.13
Pond 3	84.99	0.50	0.43	36.42
	188.01			94.51

Total Post-Dev Area	235.0	ha
Development Area	188.5	ha
Development Impervious Area	94.5	ha
Subwatershed % IMP	40.2%	

No Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow	Clay	45.0	19.1%	944	530	100	314	181	101	19	60
	Peat	4.0	1.7%	944	530	175	239	16	9	3	4
Woodland	Clay	2.0	0.9%	944	550	150	244	8	5	1	2
Water / Wetland / SMWF	-	14.0	6.0%	944	660	50	234	56	39	3	14
Urban Grassed (no infiltration)	Topsoil/Clay	74.2	32.1%	944	525	145	274	303	169	47	88
Impervious Areas	-	95.8	40.2%	944	194	0	750	379	78	0	302
Totals		**235.0**	**100.0%**					**944**	**401**	**73**	**470**

With Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow	Clay	45.0	19.1%	944	530	170	244	181	101	33	47
	Peat	4.0	1.7%	944	530	175	239	16	9	3	4
Woodland	Clay	2.0	0.9%	944	550	150	244	8	5	1	2
Water / Wetland / SMWF	-	14.0	6.0%	944	660	50	234	56	39	3	14
Urban Grassed (w/ infiltration)	Topsoil/Clay	44.2	18.8%	944	500	225	219	178	94	42	41
Urban Grassed (no infiltration)	Topsoil/Clay	30.0	12.8%	944	525	145	274	121	67	19	35
Impervious Areas	-	95.8	40.8%	944	194	0	750	385	79	0	306
Totals		**235.0**	**100.0%**					**944**	**395**	**101**	**449**

CARP RIVER WATER BALANCE
Pre vs. Post-Development (no infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	437	401	8% Decrease
Infiltration	112	73	35% Decrease
Runoff	395	470	19% Increase

Pre vs. Post-Development (with infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	437	395	10% Decrease
Infiltration	112	101	10% Decrease
Runoff	395	449	14% Increase

FAULKNER DRAIN WATER BALANCE
Existing Conditions

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Pasture / Meadow	Fine Sand	2.0	4.1%	944	520	250	174	38.9	21.4	10.3	7.2
	Thin Organic	5.0	10.3%	944	530	135	279	97.3	54.6	13.9	28.8
	Bedrock	16.2	33.4%	944	530	120	294	315.3	177.0	40.1	98.2
	Till	10.8	22.3%	944	530	73	341	210.2	118.0	16.3	75.9
Woodland	Thin Organic	2.0	4.1%	944	550	145	249	38.9	22.7	6.0	10.3
	Bedrock	4.5	9.3%	944	550	140	254	87.6	51.0	13.0	23.6
	Till	3.0	6.2%	944	550	125	269	58.4	34.0	7.7	16.6
Water / Wetland	Till	5.0	10.3%	944	660	50	234	97.3	68.0	5.2	24.1
Totals		**48.5**	**100.0%**					**944**	**547**	**112**	**285**

FAULKNER DRAIN WATER BALANCE
Developed Conditions

Storm Drainage Areas to SWM Facility
(from Storm Sewer Design Sheets - refer to Fernbank CDP Master Servicing Plan)

	Area (ha)	C	IMP %	A x IMP (ha)
Pond 4	61.55	0.51	0.44	27.26

Total Post-Dev Area	61.5	ha
Development Area	61.6	ha
Development Impervious Area	27.3	ha
Subwatershed % IMP	44.3%	

No Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow / Hydro	Fine Sand	2.0	3.3%	944	520	250	174	30.7	16.9	8.1	5.7
	Thin Organic	4.0	6.5%	944	530	135	279	61.4	34.5	8.8	18.1
	Bedrock	1.0	1.6%	944	530	120	294	15.3	8.6	2.0	4.8
	Till	1.0	1.6%	944	530	73	341	15.3	8.6	1.2	5.5
Water / Wetland / SMWF	-	3.6	5.9%	944	660	50	234	55.3	38.6	2.9	13.7
Urban Grassed (no infiltration)	Topsoil / Clay	14.1	22.9%	944	525	145	274	216.4	120.4	33.2	62.8
	Topsoil / Till	8.6	13.9%	944	525	90	329	131.2	73.0	12.5	45.7
Impervious Areas	-	27.3	44.3%	944	194	0	750	418.3	86.0	0.0	332.4
Totals		**61.5**	**100.0%**					**944**	**387**	**69**	**489**

With Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow / Hydro	Fine Sand	2.0	3.3%	944	520	250	174	30.7	16.9	8.1	5.7
	Thin Organic	4.0	6.5%	944	530	135	279	61.4	34.5	8.8	18.1
	Bedrock	1.0	1.6%	944	530	125	289	15.3	8.6	2.0	4.7
	Till	1.0	1.6%	944	530	73	341	15.3	8.6	1.2	5.5
Water / Wetland / SMWF	-	3.6	5.9%	944	660	50	234	55.3	38.6	2.9	13.7
Urban Grassed (no infiltration)	Topsoil / Clay	5.7	9.3%	944	525	145	274	87.5	48.7	13.4	25.4
	Topsoil / Till	3.2	5.2%	944	525	90	329	49.1	27.3	4.7	17.1
Urban Grassed (with infiltration)	Topsoil / Clay	8.5	13.7%	944	500	225	219	129.7	68.7	30.9	30.1
	Topsoil / Till	5.3	8.6%	944	500	120	324	81.3	43.1	10.3	27.9
Impervious Areas	-	27.3	44.3%	944	194	0	750	418.3	86.0	0.0	332.4
Totals		**61.5**	**100.0%**					**944**	**381**	**82**	**481**

FAULKNER DRAIN WATER BALANCE
Pre vs. Post-Development (no infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	547	387	29% Decrease
Infiltration	112	69	39% Decrease
Runoff	285	489	72% Increase

Pre vs. Post-Development (with infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	547	381	30% Decrease
Infiltration	112	82	27% Decrease
Runoff	285	481	69% Increase

FLEWELLYN DRAIN WATER BALANCE
Existing Conditions

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Pasture / Meadow	Clay	14.3	9.2%	944	530	100	314	86.8	48.7	9.2	28.9
	Thin Organic	5.0	3.2%	944	530	135	279	30.3	17.0	4.3	9.0
	Bedrock	8.5	5.5%	944	530	120	294	51.6	29.0	6.6	16.1
	Till	12.8	8.2%	944	530	73	341	77.7	43.6	6.0	28.1
Agricultural	Clay	28.0	18.0%	944	420	110	414	169.9	75.6	19.8	74.5
	Bedrock	6.0	3.9%	944	420	125	399	36.4	16.2	4.8	15.4
	Till	39.0	25.1%	944	420	80	444	236.6	105.3	20.1	111.3
Woodland	Clay	5.0	3.2%	944	550	150	244	30.3	17.7	4.8	7.8
	Thin Organic	16.0	10.3%	944	550	145	249	97.1	56.6	14.9	25.6
	Bedrock	12.0	7.7%	944	550	140	254	72.8	42.4	10.8	19.6
	Till	6.0	3.9%	944	550	125	269	36.4	21.2	4.8	10.4
Water / Wetland	Clay	3.0	1.9%	944	660	50	234	18.2	12.7	1.0	4.5
Totals		**155.6**	**100.0%**					**944**	**486**	**107**	**351**

FLEWELLYN DRAIN WATER BALANCE
Developed Conditions

Storm Drainage Areas to SWM Facility
(from Storm Sewer Design Sheets - refer to Fernbank CDP Master Servicing Plan)

	Area (ha)	C	IMP %	A x IMP (ha)
Pond 5	146.28	0.48	0.40	58.51

Total Post-Dev Area	155.6 ha
Development Area	146.3 ha
Development Impervious Area	58.5 ha
Subwatershed % IMP	37.6%

No Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow / Hydro	Clay	0.0	0.0%	944	530	170	244	0.0	0.0	0.0	0.0
	Thin Organic	0.0	0.0%	944	530	135	279	0.0	0.0	0.0	0.0
	Bedrock	8.5	5.6%	944	530	120	294	52.5	29.5	6.7	16.3
	Till	5.0	3.3%	944	530	73	341	30.9	17.3	2.4	11.2
Water / Wetland / SMWF	-	7.7	5.0%	944	660	50	234	47.5	33.2	2.5	11.8
Urban Grassed (no infiltration)	Topsoil / Clay	37.0	24.2%	944	525	145	274	228.4	127.0	35.1	66.3
	Topsoil / Till	36.2	23.7%	944	525	90	329	223.5	124.3	21.3	77.9
Impervious Areas	-	58.5	38.3%	944	194	0	750	361.2	74.2	0.0	287.0
Totals		**152.9**	**100.0%**					**944**	**406**	**68**	**470**

With Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow / Hydro	Clay	0.0	0.0%	944	530	170	244	0.0	0.0	0.0	0.0
	Thin Organic	0.0	0.0%	944	530	135	279	0.0	0.0	0.0	0.0
	Bedrock	8.5	5.6%	944	530	125	289	52.5	29.5	6.9	16.1
	Till	5.0	3.3%	944	530	90	324	30.9	17.3	2.9	10.6
Water / Wetland / SMWF	-	7.7	5.0%	944	660	50	234	47.5	33.2	2.5	11.8
Urban Grassed (no infiltration)	Topsoil / Clay	15.3	10.0%	944	525	145	274	94.5	52.5	14.5	27.4
	Topsoil / Till	16.3	10.7%	944	525	90	329	100.6	56.0	9.6	35.1
Urban Grassed (with infiltration)	Topsoil / Clay	20.3	13.3%	944	500	225	219	125.3	66.4	29.9	29.1
	Topsoil / Till	21.3	13.9%	944	500	120	324	131.5	69.6	16.7	45.1
Impervious Areas	-	58.5	38.3%	944	194	0	750	361.2	74.2	0.0	287.0
Totals		**152.9**	**100.0%**					**944**	**399**	**83**	**462**

FLEWELLYN DRAIN WATER BALANCE
Pre vs. Post-Development (no infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	486	406	17% Decrease
Infiltration	107	68	37% Decrease
Runoff	351	470	34% Increase

FLEWELLYN DRAIN WATER BALANCE
Pre vs. Post-Development (with infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	486	399	18% Decrease
Infiltration	107	83	22% Decrease
Runoff	351	462	32% Increase

MONAHAN DRAIN WATER BALANCE
Existing Conditions

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Pasture / Meadow	Clay	14.0	5.9%	944	530	100	314	56	31	6	19
	Peat	1.0	0.4%	944	530	175	239	4	2	1	1
Agricultural	Sand	1.0	0.4%	944	400	290	254	4	2	1	1
	Clay	198.5	83.8%	944	420	110	414	791	352	92	347
	Peat	1.0	0.4%	944	420	160	364	4	2	1	2
	Till	12.0	5.1%	944	420	80	444	48	21	4	22
	Bedrock	6.5	2.7%	944	420	125	399	26	12	3	11
Woodland	Clay	3.0	1.3%	944	550	150	244	12	7	2	3
Water / Wetland	Clay	0.0	0.0%	944	660	50	234	0	0	0	0
Totals		**237.0**	**100.0%**					**944**	**429**	**110**	**405**

MONAHAN DRAIN WATER BALANCE
Developed Conditions

Storm Drainage Areas to SWM Facilities
(from Storm Sewer Design Sheets - refer to Fernbank CDP Master Servicing Plan)

	Area (ha)	C	IMP %	A x IMP (ha)
Pond 6	89.44	0.54	0.49	43.44
Pond 7	42.45	0.45	0.36	15.16
Pond 8	63.69	0.57	0.53	33.66
	195.58			92.27

Total Post-Dev Area	210.9	ha
Development Area	195.6	ha
Development Impervious Area	92.3	ha
Subwatershed % IMP	43.7%	

No Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow / Hydro	Clay	19.4	9.1%	944	530	170	244	86	48	16	22
Water / Wetland / SMWF	-	12.0	5.7%	944	660	50	234	53	37	3	13
Urban Grassed (no infiltration)	Topsoil / Clay	88.5	41.7%	944	525	145	274	394	219	60	114
Impervious Areas	-	92.3	43.5%	944	194	0	750	411	84	0	326
Totals		**212.2**	**100.0%**					**944**	**389**	**79**	**476**

With Infiltration BMPs

Land Use	Soil Type	Area		Individual				Weighted (by Area)			
		ha	%	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)	Precip (mm)	ET (mm)	Infil (mm)	Runoff (mm)
Open Space / Meadow / Hydro	Clay	19.4	9.1%	944	530	170	244	86	48	16	22
Water / Wetland / SMWF	-	12.0	5.7%	944	660	50	234	53	37	3	13
Urban Grassed (w/ infiltration)	Topsoil / Clay	51.2	24.1%	944	500	225	219	228	121	54	53
Urban Grassed (no infiltration)	Topsoil / Clay	37.3	17.6%	944	525	145	274	166	92	25	48
Impervious Areas	-	92.3	43.5%	944	194	0	750	411	84	0	326
Totals		**212.2**	**100.0%**					**944**	**383**	**98**	**463**

MONAHAN DRAIN WATER BALANCE
Pre vs. Post-Development (no infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	429	389	9% Decrease
Infiltration	110	79	28% Decrease
Runoff	405	476	17% Increase

MONAHAN DRAIN WATER BALANCE
Pre vs. Post-Development (with infiltration BMPs)

Component	Pre (mm/yr)	Post (mm/yr)	% Change
Precipitation	944	944	0%
Evapotranspiration	429	383	11% Decrease
Infiltration	110	98	11% Decrease
Runoff	405	463	14% Increase

APPENDIX H

HEC-RAS ANALYSIS OF CARP RIVER

<u>List of Simulations (100yr Event)</u>

Existing Conditions
(Existing Carp River Geometry / No Development in Kanata West)

Plan 100	*CH2MHill Hydrographs for Fernbank Lands (Existing Conditions)*
100-FCDP-EX	*Novatech Hydrographs for Fernbank Lands (Existing Conditions)*
100-FCDP-FUT	*Novatech Hydrographs for Fernbank Lands (Future Conditions)*
100-FCDP-BMP	*Novatech Hydrographs for Fernbank Lands (Future Conditions w/ Infiltration BMPs)*

Future Conditions
(Carp River Restoration / Kanata West Development)

FUT100TSHRev	*CH2MHill Hydrographs for Fernbank Lands (Existing Conditions)*
F100FCDP-EX	*Novatech Hydrographs for Fernbank Lands (Existing Conditions)*
F100FCDP-FUT	*Novatech Hydrographs for Fernbank Lands (Future Conditions)*
F100FCDP-BMP	*Novatech Hydrographs for Fernbank Lands (Future Conditions w/ Infiltration BMPs)*

CARP RIVER - EXISTING CONDITIONS

CARP RIVER EX. GEOMETRY / NO DEVELOPMENT IN KANATA WEST

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	44953	Max WS	Plan 100	9.89	94.92	0.13	182.23	4276.50
Upper Reach	44953	Max WS	100-FCDP-EX	9.46	94.97	0.12	188.92	4299.66
Upper Reach	44953	Max WS	100-FCDP-FUT	9.67	94.88	0.14	179.11	4244.89
Upper Reach	44953	Max WS	100-FCDP-BMP	9.89	94.88	0.14	178.69	4242.84
Upper Reach	44890	Max WS	Plan 100	9.87	94.91	0.14	230.94	4270.60
Upper Reach	44890	Max WS	100-FCDP-EX	9.45	94.96	0.12	232.79	4293.24
Upper Reach	44890	Max WS	100-FCDP-FUT	9.60	94.88	0.14	229.71	4239.30
Upper Reach	44890	Max WS	100-FCDP-BMP	9.85	94.88	0.15	229.54	4237.30
Upper Reach	44751	Max WS	Plan 100	9.80	94.91	0.17	209.82	4254.07
Upper Reach	44751	Max WS	100-FCDP-EX	9.43	94.96	0.15	215.67	4275.34
Upper Reach	44751	Max WS	100-FCDP-FUT	9.42	94.88	0.17	205.56	4223.66
Upper Reach	44751	Max WS	100-FCDP-BMP	9.76	94.87	0.18	204.87	4221.79
Upper Reach	44548	Max WS	Plan 100	16.06	94.90	0.15	132.44	4222.28
Upper Reach	44548	Max WS	100-FCDP-EX	16.09	94.95	0.14	133.77	4241.63
Upper Reach	44548	Max WS	100-FCDP-FUT	14.87	94.87	0.14	131.60	4193.06
Upper Reach	44548	Max WS	100-FCDP-BMP	15.04	94.86	0.14	131.47	4191.38
Upper Reach	44325	Max WS	Plan 100	15.95	94.87	1.09	265.18	4179.42
Upper Reach	44325	Max WS	100-FCDP-EX	17.06	94.92	1.14	270.61	4196.18
Upper Reach	44325	Max WS	100-FCDP-FUT	15.58	94.84	1.08	261.34	4151.80
Upper Reach	44325	Max WS	100-FCDP-BMP	15.51	94.83	1.08	260.68	4150.39
Upper Reach	44324	Hazeldean Culver		Culvert				
Upper Reach	44302	Max WS	Plan 100	15.41	94.53	1.18	167.49	4175.46
Upper Reach	44302	Max WS	100-FCDP-EX	16.33	94.54	1.25	171.09	4192.01
Upper Reach	44302	Max WS	100-FCDP-FUT	14.71	94.50	1.15	145.46	4148.01
Upper Reach	44302	Max WS	100-FCDP-BMP	14.70	94.50	1.15	144.13	4146.62
Upper Reach	44153	Max WS	Plan 100	15.40	94.53	0.20	137.79	4157.50
Upper Reach	44153	Max WS	100-FCDP-EX	16.45	94.54	0.21	138.16	4173.85
Upper Reach	44153	Max WS	100-FCDP-FUT	14.83	94.51	0.19	136.77	4130.59
Upper Reach	44153	Max WS	100-FCDP-BMP	14.69	94.51	0.19	136.71	4129.23
Upper Reach	43966	Max WS	Plan 100	15.37	94.53	0.14	238.56	4126.07
Upper Reach	43966	Max WS	100-FCDP-EX	16.41	94.54	0.14	239.76	4142.10
Upper Reach	43966	Max WS	100-FCDP-FUT	14.80	94.50	0.13	235.03	4100.05
Upper Reach	43966	Max WS	100-FCDP-BMP	14.67	94.50	0.13	234.83	4098.73
Upper Reach	43764	Max WS	Plan 100	16.82	94.52	0.15	233.63	4082.90
Upper Reach	43764	Max WS	100-FCDP-EX	17.53	94.53	0.16	234.34	4098.50
Upper Reach	43764	Max WS	100-FCDP-FUT	15.88	94.49	0.15	231.51	4058.17
Upper Reach	43764	Max WS	100-FCDP-BMP	15.82	94.49	0.15	231.38	4056.92

CARP RIVER - EXISTING CONDITIONS

CARP RIVER EX. GEOMETRY / NO DEVELOPMENT IN KANATA WEST

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	43582	Max WS	Plan 100	17.08	94.51	0.16	221.51	4042.09
Upper Reach	43582	Max WS	100-FCDP-EX	17.74	94.52	0.17	222.54	4057.32
Upper Reach	43582	Max WS	100-FCDP-FUT	16.14	94.49	0.16	218.61	4018.52
Upper Reach	43582	Max WS	100-FCDP-BMP	16.07	94.49	0.16	218.48	4017.33
Upper Reach	43375	Max WS	Plan 100	17.42	94.44	1.27	168.41	4015.00
Upper Reach	43375	Max WS	100-FCDP-EX	18.06	94.44	1.32	170.90	4029.88
Upper Reach	43375	Max WS	100-FCDP-FUT	16.50	94.42	1.22	157.78	3992.55
Upper Reach	43375	Max WS	100-FCDP-BMP	16.41	94.42	1.21	157.57	3991.41
Upper Reach	43370	Maple Grove Culv		Culvert				
Upper Reach	43364	Max WS	Plan 100	17.42	94.43	1.14	253.61	4013.84
Upper Reach	43364	Max WS	100-FCDP-EX	18.06	94.43	1.18	254.26	4028.72
Upper Reach	43364	Max WS	100-FCDP-FUT	16.51	94.41	1.08	248.98	3991.44
Upper Reach	43364	Max WS	100-FCDP-BMP	16.41	94.41	1.08	248.83	3990.31
Upper Reach	43223	Max WS	Plan 100	17.39	94.44	0.20	209.31	3990.25
Upper Reach	43223	Max WS	100-FCDP-EX	18.03	94.44	0.21	209.55	4005.01
Upper Reach	43223	Max WS	100-FCDP-FUT	16.51	94.42	0.20	207.67	3968.56
Upper Reach	43223	Max WS	100-FCDP-BMP	16.38	94.42	0.20	207.63	3967.45
Upper Reach	43173	Max WS	Plan 100	17.38	94.44	0.17	307.64	3979.31
Upper Reach	43173	Max WS	100-FCDP-EX	18.02	94.44	0.17	308.11	3994.03
Upper Reach	43173	Max WS	100-FCDP-FUT	16.50	94.42	0.16	304.45	3957.90
Upper Reach	43173	Max WS	100-FCDP-BMP	16.36	94.42	0.16	304.36	3956.80
Upper Reach	43072	Max WS	Plan 100	34.26	94.43	0.34	294.66	3957.09
Upper Reach	43072	Max WS	100-FCDP-EX	34.55	94.43	0.34	295.12	3971.71
Upper Reach	43072	Max WS	100-FCDP-FUT	33.24	94.40	0.34	291.53	3936.26
Upper Reach	43072	Max WS	100-FCDP-BMP	33.18	94.40	0.34	291.39	3935.17
Upper Reach	42890	Max WS	Plan 100	34.25	94.36	0.83	144.23	3931.20
Upper Reach	42890	Max WS	100-FCDP-EX	34.51	94.36	0.83	144.42	3945.70
Upper Reach	42890	Max WS	100-FCDP-FUT	33.28	94.34	0.81	142.68	3911.16
Upper Reach	42890	Max WS	100-FCDP-BMP	33.22	94.34	0.81	142.63	3910.09
Upper Reach	42885	Palladium Drive		Bridge				
Upper Reach	42855	Max WS	Plan 100	34.25	94.33	0.83	176.63	3928.70
Upper Reach	42855	Max WS	100-FCDP-EX	34.51	94.34	0.84	176.72	3943.20
Upper Reach	42855	Max WS	100-FCDP-FUT	33.23	94.32	0.81	175.88	3908.69
Upper Reach	42855	Max WS	100-FCDP-BMP	33.22	94.31	0.81	175.87	3907.62
Upper Reach	42686	Max WS	Plan 100	34.25	94.32	0.38	146.39	3900.34
Upper Reach	42686	Max WS	100-FCDP-EX	34.50	94.32	0.38	146.59	3914.77
Upper Reach	42686	Max WS	100-FCDP-FUT	33.24	94.30	0.37	144.65	3880.91
Upper Reach	42686	Max WS	100-FCDP-BMP	33.21	94.30	0.37	144.62	3879.85

CARP RIVER - EXISTING CONDITIONS

CARP RIVER EX. GEOMETRY / NO DEVELOPMENT IN KANATA WEST

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	42558	Max WS	Plan 100	34.24	94.29	0.46	153.98	3883.29
Upper Reach	42558	Max WS	100-FCDP-EX	34.50	94.29	0.46	154.13	3897.68
Upper Reach	42558	Max WS	100-FCDP-FUT	33.25	94.27	0.46	152.40	3864.21
Upper Reach	42558	Max WS	100-FCDP-BMP	33.20	94.27	0.46	152.37	3863.16
Upper Reach	42410	Max WS	Plan 100	34.68	94.25	0.52	185.04	3866.53
Upper Reach	42410	Max WS	100-FCDP-EX	34.85	94.25	0.52	185.52	3880.89
Upper Reach	42410	Max WS	100-FCDP-FUT	33.66	94.23	0.51	180.18	3847.84
Upper Reach	42410	Max WS	100-FCDP-BMP	33.62	94.23	0.51	180.10	3846.81
Upper Reach	42212	Max WS	Plan 100	34.66	94.23	0.26	174.85	3829.31
Upper Reach	42212	Max WS	100-FCDP-EX	34.86	94.23	0.26	175.36	3843.61
Upper Reach	42212	Max WS	100-FCDP-FUT	33.66	94.21	0.25	171.69	3811.30
Upper Reach	42212	Max WS	100-FCDP-BMP	33.63	94.21	0.25	171.66	3810.27
Upper Reach	42182	Max WS	Plan 100	34.66	94.18	1.34	234.35	3823.95
Upper Reach	42182	Max WS	100-FCDP-EX	34.84	94.18	1.35	234.71	3838.24
Upper Reach	42182	Max WS	100-FCDP-FUT	33.66	94.16	1.31	227.59	3806.07
Upper Reach	42182	Max WS	100-FCDP-BMP	33.60	94.16	1.31	227.47	3805.04
Upper Reach	42172	Highway 417 Sout		Bridge				
Upper Reach	42154	Max WS	Plan 100	34.66	94.13	1.32	217.32	3822.44
Upper Reach	42154	Max WS	100-FCDP-EX	34.84	94.13	1.32	217.43	3836.72
Upper Reach	42154	Max WS	100-FCDP-FUT	33.63	94.12	1.29	214.61	3804.58
Upper Reach	42154	Max WS	100-FCDP-BMP	33.60	94.12	1.29	214.61	3803.56
Upper Reach	42134	Max WS	Plan 100	34.62	94.11	1.38	212.91	3821.16
Upper Reach	42134	Max WS	100-FCDP-EX	34.84	94.11	1.39	213.02	3835.44
Upper Reach	42134	Max WS	100-FCDP-FUT	33.63	94.09	1.36	210.36	3803.34
Upper Reach	42134	Max WS	100-FCDP-BMP	33.60	94.09	1.36	210.31	3802.32
Upper Reach	42124	Max WS	Plan 100	34.62	94.08	1.38	208.39	3820.15
Upper Reach	42124	Max WS	100-FCDP-EX	34.80	94.08	1.39	208.39	3834.43
Upper Reach	42124	Max WS	100-FCDP-FUT	33.58	94.07	1.35	206.00	3802.37
Upper Reach	42124	Max WS	100-FCDP-BMP	33.56	94.07	1.35	206.00	3801.34
Upper Reach	42119	Highway 417 Nort		Bridge				
Upper Reach	42097	Max WS	Plan 100	34.23	94.00	1.46	138.70	3819.05
Upper Reach	42097	Max WS	100-FCDP-EX	34.56	94.00	1.48	137.92	3833.33
Upper Reach	42097	Max WS	100-FCDP-FUT	33.29	93.99	1.43	132.12	3801.28
Upper Reach	42097	Max WS	100-FCDP-BMP	33.29	93.99	1.43	132.12	3800.26
Upper Reach	42075	Max WS	Plan 100	34.56	94.03	0.35	192.81	3815.20
Upper Reach	42075	Max WS	100-FCDP-EX	34.74	94.03	0.36	192.75	3829.50
Upper Reach	42075	Max WS	100-FCDP-FUT	33.51	94.02	0.35	191.64	3797.52
Upper Reach	42075	Max WS	100-FCDP-BMP	33.49	94.02	0.35	191.64	3796.50

CARP RIVER - EXISTING CONDITIONS

CARP RIVER EX. GEOMETRY / NO DEVELOPMENT IN KANATA WEST

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	42002	Max WS	Plan 100	34.47	94.02	0.32	137.06	3804.61
Upper Reach	42002	Max WS	100-FCDP-EX	34.74	94.02	0.32	137.01	3818.91
Upper Reach	42002	Max WS	100-FCDP-FUT	33.51	94.01	0.31	136.42	3787.06
Upper Reach	42002	Max WS	100-FCDP-BMP	33.40	94.01	0.31	136.42	3786.04
Upper Reach	41896	Max WS	Plan 100	34.66	94.00	0.35	112.51	3791.83
Upper Reach	41896	Max WS	100-FCDP-EX	34.92	94.00	0.35	112.41	3806.15
Upper Reach	41896	Max WS	100-FCDP-FUT	33.70	93.99	0.34	111.61	3774.42
Upper Reach	41896	Max WS	100-FCDP-BMP	33.57	93.99	0.34	111.61	3773.40
Upper Reach	41743	Max WS	Plan 100	34.63	93.97	0.29	204.30	3767.99
Upper Reach	41743	Max WS	100-FCDP-EX	34.95	93.97	0.29	204.13	3782.34
Upper Reach	41743	Max WS	100-FCDP-FUT	33.69	93.96	0.28	203.16	3750.82
Upper Reach	41743	Max WS	100-FCDP-BMP	33.53	93.96	0.28	203.20	3749.80
Upper Reach	41671	Max WS	Plan 100	34.26	93.95	0.79	300.38	3755.39
Upper Reach	41671	Max WS	100-FCDP-EX	34.44	93.95	0.79	299.31	3769.78
Upper Reach	41671	Max WS	100-FCDP-FUT	33.13	93.94	0.78	296.11	3738.41
Upper Reach	41671	Max WS	100-FCDP-BMP	33.14	93.94	0.78	296.24	3737.38
Upper Reach	41357	Max WS	Plan 100	37.41	93.60	0.32	589.06	3695.77
Upper Reach	41357	Max WS	100-FCDP-EX	37.17	93.61	0.32	589.60	3710.02
Upper Reach	41357	Max WS	100-FCDP-FUT	36.37	93.59	0.32	586.20	3680.34
Upper Reach	41357	Max WS	100-FCDP-BMP	36.32	93.59	0.32	586.13	3679.36
Upper Reach	41117	Max WS	Plan 100	36.09	93.57	0.23	461.17	3615.03
Upper Reach	41117	Max WS	100-FCDP-EX	35.84	93.57	0.23	461.34	3628.92
Upper Reach	41117	Max WS	100-FCDP-FUT	35.14	93.56	0.23	460.51	3601.22
Upper Reach	41117	Max WS	100-FCDP-BMP	35.09	93.56	0.23	460.49	3600.29
Upper Reach	40910	Max WS	Plan 100	35.33	93.55	0.21	416.02	3539.02
Upper Reach	40910	Max WS	100-FCDP-EX	35.09	93.55	0.21	416.57	3552.57
Upper Reach	40910	Max WS	100-FCDP-FUT	34.44	93.53	0.21	414.25	3526.42
Upper Reach	40910	Max WS	100-FCDP-BMP	34.39	93.53	0.21	414.21	3525.54
Upper Reach	40703	Max WS	Plan 100	34.28	93.53	0.22	387.86	3471.15
Upper Reach	40703	Max WS	100-FCDP-EX	33.69	93.53	0.21	388.48	3484.35
Upper Reach	40703	Max WS	100-FCDP-FUT	32.82	93.52	0.21	386.30	3459.54
Upper Reach	40703	Max WS	100-FCDP-BMP	33.09	93.52	0.21	386.27	3458.69
Upper Reach	40505	Max WS	Plan 100	32.12	93.51	0.22	335.17	3410.94
Upper Reach	40505	Max WS	100-FCDP-EX	30.22	93.51	0.21	335.80	3423.71
Upper Reach	40505	Max WS	100-FCDP-FUT	29.56	93.50	0.21	334.21	3400.15
Upper Reach	40505	Max WS	100-FCDP-BMP	29.89	93.49	0.21	334.15	3399.34
Upper Reach	40298	Max WS	Plan 100	28.57	93.49	0.16	415.50	3342.55
Upper Reach	40298	Max WS	100-FCDP-EX	28.01	93.50	0.15	416.07	3354.73
Upper Reach	40298	Max WS	100-FCDP-FUT	26.71	93.48	0.15	414.86	3332.48
Upper Reach	40298	Max WS	100-FCDP-BMP	26.66	93.48	0.15	414.82	3331.72

CARP RIVER - EXISTING CONDITIONS

CARP RIVER EX. GEOMETRY / NO DEVELOPMENT IN KANATA WEST

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	40092	Max WS	Plan 100	26.57	93.48	0.24	306.88	3278.77
Upper Reach	40092	Max WS	100-FCDP-EX	26.82	93.49	0.24	308.41	3290.32
Upper Reach	40092	Max WS	100-FCDP-FUT	25.35	93.47	0.24	305.50	3269.33
Upper Reach	40092	Max WS	100-FCDP-BMP	25.30	93.47	0.24	305.40	3268.61
Upper Reach	40070	Richardson Side		Culvert				
Upper Reach	40050	Max WS	Plan 100	25.22	93.44	1.08	226.07	3269.76
Upper Reach	40050	Max WS	100-FCDP-EX	25.74	93.45	1.10	226.15	3281.23
Upper Reach	40050	Max WS	100-FCDP-FUT	24.62	93.44	1.06	225.99	3260.40
Upper Reach	40050	Max WS	100-FCDP-BMP	24.58	93.44	1.06	225.99	3259.68
Upper Reach	39892	Max WS	Plan 100	25.35	93.44	0.26	297.74	3236.92
Upper Reach	39892	Max WS	100-FCDP-EX	26.05	93.45	0.26	299.46	3248.08
Upper Reach	39892	Max WS	100-FCDP-FUT	24.89	93.44	0.26	296.22	3227.83
Upper Reach	39892	Max WS	100-FCDP-BMP	24.85	93.44	0.26	296.16	3227.13
Upper Reach	39695	Max WS	Plan 100	23.98	93.42	0.27	246.46	3200.48
Upper Reach	39695	Max WS	100-FCDP-EX	23.75	93.43	0.26	247.32	3211.24
Upper Reach	39695	Max WS	100-FCDP-FUT	23.76	93.41	0.26	245.83	3191.72
Upper Reach	39695	Max WS	100-FCDP-BMP	23.73	93.41	0.26	245.80	3191.05
Upper Reach	39202	Max WS	Plan 100	22.16	93.39	0.16	397.09	3068.11
Upper Reach	39202	Max WS	100-FCDP-EX	22.48	93.40	0.16	398.17	3077.41
Upper Reach	39202	Max WS	100-FCDP-FUT	22.37	93.38	0.17	396.30	3060.41
Upper Reach	39202	Max WS	100-FCDP-BMP	22.35	93.38	0.17	396.27	3059.81
Upper Reach	38697	Max WS	Plan 100	21.97	93.38	0.08	482.96	2855.10
Upper Reach	38697	Max WS	100-FCDP-EX	22.34	93.39	0.08	484.03	2862.54
Upper Reach	38697	Max WS	100-FCDP-FUT	22.21	93.37	0.08	482.11	2848.86
Upper Reach	38697	Max WS	100-FCDP-BMP	22.20	93.37	0.08	482.04	2848.37
Upper Reach	38236	Max WS	Plan 100	21.92	93.37	0.12	428.75	2622.67
Upper Reach	38236	Max WS	100-FCDP-EX	22.33	93.38	0.12	429.75	2628.35
Upper Reach	38236	Max WS	100-FCDP-FUT	22.16	93.37	0.12	427.90	2617.90
Upper Reach	38236	Max WS	100-FCDP-BMP	22.16	93.37	0.12	427.83	2617.50
Upper Reach	37894	Max WS	Plan 100	44.74	93.36	0.19	430.24	2449.84
Upper Reach	37894	Max WS	100-FCDP-EX	44.85	93.37	0.19	431.27	2454.18
Upper Reach	37894	Max WS	100-FCDP-FUT	44.68	93.35	0.19	429.38	2446.18
Upper Reach	37894	Max WS	100-FCDP-BMP	44.68	93.35	0.19	429.31	2445.86
Upper Reach	37890			Bridge				
Upper Reach	37101	Max WS	Plan 100	41.47	92.93	0.20	440.35	2105.30
Upper Reach	37101	Max WS	100-FCDP-EX	41.80	92.93	0.21	441.15	2108.57
Upper Reach	37101	Max WS	100-FCDP-FUT	41.40	92.93	0.20	439.72	2102.44
Upper Reach	37101	Max WS	100-FCDP-BMP	41.38	92.93	0.20	439.64	2102.21

CARP RIVER - EXISTING CONDITIONS

CARP RIVER EX. GEOMETRY / NO DEVELOPMENT IN KANATA WEST

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	36580	Max WS	Plan 100	41.34	92.92	0.16	414.19	1823.48
Upper Reach	36580	Max WS	100-FCDP-EX	41.55	92.92	0.16	414.30	1826.07
Upper Reach	36580	Max WS	100-FCDP-FUT	41.16	92.91	0.16	414.10	1821.15
Upper Reach	36580	Max WS	100-FCDP-BMP	41.13	92.91	0.16	414.09	1820.96
Upper Reach	35288	Max WS	Plan 100	41.14	92.86	0.33	349.82	1249.83
Upper Reach	35288	Max WS	100-FCDP-EX	41.40	92.87	0.33	350.15	1251.00
Upper Reach	35288	Max WS	100-FCDP-FUT	40.97	92.86	0.33	349.57	1248.60
Upper Reach	35288	Max WS	100-FCDP-BMP	40.95	92.86	0.33	349.53	1248.51
Upper Reach	35073	Max WS	Plan 100	41.13	92.84	0.40	278.82	1186.39
Upper Reach	35073	Max WS	100-FCDP-EX	41.37	92.84	0.41	279.91	1187.37
Upper Reach	35073	Max WS	100-FCDP-FUT	40.96	92.84	0.40	277.98	1185.31
Upper Reach	35073	Max WS	100-FCDP-BMP	40.94	92.84	0.40	277.98	1185.24
Upper Reach	34555	Max WS	Plan 100	41.11	92.76	0.51	203.04	1084.39
Upper Reach	34555	Max WS	100-FCDP-EX	41.36	92.76	0.52	203.41	1085.11
Upper Reach	34555	Max WS	100-FCDP-FUT	40.94	92.75	0.51	202.66	1083.53
Upper Reach	34555	Max WS	100-FCDP-BMP	40.92	92.75	0.51	202.66	1083.47
Upper Reach	33472	Max WS	Plan 100	41.15	92.66	0.29	282.72	789.56
Upper Reach	33472	Max WS	100-FCDP-EX	41.39	92.66	0.29	282.81	789.90
Upper Reach	33472	Max WS	100-FCDP-FUT	40.99	92.66	0.28	282.63	789.09
Upper Reach	33472	Max WS	100-FCDP-BMP	40.97	92.66	0.28	282.63	789.06
Upper Reach	33201	Max WS	Plan 100	42.46	92.63	0.74	374.40	689.58
Upper Reach	33201	Max WS	100-FCDP-EX	42.65	92.63	0.75	374.65	689.83
Upper Reach	33201	Max WS	100-FCDP-FUT	42.27	92.63	0.74	374.14	689.22
Upper Reach	33201	Max WS	100-FCDP-BMP	42.26	92.63	0.74	374.14	689.20
Upper Reach	33197			Bridge				
Upper Reach	32609	Max WS	Plan 100	42.46	92.58	0.22	380.72	474.42
Upper Reach	32609	Max WS	100-FCDP-EX	42.64	92.58	0.22	380.78	474.54
Upper Reach	32609	Max WS	100-FCDP-FUT	42.26	92.58	0.22	380.67	474.23
Upper Reach	32609	Max WS	100-FCDP-BMP	42.25	92.58	0.22	380.67	474.22
Upper Reach	32096	Max WS	Plan 100	42.41	92.57	0.19	390.56	233.52
Upper Reach	32096	Max WS	100-FCDP-EX	42.62	92.57	0.19	390.56	233.56
Upper Reach	32096	Max WS	100-FCDP-FUT	42.26	92.57	0.19	390.55	233.45
Upper Reach	32096	Max WS	100-FCDP-BMP	42.23	92.57	0.19	390.55	233.45
Upper Reach	31662	Max WS	Plan 100	42.21	92.53	0.66	162.72	106.57
Upper Reach	31662	Max WS	100-FCDP-EX	42.38	92.53	0.66	162.72	106.57
Upper Reach	31662	Max WS	100-FCDP-FUT	42.10	92.53	0.66	162.56	106.55
Upper Reach	31662	Max WS	100-FCDP-BMP	42.04	92.53	0.66	162.56	106.55
Upper Reach	31658			Bridge				

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT
HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	44953	Max WS	Fut100TSHRev	11.16	94.95	0.12	185.51	4566.06
Upper Reach	44953	Max WS	F100FCDP-EX	10.93	94.97	0.12	189.79	4573.27
Upper Reach	44953	Max WS	100FCDP-FUT	10.89	94.90	0.13	181.17	4528.87
Upper Reach	44953	Max WS	100FCDP-BMP	10.89	94.90	0.13	180.94	4526.15
Upper Reach	44890	Max WS	Fut100TSHRev	11.16	94.95	0.12	232.23	4559.85
Upper Reach	44890	Max WS	F100FCDP-EX	10.93	94.97	0.11	232.82	4566.89
Upper Reach	44890	Max WS	100FCDP-FUT	10.87	94.90	0.13	230.50	4523.13
Upper Reach	44890	Max WS	100FCDP-BMP	10.85	94.90	0.13	230.42	4520.43
Upper Reach	44751	Max WS	Fut100TSHRev	11.14	94.94	0.14	213.71	4542.33
Upper Reach	44751	Max WS	F100FCDP-EX	10.91	94.96	0.13	215.64	4548.92
Upper Reach	44751	Max WS	100FCDP-FUT	10.84	94.90	0.14	208.20	4506.89
Upper Reach	44751	Max WS	100FCDP-BMP	10.82	94.89	0.15	207.88	4504.25
Upper Reach	44548	Max WS	Fut100TSHRev	19.10	94.93	0.15	133.23	4509.25
Upper Reach	44548	Max WS	F100FCDP-EX	18.68	94.95	0.14	133.69	4515.18
Upper Reach	44548	Max WS	100FCDP-FUT	16.84	94.88	0.14	132.07	4475.51
Upper Reach	44548	Max WS	100FCDP-BMP	16.78	94.88	0.14	132.02	4472.95
Upper Reach	44325	Max WS	Fut100TSHRev	19.20	94.92	0.42	269.98	4465.57
Upper Reach	44325	Max WS	F100FCDP-EX	20.07	94.93	0.44	271.29	4470.64
Upper Reach	44325	Max WS	100FCDP-FUT	17.80	94.87	0.40	266.14	4434.05
Upper Reach	44325	Max WS	100FCDP-BMP	17.74	94.87	0.40	265.88	4431.60
Upper Reach	44324	Hazeldean Culver		Bridge				
Upper Reach	44302	Max WS	Fut100TSHRev	19.09	94.71	0.65	137.97	4464.43
Upper Reach	44302	Max WS	F100FCDP-EX	20.05	94.70	0.69	137.92	4469.48
Upper Reach	44302	Max WS	100FCDP-FUT	17.63	94.67	0.62	137.42	4432.94
Upper Reach	44302	Max WS	100FCDP-BMP	17.55	94.67	0.61	137.39	4430.50
Upper Reach	44218	Max WS	Fut100TSHRev	19.09	94.71	0.15	150.19	4451.59
Upper Reach	44218	Max WS	F100FCDP-EX	20.05	94.71	0.16	150.14	4456.68
Upper Reach	44218	Max WS	100FCDP-FUT	17.63	94.68	0.15	149.44	4420.54
Upper Reach	44218	Max WS	100FCDP-BMP	17.54	94.68	0.15	149.40	4418.13
Upper Reach	44193	Max WS	Fut100TSHRev	19.08	94.71	0.15	148.19	4445.73
Upper Reach	44193	Max WS	F100FCDP-EX	20.05	94.71	0.15	148.17	4450.82
Upper Reach	44193	Max WS	100FCDP-FUT	17.62	94.68	0.14	147.90	4414.83
Upper Reach	44193	Max WS	100FCDP-BMP	17.55	94.68	0.14	147.88	4412.42
Upper Reach	44153	Max WS	Fut100TSHRev	19.08	94.71	0.12	157.36	4436.50
Upper Reach	44153	Max WS	F100FCDP-EX	20.04	94.71	0.12	157.35	4441.60
Upper Reach	44153	Max WS	100FCDP-FUT	17.62	94.68	0.11	157.21	4405.83
Upper Reach	44153	Max WS	100FCDP-BMP	17.55	94.67	0.11	157.20	4403.44

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	44093	Max WS	Fut100TSHRev	19.08	94.71	0.13	138.48	4422.09
Upper Reach	44093	Max WS	F100FCDP-EX	20.04	94.71	0.13	138.48	4427.22
Upper Reach	44093	Max WS	100FCDP-FUT	17.61	94.68	0.12	138.48	4391.77
Upper Reach	44093	Max WS	100FCDP-BMP	17.53	94.67	0.12	138.48	4389.40
Upper Reach	44068	Max WS	Fut100TSHRev	19.06	94.71	0.11	174.21	4415.22
Upper Reach	44068	Max WS	F100FCDP-EX	20.03	94.71	0.12	174.20	4420.37
Upper Reach	44068	Max WS	100FCDP-FUT	17.62	94.68	0.10	173.98	4385.07
Upper Reach	44068	Max WS	100FCDP-BMP	17.54	94.67	0.10	173.97	4382.70
Upper Reach	44044.2	Max WS	Fut100TSHRev	19.06	94.71	0.11	167.46	4408.79
Upper Reach	44044.2	Max WS	F100FCDP-EX	20.03	94.71	0.12	167.45	4413.94
Upper Reach	44044.2	Max WS	100FCDP-FUT	17.62	94.68	0.11	167.25	4378.79
Upper Reach	44044.2	Max WS	100FCDP-BMP	17.54	94.67	0.11	167.24	4376.43
Upper Reach	44013.6	Max WS	Fut100TSHRev	19.07	94.71	0.10	158.75	4400.89
Upper Reach	44013.6	Max WS	F100FCDP-EX	20.04	94.71	0.10	158.74	4406.06
Upper Reach	44013.6	Max WS	100FCDP-FUT	17.62	94.68	0.09	158.52	4371.08
Upper Reach	44013.6	Max WS	100FCDP-BMP	17.54	94.67	0.09	158.50	4368.73
Upper Reach	43966	Max WS	Fut100TSHRev	19.06	94.71	0.12	145.39	4389.72
Upper Reach	43966	Max WS	F100FCDP-EX	20.03	94.71	0.12	145.37	4394.90
Upper Reach	43966	Max WS	100FCDP-FUT	17.60	94.68	0.11	145.14	4360.18
Upper Reach	43966	Max WS	100FCDP-BMP	17.54	94.67	0.11	145.13	4357.85
Upper Reach	43954	Max WS	Fut100TSHRev	20.50	94.71	0.10	152.39	4386.62
Upper Reach	43954	Max WS	F100FCDP-EX	22.25	94.71	0.11	152.37	4391.81
Upper Reach	43954	Max WS	100FCDP-FUT	19.63	94.67	0.10	152.11	4357.17
Upper Reach	43954	Max WS	100FCDP-BMP	19.57	94.67	0.10	152.10	4354.83
Upper Reach	43946	Max WS	Fut100TSHRev	20.49	94.71	0.11	157.15	4384.43
Upper Reach	43946	Max WS	F100FCDP-EX	22.26	94.71	0.12	157.13	4389.62
Upper Reach	43946	Max WS	100FCDP-FUT	19.64	94.67	0.11	156.84	4355.02
Upper Reach	43946	Max WS	100FCDP-BMP	19.55	94.67	0.11	156.83	4352.69
Upper Reach	43938	Max WS	Fut100TSHRev	20.50	94.71	0.09	161.48	4382.09
Upper Reach	43938	Max WS	F100FCDP-EX	22.26	94.71	0.10	161.48	4387.29
Upper Reach	43938	Max WS	100FCDP-FUT	19.63	94.67	0.09	161.48	4352.74
Upper Reach	43938	Max WS	100FCDP-BMP	19.55	94.67	0.09	161.48	4350.41
Upper Reach	43852	Max WS	Fut100TSHRev	20.48	94.71	0.14	149.02	4360.08
Upper Reach	43852	Max WS	F100FCDP-EX	22.26	94.71	0.15	149.02	4365.32
Upper Reach	43852	Max WS	100FCDP-FUT	19.63	94.67	0.14	149.02	4331.22
Upper Reach	43852	Max WS	100FCDP-BMP	19.56	94.67	0.14	149.02	4328.92

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT
HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	43822	Max WS	Fut100TSHRev	20.49	94.71	0.15	148.56	4351.71
Upper Reach	43822	Max WS	F100FCDP-EX	22.24	94.71	0.16	148.56	4356.96
Upper Reach	43822	Max WS	100FCDP-FUT	19.61	94.67	0.15	148.56	4323.04
Upper Reach	43822	Max WS	100FCDP-BMP	19.53	94.67	0.15	148.56	4320.75
Upper Reach	43813	Max WS	Fut100TSHRev	20.48	94.71	0.20	148.55	4349.83
Upper Reach	43813	Max WS	F100FCDP-EX	22.23	94.71	0.22	148.55	4355.08
Upper Reach	43813	Max WS	100FCDP-FUT	19.62	94.67	0.20	148.55	4321.22
Upper Reach	43813	Max WS	100FCDP-BMP	19.55	94.67	0.20	148.55	4318.93
Upper Reach	43764	Max WS	Fut100TSHRev	20.45	94.71	0.12	249.74	4336.37
Upper Reach	43764	Max WS	F100FCDP-EX	22.24	94.71	0.14	249.42	4341.66
Upper Reach	43764	Max WS	100FCDP-FUT	19.60	94.67	0.12	246.00	4308.22
Upper Reach	43764	Max WS	100FCDP-BMP	19.52	94.67	0.12	245.81	4305.95
Upper Reach	43582	Max WS	Fut100TSHRev	21.03	94.71	0.15	189.35	4283.35
Upper Reach	43582	Max WS	F100FCDP-EX	22.72	94.70	0.16	189.35	4288.79
Upper Reach	43582	Max WS	100FCDP-FUT	20.14	94.67	0.15	189.35	4256.93
Upper Reach	43582	Max WS	100FCDP-BMP	20.09	94.67	0.15	189.35	4254.75
Upper Reach	43572.4	Max WS	Fut100TSHRev	21.00	94.71	0.19	185.00	4281.18
Upper Reach	43572.4	Max WS	F100FCDP-EX	22.75	94.70	0.21	184.46	4286.63
Upper Reach	43572.4	Max WS	100FCDP-FUT	20.14	94.67	0.19	179.22	4254.82
Upper Reach	43572.4	Max WS	100FCDP-BMP	20.06	94.67	0.18	178.93	4252.65
Upper Reach	43375	Max WS	Fut100TSHRev	21.35	94.69	0.69	197.89	4242.30
Upper Reach	43375	Max WS	F100FCDP-EX	23.10	94.68	0.75	197.81	4247.89
Upper Reach	43375	Max WS	100FCDP-FUT	20.44	94.65	0.68	197.46	4217.29
Upper Reach	43375	Max WS	100FCDP-BMP	20.33	94.65	0.67	197.44	4215.19
Upper Reach	43370	Maple Gr. Upgrad		Bridge				
Upper Reach	43364	Max WS	Fut100TSHRev	18.86	94.65	0.65	140.90	4239.98
Upper Reach	43364	Max WS	F100FCDP-EX	20.81	94.63	0.73	140.90	4245.60
Upper Reach	43364	Max WS	100FCDP-FUT	18.22	94.61	0.64	140.90	4215.04
Upper Reach	43364	Max WS	100FCDP-BMP	18.13	94.61	0.64	140.90	4212.95
Upper Reach	43223	Max WS	Fut100TSHRev	19.49	94.66	0.09	129.65	4216.76
Upper Reach	43223	Max WS	F100FCDP-EX	21.55	94.64	0.11	129.65	4222.60
Upper Reach	43223	Max WS	100FCDP-FUT	18.85	94.62	0.09	129.65	4192.41
Upper Reach	43223	Max WS	100FCDP-BMP	18.72	94.62	0.09	129.65	4190.34
Upper Reach	43180.6	Max WS	Fut100TSHRev	19.54	94.66	0.09	190.25	4205.01
Upper Reach	43180.6	Max WS	F100FCDP-EX	21.55	94.64	0.10	190.25	4210.94
Upper Reach	43180.6	Max WS	100FCDP-FUT	18.80	94.62	0.09	190.25	4180.91
Upper Reach	43180.6	Max WS	100FCDP-BMP	18.76	94.62	0.09	190.25	4178.86

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	43173	Max WS	Fut100TSHRev	19.48	94.66	0.05	838.21	4200.93
Upper Reach	43173	Max WS	F100FCDP-EX	21.55	94.64	0.06	828.84	4206.93
Upper Reach	43173	Max WS	100FCDP-FUT	18.79	94.62	0.05	813.07	4177.00
Upper Reach	43173	Max WS	100FCDP-BMP	18.76	94.62	0.05	812.00	4174.95
Upper Reach	43163.8	Max WS	Fut100TSHRev	40.68	94.65	0.21	204.88	4196.31
Upper Reach	43163.8	Max WS	F100FCDP-EX	40.73	94.64	0.21	204.88	4202.37
Upper Reach	43163.8	Max WS	100FCDP-FUT	39.34	94.62	0.20	204.88	4172.55
Upper Reach	43163.8	Max WS	100FCDP-BMP	39.26	94.62	0.20	204.88	4170.51
Upper Reach	43100	Max WS	Fut100TSHRev	40.68	94.65	0.21	230.16	4176.98
Upper Reach	43100	Max WS	F100FCDP-EX	40.72	94.64	0.21	230.16	4183.23
Upper Reach	43100	Max WS	100FCDP-FUT	39.33	94.62	0.21	230.16	4153.72
Upper Reach	43100	Max WS	100FCDP-BMP	39.25	94.62	0.21	230.16	4151.70
Upper Reach	43072	Max WS	Fut100TSHRev	40.67	94.65	0.16	277.13	4167.28
Upper Reach	43072	Max WS	F100FCDP-EX	40.72	94.64	0.16	277.13	4173.63
Upper Reach	43072	Max WS	100FCDP-FUT	39.33	94.62	0.16	277.13	4144.30
Upper Reach	43072	Max WS	100FCDP-BMP	39.25	94.61	0.16	277.13	4142.30
Upper Reach	42975	Max WS	Fut100TSHRev	40.85	94.65	0.20	212.27	4139.15
Upper Reach	42975	Max WS	F100FCDP-EX	40.87	94.64	0.20	212.13	4145.85
Upper Reach	42975	Max WS	100FCDP-FUT	39.50	94.61	0.20	211.90	4117.09
Upper Reach	42975	Max WS	100FCDP-BMP	39.42	94.61	0.20	211.88	4115.13
Upper Reach	42970.1	Max WS	Fut100TSHRev	40.85	94.65	0.23	209.59	4137.82
Upper Reach	42970.1	Max WS	F100FCDP-EX	40.87	94.64	0.23	209.47	4144.54
Upper Reach	42970.1	Max WS	100FCDP-FUT	39.50	94.61	0.23	209.26	4115.80
Upper Reach	42970.1	Max WS	100FCDP-BMP	39.42	94.61	0.23	209.24	4113.84
Upper Reach	42890	Max WS	Fut100TSHRev	45.92	94.64	0.38	304.38	4115.89
Upper Reach	42890	Max WS	F100FCDP-EX	45.43	94.63	0.38	303.41	4122.88
Upper Reach	42890	Max WS	100FCDP-FUT	44.39	94.61	0.43	216.84	4094.68
Upper Reach	42890	Max WS	100FCDP-BMP	44.31	94.61	0.43	216.81	4092.75
Upper Reach	42889	Max WS	Fut100TSHRev	45.92	94.62	1.16	349.43	4115.54
Upper Reach	42889	Max WS	F100FCDP-EX	45.42	94.60	1.16	348.67	4122.53
Upper Reach	42889	Max WS	100FCDP-FUT	44.37	94.58	1.14	347.48	4094.36
Upper Reach	42889	Max WS	100FCDP-BMP	44.30	94.58	1.14	347.38	4092.43
Upper Reach	42885	Palladium Drive		Bridge				
Upper Reach	42855	Max WS	Fut100TSHRev	45.75	94.33	1.29	207.15	4112.36
Upper Reach	42855	Max WS	F100FCDP-EX	45.19	94.31	1.28	207.13	4119.39
Upper Reach	42855	Max WS	100FCDP-FUT	44.16	94.29	1.26	207.11	4091.26
Upper Reach	42855	Max WS	100FCDP-BMP	44.06	94.29	1.26	207.11	4089.33

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	42686	Max WS	Fut100TSHRev	45.77	94.33	0.51	102.68	4080.43
Upper Reach	42686	Max WS	F100FCDP-EX	45.21	94.32	0.50	102.43	4087.82
Upper Reach	42686	Max WS	100FCDP-FUT	44.17	94.30	0.50	102.13	4060.17
Upper Reach	42686	Max WS	100FCDP-BMP	44.10	94.30	0.50	102.10	4058.28
Upper Reach	42558	Max WS	Fut100TSHRev	45.77	94.31	0.51	152.42	4062.02
Upper Reach	42558	Max WS	F100FCDP-EX	45.22	94.30	0.51	152.18	4069.65
Upper Reach	42558	Max WS	100FCDP-FUT	44.18	94.28	0.51	151.89	4042.29
Upper Reach	42558	Max WS	100FCDP-BMP	44.10	94.28	0.51	151.87	4040.43
Upper Reach	42410	Max WS	Fut100TSHRev	46.79	94.27	1.02	70.90	4043.98
Upper Reach	42410	Max WS	F100FCDP-EX	46.10	94.26	1.02	70.90	4051.84
Upper Reach	42410	Max WS	100FCDP-FUT	45.13	94.24	1.01	70.90	4024.77
Upper Reach	42410	Max WS	100FCDP-BMP	45.06	94.24	1.01	70.90	4022.93
Upper Reach	42212	Max WS	Fut100TSHRev	46.80	94.20	0.93	71.65	4023.23
Upper Reach	42212	Max WS	F100FCDP-EX	46.10	94.18	0.93	71.58	4031.30
Upper Reach	42212	Max WS	100FCDP-FUT	45.14	94.16	0.92	71.49	4004.50
Upper Reach	42212	Max WS	100FCDP-BMP	45.07	94.16	0.92	71.48	4002.68
Upper Reach	42182	Max WS	Fut100TSHRev	46.80	94.12	1.49	86.98	4020.06
Upper Reach	42182	Max WS	F100FCDP-EX	46.09	94.11	1.48	86.98	4028.16
Upper Reach	42182	Max WS	100FCDP-FUT	45.14	94.09	1.46	86.98	4001.40
Upper Reach	42182	Max WS	100FCDP-BMP	45.07	94.09	1.46	86.98	3999.59
Upper Reach	42172	Highway 417 Sout		Bridge				
Upper Reach	42154	Max WS	Fut100TSHRev	46.33	93.95	1.76	269.94	4018.56
Upper Reach	42154	Max WS	F100FCDP-EX	45.96	93.94	1.75	269.50	4026.68
Upper Reach	42154	Max WS	100FCDP-FUT	45.09	93.93	1.74	268.98	3999.94
Upper Reach	42154	Max WS	100FCDP-BMP	45.05	93.93	1.74	268.93	3998.13
Upper Reach	42134	Max WS	Fut100TSHRev	46.79	94.02	1.31	196.90	4015.60
Upper Reach	42134	Max WS	F100FCDP-EX	46.05	94.01	1.30	194.59	4023.78
Upper Reach	42134	Max WS	100FCDP-FUT	45.14	93.99	1.29	191.70	3997.12
Upper Reach	42134	Max WS	100FCDP-BMP	45.07	93.99	1.29	191.49	3995.31
Upper Reach	42124	Max WS	Fut100TSHRev	45.52	93.91	1.77	269.10	4014.33
Upper Reach	42124	Max WS	F100FCDP-EX	45.84	93.90	1.80	265.50	4022.54
Upper Reach	42124	Max WS	100FCDP-FUT	44.53	93.88	1.76	261.73	3995.91
Upper Reach	42124	Max WS	100FCDP-BMP	44.31	93.88	1.75	261.48	3994.11
Upper Reach	42119	Highway 417 Nort		Bridge				
Upper Reach	42097	Max WS	Fut100TSHRev	42.40	93.74	1.87	98.34	4013.15
Upper Reach	42097	Max WS	F100FCDP-EX	41.37	93.73	1.84	98.24	4021.38
Upper Reach	42097	Max WS	100FCDP-FUT	40.69	93.71	1.82	98.09	3994.78
Upper Reach	42097	Max WS	100FCDP-BMP	42.89	93.71	1.92	98.09	3992.97

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT
HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	42075	Max WS	Fut100TSHRev	44.96	93.85	0.35	92.23	4010.86
Upper Reach	42075	Max WS	F100FCDP-EX	44.15	93.83	0.35	92.21	4019.12
Upper Reach	42075	Max WS	100FCDP-FUT	43.31	93.82	0.34	92.20	3992.55
Upper Reach	42075	Max WS	100FCDP-BMP	43.25	93.82	0.34	92.20	3990.74
Upper Reach	42036	Max WS	Fut100TSHRev	44.95	93.85	0.26	148.57	4004.43
Upper Reach	42036	Max WS	F100FCDP-EX	44.12	93.83	0.26	148.37	4012.77
Upper Reach	42036	Max WS	100FCDP-FUT	43.31	93.82	0.26	148.25	3986.25
Upper Reach	42036	Max WS	100FCDP-BMP	43.21	93.82	0.26	148.24	3984.45
Upper Reach	42002	Max WS	Fut100TSHRev	44.95	93.85	0.27	148.29	3998.20
Upper Reach	42002	Max WS	F100FCDP-EX	44.08	93.83	0.27	148.26	4006.64
Upper Reach	42002	Max WS	100FCDP-FUT	43.27	93.82	0.27	148.24	3980.18
Upper Reach	42002	Max WS	100FCDP-BMP	43.20	93.82	0.27	148.24	3978.38
Upper Reach	41997.6	Max WS	Fut100TSHRev	45.20	93.85	0.29	145.43	3997.32
Upper Reach	41997.6	Max WS	F100FCDP-EX	44.19	93.83	0.29	145.43	4005.76
Upper Reach	41997.6	Max WS	100FCDP-FUT	43.51	93.82	0.29	145.43	3979.31
Upper Reach	41997.6	Max WS	100FCDP-BMP	43.44	93.82	0.29	145.43	3977.51
Upper Reach	41970.1	Max WS	Fut100TSHRev	45.20	93.84	0.27	136.06	3992.17
Upper Reach	41970.1	Max WS	F100FCDP-EX	44.12	93.83	0.27	136.00	4000.68
Upper Reach	41970.1	Max WS	100FCDP-FUT	43.50	93.82	0.26	135.96	3974.27
Upper Reach	41970.1	Max WS	100FCDP-BMP	43.44	93.82	0.26	135.96	3972.48
Upper Reach	41948.9	Max WS	Fut100TSHRev	46.33	93.84	0.31	194.34	3988.71
Upper Reach	41948.9	Max WS	F100FCDP-EX	44.65	93.83	0.30	193.79	3997.28
Upper Reach	41948.9	Max WS	100FCDP-FUT	44.61	93.81	0.30	192.58	3970.91
Upper Reach	41948.9	Max WS	100FCDP-BMP	44.49	93.81	0.30	192.38	3969.12
Upper Reach	41896	Max WS	Fut100TSHRev	46.27	93.84	0.34	185.87	3979.28
Upper Reach	41896	Max WS	F100FCDP-EX	44.55	93.82	0.33	185.71	3988.00
Upper Reach	41896	Max WS	100FCDP-FUT	44.55	93.81	0.34	185.59	3961.73
Upper Reach	41896	Max WS	100FCDP-BMP	44.48	93.81	0.34	185.59	3959.95
Upper Reach	41845.2	Max WS	Fut100TSHRev	46.54	93.84	0.37	152.94	3969.47
Upper Reach	41845.2	Max WS	F100FCDP-EX	44.62	93.82	0.36	152.80	3978.33
Upper Reach	41845.2	Max WS	100FCDP-FUT	44.81	93.81	0.36	152.70	3952.17
Upper Reach	41845.2	Max WS	100FCDP-BMP	44.75	93.81	0.36	152.69	3950.39
Upper Reach	41836	Max WS	Fut100TSHRev	46.46	93.83	0.43	100.98	3967.98
Upper Reach	41836	Max WS	F100FCDP-EX	44.55	93.82	0.42	100.98	3976.86
Upper Reach	41836	Max WS	100FCDP-FUT	44.81	93.80	0.43	100.98	3950.71
Upper Reach	41836	Max WS	100FCDP-BMP	44.75	93.80	0.42	100.98	3948.93
Upper Reach	41776	Max WS	Fut100TSHRev	46.37	93.83	0.44	191.67	3957.63
Upper Reach	41776	Max WS	F100FCDP-EX	44.48	93.81	0.43	191.03	3966.65
Upper Reach	41776	Max WS	100FCDP-FUT	44.65	93.80	0.44	190.50	3940.62
Upper Reach	41776	Max WS	100FCDP-BMP	44.67	93.80	0.44	190.48	3938.85

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	41769	Max WS	Fut100TSHRev	46.29	93.83	0.49	100.32	3956.89
Upper Reach	41769	Max WS	F100FCDP-EX	44.39	93.81	0.48	100.32	3965.92
Upper Reach	41769	Max WS	100FCDP-FUT	44.65	93.80	0.49	100.32	3939.90
Upper Reach	41769	Max WS	100FCDP-BMP	44.59	93.80	0.49	100.32	3938.13
Upper Reach	41744	Max WS	Fut100TSHRev	46.90	93.82	0.35	105.55	3952.87
Upper Reach	41744	Max WS	F100FCDP-EX	44.68	93.81	0.34	105.55	3961.95
Upper Reach	41744	Max WS	100FCDP-FUT	45.23	93.79	0.35	105.55	3935.97
Upper Reach	41744	Max WS	100FCDP-BMP	45.17	93.79	0.35	105.55	3934.20
Upper Reach	41743	Max WS	Fut100TSHRev	46.57	93.77	1.33	105.13	3952.73
Upper Reach	41743	Max WS	F100FCDP-EX	43.65	93.76	1.25	105.13	3961.81
Upper Reach	41743	Max WS	100FCDP-FUT	42.66	93.75	1.23	105.13	3935.83
Upper Reach	41743	Max WS	100FCDP-BMP	42.63	93.75	1.23	105.13	3934.06
Upper Reach	41738	Fut Transitway		Bridge				
Upper Reach	41725.5	Max WS	Fut100TSHRev	46.48	93.75	0.96	100.00	3951.58
Upper Reach	41725.5	Max WS	F100FCDP-EX	43.17	93.74	0.89	100.00	3960.66
Upper Reach	41725.5	Max WS	100FCDP-FUT	42.16	93.73	0.88	100.00	3934.70
Upper Reach	41725.5	Max WS	100FCDP-BMP	42.09	93.73	0.88	100.00	3932.93
Upper Reach	41671	Max WS	Fut100TSHRev	46.47	93.76	0.63	98.19	3944.51
Upper Reach	41671	Max WS	F100FCDP-EX	43.48	93.75	0.59	98.13	3953.65
Upper Reach	41671	Max WS	100FCDP-FUT	42.44	93.74	0.59	98.03	3927.76
Upper Reach	41671	Max WS	100FCDP-BMP	42.40	93.74	0.59	98.02	3926.00
Upper Reach	41608	Max WS	Fut100TSHRev	48.00	93.73	0.82	100.00	3930.50
Upper Reach	41608	Max WS	F100FCDP-EX	47.52	93.72	0.82	100.00	3939.69
Upper Reach	41608	Max WS	100FCDP-FUT	46.54	93.71	0.81	100.00	3913.98
Upper Reach	41608	Max WS	100FCDP-BMP	46.50	93.70	0.81	100.00	3912.22
Upper Reach	41602	Future Campeau C		Bridge				
Upper Reach	41572	Max WS	Fut100TSHRev	45.87	93.67	0.80	96.01	3927.51
Upper Reach	41572	Max WS	F100FCDP-EX	45.57	93.67	0.79	96.01	3936.71
Upper Reach	41572	Max WS	100FCDP-FUT	44.56	93.65	0.78	96.01	3911.02
Upper Reach	41572	Max WS	100FCDP-BMP	44.49	93.65	0.78	96.01	3909.26
Upper Reach	41374.8	Max WS	Fut100TSHRev	44.60	93.64	1.10	114.03	3897.74
Upper Reach	41374.8	Max WS	F100FCDP-EX	44.23	93.63	1.10	114.03	3907.03
Upper Reach	41374.8	Max WS	100FCDP-FUT	43.26	93.62	1.10	114.03	3881.68
Upper Reach	41374.8	Max WS	100FCDP-BMP	43.23	93.62	1.10	114.03	3879.94
Upper Reach	41357	Max WS	Fut100TSHRev	43.94	93.62	0.88	114.04	3896.19
Upper Reach	41357	Max WS	F100FCDP-EX	43.58	93.62	0.88	113.63	3905.49
Upper Reach	41357	Max WS	100FCDP-FUT	42.71	93.61	0.89	112.44	3880.18
Upper Reach	41357	Max WS	100FCDP-BMP	42.57	93.60	0.88	112.43	3878.44

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	41349.4	Max WS	Fut100TSHRev	44.81	93.64	0.13	322.66	3894.05
Upper Reach	41349.4	Max WS	F100FCDP-EX	44.49	93.64	0.13	322.46	3903.36
Upper Reach	41349.4	Max WS	100FCDP-FUT	43.54	93.62	0.13	321.67	3878.08
Upper Reach	41349.4	Max WS	100FCDP-BMP	43.49	93.62	0.13	321.64	3876.35
Upper Reach	41338	Max WS	Fut100TSHRev	44.79	93.64	0.14	301.95	3888.89
Upper Reach	41338	Max WS	F100FCDP-EX	44.39	93.63	0.14	301.04	3898.22
Upper Reach	41338	Max WS	100FCDP-FUT	43.52	93.62	0.14	297.48	3873.01
Upper Reach	41338	Max WS	100FCDP-BMP	43.47	93.62	0.14	297.34	3871.28
Upper Reach	41320	Max WS	Fut100TSHRev	44.76	93.64	0.11	258.02	3879.74
Upper Reach	41320	Max WS	F100FCDP-EX	44.39	93.63	0.11	257.95	3889.10
Upper Reach	41320	Max WS	100FCDP-FUT	43.54	93.62	0.11	257.71	3863.99
Upper Reach	41320	Max WS	100FCDP-BMP	43.49	93.62	0.11	257.69	3862.27
Upper Reach	41198	Max WS	Fut100TSHRev	44.75	93.64	0.19	210.91	3831.09
Upper Reach	41198	Max WS	F100FCDP-EX	44.35	93.63	0.18	210.90	3840.58
Upper Reach	41198	Max WS	100FCDP-FUT	43.45	93.62	0.18	210.85	3815.96
Upper Reach	41198	Max WS	100FCDP-BMP	43.34	93.62	0.18	210.85	3814.26
Upper Reach	41180	Max WS	Fut100TSHRev	44.75	93.64	0.17	204.23	3823.31
Upper Reach	41180	Max WS	F100FCDP-EX	44.31	93.63	0.17	204.08	3832.82
Upper Reach	41180	Max WS	100FCDP-FUT	43.34	93.62	0.16	203.49	3808.28
Upper Reach	41180	Max WS	100FCDP-BMP	43.36	93.62	0.16	203.45	3806.58
Upper Reach	41125.4	Max WS	Fut100TSHRev	44.68	93.63	0.20	205.17	3803.86
Upper Reach	41125.4	Max WS	F100FCDP-EX	44.33	93.63	0.20	205.16	3813.42
Upper Reach	41125.4	Max WS	100FCDP-FUT	43.41	93.62	0.20	205.11	3789.07
Upper Reach	41125.4	Max WS	100FCDP-BMP	43.32	93.61	0.20	205.11	3787.39
Upper Reach	41117	Max WS	Fut100TSHRev	44.64	93.63	0.36	340.69	3800.86
Upper Reach	41117	Max WS	F100FCDP-EX	44.27	93.63	0.36	340.65	3810.43
Upper Reach	41117	Max WS	100FCDP-FUT	43.35	93.61	0.36	340.52	3786.11
Upper Reach	41117	Max WS	100FCDP-BMP	43.30	93.61	0.36	340.51	3784.43
Upper Reach	41071	Max WS	Fut100TSHRev	45.29	93.63	0.16	338.21	3782.74
Upper Reach	41071	Max WS	F100FCDP-EX	44.84	93.63	0.16	338.16	3792.38
Upper Reach	41071	Max WS	100FCDP-FUT	44.03	93.61	0.16	337.97	3768.33
Upper Reach	41071	Max WS	100FCDP-BMP	43.92	93.61	0.16	337.96	3766.67
Upper Reach	40965.2	Max WS	Fut100TSHRev	45.68	93.63	0.18	334.67	3745.10
Upper Reach	40965.2	Max WS	F100FCDP-EX	45.25	93.63	0.18	334.64	3754.88
Upper Reach	40965.2	Max WS	100FCDP-FUT	44.33	93.61	0.18	334.53	3731.40
Upper Reach	40965.2	Max WS	100FCDP-BMP	44.25	93.61	0.18	334.52	3729.77
Upper Reach	40956	Max WS	Fut100TSHRev	45.66	93.63	0.29	215.69	3741.86
Upper Reach	40956	Max WS	F100FCDP-EX	45.17	93.63	0.29	215.62	3751.66
Upper Reach	40956	Max WS	100FCDP-FUT	44.27	93.61	0.28	215.36	3728.21
Upper Reach	40956	Max WS	100FCDP-BMP	44.27	93.61	0.28	215.35	3726.58

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	40919.2	Max WS	Fut100TSHRev	45.55	93.63	0.45	196.00	3731.60
Upper Reach	40919.2	Max WS	F100FCDP-EX	45.09	93.62	0.45	195.85	3741.43
Upper Reach	40919.2	Max WS	100FCDP-FUT	44.08	93.61	0.44	195.28	3718.10
Upper Reach	40919.2	Max WS	100FCDP-BMP	44.15	93.61	0.44	195.24	3716.47
Upper Reach	40910	Max WS	Fut100TSHRev	45.55	93.63	0.14	193.44	3728.99
Upper Reach	40910	Max WS	F100FCDP-EX	45.11	93.62	0.14	193.41	3738.83
Upper Reach	40910	Max WS	100FCDP-FUT	44.25	93.61	0.14	193.27	3715.53
Upper Reach	40910	Max WS	100FCDP-BMP	44.17	93.61	0.14	193.27	3713.91
Upper Reach	40703	Max WS	Fut100TSHRev	45.54	93.63	0.16	211.17	3659.98
Upper Reach	40703	Max WS	F100FCDP-EX	45.06	93.62	0.16	211.15	3669.97
Upper Reach	40703	Max WS	100FCDP-FUT	44.11	93.61	0.16	211.09	3647.28
Upper Reach	40703	Max WS	100FCDP-BMP	44.07	93.61	0.16	211.08	3645.69
Upper Reach	40688.5	Max WS	Fut100TSHRev	46.88	93.62	0.38	400.70	3654.06
Upper Reach	40688.5	Max WS	F100FCDP-EX	46.33	93.62	0.38	400.05	3664.07
Upper Reach	40688.5	Max WS	100FCDP-FUT	45.47	93.60	0.38	397.67	3641.46
Upper Reach	40688.5	Max WS	100FCDP-BMP	45.43	93.60	0.38	397.56	3639.88
Upper Reach	40505	Max WS	Fut100TSHRev	46.54	93.61	0.34	373.32	3587.21
Upper Reach	40505	Max WS	F100FCDP-EX	45.89	93.61	0.33	372.91	3597.48
Upper Reach	40505	Max WS	100FCDP-FUT	45.07	93.59	0.33	371.22	3575.94
Upper Reach	40505	Max WS	100FCDP-BMP	45.04	93.59	0.33	371.12	3574.41
Upper Reach	40423.5	Max WS	Fut100TSHRev	46.39	93.60	0.31	386.37	3553.68
Upper Reach	40423.5	Max WS	F100FCDP-EX	45.76	93.60	0.31	385.87	3564.08
Upper Reach	40423.5	Max WS	100FCDP-FUT	44.98	93.59	0.31	383.77	3543.02
Upper Reach	40423.5	Max WS	100FCDP-BMP	44.88	93.58	0.31	383.64	3541.52
Upper Reach	40415	Max WS	Fut100TSHRev	46.41	93.60	0.26	380.68	3550.04
Upper Reach	40415	Max WS	F100FCDP-EX	45.74	93.60	0.26	380.20	3560.45
Upper Reach	40415	Max WS	100FCDP-FUT	44.93	93.58	0.26	378.17	3539.44
Upper Reach	40415	Max WS	100FCDP-BMP	44.90	93.58	0.26	378.05	3537.94
Upper Reach	40348.1	Max WS	Fut100TSHRev	46.39	93.60	0.22	357.34	3521.36
Upper Reach	40348.1	Max WS	F100FCDP-EX	45.65	93.60	0.22	357.07	3531.85
Upper Reach	40348.1	Max WS	100FCDP-FUT	44.93	93.58	0.22	355.94	3511.24
Upper Reach	40348.1	Max WS	100FCDP-BMP	44.84	93.58	0.22	355.87	3509.76
Upper Reach	40339.7	Max WS	Fut100TSHRev	46.38	93.60	0.13	398.64	3517.19
Upper Reach	40339.7	Max WS	F100FCDP-EX	45.69	93.60	0.13	398.18	3527.69
Upper Reach	40339.7	Max WS	100FCDP-FUT	44.92	93.58	0.11	388.87	3507.12
Upper Reach	40339.7	Max WS	100FCDP-BMP	44.87	93.58	0.11	387.76	3505.65
Upper Reach	40298	Max WS	Fut100TSHRev	46.38	93.60	0.12	423.62	3492.88
Upper Reach	40298	Max WS	F100FCDP-EX	45.66	93.60	0.12	423.37	3503.45
Upper Reach	40298	Max WS	100FCDP-FUT	44.88	93.58	0.12	422.33	3483.15
Upper Reach	40298	Max WS	100FCDP-BMP	44.86	93.58	0.12	422.27	3481.69

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	40092	Max WS	Fut100TSHRev	46.71	93.59	0.39	317.77	3405.76
Upper Reach	40092	Max WS	F100FCDP-EX	45.90	93.59	0.38	317.52	3416.59
Upper Reach	40092	Max WS	100FCDP-FUT	45.22	93.58	0.39	316.36	3397.45
Upper Reach	40092	Max WS	100FCDP-BMP	45.17	93.57	0.39	316.30	3396.06
Upper Reach	40071.5	Max WS	Fut100TSHRev	18.52	93.52	0.76	262.60	3392.61
Upper Reach	40071.5	Max WS	F100FCDP-EX	18.91	93.53	0.78	263.87	3403.41
Upper Reach	40071.5	Max WS	100FCDP-FUT	18.70	93.52	0.77	261.77	3384.50
Upper Reach	40071.5	Max WS	100FCDP-BMP	18.67	93.51	0.77	261.61	3383.12
Upper Reach	40070	Richardson Side		Culvert				
Upper Reach	40050	Max WS	Fut100TSHRev	18.73	93.52	0.72	208.42	3387.83
Upper Reach	40050	Max WS	F100FCDP-EX	19.12	93.53	0.73	209.25	3398.58
Upper Reach	40050	Max WS	100FCDP-FUT	18.70	93.52	0.72	207.90	3379.75
Upper Reach	40050	Max WS	100FCDP-BMP	18.67	93.52	0.72	207.79	3378.38
Upper Reach	39892	Max WS	Fut100TSHRev	18.73	93.52	0.18	247.86	3355.02
Upper Reach	39892	Max WS	F100FCDP-EX	19.12	93.53	0.18	249.56	3365.42
Upper Reach	39892	Max WS	100FCDP-FUT	18.90	93.52	0.18	246.80	3347.15
Upper Reach	39892	Max WS	100FCDP-BMP	18.87	93.52	0.18	246.58	3345.81
Upper Reach	39695	Max WS	Fut100TSHRev	18.35	93.52	0.15	256.60	3315.91
Upper Reach	39695	Max WS	F100FCDP-EX	18.73	93.53	0.15	257.62	3325.66
Upper Reach	39695	Max WS	100FCDP-FUT	18.53	93.51	0.16	255.93	3308.43
Upper Reach	39695	Max WS	100FCDP-BMP	18.50	93.51	0.16	255.80	3307.24
Upper Reach	39400	Max WS	Fut100TSHRev	18.17	93.51	0.14	364.82	3239.13
Upper Reach	39400	Max WS	F100FCDP-EX	18.56	93.52	0.14	365.77	3247.88
Upper Reach	39400	Max WS	100FCDP-FUT	18.36	93.50	0.14	364.17	3232.30
Upper Reach	39400	Max WS	100FCDP-BMP	18.33	93.50	0.14	364.05	3231.20
Upper Reach	39202	Max WS	Fut100TSHRev	18.03	93.50	0.11	410.52	3161.37
Upper Reach	39202	Max WS	F100FCDP-EX	18.43	93.51	0.11	410.73	3169.32
Upper Reach	39202	Max WS	100FCDP-FUT	18.23	93.50	0.11	410.07	3155.11
Upper Reach	39202	Max WS	100FCDP-BMP	18.20	93.50	0.11	409.93	3154.11
Upper Reach	38697	Max WS	Fut100TSHRev	17.99	93.50	0.06	497.59	2922.99
Upper Reach	38697	Max WS	F100FCDP-EX	18.40	93.51	0.06	498.36	2928.90
Upper Reach	38697	Max WS	100FCDP-FUT	18.18	93.49	0.06	496.75	2918.23
Upper Reach	38697	Max WS	100FCDP-BMP	18.16	93.49	0.06	496.60	2917.47
Upper Reach	38692.5	Max WS	Fut100TSHRev	18.00	93.50	0.05	488.25	2919.96
Upper Reach	38692.5	Max WS	F100FCDP-EX	18.40	93.51	0.05	489.19	2925.85
Upper Reach	38692.5	Max WS	100FCDP-FUT	18.18	93.49	0.05	487.40	2915.22
Upper Reach	38692.5	Max WS	100FCDP-BMP	18.16	93.49	0.05	487.26	2914.47
Upper Reach	38236	Max WS	Fut100TSHRev	17.95	93.50	0.09	447.05	2670.80
Upper Reach	38236	Max WS	F100FCDP-EX	18.37	93.51	0.09	449.67	2674.81
Upper Reach	38236	Max WS	100FCDP-FUT	18.14	93.49	0.09	442.39	2667.47
Upper Reach	38236	Max WS	100FCDP-BMP	18.12	93.49	0.09	442.13	2666.95

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	37894	Max WS	Fut100TSHRev	42.51	93.47	1.13	442.41	2497.31
Upper Reach	37894	Max WS	F100FCDP-EX	42.61	93.48	1.10	443.64	2499.99
Upper Reach	37894	Max WS	100FCDP-FUT	42.36	93.46	1.15	441.48	2495.00
Upper Reach	37894	Max WS	100FCDP-BMP	42.34	93.46	1.15	441.34	2494.63
Upper Reach	37890	Huntmar		Bridge				
Upper Reach	37869.5	Max WS	Fut100TSHRev	40.10	92.97	1.55	390.70	2495.18
Upper Reach	37869.5	Max WS	F100FCDP-EX	40.33	92.97	1.56	390.85	2497.84
Upper Reach	37869.5	Max WS	100FCDP-FUT	40.07	92.97	1.55	390.62	2492.88
Upper Reach	37869.5	Max WS	100FCDP-BMP	40.05	92.97	1.55	390.59	2492.52
Upper Reach	37101	Max WS	Fut100TSHRev	39.93	92.94	0.19	444.27	2148.28
Upper Reach	37101	Max WS	F100FCDP-EX	40.08	92.95	0.19	444.80	2150.29
Upper Reach	37101	Max WS	100FCDP-FUT	39.83	92.94	0.19	443.96	2146.42
Upper Reach	37101	Max WS	100FCDP-BMP	39.81	92.94	0.19	443.89	2146.13
Upper Reach	36580	Max WS	Fut100TSHRev	39.83	92.93	0.15	414.69	1862.58
Upper Reach	36580	Max WS	F100FCDP-EX	40.02	92.93	0.15	414.76	1864.17
Upper Reach	36580	Max WS	100FCDP-FUT	39.78	92.93	0.15	414.65	1861.00
Upper Reach	36580	Max WS	100FCDP-BMP	39.76	92.93	0.15	414.64	1860.78
Upper Reach	35288	Max WS	Fut100TSHRev	39.79	92.88	0.31	352.17	1280.94
Upper Reach	35288	Max WS	F100FCDP-EX	39.96	92.88	0.31	352.35	1281.65
Upper Reach	35288	Max WS	100FCDP-FUT	39.73	92.88	0.31	351.99	1279.99
Upper Reach	35288	Max WS	100FCDP-BMP	39.71	92.88	0.31	351.99	1279.88
Upper Reach	35073	Max WS	Fut100TSHRev	39.79	92.86	0.39	287.72	1216.04
Upper Reach	35073	Max WS	F100FCDP-EX	39.95	92.86	0.39	288.31	1216.63
Upper Reach	35073	Max WS	100FCDP-FUT	39.72	92.86	0.39	287.11	1215.19
Upper Reach	35073	Max WS	100FCDP-BMP	39.71	92.86	0.39	287.11	1215.09
Upper Reach	34555	Max WS	Fut100TSHRev	39.78	92.79	0.48	209.51	1111.14
Upper Reach	34555	Max WS	F100FCDP-EX	39.94	92.79	0.49	209.76	1111.57
Upper Reach	34555	Max WS	100FCDP-FUT	39.72	92.79	0.48	209.26	1110.43
Upper Reach	34555	Max WS	100FCDP-BMP	39.70	92.79	0.48	209.19	1110.35
Upper Reach	33472	Max WS	Fut100TSHRev	39.77	92.70	0.27	285.90	805.73
Upper Reach	33472	Max WS	F100FCDP-EX	39.93	92.70	0.27	285.95	805.91
Upper Reach	33472	Max WS	100FCDP-FUT	39.68	92.70	0.27	285.82	805.33
Upper Reach	33472	Max WS	100FCDP-BMP	39.69	92.70	0.27	285.82	805.30
Upper Reach	33201	Max WS	Fut100TSHRev	41.19	92.66	0.71	382.67	701.72
Upper Reach	33201	Max WS	F100FCDP-EX	41.29	92.66	0.71	382.84	701.83
Upper Reach	33201	Max WS	100FCDP-FUT	41.08	92.66	0.71	382.41	701.42
Upper Reach	33201	Max WS	100FCDP-BMP	41.06	92.66	0.71	382.41	701.39
Upper Reach	33197	March Road		Bridge				
Upper Reach	33181	Max WS	Fut100TSHRev	41.18	92.64	0.72	380.03	699.72
Upper Reach	33181	Max WS	F100FCDP-EX	41.29	92.64	0.72	380.11	699.83
Upper Reach	33181	Max WS	100FCDP-FUT	41.07	92.64	0.72	379.79	699.42
Upper Reach	33181	Max WS	100FCDP-BMP	41.06	92.64	0.72	379.79	699.40

CARP RIVER - FUTURE CONDITIONS

CARP RIVER RESTORATION / KANATA WEST DEVELOPMENT

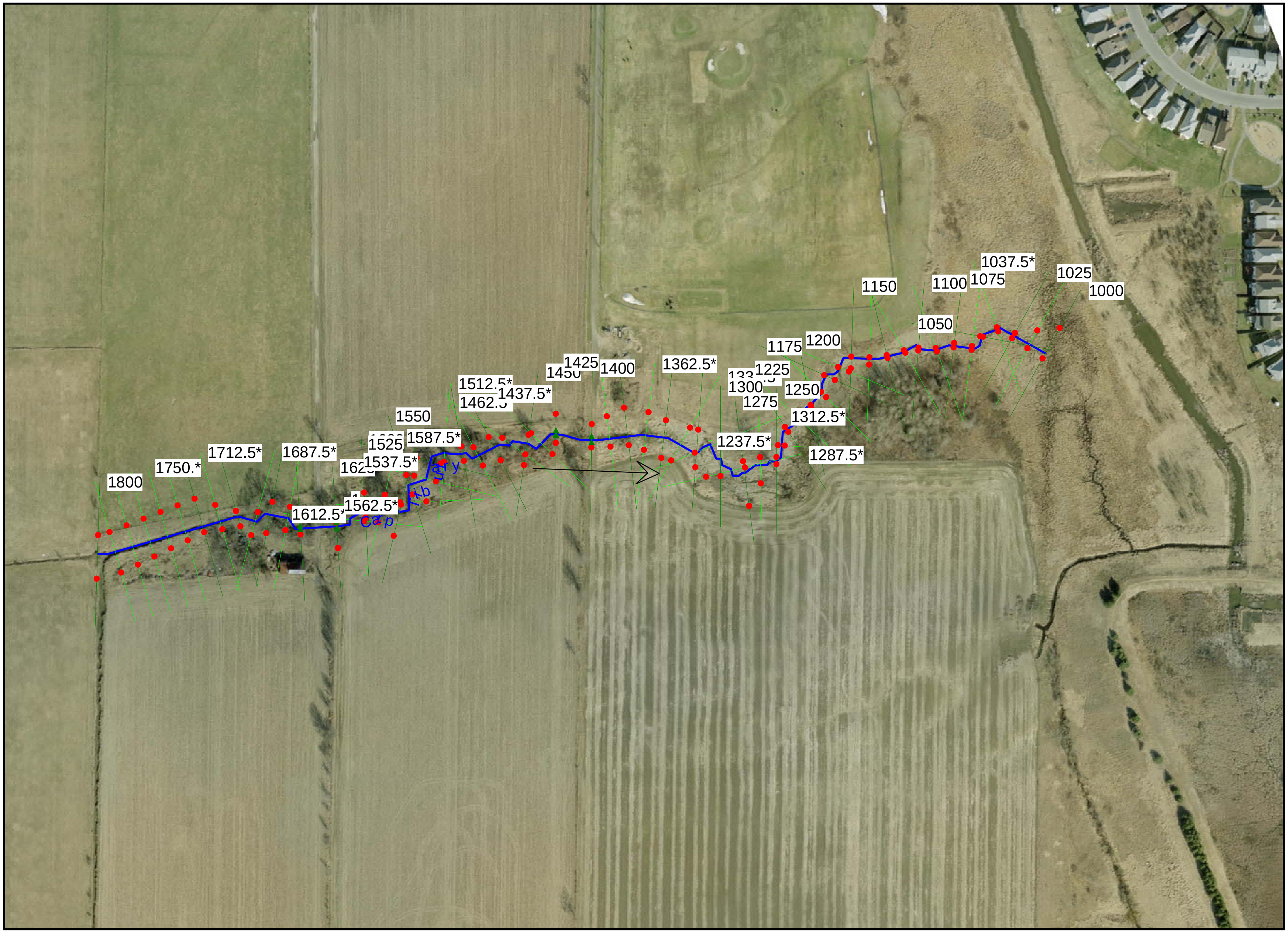
HEC-RAS River: Carp River Reach: Upper Reach Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total (m3/s)	W.S. Elev (m)	Vel Chnl (m/s)	Top Width (m)	Volume (1000 m3)
Upper Reach	32609	Max WS	Fut100TSHRev	41.16	92.59	0.22	381.16	484.74
Upper Reach	32609	Max WS	F100FCDP-EX	41.25	92.59	0.23	381.19	484.79
Upper Reach	32609	Max WS	100FCDP-FUT	41.04	92.59	0.22	381.11	484.57
Upper Reach	32609	Max WS	100FCDP-BMP	41.02	92.59	0.22	381.11	484.56
Upper Reach	32096	Max WS	Fut100TSHRev	41.10	92.57	0.18	390.60	242.96
Upper Reach	32096	Max WS	F100FCDP-EX	41.19	92.57	0.18	390.61	242.98
Upper Reach	32096	Max WS	100FCDP-FUT	40.98	92.57	0.18	390.60	242.90
Upper Reach	32096	Max WS	100FCDP-BMP	40.95	92.57	0.18	390.60	242.89
Upper Reach	31662	Max WS	Fut100TSHRev	40.95	92.53	0.70	164.19	114.70
Upper Reach	31662	Max WS	F100FCDP-EX	40.95	92.53	0.70	164.19	114.70
Upper Reach	31662	Max WS	100FCDP-FUT	40.75	92.53	0.70	164.02	114.69
Upper Reach	31662	Max WS	100FCDP-BMP	40.74	92.53	0.70	164.02	114.69
Upper Reach	31658	Carp Road		Bridge				
Upper Reach	31642	Max WS	Fut100TSHRev	40.60	92.53	0.70	160.44	112.14
Upper Reach	31642	Max WS	F100FCDP-EX	40.70	92.53	0.70	160.44	112.14
Upper Reach	31642	Max WS	100FCDP-FUT	40.50	92.53	0.70	160.28	112.12
Upper Reach	31642	Max WS	100FCDP-BMP	40.43	92.53	0.69	160.28	112.12

APPENDIX I

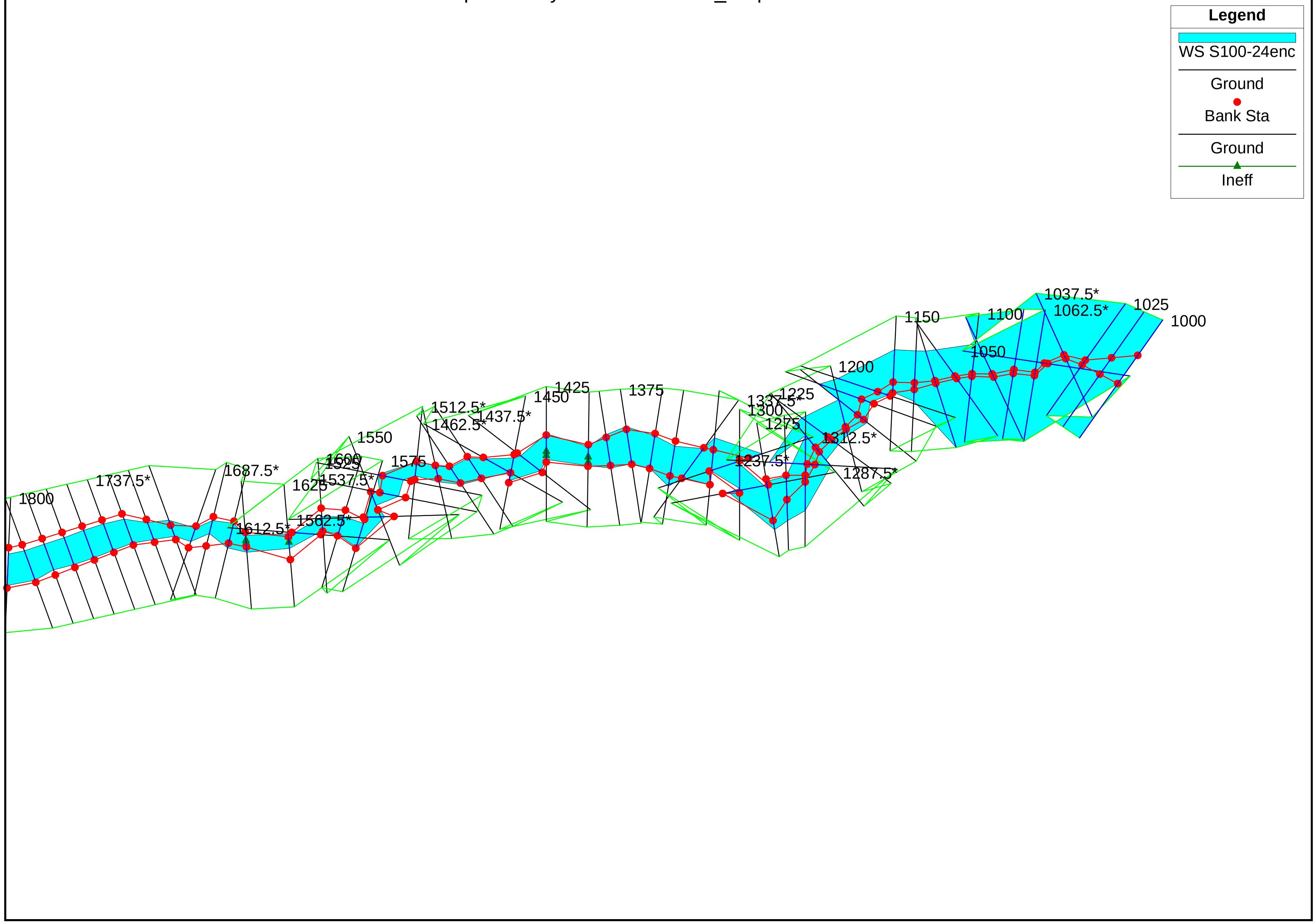
HYDRAULIC ANALYSIS OF CARP RIVER WEST TRIBUTARY

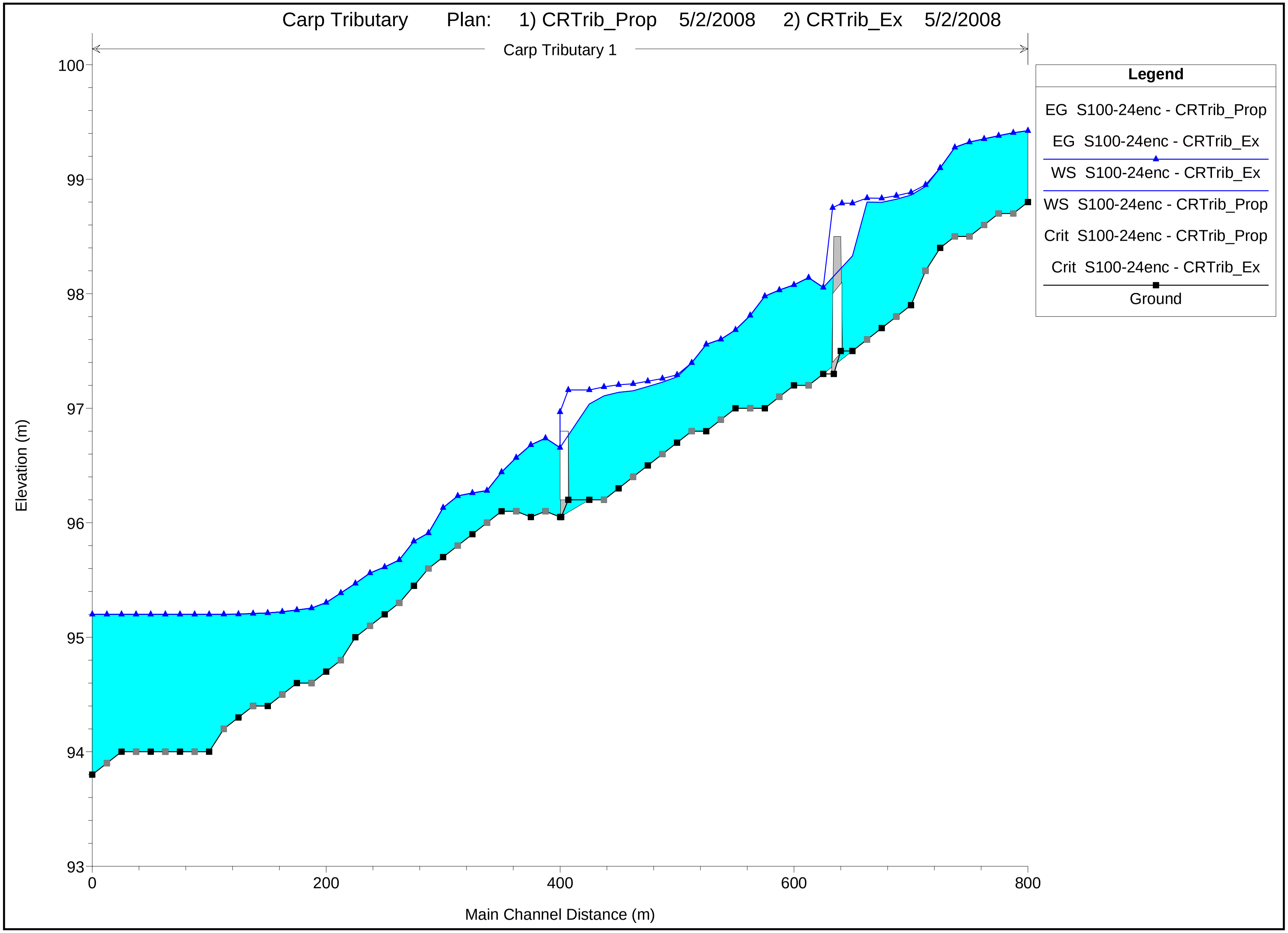
HEC-RAS modeling files
Carp River Tributary Floodplain



Partial GIS data

Carp Tributary   Plan: CRTrib_Prop   3/27/2008




Carp Tributary Plan: 1) CRTrib_Prop 5/2/2008 2) CRTrib_Ex 5/2/2008
Carp Tributary 1
Elevation (m)
100
99
98
97
96
95
94
93
0
200
400
600
800
Main Channel Distance (m)
Legend
EG S100-24enc - CRTrib_Prop
EG S100-24enc - CRTrib_Ex
WS S100-24enc - CRTrib_Ex
WS S100-24enc - CRTrib_Prop
Crit S100-24enc - CRTrib_Prop
Crit S100-24enc - CRTrib_Ex
Ground

HEC-RAS   River: Carp Tributary   Reach: 1   Profile: S100-24enc

Reach	River Sta	Profile	Plan	Q Total	W.S. Elev	Vel Chnl	Top Width	Volume
				(m3/s)	(m)	(m/s)	(m)	(1000 m3)
1	1000	S100-24enc	CRTrib_Prop	4.76	95.20	0.05	100.00	
1	1000	S100-24enc	CRTrib_Ex	4.76	95.20	0.05	100.00	
1	1012.5*	S100-24enc	CRTrib_Prop	4.76	95.20	0.05	97.50	1.49
1	1012.5*	S100-24enc	CRTrib_Ex	4.76	95.20	0.05	97.50	1.49
1	1025	S100-24enc	CRTrib_Prop	4.76	95.20	0.06	95.00	2.84
1	1025	S100-24enc	CRTrib_Ex	4.76	95.20	0.06	95.00	2.84
1	1037.5*	S100-24enc	CRTrib_Prop	4.76	95.20	0.07	97.50	4.09
1	1037.5*	S100-24enc	CRTrib_Ex	4.76	95.20	0.07	97.50	4.09
1	1050	S100-24enc	CRTrib_Prop	4.76	95.20	0.08	100.00	5.25
1	1050	S100-24enc	CRTrib_Ex	4.76	95.20	0.08	100.00	5.25
1	1062.5*	S100-24enc	CRTrib_Prop	4.76	95.20	0.09	98.50	6.00
1	1062.5*	S100-24enc	CRTrib_Ex	4.76	95.20	0.09	98.50	6.00
1	1075	S100-24enc	CRTrib_Prop	4.76	95.20	0.11	97.00	6.66
1	1075	S100-24enc	CRTrib_Ex	4.76	95.20	0.11	97.00	6.66
1	1087.5*	S100-24enc	CRTrib_Prop	4.76	95.20	0.16	96.50	7.19
1	1087.5*	S100-24enc	CRTrib_Ex	4.76	95.20	0.16	96.50	7.19
1	1100	S100-24enc	CRTrib_Prop	4.76	95.20	0.23	73.03	7.60
1	1100	S100-24enc	CRTrib_Ex	4.76	95.20	0.23	73.03	7.60
1	1112.5*	S100-24enc	CRTrib_Prop	4.76	95.20	0.32	73.51	8.03
1	1112.5*	S100-24enc	CRTrib_Ex	4.76	95.20	0.32	73.51	8.03
1	1125	S100-24enc	CRTrib_Prop	4.76	95.20	0.47	73.69	8.39
1	1125	S100-24enc	CRTrib_Ex	4.76	95.20	0.47	73.69	8.39
1	1137.5*	S100-24enc	CRTrib_Prop	4.76	95.21	0.42	37.25	8.60
1	1137.5*	S100-24enc	CRTrib_Ex	4.76	95.21	0.42	37.25	8.60
1	1150	S100-24enc	CRTrib_Prop	4.76	95.21	0.40	31.39	8.79
1	1150	S100-24enc	CRTrib_Ex	4.76	95.21	0.40	31.39	8.79
1	1162.5*	S100-24enc	CRTrib_Prop	4.76	95.22	0.45	31.85	9.02
1	1162.5*	S100-24enc	CRTrib_Ex	4.76	95.22	0.45	31.85	9.02
1	1175	S100-24enc	CRTrib_Prop	4.76	95.24	0.48	32.48	9.23
1	1175	S100-24enc	CRTrib_Ex	4.76	95.24	0.48	32.48	9.23
1	1187.5*	S100-24enc	CRTrib_Prop	4.76	95.25	0.89	30.39	9.38
1	1187.5*	S100-24enc	CRTrib_Ex	4.76	95.25	0.89	30.39	9.38
1	1200	S100-24enc	CRTrib_Prop	4.76	95.30	1.58	26.86	9.49
1	1200	S100-24enc	CRTrib_Ex	4.76	95.30	1.58	26.86	9.49
1	1212.5*	S100-24enc	CRTrib_Prop	4.76	95.39	1.45	29.09	9.55
1	1212.5*	S100-24enc	CRTrib_Ex	4.76	95.39	1.45	29.09	9.55

HEC-RAS   River: Carp Tributary   Reach: 1   Profile: S100-24enc (Continued)

Reach	River Sta	Profile	Plan	Q Total	W.S. Elev	Vel Chnl	Top Width	Volume
				(m3/s)	(m)	(m/s)	(m)	(1000 m3)
1	1225	S100-24enc	CRTrib_Prop	4.76	95.47	1.41	32.10	9.61
1	1225	S100-24enc	CRTrib_Ex	4.76	95.47	1.41	32.10	9.61
1	1237.5*	S100-24enc	CRTrib_Prop	4.76	95.56	1.03	36.21	9.69
1	1237.5*	S100-24enc	CRTrib_Ex	4.76	95.56	1.03	36.21	9.69
1	1250	S100-24enc	CRTrib_Prop	4.76	95.61	0.75	55.53	9.82
1	1250	S100-24enc	CRTrib_Ex	4.76	95.61	0.75	55.53	9.82
1	1262.5*	S100-24enc	CRTrib_Prop	4.76	95.68	1.30	32.96	9.92
1	1262.5*	S100-24enc	CRTrib_Ex	4.76	95.68	1.30	32.96	9.92
1	1275	S100-24enc	CRTrib_Prop	4.76	95.84	0.71	36.04	10.00
1	1275	S100-24enc	CRTrib_Ex	4.76	95.84	0.71	36.04	10.00
1	1287.5*	S100-24enc	CRTrib_Prop	4.76	95.91	1.31	21.36	10.07
1	1287.5*	S100-24enc	CRTrib_Ex	4.76	95.91	1.31	21.36	10.07
1	1300	S100-24enc	CRTrib_Prop	4.76	96.13	1.16	18.24	10.12
1	1300	S100-24enc	CRTrib_Ex	4.76	96.13	1.16	18.24	10.12
1	1312.5*	S100-24enc	CRTrib_Prop	4.76	96.23	0.59	32.61	10.19
1	1312.5*	S100-24enc	CRTrib_Ex	4.76	96.23	0.59	32.61	10.19
1	1325	S100-24enc	CRTrib_Prop	4.76	96.26	0.57	34.74	10.30
1	1325	S100-24enc	CRTrib_Ex	4.76	96.26	0.57	34.74	10.30
1	1337.5*	S100-24enc	CRTrib_Prop	4.76	96.28	1.10	24.76	10.38
1	1337.5*	S100-24enc	CRTrib_Ex	4.76	96.28	1.10	24.76	10.38
1	1350	S100-24enc	CRTrib_Prop	4.76	96.44	1.01	29.94	10.44
1	1350	S100-24enc	CRTrib_Ex	4.76	96.44	1.01	29.94	10.44
1	1362.5*	S100-24enc	CRTrib_Prop	4.76	96.57	0.97	24.25	10.50
1	1362.5*	S100-24enc	CRTrib_Ex	4.76	96.57	0.97	24.25	10.50
1	1375	S100-24enc	CRTrib_Prop	4.76	96.68	0.85	27.70	10.57
1	1375	S100-24enc	CRTrib_Ex	4.76	96.68	0.85	27.70	10.57
1	1387.5*	S100-24enc	CRTrib_Prop	4.76	96.74	0.64	24.85	10.65
1	1387.5*	S100-24enc	CRTrib_Ex	4.76	96.74	0.64	24.85	10.65
1	1400	S100-24enc	CRTrib_Prop	4.76	96.66	2.02	14.32	10.73
1	1400	S100-24enc	CRTrib_Ex	4.76	96.66	2.02	14.32	10.73
1	1425	S100-24enc	CRTrib_Prop	4.76	97.04	0.99	18.90	10.88
1	1425	S100-24enc	CRTrib_Ex	4.76	97.16	0.68	22.86	10.91
1	1437.5*	S100-24enc	CRTrib_Prop	4.76	97.11	0.74	16.02	10.96
1	1437.5*	S100-24enc	CRTrib_Ex	4.76	97.19	0.62	17.42	11.02
1	1450	S100-24enc	CRTrib_Prop	4.76	97.14	0.59	16.97	11.05
1	1450	S100-24enc	CRTrib_Ex	4.76	97.21	0.52	17.48	11.12

HEC-RAS River: Carp Tributary Reach: 1 Profile: S100-24enc (Continued)

Reach	River Sta	Profile	Plan	Q Total	W.S. Elev	Vel Chnl	Top Width	Volume
				(m3/s)	(m)	(m/s)	(m)	(1000 m3)
1	1462.5*	S100-24enc	CRTrib_Prop	4.76	97.15	0.78	17.12	11.14
1	1462.5*	S100-24enc	CRTrib_Ex	4.76	97.21	0.66	17.61	11.23
1	1475	S100-24enc	CRTrib_Prop	4.76	97.19	0.81	17.58	11.22
1	1475	S100-24enc	CRTrib_Ex	4.76	97.24	0.72	17.85	11.31
1	1487.5*	S100-24enc	CRTrib_Prop	4.76	97.23	0.98	14.34	11.28
1	1487.5*	S100-24enc	CRTrib_Ex	4.76	97.26	0.90	14.74	11.39
1	1500	S100-24enc	CRTrib_Prop	4.76	97.27	1.36	12.21	11.34
1	1500	S100-24enc	CRTrib_Ex	4.76	97.29	1.29	12.46	11.44
1	1512.5*	S100-24enc	CRTrib_Prop	4.76	97.40	1.52	10.55	11.38
1	1512.5*	S100-24enc	CRTrib_Ex	4.76	97.40	1.52	10.55	11.49
1	1525	S100-24enc	CRTrib_Prop	4.76	97.56	0.95	15.61	11.43
1	1525	S100-24enc	CRTrib_Ex	4.76	97.56	0.95	15.61	11.54
1	1537.5*	S100-24enc	CRTrib_Prop	4.76	97.60	1.18	11.34	11.49
1	1537.5*	S100-24enc	CRTrib_Ex	4.76	97.60	1.18	11.34	11.60
1	1550	S100-24enc	CRTrib_Prop	4.76	97.68	1.36	10.27	11.54
1	1550	S100-24enc	CRTrib_Ex	4.76	97.68	1.36	10.27	11.64
1	1562.5*	S100-24enc	CRTrib_Prop	4.76	97.81	1.46	10.40	11.58
1	1562.5*	S100-24enc	CRTrib_Ex	4.76	97.81	1.46	10.40	11.69
1	1575	S100-24enc	CRTrib_Prop	4.76	97.98	0.89	18.18	11.63
1	1575	S100-24enc	CRTrib_Ex	4.76	97.98	0.89	18.18	11.74
1	1587.5*	S100-24enc	CRTrib_Prop	4.76	98.03	0.95	13.70	11.70
1	1587.5*	S100-24enc	CRTrib_Ex	4.76	98.03	0.95	13.70	11.81
1	1600	S100-24enc	CRTrib_Prop	4.76	98.08	1.06	10.22	11.76
1	1600	S100-24enc	CRTrib_Ex	4.76	98.08	1.06	10.22	11.87
1	1612.5*	S100-24enc	CRTrib_Prop	4.76	98.14	0.83	12.26	11.82
1	1612.5*	S100-24enc	CRTrib_Ex	4.76	98.14	0.83	12.26	11.93
1	1625	S100-24enc	CRTrib_Prop	4.76	98.06	2.28	10.94	11.88
1	1625	S100-24enc	CRTrib_Ex	4.76	98.06	2.28	10.94	11.99
1	1650	S100-24enc	CRTrib_Prop	4.76	98.33	2.87	12.49	11.98
1	1650	S100-24enc	CRTrib_Ex	4.76	98.79	0.93	21.39	12.17
1	1662.5*	S100-24enc	CRTrib_Prop	4.76	98.80	0.55	18.60	12.07
1	1662.5*	S100-24enc	CRTrib_Ex	4.76	98.84	0.52	19.42	12.31
1	1675	S100-24enc	CRTrib_Prop	4.76	98.80	0.88	9.84	12.16
1	1675	S100-24enc	CRTrib_Ex	4.76	98.83	0.83	10.15	12.41
1	1687.5*	S100-24enc	CRTrib_Prop	4.76	98.83	0.99	10.37	12.22
1	1687.5*	S100-24enc	CRTrib_Ex	4.76	98.86	0.93	10.81	12.47

HEC-RAS River: Carp Tributary Reach: 1 Profile: S100-24enc (Continued)

Reach	River Sta	Profile	Plan	Q Total	W.S. Elev	Vel Chnl	Top Width	Volume
				(m3/s)	(m)	(m/s)	(m)	(1000 m3)
1	1700	S100-24enc	CRTrib_Prop	4.76	98.86	1.18	11.71	12.28
1	1700	S100-24enc	CRTrib_Ex	4.76	98.89	1.12	12.44	12.54
1	1712.5*	S100-24enc	CRTrib_Prop	4.76	98.94	1.25	13.01	12.33
1	1712.5*	S100-24enc	CRTrib_Ex	4.76	98.95	1.20	13.20	12.59
1	1725	S100-24enc	CRTrib_Prop	4.76	99.10	1.46	14.85	12.37
1	1725	S100-24enc	CRTrib_Ex	4.76	99.10	1.47	14.81	12.63
1	1737.5*	S100-24enc	CRTrib_Prop	4.76	99.28	0.79	20.46	12.43
1	1737.5*	S100-24enc	CRTrib_Ex	4.76	99.28	0.79	20.46	12.69
1	1750.*	S100-24enc	CRTrib_Prop	4.76	99.32	0.66	21.27	12.52
1	1750.*	S100-24enc	CRTrib_Ex	4.76	99.32	0.66	21.27	12.78
1	1762.5*	S100-24enc	CRTrib_Prop	4.76	99.35	0.67	20.78	12.61
1	1762.5*	S100-24enc	CRTrib_Ex	4.76	99.35	0.67	20.78	12.87
1	1775.*	S100-24enc	CRTrib_Prop	4.76	99.38	0.64	19.75	12.70
1	1775.*	S100-24enc	CRTrib_Ex	4.76	99.38	0.64	19.75	12.96
1	1787.5*	S100-24enc	CRTrib_Prop	4.76	99.41	0.57	22.69	12.80
1	1787.5*	S100-24enc	CRTrib_Ex	4.76	99.41	0.57	22.69	13.06
1	1800	S100-24enc	CRTrib_Prop	4.76	99.42	0.61	19.99	12.90
1	1800	S100-24enc	CRTrib_Ex	4.76	99.42	0.61	19.99	13.16

APPENDIX J

HYDRAULIC ANALYSIS OF MONAHAN DRAIN

Pre-Development Channel Analysis (Manning's Equation)
Post-Development Channel Analysis (HEC-RAS model)

FERNBANK CDP: Monahan Drain Analysis

A HEC-RAS model of the Monahan Drain has been developed to identify the 100-year floodplain from Pond 6 to Terry Fox Drive (refer to 101108-CH1):

- Geometric data (cross-sections, reach lengths and in-stream structures) used in the model south of Terry Fox Drive was generated based on the proposed drain design, including the proposed ditch inverts and two cross-sectional details (pool and riffle);
- The downstream boundary condition was set at an elevation of 94.06 m for the 1:5-year and 94.56 m for the 100-year storm events, which represents the flood elevations in the downstream Monahan Drain Constructed Wetlands;
- The Terry Fox Drive box culvert was measured on-site to have the dimensions 4.6 m span and 1.2 m rise. A proposed arch-culvert with 2.08 m rise and 3.30 m span is suggested for the proposed collector road crossing (HEC-RAS station 1622), which conveys the 100-year flow;
- Robinson Consultants prepared an Engineer's Report for proposed modifications and improvements to the Monahan Drain in July 2003 to accommodate the proposed extension of Terry Fox Drive and the new culvert for the Monahan Drain. Their proposed drain was sized to accommodate the 100-year peak flow from the upstream drainage area and the cross-sectional design was used in the model north of Terry Fox Drive;
- A steady-state analysis of the tributary was run using peak flows from the post-development SWMHYMO model. The 24-hour SCS distribution generated the highest peak flows for the Monahan Drain at both the proposed Headwater Pond (P6) and at Terry Fox Drive. A summary of the peak flows and locations is provided in Table J-1.

Table J-1: Inflow Locations and Peak Flows

Storm Event	Peak Flows at Headwater Pond [m^3/s] (HEC-RAS River Station:1954) (Novatech Chainage: 0+385.443)	Peak Flows at Terry Fox Drive [m^3/s] (HEC-RAS River Station:1224) (Novatech Chainage: 1+115.305)
2-year	0.63	1.31
5-year	0.89	1.94
10-year	1.07	2.42
25-year	1.29	3.06
50-year	1.47	3.57
100-year	1.72	4.33

The results of the analysis indicate that the floodplain elevations for the 100-year event are well within the limits of the proposed 40 m riparian corridor for the Monahan Drain. 100-year flood elevations range from 95.57 at Terry Fox Drive to 97.62 at the upstream end of the drain (outlet of headwater pond P6).

Proposed Fish Passage Arch Culvert:

A 34 m long, 3300 x 2080 mm arch CSP culvert is proposed to convey flow under the street between Pond 6 and Terry Fox Drive (refer to drawing 101108-CH1). The culvert will match the 0.3% slope of the channel to produce maximum flow velocities at the 100-year storm event of 0.83 m/s. This culvert was chosen to meet the fish passage guidelines from *British Columbia Ministry of Transportation and Highways: Environmental Management Section Fact Sheet, 'Culverts and Fish Passage', October 2000.* The criterion met is:

- For culverts with lengths greater than 24 m, the maximum allowable grade is 0.5%
- Culverts that are over 24 m in length can have water velocities of up to 0.9 m/s
- Avoid supercritical flow by sizing the culvert to maintain natural stream width and grade
- Avoid drops at the outlet of the culvert to reduce erosion

Culvert Considerations for Local Habitat:

In the detailed design stage, the detailer should consider and open culvert with passages for local habitat (such as squirrels) to run through. This type of culvert is a benefit because it provides habitat to cross to the other side of the street by a safer and more natural means.

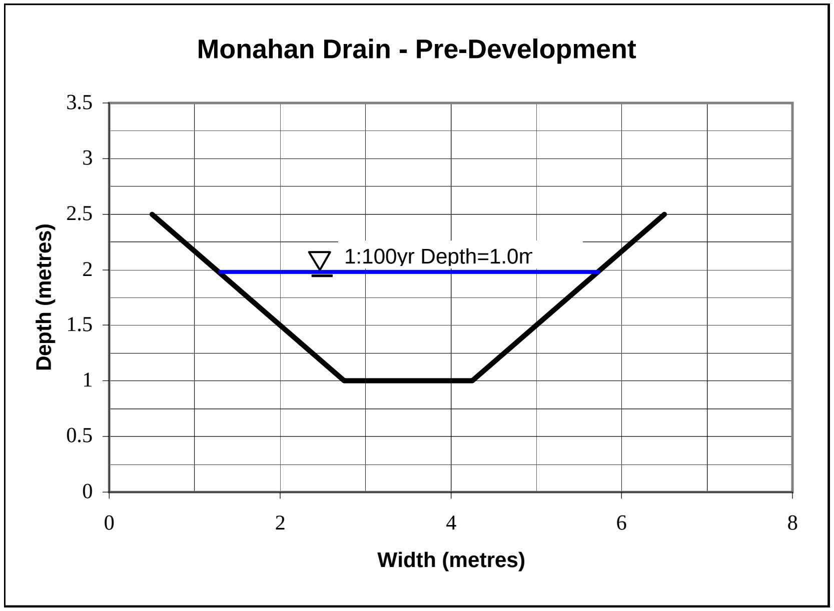
Location : **Monahan Drain - Pre-Development**

Description: Grassed Swale

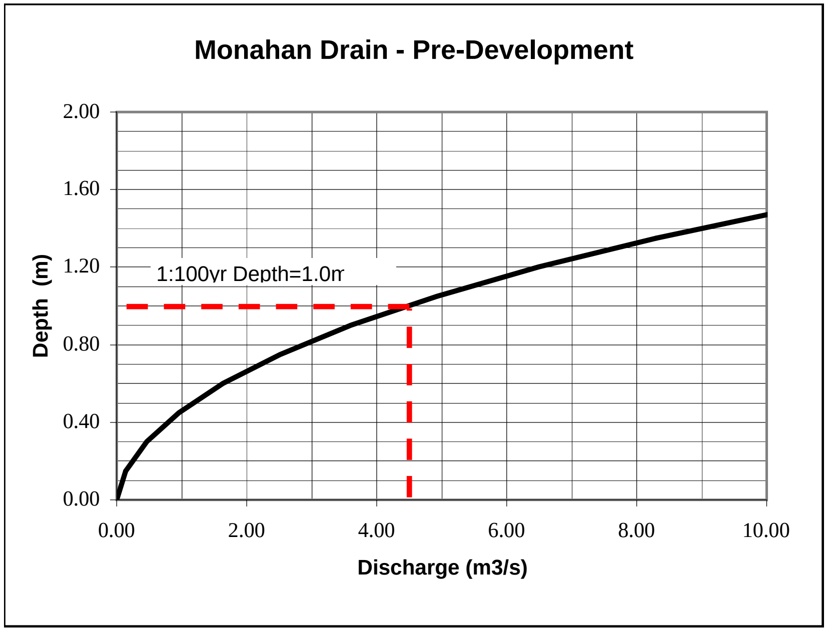
Dimensions:

Bottom width =	1.50	m
Right Side slopes =	1.5	:1
Left Side slopes =	1.5	:1
Slope =	0.55%	
Mannings n =	0.035	
Maximum depth =	1.50	m

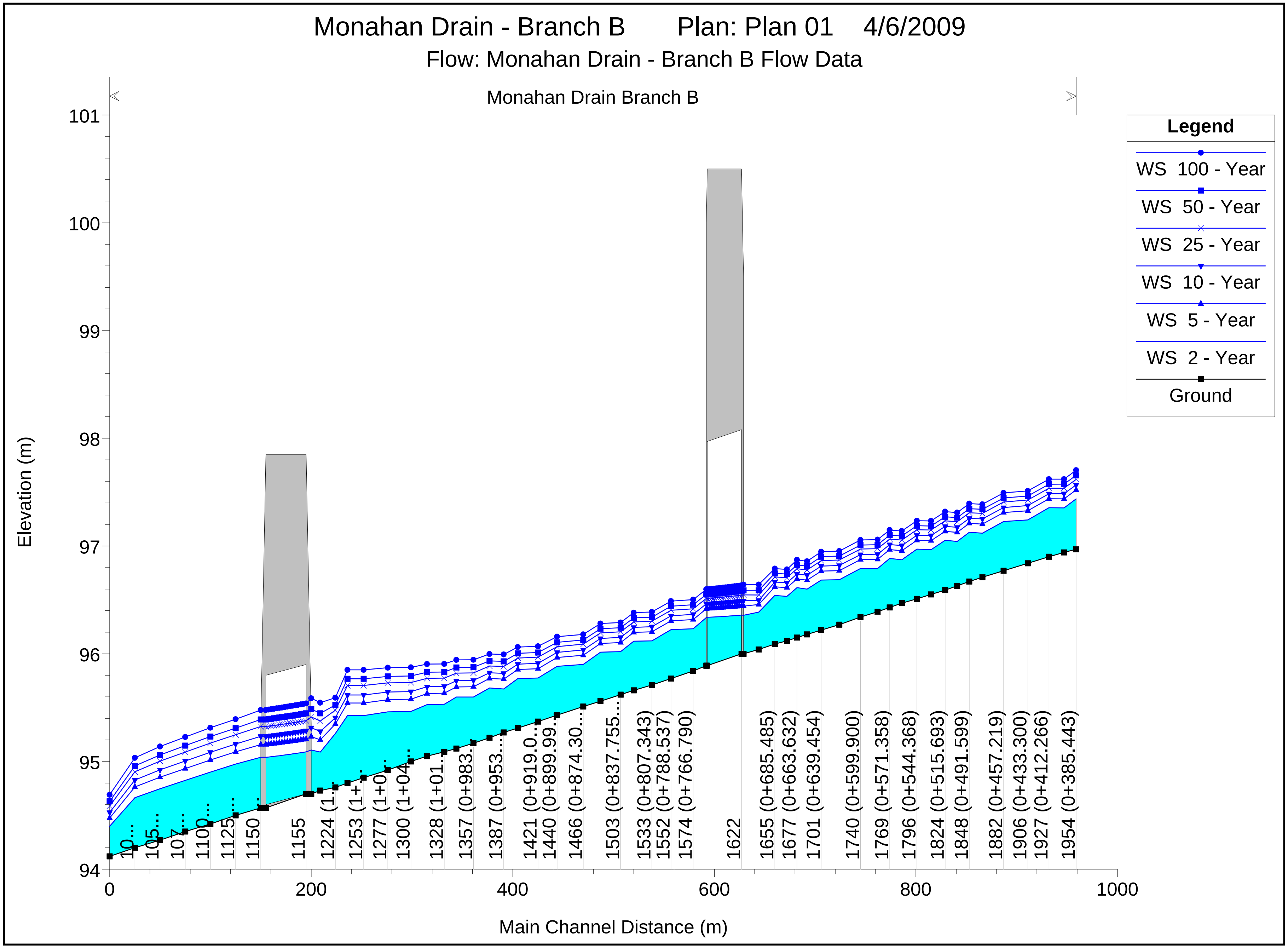
1:100yr Event:	*Peak Flow =*	*4.3*	*m^3/s*
	Depth =	*1.00*	*m*



Depth (m)	Area (m2)	Hydraulic Radius (m)	Velocity (m/s)	Flow (m3/s)
0.00	0.00	0.00	0.00	0.00
0.15	0.26	0.13	0.54	0.14
0.30	0.59	0.23	0.79	0.46
0.45	0.98	0.31	0.98	0.96
0.60	1.44	0.39	1.14	1.64
0.75	1.97	0.47	1.28	2.52
0.90	2.57	0.54	1.41	3.61
1.05	3.23	0.61	1.53	4.93
1.20	3.96	0.68	1.64	6.49
1.35	4.76	0.75	1.75	8.31
1.50	5.63	0.81	1.85	10.39



Novatech Engineering Consultants Ltd.
9/15/2008
Chancap-Monahan Drain.xls



Monahan Drain - Branch B Plan: Plan 01 4/6/2009
Flow: Monahan Drain - Branch B Flow Data
Monahan Drain Branch B
Legend
WS 100 - Year
WS 50 - Year
WS 25 - Year
WS 10 - Year
WS 5 - Year
WS 2 - Year
Ground
Elevation (m)
Main Channel Distance (m)
101
100
99
98
97
96
95
94
0
200
400
600
800
1000
1150
1155
1224 (1...
1253 (1+
1277 (1+0...
1300 (1+04...
1328 (1+01...
1357 (0+983...
1387 (0+953....
1421 (0+919.0...
1440 (0+899.99...
1466 (0+874.30...
1503 (0+837.755...
1533 (0+807.343)
1552 (0+788.537)
1574 (0+766.790)
1622
1655 (0+685.485)
1677 (0+663.632)
1701 (0+639.454)
1740 (0+599.900)
1769 (0+571.358)
1796 (0+544.368)
1824 (0+515.693)
1848 (0+491.599)
1882 (0+457.219)
1906 (0+433.300)
1927 (0+412.266)
1954 (0+385.443)

HEC-RAS Plan: Plan 01 River: Monahan Drain Reach: Branch B

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1954	2 - Year	0.63	96.97	97.44	0.45	1.46	4.24
Branch B	1954	5 - Year	0.89	96.97	97.52	0.52	1.83	4.90
Branch B	1954	10 - Year	1.07	96.97	97.57	0.56	2.07	5.27
Branch B	1954	25 - Year	1.29	96.97	97.62	0.62	2.35	5.68
Branch B	1954	50 - Year	1.47	96.97	97.66	0.65	2.57	5.99
Branch B	1954	100 - Year	1.72	96.97	97.70	0.70	2.87	6.37
Branch B	1942	2 - Year	0.63	96.94	97.35	1.12	0.57	2.36
Branch B	1942	5 - Year	0.89	96.94	97.44	1.13	0.79	2.95
Branch B	1942	10 - Year	1.07	96.94	97.49	1.14	0.94	3.29
Branch B	1942	25 - Year	1.29	96.94	97.54	1.16	1.12	3.72
Branch B	1942	50 - Year	1.47	96.94	97.57	1.19	1.26	4.05
Branch B	1942	100 - Year	1.72	96.94	97.62	1.22	1.46	4.45
Branch B	1927	2 - Year	0.63	96.90	97.36	0.46	1.41	4.14
Branch B	1927	5 - Year	0.89	96.90	97.44	0.54	1.78	4.80
Branch B	1927	10 - Year	1.07	96.90	97.48	0.58	2.01	5.18
Branch B	1927	25 - Year	1.29	96.90	97.54	0.63	2.28	5.58
Branch B	1927	50 - Year	1.47	96.90	97.57	0.67	2.50	5.88
Branch B	1927	100 - Year	1.72	96.90	97.62	0.71	2.78	6.26
Branch B	1906	2 - Year	0.63	96.84	97.24	1.17	0.54	2.28
Branch B	1906	5 - Year	0.89	96.84	97.33	1.18	0.76	2.87
Branch B	1906	10 - Year	1.07	96.84	97.38	1.18	0.91	3.22
Branch B	1906	25 - Year	1.29	96.84	97.43	1.20	1.08	3.64
Branch B	1906	50 - Year	1.47	96.84	97.46	1.22	1.22	3.96
Branch B	1906	100 - Year	1.72	96.84	97.51	1.25	1.42	4.37
Branch B	1882	2 - Year	0.63	96.77	97.23	0.46	1.41	4.16
Branch B	1882	5 - Year	0.89	96.77	97.31	0.53	1.78	4.82
Branch B	1882	10 - Year	1.07	96.77	97.36	0.58	2.02	5.19
Branch B	1882	25 - Year	1.29	96.77	97.41	0.63	2.29	5.60
Branch B	1882	50 - Year	1.47	96.77	97.45	0.67	2.51	5.90
Branch B	1882	100 - Year	1.72	96.77	97.49	0.71	2.80	6.28
Branch B	1861	2 - Year	0.63	96.71	97.12	1.14	0.56	2.33
Branch B	1861	5 - Year	0.89	96.71	97.20	1.15	0.78	2.92
Branch B	1861	10 - Year	1.07	96.71	97.25	1.15	0.93	3.26
Branch B	1861	25 - Year	1.29	96.71	97.30	1.18	1.11	3.69
Branch B	1861	50 - Year	1.47	96.71	97.34	1.20	1.25	4.02
Branch B	1861	100 - Year	1.72	96.71	97.39	1.23	1.45	4.43
Branch B	1848	2 - Year	0.63	96.67	97.13	0.46	1.42	4.16
Branch B	1848	5 - Year	0.89	96.67	97.21	0.53	1.79	4.82
Branch B	1848	10 - Year	1.07	96.67	97.26	0.58	2.02	5.19
Branch B	1848	25 - Year	1.29	96.67	97.31	0.63	2.30	5.60
Branch B	1848	50 - Year	1.47	96.67	97.35	0.66	2.51	5.91
Branch B	1848	100 - Year	1.72	96.67	97.39	0.71	2.80	6.28
Branch B	1836	2 - Year	0.63	96.63	97.04	1.12	0.56	2.35
Branch B	1836	5 - Year	0.89	96.63	97.13	1.14	0.79	2.94
Branch B	1836	10 - Year	1.07	96.63	97.17	1.14	0.94	3.28
Branch B	1836	25 - Year	1.29	96.63	97.23	1.17	1.11	3.71
Branch B	1836	50 - Year	1.47	96.63	97.26	1.19	1.26	4.04

HEC-RAS Plan: Plan 01 River: Monahan Drain Reach: Branch B (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1836	100 - Year	1.72	96.63	97.31	1.22	1.46	4.45
Branch B	1824	2 - Year	0.63	96.59	97.05	0.45	1.44	4.20
Branch B	1824	5 - Year	0.89	96.59	97.14	0.53	1.81	4.86
Branch B	1824	10 - Year	1.07	96.59	97.18	0.57	2.05	5.24
Branch B	1824	25 - Year	1.29	96.59	97.23	0.62	2.33	5.64
Branch B	1824	50 - Year	1.47	96.59	97.27	0.66	2.54	5.95
Branch B	1824	100 - Year	1.72	96.59	97.32	0.70	2.84	6.33
Branch B	1810	2 - Year	0.63	96.55	96.97	1.10	0.57	2.38
Branch B	1810	5 - Year	0.89	96.55	97.05	1.12	0.80	2.97
Branch B	1810	10 - Year	1.07	96.55	97.10	1.13	0.95	3.30
Branch B	1810	25 - Year	1.29	96.55	97.15	1.16	1.12	3.74
Branch B	1810	50 - Year	1.47	96.55	97.19	1.18	1.27	4.06
Branch B	1810	100 - Year	1.72	96.55	97.23	1.21	1.47	4.47
Branch B	1796	2 - Year	0.63	96.51	96.97	0.46	1.43	4.19
Branch B	1796	5 - Year	0.89	96.51	97.05	0.53	1.80	4.85
Branch B	1796	10 - Year	1.07	96.51	97.10	0.57	2.03	5.21
Branch B	1796	25 - Year	1.29	96.51	97.15	0.63	2.31	5.62
Branch B	1796	50 - Year	1.47	96.51	97.19	0.66	2.53	5.92
Branch B	1796	100 - Year	1.72	96.51	97.24	0.71	2.81	6.30
Branch B	1781	2 - Year	0.63	96.47	96.87	1.17	0.54	2.28
Branch B	1781	5 - Year	0.89	96.47	96.96	1.18	0.76	2.87
Branch B	1781	10 - Year	1.07	96.47	97.00	1.18	0.90	3.21
Branch B	1781	25 - Year	1.29	96.47	97.06	1.20	1.08	3.63
Branch B	1781	50 - Year	1.47	96.47	97.09	1.22	1.22	3.95
Branch B	1781	100 - Year	1.72	96.47	97.14	1.25	1.41	4.36
Branch B	1769	2 - Year	0.63	96.43	96.88	0.46	1.40	4.14
Branch B	1769	5 - Year	0.89	96.43	96.97	0.54	1.77	4.79
Branch B	1769	10 - Year	1.07	96.43	97.01	0.58	2.00	5.16
Branch B	1769	25 - Year	1.29	96.43	97.06	0.63	2.27	5.57
Branch B	1769	50 - Year	1.47	96.43	97.10	0.67	2.49	5.87
Branch B	1769	100 - Year	1.72	96.43	97.15	0.72	2.77	6.24
Branch B	1757	2 - Year	0.63	96.39	96.79	1.17	0.54	2.27
Branch B	1757	5 - Year	0.89	96.39	96.88	1.18	0.76	2.87
Branch B	1757	10 - Year	1.07	96.39	96.92	1.18	0.90	3.21
Branch B	1757	25 - Year	1.29	96.39	96.98	1.20	1.08	3.62
Branch B	1757	50 - Year	1.47	96.39	97.01	1.22	1.22	3.95
Branch B	1757	100 - Year	1.72	96.39	97.06	1.25	1.41	4.35
Branch B	1740	2 - Year	0.63	96.34	96.79	0.47	1.39	4.11
Branch B	1740	5 - Year	0.89	96.34	96.87	0.54	1.76	4.77
Branch B	1740	10 - Year	1.07	96.34	96.92	0.58	1.99	5.14
Branch B	1740	25 - Year	1.29	96.34	96.97	0.64	2.26	5.55
Branch B	1740	50 - Year	1.47	96.34	97.01	0.67	2.47	5.85
Branch B	1740	100 - Year	1.72	96.34	97.06	0.72	2.76	6.23
Branch B	1719	2 - Year	0.63	96.27	96.69	1.10	0.58	2.39
Branch B	1719	5 - Year	0.89	96.27	96.77	1.11	0.80	2.98
Branch B	1719	10 - Year	1.07	96.27	96.82	1.12	0.95	3.31

HEC-RAS Plan: Plan 01 River: Monahan Drain Reach: Branch B (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1719	25 - Year	1.29	96.27	96.87	1.15	1.13	3.75
Branch B	1719	50 - Year	1.47	96.27	96.91	1.18	1.27	4.07
Branch B	1719	100 - Year	1.72	96.27	96.95	1.21	1.47	4.47
Branch B	1701	2 - Year	0.63	96.22	96.68	0.45	1.44	4.21
Branch B	1701	5 - Year	0.89	96.22	96.77	0.53	1.82	4.87
Branch B	1701	10 - Year	1.07	96.22	96.81	0.57	2.05	5.24
Branch B	1701	25 - Year	1.29	96.22	96.86	0.62	2.33	5.64
Branch B	1701	50 - Year	1.47	96.22	96.90	0.66	2.54	5.94
Branch B	1701	100 - Year	1.72	96.22	96.95	0.71	2.83	6.31
Branch B	1687	2 - Year	0.63	96.18	96.60	1.08	0.58	2.41
Branch B	1687	5 - Year	0.89	96.18	96.68	1.11	0.81	2.99
Branch B	1687	10 - Year	1.07	96.18	96.73	1.12	0.95	3.31
Branch B	1687	25 - Year	1.29	96.18	96.78	1.16	1.12	3.74
Branch B	1687	50 - Year	1.47	96.18	96.81	1.19	1.26	4.04
Branch B	1687	100 - Year	1.72	96.18	96.86	1.22	1.45	4.44
Branch B	1677	2 - Year	0.63	96.15	96.61	0.45	1.44	4.20
Branch B	1677	5 - Year	0.89	96.15	96.69	0.53	1.81	4.85
Branch B	1677	10 - Year	1.07	96.15	96.74	0.57	2.03	5.22
Branch B	1677	25 - Year	1.29	96.15	96.79	0.63	2.30	5.61
Branch B	1677	50 - Year	1.47	96.15	96.83	0.67	2.51	5.90
Branch B	1677	100 - Year	1.72	96.15	96.87	0.71	2.79	6.26
Branch B	1667	2 - Year	0.63	96.12	96.53	1.12	0.57	2.36
Branch B	1667	5 - Year	0.89	96.12	96.61	1.15	0.78	2.92
Branch B	1667	10 - Year	1.07	96.12	96.66	1.16	0.92	3.24
Branch B	1667	25 - Year	1.29	96.12	96.71	1.20	1.08	3.63
Branch B	1667	50 - Year	1.47	96.12	96.74	1.23	1.21	3.93
Branch B	1667	100 - Year	1.72	96.12	96.78	1.27	1.39	4.30
Branch B	1655	2 - Year	0.63	96.09	96.54	0.47	1.39	4.11
Branch B	1655	5 - Year	0.89	96.09	96.62	0.54	1.74	4.75
Branch B	1655	10 - Year	1.07	96.09	96.66	0.59	1.96	5.10
Branch B	1655	25 - Year	1.29	96.09	96.71	0.65	2.21	5.48
Branch B	1655	50 - Year	1.47	96.09	96.75	0.69	2.40	5.75
Branch B	1655	100 - Year	1.72	96.09	96.79	0.74	2.66	6.10
Branch B	1639	2 - Year	0.63	96.04	96.39	1.49	0.42	1.88
Branch B	1639	5 - Year	0.89	96.04	96.46	1.55	0.58	2.39
Branch B	1639	10 - Year	1.07	96.04	96.50	1.59	0.67	2.66
Branch B	1639	25 - Year	1.29	96.04	96.55	1.59	0.81	3.01
Branch B	1639	50 - Year	1.47	96.04	96.59	1.54	0.95	3.32
Branch B	1639	100 - Year	1.72	96.04	96.64	1.52	1.14	3.78
Branch B	1624	2 - Year	0.63	96.00	96.36	0.61	1.04	3.36
Branch B	1624	5 - Year	0.89	96.00	96.44	0.68	1.35	4.04
Branch B	1624	10 - Year	1.07	96.00	96.49	0.71	1.56	4.43
Branch B	1624	25 - Year	1.29	96.00	96.55	0.76	1.81	4.87
Branch B	1624	50 - Year	1.47	96.00	96.59	0.79	2.02	5.20
Branch B	1624	100 - Year	1.72	96.00	96.64	0.83	2.31	5.63
Branch B	1622		Culvert					

HEC-RAS Plan: Plan 01 River: Monahan Drain Reach: Branch B (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1587	2 - Year	0.63	95.89	96.34	0.47	1.37	4.07
Branch B	1587	5 - Year	0.89	95.89	96.42	0.55	1.72	4.72
Branch B	1587	10 - Year	1.07	95.89	96.46	0.59	1.95	5.08
Branch B	1587	25 - Year	1.29	95.89	96.51	0.65	2.22	5.49
Branch B	1587	50 - Year	1.47	95.89	96.55	0.68	2.43	5.78
Branch B	1587	100 - Year	1.72	95.89	96.60	0.73	2.71	6.16
Branch B	1574	2 - Year	0.63	95.84	96.23	1.22	0.52	2.21
Branch B	1574	5 - Year	0.89	95.84	96.32	1.22	0.73	2.81
Branch B	1574	10 - Year	1.07	95.84	96.37	1.22	0.88	3.15
Branch B	1574	25 - Year	1.29	95.84	96.42	1.24	1.05	3.56
Branch B	1574	50 - Year	1.47	95.84	96.45	1.25	1.19	3.88
Branch B	1574	100 - Year	1.72	95.84	96.50	1.28	1.38	4.29
Branch B	1552	2 - Year	0.63	95.77	96.22	0.46	1.40	4.13
Branch B	1552	5 - Year	0.89	95.77	96.31	0.54	1.77	4.79
Branch B	1552	10 - Year	1.07	95.77	96.35	0.58	2.00	5.16
Branch B	1552	25 - Year	1.29	95.77	96.40	0.63	2.27	5.56
Branch B	1552	50 - Year	1.47	95.77	96.44	0.67	2.48	5.87
Branch B	1552	100 - Year	1.72	95.77	96.49	0.72	2.77	6.24
Branch B	1533	2 - Year	0.63	95.71	96.12	1.13	0.56	2.33
Branch B	1533	5 - Year	0.89	95.71	96.20	1.15	0.78	2.92
Branch B	1533	10 - Year	1.07	95.71	96.25	1.15	0.93	3.26
Branch B	1533	25 - Year	1.29	95.71	96.30	1.18	1.10	3.69
Branch B	1533	50 - Year	1.47	95.71	96.34	1.20	1.25	4.01
Branch B	1533	100 - Year	1.72	95.71	96.39	1.23	1.45	4.42
Branch B	1516	2 - Year	0.63	95.66	96.12	0.46	1.41	4.15
Branch B	1516	5 - Year	0.89	95.66	96.20	0.54	1.78	4.81
Branch B	1516	10 - Year	1.07	95.66	96.24	0.58	2.01	5.18
Branch B	1516	25 - Year	1.29	95.66	96.30	0.63	2.28	5.58
Branch B	1516	50 - Year	1.47	95.66	96.33	0.67	2.50	5.88
Branch B	1516	100 - Year	1.72	95.66	96.38	0.71	2.79	6.27
Branch B	1503	2 - Year	0.63	95.62	96.02	1.18	0.54	2.26
Branch B	1503	5 - Year	0.89	95.62	96.10	1.19	0.75	2.86
Branch B	1503	10 - Year	1.07	95.62	96.15	1.19	0.90	3.19
Branch B	1503	25 - Year	1.29	95.62	96.20	1.21	1.07	3.61
Branch B	1503	50 - Year	1.47	95.62	96.24	1.23	1.22	3.94
Branch B	1503	100 - Year	1.72	95.62	96.29	1.25	1.42	4.36
Branch B	1483	2 - Year	0.63	95.56	96.01	0.46	1.40	4.13
Branch B	1483	5 - Year	0.89	95.56	96.10	0.54	1.77	4.79
Branch B	1483	10 - Year	1.07	95.56	96.14	0.58	2.00	5.16
Branch B	1483	25 - Year	1.29	95.56	96.19	0.63	2.27	5.57
Branch B	1483	50 - Year	1.47	95.56	96.23	0.67	2.49	5.87
Branch B	1483	100 - Year	1.72	95.56	96.28	0.71	2.78	6.26
Branch B	1466	2 - Year	0.63	95.51	95.90	1.23	0.52	2.20
Branch B	1466	5 - Year	0.89	95.51	95.99	1.23	0.73	2.80
Branch B	1466	10 - Year	1.07	95.51	96.04	1.22	0.88	3.15
Branch B	1466	25 - Year	1.29	95.51	96.09	1.23	1.06	3.57

HEC-RAS Plan: Plan 01 River: Monahan Drain Reach: Branch B (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1466	50 - Year	1.47	95.51	96.13	1.24	1.20	3.92
Branch B	1466	100 - Year	1.72	95.51	96.18	1.25	1.42	4.36
Branch B	1440	2 - Year	0.63	95.43	95.88	0.47	1.39	4.12
Branch B	1440	5 - Year	0.89	95.43	95.97	0.54	1.76	4.78
Branch B	1440	10 - Year	1.07	95.43	96.01	0.58	2.00	5.16
Branch B	1440	25 - Year	1.29	95.43	96.07	0.63	2.28	5.58
Branch B	1440	50 - Year	1.47	95.43	96.11	0.66	2.51	5.91
Branch B	1440	100 - Year	1.72	95.43	96.16	0.70	2.83	6.32
Branch B	1421	2 - Year	0.63	95.37	95.77	1.16	0.55	2.30
Branch B	1421	5 - Year	0.89	95.37	95.86	1.16	0.77	2.91
Branch B	1421	10 - Year	1.07	95.37	95.91	1.15	0.93	3.26
Branch B	1421	25 - Year	1.29	95.37	95.97	1.15	1.13	3.74
Branch B	1421	50 - Year	1.47	95.37	96.01	1.16	1.30	4.12
Branch B	1421	100 - Year	1.72	95.37	96.07	1.16	1.55	4.62
Branch B	1401	2 - Year	0.63	95.31	95.77	0.46	1.42	4.17
Branch B	1401	5 - Year	0.89	95.31	95.85	0.53	1.80	4.85
Branch B	1401	10 - Year	1.07	95.31	95.90	0.57	2.05	5.24
Branch B	1401	25 - Year	1.29	95.31	95.96	0.61	2.36	5.70
Branch B	1401	50 - Year	1.47	95.31	96.00	0.64	2.62	6.05
Branch B	1401	100 - Year	1.72	95.31	96.06	0.68	2.98	6.51
Branch B	1387	2 - Year	0.63	95.27	95.67	1.16	0.54	2.29
Branch B	1387	5 - Year	0.89	95.27	95.76	1.14	0.78	2.93
Branch B	1387	10 - Year	1.07	95.27	95.82	1.13	0.95	3.31
Branch B	1387	25 - Year	1.29	95.27	95.88	1.11	1.18	3.86
Branch B	1387	50 - Year	1.47	95.27	95.93	1.10	1.37	4.27
Branch B	1387	100 - Year	1.72	95.27	95.99	1.09	1.66	4.83
Branch B	1373	2 - Year	0.63	95.22	95.68	0.45	1.43	4.20
Branch B	1373	5 - Year	0.89	95.22	95.77	0.52	1.84	4.91
Branch B	1373	10 - Year	1.07	95.22	95.82	0.56	2.10	5.32
Branch B	1373	25 - Year	1.29	95.22	95.89	0.60	2.46	5.83
Branch B	1373	50 - Year	1.47	95.22	95.93	0.62	2.74	6.21
Branch B	1373	100 - Year	1.72	95.22	96.00	0.65	3.16	6.72
Branch B	1357	2 - Year	0.63	95.17	95.60	1.05	0.60	2.46
Branch B	1357	5 - Year	0.89	95.17	95.69	1.02	0.87	3.14
Branch B	1357	10 - Year	1.07	95.17	95.75	1.01	1.07	3.60
Branch B	1357	25 - Year	1.29	95.17	95.82	0.99	1.34	4.21
Branch B	1357	50 - Year	1.47	95.17	95.87	0.98	1.57	4.66
Branch B	1357	100 - Year	1.72	95.17	95.94	0.96	1.92	5.36
Branch B	1340	2 - Year	0.63	95.12	95.60	0.44	1.50	4.33
Branch B	1340	5 - Year	0.89	95.12	95.69	0.50	1.95	5.08
Branch B	1340	10 - Year	1.07	95.12	95.75	0.53	2.25	5.54
Branch B	1340	25 - Year	1.29	95.12	95.82	0.56	2.66	6.10
Branch B	1340	50 - Year	1.47	95.12	95.87	0.58	2.99	6.52
Branch B	1340	100 - Year	1.72	95.12	95.94	0.60	3.47	7.08
Branch B	1328	2 - Year	0.63	95.09	95.53	1.00	0.64	2.55
Branch B	1328	5 - Year	0.89	95.09	95.63	0.96	0.94	3.28

HEC-RAS Plan: Plan 01 River: Monahan Drain Reach: Branch B (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1328	10 - Year	1.07	95.09	95.70	0.93	1.16	3.82
Branch B	1328	25 - Year	1.29	95.09	95.77	0.91	1.48	4.48
Branch B	1328	50 - Year	1.47	95.09	95.83	0.90	1.74	4.99
Branch B	1328	100 - Year	1.72	95.09	95.91	0.88	2.15	5.80
Branch B	1316	2 - Year	0.63	95.05	95.53	0.44	1.50	4.33
Branch B	1316	5 - Year	0.89	95.05	95.63	0.49	1.98	5.14
Branch B	1316	10 - Year	1.07	95.05	95.69	0.51	2.33	5.65
Branch B	1316	25 - Year	1.29	95.05	95.77	0.54	2.79	6.27
Branch B	1316	50 - Year	1.47	95.05	95.83	0.55	3.16	6.73
Branch B	1316	100 - Year	1.72	95.05	95.90	0.57	3.70	7.33
Branch B	1300	2 - Year	0.63	95.00	95.46	0.91	0.70	2.72
Branch B	1300	5 - Year	0.89	95.00	95.58	0.85	1.05	3.56
Branch B	1300	10 - Year	1.07	95.00	95.65	0.82	1.33	4.18
Branch B	1300	25 - Year	1.29	95.00	95.73	0.80	1.71	4.92
Branch B	1300	50 - Year	1.47	95.00	95.79	0.79	2.02	5.56
Branch B	1300	100 - Year	1.72	95.00	95.87	0.78	2.51	6.42
Branch B	1277	2 - Year	0.63	94.92	95.46	0.38	1.79	4.83
Branch B	1277	5 - Year	0.89	94.92	95.57	0.42	2.38	5.72
Branch B	1277	10 - Year	1.07	94.92	95.65	0.44	2.81	6.30
Branch B	1277	25 - Year	1.29	94.92	95.73	0.46	3.37	6.97
Branch B	1277	50 - Year	1.47	94.92	95.79	0.48	3.81	7.45
Branch B	1277	100 - Year	1.72	94.92	95.87	0.49	4.44	8.10
Branch B	1253	2 - Year	0.63	94.85	95.43	0.61	1.04	3.55
Branch B	1253	5 - Year	0.89	94.85	95.54	0.61	1.52	4.56
Branch B	1253	10 - Year	1.07	94.85	95.62	0.61	1.88	5.29
Branch B	1253	25 - Year	1.29	94.85	95.71	0.61	2.39	6.22
Branch B	1253	50 - Year	1.47	94.85	95.77	0.61	2.80	6.89
Branch B	1253	100 - Year	1.72	94.85	95.85	0.61	3.41	7.78
Branch B	1237	2 - Year	0.63	94.80	95.43	0.32	2.23	5.50
Branch B	1237	5 - Year	0.89	94.80	95.54	0.36	2.92	6.44
Branch B	1237	10 - Year	1.07	94.80	95.62	0.38	3.43	7.04
Branch B	1237	25 - Year	1.29	94.80	95.71	0.40	4.08	7.74
Branch B	1237	50 - Year	1.47	94.80	95.77	0.41	4.58	8.24
Branch B	1237	100 - Year	1.72	94.80	95.85	0.43	5.29	8.90
Branch B	1224	2 - Year	1.31	94.76	95.26	1.64	0.80	2.97
Branch B	1224	5 - Year	1.94	94.76	95.35	1.79	1.09	3.65
Branch B	1224	10 - Year	2.42	94.76	95.41	1.88	1.31	4.15
Branch B	1224	25 - Year	3.06	94.76	95.48	1.98	1.63	4.77
Branch B	1224	50 - Year	3.57	94.76	95.53	2.05	1.87	5.26
Branch B	1224	100 - Year	4.33	94.76	95.59	2.14	2.25	5.98
Branch B	1209	2 - Year	1.31	94.73	95.09	1.26	1.04	3.37
Branch B	1209	5 - Year	1.94	94.73	95.20	1.36	1.47	4.27
Branch B	1209	10 - Year	2.42	94.73	95.28	1.42	1.83	4.89
Branch B	1209	25 - Year	3.06	94.73	95.38	1.47	2.34	5.66
Branch B	1209	50 - Year	3.57	94.73	95.45	1.50	2.76	6.23
Branch B	1209	100 - Year	4.33	94.73	95.55	1.53	3.42	7.02

HEC-RAS Plan: Plan 01 River: Monahan Drain Reach: Branch B (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1200	2 - Year	1.31	94.70	95.11	0.55	2.38	6.63
Branch B	1200	5 - Year	1.94	94.70	95.23	0.61	3.27	7.62
Branch B	1200	10 - Year	2.42	94.70	95.31	0.65	3.93	8.29
Branch B	1200	25 - Year	3.06	94.70	95.41	0.69	4.80	9.09
Branch B	1200	50 - Year	3.57	94.70	95.49	0.72	5.48	9.67
Branch B	1200	100 - Year	4.33	94.70	95.59	0.76	6.49	10.47
Branch B	1155		Culvert					
Branch B	1150	2 - Year	1.31	94.57	95.04	0.47	2.78	6.88
Branch B	1150	5 - Year	1.94	94.57	95.16	0.54	3.63	7.35
Branch B	1150	10 - Year	2.42	94.57	95.23	0.58	4.20	7.66
Branch B	1150	25 - Year	3.06	94.57	95.33	0.62	4.92	8.02
Branch B	1150	50 - Year	3.57	94.57	95.39	0.66	5.45	8.28
Branch B	1150	100 - Year	4.33	94.57	95.48	0.70	6.19	8.63
Branch B	1125	2 - Year	1.31	94.50	94.98	0.80	1.65	4.41
Branch B	1125	5 - Year	1.94	94.50	95.09	0.89	2.17	4.86
Branch B	1125	10 - Year	2.42	94.50	95.16	0.96	2.53	5.15
Branch B	1125	25 - Year	3.06	94.50	95.25	1.02	2.99	5.49
Branch B	1125	50 - Year	3.57	94.50	95.31	1.07	3.34	5.74
Branch B	1125	100 - Year	4.33	94.50	95.39	1.13	3.83	6.07
Branch B	1100	2 - Year	1.31	94.42	94.90	0.78	1.67	4.43
Branch B	1100	5 - Year	1.94	94.42	95.01	0.89	2.19	4.87
Branch B	1100	10 - Year	2.42	94.42	95.09	0.95	2.55	5.16
Branch B	1100	25 - Year	3.06	94.42	95.17	1.02	3.00	5.50
Branch B	1100	50 - Year	3.57	94.42	95.23	1.07	3.35	5.75
Branch B	1100	100 - Year	4.33	94.42	95.31	1.13	3.83	6.07
Branch B	1075	2 - Year	1.31	94.35	94.82	0.80	1.64	4.40
Branch B	1075	5 - Year	1.94	94.35	94.93	0.91	2.14	4.84
Branch B	1075	10 - Year	2.42	94.35	95.00	0.97	2.49	5.12
Branch B	1075	25 - Year	3.06	94.35	95.09	1.04	2.93	5.45
Branch B	1075	50 - Year	3.57	94.35	95.15	1.09	3.27	5.69
Branch B	1075	100 - Year	4.33	94.35	95.23	1.16	3.73	6.01
Branch B	1050	2 - Year	1.31	94.27	94.75	0.79	1.65	4.41
Branch B	1050	5 - Year	1.94	94.27	94.85	0.91	2.14	4.84
Branch B	1050	10 - Year	2.42	94.27	94.92	0.98	2.48	5.11
Branch B	1050	25 - Year	3.06	94.27	95.00	1.05	2.91	5.43
Branch B	1050	50 - Year	3.57	94.27	95.06	1.11	3.23	5.66
Branch B	1050	100 - Year	4.33	94.27	95.14	1.18	3.68	5.97
Branch B	1025	2 - Year	1.31	94.20	94.66	0.82	1.59	4.36
Branch B	1025	5 - Year	1.94	94.20	94.76	0.95	2.05	4.76
Branch B	1025	10 - Year	2.42	94.20	94.83	1.03	2.36	5.01
Branch B	1025	25 - Year	3.06	94.20	94.91	1.11	2.76	5.32
Branch B	1025	50 - Year	3.57	94.20	94.96	1.17	3.05	5.54
Branch B	1025	100 - Year	4.33	94.20	95.03	1.25	3.48	5.84
Branch B	1000	2 - Year	1.31	94.12	94.40	1.53	0.86	3.62
Branch B	1000	5 - Year	1.94	94.12	94.48	1.70	1.14	3.92
Branch B	1000	10 - Year	2.42	94.12	94.53	1.79	1.35	4.13

HEC-RAS Plan: Plan 01   River: Monahan Drain   Reach: Branch B (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Vel Chnl	Flow Area	Top Width
			(m3/s)	(m)	(m)	(m/s)	(m2)	(m)
Branch B	1000	25 - Year	3.06	94.12	94.59	1.91	1.60	4.37
Branch B	1000	50 - Year	3.57	94.12	94.63	1.98	1.80	4.54
Branch B	1000	100 - Year	4.33	94.12	94.69	2.08	2.08	4.79

APPENDIX K

HYDRAULIC & SENSITIVITY ANALYSIS OF FLEWELLYN DRAIN

Summary Report
HEC-RAS Modeling Files
SWMHYMO Modeling Files

M E M O R A N D U M

DATE: OCTOBER 3, 2007

TO: PETER NESBITT

FROM: JOHN RIDDELL

RE: LOWERING OF FLEWELLYN DRAIN

CC: GRAHAM BIRD

As previously discussed, the storm drainage solution for your lands contemplates lowering the Flewellyn Drain approximately 0.5m, from just south of your property and tieing into existing grade approximately 650m south. This would contain the work to a single property owner (A&A Schouten).

Based on discussion at the last POH we understand that these lands are under an agreement of purchase and sale (presumably to the Calgary company that is land banking in the area). We provided some general information to their real estate agent (Paul Major, Royal Lepage Performance Realty).

Some of the issues to consider / pursue:

1. The alternative to lowering the drain is $500-700,000 of additional earth moving. Therefore, this solution is economical but if it becomes problematic, we have a fall back that doesn't "break the bank".
2. The City is suggesting that the engineers report under the Drainage Act should be initiated now. We need to submit a formal request to the City. The issue of the City undertaking the work and us keeping track of the schedule will need to be resolved.
3. We recommend that negotiations with the landowner (purchaser) should be completed with compensation agreed upon and documented. This will assist in ensuring the Drainage Act proceeds smoothly, although it doesn't preclude others from objecting.
4. With respect to the City and the EMP, if we have initiated the Drainage Act process and we have a fallback position (failing approval of the lowering) they will be satisfied.
5. Attached is a plan and sketch of the proposal. The additional land impacted is 0.23ha plus a working easement strip along the drain of say 10 metres wide (only required during construction).

Please review and give me a call to discuss.

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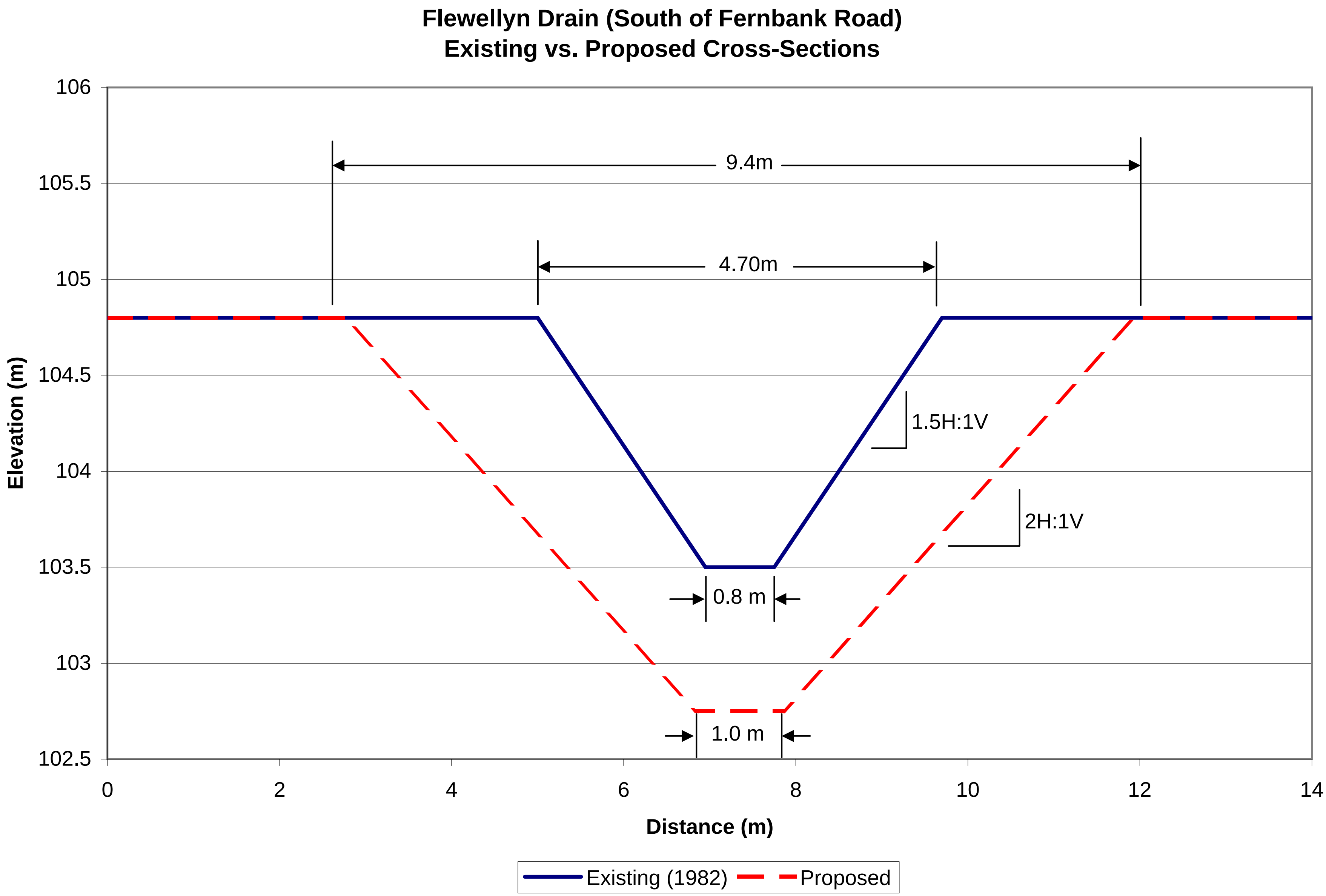
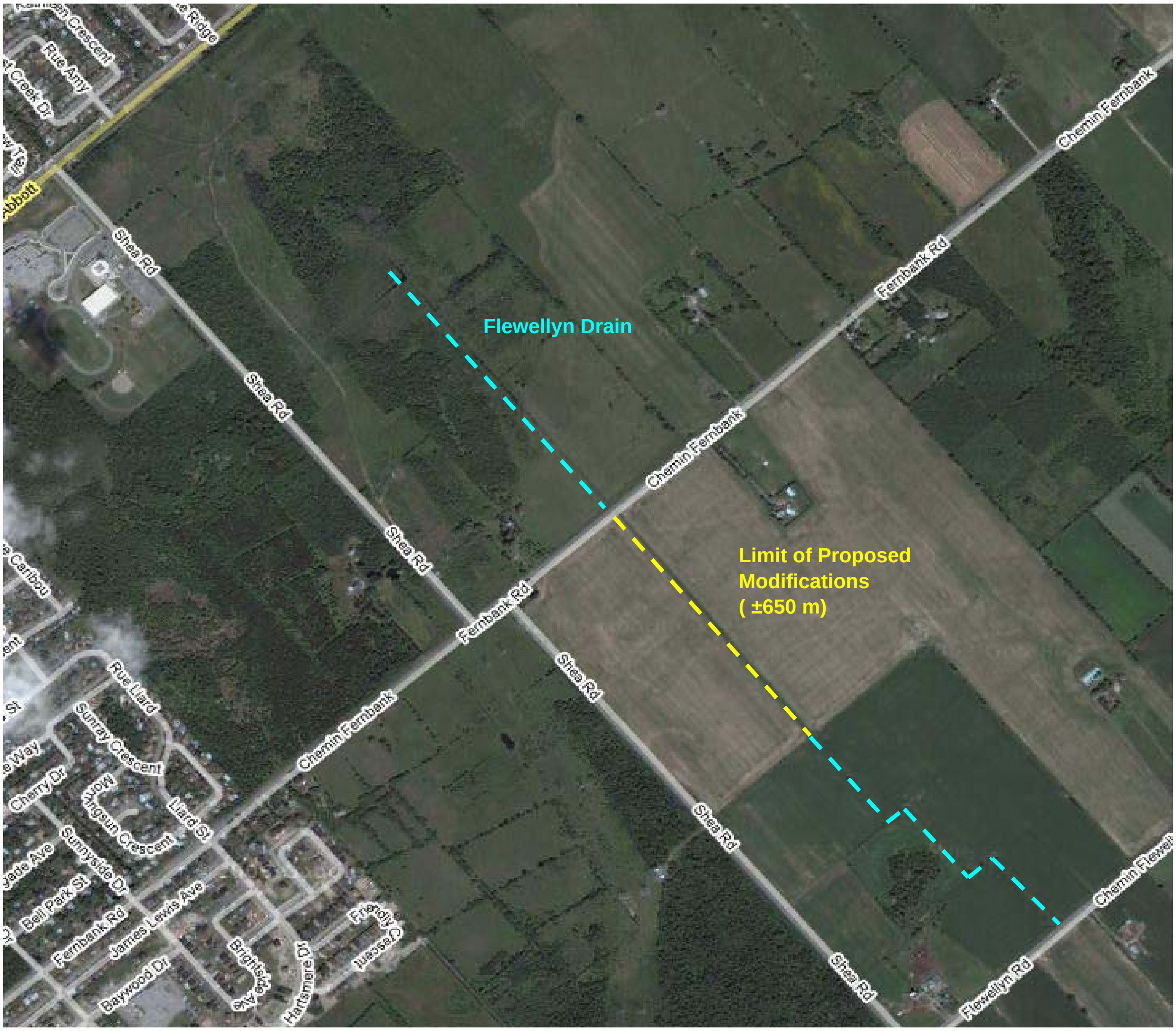

Flewellyn Drain (South of Fernbank Road)
Existing vs. Proposed Cross-Sections
Elevation (m)
106
105.5
105
104.5
104
103.5
103
102.5
0
2
4
6
8
10
12
14
Distance (m)
9.4m
4.70m
1.5H:1V
2H:1V
0.8 m
1.0 m
Existing (1982)
Proposed


Flewellyn Drain
Limit of Proposed
Modifications
(±650 m)
Shea Rd
Chemin Fernbank
Fernbank Rd
Flewellyn Rd

FERNBANK CDP: Flewellyn Drain SWM Facility Sensitivity Analysis

A HEC-RAS model has been developed for the Flewellyn Drain based on the design drawings accompanying the 1982 Engineer's Report. SWMHYMO models have been developed to calculate both pre and post-development flows in the Flewellyn Drain. The existing conditions hydrologic model was calibrated using the results of the modeling completed for the *Jock River Reach 2 Subwatershed Study*. The results of this calibration are provided in a separate design brief.

The post-development hydrologic model reflects the proposed land use plan for the Fernbank Community, including a conceptual storage-discharge table for the Flewellyn Drain SWM facility.

Determination of Bankfull Flow in the Flewellyn Drain

Peak flows from the SWMHYMO model were input into the HEC-RAS model of the Flewellyn Drain to determine reaches that are susceptible to flooding, and to determine what the bankfull flow capacity of the drain is in those locations. The two locations selected for use in the sensitivity analysis are downstream of Fernbank Road (Station 6+948), and downstream of Flewellyn Road (Station 5+148). HEC-RAS output plots are attached. Table 1 provides a summary of the analysis.

Table 1: Flewellyn Drain Bankfull Flow Capacity

Location	Bankfull Capacity	Approximate Return Period
Station 6+948 Downstream of Fernbank Road	2.90 m^3/s	25 yr
Station 5+148 Downstream of Flewellyn Road	3.23 m^3/s	5 yr

These two locations were selected for the analysis as they are close enough to the proposed development that the impacts of the sensitivity analysis are apparent. As additional flows enter the drain further downstream, the impacts of development within the Fernbank Community are less significant with respect to the overall flow in the drain.

SWM Facility Storage-Discharge Curves

For post-development conditions, a conceptual storage-discharge curve has been used to model outflows from the Fernbank CDP lands to the Flewellyn Drain. A second storage-discharge curve was created that represents a 25% decrease in active storage. The SWM Facility storage-discharge curves are provided in Table 2.

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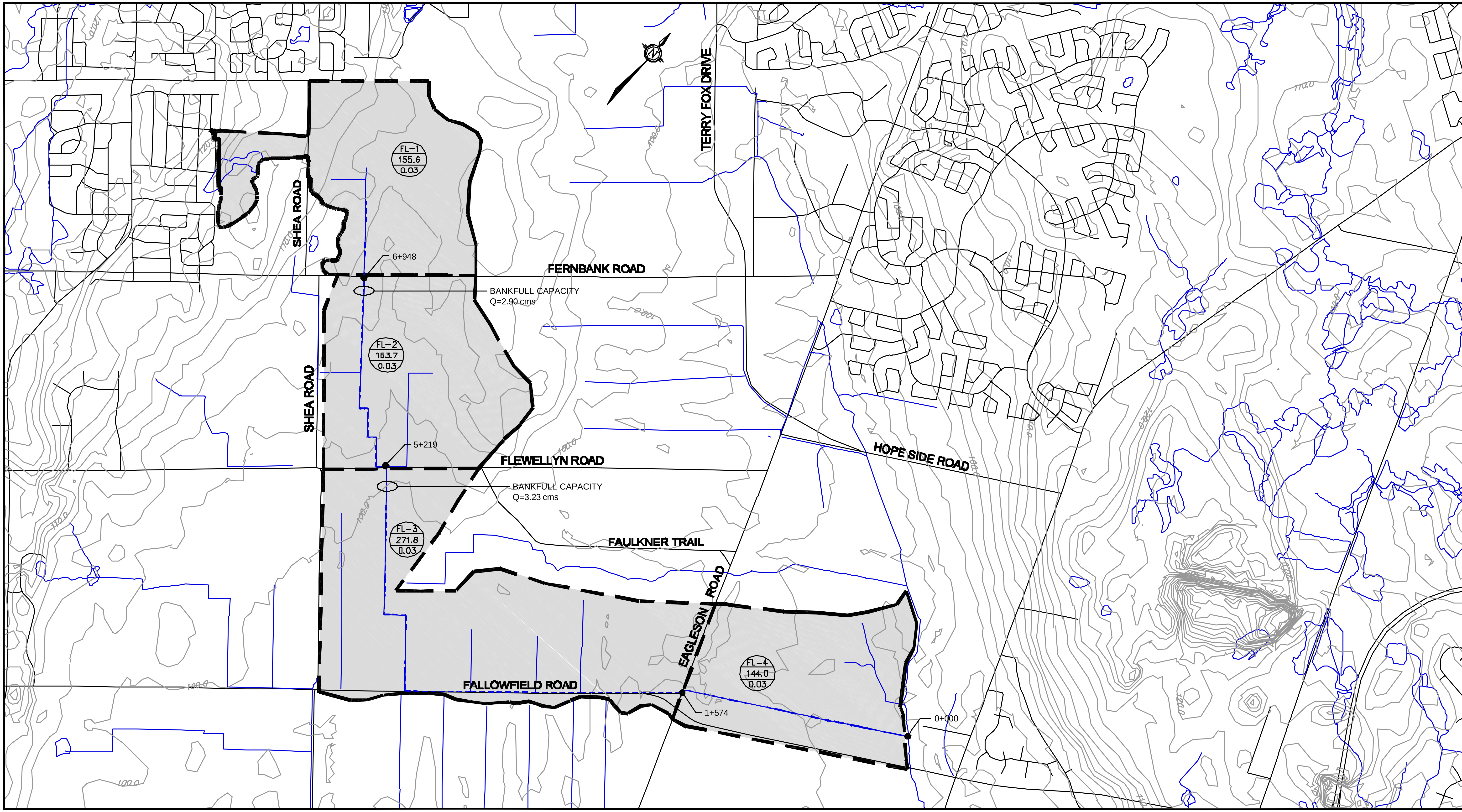
Drawing: M:\2001\101108\CAD\SWM\MONAHAN DRAIN AREAS-EX.dwg Layout: Flewellyn Updated FEB 20, 2008 at 2:03pm by mpetepiece



0+000 HEC-RAS STATION ID

FLEWELLYN DRAIN

FL-3 / 271.8 / 0.03 — SUBCATCHMENT ID / DRAINAGE AREA (hectares) / % IMPERVIOUS

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FERNBANK COMMUNITY

FLEWELLYN DRAIN SENSITIVITY ANALYSIS SUBCATCHMENTS & HEC-RAS STATIONS

101108 FEB 2008 **FIG-FLW1**

SH711X17.DWG – 278mmX431mm

Table 2: Flewellyn SWMF Storage-Discharge

Release Rate (m^3/s)	Active Storage (m^3)	Active Storage (25% reduction) (m^3)
0.090	6,120	4,590
1.800	31,000	23,250
2.400	39,000	29,250
4.000	65,000	48,750

Sensitivity Analysis

Once the bankfull flow capacities were identified, the SWMHYMO model was used to determine the extent of flooding (volume of runoff exceeding bankfull capacity) for both pre and post-development conditions. Flooding volumes were determined using the COMPUTE VOLUME command. This command calculates the storage required to attenuate the peak flow of a given hydrograph to a specified rate, in this case the bankfull capacity. The calculated volume represents the volume of runoff that would exceed bankfull conditions (ie. flooding volume).

A sensitivity analysis was performed to determine what impact 25% decrease in active storage would have on flooding downstream in the Flewellyn drain. The analysis was completed for return periods of 5, 10 and 100 years. The results of the analysis are summarized in Tables 3 and 4.

Table 3: Flooding Analysis at Station 6+948 (Downstream of Fernbank Road)

Development Condition	Bankfull Capacity (m^3/s)	1:5 year			1:10 year			1:100 year		
		Peak Flow (m^3/s)	Flooding Volume (ha.m)	SWMF Storage (ha.m)	Peak Flow (m^3/s)	Flooding Volume (ha.m)	SWMF Storage (ha.m)	Peak Flow (m^3/s)	Flooding Volume (ha.m)	SWMF Storage (ha.m)
Pre-Dev	2.90	1.81	0	N/A	2.28	0	N/A	4.05	1.19	N/A
Post-Dev	2.90	2.04	0	3.42	2.50	0	4.07	4.04	1.18	6.50
Post-Dev (-25%)	2.90	2.47	0	3.01	2.95	0.01	3.60	4.78	2.41	4.87
Increase in Flooding Volume / Decrease in SWMF Storage			0	0.41		0.01	0.47		1.23	1.69

Table 4: Flooding Analysis at Station 5+148 (Downstream of Flewellyn Road)

Development Condition	Bankfull Capacity (m^3/s)	1:5 year			1:10 year			1:100 year		
		Peak Flow (m^3/s)	Flooding Volume (ha.m)	SWMF Storage (ha.m)	Peak Flow (m^3/s)	Flooding Volume (ha.m)	SWMF Storage (ha.m)	Peak Flow (m^3/s)	Flooding Volume (ha.m)	SWMF Storage (ha.m)
Pre-Dev	3.23	3.23	0	N/A	4.08	0.86	N/A	6.73	7.37	N/A
Post-Dev	3.23	3.45	0.11	3.42	4.30	1.15	4.07	6.74	7.55	6.56
Post-Dev (-25%)	3.23	3.87	0.49	3.01	4.66	1.72	3.60	7.94	8.50	4.87
Increase in Flooding Volume /			0.38	0.41		0.57	0.47		0.95	1.69

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Decrease in SWMF Storage								

Results of Sensitivity Analysis

The results of the analysis indicate that decreasing the active storage in the SWM facility would result in a similar increase in flooding downstream. For Example:

<u>Flooding D/S of Fernbank (1:100 year event)</u>

Pre-Development Flooding Volume: 11,900 m^3

Max SWM Facility Active Storage: 65,000 m^3
Post-Development Flooding Volume: 11,800 m^3

Max SWM Facility Active Storage: 48,750 m^3 (16,250 m^3 decrease in storage)
Post-Development Flooding Volume: 24,100 m^3 (12,300 m^3 increase in flooding)

<u>Flooding D/S of Flewellyn Road (1:5 year event)</u>

Pre-Development Flooding Volume: 0 m^3

SWM Facility Active Storage: 34,200 m^3
Post-Development Flooding Volume: 1,100 m^3

Max SWM Facility Active Storage: 30,100 m^3 (4,100 m^3 decrease in storage)
Post-Development Flooding Volume: 4,900 m^3 (3,800 m^3 increase in flooding)

Decreasing the active storage in the Flewellyn SWM facility would not only increase the extent of flooding downstream. The peak outflow rates from the facility would also increase, which could result in increased erosion in the downstream channel.

Conclusions

The proposed SWM facility should be sized to provide sufficient storage to ensure that there is no significant increase in flooding volumes in the downstream Flewellyn Drain. Peak flow control should be provided to ensure that post-development flows do not result in an increase in erosive flows.

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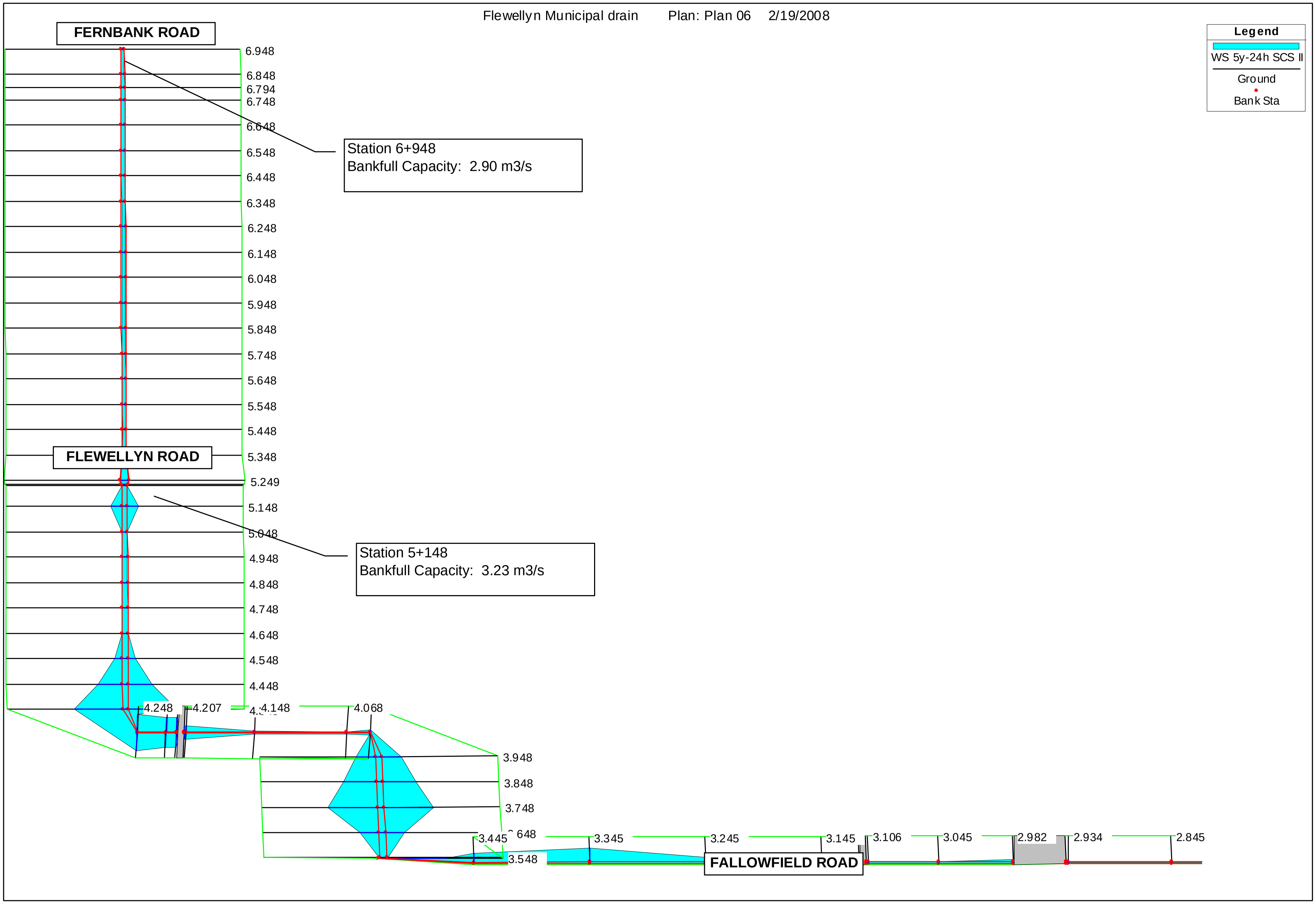
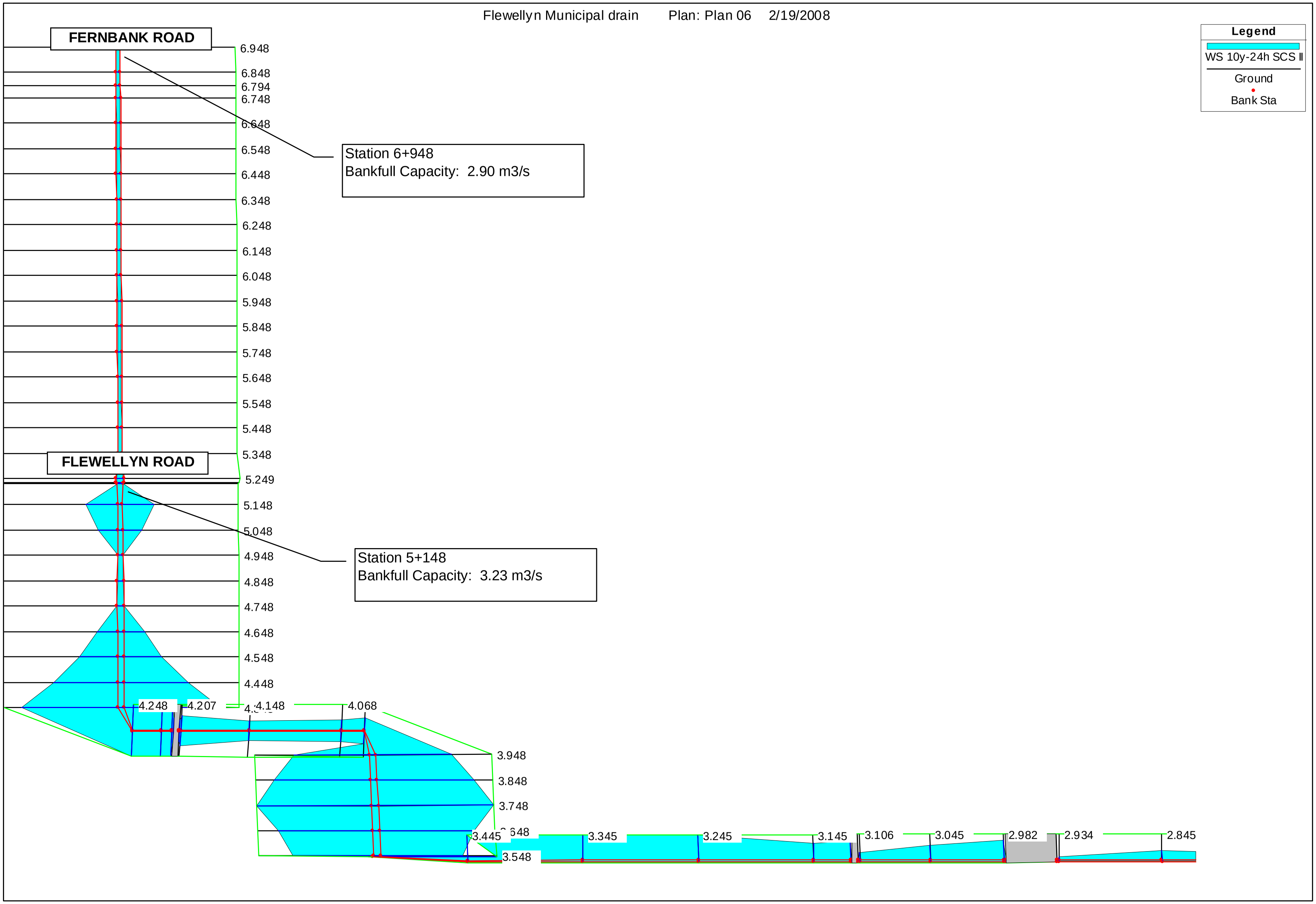
FLEWELLYN DRAIN HEC-RAS MODEL
1:5 YEAR EVENT



FLEWELLYN DRAIN HEC-RAS MODEL
1:10 YEAR EVENT



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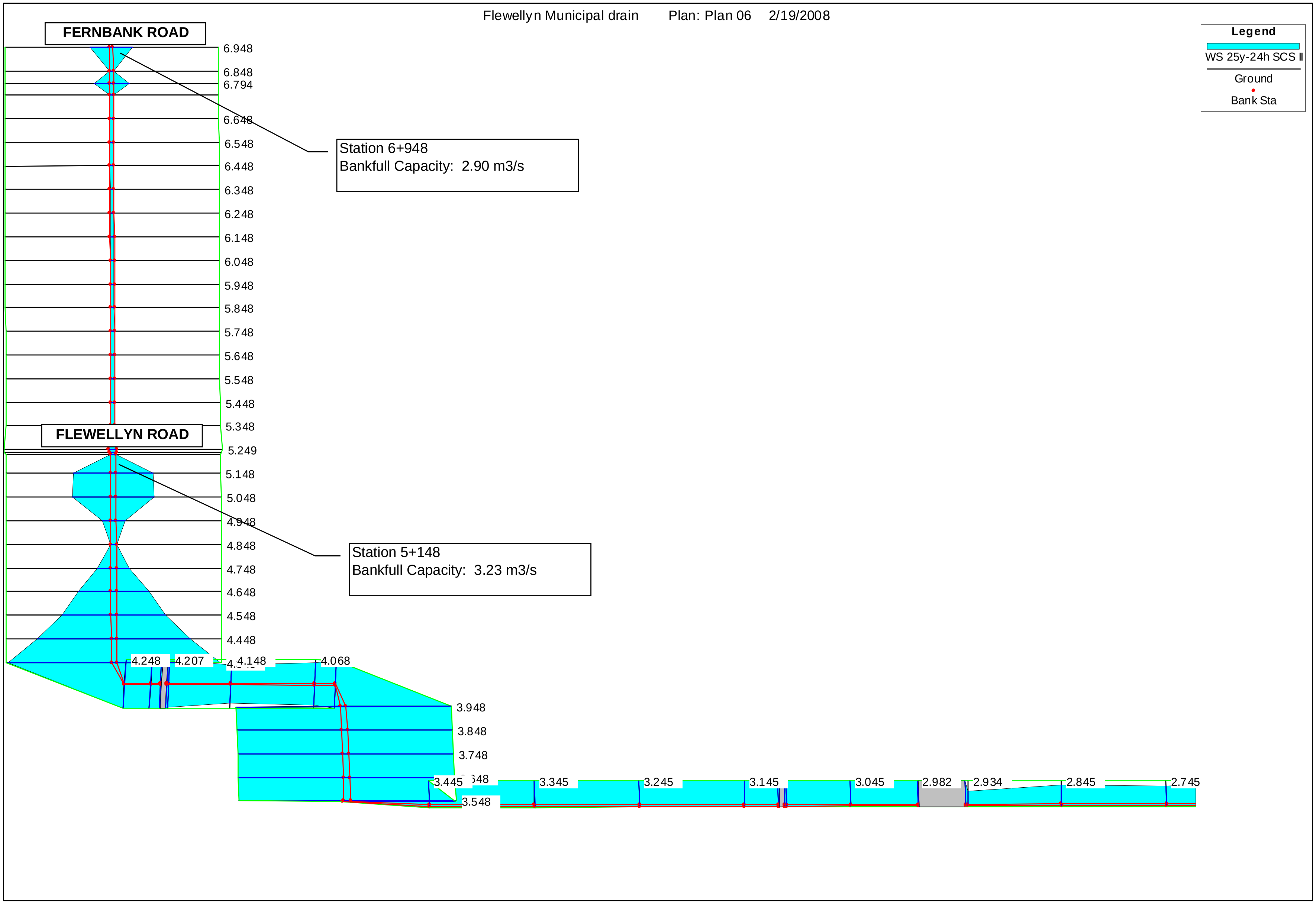
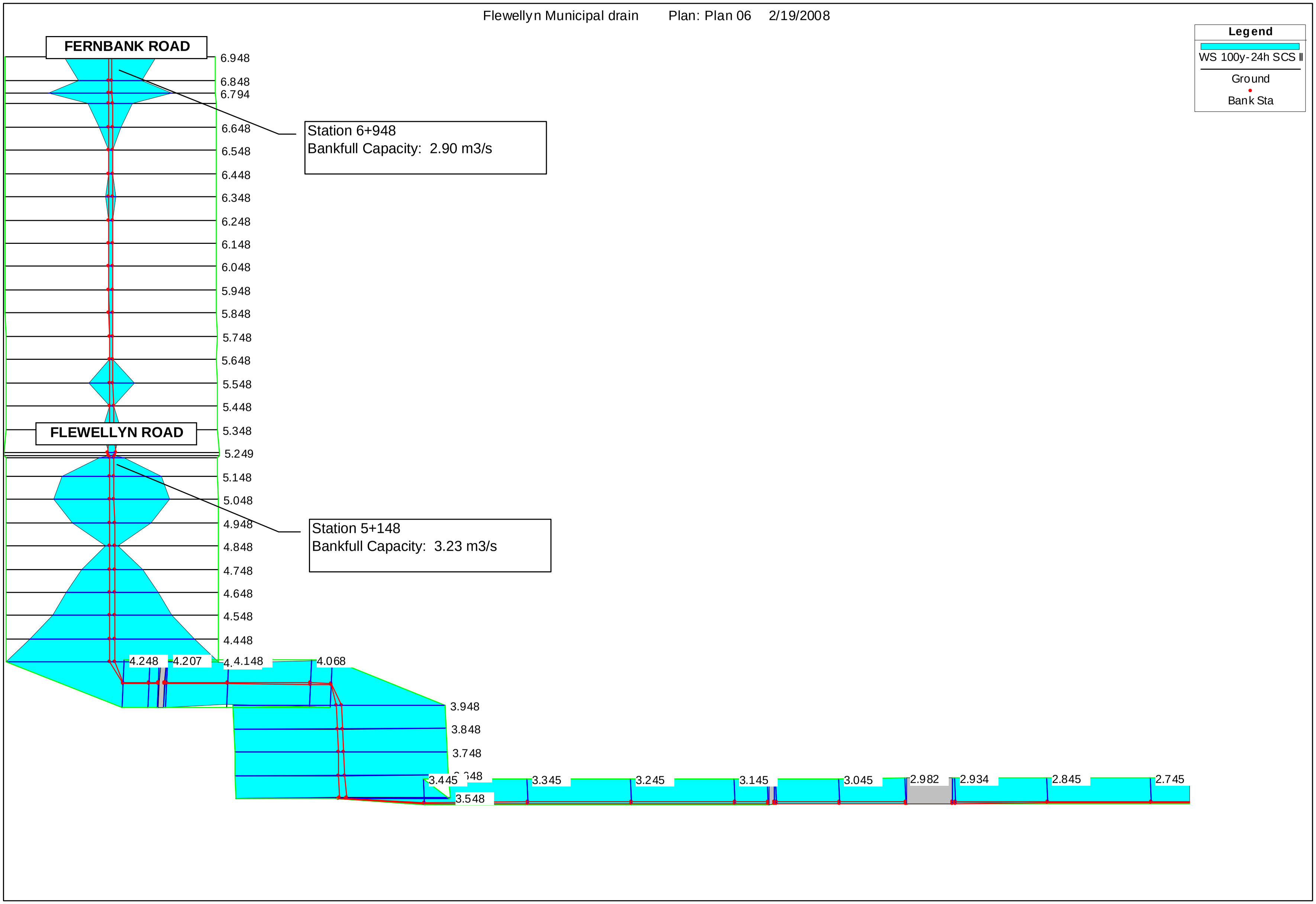
1:25 YEAR EVENT



FLEWELLYN DRAIN HEC-RAS MODEL
1:100 YEAR EVENT



APPENDIX L

CARP RIVER RESTORATION CONCEPT - UPSTREAM OF HAZELDEAN ROAD

Appendix L

Carp River Restoration Concept
(Upstream of Hazeldean Road)

Restoration Concept

Suggested areas for enhancements are referenced by the following numbers on the attached marked-up plan (Figure L-1):

1. In headwaters of Carp River improve channel definition to increase fish access further upstream. Remove islands that are splitting flow and debris jams, including clumps of earth, in the channels;
2. Provide riparian and floodplain plantings along Carp River and West Tributary within MVC lands, taking into consideration any impacts on floodplain function (ie. increased floodplain roughness). Concentrate on west and south (where applicable) sides for increased shading;
3. Add a series of floodplain pools and deeper refuge pools along the Carp River to provide spawning and nursery habitat and summer refuge;
4. Add a series of drowned riffles for scouring and diversity of habitat;
5. Add logs, root wads and boulders to provide additional enhanced in-stream structure; and,
6. On Carp River West Tributary - remove perched culvert under access road.

Focus is on improving overall aquatic habitat, not providing spawning habitat for a specific species. The Carp River Restoration Plan states that no pike were observed at anytime in any location during the spring inventories. No pike or any other large-bodied species were observed in the flooded vegetation along the mainstream of the Carp River. Only non-forage fish recorded during the study were pumpkinseed, rock bass and white sucker. Some restoration measures in the Carp River plan do not appear to be applicable to our section such as narrowing of channel (channel is already narrow).

Deficit Floodplain Volume (from Carp River Restoration 3rd Party Review)

The Third Party Review has estimated a worst-case scenario storage deficit within the Carp River at approximately 85,600 m^3. The Fernbank portion of this deficit storage is currently estimated at approximately 18,400 m^3 (refer to EMP Section 11.7).

The required deficit storage requirement should be revisited at the time of detailed design. The proposed restoration works upstream of Hazeldean Road represent an opportunity to create additional floodplain storage outside the main channel of the Carp River, and consideration should be given to coordinating the proposed restoration works with the potential requirement for additional flood storage.

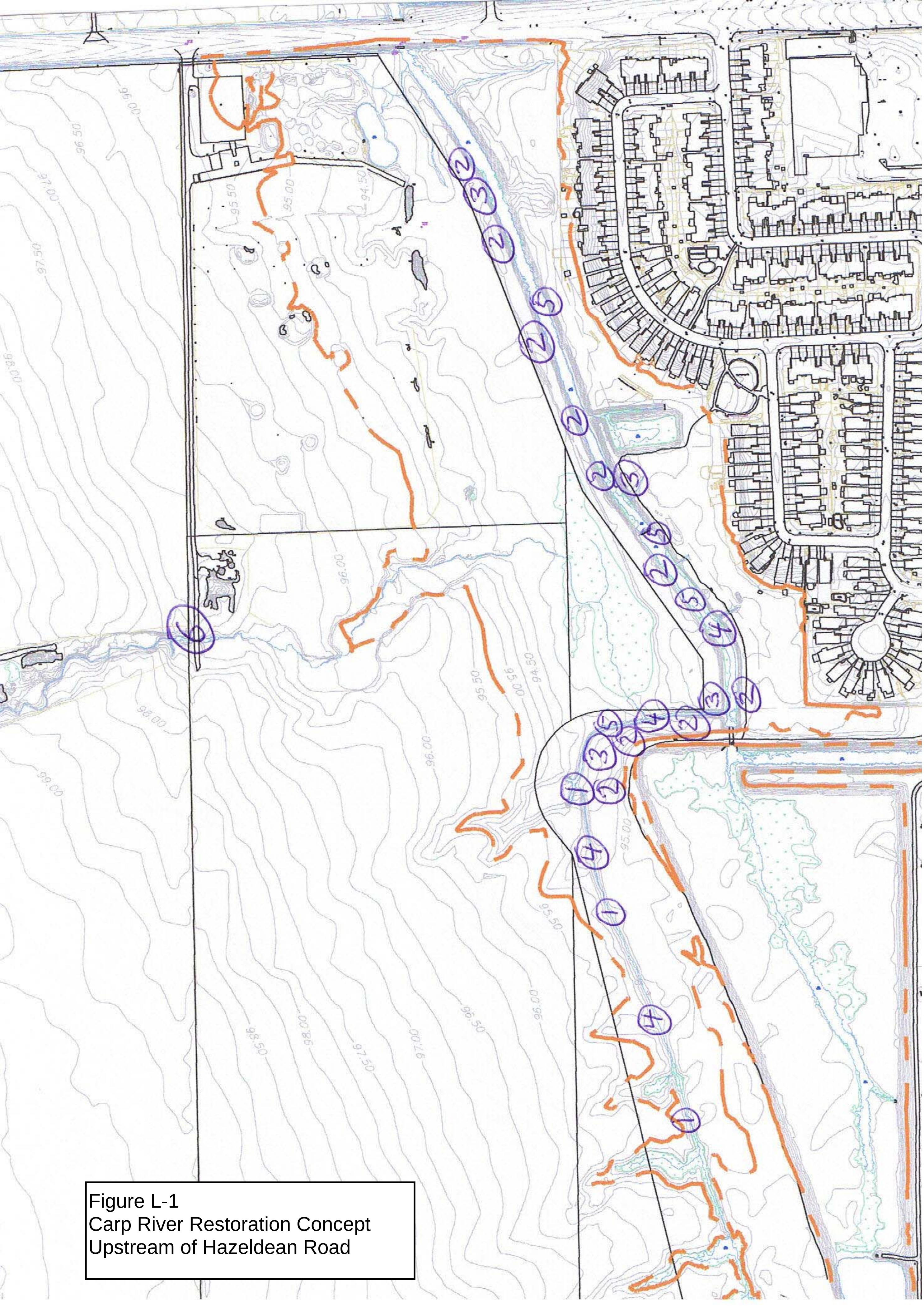


Figure L-1
Carp River Restoration Concept
Upstream of Hazeldean Road

APPENDIX M

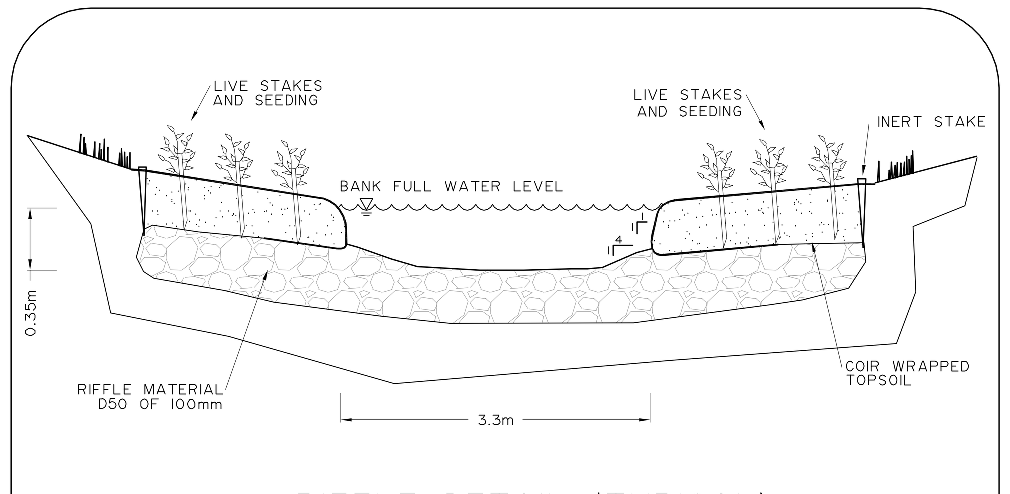
EXISTING CONDITIONS REPORTS
(UNDER SEPARATE COVER)

Archaeological Assessment
Land Use Planning
Transportation
Municipal Infrastructure
Natural Environment
Fluvial Geomorphology
Storm Drainage & Hydrology
Geotechnical Analysis
Hydrogeology

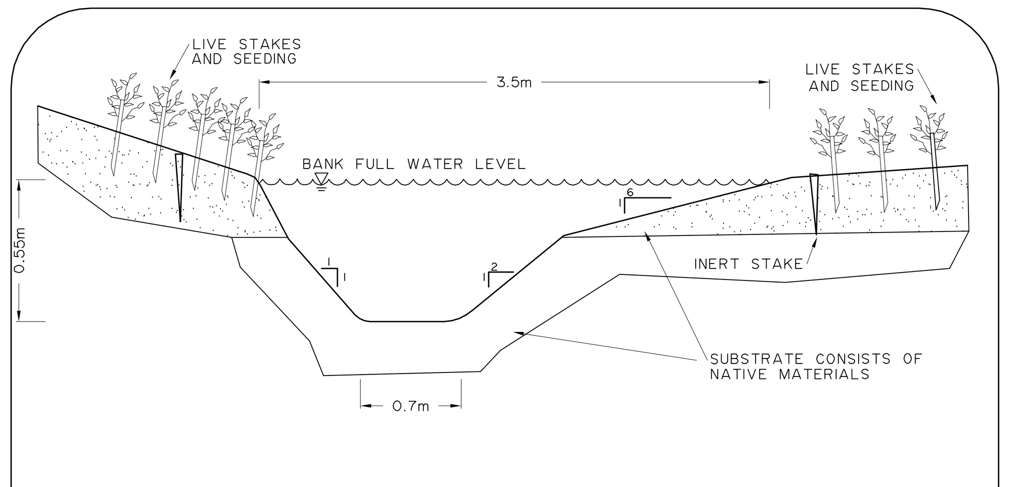
APPENDIX N

DRAWINGS

Carp River Tributary Plan & Profile
Monahan Drain Plan & Profile
Flewellyn Drain Plan & Profile

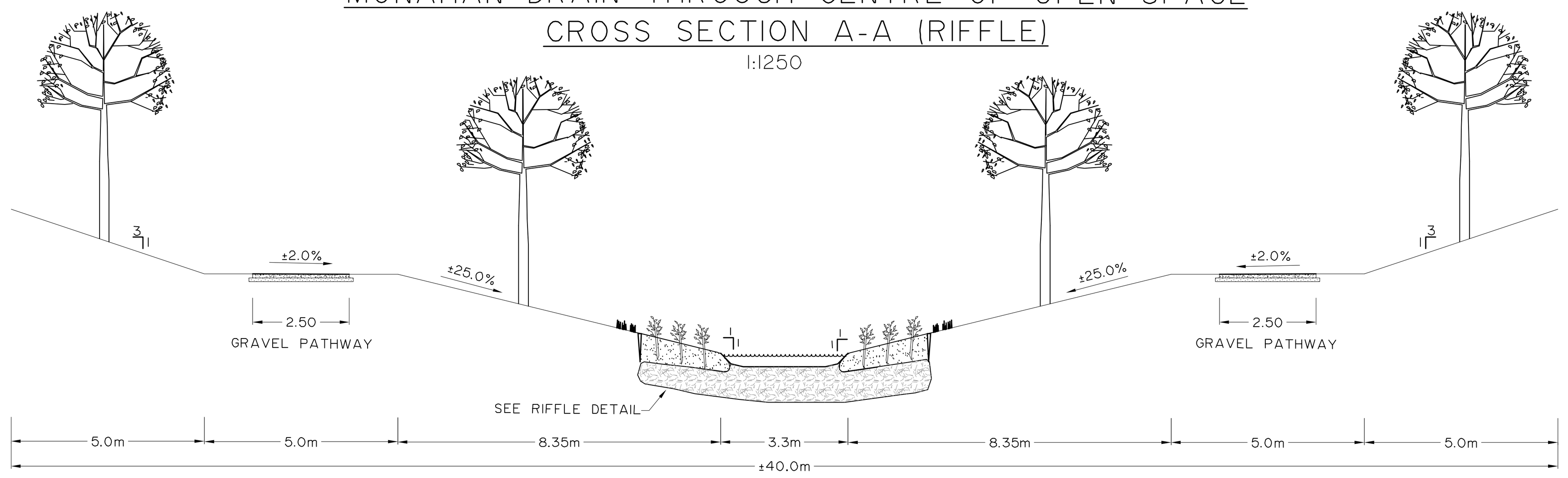


RIFFLE DETAIL (TYPICAL)
NOT TO SCALE

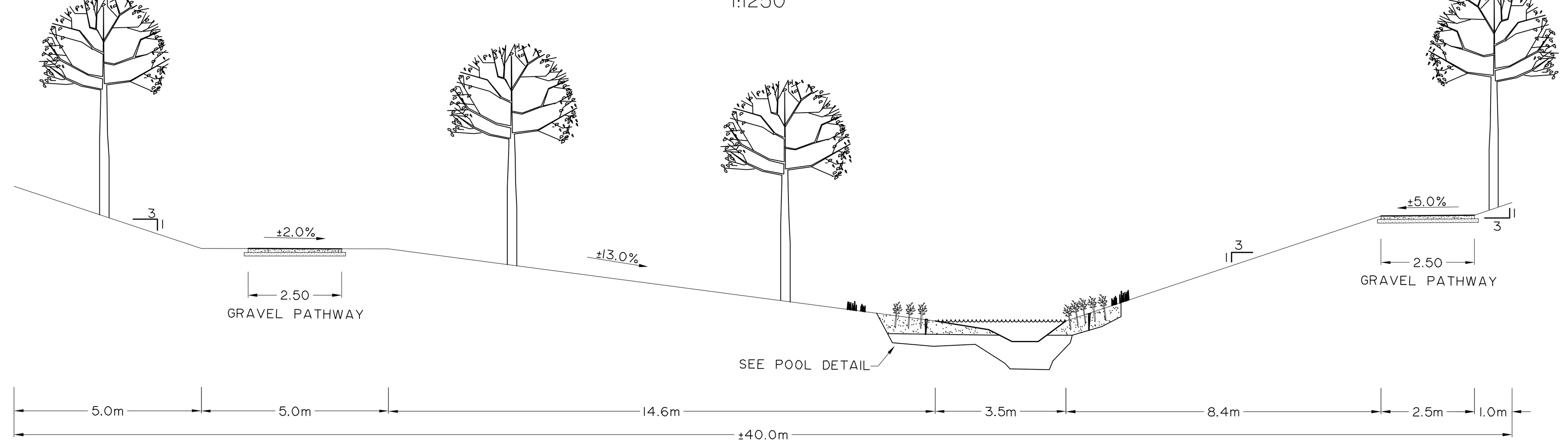


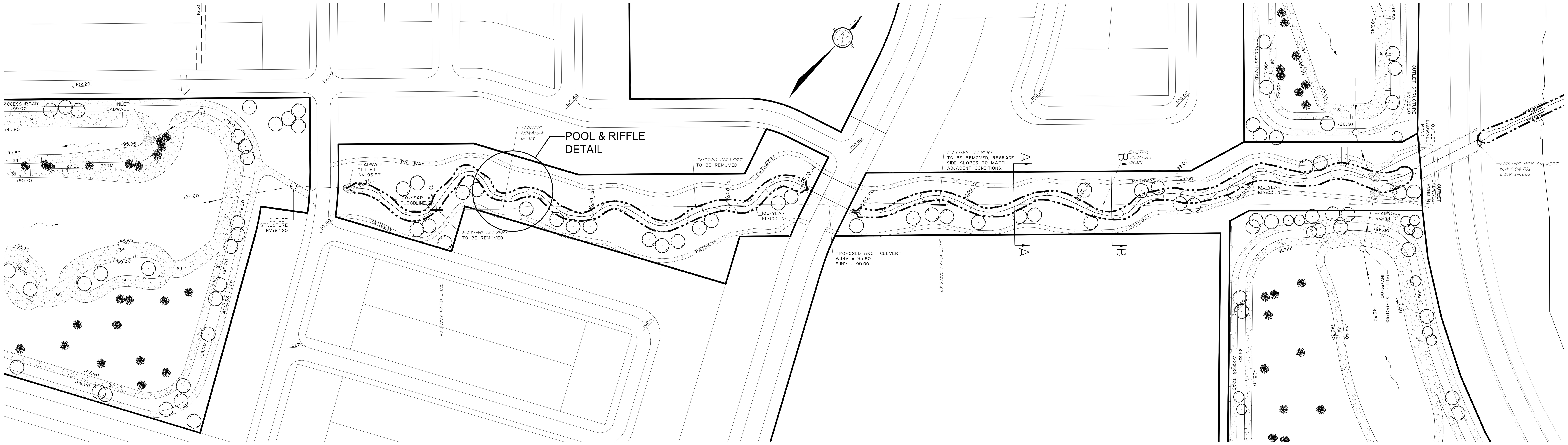
POOL DETAIL (TYPICAL)
NOT TO SCALE

MONAHAN DRAIN THROUGH CENTRE OF OPEN SPACE
CROSS SECTION A-A (RIFFLE)
1:1250

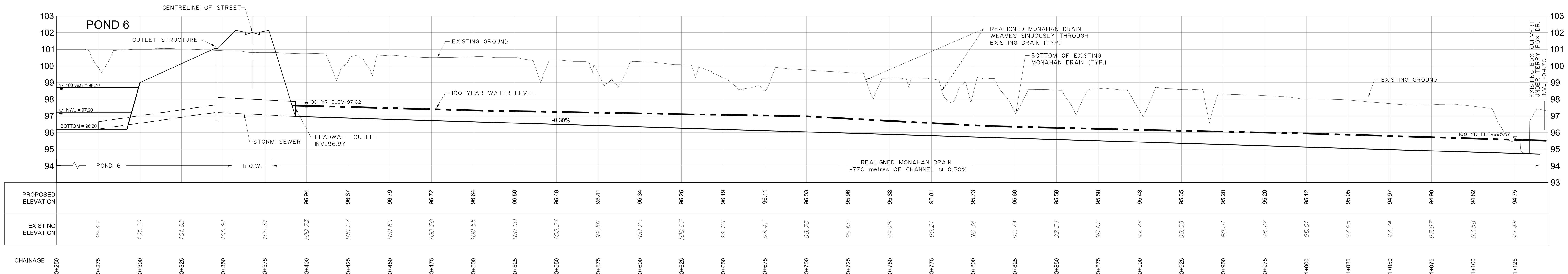


MONAHAN DRAIN OFFSET FROM CENTRE OF OPEN SPACE
CROSS SECTION B-B (POOL)
1:1250





MONAHAN DRAIN



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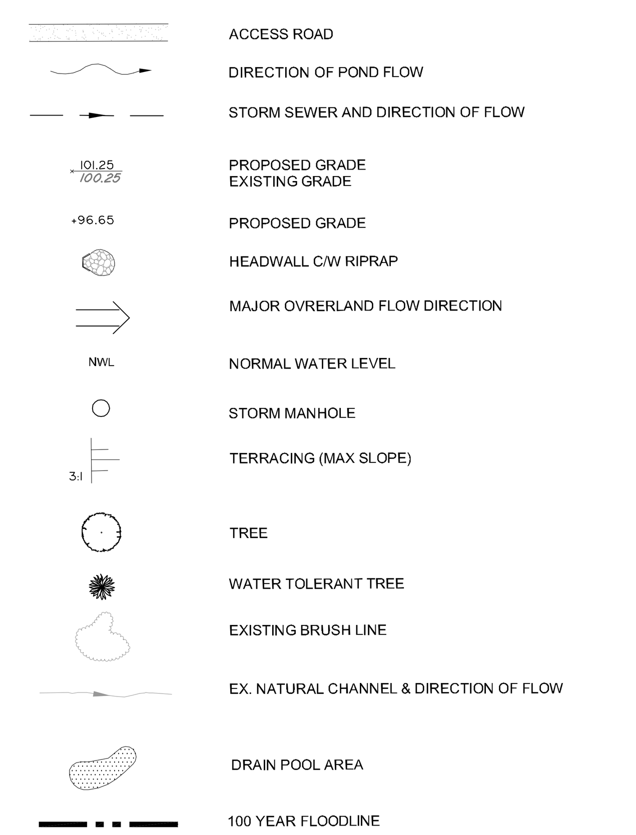
DRAWING No.
101108-CH1

MONAHAN DRAIN

PLAN AND PROFILE

LEGEND



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J.G. RIDDELL — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

M.J. PETEPIECE 100079354 — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

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3	REVISED WITH 100-YEAR PONDING LIMIT	APRIL 06/09	MJP
2	ISSUED WITH DRAFT ENVIRONMENTAL MANAGEMENT PLAN	SEPT 15/08	MJP
1	ISSUED WITH DRAFT ENVIRONMENTAL MANAGEMENT PLAN	MAY 02/08	MAB

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1:125 (VERT)
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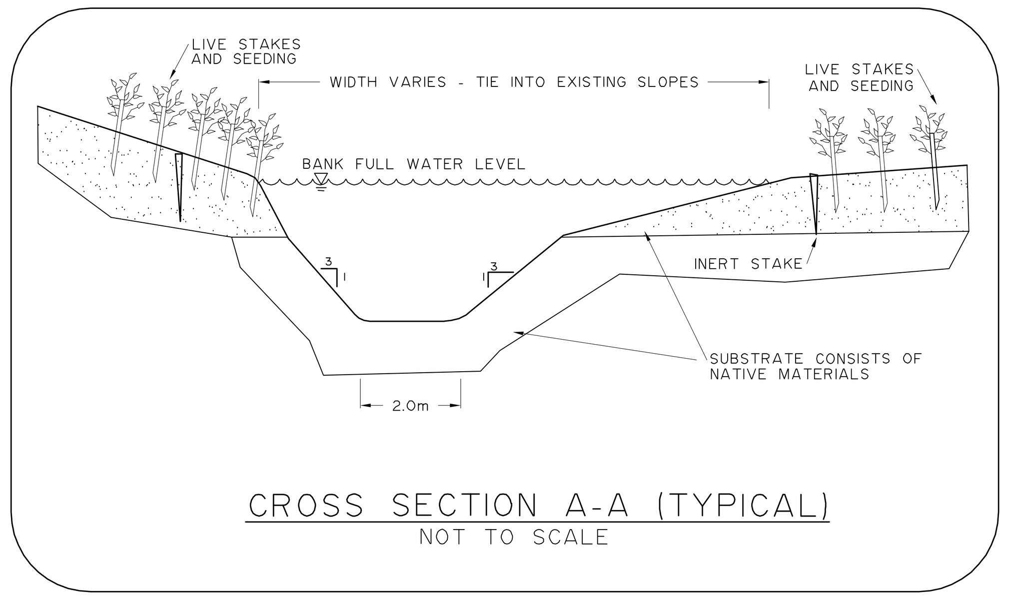
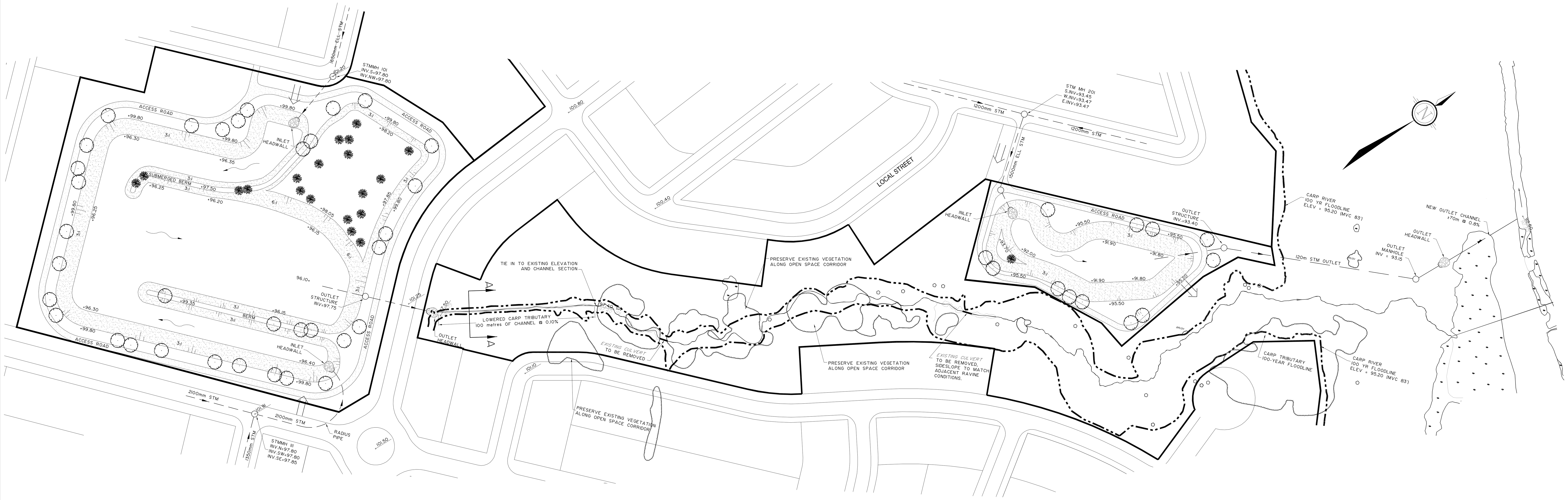
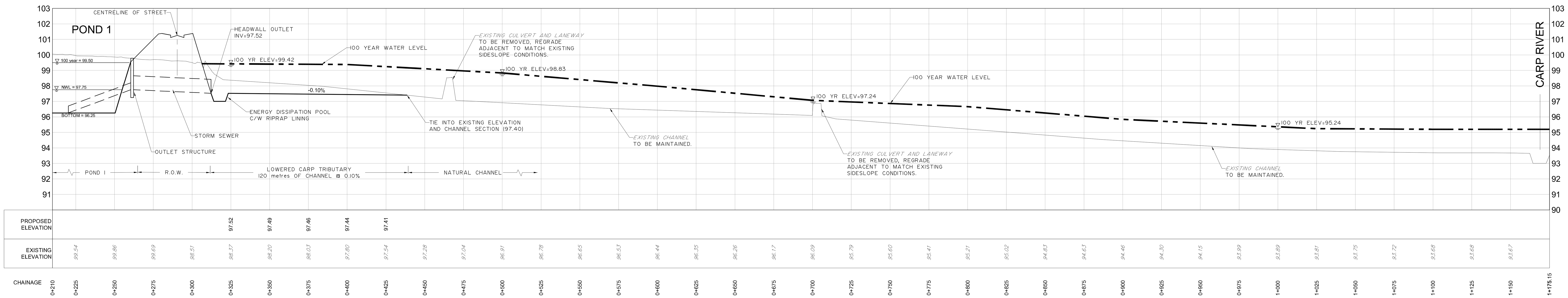




CARP RIVER WEST TRIBUTARY



FERNBANK COMMUNITY DESIGN PLAN

City of Ottawa

ENVIRONMENTAL MANAGEMENT PLAN

DRAWING No. 101108-CH2

CARP RIVER WEST TRIBUTARY

PLAN AND PROFILE

LEGEND

- ACCESS ROAD
- DIRECTION OF POND FLOW
- STORM SEWER AND DIRECTION OF FLOW
- PROPOSED GRADE / EXISTING GRADE
- PROPOSED GRADE
- HEADWALL C/W RIPRAP
- MAJOR OVERLAND FLOW DIRECTION
- NWL — NORMAL WATER LEVEL
- STORM MANHOLE
- TERRACING (MAX SLOPE)
- TREE
- WATER TOLERANT TREE
- EXISTING BRUSH LINE
- EX. NATURAL CHANNEL & DIRECTION OF FLOW
- DRAIN POOL AREA
- 100 YEAR FLOODLINE

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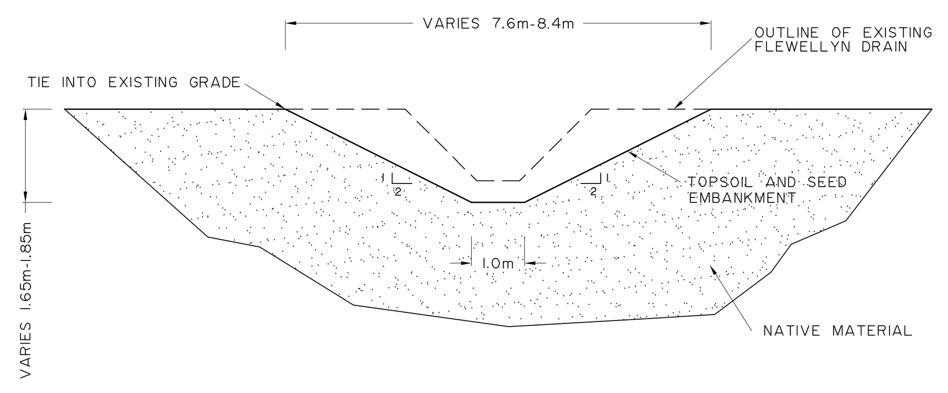
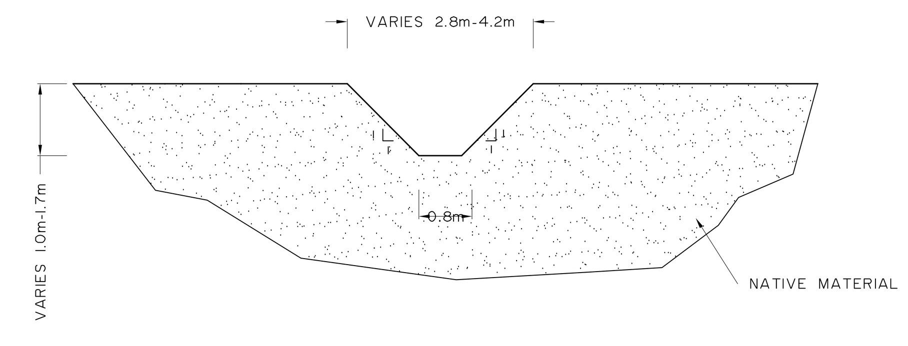


PROPOSED FLEWELLYN DRAIN CROSS SECTION A-A
SCALE 1:100



EXISTING FLEWELLYN DRAIN CROSS SECTION B-B
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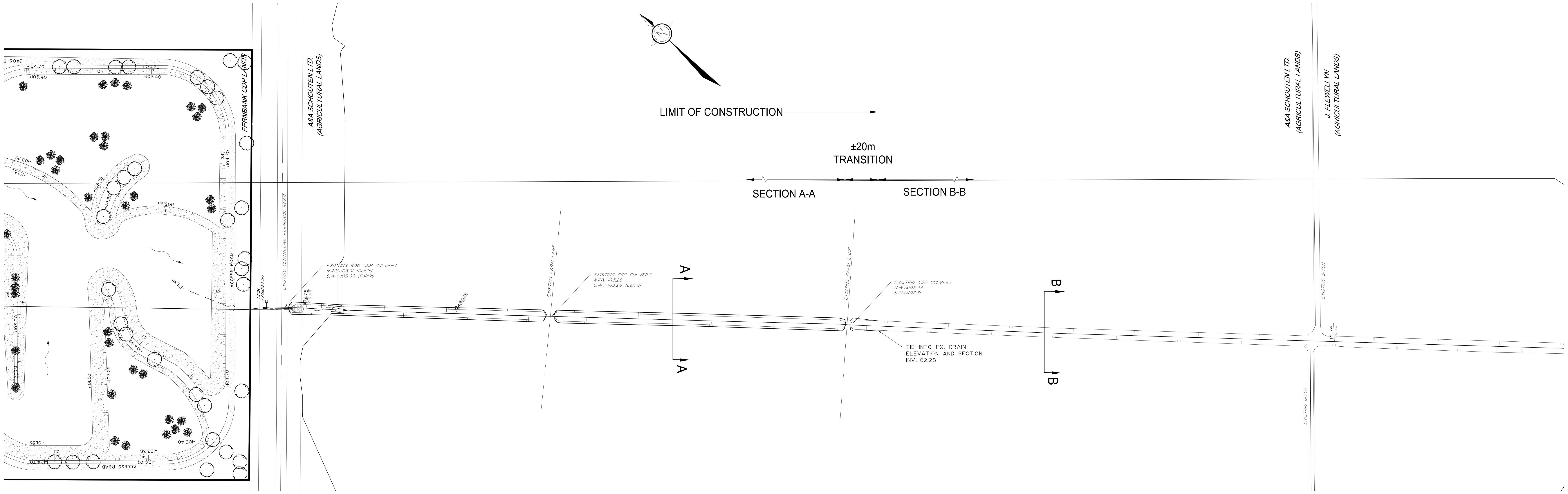
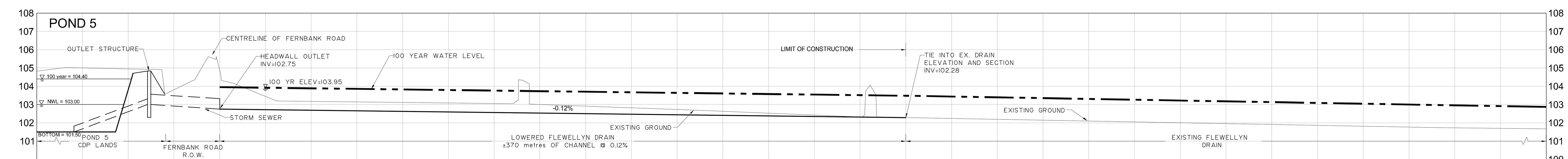


FLEWELLYN DRAIN



CHAINAGE	PROPOSED ELEVATION	EXISTING ELEVATION
0+275		
0+300		105.00
0+325		104.95
0+350		103.80
0+375	102.75	104.90
0+400	102.72	103.44
0+425	102.69	103.17
0+450	102.66	103.14
0+475	102.63	103.11
0+500	102.59	103.09
0+525	102.56	103.06
0+550	102.53	103.00
0+575	102.50	102.91
0+600	102.47	102.82
0+625	102.44	102.73
0+650	102.41	102.63
0+675	102.38	102.53
0+700	102.34	102.42
0+725	102.31	102.32
0+750	102.28	102.28
0+775		102.24
0+800		102.20
0+825		102.16
0+850		102.12
0+875		102.07
0+900		102.02
0+925		101.97
0+950		101.92
0+975		101.87
1+000		101.82
1+025		101.77
1+050		101.73
1+075		101.70

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FLEWELLYN DRAIN

PLAN AND PROFILE

LEGEND

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- DIRECTION OF POND FLOW
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- PROPOSED DITCH GRADE / EXISTING DITCH GRADE
- PROPOSED TOP OF SLOPE GRADE
- HEADWALL C/W RIPRAP
- MAJOR OVERLAND FLOW DIRECTION
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- STORM MANHOLE
- TERRACING (MAX SLOPE)
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- DRAIN POOL AREA
- EX. DITCH & DIRECTION OF FLOW

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