

City of Port Colborne

PORT COLBORNE Committee of Adjustment Meeting Agenda

Date:	Wednesday, October 9, 2024
Time:	6:00 pm
Location:	Committee Room 3-City Hall
	66 Charlotte Street, Port Colborne, Ontario, L3K 3C8

- 1. Call to Order
- 2. Reading of Meeting Protocol
- 3. Disclosures of Interest
- 4. Request for Any Deferrals or Withdrawals of Applications
- 5. New Business
 - 5.1 A24-24-PC 1070 Brookfield Road

Action: Minor Variance

Agent: Julian Allen

Applicant: James and Jannet Symes

Location: 1070 Brookfield Road

5.2 A23-24-PC - VL Northland Avenue

Action: Minor Variance

Agent: Matt Kernahan

Applicant: 2600261 Ontario Inc.

Location: VL Northland Avenue

- 6. Other Business
- 7. Approval of Minutes
 - 7.1 September 11th, 2024, Committee of Adjustment Minutes
- 8. Adjournment

Pages



IN THE MATTER OF the *Planning Act, R.S.O., 1990,* c.P.13, as amended, and section 2.9.1 (a) (iii) of the City of Port Colborne Zoning By-law 6575/30/18, as amended;

AND IN THE MATTER OF the lands legally known as Concession 2, Part of Lot 11, Part 1 on Reference Plan 59R14222, formerly in the Township of Humberstone, currently in the City of Port Colborne, located in the Hamlet Residential (HR) zone, municipally known as 1070 Brookfield Road;

AND IN THE MATTER OF AN APPLICATION by the agent Julian Allen, on behalf of the owners James and Jannet Symes, for relief from the provisions of Zoning by-law 6575/30/18, as amended, under section 45 of the *Planning Act, R.S.O 1990* c.P.13, to permit an accessory dwelling unit exceeding the maximum permitted square footage, notwithstanding the following:

1. That an accessory dwelling unit with a floor area of 95% of the gross floor area of the principal dwelling be permitted, where a maximum floor area of 40% of the gross floor area of the principal dwelling is required.

Explanatory Relief from the Zoning By-law: The applicant is requesting permission to build an addition to the existing garage on the property and convert the structure into an accessory dwelling unit. Due to the size of the existing structure and the proposed addition, a variance is required. A sketch of the proposed site plan is shown on the reverse side of this notice. A higher resolution PDF version of this sketch can be found on the City's website.



LOCATION MAP

PLEASE TAKE NOTICE that this application will be heard in-person and virtually by the Committee of Adjustment as shown below:

Date:October 9, 2024Time:6:00 p.m.Location:66 Charlotte Street – Third Floor Council Chambers and Virtually via Zoom

Additional information regarding this application is available for public inspection. An appointment can be scheduled in the office of the Planning and Development department, Monday to Friday, during the hours of 8:30 A.M. to 4:30 P.M., by telephone at (905)-228-8124 or through email at taya.taraba@portcolborne.ca to view the material.

PUBLIC HEARING: You are entitled to participate and express your views about this application, or you may be represented by counsel for that purpose. The Planning Division report is to be made available for public inspection by **Friday, October 4, 2024**. If you are receiving this notice as the owner of land that contains multiple residential units, please post this in a location that Is visible to all tenants.

Electronic Hearing Procedures How to Get Involved in the Hearing

The meeting will be held in person and will be livestreamed on the City's YouTube channel.

Anyone wishing to participate in the meeting can attend either virtually or in-person and is encouraged to submit a written submission that will be circulated to the Committee of Adjustment prior to the meeting. All comments submitted are part of the public record. If anyone wishes to orally participate in the meeting, they must pre-register with the Secretary-Treasurer. **Written submissions and participation requests must be received by 12:00 p.m. on Tuesday, October 8, 2024**, by emailing taya.taraba@portcolborne.ca or by calling (905)-228-8124. Written submissions may also be submitted to the mail slot located in the front-left of City Hall; 66 Charlotte Street.

If you have any questions about the application(s) or submission process, please email taya.taraba@portcolborne.ca or call (905)-228-8124.

If you wish to be notified of the decision of the Committee of Adjustment in respect to this application, you must submit a written request to the Secretary-Treasurer. The Notice of Decision will also explain the process for appealing a decision to the Ontario Land Tribunal.

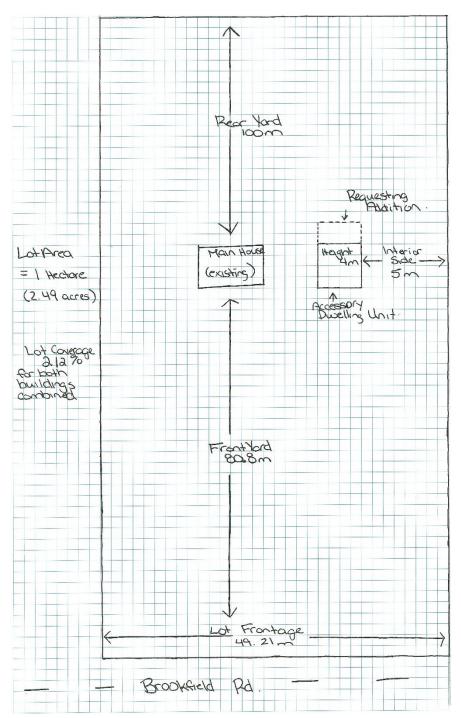
By order of the Committee of Adjustment,

aya laraba

Taya Taraba Secretary-Treasurer

Date of Mailing: September 26, 2024

<u>SKETCH</u>



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MINOR VARIANCE APPLICATION

THE CITY OF PORT COLBORNE

PORT COLBORNE DEVELOPMENT AND LEGISLATIVE SERVICES

The Planning Act – Section 45

	RECEIVED			
For Office Use Only				
Date Received: Date of Completion:	AUG () 1 2024	Application Complete:	□ Yes	□ No
SUBMISSION (DE-APPLICATION			

Completed applications can be sent to:

City of Port Colborne		
Taya Taraba		
Secretary Treasurer of the Committee of Adjustment		
City Hall		
66 Charlotte Street		
Port Colborne, Ontario L3K 3C8		

Telephone:	1-905-835-2900 ext. 204
Fax:	1-905-835-2939
Email:	taya.taraba@portcolborne.ca

2023 APPLICATION FEES

Minor Variance	\$1,383
Minor Variance (Building without a Permit)	\$1,805
Minor Variance & Consent Combination	\$2,528

COMPLETENESS OF APPLICATION

A complete application includes all required forms, fees, and applicable sketches, as well as any additional information that may be identified by the Secretary-Treasurer in accordance with the provisions under *the Planning Act, R.S.O. 1990*, c.P. 13, as amended.

To be considered complete, submitted applications must include:

- One fully completed application for minor variance or permission signed by the applicant(s) and/or authorized agent and properly witnessed by a Commissioner for the taking of affidavits.
- A letter of authorization from the property owner, if applicable.
- Two (2) copies of a <u>completed</u> preliminary drawing (see the "Drawing Requirements" section).
- Payment of the appropriate fee submitted at the time of application through cash, credit, debit, or cheque payable to the City of Port Colborne.
- Payment of the appropriate Regional Review & Approval fee(s) if required by the Region, submitted at the time of the preliminary review. Payment can be submitted to the City of Port Colborne or to the Niagara Region. If payment is submitted to the Region directly, please submit the receipt to the City of Port Colborne. Failure to pay the Region's fee may result in an incomplete application. The Region's fees are available on its website, https://www.niagararegion.ca/business/fpr/forms_fees.aspx
- Payment of the appropriate NPCA fee, if required, submitted at the time of the preliminary review. Payment can be submitted to the City of Port Colborne or to the NPCA. If payment is submitted to the NPCA directly, please submit the receipt to the City of Port Colborne. Failure to pay the NPCA's fee may result in an incomplete application.

*<u>Note:</u> Additional information may be required once a full review has been completed by planning staff. This may prevent deferral of your application. *

DRAWING REQUIREMENTS

Please submit two copies of each separate plan along with your completed application. Ensure that all the information below is included in the plan(s). Depending on the extent of the proposal, the **Planning Division may request a sketch prepared by a professional, and the Committee may require (at the discretion of the Manager of Planning Services) that the sketch be signed by an Ontario Land Surveyor.** This requirement can be clarified by the Planning Staff. The required sketch should be based on an actual survey by an Ontario Land Surveyor or drawn to a usable metric scale [e.g., 1:100, 1:300, 1:500].

To be considered complete, each sketch must identify:

- 1. The boundaries and dimensions of the land / lot.
- 2. The location and nature of any easement affecting the land, if applicable.
- 3. The location, size, height, and type of all existing and proposed buildings and structures on the land, indicating the distance of the buildings or structures from the front lot line, rear lot line and the side lot lines.
- 4. The parking areas, loading spaces, driveway entrance / exits.

PROCEDURES FOR PROCESSING APPLICATIONS FOR MINOR VARIANCE OR PERMISSION

Once the Secretary-Treasurer has received an application, the application will be circulated to external agencies for up to 10 days to determine whether additional information and/or fees are required. Once comments from these agencies have been received, the Secretary-Treasurer will inform the applicant of any additional information and/or fees required by these agencies (ie. Niagara Region, Niagara Peninsula Conservation Authority). If applicable, the applicant must submit this additional information and/or pay the additional fees for their application to be deemed complete. Once the application is deemed complete, a hearing date will be confirmed in writing by the Secretary-Treasurer.

Prior to the hearing, members of the Committee may choose to conduct a site visit and/or contact the applicants. **Please note that the Committee should not be contacted by members of the public.** Any comments, questions, or concerns should be addressed through the Planning Division.

Following the hearing, the applicant/agent/solicitor will be notified of the Committee's decision in a written Notice of Decision. In addition, any other person or agency who filed a written request for the Committee's decision will be sent a copy. Any applicant objecting to the decision of the Committee, or the condition(s) imposed by the Committee may appeal the decision to the Local Planning Appeal Tribunal within 20 days after the Notice of Decision has been given. The notice of appeal, together with written reasons supporting the appeal and the fee, by certified cheque or money order payable to the Minister of Finance, must be filed with the Secretary-Treasurer, who in turn, will forward the appeal to the Local Planning Appeal Tribunal. The fee is \$300.00 for the first application to be appealed and \$25.00 for each additional related minor variance appeal.

NIAGARA PENINSULA CONSERVATION AUTHORITY REVIEW

Fees which are payable directly to Authority vary depending on the location and on the type of application. For land: abutting or within 15 meters of a water course; on or within 30 meters of the Lake Erie shoreline; on land identified as "Hazard Land" or "Environmental Protection" by the Port Colborne Official Plan or Zoning Bylaw; or within a groundwater recharge / discharge area, aquifer, or headwater on the property or within 30 meters of the property, the Niagara Peninsula Conservation Authority will charge an additional Plan Review Fee. These fees are provided on the Niagara Peninsula Conservation Authority's website.

I acknowledge that I have read, understand, and agree to the terms outlined above.			
Name: Allen	Date: Awg 1 2024	Initials:	



MINOR VARIANCE APPLICATION

THE CITY OF PORT COLBORNE

DEVELOPMENT AND LEGISLATIVE SERVICES

The Planning Act – Section 45

SECTION 1 : CONTACT INFORMATION

1.1 Registered Owner (s):		
Name: James and Janet	Symes.	
Mailing Address: 1070 Brook Giel	d Rd.	
City: Port Colborne	Province:	
Postal Code: L3K SV3	Telephone: :++6 - 606 - 6932 -	
Fax:	Email:	
1.2 Owner's SOLICITOR (if applicable)		
Name:		
Mailing Address:		
City:	Province:	
Postal Code:	Telephone:	
Fax:	Email:	
1.3 Owner's Authorized AGENT (if app	licable)	
Name: Julian Allen		
Mailing Address: 6534 kohn a	LIES	
City: Nagara Falls.	Province:	
Postal Code: L2H 2HI	Telephone: (905) 467-8033	
Fax:	Email: Ulan @golfitean. com	
1.4 Owner's ONTARIO LAND SURVEYOR (if applicable)		
Name:		
Mailing Address:		
City:	Province:	
Postal Code:	Telephone:	
Fax:	Email:	
1.5 All communications should be sent to the:		
Owner Solicitor		

SECTION 2: LOCATION OF SUBJECT LAND

Former Municipality: Humberstone	
Concession No. 2	Lot(s): DT LT 11
Registered Plan No.	Lot(s):
Reference Plan No. STR 14272	Part(s): PT
Name of Street: Brackfield	Street No. 1070

SECTION 3: SUBJECT LAND DESCRIPTION

Part No. On Sketch:

3.1 Lot Description			
Frontage: 49.21 m Depth:	Area: 1.00 Hectars		
Existing Use: Residential			
Proposed Use: Residential			
3.2 What is the current designation of the land in the Official Plan and the Regional Plan?			
Port Colborne Official Plan: Hamlet			
Regional Policy Plan: Rural Settlements			
3.3 What is the current zoning of the land (By-law 6575/30/18)?			

SECTION 4: LAND INFORMATION

4.1 Date the Subject Land was acquired by the Current Owner:			
4.2 Are there any existing EASMENTS OR RESTRICTIVE COVENANTS affecting the land?			
Yes If "Yes" describe the easement or covenant and its effect:			
4.3 MORTGAGES, Charges & Other Encumbrances:			
List the name(s) and address(es) of any mortgages, charges, or other encumbrances in respect of the land.			
Unknown			
4.4 DATE OF CONSTRUCTION of all existing buildings and structures on the land:			
4.5 Type of ACCESS			
4.5 Type of ACCESS Provincial Highway Municipal Road maintained seasonally Regional Road Right-of-Way Municipal Road maintained all year Water Access Other Public Road Private Road 4.6 What type of WATER SUPPLY is proposed? Publicly owned and operated piped water supply Lake Well (private or communal) Other (specify)			
4.8 What type of STORMWATER DISPOSAL is proposed?			
 Publicly owned and operated stormwater system Other (specify) 			
4.9 Has a Pre-Consultation application been filed for this proposal?			
Ves No			
If Yes, please indicate the meeting date:			

SECTION 5: NATURE & EXTENT OF RELIEF FROM THE ZONING BY-LAW

5.1 Nature and Extent of Relief from the Zoning By-law: Requesting an accessory dwelling unit to be 95% of the gross square footage of the primary dwelling 5.2 Why is it not possible to comply with the Zoning By-law? excedes he The current already -Fruct ure 40% pylaw 5.3 Does the structure(s) pertaining to the application for Minor Variance already exist? Yes 🛛 No 5.4 If the answer to 5.3 is YES, has a building permit been issued? □ Yes No No

If the answer is "Yes," please provide the following information:

File Number: Decision:

SECTION 6: ALL EXISTING, PREVIOUS AND ADJACENT USE OF THE LAND

6.1 ALL EXISTING USE			
Residential Industrial Commercial	 Institutional Agricultural Parkland 	 Vacant Other (specify): 	
6.2 What is the length of time the existing use(s) of the land have continued?			
UNKNOWN			
6.3 Are there any buildings or structures on the subject land?			
Yes	🗖 No	Televin " Bask V	
If Yes, briefly describe and indicate their use.			

6.4 Are any of these buildings designated under the Ontario Heritage Act?			
Yes	No	Unknown	
6.5 Has the grading of filling occurred on the s		anged by adding earth or material? Has	
Yes	No No	Unknown	
6.6 Has a gasoline sto land or adjacent lands		ervice station been located on the subject	
Yes	No	Unknown	
6.7 Has there been pe	troleum or other fuel store	ed on the subject land or adjacent lands?	
Yes	V No	Unknown	
6.8 Are there or have the subject land or adjo		und storage tanks or buried waste on	
Yes	No	Unknown	
6.9 Have the lands or a pesticides have been a		used as an agricultural operation where	
Yes	No No	Unknown	
6.10 Have the lands o	r adjacent lands ever bee	n used as a weapon firing range?	
Yes	No No	Unknown	
		tion within 500 metres (1,640 feet) of the Il public or private landfill or dump?	
Yes	No No	Unknown	
6.12 If there are existing or previously existing buildings on the subject lands, are there any building materials remaining on site which are potentially hazardous to public health (e.g., asbestos, PCB's)?			
Yes	No No	Unknown	
6.13 If there has been industrial or commercial uses on the property, a previous use inventory is needed. Is a previous use inventory attached?			
Yes	🚺 No	Unknown	
6.14 Is there reason to believe the subject lands may have been contaminated by existing or former uses on the site or adjacent sites?*			
Yes	No	Unknown	
If previous use of property is industrial or commercial or if the answer was YES to any of the above, please attach a previous use inventory showing all former uses of the land, or if applicable, the land(s) adjacent to the land.			
*Possible uses that can cause contamination include operation of electrical transformer stations, disposal of waste minerals, raw material storage, and residues left in containers, maintenance activities, and spills. Some commercial properties such as gasoline stations, automotive repair garages, and development have			

similar potential. Any industrial use can result in potential contamination. The longer a property is under industrial or similar use, the greater the potential for site contamination. Also, a series of different industrial or similar uses upon a site could potentially increase the number of chemicals which are present.

ACKNOWLEDGMENT CLAUSE

I hereby acknowledge that is my responsibility to ensure that I am in compliance with all applicable laws, regulations, and standards pertaining to contaminated sites. I further acknowledge that the City of Port Colborne is not responsible for the identification and/or remediation of contaminated sites, and I agree, whether in (or as a result of) any action or proceeding for environmental clean-up of any damage or otherwise, I will not sue or make claim whatsoever against the City of Port Colborne, its officers, officials, employees or agents for or in respect of any loss, damage, injury or costs.

Hug 1, 2024 X

Signature o

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NIAGARA PENINSULA CONSERVATION AUTHORITY

Pre-Screening Criteria

9.1 Is there land on the "hazard lands"?	property identified in the O	fficial Plan and / or Zoning By-law as
Yes	No	Unknown
9.2 Is there a watercour property?	rse or municipal drain on the	e property or within 15 metres of the
property:		
Yes	No	Unknown
9.3 Is the property loco	ated on or within 30 metres	of the Lake Erie shoreline?
	/	
Yes	No	Unknown
9.4 Is there a valley slo	pe on the property?	alling perturb enc.
Alteria Carlos Carlos Comp	in the said of a back of the	
Yes	No	Unknown
9.5 Is there known localize	ed flooding or a marsh / bog are	a on or within 30 metres of the property?
	a falls	Director Company Alleran
Yes	No	Unknown
9.6 Is the property on a Re	gional Road?	
Yes	No	Unknown

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SIGNATURE OF APPLICANT(S)

Please note:

Signature of Applicant(s)

If the applicant is not the owner of the subject land or there is more than one owner, written authorization of the owner(s) is required (Complete Form 1) indicating that the applicant is authorized to make application.

I/We Nagara Of the City/Town/Township of _ In the County/District/Regional Municipality of Magneto

solemnly declare that all the statements contained in this application are true, and I/we make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act.

DECLA	RED before m	e at the	
	City	of	Port Colburne
In the	Region	of	Nagara
	151		August
20 <u>24</u> .		_	Tank

A Commissioner, Hence Taraba, a Commissioner, etc., Province of Ontario, for the Corporation of the City of Port Colborne.

TO BE SIGNED IN THE PRESENCE OF A COMMISIONER FOR TAKING AFFIDAVITS
x III'
Signature of applicant(s), solicitor, or authorized agent
Julian Allen

Expires January 31, 2027 Personal information collected on this application will become part of a public record. Any questions regarding this collection should be directed to the City Clerk at 66 Charlotte Street, Port Colborne, Ontario L3K 3C8 (905) 835-2900 Ext. 106.

POSTING OF PUBLIC HEARING SIGN

A public hearing sign is required to be posted by all applicants or agents on each property under application. A sign will be made available to you after review of your application, and you are required to post each sign in a prominent location on the subject property. The sign should be placed so that it is legible from the roadway.

Each sign must remain posted a minimum of 14 days prior to the hearing, until the day following the hearing. Should a sign go missing or become damaged or illegible please contact the Secretary-Treasurer as soon as possible to request a replacement sign. Failure to post the sign as required may result in deferral of you application(s).

Please note that an affidavit must also be signed and commissioned in the presence of a Commissioner of Oaths. This can be done at City Hall AFTER the signs have been posted.

~ Allen I/We

owner(s) of the land subject to this application for a Minor Variance and I/We agree to post the required sign(s) a minimum of 14 days prior to the hearing and will remain posted, and replaced, if necessary, until the day following the hearing.

X Signature of Owner/Agent	X Aug 1, 200	24
Х	X	
Signature of Owner/Agent	Date	50

PERMISSION TO ENTER

I/We __________ am/are the owner(s) of the land subject to this application for a Minor Variance and I/We authorize the members of the Committee of Adjustment and the City of Port Colborne Planning Staff to enter onto the property for the purpose of evaluating the merits of the application(s).

Please note that the Committee should not be contacted by members of the public. Any comments, questions or concerns should be addressed through the Planning Division.

Signature of Own

Aug 1, 2024

Signature of Owner

Х		-
Date		

am/are the

AUTHORIZATION FOR AGENT / SOLICITOR (IF APPLICABLE)

If the application is not the owner of the lane that is subject to this application for a Minor Variance, the authorization set out below must be completed by the owner(s). All registered owners must complete the authorization form for it to be valid.

Please Note: If the registered owner is a corporation, in addition to the signatures of the authorized signing officers, the corporate seal must be affixed.

Where the Owner is without a spouse, common-law or legally married, the Owner is required to sign only once. Where the spouse of the Owner is not an owner, the spouse is required to sign. Spouse shall include a common-law spouse as defined within the *Family Law Reform Act.*

I/We

am/are the

owner(s) of the land that is subject to this application for a Minor Variance and I/We hereby authorize as my/our agent for the purposes of submitting an application(s) to the Committee of Adjustment for a Minor Variance.

Х	Х	
gnature of Owner	Date	
X	X	
ignature of Owner	Date	
X	X	
Signature of Agent	Date	

AUTHORIZATION FOR AGENT / SOLICITOR (IF APPLICABLE)

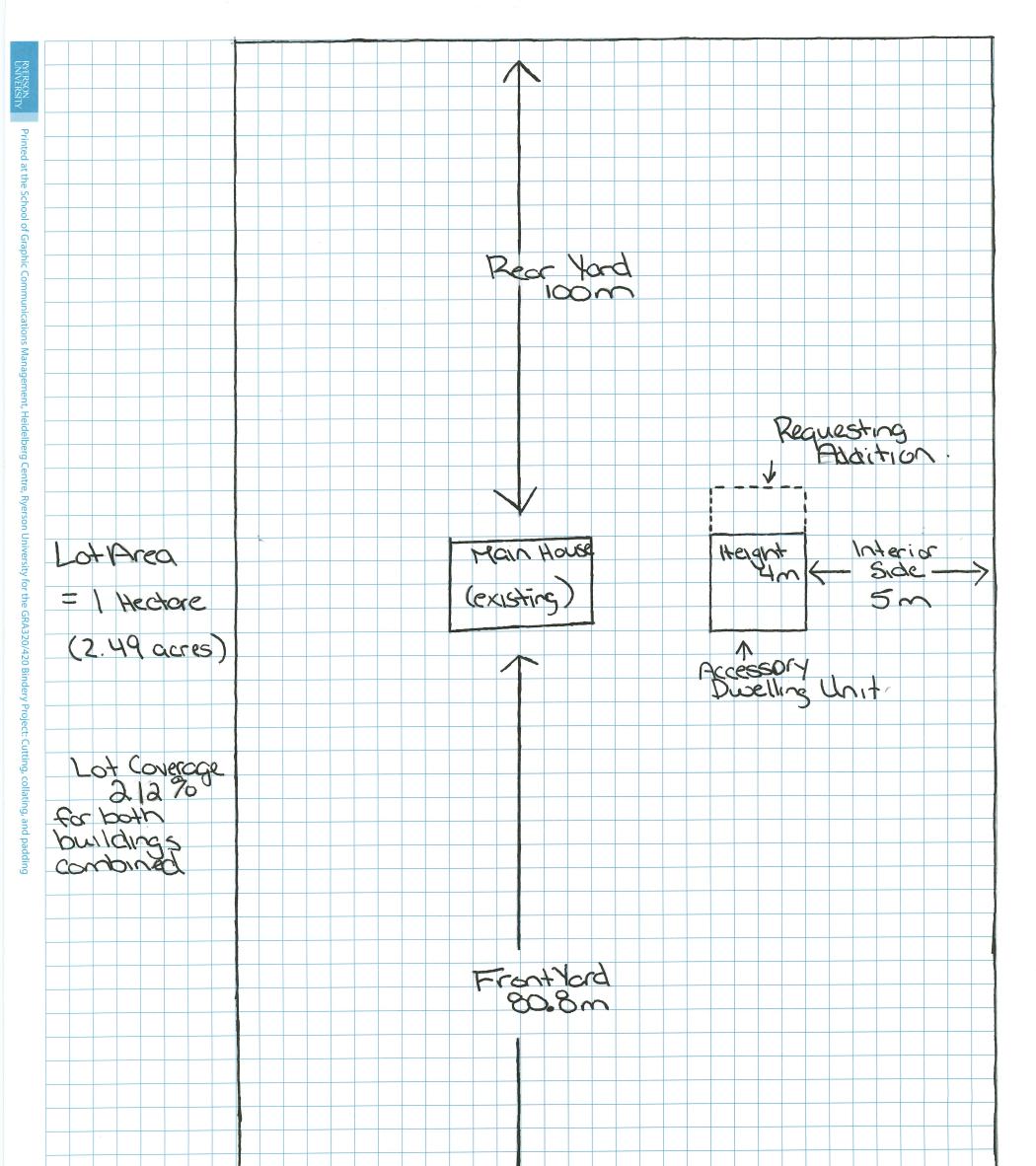
If the application is not the owner of the lane that is subject to this application for a Minor Variance, the authorization set out below must be completed by the owner(s). All registered owners must complete the authorization form for it to be valid.

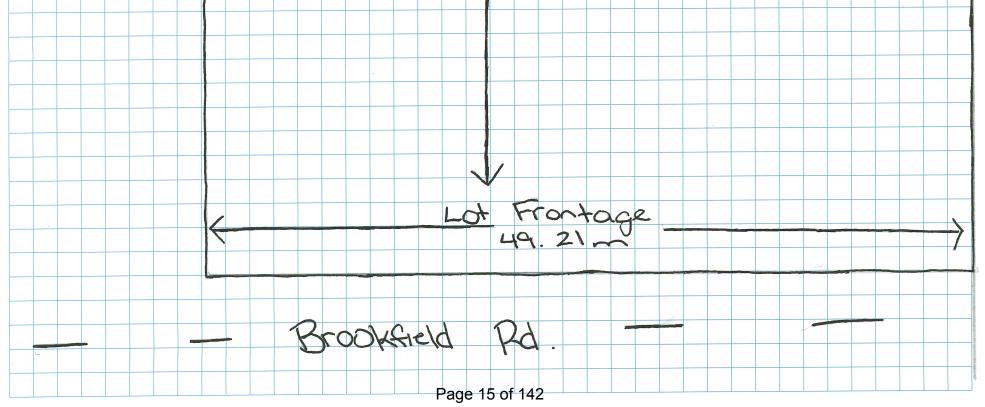
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Where the Owner is without a spouse, common-law or legally married, the Owner is required to sign only once. Where the spouse of the Owner is not an owner, the spouse is required to sign. Spouse shall include a common-law spouse as defined within the *Family Law Reform Act.*

I/We <u>Sames and Samet</u> Symes am/are the owner(s) of the land that is subject to this application for a Minor Variance and I/We hereby authorize as my/our agent for the purposes of submitting an application(s) to the Committee of Adjustment for a Minor Variance.

Hug1, Lody





City of Port Colborne



Municipal Offices 66 Charlotte Street Port Colborne, Ontario L3K 3C8 www.portcolborne.ca

Development and Government Relations Department

Planning Division Report

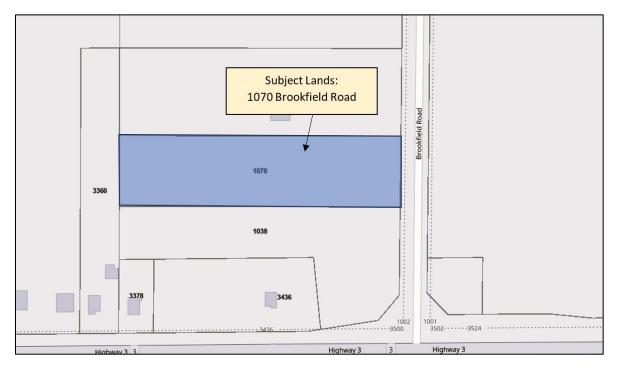
October 4, 2024

Secretary-Treasurer Port Colborne Committee of Adjustment 66 Charlotte Street Port Colborne, ON L3K 3C8

Re: Application for Minor Variance A24-24-PC 1070 Brookfield Road Concession 2, Part of Lot 11, Part 1 on Reference Plan 59R14222, formerly in the Township of Humberstone, now in the City of Port Colborne Owner(s): Christina and Kolin Mayne Agent: Julian Allen

Proposal

The purpose of this application is to permit the construction of an addition to the existing garage on the property and convert the structure into an accessory dwelling unit. The application is requesting that an accessory dwelling unit with a floor area of 95% of the gross floor area of the principal dwelling be permitted, where a maximum floor area of 40% of the gross floor area of the principal dwelling is required.



Surrounding Land Uses and Zoning

The parcels surrounding the subject lands are zoned Hamlet Residential (HR) to the north, south, and west. The lands to the east are zoned Agricultural (A), Agricultural Purposes Only (APO), and Agricultural Residential (AR). The surrounding uses consist of primarily of detached dwellings to the east, west, north, and south.

Official Plan

The subject lands are in the Hamlet designation in the City of Port Colborne Official Plan. This designation supports the development of accessory dwelling units.

Zoning

The subject lands are in the Hamlet Residential (HR) zone under Zoning By-law 6575/30/18, which permits residential uses including accessory dwelling units.

Environmentally Sensitive Areas

The subject lands do not contain any environmentally sensitive areas.

Public Comments

Notice was circulated on September 26, 2024, as per section 45 (5) of the *Planning Act*, to properties within 60 metres of the subject lands. As of October 4, 2024, no comments from the public have been received.

Agency Comments

Notice was circulated on August 16, 2024, to internal departments and external agencies. As of October 4, 2024, the following comments have been received:

Drainage Superintendent

No comments.

Fire Department

No objections.

Engineering Technologist

No comments.

Ministry of Transportation (MTO)

The subject lands are within the MTO permit jurisdiction. MTO review, approvals and permits will be required at the time of the building permit.

Niagara Peninsula Conseration Authority (NPCA)

The NPCA have no objection to the proposed variance. NPCA staff noted that there are possible unevaluated wetlands west of the subject lands which would require NPCA review and approval if development were proposed in the back of the lot.

Niagara Region

The Niagara Region identified that this proposal would require the installation of a new septic system. Regional staff required that the applicant provide the design of the new septic system (with spare area). Regional staff also required that an inspection be completed to confirm the condition of the existing septic system. Both requirements have been met by the applicants. Regional staff also noted that the property is mapped for archaeological potential; however, due to the location of the proposed expansion, Regional staff waived their archaeological assessment requirements.

Planning Act – Four Tests

In order for a Minor Variance to be approved, it must meet the four-part test outlined under section 45 (1) of the *Planning Act*. These four tests are listed and analyzed below.

Is the application minor in nature?

Planning staff find the requested variance to be minor in nature. The increase in the maximum permitted accessory dwelling unit floor area of 40% the gross floor area of the principal dwelling to 95% is required due to the size of the existing garage. Staff note that, while the applicant requested permission for 95%, a detailed review of the minor variance application in conjunction with data retrieved from prior building permits found that only 77% is required to facilitate the proposal. The existing garage measures 9.14m in width by 9.75m in length, for an existing floor area of 89.12m². The dwelling is approximately 8.3m in width by 15.86m in length, for a total gross floor area of 131.64m². The addition is proposed to measure 6.1m in length by 1.98m in width, for a proposed additional floor area of 12.08m². The total floor area proposed for the accessory dwelling unit is 101.2m². The existing garage floor area is already 68% of the gross floor area of the dwelling, which would require a variance to facilitate the conversion of the garage into an accessory dwelling unit without the proposed addition. The existing structure is situated behind the dwelling, and the addition is proposed to extend towards the rear of the lot, which will help mitigate the increased size of the proposed structure. The maximum accessory dwelling unit floor area provisions intend to ensure that accessory structures remain a secondary use to the primary use of the dwelling. As the area of the accessory dwelling unit with the proposed addition will not exceed the area of the dwelling, Planning staff are satisfied that the application is minor in nature.

Is it desirable for the appropriate development or use of the land, building, or structure?

The proposal is desirable and appropriate as the development is located in a suitable location on the site. The proposed development reflects the types of dwellings and uses already existing in the neighbourhood. The requested variance is minimal and will facilitate the addition of a new dwelling unit to the supply of housing options within the City. The development is compatible with most of the requirements of the Zoning By-law, with the exception of the requested variance. The new dwelling unit proposed in this application supports a more efficient use of the land and resources that must be expended to service the existing dwelling, which demonstrates that the application is desireable for the appropriate development and use of the land and building.

Is it in keeping with the general intent and purpose of the Zoning By-law?

The Zoning By-law permits accessory dwelling units within the HR zone, and the proposal meets the majority of the zoning requirements. The accessory structure will remain accessory in nature to the primary dwelling as the accessory structure is not within the front yard, is more than 1 metre from the interior side and rear lot lines, does not exceed 5% of the lot area, as is required by the accessory building provisions established in section 2.8 of the Zoning By-law. Planning staff therefore find the application to be in keeping with the general intent and purpose of the Zoning-By-law.

Is it in keeping with the general intent and purpose of the Official Plan?

Planning staff find this variance application meets the general intent and purpose of the Official Plan, as the Official Plan permits accessory structures and accessory dwelling units within the Hamlet designation.

Recommendation:

Given the information above, Planning staff recommend application A24-24-PC be **granted** for the following reasons:

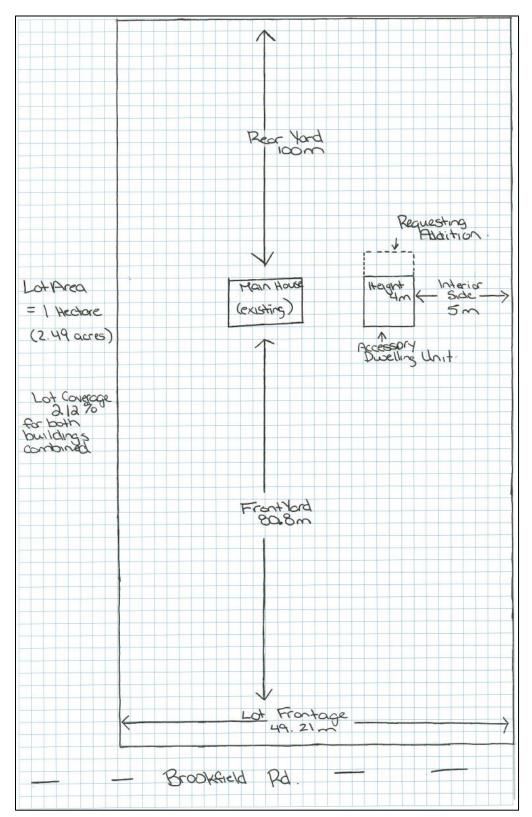
- 1. The application is minor in nature.
- 2. It is appropriate for the development of the site.
- 3. It is desirable and in compliance with the general intent and purpose of the Zoning By-Law.
- 4. It is desirable and in compliance with the general intent and purpose of the Official Plan.

Prepared by,

Diana Vasu, BA, MA Planner

Submitted by,

David Schulz, MCIP, RPP Manager of Planning



Appendix A



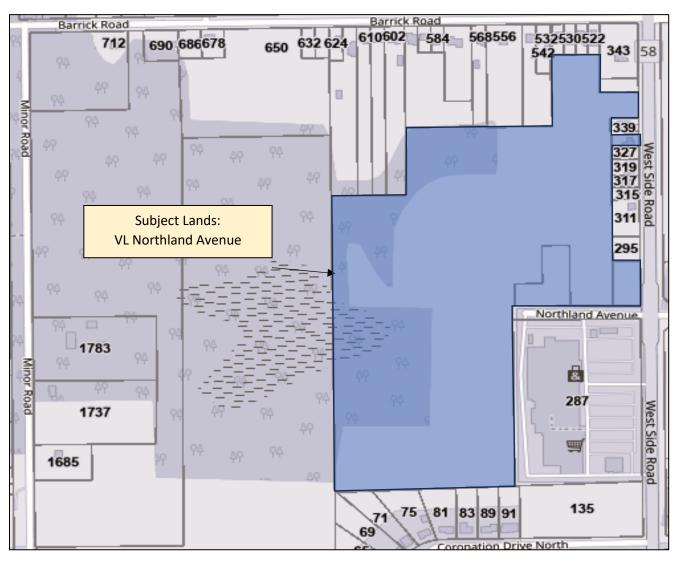
IN THE MATTER OF the *Planning Act, R.S.O., 1990,* c.P.13, as amended, and sections 2.19.1, 3.2, 7.8 (c), 7.8 (e), 7.8 (g), and 37 (Special Provision: R3-73) of the City of Port Colborne Zoning By-law 6575/30/18, as amended;

AND IN THE MATTER OF the lands legally known as Concession 2, Part of Lot 31, Parts 2 to 5 on Reference Plan 59R1186, Parts 1 and 2 on Reference Plan 59R12021, in the City of Port Colborne, located in the Residential Development (RD) zone, municipally known as a vacant lot on Northland Avenue;

AND IN THE MATTER OF AN APPLICATION by the agent Matt Kernahan, on behalf of the applicant 2600261 Ontario Inc., for relief from the provisions of Zoning by-law 6575/30/18, as amended, under section 45 of the *Planning Act, R.S.O 1990* c.P.13, to permit the construction of a new subdivision, notwithstanding the following:

- 1. That a minimum setback for uncovered stairs of the first storey of a dwelling to a lot line of 0.3m be permitted, whereas a minimum of 0.5m is required.
- 2. That a parking space obstructed on two sides be permitted a minimum width of 3m, whereas a minimum of 3.5m is required.
- 3. That a minimum lot area for townhouses of 160 m² be permitted, whereas a minimum of 180 m² is required.
- 4. That a minimum front yard setback of 6m be permitted, whereas a minimum of 7.5m is required.
- 5. That a minimum corner side yard setback of 3m to a dwelling be permitted, whereas a minimum of 4.5m is required.
- 6. That a minimum corner side yard setback of 1.5m from a deck 1.2m or greater above the ground floor level to a lot line be permitted, whereas a minimum of 4.5m is required.
- 7. That a maximum dwelling height of 12m be permitted, whereas a maximum of 11m is required.

Explanatory Relief from the Zoning By-law: The applicant is requesting relief from several Zoning By-law provisions to facilitate the development of a new subdivision. A sketch of the proposed site plan is shown on the reverse side of this notice. A higher resolution PDF version of this sketch can be found on the City's website.



LOCATION MAP

PLEASE TAKE NOTICE that this application will be heard in-person and virtually by the Committee of Adjustment as shown below:

Date:September 11, 2024Time:6:00 p.m.Location:66 Charlotte Street – Third Floor Council Chambers and Virtually via Zoom

Additional information regarding this application is available for public inspection. An appointment can be scheduled in the office of the Planning and Development department, Monday to Friday, during the hours of 8:30 A.M. to 4:30 P.M., by telephone at (905)-228-8124 or through email at taya.taraba@portcolborne.ca to view the material.

PUBLIC HEARING: You are entitled to participate and express your views about this application, or you may be represented by counsel for that purpose. The Planning Division report is to be made available for public inspection by **Friday, September 6, 2024**.

NOTE: If you are receiving this notice as the owner of land that contains multiple residential units, please post this in a location that Is visible to all tenants.

Electronic Hearing Procedures How to Get Involved in the Hearing

The meeting will be held in person and will be livestreamed on the City's YouTube channel.

Anyone wishing to participate in the meeting can attend either virtually or in-person and is encouraged to submit a written submission that will be circulated to the Committee of Adjustment prior to the meeting. All comments submitted are part of the public record. If anyone wishes to orally participate in the meeting, they must pre-register with the Secretary-Treasurer. Written submissions and participation requests must be received by 12:00 p.m. on Tuesday, September 10, 2024, by emailing taya.taraba@portcolborne.ca or by calling (905)-228-8124. Written submissions may also be submitted to the mail slot located in the front-left of City Hall; 66 Charlotte Street.

If you have any questions about the application(s) or submission process, please email taya.taraba@portcolborne.ca or call (905)-228-8124.

If you wish to be notified of the decision of the Committee of Adjustment in respect to this application, you must submit a written request to the Secretary-Treasurer. The Notice of Decision will also explain the process for appealing a decision to the Ontario Land Tribunal.

By order of the Committee of Adjustment,

Date of Mailing: August 28, 2024

aya laraba

Taya Taraba Secretary-Treasurer

<u>SKETCH</u>







June 27, 2024

David Schulz BURPL, MCIP, RPP Senior Planner, City of Port Colborne 66 Charlotte Street Port Colborne, ON L3K 3C8

Re: Northland Estates Subdivision Application for Redline Revision to Draft Plan of Subdivision Application for Minor Variance Addendum to Planning Justification Report (June 2022)

Garden City Development is pleased to provide this letter in support of the application for redline revision to the Northland Estates Draft Plan of Subdivision and the associated application for Minor Variance. The following letter is submitted along with the Application for Minor Variance, Revised Functional Servicing Study and Stormwater Management Report and Traffic Impact Study Addendum. I trust you will find this submission is responsive to the submission requirements outlined at our meeting of May 17, 2024, and Ms. Landry's email of May 3, 2024.

The purpose of this letter is to provide background and context to the applications and to provide Planning Justification for the proposed redline revision and associated application for minor variance. This letter is to serve as an addendum to the Planning Justification Report by Upper Canada Consultants (by this author), dated July 2022 in support of the application for Draft Plan of Subdivision and Zoning By-law Amendment.

Background and Context

2600261 Ontario Inc. (Northland) is the owner of the Northland Estates Subdivision, which is legally described as Part of Lot 31, Concession 2, Geographic Township of Humberstone, City of Port Colborne, Regional Municipality of Niagara. The subject lands are located south of Barrick Road and west of West Side Road at the terminus of Northland Avenue. Northland filed applications for a Draft Plan of Subdivision and Zoning By-law Amendment to facilitate the development of the subject lands as a residential subdivision, mixed use block, park and associated stormwater management pond and natural area in July 2022. The July 2022 Draft Plan of Subdivision was comprised of 120 single detached dwelling lots, 46 street townhouses and a mixed-use block containing 50 residential apartments. The Northland Estates Draft Plan of Subdivision and By-law 7141/83/23, which established the site-specific zoning to implement the subdivision were approved by Port Colborne Council on September 26, 2023.

By-law No. 7141/83/23 was appealed to the Ontario Land Tribunal by a resident that made submissions in opposition to the Zoning By-law Amendment. The appeal was dismissed by an order of the Ontario Land Tribunal dated May 31, 2024.

In the intervening two-year period between when the Northland applications for Draft Plan of Subdivision and associated Zoning By-law Amendment were made and present, the housing market conditions have changed drastically. There is a significantly increased demand for more affordable housing and less demand for large lot single detached dwellings. Northland is seeking to respond to this demand by making changes to the Draft Plan of Subdivision and the Zoning regulations that will implement it.

Purpose of the Applications

The purpose of the proposed redline revision to the draft plan of subdivision is generally to increase the proportion of more affordable housing typologies within the subdivision. The proposed changes to the North Estates Subdivision are summarised as follows:

- 1. Decrease the number of single detached dwellings from 120 to 44. Several of the remaining single detached dwelling lots have also been reduced in size (i.e. frontage).
- 2. Increase the number of townhouse dwellings from 46 to 189.
- 3. Addition of 4 semi-detached dwelling units.
- 4. Other minor technical changes to the subdivision plan.

Port Colborne By-law 7141/83/23 Zones the portion of the Northland Estates Subdivision that was approved for single detached dwellings and street townhouses R3-73. The R3-73 Zone permits single detached dwellings, street townhouse dwellings and semi-detached dwellings. There is no change to the boundary within which these dwellings are proposed within the redlined subdivision compared to the location where they are proposed within the draft plan approved subdivision.

The detailed design of the single detached and street townhouse dwelling units has now been completed by Hunt Design Associates Inc. Various site plans and elevations by Hunt Design Associates are included with this submission. To implement Northland's vision for more affordable housing units on compact lots, the proposed dwellings require deviation from the approved zoning regulations contained in By-law 7141/83/23 and Port Colborne's parent by-law. The purpose of the Minor Variance Application is to permit the development of the dwelling units designed by Hunt Design Associates within the redlined Draft Plan. In particular, the Minor Variance Application seeks the following zoning relief:

- 1. (By-law 7141/83/23, 3. a) Minimum Lot Area for Townhouses (Interior and Exterior) 160 m²
- 2. (By-law 6575-30-18, 7.8 c) Minimum Front Yard to House and Garage 6.0 m
- 3. (By-law 6575-30-18, 7.8 e) Minimum Flankage to House 3.0 m
- 4. (By-law 6575-30-18, 7.8 e) Minimum Flankage to Porch 1.5 m
- 5. (By-law 6575-30-18, 7.8 g) Maximum Building Height 12.0 m
- 6. (By-law 6575-30-18, 3.2) Minimum Garage Width (Obstructed Parking) 3.0 m
- (By-law 6575-30-18, 2.19.1) Minimum setback of uncovered stairs to first storey from lot line 0.3 m

Planning Justification

The Planning Justification Report prepared in support of the 2022 Application for Draft Plan of Subdivision and Zoning By-law Amendment provides a Planning Rationale for the development of the subject property as a residential subdivision containing a mix of dwelling types, a mixed-use block, park

and environmental protection areas generally. The Planning Justification Report contains an analysis of the development proposal in the context of the Planning Act, Provincial Policy Statement, Growth Plan, Region of Niagara Official Plan and Urban Design Guidelines, City of Port Colborne Official Plan and Comprehensive By-law 675-30-18. The analysis contained in the July 2022 Planning Justification Report is directly applicable to and should be relied upon for the consideration of the redline revision. The following is the summary of the planning analysis contained in the July 2022 Planning Justification Report:

"The proposed development achieves a balance between environmental conservation and the accommodation of prescribed growth. The subject lands are located within the City of Port Colborne's Settlement Area and are further within a designated Greenfield area. Provincial, Regional and local land use planning documents direct that these lands be developed to accommodate a range and mix of land uses and dwelling types through compact and efficient land use patterns to meet prescribed growth targets. The lands are also affected by Natural Heritage Features protected under the Region's Core Natural Heritage System. Provincial, Regional and local land use policies require the long-term protection of Natural Heritage features and their functions. The on-site environmental features have been delineated through an Environmental Impact Study and will be contained within an environmental conservation block. This block will be designated and zoned to prohibit development which would negatively impact these features. The areas outside of the environmental conservation area are proposed to be developed through a compact mix of land uses, including a mix of dwelling types as encouraged in the Provincial, Regional and local plans. The proposed development yield contributes positively to the achievement of the City's density obligations.

Based on the above analysis, it is my opinion that the applications comply with the Planning Act, are consistent with the Provincial Policy Statement, conform with the Growth Plan, Region of Niagara Official Plan and the City of Port Colborne Official Plan, represent good planning and should be supported."

The additional density proposed through the redline revision improves the efficiency and affordability of the proposed development which further contribute to the development's consistency and conformity with relevant planning policy.

The revised subdivision plan continues to protect natural heritage features in proximity to the development. An Addendum to the Environmental Impact Study was prepared and peer reviewed subsequent to the July 2022 submission. This Environmental Impact Study Addendum and the City's peer review confirm that natural heritage features will be adequately protected by the proposed development.

Minor Variance Analysis

The following provides an analysis of the required minor variance for the severed parcel in the context of Section 45 of the Planning Act:

Are the variances consistent with the general intent of the Official Plan

The proposed variances will facilitate the intensification of a subdivision within an area Designated Greenfield in the City of Port Colborne and Region of Niagara Official Plan. The general intent of the

City's Official Plan is to promote compact, mixed-use communities, higher densities and a greater mix of housing types. The general intent of the Official Plan is to support the achievement of the Greenfield density target of 50 people and jobs per hectare. The revised plan of subdivision that is facilitated by the proposed variances will is a compact, mixes use development containing variety of housing forms at a density of 60 persons and jobs per hectare. The variances therefore conform to the general intent of the Official Plan.

Are the variances consistent with the general intent of the Zoning By-law

The general intent of the zoning by-law for minimum lot area for townhouses is to ensure that there is adequate space available on the lot for a dwelling, parking and amenity area. The proposed variance will apply to a limited amount of interior townhouse lots that have shallow depth. These lots will still accommodate a dwelling, minimum of 6 m front and rear yard setbacks which provide for adequate amenity area and a parking space in the driveway (and garage). The proposed variance for minimum lot area is therefore consistent with the general intent of the zoning by-law.

The general intent of the zoning by-law for minimum front yard setback to the house and garage is to ensure that there is adequate space in the front yard for parking and to minimize streetscape impacts. In this instance, the minimum front yard setback will apply universally to the new subdivision so a consistent streetscape will be achieved within the subdivision. The 6.0 m setback will also provide adequate space for a legal parking space in the front yard of each dwelling. The proposed variance for front yard setback is therefore consistent with the general intent of the zoning by-law.

The general intent of the zoning by-law for minimum flankage yards for dwellings and porches is to ensure that there is adequate separation between dwellings/porches and the street. In this instance, the proposed 1.5 m will be adequate to ensure that sight lines are not obstructed and will provide for consistency of setbacks within the subdivision. The proposed variance for flanking yard setback is therefore consistent with the general intent of the zoning by-law.

The general intent of the zoning by-law for maximum height is to ensue that buildings do not overpower the lot on which they are located and to ensure that consistency with existing, traditional development is maintained. The increase in height is required due to the shallow bedrock within the subdivision. The dwellings within the subdivision will have very limited interface with established development and will generally only interface with a rear yard-rear yard condition. The proposed dwellings will not overpower their lots and will maintain consistency with the surrounding neighbourhood. The proposed variance for maximum height is therefore consistent with the general intent of the zoning by-law.

The general intent for minimum obstructed parking space width is to ensure that adequate parking is provided for the use it serves. In this instance, a 6 m front yard setback will be provided to each dwelling unit. This setback provides for a legal parking space in the front yard of each dwelling which ensures adequate parking is provided to each dwelling. The proposed variance for obstructed parking space width is therefore consistent with the general intent of the zoning by-law.

The general intent of the zoning by-law for minimum setback of stairs to the first storey of a dwelling is to prevent the encroachment of stairs onto adjacent lots or municipal rights of way. In this instance, a slight decrease in setback is necessary to accommodate the raised first storey which is required as a consequence of the shallow bedrock. The requested variance will only apply to a limited number of flanking yards and will not cause encroachment into the right of way. The proposed variance for setback

to stairs to the first storey of the dwelling is therefore consistent with the general intent of the zoning by-law.

Are the variances considered desirable for the appropriate development or use of the land

The variances will facilitate a compact mixed-use development at an appropriate density considering the Greenfield designation of the site. The proposed development consistent with the Provincial Policy Statement, conforms to the Growth Plan, Region of Niagara Official Plan and the City of Port Colborne Official Plan, represents good planning and is in the public interest. The variances are therefore considered desirable for the appropriate development of the subject property.

Are the variances minor in nature

The minor variances will apply uniform zoning regulations to a new subdivision with limited interface with adjacent established neighbourhoods. There will be no tangible impact of the granting any of the minor variances requested on existing or future residents. There The minor variances are therefore minor in nature.

Conclusion

The applications for redline revision and minor variance will facilitate modifications to a subdivision plan in response to the change in market conditions which have occurred subsequent to the original application two years ago. The applications will facilitate efficient, compact, mixed-use development at an appropriate density for the Greenfield area. The applications satisfy the requirements under the Planning Act, are consistent with the Provincial Policy Statement, conform to the Growth Plan, the Region of Niagara Official Plan, and the City of Port Colborne Official Plan, represent good planning and should therefore be supported.

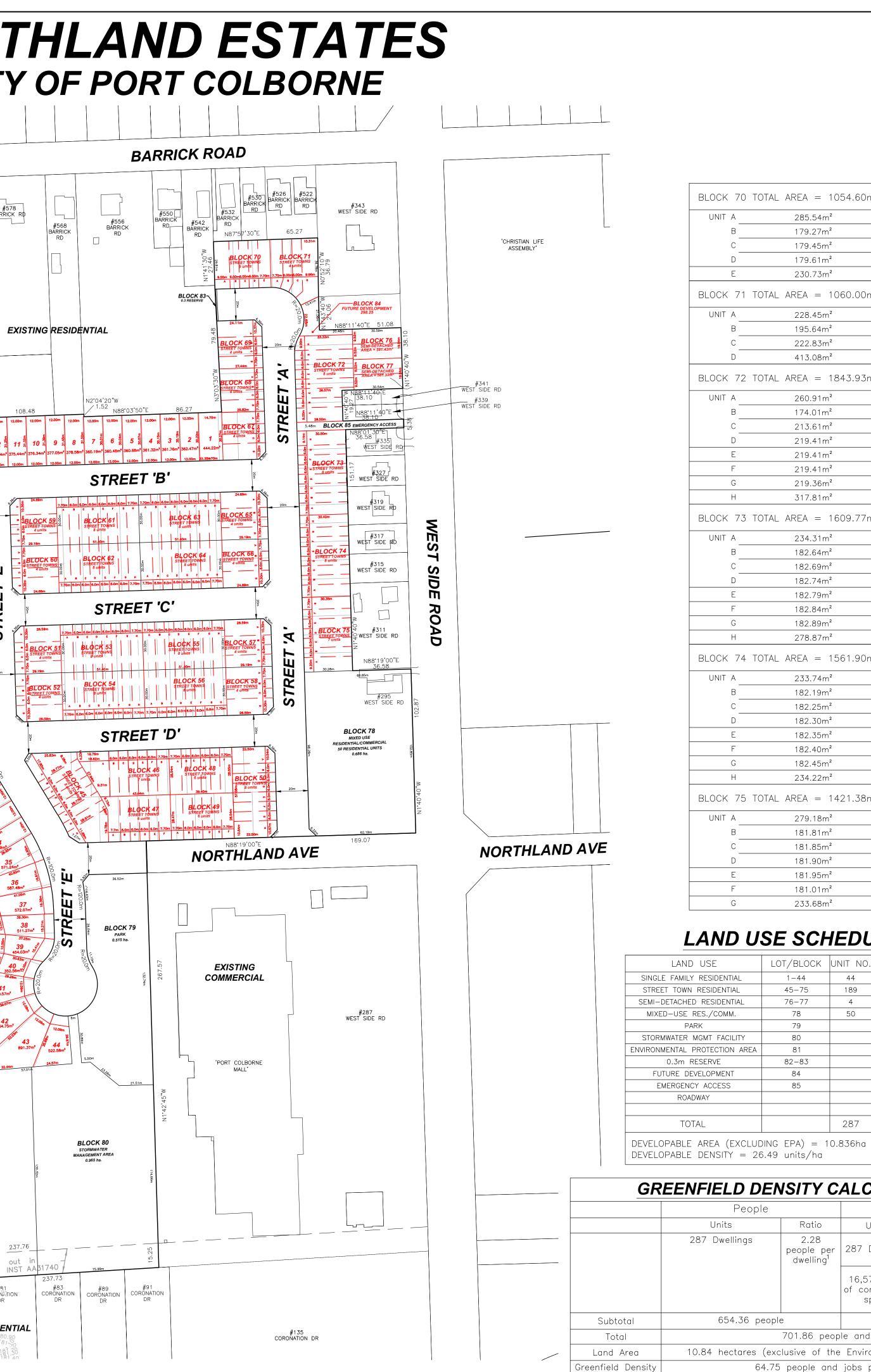
Respectfully submitted,

Mark

Matt Kernahan, MCIP, RPP Principal Garden City Development 289-783-8598 matt@gardencitydevelopment.ca



EUCK 45 I	OTAL AREA= 1756.55m²	BLOCK 56 TO	TAL AREA = 1542.00 m ²	NOF
UNIT A	369.16m ²	UNIT A	231.00m ²	
В С	172.62m ² 172.62m ²	- B	180.00m ² 180.00m ²	CI
0	172.62m ²	D	180.00m ²	
E	172.48m²	E	180.00m²	
F	172.79m ²	F	180.00m ²	
G H	173.23m ² 351.03m ²	G H	180.00m ² 231.00m ²	_
	$TAL AREA = 1471.62m^2$		$TAL AREA = 865.86m^2$	
UNIT A	395.22m²	UNIT A	290.50m²	#620 BARRICK RD #610 BARRICK #610 BARRICK
В	171.31m²	B	175.12m ²	
с D	171.31m ² 171.31m ²		175.12m ² 225.12m ²	
E E	171.31m ²		225.12m DTAL AREA = 865.86m ²	
F	171.31m ²	UNIT A	225.12m ²	
G	219.85m²	B	175.12m²	
_OCK 47 TC UNIT A	$DTAL AREA = 1141.13m^2$ 237.75m ²	C	175.12m ² 290.50m ²	
B	171.04m ²		290.50 m DTAL AREA = 865.86 m ²	
С	171.06m²	UNIT A	290.50m ²	
D	170.87m ²	B	175.12m²	
E	171.17m ² 219.24m ²	C	175.12m ²	
 _OCK 48 TC	$219.24m^2$ DTAL AREA = 1124.94m ²	BLOCK ED TO	$225.12m^2$ DTAL AREA = 865.86m ²	-
UNIT A	219.85m ²	UNIT A	225.12m ²	N87*55'20"E
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С	171.31m ²	C	175.12m ²	8 8 15 15 14 1 13 0 172.24m ¹ 373.04m ¹ 373.93
ט F	171.31m ² 171.31m ²	D	290.50m²	372.05m ⁺ 372.24m ⁺ 373.04m ⁺ 373.93 12.00m 12.00m 12.00m 12.00m 12.00m
F	219.85m ²	BLOCK 61 TO	TAL AREA = 1542.00 m ²	BLOCK 82 0.3 RESERVE
	TOTAL AREA = 1122.00	UNIT A	231.00m ²	
UNIT A	218.37m ²	B	180.00m ² 180.00m ²	
В С	170.92m ² 170.98m ²	D	180.00m ⁻ 180.00m ²	
D	171.04m ²	E	180.00m²	
E	171.07m ²	F	180.00m ²	N88'06'50"E 35.28 N87'47'05"E 64.15
F	219.62m²	G H	180.00m ² 231.00m ²	53.28 (107 H) 00 2 30.01m 8 21 8 360.80m* 2
_OCK 50 T($DTAL AREA = 1521.76m^2$		-	30.01m 22 § 361.43m [*] ♀
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C D	162.00m ² 162.00m ²	-	180.00m² 180.00m²	U 2021 U 202
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B	175.12m ²	UNIT A	231.00m ²	- + + + 30
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UNIT A	225.12m²	– D – E	180.00m ² 180.00m ²	
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C D	175.12m ² 290.50m ²	G	180.00m ²	
		- Н	231.00m²	
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в	180.00m ² 180.00m ²	B	180.00m ²	
D	180.00m ²	C	180.00m ²	
E	180.00m ²	– D – Е	180.00m ² 180.00m ²	
F	180.00m ²	– F	180.00m ²	
G H	180.00m ² 231.00m ²	G	180.00m²	
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UNIT A		UNIT A	$DTAL AREA = 865.86m^2$ 290.50m ²	+ + + + + + + + + + + + + + + + + + +
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C	180.00m ²	c	175.12m ²	
D	180.00m ²		$225.12m^2$	
E	180.00m ² 180.00m ²	BLOCK 66 TO	$DTAL AREA = 865.86m^2$ 225.12m ²	-
G	180.00m ⁻ 180.00m ²	B	175.12m ²	
Н	231.00m ²	c	175.12m²	
 _OCK 55 T($DTAL AREA = 1542.00m^2$		290.50m ²	
UNIT A	231.00m ²	BLOCK 67 TO	$\frac{\text{DTAL AREA} = 769.07 \text{m}^2}{183.76 \text{m}^2}$	EXISTING EXISTING EXISTING EXISTING EXISTING EXISTING EXISTING EXISTING
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C	180.00m²	C	160.93m²	
D	180.00m ²		263.45m ²	
E F	180.00m ² 180.00m ²	BLOCK 68 TO	$\frac{\text{DTAL AREA} = 743.27 \text{m}^2}{210.60 \text{m}^2}$	+ + + + + +
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Н	231.00m²	c	162.36m ²	N86'30'30''E #75 CORONATION
		D	207.15m ²	#71 DR CORONATION DR
			$\frac{\text{DTAL AREA} = 825.13\text{m}^2}{280.24\text{m}^2}$	
		UNIT AB	280.24m ² 166.89m ²	- #69 CORONATION DR
			100.00111	



AL	AREA	= ~	054.60m²
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	179.	27m²	
		45m²	
		61m²	
	230.	73m ⁴	2
AL	AREA	= ´	060.00m²
	228.	45m ²	2
	195.	64m²	1
	222.	83m²	2
	413.	08m ²	2
AL	AREA	= ~	843.93m²
	260.	91m ⁴	2
	174.	01m²	
	213.	61m ⁴	2
	219.	41m ⁴	2
	219.	41m ²	2
	219.	41m ²	2
	219.	36m ⁴	2
	317.	81m ⁴	2
AL	AREA	= ´	609.77m²
	234.	31m ⁴	2
	182.	64m²	
	182.	69m²	
	182.	74m²	
	182.	79m²	
	182.	84m²	
	182.	89m²	
	278.	87m ²	2
AL	AREA	= ´	561.90m²
		74m ²	
		19m²	
		25m²	
		30m²	
		35m²	
		40m²	
		45m²	
	234.	22m ²	2
AL	AREA	= ´	421.38m²
		18m ²	
		81m²	
		85m²	
		90m²	
		95m²	
		01m²	
	233.	68m ²	2

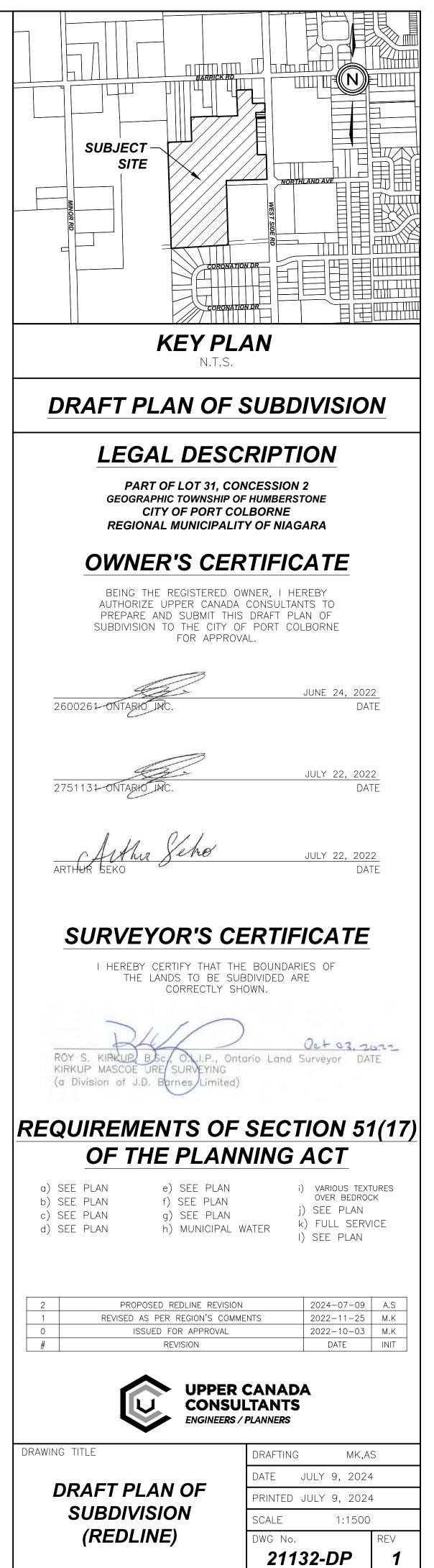
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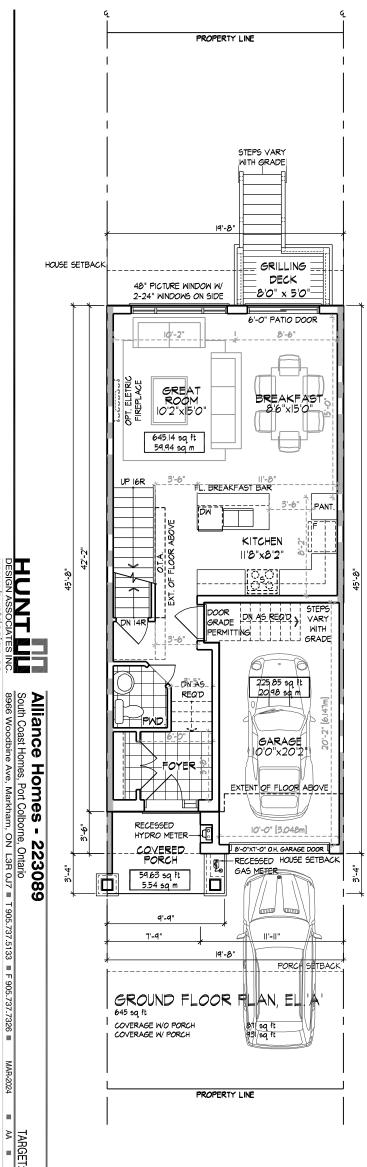
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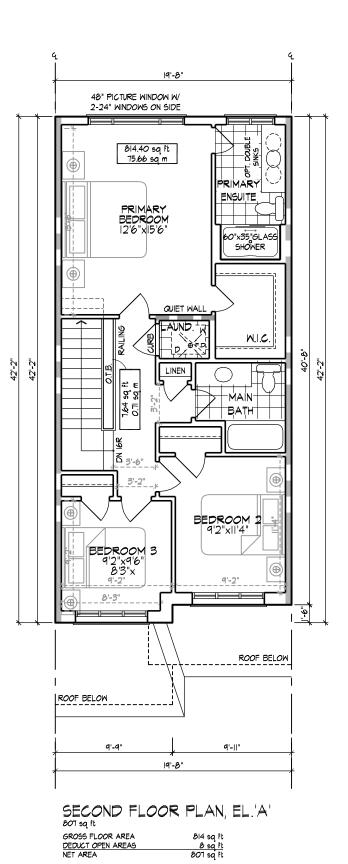
LOT/BLOCK	UNIT	NO.	AREA(ha)	AREA(%)	
1-44	44	ŀ	1.993	11.96	
45-75	18	9	3.828	22.96	
76-77	4		0.116	0.70	
78	50)	0.686	4.12	
79			0.515	3.09	
80			1.373	8.24	
81			5.424	32.54	
82-83			0.004	0.02	
84			0.030	0.18	
85			0.036	0.22	
			2.665	15.99	
	28	7	16.670	100.00	
NG EPA) = 10.836ha					

GREENFIELD DENSITY CALCULATION

)		Jobs			
	Ratio	Units		Ratio	Total
	2.28 people per dwelling ¹	287 Dwellings		5% "at home" employment	14.35 Jobs
		of c	576.42ft² ommercial space	1 employee per 500ft ² of commercial space ²	33.15 Jobs
ople	ple 47.50 jobs				
	701.86 people and jobs				
exc	exclusive of the Environmental Protection Area)				1)
.75	people and	jobs	per hecta	re	







FOR 6.0mX26.82m LOTS

ZONING STANDARDS				
MAX. HOUSE WIDTH	19'-8"			
MAX. LENGTH GARAGE SIDE	48'-7"			
MAX. LENGTH HOUSE SIDE	48'-7"			
MAX. COVERAGE W/ PORCH	N/A			
MAX. COVERAGE W/O PORCH	N/A			
MAX. G.F.A.	N/A			
MAX. HEIGHT	11 m			
MIN. GARAGE WIDTH	3.5m x 5.2m			
MAX. GARAGE WIDTH	N/A			
MAX. GARAGE PROJ.	N/A			

www.huntdesign. ca a 223089DT2002

1450 SF

AREA -

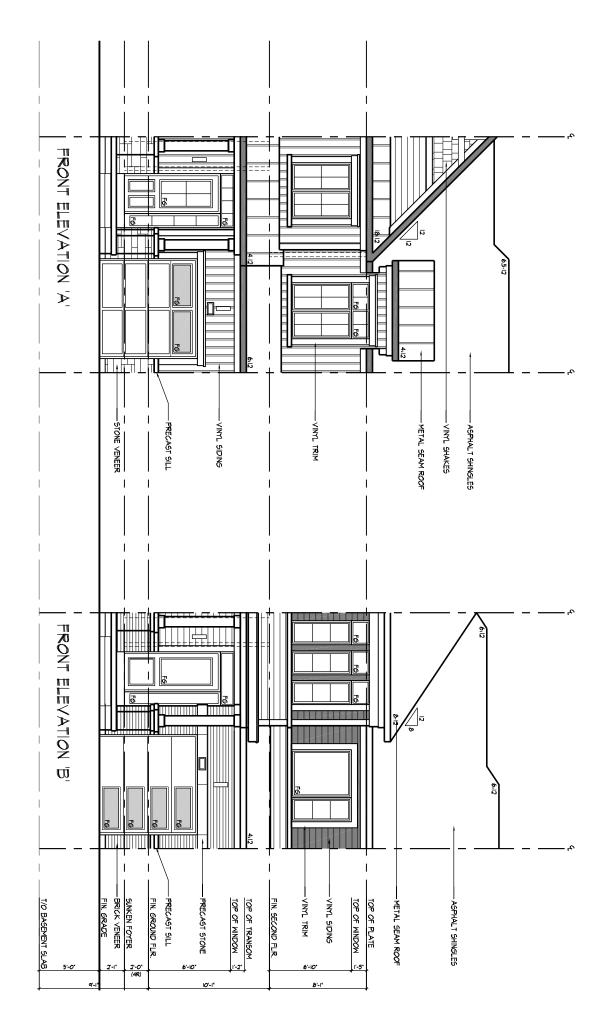
UNIT 2002 A- EL 'A' 1452 SF

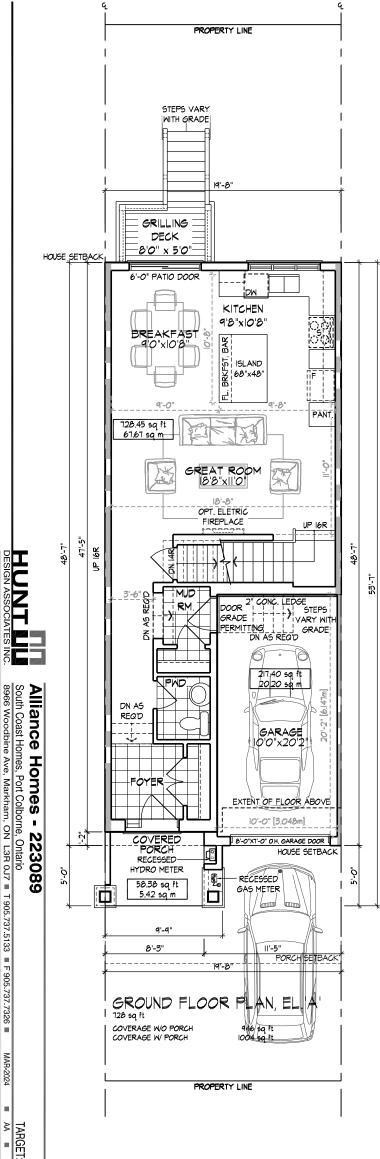
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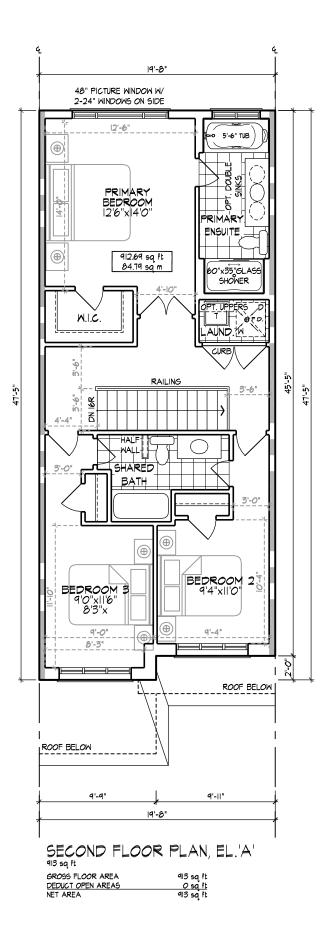
UNIT 2002

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FOR 6.0mX26.82m LOTS

ZONING STANDARDS				
MAX. HOUSE WIDTH	19'-8"			
MAX. LENGTH GARAGE SIDE	48'-7"			
MAX. LENGTH HOUSE SIDE	48'-7"			
MAX. COVERAGE W/ PORCH	N/A			
MAX. COVERAGE W/O PORCH	N/A			
MAX. G.F.A.	N/A			
MAX. HEIGHT	11 m			
MIN. GARAGE WIDTH	3.5m x 5.2m			
MAX. GARAGE WIDTH	N/A			
MAX. GARAGE PROJ.	N/A			

. Ca 8966 Woodbine Ave, Markham, ON L3R 0J7 🖩 T 905 737 5133 F 905 737 7326 MAR-2024 Ą 223089DT2003

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AREA -

UNIT 2003 EL. A 1641 SF

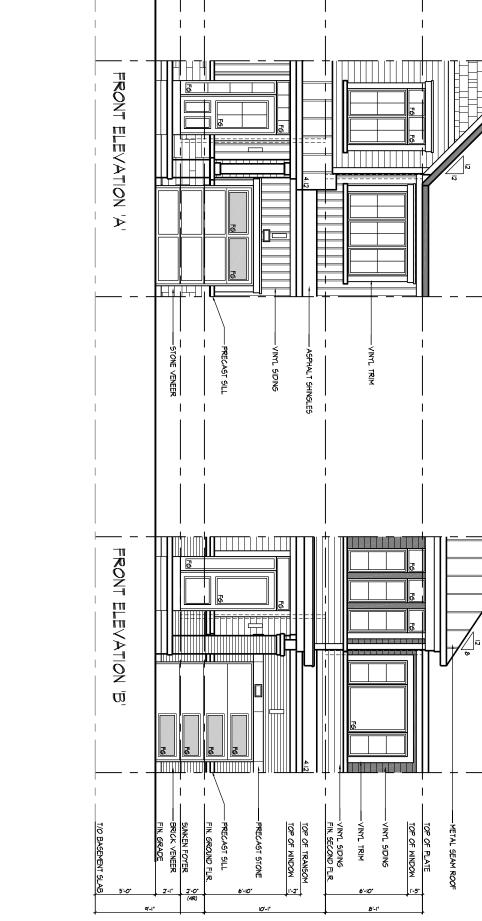
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UNIT 2003

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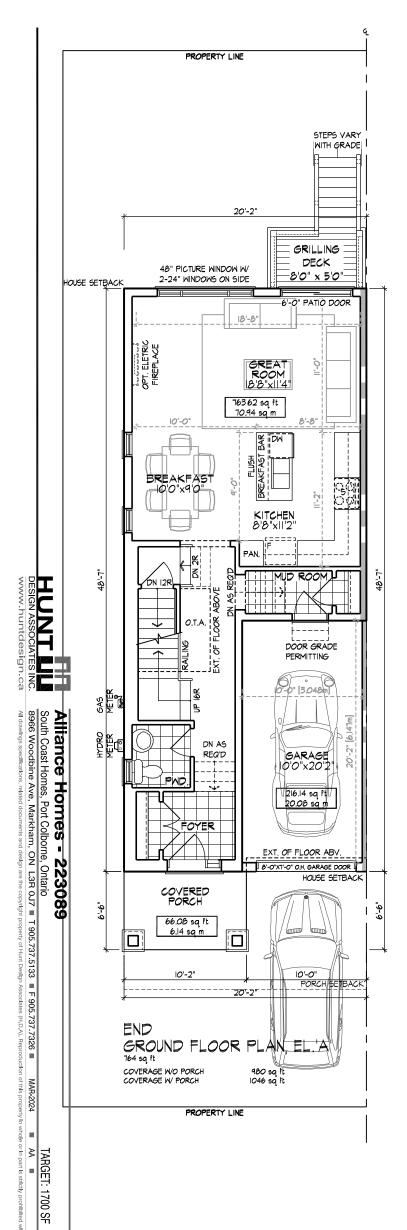
ASPHALT SHINGLES

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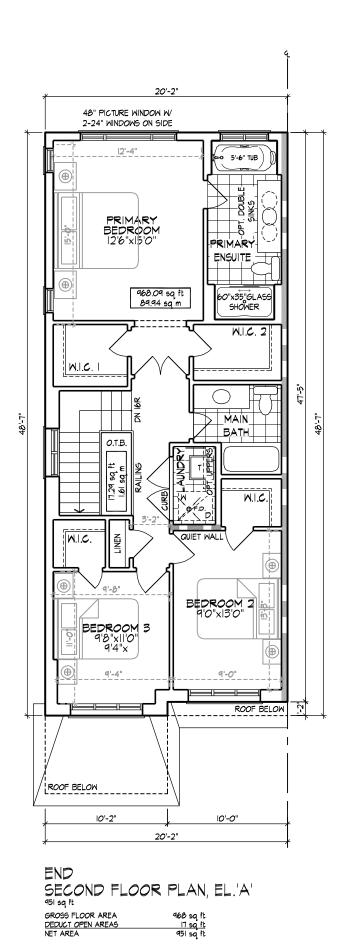
ASPHALT SHINGLES

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VINYL SHAKES



AREA - EL. /A' 1715 SF 223089DT2004



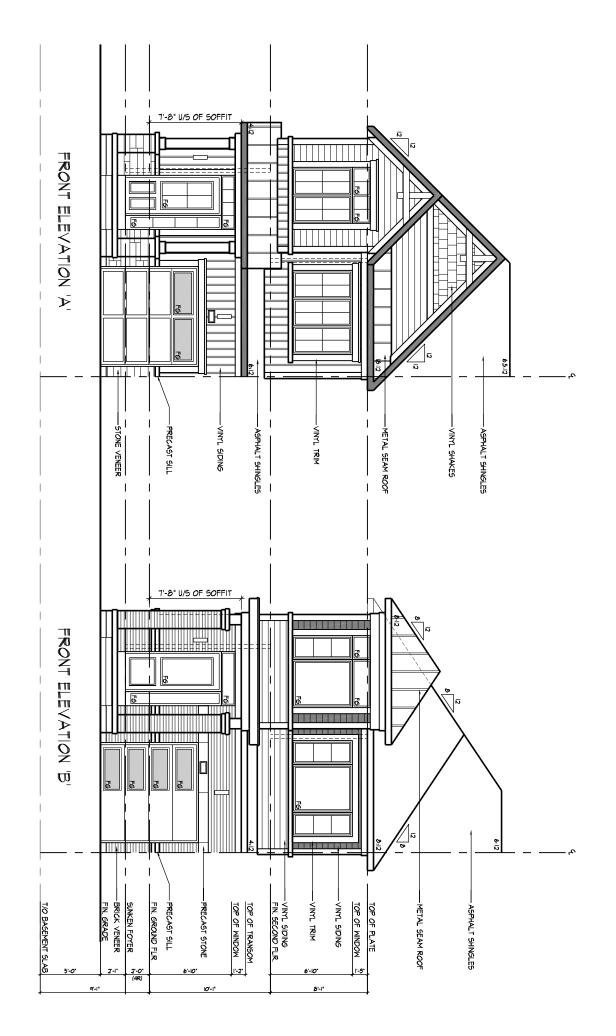
FOR 7.7mX26.82m LOTS

ZONING STANDARDS									
MAX. HOUSE WIDTH	20'-2"								
MAX. LENGTH GARAGE SIDE	48'-7"								
MAX. LENGTH HOUSE SIDE	48'-7"								
MAX. COVERAGE W/ PORCH	N/A								
MAX. COVERAGE W/O PORCH	N/A								
MAX. G.F.A.	N/A								
MAX. HEIGHT	11 m								
MIN. GARAGE WIDTH	3.5m x 5.2m								
MAX. GARAGE WIDTH	N/A								
MAX. GARAGE PROJ.	N/A								

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UNIT 2004 END





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UNIT 2005 C

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UNIT 2005 C



FLANKAGE ELEVATION 'A'			
T/O BASEMENT SLAB	SUNKEN FOYER 2'-0' (4R) -STONE VENEER 2'-1'	70 <u>~</u> 6'-10' 1'-3'	-ASPHALT SHINGLES -METAL SEAM ROOF TOP OF PLATE

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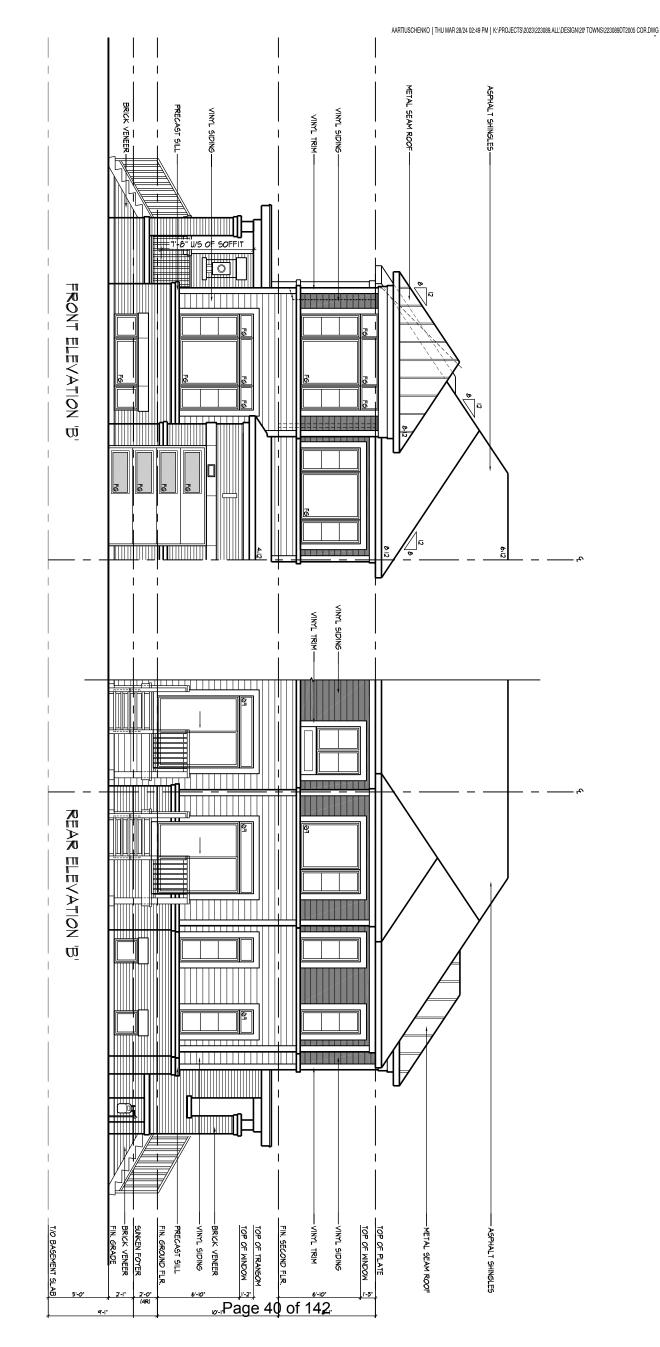
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UNIT 2005 C

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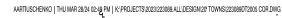
UNIT 2005 C

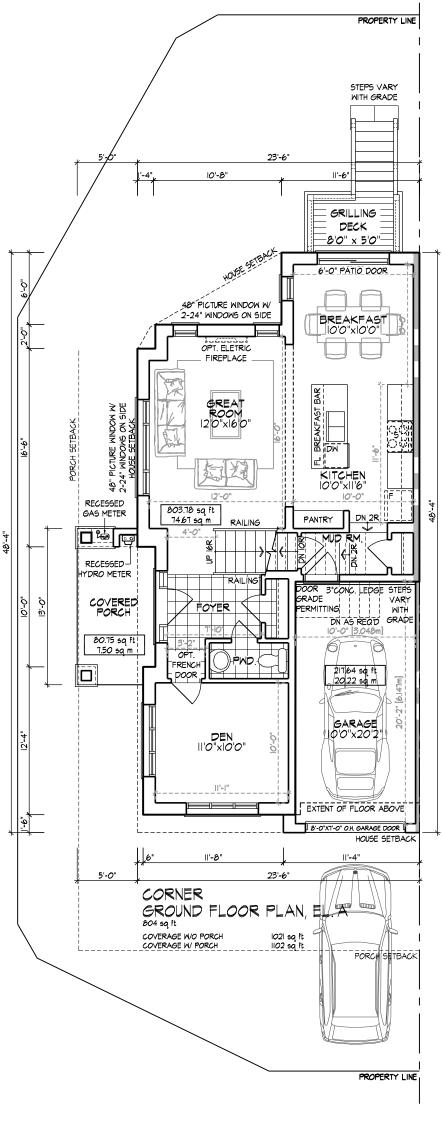


FLANKAGE ELEVA			ASPHALT SHIVELES
ELEVATION 'B'	PRECAST SILL		6 ASPHALT SHINGLES



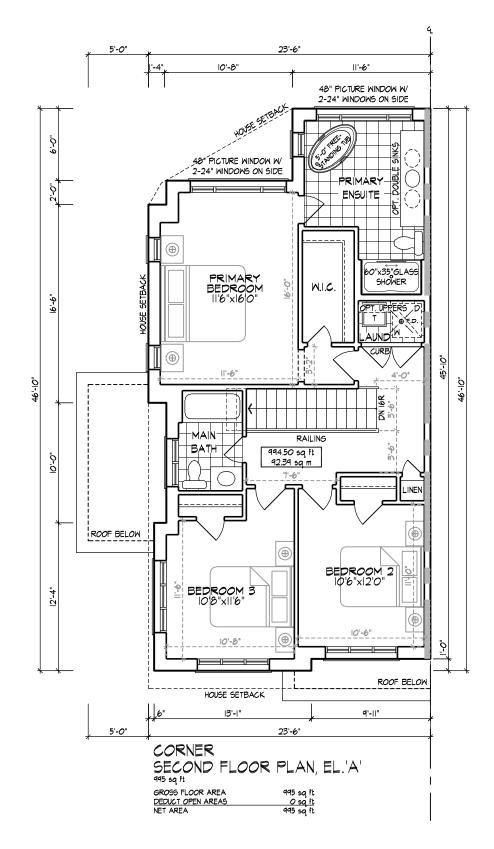






FOR 10.2mX26.82m LOTS

ZONING STANDARDS										
MAX. HOUSE WIDTH	23'-6"									
MAX. LENGTH GARAGE SIDE	48'-4"									
MAX. LENGTH HOUSE SIDE	48'-4"									
MAX. COVERAGE W/ PORCH	N/A									
MAX. COVERAGE W/O PORCH	N/A									
MAX. G.F.A.	N/A									
MAX. HEIGHT	11 m									
MIN. GARAGE WIDTH	3.5m x 5.2m									
MAX. GARAGE WIDTH	N/A									
MAX. GARAGE PROJ.	N/A									



HUNT L DESIGN ASSOCIATES www.huntdesign.ca

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TARGET: 1800 SF art Is strictly

> UNIT 2005 C AREA - EL. 'A' 1800 SF 223089DT2005C

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Upper Canada Planning & Engineering Ltd. 3-30 Hannover Drive St. Catharines, ON L2W 1A3 Phone 905-688-9400 Fax 905-688-5274

UCC File: 21132

FUNCTIONAL SERVICING REPORT

Northland Estates City of Port Colborne Revised June 2024

INTRODUCTION

Upper Canada Consultants has been retained to undertake and provide a Functional Servicing Report to address the servicing needs and requirements for the proposed residential development known as Northland Estates as part of the Red Line of Draft Plan of Subdivision application process for the City of Port Colborne.

The project site is located in the City of Port Colborne as part of Lot 31 and Concession 2 and is situated north of Coronation Drive North, east of Minor Road, south of Barrick Road and west of West Side Road (Regional Road 58) with site entrances on Northland Avenue. The site is bound by a Locally Significant Wetland at the west limits of the site, and the development area has historically been agricultural/vacant land.

The development site is approximately 16.67 hectares and has been previously Draft Approved to accommodate 120 single family dwellings, 46 townhouse units, and a mixed commercial/residential block with 50 residential units for a total unit count of 216 units. The proposed Red-Line Draft Plan submission has revised the previous design to now incorporate 44 single family dwellings and 189 townhouse units with the commercial residential block remaining unchanged for a new total unit count of 287. The site shall include associated asphalt road, concrete curb, catch basins, storm sewers, sanitary sewers, and watermain.

The objectives of this study are as follows:

- 1. Identify domestic and fire protection water service needs for the site;
- 2. Identify sanitary servicing needs for the site; and,
- 3. Identify stormwater management needs for the site.

WATER SERVICING

There is an existing municipal 300mm diameter Ductile Iron watermain located on the north side of Northland Avenue as well as a municipal 400mm diameter PVC watermain on the west side of West Side Road (Regional Road 58). Two connections will be made to the Northland Avenue watermain to provide an internal loop within the development to provide both domestic water



supply and fire protection. Four single family dwellings are to be constructed fronting West Side Road and will be provided service via the 400mm diameter watermain fronting the units.

The sizes and locations of the proposed internal watermain will be finalized as part of the future detailed design. At this time, a preliminary internal watermain design can be found in Appendix A. The proposed development will continue the 300mm diameter watermain westerly from its' current limit on Northland Avenue to Street 'E'. A second watermain connection to the existing West Main Street 400mm diameter watermain will be made through the access path between #339 and #335 West Main Street. As well a 200mm diameter watermain will be constructed on Street 'A' from Northland Avenue to the northerly limit with the intention of eventually connecting to the existing 300mm diameter watermain on Barrick Road through future development. Watermains constructed on Streets 'B' and 'E' will both be 200mm diameter and watermains constructed on Streets 'D' and 'C' are expected to be 150mm in diameter.

Fire protection will be provided to the proposed development with municipal fire hydrants within the subdivision and private fire hydrants within the mixed-use condominium block. The spacing and location shall be identified as part future detailed design. Fire protection will be provided to the four proposed units fronting West Side Road via an existing hydrant fronting #339 West Side Road.

Upper Canada Consultants has undertaken a watermain analysis using the EPANET software to model flows and pressures within the existing and proposed system as a result of the proposed development under various conditions. The software was used to model the conditions utilizing average day, maximum day, and peak unit consumption rates per MECP standards. The model has been calibrated utilizing hydrant test flow data provided by the municipality from tests conducted in May/June of this year and have ensured supportable conclusions for this development.

The EPANET model has utilized flow test data from four hydrants located at the following locations:

- 1. Fronting #341 West Side Road
- 2. Fronting #311 West Side Road
- 3. North-west corner of West Side Road and Northland Avenue
- 4. South-east corner of West Side Road and Northland Avenue

The results of the conducted modelling have been included in Appendix A along with images depicting the existing and proposed conditions utilized for this model. The existing testing outlines the existing watermain system having static pressures within the preferred system pressure range of 50-80 PSI and above the minimum pressures of 40 PSI. The modelled static pressures and residual pressures were within 5% (typical) of the results when compared to existing conditions provided by the hydrant flow tests. The existing hydrant fronting #341 West Side Road has the lowest theoretical flow rate of 3069 GPM under fire flow conditions (at 20 PSI). This flow rate would be attributed a BLUE rating (>1499GPM) and has ample flow to provide both domestic and fire flow protection to the surrounding residential properties.



Overall, mainly due to the elevation difference between the north and south ends of the site, the existing hydrant fronting #341 West Side Road as well as the most north-easterly proposed hydrant experience the lowest pressures (and therefore flow rates) through the modelling. However, even under peak daily conditions (720 LPCD), both noted hydrants will experience almost identical pressures with an approximate drop of 0.7% under future conditions. All hydrants will maintain static pressures of approximately 50PSI under future developed conditions. Therefore, it is expected that the existing municipal watermain system will have adequate capacity to provide both domestic and fire water supply for the proposed development.

Unfortunately, due to the complicated nature of this model, theoretical flows calculated by the model are not comparable to theoretical flows modelled during the municipal hydrant flow tests. Therefore, the model has been utilized to model the difference between pressures observed in the system. It should be noted that the pressures and flow rates observed by this model are purely theoretical, attempting to replicate information provided by the City's hydrant flow test data for hydrants within the immediate vicinity of the proposed development site. Without a complete model of the city's entire water system, a highly accurate model providing reliable flow rate data for the future development is unobtainable.

SANITARY SERVICING

There is an existing 200mm diameter municipal sanitary sewer on the west side of West Side Road (Regional Road 58) as well as a 200mm diameter sanitary sewer on Northland Avenue. The three proposed single-family dwellings fronting West Side Road will be provided service via the existing 200mm diameter sewer on West Side Road, with the remaining majority of the development block discharging sanitary flows to the existing sanitary sewer on Northland Avenue. All sanitary sewers will convey flows via gravity to their respective outlets.

An overall sanitary analysis has been conducted and included in Appendix B for the municipal sanitary sewer system downstream of the proposed development site from the site connection to the Regional Sanitary Sewer at the Steele Street Sanitary Pumping Station (SPS). The analysis utilizes a flow rate of 28 m³/ha/day for commercial and institutional land uses as well a residential flow rate of 255 L/person/day as per the 2021 Niagara Regional Wastewater Master Servicing Plan (MSP) Update. An infiltration rate of 0.28 L/s/ha has been used for residential land uses as well as drainage areas consisting of solely commercial/institutional land uses (containing a reduced sewer system with a highly reduced number of infiltration points). Per Plan and Profile information provided by the municipality, sanitary flows from the Oxford Boulevard Pumping Station and north od Steele Street on Barrick Road have been removed from the revised analysis as it has been determined sanitary flows continue flowing east on Barrick Road.

Three separate analyses have been completed and included in Appendix B:

- 1. Municipal Sanitary System under existing conditions with current Northland Estates Draft Plan.
- 2. Municipal Sanitary System with the proposed Red-Lined Draft Plan



3. Municipal Sanitary System with the proposed Red-Lined Draft Plan and potential future development north east of the site.

The analysis has concluded that the existing downstream municipal sanitary sewer system will theoretically reach capacities of approximately 83% on Northland Avenue, east of the proposed development, under currently approved Northland Estates Draft Plan. The development will produce a dry weather flow of 6.32L/s and total peak wet weather flow of 9.01L/s to the municipal system. The downstream sanitary sewers will experience a maximum capacity of 83.2% at the east end of Northland Avenue and will discharge a peak wet weather flow of 24.08L/s to the Steele Street SPS.

Under future conditions proposed by the Red-Lined Draft Plan, the development will discharge an increased dry weather flow of 8.16L/s and wet weather flow of 10.84L/s to the downstream sanitary sewer system. This will increase peak wet weather flow capacities experienced within the downstream sanitary sewer system to approximately 90.6% at the east end of Northland Avenue and will discharge a peak wet weather flow of 25.84L/s to the Steele Street SPS.

The analysis concludes that the existing downstream municipal sanitary sewer system from the proposed development to the Steele Street SPS will have adequate capacity for the proposed Northland Estates Subdivision development. The analysis also concludes that the existing municipal system would have capacity to accommodate sanitary flows from an additional 23 residential dwellings - shown as part of Drainage Area 'NEX' immediately north-west of the proposed development. The proposed internal sanitary sewer system for this development will be design to include capacity for future development in this area. It should be noted that any additional development occurring upstream of the existing 200mm diameter sanitary sewer system on Northland Avenue, east of West Side Road, may result in further capacity issues and would require upgrades to the existing sanitary sewer system.

The proposed development will discharge sanitary flows to the existing municipal sanitary sewer system ultimately conveying flows to the Regional Steele Street Pumping Station. Per the Water and Wastewater Master Servicing Plan Update (2021), the capacities and performance of the Steele Street SPS are included in the following table:

Steele Street Pumping Station Charac	cteristics
Criteria	Flow (L/s)
Operational Firm Capacity	25.2
ECA Firm Capacity	35.0
2021 Existing 5-Yr Peak Wet Weather Flow	48.8
2051 Design 5-Yr Peak Wet Weather Flow	53.0
Forcemain Capacity @ 2.5m/s	78.5



According to the MSP Update and values included in the previous table, the existing Steele Street SPS does not have the capacity to accommodate existing flows from its' drainage area under the current Operational Firm Capacity. With the additional sanitary flows from the proposed development, the Steele Street SPS will be inadequate in providing the necessary sanitary infrastructure required for the population in this area. Upgrades to the Regional Steel Street Sanitary Pumping Station will be required in order to provide the adequate downstream infrastructure required for this development.

STORMWATER MANAGEMENT PLAN

As part of the site development, the following is a summary of the stormwater management plan for the proposed residential development.

The criteria provided by the City of Port Colborne and Region of Niagara for this development includes the requirement to control peak stormwater flows from the proposed development area up to and including the 100 year design storm event and improve stormwater quality levels to MECP Normal (70% TSS removal) Protection levels prior to discharge from the development.

To limit future stormwater flows to allowable levels, and improve stormwater quality to the required TSS removal levels, a stormwater management wetpond facility will provide the necessary controls for this development. Stormwater quality levels will be provided to a Normal Standard before outletting from the development site. A channel will be created to convey stormwater flows from the proposed stormwater management facility and surrounding lands to the Eagle Marsh Drain. Roadway overland flows will be directed to the stormwater management facility at the south end of the site. A Stormwater Management Plan for this development has been created and can be found in Appendix C.



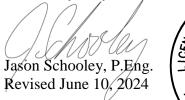
CONCLUSIONS AND RECOMMENDATIONS

Therefore, based on the above comments and design calculations provided for this site, the following summarizes the servicing for this site.

- 1. The existing municipal watermain system will have sufficient capacity to provide both domestic and fire protection water supply.
- 2. The existing municipal sanitary sewer system downstream of the site will have adequate capacity for the proposed residential development. Upgrades may be required to the Steele Street Sanitary Pumping Station.
- 3. Stormwater quality controls are being provided to Normal Protection (70% TSS removal) levels by a stormwater wetpond facility before outletting to the Eagle Marsh Drain.
- 4. Stormwater quantity controls are being provided by a stormwater management wetpond facility up to the 100-year design storm event prior to discharging from the site.
- 5. The site stormwater overland route from the road system is to the proposed stormwater management facility before outletting to the Eagle Marsh Drain.
- 6. A channel will be created as an extension to the Eagle Marsh Drain to convey stormwater flows from the proposed stormwater management facility and surrounding lands to the Eagle Marsh Drain.

Based on the above and the accompanying Stormwater Management Brief, there exists adequate municipal servicing for this development. We trust the above comments and enclosed calculations are satisfactory for approval. If you have any questions or require additional information, please do not hesitate to contact our office.

Yours very truly,



Encl.





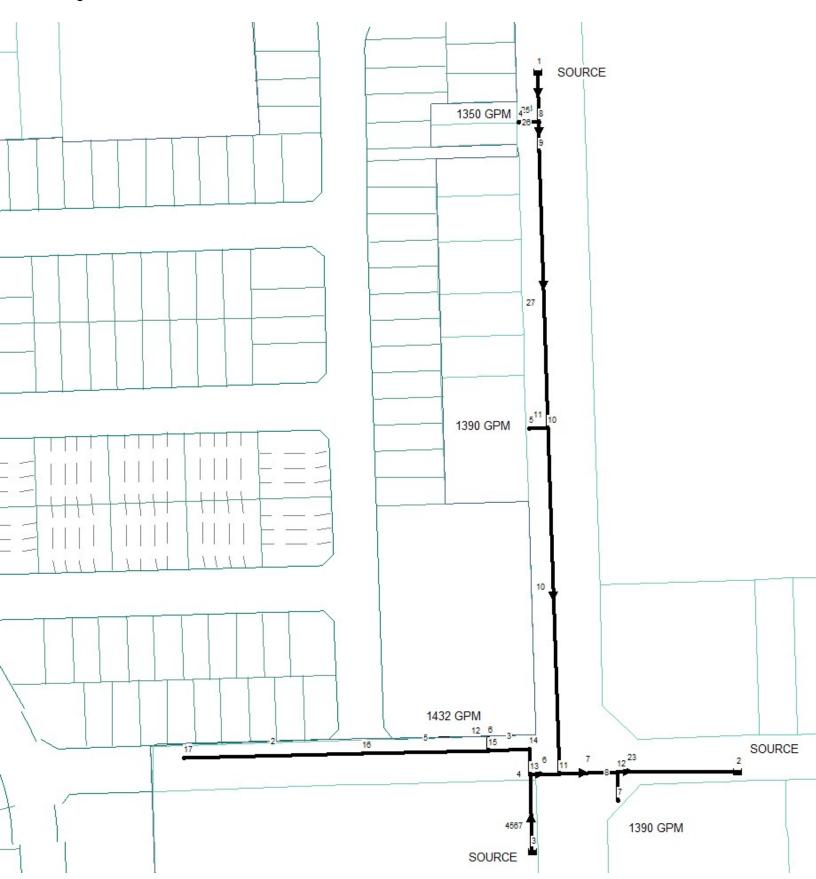
APPENDICES



APPENDIX A

EPANET Analysis – Existing Conditions Imagery EPANET Analysis Calculations

EPANET Analysis Northland Estates Subdivision Existing Conditions



WATERMAIN ANALYSIS

Software Utilized: EPANET									
Upper Canada Consultants									
Project Name: Northland Estate									
Project Number:	21132								
Date:	June 10, 2024								

Provided Hydrant Test Data

Model	Physical	Test Static Pressure	Modelled Static Pressures	Test Residual Pressures (PSI)	Modelled Residual Pressures	Actual Flow Rate (GPM)	
Node No.	Location	(PSI)	(PSI)	(PSI)	(PSI)	(GPIVI)	
4	Fronting #341	50	50.2	43	43.2	1350	
5	Fronting #311	53	51.9	45	44.7	1390	
6	NW Corner	54	53.1	46	45.6	1432	
7	SE Corner	53	53.5	43	44.7	1390	

Hydrant with Lowest Modelled Pressures:

Node #20

	Table 1	L. Modelled Ave	erage Day Pre	essures and	Flow Rates								
Hydrant Node Number	Number of Units	Population	Average Daily Load (LPM)	Existing Static Pressures (PSI)	Future Static Pressures (PSI)	% Change							
Existing Hydrants													
4	10	24	4.0	50.2	50.1	0.20%							
5	3	7	1.2	51.9	51.8	0.19%							
6	0	0	0.0	53.1	53.0	0.16%							
7	19	.9 46 7.6 53.5				0.19%							
		Northlan	ds Estates Su	ubdivision									
18	82	197	32.8	-	51.5	-							
19	54	130	21.6	-	51.1	-							
20	47	113	18.8	-	50.1	-							
21	38	91	15.2	-	51.2	-							
22	41	98	16.4	-	51.5	-							
23	22	53	8.8	-	51.8	-							
Note: Ave	rage Daily L	Init Consuption	Rate of 240	LPCD Utilize	d per 2021 M	SPU							

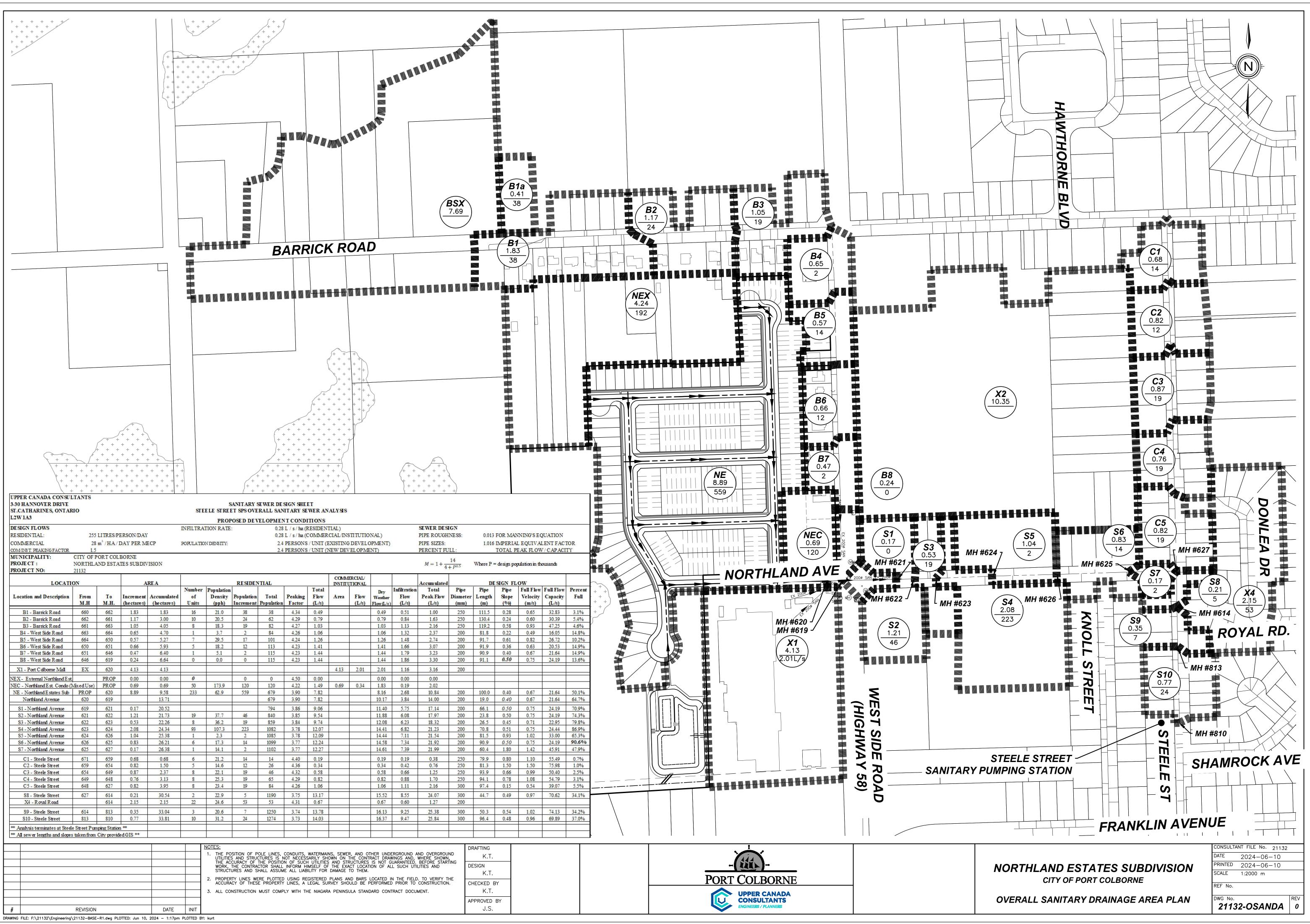
	Table 2	Modelled Max	imum Day Pi	ressures and	Flow Rates								
Hydrant Node Number	Number of Units	Population	Average Daily Load (LPM)	Existing Static Pressures (PSI)	Future Static Pressures (PSI)	% Change							
Existing Hydrants													
4	10	24	7.6	50.2	50.0	0.40%							
5	3	7	2.3	51.9	51.7	0.36%							
6	0	0	0.0	53.0	52.9	0.35%							
7	19	46	14.4	53.5	53.3	0.35%							
		Northlan	ds Estates Su	ubdivision									
18	82	197	62.3	- 51.4		-							
19	54	130	41.0	- 51.0		-							
20	47	113	35.7	-	50.0	-							
21	38	91	28.9	-	51.1	-							
22	41	98	31.2	-	51.4	-							
23	22	53	53 16.7 -			-							
	-	/ Unit Consuptic eaking Factor)	on Rate of 45	6 LPCD Utili	zed based on	peaking							

	Ta	ble 3. Modelled	Peak Pressu	res and Flov	v Rates								
Hydrant Node Number	Number of Units	Population	Average Daily Load (LPM)	Existing Static Pressures (PSI)	Future Static Pressures (PSI)	% Change							
Existing Hydrants													
4	10	24	12.0	50.2	49.9	0.60%							
5	3	7	3.6	51.9	51.6	0.60%							
6	0	0	0.0	53.0	52.7	0.56%							
7	19	46	22.8	53.5	53.2	0.56%							
		Northlan	ds Estates Sı	ubdivision									
18	82	197	98.4	-	51.3	-							
19	54	130	64.8	-	50.9	-							
20	47	113	56.4	-	49.9	-							
21	38	91	45.6	-	50.9	-							
22	41	98	49.2	-	51.3	-							
23	22	53	26.4	-	51.6	-							
Note: Peal of 3.0 (202	•	it Consuption R	ate of 720 LF	PCD Utilized	based on pea	king factor							



APPENDIX B

Overall Sanitary Drainage Area Plan – Proposed Conditions Overall Sanitary Calculations – Existing Conditions Overall Sanitary Calculations – Proposed Conditions with Additional Development



3-30 HANNOVER DRIVE SANITARY SEWER DESIGN SHEET ST.CATHARINES, ONTARIO STEELE STREET SPS OVERALL SANITARY SEWER ANALYSIS L2W 1A3 **EXISTING CONDITIONS WITH CURRENT NORTHLAND ESTATES DRAFT APPROVED SUBDIVISION** INFILTRATION RATE: DESIGN FLOWS 0.28 L/s/ha (RESIDENTIAL) SEWER DESIGN **RESIDENTIAL:** 255 LITRES/PERSON/DAY PIPE ROUGHNESS 0.28 L/s/ha (COMMERCIAL/INSTITUTIONAL) 28 m³ / HA / DAY PER MECP COMMERCIAL 2.4 PERSONS / UNIT (EXISTING DEVELOPMENT) **POPULATION DENSITY:** PIPE SIZES: 1.5 2.4 PERSONS / UNIT (NEW DEVELOPMENT) PERCENT FULL: COM/INST. PEAKING FACT(CITY OF PORT COLBORNE **MUNICIPALITY:** 14 $M = 1 + \frac{1}{4 + P^0}$ **PROJECT :** NORTHLAND ESTATES SUBDIVISION **PROJECT NO:** 21132 COMMERCIAL/ INSTITUTIONAL **LOCATION** AREA RESIDENTIAL Accumulated Total Total Pi Number Infiltration Populatio Weather Location and Description To of n Density Population Total Peaking Flow **Peak Flow** Diam From Increment Accumulated Area Flow Flow Flow M.H M.H. (hectares) (hectares) Units (pph) Increment Population Factor (L/s)(L/s)(L/s) (L/s) (L/s)(mi 25 B1 - Barrick Road 660 662 1.83 1.83 21.0 38 38 4.34 0.49 0.49 0.51 1.00 16 25 B2 - Barrick Road 662 1.17 3.00 24 0.79 0.79 661 10 20.5 62 4.29 0.84 1.63 25 B3 - Barrick Road 663 1.05 4.05 8 18.3 19 82 4.27 1.03 1.03 1.13 2.16 661 B4 - West Side Road 20 663 664 0.65 4.70 3.7 2 84 4.26 1.06 1.06 1.32 2.37 1 B5 - West Side Road 664 650 0.57 5.27 5 12 96 1.20 1.48 2.68 20 21.1 4.25 1.20 650 1.35 1.35 20 B6 - West Side Road 651 0.66 5.93 5 18.2 12 108 4.23 1.66 3.01 20 B7 - West Side Road 651 646 0.47 6.40 5.1 2 110 4.23 1.38 1.38 1.79 3.17 B8 - West Side Road 646 619 0.24 6.64 0 0.0 0 110 4.23 1.38 1.38 1.86 3.24 20 EX 620 4.13 4.13 2.01 2.01 3.16 20 X1 - Port Colborne Mall 4.13 1.16 EX - External Northland Est. PROP NEC - Northland Est. Condo (Mixed U PROP 0.69 0.69 50 173.9 120 120 4.22 1.49 0.69 0.34 1.83 0.19 2.02 NE - Northland Estates Sub PROP 620 8.89 9.58 163 44.0 391 511 3.97 5.99 6.32 2.68 9.01 20 20 619 13.71 5.99 3.84 Northland Avenue 620 511 3.97 8.33 12.17 621 20.52 622 7.20 20 619 0.17 3.92 9.54 5.75 15.29 S1 - Northland Avenue S2 - Northland Avenue 621 622 1.21 21.73 19 37.7 46 667 3.91 7.69 10.04 6.08 16.12 20 622 623 0.53 22.26 36.2 19 7.90 6.23 20 S3 - Northland Avenue 8 686 3.90 10.24 16.48 623 624 2.08 24.34 93 107.3 223 3.83 10.27 12.61 6.82 19.43 20 S4 - Northland Avenue 910 S5 - Northland Avenue 624 626 1.04 25.38 2.3 2 912 3.83 10.30 12.64 7.11 19.75 20 20 S6 - Northland Avenue 626 625 0.83 26.21 6 17.3 14 926 3.82 10.45 12.79 7.34 20.13 S7 - Northland Avenue 625 627 0.17 26.38 14.1 2 929 3.82 10.47 12.82 7.39 20.20 20 1 25 0.68 C1 - Steele Street 671 659 0.68 6 21.2 14 14 4.40 0.19 0.19 0.19 0.38 C2 - Steele Street 659 654 0.82 1.50 5 12 26 0.34 0.42 0.76 25 14.6 4.36 0.34 25 C3 - Steele Street 654 649 0.87 2.37 22.1 0.58 0.58 1.25 8 19 46 4.32 0.66 C4 - Steele Street 649 648 0.76 3.13 8 25.3 65 0.82 0.82 0.88 1.70 25 19 4.29 C5 - Steele Street 627 0.82 3.95 23.4 30 648 8 19 84 4.26 1.06 1.06 1.11 2.16 S8 - Steele Street 627 614 0.21 30.54 2 22.9 5 1018 3.80 11.40 13.74 8.55 22.29 30 614 2.15 22 53 53 20 X4 - Royal Road 2.15 24.6 4.31 0.67 0.67 0.60 1.27 813 0.35 33.04 3 9.25 23.61 30 S9 - Steele Street 614 20.6 7 1078 3.78 12.02 14.36

24

3.77

1102

12.27

Page 57 of 142

9.47

14.61

24.08

UPPER CANADA CONSULTANTS

S10 - Steele Street

813

* All sewer lengths and slopes taken from City provided GIS **

* Analysis terminates at Steele Street Pumping Station **

810

0.77

33.81

10

31.2

GN													
IESS:	0.013	FOR MAN	INING'S E	QUATION									
L:	1.016 IMPERIAL EQUIVALENT FACTOR TOTAL PEAK FLOW / CAPACITY												
14 - P ^{0.5}	Where P = design population in thousands												
	DE	SIGN FL	OW										
Pipe	Pipe	Pipe		Full Flow	Percent								
iameter	Length	Slope	Velocity	Capacity	Full								
(mm)	(m)	(%)	(m/s)	(L/s)									
250	111.5	0.28	0.65	32.83	3.1%								
250	130.4	0.24	0.60	30.39	5.4%								
250	119.2	0.58	0.93	47.25	4.6%								
200	81.8	0.22	0.49	16.05	14.8%								
200	91.7	0.61	0.82	26.72	10.0%								
200	91.9	0.36	0.63	20.53	14.7%								
200	90.9	0.40	0.67	21.64	14.7%								
200	91.1	0.50	0.75	24.19	13.4%								
200													
200	100.0	0.40	0.67	21.64	41.6%								
200	19.0	0.40	0.67	21.64	56.2%								
200	66.1	0.50	0.75	24.19	63.2%								
200	23.8	0.50	0.75	24.19	65.2% 66.6%								
200	26.5	0.30	0.73	22.95	71.8%								
200	70.8	0.13	0.71	24.44	79.5%								
200	81.5	0.93	1.02	33.00	59.8%								
200	90.9	0.50	0.75	24.19	83.2%								
200	60.4	1.80	1.42	45.91	44.0%								
250	79.9	0.80	1.10	55.49	0.7%								
250	81.3	1.50	1.50	75.98	1.0%								
250	93.9	0.66	0.99	50.40	2.5%								
250	94.1	0.78	1.08	54.79	3.1%								
300	97.4	0.15	0.54	39.07	5.5%								
300	44.7	0.49	0.97	70.62	31.6%								
200													
300	50.3	0.54	1.02	74.13	31.9%								
300	96.4	0.48	0.96	69.89	34.4%								

UPPER CANADA CONSU	LTANTS																				
3-30 HANNOVER DRIVE							NITARY S														
ST.CATHARINES, ONTA	RIO				STEE	LE STREE	Г SPS OVEI	RALL SAN	ITARY S	EWER A	NALYSI	S									
L2W 1A3						FU	LLY DEVE	LOPED (CONDITI	ONS											
DESIGN FLOWS					INFILTRA	TION RAT			L / s / ha (ITIAL)				SEWER DES	SIGN					
RESIDENTIAL:	255	LITRES/P	ERSON/DA						L/s/ha (ISTITUT	IONAL)		PIPE ROUGH		0.013	FOR MAN	JNING'S E	EQUATION	
COMMERCIAL			DAY PER M		POPULATI	ON DENSIT	V·		PERSONS				,		PIPE SIZES:					ALENT FAC	
COM/INST. PEAKING FACT(-		DITTTER	iller	TOTULATI	ON DENSIT	1.		PERSONS					,	PERCENT FU	ПΙ·			-	W / CAPAC	
	CITY OF		BORNE					2.1	TERDOT				1L1(1)		TERCEIVITC			TOTAL			
			ATES SUBD	IVISION											$M = 1 + \frac{1}{4}$	14	Where P	= design no	nulation in	n thousands	
	21132		11L5 50DD												$M = 1 + \frac{1}{4}$	$+ P^{0.5}$	where r	- design pe	pulation in	ulousalius	
	21152										COMMI	FDCIAL/	1		1						
LOCATI	ON		A	REA			RESIDEN	TIAL			INSTITU				Accumulated		DE	SIGN FL	OW		
					Number	Populatio				Total			Weather	Infiltratior		Pipe	Pipe	Pipe		Full Flow	Percent
Location and Description	From	То	Increment	Accumulated		-	Population	Total	Peaking	Flow	Area	Flow	Flow	Flow	Peak Flow	Diameter	Length	Slope	Velocity	Capacity	Full
	M.H	M.H.	(hectares)	(hectares)	Units	(pph)	Increment	Population	Factor	(L/s)		(L/s)	(L/s)	(L/s)	(L/s)	(mm)	(m)	(%)	(m/s)	(L/s)	
BSX - Barrick Road West (No	ot Included,)	7.69	7.69	240	74.9	576	576	3.94	6.70			6.70	2.15	8.85						
B1a - Future Dev (towns)		660	0.41	0.41	16	93.7	38	38	4.34	0.49			0.49	0.11	0.61	200	90.0	0.40	0.67	21.64	
B1 - Barrick Road	660	662	1.83	2.24	16	21.0	38	77	4.27	0.97			0.97	0.63	1.60	250	111.5	0.28	0.65	32.83	4.9%
B2 - Barrick Road	662	661	1.17	3.41	10	20.5	24	101	4.24	1.26			1.26	0.95	2.22	250	130.4	0.24	0.60	30.39	7.3%
B3 - Barrick Road	661	663	1.05	4.46	8	18.3	19	120	4.22	1.49			1.49	1.25	2.74	250	119.2	0.58	0.93	47.25	5.8%
B4 - West Side Road	663	664	0.65	5.11	1	3.7	2	122	4.22	1.52			1.52	1.43	2.95	200	81.8	0.22	0.49	16.05	18.4%
B5 - West Side Road	664	650	0.57	5.68	6	25.3	14	137	4.20	1.70			1.70	1.59	3.29	200	91.7	0.61	0.82	26.72	12.3%
B6 - West Side Road	650	651	0.66	6.34	5	18.2	12	149	4.19	1.84			1.84	1.78	3.62	200	91.9	0.36	0.63	20.53	17.6%
B7 - West Side Road	651	646	0.47	6.81	1	5.1	2	151	4.19	1.87			1.87	1.91	3.78	200	90.9	0.40	0.67	21.64	17.5%
B8 - West Side Road	646	619	0.24	7.05	0	0.0	0	151	4.19	1.87			1.87	1.97	3.84	200	91.1	0.50	0.75	24.19	15.9%
X1 - Port Colborne Mall	EX	620	4.13	4.13		0.0					4.13	2.01	2.01	1.16	3.16	200					
JEX - External Northland Est	t.	PROP	4.24	4.24	23	13.0	55	55	4.31	0.70			0.70	1.19	1.89						
NEC - Northland Est. Condo			0.69	0.69	50	173.9	120	120	4.22	1.49	0.69	0.34	1.83	0.19	2.02						
NE - Northland Estates Sub	PROP	620	8.89	13.82	233	62.9	559	734	3.88	8.42			8.75	3.87	12.62	200	100.0	0.40	0.67	21.64	58.3%
Northland Avenue	620	619		17.95				734	3.88	8.42			8.75	5.03	13.78	200	19.0	0.40	0.67	21.64	63.7%
S1 - Northland Avenue	619	621	0.17	25.17				886	3.83	10.02			12.36	7.05	19.41	200	66.1	0.50	0.75	24.19	80.2%
S2 - Northland Avenue	621	622	1.21	26.38	19	37.7	46	931	3.82	10.50			12.84	7.39	20.23	200	23.8	0.50	0.75	24.19	83.6%
S3 - Northland Avenue	622	623	0.53	26.91	8	36.2	19	950	3.81	10.70			13.04	7.53	20.23	200	26.5	0.30	0.73	22.95	89.6%
S4 - Northland Avenue	623	623	2.08	28.99	93	107.3	223	1174	3.75	13.00			15.35	8.12	23.46	200	70.8	0.51	0.71	24.44	96.0%
S5 - Northland Avenue	624	626	1.04	30.03	1	2.3	2	1176	3.75	13.03			15.37	8.41	23.78	200	81.5	0.93	1.02	33.00	72.1%
S6 - Northland Avenue	626	625	0.83	30.86	6	17.3	14	1190	3.75	13.17			15.52	8.64	24.16	200	90.9	0.50	0.75	24.19	99.9%
S7 - Northland Avenue	625	627	0.17	31.03	1	14.1	2	1193	3.75	13.20			15.54	8.69	24.23	200	60.4	1.80	1.42	45.91	52.8%
C1 - Steele Street	671	659	0.68	0.68	6	21.2	14	14	4.40	0.19			0.19	0.19	0.38	250	79.9	0.80	1.10	55.49	0.7%
C2 - Steele Street	659	654	0.82	1.50	5	14.6	12	26	4.36	0.34			0.34	0.42	0.76	250	81.3	1.50	1.50	75.98	1.0%
C3 - Steele Street	654	649	0.87	2.37	8	22.1	19	46	4.32	0.58			0.58	0.66	1.25	250	93.9	0.66	0.99	50.40	2.5%
C4 - Steele Street	649	648	0.76	3.13	8	25.3	19	65	4.29	0.82			0.82	0.88	1.70	250	94.1	0.78	1.08	54.79	3.1%
C5 - Steele Street	648	627	0.82	3.95	8	23.4	19	84	4.26	1.06			1.06	1.11	2.16	300	97.4	0.15	0.54	39.07	5.5%
S8 - Steele Street	627	614	0.21	35.19	2	22.9	5	1282	3.73	14.10			16.44	9.85	26.30	300	44.7	0.49	0.97	70.62	37.2%
X4 - Royal Road		614	2.15	2.15	22	24.6	53	53	4.31	0.67			3.01	0.60	3.62	200					
S9 - Steele Street	614	813		37.69	3		7	1342		14.71			17.05		27.60	300	50.3	0.54	1.02	74.13	27.00/
S9 - Steele Street	813	813	0.35	37.69	3 10	20.6 31.2	24	1342	3.71 3.71	14.71			17.05	10.55 10.77	27.60	300		0.54	0.96	74.13 69.89	37.2%
				30.40	10	31.2	24	1300	3./1	14.93			17.29	10.//	28.00	300	96.4	0.48	0.90	09.89	40.1%
** Analysis terminates at Ste		1 0																			
** All sewer lengths and slop	oes taken fr	om City pr	ovided GIS *	**					F	age 58	of 142										



APPENDIX C

Northland Estates – Stormwater Management Plan

STORMWATER MANAGEMENT PLAN

NORTHLAND ESTATES

CITY OF PORT COLBORNE

Prepared for:

2600261 Ontario Inc.

Prepared by:

Upper Canada Consultants 3-30 Hannover Drive St. Catharines, Ontario L2W 1A3

Revised May 2024

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APPENDICES

Appendix AWeighted Percent Impervious Calculation Sheet
Stormwater Management Facility Calculations

Appendix B MIDUSS Output Files

REFERENCES

1. Stormwater Management Planning and Design Manual Ontario Ministry of Environment (March 2003)

STORMWATER MANAGEMENT PLAN

NORTHLAND ESTATES

CITY OF PORT COLBORNE

1.0 INTRODUCTION

1.1 Study Area

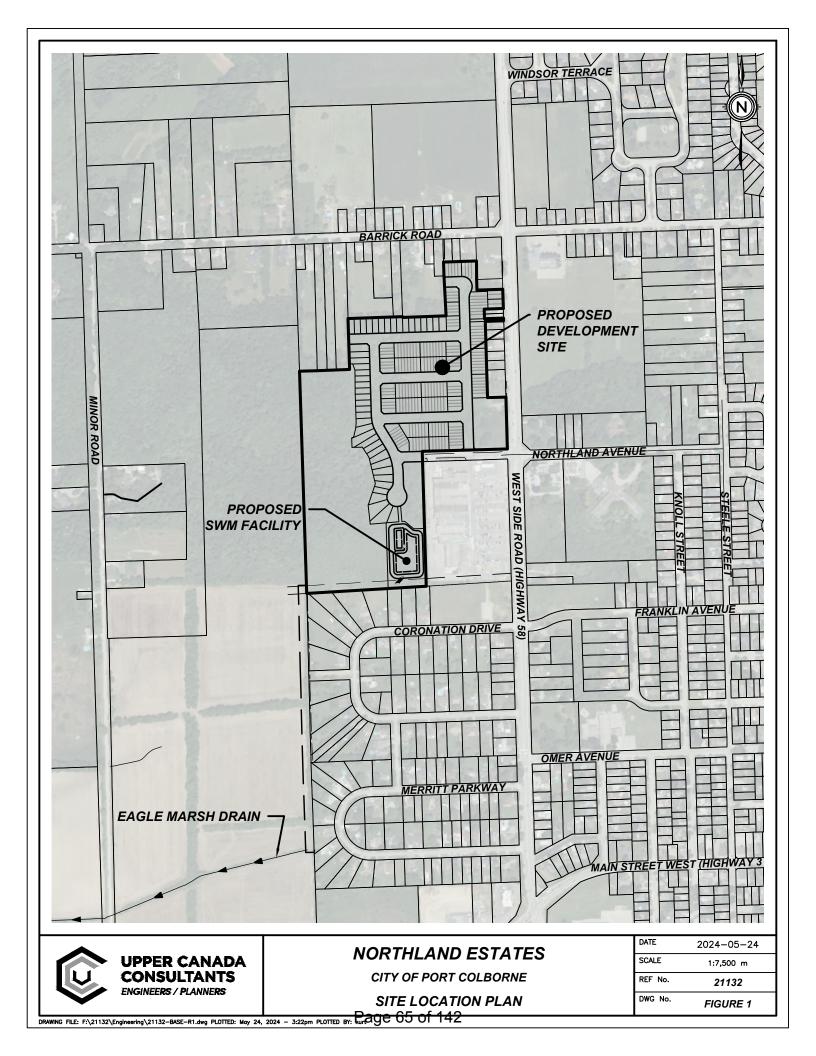
The proposed residential development is located in the City of Port Colborne as part of Lot 31 and Concession 2. As shown on the enclosed Site Location Plan (Figure 1), the subject property is situated north of Coronation Drive North, east of Minor Road, south of Barrick Road and west of West Side Road (Regional Road 58) with site entrances on Northland Avenue. This Stormwater Management Plan has been written to obtain approvals as part of the Redline of Draft Plan of Subdivision process.

The approximately 16.67ha property is bound by a Locally Significant Wetland to the west, a commercial plaza at the south east corner, and multiple residential properties to the north, east and south. The drainage areas contributing to this stormwater management plan consist primarily of the subject lands, though incorporate surrounding residential areas that convey stormwater flows through the development lands. The receiving body of water for the proposed stormwater flows will be the Eagle Marsh Drain.

1.2 Objectives

The objectives of this study are as follows:

- 1. Establish specific criteria for the management of stormwater from this site.
- 2. Determine the impact of development on the stormwater peak flow & volume from this site.
- 3. Investigate alternatives for controlling the quantity and quality of stormwater from this site.
- 4. Establish property requirements for the Stormwater Management Facility for the Draft Plan of Subdivision.



1.3 Existing & Proposed Conditions

a) <u>Existing Conditions</u>

Historically, the site has been used for agricultural purposes, though more recently has been vacant land. The approximately 16.67-hectare property includes 5.83 hectares of undevelopable lands along the western limits comprised of an existing Locally Significant Wetland. The proposed development is located within the upper reaches of the Eagle Marsh Drain drainage area, with the current actual drain upstream limit located approximately 500m south of the south-west corner of the site. The existing topography of the site generally directs flows to the south-east to the adjacent Locally Significant Wetland or Eagle Marsh Drain with all flows ultimately outletting to the Eagle Marsh Drain.

The majority of native soils within the study area have been characterized as imperfectly drained loam/clay loam Franktown Soils (hydrologic soil group CB) with bedrock located less than 1m below the surface. Within the south-western portion of the site, the soil transitions to a low permeability clay and silt resulting in the perched water necessary to create the Locally Significant Wetlands.

b) <u>Proposed Conditions</u>

Approximately 11.0 hectares of the site is proposed to be developed, consisting of 44 single family dwellings, 4 semi-detached units, 189 townhouse units, and a mixed-use commercial/residential block with 50 units, resulting in a total unit count of 287 units. The site shall be provided with full municipal services including sanitary sewers, storm sewers and watermain with asphalt pavement, concrete curbs and gutters. The proposed stormwater management plan discusses the proposed development under fully developed conditions.

The Northland Estates Subdivision development was previously draft approved with an associated Stormwater Management (SWM) Plan detailing the construction of a swale from the proposed SWM Facility to the current upstream limit of the Eagle Marsh Drain approximately 500m south of the south-east corner of the site providing a sufficient outlet. Since this approval, a design was set into motion by the City's Municipal Drain Engineering Consultant to extend the Eagle Marsh Drain from its' current upstream limit, through the rear yards of houses on Coronation Drive to the south-east corner of the site. It is expected that the Eagle Marsh Drain extension will be constructed prior to the development of the Northland Estates Subdivision and will therefore become the focus stormwater outlet for this development.

2.0 STORMWATER MANAGEMENT CRITERIA

New developments are required to provide stormwater management in accordance with provincial and municipal policies including:

- Stormwater Quality Guidelines for New Development (MECP/MNRF, May 1991)
- Stormwater Management Planning and Design Manual (MECP, March 2003)

Based on the comments and outstanding policies from various agencies (City of Port Colborne, Regional Municipality of Niagara, Niagara Peninsula Conservation Authority (NPCA), and the Ministry of the Environment, Conservation and Parks (MECP), and others) the following site-specific considerations were identified:

- The receiving watercourse, Eagle Marsh Drain has been identified by the Ministry of Natural Resources watercourse evaluation as a **Type 2** (*Important*) fish habitat. Based on this fish habitat, the corresponding MECP level of protection for stormwater management <u>quality</u> practices on all new developments shall be *Normal*.
- The site outlets to the Eagle Marsh Drain which contains lands that would be negatively impacted by increased flooding levels, and, therefore, stormwater quantity control is considered necessary to maintain the downstream peak water elevations.

Based on the above policies and site specific considerations, the following stormwater management criteria have been established for this site.

- Stormwater **quality** controls are to be provided for the internal storm system of the development according to MECP guidelines. It is proposed to provide Normal Protection (70% TSS removal) to the stormwater before outletting to the Eagle Marsh Drain.
- Stormwater **quantity** controls are to be provided for the outlet to limit the proposed development peak flows from the 2, 5, 10, 25, 50, and 100 year storm events to existing peak flow levels

3.0 STORMWATER ANALYSIS

A stormwater analysis has been conducted by Upper Canada Consultants as part of the design of the Northland Estates development using the MIDUSS computer modelling program. A new stormwater analysis was conducted to represent the existing and future conditions to the Eagle Marsh Drain.

This program was selected because it is applicable to an urban drainage area like the study area, it is relatively easy to use and modify for the proposed drainage conditions and control facilities, and it readily allows for the use of design storm hyetographs for the various return periods being investigated. Copies of the current model output files are enclosed in Appendix B.

3.1 Design Storms

Design storm hyetographs were developed using a Chicago distribution based on the Ministry of Transportations (MTO) Intensity-Duration-Frequency curves for the development area in Port Colborne. These curves were utilized due to the developments' proximity to West Side Road (Highway 58) and review requirements of the MTO. Hyetographs for the 25mm, 2, 5, 10, 25, 50 and 100 year events were developed using a 4-hour Chicago distribution. Table 1 summarizes the rainfall data.

Stormwater Management Plan Northland Estates – City of Port Colborne

	Table 1.	Rainfall Data			
Design Storm	Chicago Distribution Parameters				
(Return Period)	a	b	с		
25mm	512.000	0.0	0.699		
2 Year	397.149	0.0	0.699		
5 Year	524.867	0.0	0.699		
10 Year	608.845	0.0	0.699		
25 Year	715.568	0.0	0.699		
50 Year	794.298	0.0	0.699		
100 Year	871.279	0.0	0.699		

3.2 Existing Conditions

The existing conditions were modelled to establish the stormwater peak flows and volumes prior to development within this site. The existing drainage areas for this subwatershed are shown on Figure 2 with a schematic depicting the modelling strategy detailed on Figure 4. This area was determined from field investigations and a combination of recent topographic surveys as well as topographic information gathered from the Niagara Peninsula Conservation Authority (NPCA).

Stormwater flows from the majority of the development site are conveyed southerly overland towards the natural gas easement under existing conditions shown by Drainage Area EX10. Flows from the rear of the adjacent commercial property (EX20) join and are directed through EX30 to the south-west corner of the development property (Outlet A). Stormwater flows from Drainage Area EX40 are conveyed through the wetland to EX50 and ultimately directed south to Outlet A, confluencing with the previously described drainage areas. Under existing conditions, stormwater flows are directed south from Outlet A to ultimately discharge to the Eagle Marsh Drain (Outlet B).

Input parameters for the computer model for the existing conditions are shown in Table 2. Table 3 details the stormwater peak flows and volumes generated by the various design storm events.

3.3 Proposed Conditions

The future drainage areas for the proposed development, shown in Figure 3, were modelled to establish the stormwater peak flows and volumes once development has been completed at the proposed site.

It is proposed to construct and internal storm sewer system to collect peak flows from the proposed development, and discharge to a proposed Stormwater Management (SWM) Facility. The facility has been designed to accommodate potential future development north-east of the site fronting Barrick Road. Stormwater flows discharging from the SWM facility will outlet to a proposed channel conveying flows westerly through a channel within the existing natural gas easement to the south-west corner of the site (Outlet A) to the expected future upstream limit of the Eagle Marsh Drain. As stated previously, it is expected the Drain Extension will be completed prior to construction of this development.

Stormwater flows from the rear of lots 20 to 43 as part of Drainage Area A40 will outlet uncontrolled to the adjacent Locally Significant Wetland to maintain runoff volumes as required by the Water Balance Study (Terra-Dynamics, 2022). Stormwater flows directed southerly from the existing residential properties north of the site, fronting Barrick Road, will be captured and conveyed via swales and rear yard catch basins located on the proposed properties backing onto the Barrick road properties.

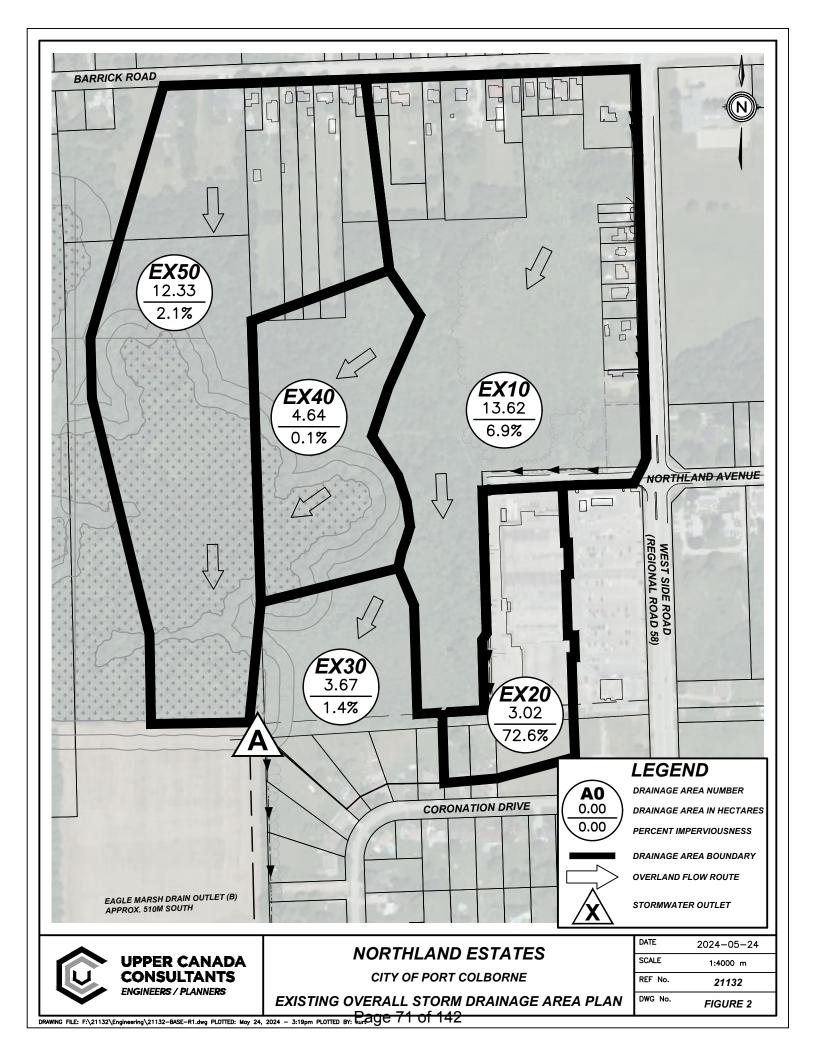
Input parameters for the computer model with the proposed development conditions are shown in Table 2. Impervious Calculations for existing conditions are included in Appendix A.

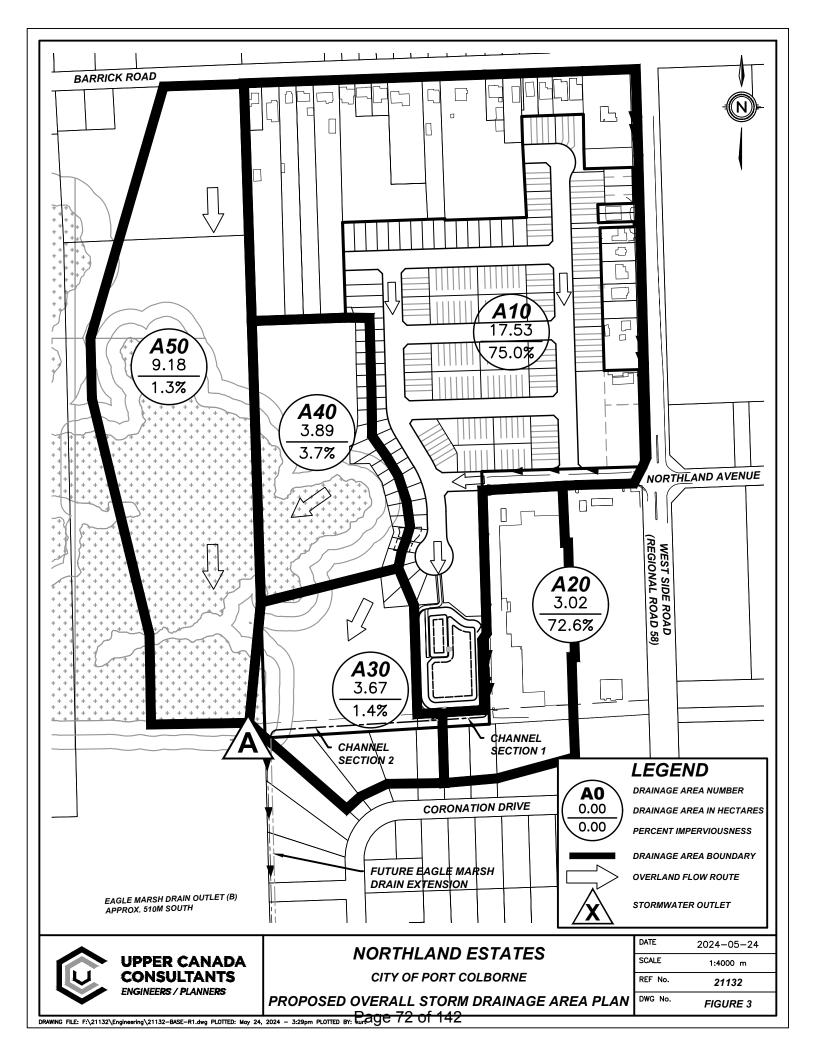
Table 2. Hydrologic Parameters							
Area No.	Area (ha)	Length (m)	Slope (%)	SCS CN	Percent Impervious		
Existing Conditions							
EX10	13.62	500	2.0	77	6.9		
EX20	3.02	100	0.5	77	72.6		
EX30	3.67	80	0.5	77	1.4		
EX40	4.64	100	0.5	77	0.1		
EX50	12.33	350	1.0	77	2.1		
	37.28 Total Area						
Future Conditions							
A10	17.99	500	1.0	77	75.0		
A20	3.02	100	0.5	77	72.6		
A30	3.21	80	0.5	77	1.6		
A40	3.89	100	0.5	77	3.7		
A50	9.18	350	1.0	77	1.3		
	37.29	Total Area					

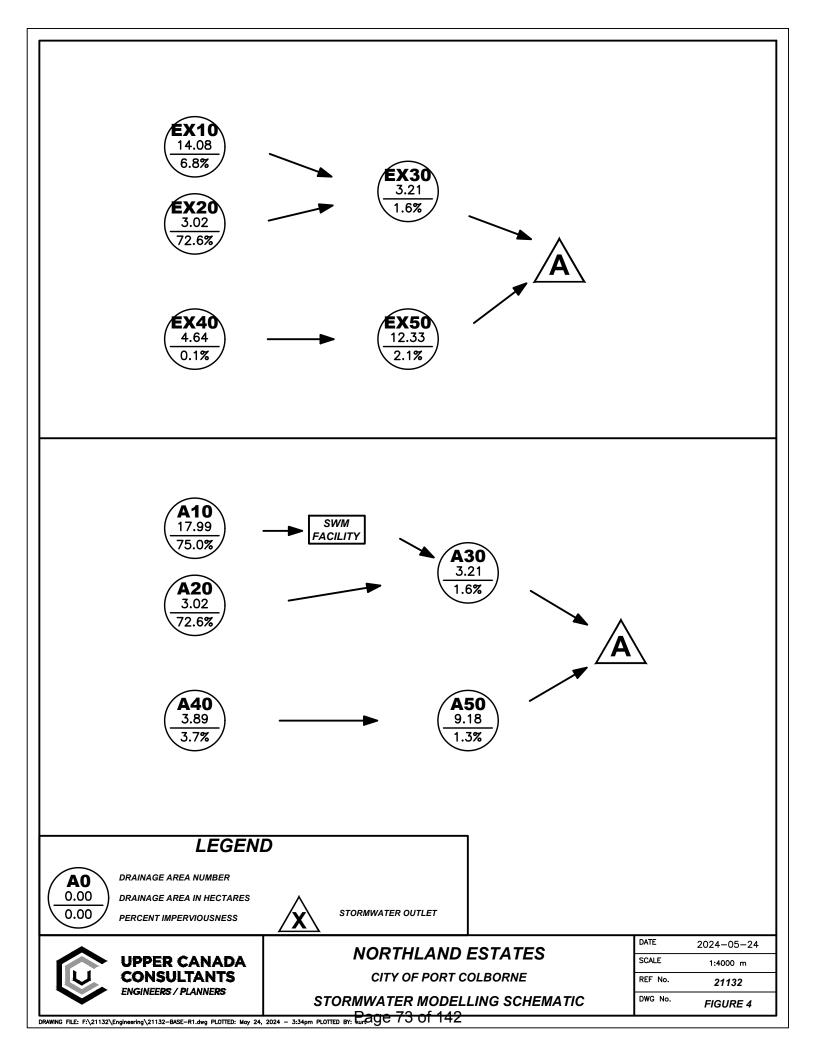
The results of the modelling are shown in Table 3, where the peak flows and runoff volumes were calculated for the 2, 5, 10, 25, 50 and 100 year design storm events.

Table 3. Peak Flows and Volumes at Outlet A							
Design	P	eak Flow (m	³ /s)		Volume (m ³)		
Storm	Existing	Future*	Change	Existing	Future*	Change	
2 Year	0.327	1.588	+386%	3,364	6,093	+2,729	
5 Year	0.513	2.192	+327%	5,645	8,952	+3,307	
10 Year	0.668	2.682	+301%	7,329	11,015	+3,686	
25 Year	0.916	3.377	+269%	9,637	13,758	+4,121	
50 Year	1.168	3.900	+234%	11,443	15,825	+4,382	
100 Year	1.451	4.424	+205%	13,268	17,899	+4,631	
*Note: Future stormwater values depict conditions without stormwater quantity controls							

As seen above in Table 3, stormwater quantity controls are considered necessary for the proposed development since the peak flows and volumes outletting from the proposed development area increase as a result of the proposed development. The existing and future stormwater drainage areas shown on Figures 2 and 3 were used to assess the stormwater management plan for this study. Figure 4 outlines the stormwater schematic used to model the conditions for this development.







4.0 STORMWATER MANAGEMENT ALTERNATIVES

4.1 Screening of Stormwater Management Alternatives

A variety of stormwater management alternatives are available to control the quality of stormwater, most of which are described in the Stormwater Management Planning and Design Manual (MECP, March 2003). Alternatives for the proposed and ultimate developments were considered in the following broad categories: lot level, vegetative, infiltration, and end-of-pipe controls. General comments on each category are provided below. Individual alternatives for the proposed development are listed in Table 4 with comments on their effectiveness and applicability to the proposed outlet.

a) Lot Level Controls

Lot level controls are not generally suitable as the primary control facility for quality control. They are generally used to enhance stormwater quality in conjunction with other types of control facilities.

b) Vegetative Alternatives

Vegetative stormwater management practices are not generally suitable as the primary control facility for quality control. They are generally used to enhance stormwater quality in conjunction with other types of control facilities.

c) <u>Infiltration Alternatives</u>

Where soils are suitable, infiltration techniques can be very effective in providing quantity and quality control. However, the very small amount of surface area on this site dedicated to permeable surfaces such as greenspace and landscaping make this an impractical option. Therefore, infiltration techniques will not be considered for this development.

d) <u>End-of-Pipe Alternatives</u>

Surface storage techniques can be very effective in providing quality and quantity control. Dry facilities are effective practices for stormwater erosion and flood control for large drainage areas.

Wet facilities are effective practices for stormwater erosion, quality and quantity control for large drainage areas.

Table 4. Evaluation of Stormwater Management Practices									
	Criteria for Implementation of Stormwater Management Practices (SWMP)								
Northland Estates	Topography	Soils	Bedrock	Groundwater	Area	Technical	Recommend		
Site Conditions	Variable 1 to 3%	Clay Loam <12mm/hr	At Considerable Depth	At Considerable Depth	± 17.99ha	Effectiveness (10 high)	Implementation Yes / No	Comments	
Lot Level Controls									
Lot Grading	<5%	nlc	nlc	nlc	nlc	2	Yes	Quality/quantity benefits	
Roof Leaders to Surface	nlc	nlc	nlc	nlc	nlc	2	Yes	Quality/quantity benefits	
Roof Ldrs.to Soakaway Pits	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 0.5 ha	6	No	Unsuitable site conditions	
Sump Pump Fdtn. Drains	nlc	nlc	nlc	nlc	nlc	2	No	Unsuitable site conditions	
Vegetative									
Grassed Swales	< 5 %	nlc	nlc	nlc	nlc	7	Yes	Quality/quantity benefits	
Filter Strips(Veg. Buffer)	< 10 %	nlc	nlc	>.5m Below Bottom	< 2 ha	5	No	Unsuitable site conditions	
Infiltration									
Infiltration Basins	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 5 ha	2	No	Unsuitable site conditions	
Infiltration Trench	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 2 ha	4	No	Unsuitable site conditions	
Rear Yard Infiltration	< 2.0 %	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 0.5 ha	7	No	Unsuitable site conditions	
Perforated Pipes	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	nlc	4	No	Unsuitable site conditions	
Pervious Catch basins	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	nlc	3	No	Unsuitable site conditions	
Sand Filters	nlc	nlc	nlc	>.5m Below Bottom	< 5 ha	5	No	High maintenance/poor aesthetics	
Surface Storage									
Dry Ponds	nlc	nlc	nlc	nlc	> 5 ha	7	No	No quality control	
Wet Ponds	nlc	nlc	nlc	nlc	> 5 ha	9	Yes	Very effective quality control	
Wetlands	nlc	nlc	nlc	nlc	> 5 ha	10	No	Very effective quality control	
Other									
Oil/Grit Separator	nlc	nlc	nlc	nlc	<2 ha	3	No	Limited benefit/area too large	

Reference: Stormwater Management Practices Planning and Design Manual - 1994 nlc - No Limiting Criteria

4.2 Selection of Stormwater Management Alternatives

Stormwater management alternatives were screened based on technical effectiveness, physical suitability for this site, and their ability to meet the stormwater management criteria established for proposed and future development areas. The following stormwater management alternatives are recommended for implementation on the proposed development:

- Lot grading to be kept as flat as practical, while remaining consistent with municipal standards, in order to slow down stormwater and encourage infiltration.
- **Roof leaders to be discharged to the ground surface** in order to slow down stormwater and encourage infiltration.
- **Grassed swales** to be used to collect rear lot drainage. Grassed swales tend to filter sediments and slow down the rate of stormwater.
- A wet pond facility to be constructed to provide stormwater quality enhancement for frequent storms.

5.0 STORMWATER MANAGEMENT PLAN

A MIDUSS model was created to assess existing, future and ultimate development peak flows and stormwater volumes generated by the proposed subdivision. The stormwater management facility was sized according to MECP Guidelines (MECP, March 2003) as follows:

5.1 Proposed Stormwater Management Facility

5.1.1 Stormwater Quality

The stormwater drainage outlet for the proposed development is the Eagle Marsh Drain, which has been identified by the Ministry of Natural Resources watercourse evaluation as a **Type 2** fish habitat. Based on this fish habitat, the corresponding MECP level of protection for stormwater management <u>quality</u> practices on all new developments shall be *Normal* (70% TSS removal). Based on Table 3.2 of SWMP & Design Manual, the water quality storage requirement is approximately 136.7m³/ha for *Normal* protection for developments with 75% impervious areas. The drainage area requiring stormwater quality improvement draining to the proposed facility is 17.99 hectares. The storage volumes required for this proposed facility are shown in Table 5.

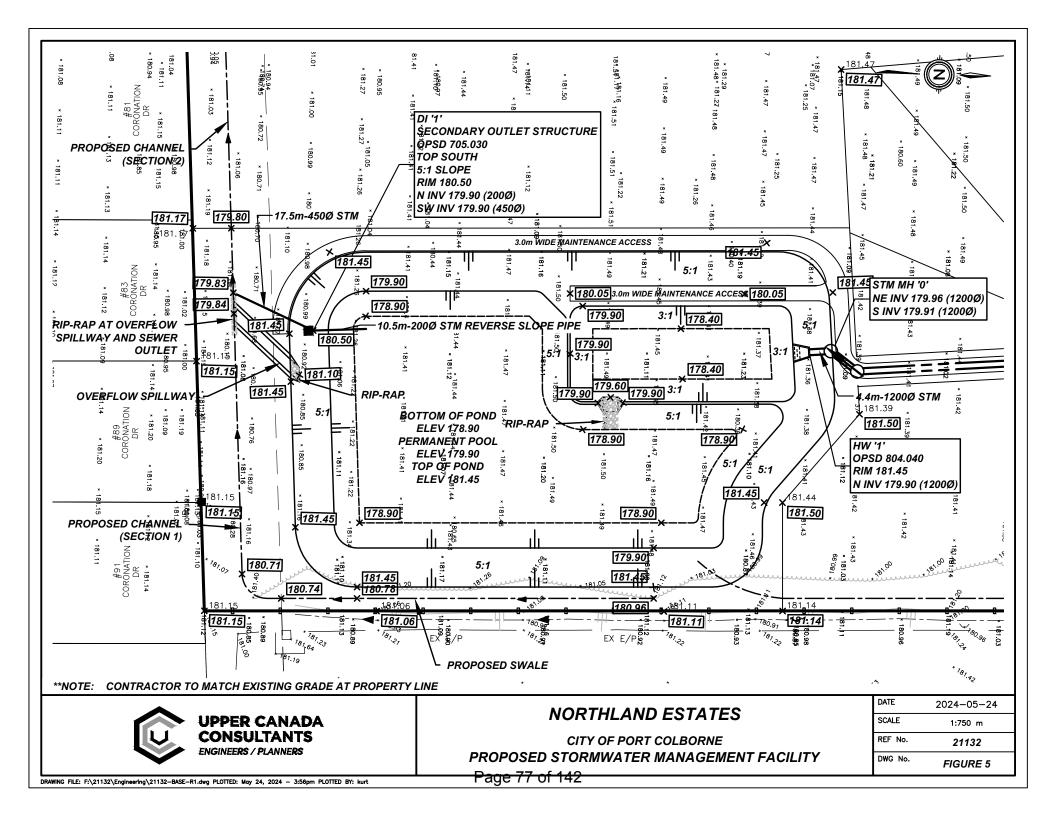


Table 5. Stormwater Quality Volume Calculations					
Total Water Quality Volume = 17.53 ha x 136.7 m ³ /ha = 2,396.4 m ³ \rightarrow 5,588.0 m ³ (provided)	Reference: Table 3.2, SWMP & Design Manual (MECP 2003)				
Permanent Pool Volume = 17.53 ha x 96.7 m ³ /ha = 1,695.2 m ³ \rightarrow 2,745 m ³ (provided)	Extended Detention Volume = 17.53 ha x 40 m ³ /ha = 701.2 m ³ \rightarrow 2,843 m ³ (provided)				

5.1.3 Stormwater Quantity Control

As shown in the previous Table 3, stormwater management quantity controls are required to reduce the peak flows from the development area to existing conditions up to and including the 100-year design storm event. The stormwater peak flows from the proposed development shall be reduced to existing levels by providing stormwater quantity storage. It is proposed to construct a control structure outlet to reduce the peak stormwater flows discharging from the proposed facility.

5.1.4 Stormwater Management Facility Configuration

As seen on the Proposed Stormwater Management Facility detail (Figure 5), the layout of the stormwater management facility is providing a single sewer outlet to a proposed ditch immediately south of the proposed SWM facility. The ditch will convey flows west through the natural gas easement to the future Eagle Marsh Drain outlet (Outlet A) at the southwest corner of the site.

It is proposed to construct a three-stage outlet for the stormwater management facility as shown in Figure 5. The first stage of control consists of a reverse slope pipe acting as a 200mm diameter orifice to provide the required quality controls. The second stage of control consists of a ditch inlet catch basin and outlet pipe which provides an outlet for flows exceeding the extended detention volume. An emergency spillway will provide an outlet for flows exceeding the capacity of the ditch inlet catch basin and outlet pipe.

The proposed effective bottom elevation of the facility is 178.90m, and the permanent pool water level is 179.90m for a water depth of 1.0 metres. The configuration of the facility provides $2,745m^3$ of permanent pool volume, which is more than the required $1,695m^3$. The proposed top of pond is at an elevation of 181.45m which provides a total active volume of $8,479m^3$. As stated previously, it is known that the bedrock elevation is quite close (+/- 1.0m) to the surface. It is expected that a considerable amount of rock excavation will be necessary to provide the depths required for the stormwater quality and quantity controls.

Based on the configuration of the proposed facility, the 200mm diameter quality orifice shall provide 24.2 hours (24 hrs is MECP minimum) of detention during the 25mm design storm event. The rim elevation for the proposed ditch inlet chamber is 180.50m and will provide an extended detention volume of 2,842m³, which is more than the required 701m³.

The outflow pipe from the stormwater management facility is to be 450mm in diameter and will convey the stormwater flows from the ditch inlet to the proposed channel ultimately conveying flows to the Eagle Marsh Drain. The emergency overflow spillway will be constructed at an elevation of 181.10m with a base width of 2.0m and side slopes of 2:1 to the top of the facility. A stage-storage-discharge relationship was determined for the facility and is included in Appendix A for reference purposes.

The proposed on-site storm sewer system will convey stormwater flows up to and including the 5-year design storm event directly to the stormwater management facility. During extreme storm events greater than the 5-year event, overland flows from the development area shall be directed to the proposed stormwater management facility. The storm sewer system will be design to convey stormwater flows from the development site as well as the expected future development area to the north-east. As well, stormwater flows from the private condo development at the north-west corner of the intersection of Northland Avenue and West Side Road will discharge stormwater flows directly to the Subdivision storm sewer system without the need for quantity or quality controls.

Table 6 summarizes the peak inflows and outflows for the stormwater management facility along with corresponding pond elevations. Based on the MIDUSS model, Table 6 shows the maximum wet pond elevation of 181.15m, and an active storage volume of 6,580m³ for the 100-year design storm event. This will provide a freeboard of 0.30m during the 100 year design storm event.

Table 6. Stormwater Management Wet Pond Facility Characteristics							
Design	P	eak Flows (L/	Maximum	Maximum			
Storm		Fut	ture	Elevation	Volume		
(Return Period)	Existing	Inflow	Outflow	(m)	(m ³)		
25mm	84	924	48	180.36	2,183		
2 Year	129	1,646	87	180.56	3,185		
5 Year	191	2,324	155	180.73	4,113		
10 Year	238	2,767	203	180.85	4,769		
25 Year	304	3,322	281	180.99	5,590		
50 Year	397	3,762	342	181.09	6,171		
100 Year	484	4,115	468	181.15	6,580		

As seen in Table 6 above, the proposed stormwater management facility will restrict flows from the proposed development area to existing storm levels up to and including the 100-year design storm event.

Table 7 details the difference in peak stormwater flows for existing and future conditions with the constructed and operational stormwater management facility.

Table 7. Impacts of Wet Pond Facility on Peak Flows at Outlet A								
		Peak Flow (m ³ /s)						
Design Storm	Existing	Future with SWM	Change*					
2 Year	0.327	0.285	-12.8%					
5 Year	0.513	0.431	-15.4%					
10 Year	0.668	0.559	-16.3%					
25 Year	0.916	0.757	-17.4%					
50 Year	1.168	0.957	-18.1%					
100 Year	1.451	1.182	-18.5%					
	the percent change be mwater management o	etween existing conditions a controls in place.	and future conditions					

As shown in Table 7 above, peak stormwater flows discharging from the proposed development site to Outlet A at the south-west corner will ultimately be reduced as a result of the proposed development plan during all storm events.

The proposed facility has a single storm sewer inlet, therefore, the sediment forebay was designed to minimize the transport of heavy sediment from the storm sewer outlet throughout the facility and to localize maintenance activities. Calculations for the forebay sizing follow MECP Guidelines and are shown in Tables 8 for the storm sewer outlet.

Table 8. Stormw	vater Man	agemen	t Facilit	y Forebay Sizing
a) Forebay Settling Length (MOI	ECC SWM	IP&D, E	quation 4	4.5)
	r =	3.5	:1	(Length:Width Ratio)
Settling Length = $\sqrt{\frac{r * Q_p}{V_s}}$	$Q_p =$	0.048	m ³ /s	(25mm Storm Pond Discharge)
N ³	$V_s =$	0.0003	m/s	(Settling Velocity)
Settling Length = 23.66				
b) Dispersion Length (MOECC S	SWMP&D	, Equatic	on 4.6)	
				(5 Yr Stm Sew Design Inflow)
$Dispersion \ Length = \frac{8 * Q}{D * V_f}$	D =	1.50	m	(Depth of Forebay)
				(Desired Velocity)
Dispersion Length = 24.79	m			
c) Minimum Forebay Deep Zone	Bottom W	/idth (M	OECC S	WMP&D, Equation 4.7)
Diananaian I an ath	Minimun	n Foreba	y Lengtł	n from Equations 3.3 and 3.4
$Width = \frac{Dispersion \ Length}{8}$		24.79	m	(minimum required length)
Width = 3.10	m (minir	num requ	uired wi	dth)
d) Average Velocity of Flow				
	Q =	0.924	m ³ /s	(Quality Design Inflow)
0	A =	21.75	m^2	(Cross Sectional Area)
Average Velocity = $\frac{Q}{A}$	D =	1.50	m	(Depth of Forebay)
A	$\mathbf{W} =$	10.00	m	(Proposed Bottom Width)
	S =	3	:1	(Side slopes - minimum)
Average Velocity = 0.04	m/s			
Is this Acceptable? Yes	(Maxi	mum vel	ocity of	flow = 0.15 m/s)
e) Cleanout Frequency				
Is this Acceptable? Yes	L =	35.0	m	(Proposed Bottom Length)
	ASL =	3.13	m ³ /ha	(Annual Sediment Loading)
	A =	17.58	ha	(Drainage Area)
	FRC =	70	%	(Facility Removal Efficiency)
	FV =	889.50	m^3	(Forebay Volume)
Cleanout Frequency = 11.3	years			
Is this Acceptable? Yes				(10 year minimum cleanout frequency)

5.1.5 Proposed Channel

As part of the proposed stormwater management plan, a channel will be constructed to provide an outlet for stormwater flows discharged from the stormwater management facility and surrounding lands. The proposed channel will begin at the south-east corner of the site, providing an outlet for stormwater flows discharging from the adjacent commercial property (287 West Side Road) and surrounding residential lands (Drainage Area A20). The channel will continue west within the existing natural gas easement to the south-west corner of the development and discharge to the future upstream Eagle Marsh Drain limit (Outlet A) at the south-west corner of the site.

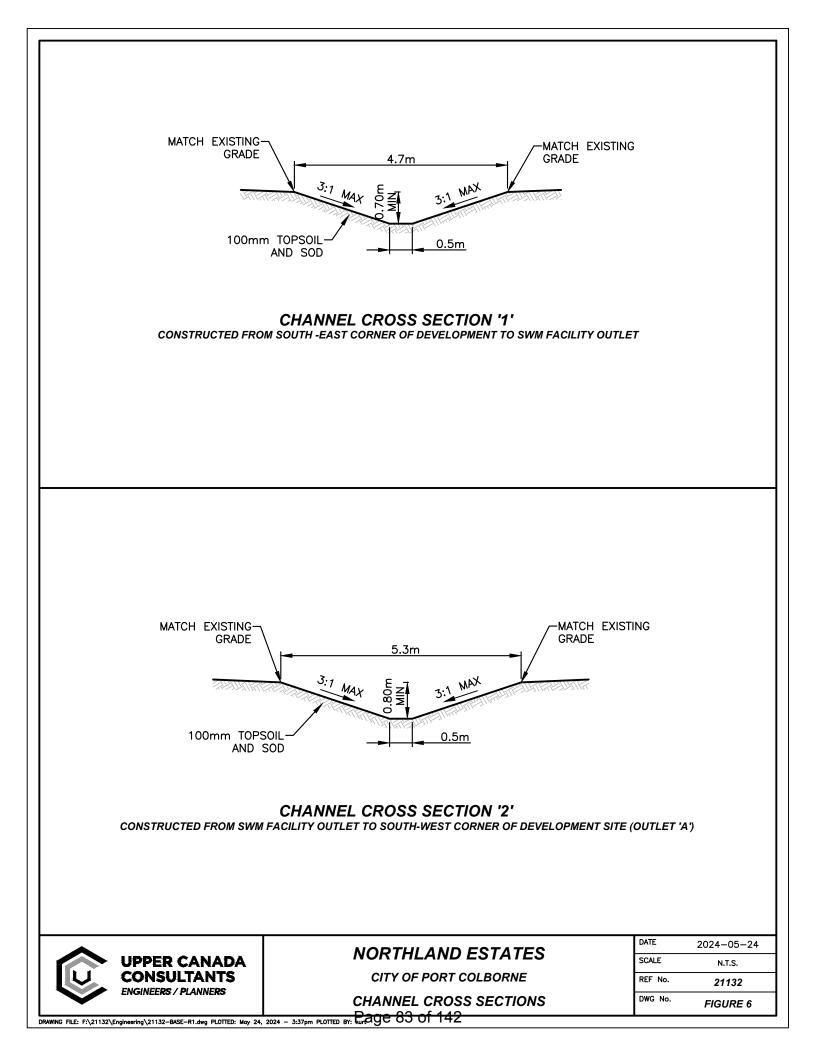
As part of the stormwater analysis of this development, the channel has been modelled using the MIDUSS computer modelling program to have capacity for flows up to and including the 100-year design storm event. The channel has been modelled in three sections as follows:

- 1. Start of channel at south-east corner of development to proposed stormwater management facility outlet.
- 2. SWM facility outlet to south-west corner (Outlet A) of development property.

The modelled sections of the channel have been noted on the Proposed Overall Storm Drainage Area Plan (Figure 3) included previously on Page 9 of this report. The channel modelling was incorporated into the overall development MIDUSS stormwater management model and utilizes input parameters noted previously in the report.

The proposed channel has been modelled to have capacity for stormwater flows from the proposed development and surrounding lands for storm events up to and including the 100-year design storm event. Table 10 below details the stormwater characteristics of the proposed channel conveying stormwater flows from upstream of the SWM facility outlet to the Eagle Marsh Drain during the 100-year design storm event. It is proposed to construct a channel with dimensions and side slopes as detailed in Table 10. Cross sections of the proposed channel have been included on the next page.

Table 9. Channel Characteristics								
Channel Section	Length (m)	Base Width (m)	Slope (%)	Side Slopes	Minimum Proposed Channel Depth (m)	Peak Flow Rate (m ³ /s)	100-Year Peak Flow Depth (m)	
1 – Start	50	0.5	0.30	3:1	0.70m	0.694	0.64	
2 - End	200	0.5	0.20	3:1	0.80m	0.843	0.76	



6.0 SEDIMENT AND EROSION CONTROL

Sediment and erosion controls are required during all construction phases of this development to limit the transport of sediment into the adjacent Locally Significant Wetland as well as the Eagle Marsh Drain.

The following additional erosion and sediment controls will also be implemented during construction:

- Install silt control fencing along the limits of construction of the development to collect sediment in overland flows before discharging to downstream systems. The silt control fence installed along east end of site will be installed along the wetland buffer to act as the limit of construction.
- Re-vegetate disturbed areas as soon as possible after grading works have been completed.
- Lot grading and siltation controls plans will be provided with sediment and erosion control measures to the appropriate agencies for approval during the final design stage.

7.0 STORMWATER MANAGEMENT FACILITY MAINTENANCE

7.1 Wetpond Facility

Maintenance is a necessary and important aspect of urban stormwater quality and quantity measures such as constructed wetlands. Many pollutants (ie. nutrients, metals, bacteria, etc.) bind to sediment and therefore removal of sediment on a scheduled basis is required.

The wet pond for this development is subject to frequent wetting and deposition of sediments as a result of frequent low intensity storm events. The purpose of the wet pond is to improve post development sediment and contaminant loadings by detaining the 'first flush' flow for a 24 hour period. For the initial operation period of the stormwater management facility, the required frequency of maintenance is not definitively known and many of the maintenance tasks will be performed on an 'as required' basis. For example, during the home construction phase of the development there will be a greater potential for increased maintenance frequency, which depends on the effectiveness of sediment and erosion control techniques employed.

Inspections of the wet pond will indicate whether or not maintenance is required. Inspections should be made after every significant storm during the first two years of operation or until all development is completed to ensure the wet pond is functioning properly. This may translate into an average of six inspections per year. Once all building activity is finalized, inspections shall be performed annually. The following points should be addressed during inspections of the facility.

- a) Standing water above the inlet storm sewer invert a day or more after a storm may indicate a blockage in the reverse slope pipe or orifice. The blockage may be caused by trash or sediment and a visual inspection would be required to determine the cause.
- b) The vegetation around the wet pond should be inspected to ensure its function and aesthetics. Visual inspections will indicate whether replacement of plantings are required. A decline in vegetation habitat may indicate that other aspects of the constructed wet pond are operating improperly, such as the detention times may be inadequate or excessive.
- c) The accumulation of sediment and debris at the wet pond inlet sediment forebay or around the high water line of the wet pond should be inspected. This will indicate the need for sediment removal or debris clean up.
- d) The wet pond has been created by excavating a detention area. The integrity of the embankments should be periodically checked to ensure that it remains watertight and the side slopes have not sloughed.

Grass cutting is a maintenance activity that is done solely for aesthetic purposes. It is recommended that grass cutting be eliminated. It should be noted that municipal by-laws may require regular grass maintenance for weed control.

Trash removal is an integral part of maintenance and an annual cleanup, usually in the spring, is a minimum requirement. After this, trash removal is performed as required basis on observation of trash build-up during inspections.

To ensure long term effectiveness, the sediment that accumulates in the forebay area should be removed periodically to ensure that sediment in not deposited throughout the facility. For sediment removal operations, typical grading/excavating equipment should be used to remove sediment from the inlet forebay and detention areas. Care should be taken to ensure that limited damage occurs to existing vegetation and habitat.

Generally, the sediment which is removed from the detention pond will not be contaminated to the point that it would be classified as hazardous waste. However, the sediment should be tested to determine the disposal options.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this study, the following conclusions are offered:

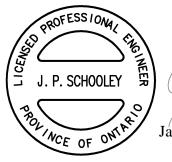
- Infiltration techniques are not suitable for this site as the primary control facility due to the low soil infiltration rates and the large drainage area for this development.
- The proposed stormwater management facilities will provide stormwater quality and quantity controls for the approximately 17.99-hectare catchment area.
- The proposed channel will convey stormwater flows from the proposed stormwater management facility and surrounding lands directly to the Eagle Marsh Drain.
- Various lot level vegetative stormwater management practices can be implemented to enhance stormwater quality.
- This report was prepared in accordance with the provincial guidelines contained in "Stormwater Management Planning and Design Manual, March 2003".

The above conclusions lead to the following recommendations:

- That the stormwater management criteria established in this report be accepted.
- That a stormwater management wet pond facility be constructed to provide stormwater quality protection to MECP *Normal* Protection levels and quantity controls as outlined in this report.
- That additional lot level controls and vegetative stormwater management practices as described previously in this report be implemented.

Prepared By:

Kurt Tiessen, E.I.T.



Reviewed By:

Jason Schooley, P.Eng. Revised May 24, 2024

APPENDICES

APPENDIX A

Weighted Impervious Calculation Sheet Stormwater Management Facility Calculations

Weighted Impervio	usness Percentage Calo	culation Workshee	t
Project Name:	Northland Estates		
Project Number:	21132		
Date:	May 2024		
Person:	K. Tiessen E.I.T		
EX10 - EXISTING CONDITIONS			
	Footprint	% Impervious	Effective Impervious Area
Residential Dwellings	5108.1 m ²	100.0% ea	5108.1 m ²
Open Space	129385.9 m ²	2% ea	2587.7 m ²
Northland Roadway	1731.0 m ²	100% ea	1731.0 m ²
	1731.0 11	100 % ea	1751.0 11
TOTAL CATCHMENT IMPERVIOUS AREAS			9,427 m ²
TOTAL CATCHMENT AREA			136,225 m ²
	EFFECTIVE WEIGHTED CAT	CHMENT % IMPERVIOUS RUNOFF COEFFICIENT	6.9 % 0.25
EX30 - EXISTING CONDITIONS			0.25
	Footprint	% Impervious	Effective Impervious Area
Residential Dwellings	468.4 m ²	100.0% ea	468.4 m ²
-	36193.6 m ²		36.2 m^2
Open Space	30193.0 11	0% ea	30.2 11
TOTAL CATCHMENT IMPERVIOUS AREAS			505 m ²
TOTAL CATCHMENT AREA			36,662 m ²
	EFFECTIVE WEIGHTED CAT		1.4 %
		RUNOFF COEFFICIENT	0.21
EX50 - EXISTING CONDITIONS	Footprint	% Impervious	Effective Impervious Area
	$0540.7 m^2$	400.0%	$2540.7 m^2$
Residential Dwellings	2519.7 m ²	100.0% ea	2519.7 m ²
Open Space	120794.5 m ²	0% ea	120.8 m ²
TOTAL CATCHMENT IMPERVIOUS AREAS			2,640 m ²
TOTAL CATCHMENT AREA			123,314 m ²
	EFFECTIVE WEIGHTED CAT	CHMENT % IMPERVIOUS RUNOFF COEFFICIENT	2.1 % 0.21
EX20/A20 - EXISTING/FUTURE CONDITIONS	Footprint	% Impervious	Effective Impervious Area
Residential Dwellings	265.2 m ²	100.0% ea	265.2 m ²
Commercial Area	205.2 m 21633.8 m ²	100% ea	21633.8 m ²
Open Space	8284.3 m ²	0% ea	8.3 m ²
TOTAL CATCHMENT IMPERVIOUS AREAS			21,907 m ²
TOTAL CATCHMENT AREA			30,183 m ²
	EFFECTIVE WEIGHTED CAT	CHMENT % IMPERVIOUS	72.6 %
		RUNOFF COEFFICIENT	0.71

A30 - FUTURE CONDITIONS			
	Footprint	% Impervious	Effective Impervious Area
	400 fm^2	100.00/	$100 ext{ } 2$
Residential Dwellings	468.4 m ²	100.0% ea	468.4 m ²
Open Space	36193.6 m ²	0% ea	36.2 m ²
TOTAL CATCHMENT IMPERVIOUS AREAS			505 m ²
TOTAL CATCHMENT AREA			36,662 m ²
	EFFECTIVE WEIGHTED CATCH	IMENT % IMPERVIOUS	
A40 - FUTURE CONDITIONS			
	Footprint	% Impervious	Effective Impervious Area
Future Single Residential	4968.4 m ²	28.6% ea	1421.0 m ²
Open Space	33977.2 m ²	0% ea	34.0 m ²
Open Space	55917.2 11	070 ea	54.0 11
TOTAL CATCHMENT IMPERVIOUS AREAS			1,455 m ²
TOTAL CATCHMENT AREA			38,946 m ²
	EFFECTIVE WEIGHTED CATCH	IMENT % IMPERVIOUS	6 3.7 %
		RUNOFF COEFFICIEN	Г 0.23
A50 - FUTURE CONDITIONS			
	Footprint	% Impervious	Effective Impervious Area
Existing Residential Dwellings	1079.7 m ²	100.0% ea	1079.7 m ²
Open Space	90692.0 m ²	0% ea	90.7 m ²
	50052.0 m	070 Cd	50.7 m
TOTAL CATCHMENT IMPERVIOUS AREAS			1,170 m ²
TOTAL CATCHMENT AREA			91,772 m ²
	EFFECTIVE WEIGHTED CATCH	IMENT % IMPERVIOUS	6 1.3 %
		RUNOFF COEFFICIEN	

Upper Canada Consultants 30 HANNOVER DRIVE, UNIT 3 St. Catharines, Ontario L2W 1A3 PROJECT NAME: NORTHLAND ESTATES PROJECT NO.: 21132

DATE: MAY 2024

Quality Requirements Drainage Area (ha) = 17.53		Quality Orifice Diameter $(m) = 0.203$			Ditch Inlet Weir Length $(m) = 0.60$			Dia	Outflow Pipe Orifice Diameter $(m) = 0.457$		Overflow Spillway Minor Length (m) = 2.00			
Norm	al $(m^3/ha) = 1$	37	(@ 75% lmp)	Cd =	0.63		Width (m) =	0.60		Cd =	0.63	Sl	opes (X:1) =	2.00
Perm Po	ol $(m^3/ha) = 9$	97]	Invert (m) =	179.90	Grate Sl	lope (X:1) =	5		Invert (m) =	179.90	Minor	Invert (m) =	181.10
Perm Pool	$1 \operatorname{Vol}(m^3) = 1$,695				Inlet Elev	vation (m) =	180.50		Overt (m) =	180.36			
Acti	ve Vol (m ³) 7	701					Cd =	1.84						
	25mm MOEE (m ³) 2,447 m ³		MOE Equ	uation 4.11 Dra	1 Drawdown Coefficient 'C2' = 1 Drawdown Coefficient 'C3' = tion 4.11 Drawdown Time (h) =		1,0 4,2 2							
Elevation	Increment Depth	Active Depth	Surface Area	Average Surface Area	Increment Volume	Permanent Volume	Active Volume	Quality Orifice	Ditch Inlet	Max Pipe Orifice	Overflow Spillway	Total Outflow	Average Discharge	Averag Drawdov Time
	(m)	(m)	(m ²)	(m ²)	(m ³)	(m ³)	(m ³)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(hr)
178.90	0.50	-1.00	2,147	0.440	1.220	0								
179.40	0.50	-0.50	2,733	2,440	1,220	1,220								
	0.50		_,	3,050	1,525	-,•								
179.90	0.00	0.00	3,368	3,809	0	2,745								
179.90	0.60	0.00	4,251	1 720	2.042		0.0	0.000	0.000	0.00	0.00	0.000	0.021	
180.50	0.60	0.60	5,225	4,738	2,843		2842.9	0.062	0.000	0.249	0.000	0.062	0.031	25.65
	0.40		-) -	5,519	2,208								0.143	
180.90	0.20	1.00	5,813	5,964	1,193		5050.5	0.084	0.140	0.382	0.000	0.224	0.287	29.95
181.10	0.15	1.20	6,116	(221	025		6243.3	0.093	0.257	0.433	0.000	0.350	0.514	31.11
181.25	0.15	1.35	6,347	6,231	935		7177.9	0.100	0.359	0.468	0.220	0.678	0.514	31.61
181.45	0.20	1.55	6,661	6,504	1,301		8478.7	0.107	0.511	0.511	0.888	1.399	1.038	31.96

2. Pipe Orifice flow is calculated using an orifice formula on the pipe from the ditch inlet to the outlet and uses the total head on the orifice.

3. Overflow Weir flow is calculated using a trapezondial weir to convey outflow for less frequent storms through the embankment with an emergency spillway.

4. Total Outflow is calculated by adding the Overflow Spillway with the lowest of Quality Orifice plus Ditch Inlet or Max Pipe Orifice.

APPENDIX B MIDUSS Output Files

Existing Conditions

Output File (4.7) EX.OUT opened 2024-05-24 14:20 Units used are defined by G = 9.810 Units used are defined by G = 9.810 24 144 10.000 are MAXDT MAXHYD & DTMIN values Licensee: UPPER CANADA CONSULTANTS 35 COMMENT line(s) of comment F line(s) of comment PROJECT NAME: NORTHLAND ESTATES, PORT COLBORNE PROJECT NO.: 21132 STORMWATER MANAGEMENT ANALYSIS MAY 2022 EXISTING CONDITIONS 14 START 1=Zero; 2=Define 1 I I=Zero; 2=Define COMMENT 3 line(s) of comment ********************************** 35 ** 25mm DESIGN STORM EVENT ** 2 STORM l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c 512.000 6.000 .800 Fraction to peak r Duration ó 240 min 25.036 mm Total depth OUS 400 240.000 TMPERVIOUS UUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction "" .013 98.000 .100 .518 .518 Initial Abstraction CATCHMENT 20.000 ID No.6 99999 3.020 Area in hectares 00.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 00.000 Loracth (IMDEVU) 4 CATCHN 20.000 3.020 100.000 .500 72.600 Per Cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; Z=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Taitiol Jataraction 100.000 .000 . 250 .250 77.000 .100 .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv .202 .000 .000 c.m/s .130 .797 .614 C perv/imperv/total ADD RUNOFF .202 .202 .000 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .46369608-03 c.m CHANNEL .500 Base Width = 15 27 Volume - Stol Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .326 metres Velocity = .164 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .130 metres ROUTE 11 10.000 Conduit Length 50.000
 000
 Conduit Length

 000
 Supply X-factor <.5</td>

 369
 Supply K-lag (sec)

 808
 Beta weighting factor

 000
 Routing timestep

 1
 No. of sub-reaches

 .202
 .202

 .179

 MBINE
 .000 228 369 600.000 .202 .202 .179 .000 c.m/s COMBINE Junction Node No. .202 .202 .179 .179 c.m/s START 1=Zero; 2=Define CATCHMENT 10.000 ID No.6 99999 13.620 Area in hectares 500.000 Length (PERV) metres 2.000 Gradient (%) 6.900 Per cent Impervious 500.000 Length (IMPERV) .000 %Imp.with Zero Dpth 1 Option 1=SCS CN/c; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" .000 c.m/s 17 14 4 Option 1=SCS CM/C/ 2=Horton; 3=Green-Ampt; 4=Kepeat Manning "n" O SCS Curve No or C 1 Ia/S Coefficient 7 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .084 .000 .179 .179 c.m/s .130 .804 .177 C perv/imperv/total RNNOFF .250 77.000 .100 7.587 1 15 ADD RUNOFF .179 .179 c.m/s 084 084 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .6027209E+03 c.m 27 ROUTE Conduit Length .000 000 Conduit Length 500 Supply X-factor <.5 500 Supply K-lag (sec) 500 Beta weighting factor 000 Routing timestep 1 No. of sub-reaches .084 .084 .084 .500 .000 500 600.000 .179 c.m/s COMBINE 1 Junction Node No. 17 1 JUNCLING .084 .084 CONFLUENCE 1 JUNCTION Node No. .084 .263 .084 CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .263 c.m/s 18 .000 c.m/s

%Imp. with Zero Dpth
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
Manning "n"
SCS Curve No or C
I_a(S Configurate .000 . 250 77.000 .100 Ia/S Coefficient 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .010 .263 .084 .000 c.m/s .130 .785 .139 C perv/imperv/total 15 ADD RUNOFF .010 .269 .084 .000 c.m/s 11 CHANNEL L Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = .366 metres ty = .177 m/sec .500 10 000 10.000 10.000 .060 1.000 .100 Depth Depth = .366 metres Velocity = .177 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .148 metres ROUTE 200.000 Conduit Length 9 200.000 Conduit Length .135 Supply X-factor <.5 849.757 Supply K-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .010 .269 .193 17 COMBINE 2 Junction Node No. .010 .269 100 .000 c.m/s .010 .269 .193 START 14 : 1 .193 c.m/s 1=Zero; 2=Define 1 l=Zero; Z=Deline CATCHMENT 40.000 ID No.ó 99999 4 4.640 Area in hectares 100.000 Length (PERV) metres Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp.with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .500 100.000 . 250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .011 .000 .193 .193 c.m/s .130 .797 .131 C perv/imperv/total 15 ADD RUNOFF .100 .011 .193 .193 c.m/s .011 CATCHMENT 4 NT ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 50.000 12.330 350.000 1.000 2.100 Length (IMPERV) 350.000 Length (IMPERV)
%Imp. with Zero Dpth
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
Manning "n"
SCS Curve No or C
Ia/S Coefficient
Initial Abstraction
Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
.024 .011 .193 .193 c.m/s
.130 .803 .144 C perv/imperv/total
UNOFF .000 250 77.000 .100 7.587 1 15 ADD RUNOFF UNOFF .024 .029 .193 .193 c.m/s 9 ROUTE Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .024 .029 .029 NE .500 000 500 600.000 1 .193 c.m/s COMBINE 2 Junction Node No. .024 .029 .029 17 2 2 JUNCTION Node No. .024 .029 .029 . CONFLUENCE 2 JUNCTION Node No. .024 .214 .029 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1786801E+04 c.m START .214 c.m/s 18 .000 c.m/s 27 14 1 COMMENT 3 line(s) of comment 35 ** 2 YEAR DESIGN STORM EVENT ** 2 STORM l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r 397.149 .000 .699 .400 240.000 Duration ó 240 min 34.453 mm Total depth 3 IMPERVIOUS UUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient .013 98.000 .100 .518 Initial Abstraction 4 CATCHMENT 20.000 3.020 100.000 .500 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 72.600 100.000 Length (IMPERV) Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient 77.000

.100

/ Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .275 .000 .029 .000 c.m/s .204 .828 .657 C perv/imperv/total 7.587 ADD RUNOFF 15 .029 .275 .275 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .6835738±403 c.m CHANNEL 27 CHANNEL .500 Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .369 metres Velocity = .178 m/sec Flow Capacity = .252 - . Flow Capacity = 3.531 c.m/s Critical depth = .150 metres ROUTE 50.000 .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) 211.250 Supply K-lag (sec) .842 Beta weighting factor 600.000 Routing timestep .275 .275 .257 COMBINE 1 Junction Node No. .275 .275 .257 STRRT 1 = 2775 .275 .000 c.m/s 17 .257 c.m/s 14 1=Zero; 2=Define l l=2erc. CATCHMENT -^ 000 ID No.ó 99999 -> hectar 4 10.000 13.620 500.000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 2.000 6.900 Per Cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Taitiol Jetraction 500.000 .000 .250 77.000 .100 7.587 Initial Abstraction 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .129 .000 .257 .257 c.m/s .204 .847 .248 C perv/imperv/total ADD RUNOFF .129 .257 .257 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = 1164711Fr04 c.m. 15 27 Volume = .1164711E+04 c.m .000 .500 9 ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply K-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .129 .129 .129 .129 .257 c.m/s COMBINE 1 Junction Node No. .129 .129 .129 CONFLUENCE 17 .386 c.m/s 18 Junction Node No. .129 .386 .129 1

 .129
 .386
 .129
 .000 c.m/s

 CATCHMENT
 .000
 ID No.6 99999

 3.670
 Area in hectares

 80.000
 Length (PERV) metres

 .500
 Gradient (%)

 1.400
 Per cent Impervious

 80.000
 Length (IMPERV)

 .000
 % Imp. with Zero Dpth

 1
 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat

 .250
 Manning *n*

 77.000
 SCS Curve No or C

 .100
 Ia/S Coefficient

 7.587
 Initial Abstraction

 .000 c.m/s 4 30.000 3.670 80.000 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .025 .386 .129 .000 c.m/s .204 .838 .213 C perv/imperv/total 1 .204 ADD RUNOFF .025 CHANNEL 15 .399 .129 .000 c.m/s 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % .500 10.000 .060 .100 Depth = .428 metres = .195 m/sec Velocity Velocity = .195 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .177 metres ROUTE 200.000 Conduit Length .077 Supply X-factor <.5 Conduit Length Supply X-factor <.5 Supply K-lag (sec) / Lactor <.5
//69.853 Supply K-lag (sec)
//60.800 Routing timestep
// No. of sub-reaches
.025 .399 .284
COMBINE
/ Junction Node No.
.025 .399 .284
STRT
// Lactor 1
// La .000 c.m/s .284 c.m/s 14 l l=Zerc. CATCHMENT *^ 000 ID No.ó 99999 *> hectar 1=Zero; 2=Define 4 40.000 4.640 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 100.000 .500 100 000 Length (IMPERV) %Ing. with Zero Dpth Option 1=SCS (CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C .000 250 77.000

0 Ia/S Coefficient 7 Initial Abstraction 0ption 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv .028 .000 .284 .284 c.m/s .204 .828 .205 C perv/imperv/total 100 7.587 1 15 ADD RUNOFF .028 .028 .284 .284 c.m/s 4 CATCHMENT 50.000 12.330 ID No.ó 99999 Area in hectares Length (PERV) metres 350.000 Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning ** 1.000 2.100 350.000 .000 . 250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 .100 Initial Abstraction Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .051 .028 .284 .284 c.m/s .204 .848 .217 C perv/imperv/total 15 ADD RUNOFF .078 .284 .284 c.m/s .051 9 ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .051 .078 .078 NE .000 .000 600.000 1 .078 .284 c.m/s COMBINE 2 Junction Node No. .051 .078 CONFLUENCE 17 .078 .327 c.m/s 18 2 Junction Node No. .327 .078 .051 .327 HYDROGRAPH DISPLAY .000 c.m/s 27 Introverarr DISPLAY
5 is # of Hyeto/Hydrograph chosen
Volume = .3363599E+04 c.m
START
1 1=Zero; 2=Define
COMPUNE 14 COMMENT 3 line(s) of comment 35 ** 5 YEAR DESIGN STORM EVENT ** 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 45.533 mm Total depth IOUS 524.867 .000 .699 400 240.000 45.533 umax ---IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 3 Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 98.000 .100 .518 CATCHMENT 2 000 ID No.ó 99999 in hecta 20.000 Area in hectares 100.000 Length (PERV) metres Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .500 .500 72.600 100.000 .000 . 250 Manning "n" 77.000 SCS Curve No or C Ia/S Coefficient 100 Ia/S Coerricient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .364 .000 .078 .000 c.m/s .278 .869 .707 C perv/imperv/total 7.587 15 ADD RUNOFF .364 .078 .000 c.m/s .364 .354 .554 .078 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .9720645E+03 c.m CHANNEL 27 CHANNEL .500 Base Width = 10.000 Left bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .413 metres Velocity = .191 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .170 metres ROUTE 50 000 -11 .170 metres ROUTE 50.000 .000 196.842
 ROUTE

 50.000
 Conduit Length

 .000
 Supply X-factor <.5</td>

 196.842
 Supply K-lag (sec)

 .873
 Beta weighting factor

 600.000
 Routing timestep

 1
 No. of sub-asseptor
 1 No. of sub-reaches .364 .364 .3 .350 .000 c.m/s COMBINE 1 Junction Node No. .364 .364 .350 START 17 .350 c.m/s 14 1 1 l=zerc. CATCHMENT `^ ^^() ID No.ó 99999 `> hecta: 1=Zero; 2=Define 4 10.000 13.620 500.000 2.000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 6.900 500.000 Length (IMPERV)
%Imp. with Zero Dpth
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
Manning "n"
SCS Curve No or C
Ia/S Coefficient
Tritiol Networking Length (IMPERV) .000 250 77.000 .100 Initial Abstraction

Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .191 .000 .350 .350 c.m/s .278 .884 .320 C perv/imperv/total 1 ADD RUNOFF 15 .191 .350 .350 c.m/s .191 HYDROGRAPH DISPLAY 27 NUMBER DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1982292E+04 c.m ROUTE Conduit Length .000 Conduit Length 500 Supply X-factor <.5 500 Supply K-lag (sec) 500 Beta weighting factor 500 Routing timestep 1 No. of sub-reaches .191 .191 .191 .500 .000 500 600.000 .350 c.m/s COMBINE 1 Junction Node No. 17 . .191 .191 .191 CONFLUENCE .541 c.m/s 18
 CONFLUENCE

 1
 Junction Node No. .191
 .541
 .191
 .000 c.m/s

 CATCHMENT
 30.000
 ID No.6 99999
 3.670
 Area in hectares

 80.000
 Length (PERV) metres
 .500
 Gradient (%)

 1.400
 Per cent Impervious

 80.000
 Length (IMPERV)
 .000

 .000
 #Imp. with Zero Dpth

 1
 Option 1=SCS CN/C/ 2=Horton; 3=Green-Ampt; 4=Repeat

 .250
 Maning "n"
 4 .250 Manning "n" Manning "n"
 SCS Curve No or C
 Ia/S Coefficient
 Initial Abstraction
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 .059 .541 .191 .000 c.m/s
 .278 .877 .286 C perv/imperv/total 77.000 .100 7.587 1 15 ADD RUNOFF .570 .191 .000 c.m/s .059 CHANNEL 11 . 500 Base Width = Left bank slope 1: Right bank slope 1: 10.000 10.000 Right Dank Slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .493 metres Velocity = .213 m/sec Flow Capacity = .531 c.m/s Critical depth = .208 metres POUTUPE ROUTE Conduit Length 200.000
 0.00
 Conduit Length

 0.16
 Supply X-factor <.5</td>

 .815
 Supply K-lag (sec)

 500
 Beta weighting factor

 .000
 Routing timestep

 1
 No. of sub-reaches

 .059
 .570

 .414

 MBINE
 .016 703.815 .500 .000 c.m/s 17 COMBINE Junction Node No. Junctio .059 START 1 .570 .414 .414 c.m/s 14 START 1 =Zero; 2=Define CATCHMENT 40.000 ID No.6 99999 4.640 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) .100 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 100.000 .000 Option 1=SCS CM/C 2=Horton, S=Green-Ampt, 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .069 .000 .414 .414 c.m/s .278 .869 .278 C perv/imperv/total Impore .250 77 000 .100 15 ADD RUNOFF .069 .414 .414 c.m/s .069 4 CATCHMENT 50.000 12.330 350.000 ID No.ó 99999 Area in hectares Length (PERV) metres 1.000 2.100 Gradient (%) Per cent Impervious Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C/ 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C 1=0 0 0=reficience 350.000 .000 77.000 .100 Ia/S Coefficient 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .119 .069 .414 .414 c.m/s .278 .884 .291 C perv/imperv/total 1 15 ADD RUNOFF .119 ROUTE .178 .414 .414 c.m/s 9 Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .500 .000 .500 1 No. of sub-reaches .119 .178414 c.m/s .178 .178 COMBINE 2 Junction Node No. .119 .178 CONFLUENCE 17 .178 .513 c.m/s 18 Junction Node No. .178 .000 c.m/s .119 .513 HYDROGRAPH DISPLAY 27 billowsaff Displat billowsaff billowsaff volume = .5645400E+04 c.m START 1 =Zero; 2=Define 14 COMMENT 3 line(s) of comment 35

***** ** 10 YEAR DESIGN STORM EVENT ** 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic I=Chicago/2=HUT/3=USEY/ Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 52.818 mm Total depth COUS 608.845 .000 240.000 3 IMPERVIOUS OUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction .013 98.000 .100 .518 .518 CATCHMENT 22 000 ID No.ó 99999 in hecta: 4 20.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 3.020 100.000 .500 72.600 100.000 .000 %Imp. with Zero Dpth
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Option 1=SCS CN/C/ 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C 1 Ia/S Coefficient 7 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .442 .000 .178 .000 c.m/s .320 .887 .732 C perv/imperv/total pmpopp .250 .250 77.000 .100 7.587 1 15 ADD RUNOFF ADD RUNOFF .442 .442 .178 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1167105E+04 c.m CHANNEL .442 .178 .000 c.m/s 27 11 CHANNEL .500 Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: .660 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .446 metres Velocity = .200 m/sec Plog Cangeity = .252 a co 10.000 Flow Capacity = 3.531 c.m/s Critical depth = .186 metres ROUTE 50.000 Conduit Length
 J.UUU
 Conduit Length

 .000
 Supply X-factor <.5</td>

 .87.592
 Supply K-lag (sec)

 .894
 Beta weighting factor

 00.000
 Routing timestep

 .000
 Routing timestep

 .000
 Law

 .411
 COMBINE

 1
 Junction Node No.

 .442
 .442
 .000 187.592 600.000 1 .000 c.m/s 17 1 .442 .442 .411 START .411 c.m/s 14 1=Zero; 2=Define 1 CATCHMENT 4 10.000 . ID No.ó 99999 13.620 Area in hectares Length (PERV) metres 500.000 Length (PERV) metres Gradient (\$) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning ** SCS Curve No or C X=0 0 certéction ent 2.000 500.000 . 250 77.000 .100 Ta/S Coefficient 15 .238 .411 .411 c.m/s .238 27 HYDROGRAPH DISPLAY is # of Hyeto/Hydrograph chosen ume = .2587458E+04 c.m Volume ROUTE .000 .500 Conduit Length Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .238 .238 .238 .000 .500 600.000 1 .411 c.m/s .238 .235 COMBINE Junction Node No. 238 .238 17 1 .238 .238 .238 .649 c.m/s 18 CONFLUENCE CONFLUENCE 1 Junction Node No. .238 .649 CATCHMENT 30.000 ID No.ó 99999 3.670 Area in hectares 1 .238 .000 c.m/s 4 80.000 Length (PERV) metres Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .500 80.000 . 250 Manning "n" 77.000 SCS Curve No or C Ia/S Coefficient .100 7 587 Initial Abstraction

 Initial Abstraction

 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 .093
 .649
 .238
 .000 c.m/s

 .320
 .893
 .328
 C perv/imperv/total

 15 ADD RUNOFF .695 .238 .000 c.m/s .093 CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres 500 10.000 .060

.100 Select Grade in % Depth = .533 metres Velocity = .224 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .227 metres ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor 200.000 .000 .524 000 Routing timestep 1 No. of sub-reaches .093 .695 .511 MRINE 600.000 .000 c.m/s 17 COMBINE 2 Junction Node No. .093 .695 .511 START .511 c.m/s 14 1=Zero; 2=Define CATCHMENT 4 TD No.6 99999 40.000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 4.640 100.000 .100 100.000 Length (IMPERV) Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C In/S Coefficient Initial Abstraction Option 1=Science: 2=Destangle: 2=SUM UND: 4-Lin Do .000 250 .250 77.000 .100 7.587 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 01 .000 .511 .511 c.m/s 20 .887 .320 C perv/imperv/total 1 .101 .320 ADD RUNOFF .101 CATCHMENT 15 .101 .511 .511 c.m/s ID No.ó 99999 50.000 12.330 Area in hectares Area in nectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Marxing #CS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 350.000 1.000 2.100 350.000 .000 .250 Manning "n" Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .181 .101 .511 c.m/s .320 .898 .332 C perv/imperv/total PINNARE 77.000 100 7.587 15 .181 .269 ROUTE ADD RUNOFF .511 .511 c.m/s 9 XOUTE .000 Conduit Length .500 Supply X-factor <.5. .000 Supply K-lag (sec) .500 Beta weighting factor 0.000 Routing timestep 1 No. of sub-reaches .181 .269 .269 ZOMEINE 600.000 .269 .511 c.m/s COMBINE 2 Junction Node No. .181 .269 .269 CONFLUENCE 17 .668 c.m/s 18 CUMFLUENCE 2 JUNCTION Node No. .181 .668 .269 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .7329000E+04 c.m START 27 14 START 1 1=Zero; 2=Define 35 COMMENT line(s) of comment ** 25 YEAR DESIGN STORM EVENT ** STORM 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic l=Chlcago;2=Huff;3=User;4 Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 62.077 mm Total depth COUS 715.568 .000 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 1 .013 1 Option 1=SCS CN/C; 2 .013 Manning "n" 98.000 SCS Curve No or C .100 IA/S Coefficient .518 Initial Abstraction CATCHMENT 20.000 ID No.6 99999 98 000 20.000 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 3.020 100.000 .500 72.600 100.000 .000 Option 1=SUS CM/C7 Z=Horton; 3=Green-Ampt; 4=Repeat
 Manning "n"
 SCS Curve No or C
 Ia/S Coefficient
 Tinitial Abstraction
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 .543 .000 .269 .000 c.m/s
 .367 .905 .757 C perv/imperv/total .250 77.000 .100 15 ADD RUNOFF .543 .269 .000 c.m/s 543 .543 .543 .269 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1419536E+04 c.m CHANNEL 27 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = .484 metres .500 10.000 .060 .100 Depth

Velocity = .211 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .204 metres 9 ROUTE Conduit Length 50.000
 000
 Conduit Length

 000
 Supply X-factor <.5</td>

 126
 Supply K-lag (sec)

 916
 Beta weighting factor

 000
 Routing timestep

 1
 No. of sub-reaches

 .543
 .543

 .543
 .485
 .000 178.126 .916 .000 c.m/s 17 COMBINE Junction Node No. 1 1 Junction Node No. .543 .543 START 1 1=Zero; 2=Define CATCHMENT 10.000 ID No.6 99999 .485 .485 c.m/s 14 4 10.000 13.620 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 500.000 2.000 6.900 500.000 %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .000 . 250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .304 .000 .485 .485 c.m/s .367 .911 .404 C perv/imperv/total 15 ADD RUNOFF .304 .201 .304 .485 .485 c.m/s . 304 .304 .304 .485 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .3418805E+04 c.m 27 ROUTE Conduit Length .000 000 Conduit Length 500 Supply X-factor <.5 500 Supply K-lag (sec) 500 Beta weighting factor .000 Routing timestep 1 No. of sub-reaches .304 .304 .304 .500 .000 500 600.000 .304 .485 c.m/s COMBINE 1 Junction Node No. .304 .304 17 1 .304 .789 c.m/s .304 .304 .304 CONFLUENCE 1 Junction Node No. .304 .789 .304 CATCHMENT No.6 99999 3.670 Erea in bectares 18 .000 c.m/s 4 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) *Imm with Zoro Dath 3.670 80.000 .500 1.400 80.000 %Imp. with Zero Dpth
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" Manning "n" SCS Curve No or C Ia/S Coefficient 'Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .137 ...789 ...304 ...000 c.m/s .367 ...908 ...374 C perv/imperv/total DMARF 77.000 .100 7.587 1 15 ADD RUNOFF .865 .304 .000 c.m/s .137 11 CHANNEL CHANNEL .500 Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: 10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .580 metres Velocity = .237 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .250 metre pourpe .250 metres 9
 ROUTE

 200.000
 Conduit Length

 .000
 Supply X-factor <.5</td>

 634.232
 Supply K-lag (sec)

 .570
 Beta weighting factor

 600.000
 Routing timestep

 1
 No. of sub-reaches
 ROUTE 1 No. of sub-reaches .137 .865 .6 .651 .000 c.m/s 2 Junction Node No. .137 .865 .651 17 2 .651 c.m/s 1=Zero; 2=Define 1 L=2010 CATCHMENT *^ ^^() ID No.6 99999 *> hectar 4 40.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manping "n" 40.000 4.640 100.000 .500 .100 100.000 .000 Option 1=SCS CM/C? 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .162 .000 .651 .651 c.m/s .367 .905 .367 C perv/imperv/total RUNOFF .250 77.000 .100 7.587 1 15 ADD RUNOFF .162 .651 .651 c.m/s 4 50.000 12.330 350.000 Area in hectares Length (PERV) metres Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=2CS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" 1.000 2.100 350.000 .000 .250

SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr: 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 70 .162 .651 .651 c.m/s 67 .911 .378 C perv/imperv/total PFP 77.000 .100 1 .270 .162 .367 .911 .270 15 ADD RUNOFF ...NOFF . 270 ROUTE .651 .404 .651 c.m/s Conduit Length .000 conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .270 .404 .404 NE .500 .000 500 600 000 1 .651 c.m/s COMBINE 2 Junction Node No. 17 .270 .404 CONFLUENCE .404 .916 c.m/s 18 2 Junction Node No. .270 .916 HYDROGRAPH DISPLAY .404 .000 c.m/s 27 5 is # of Hyeto/Hydrograph chosen Volume = .9636599E+04 c.m 14 START 1=Zero; 2=Define COMMENT 3 line(s) of comment 35 ** 50 YEAR DESIGN STORM EVENT ** 2 STORM l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c 794.298 .000 Fraction to peak r Duration ó 240 min 68.907 mm Total depth .400 240.000 IMPERVIOUS JUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 013 98.000 .100 .518 CATCHMENT TD No 6 99999 20 000 20.000 3.020 100.000 .500 72.600 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 100.000 Length (IMPERV) Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient .000 .250 77.000 .100 7.587 7.57 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .619 .000 .404 .000 c.m/s .397 .913 .772 C perv/imperv/total ADD RUNOFF .619 .619 .404 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1606272E+04 c.m CHANNEL Initial Abstraction 15 27 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres .500 10.000 10.000 .060 1.000 .100 Select Grade in % Depth = .509 metres Velocity = .218 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .216 metres ROUTE Conduit Length 50.000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .619 .619 .539 NE .000 172.375 930 600.000 1 .000 c.m/s 17 COMBINE Junction Node No. Junction Node No .619 .619 START 1 . 539 .539 c.m/s 14 START l 1=Zero; 2=Define CATCHMENT L0.000 ID No.6 99999 4 10.000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 13.620 500.000 2.000 6.900 500.000 .000 . 250 Manning "n" 77.000 SCS Curve No or C Ia/S Coefficient .100 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .397 .000 .539 .539 c.m/s .398 .918 .434 C perv/imperv/total 7.587 1 15 ADD RUNOFF .539 c.m/s . 397 .539 . 397 27 HYDROGRAPH DISPLAY Volume = .4069199E+04 c.m ROUTE Conduit Length .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .397 .397 .397 .500 .000 500 600.000 1 .539 c.m/s 17 COMBINE

1 Junction Node No. . 397 CONFLUENCE .397 .397 .898 c.m/s 18 1 Junction Node No. .898 .397 .397 .000 c.m/s 4 CATCHMENT T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 30.000 3.670 80.000 .500 1.400 80.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Victor Notron C .000 .250 77.000 .100 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 73 .898 .397 .000 c.m/s 97 .916 .404 C perv/imperv/total .173 .173 .898 .397 .916 ADD RUNOFF .173 15 1.001 .397 .000 c.m/s CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's n* O/a Depth in metres Select Grade in % = .614 metres r = .245 m/sec .500 10.000 10.000 10.000 .060 1.000 .100 Depth Velocity .245 m/sec .10W Capacity = 3.531 c.m/s Critical depth = .266 metric ROUTE .266 metres ROUTE 200.000 .000 611.414 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .600 600.000 Routing timestep No. of sub-reaches 73 1.001 . 1 .173 .767 .000 c.m/s COMBINE 2 Junction Node No. 17 .173 1.001 .767 START .767 c.m/s 14 1=Zero; 2=Define 1 CATCHMENT 4 T ID No.6 99999 Area in hectares Length (PERV) metres 40.000 4.640 100.000 .500 Gradient (%) Per cent Impervious .100 Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient ender: Comparison C 100.000 .000 .250 77.000 .100 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .206 .000 .767 .767 c.m/s .397 .913 .398 C perv/imperv/total 15 ADD RUNOFF .767 c.m/s .206 .767 .206 .206 .206 .767 .767 C.m/S
MENT
ID No.6 99999
Area in hectares
Length (PERV) metres
Gradient (%)
Per cent Impervious
Length (IMPERV)
% Imp. with Zero Dpth
Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat
Manning *n*
SCS Curve No or C
Ia/S Coefficient
Initial Abstraction
Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
.357 .206 .767 .767 c.m/s
.398 .918 .409 C perv/imperv/total
UNOFF 4 CATCHMENT CATCHM 50.000 12.330 350.000 1.000 2.100 350.000 .000 250 .250 77.000 .100 7.587 15 ADD RUNOFF .767 .357 .523 .767 c.m/s ROUTE 9 Conduit Length
 .000
 Conduit Length

 .500
 Supply X-factor <.5</td>

 .500
 Supply K-lag (sec)

 .500
 Beta weighting factor

 00.000
 Routing timestep

 1
 No. of sub-reaches

 .357
 .523

 COMEINE
 2

 Junction Node No.

 .357
 .523
 .000 .500 600.000 .767 c.m/s 17 .523 .523 1.168 c.m/s 18 CONFLUENCE CONFLUENCE 2 Junction Node No. .357 1.168 .523 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1143120E+05 c.m .000 c.m/s 27 14 START 1 1=Zero; 2=Define COMMENT 35 3 line(s) of comment ** 100 YEAR DESIGN STORM EVENT ** 2 STORM 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r 871 279 .000 400 240.000 Duration ó 240 min 75.585 mm Total depth 3 IMPERVIOUS UUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 013 98.000 .100 .518

4	CATCHMENT	
	20.000 ID No.6 99999 3.020 Area in hectares	
	100.000 Length (PERV) metres .500 Gradient (%)	
	72.600 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth	
	1 Option l=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n"	
	77.000 SCS Curve No or C .100 Ia/S Coefficient	
	7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
	.694 .000 .523 .000 c.m/s .425 .921 .785 C perv/imperv/total	
15	ADD RUNOFF .694 .694 .523 .000 c.m/s	
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen	
11	Volume = .1792627E+04 c.m CHANNEL	
	.500 Base Width = 10.000 Left bank slope 1:	
	10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Deoth in metres	
	.100 Select Grade in % Depth = .532 metres Velocity = .224 m/sec Flow Comparity = .244 m/sec	
9	Velocity = .224 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .227 metres ROUTE	
	50.000 Conduit Length .000 Supply X-factor <.5	
	167.518 Supply K-lag (sec) .943 Beta weighting factor	
	600.000 Routing timestep 1 No. of sub-reaches	
17	.694 .694 .591 .000 c.m/s COMBINE	
	1 Junction Node No. .694 .694 .591 .591 c.m/s	
14	START 1 1=Zero; 2=Define	
4	CATCHMENT 10.000 ID No.6 99999 13.620 Area in hectares	
	500.000 Length (PERV) metres 2.000 Gradient (%)	
	6.900 Per cent Impervious 500.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n" 77.000 SCS Curve No or C	
	.100 Ia/S Coefficient 7.587 Initial Abstraction	
	 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .484 .000 .591 c.m/s .425 .922 .459 C perv/imperv/total 	
15	ADD RUNOFF	
27	.484 .484 .591 .591 c.m/s HYDROGRAPH DISPLAY	
9	5 is # of Hyeto/Hydrograph chosen Volume = .4729494E+04 c.m ROUTE	
,	.000 Conduit Length .500 Supply X-factor <.5	
	.000 Supply K-lag (sec)	
	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches	
17	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE	
	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 1.003 c.m/s	
17 18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No.	
	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 JUnction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMENE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV)	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C1 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "* 77.000 SCS Curve No or C .100 IAS Coefficient	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 & HIMD, with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient .587 Initial Abstraction	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C? 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.003 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total	
18 4	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 0.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (TMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.003 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .210 1.137 .484 .000 c.m/s	
18	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (TMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.003 .484 .000 c.m/s .210 1.137 .484 .000 c.m/s CHANNEL ADD RUNOFF .210 1.137 .484 .000 c.m/s	
18 4	<pre>.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.03 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNNOFF .210 1.137 .484 .000 c.m/s CHANNEL .500 Base Width = 10.000 Left bank slope 1:</pre>	
18 4	<pre>.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 1.587 Initial Abstraction 1 Option 1=Trianglr: 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.03 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .210 1.137 .484 .000 c.m/s CHANNEL .500 Base Width = 10.000 Left bank slope 1: .000 Maning's "n" 1.000 (/a Depth in metres</pre>	
18 4	.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CU/C: Z=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; Z=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.03 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .210 1.137 .484 .000 c.m/s CHANNEL .500 Base Width = 10.000 Left bank slope 1: 10.000 Aight bank slope 1: 10.000 Select Grade in % Depth = .646 metres Velocity = .253 m/sec	
18 4 15 11	<pre>.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.03 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .210 1.137 .484 .000 c.m/s CHANNEL .500 Base Width = 10.000 Left bank slope 1: .000 Jack bank slope 1: .000 Select Grade in % Depth = .646 metres Velocity = .253 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .281 m/sec</pre>	
18 4	<pre>.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMEJUE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .100 Aimp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr: 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.03 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .210 1.137 .484 .000 c.m/s CHANNEL .500 Base Widt = 10.000 Left bank slope 1: .060 Manning's "n" 1.000 Jappt him metres .100 Select Grade in % Depth = .646 metres Velocity = .253 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .281 metres ROUTE 200.000 Conduit Length</pre>	
18 4 15 11	<pre>.500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .484 .484 .484 .591 c.m/s COMBINE 1 Junction Node No. .484 .484 .484 1.003 c.m/s CONFLUENCE 1 Junction Node No. .484 1.003 .484 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (PERV) metres .500 Gradient (%) 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.003 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .210 1.137 .484 .000 c.m/s CHANNEL .500 Base Width = 10.000 Left bank slope 1: 10.000 J/a Depth in metres .100 Select Grade in % Depth = .646 metres Velocity = .253 m/sec Flow Capacity = .253 m/sec Flow Capacity = .281 metres ROUTE</pre>	

.626 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .210 1.137 .891 COMBINE 1 No. of sub-reaches
.10 1.137 .891 .000 c.m/s
COMBINE
2 Junction Node No.
.210 1.137 .891 .891 c.m/s
START
1 1=Zero; 2=Define
CATCHMENT
40.000 ID No.6 99999
4.640 Area in hectares
100.000 Length (PERV) metres
.500 Gradient (%)
.100 Per cent Impervious
100.000 &Length (IMPERV)
.000 %Imp, with Zero Dpth
1 Option 1=SCS CN/C? Z=Horton; 3=Green-Ampt; 4=Repeat
.250 Manning *n*
77.000 SCS Curve No or C
.100 Ia/S Coefficient
7.587 Initial Abstraction
1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
.252 .000 .891 c.m/s
.425 .921 .425 C perv/imperv/total
ADD RUNOFF
.252 .252 .891 .891 c.m/s
CATCHMENT
50.000 ID No.6 99999 .000 c.m/s 17 14 4 15 Los 252 .252 .891 .891 c.m/s CATCHMENT 50.000 ID No.6 99999 12.330 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 2.100 Per cent Impervious 350.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 4 15 9 OUTE 000 Conduit Length 500 Supply X-factor <.5 000 Supply K-lag (sec) 500 Beta weighting factor .000 Routing timestep 1 No. of sub-reaches .437 .645 .645 OMBINE ROUTE .000 .500 .000 .500 600.000 .645 .891 c.m/s .437 .645 .645 .3 COMBINE 2 Junction Node No. .437 .645 .645 1. CONFLUENCE 2 JUNCTION Node No. .437 1.451 .645 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1326780E+05 c.m MANUAL 17 1.451 c.m/s 18 .000 c.m/s 27 20

Developed Conditions – NO SWM

)ev	eloped Conditions – NO SWM
	Output File (4.7) NOSMM.OUT opened 2024-05-24 15:09 Units used are defined by G = 9.810
35	24 144 10.000 are MAXDT MAXHYD & DTMIN values Licensee: UPPER CANADA CONSULTANTS COMMENT
35	3 line(s) of comment PROJECT NAME: NORTHLAND ESTATES
14	PROJECT NO.: 21132 PROPOSED CONDITIONS WITH SWM START
	<pre>1 l=Zero; 2=Define</pre>
35	COMMENT 3 line(s) of comment

	** 2 YEAR DESIGN STORM EVENT **
2	STORM 1 l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic
	397.149 Coefficient a
	.000 Constant b (min) .699 Exponent c
	.400 Fraction to peak r
	240.000 Duration ó 240 min 34.453 mm Total depth
3	IMPERVIOUS
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .013 Manning "n"</pre>
	98.000 SCS Curve No or C
	.100 Ia/S Coefficient .518 Initial Abstraction
4	CATCHMENT 20.000 ID No.ó 99999
	3.020 Area in hectares
	100.000 Length (PERV) metres .500 Gradient (%)
	72.600 Per cent Impervious
	100.000 Length (IMPERV) .000 %Imp. with Zero Dpth
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n" 77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reser
	.275 .000 .025 .000 c.m/s .204 .828 .657 C perv/imperv/total
15	ADD RUNOFF
27	.275 .275 .025 .000 c.m/s HYDROGRAPH DISPLAY
	5 is # of Hyeto/Hydrograph chosen Volume = .6835738E+03 c.m
11	CHANNEL
	.500 Base Width = 3.000 Left bank slope 1:
	3.000 Right bank slope 1:
	.060 Manning's "n" 1.500 O/a Depth in metres
	.300 Select Grade in %
	Velocity = .353 m/sec
	Flow Capacity = 5.657 c.m/s Critical depth = .211 metres
9	ROUTE
	.000 Supply X-factor <.5
	106.220 Supply K-lag (sec) .567 Beta weighting factor
	200.000 Routing timestep
	.275 .275 .270 .000 c.m/s
17	COMBINE 1 Junction Node No.
	.275 .275 .270 .270 c.m/s
14	START 1 l=Zero; 2=Define
4	CATCHMENT 10.000 ID No.ó 99999
	17.530 Area in hectares
	500.000 Length (PERV) metres 1.000 Gradient (%)
	75.000 Per cent Impervious 500.000 Length (IMPERV)
	.000 %Imp. with Zero Dpth
	<pre>1 Option l=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n"</pre>
	77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reser
	1.646 .000 .270 .270 c.m/s .204 .852 .690 C perv/imperv/total
15	ADD RUNOFF 1.646 1.646 .270 .270 c.m/s
27	HYDROGRAPH DISPLAY
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m
9	ROUTE .000 Conduit Length
	.500 Supply X-factor <.5
	.000 Supply K-lag (sec) .500 Beta weighting factor
	600.000 Routing timestep
	l No. of sub-reaches 1.646 1.646 1.646 .270 c.m/s
17	COMBINE 1 Junction Node No.
	1.646 1.646 1.646 1.916 c.m/s
18	CONFLUENCE 1 Junction Node No.
	1.646 1.916 1.646 .000 c.m/s
4	CATCHMENT 30.000 ID No.6 99999
	3.670 Area in hectares 80.000 Length (PERV) metres
	SS.SSS BENGEN (FBRV) MELLES

.500 Gradient (%) Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" 1.400 80.000 .000 .250 77.000 SCS Curve No or C Ia/S Coefficient 100 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .025 1.916 1.646 .000 c.m/s .204 .838 .213 C perv/imperv/total 15 ADD RUNOFF .025 1.929 1.646 .000 c.m/s 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % .500 3.000 3.000 .060 1.500 .200 = 1.059 metres = .495 m/sec ity = 4.619 c m/s Depth = Velocity = Flow Capacity = Critical depth = 1.059 metres .495 m/sec 4.619 c.m/s .533 metres .533 metr 200.000 Conduit Length .000 Supply X-factor <.5 303.041 Supply X-factor <.5 .516 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .025 1.929 1.55 COMBINE 2 Junction 1.557 .000 c.m/s 17
 COMBINE

 2
 Junction Node No.

 0.025
 1.929
 1.557

 START
 1
 1=Zero; 2=Define

 CATCHMENT
 40.000
 ID No.6 99999

 3.880
 Area in hectares
 14 4 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" COS Course No. or C 100.000 3.700 100.000 .000 .250 Manning 'n' SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .025 .000 1.557 1.557 c.m/s .204 .828 .227 C perv/imperv/total 77.000 100 7.587 .025 15 ADD RUNOFF .025 1.557 1.557 c.m/s .025 4 CATCHMENT 50.000 9.180 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 350.000 1.000 1.300 Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Is/S Coefficient Is/S Coefficient 350.000 .250 77.000 .100 15 9 Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .500 .000 .500 No. of sub-reaches 1 .038 .061 COMBINE .061 1.557 c.m/s 17 COMBINE 2 Junction Node No. .038 .061 .061 1.588 c.m/s CONFLUENCE 2 JUNCTION Node No. .038 1.588 .061 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .60930002+04 c.m START 1 1=2ero; 2=Define COMMENT 2 18 27 14 35 COMMENT ** 5 YEAR DESIGN STORM EVENT ** 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic l=Chicago,z=Huir,-Seel.. Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 45.533 mm Total depth Te 524.867 .000 .699 400 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .013 Manning "n" 98.000 SCS Curve No or C Ia/S Coefficient .100 Initial Abstraction CATCHMENT 20.000 3.020 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) 100.000 .500

	72.600 Per cent Impervi	ous	
	100.000 Length (IMPERV) .000 %Imp. with Zero 1		
	.250 Manning "n"	C; 2=Horton; 3=Green-Ampt; 4=Repea	t
	77.000 SCS Curve No or .100 Ia/S Coefficient		
	7.587 Initial Abstract 1 Option 1=Triangl:	L/ Z-Rectangil/ S-SWM HID/ 4-Din.	Reserv
	.364 .000 .278 .869	.061 .000 c.m/s .707 C perv/imperv/total	
15	ADD RUNOFF .364 .364	.061 .000 c.m/s	
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrogra	aph chosen	
11	Volume = .9720645E+03 c.m CHANNEL		
	.500 Base Width = 3.000 Left bank slope 3.000 Right bank slope	1:	
	.060 Manning's "n"		
	1.500 O/a Depth in met: .300 Select Grade in 3	2	
	Velocity = 379	metres m/sec	
	Critical depth = .243	c.m/s metres	
9	ROUTE 50.000 Conduit Length		
	.000 Supply X-factor 98.911 Supply K-lag (se	<.5 c)	
	Kooli Conduit Length .000 Supply X-factor 98.911 Supply K-lag (sec .598 Beta weighting fi 200.000 Routing timestep 1 No. of sub-reach 264 264	actor	
	.504 .504	.364 .000 c.m/s	
17	COMBINE 1 Junction Node No.		
14	.364 .364 START	.364 .364 c.m/s	
4	1 1=Zero; 2=Define CATCHMENT		
	17.530 Area in hectares 500.000 Length (PERV) me		
	1.000 Gradient (%)	tres	
	75.000 Per cent Impervia 500.000 Length (IMPERV) .000 %Imp. with Zero 1 0 Option l=SCS (N/		
			t
	.250 Manning "n" 77.000 SCS Curve No or (.100 Ia/S Coefficient	2	
	7.587 Initial Abstract	ion	Pogorit
	2.324 .000 .278 .874	r; 2=Rectanglr; 3=SWM HYD; 4=Lin. .364 .364 c.m/s .725 C perv/imperv/total	RESELV
15	ADD RUNOFF 2.324 2.324	.364 .364 c.m/s	
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrogra		
9	Volume = .5784277E+04 c.1 ROUTE		
-	.000 Conduit Length .500 Supply X-factor	<.5	
	000 Supply K-lag (see	-)	
	.500 Beta weighting fr 600.000 Routing timestep 1 No. of sub-reach	es	
17	2.324 2.324 COMBINE	2.324 .364 c.m/s	
	1 Junction Node No. 2.324 2.324	2.324 2.688 c.m/s	
18	CONFLUENCE 1 Junction Node No.		
4	2.324 2.688 CATCHMENT	2.324 .000 c.m/s	
	30.000 ID No.ó 99999 3.670 Area in hectares		
	80.000 Length (PERV) me .500 Gradient (%) 1.400 Per cent Impervio	tres	
	1.400 Per cent Impervie 80.000 Length (IMPERV)		
		Dpth C; 2=Horton; 3=Green-Ampt; 4=Repea	t
	.250 Manning "n" 77.000 SCS Curve No or (.100 Ia/S Coefficient	2	
	7.587 Initial Abstract		
	.059 2.688	r; 2=Rectanglr; 3=SWM HYD; 4=Lin. 2.324 .000 c.m/s .286 C perv/imperv/total	keserv
15	.278 .877 ADD RUNOFF .059 2.717	.286 C perv/imperv/total 2.324 .000 c.m/s	
11	CHANNEL .500 Base Width =	2.324 .000 C.m/S	
	3.000 Left bank slope 3.000 Right bank slope	1:	
	.060 Manning's "n" 1.500 0/a Depth in met:		
	.200 Select Grade in		
		m/sec	
9		metres	
-	200.000 Conduit Length	<.5	
	278.130 Supply K-lag (see .549 Beta weighting fa	actor	
	600.000 Routing timestep 1 No. of sub-reach	25	
17	.059 2.717	2.118 .000 c.m/s	
	COMBINE		
	2 Junction Node No. .059 2.717	2.118 2.118 c.m/s	
14	2 Junction Node No.	2.118 2.118 c.m/s	

4	CATCHMENT 40.000 ID No.6	99999	
	40.000 ID No.ć 3.890 Area ir	hectares	
	100.000 Length .500 Gradier	(PERV) metres nt (%)	
	3.700 Per cer	nt Impervious	
		(IMPERV) vith Zero Dpth	
	1 Option .250 Manning	1=SCS CN/C; 2=Horto	n; 3=Green-Ampt; 4=Repeat
	77.000 SCS Cur	rve No or C	
		efficient Abstraction	
	1 Option	1=Trianglr; 2=Recta	nglr; 3=SWM HYD; 4=Lin. Reserv
	.060	.000 2.118 .869 .299	2.118 c.m/s C perv/imperv/total
15	ADD RUNOFF .060	.060 2.118	2.118 c.m/s
4	CATCHMENT		2.110 C.m/B
	50.000 ID No.ć 9.180 Area ir) 99999 1 hectares	
	350.000 Length	(PERV) metres	
	1.000 Gradier 1.300 Per cer	it (%) it Impervious	
	350.000 Length	(IMPERV) with Zero Dpth	
	1 Option	1=SCS CN/C; 2=Horto	n; 3=Green-Ampt; 4=Repeat
	.250 Manning 77.000 SCS Cur	y "n" we No or C	
	.100 Ia/S Co	efficient	
		. Abstraction 1=Trianglr; 2=Recta:	nglr; 3=SWM HYD; 4=Lin. Reserv
		.060 2.118 .884 .286	
15	ADD RUNOFF		
9	.088 ROUTE	.138 2.118	2.118 c.m/s
-	.000 Conduit	Length	
	.500 Supply .000 Supply	X-factor <.5 K-lag (sec)	
	.500 Beta we	ighting factor	
	1 No. of	g timestep sub-reaches	
17	.088 COMBINE	.138 .138	2.118 c.m/s
1,	2 Junction Nod		
18	.088 CONFLUENCE	.138 .138	2.192 c.m/s
	2 Junction Nod		.000 c.m/s
27	HYDROGRAPH DISPLA	Y	
	5 is # of Hyet Volume = .89520	:o/Hydrograph chosen	
14	START		
35	<pre>1 1=Zero; 2=De COMMENT</pre>	fine	
	3 line(s) of c		
	** 10 YEAR DESIGN	I STORM EVENT **	
2	**************************************	*****	
2	1 1=Chica	ugo;2=Huff;3=User;4=	Cdnlhr;5=Historic
	608.845 Coeffic .000 Constar	ient a ht b (min)	
	.699 Exponer	nt c on to peak r	
	240.000 Duratio	on ó 240 min	
3	52.818 n IMPERVIOUS	m Total depth	
5	1 Option		n; 3=Green-Ampt; 4=Repeat
	.013 Manning 98.000 SCS Cur	y "n" :ve No or C	
	.100 Ia/S Co	oefficient	
4	CATCHMENT	Abstraction	
	20.000 ID No.6 3.020 Area ir) 99999 1 hectares	
	100.000 Length	(PERV) metres	
		t Impervious	
		(IMPERV) with Zero Dpth	
	1 Option	1=SCS CN/C; 2=Horto	n; 3=Green-Ampt; 4=Repeat
	.250 Manning 77.000 SCS Cur	y "n" Tve No or C	
	.100 Ia/S Co	efficient Abstraction	
	1 Option	1=Trianglr; 2=Recta	nglr; 3=SWM HYD; 4=Lin. Reserv
	.442	.000 .138 .887 .732	.000 c.m/s C perv/imperv/total
15	ADD RUNOFF		
27	.442 HYDROGRAPH DISPLA		.000 c.m/s
	5 is # of Hyet Volume = .11671	0/Hydrograph chosen	
11	CHANNEL		
	.500 Base Wi 3.000 Left b	dth = bank slope 1:	
	3.000 Right b	pank slope 1: g's "n"	
	1.500 O/a Dep	th in metres	
	.300 Select	Grade in %	
	Vologity -	200 m/aca	
	Flow Capacity = Critical depth =	5.657 c.m/s .267 metres	
9	ROUTE		
	.000 Supply	: Length X-factor <.5	
	94.229 Supply	K-lag (sec) eighting factor	
	200.000 Routing	sub-reaches	
	1 No. of .442	sub-reaches .442 .425	.000 c.m/s
17	COMBINE 1 Junction Nod		
		.442 .425	.425 c.m/s

14		Zero; 2=Define
4	CATCHME 10.000	ENT ID No.ó 99999
	17.530 500.000	Area in hectares Length (PERV) metres
	1.000	Gradient (%) Per cent Impervious
	75.000 500.000	Per cent Impervious Length (IMPERV)
	.000	Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat
	.250	Manning "n"
	77.000 .100	SCS Curve No or C Ia/S Coefficient
	7.587 1	Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	2	2.767 .000 .425 .425 c.m/s
15	ADD RUN	.320 .892 .749 C perv/imperv/total NOFF
27		2.767 2.767 .425 .425 c.m/s RAPH DISPLAY
2.	5 is	# of Hyeto/Hydrograph chosen
9	ROUTE	= .6933451E+04 c.m
	.000	Conduit Length Supply X-factor <.5
	.000	Supply K-lag (sec) Beta weighting factor
	.500 600.000	Routing timestep
	1	No. of sub-reaches 2.767 2.767 2.767 .425 c.m/s
17	COMBINE	
	2	unction Node No. 2.767 2.767 2.767 3.192 c.m/s
18	CONFLUE 1 Ju	ENCE unction Node No.
4		2.767 3.192 2.767 .000 c.m/s
1	30.000	ID No.ó 99999
	3.670 80.000	Area in hectares Length (PERV) metres
	.500 1.400	Gradient (%) Per cent Impervious
	80.000	Length (IMPERV)
	1	%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 77.000	Manning "n" SCS Curve No or C
	.100	Ia/S Coefficient Initial Abstraction
	1	Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
		.093 3.192 2.767 .000 c.m/s .320 .893 .328 C perv/imperv/total
15	ADD RUN	NOFF .093 3.238 2.767 .000 c.m/s
11	CHANNEI .500	
	3.000	Left bank slope 1:
	3.000	Right bank slope 1: Manning's "n"
	1.500	O/a Depth in metres Select Grade in %
	Depth	= 1.303 metres
	Velocit Flow Ca	apacity = 4.619 c.m/s
9	Critica ROUTE	al depth = .672 metres
	200.000	Conduit Length
	.000 266.193	Supply K-lag (sec)
	.565 600.000	Beta weighting factor Routing timestep
	1	No. of sub-reaches .093 3.238 2.571 .000 c.m/s
17	COMBINE	
		unction Node No. .093 3.238 2.571 2.571 c.m/s
14	START 1 1=	Zero; 2=Define
4	CATCHME 40.000	
	3.890	Area in hectares Length (PERV) metres
	100.000	Gradient (%)
	3.700 100.000	Per cent Impervious Length (IMPERV)
	.000	<pre>%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>
	.250	Manning "n"
	77.000 .100	SCS Curve No or C Ia/S Coefficient
	7.587	Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	-	.086 .000 2.571 2.571 c.m/s .320 .887 .341 C perv/imperv/total
15	ADD RUN	IOFF
4	CATCHME	.086 .086 2.571 2.571 c.m/s
	50.000 9.180	ID No.ó 99999 Area in hectares
	350.000	Length (PERV) metres
	1.000	Gradient (%) Per cent Impervious
	350.000	Length (IMPERV) %Imp. with Zero Dpth
	1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 77.000	Manning "n" SCS Curve No or C
	.100 7.587	Ia/S Coefficient Initial Abstraction
	1	Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .134 .086 2.571 2.571 c.m/s
15	ADD RUN	.320 .898 .327 C perv/imperv/total
		.134 .208 2.571 2.571 c.m/s
9	ROUTE	Conduit Length

Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .500 .000 600.000 I No. of sub-rea .134 .208 COMBINE No. of sub-reaches .208 2.571 c.m/s 17 BINE Junction Node No. .134 .208 .208 2 2.682 c.m/s .134 .208 .208 2.682 c.m/s CONFLUENCE 2 Junction Node No. .134 2.682 .208 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1101540E+05 c.m STRAT 18 27 Volume START 1 =Zero; 2=Define 14 35 ** 25 YEAR DESIGN STORM EVENT ** 2 STORM l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 62.077 mm Total depth me 715.568 .000 .699 400 240.000 IMPERVIOUS
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 3 Manning "n" SCS Curve No or C Ia/S Coefficient 98.000 .100 Initial Abstraction CATCHMENT 20.000 3.020 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning ** SCS Curve No or C Ia/S Coefficient 4 100.000 .500 72.600 100.000 .250 77.000 Ia/S Coefficient .100 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .543 .000 .208 .000 c.m/s .367 .905 .757 C perv/imperv/total 15 ADD RUNOFF ADU RUNOFF .543 .543 .208 .000 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1419536E+04 c.m GUANNEY 27 CHANNEL .500 3.000 11 CHANNEL .500 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: .060 Manning's "n" 1.500 O/a Depth in metres .300 Select Grade in % Depth = .579 metres Velocity = .419 m/sec Flow Capacity = 5.657 c.m/s Critical depth = .295 metres ROUTE ROUTE 50.000 Conduit Length .000 Supply X-factor <.5 89.446 Supply K-lag (sec) .640 Beta weighting factor 200.000 Routing timestep 1 No. of sub-reaches .543 .543 .500 COMBINE .640 200.000 .000 c.m/s 17 1 Junction Node No. .543 .543 .500 .543 .500 c.m/s 14 START 1=Zero; 2=Define 4 CATCHMENT ID No.ó 99999 CATCHMEP 10.000 17.530 500.000 1.000 75.000 500.000 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 0 Length (IMPERV) % Imp, with Zero Dpth 0 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat % SCS Curve No or C 0 Ia/S Coefficient Initial Abstraction 0 Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 3.322 .000 .500 .500 c.m/s .367 .910 .774 C perv/imperv/total RUNOFF .000 .250 77.000 .100 7.587 1 15 ADD RUNOFF 3.322 3.322 .500 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen VOlume = .84255C8404 c.m ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply X-factor <.5 ADD RUNOFF .500 c.m/s 27 9 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep 000 .500 600.000 1 No. of sub-reaches 3.322 3.322 3.322 .500 c.m/s 17 COMBINE COMBINE 1 Junction Node No. 3.322 3.322 3.322 3.822 c.m/s CONFLUENCE 1 Junction Node No. 3.322 3.822 3.322 .000 c.m/s Carcument 1 18 .000 c.m/s CATCHMENT 4

	30.000 3.670	ID No.ó 99999 Area in hectares
	80.000	Length (PERV) metres
	.500 1.400	Gradient (%) Per cent Impervious
	80.000	Length (IMPERV)
	.000	<pre>%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>
	.250	Manning "n"
	77.000	SCS Curve No or C Ia/S Coefficient
	7.587	Initial Abstraction
	1	Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 137 3.822 3.322 .000 c.m/s
15		367 .908 .374 C perv/imperv/total
12	ADD RUNO	137 3.898 3.322 .000 c.m/s
11	CHANNEL .500	Base Width =
	3.000	Left bank slope 1:
	3.000	Right bank slope 1: Manning's "n"
	1.500	O/a Depth in metres
	.200 Depth	Select Grade in % = 1.403 metres
	Velocity	= .590 m/sec
	Flow Cap Critical	acity = 4.619 c.m/s depth = .730 metres
9	ROUTE	deptil750 metres
	200.000	Conduit Length
	254.140	Supply X-factor <.5 Supply K-lag (sec)
	.582	Beta weighting factor Routing timestep
	1	No. of sub-reaches
17	COMBINE	137 3.898 3.213 .000 c.m/s
17	2 Jun	ction Node No.
14	START	137 3.898 3.213 3.213 c.m/s
	1 1=Z	ero; 2=Define
4	CATCHMEN 40.000	T ID No.ó 99999
	3.890	Area in hectares
	100.000	Length (PERV) metres Gradient (%)
	3.700	Per cent Impervious
	100.000	Length (IMPERV) %Imp. with Zero Dpth
	1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 77.000	Manning "n" SCS Curve No or C
	.100	Ia/S Coefficient
	7.587	Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
		138 .000 3.213 3.213 c.m/s
15	ADD RUNO	367 .905 .387 C perv/imperv/total
		138 .138 3.213 3.213 c.m/s
4	CATCHMEN 50.000	T ID No.ó 99999
	9.180	Area in hectares
	350.000 1.000	Length (PERV) metres Gradient (%)
	1.300	Per cent Impervious
	350.000	Length (IMPERV) %Imp. with Zero Dpth
	1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 77.000	Manning "n" SCS Curve No or C
	.100	Ia/S Coefficient
	7.587 1	Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
		200 .138 3.213 3.213 c.m/s 367 .911 .374 C perv/imperv/total
15	ADD RUNO	FF
9	ROUTE .	200 .313 3.213 3.213 c.m/s
	.000	Conduit Length
	.500	Supply X-factor <.5 Supply K-lag (sec)
	.500	Beta weighting factor
	600.000 1	Routing timestep No. of sub-reaches
		200 .313 .313 3.213 c.m/s
17	COMBINE 2 Jun	ction Node No.
1.0		200 .313 .313 3.377 c.m/s
18	CONFLUEN 2 Jun	CE ction Node No.
		200 3.377 .313 .000 c.m/s
27		PH DISPLAY # of Hyeto/Hydrograph chosen
	Volume	= .1375860E+05 c.m
14	START 1 1=Z	ero; 2=Define
35	COMMENT	
	*******	e(s) of comment
		AR DESIGN STORM EVENT **
2	STORM	
	1	1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
	794.298	Coefficient a Constant b (min)
	.699	Exponent c
	.400 240.000	Fraction to peak r Duration ó 240 min
~		68.907 mm Total depth
3	IMPERVIO 1	US Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.013 98.000	Manning "n" SCS Curve No or C
	.100	Ia/S Coefficient
4	.518 CATCHMEN	Initial Abstraction
4	20.000	ID No.ó 99999

Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 3.020 100.000 .500 72.600 100.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 10. 000 or m(s) .000 1 .250 77.000 7.587 .619 .000 .313 .000 c.m/s .397 .913 .772 C perv/imperv/total 15 27 11 ROUTE 50.000 Conduit Length .000 Supply X-factor <.5 86.544 Supply K-lag (sec) .653 Beta weighting factor 00.000 Routing timestep 1 No. of sub-reaches .619 .619 .55 COMBINE 1 Junction Node No. .619 .619 .51 86.544 200.000 . 553 .000 c.m/s 17 1 .619 START .619 .553 .553 c.m/s 14 1=Zero; 2=Define CATCHMENT 4 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C 10.000 17.530 ID No.ó 99999 500.000 1.000 75.000 500.000 .250 77.000 SCS Curve No or C Ia/S Coefficient .100 .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 3.726 .000 .553 .553 c.m/s .398 .920 .789 C perv/imperv/total ADD RUNOFF 3.726 3.726 .553 .553 c.m/s 15 3.726 .553 .553 c.m/s 5.720 5.720 5.720 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .9530810E+04 c.m 27 5 is Volume ROUTE .000 .500 .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) 500 Beta weighting factor .500 Beta weighting factor 00.000 Routing timestep 1 No. of sub-reaches 3.726 3.726 3.726 COMBINE 1 Junction Node No. 3.726 3.726 3.726 CONFLUENCE 600.000 .553 c.m/s 17 1 4.279 c.m/s CONFLUENCE 18 Junction Node No. 3.726 4.279 3.726 1 .000 c.m/s CATCHMENT 30.000 ID No.ó 99999 3.670 Area in hectar Area in hectares Length (PERV) metres 80.000 Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" CGC Corror No ce C .500 80.000 .250 77.000 SCS Curve No or C SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .173 4.279 3.726 .000 c.m/s .397 .916 .404 C perv/imperv/total were 100 7.587 ADD RUNOFF .173 4.382 3.726 CHANNEL 15 .000 c.m/s 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres .500 3.000 3.000 .060 1.500
 1.500
 0/a Depth in metres

 .200
 Select Grade in %

 Depth
 =
 1.469 metres

 Velocity
 =
 .608 m/sec

 Flow Capacity
 4.619 c.m/s

 Critical depth
 .768 metres
 ROUTE COMBINE 200.000 246.805 600.000 1 .000 c.m/s 17 Junction Node No. 2

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	.173 4.382	3.687 3.687 c.m/s
14	START 1 1=Zero; 2=Define	
4	CATCHMENT 40.000 ID No.ó 99999	
	3.890 Area in hecta 100.000 Length (PERV)	ires
	.500 Gradient (%)	
	100.000 Length (IMPER	2V)
	.000 %Imp. with Ze 1 Option 1=SCS	ero Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n" 77.000 SCS Curve No	
	.100 Ia/S Coeffici	ent
	7.587 Initial Abstr 1 Option 1=Tria:	nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.174 .000 .397 .913	3.687 3.687 c.m/s .416 C perv/imperv/total
15	ADD RUNOFF .174 .174	3.687 3.687 c.m/s
4	CATCHMENT	
	50.000 ID No.ó 99999 9.180 Area in hecta	ires
	350.000 Length (PERV) 1.000 Gradient (%)	metres
	1.000 Gradient (%) 1.300 Per cent Impe 350.000 Length (IMPER)	rvious
	.000 %Imp. with Ze	ro Dpth CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n"	
	77.000 SCS Curve No .100 Ia/S Coeffici	ent
	7.587 Initial Abstr 1 Option 1=Tria	action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.265 .174 .398 .918	3.687 3.687 c.m/s .404 C perv/imperv/total
15	ADD RUNOFF .265 .404	3.687 3.687 c.m/s
9	ROUTE	
	.000 Conduit Lengt .500 Supply X-fact	or <.5
	.000 Supply K-lag .500 Beta weightin	
	600.000 Routing times 1 No. of sub-re	tep
17	.265 .404 COMBINE	.404 3.687 c.m/s
17	2 Junction Node No.	
18	.265 .404 CONFLUENCE	.404 3.900 c.m/s
	2 Junction Node No. .265 3.900	.404 .000 c.m/s
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydr	
14	Volume = .1582500E+05 START	
	1 1=Zero; 2=Define	
35	COMMENT 3 line(s) of comment	
	*** 100 YEAR DESIGN STO	
2	**************************************	
2	1 1=Chicago;2=H	Muff;3=User;4=Cdnlhr;5=Historic
	.000 Constant b	
	.699 Exponent c .400 Fraction to p	
	240.000 Duration ó 2 75.585 mm	240 min Total depth
3	IMPERVIOUS	CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.013 Manning "n" 98.000 SCS Curve No	
	.100 Ia/S Coeffici	ent
4	.518 Initial Abstr CATCHMENT	
	20.000 ID No.ó 99999 3.020 Area in hecta	
	100.000 Length (PERV) .500 Gradient (%)	metres
	72.600 Per cent Imper 100.000 Length (IMPER)	
	.000 %Imp. with Ze	ero Dpth
	.250 Manning "n"	CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	77.000 SCS Curve No .100 Ia/S Coeffici	ent
	7.587 Initial Abstr 1 Option 1=Tria:	action nglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.694 .000 .425 .921	.404 .000 c.m/s .785 C perv/imperv/total
15	ADD RUNOFF	
27	.694 .694 HYDROGRAPH DISPLAY	.404 .000 c.m/s
	5 is # of Hyeto/Hydr Volume = .1792627E+04	
11	CHANNEL .500 Base Width	=
	3.000 Left bank sl 3.000 Right bank sl	
	.060 Manning's "n"	
	1.500 O/a Depth in .300 Select Grade	in %
	Depth = . Velocity = .	642 metres 446 m/sec
	Flow Capacity = 5.	657 c.m/s 332 metres
9	ROUTE 50.000 Conduit Lengt	
	.000 Supply X-fact	or <.5
	84.095 Supply K-lag .665 Beta weightin	ng factor
	200.000 Routing times 1 No. of sub-re-	aches
	.694 .694	.615 .000 c.m/s

17 COMBINE Junction Node No. .694 .694 1 .615 .615 c.m/s START 1 1=Zero; 2=Define 14 CATCHMENT 4 ID No.ó 99999 10.000 17.530 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 500.000 1.000 75.000 500.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 4.115 .000 .615 .615 c.m/s .425 .926 .801 C perv/imperv/total NOFF .000 1 .250 .230 77.000 .100 7.587 1 4.115 ADD RUNOFF 15 ADD RUNOFF 4.115 4.115 .615 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1061312E+05 c.m .615 c.m/s 27 9 ROUTE Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .500 .500 1 No. of sub-reaches 4.115 4.115 4.115 .615 c.m/s COMBINE 17 COMBINE 1 Junction Node No. 4.115 4.115 4.115 4.721 c.m/s CONFLUENCE 1 Junction Node No. 4.115 4.721 4.115 .000 c.m/s CATCHMENT 1 18 CATCHMENT ^ 000 ID No.ó 99999 im hectar 4 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 4.721 4.115 .000 c.m/s .425 .922 .432 C perv/imperv/total NOFF 30.000 3.870 80.000 .500 1.400 80.000 .000 .250 77.000 .100 7.587 1 15 ADD RUNOFF0FF .210 CHANNEL 1.000 4.855 4.115 .000 c.m/s 11 CHANNEL 1.000 Base Width = 3.000 Left bank slope 1: 3.000 Night bank slope 1: 3.000 O'a Depth in metres 3.000 O'a Depth in metres 3.000 Select Grade in % Depth = 1.454 metres Velocity = .623 m/sec Flow Capacity = 10.613 c.m/s Critical depth = .734 metres Critical depth = .734 metres ROUTE 200.000 .000 240.715 q Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .600. 600.000 1 No. of sub-reaches .210 4.855 4 COMBINE 4.155 .000 c.m/s 17 2 Junction Node No. .210 4.855 4.155 4.155 c.m/s 14 START 1 1=Zero; 2=Define CATCHMENT 40.000 ID No.ó 99999 4 40.000 3.890 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 100.000 .500 3.700 Per cent impervious Length (IMPRV) %Imp. with Zero Dpth Option 1=SCS CN/C; Z=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 100.000 .000 .250 77.000 .100 7.587 Initial Abstraction Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 4.155 4.155 c.m/s .425 .921 .443 C perv/imperv/total 1 .211 .425 ADD RUNOFF .211 .211 CATCEMENT 15 .211 4.155 4.155 c.m/s 4 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat 350.000 1.000 1.300 350.000 .000 Option 1=SCS CM/CT 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ta/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 25 .211 4.155 4.155 c.m/s 25 .922 .432 C perv/imperv/total .250 77.000 100 7.587 1 425

15

ADD RUNOFF

	.:	325	.499	4.155	4.155	c.m/s
9	ROUTE					
	.000	Conduit	: Length			
	.500	Supply	X-factor <	.5		
	.000	Supply	K-lag (sec)		
	.500	Beta we	eighting fa	ctor		
	600.000	Routing	g timestep			
	1	No. of	sub-reache	s		
	.:	325	.499	.499	4.155	c.m/s
17	COMBINE					
		ction Noo				
		325	.499	.499	4.424	c.m/s
18	CONFLUEN					
		ction Noo				
			4.424	.499	.000	c.m/s
27	HYDROGRAI					
			o/Hydrogra	ph chosen		
		17898	360E+05 c.m			
20	MANUAL					

Upper Canada Consultants

Developed Conditions – FULL SWM

	ciopeu	Conditions – FULL SWM
	Output F Units us	ile (4.7) SWM.OUT opened 2024-05-24 14:19 ed are defined by G = 9.810
	24	144 10.000 are MAXDT MAXHYD & DTMIN values
35	COMMENT	: UPPER CANADA CONSULTANTS
	PROJECT	e(s) of comment NAME: NORTHLAND ESTATES
	PROJECT	CONDITIONS WITH SWM
14	PROPOSED	CONDITIONS WITH SWM
35	1 1=Z COMMENT	ero; 2=Define
دد	3 lin	e(s) of comment

	*******	*******
2	STORM 1	l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic
	512.000 6.000	Coefficient a Constant b (min)
	.800	Exponent c
	240.000	Fraction to peak r Duration ó 240 min
3	IMPERVIO	25.036 mm Total depth
-	1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.013 98.000	Manning "n" SCS Curve No or C
	.100	Ia/S Coefficient Initial Abstraction
4	CATCHMEN	Т
	20.000 3.020	Area in hectares
	100.000 .500	Length (PERV) metres Gradient (%)
	72.600	Per cent Impervious
	100.000	Length (IMPERV) %Imp. with Zero Dpth
	1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 77.000	Manning "n" SCS Curve No or C
	.100 7.587	Ia/S Coefficient Initial Abstraction
	1	Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	:	202 .000 .000 .000 c.m/s 130 .797 .614 C perv/imperv/total
15	ADD RUNO	
27	HYDROGRA	PH DISPLAY
		<pre># of Hyeto/Hydrograph chosen = .4636960E+03 c.m</pre>
11	CHANNEL	
	3.000	Left bank slope 1:
	3.000	Right bank slope 1: Manning's "n"
	1.000	0/a Depth in metres
	.300 Depth	Select Grade in % = .378 metres
	Velocity Flow Cap	= .326 m/sec acity = 2.047 c.m/s
	Critical	depth = .180 metres
9	ROUTE 50.000	Conduit Length
	.000	
	11/ 020	Supply X-factor <.5
	114.938 .531	Supply K-lag (sec) Beta weighting factor
		Supply K-lag (sec) Beta weighting factor
17	.531 200.000 1	Supply K-lag (sec)
17	.531 200.000 1 COMBINE 1 Jun	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No.
17	.531 200.000 1 COMBINE 1 Jun	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s
14	.531 200.000 1 COMBINE 1 Jun START 1 1=Z	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define
	.531 200.000 1 COMBINE 1 Jun START 1 1=Z CATCHMEN 10.000	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999
14	.531 200.000 1. COMBINE 1 Jun START 1 1=Z CATCHMEN 10.000 17.530	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.ó 99999 Area in hectares
14	.531 200.000 1 COMBINE 1 Jun START 1 1=Z CATCHMEN 10.000 17.530 500.000 1.000	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%)
14	.531 200.000 1 COMBINE 1 Jun 1 =Z CATCHMEN 10.000 17.530 500.000 1.000 75.000	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious
14	.531 200.000	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth
14	.531 200.000 .COMBINE 1 Jun START 1 1=Z CATCHMEN 10.000 17.530 500.000 1.000 75.000 500.000 .000 1.250	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n*
14	.531 200.000 1 JUL COMBINE 1 JUL START 1 1=2 CATCHMEN 10.000 17.530 500.000 1.000 550.000 500.000 1.000 1.250 77.000	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n*
14	.531 200.000 1 JUN COMBINE 1 JUN START 1 1=2 CATCHMEN 10.000 17.530 500.000 17.530 500.000 100 500.000 1 .250 77.000 .100 7.587	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction
14	.531 200.000 1 Jun COMBINE 1 JUN 1 I=2 CATCHMEN 10.000 17.530 500.000 10.000 500.000 1.000 75.000 500.000 1.000 77.000 .100 7.587 1	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s
14	.531 200.000 1 JUN COMBINE 1 JUN START 1 1=2 CATCHMEN 10.000 17.530 500.000 17.530 500.000 500.000 500.000 1 .000 75.000 500.000 1 .250 77.000 .100 7.587 1 .	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s </pre>
14 4	.531 200.000 1 Jun COMBINE 1 Jun START 1 1=2 CATCHMEN 10.000 17.530 500.000 1.000 75.000 500.000 1.000 75.000 500.000 1.000 7.587 7.000 7.587 1 1 .2587 .100 .100 .100 .100 .100 .100 .100 .10	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (DERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s
14	.531 200.000 .000 .COMBINE 1 Jun START 1 1=2 CATCHMEN 10.000 17.530 500.000 .100 75.000 500.000 .000 .100 77.000 .100 7.587 1 ADD RUNO ADD RUNO	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s 130 .806 .637 C perv/imperv/total
14 4 15 27	.531 200.000 1 COMBINE 1 JUN START 1 1=Z CATCHMEN 10.000 17.530 500.000 17.530 500.000 500.000 100 75.000 500.000 100 7.587 1 1 .100 7.587 1 .100 7.587 1 .100 7.587 1 .100 7.587 1 .100 7.587 1 .100 7.587 1 .100 7.587 1 .100 7.587 1 .100 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 .000 .000 .000 .000 .000 .000	Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=Triang1; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s FF 924 .924 .192 .192 c.m/s
14 4	.531 200.000 1 JUN COMBINE 1 JUN START 1 1=Z CATCHMEN 10.000 17.530 500.000 17.530 500.000 17.530 500.000 500.000 10.000 75.000 500.000 10.250 77.000 1.000 7.587 1 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 .000 .000 .000 .000 .000 .000	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning ** SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=Frianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s Pi DISPLAY # of Hyeto/Hydrograph chosen = .2788I53E+04 c.m Discharge - Volume sets</pre>
14 4 15 27	.531 200.000 1 JUU COMBINE 1 JUU START 1 1=2 CATCHMEN 10.000 17.530 500.000 500.000 1.000 500.000 1.000 500.000 1.000 77.000 .100 77.000 .100 77.000 .100 77.000 .100 77.000 .100 77.000 .100 77.000 .100 77.000 .100 77.000 .100 77.000 .100 .1	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning 'n' SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s HM DISPLAY # of Hyeto/Hydrograph chosen = .2788153E+04 c.m</pre>
14 4 15 27	.531 200.000 1 Jun COMBINE 1 Jun 1 -zz CATCHMEN 10.000 17.530 500.000 17.530 500.000 17.530 500.000 100 75.000 500.000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.00000 10.0000 10.00000 10.00000 10.00000 10.00000 10.00000000	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s 130 .806 .637 C perv/imperv/total FF 924 .924 .192 .192 c.m/s H DISPLAY # of Hyeto/Hydrograph chosen = .2788153E+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5</pre>
14 4 15 27	.531 200.000 1 JUN COMBINE 1 JUN START 1 1=Z CATCHMEN 10.000 17.530 500.000 17.530 500.000 1.000 75.000 500.000 1.000 75.000 500.000 1.000 7.587 1 MDD RUNO ADD RUNO HVDROGRA 5 is Volume POND 6 Depth - 17.9.900 180.500	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 22Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) % Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .0192 .192 c.m/s HID SHAY # of Hyeto/Hydrograph chosen = .27881538+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5 .350 6240.3</pre>
14 4 15 27	.531 200.000 1 Jun COMBINE 1 Jun START 1 1=2 CATCHMEN 10.000 17.530 500.000 1.000 75.000 500.000 1.000 75.000 500.000 1.000 1.000 7.530 77.000 1.000 1.000 7.587 1 ADD RUNO ADD RUNO	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %tmp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s HD ISPLAY # of Hyeto/Hydrograph chosen = .2788153E+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5 .350 6243.3 .678 T177.9 1.399 8478.7</pre>
14 4 15 27	.531 200.000 1 Jun COMBINE 1 Jun START 1 1=2 CATCHMEN 10.000 17.530 500.000 1.000 75.000 500.000 1.000 75.000 500.000 1.000 7.530 77.000 1.000 7.530 77.000 1.000 1.000 7.587 1.000 7.587 1.000 1.000 7.587 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.00000 1.0000 1.00000 1.000000 1.00000000	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %tmp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s HP DISPLAY # of Hyeto/Hydrograph chosen = .2788153E+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5 .350 6243.3 .678 T177.9 1.399 8478.7 flow = .048 c.m/s </pre>
14 4 15 27	.531 200.000 COMBINE 1 JUN START 1 1=Z CATCHMEN 10.000 17.530 500.000 17.530 500.000 17.530 500.000 500.000 10.000 75.000 500.000 10.250 77.000 .100 7.587 1 MYDROGRA 5 is Volume POND 6 Depth - 179.900 180.500 180.500 181.450 Peak Out Maximum	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %tmp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s HD ISPLAY # of Hyeto/Hydrograph chosen = .2788153E+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5 .350 6243.3 .678 T177.9 1.399 8478.7</pre>
14 4 15 27	.531 200.000 1 J. COMBINE 1 JUN START 1 1=Z CATCHMEN 10.000 17.530 500.000 17.530 500.000 17.530 500.000 100 75.000 500.000 100 75.000 500.000 100 77.000 100 77.587 1 HVPROGRA 5 is Volume POND 6 Depth - 179.900 180.500 180.500 181.250 181.250 181.450 Peak Out Maximum Maximum	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCC SU/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=TriangIr; 2=RectangIr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s PH DISPLAY # of Hyeto/Hydrograph chosen = .2788153E+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5 .350 6242.3 .678 7177.9 1.399 6478.7 flow = .048 c.m/s Depth = 180.361 metres Storage = 2183. c.m 924 .924 .048 .192 c.m/s</pre>
14 4 15 27 10	.531 200.000 1 JUN COMBINE 1 JUN START 1 1=Z CATCHMEN 10.000 17.530 500.000 100 75.000 500.000 100 75.000 500.000 100 75.000 77.000 100 75.000 100 77.587 1 1	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning ** SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=TriangIr; 2=RectangIr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s 130 .806 .637 C perv/imperv/total FF .2788153E+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5 .350 62243.3 .678 7177.9 1.399 8478.7 flow = .048 c.m/s Depth = 180.361 metres Storage = 2183. c.m 924 .924 .048 .192 c.m/s</pre>
14 4 15 27 10	.531 200.000 1 JUU COMBINE 1 JUU START 1 1=2 CATCHMEN 10.000 17.530 500.000 500.000 500.000 500.000 500.000 100 75.000 500.000 100 77.000 100 77.000 100 77.000 100 77.000 100 77.000 100 77.000 100 77.000 100 77.000 100 77.000 100 77.000 100 77.000 100 100 100 100 100 100 100 100 100	<pre>Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 202 .202 .192 .000 c.m/s ction Node No. 202 .202 .192 .192 c.m/s ero; 2=Define T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning ** SCS Curve No or C IA/S Coefficient Initial Abstraction Option 1=TriangIr; 2=RectangIr; 3=SWM HYD; 4=Lin. Reserv 924 .000 .192 .192 c.m/s 130 .806 .637 C perv/imperv/total FF .2788153E+04 c.m Discharge - Volume sets .000 .0 .0620 2842.9 .224 5050.5 .350 62243.3 .678 7177.9 1.399 8478.7 flow = .048 c.m/s Depth = 180.361 metres Storage = 2183. c.m 924 .924 .048 .192 c.m/s</pre>

4	CATCHMENT	r -				
	30.000	ID No.ó				
			(PERV) me			
	.500	Gradien Per cen	t (%) t Impervi	0115		
	80.000	Length	(IMPERV)			
	.000 1	Option	ith Zero 1=SCS CN/		on; 3=Green-Ampt; 4=Repeat	
	.250 77.000	Manning	"n" ve No or			
	.100	Ia/S Co	efficient			
	7.587		Abstract 1=Triangl		anglr; 3=SWM HYD; 4=Lin. Rese	rv
		010 L30	.204	.048	.000 c.m/s C perv/imperv/total	
15	ADD RUNOR		.785	.139	C perv/imperv/total	
11	. (CHANNEL	010	.210	.048	.000 c.m/s	
	.500	Base Wi				
			ank slope ank slope			
	.060	Manning	's "n" th in met	ree		
	.200	Select	Grade in	\$		
	Depth Velocity	=	. 420	metres m/sec		
	Flow Capa	acity =	1.671	c.m/s		
9	Critical ROUTE	aeptn =	.184	metres		
	200.000	Conduit				
	529.337	Supply	X-factor K-lag (se	c)		
	.500 600.000	Routing	ighting f timestep			
	1	No. of	sub-reach	es		
17	.(COMBINE	010	.210	.185	.000 c.m/s	
	2 Juno	tion Nod		105	105 /-	
14	START			.185	.185 c.m/s	
4	1 1=Ze CATCHMENT	ero; 2=De	fine			
	40.000	ID No.ó				
	3.890 100.000	Area in Length	(PERV) me	tres		
	.500 3.700	Gradien	t (%) t Impervi	0110		
	100.000	Length		ous		
	.000	%Imp. w	ith Zero	Dpth C: 2=Horte	on; 3=Green-Ampt; 4=Repeat	
	. 250	Manning	"n"	-		
	77.000 .100	Ia/S Co	"n" ve No or efficient	C		
	7.587 1	Initial	Abstract	ion	anglr; 3=SWM HYD; 4=Lin. Rese	
	. (014	.000	.185	.185 c.m/s	r v
15	. 1 ADD RUNOR	L30 ?F	.797	.155	C perv/imperv/total	
	. (014	.014	.185	.185 c.m/s	
4	CATCHMENT 50.000	ID No.ó	99999			
	9.180	Area in	heatarea			
	350 000	Length	(PERV) me	tres		
	350.000 1.000	Length Gradien	(PERV) me .t (%)	tres		
		Length Gradien Per cen	(PERV) me	tres		
	1.000 1.300 350.000 .000	Length Gradien Per cen Length %Imp. w	(PERV) me t (%) t Impervi (IMPERV) tth Zero	tres ous Dpth	n: 2-Cupon Junt: 4-Depost	
	1.000 1.300 350.000 .000 1 .250	Length Gradien Per cen Length %Imp. w Option Manning	(PERV) me t (%) t Impervi (IMPERV) th Zero 1=SCS CN/	tres ous Dpth C; 2=Horto	on; 3=Green-Ampt; 4=Repeat	
	1.000 1.300 350.000 .000 1 .250 77.000	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur	(PERV) me t (%) t Impervi (IMPERV) tith Zero 1=SCS CN/ "n" ve No or	tres ous Dpth C; 2=Horto C	n; 3=Green-Ampt; 4=Repeat	
	1.000 1.300 350.000 .000 1 .250 77.000 .100 7.587	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial	(PERV) me t (%) t Impervi (IMPERV) tith Zero 1=SCS CN/ "n" ve No or efficient Abstract	tres ous Dpth C; 2=Horto C ion		
	1.000 1.300 350.000 .000 1 .250 77.000 .100 7.587 1	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option	(PERV) met t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triangl .014	tres ous Dpth C; 2=Horto C C ion r; 2=Recta .185	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s	rv
15	1.000 1.300 350.000 1 .250 77.000 .100 7.587 1 .00 .1000 .100	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 05	(PERV) me t (%) t Impervi (IMPERV) tith Zero l=SCS CN/ "n" ve No or efficient Abstract l=Triangl	tres ous Dpth C; 2=Horto C ion r; 2=Recta	anglr; 3=SWM HYD; 4=Lin. Rese	rv
15	1.000 1.300 350.000 .000 1 .250 77.000 7.587 1 .00 7.587 1 .00 .00 .00 .00 .00 .00 .00 .00 .00	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 05	(PERV) met t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triangl .014	tres ous Dpth C; 2=Horto C C ion r; 2=Recta .185	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s	rv
15	1.000 1.300 350.000 .000 1 .250 77.000 .100 7.587 1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option D15 I30	(PERV) met t (%) t Impervi (IMPERV) ith Zero l=SCS CN/ "n" ve No or efficient Abstract l=Triangl .014 .803 .025	tres ous Dpth C; 2=Horto C c ion r; 2=Recta .185 .139	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total	rv
15 9	1.000 1.300 350.000 .000 1.250 77.000 7.587 1.00 ADD RUNOI ADD RUNOI ROUTE .000 .500	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 05 30 7F 015 Conduit Supply	(PERV) me t (%) t Impervi (IMPERV) ith Zero l=SCS CN/ "n" ve No or efficient Abstract l=Triangl .014 .803 .025 Length X-factor	<pre>tres ous Dpth C; 2=Horto C ion r; 2=Recta .185 .139 .185 <.5</pre>	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total	rv
15 9	1.000 1.300 350.000 .000 1 .250 77.000 70.000 .100 7.587 .00 .000 .000 .500	Length Gradien Per ceen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 30 0 Fr 015 Supply Supply Beta we	(PERV) me t (%) t Impervi (IMPERV) ith Zero l=SCS CN/ *n" ve No or efficient Abstract 1=Triang1 .014 .803 .025 Length X-factor K-lag (se ighting f	tres ous Dpth C; 2=Horto C .100 .139 .185 .139 .185 <.5 c) actor	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total	rv
15 9	1.000 1.300 350.000 .000 1 .250 77.000 70.000 .100 7.587 .000 .000 .000 .500	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 115 130 "F Dissection Supply Supply Beta we Routing No. of	<pre>(PERV) me t (%) t Impervi (IMPERV) iih Zero l=SCS CN/ * n" ve No or efficient Abstract .014 .014 .025 Length X-factor K-lag (se ighting f timestep sub-reach</pre>	<pre>tres ous Dpth C; 2=Horto C ion r; 2=Rects .185 .135 .185 <<.5 c) actor</pre>	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total	rv
9	1.000 1.300 350.000 .000 1.250 7.587 1 .00 7.587 1 .00 .00 .000 .500 .500 .500 .500 .000 .500 .000 .500 .000	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 115 130 "F Dissection Supply Supply Beta we Routing No. of	(PERV) me t (%) t Impervi (IMPERV) ith Zero l=SCS CN/ *n" ve No or efficient Abstract 1=Triang1 .014 .803 .025 Length X-factor K-lag (se ighting f	tres ous Dpth C; 2=Horto C c ion r; 2=Rectr .185 .139 .185 <.5 c) actor es	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total	rv
15 9 17	1.000 1.300 350.000 .000 1 .250 77.000 77.000 75.87 1 ADD RUNO .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .00000 .0000 .0000 .0000 .0000 .0000 .00000 .0000 .00000 .00000 .00000 .0000 .00000	Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 115 130 "F Dissection Supply Supply Beta we Routing No. of	<pre>(PERV) me t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triangl .014 .014 .015 Length X-factor K-lag (se ighting f timestep sub-reach .025</pre>	tres ous Dpth C; 2=Horto C c .139 .139 .185 <.5 actor es	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s	rv
9 17	1.000 1.300 350.000 .000 1 .250 77.000 .100 7.507 1 .000 .500 .500 .500 .500 .000 .500 .500 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .000 .00000 .0000 .0000 .0000 .00000 .00000 .0000 .00000 .000000 .0000000 .00000 .00000 .000000 .00000000	Length Gradiem Per cen Length %Imp.w Option Manning SCS Cur Ia/S CO Initial Option 115 Supply Supply Beta we Routing No. of 015 ction Nod	<pre>(PERV) me t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triangl .014 .014 .015 Length X-factor K-lag (se ighting f timestep sub-reach .025</pre>	tres ous Dpth C; 2=Horto C c .139 .139 .185 <.5 actor es	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s	rv
9	1.000 1.300 350.000 .000 1 .250 7.507 1 ADD RUNOT .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .00000 .00000 .0000 .00000 .00000 .00000 .0000 .00000 .000000 .0000	Length Gradiem Per cen Length %Imp.w Option Manning SCS Cur Ia/S CC Initial Option 015 30 0 Fr Supply Supply Supply Supply Supply Supply Supply Stion Nod 015 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CM/ *n" ve No or efficient Abstract 1=Triang1 .014 .003 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .025	tres ous Dpth C; 2=Horto C ion r; 2=Recta .185 .139 .185 .139 .185 c; actor es .025	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s	ΥΥ
9 17	1.000 1.300 350.000 .000 1 .250 7.507 1 ADD RUNOT .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .00000 .00000 .0000 .00000 .00000 .00000 .0000 .00000 .000000 .0000	Length Gradiem Per cen Length Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Beta we Routing No. of 015 stion Nod 015	(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CM/ *n" ve No or efficient Abstract 1=Triang1 .014 .003 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .025	tres ous Dpth C; 2=Horto C c ion r; 2=Rects .185 .139 .185 <.5 c) actor es .025	anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s	ΥV
9 17 18 14	1.000 1.300 350.000 .000 1 .250 77.000 77.000 75.87 .1 ADD RUNDE .000 .5	Length Gradiem Per cen Length % Imp. w Option Manning SCS Cur Ia/S CC Initial Option 015 330 7F Supply Supply Beta we Routing No. of 015 ttion Nod 015 ttion Nod 015	<pre>(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triangl .014 .003 .025 Ength X-factor X-factor K-lag (se ightIng f timesteg sub-reach .025 e No. .202</pre>	tres ous Dpth C; 2=Horto C ion r; 2=Recta .185 .139 .185 .139 .185 c; actor es .025	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s</pre>	τv
9 17 18	1.000 1.300 350.000 .000 1 .250 77.000 77.000 75.87 1.00 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .000 .0	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CC Initial Option 115 Conduit Supply Supply Beta we Routing No. of 115 tion Nod 115 Et ion Nod 115 et ion Nod 115 Et ion Nod	<pre>(PERV) me t (%) t (%) t mpervi (IMPERV) ith Zero 1=SCS CN/ *n* ve No or efficient 1=Triang1 .014 .005 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .202 fine omment</pre>	<pre>tres ous Dpth C; 2=Hortc C ion r; 2=Recti .185 .139 .185 <<.5 c) actor es .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s</pre>	ΞV
9 17 18 14	1.000 1.300 350.000 .000 1.250 7.507 1.00 7.587 1.00 7.587 1.00 .000 .000 .500 .50	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Beta we Routing No. of 115 ttion Nod 115 erro; 2=De e(s) of c	<pre>(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CM/ "n" ve No or efficient Abstract 1=Triangl .014 .803 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .202 fine omment ************************************</pre>	tres ous Dpth C; 2=Horto C c ion r; 2=Rects .185 .139 .185 .139 .185 .025 .025 .025 .025	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s</pre>	ΞV
9 17 18 14 35	1.000 1.300 350.000 .000 1.250 77.000 77.000 77.000 70.000 .000 .000 .500 600.000 1 .000 .500 600.000 1 .000 .500 600.000 1 .000 .500 600.000 1 .000 .500 600.000 1 .000 .500 .000 .000 .000 .500 .0000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .00	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Supply Beta we Routing No. of 115 trion Nod 015 erc; 2=De e(s) of c to the conduction Supply Supply Supply State we Routing No. of 200 200 200 200 200 200 200 200 200 20	<pre>(PERV) me t (%) t (%) t mpervi (IMPERV) ith Zero 1=SCS CN/ *n* ve No or efficient 1=Triang1 .014 .005 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .202 fine omment</pre>	<pre>tres ous Dpth C; 2=Hortc C ion ; 2=Rects .185 .139 .185 <.5 c) actor es .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s</pre>	ΣA
9 17 18 14	1.000 1.300 350.000 .000 1.250 77.000 7.000 7.587 1 .0000 .000 .000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Supply Beta we Routing No. of PE tion Nod 015 Extion Nod 015 Extion Nod 015 Ext of c context Conduit Supply Supply Seta we Routing No. of SCS Cur Seta we Routing SCS Cur Seta we Routing SCS Cur Seta we Routing No. of SCS Cur Seta we SCS Cur Seta SCS Cur	(PERV) me t (%) t (%) t Tmpervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triang .014 .025 Length X-factor K-lag (se ighting f ighting f ub-reach .025 e No. .025 e No. .025 fine omment ************************************	<pre>tres ous Dpth C; 2=Hortc C c ion r; 2=Rectr .185 .139 .185 <.5 c) actor es .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	ΣA
9 17 18 14 35	1.000 1.300 350.000 .000 1.250 7.57 1 ADD RUNOÜ .000 .500 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .000 .500 .000 .500 .000 .500 .0000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .0000 .0000 .0000 .0000 .0000 .0000 .000 .0000 .0000	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CO Initial Option 115 300 FF 115 Conduit Supply Beta we Routing No. of 115 ttion Nod 115 ttion Nod 115	(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triangl .014 .025 Length X-factor K-lag (se ighting f timesteg sub-reach .025 e No. .025 e No. .025 e No. .025 fine omment ************************************	<pre>tres ous Dpth C; 2=Horto C ion r; 2=Rects .185 .139 .185 <<.5 c) actor es .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s</pre>	τw
9 17 18 14 35	1.000 1.300 350.000 .000 1 .250 77.000 77.000 70.000 70.000 .0000 .000 .000 .000	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Beta we Routing No. of PE tion Nod 015 Extion Nod 015 Extion Nod 015 Extion Soft Confict Confict Extinct State 2 DESIGN	<pre>(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triang1 .014 .803 .025 Length X-factor K-lag (se ighting f t timestep sub-reach .025 e No. .202 fine omment ************************************</pre>	<pre>tres ous Dpth C; 2=Hortc C c ion r; 2=Rectr .185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	ΞV
9 17 18 14 35	1.000 1.300 350.000 .000 1.250 77.000 7.000 7.587 1.00 7.507 .000 .500 .000 .000 .500 .0000 .000 .000 .000 .000 .000 .000 .000	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Beta we Routing No. of PE tion Nod 015 Extion Nod 015 Extion Nod 015 Extion Soft Confict Confict Extinct State 2 DESIGN	<pre>(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ "n" ve No or efficient Abstract 1=Triang1 .014 .803 .025 Length X-factor K-lag (se ighting f t timestep sub-reach .025 e No. .202 fine omment ************************************</pre>	<pre>tres ous Dpth C; 2=Hortc C c ion r; 2=Rectr .185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	ΞA
9 17 18 14 35 2	1.000 1.300 350.000 .000 1.250 7.000 7.000 7.507 1 ADD RUND .0 RUUTE .000 .500 .0000 .00000 .0000 .0000 .00000 .00000 .00000 .00000 .00000 .00000 .000000 .000000 .00000000	Length Gradiem Per cen Length Manning SCS Cur Ia/S CO Initial Option No. of Conduit Supply Supply Beta we Routing No. of D15 Conduit Supply Supply Beta we Routing No. of D15 Conduit Supply Supply Beta we Routing No. of D15 Conduit Supply Supply Beta we Routing No. of D15 Conduit Supply Supply Beta we Routing No. of D15 Conduit Supply Supply Beta we Routing No. of D15 Conduit Supply Su	<pre>(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CM/ "n" ve No or efficient Abstract 1=Triangl .014 .025 Length X-factor K-lag (se ighting f t imestep sub-reach .025 e No. .025 e No. .026 e No. .026 e No. .026 e No. .026 e No. .027 e No. .026 e No. .027 e No. .027 e No. .026 e No. .026 e No. .027 e No. .027 e No. .027 e No. .026 e No. .027 e No. .02</pre>	<pre>tres ous Dpth C; 2=Hortc C c ion r; 2=Rectr .185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	
9 17 18 14 35	1.000 1.300 350.000 .000 1.250 7.587 1 .007 .507 .000 .500 .0000 .000 .000 .000	Length Gradiem Per cen Length Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Beta we Routing No. of D15 ction Nod D15 ction	<pre>(PERV) me t (%) t Tmpervi (TMPERV) ith Zero 1=SCS CN/ *n" ve No or efficient Abstract 1=Triangl .014 .003 .025 e No. .025 e No. .025 e No. .025 e No. .202 fine omment ************************************</pre>	<pre>tres ous Dpth C; 2=Horto C c ion r; 2=Recta .185 .139 .185 <.5 c) actor es .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	
9 17 18 14 35 2	1.000 1.300 350.000 .000 1.250 7.507 1.00 7.507 1.00 7.507 .00 .000 .500 .000 .000 .500 .000	Length Gradiem Per cen Length Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Beta we Routing No. of D15 trion Nod D15 trion	<pre>(PERV) me t (%) t (%) t Tmpervi (IMPERV) ith Zero 1=SCS CN/ *n" ve No or efficient Abstract 1=Triangl .014 .803 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .025 e No. .026 e No. .026 e No. .026 e No. .027 e No.</pre>	<pre>tres ous Dpth C; 2=Hortc C ion r; 2=Recta .185 .139 .185 <.5 c) .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	2.5
9 17 18 14 35 2	1.000 1.300 350.000 .000 1 .250 77.000 77.000 77.000 75.87 1 ADD RUNOU COMFILE 2 JUNC COMFILENC 2 JUNC CONFLUENC 2 JUNC COMFILENC 2 JUNC 1 1=22 COMMENT 3 11=22 COMMENT 3 11=24 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 3 11=34 COMMENT 11=34 COMMENT 3 11=34 COMMENT 11=34 COMM	Length Gradiem Per cen Length Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Supply Beta we Routing No. of D15 Conduit Supply Supply Beta we Routing No. of D15 Conduit Stron Nod D15 Conduit Stron Stron Nod D15 Conduit Stron Nod D15 Stron Nod D15 Conduit Stron Nod D15 Conduit Stron Nod D15 Conduit Stron Nod D15 Stron Nod Stron Nod D15 Stron Nod D15 Stron Nod D15 Stron Nod Stron Str	<pre>(PERV) me t (%) t (%) t (%) ith Zero 1=SCS CN/ *n" ve No or efficient Abstract 1=Triangl .014 .025 .025 e No. .025 e No. .025 e No. .025 e No. .202 fine omment ************************************</pre>	<pre>tres ous Dpth C; 2=Hortc C ion r; 2=Recta .185 .139 .185 <.5 c) .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	
9 17 18 14 35 2 3	1.000 1.300 350.000 .000 1.250 7.587 1 ADD RUNOU .000 .500 .000 .000 .500 .000 .000 .500 .0000 .000 .0	Length Gradiem Per cen Length Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Beta we Routing No. of 115 Conduit Supply Beta we Routing No. of 115 conduit Supply Beta we Routing No. of Conduit Supply Beta we Routing No. of Conduit Supply Beta we Routing No. of Conduit Supply Beta we Routing No. of Conduit Supply Beta we Routing No. of Lis Conduit Supply Beta we Routing No. of Conduit Supply Beta we Routing No. of Lis Conduit Supply Beta we Routing No. of Conduit Supply Beta we Routing No. of Lis Conduit Supply Beta we Routing No. of Lis Conduit Supply Supply Beta we Routing No. of Lis Conduit Supply Supply Beta we Routing No. of Conduit Supply Supply Beta we Routing No. of Conduit Supply Supply Beta we Routing No. of Conduit Supply	(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ *n" ve No or efficient Abstract 1=Triang) .014 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .025 e No. .025 e No. .025 fine comment ************************************	<pre>tres ous Dpth C; 2=Hortc C ion r; 2=Recta .185 .139 .185 <.5 c) .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	1.1
9 17 18 14 35 2	1.000 1.300 350.000 .000 1.250 7.587 1 .00 7.587 1 .00 .000 .500 .000 .000 .500 .000 .000 .500 .000 .000 .500 .000 .500 .000 .500 .000 .000 .500 .000 .500 .000 .000 .500 .000 .000 .000 .500 .0000 .00000 .0000 .0000 .0000 .00000 .0000 .0000 .0000 .00000 .0000 .0000 .00000 .00000 .00000 .00000 .00000 .000000	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CO Initial Option 115 Conduit Supply Beta we Routing No. of Pr Beta we Routing No. of 115 conduit Supply Beta we Routing No. of Conduit Supply Beta we Routing No. of Conduit Supply Supply Beta we Routing No. of Conduit Supply Supply Beta we Routing No. of Conduit Supply Supply Beta we Routing No. of Conduit Supply Su	(PERV) me t (%) t (%) t Tmpervi (IMPERV) ith Zero 1*3CS CN/ *n* ve No or efficient Abstract 1-Triang .014 .025 Length X-factor K-lag (se ighting f t timesteg sub-reach .025 e No. .202 fine omment ************************************	<pre>tres ous ppth C; 2=Hortc C ion r; 2=Rectr .185 .139 .185 <.5 c .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	
9 17 18 14 35 2 3	1.000 1.300 350.000 .000 .100 7.250 7.000 7.250 7.000 7.250 7.000 .007 .007 .007 .0000 .000 .000 .000 .000 .000 .000 .000	Length Gradiem Per cen Length %Imp. w Option Manning SCS Cur Ia/S CCO Initial Option 115 Conduit Supply Supply Beta we Routing No. of 115 Conduit Supply Supply Beta we Routing No. of 115 Conduit Supply Sup	<pre>(PERV) me t (%) t (%) t Impervi (IMPERV) ith Zero 1=SCS CN/ *n* ve No or efficient Abstract 1=Triangl .014 .025 Length X-factor K-lag (se ighting f timestep sub-reach .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 fine omment ************************************</pre>	<pre>tres ous Dpth C; 2=Hortc C ion r; 2=Recta .185 .139 .185 <<.5 c) actor .025 .025 .025 .025 .025 .025 .025 .025</pre>	<pre>anglr; 3=SWM HYD; 4=Lin. Rese .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s</pre>	τA

	.500 Gradient (%)
	72.600 Per cent Impervious
	<pre>100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n"</pre>
	77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.204 .828 .657 C perv/imperv/total
15	ADD RUNOFF .275 .275 .025 .000 c.m/s
27	HYDROGRAPH DISPLAY
	5 is # of Hyeto/Hydrograph chosen Volume = .6835738E+03 c.m
11	CHANNEL .500 Base Width =
	.500 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1:
	3.000 Right bank slope 1: .060 Manning's *n* 1.000 O/a Depth in metres .300 Select Grade in % Depth = .433 metres
	1.000 O/a Depth in metres
	.300 Select Grade in % Depth = .433 metres Velocity = .353 m/sec
	Velocity = .353 m/sec Flow Capacity = 2.047 c.m/s
	Critical depth = .211 metres
9	50.000 Conduit Length
	.000 Supply X-factor <.5
	106.220 Supply K-lag (sec) .567 Beta weighting factor
	200.000 Routing timestep 1 No. of sub-reaches
	.275 .275 .270 .000 c.m/s
17	COMBINE 1 Junction Node No.
	.275 .275 .270 .270 c.m/s
14	START 1 l=Zero; 2=Define
4	CATCHMENT 10.000 ID No.ó 99999
	17.530 Area in hectares
	500.000 Length (PERV) metres 1.000 Gradient (%)
	75.000 Per cent Impervious 500.000 Length (IMPERV)
	.000 %Imp. with Zero Dpth
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n"</pre>
	77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 1.646 .000 .270 c.m/s 000 .000 .270 c.m/s
15	.204 .852 .690 C perv/imperv/cocai
	ADD RUNOFF 1.646 1.646 .270 .270 c.m/s
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen
10	Volume = .4165142E+04 c.m POND
10	6 Depth - Discharge - Volume sets
	179.900 .000 .0 180.500 .0620 2842.9
	180.900 .224 5050.5
	181.100 .350 6243.3 181.250 .678 7177.9
	181.100 .530 6243.3 181.250 .678 7177.9 181.450 1.399 8478.7 Peak Outflow = .087 c.m/s Maximum Denth = .180.552 metres
	Peak Outflow 0.087 c.m/s Maximum Depth = 180.562 metres Maximum Storage = 3185. c.m
	Maximum Storage = 3185. c.m 1.646 1.646 .087 .270 c.m/s
17	COMBINE 1 Junction Node No.
	1.646 1.646 .087 .290 c.m/s
18	CONFLUENCE 1 Junction Node No.
4	1.646 .290 .087 .000 c.m/s
4	CATCHMENT 30.000 ID No.ó 99999
	3.670 Area in hectares 80.000 Length (PERV) metres
	.500 Gradient (%)
	80.000 Length (IMPERV)
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n"
	77.000 SCS Curve No or C .100 Ia/S Coefficient
	7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.025 .290 .087 .000 c.m/s
15	.204 .838 .213 C perv/imperv/total ADD RUNOFF
	.025 .303 .087 .000 c.m/s
11	CHANNEL .500 Base Width =
	3.000 Left bank slope 1: 3.000 Right bank slope 1:
	.060 Manning's "n"
	1.000 O/a Depth in metres .200 Select Grade in %
	Depth = .492 metres
	FIOW Capacity = 1.6/1 C.m/S
9	Critical depth = .221 metres ROUTE
2	200.000 Conduit Length
	.237 Supply X-factor <.5 482.477 Supply K-lag (sec)
	.500 Beta weighting factor
	600.000 Routing timestep 1 No. of sub-reaches
	.025 .303 .254 .000 c.m/s

17	7 COMBINE	
	2 Junction Node No.	
14		4 c.m/s
14	14 START 1 1=Zero; 2=Define	
4		
	40.000 ID No.ó 99999	
	3.890 Area in hectares	
	100.000 Length (PERV) metres .500 Gradient (%)	
	.500 Gradient (%) 3.700 Per cent Impervious	
	100.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth	
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Gree</pre>	een-Ampt; 4=Repeat
	.250 Manning "n" 77.000 SCS Curve No or C	
	77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction	
	<pre>1 Option 1=Trianglr; 2=Rectanglr; 3:</pre>	
		4 c.m/s //imperv/total
15		//imperv/cocar
		4 c.m/s
4		
	50.000 ID No.ó 99999 9.180 Area in hectares	
	9.180 Area in hectares 350.000 Length (PERV) metres	
	1.000 Gradient (%)	
	1.300 Per cent Impervious	
	350.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Gre	en_lmnt: 4-Penest
	.250 Manning "n"	
	.100 Ia/S Coefficient	
	7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3:	SWM HYD; 4=T.in Pecery
	.038 .025 .254 .254	4 c.m/s
	.204 .848 .212 C per	/imperv/total
15		
9		4 c.m/s
2	.000 Conduit Length	
	.500 Supply X-factor <.5	
	.000 Supply K-lag (sec)	
	.500 Beta weighting factor 600.000 Routing timestep	
	600.000 Routing timestep 1 No. of sub-reaches	
	.038 .061 .061 .254	1 c.m/s
17	17 COMBINE	
	2 Junction Node No.	
18		5 c.m/s
±0	2 Junction Node No.	
	.038 .285 .061 .000) c.m/s
14	4 START	
35	1 1=Zero; 2=Define 35 COMMENT	
30	3 line(s) of comment	

	** 5 YEAR DESIGN STORM EVENT **	

2	2 STORM	-Historic
2	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr;	5=Historic
2	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr; 524.867 Coefficient a .000 Constant b (min)	5=Historic
2	**************************************	5=Historic
2	2 STORM 1 =Chicago;2=Huff;3=User;4=Cdnlhr; 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r	5=Historic
2	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr; 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min	5=Historic
2	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr; 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS	
	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr; 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Grr	
	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr;5 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .013 Manning *n*	
	<pre>************************************</pre>	
	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr; 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Gro .013 Manning 'n" 98.000 SCS Curve No or C .100 Ia/S Coefficient .516 Initial Abstraction	
	2 STORM 1 I=Chicago;2=Huff;3=User;4=Cdnlhr;5 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .013 Manning 'n* 98.000 SCS Curve No or C .100 Ia/S Coefficient .518 Initial Abstraction 4 CATCHMENT	
3	<pre>************************************</pre>	
3	2 STORM 1 I=Chicago;2=Huff;3=User;4=Cdnlhr;5 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .013 Manning *n* 98.000 SCS Curve No or C .100 Ia/S Coefficient .518 Initial Abstraction 4 CATCHMENT 20.000 ID No.6 99999 3.020 Area in hectares	
3	<pre>************************************</pre>	
3	2 STORM 1 1=Chicago:2=Huff;3=User;4=Cdnlhr;5 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .013 Manning "n" 98.000 SCS Curve No or C .100 Ta/S Coefficient .518 Initial Abstraction 4 CATCHMENT 20.000 ID No.6 99999 3.020 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious	
3	<pre>************************************</pre>	
3	2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr;5 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .013 Manning "n" 98.000 SCS Curve No or C .100 Ta/S Coefficient .518 Initial Abstraction 4 CATCHMENT 20.000 ID No.6 99999 3.020 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 100.000 & Ength (IMPERV) .000 % Thm, with Zero Dpth	een-Ampt; 4=Repeat
3	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat
3	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv
3	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv
3	<pre> STORM</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s
3	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15	<pre> 2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr;5 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .013 Manning "n" 98.000 SCS Curve No or C .100 Ia/S Coefficient .518 Initial Abstraction 4 CATCHMENT 20.000 LEngth (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 100.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 100.000 Length (MPERV) .000 % ITM, with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=SCS CN/C; 2=Horton; 3=Gre .278 .669 .707 C per .364 .000 .061 .000 27 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .9720645E+03 c.m </pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre> 2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr; 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Grd .013 Manning "n" 98.000 SCS Curve No or C .100 Ia/S Coefficient .518 Initial Abstraction 4 CATCHMENT 20.000 ID No.6 99999 3.020 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 100.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 100.000 Length (MPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Grd .278 .669 .707 C per .364 .000 .061 .000 .278 .869 .707 C per .364 .001 .061 .001 .278 .869 .707 C per .364 .061 .001 .278 .364 .001 .001 .278 .364 .001 .001 .278 .364 .001 .001 .278 .364 .001 .001 .278 .364 .001 .001 .278 .364 .001 .001 .278 .364 .001 .001 .278 .364 .001 .001 .278 .364 .001 .001 .200 .200 .200 .200 .200 .200 .200 .200</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre> STORM</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre> 2 STORM 1 1=Chicago;2=Huff;3=User;4=Cdnlhr;5 524.867 Coefficient a .000 Constant b (min) .699 Exponent c .400 Fraction to peak r 240.000 Duration ó 240 min 45.533 mm Total depth 3 IMPERVIOUS 1 0 Option 1=SCS CN/C; 2=Horton; 3=Grd .013 Manning *n* 98.000 SCS Curve No or C .100 Ia/S Coefficient .518 Initial Abstraction 4 CATCHMENT 20.000 ID No.ó 99999 3.020 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 100.000 Length (PERV) metres .500 Gradient (%) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Grd .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=SCS CN/C; 2=Horton; 3=Grd .278 .869 .707 C per .364 .000 .661 .000 278 HyBOGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .9720645E+03 c.m CHANNEL .500 Base Width = 3.000 Left bank slope 1: .600 Manning's *n* 1.000 O/a Depth in metres .300 Selet Grade in % </pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27 11	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27 11	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27 11	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27 11	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27 11	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total) c.m/s
3 4 15 27 11	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total
3 4 15 27 11	<pre>************************************</pre>	een-Ampt; 4=Repeat een-Ampt; 4=Repeat =SWM HYD; 4=Lin. Reserv) c.m/s //imperv/total) c.m/s

	1 Junction M .364		.364	.364 c.m/s	
14	START 1 1=Zero; 2=	Define			
4	CATCHMENT				
		o.ó 99999 in hectares h (PERV) metr			
		in hectares th (PERV) meti ient (%)	res		
	75.000 Per d	cent Imperviou			
		h (IMPERV) with Zero Dg	ot h		
	1 Optio	on 1=SCS CN/C		n; 3=Green-Ampt; 4=Repeat	
	.250 Manni 77.000 SCS 0	ing "n" Curve No or C			
	.100 Ia/S	Coefficient			
	1 Optio	al Abstraction 1=Trianglr;	2=Recta	nglr; 3=SWM HYD; 4=Lin. Rese	rv
	2.324 .278	.000	.364	.364 c.m/s C perv/imperv/total	
15	ADD RUNOFF				
27	2.324 HYDROGRAPH DISI	2.324 PLAY	.364	.364 c.m/s	
	5 is # of Hy Volume = .578		oh choser		
10	POND				
	6 Depth - Discha 179.900	.000 - Volume	sets .0		
	180.500	.0620 284	12.9		
	181.100	.224 505 .350 624			
	181.250 181.450	.678 717 L.399 847	77.9 78 7		
	Peak Outflow	.678 71 1.399 847 = .155 = 180.730	c.m/s		
	Peak Outflow Maximum Depth Maximum Storage	e = 4113.	metres c.m		
17	2.324 COMBINE	2.324	.155	.364 c.m/s	
17	1 Junction M				
18	2.324 CONFLUENCE	2.324	.155	.397 c.m/s	
	1 Junction M		155		
4	2.324 CATCHMENT	.397	.155	.000 c.m/s	
		o.ó 999999 in hectares			
	80.000 Lengt	h (PERV) meta	res		
		ient (%) cent Imperviou	15		
	80.000 Lengt	h (IMPERV) with Zero Dr			
	1 Optic	on 1=SCS CN/Ca		n; 3=Green-Ampt; 4=Repeat	
		ing "n" Curve No or C			
	.100 Ia/S	Coefficient			
	1 Optio	on 1=Trianglr;	2=Recta	nglr; 3=SWM HYD; 4=Lin. Rese	rv
	.059	.397 .877	.155 .286	.000 c.m/s C perv/imperv/total	
15	ADD RUNOFF .059	.426	.155	.000 c.m/s	
11	CHANNEL				
	3.000 Left	Width = bank slope			
	3.000 Right .060 Manni	: bank slope ing's "n"	1:		
	.060 Manni 1.000 O/a I	ing's "n" Depth in metre			
	.060 Manni 1.000 O/a I .200 Selec	ing's "n" Depth in metre at Grade in %	es		
	.060 Manni 1.000 O/a I .200 Selec Depth	ing's "n" Depth in metre ot Grade in % = .570 m	es netres n/sec		
	.060 Manni 1.000 O/a I .200 Selec Depth Velocity Flow Capacity Critical depth	ing's "n" Depth in metre st Grade in % = .570 m = .339 m = 1.671 c	es netres n/sec c.m/s		
9	.060 Manni 1.000 O/a I .200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu	ing's "n" Depth in metre ct Grade in % = .570 m = .339 m = 1.671 c = .262 m nit Length	es netres n/sec c.m/s netres		
9	.060 Manni 1.000 O/a I .200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl	ing's "n" Depth in metre ct Grade in % = .570 m = .339 m = 1.671 c = .262 m hit Length Ly X-factor <.	es netres n/sec c.m/s netres		
9	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condi .200 Suppl 442.546 Suppl .500 Beta	<pre>ing's "n" Depth in metre to Grade in % = .570 m = .339 m = 1.671 c = .262 m hit Length Ly X-factor <. Ly K-lag (sec) weighting fac</pre>	es netres n/sec c.m/s netres		
9	.060 Manni 1.000 O/a I .200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condi .200 Supp] 442.546 Suppl .500 Beta 600.000 Routi	ing's "n" Depth in metre t Grade in % = .570 m = .339 m = 1.671 c = .262 m lit Length Ly X-factor <. Ly K-lag (sec) weighting ficestep	es netres n/sec c.m/s netres		
	.060 Manni 1.000 O/a I .200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Supp] 442.546 Supp] 442.546 Supp] 1 No. c .059	ing's "n" Depth in metre th Grade in % = .570 m = 1.671 c = .262 m it Length Ly X-factor < . Vy K-lag (sec) weighting fac ing timestep f sub-reaches	es netres n/sec c.m/s netres	.000 c.m/s	
9 17	.060 Manni 1.000 O/a I .200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Supp .500 Beta 600.000 Routi 1 No. c .059 COMBINE 2 Junction M	<pre>ing's "n" bepth in metrebert in metrebe</pre>	es netres 2.m/s netres .5) ctor .357		
		<pre>ing's "n" Depth in metre the Grade in % = .570 m = 1.671 c = .262 m nit Length it Length ity X-factor < y K-lag (sec) weighting fac ing timester of sub-reacher .426</pre>	es netres n/sec c.m/s netres .5 ctor	.000 c.m/s .357 c.m/s	
17 14	.060 Manni 1.000 O'a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 442.546 Suppl .500 Beta 600.000 Routi 1 No. c .059 COMBINE 2 Junction M .059 START 1 1=Zero; 2=	<pre>ing's "n" bepth in metrepeth in metre tf Grade in % = .570 m = .1671 c = .262 m int Length ty X-factor < . ty K-lag (sec) the second second</pre>	es netres 2.m/s netres .5) ctor .357		
17	.060 Manni 1.000 O/a I 200 O/a I Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 442.546 Suppl .500 Beta 600.000 Routi 1 No. c .059 COMBINE 2 Junction P .059 START 1 1=Zero; 2= CATCHMENT M	<pre>ing's "n" Pepth in metry pepth in metry it Grade in %</pre>	es netres 2.m/s netres .5) ctor .357		
17 14		<pre>ing's "n" bepth in metre st Grade in % = .570 m = .1.671 c = .1.671 c int Length ty X-factor <. ty K-lag (sec) weighting fac ing timestep .426 Node No426 Define .0.6 99999 in hectares</pre>	ess A/sec .m/s hetres .5 etor .357 .357		
17 14		<pre>ing's "n" pepth in metrevent cf Grade in % = .570 m = .339 m = 1.671 c mit Length y X-factor <. y K-lag (sec) weighting fac ing timestep .426 Node No426 Define .6 99999 in hectares h (PERV) metr ent (%) ent </pre>	es		
17 14		<pre>ing's "n" Depth in metret t Grade in % cs70 i</pre>	es		
17 14		<pre>ing's "n" Pepth in metry pepth in metry tf Grade in % = .570 m = .1671 c = .262 m int Length ty X-factor <. ty K-lag (sec) weighting far ing timestep f sub-reaches .426 Node No426 Pefine .6 99999 in hectares th (PERV) metr lent (%) rent Impervion th (IMPERV) with Zero Dp </pre>	es metres m/s metres 5 toor 	.357 c.m/s	
17 14		<pre>ing's "n" bepth in metre st Grade in % = .570 m = .1671 c = .262 m it Length ty X-factor <. ty K-lag (sec) weighting fac ing timestep .426 Node No426 befine b.6 99999 in hectares th (PBRV) metr ient (%) ent Imperviou th (IMPERV) with Zero Dg n 1=SCS CM/C. ing "n"</pre>	es metres m/s metres 5 toor 		
17 14	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 42.546 Suppl 42.546 Suppl 42.546 Suppl 42.546 Suppl 2 Junction N .059 START 1 1=Zero; 2 CATCHMENT 40.000 ID NK 3.890 Area 100.000 Lengt .500 Gradi 3.700 Per C 100.000 Lengt .000 Lengt .0000 Lengt .0000 Lengt .000 Lengt .0000 Lengt .0000 Lengt .0000 Lengt	<pre>ing's "n" Pepth in metry pepth in metry it Grade in %</pre>	es metres m/s metres 5 toor 	.357 c.m/s	
17 14	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condi .200 Suppl 442.546 Suppl .500 Beta 600.000 Routi 1 No. c .059 COMBINE 2 Junction M .059 COMBINE 2 Junction M .059 CATCHMENT 40.000 ID M 3.890 Area 100.000 Lengt .000 Fradi .000 Fradi .000 Fradi .000 Lengt .000 Lengt .000 Lengt .000 Lengt .000 Kadi .000 Lengt .000 Kadi .000 Lengt .000 Kadi .000 Lengt .000 Kadi .000 Lengt .000 Kadi .000 Lengt .000 Kadi .000 Kadi .000 Lengt .000 Kadi .000 Kadi .0000 Kadi .000 Kadi .000 Kadi .000 Kadi .000 Kadi .000	<pre>ing's "n" bepth in metret ct Grade in %</pre>	ess a/sec m/s h/sec m/s h/s tor .357 .357 .357 .357 .357 .357 .357 .357	.357 c.m/s n; 3=Green-Ampt; 4=Repeat	rv
17 14	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 442.546 Suppl .500 Beta 600.000 Routi .059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 START 1 =Zero; 2: CATCHMENT 40.000 I D MG 3.890 Area 100.000 Lengt .500 Gradi 3.700 Per c 100.000 Lengt .000 Kang .000 Kang	<pre>ing's "n" Pepth in metre pepth in metre it Grade in %</pre>	<pre>ss advec m/s wetres m/s wetres </pre>	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s	rv
17 14	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 422.546 Suppl .500 Beta 600.000 Routi 1 0.059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 COMBINE 1 1=Zero; 2= CATCHNENT 40.000 I D NG 3.890 Area 100.000 Lengt .500 Gradi 3.700 Per co 100 000 Lengt .000 Area 100.000 Lengt .000 Area 100.000 Lengt .250 Manni 77.000 SCS C .100 Is/S 7.587 Initi .060 .278	<pre>ing's "n" pepth in metry pepth in metry t Grade in % = .570 m = .1671 c in 1671 c in 1672 c</pre>	<pre>ss metres is/sec im/s metres is itor .357 .357 .357 .357 .259</pre>	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese	rv
17 14 4	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condi .200 Supp] 442.546 Supp] 442.546 Supp] 442.546 Supp] 442.546 Supp] COMBINE 2 Junction N .059 START 1 1=Zero; 2: CATCHMENT 40.000 ID NK 3.890 Area 100.000 Lengt .500 Gradi 3.700 Per C 100.000 Lengt .500 Gradi 3.700 Per C 100.000 Lengt .500 Gradi 3.700 Per C 100.000 Lengt .500 Gradi 3.700 SCS C .100 IA/S 7.587 Initi .000 SCS C .000 SCS C .000 Lengt .000 SCS C .000 Lengt .000 SCS C .000 Lengt .000 Lengt	<pre>ing's "n" Pepth in metre pepth in metre it Grade in %</pre>	<pre>ss advec m/s wetres </pre>	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s	rv
17 14 4	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condi .200 Suppl 42.546 Suppl 42.546 Suppl 42.546 Suppl 42.546 Suppl 2 Junction N .059 START 1 1=Zero; 2 CATCHMENT 40.000 ID NK 3.890 Area 100.000 Lengt .500 Gradi 3.700 Per C 100.000 Lengt .000 Kimp 100.000 Lengt .000 Kimp 100 ScSC .000 Kimp .100 IS .000 ScSC .000 Kimp .000 ScSC .000 Lengt .000 Kimp .000 ScSC .000 Lengt .000 Lengt .000 Kimp .000 Lengt .000	<pre>ing's "*" Pepth in metry pepth in metry it Grade in %</pre>	<pre>ss metres is/sec im/s metres is itor .357 .357 .357 .357 .259</pre>	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total	rv
17 14 4		<pre>ing's "n" pepth in metre pepth in metre tf Grade in % = .570 m = .1671 c = .262 m it Length ty X-factor <. y K-lag (sec; weighting fac ing timestep .426 .426 .426 .426 .426 .426 .00de No426 .00 p9999 in hectares th (PBRV) metr ient (%) .with Zero Dg nn l=SCS CN/C, ing "n" Surve No or C Coefficient al Abstractic on l=Triaglr: .000 .869 .060</pre>	es metres //sec .m/s .m/s .so .357 .357 .357 .357 .2=Horto .357 .2=Horto .357 .2=Horto .357 .357 .357	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total	rv
17 14 4		<pre>ing's "n" pepth in metre pepth in metre tf Grade in % = .570 m it Length it Length it Length it Length ity X-factor <. ity K-lag (sec) weighting fac ing timestep if sub-reacher .426 Node No426 Define b.6 99999 in hectares th (IMERV) .with Zero Dp in l=Stag CN/C ing "n" Lurve No or C COefficient lal Abstractif .000 .660 b.6 99999 in hectares th (PERV) met ient in l=Trianglr .000 .660 b.6 99999 in hectares th (PERV) met ient in hectares in</pre>	es metres //sec m/s .s .s .357 .357 .357 .s .357	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total	rv
17 14 4	.060 Manni 1.000 O/a II 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 442.546 Suppl 442.546 Suppl 442.546 Suppl COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 STRT 1 1=Zero; 2 CATCHMENT 40.000 ID NG .3890 Area 100.000 Lengt .500 Gradů 3.700 Per c 100.000 Lengt .000 KImp, 1 0ptic .250 Manni 77.000 SCSC .100 IA/S 7.587 Initi .060 .278 ADD RUNOFF .060 .278 ADD RUNOFF 50.000 ID NK 9.180 Area 350.000 Lengt 1.000 Gradů .278	<pre>ing's "n" Pepth in metry pepth in metry it Grade in % = .570 m = .1671 c it Length it Lengt</pre>	es metres 1/sec 2.m/s 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total	rv
17 14 4	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condi .200 Suppl 442.546 Suppl .500 Beta 600.000 Routi 1 059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 CATCHMENT 40.000 ID NG 3.890 Area 100.000 Lengt .000 %Imp .250 Manni 7.000 SCSG .278 ADD RUNOFF .060 .278 ADD RUNOFF .060 CATCHMENT 50.000 ID NG .278 ADD RUNOFF .060 CATCHMENT 50.000 ID NG .278 ADD RUNOFF .060 CATCHMENT 50.000 ID NG .210 Area 350.000 Lengt 1.000 Gradi 1.000 Gradi 1.000 Gradi	<pre>ing's "*" Pepth in metry pepth in metry it Grade in %</pre>	<pre>ss advec m/s metres m/s metres m/s m/s </pre>	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total .357 c.m/s	rv
17 14 4	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 442.546 Suppl .500 Beta 600.000 Routi .059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 CATCHMENT 40.000 I D M 3.890 Area 100.000 Lengt .000 Kang .000 Kang .000 Kang .250 Manni 77.000 SCS C .100 I D M .278 ADD RUNOFF .060 .278 ADD RUNOFF .060 CATCHMENT 50.000 Lengt .060 .278 ADD RUNOFF .060 CATCHENT 50.000 Lengt .060 .278 ADD RUNOFF .060 CATCHENT 50.000 Lengt 1.000 Area .060 .278 ADD RUNOFF .060 CATCHENT 50.000 Lengt 1.000 Gradi 1.300 Perc C .050 CATCHENT 50.000 Lengt 1.000 Gradi 1.300 Perc C .000 Lengt 1.000 Cradi	<pre>ing's "*" Pepth in metre' st Grade in % st Grade in %</pre>	<pre>ss advec m/s metres m/s metres m/s m/s </pre>	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total	rv
17 14 4	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condu .200 Suppl 442.546 Suppl .500 Beta 600.000 Routi 1 No. c .059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 COMBINE 2 Junction N .059 CATCHNENT 40.000 I D NG 3.890 Area 100.000 Lengt .500 Gradi 3.700 Per c .060 .278 Manni 7.000 SCS C .100 ID NG .278 ADD RUNOFF .060 CATCHNENT 50.000 Lengt .060 .278 ADD RUNOFF .060 CATCHENT 50.000 Lengt .060 CATCHENT 50.000 Lengt .060 CATCHENT 50.000 Lengt .060 CATCHENT 50.000 Lengt .000 CATCHENT 50.000 Lengt 1.000 CATCHENT 500 Manni 7.000 SCS C .100 LASS	<pre>ing's "n" Pepth in metre' pepth in metre' it Grade in % Pepth in metre' it Grade in % Storm in the interval in the interval interval</pre>	<pre>ss advector</pre>	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total .357 c.m/s	rv
17 14 4	.060 Manni 1.000 O/a I 200 Selec Depth Velocity Flow Capacity Critical depth ROUTE 200.000 Condi .200 Suppl 42.546 Suppl 42.546 Suppl 42.546 Suppl 2 Junction N .059 START 1 =Zero; 2 CATCHMENT 40.000 ID NK 3.890 Area 100.000 Lengt .500 Gradi 3.700 Per C 100.000 Lengt .000 KIMP, 100 OD Lengt .000 SCSC (100 ID NK 7.57 Initi 1 Optic .060 .278 ADD RUNOFF .000 ID NK 9.180 Area 350.000 Lengt 1.000 Gradi .060 .278 ADD RUNOFF .000 ID NK 9.180 Area 350.000 Lengt 1.000 Gradi .060 .278 ADD RUNOFF .000 ID NK 9.180 Area 350.000 Lengt 1.000 Gradi 1.000 Gradi 1.000 Gradi 1.000 Lengt .000 KIMP, .000 KIMP	<pre>ing's "*" pepth in metry pepth in metry it Grade in %</pre>	ess aetress Jsec m/s aetress m/s m/s m/s 	.357 c.m/s n; 3=Green-Ampt; 4=Repeat nglr; 3=SWM HYD; 4=Lin. Rese .357 c.m/s C perv/imperv/total .357 c.m/s	

.357 c.m/s C perv/imperv/total .088 .060 .357 .278 .884 .286 15 ADD RUNOFF .088 .138 .357 .357 c.m/s 9 ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply K-lag (sec) .500 Beta weighting factor S00.000 Routing timestep 1 No. of sub-reaches .088 .138 .11 COMBINE 2 Junction Node No. .088 .431 .11 START 1 =zeroi 2=Define COMMENT Conduit Length .000 600.000 1 .138 .357 c.m/s 17 .138 .431 c.m/s 18 .138 .000 c.m/s 14 COMMENT 35 line(s) of comment ** 10 YEAR DESIGN STORM EVENT ** 2 STORM 1=Chicago; 2=Huff; 3=User; 4=Cdnlhr; 5=Historic l=chicago;2=Hufr;3=User;4 Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 52.818 mm Total depth US 608.845 .000 .400 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction .013 98.000 .100 .518 4 CATCHMENT ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 42 .000 .138 .000 c.m/s ID No.ó 99999 20.000 3.020 100.000 .500 72.600 100.000 .000 .250 .230 77.000 .100 7.587 .442 .000 .138 .000 c.m/s .320 .887 .732 C perv/imperv/total ALD RUNOFF .442 .442 .138 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1167105E+04 c.m CHANNEL 15 ADD RUNOFF .000 c.m/s 27 11 Beta weighting factor Routing timestep No. of sub-reaches 42 .442 .4 .618 200.000 1 No. 01 -.442 .442 .42 COMBINE 1 Junction Node No. .442 .442 .425 .000 c.m/s 17 1 .442 .442 START 1 1=Zero; 2=Define .425 c.m/s 14 1 I=ZEIG, _ CATCHMENT 10.000 ID No.6 99999 17.530 Area in hectares 00.000 Length (PERV) metres ~radient (%) 4 10.000 17.530 500.000 Length (PERV) metres Gradient (\$) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction 1.000 500.000 .250 77.000 .100 7.587

 7.587
 Initial Abstraction

 1
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 2.767
 .000
 .425
 .425 c.m/s

 .320
 .892
 .749
 C perv/imperv/total

 ADD RUNOFF
 2.767
 2.767
 .425
 .425 c.m/s

 HYDROGRAPH DISPLAY
 5
 is # of HyetO/Hydrograph chosen
 Volume = .6933451E+04 c.m

 Volume
 .6933451E+04 c.m
 POND

 Initial Abstraction 15 27 10
 180.500
 .0620
 2842.9

 180.900
 .224
 5050.5

 181.100
 .350
 6243.3

 181.450
 1.399
 8478.7

 Peak Outflow
 =
 .203 c.m/s

 Maximum Depth
 =
 180.849 metres

 Maximum Storage
 4769. c.m
 2.767
 .203
 .425 c.m/s

Stormwater Management Plan Northland Estates, City of Port Colborne

17	COMBINE
1/	1 Junction Node No.
18	2.767 2.767 .203 .468 c.m/s CONFLUENCE
	1 Junction Node No.
4	2.767 .468 .203 .000 c.m/s CATCHMENT
	30.000 ID No.ó 99999 3.670 Area in hectares
	80.000 Length (PERV) metres
	.500 Gradient (%) 1.400 Per cent Impervious
	80.000 Length (IMPERV) .000 %Imp. with Zero Dpth
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>
	.250 Manning "n" 77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.093 .468 .203 .000 c.m/s .320 .893 .328 C perv/imperv/total
15	ADD RUNOFF
11	CHANNEL
	.500 Base Width = 3.000 Left bank slope 1:
	3.000 Right bank slope 1: .060 Manning's "n"
	1.000 O/a Depth in metres
	.200 Select Grade in % Depth = .616 metres
	VEIOCICY555 m/sec
9	ROUTE 200.000 Conduit Length
	.177 Supply X-factor <.5 422.150 Supply K-lag (sec)
	.500 Beta weighting factor
	600.000 Routing timestep 1 No. of sub-reaches
17	.093 .514 .439 .000 c.m/s COMBINE
17	2 Junction Node No.
14	.093 .514 .439 .439 c.m/s START
4	1 1=Zero; 2=Define CATCHMENT
	40.000 ID No.ó 99999
	3.890 Area in hectares 100.000 Length (PERV) metres
	.500 Gradient (%) 3.700 Per cent Impervious
	100.000 Length (IMPERV)
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n" 77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.086 .000 .439 .439 c.m/s .320 .887 .341 C perv/imperv/total
15	ADD RUNOFF .086 .086 .439 .439 c.m/s
4	CATCHMENT 50.000 ID No.ó 99999
	9.180 Area in hectares
	350.000 Length (PERV) metres 1.000 Gradient (%)
	1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV)
	.000 %Imp. with Zero Dpth
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n"</pre>
	77.000 SCS Curve No or C .100 Ia/S Coefficient
	7.587 Initial Abstraction
	.134 .086 .439 .439 c.m/s
15	.320 .898 .327 C perv/imperv/total ADD RUNOFF
9	.134 .208 .439 .439 c.m/s
ر	.000 Conduit Length
	.500 Supply X-factor <.5 .000 Supply K-lag (sec)
	.500 Beta weighting factor 600.000 Routing timestep
	1 No. of sub-reaches
17	.134 .208 .208 .439 c.m/s COMBINE
	2 Junction Node No. .134 .208 .208 .559 c.m/s
18	CONFLUENCE 2 Junction Node No.
	.134 .559 .208 .000 c.m/s
14	START 1 l=Zero; 2=Define
35	COMMENT
	<pre>3 line(s) of comment ************************************</pre>
	** 25 YEAR DESIGN STORM EVENT **
2	STORM 1 l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic
	715.568 Coefficient a
	.000 Constant b (min) .699 Exponent c
	.400 Fraction to peak r 240.000 Duration ó 240 min
3	62.077 mm Total depth IMPERVIOUS
د	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.013 Manning "n" 98.000 SCS Curve No or C

.100 Ia/S Coefficient .518 CATCHMENT 20.000 3.020 Initial Abstraction 4 ID No.ó 99999 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C 100.000 .500 72.600 100.000 .250 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction Option 1-Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .543 .000 .208 .000 c.m/s .367 .905 .757 C perv/imperv/total OFF ADD RUNOFF .543 .543 .208 .000 c.m/s HYDROGRAPH DISPLAY 15 27 HYDROUGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .14195368+04 c.m CHANNEL .500 Base Width = 3.000 Left bank slope 1: 11 .500 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: 0.600 Manning's "n" 1.000 O'a Depth in metres .300 Select Grade in % Depth = .579 metres Velocity = .419 m/sec Flow Capacity = 2.047 c.m/s Critical depth = .295 metres ROUTE ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor 50.000 .0000 89.446 .640 200.000 Routing timestep No. of sub-reaches 43 .543 1 _ No .543 COMBINE .500 .000 c.m/s 17 COMBINE 1 Junction Node No. .543 .543 .500 START 1 1=Zero; 2=Define .500 c.m/s 14 CATCHMENT 4 ID No.ó 99999 10.000 17.530 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) % Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 322 .000 .500 c.m/s 17.530 500.000 1.000 75.000 500.000 .000 .250 77.000 .100 7.587 1 3.322 .000 .500 .500 c.m/s .367 .910 .774 C perv/imperv/total ADD RUNOFF 15 ALD RUNOFF 3.322 3.322 .500 .500 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .8425626E+04 c.m pown 27 10 POND
 POND
 Constraint

 6 Depth - Discharge - Volume sets
 179.900

 180.500
 .0620
 2842.9

 180.900
 .224
 5050.5

 181.100
 .350
 6243.3

 181.250
 .678
 7177.9
 .500 c.m/s 17 Junction Node No. 1 Junction Node No. 3.322 3.322 .281 .555 c.m/s 18 CONFLUENCE
 CONFIDENCE

 1
 JUnction Node No.

 3.322
 .555
 .281

 CATCHMENT
 30.000
 ID No.6 99999

 3.670
 Area in hectares
 .000 c.m/s 4 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning ** SCS Curve No or C Ia/G Coefficient 80.000 .500 1.400 80.000 .000 .250 77.000 100 Ia/S Coefficient 7.587 1 ADD RUNOFF .137 15 .631 .281 .000 c.m/s . CHANNEL 11 CHANNEL .500 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: .060 Maning's "n" 1.000 O/a Depth in metres .200 Select Grade in % Depth = .671 metres Velocity = .374 m/sec Flow Capacity = .317 metres ROUTE 9 ROUTE

200.000

Conduit Length

Stormwater Management Plan Northland Estates, City of Port Colborne

	.151	Supply X-f	Factor < F		
	401.078	Supply K-1	lag (sec)		
	.500 600.000	Beta weigh Routing ti		or	
	1	No. of suk	o-reaches		
17	COMBINE	137 .6	531	.560	.000 c.m/s
		ction Node M 137 .6	No.	.560	.560 c.m/s
14	START			. 500	.500 C.m/s
4	1 1=Z CATCHMEN	ero; 2=Defir T	ne		
	40.000	ID No.ó 99	9999		
	3.890 100.000	Area in he Length (PH	ectares ERV) metre	s	
	.500	Gradient (Per cent 1			
	100.000	Length (IN	MPERV)		
	.000	%Imp. with Option 1=8			3=Green-Ampt; 4=Repeat
	.250	Manning "r	1 "		
	77.000 .100	SCS Curve Ia/S Coeff	ficient		
	7.587 1	Initial Ak Option 1=1			lr; 3=SWM HYD; 4=Lin. Reserv
		138 .0	000	.560	.560 c.m/s
15	ADD RUNC		905	.387	C perv/imperv/total
4	CATCHMEN		138	.560	.560 c.m/s
-	50.000	ID No.ó 99	9999		
	9.180 350.000	Area in he Length (PH	ectares ERV) metre	s	
	1.000	Gradient	(%)		
	350.000	Per cent 1 Length (IN	MPERV)		
	.000	%Imp. with Option 1=9			3=Green-Ampt; 4=Repeat
	.250	Manning "r	1 "		
	77.000 .100	SCS Curve Ia/S Coeff	NO OF C ficient		
	7.587 1	Initial Ak	ostraction		lr; 3=SWM HYD; 4=Lin. Reserv
		200 .1	138	.560	.560 c.m/s
15	ADD RUNC	FF	911		C perv/imperv/total
9	ROUTE	200 .3	313	.560	.560 c.m/s
	.000	Conduit Le	ength		
	.000	Supply X-f Supply K-1	lag (sec)		
	.500 600.000	Beta weigh Routing ti		or	
	1	No. of sub 200 .3	o-reaches	.313	.560 c.m/s
17	COMBINE			. 313	.560 C.m/S
		ction Node M 200 .3		.313	.757 c.m/s
18	CONFLUEN	CE ction Node M	No.		
		200 .7	757	.313	.000 c.m/s
14		ero; 2=Defir		.313	.000 c.m/s
35	1 1=Z COMMENT	ero; 2=Defir	ne	.313	.000 c.m/s
	1 1=Z COMMENT 3 lin	ero; 2=Defir e(s) of comm	1e nent *********	***	.000 c.m/s
35	1 1=2 COMMENT 3 lin ******** ** 50 YE ********	ero; 2=Defir .e(s) of comm	ne nent ********** FORM EVENT	***	.000 c.m/s
	1 1=2 COMMENT 3 lin ******** ** 50 YE	ero; 2=Defir e(s) of comm ************ AR DESIGN ST **********	ne *********** FORM EVENT *********	***	
35	1 1=2 COMMENT 3 lin ******** ** 50 YE ******** STORM 1 794.298	ero; 2=Defir e(s) of comm ************ AR DESIGN ST ************* 1=Chicago: Coefficier	nent *********** FORM EVENT ********** ;2=Huff;3= nt a	*** ** *** User;4=Cd	.000 c.m/s nlhr;5=Historic
35	1 1=2 COMMENT 3 lin ******* ** 50 YE ******** STORM 1 794.298 .000 .699	ero; 2=Defir e(s) of comm ***********************************	ne ment FORM EVENT *********** ;2=Huff;3= nt a b (min c	*** *** User;4=Cd	
35	1 1=2 COMMENT 3 lin ******** ** 50 YE ******** STORM 1 794.298 .000	ero; 2=Defir e(s) of comm ***********************************	ne TORM EVENT it a b (min c co peak r 5 240 min	*** *** User;4=Cd	
35	1 1=2 COMMENT 3 111 ******* ** 50 YE ******** STORM 1 794.298 .000 .699 .400 240.000	ero; 2=Defir e(s) of comm AR DESIGN ST """"""""""""""""""""""""""""""""""""	ne TORM EVENT it a b (min c co peak r 5 240 min	*** *** User;4=Cd	
35	1 1=z COMMENT 3 1in ***50 YE ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIC 1	ero; 2=Defir e(s) of comm ***********************************	ne ment iz=Huff;3= nt a b (min c peak r 5 240 min Total SCS CN/C;	*** *** User;4=Cd .) depth	
35	1 1=z COMMENT 3 1in ***50 YE ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIC 1 .013 98.000	ero; 2=Defir e(s) of comm AR DESIGN S7 " 1=Chicago: Coefficier Constant Fraction t Exponent Fraction t 68.907 mm US Option 1=5 Manning " SCS Curve	ne ment FORM EVENT ;2=Huff;3= nt a b (min c co peak r 5 240 min Total SCS CN/C; 1" No or C	*** *** User;4=Cd .) depth	nlhr;5=Historic
35	1 1=z COMMENT 3 1in ** 50 YE ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIC 1 .013	ero; 2=Defir AR DESIGN ST 1=Chicago: Coefficier Constant Exponent Fraction t 68.907 mm US Option 1=5 Manning * SCS Curve Ia/S Coeff	ne ment rORM EVENT ;2=Huff;3= th a b (min c o peak r 5 240 min Total SCS CN/C; " No or C ficient	*** *** User;4=Cd) depth 2=Horton;	nlhr;5=Historic
35	1 1 1=2 COMMENT 3 111 ** 50 YE ** 50 YE	ero; 2=Defir AR DESIGN ST 1=Chicago: Coefficier Constant Exponent Fraction t 68.907 mm US Option 1=5 Manning *r SCS Curve Ia/S Coeff Initial AF	ne nent CORM EVENT 2 = Huff;3= t a b (mir c c c peak r 5 240 mir Total SCS CN/C; " No or C ficient spraction	*** *** User;4=Cd) depth 2=Horton;	nlhr;5=Historic
35 2 3	1 1 1=2 COMMENT 3 111 ** 50 YE ** 50 YE ************************************	ero; 2=Defir AR DESIGN ST 1=Chicago: Coefficier Constant Exponent Fraction t 68.907 mm US Option 1=5 Manning *r SCS Curve Ia/S Coeff Initial Ał T ID No.6 99 Area in he	nent CORM EVENT CORM EVENT CORM EVENT CORMANNE CORMANNNE CORMANNNE CORMANNNE CORMANNNE CORMANNNE CORMANNNE	*** ** User;4=Cd) depth 2=Horton;	nlhr;5=Historic
35 2 3	1 1 1-2 COMMENT 3 111 ***50 YE **50 YE ***50 YE ************************************	ero; 2=Defir e(s) of comm AR DESIGN ST l=Chicago: Coefficier Constant Exponent Fraction t 68.907 mm US Option 1=5 Manning * SCS Curve Ia/S Coeffi Initial AR T ID No.6 99 Area in ht Length (PF	re re re re re re re re re re	*** ** User;4=Cd) depth 2=Horton;	nlhr;5=Historic
35 2 3	1 1 1-2 COMMENT 3 117 ***50 YE ***50 YE ***50 YE **50 YE **	ero; 2=Defir e(s) of comm ***********************************	re re re re re re re re re re	*** ** User;4=Cd) depth 2=Horton;	nlhr;5=Historic
35 2 3	1 1 1=2 COMMENT 3 1in ** 50 YE STORM 1 794.298 .000 240.000 IMPERVIC 1 .013 98.000 .100 .518 CATCHMEN 20.000 3.020 100.000 72.600 100.000	ero; 2=Defir AR DESIGN ST I=Chicago: Coefficier Constant Exponent Fraction & Option 1=5 Manning * SCS Curve US Option 1=5 Manning * SCS Curve Ia/S Coeffi Initial AF T ID No.6 99 Area in h¢ Length (Pf Gradient (Pf Gradient (Pf Gradient) Per cent 1 Length (N) % Tm, with	rorm Event iz=Huff;3= th a b (mir c c) c 240 mir Total SCS CN/C; 1° No or C ficient straction 3999 sectares ERV) metre \$ Rmpervious MPERV) the Zero DPC	user;4=Cd) depth 2=Horton; s	nlhr;5=Historic 3=Green-Ampt; 4=Repeat
35 2 3	1 1 1-2 COMMENT 3 1 1 *** 50 YE *** 50 Y	ero; 2=Defil e(s) of comm AR DESIGN ST i=Chicago: Coefficier Constant Fraction t Exponent Fraction t Duration C 68.907 mm US Option 1=5 Manning " SCS Curve Ia/S Coeffi Initial Al T ID No.6 99 Area in he Length (PI Gradient (Per cent 2) Length (II %Imp. with Option 1=5	reaction of the second	user;4=Cd) depth 2=Horton; s	nlhr;5=Historic
35 2 3	1 1 1-2 COMMENT 3 111 ***50 YE **50 YE **50 YE **50 YE ***50 YE ***000 1794.298 .000 .699 .400 240.000 IMPERVIC 1 .013 98.000 .518 CATCHMEN 20.000 .518 CATCHMEN 20.000 .518 CATCHMEN 20.000 .518 CATCHMEN 20.000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .518 .000 .500 .000 .500 .000 .518 .000 .500 .000 .500 .000 .518 .000 .500 .000 .500 .000 .518 .000 .500 .000 .500 .000 .518 .000 .500 .000 .000 .518 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .518 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .000 .000 .500 .000 .250 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .250 .000	ero; 2=Defir e(s) of comm ***********************************	<pre>return to the second seco</pre>	user;4=Cd) depth 2=Horton; s	nlhr;5=Historic 3=Green-Ampt; 4=Repeat
35 2 3	1 1 1-2 COMMENT 3 111 ***50 YE **50 YE ***000 1794.298 .000 .699 .400 240.000 IMPERVIC 100 .518 CATCHMEN 20.000 3.020 100.000 .510 2500 72.600 100.000 .250 77.000 .100 .7587	ero; 2=Defir e(s) of comm AR DESIGN ST l=Chicago: Coefficier Constant Exponent Fraction t G8.907 mm US Option 1=5 Manning *r SCS Curve Ia/S Coeffi Initial AR T ID No.6 99 Area in he Length (PI Gradient () Per cent) Length (PI Gradient) Per cent) Length (PI Gradient) SCS Curve Ia/S Coeffi Initial AR	2=Huff;3= transformer compared for the second compared	<pre>*** UUser;4=Cd) depth 2=Horton; s h 2=Horton;</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat
35 2 3	1 1 1-2 COMMENT 3 111 ***50 YE **50 YE ***50 YE ************************************	ero; 2=Defir e(s) of comm ***********************************	the sent trorm Event trorm Event transformation transforma	<pre>*** User;4=Cd) depth 2=Horton; s h 2=Rectang; 313</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat
35 2 3 4	1 1 12 COMMENT 3 11 ** 50 YE **	ero; 2=Defil e(s) of comm ***********************************	the trork EVENT trork EVENT transformation	<pre>*** User;4=Cd) depth 2=Horton; s h 2=Horton; 2=Rectang .313</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat 1r; 3=SWM HYD; 4=Lin. Reserv
35 2 3 4	1 1 12 COMMENT 3 11 *** 50 YE ***50 YE ***000 1794.298 .000 240.000 240.000 IMPERVIC 1 .013 98.000 .518 CATCHMEE 20.000 3.020 100.000 .550 72.600 100.000 .550 77.000 7.587 1 ADD RUKC	ero; 2=Defil e(s) of comm ***********************************	<pre>read a second seco</pre>	<pre>*** User;4=Cd) depth 2=Horton; s h 2=Horton; 2=Rectang .313</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat 1r; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s
35 2 3 4	1 1 12 COMMENT 3 11 ** 50 YE **	ero; 2=Defir e(s) of comm ***********************************	<pre>tee rorm Event it a b (mir c) b (mir c) c) c) c) c) c) c) c) c) c)</pre>	**** User;4=Cd) depth 2=Horton; s h 2=Horton; 2=Rectang .313 .772 .313	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27	1 1 12 COMMENT 3 11 ** 50 YE **	ero; 2=Defir e(s) of comm ***********************************	<pre>return to the second seco</pre>	**** User;4=Cd) depth 2=Horton; s h 2=Horton; 2=Rectang .313 .772 .313	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4	1 1 12 COMMENT 3 11 ** 50 YE **	ero; 2=Defin e(s) of comm AR DESIGN ST ************************************	rorm Event rorm Event t a b (min c Deak r f 5 240 min c Deak r f 5 240 min scractares SCS CN/C; 1 No or C ficient sctares REW) metre SCS CN/C; 1 a 2 cro Dpt SCS CN/C; 1 a 2 cro Dpt SC	<pre>view view view view view view view view</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27	1 1 1-2 COMMENT 3 1in ** 50 YE ** 50 YE	ero; 2=Defir e(s) of comm ***********************************	<pre>return to the second seco</pre>	**** User;4=Cd) depth 2=Horton; s h 2=Rectang .772 .313 .chosen :	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27	1 1 1-2 COMMENT 3 111 ****50 YE ***50 YE ************************************	ero; 2=Defir e(s) of comm ***********************************	<pre>re re re re re re re re re re re re re r</pre>	**** User;4=Cd) depth 2=Horton; s h 2=Rectang 	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27	1 1 1-2 COMMENT 3 111 ***50 YF **50 YF **50 YF ************************************	ero; 2=Defin AR DESIGN ST AR DESIGN ST Coefficier Constant Exponent Exponent Braction (68.907 mm US Option 1=5 Manning " SCS Curve Ia/S Coeffi Initial AF T ID No.6 99 Area in he Length (Pi Gradient () Per cent 1 Length (Pi Gradient () Per cent 2 Length (Pi SCS Curve IL No.6 99 Area in he Length (Pi Gradient () SCS Curve Ia/S Coeffi Initial AF Manning " SCS Curve Harea () 619 8 Jone () Brase Width Left banh Right banh Manning's O/a Depth Select Grz	<pre>rorm event rorm event ;2=Huff;3= th a b (mir c) c) peak r 5 240 mir Total SCS CN/C; n n No or C ficient setraction page extracts ERV) metre (%) mmpervious #DERV) 1 Zero Dpt SCS CN/C; n 1 Zero Dpt SCS CN/C; n 2 Zero Dpt SCS C</pre>	**** User;4=Cd) depth 2=Horton; 2=Rectang .313 .772 .313 . chosen :	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27	1 1 1-2 COMMENT 3 111 ***50 YE **50 YE ************************************	ero; 2=Defir e(s) of comm ***********************************	<pre>temp rorm event ;2=Huff;3= th a b (mir c peak r 5 240 min Total SCS CN/C; n No or C ficient straction 9999 extares 2RV) metre SRV) metre SRV) metre SRV) n Zero Dpt SCS CN/C; n No or C ficient straction restraction restraction rrianglr; 00 519 494rograph E+04 c.m n = c slope 1 "n" sci slope 1 "n" c slope 1 "n" sci slope 1 "n" sci slope 1 "n" "n" sci slope 1 "n" "n" sci slope 1 "n" "n"</pre>	<pre>*** User;4=Cd) depth 2=Horton; s h 2=Horton; 313 chosen : tres</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27	1 1 1-2 COMMENT 3 11 *** 50 YE ** 50 YE *** 50 YE	ero; 2=Defir e(s) of comm ***********************************	<pre>2=Huff;3= CORM EVENT ************************************</pre>	<pre>*** Uuser;4=Cd) depth 2=Horton; s h 2=Rectang</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27	1 1 1-2 COMMENT 3 111 ***50 YE **50 YE ***000 1794.298 .000 .699 .400 240.000 IMPERVIC 10 .013 98.000 .518 CATCHMEN 20.000 3.020 100.000 .518 CATCHMEN 20.000 .518 CATCHMEN .000 .100 .250 77.000 .100 .250 77.000 .100 .250 77.000 .100 .250 77.000 .100 .518 VOUME CHANNEL .500 3.000 3.000 3.000 .500 .000 .000 .000 .100 .250 .000 .100 .250 .000 .100 .250 .000 .100 .250 .000 .100 .507 .250 .000 .250 .000 .100 .000 .100 .507 .000 .000 .100 .000 .100 .507 .000 .000 .100 .507 .0000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .0000 .0	ero; 2=Defir e(s) of comm ***********************************	<pre>return to the second seco</pre>	<pre>*** Uuser;4=Cd) depth 2=Horton; s h 2=Rectang</pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total
35 2 3 4 15 27 11	1 1 12 COMMENT 3 11 ** 50 YE **	ero; 2=Defir e(s) of comm ***********************************	<pre>rorm event rorm event ;2=Huff;3= th a b (min c peak r 5 240 min c peak r 5 240 min rotal 3GCS CN/C; " No or C ficient straction 9999 sectares 2RV) metre (%) Impervious 4PERV) in 2ero Dpt SCS CN/C; " No or C ficient at a 2ero Dpt SCS CN/C; " No or C ficient straction stra</pre>	<pre>*** User;4=Cd) depth 2=Horton; s h 2=Horton; 2=Rectang 313 .772 .313 chosen : tres sec m/s tres </pre>	nlhr;5=Historic 3=Green-Ampt; 4=Repeat 3=Green-Ampt; 4=Repeat lr; 3=SWM HYD; 4=Lin. Reserv .000 c.m/s C perv/imperv/total

	86.544	Supply K-lag (50C)		
	.653	Beta weighting	factor		
	200.000 1	Routing timest No. of sub-rea	ep ches		
17	.6	.619	.553	.000 c.m/s	
1/	COMBINE 1 Junc	tion Node No.			
14	.6 START	.619	.553	.553 c.m/s	
	1 1=Ze	ero; 2=Define			
4	CATCHMENT 10.000	ID No.ó 99999			
	17.530	Area in hectar	es		
	500.000 1.000	Length (PERV) : Gradient (%)	metres		
	75.000	Per cent Imper Length (IMPERV			
	.000	%Imp. with Zer	o Dpth		
	1 .250	Option 1=SCS C Manning "n"	N/C; 2=Hort	on; 3=Green-Ampt; 4=Repeat	
	77.000	SCS Curve No o	r C		
	.100 7.587	Ia/S Coefficies Initial Abstra	ction		
	1 3.7	Option 1=Trian	glr; 2=Rect;	anglr; 3=SWM HYD; 4=Lin. Reserv .553 c.m/s	
	. 3	.920	.789	C perv/imperv/total	
15	ADD RUNOF 3.7		.553	.553 c.m/s	
27	HYDROGRAP	PH DISPLAY			
		of Hyeto/Hydro .9530810E+04		n	
10	POND 6 Depth -	Discharge - Vol	ume sets		
	179.900	.000	.0		
	180.500 180.900		2842.9 5050.5		
	181.100		6243.3		
	181.250 181.450		7177.9 8478.7		
	Peak Outf Maximum D	1.399 flow = . Depth = 181. Storage = 61	342 c.m/s 088 metres		
	Maximum S	torage = 61	71. c.m		
17	COMBINE	3.726	.342	.553 c.m/s	
		tion Node No. 26 3.726	.342	.624 c.m/s	
18	CONFLUENC	E	. 512	.024 C.m/S	
	1 Junc 3.7	tion Node No. 26 .624	.342	.000 c.m/s	
4	CATCHMENT	2			
	30.000	ID No.ó 99999 Area in hectar	es		
		Length (PERV) : Gradient (%)	metres		
	1.400	Per cent Imper	vious		
	80.000 .000	Length (IMPERV %Imp. with Zer			
	1 .250			on; 3=Green-Ampt; 4=Repeat	
	77.000	SCS Curve No o	r C		
		Ia/S Coefficies Initial Abstra			
	1	Option 1=Trian	glr; 2=Recta	anglr; 3=SWM HYD; 4=Lin. Reserv	
	.3	.73 .624 97 .916	. 342	.000 c.m/s C perv/imperv/total	
15	ADD RUNOF	F	.342	.000 c.m/s	
11	CHANNEL				
	.500 3.000	Base Width Left bank slo	= pe 1:		
		Right bank slo Manning's "n"	pe 1:		
	1.000	0/a Depth in m	etres		
	.200 Depth				
		Select Grade i: = .7	n % 12 metres		
	Velocity Flow Capa	= .7	12 metres 88 m/sec		
	Flow Capa Critical	Select Grade i = .7 = .3 acity = 1.6 depth = .3	12 metres 88 m/sec		
9	Flow Capa Critical ROUTE	= .7 = .3 acity = 1.6 depth = .3	12 metres 88 m/sec 71 c.m/s 39 metres		
9	Flow Capa Critical ROUTE 200.000 .132	= .7 = .3 acity = 1.6 depth = .3 Conduit Length Supply X-facto	12 metres 88 m/sec 71 c.m/s 39 metres r <.5		
9	Flow Capa Critical ROUTE 200.000 .132 387.012 .500	= .7 = .3 acty = 1.6 depth = .3 Conduit Length Supply X-facto Supply K-lag (Beta weighting	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor		
9	Flow Capa Critical ROUTE 200.000 .132 387.012	= .7 = .3 acity = 1.6 depth = .3 Conduit Length Supply X-facto Supply K-lag (Beta weighting Routing timest	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep		
	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1	= .7 = .3 acty = 1.6 depth = .3 Conduit Length Supply X-facto Supply K-lag (Beta weighting	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep	.000 c.m/s	
9	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE	= .7 = .3 acity = 1.6 depth = .3 Conduit Length Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660	.000 c.m/s	
17	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc .1	= .7 = .3 acity = 1.6 depth = .3 Conduit Length Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches	.000 c.m/s .660 c.m/s	
17 14	Flow Capa Critical ROUTE 200.000 .132 .500 600.000 .1 COMBINE 2 JUNC .1 START 1 1=Ze	= .7 = .3 icity = 1.6 depth = .3 Conduit Length Supply K-facto Supply K-lag(Beta weighting Routing timest No. of sub-rea .73 .727 tion Node No. .73 .727 prof 2=Define	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660		
17	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc .3TART	= .7 = .3 icity = 1.6 depth = .3 Conduit Length Supply K-facto Supply K-lag(Beta weighting Routing timest No. of sub-rea .73 .727 tion Node No. .73 .727 prof 2=Define	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660		
17 14	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc .1 START 1 1=2e CATCHMENT 40.000 3.890	= .7 .3 dity = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ttion Node No. .73 .727 ttion Node No. .73 .727 ttion Node Sub- rea in hectar	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660		
17 14	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 COMENNE 2 Junc .1 START 1 1=2e CATCHMENT 40.000 3.890 100.000 .500	= .7 ; a icity = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ttion Node No. .73 .727 icition Node No. .73 .727 D No.6 99999 Area in hectar Length (PERV); Gradient (%)	12 metres 18 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 es metres		
17 14	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 COMBINE 2 Junc START 40.000 3.890 3.700	= .7 = .3 cdity = 1.6 depth = .3 Conduit Length Supply K-lag(Beta weighting Routing timest NO. of sub-rea Routing timest NO. of sub-rea ros .727 rtion Node No. .73 .727 rtion Node No. .73 .727 pro; 2=Define D No.6 99999 Area in hectar Length (PERV) ;	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious		
17 14	Flow Capa Critical ROUTE 200.000 .132 .500 600.000 .1 COMBINE 2 Junc .1 START 1 1=2e CATCHMENT 40.000 3.890 100.000 500 3.700 100.000 .000	= .7 = .3 kdity = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ktion Node No. .73 .727	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 es metres vious) o Dpth	.660 c.m/s	
17 14	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc .1 START 1 122 CATCHMENT 40.000 3.890 100.000 500 3.700 100.000 10.000 1.250	= .7 = .3 deity = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ttion Node No. .73 .727 ttion Node No. .73 .727 ttion Node No. .73 .727 D No.6 99999 Area in hectar Length (PERV) : Par cent Imper Length (IMPERV %Imp. with Zer Option 1=SCS C Manning *n*	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Hort.		
17 14	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc 2 Junc 2 Junc 3.890 100.000 .500 3.700 100.000 .250 77.000	<pre>= .7 = .3 deity = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply X-lag (Beta weighting Routing timest No. of sub-rea .73 .727 tition Node No. .73 .727 tition Node No. .73 .727 tition Node No. .73 .727 tro; 2=Define .73 D No.6 99999 Area in hectar Length (DPRV) Gradient (%) Per cent Imper Length (IMPERV %Imp. with Zer Option 1=SCS C Manning *n* SCS Curve No o</pre>	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Horto r C	.660 c.m/s	
17 14	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 JUNC 2 JUNC 3.890 100.000 .500 3.890 100.000 .500 3.700 100.000 1 2.50 77.000 .100 7.587	= .7 = .3 conduit Length Supply X-facto Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 rtion Node No. .73 .727 .727 rtion Node No. .73 .727 .7	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Hortor r C nt ction	.660 c.m/s on; 3=Green-Ampt; 4=Repeat	
17 14	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 COMENNE 2 Junc 3TART 1 1 122 CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000 .250 77.000 .100 7.587 1	= .7 = .3 conduit Length Supply X-facto Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 rtion Node No. .73 .727 .727 rtion Node No. .73 .727 .7	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Hortor r C nt ction	.660 c.m/s	
17 14 4	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 COMEINE 2 Junc CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000 .000 .000 .000 .1 .250 77.000 .100 7.587 1 .1 .3	<pre>7 3 cdty = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ttion Node No. .73 .727 ttion Node No. .73 .727 ttion Node No. .73 .727 iD No.6 99999 Area in hectar Length (PERV) Per cent Imper Der det Imper Option 1-SCS C Manning *n* SCS Curve No o Ia/S Coefficie Initial Abstra option 1=Trian .74 .000 197 .913</pre>	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Horter r C nt ction glr; 2=Rect.	.660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv	
17 14 4	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 COMEINE 2 Junc COMEINE 2 Junc 1=22 Junc 1=22 CATCLIMENT 40.000 .3.890 100.000 .000 .000 .000 .000 .000 .000	<pre>7 3 cdity = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 tition Node No. .73 .727 tition Node No. .73 .727 tition Node No. .73 .727 into: 2=Define D No.6 99999 Area in hectar Length (PERV): Gradient (%) Per cent Imper Option 1=SCS C Manning *n* SCS Curve No o Ia/S Coefficie Initial Abstra Option 1=Trian .74 .074</pre>	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Horto r C nt crion glr; 2=Rect. .660	.660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s	
17 14 4	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 .COMBINE 2 Junc 2 Junc 2 Junc .1 START 1 128 CATCHMENT 40.000 3.890 100.000 .000 100.000 10.000 10.000 10.000 10.000 10.000 .1 .250 77.000 .100 7.587 1 .3 ADD RUNOF	<pre>7 3 cdity = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 tition Node No. .73 .727 tition Node No. .73 .727 tition Node No. .73 .727 into: 2=Define D No.6 99999 Area in hectar Length (PERV): Gradient (%) Per cent Imper Option 1=SCS C Manning *n* SCS Curve No o Ia/S Coefficie Initial Abstra Option 1=Trian .74 .074</pre>	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Hort(r c nt ction glr; 2=Rect: .660 .416	.660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total	
17 14 4	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 .COMENNE 2 Junc .1 START 1 1=2C CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.0000 10.00000 10.00000 10.00000 10.00000000	 7 3 .6 tiy = 1.6 depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ttion Node No. .74 .100 Supply K-rain (hoctar .174 .174 D No. 6 99999 Area in hoctar 	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Hort: .660 .416 .660 es	.660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total	
17 14 4	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 .COMENNE 2 Junc 2 Junc 3TART 1 1 1=20 CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000 .250 77.000 .100 7.587 1 .3 ADD RUNOP 1 .3 ADD RUNOP 9.180 350.000 1.000	 7 3 .6 (ty = 1.6 6 (depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ttion Node No. .74 .74 D No.6 99999 Area in hectar LD No.6 99999 Area in hectar Longth (PERV) .74 .174 D No.6 99999 Area in hectar Longth (PERV) .74 .174 	12 metres 18 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C? 2=Hort(.660 .416 .660 es metres	.660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total	
17 14 4	Flow Capa Critical ROUTE 200.000 .132 .500 600.000 .1 COMBINE 2 JUNC 2 JUNC 2 JUNC 1 1=20 CATCHMENT 40.000 .500 .500 .500 .000 100.000 .000 10.000 .250 77.000 .100 7.587 1 .3 ADD RUNOF .1 .3 ADD RUNOF .1 .3 ADD RUNOF .1 .3 .3 ADD RUNOF .1 .3 .3 .3 .3 .3 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	= .7 = .3 conduit Length Supply X-facto Supply X-facto Supply X-facto Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ction Node No. .73 .727 ction Node No. .74 .74 ID No.6 99999 Area in hectar Length (PERV): .74 .74 .74 .74 .74 .74 .74 .74 .74 .74 .75 .75 .76 .75 .77	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 es metres vious) o Dpth N/C; 2=Horto r c nt ction glr; 2=Rect. .660 es metres vious	.660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total	
17 14 4	Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 .1 .COMENNE 2 Junc 2 Junc 3TART 1 1 1=20 CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000 .250 77.000 .100 7.587 1 .3 ADD RUNOP 1 .3 ADD RUNOP 9.180 350.000 1.000	 7 3 .6 (ty = 1.6 6 (depth = .3 Conduit Length Supply X-facto Supply X-facto Supply K-lag (Beta weighting Routing timest No. of sub-rea .73 .727 ttion Node No. .74 .74 D No.6 99999 Area in hectar LD No.6 99999 Area in hectar Longth (PERV) .74 .174 D No.6 99999 Area in hectar Longth (PERV) .74 .174 	12 metres 88 m/sec 71 c.m/s 39 metres r <.5 sec) factor ep ches .660 .660 es metres vious) o Dpth N/C; 2=Horts r c .660 .416 .660 es metres vious))	.660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total	

Stormwater Management Plan Northland Estates, City of Port Colborne

	1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 77.000	Manning "n" SCS Curve No or C	
	.100 7.587	Ia/S Coefficient Initial Abstraction	
		Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 265 .174 .660 .660 c.m/s	
15	ADD RUNO	398 .918 .404 C perv/imperv/total 7F	
9	ROUTE	265 .404 .660 .660 c.m/s	
	.000	Conduit Length Supply X-factor <.5	
	.000	Supply K-lag (sec) Beta weighting factor	
	600.000 1	Routing timestep No. of sub-reaches	
17		265 .404 .404 .660 c.m/s	
- /	2 Jun	ction Node No. 265 .404 .404 .957 c.m/s	
18	CONFLUEN		
14		265 .957 .404 .000 c.m/s	
		ero; 2=Define	
35	3 lin	e(s) of comment	
	** 100	YEAR DESIGN STORM EVENT **	
2	STORM		
	1 871.279	l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a	
	.000	Constant b (min) Exponent c	
	.400 240.000	Fraction to peak r Duration ó 240 min	
3	IMPERVIO	75.585 mm Total depth JS	
	.013	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n"	
	98.000 .100	SCS Curve No or C Ia/S Coefficient	
4	.518 CATCHMEN	Initial Abstraction	
		ID No.ó 99999 Area in hectares	
	100.000	Length (PERV) metres Gradient (%)	
	72.600	Per cent Impervious Length (IMPERV)	
	.000	<pre>%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>	
	.250	Manning "n" SCS Curve No or C	
	.100	Ia/S Coefficient Initial Abstraction	
	1	Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
15		594 .000 .404 .000 c.m/s 425 .921 .785 C perv/imperv/total	
15 27	ADD RUNO HYDROGRAI	594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7F 594 .694 .404 .000 c.m/s H DISPLAY	
27	ADD RUNO HYDROGRAI 5 is Volume	594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7F 594 .694 .404 .000 c.m/s	
	ADD RUNO HYDROGRAI 5 is Volume CHANNEL .500	594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7F .921 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278-04 c.m Base Width =	
27	ADD RUNO HYDROGRAI 5 is CHANNEL .500 3.000 3.000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Right bank slope 1:</pre>	
27	ADD RUNO HYDROGRA 5 is Volume CHANNEL .500 3.000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 504 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Manning's 'n* O/a Dept hin metres</pre>	
27	ADD RUNO HYDROGRAI 5 is CHANNEL .500 3.000 3.000 .060	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7F 594 .694 .404 .000 c.m/s PH DISPLAY \$ of Hyeto/Hydrograph chosen = .1792627E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = .642 metres</pre>	
27	ADD RUNOU HYDROGRAI 5 is 5 CHANNEL .500 3.000 3.000 .060 1.000 .300 Depth Velocity	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % e = .642 metres = .446 m/sec</pre>	
27	ADD RUNO HYDRORRA 5 is CHANNEL 500 3.000 3.000 0.060 1.000 .300 Depth Velocity Flow Cap	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % e = .642 metres = .446 m/sec</pre>	
27	ADD RUNCO HYDROGRAI 5 is: Volume CHANNEL 500 3.000 3.000 .060 1.000 .300 Depth Velocity Flow Cap Critical ROUTE 50.000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278-04 c.m Base Width = Left bank slope 1: Right bank slope 1: Manning's 'n* 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length</pre>	
27	ADD RUNCO HYDROGRAI 5 is CHANNEL 500 3.000 3.000 .060 1.000 .300 Depth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Manning's 'n* 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply K-factor <.5 Supply K-factor <.5 </pre>	
27	ADD RUNO HYDROGRAI 5 is CHANNEL .500 3.000 .660 1.000 .300 Depth Velocity Flow Capu Critical ROUTE 50.000 .000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Manning's 'n* O/a Depth in metres Select Grade in % = .642 metres = .642 metres = .446 m/sec scity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Suppl X-factor <.5 Suppl X-factor Routing factor Routing timestep </pre>	
27	ADD RUNO HYDROGRAI 5 1s 3 Volume CHANNEL .500 3.000 .060 1.000 .3300 Depth Velocity Flow Capy Critical ROUTE 50.000 .000 84.095 .665 200.000 1	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s 94 DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Nanning's *n* O/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor</pre>	
27 11 9	ADD RUNCOR HYDROGRA 5 is Volume CHANNEL .500 3.000 .060 1.000 .060 1.000 .000 Bepth Velocity Flow Cap. Critical ROUTE 50.000 .000 84.095 .665 200.000 1 COMBINE 1 Jun	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 594 .694 .404 .000 c.m/s 94 DISPLAY * of Hyeto/Hydrograph chosen = .1792627E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Nanning's *n* O/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 Supply K-factor Routing timestep NO. of sub-reaches 594 .615 .000 c.m/s ction Node No.</pre>	
27 11 9	ADD RUNC ADD RUNCARA 5 is Volume CHANNEL .500 3.000 .060 1.000 .060 1.000 .000 Pepth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 COMBINE 1 JUN START	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 594 .694 .404 .000 c.m/s 94 DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272#.04 c.m Base Width = Left bank slope 1: Right bank slope 1: Nanning's "n" O/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 594 .694 .615 .000 c.m/s </pre>	
27 11 9	ADD RUNC ADD RUNCARA 5 is Volume CHANNEL .500 3.000 .060 1.000 .060 1.000 .000 Pepth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 COMBINE 1 JUN START	594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF .694 .404 .000 c.m/s PH DISPLAY .404 .000 c.m/s Base Width = .17926278-04 c.m Base Width = .17926278-04 c.m Dase Width = .642 Manning's 'n* .0/a Depth in metrees .624 metres Select Grade in % = .642 metres = .446 m/sec .404 acity 2.047 c.m/s .32 Conduit Length Supply X-factor <.5 .5 Supply X-factor <.5 .5 .000 c.m/s Stuppl X-factor <.615 .000 c.m/s rbion Node No. .694 .615 .615 c.m/s stoin Node No. .694 .615 .615 c.m/s	
27 11 9 17 14	ADD RUNCOGRA HYDROGRA 5 is : Volume CHANNEL .500 3.000 .660 1.000 .060 1.000 .000 Depth Velocity Flow Cap. Critical ROUTE 50.000 .000 84.095 .665 200.000 1 COMBINE 1 Jun. START 1 = 1 CATCHMENN	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 7 9 .921 .785 C perv/imperv/total 7 7 9 .694 .404 .000 c.m/s PH DISPLAY 9 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Manning's 'n' 0/a Depth in metres Select Grade in %</pre>	
27 11 9 17 14	ADD RUNO HYDROGRA 5 18 CHANNEL .500 3.000 .660 1.000 .300 Depth Velocity Flow Capp Critical ROUTE 50.000 .000 84.095 .665 200.000 1 COMBINE 1 Jun START 1 1=Z/ CATCHMEN 10.000 17.530 500.000 1.000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Manning's 'n* 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Suppl X-fac</pre>	
27 11 9 17 14	ADD RUNO ADD RUNO 5 183 CHANNEL .500 3.000 .660 1.000 .300 Depth Velocity Flow Capp Critical ROUTE 50.000 .000 84.095 .665 200.000 1 START 1 L=ZZ CATCHENN 10.000 17.530 500.000	594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total PF .694 .404 .000 c.m/s PH DISPLAY .000 c.m/s .1796272+04 c.m Base Width = .1292672+04 c.m Base Width = .642 Left bank slope 1: .000 c.m/s Manning's 'n* .042 metres = .642 metres = .642 metres = .642 metres = .446 m/sec Acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 .5000 c.m/s Stion Node No. .694 .694 .615 .000 c.m/s rtion Node No. .694 .694 .615 .615 c.m/s eroi 2=Define .615 .615 c.m/s TI No.6 99999 Area in hectares Length (PERV) metres Coralient (%) .9 Per cent Impervious Length (NPERV) .0	
27 11 9 17 14	ADD RUNCARN ADD RUNCARN 5 183 CHANNEL .500 3.000 .660 1.000 .300 Depth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1.Jun START 1 1=22 CATCHMEN 10.000 75.000 500.000 1.000 75.000 500.000 1.000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 7 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278-04 c.m Base Width = Left bank slope 1: Manning's 'n* 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Suppl X-factor <.615 .000 c.m/s ction Node No. S94 .694 .615 .000 c.m/s eroi 2=Define F I DNo.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) % Imp. with Zero Dpth Option I-SCS CN/C; 2+Borton; 3=Green-Ampt; 4=Repeat </pre>	
27 11 9 17 14	ADD RUNC) HYDROGRA 1 is Volume CHANNEL .500 3.000 .660 1.000 .300 Depth Velocity Flow Cap- Critical ROUTE 50.000 84.095 .665 200.000 1 Jun START 1 =27 CATCHMENE 1 Jun 550.000 1.000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278-04 c.m Base Width = Left bank slope 1: Manning's 'n* 0/a Depth in metres Select Grade in % = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Suppl X</pre>	
27 11 9 17 14	ADD RUNOU HYDROGRA 5 is 1 Volume CHANNEL .500 3.000 .060 1.000 .060 1.000 Pepth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 .COMBINE 1 JUN START 1 1 22. CATCHMEN 1.000 1.7530 500.000 1.000 500.000 500.000 .000 1.250	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 7 7 7 9 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278+04 c.m Base Width = Left bank slope 1: Manning's "n" 0/a Depth in metres Select Grade in %</pre>	
27 11 9 17 14	ADD RUNOU HYDROGRA 5 CHANNEL .500 3.000 .060 1.000 .060 1.000 Pepth Velocity Flow Capp Critical ROUTE 50.000 1000 84.095 200.000 1 Jun COMBINE 1 JUN START 1 12.2 CATCHMEN 500.000 1.000 1.000 1.250 77.000 .000 .000 .000 .000 .000 1.250 77.000 .000 .000 .000 .000 .000 .000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF 594 .694 .404 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .17926272+04 c.m Base Width = Left bank slope 1: Manning's 'n* 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Suppl X-factor <.5 Supl X-factor <.5 Suppl X-factor <.5 Suppl X-factor <.5 Su</pre>	
27 11 9 17 14	ADD RUNOU HYDROGRA 5 15 CHANNEL .500 3.000 .060 1.000 .060 1.000 Pepth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 .COMBINE 1 JUN COMBINE 1 JUN START 1 1 = 2. CATCHMEN 1.000 1.550 500.000 1.000 1.250 77.000 .000 1.250 77.000 .000 1.250 7.587 1 .250 7.587 7.000	594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF .694 .404 .000 c.m/s PH DISPLAY .404 .000 c.m/s # of Hyeto/Hydrograph chosen .1726278-04 c.m Base Width = .1726278-04 c.m Left bank slope 1: .404 Manning's 'n" .0/0 Depth in metrees Select Grade in %	
27 11 9 17 14 4	ADD RUNOU HYDROGRA 5 is 5 Volume 5 CHANNEL .500 3.000 .060 1.000 .060 1.000 Pepth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 Jun COMBINE 1 JUN START 1 1 22. CATCHMEN 10.000 1.000 1.000 1.000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 77.000 .000 1.250 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .000 7.587 1 .250 7.587 1 .000 7.587 1 .250 7.000 .000 1.250 7.587 7.000 .000 1.250 7.000 7.587 1.000 7.587 7.000 7.587 7.000 7.587 1.000 7.587 7.000 7.587 7.000 7.587 1 .000 7.587 7.000 7.587 7.000 7.587 1 .250 7.000 7.587 1 .250 7.000 7.587 1 .000 7.587 1.0000 7.587 1.0000 7.587 1.0000 7.587 1.00000 7.587 1.000000000000000000000000000000000000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF 594 .694 .404 .000 c.m/s HDISPLAY 4 of Hyeto/Hydrograph chosen = .17926278-04 c.m Base Width = Left bank slope 1: Maning's 'n* 0/a Depth in metres Select Grade in % = .642 metres = .642 metres = .642 metres a .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Suppl X-fact</pre>	
27 11 9 17 14 4 15 27	ADD RUNOU HYDROGRA 5 is Volume CHANNEL .500 3.000 .060 1.000 .060 1.000 .000 Depth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 .000 84.095 .665 200.000 1 .000 84.095 .665 200.000 1 .000 1 .000 75.000 500.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 77.000 1.250 7.587 1 .250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.587 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.570 1.250 7.57	594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF .694 .404 .000 c.m/s PH DISPLAY .404 .000 c.m/s PH DISPLAY .17926278-04 c.m Base Width = .17926278-04 c.m Base Width = .17926278-04 c.m Base Width = .642 .17926278-04 c.m - - Manning's 'n* .0/a Depth in metrees - Select Grade in % = .642 metres = .464 m/sec . - .000 c.m/s conduit Length Supply X-factor <.5 . Supply X-factor <.5 Supply X-fadg (sec) Bate weighting factor .000 c.m/s . rtion Node No. .694 .615 .000 c.m/s sttion Node No. .694 .615 .615 c.m/s eroi 2=Define .694 .615 .615 c.m/s DI No. 6 99999 Area in hectares .enpth (PERV) metres .6774ient (%)	
27 11 9 17 14 4	ADD RUNOO HYDROGRA 5 is 4 Volume 5 CHANNEL .500 3.000 .0660 1.000 .060 1.000 .000 Depth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 .000 84.095 .665 200.000 1 .000 84.095 .665 200.000 1 .250 77.000 .000 75.000 500.000 1 .250 77.000 .000 75.87 1 .250 77.000 .000 .000 .000 .000 .000 .000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 77 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278-04 c.m Base Width = Left bank slope 1: Manning's 'n' 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply X-</pre>	
27 11 9 17 14 4 15 27	ADD RUNO HYDROGRA 5 is CHANNEL .500 3.000 .660 1.000 .300 Depth Velocity Flow Cap Critical ROUTE 50.000 .000 84.095 .665 200.000 1 .250 .000 .000 84.095 .665 200.000 1 .250 .000 .000 84.095 .665 200.000 1 .250 .000 .000 1 .250 .000 .000 .000 .000 .000 .000 .000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total 77 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hyeto/Hydrograph chosen = .17926278-04 c.m Base Width = Left bank slope 1: Manning's 'n" 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply X-factor <.5 Supply X-factor <.6 Supply X-factor <.6 Supply X-factor <.6 Supply X-factor <.5 Supply X-factor <.5 Supply X-factor <.5 Supply X-factor <.6 Supply X-factor <.6 Supply X-factor <.5 Supply X-factor <.5 Supply X-factor <.5 Supply X-factor <.5 Supply X-factor <.6 Supply X-factor <.5 Supply X-factor Supply X-factor //S Supply X-fact</pre>	
27 11 9 17 14 4 15 27	ADD RUNOO HYDROGRA 5 CHANNEL .500 3.000 .060 1.000 .060 1.000 .000 Pepth Velocity Flow Capp Critical ROUTE 50.000 .000 84.095 50.000 1000 84.095 200.000 11 COMBINE 1 JUN START 1 122 CATCHMEN 10.000 17.530 500.000 1.000 75.000 500.000 1.000 75.000 500.000 1.250 77.000 1.000 7.587 1 4. ADD RUNO 4. START 1 1250 7.587 1 4. ADD RUNO 4. START 1 1000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.000 500.000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.00000 1.00000000	<pre>594 .000 .404 .000 c.m/s 125 .921 .785 C perv/imperv/total FF 594 .694 .404 .000 c.m/s PH DISPLAY 4 of Hysto/Hydrograph chosen = .17926278-04 c.m Base Width = Left bank slope 1: Manning's 'n* 0/a Depth in metres Select Grade in % = .642 metres = .446 m/sec acity = 2.047 c.m/s depth = .332 metres Conduit Length Supply X-factor <.5 Supply X-</pre>	

	181.250 .678 7177.9
	181.250 .678 7177.9 181.450 1.399 8478.7 Peak Outflow = .468 c.m/s
	Peak Outflow = .468 c.m/s
	Peak Outflow = .468 c.m/s Maximum Depth = 181.154 metres Maximum Storage = 6580 c.m
	Maximum Storage = 6580. c.m
17	4.115 4.115 .468 .615 c.m/s COMBINE
	1 Junction Node No.
	4.115 4.115 .468 .709 c.m/s
18	CONFLUENCE
	1 Junction Node No. 4.115 .709 .468 .000 c.m/s
4	4.115 .709 .468 .000 c.m/s CATCHMENT
-	
	30.000 ID No.ó 99999 3.670 Area in hectares
	80.000 Length (PERV) metres
	.500 Gradient (%) 1.400 Per cent Impervious
	80.000 Length (IMPERV)
	.000 %Imp. with Zero Dpth
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n"
	77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.210 .709 .468 .000 c.m/s .425 .922 .432 C perv/imperv/total
	.425 .922 .432 C perv/imperv/total
15	ADD RUNOFF .210 .843 .468 .000 c.m/s
11	.210 .843 .468 .000 C.m/S CHANNEL
	.500 Base Width = 3.000 Left bank slope 1:
	3.000 Right bank slope 1:
	.200 Select Grade in %
	1.000 O/a Depth in metres 200 Select Grade in % Depth = .757 metres Velocity = .402 m/sec New Constitut = .401 m/sec
	Flow capacity = 1.0/1 C.m/S
9	Critical depth = .364 metres ROUTE
9	200.000 Conduit Length
	.111 Supply X-factor <.5
	372.831 Supply K-lag (sec)
	.500 Beta weighting factor
	600.000 Routing timestep 1 No. of sub-reaches
	.210 .843 .775 .000 c.m/s
17	COMBINE
	2 Junction Node No.
14	.210 .843 .775 .775 c.m/s START
±4	1 1=Zero; 2=Define
4	CATCHMENT
4	CATCHMENT 40.000 ID No.ó 99999
4	CATCHMENT 40.000 ID No.ó 99999 3.890 Area in hectares
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV)
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/c7 2=Horton; 3=Green-Ampt; 4=Repeat
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning 'n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s ADD RUNOFF .211 .211 .775 .775 c.m/s
-	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth .1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction .1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/inperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .rm/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .rm/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CNC: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV)
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Retanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 % Imp. with Zero Dpth
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SSC S(N/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS S(N/C; 2=Horton; 3=Green-Ampt; 4=Repeat
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Lurve No or C
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning 'n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning 'n" 77.000 SCS Curve No or C .100 Ia/S Coefficient
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.700 IS // 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.700 IS // 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.700 IS // 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.807 Initial Abstraction
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning 'n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning 'n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.7000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .r./s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.700 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 .775 c.m/s
15	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.800 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/SC CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/SC CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/SC GM/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.601 Is/SC CM/C; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .251 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF
15 4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 %Imp. with Zero Dpth 1 Option 1-SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (PERV) metres 1.000 Gradient (%) 1.000 ISCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.7000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .211 .775 c.m/s
15 4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 % Imp. with Zero Dpth 1 Option 1+SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1+Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .211 .211 .775 .775 c.m/s 7.687 Manning *n* 7.000 SCS CUrve No or C .100 If No.6 99999 9.180 Area in hectares 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .200 Manning *n* 7.000 SCS CUrve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1+Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1+Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 .775 c.m/s .325 .499 .775 .775 c.m/s ROUTE
15 4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.7000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.600 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .29 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .499 .775 .775 c.m/s ROUTE .000 Conduit Length
15 4	CATCEMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning 'n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF 211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 % Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning 'n" 77.000 SCS CUrve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .499 .775 .775 c.m/s ROUTE .000 Conduit Length .500 Supply X-factor <.5
15 4	CATCEMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .100 SCS Curve No or C .100 Ia/S COM/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S COEfficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 .775 c.m/s Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 .775 c.m/s ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply X-factor <.5 .000 Supply X-factor <.5 .000 Supply X-factor <.5 .000 Supply X-factor <.5 .500 Beta weighting factor
15 4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.7000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.7000 SCS Curve No or C .100 Ia/S Coefficient 1.000 Fr cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.7000 SCS Curve No or C .100 Ia/S Coefficient 1.001 Ia/S Coefficient 1.004 Ia/S coefficient 1.005 SCS Lurve No or C .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .499 .775 c.m/s ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply X-factor <.5 .000 Supply X-factor <.5 .000 Supply X-factor <.5 .000 Routing timestep
15 4	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .211 .775 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .211 .775 .775 c.m/s .425 .922 .432 C perv/imperv/total ADD RUNOFF .325 .499 .775 .775 c.m/s ROUTE .000 Supply X-factor <.5 .000 Roting timestep 1 No. of sub-reaches
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15 4 15 9	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 %Imp. with Zero Dpth 1 Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s .425 .921 .443 C perv/imperv/total ADD RUNOFF .211 .211 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (PERV) metres 1.001 IsSCS CV(? 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=FSCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=FSCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 c.m/s ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .325 .499 .499 .775 c.m/s COMBINE 2 Junction Node No.
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15 4 15 9	CATCHMENT 40.000 ID No.6 99999 3.890 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 3.700 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C? 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.600 SCS Curve No or C .100 Ia/S Coefficient 7.687 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 .775 .775 c.m/s CATCHMENT 50.000 ID No.6 99999 9.180 Area in hectares 350.000 Length (PERV) metres 1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.507 Initial Abstraction 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.607 Initial Abstraction 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 7.600 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .325 .211 .775 c.m/s ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Routing timestep 1 No. of sub-reaches .325 .499 .775 c.m/s COMBINE 2 Junction Node No. .325 .499 .499 1.182 c.m/s COMFUENCE
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To: Port Colborne Committee of Adjustment

From: Diana Vasu, Planner

Cc: David Schulz, Manager of Planning

Date: October 4, 2024

Re: Application for Minor Variance A23-24-PC

At the September 11, 2024, Committee of Adjustment (Committee) hearing, the Committee adjourned the above-referenced application to request additional information before making their decision.

The table below identifies the information requested by the Committee, the response of the applicants, and which appendix to this memorandum that the information is located.

Committee Request	Applicant Response	Location of Response	
Examples of minor variances for subdivisions that are not registered yet in other municipalities.	The applicants have provided examples of other municipalities that have granted minor variances for subdivisions that are not registered yet.	Appendix A	
A plan that shows each requested variance and the units to which those variances are proposed to apply.	The applicants have prepared a set of drawings to identify which unit each variance is proposed to apply to.	Appendix B	

Appendix A to Memorandum re: Application for Minor Variance A23-24-PC

outlook 🚺

RE: A23-24-PC

From matt@gardencitydevelopment.ca <matt@gardencitydevelopment.ca> Date Wed 9/25/2024 11:38 AM

To Denise Landry <Denise.Landry@portcolborne.ca>

Cc Taya Taraba <Taya.Taraba@portcolborne.ca>; Diana Vasu <Diana.Vasu@portcolborne.ca>

Hi Denise,

I was personally involved with the Oaks at 6 Mile Creek, Hibbard Street Townhouses and Dominion Woods in Fort Erie.

I will canvass some colleagues and see if I can find other examples.

Matt

Matt Kernahan, MCIP, RPP Garden City Development Inc. (289) 783-8598 matt@gardencitydevelopment.ca



From: Denise Landry <Denise.Landry@portcolborne.ca> Sent: September 25, 2024 10:12 AM To: matt@gardencitydevelopment.ca Cc: Taya Taraba <Taya.Taraba@portcolborne.ca>; Diana Vasu <Diana.Vasu@portcolborne.ca> Subject: RE: A23-24-PC

Hi Matt,

The committee of adjustment has requested examples of minor variances for subdivisions that are not yet registered in other municipalities. If you can share any examples staff will pass them along.

Regards, Denise

MINOR VARIANCES TO THE BYLA	W 6575-30)-18
PARENT BY-LAW 6575-30-18 ZONING DESIGNATION R3-73	REQUIRED	PROPOSED
^{7.8 a)} MIN INTERIOR LOT FRONTAGE PER UNIT (& EXTERIOR)	6.0 m	6.0 m
R3-73 MIN INTERIOR LOT AREA (& EXTERIOR)	180 m2	160 m2
MIN LOT DEPTH	N/A	N/A
7.8 c) FRONT YARD: (TO HOUSE & GARAGE)	7.5 m	6.0 m
7.8 f) REAR YARD	6.0 m	6.0 m
R3-73 SIDE YARD	1.5 m	1.5 m
7.8 e) FLANKAGE (CORNER SIDE YARD) TO HOUSE	4.5 m	3.0 m
7.8 e) FLANKAGE (CORNER SIDE YARD) TO PORCH	4.5 m	1.5 m
7.8 g) BUILDING HEIGHT / MAX.	11 m	12 m
3.2 MIN GARAGE WIDTH (OBSTRUCTED PARKING)	3.5 m	3.0 m
Alliance Homes - 22	22000	ZONING STUDY

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Alliance Homes - 223089 West Side Trails, Port Colborne, Ontario Dawn By Checked By Scale AA - 1:250 223
 DESIGN ASSOCIATES INC.
 AA
 State
 File Number

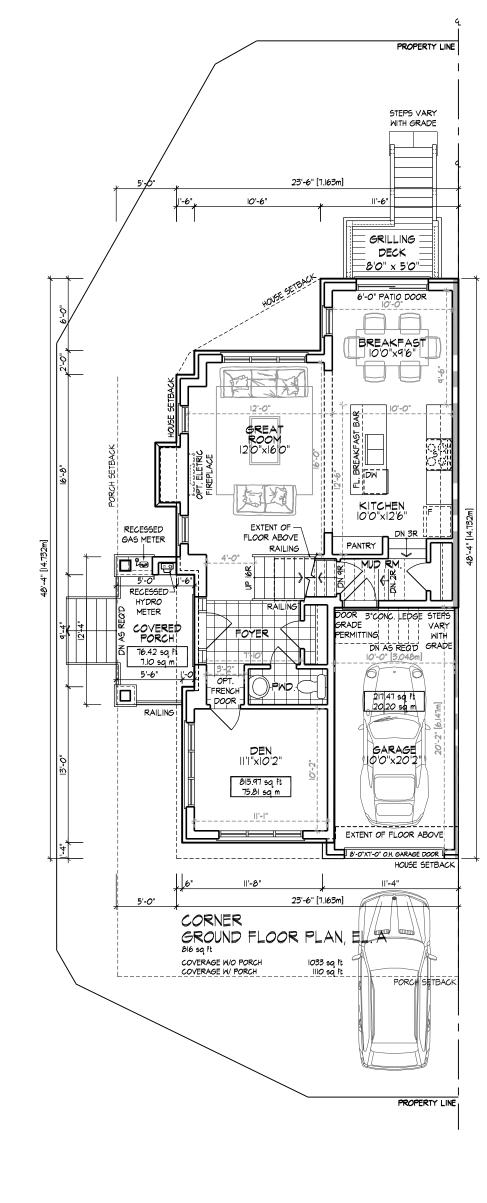
 VVVVV.huntdesign.cg
 8966.Wgodbler. Ave, Markham, ON L3R 0J7
 T 905.737.5133
 F 905.737.7326

Page Number



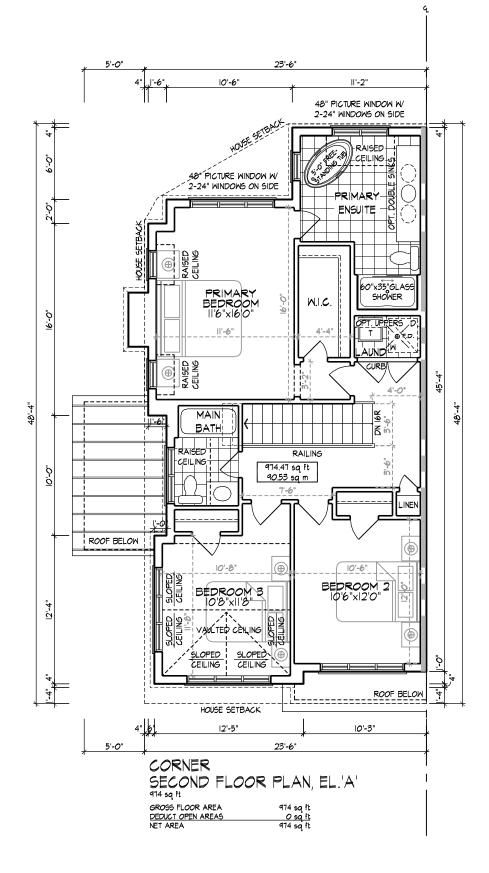
UNIT 2005 C

DESIGN ASSOCIATES INC.	HUNTER		
8966 Woodbine Ave, Markham, ON L3R 0J7 I T	South Coast Homes, Port Colborne, Ontario	Alliance Homes - 223089	



FOR 10.2mX26.82m LOTS

ZONING STANDARDS		
MAX. HOUSE WIDTH	23'-6"	
MAX. LENGTH GARAGE SIDE	48'-4"	
MAX. LENGTH HOUSE SIDE	48'-4"	
MAX. COVERAGE W/ PORCH	N/A	
MAX. COVERAGE W/O PORCH	N/A	
MAX. G.F.A.	N/A	
MAX. HEIGHT	11 m	
MIN. GARAGE WIDTH	3.5m x 5.2m	
MAX. GARAGE WIDTH	N/A	
MAX. GARAGE PROJ.	N/A	





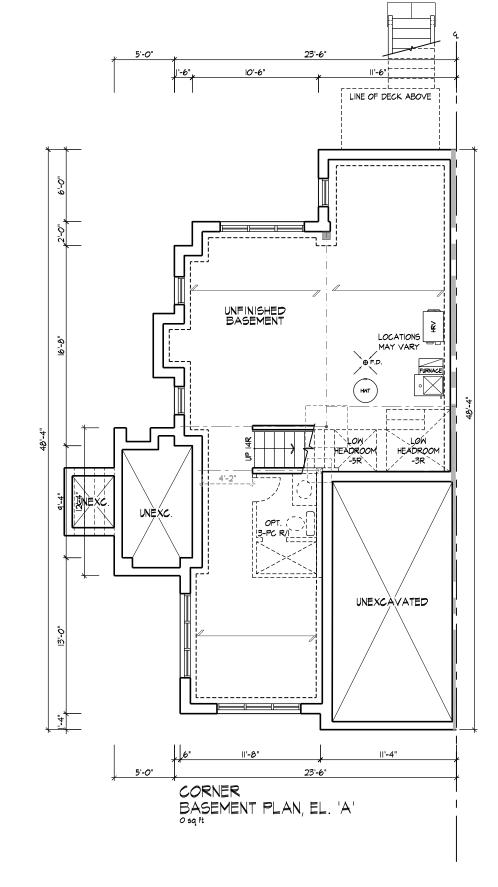
UNIT 2005 C

TARGET AREA: 1800 SF

AREA - EL. 'A' 1790 SF // EL. 'B' 1774 SF

UNIT 2005 C

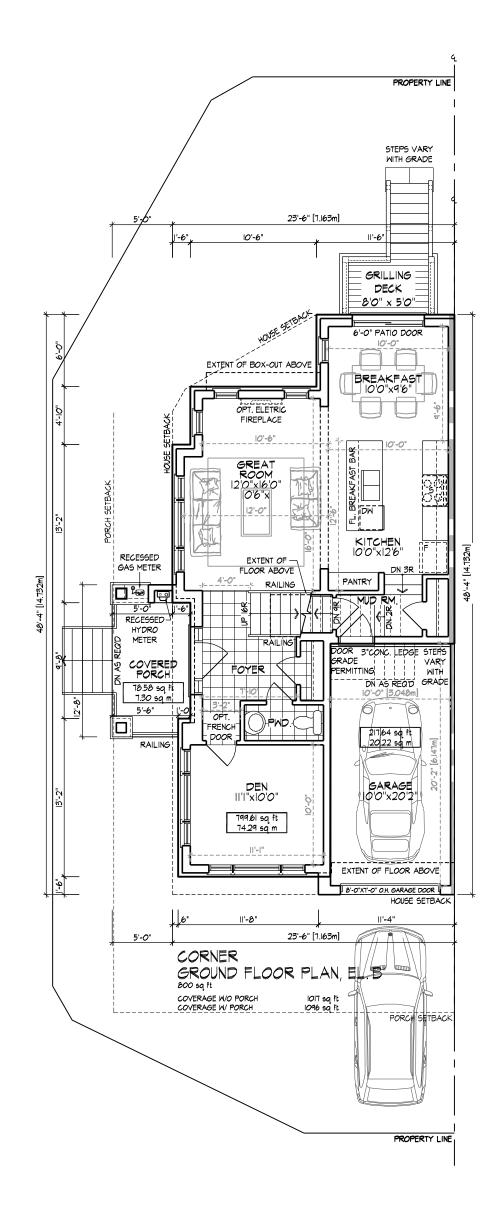






UNIT 2005 C



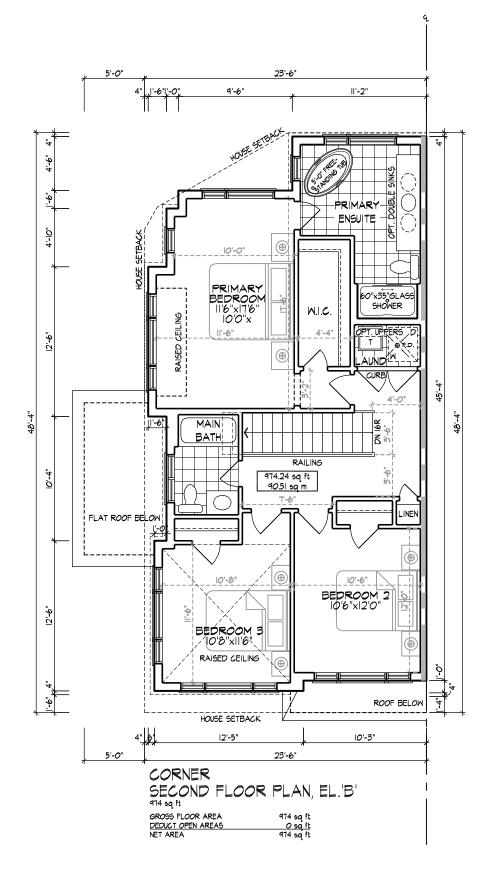


FARGET AREA: 1800 SF

AREA - EL. 'A' 1790 SF // EL. 'B' 1774 SF

UNIT 2005 C



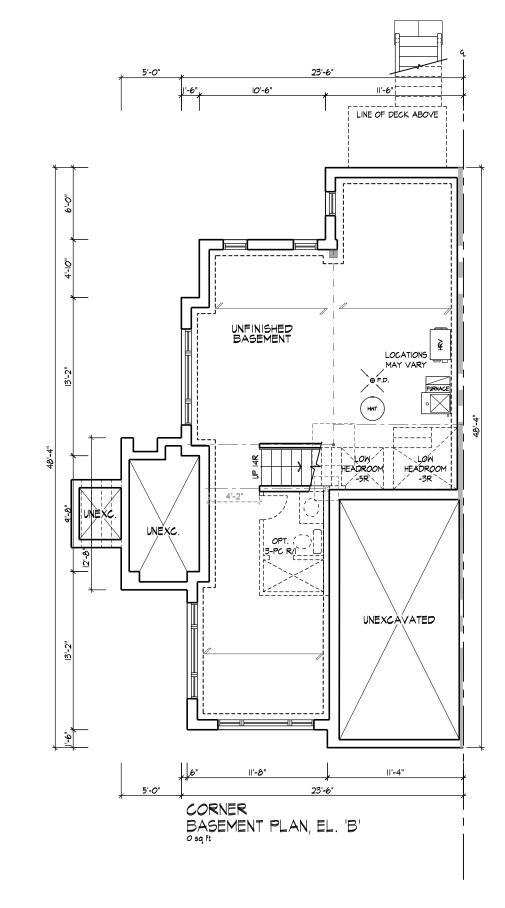


TARGET AREA: 1800 SF

AREA - EL. 'A' 1790 SF // EL. 'B' 1774 SF

UNIT 2005 C





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Alliance Homes - 223089 South Coast Homes, Port Colborne, Ontario 8966 Woodbine Ave, Markham, ON LSR 0J7 = T 905.737.5133 = F 905.737.7326 =

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Alliance Homes - 223089 South Coast Homes, Port Colborne, Ontario 8966 Woodbine Ave, Markham, ON L3R 0J7 II T 905.737.5133 II F 905.737.7326 II All drawhgs specifications, related documents and design are the copyright property of Hunt Design Associates (HDA). Reproduction

UNIT 2005 C





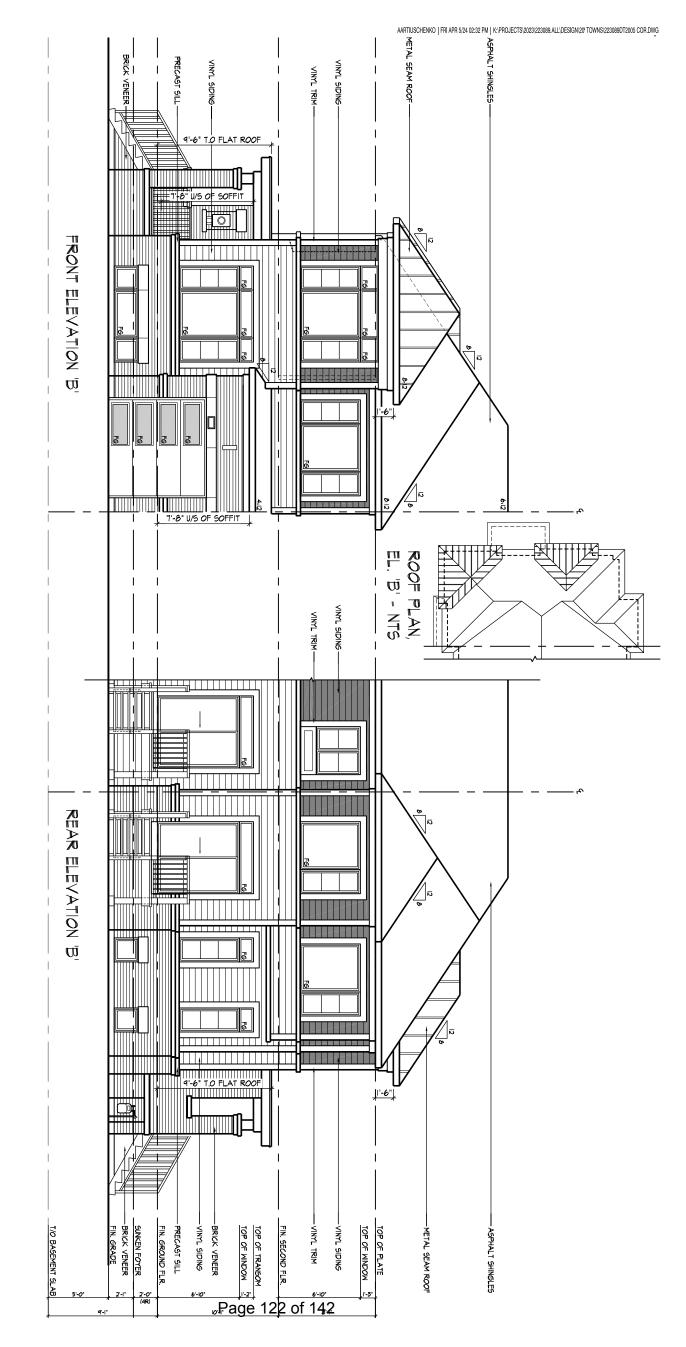
	VINTL SIDING	VINYL TRIM	VINTL SIDING
FLANKAGE ELEVATION 'A'			
T∕Ø BASEMENT SLAB 5-0°	TOP OF TRANSOM TOP OF TRANSOM TOP OF MINDOM		TOP OF PLATE

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UNIT 2005 C



			AGFHALT SHINGLES
FLANKAGE ELEVATION 'B'			
T/O BASEMENT SLAB	TOP OF TRANSOM TOP OF TRANSOM TOP OF TRANSOM TOP OF TRANSOM PRECAST STOLE FIN. GROUND FLR. FIN. GROUND FLR. FIN. GROUND FLR. FIN. GROUND FLR. PRECAST SILL FIN. GROUND FLR. FIN. GROUND	<u>7</u> 0 2	METAL SEAM ROOF

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MINOR VARIANCE APPLICATION

THE CITY OF PORT COLBORNE

The Planning Act - Section 45

DEVELOPMENT AND LEGISLATIVE SERVICES

For Office Use Only Date Received: Date of Completion:

Application Complete:
 Yes
 No

SUBMISSION OF APPLICATION

Completed applications can be sent to:

	City of Port Colborne
	Taya Taraba
Secretary	Treasurer of the Committee of Adjustment
,	City Hall
	66 Charlotte Street
	Port Colborne, Ontario L3K 3C8

Telephone: 1-905-835-2900 ext. 204 1-905-835-2939 Fax: taya.taraba@portcolborne.ca Email:

1

2024 APPLICATION FEES

Minor Variance	\$1,383
Minor Variance (Building without a Permit)	\$1,805
Minor Variance & Consent Combination	\$2,528

COMPLETENESS OF APPLICATION

A complete application includes all required forms, fees, and applicable sketches, as well as any additional information that may be identified by the Secretary-Treasurer in accordance with the provisions under the Planning Act, R.S.O. 1990, c.P. 13, as amended.

To be considered complete, submitted applications must include:

- --- One fully completed application for minor variance or permission signed by the applicant(s) and/or authorized agent and properly witnessed by a Commissioner for the taking of affidavits.
- A letter of authorization from the property owner, if applicable.
- --- Two (2) copies of a <u>completed</u> preliminary drawing (see the "Drawing Requirements" section).
- Payment of the appropriate fee submitted at the time of application through cash, credit, debit, or cheque payable to the City of Port Colborne.
- Payment of the appropriate Regional Review & Approval fee(s) if required by the Region, submitted at the time of the preliminary review. Payment can be submitted to the City of Port Colborne or to the Niagara Region. If payment is submitted to the Region directly, please submit the receipt to the City of Port Colborne. Failure to pay the Region's fee may result in an incomplete application. The Region's fees are available on its website, https://www.niagararegion.ca/business/fpr/forms_fees.aspx
- Payment of the appropriate NPCA fee, if required, submitted at the time of the preliminary review. Payment can be submitted to the City of Port Colborne or to the NPCA. If payment is submitted to the NPCA directly, please submit the receipt to the City of Port Colborne. Failure to pay the NPCA's fee may result in an incomplete application.

*Note: Additional information may be required once a full review has been completed by planning staff. This may prevent deferral of your application. *

DRAWING REQUIREMENTS

Please submit two copies of each separate plan along with your completed application. Ensure that all the information below is included in the plan(s). Depending on the extent of the proposal, the **Planning Division may request a sketch prepared by a professional, and the Committee may require (at the discretion of the Manager of Planning Services) that the sketch be signed by an Ontario Land Surveyor.** This requirement can be clarified by the Planning Staff. The required sketch should be based on an actual survey by an Ontario Land Surveyor or drawn to a usable metric scale [e.g., 1:100, 1:300, 1:500].

To be considered complete, each sketch must identify:

- 1. The boundaries and dimensions of the land / lot.
- 2. The location and nature of any easement affecting the land, if applicable.
- 3. The location, size, height, and type of all existing and proposed buildings and structures on the land, indicating the distance of the buildings or structures from the front lot line, rear lot line and the side lot lines.
- 4. The parking areas, loading spaces, driveway entrance / exits.

PROCEDURES FOR PROCESSING APPLICATIONS FOR MINOR VARIANCE OR PERMISSION

Once the Secretary-Treasurer has received an application, the application will be circulated to external agencies for up to 10 days to determine whether additional information and/or fees are required. Once comments from these agencies have been received, the Secretary-Treasurer will inform the applicant of any additional information and/or fees required by these agencies (ie. Niagara Region, Niagara Peninsula Conservation Authority). If applicable, the applicant must submit this additional information and/or pay the additional fees for their application to be deemed complete. Once the application is deemed complete, a hearing date will be confirmed in writing by the Secretary-Treasurer.

Prior to the hearing, members of the Committee may choose to conduct a site visit and/or contact the applicants. **Please note that the Committee should not be contacted by members of the public.** Any comments, questions, or concerns should be addressed through the Planning Division.

Following the hearing, the applicant/agent/solicitor will be notified of the Committee's decision in a written Notice of Decision. In addition, any other person or agency who filed a written request for the Committee's decision will be sent a copy. Any applicant objecting to the decision of the Committee, or the condition(s) imposed by the Committee may appeal the decision to the Local Planning Appeal Tribunal within 20 days after the Notice of Decision has been given. The notice of appeal, together with written reasons supporting the appeal and the fee, by certified cheque or money order payable to the Minister of Finance, must be filed with the Secretary-Treasurer, who in turn, will forward the appeal to the Local Planning Appeal Tribunal. The fee is \$300.00 for the first application to be appealed and \$25.00 for each additional related minor variance appeal.

NIAGARA PENINSULA CONSERVATION AUTHORITY REVIEW

Fees which are payable directly to Authority vary depending on the location and on the type of application. For land: abutting or within 15 meters of a water course; on or within 30 meters of the Lake Erie shoreline; on land identified as "Hazard Land" or "Environmental Protection" by the Port Colborne Official Plan or Zoning Bylaw; or within a groundwater recharge / discharge area, aquifer, or headwater on the property or within 30 meters of the property, the Niagara Peninsula Conservation Authority will charge an additional Plan Review Fee. These fees are provided on the Niagara Peninsula Conservation Authority's website.

I acknowledge that I have read, understand, and agree to the terms outlined above.		
Name: Matt Kernahan	Date: June 21, 2024	Initials: MK

2



MINOR VARIANCE APPLICATION

THE CITY OF PORT COLBORNE

DEVELOPMENT AND LEGISLATIVE SERVICES

The Planning Act – Section 45

SECTION 1 : CONTACT INFORMATION

1.1 Registered Owner (s):		
Name: 2600261 Ontario Inc.		
Mailing Address: 90 Allstate Parkway, Suite 7	01	
City: Markham	Province: Ontario	
Postal Code: L3R 6H3	Telephone: 416-809-3782	
Fax:	Email: marcelostrongco@gmail.com	
1.2 Owner's SOLICITOR (if applicable)		
Name: CHAITONS LLP.	- MARK WILLIS - O' CONNOR	
Mailing Address: 5000 YONG		
City: NORTH YORK	Province: ONTAPLO	
City: NORTH YORM Postal Code: M2N 7E9	Telephone: 416 218 1160	
Fax:	Email: MARKW@CHAITONS.COM	
1.3 Owner's Authorized AGENT (if app	licable)	
Name: Matt Kernahan		
Mailing Address: 5751 Jake Crescent		
City: _{Niagara} Falls	Province: Ontario	
Postal Code: L2H 0G3	Telephone: 289.783.8598	
Fax:	Email: matt@gardencitydevelopment.ca	
1.4 Owner's ONTARIO LAND SURVEYOR (if applicable)		
Name:		
Mailing Address:		
City:	Province:	
Postal Code:	Telephone:	
Fax:	Email:	
1.5 All communications should be sent to the:		
🕅 Owner 🗆 Solicitor	☑ Agent	

SECTION 2: LOCATION OF SUBJECT LAND

Former Municipality: HUmberstone	
Concession No. 2	Lot(s): Part of Lot 31
Registered Plan No. 59R11866	Lot(s):
Reference Plan No.	Part(s): 2 to 5
Name of Street:	Street No.

SECTION 3: SUBJECT LAND DESCRIPTION

Part No. On Sketch:

21	Lot Description -	to Northland Catatan -	Draft Plan of Subdivision (June 2024)
	ntage:	Depth:	Area:
	sting Use: Vacant	•	
		aluad upo park stormwa	ter management pond and environmental conservation
3.2	What is the current o	lesignation of the lan	d in the Official Plan and the Regional Plan?
	Colborne Official Plan;		onfield
	ional Policy Plan: _{Green}		
3.3	What is the current z	coning of the land (By	r-law 6575/30/18)?
R3-7	3		
_	CTION 4: LAN		
4.1	Date and Subject Land	was acquired by the C	urrent Owner:
2010	6		OTHER CONTRIABILE office the land?
		EASMENTS OR RESTRI	CTIVE COVENANTS affecting the land? ement or covenant and its effect:
		If "Yes" describe the ease Consumer gas pipeline ea	
4.3	MORTGAGES, Charges 8	Other Encumbrances:	
List	the name(s) and address(es) of any mortgages, ch	arges, or other encumbrances in respect of the land.
NA.			
4.4	DATE OF CONSTRUCTIO	N of all existing building	s and structures on the land:
NA			
	Type of ACCESS		
	Provincial Highway		Municipal Road maintained seasonally
	Regional Road		□ Right-of-Way □ Water Access
_	Municipal Road maintain Other Public Road	ied all year	Valer Access Private Road
4.6	What type of WATER SI	JPPLY is proposed?	
	Publicly owned and oper		
	Lake		
	Well (private or commun	nal)	
	Other (specify)		
4.7	What type of SEWAGE	DISPOSAL is proposed?	
	Other (specify)		
4.8	4.8 What type of STORMWATER DISPOSAL is proposed?		
Ø			
	Other (specify)		
4.9	4.9 Has a Pre-Consultation application been filed for this proposal?		
□ Yes ☑ No			
If \	If Yes, please indicate the meeting date:		

4

SECTION 5: NATURE & EXTENT OF RELIEF FROM THE ZONING BY-LAW

 3- (By-law 6575-30-18, 7.8 e) Minimum Flankage to Porch = 1.5 m 4. (By-law 6575-30-18, 7.8 g) Maximum Building Height = 12.0 m 3. (By-law 6575-30-18, 3.2) Minimum Garage Width (Obstructed Parking) = 3.0 m 3. (By-law 6575-30-18, 2.19.1) Minimum setback of uncovered stairs to first storey from lot line = 0.3 5.2 Why is it not possible to comply with the Zoning By-law? 5.2 Why is it not possible to comply with the Zoning By-law? 5.3 Does the structure(s) pertaining to the application for Minor Variance already exist? Yes 		
I. (By-law 7141/83/23, 3. a) Minimum Lot Area for Townhouses (Interior and Exterior) – 160 m2 (By-law 6575-30-18, 7.8 c) Minimum Front Yard to House and Garage – 6.0 m T. (By-law 6575-30-18, 7.8 c) Minimum Flankage to House – 3.0 m (Ity-law 6575-30-18, 7.8 c) Minimum Flankage to Porch – 1.5 m (By-law 6575-30-18, 7.8 g) Maximum Building Height – 12.0 m S. (By-law 6575-30-18, 7.8 c) Minimum Garage Width (Obstructed Parking) – 3.0 m 7. (By-law 6575-30-18, 2.19.1) Minimum Setback of uncovered stairs to first storey from lot line – 0.3 5.2 Why is it not possible to comply with the Zoning By-law? Development needs to be more compact to improve affordability. 5.3 Does the structure(s) pertaining to the application for Minor Variance already exist?	5.1 Nature and Extent of Relief from the Zoning By-law:	
2. (By-law 6575-30-18, 7.8 c) Minimum Flankage to House = 3.0 m 3. (By-law 6575-30-18, 7.8 c) Minimum Flankage to House = 3.0 m 3. (By-law 6575-30-18, 7.8 c) Minimum Flankage to Porch = 1.5 m 3. (By-law 6575-30-18, 7.8 c) Minimum Garage Width (Obstructed Parking) = 3.0 m 3. (By-law 6575-30-18, 3.2) Minimum Garage Width (Obstructed Parking) = 3.0 m 3. (By-law 6575-30-18, 2.19.1) Minimum setback of uncovered stairs to first storey from lot line = 0.3 7. (By-law 6575-30-18, 2.19.1) Minimum Setback of uncovered stairs to first storey from lot line = 0.3 5.2 Why is it not possible to comply with the Zoning By-law? 5.2 Why is it not possible to comply with the Zoning By-law? 5.3 Does the structure(s) pertaining to the application for Minor Variance already exist? 5.4 No		
5. (By-law 6575-30-18, 7.8 g) Maximum Building Height – 12.0 m 3. (By-law 6575-30-18, 3.2) Minimum Garage Width (Obstructed Parking) – 3.0 m 7. (By-law 6575-30-18, 2.19.1) Minimum setback of uncovered stairs to first storey from lot line – 0.3 5.2 Why is it not possible to comply with the Zoning By-law? 5.2 Why is it not possible to comply with the Zoning By-law? Development needs to be more compact to improve affordability. 5.3 Does the structure(s) pertaining to the application for Minor Variance already exist? Yes	2. (By-law 6575-30-18, 7.8 c) Minimum Front Faid to Flouse and Garage Comments 2. (By-law 6575-30-18, 7.8 c) Minimum Flankage to House – 3.0 m	or) – 160 m2
7. (By-law 6575-30-18, 2.19.1) Minimum setback of uncovered statistic metric detect, where detection is the detection of the de	5. (By-law 6575-30-18, 7.8 g) Maximum Building Height – 12.0 III	rom lot line – 0.3n
Development needs to be more compact to improve affordability	7. (By-law 6575-30-18, 2.19.1) Minimum selback of uncovered starts to met etc. 9	
Development needs to be more compact to improve affordability		
Development needs to be more compact to improve affordability		
Development needs to be more compact to improve affordability		
Development needs to be more compact to improve affordability		
Development needs to be more compact to improve affordability	5.2 Why is it not possible to comply with the Zoning By-law?	
5.3 Does the structure(s) pertaining to the application for Minor Variance already exist?		
□ Yes	Development needs to be more compact to improve affordability.	
□ Yes		
□ Yes	$\mathbf{F}_{\mathbf{a}}^{2}$. Denote the extructure(s) pertaining to the application for Minor Variance al	ready exist?
5.4 If the answer to 5.3 is YES, has a building permit been issued?	 No 5.4 If the answer to 5.3 is YES, has a building permit been issued? 	
Yes		
☑ No	☑ No	

If the answer is "Yes," please provide the following information:

Decision:

SECTION 6: ALL EXISTING, PREVIOUS AND ADJACENT USE OF THE LAND

8.1 ALL EXISTING USE			
⊠ Residential □ Industrial □ Commercial	 Institutional Agricultural Parkland 	□ Vacant □ Other (specify):	
8.2 What is the length of time the existing use(s) of the land have continued?			
50+ years 8.3 Are there any buildings or structures on the subject land?			
🕅 Yes 🗆 No			
If Yes, briefly describe and indicate their use. Single detached dwelling (to be demolished once mixed use development proceeds).			
	*		5

8.4 Are any of these buildings designated under the Ontario Heritage Act?		
□ Yes	☑ No	Unknown
	ubject land been changed by o	adding earth or material? Has
□ Yes	🖾 No	Unknown
8.6 Has a gasoline station land or adjacent lands at an	and/or automobile service stat	ion been located on the subject
□ Yes	No No	□ Unknown
8.7 Has there been petrole	um or other fuel stored on the	subject land or adjacent lands?
□ Yes	☑ No	
8.8 Are there or have there subject land or adjacent land	e ever been underground storc ds?	age tanks or buried waste on the
🗆 Yes	🖾 No	Unknown
8.9 Have the lands or adjac pesticides have been applie	ent lands ever been used as a d to the lands?	n agricultural operation where
□ Yes	⊠ No	
8.10 Have the lands or adj	acent lands ever been used as	a weapon firing range?
□ Yes	⊠ No	Unknown
8.11 Is the nearest bounda	ary line of the application with onal / non-operational public	in 500 metres (1,640 feet) of the or private landfill or dump?
□ Yes	☑ No	
8.12 If there are existing or previously existing buildings on the subject lands, are there any building materials remaining on site which are potentially hazardous to public health (e.g., asbestos, PCB's)?		
□ Yes	☑ No	
8.13 If there has been industrial or commercial uses on the property, a previous use inventory is needed. Is a previous use inventory attached?		
☐ Yes	☑ No	🗆 Unknown
8.14 Is there reason to believe the subject lands may have been contaminated by existing or former uses on the site or adjacent sites?*		
T Yes	🖾 No	
If previous use of property is industrial or commercial or if the answer was YES to any of the above, please attach a previous use inventory showing all former uses of the land, or if applicable, the land(s) adjacent to the land. *Possible uses that can cause contamination include operation of electrical transformer stations, disposal of applicable uses that can cause contamination include operation of electrical transformer stations, disposal of		
*Possible uses that can cause contamination include operation of electrical transformed database, and spills. Som		

*Possible uses that can cause contamination include operation or electrical transformed activities, and spills. Some waste minerals, raw material storage, and residues left in containers, maintenance activities, and spills. Some commercial properties such as gasoline stations, automotive repair garages, and dry-cleaning plants have similar potential. Any industrial use can result in potential contamination. The longer a property is under industrial or similar use, the greater the potential for site contamination. Also, a series of different industrial or similar uses upon a site could potentially increase the number of chemicals which are present.

ACKNOWLEDGMENT CLAUSE

I hereby acknowledge that is my responsibility to ensure that I am in compliance with all applicable laws, regulations and standards pertaining to contaminated sites. I further acknowledge that the City of Port Colborne is not responsible for the identification and / or remediation of contaminated sites, and I agree, whether in (or as a result of) any action or proceeding for environmental clean-up of any damage or otherwise, I will not sue or make claim whatsoever against the City of Port Colborne, its officers, officials, employees or agents for or in respect of any loss, damage, injury or costs.

X June 24/ 2024 Signiture of Owner,

NIAGARA PENINSULA CONSERVATION AUTHORITY

Pre-Screening Criteria

9.1 Is there land on the property identified in the Official Plan and / or Zoning By-law as "hazard lands"?		
□ Yes	☑ No	Unknown
9.2 Is there a watercourse or municipal drain on the property or within 15 metres of the property?		
□ Yes	⊠ No	
9.3 Is the property located on or within 30 metres of the Lake Erie shoreline?		
□ Yes	☑ No	
9.4 Is there a valley slope on the property?		
□ Yes	⊠ No	Unknown
9.5 Is there known localized flooding or a marsh / bog area on or within 30 metres of the property?		
🗆 Yes	⊠ No	Unknown
9.6 Is the property on a Regional Road?		
□ Yes	☑ No	

SIGNATURE OF APPLICANT(S)

July 12,20

ature of Applicant(s)

Please note:

If the applicant is not the owner of the subject land or there is more than one owner, written authorization of the owner(s) is required (Complete Form 1) indicating that the applicant is authorized to make application.

I/We Matt Kernahan

Of the City/Town/Township of <u>Niagara Falls</u>

In the County/District/Regional Municipality of Niagara

solemnly declare that all the statements contained in this application are true, and I/we make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act.

DECLARED before me at the In the day This 20

TO BE SIGNED IN THE PRESENCE OF A COMMISIONER FOR TAKING AFEIDAVITS Signature of applicant(s), solicitor, or authorized

A Commissioner, etc.

Personal information collected on this application will become part of a public record. Any questions regarding this collection should be directed to the City Clerk at 66 Charlotte Street, Port Colborne, Ontario L3K 3C8 (905) 835-2900 Ext. 106.

Diana-Vasu, a Commissioner, etc., Province of Ontario, for the Corporation of the City of Port Colborne. Expires July 3, 2026.

POSTING OF PUBLIC HEARING SIGN

A public hearing sign is required to be posted by all applicants or agents on each property under application. A sign will be made available to you after review of your application, and you are required to post each sign in a prominent location on the subject property. The sign should be placed so that it is legible from the roadway.

Each sign must remain posted a minimum of 14 days prior to the hearing, until the day following the hearing. Should a sign go missing or become damaged or illegible please contact the Secretary-Treasurer as soon as possible to request a replacement sign. Failure to post the sign as required may result in deferral of you application(s).

Please note that an affidavit must also be signed and commissioned in the presence of a Commissioner of Oaths. This can be done at City Hall AFTER the signs have been posted.

I/We Matt Kernahan (Agent)

Signature of Owner/Agent

am/are the

owner(s) of the land subject to this application for a Minor Variance and I/We agree to post the required sign(s) a minimum of 14 days prior to the hearing and will remain posted, and replaced, if necessary, until the day following the hearing.

X July 12, 2024 Signature of Owner/Agen Х

PERMISSION TO ENTER Hernandlez am/are the Marcelo I/We owner(s) of the land subject to this application for a Minor Variance and I/We authorize the members of the Committee of Adjustment and the City of Port Colborne Planning Staff to enter onto the property for the purpose of evaluating the merits of the application(s). *Please note that the Committee should not be contacted by members of the public. Any comments, questions or concerns should be addressed through the Planning Division.* X June 24 gnature of Ov Signature of Owner

AUTHORIZATION FOR AGENT / SOLICITOR (IF APPLICABLE) If the application is not the owner of the lane that is subject to this application for a Minor Variance, the authorization set out below must be completed by the owner(s). All registered owners must complete the authorization form for it to be valid. Please Note: If the registered owner is a corporation, in addition to the signatures of the authorized signing officers, the corporate seal must be affixed. Where the Owner is without a spouse, common-law or legally married, the Owner is required to sign only once. Where the spouse of the Owner is not an owner, the spouse is required to sign. Spouse shall include a common-law spouse as defined within the Family Law Reform Act. 2600261 ONTARIO WE, MARCOLO HERNANDEZam/are the I/We owner(s) of the land that is subject to this application for a Minor Variance and I/We hereby authorize as my/our agent for the purposes of submitting an application(s) to the Committee of Adjustment for a Minor Variance. 24 X June inature of Owner Date Signature of Owner Date Signature of Agent

ï

Notice of your application is required for several agencies. All written responses will be considered before reaching a decision on your application.

Although you are under no obligation to do so, we suggest that you discuss your intentions with the appropriate agencies from the list below, before submitting an application. This pre-consultation could provide you with information about the City of Port Colborne Official Plan, the minimum requirements and permitted uses of Zoning By-law 6575/30/18, the Regional Policy Plan, the concerns of various Provincial Ministries, and other relevant information which may have a direct effect upon the final decision on your application.

- Port Colborne Planning and Development Department 66 Charlotte Street, Port Colborne, Ontario L3K 3C8 General Planning Department (905) 835-2900, Ext. 286 Information on the Port Colborne Official Plan and Zoning Bylaw
- 2. Port Colborne Planning and Development Department 66 Charlotte Street, Port Colborne, Ontario L3K 3C8 Engineering Technologist (905) 835-2900, Ext. 226 Information on Servicing, Lot Grading and Drainage
- Port Colborne Building Division
 66 Charlotte Street, Port Colborne, Ontario L3K 3C8
 Building Clerk
 (905) 835-2900, Ext 229
 Information about the Building Code
- Region of Niagara Public Works Department Planning and Development Department 1815 Sir Isaac Brock Way, Thorold, Ontario L2V 4T7 (905) 980-6000, Ext. 3727 Information about the Regional Policy Plan, Agriculture, Public Works & Regional Health, and for concerns regarding Provincial Policy and Ministry responsibilities
- The Niagara Peninsula Conservation Authority
 250 Thorold Road West, Welland, Ontario L3C 3W2
 Watershed Planner
 (905) 788-3135, Ext 272
 For information about lands which may be zoned as "Hazard" in the local zoning by law, lands adjacent to watercourses, Lake Erie or flood plains
- Ministry of Transportation of Ontario
 Corridor Management Section
 159 Sir William Hearst Ave, 7th Floor, Toronto, Ontario M3M 1J8
 For information about sight plan applications for lands fronting onto provincial highways
- Ministry of Transportation of Ontario Corridor Management Section
 1201 Wilson Avenue, Bldg D, 7th Floor, Downsview, ON, M3M 1J8
 1-866-636-0663
 For information about official plan amendments, consents, re-zonings, and other inquiries for lands fronting onto provincial highways
- Ministry of Municipal Affairs and Housing. Provincial Policy Statement (PPS) available for download (On-line) at: <u>http://www.mah.gov.on.ca</u> Under "Your Ministry" – Land Use Planning – Provincial Policy Statement



Committee of Adjustment -Meeting Minutes-

Wednesday, September 11, 2024

Members Present:	Dan O'Hara, Chair
	Angie Desmarais, Committee Member
	Eric Beauregard, Committee Member
	Gary Bruno, Committee Member

Staff Present: Denise Landry, Chief Planner Diana Vasu, Planner Taya Taraba, Acting Secretary-Treasurer

- Call Meeting to Order
 The Chair called the meeting to order at approximately 6:00 p.m.
- Reading of Meeting Protocol
 The Chair read the Meeting Protocol.
- Disclosures of Interest
 Member Beauregard declared an indirect pecuniary interest on application(s)
 A23-24-PC, as his employer is an agent for the owner of the Subject Lands.
- 4. Requests for Deferrals or Withdrawals of Applications Nil.
- 5. Order of Business
 - a. Application: B11-24-PC; B15-24-PC
 Action: Consent
 Agent: Weston Consulting
 Applicant: One Forty Development Inc.
 Location: 5088 Highway 140

The Secretary-Treasurer read the correspondence received for the application.

The Chair asked the applicant if they wanted to add any further information on the application; the agent gave a short presentation describing the nature of the application and the development.

A member of the public had asked whether the development planned to include sidewalks along Forkes Road to make the area safer and more accessible for residents living within the neighbourhood. The agent reassured the public that there will be stages for them to work through City standards regarding the development.

There were no further comments from the Committee or members of the public.

That consent application **B11-24-PC** be **granted** subject to the conditions outlined in the staff report dated September 6th, 2024:

1. That application B15-24-PC be granted.

2. That the applicant provides the Secretary-Treasurer with the deeds for the conveyance of the subject parcels, with a paper and electronic copy of the deposited reference plan, for use in the issuance of the Certificate of Consent.

3. That a final certification fee of \$240 payable to the City of Port Colborne is submitted to the Secretary-Treasurer.

4. That a drainage apportionment agreement be completed by an approved engineer at the cost of the applicant, with a copy of the deposited plan to be delivered to the Drainage Superintendent through the planning department for the apportionment agreement to be completed, to the satisfaction of City staff.

5. That the owner enters into a Development Agreement with the City Port Colborne to require the identification of the permanent roadway location for the roadway that will service the "lands to be severed" identified on the severance sketch, such that the City will be able to place the water and sanitary into a future Right of Way, and that vehicular traffic will be provided adequate access to Highway 140 from municipal streets prior to site occupancy, to the satisfaction of City staff.

6. That the applicant submits an affidavit that Parts 4 and 5 will merge, to the satisfaction of City staff.

7. That all conditions of consent be cleared by September 11, 2026.

For the following reasons:

 The application is consistent with the Provincial Policy Statement and conforms to the Growth Plan for the Greater Golden Horseshoe, the Regional Official Plan, City of Port Colborne Official Plan, will comply with the provisions of Zoning By-law 6575/30/18, as amended, and with O. Reg. 337/24. That consent application **B15-24-PC** be **granted** subject to the conditions outlined in the staff report dated September 6th, 2024:

1. That the applicant provides the Secretary-Treasurer with the deeds for the conveyance of the subject parcel or a registrable legal description of the subject parcel, together with a paper copy and electronic copy of the deposited reference plan, if applicable, for use in the issuance of the Certificate of Consent.

2. That a final certification fee of \$240 payable to the City of Port Colborne is submitted to the Secretary-Treasurer.

3. That application B11-24-PC be granted.

4. That all the conditions of consent for application B11-24-PC be cleared.

5. That all conditions of consent be cleared by September 11, 2026.

For the following reasons:

 The application is consistent with the Provincial Policy Statement and conforms to the Growth Plan for the Greater Golden Horseshoe, the Regional Official Plan, City of Port Colborne Official Plan, will comply with the provisions of Zoning By-law 6575/30/18, as amended, and with O. Reg. 337/24.

Motion: Angie DesmaraisSeconded: Eric BeauregardCarried: 4-0

b. Application: A20-24-PC
Action: Minor Variance
Agent: Isaac Adams
Applicant: Emily and Andrew Brondes
Location: 1628 Third Concession Road

The Secretary-Treasurer read the correspondence received for the application.

The Chair asked the applicant if they wanted to add any further information on the application; the applicant expanded on the reason for requesting the variance.

Member Beauregard questioned what the building would be used for and asked the applicant to provide clarification on the nature of the application.

The applicant answered that the building would be used for both storage and an accessory dwelling unit.

Member Desmarais questioned Staff regarding Melissa Bigford-Loquists concerns submitted in August 2024. The Chief Planner mentioned that the resident's inquiries were addressed within the Staff Beport.

Concerns were addressed regarding why the variance was not applied for during the building permit phase.

Melissa Bigford-Loquists presented points encompassing the development being located within NPCA regulated lands and also any potential violations of the minor variance.

There were no further comments from the Committee or members of the public.

That minor variance application **A20-24-PC** be **granted** for the following reasons:

1. The application is minor in nature.

2. It is appropriate for the development of the site.

3. It is desirable and in compliance with the general intent and purpose of the Zoning By-Law.

4. It is desirable and in compliance with the general intent and purpose of the Official Plan.

Motion: Eric Beauregard	Seconded: Gary Bruno
Carried: 4-0	

c. Application: A21-24-PC
Action: Minor Variance
Applicant: Henley Heights Construction Inc.
Location: VL Steele Street

The Secretary-Treasurer read the correspondence received for the application.

The Chair asked the applicant if they wanted to add any further information on the application. The applicant had no additional information to add.

Member Beauregard inquired as to whether there was enough parking for the property, to which both Staff and the applicant reassured that there was.

There were no further comments from the Committee or members of the public.

That minor variance application **A20-24-PC** be **granted** for the following reasons:

1. The application is minor in nature.

2. It is appropriate for the development of the site.

3. It is desirable and in compliance with the general intent and purpose of the Zoning By-Law.

4. It is desirable and in compliance with the general intent and purpose of the Official Plan.

Motion: Gary Bruno	Seconded: Angie Desmarais
Carried: 4-0	

d. Application: A22-24-PC
Action: Minor Variance
Applicant: Henley Heights Construction Inc.
Location: VL Fielden Avenue

The Secretary-Treasurer read the correspondence received for the application.

The Chair asked the applicant if they wanted to add any further information on the application. The applicant had no additional information to add.

There were no further comments from the Committee or members of the public.

That minor variance application **A20-24-PC** be granted for the following reasons:

1. The application is minor in nature.

2. It is appropriate for the development of the site.

3. It is desirable and in compliance with the general intent and purpose of the Zoning By-Law.

4. It is desirable and in compliance with the general intent and purpose of the Official Plan.

Motion: Gary Bruno	Seconded: Eric Beauregard
Carried: 4-0	

e. Application: A23-24-PC Action: Consent Agent: Matt Kernahan Applicant: 260026 Ontario Inc. Location: VL Northland Avenue

The Secretary-Treasurer read the correspondence received for the application.

The Chair asked the applicant if they wanted to add any further information on the application. The agent outlined concerns from the public.

Member Bruno inquired about the nature of the minor variance increasing the density of housing on the land if the setbacks are altered.

The applicant responded that it could facilitate the increase in density and about why a variance was applied for over a Zoning By-Law amendment.

Shane Parisi inquired about the negative effects on traffic regarding the development as there is only two vehicular exits.

The Committee motioned to adjourn the application until more information could be provided regarding which lots the variances applied to.

There were no further comments from the Committee or members of the public.

Motion: Angie Desmarais	Seconded: Gary Bruno
Carried: 4-0	

f. Application: B12-24-PC; B13-24-PC: B14-24-PC
Action: Consent
Agent: Steven Rivers
Applicant: Whiskey Run Golf Course
Location: 631 Lorraine Road

The Secretary-Treasurer read the correspondence received for the application.

The Chair asked the applicant if they wanted to add any further information on the application; the agent gave a short presentation describing the nature of the application and the development.

Member Bruno brought up concerns regarding the recommendations, particularly the Nitrate Impact Assessment.

The Chief Planner had mentioned that Planning would be hesitant on supporting altering any of the recommendations as the Region were the ones who had requested the condition initially.

There were no further comments from the Committee or members of the public.

Motion: Eric Beauregard	Seconded: Angie Desmarais
Carried: 4-0	6.4.40
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That consent application **B12-24-PC**; **B13-24-PC**; **B14-24-PC** be granted subject to the conditions outlined in the staff report dated September 6th, 2024:

- 1. That the applicant provides the Secretary-Treasurer with the deeds for the conveyance of the subject parcels or a registrable legal description of the subject parcels, together with a paper copy and electronic copy of the deposited reference plan, if applicable, for use in the issuance of the Certificate of Consent.
- 2. That a final certification fee of \$240 payable to the City of Port Colborne is submitted to the Secretary-Treasurer.
- 3. That a drainage apportionment agreement be completed by the City's Drainage Superintendent or by an approved engineer at the cost of the applicant. A copy of the deposited plan must be delivered to the Drainage Superintendent through the planning department for the apportionment agreement to be completed.
- 4. That the applicant(s) sign the City of Port Colborne's standard "Memorandum of Understanding" explaining that development charges and cash-in-lieu of the dedication of land for park purposes, based on an appraisal, at the expense of the applicant, wherein the value of the land is to be determined as of the day before the issuance of a building permit, is required prior to the issuance of a building permit pursuant to Section 42 of the Planning Act. R.S.O 1990, as amended.
- 5. That the applicant/owner receive acceptance from the Ministry of Citizenship and Multiculturalism (MCM) for the archaeological assessment report titled Stage 2 Archaeological Assessment, prepared by Irvin Heritage Inc. (dated May 24, 2024). If the Ministry requires further archaeological work to be completed prior to acknowledging this report, these report(s) must also be submitted to and acknowledged by the Ministry, to the satisfaction of Niagara Region, prior to clearance of this condition. No demolition, grading or other soil disturbances shall take place on the subject property prior to the issuance of a letter from MCM through Niagara Region, confirming that all archaeological resource concerns have met licensing and resource conservation requirements.
- 6. That a Restoration Plan be prepared to the satisfaction of the Niagara Region. The plan should incorporate dense plantings of native trees, shrubs and wildflowers that complement the adjacent vegetation communities. The removal of invasive species should also be incorporated, as appropriate. The Landscape Plan should be completed by a full member of the Ontario Association of Landscape Architects (OALA) or a qualified environmental professional.
- 7. That the Nitrate Impact Assessment and Water Supply Potential Assessment, prepared by Hydrogeology Consultants Services Inc. (dated July 2, 2024) be updated with the proposed location of the bed, dilution area and groundwater

flow direction for the location of the septic systems to be located appropriately to meet the nitrate concentration requirements at the lot boundaries.

- 8. The owner provides a written undertaking stating future purchase and sales agreements will include a clause advising that the septic systems for Parcels 1, 2, and 3 will need to include pre-treatment with an effluent level of 5.5 mg/L.
- 9. That a Minimum Distance Separation I calculation be submitted which identifies that each lot is sufficiently setback from mitigating agricultural operations, to the satisfaction of City staff.
- 10. That all conditions of consent be cleared by September 11, 2026

For the following reasons:

- The application is consistent with the Provincial Policy Statement and conforms to the Growth Plan for the Greater Golden Horseshoe, the Regional Official Plan, City of Port Colborne Official Plan, and will also comply with the provisions of Zoning By-law 6575/30/18, as amended.
- 7. Approval of Minutes

Motion: Angie Desmarais Carried: 4-0 Seconded: Eric Beauregard

8. Adjournment

There being no further business, the meeting was adjourned at approximately 9:00 pm.

Dan O'Hara, Chair

Taya Taraba, Acting Secretary-Treasurer