For Office Use Only:

File Number	SPPL2022028	Public Notice Sign	
Related File Number		Application Fee	4,000.00
Pre-consultation Meeting	July 7, 2021	Conservation Authority Fee	N/A
Application Submitted	January 18, 2022	Well & Septic Info Provided	N/A
Complete Application	January 28, 2022	Planner	N. Goodbrand

Check the type of planning application(s) you are submitting.

- ☐ Official Plan Amendment
- ☐ Zoning By-Law Amendment
- ☐ Temporary Use By-law
- ☐ Draft Plan of Subdivision/Vacant Land Condominium
- ☐ Condominium Exemption
- ☒ Site Plan Application
- ☐ Extension of a Temporary Use By-law
- ☐ Part Lot Control
- ☐ Cash-in-Lieu of Parking
- ☐ Renewable Energy Project or Radio Communication Tower

Please summarize the desired end result of this application (for example: a special zoning provision on the subject lands to include additional use(s), changing the zone and/or official plan designation of the subject lands, creating a certain number of lots, or similar)

Receive site plan approval in order to construct two storage and warehousing facilities.

Property Assessment Roll Number: 40101540505

A. Applicant Information

Name of Owner 4Freds Inc. C/O Mike Fredericks

It is the responsibility of the owner or applicant to notify the planner of any changes in ownership within 30 days of such a change.

Address 155 Victoria Street

Town and Postal Code Simcoe ON N3Y 4R6

Phone Number 519.428.8020

Cell Number 519.427.8814

Email MFredericks@annexbusinessmedia.com

Name of Applicant 2212638 Ontario Limited

Address C/O 2 Talbot Street North

Town and Postal Code Simcoe ON N3Y 3W4

Phone Number 519.426.6270

Cell Number 519.410.1440

Email johnvallee@gdvallee.ca

Name of Agent G. Douglas Vallee Ltd. - C/O Scott Puillandre

Address 2 Talbot Street North

Town and Postal Code Simcoe ON N3Y 3W4

Phone Number 519.426.6270

Cell Number 519.410.1212

Email scottpuillandre@gdvallee.ca

Please specify to whom all communications should be sent. Unless otherwise directed, all correspondence and notices in respect of this application will be forwarded to both owner and agent noted above.

☐ Owner ▬ Agent ☐ Applicant

Names and addresses of any holder of any mortgagees, charges or other encumbrances on the subject lands:

No known mortgages

B. Location, Legal Description and Property Information

1. Legal Description (include Geographic Township, Concession Number, Lot Number, Block Number and Urban Area or Hamlet):

   WDH CON 5 PT LOT 3 RP - Simcoe

   Municipal Civic Address: Not assigned

   Present Official Plan Designation(s): Protected Industiral

   Present Zoning: General Industrial

2. Is there a special provision or site specific zone on the subject lands?

   ☐ Yes ■ No If yes, please specify corresponding number:

3. Present use of the subject lands:

   Vacant Land

4. Please describe **all existing** buildings or structures on the subject lands and whether they are to be retained, demolished or removed. If retaining the buildings or structures, please describe the type of buildings or structures, and illustrate the setback, in metric units, from front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   Vacant Land

5. If an addition to an existing building is being proposed, please explain what it will be used for (for example: bedroom, kitchen, or bathroom). If new fixtures are proposed, please describe.

   Vacant Land

6. Please describe **all proposed** buildings or structures/additions on the subject lands. Describe the type of buildings or structures/additions, and illustrate the setback, in metric units, from front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   Two 353m2 storage/warehousing building that will be constructed on poured concrete pads - see site plan for all setback. All required setbacks will be met.

7. Are any existing buildings on the subject lands designated under the *Ontario Heritage Act* as being architecturally and/or historically significant? Yes ☐ No ☒

   If yes, identify and provide details of the building:

   _____

   _____

8. If known, the length of time the existing uses have continued on the subject lands:

   Always Vacant

9. Existing use of abutting properties:

   North - Vacant, East - Small Warehouse, South - Eastlink, West - Vacant Land

10. Are there any easements or restrictive covenants affecting the subject lands?

    ☐ Yes ☒ No If yes, describe the easement or restrictive covenant and its effect:

    _____

C. Purpose of Development Application

Note: Please complete all that apply.

1. Please explain what you propose to do on the subject lands/premises which makes this development application necessary:

   Storage / warehousing facility which is subject to site plan control.

   _____

   _____

   _____

2. Please explain why it is not possible to comply with the provision(s) of the Zoning By-law/and or Official Plan:

   NA

   _____

   _____

3. Does the requested amendment alter all or any part of the boundary of an area of settlement in the municipality or implement a new area of settlement in the municipality? ☐ Yes ☒ No If yes, describe its effect:

   _____

   _____

   _____

4. Does the requested amendment remove the subject land from an area of employment? ☐ Yes ☒ No If yes, describe its effect:

   _____

   _____

   _____

5. Does the requested amendment alter, replace, or delete a policy of the Official Plan? ☐ Yes ☒ No If yes, identify the policy, and also include a proposed text of the policy amendment (if additional space is required, please attach a separate sheet):

   _____

   _____

   _____

6. Description of land intended to be severed in metric units:
   Frontage: _____
   Depth: _____
   Width: _____
   Lot Area: _____
   Present Use: _____
   Proposed Use: _____
   Proposed final lot size (if boundary adjustment): _____
   If a boundary adjustment, identify the assessment roll number and property owner of the lands to which the parcel will be added: _____

   _____

   Description of land intended to be retained in metric units:
   Frontage: _____
   Depth: _____
   Width: _____
   Lot Area: _____
   Present Use: _____
   Proposed Use: _____
   Buildings on retained land: _____
7. Description of proposed right-of-way/easement:
   Frontage: _____
   Depth: _____
   Width: _____
   Area: _____
   Proposed use: _____
8. Name of person(s), if known, to whom lands or interest in lands to be transferred, leased or charged (if known):

   _____

9. **Site Information**	**Zoning**	**Proposed**
Please indicate unit of measurement, for example: m, m^2 or %		
Lot frontage	30m	30m and 28.6m
Lot depth	NA	83.4m and 67.1m
Lot width	NA	29.3m and 26.05m
Lot area	1855m2	2028m2 and 2019m2
Lot coverage	NA	17%
Front yard	6m	14m
Rear yard	9m	> 30m
Left Interior side yard	3m	> 7m
Right Interior side yard	3m	> 3m
Exterior side yard (corner lot)	NA	NA
Landscaped open space	NA	NA
Entrance access width	6m	6m
Exit access width	6m	6m
Size of fencing or screening	NA	NA
Type of fencing	NA	NA

10. Building Size

Number of storeys	NA	1
Building height	Angular Plane	NA
Total ground floor area	NA	353m2
Total gross floor area	NA	353m2
Total useable floor area	NA	353m2

11. Off Street Parking and Loading Facilities

Number of off street parking spaces	2	2 per unit
Number of visitor parking spaces	2	2 per unit
Number of accessible parking spaces	1	1 per unit
Number of off street loading facilities	NA	NA

12. Residential (if applicable)

Number of buildings existing: _____

Number of buildings proposed: _____

Is this a conversion or addition to an existing building? ☐ Yes ☐ No

If yes, describe: _____

Type	**Number of Units**	**Floor Area per Unit in m2**
Single Detached	_____	_____
Semi-Detached	_____	_____
Duplex	_____	_____
Triplex	_____	_____
Four-plex	_____	_____
Street Townhouse	_____	_____
Stacked Townhouse	_____	_____
Apartment - Bachelor	_____	_____
Apartment - One bedroom	_____	_____
Apartment - Two bedroom	_____	_____
Apartment - Three bedroom	_____	_____

Other facilities provided (for example: play facilities, underground parking, games room, or swimming pool):

13. Commercial/Industrial Uses (if applicable)

Number of buildings existing: NA

Number of buildings proposed: 2

Is this a conversion or addition to an existing building? ☐ Yes ☒ No

If yes, describe:

_____

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

353m2 storage buildings

_____

_____

Seating Capacity (for assembly halls or similar): _____

Total number of fixed seats: _____

Describe the type of business(es) proposed: Storage and Warehousing

Total number of staff proposed initially: None

Total number of staff proposed in five years: Unknown at this time

Maximum number of staff on the largest shift: Unknown at this time

Is open storage required: ☐ Yes ☒ No

Is a residential use proposed as part of, or accessory to commercial/industrial use?

☐ Yes ☒ No If yes please describe:

_____

_____

14. Institutional (if applicable)

Describe the type of use proposed: _____

Seating capacity (if applicable): _____

Number of beds (if applicable): _____

Total number of staff proposed initially: _____

Total number of staff proposed in five years: _____

Maximum number of staff on the largest shift: _____

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

_____

_____

_____

15. Describe Recreational or Other Use(s) (if applicable)

_____

_____

_____

_____

_____

D. Previous Use of the Property

1. Has there been an industrial or commercial use on the subject lands or adjacent lands? ☐ Yes ☒ No ☐ Unknown
   If yes, specify the uses (for example: gas station or petroleum storage):

   _____

   _____
2. Is there reason to believe the subject lands may have been contaminated by former uses on the site or adjacent sites?☐ Yes ☒ No ☐ Unknown
3. Provide the information you used to determine the answers to the above questions:

   _____

   _____

   _____
4. If you answered yes to any of the above questions in Section D, a previous use inventory showing all known former uses of the subject lands, or if appropriate, the adjacent lands, is needed. Is the previous use inventory attached? ☐ Yes ☒ No

E. Provincial Policy

1. Is the requested amendment consistent with the provincial policy statements issued under subsection 3(1) of the *Planning Act, R.S.O. 1990, c. P. 13*? ☒ Yes ☐ No

   If no, please explain:

   _____

   _____

   _____
2. It is owner's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals, including the Endangered Species Act, 2007. Have the subject lands been screened to ensure that development or site alteration will not have any impact on the habitat for endangered or threatened species further to the provincial policy statement subsection 2.1.7? ☒ Yes ☐ No

   If no, please explain:

   _____

   _____

   _____

3. Have the subject lands been screened to ensure that development or site alteration will not have any impact on source water protection? ☐ Yes ☒ No

   If no, please explain:
   Not in wellhead protection area

   Note: If in an area of source water Wellhead Protection Area (WHPA) A, B or C please attach relevant information and approved mitigation measures from the Risk Manager Official.

4. Are any of the following uses or features on the subject lands or within 500 metres of the subject lands, unless otherwise specified? Please check boxes, if applicable.

   Livestock facility or stockyard (submit MDS Calculation with application)

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Wooded area

   ☒ On the subject lands or ☐ within 500 meters – distance _____

   Municipal Landfill

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Sewage treatment plant or waste stabilization plant

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Provincially significant wetland (class 1, 2 or 3) or other environmental feature

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Floodplain

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Rehabilitated mine site

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Non-operating mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Active mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Industrial or commercial use (specify the use(s))

   ☐ On the subject lands or ☒ within 500 meters – distance Adjacent

   Active railway line

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Seasonal wetness of lands

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Erosion

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Abandoned gas wells

   ☐ On the subject lands or ☐ within 500 meters – distance _____

F. Servicing and Access

1. Indicate what services are available or proposed:
   Water Supply
   - ☒ Municipal piped water
   - ☐ Communal wells
   - ☐ Individual wells
   - ☐ Other (describe below)

   _____

   Sewage Treatment
   - ☐ Municipal sewers
   - ☐ Communal system
   - ☒ Septic tank and tile bed in good working order
   - ☐ Other (describe below)

   _____

   Storm Drainage
   - ☒ Storm sewers
   - ☒ Open ditches
   - ☐ Other (describe below)

   _____

2. Existing or proposed access to subject lands:
   - ☒ Municipal road
   - ☐ Provincial highway
   - ☐ Unopened road
   - ☐ Other (describe below)

   Name of road/street: _____

G. Other Information

1. Does the application involve a local business? ☒ Yes ☐ No
   If yes, how many people are employed on the subject lands?
   _____
2. Is there any other information that you think may be useful in the review of this application? If so, explain below or attach on a separate page.
   _____
   _____
   _____
   _____

H. Supporting Material to be submitted by Applicant

In order for your application to be considered complete, **folded** hard copies (number of paper copies as directed by the planner) and an **electronic version (PDF) of the properly named site plan drawings, additional plans, studies and reports** will be required, including but not limited to the following details:

1. Concept/Layout Plan
2. All measurements in metric
3. Key map
4. Scale, legend and north arrow
5. Legal description and municipal address
6. Development name
7. Drawing title, number, original date and revision dates
8. Owner's name, address and telephone number
9. Engineer's name, address and telephone number
10. Professional engineer's stamp
11. Existing and proposed easements and right of ways
12. Zoning compliance table – required versus proposed
13. Parking space totals – required and proposed
14. All entrances to parking areas marked with directional arrows
15. Loading spaces, facilities and routes (for commercial developments)
16. All dimensions of the subject lands
17. Dimensions and setbacks of all buildings and structures
18. Location and setbacks of septic system and well from all existing and proposed lot lines, and all existing and proposed structures
19. Gross, ground and useable floor area
20. Lot coverage
21. Floor area ratio
22. Building entrances, building type, height, grades and extent of overhangs
23. Names, dimensions and location of adjacent streets including daylighting triangles
24. Driveways, curbs, drop curbs, pavement markings, widths, radii and traffic directional signs
25. All exterior stairways and ramps with dimensions and setbacks
26. Retaining walls including materials proposed
27. Fire access and routes
28. Location, dimensions and number of parking spaces (including visitor and accessible) and drive aisles
29. Location of mechanical room, and other building services (e.g. A/C, HRV)
30. Refuse disposal and storage areas including any related screening (if indoors, need notation on site plan)
31. Winter snow storage location

32. Landscape areas with dimensions
33. Natural features, watercourses and trees
34. Fire hydrants and utilities location
35. Fencing, screening and buffering – size, type and location
36. All hard surface materials
37. Light standards and wall mounted lights (plus a note on the site plan that all outdoor lighting is to be dark sky compliant)
38. Business signs (make sure they are not in sight lines)
39. Sidewalks and walkways with dimensions
40. Pedestrian access routes into site and around site
41. Bicycle parking
42. Architectural elevations of all building sides
43. All other requirements as per the pre-consultation meeting

In addition, the following additional plans, studies and reports, including but not limited to, **may** also be required as part of the complete application submission:

☐ Zoning Deficiency Form

☐ On-Site Sewage Disposal System Evaluation Form (to verify location and condition)

☐ Architectural Plan

☐ Buildings Elevation Plan

☐ Cut and Fill Plan

☐ Erosion and Sediment Control Plan

☐ Grading and Drainage Control Plan (around perimeter and within site) (existing and proposed)

☐ Landscape Plan

☐ Photometric (Lighting) Plan

☐ Plan and Profile Drawings

☐ Site Servicing Plan

☐ Storm water Management Plan

☐ Street Sign and Traffic Plan

☐ Street Tree Planting Plan

☐ Tree Preservation Plan

☐ Archaeological Assessment

☐ Environmental Impact Study

☐ Functional Servicing Report

☐ Geotechnical Study / Hydrogeological Review

☐ Minimum Distance Separation Schedule

☐ Noise or Vibration Study

☐ Record of Site Condition

☐ Storm water Management Report

☐ Traffic Impact Study – please contact the Planner to verify the scope required

Site Plan applications will require the following supporting materials:

1. Two (2) complete sets of the site plan drawings folded to 8½ x 11 and an electronic version in PDF format
2. Letter requesting that the Holding be removed (if applicable)
3. A cost estimate prepared by the applicant's engineer
4. An estimate for Parkland dedication by a certified land appraiser
5. Property Identification Number (PIN) printout

Standard condominium exemptions will require the following supporting materials:

☐ Plan of standard condominium (2 paper copies and 1 electronic copy)

☐ Draft condominium declaration

☐ Property Identification Number (PIN) printout

Your development approval might also be dependent on Ministry of Environment and Climate Change, Ministry of Transportation or other relevant federal or provincial legislation, municipal by-laws or other agency approvals.

All final plans must include the owner's signature as well as the engineer's signature and seal.

I. Development Agreements

A development agreement may be required prior to approval for site plan, subdivision and condominium applications. Should this be necessary for your development, you will be contacted by the agreement administrator with further details of the requirements including but not limited to insurance coverage, professional liability for your engineer, additional fees and securities.

J. Transfers, Easements and Postponement of Interest

The owner acknowledges and agrees that if required it is their solicitor's responsibility on behalf of the owner for the registration of all transfer(s) of land to the County, and/or transfer(s) of easement in favour of the County and/or utilities. Also, the owner further acknowledges and agrees that it is their solicitor's responsibility on behalf of the owner for the registration of postponements of any charges in favour of the County.

K. Permission to Enter Subject Lands

Permission is hereby granted to Norfolk County officers, employees or agents, to enter the premises subject to this application for the purposes of making inspections associated with this application, during normal and reasonable working hours.

L. Freedom of Information

For the purposes of the *Municipal Freedom of Information and Protection of Privacy Act*, I authorize and consent to the use by or the disclosure to any person or public body any information that is collected under the authority of the *Planning Act, R.S.O. 1990, c. P. 13* for the purposes of processing this application.

	January 13, 2022
Owner/Applicant Signature	Date

M. Owner's Authorization

If the applicant/agent is not the registered owner of the lands that is the subject of this application, the owner(s) must complete the authorization set out below.

I/We Mike Fredericks am/are the registered owner(s) of the lands that is the subject of this application.

I/We authorize G. Douglas Vallee Limited to make this application on my/our behalf and to provide any of my/our personal information necessary for the processing of this application. Moreover, this shall be your good and sufficient authorization for so doing.

	January 13, 2022
Owner	Date
Owner	Date

N. Declaration

I, John Vallee of Simcoe Ontario

solemnly declare that:

all of the above statements and the statements contained in all of the exhibits transmitted herewith are true and I 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*.

Sworn remotely by John Vallee stated as being located in the Town of Simcoe in the County of Norfolk, before me in the City of Niagara Falls in the Regional Municipality of Niagara, on January 12, 2022, in accordance with O. Reg 431/20, Administering Oath or Declaration Remotely.

Owner/Applicant Signature

A Commissioner, etc.

ELDON FRASER DARBYSON, a commissioner, etc.,
Province of Ontario, for G. Douglas Vallee Limited
Expires March 28, 2022

vallee

Consulting Engineers,
Architects & Planners

January 14, 2022

Norfolk County
Planning Department
Robinson Administration Building
185 Robinson Street, Suite 200
Simcoe, ON N3Y 5L6

Attention: **Jennifer Catarino, MCIP, RPP**

Reference: **Site Plan Application**
Vacant Lot - Roll # 40101540505
Our Project 21-116

Dear Jennifer,

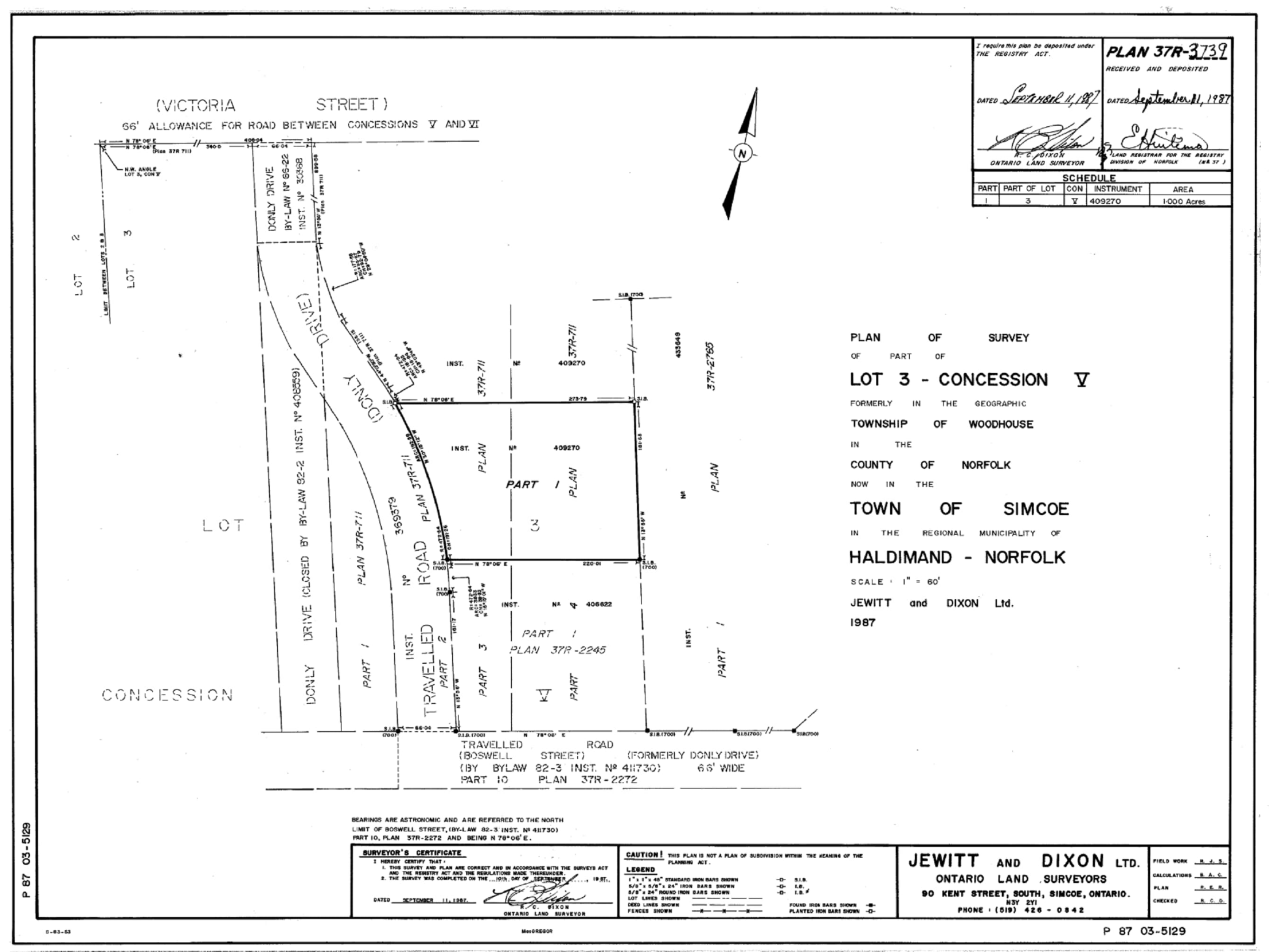
Enclosed please find the necessary documents to support a site plan application for two warehouse buildings on the subject property, including:

- Signed Norfolk County Development Application, dated January 12, 2022;
- Site Plan Drawings, G. Douglas Vallee Limited;
- Traffic Impact Letter, G. Douglas Vallee Limited, dated January 13, 2022;
- Grading Plan, G. Douglas Vallee Limited, dated January 14, 2022;
- Draft Mutual Drainage Agreement;
- Servicing Plan, G. Douglas Vallee Limited, dated January 14, 2022; and
- Functional Servicing Brief, G. Douglas Vallee Limited, dated January 11, 2022.

If you require any further information, please do not hesitate to contact me at scottpuillandre@gdvallee.ca or 519-410-1212.

Regards,

Scott Puillandre, CD, MSc
Planner
G. DOUGLAS VALLEE LIMITED
Consulting Engineers, Architects & Planners
H:\Projects\2021\21-116 Fredericks Warehouse\Agency\Site Plan\Submission



SITE STATISTIC & ZONING REQ.'S

PROPERTY LEGAL DESCRIPTION:

PLAN 37R-3739, WDH CON.5 PT LOT 3, ROLL # 40101540505
IN SIMCOE, NORFOLK COUNTY

ZONING:

IN ACCORDANCE WITH ZONING BY-LAW 1-Z-2014 NORFOLK COUNTY - JULY-2020-CONSOLIDATION

PROVISION	LAND USE:
7.1 7.1.1	GENERAL INDUSTRIAL ZONE (MG) u) STORAGE

PROVISION	SETBACKS (m - METERS):	REQUIRED (m)	PROVIDED (m) PART 1	PROVIDED (m) PART 2
7.1.4a)	MIN. LOT AREA:	1,855m²	2019.5m²	2028.5m²
7.1.4b)	MIN. LOT FRONTAGE: MINOR VARIANCE APPROVED - PART 1	30	28.6	30
7.1.4c)	MIN. FRONT YARD:	6	14	14
7.1.4d)	MIN. EXTERIOR SIDE YARD:	6	N/A	N/A
7.1.4e)	MIN. INTERIOR SIDE YARD i) ABUTTING A RESIDENTIAL ZONE	3 20	3.1/7.26	3.1/10.48
7.1.4f)	MIN. REAR YARD:	9	35.65	30.13
7.1.4g)	MAX. BLDG. HEIGHT	SUBJECT TO A 45 DEGREE ANGULAR PLANE MEASURED FROM THE EDGE OF ANY RESIDENTIAL, COMMERCIAL, OR INDUSTRIAL ZONED LOTS		
7.1.4h)	OUTDOOR STORAGE	PROHIBITED IN ANY FRONT YARD OR ANY REQUIRED EXTERIOR SIDE YARD		

PARKING REQ.'D: NON-RESIDENTIAL

4.9tt)	WAREHOUSE OR WHOLESALE ESTABLISHMENT: 1 SPACE / 180m² OF USABLE FLOOR AREA = 300m² / 180m² = 1.67 PER BUILDING	2 SPACE(S)	2 SPACE(S)
	TOTAL PARKING:	2 SPACE(S)	2 SPACE(S)

NOTE: REQ'D PARKING SPACES PROVIDED INSIDE BUILDING(S)

PARKING REQ.'D - BARRIER FREE: (PART OF REQ.'D PARKING)

4.3.3	BARRIER FREE PARKING REQ.'D: 1-25 PARKING SPACES =		
	TYPE 'A' (3.4m WIDE) PLUS 1.5m AISLE TYPE 'B' (2.4m WIDE) PLUS 1.5m AISLE	1 SPACE(S) 0 SPACE(S)	1 SPACE(S) 0 SPACE(S)

NOTE: REQ'D BARRIER FREE PARKING SPACES PROVIDED INSIDE BUILDING(S)

PARKING REQ.'D - LOADING SPACES

4.7	LOADING SPACES: 3m WIDTH x 10m DEPTH	N/A	N/A

PARKING REQ.'D - DROP OFF SPACES

	DROP OFF SPACES:	N/A	N/A

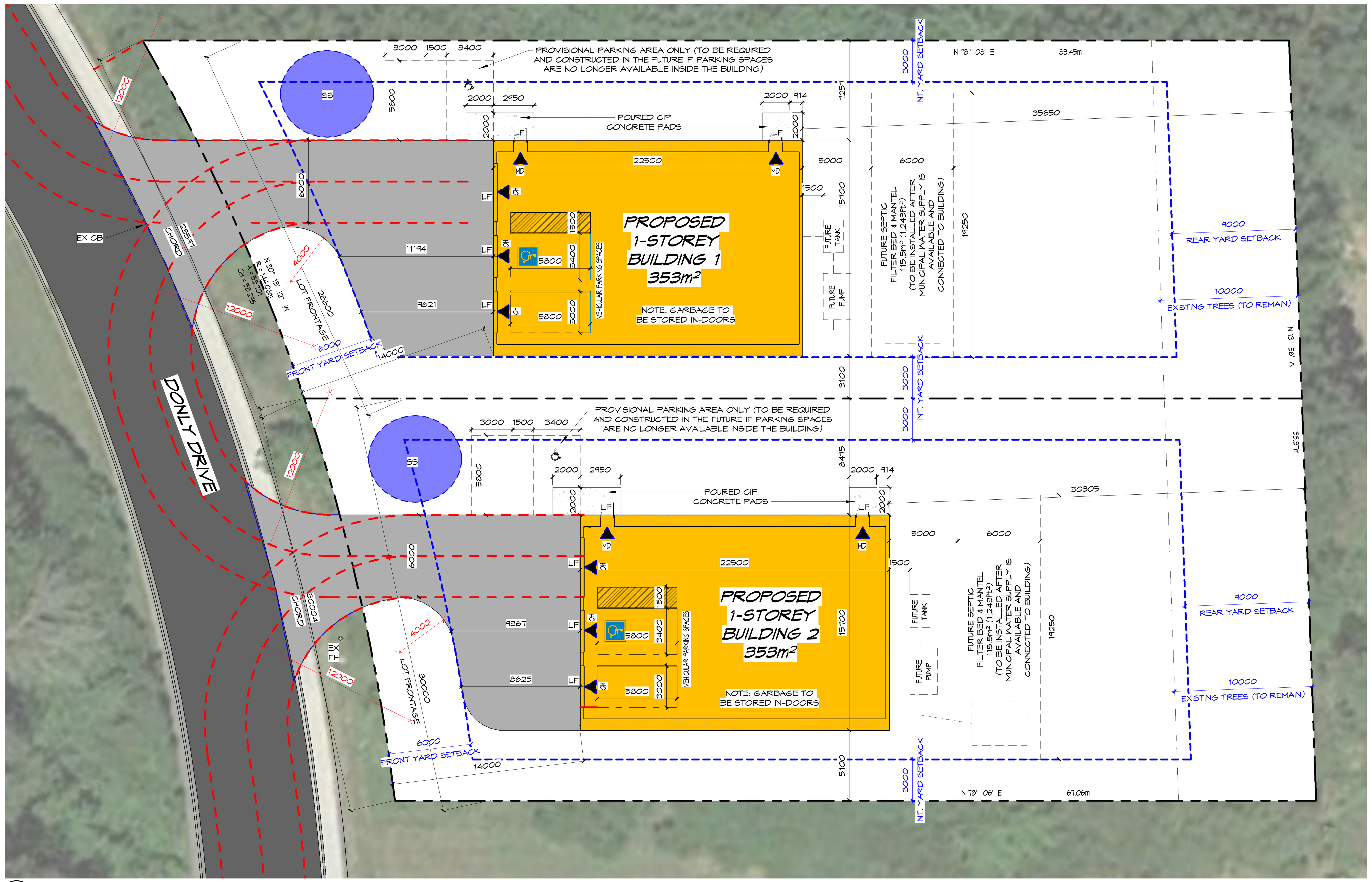
PARKING AREA REGULATIONS

4.1 4.1.3a)	PARKING SPACE DIMENSIONS WIDTH OF PARKING SPACE: FOR VEHICLES PARKED SIDE BY SIDE FOR VEHICLES PARKED WITH WALL OR FENCE ADJ.	 3 MIN. 3.3 MIN.	 3 N/A
4.1.3b)	DEPTH OF PARKING SPACE: FOR 90 DEGREE PARKING FOR PARALLEL PARKING	 5.8 MIN. 7 MIN.	 5.8 N/A
4.1.4 4.1.4b)	PARKING AISLE REQ.'S TWO-WAY TRAFFIC	7.3 MIN.	7.3 MIN.

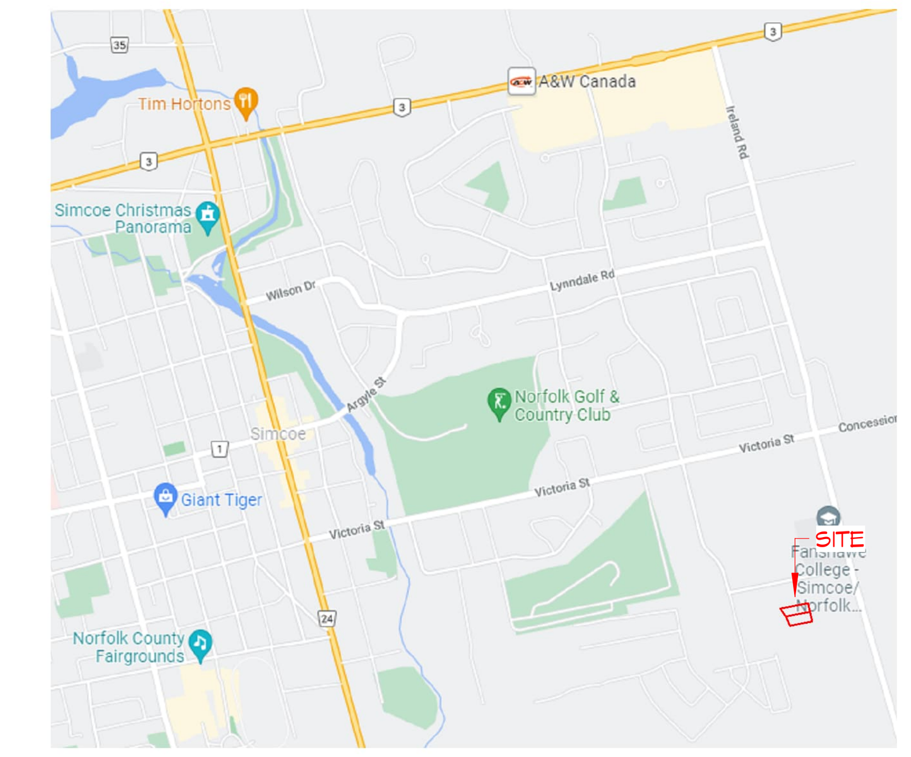
CN TN

OWNER INFORMATION:

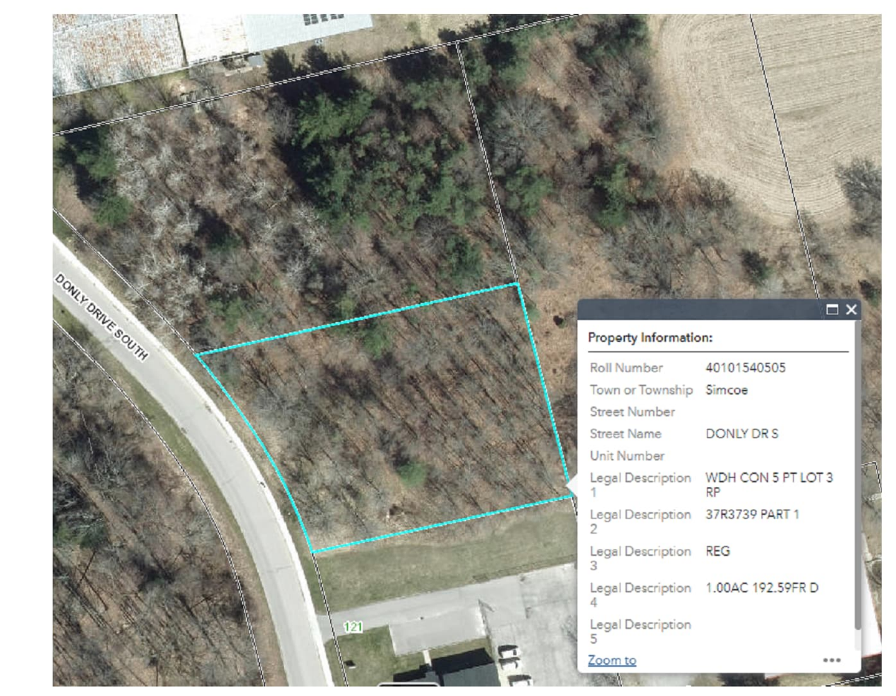
4 FREDS INC.
155 VICTORIA ST., SIMCOE
(519) 428-8020



1 SITE PLAN
P100 SCALE 1 : 200



KEY MAP
SCALE 1 : 100



SITE MAP
SCALE 1 : 100

SITE PLAN LEGEND

- PROPERTY LINE
- SETBACKS
- FIRE ROUTE (6m WIDE / 12m CENTER RADIUS)
- SNOW STORAGE (SS)
- LF — LIGHT FIXTURE (TO PROJECT DOWNWARDS & BE DARK SKY COMPLIANT)
- • WHEELCHAIR SIGN ON ASPHALT / CONC. (WHITE & BLUE COLOUR)
- • STALL MARKINGS A - ACCESSIBLE
- • DIAGONAL MARKINGS
- MAN DOOR
- OVERHEAD DOOR

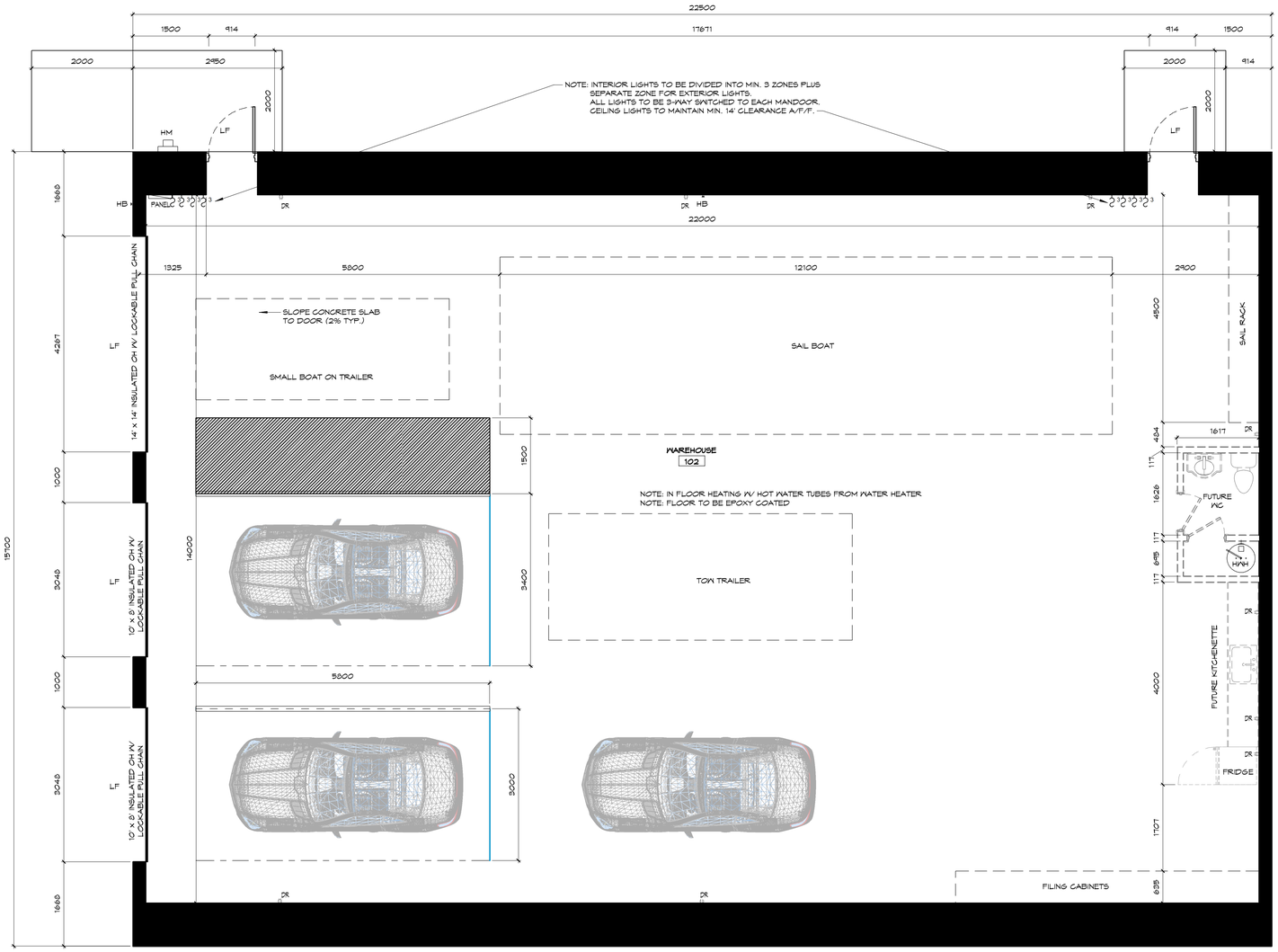
HATCH IDENTIFICATION LEGEND

- CONC. SIDEWALK / PAD / CROSSWALK / SIDEWALK / LANEWAY / STAIRS / ETC.
- AREA OF ASPHALT
- NEW BLDG. / ADDITION

vallee
Consulting Engineers, Architects & Planners
G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE ONTARIO N3Y 4W3
(519) 426-6270

Project Title
DONLY DRIVE WAREHOUSE
SIMCOE, ONTARIO, CANADA,

PROJECT No. 21-116
Drawing Title SITE PLAN
Drawing No. P100



NOTE: PROVIDE ROUGH-IN ONLY FOR FUTURE CONNECTIONS TO WATER CLOSET & KITCHENETTE SINK

NOTE: FUTURE WATER CLOSET EXEMPT FROM BARRIER FREE REQUIREMENTS PER O.B.C 3.8.1.1. (c) AS BUILDING(S) ARE NOT INTENDED TO BE OCCUPIED ON A DAILY OR FULL-TIME BASIS

1 / P201 LEVEL 1 PLAN (TYPICAL)
SCALE 1 : 50

OWNER INFORMATION:

4 FREDS INC.
155 VICTORIA ST., SIMCOE
(519) 428-8020

LEVEL PLAN LEGEND

ROOM NAME ### — ROOM TAG, NUMBERING & IDENTIFICAITON

PANEL — ELEC. CABINET PROVIDE 19mm FIRE RATED PLYWD. BEHIND ALL PANELS AS REQ'D

HM — HYDRO METER & MAST

HB — HOSE BIB (600mm A/F GRADE)

DR — DUPLEX RECEPTACLE (1200mm A/F/F)

LAVATORIES
SINGLE
LAVATORY, PEDESTAL

FLR. — TOILET - WATER CLOSET

H/WH — HOT WATER HEATER

LF — LIGHT FIXTURE ABOVE DOORWAYS (TO PROJECT DOWNWARDS & BE DARK SKY COMPLIANT)

HATCH IDENTIFICATION LEGEND

MILLWORK / FIXTURES NOT IN CONTRACT (N/I/C) / FUTURE

WALL IDENTIFICATION LEGEND

NEW WALL SYSTEM

FUTURE WALL SYSTEM

vallee
Consulting Engineers, Architects & Planners
G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE ONTARIO N3Y 4W3
(519) 426-6270

Project Title

DONLY DRIVE WAREHOUSE

SIMCOE, ONTARIO, CANADA,

PROJECT No.
21-116

Drawing Title
PRESENTATION PLANS

Drawing No.
P201

vallee

Consulting Engineers,
Architects & Planners

January 13, 2022

County of Norfolk
Robinson Administration Building
185 Robinson Street, Suite 200
Simcoe, ON N3Y 5L6

Attention: **Jennifer Catarino, Senior Planner**

Dear Jennifer,

Reference: **Traffic Impact Letter – Site Plan Application**
Vacant Lot - Roll # 40101540505
Our Project 21-116

Introduction

G. Douglas Vallee Limited has been retained by 2212638 Ontario Ltd. to make application for site plan approval in order to construct two small warehousing buildings on a vacant lot – Roll #40101540505 on Donly Drive South in Simcoe (Figure 1). This parcel received consent approval from the Norfolk County Committee of Adjustment on December 15, 2021 (reference BNPL2021344 / 368).

The purpose of the site plan application is to satisfy the necessary design criteria established by Norfolk County as part of the development approval process. The intent of this letter is to outline the anticipated traffic impacts from the proposed development.

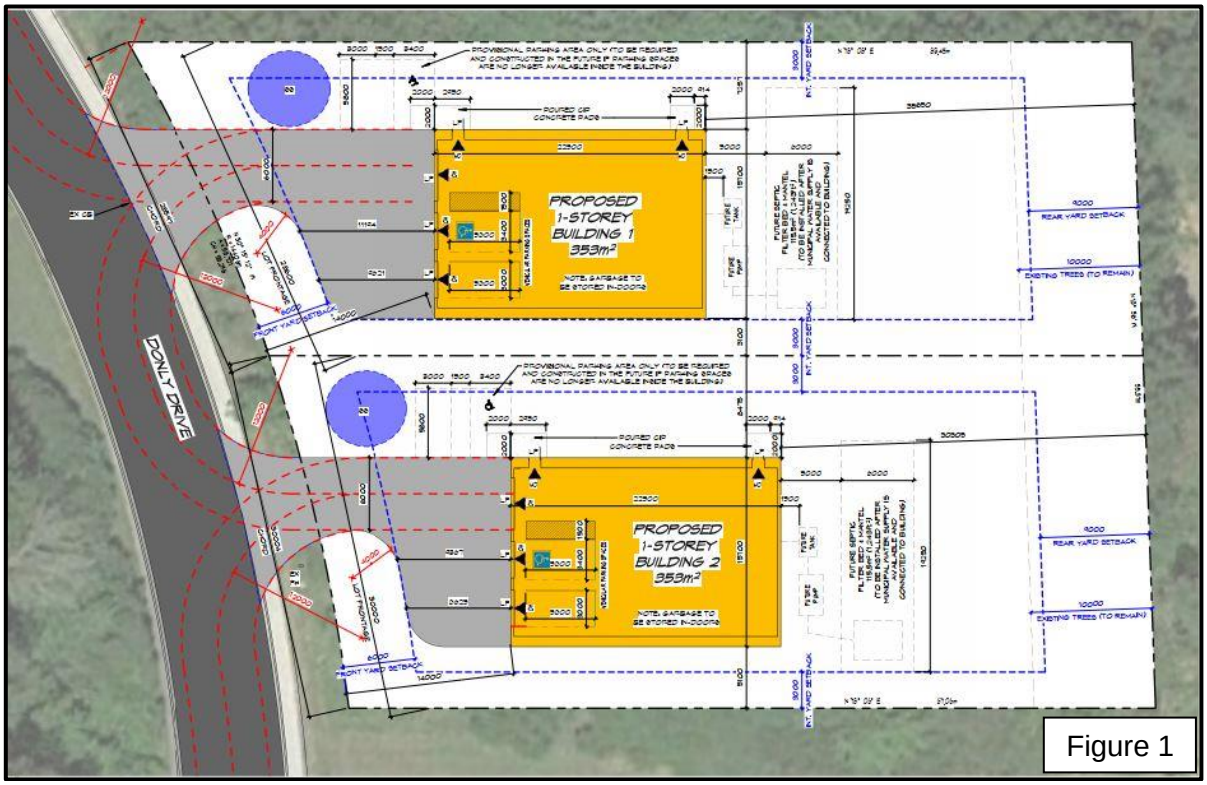


Figure 1

Analysis

The subject lands are a 4047m^2 vacant parcel located on the east side of Donly Drive South in Simcoe. The parcel is located north of the intersection of Donly Drive and Boswell Drive within an established industrial area. A large significant woodlot is located on the west side of Donly Drive, across from the subject lands.

As shown on Figure 1, the intended use of the subject lands is for two small warehouse buildings. These buildings are intended to be rented or sold to individual users seeking indoor storage spaces for large items such as recreational vehicles (RVs, ATV, etc.) or pleasure crafts (camping trailers, classic cars, etc.).

As small single user facilities, the proposed buildings are not intended for daily occupation by employees. Given the low intensity proposed use, the trips generated by this development is expected to average less than 1 total vehicle trip per day. Due to the extremely low expected trip generation, formal data collection and sightline analysis is not required.

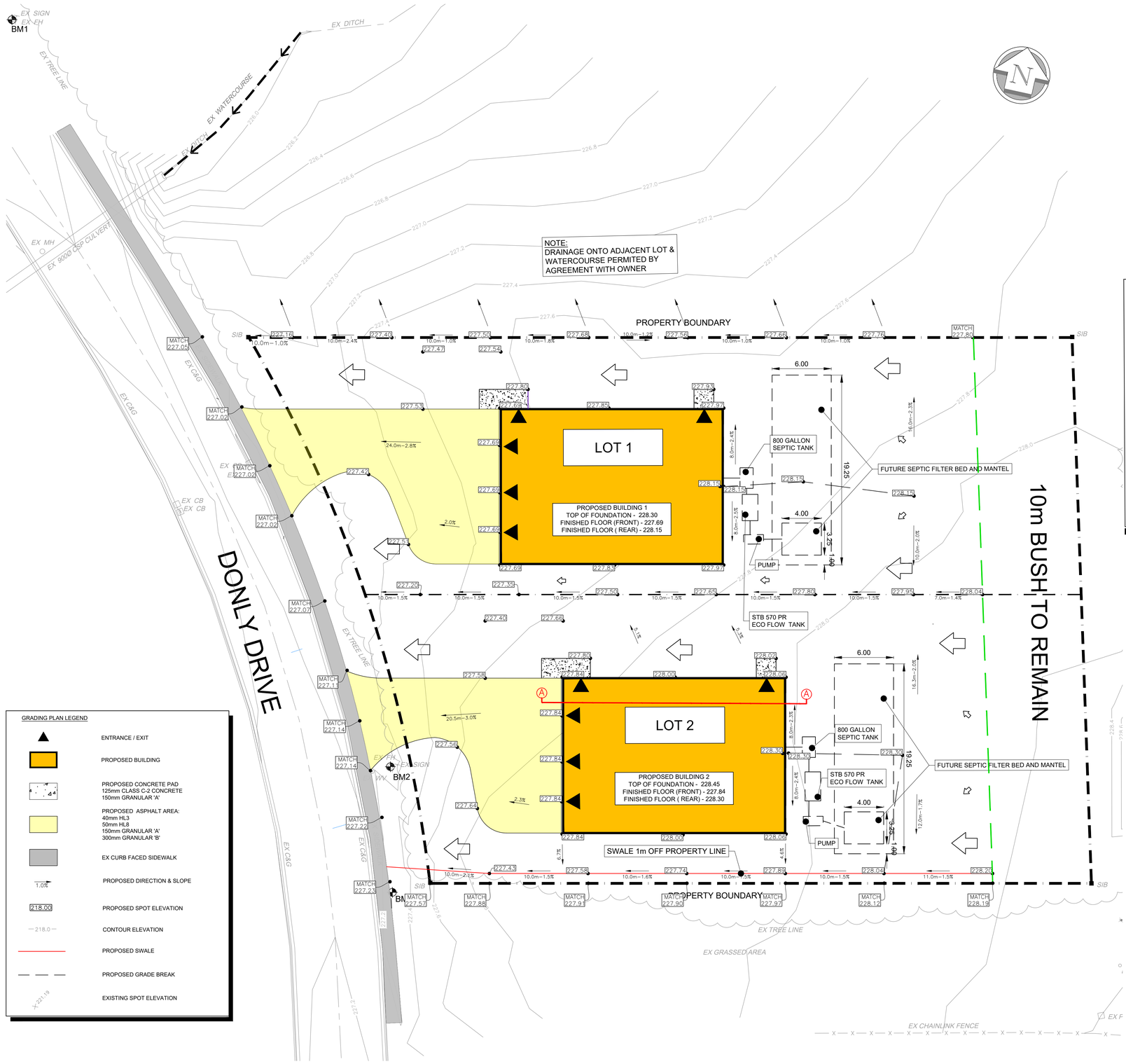
Conclusion

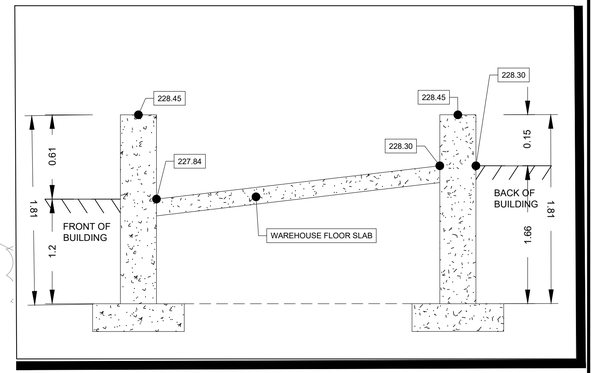
The proposed development of two small warehouse buildings on Donly Drive South in Simcoe is expected to generate less than 1 total vehicle trip per day on average. The extremely low trip generation will result in no observable impact to traffic operations on Donly Drive. It is this engineer's opinion that all-direction access to and from the proposed site access is acceptable and poses no undue hazards to traffic operations at this location.

Therefore, based on the low density proposed use, it is this engineer's opinion that the development, as proposed, will not adversely impact area traffic operations.

Yours truly,

John D. Vallee, P.Eng., President
G. DOUGLAS VALLEE LIMITED
Consulting Engineers, Architects & Planners
\\server02\data\Projects\2021\21-116 Fredericks Warehouse\Agency\Site Plan\Traffic Letter.docx





BUILDING 2
SECTION A-A
NTS

GRADING PLAN LEGEND

- ENTRANCE / EXIT
- PROPOSED BUILDING
- PROPOSED CONCRETE PAD 125mm CLASS C-2 CONCRETE 150mm GRANULAR 'A'
- PROPOSED ASPHALT AREA: 40mm HL3 50mm HL8 150mm GRANULAR 'A' 300mm GRANULAR 'B'
- EX CURB FACED SIDEWALK
- PROPOSED DIRECTION & SLOPE (1.0%)
- PROPOSED SPOT ELEVATION (218.00)
- CONTOUR ELEVATION (218.0)
- PROPOSED SWALE
- PROPOSED GRADE BREAK
- EXISTING SPOT ELEVATION (X 221.19)

% IMPERVIOUS CALCULATIONS:

LOT 1:

LOT AREA: 0.202ha

IMPERVIOUS AREA (BUILDING AND ASPHALT): 0.056 ha

PERCENTAGE: 0.056ha/0.202ha = 27.7%

LOT 2:

LOT AREA: 0.203ha

IMPERVIOUS AREA (BUILDING AND ASPHALT): 0.054 ha

PERCENTAGE: 0.054ha/0.203ha = 26.6%

NO.	DATE	ISSUANCE
0	01/14/2022	ISSUED FOR SITE PLAN APPROVAL

NOTE:
THE CONTRACTOR IS CAUTIONED THAT ALL OF THE EXISTING UTILITIES ARE NOT INDICATED ON THIS DRAWING. THE CONTRACTOR MUST ARRANGE FOR LOCATES FROM EACH AREA UTILITY COMPANY PRIOR TO ANY CONSTRUCTION OR EXCAVATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES INCLUDING THOSE NOT INDICATED ON THIS DRAWING. G. DOUGLAS VALLEE LTD. CANNOT ACCEPT RESPONSIBILITY FOR DAMAGE TO ANY EXISTING UTILITY WHICH MAY OR MAY NOT BE INDICATED ON THIS DRAWING.

ALL WORK, MATERIALS AND PROCESSES TO ABIDE TO NORFOLK COUNTY STANDARDS AND SPECIFICATIONS

BENCHMARKS

BM1: TOP OF LARGE PUMPER NOZZLE OF FIRE HYDRANT ON EAST SIDE OF DONLY DRIVE AT NORTHWEST CORNER OF SUBJECT PROPERTY.
ELEV: 228.11m

BM2: TOP OF LARGE PUMPER NOZZLE OF FIRE HYDRANT ON EAST SIDE OF DONLY DRIVE AT SOUTHWEST CORNER OF SUBJECT PROPERTY.
ELEV: 227.62m

BM1: CUT CROSS IN SIDEWALK ON EAST SIDE OF DONLY DRIVE AT SOUTHWEST CORNER OF SUBJECT PROPERTY.
ELEV: 227.21m

OWNER

4 FREDS INC.
155 VICTORIA ST. SIMCOE
519.428.8020

DRAWING LIST

21-116 - P100 - SITE PLAN
21-116 - C100 - GRADING PLAN
21-116 - C101 - SERVICING PLAN

PART 1
PLAN 37R-3739
DONLY DRIVE SIMCOE

SCALE:
2 6 10
HORIZONTAL : 1:200

DO NOT SCALE DRAWINGS, CALL FOR ANY CLARIFICATIONS THAT ARE REQUIRED, FIELD VERIFY AT ALL BUILT CONDITIONS

ALL DRAWINGS ARE TO BE READ IN COLOUR ORIGINAL PAGE SIZE ARCH 'D' - 24" x 36"

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

vallee
Consulting Engineers, Architects & Planners
G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE ONTARIO N3Y 3W4
(519) 426-6270

LICENSED PROFESSIONAL ENGINEER
21-116
2022-01-14
J. T. IEZZI
100189485
PROVINCE OF ONTARIO

PROJECT TITLE:
DONLY DRIVE WAREHOUSE

SIMCOE - NORFOLK COUNTY
DONLY DRIVE

DRAWING TITLE:
GRADING PLAN

CHECKED BY:	DRAWN BY:
JDV	NLB/NBN
DRAWING SCALE: 1:200	DRAWING NO.: C100
PROJECT NO.: 21-116	

DATE PLOTTED: 1/13/2022 10:31 AM PROJECT NUMBER & NAME: 21-116 - FREDERICKS WAREHOUSE FILE PATH: H:\PROJECTS\2021\21-116 FREDERICKS WAREHOUSE\DRAWINGS\CIVIL\PRODUCTION DRAWINGS\21-116 C100 - GRADING PLAN (WITH EDITS).DWG

Mutual Agreement Drain Agreement

Between

4Freds Inc. 155 Victoria Street Simcoe ON N3Y 4R6

(herein called “Fredericks”)

-and –

2212638 Ontario Limited 2 Talbot Street North Simcoe ON N3Y 3W3

(herein called the “2212”)

WHEREAS Fredericks is the registered owner of the properties legally described as:

a. Part Lot 3, Concession 5, Woodhouse, being Parts 3 and 4 37R711, except Part 1 37R2245 and Part 1 37R3739; Norfolk County (all of P.I.N. 50236-0451 (LT)) (herein called the “northern lands”) and

b. Part Lot 3, Concession 5, Woodhouse, being Part 1 Plan 37R3739; Norfolk County (all of P.I.N. 50236-0455 (LT)) (herein called the “southern lands”)

which are immediately adjacent to each other and both of which are on the east side of Donly Drive South in Simcoe, Norfolk County;

AND WHEREAS 2212 and Fredericks have entered into an Agreement of Purchase and Sale dated July 21st, 2021, to allow 2212 to purchase the southern lands from Fredericks;

AND WHEREAS stormwater runoff from the southern lands currently drains by overland flow to the northern lands, which northern lands contain a natural watercourse providing legal stormwater outlet;

AND WHEREAS the parties have agreed to enter into this Agreement to allow stormwater runoff from the southern lands to continue to drain onto the north lands following the purchase of the southern lands by 2212;

NOW THERFORE THIS AGREEMENT WITNESSETH that in consideration of the premises and the sum of TWO ($2.00) DOLLARS of lawful money of Canada now paid by 2212 to Fredericks, the receipt and sufficiency whereof is hereby acknowledged, the Parties agree as follows:

1. Fredericks, as the owner of the northern lands, agrees to allow surface stormwater from the southern lands to continue to flow onto the northern lands following the purchase of the southern lands by 2212, and to not obstruct the flow of same.

2. Following the closing of the purchase transaction by 2212, it shall grade the southern lands, at its expense, to allow said surface water to discharge onto the northern lands and to ultimately following the natural watercourse that exists on the northern lands. No construction, grading or other work is anticipated to be needed for the northern lands.

3. The grading and drainage of surface stormwater from the southern lands to the northern lands shall be generally as illustrated in a grading plan to be approved by Norfolk County under the site plan approval process, same to be prepared at 2212's expense.

4. The portion of the southern lands draining onto the northern lands shall, if possible, be, less than half of the total area of the southern lands.

5. The construction cost of the Mutual Drain is estimated to be $1,000.00 and shall be paid by 2212 as part of the cost of grading the southern lands.

6. For the purposes of future maintenance, the Mutual Drain works will be identified as the grading of the southern lands in accordance with the grading plan as approved by Norfolk County under the site plan approval process.

7. Future maintenance and improvement costs of the Mutual Drain works on the southern lands shall be one hundred (100%) percent the responsibility of 2212.

8. This agreement is pursuant to the Drainage Act, R.S.O. 1990, c. D. 17, in accordance with Section 2(3) of the Drainage Act, an agreement or an executed copy thereof made under this section shall, upon registration in the proper land registry office, be binding upon the successors and assigns of the parties to the agreement.

9. This agreement shall be deemed to have been made in and be governed in accordance with the laws of the Province of Ontario, and the laws of Canada applicable therein.

10. Either party to this agreement shall be entitled to register this agreement on title to both the southern lands and the northern lands.

IN WITNESS WHEREOF the parties have executed this Agreement on this 13th day of January, 2022.

4FREDS INC.

_____

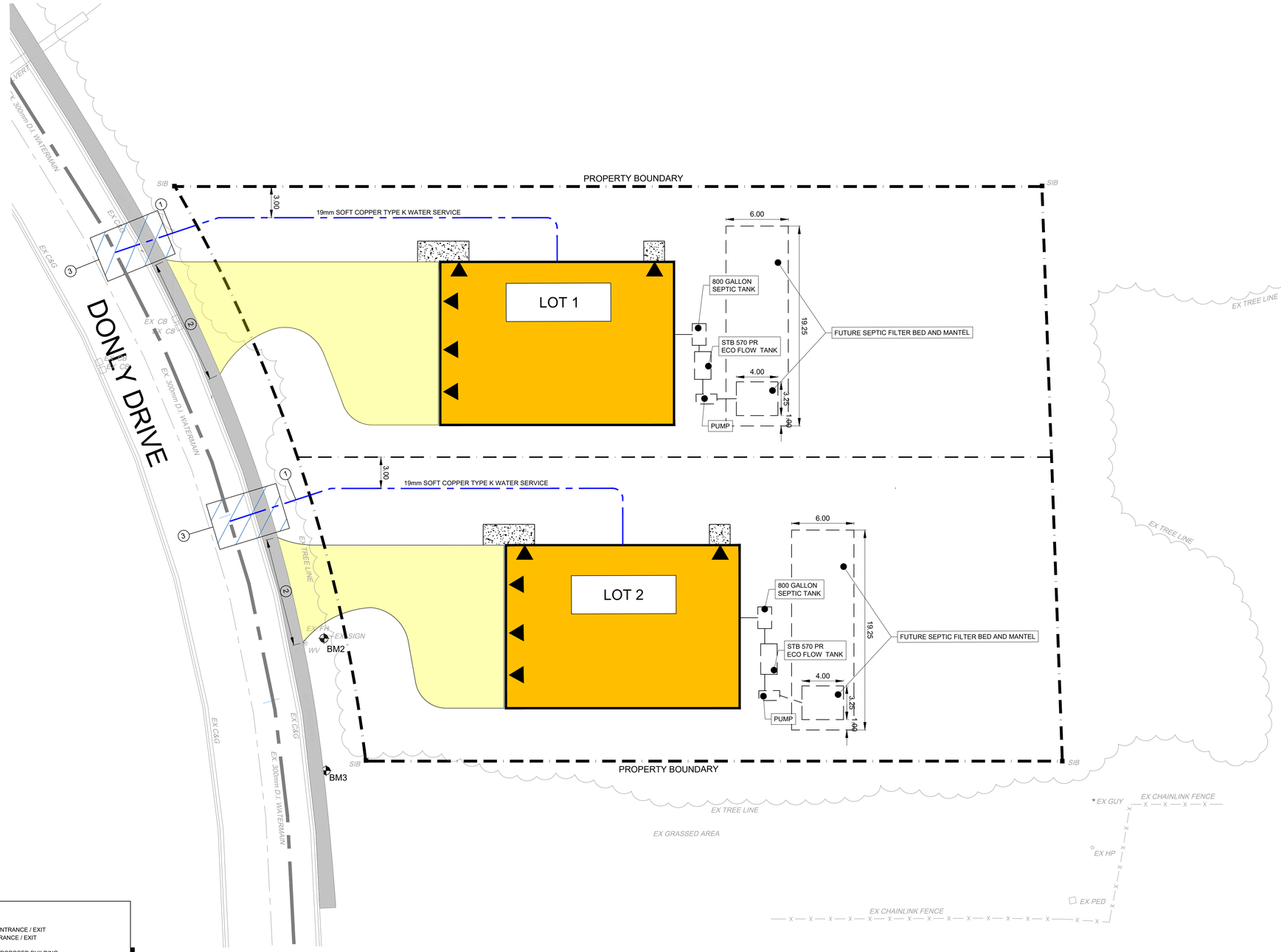
Per:
I have authority to bind the Corporation.

2212638 ONTARIO LIMITED

_____ _____

Witness

Per:
I have the authority to bind the Corporation.



SERVICING PLAN LEGEND

- ENTRANCE / EXIT
- ENTRANCE / EXIT
- PROPOSED BUILDING
- EXISTING BUILDING / STRUCTURE
- PROPOSED CONCRETE SIDEWALK
  125mm CLASS C-2 CONCRETE
  150mm GRANULAR 'A'
- PROPOSED ASPHALT AREA:
  40mm HL3
  50mm HL8
  150mm GRANULAR 'A'
  300mm GRANULAR 'B'
- EX CURB FACED SIDEWALK
- PROPOSED 19mm WATER SERVICE
- LIMIT OF ROAD RESTORATION

NOTES:

ON SITE PRIVATE SEPTIC SYSTEMS IN LIEU OF CONNECTIONS TO MUNICIPAL SANITARY SEWERS IS PERMITTED FOR THESE TWO LOTS IN ACCORDANCE WITH:

A)NORFOLK COUNTY ZONING BY-LAW SECTION 3.9.5 THAT ALLOWS THE GENERAL MANAGER OF PUBLIC WORKS AND ENVIRONMENTAL SERVICES TO WAIVE THE REQUIREMENT FOR MINIMUM SERVICES.

B) LETTER DATED NOVEMBER 22,2021 FROM NORFOLK COUNTY, MR.JASON GODBY, GENERAL MANAGER, WAIVING THE REQUIREMENT FOR CONNECTION TO MUNICIPAL SANITARY SEWERS.

C)NORFOLK COUNTY STAFF REPORTS FOR PROPOSALS
-BNBL 2021368
-BNBL 2021344
-ANPL 2021345
ALL AS CONSIDERED AND APPROVED BY NORFOLK COUNTY COMMITTEE OF ADJUSTMENT ON DECEMBER 15, 2021.

WATER SERVICE INSTALLATION IS NOT REQUIRED UNTIL MUNICIPAL WATER SERVICING CAPACITY IS AVAILABLE AND ALLOCATED TO THESE LOTS.

LEGEND:

① INSTALL 19mm SOFT COPPER TYPE K WATER SERVICE FROM EXISTING WATERMAIN TO PROPERTY LINE COMPLETE WITH CURB STOP AT PROPERTY LINE AND CONNECTION TO WATER SERVICE TO BUILDING, INSTALLATION TO BE AFTER NORFOLK COUNTY CONFIRMS THAT MUNICIPAL WATER SERVICING CAPACITY IS AVAILABLE AND ALLOCATED TO THESE LOTS.

② REMOVE EXISTING CURB AND GUTTER (BARRIER) AND REPLACE WITH NEW MOUNTABLE CURB FOR DRIVEWAY.

③ SAW CUT ASPHALT, CURB AND SIDEWALK AS REQUIRED TO INSTALL NEW WATER SERVICE. RESTORE WITH
- 40mm HL3
- 50mm HL8
- 150mm GRANULAR 'A'
- 300mm GRANULAR 'B'
- OPSD'S FOR SIDEWALKS AND CURB & GUTTER

NO.	DATE	ISSUANCE
0	01/14/2022	ISSUED FOR SITE PLAN APPROVAL

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ELEV: 227.62m

BM1: CUT CROSS IN SIDEWALK ON EAST SIDE OF DONLY DRIVE AT SOUTHWEST CORNER OF SUBJECT PROPERTY.
ELEV: 227.21m

OWNER

4 FREDS INC.
155 VICTORIA ST. SIMCOE
519.428.8020

DRAWING LIST

21-116 - P100 - SITE PLAN
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21-116 - C101 - SERVICING PLAN

PART 1
PLAN 37R-3739
DONLY DRIVE SIMCOE

SCALE:
2 6 10
HORIZONTAL : 1:200

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PRELIMINARY
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vallee
Consulting Engineers, Architects & Planners
G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE ONTARIO N3Y 3W4
(519) 426-6270

LICENSED PROFESSIONAL ENGINEER
21-116
2022-01-14
J. T. JEZZI
100189485
PROVINCE OF ONTARIO

PROJECT TITLE:
DONLY DRIVE WAREHOUSE

SIMCOE - NORFOLK COUNTY
DONLY DRIVE

DRAWING TITLE:
SERVICING PLAN

CHECKED BY:	DRAWN BY:
JDV	NLB/NBN
DRAWING SCALE: 1:200	DRAWING NO.: C101
PROJECT NO.: 21-116	

DATE PLOTTED: 1/13/2022 10:29 AM
PROJECT NUMBER & NAME: 21-116 - FREDERICKS WAREHOUSE
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vallee

Consulting Engineers,
Architects & Planners

January 11, 2022

Mike Fredericks
4Fred Inc.
155 Victoria Street, Simcoe
ON N3Y 4R6

Attention: **Mike Fredericks**

Reference: **Functional Servicing Brief**
Donly Drive Warehouses
Simcoe, Norfolk County
Our Project # 21-116

Introduction

This Functional Servicing Brief has been prepared in support of the site plan application required for the construction of two storage/warehouse buildings on Donly Drive South in Simcoe – Norfolk County. This report presents the functional serving for the proposed development, including sanitary servicing, stormwater management and domestic and fire water servicing.

The subject lands are a vacant parcel of approximately 0.4ha in area located within the Urban boundary of Simcoe on Donly Drive South, just north of the intersection of Donly Drive South and Boswell Street. The property is located on the east side of Donly Drive and immediately north of the existing Eastlink yard and office.

Stormwater Management

Under existing conditions, the subject site is covered with trees and brush. Runoff from the site drains overland in a north westerly direction towards an existing watercourse which ultimately leads to the Lynn River. As part of the Woodway Trails Subdivision (Vallee Project No. 09-056), the subject property was included in the external area contributing runoff to the Woodway Trails stormwater management facility. This external area was allocated an impervious percentage of 35% for the purpose of the stormwater management analysis. Refer to Appendix A for the Woodway Trails Subdivision Stormwater Management Report for details.

The following presents the calculations used to determine the impervious percentage associated with each lot for the proposed development.

- Lot 1 Area: 0.202 ha
- Lot 1 Impervious Area (building and asphalt): 0.056 ha
- Lot 1 Impervious Percentage: 0.056 ha/ 0.202 ha = 27.7%

- Lot 2 Area: 0.203 ha
- Lot 1 Impervious Area (building and asphalt): 0.054 ha
- Lot 1 Impervious Percentage: 0.054 ha/ 0.203 ha = 26.6%

To summarize, the impervious percentages associated with Lot 1 and 2 for the proposed development are 28% and 27%, respectively. Therefore, the runoff flows that will be generated from the proposed development are less than the flow allowance allocated to the downstream stormwater management facility designed as part of the Woodway Trails Subdivision. Consequently, no on-site stormwater management is required for the proposed development.

Sanitary Servicing

Despite being an existing lot within the established urban area of Simcoe, the subject property does not have access to municipal sanitary services. Access to sanitary services end approximately 160 meters north and 250m south of the property on Donly Drive. Due to existing depth of the sanitary sewer on either side of the subject property and the existing road profile, it is not possible to extend the existing sanitary sewer to service the proposed development. We understand that both the property immediately to the east on Boswell Drive and the property immediately to the south on Donly Drive are serviced with on-site septic system due to the lack of municipal sanitary sewers in this area. Therefore, it is proposed that each storage/warehouse building be serviced by an on-site septic system. See Appendix B for the proposed septic system design details.

Water Servicing

Norfolk County GIS online mapping and the Norfolk County ISMP indicate an existing 300mm diameter ductile iron watermain along Donly Drive. It is proposed that this watermain will be utilized to service the proposed development. It is understood that water connection will not be permitted until treatment capacity and allocation is available, so the following domestic and fire demands are provided for future reference only. Norfolk County's design criteria stipulates the following requirements for system pressures, and the system shall be designed to meet the greater of either of the following requirements;

- Fire flow conditions– not less than 140 kPa
- Normal operating conditions – not less than 280 kPa

Domestic Water Demand

The following summarizes the domestic water flow information for the proposed development:

- Industrial Population Density: 120 persons/ha
- Site Area: 0.4 ha
- Population: 48 people
- Average Daily Water Demand (per person) 0.450 m^3/person/day
- Average Daily Water Demand: 21.6 m^3/day (0.25 L/s)
- Maximum Day Demand Factor: 2.25
- Maximum Day Demand: 48.6 m^3/day (0.56 L/s)
- Peak Hourly Demand Factor (Residential) 2.00
- Peak Hourly Demand 1.80 m^3/hour (0.50 L/s)

Fire Water Service

According to Norfolk County GIS online mapping, there are three existing fire hydrants located in proximity to the subject development site. The first hydrant is located on the east side of Donly Drive. Approximately 45m north of the northwest corner of the subject property, the second is located on the east side of Donly Drive, directly in front of the subject property, and the third is located on the northeast corner of Donly Drive and Boswell Street. The entire subject property is covered within the 90m radii of the existing hydrants, consequently, no fire hydrants are required to be installed on the subject property to service the proposed development.

Typically, available fire flow during the maximum day demand is the critical criteria when evaluating a watermain distribution system's ability to service a residential subdivision. The estimated fire flow requirement for the development has been determined using both the recommendations of the Fire Underwriters Survey – 1999 (FUS) method. Using the FUS recommendations, the minimum required fire flow was determined to be 117 L/s. Supporting calculations for both methods are detailed in Appendix C.

The Norfolk County ISMP estimates that the available fire flow in the existing watermain on Donly Drive is greater than 159 L/s, as displayed in Appendix C. Therefore, the available municipal watermain is anticipated to provide sufficient flow to service the proposed development. It should be noted that the ISMP modeling was from 2015, consequently, it is recommended that Norfolk County review against their current model and provide more current available demands to confirm that the supply is adequate.

Conclusions and Recommendations

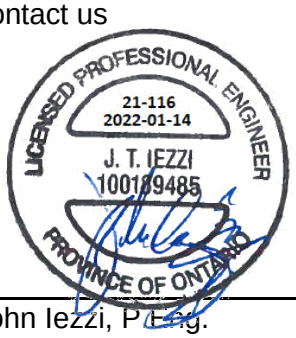
The functional servicing design for the proposed development can be summarized as follows:

- The impervious percentages associated with Lot 1 and 2 for the proposed development are 28% and 27%, respectively, which is less than the 35% impervious allowance allocated as part of the Woodway Trails Subdivision project. Consequently, no on-site stormwater management is required for the proposed development.
- The proposed development will be serviced by an on-site sanitary septic system.
- The existing 300mm watermain on Donly Drive shall serve as the water supply for the proposed development once treatment capacity and allocation are approved.
- An analysis of the hydraulic modelling will be conducted by the County consultants to determine the water servicing capacity and constraints on the existing water system to ensure adequate system flows and pressure for the aforementioned domestic and fire demands.
- The domestic maximum day demand and peak hourly demand were found to be 48.6 m3/day (0.56 L/s) and 1.80 m3/hour (0.50 L/s), respectively.
- The required fire flow demand for the proposed development was found to be 117 L/s, which is less than the estimated fire flow (greater than 159 L/s).

It is recommended that this report be provided to the Norfolk County in support of the application for zoning by-law amendment of the proposed development.

We trust that this information is complete and sufficient for submission. Should you have any questions or require further information please do not hesitate to contact us

Respectfully submitted,



Natalie Biesinger, B.A.Sc., EIT
G. DOUGLAS VALLEE LIMITED
Consulting Engineers, Architects and Planners

John Iezzi, P.Eng.
G. DOUGLAS VALLEE LIMITED
Consulting Engineers, Architects and Planners

Appendix A
– 09-056 Stormwater Management Report – Woodway Trails Subdivision

Appendix B
– Sanitary Septic System Design

Appendix C
– Domestic Water Demand Calculations
– FUS Calculations
– Norfolk ISMP Map

APPENDIX A

09-056 Stormwater Management Report – Woodway Trails Subdivision

Storm Water Management Report
Woodway Trails Subdivision

Simcoe – Norfolk County - Ontario

vallee

Consulting Engineers,
Architects & Planners

January 8, 2010
Revised May 6, 2010

Our Project #09-056

January 8, 2010
Revised May 6, 2010

2177545 Ontario Inc
2177546 Ontario Inc
c/o The Zitia Group
2 Grand River St. S.
Paris, ON N3L4G4

Attention: Mr. Peter Labiris and Mr. Paul Halyk

Dear Sirs:

Reference: Storm Water Management Report
Woodway Trails Subdivision
Simcoe – Norfolk County
Our File 09-056

1.0 Introduction

This storm water report has been completed on behalf of 2177545 Ontario Inc. and 2177546 Ontario Inc. to summarize the storm water management design for Woodway Trails Subdivision in Simcoe, Norfolk County, Ontario. It is the intention to submit this report to Norfolk County and the Long Point Region Conservation Authority for review and approval. Once all comments have been received and incorporated in the design this report will be submitted to the Ministry of the Environment as part of the application for the Certificate of Approval.

The Woodway Trails Subdivision is a residential development that when complete will include approximately 948 units comprised of a mix of town houses, single-family dwellings, semi-detached dwellings and apartments. At this time planning approvals have only been received for Phase 1 of the development, which includes 230 units made up of single family, semi-detached and townhouse units. Figure 1 shows the overall development as well as Phase 1. This report will outline the SWM approach for Phase 1 only. Some consideration has been given to the remainder of the future development, as portions will utilize the pond provided by Phase 1.

In regards to the SWM approach for the remainder of the development outside of the current draft plan approval; Figure 2 identifies the catchment areas associated with each of the potential SWM areas. No detailed design has been completed at this time for these areas. Therefore they represent a best guess of the portions of the development that will drain to these facilities.

There is also a large external area the currently drains from the east through the site as well as a portion of Oakwood Cemetery. These areas are shown on Figure 3. Consideration has also been given to these areas in the SWM design presented by this report.

The SWMHYMO computer model has been used to simulate the sub watershed under pre and post development conditions. The simulations were conducted using the 4-hour Chicago Distribution design storm of the 2-year, 5-year, 10-year, 25-year, 50-year and 100-year storm events.

During consultations on previous projects, the Long Region Conservation Authority (LPRCA)as expressed some concerns with respect to developments in general. Their issue of concern is the reduction of land surface area available for natural infiltration in the post development state. It was generally agreed that the individual lots have practices in place to promote the infiltration of surface runoff. These include:

- Roof leaders: By directing the roof leaders away from buildings and to the ground surface, runoff collected from roof tops will have an opportunity to infiltrate while following the ground surface and swales provided by a proposed grading plan.
- Sump Pump Discharges: Storm sewer services are not proposed for this development. Therefore any sump pump discharges will be directed to the grass surface, away from the buildings and providing an opportunity for any discharge to infiltrate while following the ground surface and swales provided by the proposed grading plan.

Recognizing that the soil conditions in the Simcoe area (ie sand) promote infiltration of surface runoff, the approach proposed for this site is to design a dry pond facility with a sediment forebay to promote water quality enhancement. This forebay will be designed to maintain a permanent pool of water and therefore will require a clay liner to protect against infiltration. The remainder of the facility will not have a clay liner and therefore promote infiltration of surface runoff that is retained during storm events.

As a result of the initial submission of this report in January of 2010, the LPRCA provided some comments as follows:

1) Water quality enhancement needs to be provided for post development areas 3 and 6.
2) For the portions of the development outside of the current draft plan approval, the potential drainage areas and associated future SWM facilities need to be shown.
3) Future lots along the western side of Street B are of concern to the LPRCA due to large grade differential and proimity to the ravine.

Items 1 and 2 are addressed later by this revised report. Item 3 is beyond the scope of this report. However it is noted that this area of the development had not currently received draft plan approval. Once approval is sought for these lots, item 3 can be addressed to the satisfaction of the LPRCA.

2.0 Pre-Development

The existing site is of rolling topography that drains generally in a southwesterly and southerly direction. The site can be divided into five (5) pre-development catchment areas each with a stand-alone outlet. These areas are shown on Figure 2 and can be generally described as follows:

1. PRE1: Approximately 21.82 ha of the northern portion of the site that drains to an existing watercourse and ultimately to the Lynn River. The external area identified that drains through this portion of the site making the total catchment area to this watercourse approximately 50.26 ha.
2. PRE2: An area of approximately 10.27 ha that drains under the Lynn Valley Trail via 300 to 400mm tile and ultimately to the Lynn River.
3. PRE3: Approximately 4.35 ha of the southwest corner of the site the drains via a large diameter culvert under Decou Road and ultimately to the Lynn River.

4. PRE4: Approximately 21.66 ha of the central portion of the site. This area also is served by the large diameter culvert under Decou Road and ultimately drains to the Lynn River.
5. PRE5: The 18.88 ha of the eastern portion of the site. This area is served by two (2) 600mm diameter culverts under Decou Road and to an existing watercourse that ultimately drains to the Lynn River.

The existing watercourse the currently serves area PRE1 will serve as the outlet for the proposed SWM facility presented by this report. All other outlets will remain as is and no additional flow will be introduced to them with the development of Phase 1. The other drainage areas are only presented by this report so that they can be identified for future reports as the outlets are utilized for future SWM facilities that proposed as the development proceeds.

The SWMHYMO computer model was used to simulate pre-development conditions of area PRE1 for the design storm events indicated previously. The model uses a modified SCS procedure to estimate losses that occur naturally during a rainfall event such as evaporation and infiltration. Table 1 summarizes the background information and input parameters for the computer model with complete notes included with this report as Appendix A.

Table 1
SWMHYMO Model Input – Pre Development

Parameter	Area PRE1
Area (ha)	50.26
Soil Type	Brant – lacustrine silt loam Brady – lacustrine sand and loamy sand Fox – lacustrine sand and loamy sand
Hydrologic Soil Group	AB
SCS Curve Number	70 Crop and other improve land
Longest Flow Path (m)	1,110m
Average Slope (%)	2.32%
Runoff Coeff	0.2
Time to Peak (hrs)	0.74

Table 2 summarizes the pre-development storm water runoff generated from area PRE1. These would represent the anticipated peak runoff from the area at the crossing of the Lynn Valley Trail of the existing watercourse.

Table 2 Pre-Development – Storm Runoff	
Storm Event	**PRE1 (m^3/s)**
2-Year	0.579
5-Year	0.915
10-Year	1.211
25-Year	1.571
50-Year	1.983
100-Year	2.500

3.0 Post-Development

As was noted as part of the pre development discussion external drainage areas currently drain through the site. These areas generally drain towards the site from the north and the east and follow the central low-lying area through the site continuing west ultimately to the Lynn River. Due to these drainage patterns there is no good opportunity to convey the runoff from these areas through the site separately from the drainage system that will be provided to service the development. Therefore the applicable storm sewers and the SWM facility described by this report will be designed with consideration to these external areas.

Post Development Drainage Areas

In total seven (7) post development drainage areas (six (6) within site, plus external) will be developed that will contribute surface runoff to the proposed facility outlined by this report. These areas are shown on Figure 4, which can be generally described as follows:

- External Areas
  - Donly Drive – This area is the majority of the external area that will continue to drain through the drainage system provided by this development. The total area is estimate at approximately 18.7 ha.
  - Oakwood Cemetery – This area is the remainder of the external area and is associated with the southern portion of the cemetery. The total area is estimated at approximately 9.74 ha.
- Post 1 – This area will be the catchment area for Streets A, H, I, J and E. Total area is estimated at approximately 10.24 ha.
- Post 2 – This area will be the catchment area for Streets A, F and B and is approximately 7.49 ha in size.
- Post 3 – This area will be the catchment area for portions of Street B, F and H. The storm sewer system associated with this area will direct the runoff to the proposed SWM facility during minor storm events. However, due to the topography of the site, the overland flow route for this area will convey the runoff during major events to the outlet for the proposed SWM facility. This area is outside of Phase 1.
- Post 4 – This area is outside of Phase 1 and represents approximately 5.72 ha of the development south of the proposed SWM facility. The future streets of P, Q and R service this area.
- Post 5 – This area represents to the location of the proposed SWM facility and is approximately 4.23 ha in size.
- Post 6 – This area is to the west of the proposed SWM facility. Due to the topography this area will not drain to the proposed SWM facility. The runoff for the minor and major storm events will be directed to

the outlet system from the SWM facility.

Post development, impervious land areas will be introduced to each of these areas to differing degrees. For the areas within the development the following assumptions have been made with respect to impervious surfaces introduced post development.

- Assumed Roof Area per Dwelling Unit $185m^2$
- Assumed Driveway Area per Dwelling Unit $45\ m^2$
- Road Area per metre of Length (includes sidewalk one side) $11m^2/m$
  (Road area considered directly connected to storm sewers)

For the Donly Drive area, the impervious area has been estimated from an aerial photograph as shown by Figure 5. This results in a total impervious area of 4.43 ha or 24% of the total area of 18.7 ha. For the purposes of this analysis 35% impervious has been used. It is anticipated that future developments in this area will be required to provide some level of storm water management and that this will include limiting post development runoff to pre-development values.

No impervious land area has been estimated for the portion of Oakwood Cemetery that drains to the site due to its park like state.

The following summarizes the anticipated impervious areas for each of the sub catchment areas of the overall site.

Post 1
- Number of Units 122
- Length of Road 1,135m
- Impervious Area 4.05 ha (1.25 ha directly connected)

Post 2
- Number of Units 117
- Length of Road 1,105m
- Impervious Area 3.91 ha (1.22 ha directly connected)

Post 3
- Number of Units 85
- Length of Road 770m
- Impervious Area 2.80 ha (0.85 ha directly connected)

Post 4
- Number of Units 76
- Length of Road 775m
- Impervious Area 2.60 ha (0.85 ha directly connected)

Post 6
- Number of Units 44
- Length of Road 479
- Impervious Area 1.54 ha (0.53 ha directly connected)

Area Post 5 is associated only with the proposed SWM facility and therefore will have no typical impervious areas introduced. However, any water surfaces that are present will tend to act similar to impervious surfaces. Therefore to account for this it has been assumed that 50% of the 4.23 ha, or 2.12 ha, is impervious with all of this considered as directly connected.

Discharge to Storage Relationship

To determine the required level of storage for a storm water detention pond, the post-development conditions were modeled, again using the SWMHYMO computer model. In order for the computer model to determine the storage volume required the relationship between the storage volume of the pond and the discharge must be defined and is referred to as the pond-rating curve. This rating curve is determined by calculating volume of the proposed pond facility up to a proposed contour elevation and then calculating the expected discharge from the facility based on the water level at this contour elevation and the proposed outlet control configuration.

It is proposed to control the discharge from the proposed facility in two stages. The initial control will be provided by a 150mm diameter orifice and the secondary control provided by twin 0.75m wide weirs. The invert of the orifice will be placed at elevation 214.00 and will control the discharge during the minor storm events up to the 2-year event. The weirs will be placed at an elevation of 214.90. This elevation corresponds to the level below which the pond will take approximately 48 hours to drain, which is the target time to achieve water quality enhancement of the runoff. The controlled discharge from the facility is estimated using the following equations.

1. 150mm Orifice – Elevations 214.00 to 216.00
   - $Q = C * A * \sqrt{2 * g * h}$

     where: Q = Discharge in cms
     C = constant, 0.63
     A = orifice area in m^2
     g = gravitational constant, 9.81 m/s^2
     h = height above orifice, m

2. Twin 0.75m Wide Weir – Elevations 214.90 to 216.00
   - $Q = n * 1.67 * w * h^{3/2}$

     where: n = number of weirs, 2
     w = width of weir, 0.75m
     h = height above weir, m
   - Include flow from orifice.

The rating curve for each of the ponds is appended to this report as Appendix B.

Runoff Criteria

Typically the post development runoff from a site is to limited or controlled to the pre-development levels. This is achieved by the construction of retention facilities such as ponds with controls such as orifice plates and/or weirs placed on the outlet pipes. This is the case with Phase 1 and the pre-development runoff values will serve as the post development runoff criteria.

Post Development Model

The post development model developed for Phase 1 SWM facility is appended to this report as Appendix C. Table 3 summarizes the post development conditions for the storm events analyzed.

Table 3
Post Development Runoff – Woodway Trails Subdivision Phase 1 SWM Facility

Event	Pre Development (cms)	Post Development (cms)	Storage Provided (ha*m)	Estimated Water Level (m)
2-Year	0.579	0.231	0.6962	215.05
5-Year	0.915	0.448	0.8370	215.17
10-Year	1.211	0.679	0.9620	215.27
25-Year	1.571	1.014	1.1230	215.40
50-Year	1.983	1.344	1.2680	215.50
100-Year	2.500	1.851	1.4730	215.65

For all storm events the post development discharge from the site to the ravine has been reduced to less than pre development values.

4.0 Proposed Detention Pond

The Ministry of the Environment's document titled **Stormwater Management Practices Planning and Design Manual** (March 2003) was used in conjunction with requirements of Norfolk County to determine the design for the storm water ponds for Dover Coast development. The following summarizes the design guidelines presented by the manual along with the corresponding value for the proposed facility. The complete calculations are provided as Appendix D.

a) Storage Sizing: Table 3.2 of the MOE design manual provides levels of storage volume required dependent on the percent impervious land area. For a dry pond facility based on 41% impervious area of the contributing area of the development (32.9 ha) to the facility, the required volume of storage is 103m^3/ha or contributing area. This results in a volume of approximately 3,553 m^3, which compares the volume of storage provided during the quality storm (2-year event) of approximately 6,962 m^3.

b) Detention Time: During the quality storm the design manual indicates a 24 hr detention time as a minimum requirement for dry pond facilities with 48 hr preferred. For the proposed facility the runoff stored during the quality storm (2-year event) is estimated to be between 44 and 48 hours.

c) Minimum Orifice Size: A minimum orifice of 100mm is recommended for dry pond facilties. For this facility a 150mm orifice is proposed.

d) Active Storage Depth: The MOE guideline recommends a maximum active storage depth of 2.0m. At the deepest point of the facility the active storage depth will be between 1.6 and 1.7m.

e) Side Slopes: Average side slopes are recommended to be at 4(h):1(v) or flatter. The exposed side slopes of the proposed facility are proposed to be 7(h):1(v).

f) Forebay Settling Length: The design manual outlines the calculation of the required length for the forebay to allow a certain size of particle to settle. The calculation is based on the peak flow rate from the pond during the quality storm, the length to width ratio of the forebay and settling velocity of the particle size (0.0003 m/s). The resulting length is 37m and compares to the 40 to 90m provided depending on the pond inlet.

g) Forebay Dispersion Length: The design manual also outlines a calculation to determine the length of forebay required to slow a discharge. This calculation is based on the inlet flow rate during the quality storm (2-year), the depth of the permanent pool in the forebay and the desired velocity in the forebay (0.5 m/s). The following summarizes the lengths provided for each inlet:
   - Inlet 1 (0.974 cms): 16m
   - Inlet 3 (0.211 cms): 3m

   These results compare to the 40 to 90m provided depending on the pond inlet.

h) Sediment Accumulation: Based on the anticipated sediment loading rates outlined by Table 6.3 of the MOE guidelines, the estimated sediment accumulation can be determined based on the impervious land area within the catchment area along with the target removal efficiency of the proposed facility. For the estimated 41% impervious land area of the development (excluding external area) sediment accumulation is estimated to be approximately 199 m^3 over a 10-year period. This compares to the forebay volume of 1,539 m^3.

   For maintenance purposes an access road has been provided to the proposed facility.

In regards to water quality enhancement, MOE guidelines do not provide volumetric requirements for water quality for dry ponds providing normal protection (70% removal efficiency). The proposed facility is a dry pond and is therefore only anticipated to provided basic protection in terms of suspended solids removal (60% removal efficiency) when designed in accordance with MOE guidelines.

However it is noted that the proposed design includes items that will further enhance the performance of the facility, these include:

- A large forebay design in terms of length from the respective outlets that will promote increased settling of solids as runoff passes through the facility.
- A release period approaching 48 hours during the quality storm.
- A permanent pool volume of 1,539 m3 that approaches the volume of 1,842 m3 that would be required for a wet pond facility to provide normal protection. (Reference Table 3.2 MOE guidelines, 41% impervious, 39.2 ha contributing)

It is also noted the post development drainage Areas 3 and 6, do not drain to the SWM facility and therefore do not receive any water quality enhancement. Furthermore, these areas beyond the limits of the current draft plan approval and therefore not detailed servicing design has been completed at this time. Once these areas become draft plan approved and progress to the detailed design stage, additional water quality enhancement will have to be considered.

5.0 Proposed SWM Facility Summary

The following summarizes the proposed SWM facility, shown drawings SW-1 and SW-2, for the Phase 1 and portions of the future phases of the Woodway Trails Subdivision development in Simcoe based on the analysis presented by this report;

- A dry pond facility with a permanent pool elevation of 214.50 in the sediment forebay, pond bottom of elevation 213.25 in the forebay and 214.00 in the main storage area both with a top of slope elevation of 216.00.
- Permanent pool depth of 1.25m in the sediment forebay with a volume of 1,539 m^3.
- Total storage volume provided for the 100-year storm event is 14,730 m^3.
- Three pond inlets, two to be constructed as part of this phase of diameter 825mm and 1050mm. A future third inlet with diameter to be determined.
- Discharge from the proposed facility controlled by:
    - 150mm diameter orifice at elevation 214.00
    - Twin 0.75m wide weirs each at elevation 214.90
- Outlet from the proposed facility to be provided by a 825mm diameter storm sewer and discharging to an existing watercourse just east of the facility and ultimately to the Lynn River.
- Emergency overflow/overland flow provided by catch basin structure with top of casting elevation placed at the approximate 100-year storage level (215.70).

6.0 Erosion and Sediment Control

During construction, the contractor is required to protect the work site and all adjacent lands from sediment and erosion regardless of the source to the satisfaction of all applicable parties. The measures installed by the contractor are to remain in place until such time as there is no further threat of damage.

9.0 Conclusions

It is concluded that:

1. Post development flows have been reduced to below pre-development levels for all storm events analyzed.
2. The proposed storm water pond has sufficient capacity and meets the design guidelines outlined by the MOE's document titled **Stormwater Management Practices Planning and Design Manual** (March 2003) and requirements of Norfolk County.

We trust that this is the information you require to complete the review and approval for this facility. Should you have any questions or require further information please do not hesitate to call. Thank you.

Yours truly,

T. Gregory Smith, P.Eng.
G. DOUGLAS VALLEE LIMITED
Consulting Engineers, Architects and Planners

H:\Projects\2007\07-099 Silver Lake Phase 3 Design\07099 Stormwater Report.doc

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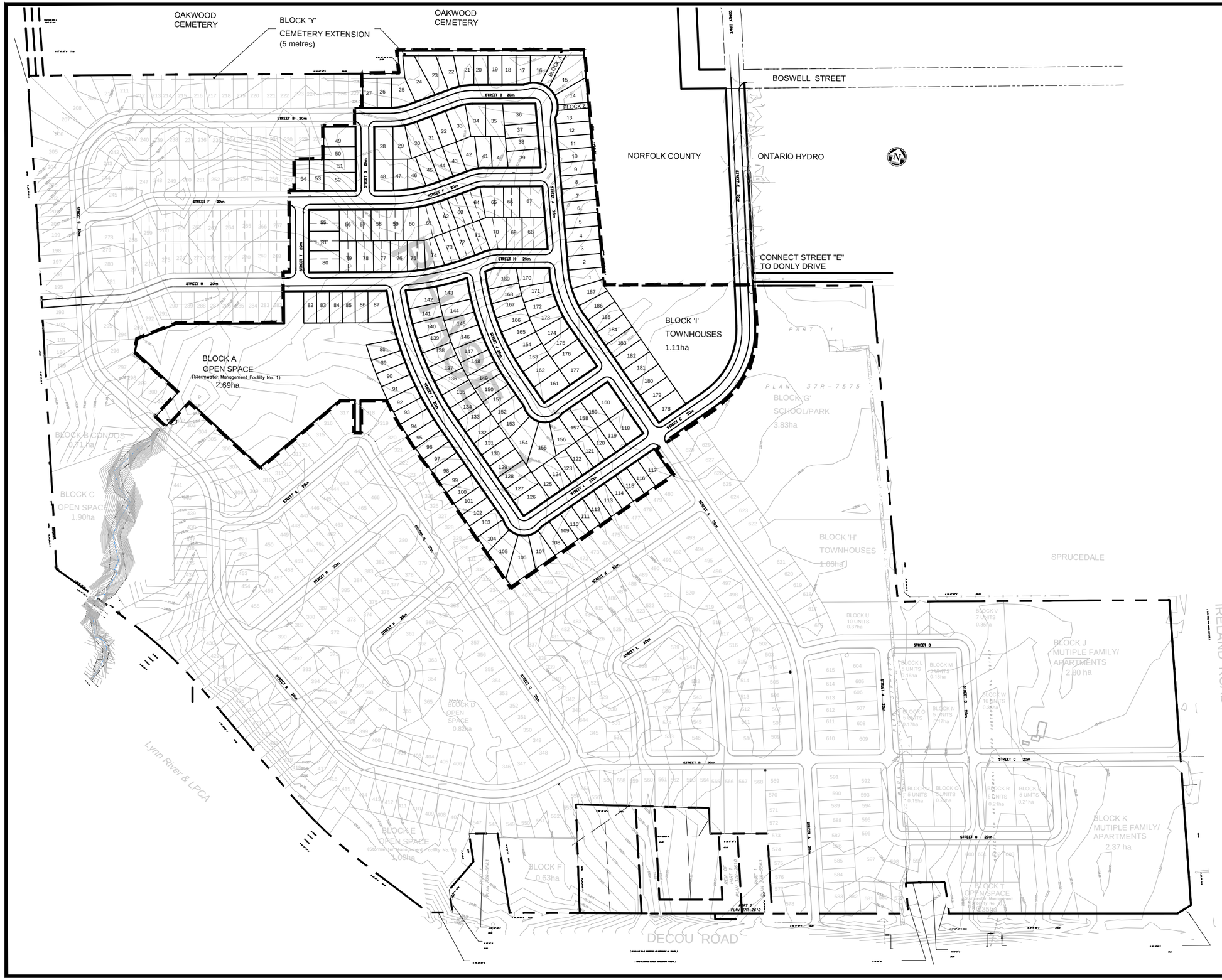
Appendix B: Pond Rating Curves
Appendix C: Post Development Model
Appendix D: Miscellaneous Pond Design Calculations

List of Drawings
09056-SW1
09056-SW2



DATE	REVISION

KEY PLAN (N.T.S.)

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(519) 426-6270

Project Title

WOODWAY TRAILS
SIMCOE- NORFOLK COUNTY

Drawing Title

FIGURE 1

PROPOSED DEVELOPMENT LAYOUT

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TGS		TGS
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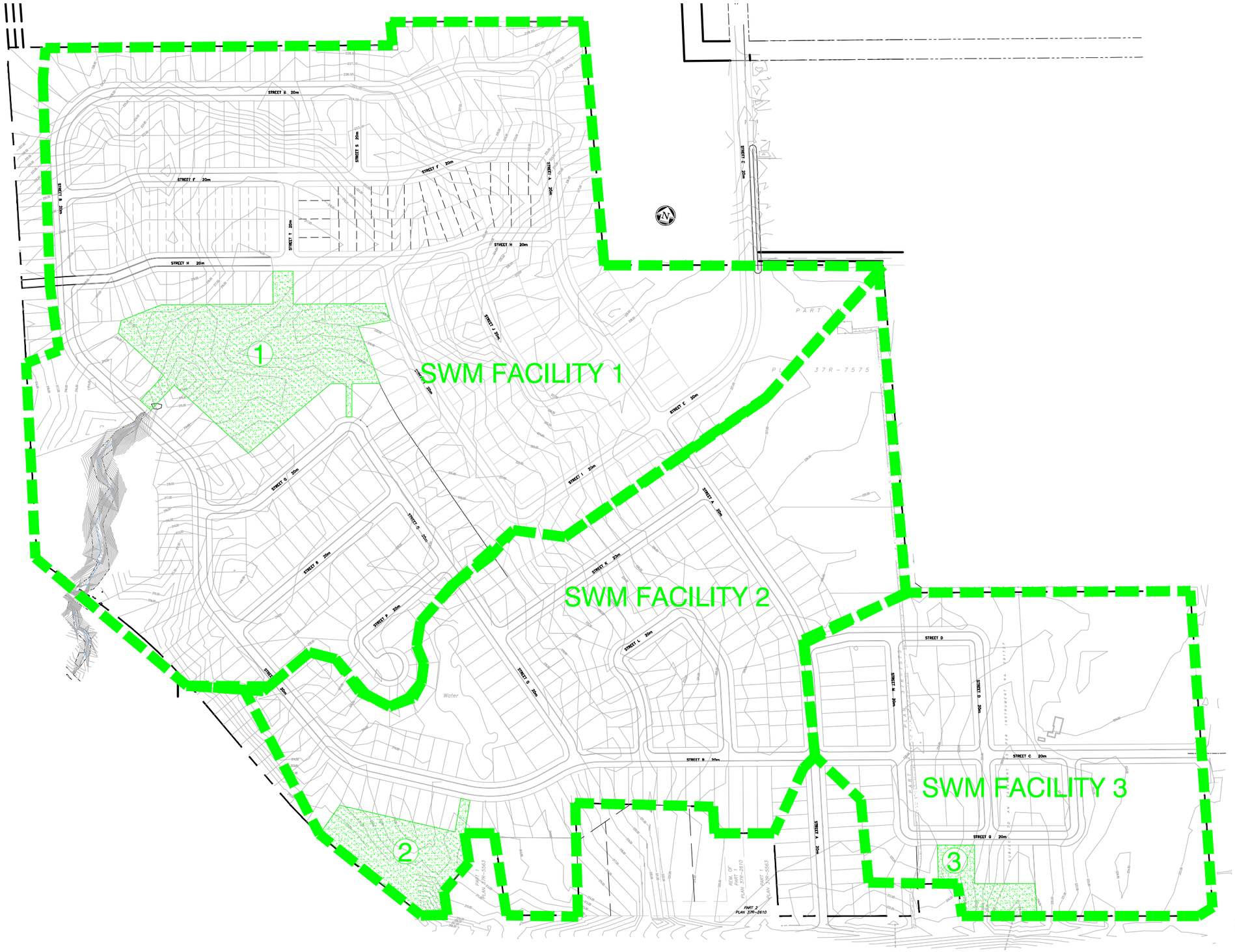
Project No. 09-056		



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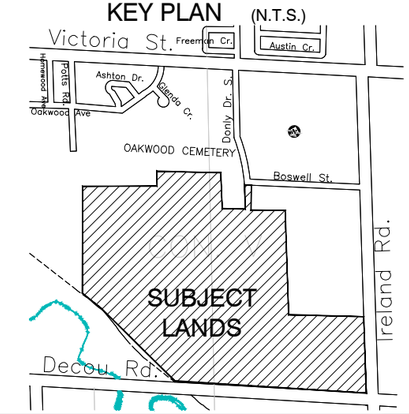

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FIGURE 2
SWM FACILITY CONTRIBUTING AREAS

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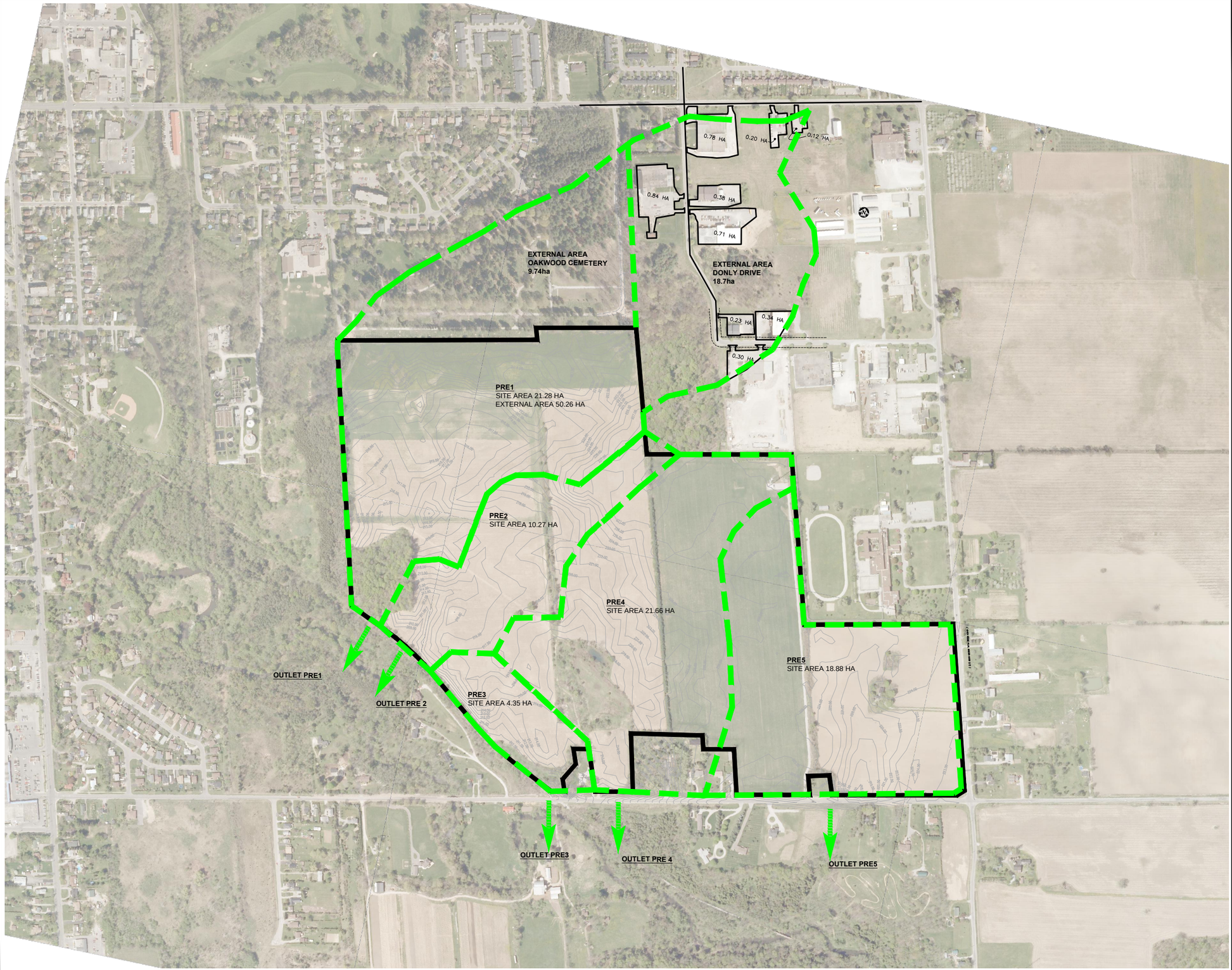
Project No. 09-056		



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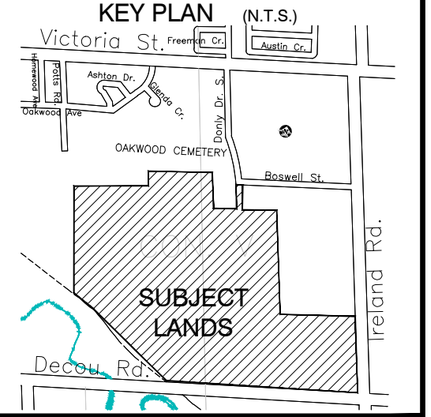

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FIGURE 3
SITE PRE DEVELOPMENT DRAINAGE AREAS AND EXTERNAL AREAS (PHASE 1)

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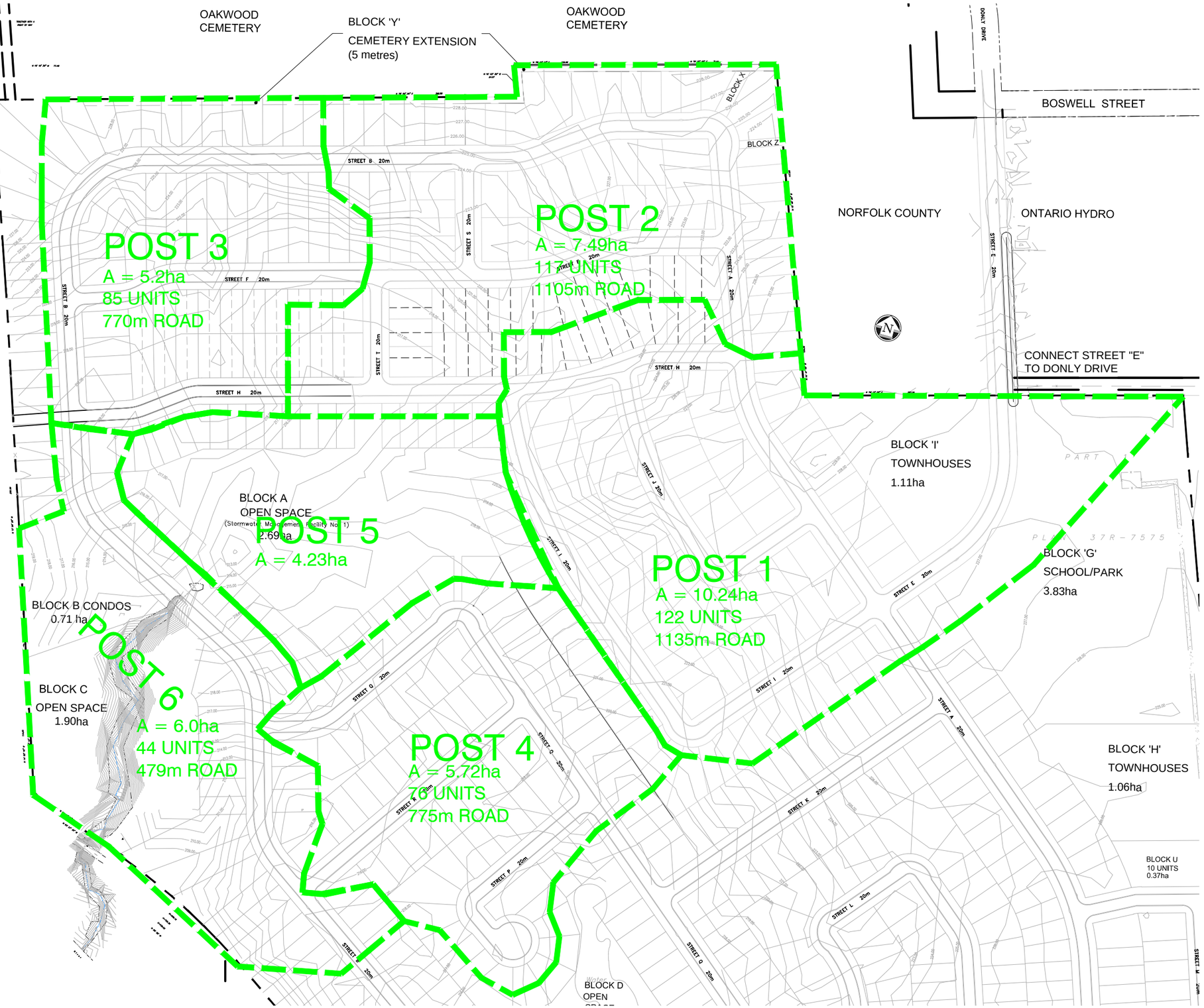
Scale : 1:7500	Date : JAN 2010	Drawing No. F3
Project No. 09-056		



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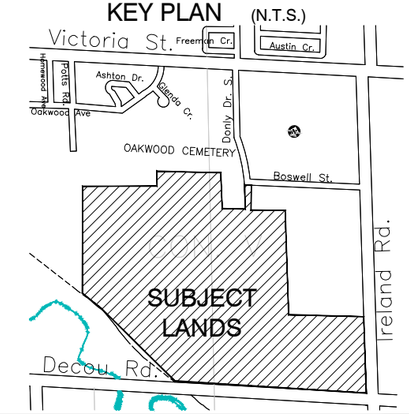

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FIGURE 4
POST DEVELOPMENT DRAINAGE AREAS
PHASE 1 SWM FACILITY

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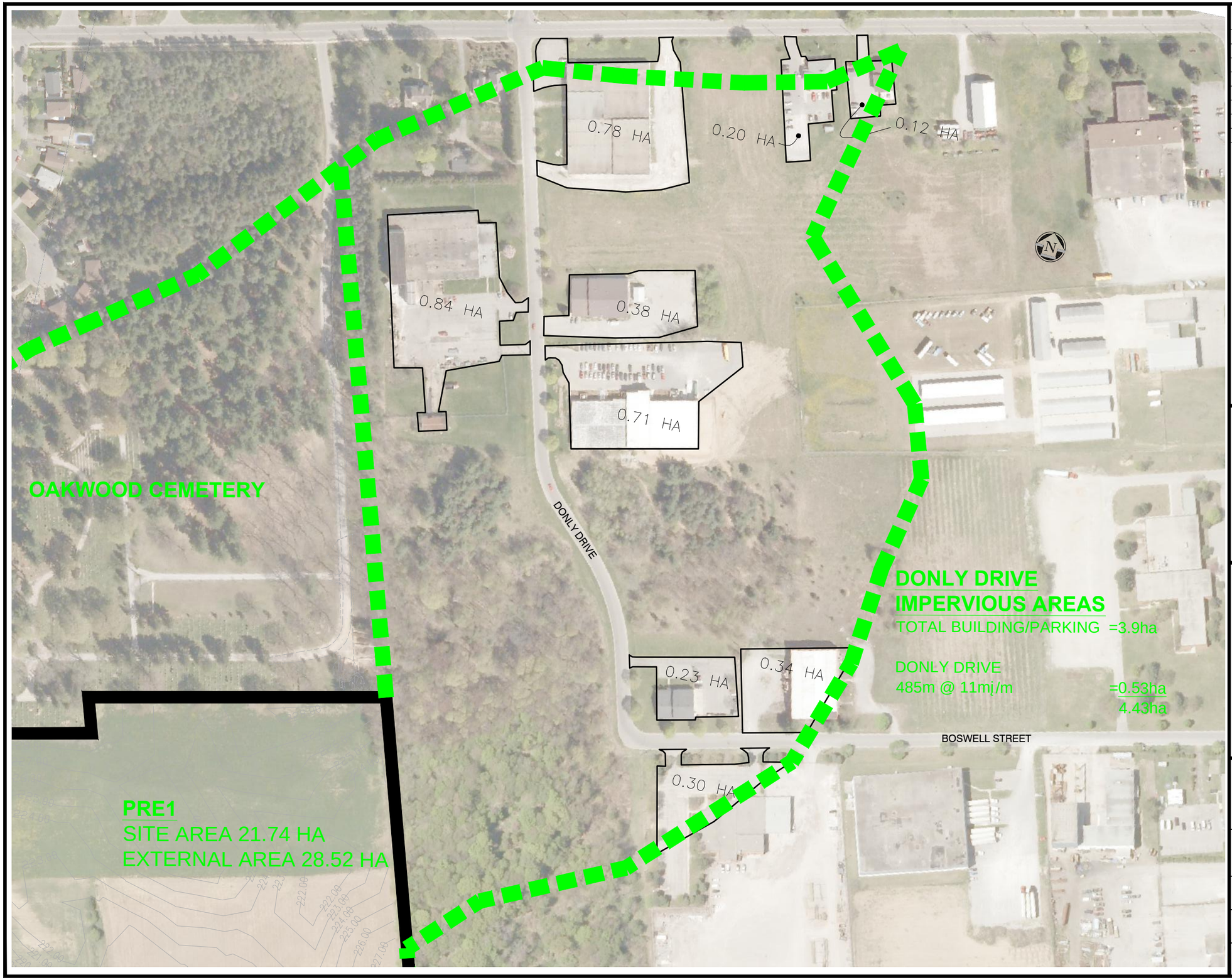
Project No. 09-056		



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WOODWAY TRAILS
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Drawing Title FIGURE 5
DONLY DRIVE EXTERNAL AREA
EXTERNAL AREAS

Designed by :	Drawn By :	Checked By :
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Project No. 09-056		

SECTION A–A

TYPICAL LOW FLOW CHANNEL

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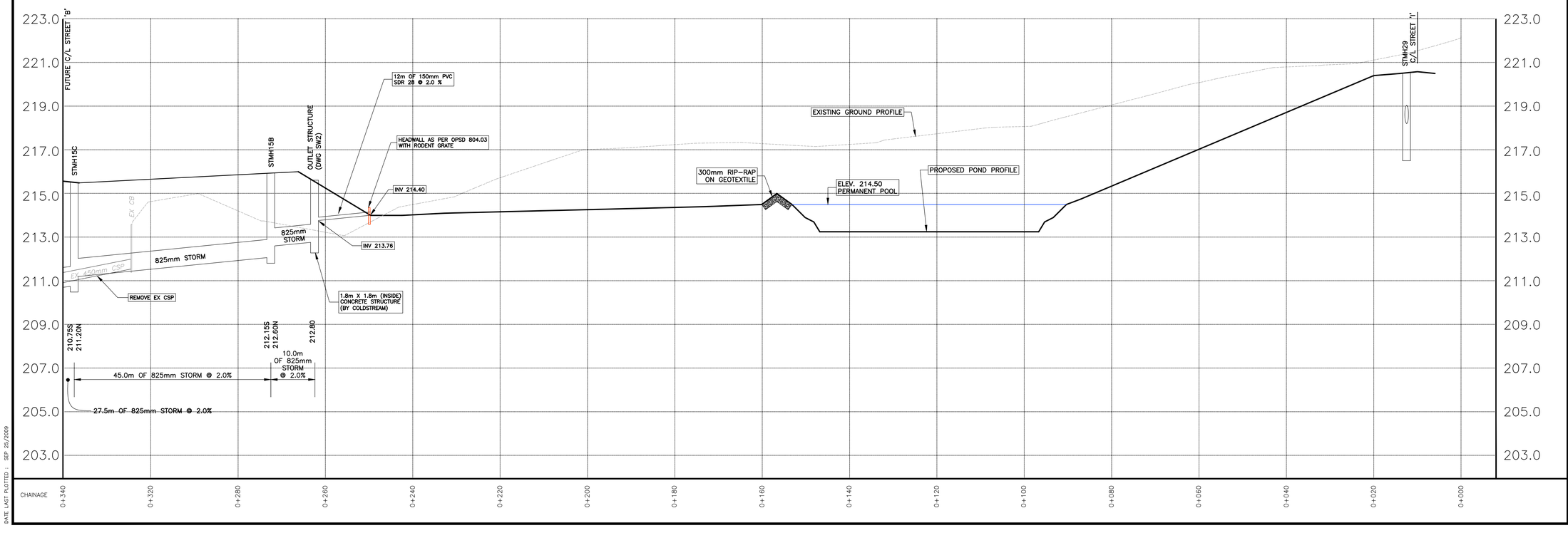

DATE LAST PLOTTED : SEP 25/2009

REV. No.	DATE	REVISION
0	JAN 7/10	SUBMITTED TO COUNTY FOR REVIEW
1	MAY 7/10	REVISED PER COUNTY COMMENTS

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

SCALE:
HORIZONTAL = 1:500
VERTICAL = 1:100

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LICENCED PROFESSIONAL ENGINEER
T. G. SMITH
PROVINCE OF ONTARIO

Project Title

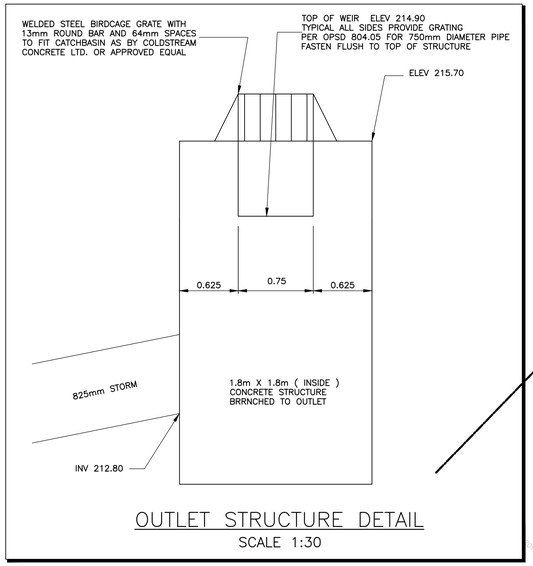
WOODWAY TRAILS SUBDIVISION

NORFOLK COUNTY - SIMCOE

Drawing Title

PLAN AND PROFILE
SWM POND 0+000 TO 0+340

Designed by : TGS	Drawn By : TJC
Checked by : TGS	Date Started : AUGUST 2009
Drawing Scale : AS NOTED	Drawing No. SW1
Project No. 09-056	



OUTLET STRUCTURE DETAIL

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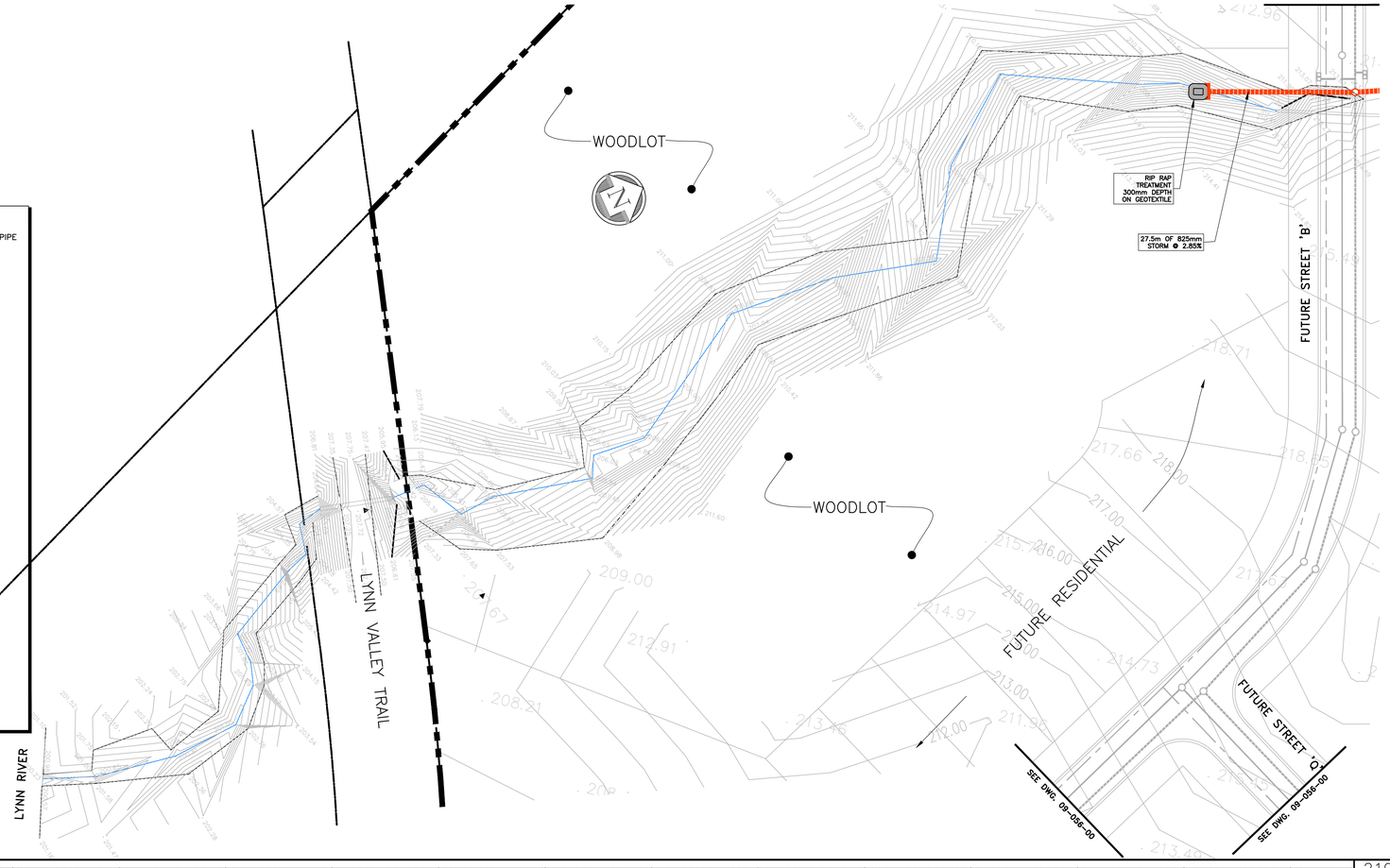
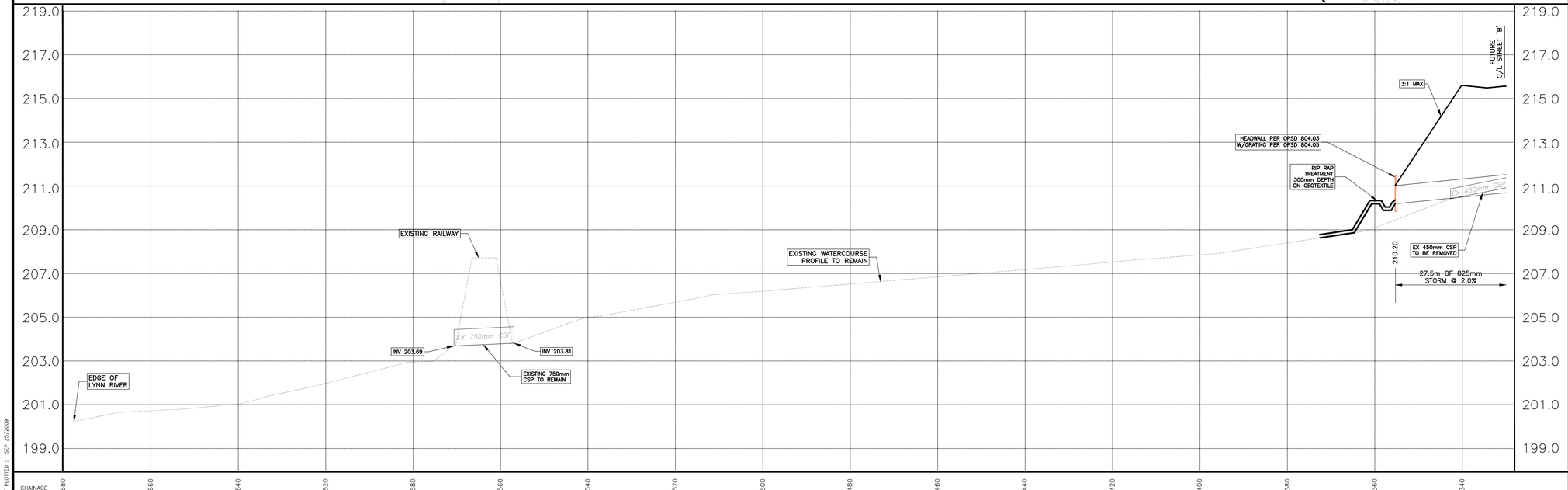




DATE LAST PLOTTED : SEP 25/2009

REV. No.	DATE	REVISION
0	JAN 7/10	SUBMITTED TO COUNTY FOR REVIEW
1	MAY 7/10	REVISED PER COUNTY COMMENTS

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

SCALE:
HORIZONTAL = 1:500
VERTICAL = 1:100

vallee
Consulting Engineers, Architects & Planners
G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE, ONTARIO N3Y 3W4
(519) 426-6270

Stamp

LICENCED PROFESSIONAL ENGINEER
T. G. SMITH
PROVINCE OF ONTARIO

Project Title

WOODWAY TRAILS SUBDIVISION
NORFOLK COUNTY - SIMCOE

Drawing Title
PLAN AND PROFILE
SWM POND STA 0+340 TO 0+680

Designed by : TGS	Drawn By : TJC
Checked by : TGS	Date Started : AUGUST 2009
Drawing Scale : AS NOTED	Drawing No. SW2
Project No. 09-056	

Appendix A: Pre-Development Model

```
2     Metric units
*#*************************************************************************
*#  Project Name: [DECOU]     Project Number: [09056]
*#  Date         : 09-23-2009
*#  Modeller     : [TGS]
*#  Company      : G. Douglas Vallee Limited
*#  License #    :  3568969
*#*************************************************************************
START                 TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                      ["CH2.STM"] <--storm filename, one per line for NSTORM time
*%------------------|-------------------------------------------------------|
READ STORM            STORM_FILENAME=["STORM.001"]
*%------------------|-------------------------------------------------------|
**************************************************************************
*
*
* SITE INCLUDING EXTERNAL AREA
*
*
**************************************************************************
DESIGN NASHYD         ID=[1], NHYD=["PRE1EX"], DT=[1.0]min, AREA=[50.26](ha),
                      DWF=[0](cms), CN/C=[70], TP=[0.74]hrs,
                      RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%------------------|-------------------------------------------------------|
*%------------------|-------------------------------------------------------|
START                 TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2]
                      ["CH5.STM"] <--storm filename, one per line for NSTORM time
*%------------------|-------------------------------------------------------|
START                 TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[3]
                      ["CH10.STM"] <--storm filename, one per line for NSTORM time
*%------------------|-------------------------------------------------------|
START                 TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4]
                      ["CH25.STM"] <--storm filename, one per line for NSTORM time
*%------------------|-------------------------------------------------------|
START                 TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[5]
                      ["CH50.STM"] <--storm filename, one per line for NSTORM time
*%------------------|-------------------------------------------------------|
START                 TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[6]
                      ["CH100.STM"] <--storm filename, one per line for NSTORM tim
*%------------------|-------------------------------------------------------|
*%------------------|-------------------------------------------------------|
FINISH
```

```
 SSSSS  W    W  M   M  H   H  Y   Y  M   M   OOO        999    999  ==========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9  Ver. 4.02
     S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999  July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9  ==========
                                                      9   9  9   9  # 3568969
      StormWater Management HYdrologic Model           999    999  ==========

 ************************************************************************
 ************************* SWMHYMO-99 Ver/4.02 ************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******               OTTHYMO-83 and OTTHYMO-89.                    *******
 ************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                   Ottawa, Ontario: (613) 727-5199          *******
 *******                   Gatineau, Quebec: (819) 243-6858         *******
 *******                   E-Mail: swmhymo@jfsa.Com                 *******
 ************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: G. Douglas Vallee Limited                   +++++++
 +++++++               Simcoe                 SERIAL#:3568969      +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

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


 ********************   D E T A I L E D   O U T P U T   ********************
 ************************************************************************
 *       DATE: 2009-12-22      TIME: 15:41:38      RUN COUNTER: 000959     *
 ************************************************************************
 * Input   filename: H:\SWMHYM~1\09056D~1\PRE.DAT                         *
 * Output  filename: H:\SWMHYM~1\09056D~1\PRE.out                         *
 * Summary filename: H:\SWMHYM~1\09056D~1\PRE.sum                         *
 * User comments:                                                         *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 ************************************************************************
```

```
001:0001----------------------------------------------------------------------
*#**********************************************************************
*#  Project Name: [DECOU]    Project Number: [09056]
*#  Date         : 09-23-2009
*#  Modeller     : [TGS]
*#  Company      : G. Douglas Vallee Limited
*#  License #    :  3568969
*#**********************************************************************
---------------------
| START             |  Project  dir.: H:\SWMHYM~1\09056D~1\
---------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   1
           #  1=CH2.STM
----------------------------------------------------------------------------
001:0002----------------------------------------------------------------------
---------------------
| READ STORM        |    Filename: H:\SWMHYM~1\09056D~1\CH2.STM
| Ptotal=  39.39 mm|    Comments: 2 YEAR CHICAGO 4 HOUR DESIGN STORM DISTR
---------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.250	1.17	8.940	2.17	8.150	3.17	4.390
.33	3.560	1.33	16.920	2.33	7.010	3.33	4.110
.50	3.960	1.50	78.820	2.50	6.200	3.50	3.890
.67	4.520	1.67	21.890	2.67	5.590	3.67	3.680
.83	5.310	1.83	13.000	2.83	5.110	3.83	3.510
1.00	6.550	2.00	9.880	3.00	4.720	4.00	3.350

```
----------------------------------------------------------------------------
001:0003----------------------------------------------------------------------
****************************************************************************
*
*
* SITE INCLUDING EXTERNAL AREA
*
*
****************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   50.26   Curve Number    (CN)=70.00
| 01:PRE1EX DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .740

     Unit Hyd Qpeak  (cms)=     2.594

     PEAK FLOW       (cms)=      .579 (i)
     TIME TO PEAK    (hrs)=     2.483
     RUNOFF VOLUME    (mm)=     9.781
     TOTAL RAINFALL   (mm)=    39.385
     RUNOFF COEFFICIENT   =      .248

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
001:0004----------------------------------------------------------------------
  ** END OF RUN :   1

****************************************************************************
```

```
----------------------
| START             |  Project  dir.: H:\SWMHYM~1\09056D~1\
---------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   1
           #  1=CH5.STM
----------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
*#**********************************************************************
*#  Project Name: [DECOU]    Project Number: [09056]
*#  Date         : 09-23-2009
*#  Modeller     : [TGS]
*#  Company      : G. Douglas Vallee Limited
*#  License #    :  3568969
*#**********************************************************************
----------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
---------------------
| READ STORM        |    Filename: H:\SWMHYM~1\09056D~1\CH5.STM
| Ptotal=  48.48 mm|    Comments: 5 YEAR CHICAGO 4 HOUR DESIGN DISTRIBUTIO
---------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.529	1.17	10.190	2.17	9.150	3.17	4.550
.33	3.658	1.33	21.620	2.33	7.700	3.33	4.220
.50	4.040	1.50	112.370	2.50	6.680	3.50	3.960
.67	4.670	1.67	27.760	2.67	5.940	3.67	3.730
.83	5.610	1.83	15.750	2.83	5.390	3.83	3.530
1.00	7.110	2.00	11.430	3.00	4.930	4.00	3.350

```
----------------------------------------------------------------------------
002:0003----------------------------------------------------------------------
****************************************************************************
*
*
* SITE INCLUDING EXTERNAL AREA
*
*
****************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   50.26   Curve Number    (CN)=70.00
| 01:PRE1EX DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .740

     Unit Hyd Qpeak  (cms)=     2.594

     PEAK FLOW       (cms)=      .915 (i)
     TIME TO PEAK    (hrs)=     2.417
     RUNOFF VOLUME    (mm)=    14.162
     TOTAL RAINFALL   (mm)=    48.478
     RUNOFF COEFFICIENT   =      .292

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
002:0004----------------------------------------------------------------------
----------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
  ** END OF RUN :   2

****************************************************************************
```

```
----------------------
| START             |  Project  dir.: H:\SWMHYM~1\09056D~1\
---------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 003
    NSTORM=   1
           #  1=CH10.STM
----------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
*#**********************************************************************
*#  Project Name: [DECOU]    Project Number: [09056]
*#  Date         : 09-23-2009
*#  Modeller     : [TGS]
*#  Company      : G. Douglas Vallee Limited
*#  License #    :  3568969
*#**********************************************************************
----------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
---------------------
| READ STORM        |    Filename: H:\SWMHYM~1\09056D~1\CH10.STM
| Ptotal=  56.08 mm|    Comments: 10 YEAR CHICAGO 4 HOURS DESIGN DISTRIBUT
---------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.580	1.17	11.510	2.17	10.310	3.17	5.050
.33	3.990	1.33	25.320	2.33	8.660	3.33	4.700
.50	4.500	1.50	133.600	2.50	7.520	3.50	4.394
.67	5.210	1.67	32.000	2.67	6.650	3.67	4.140
.83	6.270	1.83	19.730	2.83	5.380	3.83	3.910
1.00	8.000	2.00	12.954	3.00	5.490	4.00	3.632

```
----------------------------------------------------------------------------
003:0003----------------------------------------------------------------------
****************************************************************************
*
*
* SITE INCLUDING EXTERNAL AREA
*
*
****************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   50.26   Curve Number    (CN)=70.00
| 01:PRE1EX DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .740

     Unit Hyd Qpeak  (cms)=     2.594

     PEAK FLOW       (cms)=     1.211 (i)
     TIME TO PEAK    (hrs)=     2.400
     RUNOFF VOLUME    (mm)=    18.229
     TOTAL RAINFALL   (mm)=    56.083
     RUNOFF COEFFICIENT   =      .325

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
003:0004----------------------------------------------------------------------
```

```
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
  ** END OF RUN :   3

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




--------------------
| START            |  Project  dir.: H:\SWMHYM~1\09056D~1\
--------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
          #  1=CH25.STM
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [DECOU]     Project Number: [09056]
*#  Date         : 09-23-2009
*#  Modeller     : [TGS]
*#  Company      : G. Douglas Vallee Limited
*#  License #    :  3568969
*#*****************************************************************************
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: H:\SWMHYM~1\09056D~1\CH25.STM
| Ptotal=  66.02 mm|    Comments: 25 YEAR CHICAGO 4 HOUR DESIGN DISTRIBUTI
--------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   4.500 |   1.17  13.670 |   2.17  12.320 |   3.17   6.270
               .33   4.980 |   1.33  27.690 |   2.33  10.440 |   3.33   5.000
               .50   5.613 |   1.50 158.850 |   2.50   9.144 |   3.50   5.840
               .67   6.450 |   1.67  35.080 |   2.67   8.150 |   3.67   5.180
               .83   7.700 |   1.83  20.600 |   2.83   7.390 |   3.83   4.900
              1.00   9.700 |   2.00  15.240 |   3.00   6.780 |   4.00   4.650
------------------------------------------------------------------------------
004:0003----------------------------------------------------------------------
*******************************************************************************
*
*
* SITE INCLUDING EXTERNAL AREA
*
*
*******************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   50.26   Curve Number    (CN)=70.00
| 01:PRE1EX DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .740

     Unit Hyd Qpeak  (cms)=    2.594

     PEAK FLOW       (cms)=    1.571 (i)
     TIME TO PEAK    (hrs)=    2.400
     RUNOFF VOLUME    (mm)=   24.012
     TOTAL RAINFALL   (mm)=   66.023
     RUNOFF COEFFICIENT   =     .364

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
004:0004----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
  ** END OF RUN :   4

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




----------------------
| START              |  Project  dir.: H:\SWMHYM~1\09056D~1\
----------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=CH50.STM
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [DECOU]     Project Number: [09056]
*#  Date         : 09-23-2009
*#  Modeller     : [TGS]
*#  Company      : G. Douglas Vallee Limited
*#  License #    :  3568969
*#*****************************************************************************
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: H:\SWMHYM~1\09056D~1\CH50.STM
| Ptotal=  72.96 mm|    Comments: 50 YEAR CHICAGO 4 HOUR DESIGN DISTRIBUTI
--------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   3.990 |   1.17  14.270 |   2.17  12.620 |   3.17   5.790
               .33   4.450 |   1.33  33.900 |   2.33  10.390 |   3.33   5.330
               .50   5.080 |   1.50 186.560 |   2.50   8.890 |   3.50   4.980
               .67   5.970 |   1.67  44.810 |   2.67   7.800 |   3.67   4.650
               .83   7.290 |   1.83  23.440 |   2.83   6.960 |   3.83   4.370
              1.00   9.530 |   2.00  16.260 |   3.00   6.300 |   4.00   4.140
------------------------------------------------------------------------------
005:0003----------------------------------------------------------------------
*******************************************************************************
*
*
* SITE INCLUDING EXTERNAL AREA
*
*
*******************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   50.26   Curve Number    (CN)=70.00
| 01:PRE1EX DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .740

     Unit Hyd Qpeak  (cms)=    2.594

     PEAK FLOW       (cms)=    1.983 (i)
     TIME TO PEAK    (hrs)=    2.367
     RUNOFF VOLUME    (mm)=   28.321
     TOTAL RAINFALL   (mm)=   72.962
     RUNOFF COEFFICIENT   =     .388

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
005:0004----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
  ** END OF RUN :   5

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




--------------------
| START            |  Project  dir.: H:\SWMHYM~1\09056D~1\
--------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
          #  1=CH100.STM
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [DECOU]     Project Number: (09056)
*#  Date         : 09-23-2009
*#  Modeller     : [TGS]
*#  Company      : G. Douglas Vallee Limited
*#  License #    :  3568969
*#*****************************************************************************
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: H:\SWMHYM~1\09056D~1\CH100.STM
| Ptotal=  83.90 mm|    Comments: 100 YEAR CHICAGO 4 HOUR DESIGN STORM DIS
--------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   4.500 |   1.17  16.860 |   2.17  14.830 |   3.17   6.600
               .33   5.050 |   1.33  41.070 |   2.33  12.120 |   3.33   6.100
               .50   5.820 |   1.50 205.920 |   2.50  10.310 |   3.50   5.660
               .67   6.830 |   1.67  54.560 |   2.67   9.020 |   3.67   5.280
               .83   8.410 |   1.83  29.170 |   2.83   8.030 |   3.83   4.980
              1.00  11.070 |   2.00  19.280 |   3.00   7.240 |   4.00   4.700
------------------------------------------------------------------------------
006:0003----------------------------------------------------------------------
*******************************************************************************
*
*
* SITE INCLUDING EXTERNAL AREA
*
*
*******************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=   50.26   Curve Number    (CN)=70.00
| 01:PRE1EX DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .740

     Unit Hyd Qpeak  (cms)=    2.594

     PEAK FLOW       (cms)=    2.500 (i)
     TIME TO PEAK    (hrs)=    2.367
     RUNOFF VOLUME    (mm)=   35.502
     TOTAL RAINFALL   (mm)=   83.902
     RUNOFF COEFFICIENT   =     .423

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
006:0004----------------------------------------------------------------------
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
      FINISH
------------------------------------------------------------------------------
*******************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
  Simulation ended on 2009-12-22     at 15:41:40
===============================================================================
```

vallee
Consulting Engineers, Architects & Planners

Subject: Decou Road Subdivsion
Date: Sept 24/09 By: TGS
Project #: 09056 Page

Pre development site is divided into five drainage areas.

Calculate time of concentration and time to peak for each area. Time to peak equal to 0.6 * time of concentration

PRE1 (site only)

tc calc for upstream drainage area

tc = 3.26*(1.1-C)*L^(0.5)/S^0.333 (airport formula)

L as above	580 m
S as above but as percent	1.72 %
C, rational Runoff Coefficient (Pre dev)	0.2

tc =	59 min	0.98 hrs
tp =	35 min	0.59 hrs

PRE1 (including external)

tc calc for upstream drainage area

tc = 3.26*(1.1-C)*L^(0.5)/S^0.333 (airport formula)

L as above	1110 m
S as above but as percent	2.32 %
C, rational Runoff Coefficient (Pre dev)	0.2

tc =	74 min	1.23 hrs
tp =	44 min	0.74 hrs

PRE2

tc calc for upstream drainage area

tc = 3.26*(1.1-C)*L^(0.5)/S^0.333 (airport formula)

L as above	600 m
S as above but as percent	3.14 %
C, rational Runoff Coefficient (Pre dev)	0.2

tc =	49 min	0.82 hrs
tp =	29 min	0.49 hrs

PRE3

tc calc for upstream drainage area

tc = 3.26*(1.1-C)*L^(0.5)/S^0.333 (airport formula)

L as above			350 m
S as above but as percent			2.3 %
C, rational Runoff Coefficient (Pre dev)			0.2
tc =	42 min	0.69 hrs	
tp =	25 min	0.42 hrs	

PRE4

tc calc for upstream drainage area

tc = 3.26*(1.1-C)*L^(0.5)/S^0.333 (airport formula)

L as above			820 m
S as above but as percent			2.08 %
C, rational Runoff Coefficient (Pre dev)			0.2
tc =	66 min	1.10 hrs	
tp =	40 min	0.66 hrs	

PRE5

tc calc for upstream drainage area

tc = 3.26*(1.1-C)*L^(0.5)/S^0.333 (airport formula)

L as above			350 m
S as above but as percent			1.83 %
C, rational Runoff Coefficient (Pre dev)			0.2
tc =	45 min	0.75 hrs	
tp =	27 min	0.45 hrs	

CHART C2-8 - SOIL/LAND USE CURVE NUMBERS

Land Use	Hydrologic Soil Group						
	A	AB	B	BC	C	CD	D
Fallow (special cases only)	77	82	86	89	91	93	94
Crop and other improved land	66*	70	74	78	82	84	86
Pasture & other unimproved land	58*	62*	65	71	76	79	81
Woodlots and forest	50*	54*	58	65	71	74	77
Impervious areas (paved)		98					
Bare rock draining directly to stream		98					
Bare rock draining indirectly to stream		70					
Water surfaces		100	(use in special cases only)				

Notes

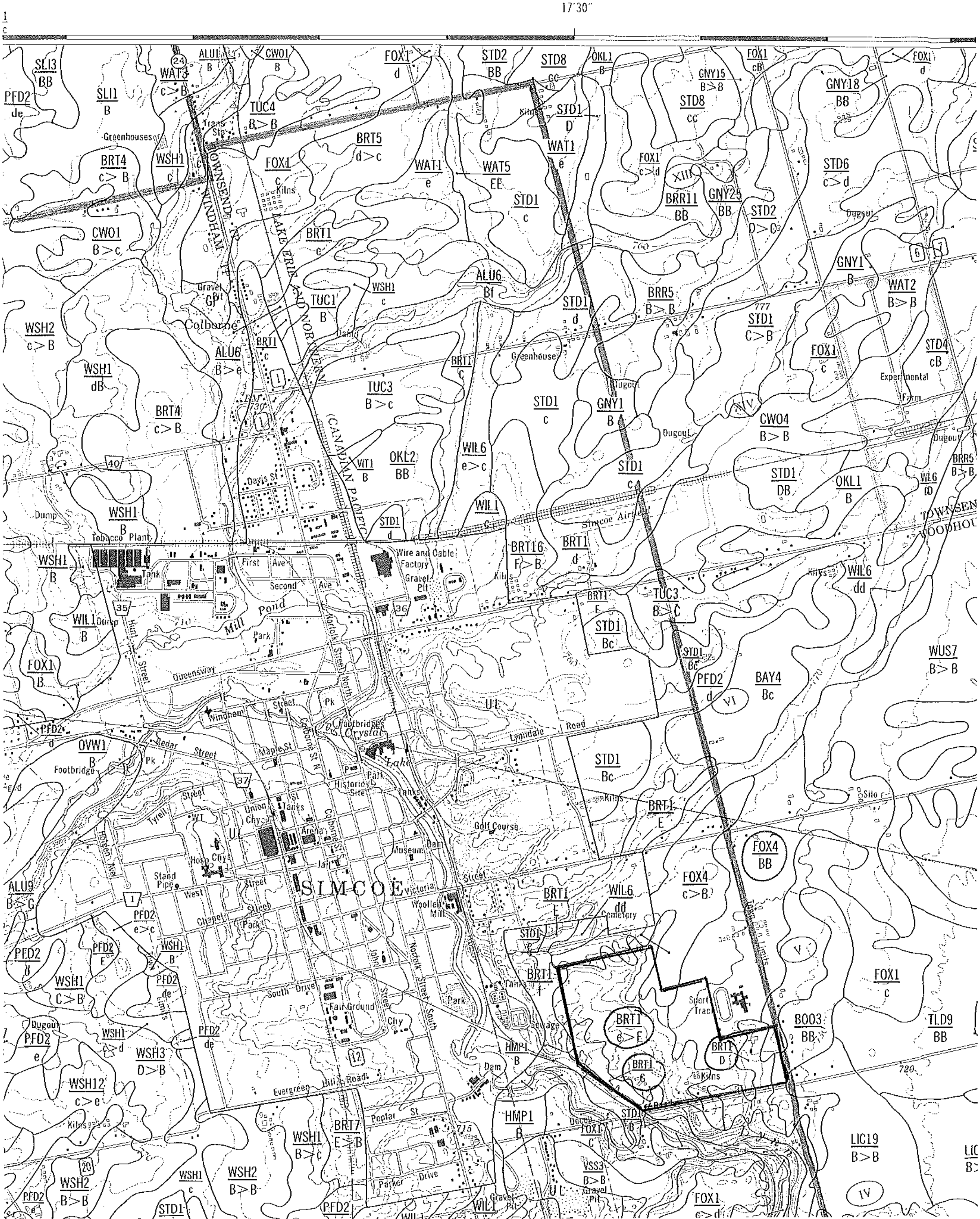
1. Figures are based on average antecedent moisture condition (AMC II) except those marked *, which are initially wet (AMC III) or an intermediate condition. For definition of AMC's see Chart C2-10.
2. Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.
3. For detailed values in urban areas see Table 2.2 of ref. 14.
4. Source: SCS Handbook of Hydrology, Chapter 9 (9), with modifications.

CHART C2-9 - PERCENT IMPERVIOUSNESS OF URBAN AREAS

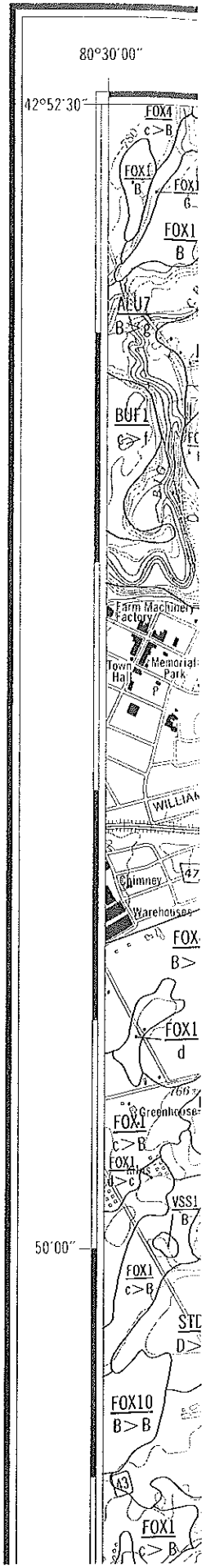
Urban Land Use	% Imperviousness
Business - Commercial	40 - 90
Industrial - Light	45 - 65
Industrial - Heavy	50 - 70
Residential - Low density	20 - 30
Residential - Medium density	25 - 35
Residential - High density	30 - 40

Source: SCS Handbook of Hydrology, Chapter 15 (9)

1 : 250000


17°30'
SIMCOE
Colborne
Greenhouses
Greenhouse
Trans Sta
Kilns
Gravel Pit
Davis St
Dump
Tobacco Plant
Tank
First Ave
Second Ave
Wire and Cable Factory
Mill Pond
Park
Queensway
Hunt Street
Norfolk Street North
Windham Street
Cedar Street
Maple St
Footbridge
Footbridges
Crystal Lake
Historic Site
Lyndale Road
Union Chy
Arena
Tanks
Golf Course
Museum
Dam
Jail
Colborne St S
Stand Pipe
West Street
Chapel Street
Victoria Street
Woollen Mill
Cemetery
South Drive
Fair Ground
John Street
Norfolk Street South
Sewage
Sport Track
Evergreen Hill Road
Poplar St
Parker Drive
Dugout
Experimental Farm
Silo
Simcoe Airfield
TOWNSEND
WOODHOUSE
TOWNSEND
WINDHAM
LAKE ERIE AND NORTHERN
(CANADIAN PACIFIC)
760
777
710
715
720
770
SLI3 BB
PFD2 de
SLI1 B
ALU1 B
CWO1 B
WAT3 c>B
TUC4 B>B
FOX1 d
STD2 BB
STD8 cc
OKL1 B
STD1 D
GNY15 B>B
FOX1 cB
GNY18 BB
STD8 cc
BRT5 d>c
BRT4 c>B
WSH1 c
FOX1 c
WAT1 e
WAT5 EE
WAT1 e
FOX1 c>d
BRR11 BB
GNY25 BB
STD6 c>d
STD1 c
STD2 D>D
CWO1 B>c
BRT1 c
ALU6 Bf
WSH1 c
TUC1 B
STD1 d
BRR5 B>B
STD1 C>B
GNY1 B
WAT2 B>B
WSH2 c>B
ALU6 B>e
BRT1 c
BRT1 C
TUC3 B>c
FOX1 c
STD4 cB
WSH1 dB
BRT4 c>B
STD1 c
GNY1 B
CWO4 B>B
VIT1 B
OKL2 BB
WIL6 e>c
STD1 c
STD1 DB
OKL1 B
BRR5 B>B
WSH1 B
WIL1 c
STD1 d
BRT16 F>B
BRT1 d
WSH1 B
WIL6 dd
WIL1 B
BRT1 E
TUC3 B>C
STD1 Bc
FOX1 B
STD1 Bc
PFD2 d
BAY4 Bc
WUS7 B>B
PFD2 d
OVW1 B
STD1 Bc
BRT1 E
FOX4 BB
ALU9 B>G
PFD2 e>c
BRT1 E
WIL6 dd
FOX4 c>B
PFD2 d
PFD2 E
WSH1 B
STD1 c
BRT1
WSH1 C>B
PFD2 de
FOX1 c
PFD2 e
WSH1 c>d
PFD2 de
BRT1 e>E
BRT1 D
BOO3 BB
TLD9 BB
WSH3 D>B
HMP1 B
BRT1 e
WSH12 c>e
STD1 B
HMP1 B
WSH1 B>c
BRT7 E>B
FOX1 C
LIC19 B>B
WSH2 B>B
WSH1 c
WSH2 B>B
VSS3 B>B
FOX1 c>d
STD1
PFD2 e
PFD2
WIL1
XIII
XIV
VI
V
IV

MAP UNIT SYMBOL	MAP UNIT COMPONENTS No. 1	No. 2	PARENT MATERIAL COMPONENTS No. 1	No. 2	DRAINAGE COMPONENTS No. 1	No. 2
ALU - Alluvium						
ALU 1	1-ALU	None	Variable floodplain deposits		Variable	
ALU 6	1-ALU	BRT	see ALU 1	see BRT 1	Variable	Well
ALU 7	1-ALU	FOX	see ALU 1	see FOX 1	Variable	Rapid to well
ALU 8	1-ALU	PFD	see ALU 1	see PFD 1	Variable	Rapid to well
ALU 9	1-ALU	WSH	see ALU 1	see WSH 1	Variable	Well
BAY – Brady						
BAY 1	BAY	None	Mainly lacustrine sand and loamy sand		Imperfect	
BAY 4	BAY	FOX	see BAY 1	see FOX 1	Imperfect	Rapid to well
BAY 5	BAY	GNY	see BAY 1	see GNY 1	Imperfect	Poor
BAY 6	BAY	BRT	see BAY 1	see BRT 1	Imperfect	Well
BAY 10	BAY	PFD	see BAY 1	see PFD 1	Imperfect	Rapid to well
BAY 11	BAY	WAM	see BAY 1	see WAM 1	Imperfect	Imperfect
BAY 13	BAY	VIT	see BAY 1	see VIT 1	Imperfect	Imperfect
BFO - Brantford						
BFO 1	BFO	None	Mainly lacustrine silty clay		Moderately well	
BFO 7	BFO	TLD	see BFO 1	see TLD 1	Moderately well	Poor
BFO 12	BFO	1-ALU	see BFO 1	see ALU 1	Moderately well	Variable
BFO 22	BFO.C	BVY.C	15-40 cm sandy textures over lacustrine silty clay	see BVY 2	Moderately well	Imperfect
BFO 27	BFO.L	TVK	15-40 cm loamy textures over lacustrine silty clay	see TVK 1	Moderately well	Imperfect
BFO 42	BFO	BRR	see BFO 1	see BRR 1	Moderately well	Imperfect
BOO - Bookton						
BOO 1	BOO	None	40-100 cm sandy textures over lacustrine silty clay		Well	
BOO 3	BOO	BRR	see BOO 1	see BRR 1	Well	Imperfect
BOO 4	BOO	WUS	see BOO 1	see WUS 1	Well	Poor
BOO 7	BOO	BVY	see BOO 1	see BVY 1	Well	Imperfect
BOO 8	BOO	BVY.C	see BOO 1	see BVY 2	Well	Imperfect



ALU 1	1-ALU	None	Variable floodplain deposits		Variable	
CWO 1	CWO	None	Mainly lacustrine silt loam		Poor	
CWO 2	CWO.C	None	15-40 cm sandy textures over lacustrine silt loam		Poor	
CWO 4	CWO	TUC	see CWO 1	see TUC 1	Poor	Imperfect
CWO 8	CWO	VIT	see CWO 1	see VIT 1	Poor	Imperfect
CWO 17	CWO.C	BRT.C	see CWO 2	see BRT 2	Poor	Well
CWO 18	CWO.C	TUC.C	see CWO 2	see TUC 2	Poor	Imperfect
FOX - Fox						
FOX 1	FOX	None	Mainly lacustrine sand and loamy sand		Rapid to well	
FOX 3	FOX	GNY	see FOX 1	see GNY 1	Rapid to well	Poor
FOX 4	FOX	BAY	see FOX 1	see BAY 1	Rapid to well	Imperfect
FOX 6	FOX	VIT	see FOX 1	see VIT 1	Rapid to well	Imperfect
FOX 8	FOX	BRR	see FOX 1	see BRR 1	Rapid to well	Imperfect
FOX 10	FOX	OKL	see FOX 1	see OKL 1	Rapid to well	Imperfect
FOX 11	FOX	BRT	see FOX 1	see BRT 1	Rapid to well	Well
FOX 12	FOX	1-ALU	see FOX 1	see ALU 1	Rapid to well	Variable
FOX 13	FOX	CWO	see FOX 1	see CWO 1	Rapid to well	Poor
FOX 14	FOX	PFD	see FOX 1	see PFD 1	Rapid to well	Rapid to well
FOX 16	FOX	WSH	see FOX 1	see WSH 1	Rapid to well	Well
FOX 25	FOX	WUS	see FOX 1	see WUS 1	Rapid to well	Poor
FOX 26	FOX	TUC	see FOX 1	see TUC 1	Rapid to well	Imperfect

Soil information by the Ontario Institute of Pedology. (Field mapping 1974–1979)

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Ontario Institute of Pedology
Guelph Agriculture Centre
P.O. Box 1030
Guelph, Ontario
N1H 6N1

			lacustrine silty clay			
BRR 4	BRR	BOO	see BRR 1	see BOO 1	Imperfect	Well
BRR 5	BRR	WUS	see BRR 1	see WUS 1	Imperfect	Poor
BRR 9	BRR	TLD.C	see BRR 1	see TLD 2	Imperfect	Poor
BRR 11	BRR	GNY	see BRR 1	see GNY 1	Imperfect	Poor
BRT - Brant						
BRT 1	BRT	None	Mainly lacustrine silt loam		Well	
BRT 2	BRT.C	None	15-40 cm sandy textures over lacustrine silt loam		Well	
BRT 3	BRT	BRT.C.	see BRT 1	see BRT 2	Well	Well
BRT 4	BRT	TUC	see BRT 1	see TUC 1	Well	Imperfect
BRT 5	BRT	CWO	see BRT 1	see CWO 1	Well	Poor
BRT 6	BRT	FOX	see BRT 1	see FOX 1	Well	Rapid to well
BRT 7	BRT	GNY	see BRT 1	see GNY 1	Well	Poor
BRT 8	BRT	WSH	see BRT 1	see WSH 1	Well	Well
BRT 13	BRT	1-ALU	see BRT 1	see ALU 1	Well	Variable
BRT 15	BRT	PFD.D	see BRT 1	see PFD 2	Well	Rapid to well
BRT 16	BRT	VSS	see BRT 1	see VSS 1	Well	Poor
BRT 21	BRT.C	WSH	see BRT 2	see WSH 1	Well	Well
BRT 22	BRT.C	VIT	see BRT 2	see VIT 1	Well	Imperfect
BRT 23	BRT.C	SIH	see BRT 2	see SIH 1	Well	Poor
BRT 25	BRT	SIH	see BRT 1	see SIH 1	Well	Poor
BUF - Burford						
BUF 1	BUF	None	Fluvial gravelly loamy sand		Rapid to well	
BVY - Beverly						
BVY 1	BVY	None	Mainly lacustrine silty clay		Imperfect	
BVY 2	BVY.C	None	15-40 cm sandy textures over lacustrine silty clay		Imperfect	
BVY 8	BVY	TLD	see BVY 1	see TLD 1	Imperfect	Poor
BVY 18	BVY.C	TLD	see BVY 2	see TLD 1	Imperfect	Poor
BVY 20	BVY.C	BFO	see BVY 2	see BFO 1	Imperfect	Moderately well
BVY 32	BVY	BRR	see BVY 1	see BRR 1	Imperfect	Imperfect
CWO - Colwood						
CWO 1	CWO	None	Mainly lacustrine silt loam		Poor	
CWO 2	CWO.C	None	15-40 cm sandy textures over lacustrine silt loam		Poor	
CWO 4	CWO	TUC	see CWO 1	see TUC 1	Poor	Imperfect

CHART C2-6 -continued

Soil Series	Soil Type	Hyd. Soil Grp.	Soil Series	Soil Type	Hyd. Soil Grp.	Soil Series	Soil Type	Hyd. Soil Grp.
Crombie	s l	B	Englehart	s l	B	Harriston	l	BC
"	si l	BC	Evanturel	si l	BC	"	si l	BC
Dack	c	D	"	si c l	C	Harrow	s	A
Dalton	s	AB	Falardeau	si l	BC	"	s l	AB
Darlington	s	B	"	si c l	C	"	l	B
"	l	C	Farmington	s l	A	Havelock	s /g	A
Dawson	s l	A	"	l	B	Hawkesvi.	l	B
"	l	B	"	c l	C	Haysville	s l	AB
Deloro	l	B	Ferndale	si l	BC	Heidelburg	f s l	B
Devlin	si c /}	C	"	c l	C	Hendrie	s /g	AB
	c l }		Flamboro	s	B	Henwood	s /g	A
Dinorwic	c	BC	Floradale	l	B	Hespeler	s l	B
Dobie	c /l	BC	Fonthill	g	A	Hillier	c	C
Doe	s l	B	Font	g s l	A	Hillsburgh	s l	A
"	si l	BC	Forbes	c	D	Himsworth	si l	BC
Donald	l	B	Fox	s	A	Hinchinbr.	s l	B
Donnybrook	s g	A	"	s l	AB	"	l	BC
"	s l	AB	Foxboro	s	A	"	si l	BC
Dorion	c /l	C	Franktown	l	B	Honeywood	s l	AB
Dorking	si c l	BC	Freeport	s l	B	"	si l	BC
Dumfries	s l	A	Galesburg	s l	A	Howland	s l	B
"	l	AB	"	l	AB	"	l	BC
Dummer	s l	A	Gameland	s /g	AB	Huron	s l	B
"	l	B	Gananoque	c	C	"	l	BC
Dundonald	s l	AB	Gerow	c l	C	"	si l	BC
Dunedin	c	D	Gilford	s l	B	"	c l	CorD
Dymond	s l	AB	"	l	B	Innisville	s l	B
"	l	B	Gordon	si c	C	Jeddo	l	BC
Eagle Lake	s /g	AB	Granby	s	B	"	c l	C
Eamer	l	BC	"	s l	B	Kagawong	si l	BC
Earlton	si l	B	Grand	l	B	Kars	s /g	A
"	c l	C	Grenville	s l	A	Kemble	si l	BC
Eastport	s	A	"	l	BC	"	si c l	C
Edenvale	s	AB	Grimsby	s l	A	"	c l	D
Eganville	l	B	Guelph	s l	A	Kenabeek	s	B
Elderslie	si l	BC	"	l	BC	"	s l	B
"	si c l	C	"	si l	BC	Killean	l/s l	AB
"	c l	C	Guerin	s l	AB	King	si l	BC
Eldorado	s l	A	"	l	B	"	c l	C
"	l	B	Gwillimb.	g	AB	Kirkland	s l	A
Elk Pit	s g	A	Haileybury	si c l	C	Kossuth	s l	B
Ellwood	c l	C	"	si c	C	L'Achigan	s	AB
Elmbrook	si l	BC	"	c	CD	Lambton	l	BC
"	c l	C	Haldimand	si l	BC	"	si l	BC
"	c	C	"	si c l	C	Lanark	c	C
Elmira	l	B	"	c	CorD	Lansdowne	c /si l	C
Elmsley	s l	B	Hanbury	si c l	C	Leech	si c l	C
Embro	s l	BC	"	si c	C	"	c l	D
"	s l	C	"	c	D	Leitrim	g	B
Emily	l	B	Harkaway	l	B	Leith	si l	BC
Emo	c & p	C	"	si l	BC	Lily	l/s l	B

CHART C2-6 -HYDROLOGIC SOIL GROUPS FOR PRINCIPAL SOIL TYPES IDENTIFIED ON AGRICULTURAL SOILS MAPS (TENTATIVE) (6)

Soil Series	Soil Type	Hyd. Soil Grp.	Soil Series	Soil Type	Hyd. Soil Grp.	Soil Series	Soil Type	Hyd. Soil Grp.
Alberton	si l	BC	Blackwell	c	C	Buzwah	c l	D
Allendale	s l	B	Blanche	si l	BC	Caledon	s l	A
Alliston	s l	AB	Blue	c l	C	Caistor	c l	C
Almonte	si c l	C	Bolingbr.	s	A	"	c	C
Ameliasbg	c l	C	Bondhead	s l	AB	Camilla	s l	AB
"	l	B	"	l	B	"	si l	BC
Ancaster	si l & s	B	Bookton	s l	AB	Campbell	si c	C
"	si l	BC	Boomer	l	B	Cane	si l	BC
Anstruther	s	A	Brady	s l	AB	"	si c l	C
Appleton	si l & s	B	Brant	s &si l	B	Carp	c &c. l	C
Atherley	c	C	Brantford	si l	BC	Casey	si l	BC
"	si c l	C	"	si c l	C	Cashel	c	D
Athol	s l	A	"	c l	D	Castor	s l	AB
Atwood	c	C	Brentha	s l	A	"	si l	BC
Ayr	s l	B	"	l	B	Chesley	si l	BC
Bainsville	s	B	Brethour	si l	BC	"	si c l	C
"	si l	B	Breypen	limest.	B	"	c l	C
Balderson	s l	B	Bridgman	s	A	Chinguac.	l	BC
Bamford	s	AB	Brighton	s	A	"	si l	BC
Bancroft	s	A	"	s l	AB	"	c l	C
"	s l	B	Brisbane	s g	AB	"	c	D
Bass	c	D	Brockport	c	D	Christy	s l	B
Bastard	s	A	Brooke	l	B	Clyde	l	BC
Battersea	si l	BC	Brookston	s l	B	"	si l	BC
"	s l	AB	"	l	C	"	c l	C
Bearbrook	s l	B	"	si l	C	"	c	C
"	si c l	C	"	si c l	C	Colborne	s	A
"	c	C	"	c l	C	Colwood	s l	B
Belmeade	m & c	B	"	c	C	"	si l	B
Bennington	s l	B	Bucke	s	AB	Codrington	si l	BC
"	si l	A	"	s l	AB	Conestogo	l	BC
Berrien	s	AB	Burford	s l	A	Conover	c l	C
"	s l	AB	"	l	AB	"	l	BC
Berriedale	s & si	AB	Burnbrae	l	B	Cooksville	c	D
Beverly	l	BC	Burnstown	l	B	Coutts	s l	AB
"	si l	C	Burpee	s	A	"	l	BC
"	si c l	C	Burris	c l	C	Craigleith	c	C
Binbrook	si l	C	Buzwah	si c l	C	Cramahe	s g	A

Notes: 1. See footnotes to Chart C2-2

2. For later additions see supplementary list at end.

3. Key to abbreviations: c - clay; f - fine; g - gravel; l - loam; ma - marl; m - muck; p - peat; r - rock; s - sand; si - silt.

Appendix B: Pond Rating Curves

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Subject: Decou Phase 1 Rating Curve
Date: Nov 9/09 By: TGS
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Pond Rating Curve - without external area, determine volume required to contain 2-year storm and release at controlled rate over 48 hours

Orfice invert	214	m
Orifice Diameter	0.15	m
CL Elevation	214.075	m
Orifice C/S Area	0.017671	sq m
Orifice Constant	0.63	

Contour (m)	Forebay (m2)	Main (m2)	Total (m2)	Incr Vol (m3)	Cum Vol (m3)	Height Above Orf (m)	Orifice Flow (cms)	Storage (ha*m)	Incr Time Discharge (hrs)	Total Time to Dis (hrs)
214		0	0			0	0.0000	0.0000	0.0	
214.1		359	359	18	18	0.025	0.0078	0.0018	0.0	0.0
214.2		1526	1526	94	112	0.125	0.0174	0.0112	2.1	2.1
214.3		3111	3111	232	344	0.225	0.0234	0.0344	3.2	5.2
214.4		5173	5173	414	758	0.325	0.0281	0.0758	4.5	9.7
214.5	1952	6616	8568	687	1445	0.425	0.0321	0.1445	6.3	16.0
214.6	2325	6874	9199	888	2334	0.525	0.0357	0.2334	7.3	23.3
214.7	2463	7135	9598	940	3273	0.625	0.0390	0.3273	7.0	30.3
214.8	2603	7399	10002	980	4254	0.725	0.0420	0.4254	6.7	37.0
214.9	2747	7666	10413	1021	5274	0.825	0.0448	0.5274	6.5	43.5
215	2893	7936	10829	1062	6336	0.925	0.0474	0.6336	6.4	49.9
215.1		12148	12148	1149	7485	1.025	0.0499	0.7485	6.6	56.5
215.2		12501	12501	1232	8718	1.125	0.0523	0.8718	6.7	63.2
215.3		12856	12856	1268	9986	1.225	0.0546	0.9986	6.6	69.8
215.4		13215	13215	1304	11289	1.325	0.0568	1.1289	6.5	76.3
215.5		13577	13577	1340	12629	1.425	0.0589	1.2629	6.4	82.7
215.6		13942	13942	1376	14005	1.525	0.0609	1.4005	6.4	89.1
215.7		14310	14310	1413	15417	1.625	0.0629	1.5417	6.3	95.5
215.8		14681	14681	1450	16867	1.725	0.0648	1.6867	6.3	101.8
215.9		15055	15055	1487	18354	1.825	0.0666	1.8354	6.3	108.1

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216		15432	15432	1524	19878	1.925	0.0684	1.9878	6.3	114.3

Reference SWMHYMO results for QUALTY.DAT==>storge used is approximately 0.4699 ha*m which is somewhere between elevation 214.9 and 214.8. Therefore place secondary outlet control at 214.9, retention provided of approximately 44 hours provided for surface runoff generated by site.

Orfice invert	214	m
Orifice Diameter	0.15	m
CL Elevation	214.075	m
Orifice C/S Area	0.017671	sq m
Orifice Constant	0.63	
Weir Elevation	214.9	
Weir Width	1.5	

Contour (m)	Forebay (m2)	Main (m2)	Total (m2)	Incr. Vol (m3)	Cum. Vol (m3)	Height Above O (m)	Orf Flow (cms)	Height Abv Weir (m)	Weir Flow (cms)	Total Flow (cms)	Storage		
214		0	0	**0**		**0**	**0**	0.00	0.00	0.000	0.0000	0.00	
214.1		359	359	**17.95**	**17.95**	**0.025**	**0.0078**	0.00	0.00	0.008	0.0018	1.28	1.28
214.2		1526	1526	**94.25**	**112.2**	**0.125**	**0.01743**	0.00	0.00	0.017	0.0112	2.08	3.35
214.3		3111	3111	**231.85**	**344.05**	**0.225**	**0.02339**	0.00	0.00	0.023	0.0344	3.15	6.51
214.4		5173	5173	**414.2**	**758.25**	**0.325**	**0.02811**	0.00	0.00	0.028	0.0758	4.47	10.98
214.5	1952	6616	8568	**687.05**	**1445.3**	**0.425**	**0.03215**	0.00	0.00	0.032	0.1445	6.33	17.31
214.6	2325	6874	9199	**888.35**	**2333.65**	**0.525**	**0.03573**	0.00	0.00	0.036	0.2334	7.27	24.58
214.7	2463	7135	9598	**939.85**	**3273.5**	**0.625**	**0.03899**	0.00	0.00	0.039	0.3273	6.99	31.57
214.8	2603	7399	10002	**980**	**4253.5**	**0.725**	**0.04199**	0.00	0.00	0.042	0.4254	6.72	38.29
214.9	2747	7666	10413	**1020.75**	**5274.25**	**0.825**	**0.04479**	0.00	0.00	0.045	0.5274	6.53	44.83
215	2893	7936	10829	**1062.1**	**6336.35**	**0.925**	**0.04743**	0.10	0.08	0.127	0.6336	3.44	48.27
215.1		12148	12148	**1148.85**	**7485.2**	**1.025**	**0.04993**	0.20	0.22	0.274	0.7485	1.59	49.86
215.2		12501	12501	**1232.45**	**8717.65**	**1.125**	**0.0523**	0.30	0.41	0.464	0.8718	0.93	50.79
215.3		12856	12856	**1267.85**	**9985.5**	**1.225**	**0.05458**	0.40	0.63	0.688	0.9986	0.61	51.40

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215.4	13215	13215	**1303.55**	**11289.1**	**1.325**	**0.05676**	0.50	0.89	0.942	1.1289	0.44	51.85
215.5	13577	13577	**1339.6**	**12628.7**	**1.425**	**0.05887**	0.60	1.16	1.223	1.2629	0.34	52.19
215.6	13942	13942	**1375.95**	**14004.6**	**1.525**	**0.0609**	0.70	1.47	1.528	1.4005	0.28	52.47
215.7	14310	14310	**1412.6**	**15417.2**	**1.625**	**0.06286**	0.80	1.79	1.855	1.5417	0.23	52.70
215.8	14681	14681	**1449.55**	**16866.8**	**1.725**	**0.06477**	0.90	2.14	2.204	1.6867	0.20	52.90
215.9	15055	15055	**1486.8**	**18353.6**	**1.825**	**0.06662**	1.00	2.51	2.572	1.8354	0.17	53.07
216	15432	15432	**1524.35**	**19877.9**	**1.925**	**0.06842**	1.10	2.89	2.958	1.9878	0.15	53.22

Interpolation

Elev	Storage
215.6	1.4005
215.651	**1.473**
215.7	1.5417

Appendix C: Post Development Model

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Consulting Engineers, Architects & Planners

Subject: Decou Road Subdivision
Date: Nov 6/09 By: TGS
Project #: 09056 Page

IMPERVIOUS AREA ASSUMPTIONS:

AVERAGE DWELLING ROOF AREA:	185 m2	
AVERAGE DWELLING DRIVEWAY AREA:	45 m2	
TOTAL IMPERVIOUS AREA PER DWELLING:	230 m2	0.023 ha
ROADWAY AND ONE SIDE SIDEWALK AREA PER METRE LENGTH OF ROAD:	11 m2	0.0011 ha

Area No.	Total Area (ha)	No. of Dwell	Dwellling Imp Area (ha)	Street Lenth (m)	Street Imp Area (ha)	Dir Conn Ratio	Total Imp Area (ha)	Imp Area Ratio
POST 1	10.24	122	2.81	1135	1.25	0.12	4.05	0.40
POST 2	7.49	117	2.69	1105	1.22	0.16	3.91	0.52
POST 3	5.2	85	1.96	770	0.85	0.16	2.80	0.54
POST 4	5.72	76	1.75	775	0.85	0.15	2.60	0.45
POST 6	6	44	1.01	479	0.53	0.09	1.54	0.26

Of the above only Post 1,2,3 and 4 contribute to the pond

Estimate impervious area of development that contributes flow to the pond	13.4
Total area to the pond includes these areas plus Post 5 (swm facility area)	32.9
As a percentage	41%

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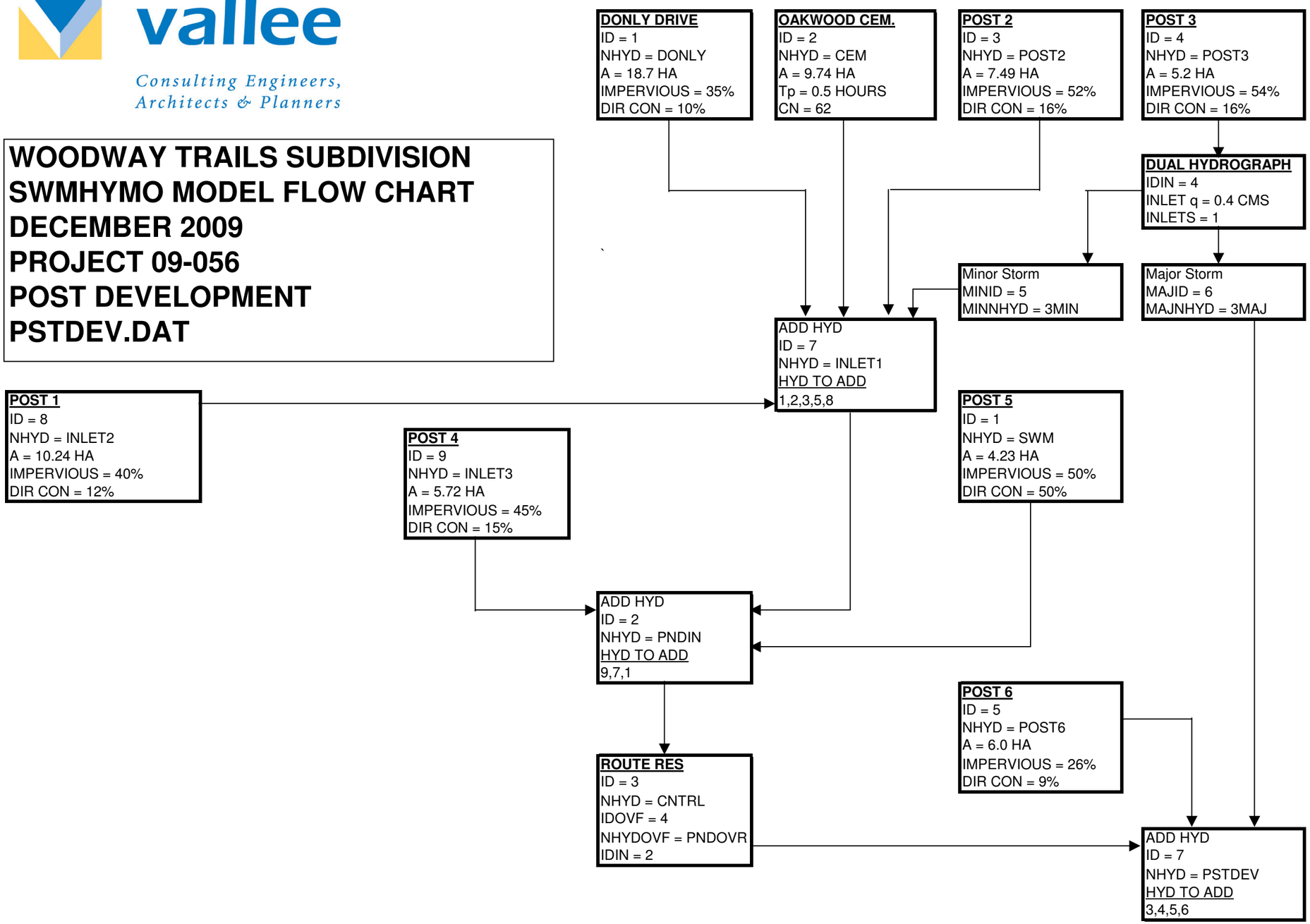
WOODWAY TRAILS SUBDIVISION
SWMHYMO MODEL FLOW CHART
DECEMBER 2009
PROJECT 09-056
POST DEVELOPMENT
PSTDEV.DAT



```
2     Metric units
*#*************************************************************************
*#  Project Name: [DECOU]     Project Number: [09056]
*#  Date        : 11-06-2009
*#  Modeller    : [TGS]
*#  Company     : G. Douglas Vallee Limited
*#  License #   : 3568969
*#*************************************************************************
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                     ["CH2.STM"] <--storm filename, one per line for NSTORM time
*%------------------|---------------------------------------------------------|
READ STORM          STORM_FILENAME=["STORM.001"]
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* EXTERNAL AREA - DONLY DRIVE
*
**************************************************************************
DESIGN STANDHYD     ID=[1], NHYD=["DONLY"], DT=[1.0]min, AREA=[18.7](ha),
                    XIMP=[0.1], TIMP=[0.35], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[1.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* EXTERNAL AREA - CEMETARY
*
**************************************************************************
DESIGN NASHYD       ID=[2], NHYD=["CEM"], DT=[1.0]min, AREA=[9.74](ha),
                    DWF=[0](cms), CN/C=[62], TP=[0.5]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* POST 2 - STREET A, F, AND B
*
**************************************************************************
DESIGN STANDHYD     ID=[3], NHYD=["POST 2"], DT=[1.0]min, AREA=[7.49](ha),
                    XIMP=[0.16], TIMP=[0.52], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[1.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* POST 3 - STREETS B, F AND H
* MAJOR STAYS ON STREET B, MINOR GOES TO POND ALONG STREET H
*
**************************************************************************
DESIGN STANDHYD     ID=[4], NHYD=["POST3"], DT=[1.0]min, AREA=[5.20](ha),
                    XIMP=[0.16], TIMP=[0.54], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[1.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
COMPUTE DUALHYD     IDin=[4], CINLET=[0.4](cms), NINLET=[1],
                    MAJID=[6], MajNHYD=["3MAJ"],
                    MINID=[5], MinNHYD=["3MIN"],
                    TMJSTO=[0](cu-m)
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* POST 1 - STREETS A, H, I, J AND E
*
**************************************************************************
DESIGN STANDHYD     ID=[8], NHYD=["INLET2"], DT=[1.0]min, AREA=[10.24](ha),
                    XIMP=[0.12], TIMP=[0.4], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[1.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* INLET ONE - EXT AREAS, POST 2 AND MINOR POST 3
*
**************************************************************************
ADD HYD             IDsum=[7], NHYD=["INLET1"], IDs to add=[1,2,3,5,8]
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* INLET TWO (FUTURE) - POST 4 - STREETS P, Q AND R
*
**************************************************************************
DESIGN STANDHYD     ID=[9], NHYD=["INLET3"], DT=[1.0]min, AREA=[5.72](ha),
                    XIMP=[0.15], TIMP=[0.45], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[1.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* POST 5 - SWM AREA
*
**************************************************************************
DESIGN STANDHYD     ID=[1], NHYD=["SWM"], DT=[1.0]min, AREA=[4.23](ha),
                    XIMP=[0.50], TIMP=[0.50], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[1.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* TOTAL INFLOW TO POND INLET1, INLET2, INLET3 AND SWM AREA
*
**************************************************************************
ADD HYD             IDsum=[2], NHYD=["PNDIN"], IDs to add=[9,7,1]
*%------------------|---------------------------------------------------------|
ROUTE RESERVOIR     IDout=[3],   NHYD=["CNTRL"],  IDin=[2],
                    RDT=[1.0](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    (cms) - (ha-m)
                                [   0.0 ,  0.0 ]
                                [  0.008, 0.0018]
                                [  0.017, 0.0112]
                                [  0.023, 0.0344]
                                [  0.028, 0.0758]
                                [  0.032, 0.1445]
                                [  0.036, 0.2334]
                                [  0.039, 0.3273]
                                [  0.042, 0.4254]
                                [  0.045, 0.5274]
                                [  0.127, 0.6336]
                                [  0.274, 0.7485]
                                [  0.464, 0.8718]
                                [  0.688, 0.9986]
                                [  0.942, 1.1289]
                                [  1.223, 1.2629]
                                [  1.528, 1.4005]
                                [  1.855, 1.5417]
                                [  2.204, 1.6867]
                                [  2.572, 1.8354]
                                [  2.958, 1.9878]
                                [   -1  ,   -1  ]  (max twenty pts)
                          IDovf=[4], NHYDovf=("PNDOVR")
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* POST 6 - STREET B
*
**************************************************************************
DESIGN STANDHYD     ID=[5], NHYD=["POST6"], DT=[1.0]min, AREA=(6.0](ha),
                    XIMP=[0.09], TIMP=[0.26], DWF=[0](cms), LOSS=[2], CN=[62],
                    SLOPE=[1.5](%), RAINFALL=[ , , , , ](mm/hr), END=-1
*%------------------|---------------------------------------------------------|
**************************************************************************
*
* POST DEVELOPMENT FROM SITE
*
**************************************************************************
ADD HYD             IDsum=[7], NHYD=["PSTDEV"], IDs to add=[3,4,5,6]
*%------------------|---------------------------------------------------------|
*%------------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2]
                    ["CH5.STM"] <--storm filename, one per line for NSTORM time
*%------------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[3]
                    ["CH10.STM"] <--storm filename, one per line for NSTORM time
*%------------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4]
                    ["CH25.STM"] <--storm filename, one per line for NSTORM time
*%------------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[5]
                    ["CH50.STM"] <--storm filename, one per line for NSTORM time
*%------------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[6]
                    ["CH100.STM"] <--storm filename, one per line for NSTORM tim
*%------------------|---------------------------------------------------------|
*%------------------|---------------------------------------------------------|
*%------------------|---------------------------------------------------------|
FINISH
```

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

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO         999     999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9   9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O ##  9   9   9   9  Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O      9999    9999  July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9       9  ==========
                                                     9   9   9   9  # 3568969
      StormWater Management HYdrologic Model         999     999  =========

 ********************************************************************************
 ************************** SWMHYMO-99 Ver/4.02 *********************************
 *******  A single event and continuous hydrologic simulation model  ********
 *******     based on the principles of HYMO and its successors      ********
 *******                  OTTHYMO-83 and OTTHYMO-89.                  ********
 ********************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.           ********
 *******                  Ottawa,  Ontario: (613) 727-5199           ********
 *******                  Gatineau, Quebec: (819) 243-6858           ********
 *******                  E-Mail: swmhymo@jfsa.com                   ********
 ********************************************************************************


 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: G. Douglas Vallee Limited                          +++++++
 +++++++                Simcoe                  SERIAL#:3568969           +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++


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


 ********************   D E T A I L E D   O U T P U T   ********************
 ********************************************************************************
 *       DATE: 2010-05-10      TIME: 09:19:51      RUN COUNTER: 001004          *
 ********************************************************************************
 * Input   filename: H:\SWMHYM~1\09056D~1\PSTDEV.DAT                            *
 * Output  filename: H:\SWMHYM~1\09056D~1\PSTDEV.out                            *
 * Summary filename: H:\SWMHYM~1\09056D~1\PSTDEV.sum                            *
 * User comments:                                                               *
 * 1:_____________________________________________________________________      *
 * 2:_____________________________________________________________________      *
 * 3:_____________________________________________________________________      *
 ********************************************************************************

--------------------------------------------------------------------------------
001:0001--------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [DECOU]    Project Number: [09056]
*#  Date        : 11-06-2009
*#  Modeller    : [TGS]
*#  Company     : G. Douglas Vallee Limited
*#  License #   :  3568969
*#*****************************************************************************
---------------------
| START             |  Project  dir.: H:\SWMHYM~1\09056D~1\
---------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   1
          #  1=CH2.STM
--------------------------------------------------------------------------------
001:0002--------------------------------------------------------------------------
---------------------
| READ STORM        |    Filename: H:\SWMHYM~1\09056D~1\CH2.STM
| Ptotal=  39.39 mm |    Comments: 2 YEAR CHICAGO 4 HOUR DESIGN STORM DISTR
---------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
             .17   3.250 |   1.17   8.940 |   2.17   8.150 |   3.17   4.390
             .33   3.560 |   1.33  16.920 |   2.33   7.010 |   3.33   4.110
             .50   3.960 |   1.50  78.820 |   2.50   6.200 |   3.50   3.890
             .67   4.520 |   1.67  21.890 |   2.67   5.590 |   3.67   3.680
             .83   5.310 |   1.83  13.000 |   2.83   5.110 |   3.83   3.510
            1.00   6.550 |   2.00   9.880 |   3.00   4.720 |   4.00   3.350

--------------------------------------------------------------------------------
001:0003--------------------------------------------------------------------------
********************************************************************************
*
* EXTERNAL AREA - DONLY DRIVE
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=   18.70
| 01:DONLY  DT= 1.00 |   Total Imp(%)=   35.00   Dir. Conn.(%)=   10.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      6.55         12.16
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    353.08         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=     78.82         15.25
               over (min)         5.00         22.00
     Storage Coeff.  (min)=     5.30 (ii)    21.63 (ii)
     Unit Hyd. Tpeak (min)=     5.00         22.00
     Unit Hyd. peak  (cms)=      .22           .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .34           .31       .438 (iii)
     TIME TO PEAK    (hrs)=     1.52          1.85      1.533
     RUNOFF VOLUME    (mm)=    38.58          9.73     12.618
     TOTAL RAINFALL   (mm)=    39.38         39.38     39.385
     RUNOFF COEFFICIENT    =     .98           .25       .320

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0004--------------------------------------------------------------------------
********************************************************************************
*
* EXTERNAL AREA - CEMETARY
*
********************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=    9.74   Curve Number    (CN)=62.00
| 02:CEM    DT= 1.00 |   Ia       (mm)=    1.500  # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=     .500

     Unit Hyd Qpeak  (cms)=      .744

     PEAK FLOW       (cms)=      .107 (i)
     TIME TO PEAK    (hrs)=     2.133
     RUNOFF VOLUME    (mm)=     7.415
     TOTAL RAINFALL   (mm)=    39.385
     RUNOFF COEFFICIENT    =     .188

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0005--------------------------------------------------------------------------
********************************************************************************
*
* POST 2 - STREET A, F, AND B
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    7.49
| 03:POST 2 DT= 1.00 |   Total Imp(%)=   52.00   Dir. Conn.(%)=   16.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      3.89          3.60
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    223.46         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=     78.82         26.67
               over (min)         4.00         17.00
     Storage Coeff.  (min)=     4.03 (ii)    17.09 (ii)
     Unit Hyd. Tpeak (min)=     4.00         17.00
     Unit Hyd. peak  (cms)=      .28           .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .23           .16       .299 (iii)
     TIME TO PEAK    (hrs)=     1.50          1.75      1.517
     RUNOFF VOLUME    (mm)=    38.58         11.64     15.954
     TOTAL RAINFALL   (mm)=    39.38         39.38     39.385
     RUNOFF COEFFICIENT    =     .98           .30       .405

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0006--------------------------------------------------------------------------
********************************************************************************
*
* POST 3 - STREETS B, F AND H
* MAJOR STAYS ON STREET B, MINOR GOES TO POND ALONG STREET H
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    5.20
| 04:POST3  DT= 1.00 |   Total Imp(%)=   54.00   Dir. Conn.(%)=   16.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.81          2.39
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    186.19         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=     78.82         29.64
               over (min)         4.00         16.00
     Storage Coeff.  (min)=     3.61 (ii)    16.13 (ii)
     Unit Hyd. Tpeak (min)=     4.00         16.00
     Unit Hyd. peak  (cms)=      .30           .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .17           .12       .218 (iii)
     TIME TO PEAK    (hrs)=     1.50          1.73      1.517
     RUNOFF VOLUME    (mm)=    38.58         12.01     16.263
     TOTAL RAINFALL   (mm)=    39.38         39.38     39.385
     RUNOFF COEFFICIENT    =     .98           .30       .413

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0007--------------------------------------------------------------------------
----------------------
| COMPUTE DUALNYD    |   Average inlet capacities   (CINLET) =    .400  (cms)
| TotalHyd 04:POST3  |   Number of inlets in system (NINLET) =      1
----------------------   Total minor system capacity           =    .400  (cms)
                         Total major system storage (TMJSTO) =      0.(cu.m.)

                  ID: NHYD        AREA      QPEAK     TPEAK      R.V.      DWF
                                   (ha)      (cms)     (hrs)      (mm)     (cms)
    TOTAL HYD.    04:POST3         5.20      .218     1.517    16.263      .000
    ==========================================================================
    MAJOR SYST    06:3MAJ           .00      .000      .000      .000      .000
    MINOR SYST    05:3MIN          5.20      .218     1.517    16.263      .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0008--------------------------------------------------------------------------
********************************************************************************
*
* POST 1 - STREETS A, H, I, J AND E
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=   10.24
| 08:INLET2 DT= 1.00 |   Total Imp(%)=   40.00   Dir. Conn.(%)=   12.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area      (ha)=        4.10          6.14
     Dep. Storage      (mm)=         .80          1.50
     Average Slope      (%)=        1.50          1.50
     Length             (m)=      261.28         40.00
     Mannings n            =        .013          .250

     Max.eff.Inten.(mm/hr)=       78.82         18.01
               over (min)         4.00         20.00
     Storage Coeff.  (min)=      4.43 (ii)    19.70 (ii)
     Unit Hyd. Tpeak (min)=       4.00         20.00
     Unit Hyd. peak  (cms)=        .26           .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .24           .18          .297 (iii)
     TIME TO PEAK    (hrs)=       1.50          1.80         1.517
     RUNOFF VOLUME    (mm)=      38.58         10.18        13.592
     TOTAL RAINFALL   (mm)=      39.38         39.38        39.385
     RUNOFF COEFFICIENT   =        .98           .26          .345

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
001:0009---------------------------------------------------------------------
*******************************************************************************
*
* INLET ONE - EXT AREAS, POST 2 AND MINOR POST 3
*
*******************************************************************************
---------------------
| ADD HYD (INLET1) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 01:DONLY     18.70     .438     1.53   12.62     .000
                 +ID2 02:CEM        9.74     .107     2.13    7.42     .000
                 +ID3 03:POST 2     7.49     .299     1.52   15.95     .000
                 +ID4 05:3MIN       5.20     .218     1.52   16.26     .000
                 +ID5 08:INLET2    10.24     .297     1.52   13.59     .000
                  ==========================================================
                  SUM 07:INLET1    51.37    1.270     1.53   12.68     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0010---------------------------------------------------------------------
*******************************************************************************
*
* INLET TWO (FUTURE) - POST 4 - STREETS P, Q AND R
*
*******************************************************************************
---------------------
| DESIGN STANDHYD    |   Area     (ha)=    5.72
| 09:INLET3 DT= 1.00 |   Total Imp(%)=   45.00   Dir. Conn.(%)=   15.00
---------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=        2.57          3.15
     Dep. Storage      (mm)=         .80          1.50
     Average Slope      (%)=        1.50          1.50
     Length             (m)=      195.28         40.00
     Mannings n            =        .013          .250

     Max.eff.Inten.(mm/hr)=       78.82         20.71
               over (min)         4.00         18.00
     Storage Coeff.  (min)=      3.72 (ii)    18.16 (ii)
     Unit Hyd. Tpeak (min)=       4.00         18.00
     Unit Hyd. peak  (cms)=        .30           .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .17           .11          .211 (iii)
     TIME TO PEAK    (hrs)=       1.50          1.77         1.517
     RUNOFF VOLUME    (mm)=      38.58         10.60        14.802
     TOTAL RAINFALL   (mm)=      39.38         39.38        39.385
     RUNOFF COEFFICIENT   =        .98           .27          .376

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
001:0011---------------------------------------------------------------------
*******************************************************************************
*
* POST 5 - SWM AREA
*
*******************************************************************************
---------------------
| DESIGN STANDHYD    |   Area     (ha)=    4.23
| 01:SWM     DT= 1.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
---------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=        2.12          2.12
     Dep. Storage      (mm)=         .80          1.50
     Average Slope      (%)=        1.50          1.50
     Length             (m)=      167.93         40.00
     Mannings n            =        .013          .250

     Max.eff.Inten.(mm/hr)=       78.82          7.64
               over (min)         3.00         25.00
     Storage Coeff.  (min)=      3.40 (ii)    24.92 (ii)
     Unit Hyd. Tpeak (min)=       3.00         25.00
     Unit Hyd. peak  (cms)=        .35           .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .44           .03          .441 (iii)
     TIME TO PEAK    (hrs)=       1.50          1.90         1.500
     RUNOFF VOLUME    (mm)=      38.58          7.41        23.000
     TOTAL RAINFALL   (mm)=      39.38         39.38        39.385
     RUNOFF COEFFICIENT   =        .98           .19          .584

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
001:0012---------------------------------------------------------------------
*******************************************************************************
*
* TOTAL INFLOW TO POND INLET1, INLET2, INLET3 AND SWM AREA
*
*******************************************************************************
---------------------
| ADD HYD (PNDIN ) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 09:INLET3     5.72     .211     1.52   14.80     .000
                 +ID2 07:INLET1    51.37    1.270     1.53   12.68     .000
                 +ID3 01:SWM        4.23     .441     1.50   23.00     .000
                  ==========================================================
                  SUM 02:PNDIN     61.32    1.901     1.52   13.59     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0013---------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>02:(PNDIN )    |
| OUT<03:(CNTRL )    |     ==========  OUTFLOW STORAGE TABLE  ==========
---------------------      OUTFLOW     STORAGE    |  OUTFLOW     STORAGE
                             (cms)      (ha.m.)    |    (cms)     (ha.m.)
                             .000   .0000E+00      |     .274   .7485E+00
                             .008   .1800E-02      |     .464   .8718E+00
                             .017   .1120E-01      |     .688   .9986E+00
                             .023   .3440E-01      |     .942   .1129E+01
                             .028   .7580E-01      |    1.223   .1263E+01
                             .032   .1445E+00      |    1.528   .1401E+01
                             .036   .2334E+00      |    1.855   .1542E+01
                             .039   .3273E+00      |    2.204   .1687E+01
                             .042   .4254E+00      |    2.572   .1835E+01
                             .045   .5274E+00      |     .000   .0000E+00
                             .127   .6336E+00      |     .000   .0000E+00

     ROUTING RESULTS            AREA      QPEAK      TPEAK       R.V.
     ---------------            (ha)      (cms)      (hrs)       (mm)
     INFLOW >02: (PNDIN )      61.32     1.901      1.517      13.591
     OUTFLOW<03: (CNTRL )      61.32      .207      4.217      13.591
    OVERFLOW<04: (PNDOVR)        .00      .000       .000        .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                  PERCENTAGE OF TIME OVERFLOWING     (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=    10.897
                  TIME SHIFT OF PEAK FLOW          (min)=   162.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=.6962E+00

-------------------------------------------------------------------------------
001:0014---------------------------------------------------------------------
*******************************************************************************
*
* POST 6 - STREET B
*
*******************************************************************************
---------------------
| DESIGN STANDHYD    |   Area     (ha)=    6.00
| 05:POST6  DT= 1.00 |   Total Imp(%)=   26.00   Dir. Conn.(%)=    9.00
---------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=        1.56          4.44
     Dep. Storage      (mm)=         .80          1.50
     Average Slope      (%)=        1.50          1.50
     Length             (m)=      200.00         40.00
     Mannings n            =        .013          .250

     Max.eff.Inten.(mm/hr)=       78.82         12.21
               over (min)         4.00         22.00
     Storage Coeff.  (min)=      3.77 (ii)    21.61 (ii)
     Unit Hyd. Tpeak (min)=       4.00         22.00
     Unit Hyd. peak  (cms)=        .29           .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .11           .09          .133 (iii)
     TIME TO PEAK    (hrs)=       1.50          1.85         1.517
     RUNOFF VOLUME    (mm)=      38.58          8.84        11.518
     TOTAL RAINFALL   (mm)=      39.38         39.38        39.385
     RUNOFF COEFFICIENT   =        .98           .22          .292

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
001:0015---------------------------------------------------------------------
*******************************************************************************
*
* POST DEVELOPMENT FROM SITE
*
*******************************************************************************
---------------------
| ADD HYD (PSTDEV) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 03:CNTRL     61.32     .207     4.22   13.59     .000
                 +ID2 04:PNDOVR      .00     .000      .00     .00     .000 **DRY**
                 +ID3 05:POST6      6.00     .133     1.52   11.52     .000
                 +ID4 06:3MAJ        .00     .000      .00     .00     .000 **DRY**
                  ==========================================================
                  SUM 07:PSTDEV    67.32     .231     4.03   13.41     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
001:0016---------------------------------------------------------------------
  ** END OF RUN :   1

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



---------------------
| START              |  Project  dir.: H:\SWMHYM~1\09056D~1\
---------------------   Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
```

```
    NSTORM=   1
          #  1=CH5.STM
```

002:0002

```
*#*************************************************************************
*#  Project Name: [DECOU]    Project Number: [09056]
*#  Date        : 11-06-2009
*#  Modeller    : [TGS]
*#  Company     : G. Douglas Vallee Limited
*#  License #   : 3568969
*#*************************************************************************
```

002:0002

READ STORM	Filename: H:\SWMHYM~1\09056D~1\CH5.STM
Ptotal= 48.48 mm	Comments: 5 YEAR CHICAGO 4 HOUR DESIGN DISTRIBUTIO

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.529	1.17	10.190	2.17	9.150	3.17	4.550
.33	3.658	1.33	21.620	2.33	7.700	3.33	4.220
.50	4.040	1.50	112.370	2.50	6.680	3.50	3.960
.67	4.670	1.67	27.760	2.67	5.940	3.67	3.730
.83	5.610	1.83	15.750	2.83	5.390	3.83	3.530
1.00	7.110	2.00	11.430	3.00	4.930	4.00	3.350

002:0003

```
*************************************************************************
*
* EXTERNAL AREA - DONLY DRIVE
*
*************************************************************************
```

DESIGN STANDHYD	Area (ha)= 18.70
01:DONLY DT= 1.00	Total Imp(%)= 35.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	6.55	12.16
Dep. Storage	(mm)=	.80	1.50
Average Slope	(%)=	1.50	1.50
Length	(m)=	353.08	40.00
Mannings n	=	.013	.250
Max.eff.Inten.	(mm/hr)=	112.37	29.41
over	(min)	5.00	17.00
Storage Coeff.	(min)=	4.60 (ii)	17.16 (ii)
Unit Hyd. Tpeak	(min)=	5.00	17.00
Unit Hyd. peak	(cms)=	.24	.07
			TOTALS
PEAK FLOW	(cms)=	.50	.60 .761 (iii)
TIME TO PEAK	(hrs)=	1.52	1.75 1.700
RUNOFF VOLUME	(mm)=	47.68	14.05 17.416
TOTAL RAINFALL	(mm)=	48.48	48.48 48.478
RUNOFF COEFFICIENT	=	.98	.29 .359

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 62.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0004

```
*************************************************************************
*
* EXTERNAL AREA - CEMETARY
*
*************************************************************************
```

DESIGN NASHYD	Area (ha)= 9.74 Curve Number (CN)=62.00
02:CEM DT= 1.00	Ia (mm)= 1.500 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .500

Unit Hyd Qpeak	(cms)=	.744
PEAK FLOW	(cms)=	.175 (i)
TIME TO PEAK	(hrs)=	2.100
RUNOFF VOLUME	(mm)=	10.890
TOTAL RAINFALL	(mm)=	48.478
RUNOFF COEFFICIENT	=	.225

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0005

```
*************************************************************************
*
* POST 2 - STREET A, F, AND B
*
*************************************************************************
```

DESIGN STANDHYD	Area (ha)= 7.49
03:POST 2 DT= 1.00	Total Imp(%)= 52.00 Dir. Conn.(%)= 16.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.89	3.60
Dep. Storage	(mm)=	.80	1.50
Average Slope	(%)=	1.50	1.50
Length	(m)=	223.46	40.00
Mannings n	=	.013	.250
Max.eff.Inten.	(mm/hr)=	112.37	49.57
over	(min)	3.00	14.00
Storage Coeff.	(min)=	3.50 (ii)	13.68 (ii)
Unit Hyd. Tpeak	(min)=	3.00	14.00
Unit Hyd. peak	(cms)=	.34	.08
			TOTALS
PEAK FLOW	(cms)=	.35	.31 .488 (iii)
TIME TO PEAK	(hrs)=	1.50	1.70 1.517
RUNOFF VOLUME	(mm)=	47.68	16.60 21.576
TOTAL RAINFALL	(mm)=	48.48	48.48 48.478
RUNOFF COEFFICIENT	=	.98	.34 .445

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 62.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0006

```
*************************************************************************
*
* POST 3 - STREETS B, F AND H
* MAJOR STAYS ON STREET B, MINOR GOES TO POND ALONG STREET H
*
*************************************************************************
```

DESIGN STANDHYD	Area (ha)= 5.20
04:POST3 DT= 1.00	Total Imp(%)= 54.00 Dir. Conn.(%)= 16.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.81	2.39
Dep. Storage	(mm)=	.80	1.50
Average Slope	(%)=	1.50	1.50
Length	(m)=	186.19	40.00
Mannings n	=	.013	.250
Max.eff.Inten.	(mm/hr)=	112.37	55.78
over	(min)	3.00	13.00
Storage Coeff.	(min)=	3.13 (ii)	12.85 (ii)
Unit Hyd. Tpeak	(min)=	3.00	13.00
Unit Hyd. peak	(cms)=	.36	.09
			TOTALS
PEAK FLOW	(cms)=	.25	.23 .358 (iii)
TIME TO PEAK	(hrs)=	1.50	1.68 1.517
RUNOFF VOLUME	(mm)=	47.68	17.09 21.982
TOTAL RAINFALL	(mm)=	48.48	48.48 48.478
RUNOFF COEFFICIENT	=	.98	.35 .453

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 62.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0007

COMPUTE DUALHYD	Average inlet capacities [CINLET] = .400 (cms)
TotalHyd 04:POST3	Number of inlets in system [NINLET] = 1
	Total minor system capacity = .400 (cms)
	Total major system storage [TMJSTO] = 0.(cu.m.)

	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
TOTAL HYD.	04:POST3	5.20	.358	1.517	21.982	.000
MAJOR SYST	06:3MAJ	.00	.000	.000	.000	.000
MINOR SYST	05:3MIN	5.20	.358	1.517	21.982	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0008

```
*************************************************************************
*
* POST 1 - STREETS A, H, I, J AND E
*
*************************************************************************
```

DESIGN STANDHYD	Area (ha)= 10.24
08:INLET2 DT= 1.00	Total Imp(%)= 40.00 Dir. Conn.(%)= 12.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.10	6.14
Dep. Storage	(mm)=	.80	1.50
Average Slope	(%)=	1.50	1.50
Length	(m)=	261.28	40.00
Mannings n	=	.013	.250
Max.eff.Inten.	(mm/hr)=	112.37	33.65
over	(min)	4.00	16.00
Storage Coeff.	(min)=	3.84 (ii)	15.74 (ii)
Unit Hyd. Tpeak	(min)=	4.00	16.00
Unit Hyd. peak	(cms)=	.29	.07
			TOTALS
PEAK FLOW	(cms)=	.35	.35 .493 (iii)
TIME TO PEAK	(hrs)=	1.50	1.73 1.533
RUNOFF VOLUME	(mm)=	47.68	14.66 18.623
TOTAL RAINFALL	(mm)=	48.48	48.48 48.478
RUNOFF COEFFICIENT	=	.98	.30 .384

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 62.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0009

```
*************************************************************************
*
* INLET ONE - EXT AREAS, POST 2 AND MINOR POST 3
*
*************************************************************************
```

ADD HYD (INLET1)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
ID1	01:DONLY	18.70	.761	1.70	17.42	.000
+ID2	02:CEM	9.74	.175	2.10	10.89	.000
+ID3	03:POST 2	7.49	.488	1.52	21.58	.000
+ID4	05:3MIN	5.20	.358	1.52	21.98	.000
+ID5	08:INLET2	10.24	.493	1.53	18.62	.000
SUM	07:INLET1	51.37	2.107	1.53	17.49	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0010

```
*************************************************************************
*
* INLET TWO (FUTURE) - POST 4 - STREETS P, Q AND R
*
*************************************************************************
```

DESIGN STANDHYD	Area (ha)= 5.72
09:INLET3 DT= 1.00	Total Imp(%)= 45.00 Dir. Conn.(%)= 15.00

```
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      2.57         3.15
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    195.28        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    112.37        39.74
           over      (min)       3.00        14.00
     Storage Coeff.  (min)=     3.23 (ii)   14.35 (ii)
     Unit Hyd. Tpeak (min)=     3.00        14.00
     Unit Hyd. peak  (cms)=      .36          .08
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .25          .21        .345 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.70       1.517
     RUNOFF VOLUME    (mm)=    47.68        15.22      20.093
     TOTAL RAINFALL   (mm)=    48.48        48.48      48.478
     RUNOFF COEFFICIENT   =      .98          .31        .414

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0011-------------------------------------------------------------------------
*******************************************************************************
*
* POST 5 - SWM AREA
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    4.23
| 01:SWM     DT= 1.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
----------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      2.12         2.12
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    167.93        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    112.37        15.29
           over      (min)       3.00        19.00
     Storage Coeff.  (min)=     2.95 (ii)   19.25 (ii)
     Unit Hyd. Tpeak (min)=     3.00        19.00
     Unit Hyd. peak  (cms)=      .38          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .63          .05        .648 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.78       1.500
     RUNOFF VOLUME    (mm)=    47.68        10.89      29.284
     TOTAL RAINFALL   (mm)=    48.48        48.48      48.478
     RUNOFF COEFFICIENT   =      .98          .22        .604

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0012-------------------------------------------------------------------------
*******************************************************************************
*
* TOTAL INFLOW TO POND INLET1, INLET2, INLET3 AND SWM AREA
*
*******************************************************************************
---------------------
| ADD HYD (PNDIN ) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------            (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 09:INLET3     5.72     .345    1.52   20.09     .000
                 +ID2 07:INLET1    51.37    2.107    1.53   17.49     .000
                 +ID3 01:SWM        4.23     .648    1.50   29.28     .000
                  ==========================================================
                  SUM 02:PNDIN     61.32    3.061    1.52   18.54     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0013-------------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |     Requested routing time step =  1.0 min.
|  IN>02:(PNDIN )    |
| OUT<03:(CNTRL )    |     =========  OUTFLOW STORAGE TABLE  =========
----------------------     OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                             (cms)      (ha.m.)   |    (cms)      (ha.m.)
                             .000   .0000E+00     |     .274   .7485E+00
                             .008   .1800E-02     |     .464   .8718E+00
                             .017   .1120E-01     |     .688   .9986E+00
                             .023   .3440E-01     |     .942   .1129E+01
                             .028   .7580E-01     |    1.223   .1263E+01
                             .032   .1445E+00     |    1.528   .1401E+01
                             .036   .2334E+00     |    1.855   .1542E+01
                             .039   .3273E+00     |    2.204   .1687E+01
                             .042   .4254E+00     |    2.572   .1835E+01
                             .045   .5274E+00     |     .000   .0000E+00
                             .127   .6336E+00     |     .000   .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (PNDIN )      61.32     3.061     1.517     18.545
     OUTFLOW<03: (CNTRL )      61.32      .410     3.617     18.545
    OVERFLOW<04: (PNDOVR)       .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   13.405
                  TIME SHIFT OF PEAK FLOW          (min)=   126.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=.8370E+00

002:0014-------------------------------------------------------------------------
*******************************************************************************
*
* POST 6 - STREET B
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    6.00
| 05:POST6  DT= 1.00 |   Total Imp(%)=   25.00   Dir. Conn.(%)=    9.00
----------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      1.56         4.44
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    200.00        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    112.37        23.68
           over      (min)       3.00        17.00
     Storage Coeff.  (min)=     3.27 (ii)   16.96 (ii)
     Unit Hyd. Tpeak (min)=     3.00        17.00
     Unit Hyd. peak  (cms)=      .35          .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .16          .18        .221 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.75       1.517
     RUNOFF VOLUME    (mm)=    47.68        12.85      15.981
     TOTAL RAINFALL   (mm)=    48.48        48.48      48.478
     RUNOFF COEFFICIENT   =      .98          .26        .330

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

002:0015-------------------------------------------------------------------------
*******************************************************************************
*
* POST DEVELOPMENT FROM SITE
*
*******************************************************************************
---------------------
| ADD HYD (PSTDEV) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------            (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 03:CNTRL     61.32     .410    3.62   18.54     .000
                 +ID2 04:PNDOVR      .00     .000     .00     .00     .000 **DRY**
                 +ID3 05:POST6      6.00     .221    1.52   15.98     .000
                 +ID4 06:3MAJ        .00     .000     .00     .00     .000 **DRY**
                  ==========================================================
                  SUM 07:PSTDEV    67.32     .448    3.48   18.32     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0016-------------------------------------------------------------------------
002:0002-------------------------------------------------------------------------
  ** END OF RUN :   2

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




---------------------
| START             |  Project  dir.: H:\SWMHYM~1\09056D~1\
---------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 003
    NSTORM=   1
            #  1=CH10.STM
003:0002-------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [DECOU]     Project Number: [09056]
*#  Date        : 11-06-2009
*#  Modeller    : [TGS]
*#  Company     : G. Douglas Vallee Limited
*#  License #   :  3568969
*#*****************************************************************************
003:0002-------------------------------------------------------------------------
---------------------
| READ STORM        |     Filename: H:\SWMHYM~1\09056D~1\CH10.STM
| Ptotal=  56.08 mm |     Comments: 10 YEAR CHICAGO 4 HOURS DESIGN DISTRIBUT
---------------------
            TIME     RAIN |   TIME     RAIN |   TIME     RAIN |   TIME     RAIN
             hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr
             .17    3.580 |   1.17   11.510 |   2.17   10.310 |   3.17    5.050
             .33    3.990 |   1.33   25.320 |   2.33    8.660 |   3.33    4.700
             .50    4.500 |   1.50  133.600 |   2.50    7.520 |   3.50    4.394
             .67    5.210 |   1.67   32.000 |   2.67    6.650 |   3.67    4.140
             .83    6.270 |   1.83   19.730 |   2.83    5.380 |   3.83    3.910
            1.00    8.000 |   2.00   12.954 |   3.00    5.490 |   4.00    3.632

003:0003-------------------------------------------------------------------------
*******************************************************************************
*
* EXTERNAL AREA - DONLY DRIVE
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=   18.70
| 01:DONLY  DT= 1.00 |   Total Imp(%)=   35.00   Dir. Conn.(%)=   10.00
----------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      6.55        12.16
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    353.08        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    133.60        41.79
           over      (min)       4.00        15.00
     Storage Coeff.  (min)=     4.29 (ii)   15.20 (ii)
     Unit Hyd. Tpeak (min)=     4.00        15.00
     Unit Hyd. peak  (cms)=      .27          .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .61          .86       1.061 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.72       1.683
```

```
     RUNOFF VOLUME     (mm)=      55.28         18.07         21.788
     TOTAL RAINFALL    (mm)=      56.08         56.08         56.083
     RUNOFF COEFFICIENT   =        .99           .32           .389

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0004-------------------------------------------------------------------------
*******************************************************************************
*
* EXTERNAL AREA - CEMETARY
*
*******************************************************************************
---------------------
| DESIGN NASHYD     |   Area     (ha)=    9.74   Curve Number   (CN)=62.00
| 02:CEM    DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=      .744

     PEAK FLOW       (cms)=      .236 (i)
     TIME TO PEAK    (hrs)=     2.100
     RUNOFF VOLUME    (mm)=    14.170
     TOTAL RAINFALL   (mm)=    56.083
     RUNOFF COEFFICIENT   =      .253

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0005-------------------------------------------------------------------------
*******************************************************************************
*
* POST 2 - STREET A, F, AND B
*
*******************************************************************************
---------------------
| DESIGN STANDHYD   |   Area     (ha)=    7.49
| 03:POST 2 DT= 1.00 |   Total Imp(%)=   52.00   Dir. Conn.(%)=   16.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      3.89          3.60
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    223.46         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=    133.60         71.97
               over (min)        3.00         12.00
     Storage Coeff.  (min)=     3.26 (ii)    12.04 (ii)
     Unit Hyd. Tpeak (min)=     3.00         12.00
     Unit Hyd. peak  (cms)=      .35           .09
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .42           .44      .658 (iii)
     TIME TO PEAK    (hrs)=     1.50          1.65      1.517
     RUNOFF VOLUME    (mm)=    55.28         21.15     26.614
     TOTAL RAINFALL   (mm)=    56.08         56.08     56.083
     RUNOFF COEFFICIENT   =      .99           .38       .475

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0006-------------------------------------------------------------------------
*******************************************************************************
*
* POST 3 - STREETS B, F AND H
* MAJOR STAYS ON STREET B, MINOR GOES TO POND ALONG STREET H
*
*******************************************************************************
---------------------
| DESIGN STANDHYD   |   Area     (ha)=    5.20
| 04:POST3  DT= 1.00 |   Total Imp(%)=   54.00   Dir. Conn.(%)=   16.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.81          2.39
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    186.19         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=    133.60         81.90
               over (min)        3.00         11.00
     Storage Coeff.  (min)=     2.93 (ii)    11.26 (ii)
     Unit Hyd. Tpeak (min)=     3.00         11.00
     Unit Hyd. peak  (cms)=      .38           .10
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .30           .33       .492 (iii)
     TIME TO PEAK    (hrs)=     1.50          1.63      1.517
     RUNOFF VOLUME    (mm)=    55.28         21.73     27.102
     TOTAL RAINFALL   (mm)=    56.08         56.08     56.083
     RUNOFF COEFFICIENT   =      .99           .39       .483

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0007-------------------------------------------------------------------------
---------------------
| COMPUTE DUALHYD   |   Average inlet capacities  [CINLET] =    .400  (cms)
| TotalRyd 04:POST3 |   Number of inlets in system [NINLET] =      1
---------------------   Total minor system capacity          =    .400  (cms)
                        Total major system storage [TMJSTO] =      0.(cu.m.)

                ID: NHYD        AREA      QPEAK     TPEAK      R.V.      DWF
                                (ha)      (cms)     (hrs)      (mm)     (cms)
     TOTAL HYD.  04:POST3       5.20      .492     1.517     27.102      .000
     ==========================================================================
     MAJOR SYST  06:3MAJ         .12      .092     1.517     27.102      .000
     MINOR SYST  05:3MIN        5.08      .400     1.467     27.102      .000

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0008-------------------------------------------------------------------------
*******************************************************************************
*
* POST 1 - STREETS A, H, I, J AND E
*
*******************************************************************************
---------------------
| DESIGN STANDHYD   |   Area     (ha)=   10.24
| 08:INLET2 DT= 1.00 |   Total Imp(%)=   40.00   Dir. Conn.(%)=   12.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      4.10          6.14
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    261.28         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=    133.60         48.13
               over (min)        4.00         14.00
     Storage Coeff.  (min)=     3.58 (ii)    13.89 (ii)
     Unit Hyd. Tpeak (min)=     4.00         14.00
     Unit Hyd. peak  (cms)=      .30           .08
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .42           .50       .668 (iii)
     TIME TO PEAK    (hrs)=     1.50          1.70      1.533
     RUNOFF VOLUME    (mm)=    55.28         18.81     23.184
     TOTAL RAINFALL   (mm)=    56.08         56.08     56.083
     RUNOFF COEFFICIENT   =      .99           .34       .413

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0009-------------------------------------------------------------------------
*******************************************************************************
*
* INLET ONE - EXT AREAS, POST 2 AND MINOR POST 3
*
*******************************************************************************
--------------------
| ADD HYD (INLET1) |  ID: NHYD     AREA      QPEAK    TPEAK    R.V.     DWF
--------------------                (ha)      (cms)    (hrs)    (mm)     (cms)
                    ID1 01:DONLY    18.70     1.061    1.68    21.79     .000
                   +ID2 02:CEM       9.74      .236    2.10    14.17     .000
                   +ID3 03:POST 2    7.49      .658    1.52    26.61     .000
                   +ID4 05:3MIN      5.08      .400    1.47    27.10     .000
                   +ID5 08:INLET2   10.24      .668    1.53    23.18     .000
                    ================================================================
                    SUM 07:INLET1   51.25     2.787    1.53    21.85     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0010-------------------------------------------------------------------------
*******************************************************************************
*
* INLET TWO (FUTURE) - POST 4 - STREETS P, Q AND R
*
*******************************************************************************
---------------------
| DESIGN STANDHYD   |   Area     (ha)=    5.72
| 09:INLET3 DT= 1.00 |   Total Imp(%)=   45.00   Dir. Conn.(%)=   15.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.57          3.15
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    195.28         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=    133.60         55.15
               over (min)        3.00         13.00
     Storage Coeff.  (min)=     3.01 (ii)    12.77 (ii)
     Unit Hyd. Tpeak (min)=     3.00         13.00
     Unit Hyd. peak  (cms)=      .37           .09
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .30           .30       .448 (iii)
     TIME TO PEAK    (hrs)=     1.50          1.68      1.517
     RUNOFF VOLUME    (mm)=    55.28         19.49     24.859
     TOTAL RAINFALL   (mm)=    56.08         56.08     56.083
     RUNOFF COEFFICIENT   =      .99           .35       .443

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0011-------------------------------------------------------------------------
*******************************************************************************
*
* POST 5 - SWM AREA
*
*******************************************************************************
---------------------
| DESIGN STANDHYD   |   Area     (ha)=    4.23
| 01:SWM    DT= 1.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.12          2.12
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    167.93         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=    133.60         21.65
               over (min)        3.00         17.00
     Storage Coeff.  (min)=     2.75 (ii)    16.94 (ii)
     Unit Hyd. Tpeak (min)=     3.00         17.00
     Unit Hyd. peak  (cms)=      .40           .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .76           .08       .783 (iii)
     TIME TO PEAK    (hrs)=     1.50          1.75      1.500
```

```
     RUNOFF VOLUME     (mm)=      55.28         14.17         34.727
     TOTAL RAINFALL    (mm)=      56.08         56.08         56.083
     RUNOFF COEFFICIENT   =        .99           .25           .619

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0012---------------------------------------------------------------------
*******************************************************************************
*
* TOTAL INFLOW TO POND INLET1, INLET2, INLET3 AND SWM AREA
*
*******************************************************************************
---------------------
| ADD HYD (PNDIN ) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 09:INLET3     5.72      .448    1.52   24.86     .000
                 +ID2 07:INLET1    51.25     2.787    1.53   21.85     .000
                 +ID3 01:SWM        4.23      .783    1.50   34.73     .000
                  ==========================================================
                  SUM 02:PNDIN     61.20     3.943    1.52   23.02     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0013---------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |     Requested routing time step =  1.0 min.
|   IN>02:(PNDIN )  |
| OUT<03:(CNTRL )   |     =========  OUTFLOW STORAGE TABLE  =========
---------------------     OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                            (cms)      (ha.m.)  |    (cms)      (ha.m.)
                             .000   .0000E+00    |     .274   .7485E+00
                             .008   .1800E-02    |     .464   .8718E+00
                             .017   .1120E-01    |     .688   .9986E+00
                             .023   .3440E-01    |     .942   .1129E+01
                             .028   .7580E-01    |    1.223   .1263E+01
                             .032   .1445E+00    |    1.528   .1401E+01
                             .036   .2334E+00    |    1.855   .1542E+01
                             .039   .3273E+00    |    2.204   .1687E+01
                             .042   .4254E+00    |    2.572   .1835E+01
                             .045   .5274E+00    |     .000   .0000E+00
                             .127   .6336E+00    |     .000   .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (PNDIN )      61.20     3.943     1.517     23.022
     OUTFLOW<03: (CNTRL )      61.20      .623     3.083     23.022
    OVERFLOW<04: (PNDOVR)       .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=    15.809
                  TIME SHIFT OF PEAK FLOW          (min)=    94.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=.9620E+00

-------------------------------------------------------------------------------
003:0014---------------------------------------------------------------------
*******************************************************************************
*
* POST 6 - STREET B
*
*******************************************************************************
---------------------
| DESIGN STANDHYD   |   Area    (ha)=    6.00
| 05:POST6  DT= 1.00 |   Total Imp(%)=   26.00   Dir. Conn.(%)=    9.00
---------------------

                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      1.56         4.44
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    200.00        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    133.60        33.77
               over (min)        3.00        15.00
     Storage Coeff.  (min)=     3.05 (ii)   14.93 (ii)
     Unit Hyd. Tpeak (min)=     3.00        15.00
     Unit Hyd. peak  (cms)=      .37          .08
                                                    *TOTALS*
     PEAK FLOW        (cms)=     .19          .26       .303 (iii)
     TIME TO PEAK     (hrs)=    1.50         1.72      1.683
     RUNOFF VOLUME     (mm)=   55.28        16.59     20.070
     TOTAL RAINFALL    (mm)=   56.08        56.08     56.083
     RUNOFF COEFFICIENT   =     .99          .30       .358

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
003:0015---------------------------------------------------------------------
*******************************************************************************
*
* POST DEVELOPMENT FROM SITE
*
*******************************************************************************
---------------------
| ADD HYD (PSTDEV) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 03:CNTRL     61.20      .623    3.08   23.02     .000
                 +ID2 04:PNDOVR     .00      .000     .00     .00     .000 **DRY**
                 +ID3 05:POST6     6.00      .303    1.68   20.07     .000
                 +ID4 06:3MAJ       .12      .092    1.52   27.10     .000
                  ==========================================================
                  SUM 07:PSTDEV    67.32      .679    2.92   22.77     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
003:0016---------------------------------------------------------------------
-------------------------------------------------------------------------------
003:0002---------------------------------------------------------------------
-------------------------------------------------------------------------------
003:0002---------------------------------------------------------------------
  ** END OF RUN :   3

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




--------------------
| START            |  Project  dir.: H:\SWMHYM~1\09056D~1\
--------------------  Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
          #  1=CH25.STM
-------------------------------------------------------------------------------
004:0002---------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: (DECOU)    Project Number: (09056)
*#  Date        : 11-06-2009
*#  Modeller    : (TGS)
*#  Company     : G. Douglas Vallee Limited
*#  License #   :  3568969
*#*****************************************************************************
-------------------------------------------------------------------------------
004:0002---------------------------------------------------------------------
--------------------
| READ STORM       |     Filename: H:\SWMHYM~1\09056D~1\CH25.STM
| Ptotal=  66.02 mm|     Comments: 25 YEAR CHICAGO 4 HOUR DESIGN DISTRIBUTI
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
            hrs    mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
            .17    4.500 |   1.17  13.670 |   2.17  12.320 |   3.17   6.270
            .33    4.980 |   1.33  27.690 |   2.33  10.440 |   3.33   5.000
            .50    5.613 |   1.50 158.850 |   2.50   9.144 |   3.50   5.840
            .67    6.450 |   1.67  35.080 |   2.67   8.150 |   3.67   5.180
            .83    7.700 |   1.83  20.600 |   2.83   7.390 |   3.83   4.900
           1.00    9.700 |   2.00  15.240 |   3.00   6.780 |   4.00   4.650

-------------------------------------------------------------------------------
004:0003---------------------------------------------------------------------
*******************************************************************************
*
* EXTERNAL AREA - DONLY DRIVE
*
*******************************************************************************
---------------------
| DESIGN STANDHYD   |   Area    (ha)=   18.70
| 01:DONLY  DT= 1.00 |   Total Imp(%)=   35.00   Dir. Conn.(%)=   10.00
---------------------

                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      6.55        12.16
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    353.08        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    158.85        60.87
               over (min)        4.00        13.00
     Storage Coeff.  (min)=     4.01 (ii)   13.39 (ii)
     Unit Hyd. Tpeak (min)=     4.00        13.00
     Unit Hyd. peak  (cms)=      .28          .09
                                                    *TOTALS*
     PEAK FLOW        (cms)=     .74         1.23      1.496 (iii)
     TIME TO PEAK     (hrs)=    1.50         1.67      1.650
     RUNOFF VOLUME     (mm)=   65.22        23.77     27.920
     TOTAL RAINFALL    (mm)=   66.02        66.02     66.023
     RUNOFF COEFFICIENT   =     .99          .36       .423

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
004:0004---------------------------------------------------------------------
*******************************************************************************
*
* EXTERNAL AREA - CEMETARY
*
*******************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=    9.74   Curve Number    (CN)=62.00
| 02:CEM    DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=      .744

     PEAK FLOW       (cms)=      .309 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   18.906
     TOTAL RAINFALL   (mm)=   66.023
     RUNOFF COEFFICIENT   =     .286

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
004:0005---------------------------------------------------------------------
*******************************************************************************
*
* POST 2 - STREET A, F, AND B
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    7.49
| 03:POST 2 DT= 1.00 |   Total Imp(%)=   52.00   Dir. Conn.(%)=   16.00
----------------------

                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      3.89         3.60
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    223.46        40.00
     Mannings n           =      .013         .250
```

```
     Max.eff.Inten.(mm/hr)=     158.85       101.61
           over (min)           3.00        11.00
     Storage Coeff.  (min)=     3.05 (ii)   10.69 (ii)
     Unit Hyd. Tpeak (min)=     3.00        11.00
     Unit Hyd. peak  (cms)=      .37          .10
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .50          .62        .886 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.63       1.517
     RUNOFF VOLUME    (mm)=    65.22        27.55      33.580
     TOTAL RAINFALL   (mm)=    66.02        66.02      66.023
     RUNOFF COEFFICIENT   =      .99          .42        .509

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
004:0006-------------------------------------------------------------------------
*******************************************************************************
*
* POST 3 - STREETS B, F AND H
* MAJOR STAYS ON STREET B, MINOR GOES TO POND ALONG STREET H
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    5.20
| 04:POST3  DT= 1.00 |   Total Imp(%)=   54.00   Dir. Conn.(%)=   16.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      2.81          2.39
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    186.19         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=     158.85       116.66
           over (min)           3.00        10.00
     Storage Coeff.  (min)=     2.73 (ii)    9.96 (ii)
     Unit Hyd. Tpeak (min)=     3.00        10.00
     Unit Hyd. peak  (cms)=      .40          .11
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .35          .46        .667 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.62       1.517
     RUNOFF VOLUME    (mm)=    65.22        28.26      34.171
     TOTAL RAINFALL   (mm)=    66.02        66.02      66.023
     RUNOFF COEFFICIENT   =      .99          .43        .518

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
004:0007-------------------------------------------------------------------------
---------------------
| COMPUTE DUALHYD   |   Average inlet capacities   (CINLET) =    .400  (cms)
| TotalHyd 04:POST3 |   Number of inlets in system (NINLET) =      1
---------------------   Total minor system capacity         =    .400  (cms)
                        Total major system storage (TMJSTO) =     0.(cu.m.)

                ID: NHYD        AREA     QPEAK     TPEAK      R.V.      DWF
                                 (ha)     (cms)     (hrs)      (mm)     (cms)
     TOTAL HYD.   04:POST3       5.20      .667     1.517    34.171     .000
     ==========================================================================
     MAJOR SYST   06:3MAJ         .50      .267     1.517    34.171     .000
     MINOR SYST   05:3MIN        4.70      .400     1.433    34.171     .000

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0008-------------------------------------------------------------------------
*******************************************************************************
*
* POST 1 - STREETS A, H, I, J AND E
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=   10.24
| 08:INLET2 DT= 1.00 |   Total Imp(%)=   40.00   Dir. Conn.(%)=   12.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      4.10          6.14
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    261.28         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=     158.85        70.85
           over (min)           3.00        12.00
     Storage Coeff.  (min)=     3.34 (ii)   12.18 (ii)
     Unit Hyd. Tpeak (min)=     3.00        12.00
     Unit Hyd. peak  (cms)=      .35          .09
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .51          .73        .924 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.65       1.533
     RUNOFF VOLUME    (mm)=    65.22        24.69      29.551
     TOTAL RAINFALL   (mm)=    66.02        66.02      66.023
     RUNOFF COEFFICIENT   =      .99          .37        .448

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
004:0009-------------------------------------------------------------------------
*******************************************************************************
*
* INLET ONE - EXT AREAS, POST 2 AND MINOR POST 3
*
*******************************************************************************
---------------------
| ADD HYD (INLET1) | ID: NHYD      AREA     QPEAK   TPEAK   R.V.    DWF
---------------------                (ha)     (cms)   (hrs)   (mm)   (cms)
              ID1 01:DONLY        18.70    1.496    1.65   27.92    .000
             +ID2 02:CEM           9.74     .309    2.08   18.91    .000
             +ID3 03:POST 2        7.49     .886    1.52   33.58    .000
             +ID4 05:3MIN          4.70     .400    1.43   34.17    .000
             +ID5 08:INLET2       10.24     .924    1.53   29.55    .000
              ==========================================================
              SUM 07:INLET1       50.87    3.718    1.53   27.93    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0010-------------------------------------------------------------------------
*******************************************************************************
*
* INLET TWO (FUTURE) - POST 4 - STREETS P, Q AND R
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    5.72
| 09:INLET3 DT= 1.00 |   Total Imp(%)=   45.00   Dir. Conn.(%)=   15.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      2.57          3.15
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    195.28         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=     158.85        82.20
           over (min)           3.00        11.00
     Storage Coeff.  (min)=     2.81 (ii)   11.13 (ii)
     Unit Hyd. Tpeak (min)=     3.00        11.00
     Unit Hyd. peak  (cms)=      .39          .10
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .36          .43        .624 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.63       1.517
     RUNOFF VOLUME    (mm)=    65.22        25.52      31.480
     TOTAL RAINFALL   (mm)=    66.02        66.02      66.023
     RUNOFF COEFFICIENT   =      .99          .39        .477

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
004:0011-------------------------------------------------------------------------
*******************************************************************************
*
* POST 5 - SWM AREA
*
*******************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    4.23
| 01:SWM    DT= 1.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      2.12          2.12
     Dep. Storage     (mm)=       .80          1.50
     Average Slope     (%)=      1.50          1.50
     Length            (m)=    167.93         40.00
     Mannings n           =      .013          .250

     Max.eff.Inten.(mm/hr)=     158.85        31.24
           over (min)           3.00        15.00
     Storage Coeff.  (min)=     2.57 (ii)   14.82 (ii)
     Unit Hyd. Tpeak (min)=     3.00        15.00
     Unit Hyd. peak  (cms)=      .41          .08
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .91          .11        .950 (iii)
     TIME TO PEAK    (hrs)=     1.50         1.72       1.500
     RUNOFF VOLUME    (mm)=    65.22        18.91      42.065
     TOTAL RAINFALL   (mm)=    66.02        66.02      66.023
     RUNOFF COEFFICIENT   =      .99          .29        .637

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
004:0012-------------------------------------------------------------------------
*******************************************************************************
*
* TOTAL INFLOW TO POND INLET1, INLET2, INLET3 AND SWM AREA
*
*******************************************************************************
--------------------
| ADD HYD (PNDIN ) | ID: NHYD      AREA     QPEAK   TPEAK   R.V.    DWF
--------------------                (ha)     (cms)   (hrs)   (mm)   (cms)
              ID1 09:INLET3        5.72      .624    1.52   31.48    .000
             +ID2 07:INLET1       50.87    3.718    1.53   27.93    .000
             +ID3 01:SWM           4.23      .950    1.50   42.06    .000
              ==========================================================
              SUM 02:PNDIN        60.82    5.172    1.52   29.25    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
004:0013-------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |   Requested routing time step =  1.0 min.
|  IN>02:(PNDIN )   |
| OUT<03:(CNTRL )   |   ==========  OUTFLOW STORAGE TABLE  ==========
---------------------   OUTFLOW    STORAGE  |  OUTFLOW    STORAGE
                          (cms)     (ha.m.)  |    (cms)    (ha.m.)
                          .000  .0000E+00    |     .274  .7485E+00
                          .008  .1800E-02    |     .464  .8718E+00
                          .017  .1120E-01    |     .688  .9986E+00
                          .023  .3440E-01    |     .942  .1129E+01
                          .028  .7580E-01    |    1.223  .1263E+01
                          .032  .1445E+00    |    1.528  .1401E+01
                          .036  .2334E+00    |    1.855  .1542E+01
                          .039  .3273E+00    |    2.204  .1687E+01
                          .042  .4254E+00    |    2.572  .1835E+01
                          .045  .5274E+00    |     .000  .0000E+00
                          .127  .6336E+00    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK      R.V.
     ---------------            (ha)     (cms)     (hrs)      (mm)
```

```
    INFLOW >02: (PNDIN )      60.82     5.172     1.517     29.250
    OUTFLOW<03: (CNTRL )      60.82      .931     2.883     29.250
   OVERFLOW<04: (PNDOVR)        .00      .000      .000       .000

                TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                PEAK   FLOW   REDUCTION [Qout/Qin](%)=   17.995
                TIME SHIFT OF PEAK FLOW          (min)=    82.00
                MAXIMUM  STORAGE   USED       (ha.m.)=.1123E+01

--------------------------------------------------------------------------------
004:0014----------------------------------------------------------------------
********************************************************************************
*
* POST 6 - STREET B
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    6.00
| 05:POST6  DT= 1.00 |   Total Imp(%)=   26.00   Dir. Conn.(%)=    9.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=       1.56         4.44
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=       1.50         1.50
     Length            (m)=     200.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     158.85        49.40
               over (min)          3.00        13.00
     Storage Coeff.  (min)=       2.85 (ii)   13.05 (ii)
     Unit Hyd. Tpeak (min)=       3.00        13.00
     Unit Hyd. peak  (cms)=        .39         .09
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .23         .37        .431 (iii)
     TIME TO PEAK    (hrs)=       1.50        1.67       1.667
     RUNOFF VOLUME    (mm)=      65.22       21.94      25.836
     TOTAL RAINFALL   (mm)=      66.02       66.02      66.023
     RUNOFF COEFFICIENT   =        .99         .33        .391

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
004:0015----------------------------------------------------------------------
********************************************************************************
*
* POST DEVELOPMENT FROM SITE
*
********************************************************************************
--------------------
| ADD HYD (PSTDEV) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
--------------------                (ha)     (cms)    (hrs)    (mm)    (cms)
                ID1 03:CNTRL     60.82      .931     2.88    29.25     .000
               +ID2 04:PNDOVR      .00      .000      .00      .00     .000 **DRY**
               +ID3 05:POST6      6.00      .431     1.67    25.84     .000
               +ID4 06:3MAJ        .50      .267     1.52    34.17     .000
                ==========================================================
                SUM 07:PSTDEV    67.32     1.014     2.75    28.98     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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004:0016----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
  ** END OF RUN :   4

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




--------------------
| START            |  Project  dir.: H:\SWMHYM-1\09056D-1\
--------------------  Rainfall dir.: H:\SWMHYM-1\09056D-1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=CH50.STM
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [DECOU]    Project Number: [09056]
*#  Date        : 11-06-2009
*#  Modeller    : [TGS]
*#  Company     : G. Douglas Vallee Limited
*#  Licence #   :  3568969
*#*****************************************************************************
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
--------------------
| READ STORM       |     Filename: H:\SWMHYM-1\09056D-1\CH50.STM
| Ptotal=  72.96 mm|     Comments: 50 YEAR CHICAGO 4 HOUR DESIGN DISTRIBUTI
--------------------
            TIME     RAIN |   TIME     RAIN |   TIME     RAIN |   TIME     RAIN
             hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr
             .17    3.990 |   1.17   14.270 |   2.17   12.620 |   3.17    5.790
             .33    4.450 |   1.33   33.900 |   2.33   10.390 |   3.33    5.330
             .50    5.080 |   1.50  186.560 |   2.50    8.890 |   3.50    4.980
             .67    5.970 |   1.67   44.810 |   2.67    7.800 |   3.67    4.650
             .83    7.290 |   1.83   23.440 |   2.83    6.960 |   3.83    4.370
            1.00    9.530 |   2.00   16.260 |   3.00    6.300 |   4.00    4.140

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005:0003----------------------------------------------------------------------
********************************************************************************
*
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```
* EXTERNAL AREA - DONLY DRIVE
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=   18.70
| 01:DONLY  DT= 1.00 |   Total Imp(%)=   35.00   Dir. Conn.(%)=   10.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=       6.55        12.16
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=       1.50         1.50
     Length            (m)=     353.08        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     186.56        81.71
               over (min)          4.00        12.00
     Storage Coeff.  (min)=       3.76 (ii)   12.10 (ii)
     Unit Hyd. Tpeak (min)=       4.00        12.00
     Unit Hyd. peak  (cms)=        .29         .09
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .88        1.67       2.014 (iii)
     TIME TO PEAK    (hrs)=       1.50        1.67       1.633
     RUNOFF VOLUME    (mm)=      72.16       28.03      32.444
     TOTAL RAINFALL   (mm)=      72.96       72.96      72.962
     RUNOFF COEFFICIENT   =        .99         .38        .445

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0004----------------------------------------------------------------------
********************************************************************************
*
* EXTERNAL AREA - CEMETARY
*
********************************************************************************
----------------------
| DESIGN NASHYD      |   Area     (ha)=    9.74   Curve Number    (CN)=62.00
| 02:CEM    DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=     .744

     PEAK FLOW       (cms)=     .400 (i)
     TIME TO PEAK    (hrs)=    2.067
     RUNOFF VOLUME    (mm)=   22.483
     TOTAL RAINFALL   (mm)=   72.962
     RUNOFF COEFFICIENT   =     .308

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0005----------------------------------------------------------------------
********************************************************************************
*
* POST 2 - STREET A, F, AND B
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    7.49
| 03:POST 2 DT= 1.00 |   Total Imp(%)=   52.00   Dir. Conn.(%)=   16.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=       3.89         3.60
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=       1.50         1.50
     Length            (m)=     223.46        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     186.56       136.76
               over (min)          3.00        10.00
     Storage Coeff.  (min)=       2.86 (ii)    9.64 (ii)
     Unit Hyd. Tpeak (min)=       3.00        10.00
     Unit Hyd. peak  (cms)=        .39         .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .60         .83        1.161 (iii)
     TIME TO PEAK    (hrs)=       1.50        1.62       1.533
     RUNOFF VOLUME    (mm)=      72.16       32.28      38.661
     TOTAL RAINFALL   (mm)=      72.96       72.96      72.962
     RUNOFF COEFFICIENT   =        .99         .44        .530

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0006----------------------------------------------------------------------
********************************************************************************
*
* POST 3 - STREETS B, F AND H
* MAJOR STAYS ON STREET B, MINOR GOES TO POND ALONG STREET H
*
********************************************************************************
----------------------
| DESIGN STANDHYD    |   Area     (ha)=    5.20
| 04:POST3  DT= 1.00 |   Total Imp(%)=   54.00   Dir. Conn.(%)=   16.00
----------------------
                           IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=       2.81         2.39
     Dep. Storage     (mm)=        .80         1.50
     Average Slope     (%)=       1.50         1.50
     Length            (m)=     186.19        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     186.56       152.68
               over (min)          3.00        9.00
     Storage Coeff.  (min)=       2.56 (ii)    9.06 (ii)
     Unit Hyd. Tpeak (min)=       3.00        9.00
     Unit Hyd. peak  (cms)=        .42         .13
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .42         .62         .873 (iii)
     TIME TO PEAK    (hrs)=       1.50        1.60       1.517
     RUNOFF VOLUME    (mm)=      72.16       33.06      39.321
     TOTAL RAINFALL   (mm)=      72.96       72.96      72.962
     RUNOFF COEFFICIENT   =        .99         .45        .539
```

```
      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 62.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

005:0007----------------------------------------------------------------------
| COMPUTE DUALHYD    |   Average inlet capacities   [CINLET] =    .400  (cms)
| TotalHyd 04:POST3  |   Number of inlets in system [NINLET] =      1
                       Total minor system capacity          =    .400  (cms)
                       Total major system storage [TMJSTO] =      0.(cu.m.)

                ID: NHYD        AREA     QPEAK     TPEAK     R.V.      DWF
                                (ha)     (cms)     (hrs)     (mm)     (cms)
    TOTAL HYD.  04:POST3        5.20      .873     1.517   39.321      .000
    MAJOR SYST  06:3MAJ          .97      .473     1.517   39.321      .000
    MINOR SYST  05:3MIN         4.23      .400     1.400   39.321      .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0008----------------------------------------------------------------------
*
* POST 1 - STREETS A, H, I, J AND E
*
| DESIGN STANDHYD    |   Area     (ha)=   10.24
| 08:INLET2 DT= 1.00 |   Total Imp(%)=   40.00   Dir. Conn.(%)=   12.00

                          IMPERVIOUS     PERVIOUS (i)
    Surface Area     (ha)=      4.10          6.14
    Dep. Storage     (mm)=       .80          1.50
    Average Slope     (%)=      1.50          1.50
    Length            (m)=    261.28         40.00
    Mannings n           =      .013          .250

    Max.eff.Inten.(mm/hr)=    186.56         95.32
              over (min)          3.00         11.00
    Storage Coeff.  (min)=      3.14 (ii)    10.98 (ii)
    Unit Hyd. Tpeak (min)=      3.00         11.00
    Unit Hyd. peak  (cms)=       .36           .10
                                                      *TOTALS*
    PEAK FLOW       (cms)=       .60           .99      1.227 (iii)
    TIME TO PEAK    (hrs)=      1.50          1.63       1.533
    RUNOFF VOLUME    (mm)=     72.16         29.06      34.233
    TOTAL RAINFALL   (mm)=     72.96         72.96      72.962
    RUNOFF COEFFICIENT   =       .99           .40        .469

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 62.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

005:0009----------------------------------------------------------------------
*
* INLET ONE - EXT AREAS, POST 2 AND MINOR POST 3
*
| ADD HYD (INLET1) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
                                  (ha)     (cms)    (hrs)    (mm)     (cms)
                  ID1 01:DONLY    18.70    2.014    1.63    32.44     .000
                 +ID2 02:CEM       9.74     .400    2.07    22.48     .000
                 +ID3 03:POST 2    7.49    1.161    1.53    38.66     .000
                 +ID4 05:3MIN      4.23     .400    1.40    39.32     .000
                 +ID5 08:INLET2   10.24    1.227    1.53    34.23     .000
                  SUM 07:INLET1   50.40    4.813    1.62    32.38     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0010----------------------------------------------------------------------
*
* INLET TWO (FUTURE) - POST 4 - STREETS P, Q AND R
*
| DESIGN STANDHYD    |   Area     (ha)=    5.72
| 09:INLET3 DT= 1.00 |   Total Imp(%)=   45.00   Dir. Conn.(%)=   15.00

                          IMPERVIOUS     PERVIOUS (i)
    Surface Area     (ha)=      2.57          3.15
    Dep. Storage     (mm)=       .80          1.50
    Average Slope     (%)=      1.50          1.50
    Length            (m)=    195.28         40.00
    Mannings n           =      .013          .250

    Max.eff.Inten.(mm/hr)=    186.56        111.01
              over (min)          3.00         10.00
    Storage Coeff.  (min)=      2.63 (ii)    10.01 (ii)
    Unit Hyd. Tpeak (min)=      3.00         10.00
    Unit Hyd. peak  (cms)=       .41           .11
                                                      *TOTALS*
    PEAK FLOW       (cms)=       .43           .58       .816 (iii)
    TIME TO PEAK    (hrs)=      1.50          1.62      1.517
    RUNOFF VOLUME    (mm)=     72.16         30.00     36.329
    TOTAL RAINFALL   (mm)=     72.96         72.96     72.962
    RUNOFF COEFFICIENT   =       .99           .41       .498

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 62.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

005:0011----------------------------------------------------------------------
*
* POST 5 - SWM AREA
*
| DESIGN STANDHYD    |   Area     (ha)=    4.23
| 01:SWM     DT= 1.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00

                          IMPERVIOUS     PERVIOUS (i)
    Surface Area     (ha)=      2.12          2.12
    Dep. Storage     (mm)=       .80          1.50
    Average Slope     (%)=      1.50          1.50
    Length            (m)=    167.93         40.00
    Mannings n           =      .013          .250

    Max.eff.Inten.(mm/hr)=    186.56         43.92
              over (min)          2.00         13.00
    Storage Coeff.  (min)=      2.41 (ii)    13.10 (ii)
    Unit Hyd. Tpeak (min)=      2.00         13.00
    Unit Hyd. peak  (cms)=       .49           .09
                                                      *TOTALS*
    PEAK FLOW       (cms)=      1.08           .16      1.146 (iii)
    TIME TO PEAK    (hrs)=      1.50          1.68       1.500
    RUNOFF VOLUME    (mm)=     72.16         22.48      47.322
    TOTAL RAINFALL   (mm)=     72.96         72.96      72.962
    RUNOFF COEFFICIENT   =       .99           .31        .649

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 62.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

005:0012----------------------------------------------------------------------
*
* TOTAL INFLOW TO POND INLET1, INLET2, INLET3 AND SWM AREA
*
| ADD HYD (PNDIN ) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
                                  (ha)     (cms)    (hrs)    (mm)     (cms)
                  ID1 09:INLET3    5.72     .816    1.52    36.33     .000
                 +ID2 07:INLET1   50.40    4.813    1.62    32.38     .000
                 +ID3 01:SWM       4.23    1.146    1.50    47.32     .000
                  SUM 02:PNDIN     60.35    6.516    1.52    33.81     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0013----------------------------------------------------------------------
| ROUTE RESERVOIR    |   Requested routing time step =  1.0 min.
|  IN>02:(PNDIN )    |
| OUT<03:(CNTRL )    |   =========  OUTFLOW STORAGE TABLE  ==========
                         OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                           (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           .000  .0000E+00     |     .274  .7485E+00
                           .008  .1800E-02     |     .464  .8718E+00
                           .017  .1120E-01     |     .688  .9986E+00
                           .023  .3440E-01     |     .942  .1129E+01
                           .028  .7580E-01     |    1.223  .1263E+01
                           .032  .1445E+00     |    1.528  .1401E+01
                           .036  .2334E+00     |    1.855  .1542E+01
                           .039  .3273E+00     |    2.204  .1687E+01
                           .042  .4254E+00     |    2.572  .1835E+01
                           .045  .5274E+00     |    .000   .0000E+00
                           .127  .6336E+00     |    .000   .0000E+00

    ROUTING RESULTS              AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
    INFLOW >02: (PNDIN )        60.35     6.516     1.517      33.805
    OUTFLOW<03: (CNTRL )        60.35     1.234     2.583      33.805
   OVERFLOW<04: (PNDOVR)          .00      .000      .000        .000

                TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
                PERCENTAGE OF TIME OVERFLOWING   (%)=       .00

                PEAK   FLOW   REDUCTION (Qout/Qin)(%)=    18.940
                TIME SHIFT OF PEAK FLOW         (min)=     64.00
                MAXIMUM  STORAGE   USED      (ha.m.)=.1268E+01

005:0014----------------------------------------------------------------------
*
* POST 6 - STREET B
*
| DESIGN STANDHYD    |   Area     (ha)=    6.00
| 05:POST6  DT= 1.00 |   Total Imp(%)=   26.00   Dir. Conn.(%)=    9.00

                          IMPERVIOUS     PERVIOUS (i)
    Surface Area     (ha)=      1.56          4.44
    Dep. Storage     (mm)=       .80          1.50
    Average Slope     (%)=      1.50          1.50
    Length            (m)=    200.00         40.00
    Mannings n           =      .013          .250

    Max.eff.Inten.(mm/hr)=    186.56         66.53
              over (min)          3.00         12.00
    Storage Coeff.  (min)=      2.67 (ii)    11.73 (ii)
    Unit Hyd. Tpeak (min)=      3.00         12.00
    Unit Hyd. peak  (cms)=       .40           .10
                                                      *TOTALS*
    PEAK FLOW       (cms)=       .27           .51       .584 (iii)
    TIME TO PEAK    (hrs)=      1.50          1.67      1.650
    RUNOFF VOLUME    (mm)=     72.16         25.95     30.109
    TOTAL RAINFALL   (mm)=     72.96         72.96     72.962
    RUNOFF COEFFICIENT   =       .99           .36       .413

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 62.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
005:0015----------------------------------------------------------------------
**************************************************************************
*
* POST DEVELOPMENT FROM SITE
*
**************************************************************************
--------------------
| ADD HYD (PSTDEV) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
--------------------              (ha)     (cms)    (hrs)    (mm)     (cms)
                  ID1 03:CNTRL     60.35    1.234    2.58   33.81     .000
                 +ID2 04:PNDOVR     .00     .000     .00     .00     .000 **DRY**
                 +ID3 05:POST6     6.00     .584    1.65   30.11     .000
                 +ID4 06:3MAJ       .97     .473    1.52   39.32     .000
                  ================================================
                  SUM 07:PSTDEV    67.32    1.344    2.48   33.55     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

005:0016----------------------------------------------------------------------
005:0002----------------------------------------------------------------------
005:0002----------------------------------------------------------------------
005:0002----------------------------------------------------------------------
005:0002----------------------------------------------------------------------
  ** END OF RUN :   5

**************************************************************************
--------------------
| START            |   Project  dir.: H:\SWMHYM~1\09056D~1\
--------------------   Rainfall dir.: H:\SWMHYM~1\09056D~1\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
          #  1=CH100.STM
----------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
*#**********************************************************************
*#  Project Name: [DECOU]    Project Number: [09056]
*#  Date        : 11-06-2009
*#  Modeller    : [TGS]
*#  Company     : G. Douglas Vallee Limited
*#  License #   : 3568969
*#**********************************************************************
----------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: H:\SWMHYM~1\09056D~1\CH100.STM
| Ptotal=  83.90 mm|    Comments: 100 YEAR CHICAGO 4 HOUR DESIGN STORM DIS
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
             .17   4.500 |   1.17  16.860 |   2.17  14.830 |   3.17   6.600
             .33   5.050 |   1.33  41.070 |   2.33  12.120 |   3.33   6.100
             .50   5.820 |   1.50 205.920 |   2.50  10.310 |   3.50   5.660
             .67   6.830 |   1.67  54.560 |   2.67   9.020 |   3.67   5.280
             .83   8.410 |   1.83  29.170 |   2.83   8.030 |   3.83   4.980
            1.00  11.070 |   2.00  19.280 |   3.00   7.240 |   4.00   4.700

----------------------------------------------------------------------------
006:0003----------------------------------------------------------------------
**************************************************************************
*
* EXTERNAL AREA - DONLY DRIVE
*
**************************************************************************
--------------------
| DESIGN STANDHYD  |   Area     (ha)=   18.70
| 01:DONLY  DT= 1.00 |   Total Imp(%)=   35.00   Dir. Conn.(%)=   10.00
--------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=     6.55          12.16
     Dep. Storage     (mm)=      .80           1.50
     Average Slope     (%)=     1.50           1.50
     Length            (m)=   353.08          40.00
     Mannings n           =     .013           .250

     Max.eff.Inten.(mm/hr)=   205.92         104.98
               over (min)        4.00          11.00
     Storage Coeff.  (min)=     3.61 (ii)     11.16 (ii)
     Unit Hyd. Tpeak (min)=     4.00          11.00
     Unit Hyd. peak  (cms)=      .30           .10
                                                      *TOTALS*
     PEAK FLOW       (cms)=      .98           2.16       2.583 (iii)
     TIME TO PEAK    (hrs)=     1.50           1.65       1.617
     RUNOFF VOLUME    (mm)=    83.10          35.13      39.926
     TOTAL RAINFALL   (mm)=    83.90          83.90      83.902
     RUNOFF COEFFICIENT   =      .99            .42        .476

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
006:0004----------------------------------------------------------------------
**************************************************************************
*
* EXTERNAL AREA - CEMETARY
*
**************************************************************************
--------------------
| DESIGN NASHYD    |   Area     (ha)=    9.74   Curve Number    (CN)=62.00
| 02:CEM    DT= 1.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .500

     Unit Hyd Qpeak  (cms)=      .744
     PEAK FLOW       (cms)=      .508 (i)
     TIME TO PEAK    (hrs)=    2.083
     RUNOFF VOLUME    (mm)=   28.520
     TOTAL RAINFALL   (mm)=   83.902
     RUNOFF COEFFICIENT   =     .340

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
006:0005----------------------------------------------------------------------
**************************************************************************
*
* POST 2 - STREET A, F, AND B
*
**************************************************************************
--------------------
| DESIGN STANDHYD  |   Area     (ha)=    7.49
| 03:POST 2 DT= 1.00 |   Total Imp(%)=   52.00   Dir. Conn.(%)=   16.00
--------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=     3.89           3.60
     Dep. Storage     (mm)=      .80           1.50
     Average Slope     (%)=     1.50           1.50
     Length            (m)=   223.46          40.00
     Mannings n           =     .013           .250

     Max.eff.Inten.(mm/hr)=   205.92         170.66
               over (min)        3.00           9.00
     Storage Coeff.  (min)=     2.75 (ii)      8.96 (ii)
     Unit Hyd. Tpeak (min)=     3.00           9.00
     Unit Hyd. peak  (cms)=      .40           .13
                                                      *TOTALS*
     PEAK FLOW       (cms)=      .66           1.06       1.458 (iii)
     TIME TO PEAK    (hrs)=     1.50           1.60       1.533
     RUNOFF VOLUME    (mm)=    83.10          40.09      46.976
     TOTAL RAINFALL   (mm)=    83.90          83.90      83.902
     RUNOFF COEFFICIENT   =      .99            .48        .560

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
006:0006----------------------------------------------------------------------
**************************************************************************
*
* POST 3 - STREETS B, F AND H
* MAJOR STAYS ON STREET B, MINOR GOES TO POND ALONG STREET H
*
**************************************************************************
--------------------
| DESIGN STANDHYD  |   Area     (ha)=    5.20
| 04:POST3  DT= 1.00 |   Total Imp(%)=   54.00   Dir. Conn.(%)=   16.00
--------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=     2.81           2.39
     Dep. Storage     (mm)=      .80           1.50
     Average Slope     (%)=     1.50           1.50
     Length            (m)=   186.19          40.00
     Mannings n           =     .013           .250

     Max.eff.Inten.(mm/hr)=   205.92         188.89
               over (min)        2.00           8.00
     Storage Coeff.  (min)=     2.46 (ii)      8.43 (ii)
     Unit Hyd. Tpeak (min)=     2.00           8.00
     Unit Hyd. peak  (cms)=      .49           .14
                                                      *TOTALS*
     PEAK FLOW       (cms)=      .47           .78       1.073 (iii)
     TIME TO PEAK    (hrs)=     1.50           1.58       1.517
     RUNOFF VOLUME    (mm)=    83.10          41.00      47.740
     TOTAL RAINFALL   (mm)=    83.90          83.90      83.902
     RUNOFF COEFFICIENT   =      .99            .49        .569

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
006:0007----------------------------------------------------------------------
--------------------
| COMPUTE DUALHYD  |   Average inlet capacities   (CINLET) =    .400  (cms)
| TotalHyd 04:POST3 |   Number of inlets in system (NINLET) =      1
--------------------   Total minor system capacity           =    .400  (cms)
                       Total major system storage (TMJSTO) =      0.(cu.m.)

                ID: NHYD        AREA     QPEAK     TPEAK      R.V.      DWF
                                 (ha)     (cms)     (hrs)      (mm)     (cms)
     TOTAL HYD.   04:POST3       5.20     1.073     1.517    47.740     .000
     ==========================================================================
     MAJOR SYST   06:3MAJ        1.28      .673     1.517    47.740     .000
     MINOR SYST   05:3MIN        3.92      .400     1.383    47.740     .000

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

----------------------------------------------------------------------------
006:0008----------------------------------------------------------------------
**************************************************************************
*
* POST 1 - STREETS A, H, I, J AND E
*
**************************************************************************
--------------------
| DESIGN STANDHYD  |   Area     (ha)=   10.24
| 08:INLET2 DT= 1.00 |   Total Imp(%)=   40.00   Dir. Conn.(%)=   12.00
--------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=     4.10           6.14
     Dep. Storage     (mm)=      .80           1.50
     Average Slope     (%)=     1.50           1.50
     Length            (m)=   261.28          40.00
     Mannings n           =     .013           .250

     Max.eff.Inten.(mm/hr)=   205.92         122.87
               over (min)        3.00          10.00
     Storage Coeff.  (min)=     3.02 (ii)     10.10 (ii)
     Unit Hyd. Tpeak (min)=     3.00          10.00
```

```
     Unit Hyd. peak  (cms)=        .37          .11
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .67         1.27        1.568 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.62        1.533
     RUNOFF VOLUME    (mm)=      83.10        36.34       41.951
     TOTAL RAINFALL   (mm)=      83.90        83.90       83.902
     RUNOFF COEFFICIENT   =        .99          .43         .500

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0     Ia = Dep. Storage   (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
006:0009----------------------------------------------------------------------
********************************************************************************
*
* INLET ONE - EXT AREAS, POST 2 AND MINOR POST 3
*
********************************************************************************
---------------------
| ADD HYD (INLET1) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 01:DONLY    18.70    2.583     1.62   39.93     .000
                 +ID2 02:CEM       9.74     .508     2.08   28.52     .000
                 +ID3 03:POST 2    7.49    1.458     1.53   46.98     .000
                 +ID4 05:3MIN      3.92     .400     1.38   47.74     .000
                 +ID5 08:INLET2   10.24    1.568     1.53   41.95     .000
                  ================================================
                  SUM 07:INLET1   50.09    6.028     1.60   39.79     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0010----------------------------------------------------------------------
********************************************************************************
*
* INLET TWO (FUTURE) - POST 4 - STREETS P, Q AND R
*
********************************************************************************
---------------------
| DESIGN STANDHYD    |   Area     (ha)=    5.72
| 09:INLET3 DT= 1.00 |   Total Imp(%)=   45.00   Dir. Conn.(%)=   15.00
---------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      2.57         3.15
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    195.28        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    205.92       139.35
               over (min)        3.00         9.00
     Storage Coeff.  (min)=      2.53 (ii)    9.27 (ii)
     Unit Hyd. Tpeak (min)=      3.00         9.00
     Unit Hyd. peak  (cms)=       .42          .12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .48          .74        1.024 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.60        1.533
     RUNOFF VOLUME    (mm)=     83.10        37.45       44.295
     TOTAL RAINFALL   (mm)=     83.90        83.90       83.902
     RUNOFF COEFFICIENT   =       .99          .45         .528

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0     Ia = Dep. Storage   (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
006:0011----------------------------------------------------------------------
********************************************************************************
*
* POST 5 - SWM AREA
*
********************************************************************************
---------------------
| DESIGN STANDHYD    |   Area     (ha)=    4.23
| 01:SWM     DT= 1.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
---------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      2.12         2.12
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    167.93        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    205.92        56.77
               over (min)        2.00        12.00
     Storage Coeff.  (min)=      2.31 (ii)   11.96 (ii)
     Unit Hyd. Tpeak (min)=      2.00        12.00
     Unit Hyd. peak  (cms)=       .51          .09
                                                        *TOTALS*
     PEAK FLOW       (cms)=      1.19          .21        1.292 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.67        1.500
     RUNOFF VOLUME    (mm)=     83.10        28.52       55.811
     TOTAL RAINFALL   (mm)=     83.90        83.90       83.902
     RUNOFF COEFFICIENT   =       .99          .34         .665

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0     Ia = Dep. Storage   (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
006:0012----------------------------------------------------------------------
********************************************************************************
*
* TOTAL INFLOW TO POND INLET1, INLET2, INLET3 AND SWM AREA
*
********************************************************************************
---------------------
| ADD HYD (PNDIN ) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 09:INLET3    5.72    1.024     1.53   44.29     .000
                 +ID2 07:INLET1   50.09    6.028     1.60   39.79     .000
                 +ID3 01:SWM       4.23    1.292     1.50   55.81     .000
                  ================================================
                  SUM 02:PNDIN    60.04    8.021     1.52   41.35     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0013----------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(PNDIN )    |
| OUT<03:(CNTRL )    |    =========  OUTFLOW STORAGE TABLE  =========
---------------------    OUTFLOW     STORAGE   |  OUTFLOW     STORAGE
                           (cms)      (ha.m.)   |    (cms)     (ha.m.)
                           .000   .0000E+00     |     .274   .7485E+00
                           .008   .1800E-02     |     .464   .8718E+00
                           .017   .1120E-01     |     .688   .9986E+00
                           .023   .3440E-01     |     .942   .1129E+01
                           .028   .7580E-01     |    1.223   .1263E+01
                           .032   .1445E+00     |    1.528   .1401E+01
                           .036   .2334E+00     |    1.855   .1542E+01
                           .039   .3273E+00     |    2.204   .1687E+01
                           .042   .4254E+00     |    2.572   .1835E+01
                           .045   .5274E+00     |    .000    .0000E+00
                           .127   .6336E+00     |    .000    .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK      R.V.
     ---------------            (ha)     (cms)     (hrs)      (mm)
     INFLOW >02: (PNDIN )      60.04     8.021     1.517     41.346
     OUTFLOW<03: (CNTRL )      60.04     1.697     2.467     41.346
    OVERFLOW<04: (PNDOVR)       .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=    21.151
                  TIME SHIFT OF PEAK FLOW          (min)=    57.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=.1473E+01

--------------------------------------------------------------------------------
006:0014----------------------------------------------------------------------
********************************************************************************
*
* POST 6 - STREET B
*
********************************************************************************
---------------------
| DESIGN STANDHYD    |   Area     (ha)=    6.00
| 05:POST6  DT= 1.00 |   Total Imp(%)=   26.00   Dir. Conn.(%)=    9.00
---------------------
                          IMPERVIOUS     PERVIOUS (i)
     Surface Area     (ha)=      1.56         4.44
     Dep. Storage     (mm)=       .80         1.50
     Average Slope     (%)=      1.50         1.50
     Length            (m)=    200.00        40.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    205.92        85.78
               over (min)        3.00        11.00
     Storage Coeff.  (min)=      2.57 (ii)   10.75 (ii)
     Unit Hyd. Tpeak (min)=      3.00        11.00
     Unit Hyd. peak  (cms)=       .41          .10
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .30          .66         .754 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.65        1.633
     RUNOFF VOLUME    (mm)=     83.10        32.67       37.205
     TOTAL RAINFALL   (mm)=     83.90        83.90       83.902
     RUNOFF COEFFICIENT   =       .99          .39         .443

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  62.0     Ia = Dep. Storage   (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
006:0015----------------------------------------------------------------------
********************************************************************************
*
* POST DEVELOPMENT FROM SITE
*
********************************************************************************
---------------------
| ADD HYD (PSTDEV) | ID: NHYD     AREA     QPEAK    TPEAK    R.V.     DWF
---------------------              (ha)     (cms)    (hrs)    (mm)    (cms)
                  ID1 03:CNTRL    60.04    1.697     2.47   41.35     .000
                 +ID2 04:PNDOVR     .00     .000      .00     .00     .000 **DRY**
                 +ID3 05:POST6     6.00     .754     1.63   37.21     .000
                 +ID4 06:3MAJ      1.28     .673     1.52   47.74     .000
                  ================================================
                  SUM 07:PSTDEV   67.32    1.851     2.33   41.10     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0016----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
    FINISH
--------------------------------------------------------------------------------
********************************************************************************
    WARNINGS / ERRORS / NOTES
    -------------------------
  Simulation ended on 2010-05-10     at 09:19:53
================================================================================
```

Appendix D: Miscellaneous Pond Design Calculations

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Subject: Decou Sub

Date: Dec-09 By: TGS

Project #: 09056 Page

Determine Permanent Pool Volume

Contour (m)	**Area (m2)**	Incr Vol (m3)	
213.25	637	0	
213.7	895	344.7	344.7
213.9	1299	219.4	564.1
214.5	1952	975.3	1539.4

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Consulting Engineers, Architects & Planners

Subject: DECOU
Date: Dec 23/09 By: TGS
Project #: 09-056 Page

1) Forebay Design: Settling

Equation 4.5 Dist= sqrt(r*Qp/Vs)

Dist = forebay length
r = length to width of forebay
Qp = peak flow rate from pond during quality storm
Vs= target settling velocity, recommended at 0.0003 m/s

Given	r=	2	Target 2:1
	Qp =	0.207	SYMHYMO RESULTS 2-year event
	Vs=	0.0003	
	Dist=	37 m	

2) Forebary Design: Dispersion Length

Equation 4.6 Dist = 8*Q/(d*Vf)

Dist = forebay length
Q= inlet flow rate for quality storm
d= depth of perm pool
Vf = desired velocity in forebay (<0.5m/s)

Inlet 1 (Ext, Cem, Post 1 Post2 and Minor Post 2)	Given	Q=	1.27	SYMHYMO results to pond for 2-year event
		d=	1.25	
		Vf=	0.5	
		dist=	16 m	
Inlet 3 (Post 4) (Future)	Given	Q=	0.211	SYMHYMO results to pond for 2-year event
		d=	1.25	
		Vf=	0.5	
		dist=	3	

3) Forebay Design: Bottom Width

Equation 4.7 Width=Dist/8

Given Dist= 37

width= 5

4) Forebay Design: Cleanout Frequency

Table 6.3 of SWM Planning and Design Manual

35% Impervious	0.6 m3/ha, annual sediment loading
55% Impervious	1.9 m3/ha, annual sediment loading

Reference Calculation of Impervious areas spreadsheet for this development==> 47% impervious for contributing area to pond
Therefore extrapolate

41% 0.99 m3/ha

Total site area, excluding external contributing area 28.7 ha

Sediment Accummulation	28.413	m3/year
Target Removal eff. For normal protection	70%	
Anticipate Accumulation	19.8891	m3/year
Clean Frequency	10	year
Total Anticipated Accumulation	198.891	m3

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Consulting Engineers, Architects & Planners

Subject: Decou Road Sub
Date: Dec-09 By: TGS
Project #: 09056 Page

SWM Facility Outlet Sizing

Reference SWMHYMO Results, discharge from the pond during the 100 year storm
1.697 cms
Reference SWMHYO Results, peak flow from POST6 during 5-year event (corresponds to typical storm sewer design storm)
0.221 cms

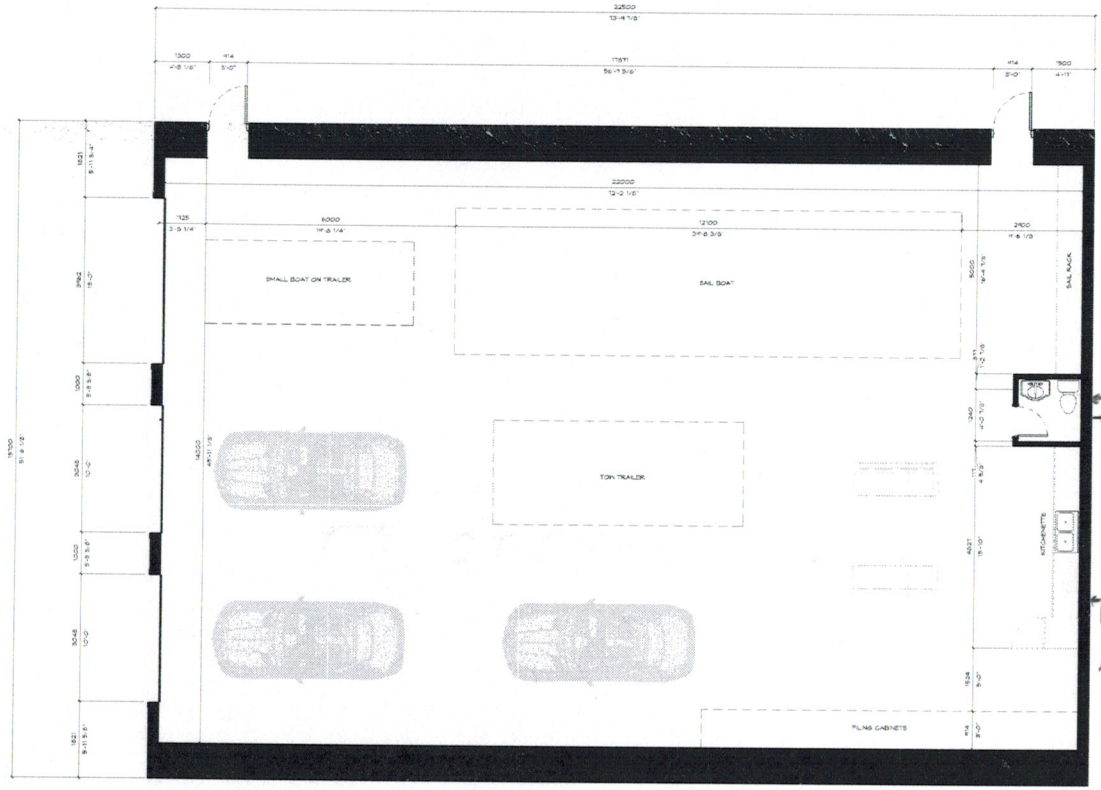
Therefore design outlet storm for 1.918 cms

Solve for Velocity and Flow

Mannings n	0.013	
Diameter	0.825	m
Slope	2.00%	
Hydraulic R	0.20625	m
C/S Area	0.53456162	m2
V	3.80	m/s
Q	2.03001	cms
	2030.01	L/s

APPENDIX B

Sanitary Septic System Design



1 P201 LEVEL 1 PLAN PRESENTATION
SCALE 1:50

DATE LAST PLOTTED 12/14/2021 11:01:31 AM

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Consulting Engineers, Architects & Planners
G. DOUGLAS VALLEE LIMITED
2 TALBOT STREET NORTH
SIMCOE ONTARIO N3Y 4W3
(519) 426-6270

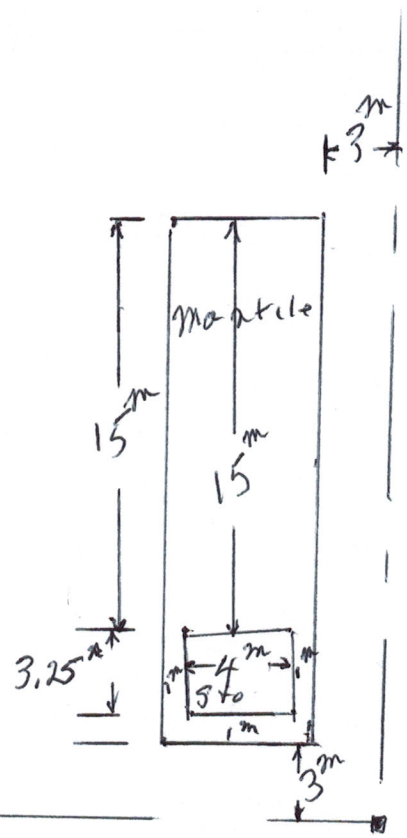
Project Title
FREDERICK'S WAREHOUSE
SIMCOE, ONTARIO, CANADA,

PROJECT No.
21-116

Drawing Title
PRESENTATION PLANS

Drawing No.
P201

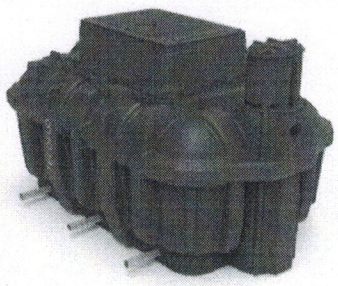
Frederick's Warehouses



ECOFLO

Polyethylene

Watertight tank bottom

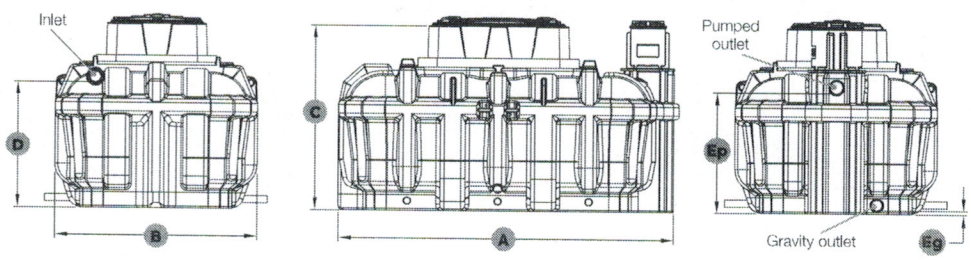


	STB-570P	STB-570PR	STB-730P	STB-730PR
Hydraulic capacity with demand dose	1,755 L/d		2,250 L/d	
Hydraulic capacity with time dose	2,200 L/d		2,810 L/d	
Length (A)	3,380 mm (11' 1)		4,130 mm (13' 7")	
Width (B)	2,000 mm (6' 7")		2,050 mm (6' 9")	
Height (C)	1,850 mm (6' 1")			
Inlet height from bottom (D)	1,260 mm (4' 2")			
Gravity water outlet height (Eg)	76 mm (3")			
Pumped water outlet height (Ep)	1,240 mm (4' 1")			
Riser height allowed	No risers allowed			
Weight Includes internal components and filtering medium	1,200 kg (2,640 lb)		1,415 kg (3,120 lb)	
Dosing volume	—	870 L	—	1,120 L
Total emergency storage capacity	—	4,370 L	—	6,030 L

Water inlet
Ø 100 mm (4") nominal

Gravity water outlet
Ø 100 mm (4") nominal

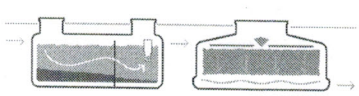
Pumped water outlet
Ø 25 mm (1") nominal



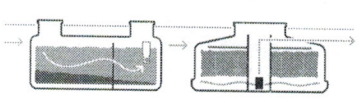
TYPICAL INSTALLATIONS

Demand-dose influent

Gravity discharge to Type A or B dispersal bed, or shallow buried trench



Pumped discharge to Type A or B dispersal bed, or shallow buried trench



Time-dose influent

Gravity discharge to Type A or B dispersal bed, or shallow buried trench

Pumped discharge to Type A or B dispersal bed, or shallow buried trench

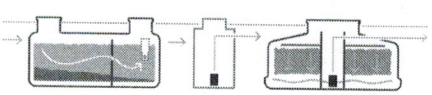


Table 8.2.1.6.A.
Minimum Clearances for Treatment Units

Forming Part of Sentence 8.2.1.6.(1)

Item	Column 1	Column 2
	Object	**Minimum Clearance, m**
1.	Structure	1.5
2.	Well	15
3.	Lake	15
4.	Pond	15
5.	Reservoir	15
6.	River	15
7.	Spring	15
8.	Stream	15
9.	Property Line	3

(2) Except as provided in Sentences 8.2.1.4.(1) and (2), a *distribution pipe* shall not be located closer than the minimum horizontal distances set out in Table 8.2.1.6.B. and these distances shall be increased when required by Sentence 8.7.4.2.(11).

Sentence 8.2.1.6.(2)
Objectives: OE, OH2.1, OH5
Functional Statements: F110, F12
Intent:
Same as Sentence 8.2.1.4.(1).

Table 8.2.1.6.B.
Minimum Clearances for Distribution Piping

Forming Part of Sentence 8.2.1.6.(2)

Item	Column 1	Column 2
	Object	**Minimum Clearance, m**
1.	Structure	5
2.	Well with a watertight casing to a depth of at least 6 m	15
3.	Any other well	30
4.	Lake	15
5.	Pond	15
6.	Reservoir	15
7.	River	15
8.	Spring not used as a source of *potable* water	15
9.	Stream	15
10.	Property Line	3

(3) Except as provided in Sentences 8.2.1.4.(1) and (2), a *holding tank* shall not be located closer than the minimum horizontal distances set out in Table 8.2.1.6.C.

Sentence 8.2.1.6.(3)
Objectives: OE, OH2.1, OH5
Functional Statement: F110
Intent:
Same as Sentence 8.2.1.4.(1).

APPENDIX C

Domestic Water Demand Calculations
FUS Calculations
Norfolk ISMP Map

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Consulting Engineers, Architects & Planners

Subject: Fredericks Warehouse
Date: 1/11/2022 By: NLB
Project #: 21-116 Page

Average Daily Demand

Site Area	0.4	ha
Zoning of Land	Industrial	
Equiv. Population Density	120	ppl/ha
Equiv. Population	48	
Av. Daily Demand Per Capita	0.45	m^3/capita/day
Average Daily Demand	21.60	m^3/day
	0.25	l/s

Site Area	0.4	ha
Zoning of Land	Industrial	
Equiv. Population Density	120	ppl/ha
Equiv. Population	48	
Av. Daily Demand Per Capita	0.45	m^3/capita/day
Maximum Daily Demand Peaking Factor	2.25	
Maximum Daily Demand	48.60	m^3/day
	0.56	l/s

Maximum Hourly Demand

Site Area	0.4	ha
Zoning of Land	Industrial	
Equiv. Population Density	120	ppl/ha
Equiv. Population	48	
Av. Daily Demand Per Capita	0.45	m^3/capita/day
Maximum Hourly Demand Peaking Factor	2	
Maximum Hourly Demand	1.80	m^3/hour
	0.50	l/s

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Consulting Engineers, Architects & Planners

Subject:	Fredericks Warehouse		
Date:	Jan-22	By:	NLB
Project #:	21-116	Page:	1

Warehouse #1

1) Fire Flow Requirement

$F_1=220C(A^{1/2})$ (L/min)

C= 1.5 Construction coefficient for wood frame construction

A= 353.0 Floor Area m^2 = main floor area

= 353.0 Fire Area m^2 = main floor area (no second floor)

F_1= 6200 L/min

F_1= 6000 L/min (Round to the nearest 1,000 l/min)

2) Occupancy

Occupancy Type: Combustible

Reduction: 0%

Surcharge: 0%

$F_2=F_1+(F_1*Reduction/Surcharge)$ (L/min)

F_2= 6000 L/min

3) Sprinkler System

Sprikler System: Not Applicable (assumed no sprinkler system in service)

Reduction: 0%

$F_3=F_2*Reduction$ (L/min)

F_3= 0 L/min

4) Seperation

Location	Direction	Distance (m)	Surcharge
Front	West	9999.0	0%
Side	North	9999.0	0%
Side	South	11.6	15%
Rear	East	9999.0	0%
		Total:	15%

Separation Surcharges	
0 to 3m	25%
3.1m to 10m	20%
10.1m to 20m	15%
20.1 to 30m	10%
30.1 to 45m	5%

F4=(TOTAL)*F2 (L/min)

F_4= 900 L/min

Total Fire Flow

$F=F_2-F_3+F_4$ = 6900 L/min

= 7000 L/min (Round to the nearest 1,000 l/min)

= **116.7 L/s**

Notes: *1) All calculations and factors from Part 2 "Water Supply for Public Fire Protection" by the Fire Underwriters Survey, 1999*

2) 9999 denotes either the nearest building > 45m away or a fire wall is provided

Warehouse #2

1) Fire Flow Requirement

$F_1=220C(A^{1/2})$ (L/min)

C= 1.5 Construction coefficient for wood frame construction

A= 353.0 Floor Area m^2 = main floor area

= 353.0 Fire Area m^2 = main floor area (no second floor)

F_1= 6200 L/min

F_1= 6000 L/min (Round to the nearest 1,000 l/min)

2) Occupancy

Occupancy Type: Combustible

Reduction: 0%

Surcharge: 0%

$F_2=F_1+(F_1*Reduction/Surcharge)$ (L/min)

F_2= 6000 L/min

3) Sprinkler System

Sprikler System: Not Applicable (assumed no sprinkler system in service)

Reduction: 0%

$F_3=F_2*Reduction$ (L/min)

F_3= 0 L/min

4) Seperation

Location	Direction	Distance (m)	Surcharge
Front	West	9999.0	0%
Side	North	11.6	15%
Side	South	40.6	5%
Rear	East	9999.0	0%
		Total:	20%

Separation Surcharges	
0 to 3m	25%
3.1m to 10m	20%
10.1m to 20m	15%
20.1 to 30m	10%
30.1 to 45m	5%

F4=(TOTAL)*F2 (L/min)

F_4= 1200 L/min

Total Fire Flow

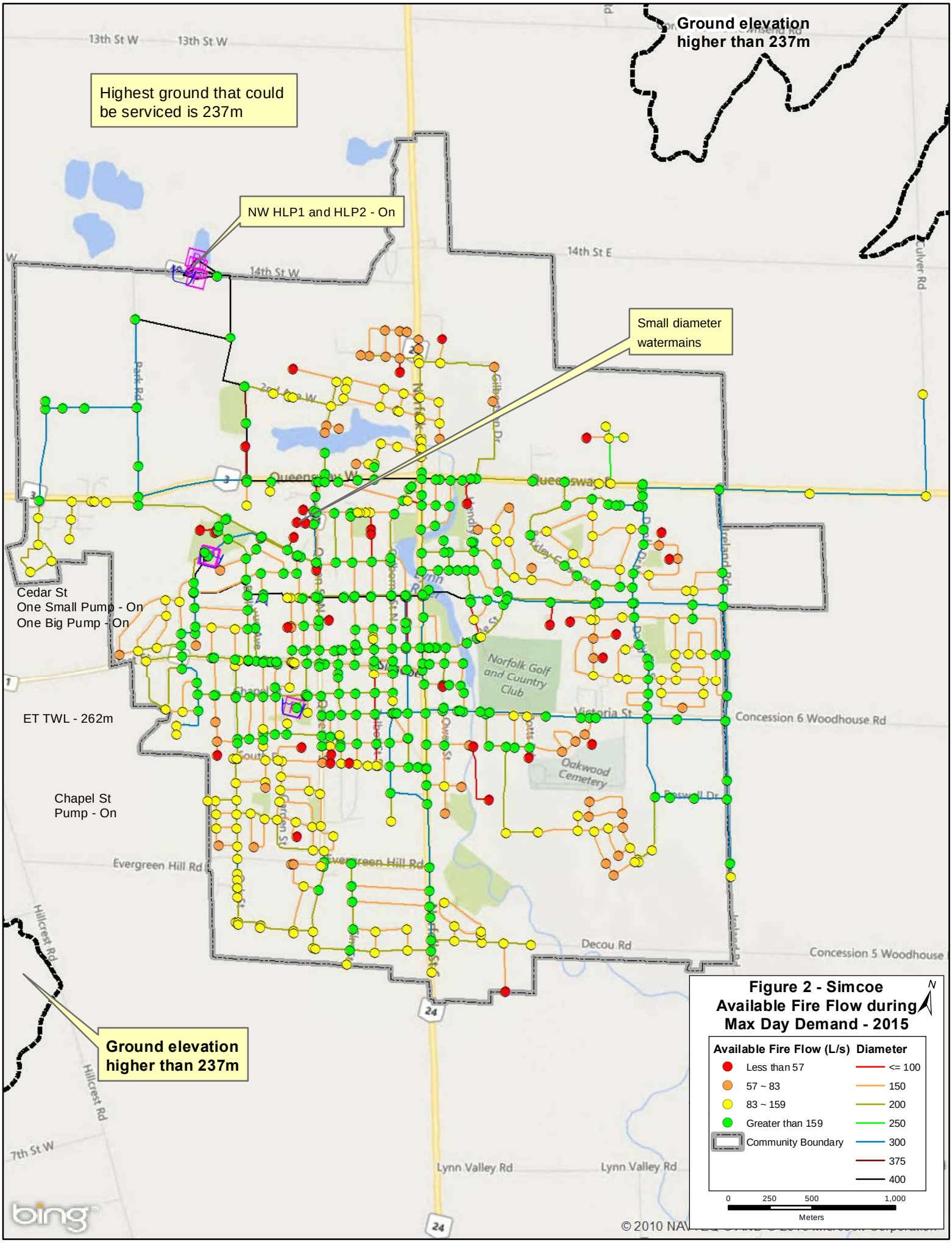
$F=F_2-F_3+F_4$ = 7200 L/min

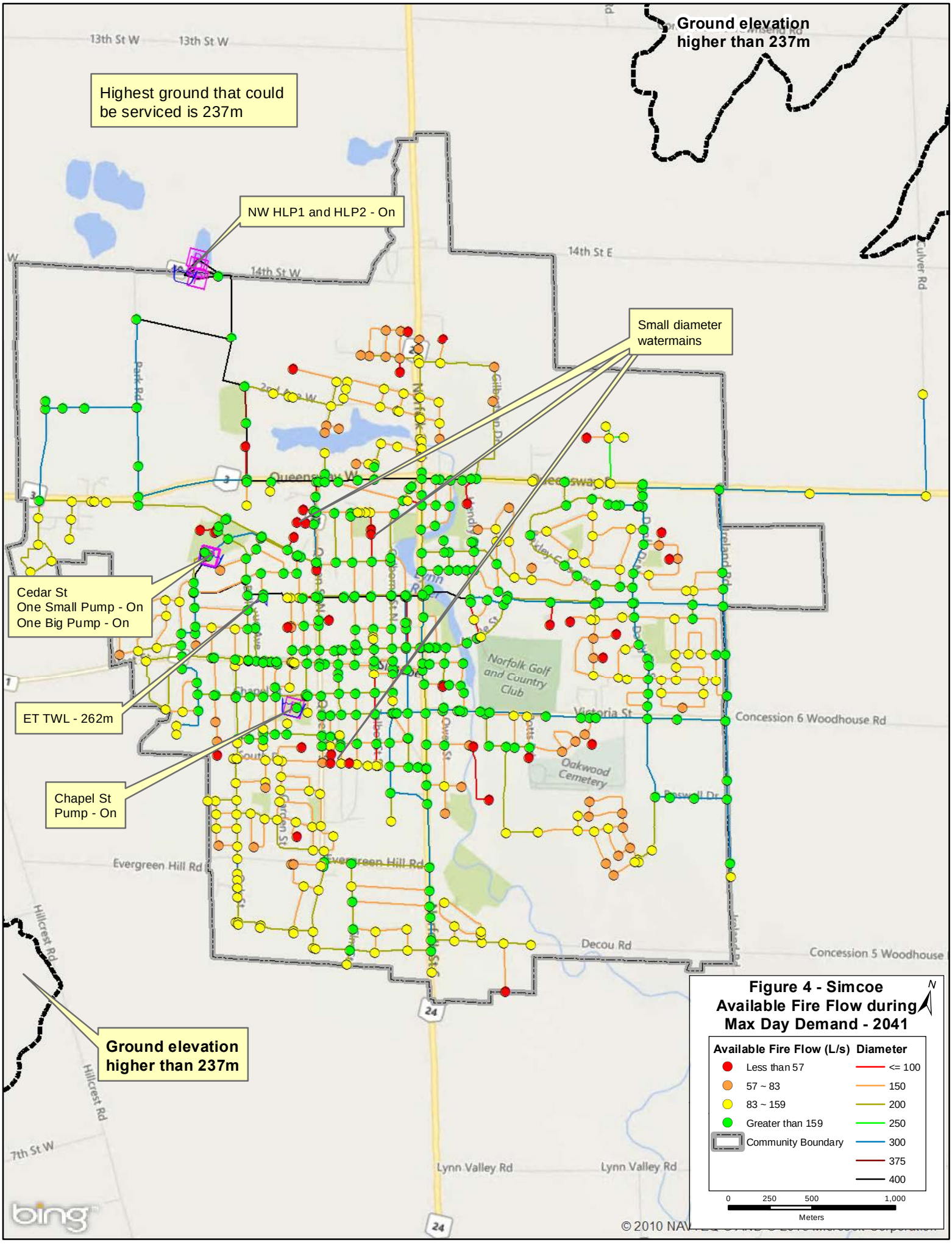
= 7000 L/min (Round to the nearest 1,000 l/min)

= **116.7 L/s**

Notes: *1) All calculations and factors from Part 2 "Water Supply for Public Fire Protection" by the Fire Underwriters Survey, 1999*

2) 9999 denotes either the nearest building > 45m away or a fire wall is provided


Ground elevation higher than 237m
Highest ground that could be serviced is 237m
NW HLP1 and HLP2 - On
Small diameter watermains
Cedar St
One Small Pump - On
One Big Pump - On
ET TWL - 262m
Chapel St
Pump - On
Ground elevation higher than 237m
13th St W
14th St W
14th St E
Queensway W
Norfolk Golf and Country Club
Oakwood Cemetery
Victoria St
Concession 6 Woodhouse Rd
Concession 5 Woodhouse
Evergreen Hill Rd
Decou Rd
Lynn Valley Rd
Hillcrest Rd
7th St W
Park Rd
Ireland Rd
Culver Rd
Figure 2 - Simcoe Available Fire Flow during Max Day Demand - 2015
Available Fire Flow (L/s)
Less than 57
57 ~ 83
83 ~ 159
Greater than 159
Community Boundary
Diameter
<= 100
150
200
250
300
375
400
0 250 500 1,000
Meters
bing


Ground elevation higher than 237m
Highest ground that could be serviced is 237m
NW HLP1 and HLP2 - On
Small diameter watermains
Cedar St
One Small Pump - On
One Big Pump - On
ET TWL - 262m
Chapel St
Pump - On
Ground elevation higher than 237m
13th St W
14th St W
14th St E
Queensway W
Queensway E
Norfolk Golf and Country Club
Oakwood Cemetery
Victoria St
Concession 6 Woodhouse Rd
Concession 5 Woodhouse
Evergreen Hill Rd
Decou Rd
Lynn Valley Rd
Hillcrest Rd
7th St W
Park Rd
Ireland Rd
Culver Rd
Figure 4 - Simcoe Available Fire Flow during Max Day Demand - 2041
N
Available Fire Flow (L/s)
Less than 57
57 ~ 83
83 ~ 159
Greater than 159
Community Boundary
Diameter
<= 100
150
200
250
300
375
400
0 250 500 1,000
Meters
bing
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