Planning Department Development Application Form

Complete Application

A complete development application consists of the following:

1. A completed, signed, and notarized application form
2. Supporting information adequate to illustrate your proposal as indicated in **Section H** of this application form
3. Written authorization from the registered owner of the subject lands where the applicant is not the owner as per Section N
4. Cash, debit, credit or cheque payable to Norfolk County in the amount set out in the user fees By-Law that will be accepted and deposited once the application has been deemed complete.

Pre-Submission Consultation:

Norfolk County requires a Pre-Consultation Meeting for all applications; however, minor applications may be exempted depending on the nature of the proposal. The purpose of a Pre-Consultation Meeting is to provide the applicant with an opportunity to present the proposed application, discuss potential issues, and for the Norfolk County and Agency staff to identify the application requirements. Application requirements, as detailed in the Pre-Consultation Meeting Comments, are valid for one year after the meeting date.

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Payment is required once your application is deemed complete. Pre-payments will not be accepted.

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Additional studies required for the complete application shall be at the applicant's sole expense. Sometimes, peer reviews may be necessary to review particular studies at the applicant's expense. In these caseds, Norfolk County staff will select the company to complete the peer review.

Norfolk County will refund the original fee if applicants withdraw their applications before circulation. If Norfolk County must recirculate your drawings, there will be an additional fee. If Norfolk County must do more than three reviews of engineering drawings due to revisions by the owner or failure to revise engineering drawings as requested, Norfolk County will charge an additional fee. Full refunds are only available before Norfolk County has circulated the application.

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For public notification, Norfolk County will provide you with a sign to indicate the intent and purpose of your development application. It is your responsibility to:

1. Post one sign per frontage in a conspicuous location on the subject lands.
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Contact Us

For additional information or assistance completing this application, please contact a Planner at 519-426-5870 or 519-875-4485 extension 1842 or planning@norfolkcounty.ca. Please submit the completed application and fees to the attention of the Planning Department at 185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6.

For Office Use Only:

File Number	_____	Public Notice Sign	_____
Related File Number	_____	Application Fee	_____
Pre-consultation Meeting	_____	Conservation Authority Fee	_____
Application Submitted	_____	Well & Septic Info Provided	_____
Complete Application	_____	Planner	_____

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

A ZBA application was previously approved in September 2022 to permit the development of 85 two-storey townhouse dwellings with Special Provisions (#ZNPL2022080). Since then, the plan has been revised to intensify the site and introduce ADUs as part of the application. A total of 172 units are proposed with 282 parking spaces.

Property Assessment Roll Number: _____

A. Applicant Information

Name of Owner _____

Address _____

Town and Postal Code _____

Phone Number _____

Cell Number _____

Email _____

Name of Applicant _____

Address _____

Town and Postal Code _____

Phone Number _____

Cell Number _____

Email _____

Name of Agent _____

Address _____

Town and Postal Code _____

Phone Number _____

Cell Number _____

Email _____

Unless otherwise directed, Norfolk County will forward all correspondence and notices regarding this application 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:

_____

_____

B. Location, Legal Description and Property Information

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

   _____

   _____

   Municipal Civic Address: _____

   Present Official Plan Designation(s): _____

   Present Zoning: _____

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:

   _____

   _____

4. Please describe **all existing** buildings or structures on the subject lands and whether they will 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 the 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:

   _____

   _____

   _____

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.

   _____

   _____

   _____

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:

The proposed development consists of fifteen (15) two-storey townhouse blocks with a total of 86 primary residential units and 86 basement-level ADUs. Each townhouse unit is approximately 6.0m by 12.0m, with a building height of 11.0m. Lot coverage ranges between 40% and 44%. Front yard setbacks are 6.0m, rear yard setbacks are 4.4m, and interior side yard setbacks are 1.2m. Each lot includes a driveway providing two spaces for the main unit and one for the ADU. A full site plan with dimensions is attached.

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:

   _____

9. Existing use of abutting properties:

   _____

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:

   _____

   _____

   _____

   _____

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

   _____

   _____

   _____

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	_____	_____
Lot depth	_____	_____
Lot width	_____	_____
Lot area	_____	_____
Lot coverage	_____	_____
Front yard	_____	_____
Rear yard	_____	_____
Left Interior side yard	_____	_____
Right Interior side yard	_____	_____
Exterior side yard (corner lot)	_____	_____
Landscaped open space	_____	_____
Entrance access width	_____	_____
Exit access width	_____	_____
Size of fencing or screening	_____	_____
Type of fencing	_____	_____

10. Building Size

Number of storeys	_____	_____
Building height	_____	_____
Total ground floor area	_____	_____
Total gross floor area	_____	_____
Total useable floor area	_____	_____

Main Unit: 144.0 sq.m
ADU: 70 sq.m
= 48%

11. Off Street Parking and Loading Facilities

Number of off street parking spaces	_____	_____
Number of visitor parking spaces	_____	_____
Number of accessible parking spaces	_____	_____
Number of off street loading facilities	_____	_____

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: _____

Number of buildings proposed: _____

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):

_____

_____

_____

Seating Capacity (for assembly halls or similar): _____

Total number of fixed seats: _____

Describe the type of business(es) proposed: _____

Total number of staff proposed initially: _____

Total number of staff proposed in five years: _____

Maximum number of staff on the largest shift: _____

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:

   _____

   _____

   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 _____

   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 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 site plan approval, 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, to disclose the registration of all transfer(s) of land and/or 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.

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 _____ am/are the registered owner(s) of the lands that is the subject of this application.

I/We authorize _____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.

Owner	Date
Owner	Date

N. Declaration

I,_____of _____

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*.

Declared before me at:

_____ _____

Owner/Applicant Signature

In _____

This _____day of _____

A.D., 20____

_____

A Commissioner, etc.

MELANIE ANNE MUIR,
a Commissioner, etc., Province of Ontario,
for Dillon Consulting Limited.
Expires May 3, 2025.

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For Office Use Only:

File Number	_____	Public Notice Sign	_____
Related File Number	_____	Application Fee	_____
Pre-consultation Meeting	_____	Conservation Authority Fee	_____
Application Submitted	_____	Well & Septic Info Provided	_____
Complete Application	_____	Planner	_____

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 — REDLINE REVISION OF PREVIOUSLY APPROVED DPS
- ☐ Condominium Exemption
- ☐ Site Plan Application
- ☐ Extension of a Temporary Use By-law
- ☐ Part Lot Control
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Please summarize the desired result of this application (for example, a special zoning provision on the subject lands to include additional use(s), changing the zone or official plan designation of the subject lands, creating a certain number of lots, or similar)

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Property Assessment Roll Number: _____

A. Applicant Information

Name of Owner _____

Address _____

Town and Postal Code _____

Phone Number _____

Cell Number _____

Email _____

Name of Applicant _____

Address _____

Town and Postal Code _____

Phone Number _____

Cell Number _____

Email _____

Name of Agent _____

Address _____

Town and Postal Code _____

Phone Number _____

Cell Number _____

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Unless otherwise directed, Norfolk County will forward all correspondence and notices regarding this application 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:

_____

_____

B. Location, Legal Description and Property Information

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

   _____

   _____

   Municipal Civic Address: _____

   Present Official Plan Designation(s): _____

   Present Zoning: _____

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:

   _____

   _____

4. Please describe **all existing** buildings or structures on the subject lands and whether they will 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 the 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:

   _____

   _____

   _____

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.

   _____

   _____

   _____

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:

The proposed development consists of fifteen (15) two-storey townhouse blocks with a total of 86 primary residential units and 86 basement-level ADUs. Each townhouse unit is approximately 6.0m by 12.0m, with a building height of 11.0m. Lot coverage ranges between 40% and 44%. Front yard setbacks are 6.0m, rear yard setbacks are 4.4m, and interior side yard setbacks are 1.2m. Each lot includes a driveway providing two spaces for the main unit and one for the ADU. A full site plan with dimensions is attached.

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:

   _____

9. Existing use of abutting properties:

   _____

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:

   _____

   _____

   _____

   _____

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

   _____

   _____

   _____

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	_____	_____
Lot depth	_____	_____
Lot width	_____	_____
Lot area	_____	_____
Lot coverage	_____	_____
Front yard	_____	_____
Rear yard	_____	_____
Left Interior side yard	_____	_____
Right Interior side yard	_____	_____
Exterior side yard (corner lot)	_____	_____
Landscaped open space	_____	_____
Entrance access width	_____	_____
Exit access width	_____	_____
Size of fencing or screening	_____	_____
Type of fencing	_____	_____

10. Building Size

Number of storeys	_____	_____
Building height	_____	_____
Total ground floor area	_____	_____
Total gross floor area	_____	_____
Total useable floor area	_____	_____

Main Unit: 144.0 sq.m
ADU: 70 sq.m
= 48%

11. Off Street Parking and Loading Facilities

Number of off street parking spaces	_____	_____
Number of visitor parking spaces	_____	_____
Number of accessible parking spaces	_____	_____
Number of off street loading facilities	_____	_____

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: _____

Number of buildings proposed: _____

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):

_____

_____

_____

Seating Capacity (for assembly halls or similar): _____

Total number of fixed seats: _____

Describe the type of business(es) proposed: _____

Total number of staff proposed initially: _____

Total number of staff proposed in five years: _____

Maximum number of staff on the largest shift: _____

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:

   _____

   _____

   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 _____

   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 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 site plan approval, 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, to disclose the registration of all transfer(s) of land and/or 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.

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 _____ am/are the registered owner(s) of the lands that is the subject of this application.

I/We authorize _____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.

Owner	Date
Owner	Date

N. Declaration

I,_____of _____

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*.

Declared before me at:

_____ _____

Owner/Applicant Signature

In _____

This _____day of _____

A.D., 20____

_____

A Commissioner, etc.

MELANIE ANNE MUIR,
a Commissioner, etc., Province of Ontario,
for Dillon Consulting Limited.
Expires May 3, 2025.

SITE PLAN and BUILDING STATISTICS		
1	ZONING	
		REQUIRED
2	LOT AREA (INTERIOR)	156 m² (MIN.)
3	LOT AREA (CORNER)	264 m² (MIN.)
4	LOT FRONTAGE (INTERIOR)	6.0 m (MIN.)
5	LOT FRONTAGE (CORNER)	8.7 m (MIN.)
6	FRONT YARD SETBACK	6.0 m (MIN.)
7	REAR YARD SETBACK	4.0 m (MIN.)
8	INT. SIDE YARD SETBACK	1.2m (MIN.)
9	EXT. SIDE YARD SETBACK	2.4 m (MIN.)
10	BUILDING HEIGHT	11.0 m (MAX)



NOTE:

- THESE ARE NOT FINAL SITINGS.
- THIS SITE PLAN IS FOR DISCUSSION PURPOSES ONLY.
- ENGINEERING AND ZONING TO BE CONFIRMED

STAMP & HAMMER
1135 STELLAR DRIVE
NEWMARKET ON L3Y 7B8
905-235-3933
info@stampandhammer.com

TIME/DATE STAMP: 2025-04-28 12:53:53 PM

REVISION SCHEDULE

No.	DESCRIPTION	DATE	BY
1	PRELIMINARY SITING, ISSUED FOR ZBLA	2025-04-28	M.S.

BIG SKY | SIMCOE 1B
TOWNHOUSE UNITS + BASEMENT ADU'S

SCALE: As indicated

DATE: APRIL 28, 2025

TITLE: SITE PLAN
PRELIMINARY SITINGS - ISSUED FOR ZBLA

A-004

NOTE: CONTRACTOR WILL CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE JOB SITE BEFORE PROCEEDING WITH ANY WORK.

COUNTERPOINT LAND DEVELOPMENT BY | DILLON CONSULTING

Big Sky Simcoe Limited Partnership

PLANNING BRIEF

Big Sky – Simcoe 1B

18 Decou Road,
Simcoe, ON

Zoning By-Law Amendment

May 2025 – 24-22019

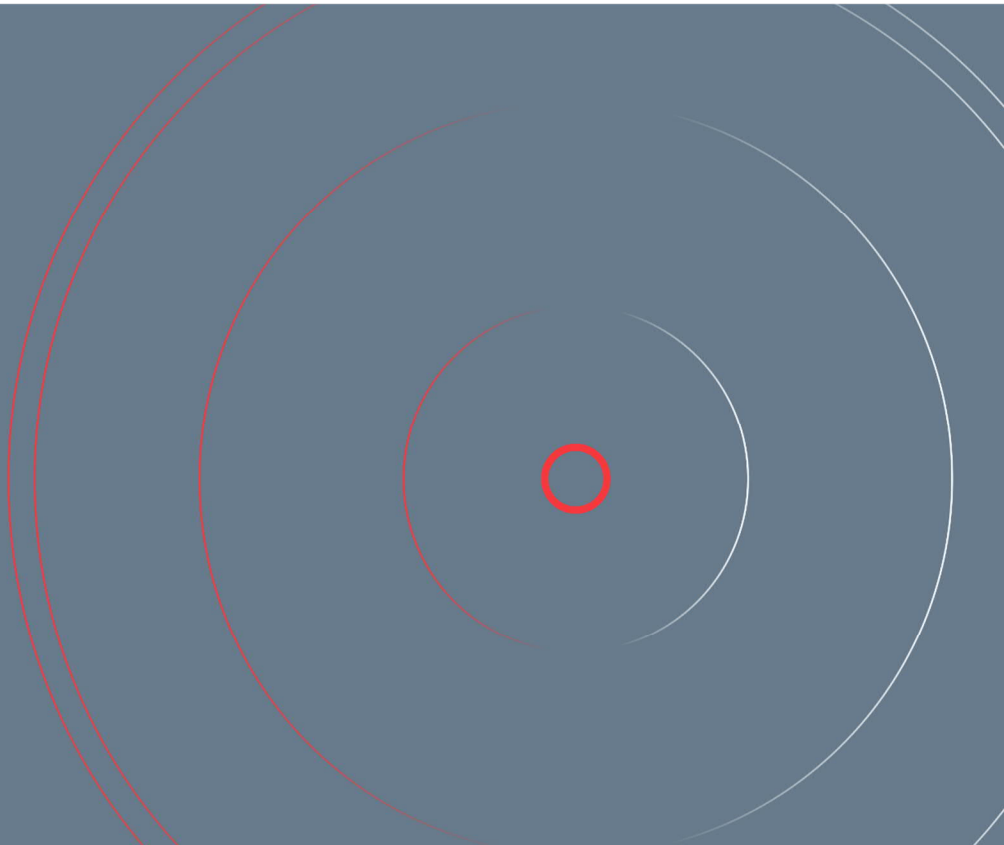


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FIGURES

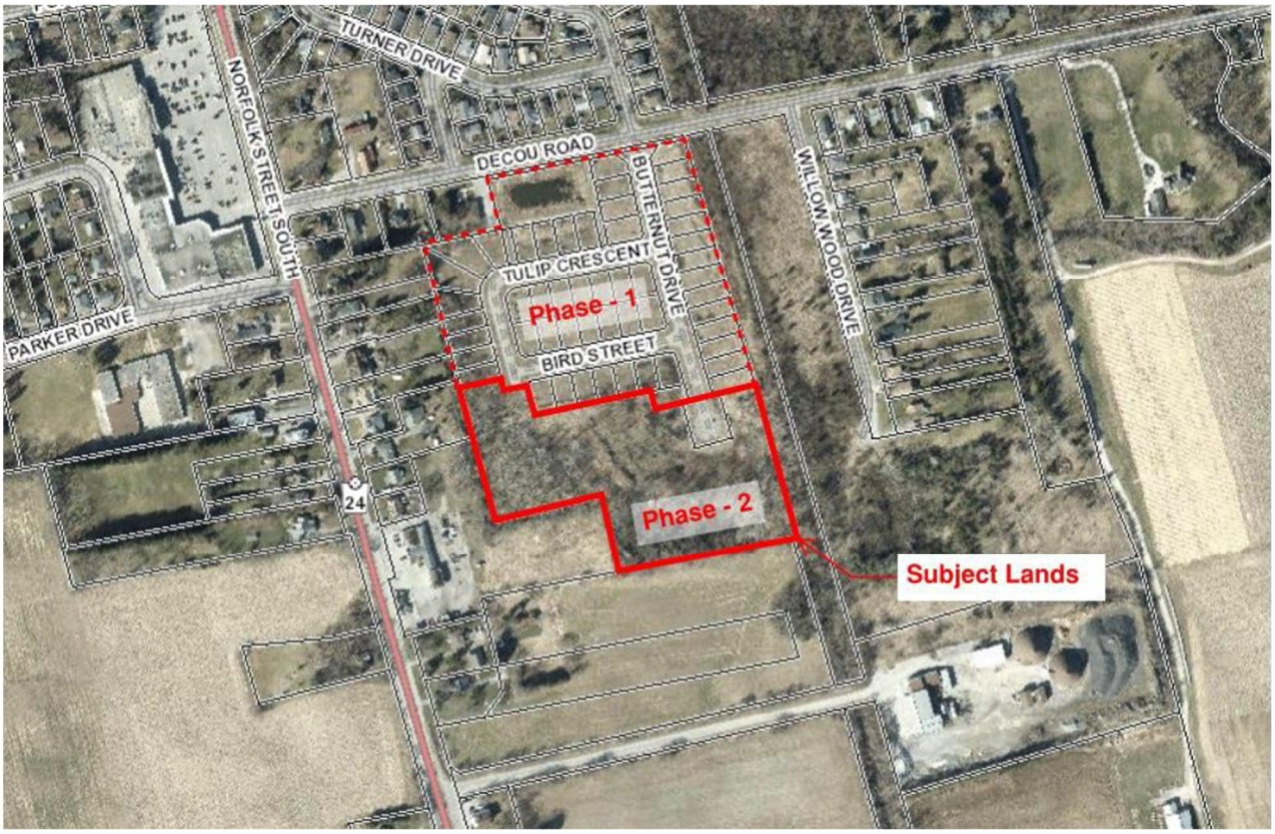
Figure 1 – Phasing Map 1

1.0 OVERVIEW

1.1 PURPOSE

Dillon Consulting Limited (Dillon) has been retained by Big Sky Simcoe Limited Partnership, herein referred to as the "applicant," to assist in obtaining the necessary planning approvals associated with the proposed subdivision development known as Phase 1B of the Big Sky-Simcoe subdivision on Decou Road within the Simcoe urban area, herein referred to as the "subject site," in Norfolk County (refer to Figure 1.0 – Phasing Map). The following report supports the Zoning By-law Amendment application required to facilitate the proposed development.

Figure 1 – Phasing Map



1.2 PROPOSED DEVELOPMENT

The subject lands are located at the south-east end of Simcoe urban boundary. It is characterized by surrounding lands with low density residential developments, agricultural lands, future trail corridor and few commercial uses. The subject site is located at the south side of the former Dream Villas Subdivision now known as Big Sky Simcoe Phase 1A, and is accessed from Decou Road, a designated arterial Road, through the Phase 1A subdivision.

The property is legally described as:

- Part Lot 1, Concession 4 and Block 59 of Registered Plan 37M-98, in the Geographic Township of Woodhouse, Norfolk County

The total site area under application is 2.906 hectares (or 7.18 acres).

The proposed development constitutes Phase 1A of the Big Sky–Simcoe subdivision and involves the construction of 86 two-storey townhouse units arranged within fifteen residential (15) blocks. Each townhouse (primary residential unit) is designed to include a basement-level accessory dwelling unit (ADU), resulting in a total of 172 residential units across the site. The site layout features a combination of interior and end units.

The development accommodates three (3) parking spaces per lot (two for the principal unit and one for the ADU), and adequate on-street visitor parking spaces are proposed across Phases 1A – 1B of the entire subdivision.

The proposed development advances Norfolk County's housing objectives by facilitating gentle residential intensification, broadening the range of available rental housing, and contributing to the County's broader growth management targets, including achieving a 25% residential intensification rate and a 15% townhouse housing mix, as outlined in the Norfolk County Official Plan.

1.3 DEVELOPMENT HISTORY

The subject lands were previously approved in 2022 (Application # ZNPL2022080) for the development of 86 two-storey townhouse units under a Zoning By-law Amendment (CD-22-082), which rezoned the site from R1-A/R1-B to R4 with a Holding (H) and Special Provision 14.1022. The amendment permitted reduced lot frontages and setbacks to accommodate the townhouse configuration.

A new Zoning By-law Amendment application is being proposed to permit the inclusion of basement-level Accessory Dwelling Units (ADUs) within the approved townhouse blocks, supporting gentle intensification and contributing to Norfolk County's housing diversity and affordability objectives. Several site-specific zoning reliefs are requested to accommodate the proposed development.

1.4 EXISTING PLANNING POLICIES

The subject site is designated accordingly in the Norfolk County Official Plan, & Zoning By-law 8600 as follows:

Norfolk County Official Plan – Schedule B-15: Land Use

- "Urban Residential"

The subject site is designated "Urban Residential" under the County's Official Plan (OP), which envisions the development of vibrant, inclusive, and complete neighbourhoods within Norfolk County's urban areas. Its intention is to support a range of residential forms that accommodate diverse population needs, from young families to seniors and individuals with special social or economic requirements. This designation promotes compact, walkable communities integrated with essential amenities such as parks, schools, places of worship, and small-scale commercial uses. By encouraging a mix of housing types, the Urban Residential designation aims to ensure flexibility, affordability, and long-term sustainability in urban growth while preserving the character and livability of neighbourhoods.

The proposed Townhouses subdivision with accessory dwelling units (ADUs) aligns with the intent of the Urban Residential designation by contributing to a diverse mix of housing types that accommodate a range of household needs, including affordability and multi-generational living. The development supports low-profile residential forms as well as the direct inclusion of ADUs (S.7.7.1(d); S.5.3.3.1–2), which encourage gentle intensification through secondary units. The proposal promotes complete communities by enhancing housing choice and aligns with the County's objective to support sustainable, attractive neighbourhoods in serviced urban areas.

Norfolk County Zoning By-law (1-Z-2014)

- "Urban Residential Type 4 Zone" (R4); Special Provision 14.1022

The subject site is currently zoned Urban Residential Type 4 (R4) in the Norfolk County Zoning By-law. The current zoning does appropriately reflect the proposed development. As such, the applicant is requesting that Council approve a site-Specific Zoning By-law Amendment to the Norfolk County Zoning By-law to apply a site-Specific Urban Residential Type 4 (R4) with reliefs related to the following several items detailed in the next section.

1.5 PROPOSED APPLICATION

The proposed residential development does not comply fully with the provisions of the current Site Specific Urban Residential Type 4 Zone (R4) (14.1022). As such, the applicant is requesting that Council approve a site-Specific Urban Residential Type 4 (R4) Zoning By-law Amendment to the Norfolk County Zoning By-law to apply the following reliefs listed in the tables below:

Table 1: Accessory Residential Dwelling Units (S.3.2.3) Zoning Matrix

ACCESSORY RESIDENTIAL DWELLING UNIT'S PROVISIONS (S.3.2.3)	NOTES
i) the accessory residential dwelling unit shall not be larger than 45 percent of the usable floor area of the dwelling unit [27-Z-2020];	Site Specific relief is required to increase the accessory dwelling unit to not be greater than 50% of the usable floor area of the dwelling unit.
l) a minimum of 50 percent of the front yard shall be maintained as landscaped open space. [7-Z-2020]	Site Specific Relief is required to reduce the required Landscaped Open Space in the Front yard to a minimum of 7.0%.

Table 2: Urban Residential Type 4 (R4) (S.14.1022) Zoning Matrix

R4 ZONE PROVISIONS	REQUIRED (Street Townhouse)	PROVIDED	NOTE
Minimum Lot Area	Attached Garages: 156.0 sq.m Corner Lots: 264.0 sq.m	161.5	-
Minimum Lot Frontage*	6.0 m	6.0 m	-
Minimum Front Yard	Attached Garage: 6.0m Detached Garage: 1.5m	6.0 m	No Garages
Minimum Exterior Side Yard	Within a 6.0 m of a front yard: 6.0 m Within a 1.5 m of a front yard: 1.5 m	2.4 m	-
Minimum Interior Side Yard	1.2 m	1.2 m	-
Minimum Rear Yard	Attached Garage: 7.5 m	4.1 m	No Garages
Minimum separation between townhouse dwellings	2.0 m	> 2.0 m	-
Maximum Building Height	11.0 m	11.0 m	-
Maximum Units in Townhouse	8	8	-

** - as per special provision 14.1022*
Bold – Zoning Relief Required

As demonstrated in Section 1.5, a number of site-specific zoning provisions is required to accommodate the proposed townhouse development with basement-level Accessory Dwelling Units (ADUs). The reliefs listed below are consistent with the intent of the Norfolk County Official Plan and reflect a balanced approach to intensification, design functionality, and resident livability. The following is a list of the requested relief:

- To allow accessory residential dwelling units (ADU) to be a maximum of 50% of the usable floor area of the dwelling unit (S.3.2.3.i);
- To permit a reduced landscaped open space within the front yard to be a minimum of 7.0% (S.3.2.3.l; S.4.2.4.e; S4.2.5);
- To permit (1) one off-street parking space to extend to a maximum of 3.0m into the public right-of-way (S.4.2.1);
- To permit a reduced Rear Yard Setback from 7.5m to 4.1m;
- To permit parking spaces in the front yard where no garages are proposed (S.4.2.3; S4.2.4.a)
- To Permit the required minimum lot area, lot frontage, and minimum front yard standards to be measured without the inclusion of attached or detached garages.

2.0 PLANNING EVALUATION

To determine the feasibility and appropriateness of the proposed development, a comprehensive evaluation of the potential planning issues and impacts has been undertaken. The scope and level of detail of the planning evaluation has been based on:

- Provincial Planning Statement (2024);
- Norfolk County Official Plan policies and criteria;
- Norfolk County Zoning By-Law regulations; and
- Visual inspections of the site and surrounding lands.

Recognizing that overlaps exist between the various policies and criteria in the Official Plan, the approach used attempts to consolidate the relevant policies and criteria to identify and evaluate the compliance and/or potential planning and land use related issues associated with the proposed residential development.

2.1 PROVINCIAL PLANNING STATEMENT

The Provincial Planning Statement, 2024 (PPS 2024) is a consolidated land use planning policy framework that guides decision-making on growth, development, and resource management across the province. It emphasizes flexibility and local autonomy while maintaining provincial interests in building strong, healthy communities. Key priorities include increasing housing supply and affordability, supporting economic development, protecting the environment and agricultural lands, and ensuring infrastructure and public service facilities are available to meet current and future needs. The statement promotes a balanced

approach to intensification, greenfield development, and rural growth, aligning planning decisions with long-term sustainability goals. All decisions affecting planning matters shall be consistent with the revised Provincial Planning Statement.

2.2 NORFOLK COUNTY OFFICIAL PLAN

The local policy context is provided in the Norfolk County Official Plan (OP) which contains a holistic set of goals, objectives, and policies to manage and direct growth in the municipality. The primary goals of the Norfolk County OP include:

- Encourages compact, efficient development within Urban Areas to optimize existing services, reduce sprawl, and support long-term sustainability.
- Promotes a mix of housing types, including affordable and alternative forms like ADUs, to meet the needs of a diverse and aging population.
- Explicitly supports residential intensification, including second units, within existing and planned developments, especially where servicing capacity exists.

The subject site is currently designated as Urban Residential in the Official Plan. The proposed development is in conformance with the basic land use policies outlined in the existing OP.

2.3 NORFOLK COUNTY ZONING BY-LAW

The Norfolk County's Zoning By-Law designates the subject lands as Urban Residential Type 4 (R4) with special provision 14.1022. As mentioned in Section 2 of this report, the current zoning on the site does not permit the proposed residential development. As such, the applicant is requesting that Council approve a Site-Specific Zoning By-law Amendment to the Norfolk County Zoning By-law to apply a site-specific Urban Residential Type 4 (R4). All other building requirements for multiple dwelling is in accordance with the Urban Residential Type 4 (R4).

2.4 PLANNING ANALYSIS AND CONSIDERATIONS

The proposed redevelopment of the subject site is consistent with the Provincial Planning Statement 2024, and the Norfolk County Official Plan policies by encouraging opportunities for redevelopment, intensification, and revitalization of areas with sufficient existing and planned infrastructure as well as a full range of housing types and densities. The proposed development will support the future growth of the community and provide a greater diversity of uses in the area. The proposed development is compatible with the surrounding land uses.

2.4.1 PPS (2024)

The Provincial Policy Statement (2024) is a consolidated statement of the government's policies on land use planning. It gives provincial policy direction on key land use planning issues that affect communities, such as:

- Efficient use and management of land and infrastructure;
- The provision of sufficient housing to meet changing needs, including affordable housing;
- The protection of the environment and resources including farmland, natural resources (for example, wetlands and woodlands) and water;
- Opportunities for economic development and job creation;
- The appropriate transportation, water, sewer, and other infrastructure needed to accommodate current and future needs; and
- The protection of people, property, and community resources by directing development away from natural or human-made hazards, such as flood prone areas.

Essentially, the PPS (2024) supports improved land use planning and management, which contributes to a more effective and efficient land use planning system.

The proposed development is consistent with the PPS (2024), and advances its core objectives for sustainable, inclusive growth. The project efficiently utilizes designated land within a Settlement Area, supporting compact development and optimizing existing municipal water, sanitary, and stormwater infrastructure (PPS S.2.1.4, 2.3.1, 3.1.1, 3.6.1). By introducing townhouses with accessory dwelling units (ADUs), the development broadens the range of available housing options, promoting affordability, flexibility, and demographic diversity, in line with policies for complete communities and housing choice (PPS S.2.1.6, 2.2.1). The inclusion of ADUs supports aging in place and multi-generational living, while enhancing tenure diversity through modest, ground-oriented intensification that maintains neighbourhood character. The development design prioritizes active transportation through sidewalks and pedestrian connectivity, supports future transit integration, and promotes reduced reliance on single-occupancy vehicles (PPS S.2.3.1.2, 3.2.1). Environmental sustainability is reinforced through stormwater management practices that protect natural systems and reduce climate vulnerability, consistent with green infrastructure and resiliency goals (PPS S.2.9.1). The project enhances social equity, accessibility, and economic resilience by introducing attainable housing, expanding the customer base for local businesses, and increasing municipal tax revenues. Overall, the proposal exemplifies good planning practice by integrating land use, servicing, housing, transportation, and environmental management considerations in a manner that is fully aligned with the PPS (2024).

2.4.2 Site-Specific Relief Justification

While the proposed design remains compatible with surrounding residential uses and consistent with the Urban Residential Designation, a number of minor site-specific zoning reliefs are required to accommodate the intensified residential form, reflect modern development practices, and optimize the use of the subject site. The following outlines each requested zoning relief, along with planning rationales based on Norfolk County Official Plan policies supporting urban intensification, innovative housing, efficient land use, and high-quality community design.

1. To Permit accessory residential dwelling units (ADUs) to be a maximum of 50% of the usable floor area of the primary dwelling unit;

- Permitting slightly larger ADUs enhances livability, functionality, and long-term housing flexibility, encouraging a diverse range of housing types, including accessory apartments, to meet the needs of all age groups and income levels (OP S.7.2.1.b). This minor increase in ADU size ensures high-quality, self-contained rental units while maintaining the low-rise character of the neighbourhood.

2. To Permit a reduced landscaped open space within the front yard, ranging from a minimum of 7%;
    - Although the front yard landscaped area is reduced, the development compensates with enhanced rear yard amenity spaces and the provision of boulevard street trees to maintain visual character and green infrastructure (OP S.7.2.1.c), supporting innovative residential design that accommodates intensification while enhancing community aesthetics.
3. To Permit one off-street parking space per lot to extend up to 3.0 metres into the public right-of-way;
    - Given the compact urban form and consistent driveway layout, a minor extension into the right-of-way allows for functional three-car driveways, facilitating compliance with an ADU's parking requirement (OP S.3.2.3.d). This design ensures no obstruction to public sidewalks or pedestrian movement, prompting efficient land use and site design to support complete communities (OP S7.2.1f).
4. To Permit a reduced rear yard setback from 7.5 metres to 4.1 metres;
    - The reduced rear yard accommodates the townhouse layout while maintaining appropriate separation, privacy, and rear yard amenity areas. Landscaped buffers are incorporated to mitigate impacts, supporting a variety of residential forms, including innovative designs that ensure compatible relationships with adjacent development (OP S.7.7.1.b).
5. To Permit parking spaces within the front yard in cases where no garages are proposed;
    - The development proposes driveways as primary parking areas due to the absence of garages, typical for contemporary townhouse design. The design ensures orderly, functional parking without negatively impacting streetscape quality or pedestrian safety, encouraging designs that balance vehicle needs with pedestrian-oriented urban design principles (OP S.7.2.1.h).
6. To Permit the required minimum lot area, lot frontage, and minimum front yard standards to be measured without the inclusion of attached or detached garages.
    - This reflects the contemporary ground-oriented townhouse typology and allows efficient use of urban land. It supports the Official Plan's Urban Residential policies, which promote compact residential forms and gentle intensification within serviced settlement areas (OP S.7.1c). This relief enables attainable housing options without compromising built form or character.

The requested reliefs collectively support a compact, transit-supportive, and complete community vision for Norfolk County's Urban Residential areas.

2.4.3 Site Suitability

The subject lands are situated at the southeast edge of Simcoe's urban boundary, specifically at 18 Decou Road. This location offers a strategic position within a fully serviced urban area, making it highly suitable for the proposed residential development for the following reasons:

- The site is within close proximity to several schools, including West Lynn Public School, Holy Trinity Catholic High School, and Elgin Avenue Public School. This accessibility supports families and promotes walkability within the community;
- Norfolk General Hospital is located nearby, ensuring residents have convenient access to essential healthcare services.
- Residents will benefit from nearby parks such as Grant Anderson Park and Lynndale Heights Park, providing ample green space for outdoor activities and community engagement.
- The development is a short drive from Simcoe Town Centre and other shopping plazas, offering a variety of retail, dining, and service options to meet daily needs.
- Decou Road connects directly to Norfolk Street, a major arterial route facilitating easy travel throughout Simcoe and to neighboring communities.
- The area is serviced by Ride Norfolk, providing public transportation options that enhance mobility for residents without personal vehicles.

The subject lands are well positioned to support a compact, diverse, and complete community, in line with the intensification goals of the Norfolk County Official Plan. Access to schools, healthcare, parks, commercial services, major transportation routes, and public transit ensures that the proposed development can seamlessly integrate with and enhance the existing urban fabric.

2.4.4 Intensification

The Official Plan encourages modest intensification within fully serviced Urban Areas, particularly where existing infrastructure can support additional residential growth without undue environmental, servicing, or community impacts.

- In keeping with this policy framework, the proposed development contributes to the County's goal of achieving a minimum intensification target of 15% for new housing within built-up areas (OP S.7.1b; S.7.3) while diversifying housing options. The proposed development contributes directly to achieving this target by introducing 86 townhouses and 86 ADUs within an existing urbanized area;
- The Plan encourages infill and intensification that optimizes existing land supply and infrastructure while promoting compact forms of development. This project consolidates development within the Simcoe Urban Area, avoiding outward expansion into agricultural or natural lands, thus supporting efficient land use (OP S.7.2.1.a);
- The Official Plan explicitly promotes the inclusion of secondary units (ADUs) in residential developments to support affordability and demographic diversity. Permitting ADUs within townhouses directly advances this policy objective by introducing additional rental opportunities without expanding the building footprint or increasing the height of the built form (OP S.7.2.1.b);

The development also supports broader PPS, 2024 objectives, including building strong healthy communities, promoting a mix of housing types, optimizing infrastructure investment, and supporting active transportation and public transit use.

2.4.5 Compatibility of Design

The proposed development has been carefully designed to ensure compatibility with the existing and planned character of the surrounding neighbourhood, consistent with broader principles of good urban design. Although the development introduces new residential density through the addition of basement-level accessory dwelling units (ADUs), it maintains a low-rise built form (two storeys), similar to surrounding residential dwellings, and integrates thoughtfully into the established fabric of the Simcoe Urban Area.

- Rear and side yard setbacks, combined with landscaped buffers, maintain privacy, minimize overlook, and soften the visual transition between lots.
- Street-oriented townhouse entrances, enhanced boulevard landscaping, and varied façade treatments create an active, human-scaled streetscape.
- Façade articulation, material variety, and consistent rooflines break down building massing and maintain visual rhythm along the street.
- Parking areas are organized within private driveways without dominating the streetscape, consistent with pedestrian-focused design objectives.

The proposed development introduces compact, context-sensitive intensification that respects the surrounding residential form. It fulfills the Norfolk County Official Plan's objectives for urban design, compatibility, and sustainable growth by enhancing the streetscape, supporting a walkable environment, and maintaining the established character of the Simcoe Urban Area.

2.4.6 Natural Environment Impacts

The proposed development is not anticipated to result in any significant negative impacts to the natural environment. It is located within a fully serviced Urban Area and is not situated within or adjacent to any identified natural heritage features, significant woodlands, wetlands, or hazard lands as defined by the Norfolk County Official Plan and applicable mapping.

The development avoids adverse impacts to natural features and ecological functions (OP S.3.4.2; S.3.5). Minor tree removals will be required to facilitate site grading and servicing, however, new landscaping, street trees, and rear yard planting areas will enhance the urban canopy and contribute to environmental resilience.

2.4.7 Municipal Service Impacts

According to the Functional Servicing Report, the proposed development will utilize existing municipal infrastructure within the Simcoe Urban Area, including connections to a 200mm diameter watermain and a 200mm diameter sanitary sewer at the ends of Tulip Crescent and Butternut Drive. Sanitary flows will be accommodated within the existing Phase 1A system and pumping station, with no capacity issues identified. Stormwater will be conveyed to the existing stormwater management pond, supplemented by 97 m^3 of new on-site storage and an orifice control structure to maintain allowable discharge rates. Stormwater quality will be managed through a Wetland Stormwater Management Facility, consistent with County and

MOECC standards. The servicing strategy will ensure that growth occurs efficiently within areas with full municipal services (OP S.2.2.3f).

2.4.8 Social and/or Economic Considerations

The proposed development offers substantial social and economic benefits by expanding the range of housing options to accommodate diverse demographic needs, including individuals, families, seniors, and multi-generational households. The integration of basement accessory dwelling units (ADUs) within townhouses promotes social diversity and inclusivity by supporting aging in place, providing independent living opportunities for seniors, and enabling multi-generational family arrangements that foster interdependence and affordability. Economically, the addition of ADUs introduces attainable rental options, supports homeowners by offering potential mortgage offsets, and strengthens the resilience of the local housing market. The development is poised to stimulate local economic activity by expanding the customer base for nearby businesses and services, enhancing the vitality of the Urban Residential area, increasing municipal tax revenues and property values, and generating direct employment during construction. Long-term, the project will support economic stability through sustained demand for local goods, services, and community infrastructure. The proposal is fully consistent with Norfolk County's Official Plan objectives to promote complete, inclusive, and economically sustainable communities.

2.4.9 Housing

The proposed development addresses a critical gap in Norfolk County's housing continuum by introducing a "missing middle" form, ground-oriented townhouses complemented by basement accessory dwelling units (ADUs). This typology offers flexible, attainable options for a wide range of demographics, including first-time buyers, seniors seeking to age in place, and multi-generational families requiring adaptable living arrangements. While the primary dwelling units are intended for ownership, the inclusion of ADUs introduces additional rental opportunities within the Simcoe Urban Area, enhancing tenure diversity without altering the built form. The development provides for a range of housing types, sizes, tenures, and densities to meet the diverse needs of residents (OP S.7.2.1). By adding gentle density within a compatible, low-rise form, the project contributes to a complete, resilient neighbourhood structure aligned with long-term growth management and housing affordability goals.

2.4.10 Transportation

The proposed development supports a transit-oriented and active transportation-friendly design, consistent with Norfolk County's goals for complete, accessible communities. The site is located within proximity to existing Ride Norfolk transit services on Norfolk Street South, offering mobility options for residents without reliance on private vehicles. The internal subdivision design prioritizes walkability through the provision of sidewalks, street-oriented entrances, and short block lengths, supporting land use patterns that encourage active transportation and transit use (OP S.5.2.2.b). Off-street parking is provided through private driveways, with additional visitor parking accommodated through strategically placed on-street spaces across the whole subdivision. The compact form and transit-supportive location align with the County's

broader transportation and growth management strategies, reducing automobile dependency while promoting sustainable, efficient infrastructure use.

2.4.11 Good Planning

The proposed development represents good planning by efficiently utilizing designated urban land, supporting Norfolk County's intensification, housing diversity, and sustainability objectives. It provides a mix of ownership townhouses and flexible rental opportunities through accessory dwelling units (ADUs), promoting inclusive, adaptable living arrangements for a range of demographics. The development maintains compatibility with the surrounding residential fabric through sensitive built form, scale, and streetscape design by promoting the orderly, efficient, and sustainable development of land (OP S.2.2.3.a). By optimizing the use of existing infrastructure, encouraging active transportation, and enhancing local economic vitality, the project advances the long-term vision for resilient, complete communities as outlined in both the Norfolk County Official Plan and the Provincial Policy Statement, 2024.

2.5 BACKGROUND STUDIES

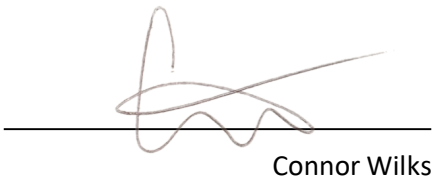
The supporting background studies prepared for the Zoning By-law Amendment application demonstrated that the proposed development is technically feasible and appropriate for the site. The Functional Servicing Report confirmed that the site can be fully serviced by existing municipal infrastructure without constraints. Collectively, these studies provide a comprehensive planning and technical foundation to support the proposed residential development.

3.0 CONCLUSION

The proposed residential development located at 18 Decou Road represents an appropriate and desirable form of intensification within the Simcoe Urban Area and should be supported by Norfolk County Council for the following reason:

- Is consistent with the PPS 2024;
- Meets the intent and purpose of the Norfolk County Official Plan;
- Is a site that is physically suitable;
- Will be designed to respect and maintain compatibility with surrounding residential uses and will not negatively impact the enjoyment of existing area residents;
- Will not have negative natural environmental impacts;
- Will be integrated into the local multimodal transportation network;
- Will utilize existing municipal infrastructure efficiently, without causing adverse impacts to service capacity;
- Will promote positive social, environmental, or economic impacts; and
- Will have favourable positive impacts for the Norfolk County providing for additional residential opportunities.

For these reasons, it is appropriate and in the public interest for Norfolk County Council to approve the proposed site-specific Zoning By-law Amendment to permit the residential subdivision, including accessory dwelling units (ADUs). This report has demonstrated that the proposed development is a suitable and compatible use of the lands, is consistent with the PPS, conforms to the intent and purpose of the Norfolk County Official Plan, and represents good planning.



Connor Wilks
Associate & Planner

APPENDIX A

April 4, 2025

c/o Veronika Axenova
Big Sky Simcoe Limited Partnership
1135 Stellar Drive, Newmarket, Ontario L3Y 7B8

RE: 18 Decou Road Transportation Review

Veronika:

BA Group is retained by Big Sky Simcoe Limited Partnership for transportation advisory services related to the proposed red-line Draft Plan of Subdivision and Zoning By-Law Amendment for the remaining lands to be developed at 18 Decou Road.

This letter documents an update to our March 2022 review of traffic and on-street parking related to the proposed development at 18 Decou Road (titled Simcoe 1B, herein referred to as the "Site"). The primary difference between the March 2022 study and this update is the consideration of 86 additional dwelling units (ADUs) and an update to the available parking supply.

The Site lands are generally located south of Decou Road and east of Norfolk Street South and form the second phase (Simcoe 1B) of the subdivision lands to the north.

A former traffic study was prepared for the entirety of the subdivision lands in 2011 by EXP and considered the development of a total of 86 detached units. There is currently approximately 51 detached units (Simcoe 1A) be constructed starting Spring 2022 on the lands immediately north of the site and an additional 86 townhouse units, with the potential for an additional 86 ADUs proposed as part of the remainder of the subdivision (i.e. the Site – Simcoe 1B), for a total of up to 223 units connecting to Decou Road.

The site location is illustrated in **Figure 1**.

1.0 INTRODUCTION

1.1 PROPOSED DEVELOPMENT

The proposed plans contemplate 86 residential townhouse units plus a potential additional 86 ADUs. The site will be served by a new public roadway (Butternut Drive) that will provide a vehicular connection to the Butternut Drive / Decou Road connection on the south leg of the existing Simson Avenue / Decou Road intersection.

The Draft Plan for the site is illustrated in **Appendix A**.

1.2 THIS STUDY

BA Group has undertaken a review of all required transportation related aspects of the proposed development plan. The following study aspects have been reviewed in our analysis:

- A review of the existing road network within the study area;
- Site traffic generation, distribution, and assignment;
- A review of existing traffic and intersection operating conditions;
- An assessment of estimated traffic volume changes on the surrounding road network due to area background development, corridor growth, and the addition of site traffic;
- An analysis of total future traffic volumes at key intersections; and,
- A review of the on-street parking supply along future Tulip Crescent / Butternut Drive.

2.0 ROAD NETWORK

2.1 EXISTING ROAD NETWORK

The local area road network is briefly described in the following and the existing road network is illustrated in the context plan in **Figure 2**.

Norfolk Street South (Highway 24) is an arterial road that maintains a basic four-lane cross section with two-way traffic and two lanes operating in each direction. Norfolk Street South has a posted speed limit of 50 kilometres per hour (km/h). As illustrated in **Figure 3**, Norfolk Street South runs north-south, and intersects with Decou Road west of the site. Norfolk Street South is under the jurisdiction of Norfolk County.

Decou Road is a collector road that maintains a basic two-lane cross section with two-way traffic and one lane operating in each direction. Decou Road has a posted speed limit of 50 kilometres per hour (km/h). As illustrated in **Figure 2**, Decou Street runs east-west, and intersects with Norfolk Street South west of the site, Willow Wood Drive east of the site, and with the proposed entrance north of the site opposite Simson Avenue. Decou Road is under the jurisdiction of Norfolk County.

Simson Avenue is a two lane local road under the jurisdiction of Norfolk County. It runs generally north-south, forming intersections with Decou Street and Turner Drive. On-street parking is permitted on both sides of the road. Simson Avenue does not have a posted speed limit and is assumed to be 40 kilometres per hour (km/h). Butternut Drive is an extension of Simson Avenue on the south side of Decou Road.

Willow Wood Drive is a two lane local road under the jurisdiction of Norfolk County. It runs generally north-south, forming an intersection with Decou Street. On-street parking is permitted on both sides of the road. Willow Wood Drive does not have a posted speed limit and is assumed to be 40 kilometres per hour (km/h).

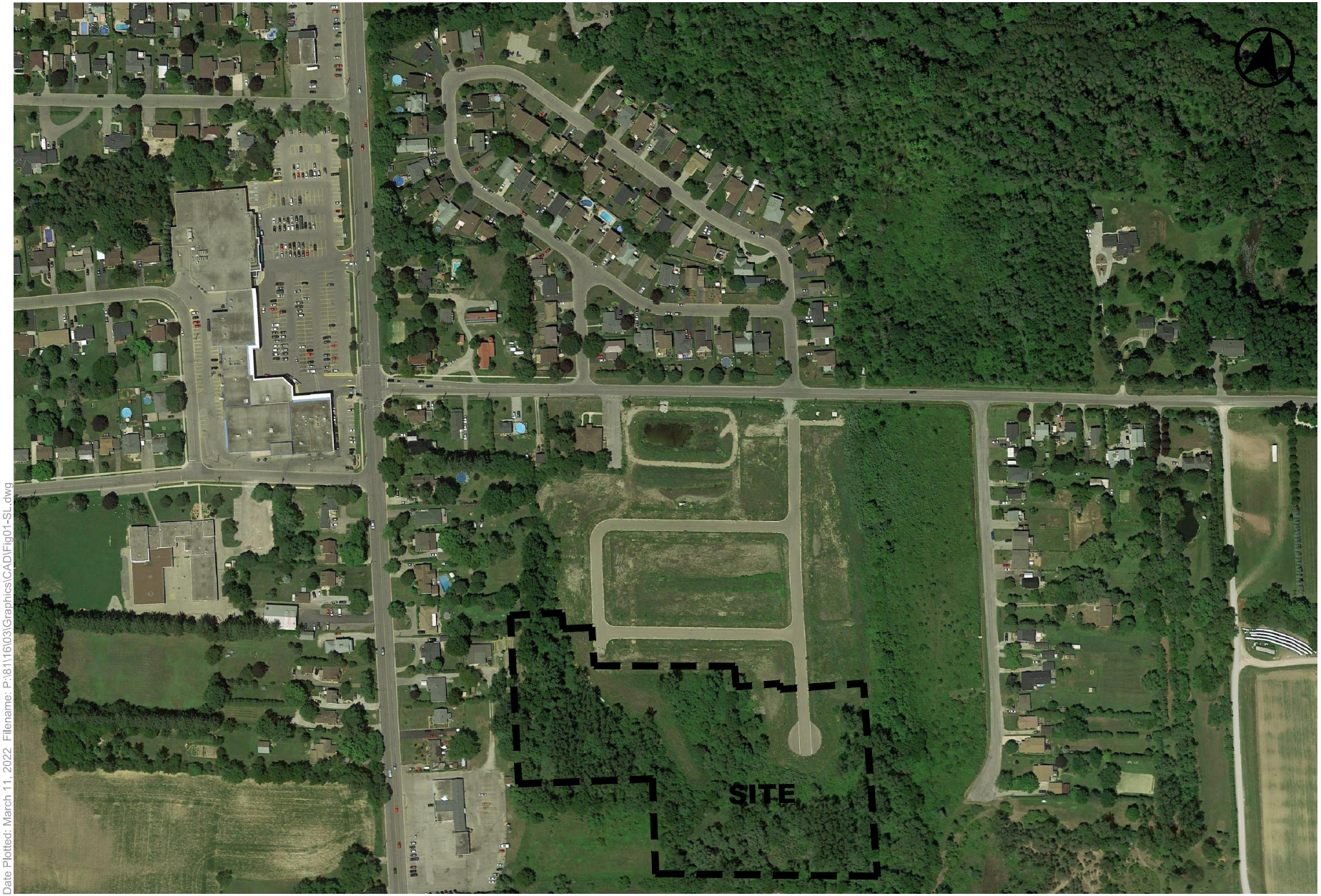
2.2 PROPOSED ROAD NETWORK

A new public road is proposed to serve Simcoe 1B, identified as Tulip Crescent / Butternut Drive on the Draft Plan provided in **Appendix A**. The extension of existing Butternut Drive connects the proposed development to the existing Decou Road / Simson Avenue intersection through Simcoe 1A.

These roads provide a logical extension to the proposed subdivision being constructed south of Decou Road.

2.2.1 Roadway Cross-Section

Norfolk County's Official Plan requires a minimum 20 metre right-of-way for local roads. The right-of-way of Tulip Crescent and Butternut Drive will be 20 metres with an 8 metre pavement width (measured to edge of pavement) and sidewalks on one-side. The proposed sidewalks on both streets will also tie into the Phase 1A of the subdivision that connects to Decou Road, where further connections can be made at such time that Decou Road is urbanized or upgraded.



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FIGURE 1 SITE LOCATION

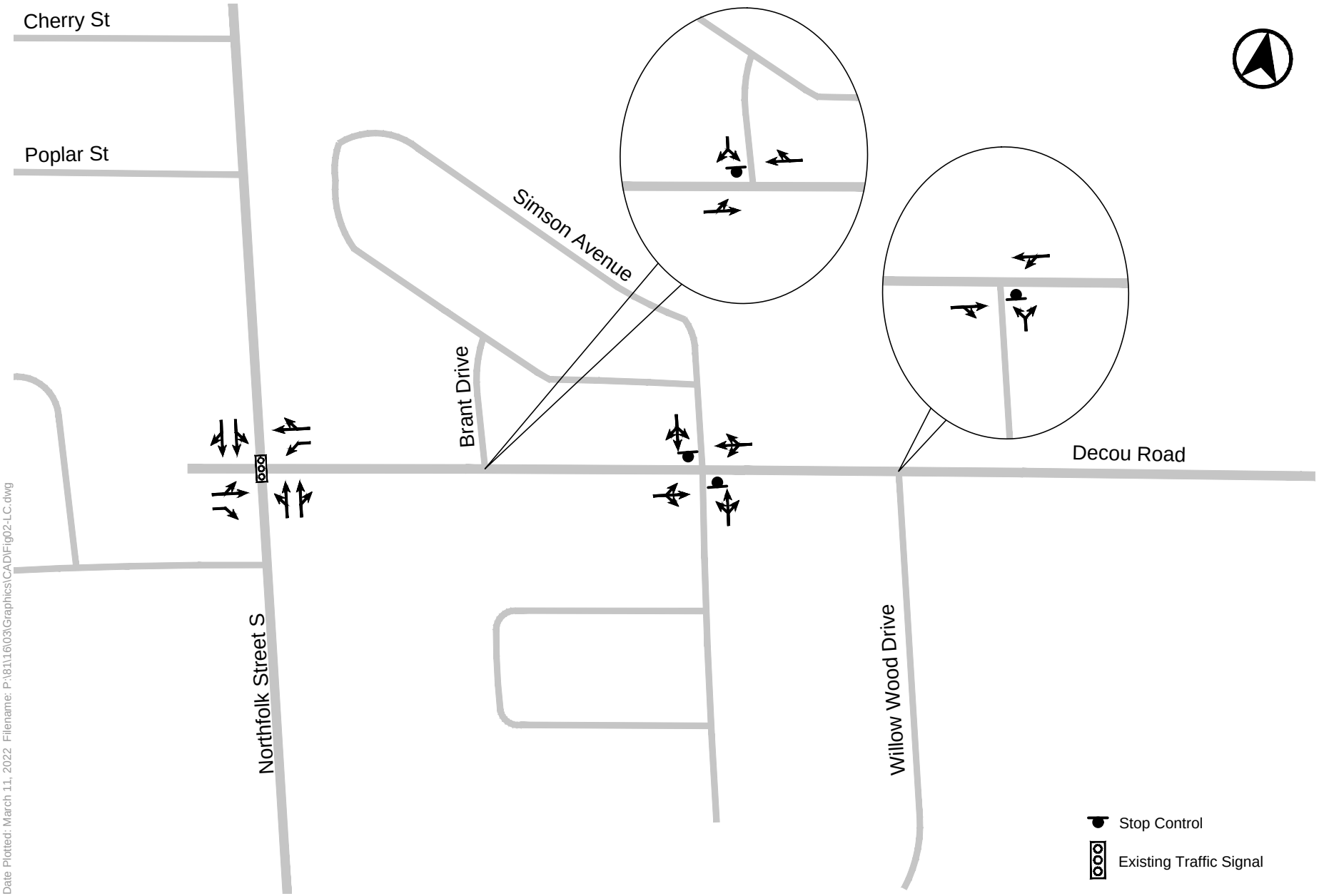


FIGURE 2 Lane Configuration

3.0 AREA TRAFFIC VOLUMES

3.1 EXISTING TRAFFIC

Existing “baseline” traffic volumes for the weekday were based on BA Group traffic counts in January of 2022 and October of 2017. In keeping with the requirements for Transportation Impact Studies laid out by Norfolk County, counts were conducted during peak periods throughout the day.

Norfolk County’s counts were conducted at key intersections relevant to the study area during the peak weekday periods of 7:30am to 9:30pm and 4:00pm to 6:00pm. This is summarized below in **Table 1**.

TABLE 1 INTERSECTION TURNING MOVEMENT COUNT INFORMATION

Intersection	Date of Counts	Source
Norfolk Street South / Decou Road	Tuesday, October 17, 2017 & Wednesday, January 26, 2022	Spectrum Traffic Data Inc.
Brant Street / Decou Road	Wednesday, January 26, 2022	Spectrum Traffic Data Inc.
Simson Avenue / Decou Road	Wednesday, January 26, 2022	Spectrum Traffic Data Inc.
Willow Wood Drive / Decou Road	Wednesday, January 26, 2022	Spectrum Traffic Data Inc.

Notes:
1. Counts were recorded at 15 minute intervals within survey periods

Recognizing that the 2022 counts were conducted during the COVID-19 pandemic, the higher 2017 traffic through volumes at Norfolk Street South / Decou Road were carried through the road network along Decou Road to reflect typical existing levels of activity along the corridor.

A summary of the baseline existing traffic movements at individual intersections is presented in **Figure 3** for the morning and afternoon peak hours, respectively.

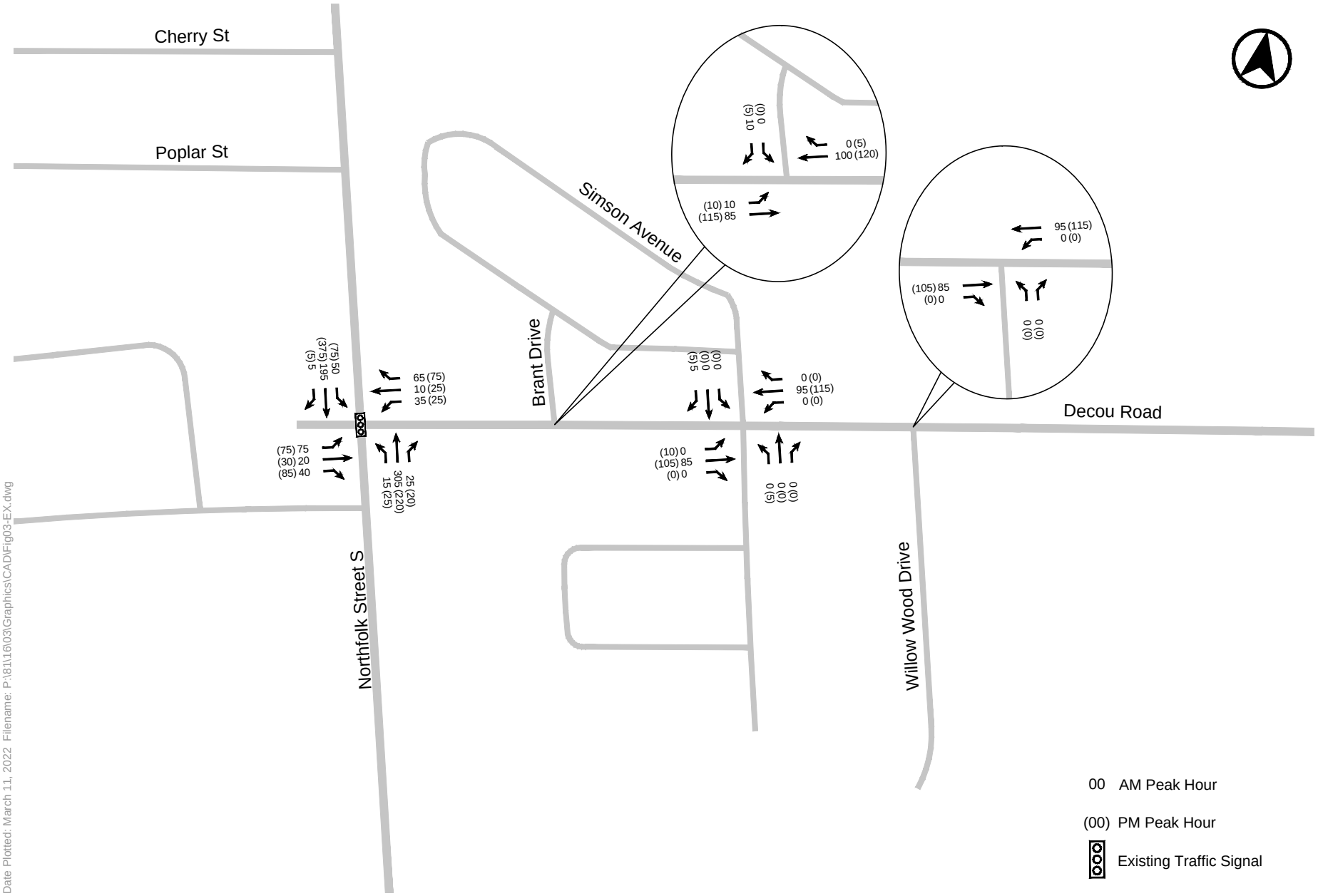


FIGURE 3 EXISTING TRAFFIC VOLUMES

3.2 FUTURE BACKGROUND TRAFFIC

Consistent with the standards outlined in the Norfolk County Guidelines for Transportation Impact Studies, a 5-year future forecast period (2022 plus 5 years) has been applied over the 2022 base year. **Figure 4** illustrates future background traffic within the study area, including corridor growth and area background development.

3.2.1 Corridor Growth

As part of their data collection efforts, the Ministry of Transportation (MTO) compiles Average Annual Daily Traffic (AADT) volumes for segments along the provincial road network. BA Group reviewed historic AADT volumes in 5-year intervals for road segments around Simcoe, where there is extensive historical data available, as summarized in **Table 2**.

The roads reviewed for historical growth are higher order corridors through the town than within the Site study area, and represent a conservative approach to establishing a corridor growth rate along Decou Road and Norfolk Street South (in addition to the site specific background developments considered in **Table 3**).

TABLE 2 HISTORIC NORFOLK COUNTY AADT COUNTS

Location	1991	1996	2001	2006	2011	2016
Highway 3 East of Simcoe[1]	7900	8800	9800	10200	10300	11100
Highway 3 West of Simcoe[1]	6100	6650	6850	6900	6650	6650
Norfolk Street North of Simcoe[1]	8450	9250	10200	10800	9000	10700

Notes:
1. Retrieved from Historical Provincial Highways Traffic Volumes on the MTO iCorridor website.

The average of 25-year growth rates across each station yields an average yearly growth rate of 1.0% along Highway 3 and Norfolk Road. Based upon these calculations, BA Group has applied a conservative annual growth rate of 1% to background traffic movements for all subsequent horizon year forecasts along Decou Road and Norfolk Street South.

3.2.2 Background Development Growth

Background development traffic allowances were made for proposed developments in the vicinity of the site, as summarized in **Table 3**.

TABLE 3 AREA BACKGROUND DEVELOPMENT

Location	Development Description	Traffic Study
Simcoe 1A	51 single detached units	Report prepared by EXP (October 20, 2011)
682 Ireland Road	251 single detached / townhouse units 48 affordable housing units 10,000 sf of office.	Draft report prepared by BA Group (March 2022)
Zita Residential Development	948 residential units	Report prepared by Read, Voorhees & Associated (May 2009)
487 Norfolk Street	42 residential units 16,469 sf of commercial	Report prepared by Paradigm Transportation (March 2022)

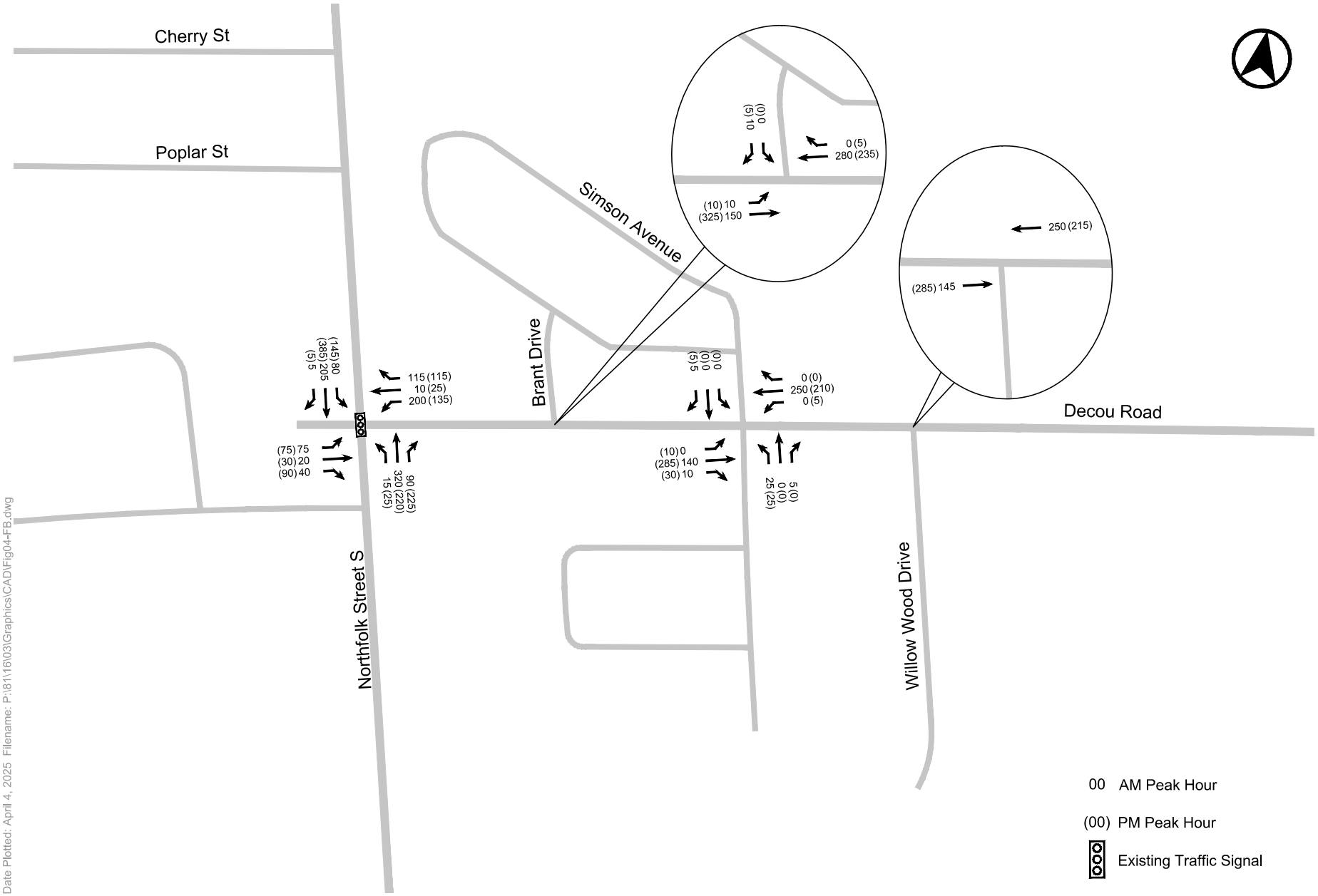


FIGURE 4 FUTURE BACKGROUND TRAFFIC VOLUMES

3.3 SITE TRAFFIC

3.3.1 Trip Generation

Details of the proposed trip generation for the site are presented in **Table 4**. The Institute of Transportation Engineers (ITE) Trip Generation Manual, 11TH Edition was applied for residential units on the site.

TABLE 4 TRIP GENERATION SUMMARY

Land Use	Size	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Single-Family Attached Housing (ITE 215)	*Effective Trip Rate per Dwelling Unit*	*0.12*	*0.38*	*0.49*	*0.35*	*0.23*	*0.58*
	172 units[3]	**20**	**65**	**85**	**60**	**40**	**100**

Notes:
1. ITE = Institute of Transportation Engineers
2. ITE Average Rate per Dwelling Unit, Peak Hour of Generator
3. Unit count includes 86 detached units and an potential additional 86 ADUs.

3.3.2 Trip Distribution and Trip Assignment

Site traffic distribution patterns for the new residential units were established based on data available through 2022 traffic surveys conducted by BA Group at the intersection of Decou Road / Norfolk Street South and Willow Wood Drive / Decou Road.

The trip generation and trip distribution data was used with a micro trip assignment method to assign trips to the study area intersections. Trip assignment was made with regards to the access to the proposed development at Decou Road and Butternut Drive.The corresponding residential trip distribution is summarized in **Table 5**, while site traffic volumes are illustrated in **Figure 5**.

TABLE 5 RESIDENTIAL TRIP DISTRIBUTION ASSUMPTIONS

Direction (To / From)	Route	Weekday AM Peak Hour	Weekday PM Peak Hour
North	Norfolk Street South & Decou Road	40% (55%)	55% (40%)
South	Norfolk Street South & Decou Road	50% (35%)	35% (50%)
East	Willow Wood Drive & Decou Road	10% (10%)	20% (10%)
Total		**100% (100%)**	**100% (100%)**

Notes:
1. 00 (00) Inbound (Outbound)

Future total traffic volumes were established by adding site traffic to future background traffic. **Figure 6** illustrates future total traffic volumes for both the weekday morning and afternoon peak periods.

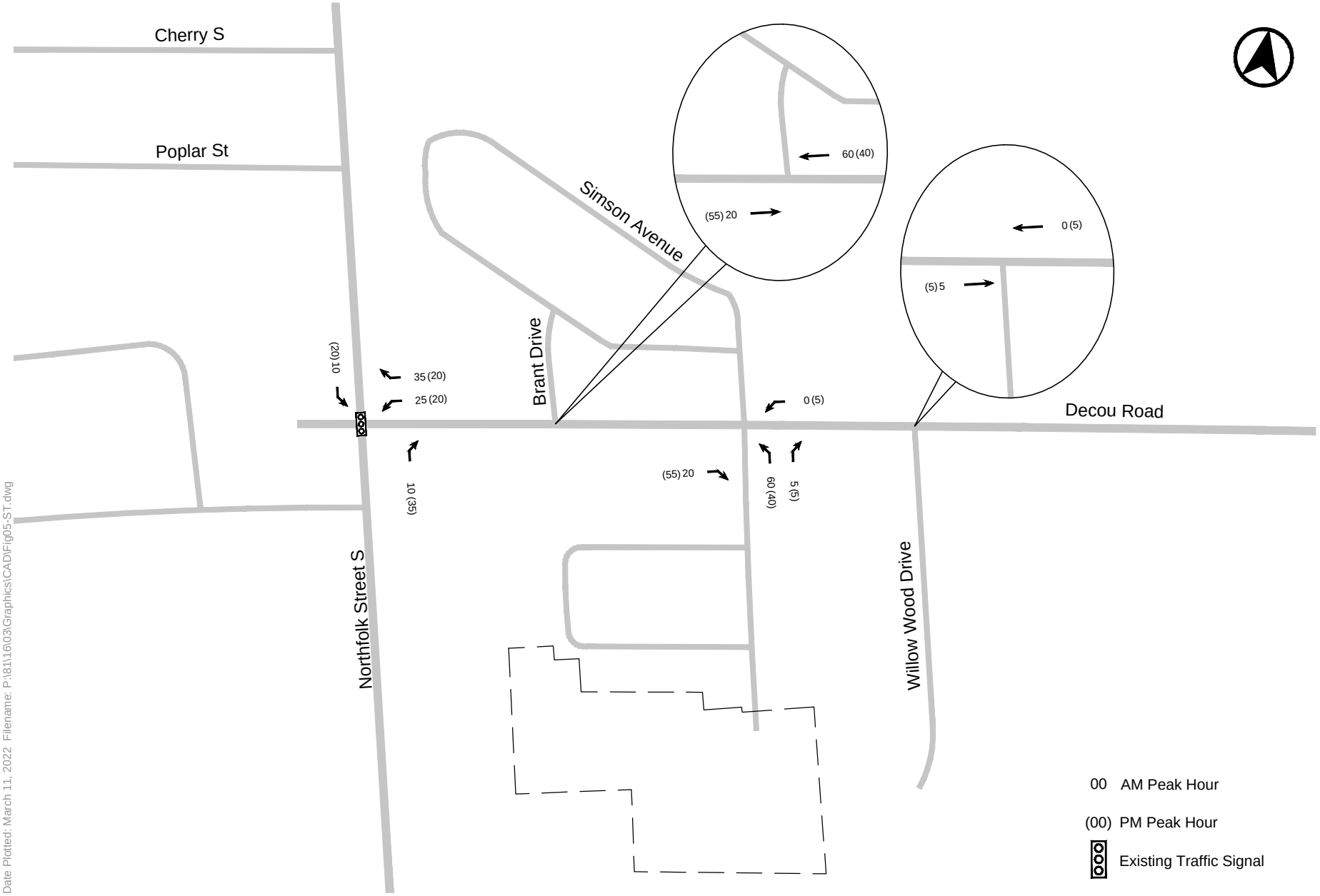


FIGURE 5 SITE TRAFFIC VOLUMES

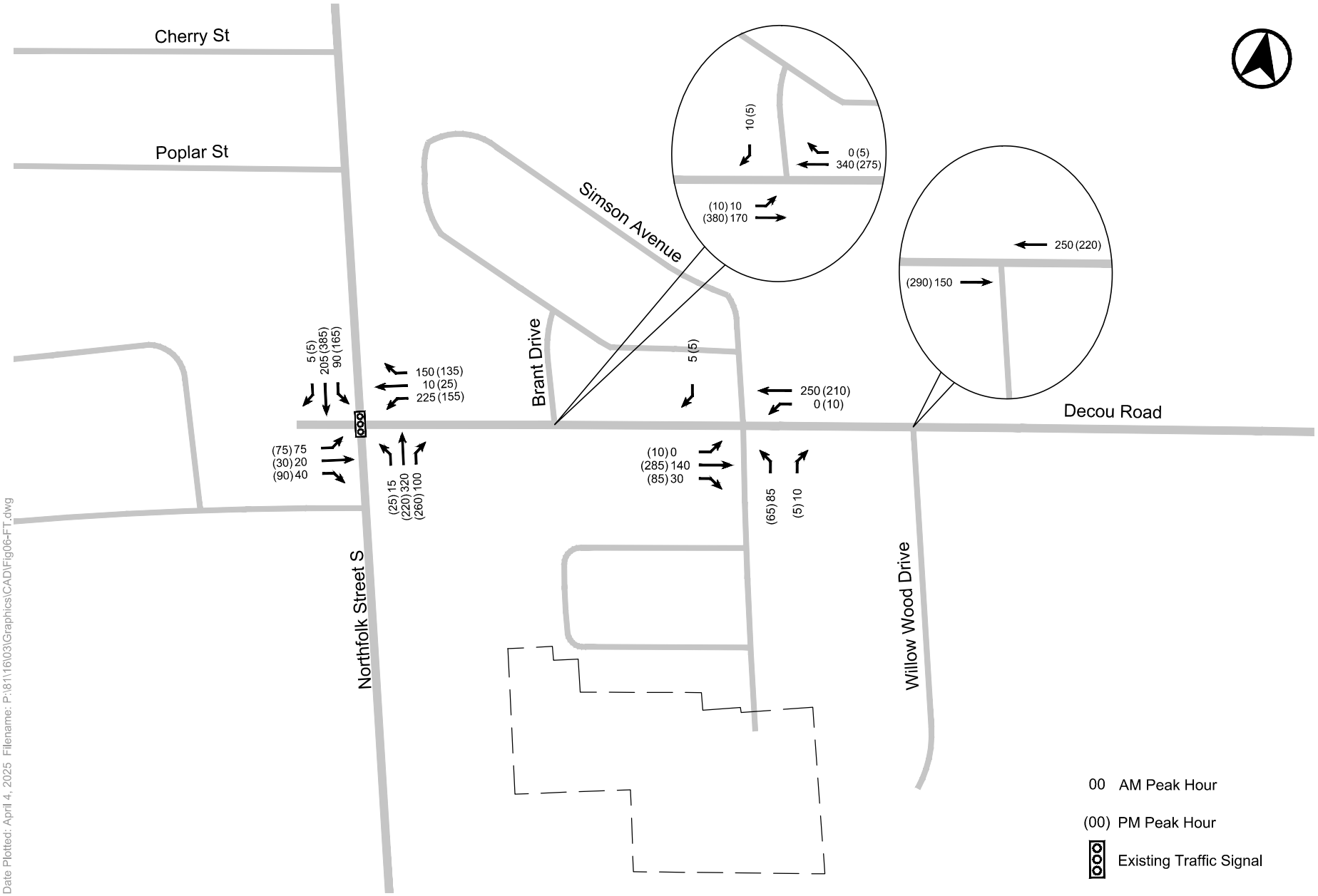


FIGURE 6 FUTURE TOTAL TRAFFIC VOLUMES

4.0 TRAFFIC OPERATIONS

Traffic operations analysis was undertaken utilizing Synchro software and the Highway Capacity Manual (HCM) methodology. Detailed analysis worksheets are provided in **Appendix B**.

For signalized intersections, the volume to capacity ratio (v/c) is an indicator of the capacity utilization for individual movements in the intersection. A v/c ratio of 1.0 indicates that certain governing traffic movements through the intersection are operating at or near maximum capacity. The primary overall level of service (LOS) indicator is delay, both on individual movements and expressed as an average for all vehicles processed. Many busy urban intersections operate at LOS D to E; which reflect average (control) delays in the range of 35 to 80 seconds. Volume to capacity ratios equal to or greater than 0.85 are considered to be critical intersection movements and may be identified for potential improvements.

For unsignalized intersections, level of service (LOS) characterizes operational conditions for key movements in terms of delay within the traffic stream. LOS A represents a good level of service with short delays. LOS F represents a poor level of service with long delays. The volume to capacity ratio (v/c) is an indicator of the capacity utilization for movements at the intersection and resultant residual capacity potential.

In keeping with Norfolk County's Guidelines for Transportation Impact Studies, three scenarios have been considered:

- Existing Conditions;
- Future Background Conditions; and,
- Future Total Conditions: Background Conditions + Site traffic

The following sections outline intersection operations analysis results for area signalized and unsignalized intersections.

4.1 SIGNALIZED INTERSECTIONS

The **Norfolk Street South and Decou Road** intersection is signalized with an existing weekday cycle length of 80 seconds and 90 seconds during the morning and afternoon peak periods, respectively (signal timing plan is attached in **Appendix C**). Signal timing plans were provided by Norfolk County, and timings were calibrated based on the observed timings through footage acquired by Spectrum Traffic during the traffic survey referenced in **Section 3.1**. Capacity analysis results for this intersection are summarized in **Table 6**.

Under existing traffic conditions, the intersection operates within capacity during the weekday morning and afternoon peak hour periods with overall v/c ratios of 0.25 and 0.29, respectively.

Under future background traffic conditions, with allowances of specific area developments and corridor growth, the intersection operates within capacity during the weekday morning and afternoon peak hours, with overall v/c ratios of 0.35 and 0.41, respectively.

Under future total traffic, with the addition of site traffic to future background volumes will result in overall intersection v/c ratios of 0.38 and 0.45 during the weekday morning and afternoon peak periods, respectively.

TABLE 6 CAPACITY ANALYSIS RESULTS FOR THE NORFOLK STREET SOUTH / DECOU ROAD INTERSECTION

	Existing Traffic		Future Background Traffic		Future Total Traffic	
	V/C	LOS	V/C	LOS	V/C	LOS
EBTL	0.24 (0.24)	B (B)	0.22 (0.24)	B (B)	0.23 (0.25)	B (B)
EBR	0.03 (0.06)	B (B)	0.03 (0.06)	B (B)	0.03 (0.06)	B (B)
WBL	0.10 (0.06)	B (B)	0.49 (0.33)	C (C)	0.55 (0.38)	C (C)
WBTR	0.08 (0.10)	B (B)	0.10 (0.12)	B (B)	0.12 (0.14)	B (B)
NBTLR	0.26 (0.18)	B (B)	0.26 (0.25)	B (B)	0.26 (0.27)	B (B)
SBTLR	0.22 (0.32)	B (B)	0.24 (0.46)	B (B)	0.25 (0.49)	B (B)
Overall	**0.25 (0.29)**	**B (B)**	**0.35 (0.41)**	**B (B)**	**0.38 (0.45)**	**B (B)**

Notes:
1. XX (XX) – Weekday AM (Weekday PM)

Based on the capacity analysis, no physical improvements are required to accommodate forecasted traffic volumes and traffic from the proposed development can be appropriately accommodated.

4.2 UNSIGNALIZED INTERSECTIONS

Under existing traffic conditions, all unsignalized intersections in the area operate at acceptable levels of service with all approaches operating at LOS C or better in both the weekday morning and afternoon peak periods.

Under future background and future total traffic conditions, acceptable levels of operation will be maintained at these intersections. All approaches at these intersections will continue to operate at LOS C or better in both the morning and afternoon peak periods. An MTO Left Turn Warrant was conducted along Decou Road for future background and future total conditions at Butternut Drive and provided in **Appendix D**. This warrant indicates that no left turn lane is warranted/required along Decou Road in the future.

No physical improvements will be required to accommodate forecasted traffic volumes and site traffic can be appropriately accommodated.

Analyses for the intersections at Decou Road and Brant Street, Decou Road and Simson Ave, Decou Road and Willow Wood Drive are provided in **Table 7**.

TABLE 7 PEAK HOUR ANALYSIS RESULTS: UNSIGNALIZED INTERSECTIONS

	Existing Traffic		Future Background Traffic		Future Total Traffic	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Decou Road / Brant Street						
EBLT	0.8 (0.6)	A (A)	0.6 (0.3)	A (A)	0.5 (0.3)	A (A)
SBLR	8.9 (8.9)	A (A)	10.0 (9.7)	A (A)	10.4 (9.9)	B (A)
Decou Road / Simson Ave						
EBLTR	0.0 (0.7)	A (A)	0.0 (0.3)	A (A)	0.0 (0.3)	A (A)
WBLTR	-- (--)	-- (--)	0.0 (0.2)	A (A)	0.0 (0.4)	A (A)
NBLTR	0.0 (10.3)	A (B)	11.5 (13.9)	A (B)	12.8 (15.4)	B (C)
SBLTR	8.9 (8.8)	A (A)	9.6 (9.4)	A (A)	9.6 (9.4)	A (A)
Decou Road / Willow Wood Drive						
NBLR	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)

Notes:
1. XX (XX) – Weekday AM (Weekday PM)

5.0 ON-STREET PARKING

Stamp & Hammer has prepared an on-street parking allocation plan based on the road network elements proposed for the 20m public right-of-way and the location of driveways for the proposed lot fabric. The site plan that shows parking allocation (A-004) is provided in **Appendix E.**. Final supply is subject to further details related to coordination with hydrant and community mailbox locations.

Based on the estimated on-street parking supply of 23 spaces, the Site can achieve approximately 0.13 spaces per unit on-street.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the above, the following conclusions and recommendations are provided for the transportation related aspects of the site.

1. All lots within the site will be served by 3 off-street parking spaces (2 spaces per townhouse unit and 1 space per ADU).

2. Proposed Tulip Crescent and Butternut Drive have a right-of-way of 20 metres, a sidewalk on one side, and on-street parking. Approximately 23 parking spaces are expected to be accommodated on-street in accordance with the site plan that illustrates parking allocation (A-004).

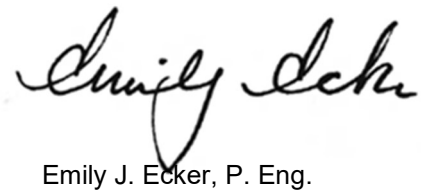
3. The proposed development will generate on the order of 85 and 100 new trips (two-way) vehicle trips during the weekday morning and weekday afternoon peak hours, respectively, if all Simcoe 1B units implement ADUs.

4. Under future background and future total traffic conditions, acceptable operations will be maintained at all area signalized and unsignalized intersections, with all approaches operating at a v/c of under 0.45 or at LOS C or better during both the weekday morning and afternoon peak periods. No physical improvements on the existing road network will be required to accommodate forecasted traffic volumes.

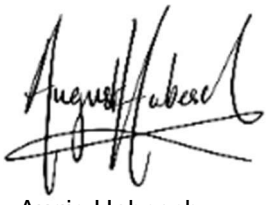
* * * * *

I trust the foregoing is satisfactory. If you have any questions, feel free to call.

Sincerely,
BA Consulting Group Ltd.



Emily J. Ecker, P. Eng.
Senior Associate, BA Group



Augie Habesch
Lead Transportation Analyst, BA Group

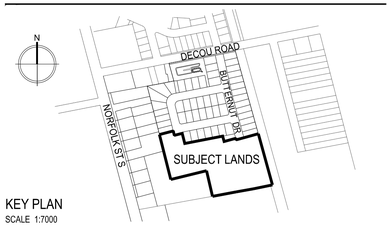
cc.
Steve Krossey, BA Group

Appendix A:
Draft Plan (Weston Consulting)

BA Consulting Group Ltd.
300 – 45 St. Clair Ave. W
Toronto ON M4V 1K9
TEL 416 961 7110
EMAIL bagroup@bagroup.com

DRAFT PLAN OF SUBDIVISION

PART OF LOT 1, CONCESSION 4
GEOGRAPHIC TOWNSHIP OF WOODHOUSE
NORFOLK COUNTY



KEY PLAN
SCALE 1:7000

OWNER'S CERTIFICATE:
I authorize Weston Consulting Group Inc. to prepare and submit this plan for draft approval.

Date: _ _ _ _ _ _

BIG SKY SIMCOE GP INC.
1135 STELLAR DRIVE
NEWMARKET, ONTARIO L3Y 7B8
PHONE: 289-716-0999
email: ashley@calibrex.ca bruno@calibrex.ca

SURVEYOR'S CERTIFICATE:
I hereby certify that the boundaries of the lands being subdivided and their correct relationship to the adjacent lands are accurately and correctly shown on this plan.

Date: _ _ _ _ _ _

HARRY KALANTZAKOS
ASHENHURST NOUWENS & ASSOCIATES INC.
PROFESSIONAL ENGINEERS & ONTARIO LAND SURVEYORS
225 KING WILLIAM ST, SUITE 204
HAMILTON, ONTARIO L8R 1B1
PHONE: (905) 529-6316
email: anl@AshenhurstNouwens.ca

ADDITIONAL INFORMATION:
[Section 51(17) of the Planning Act, R.S.O. 1990, c. P.13], as amended to December 8, 2021.
a), b), e), f), g), & j) - on plan.
c) - on key plan
d) - see statistics
h) - piped water to be installed by developer
i) - sandy or loamy sediments over lacustrine clays or loams
k) - all services to be made available by developer
l) - nil

DEVELOPMENT STATISTICS:

BLOCKS	UNITS	AREA(HA)
Street Townhouses [Blks 1-15]:	85	2.132 ha
Park [Blk 16]:		0.069 ha
Roads:		0.705 ha
Total:	85	2.906 ha

SCALE 1:400

0 20m

WESTON CONSULTING

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Toronto: 268 Berkeley St.
Toronto, Ontario M5A 2X1
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REVISIONS LIST

09 MAR 2022	Block 2 units & driveway modifications
07 MAR 2022	Finalize RED-LINED COMMENTS
09 FEB 2022	First draft

Drawing Number: D1

File Number:	10612
Drawn By:	SM
Planner:	KP
Scale:	1:400
CAD:	10612/D1 Draft Plan_2022_03_09.dwg

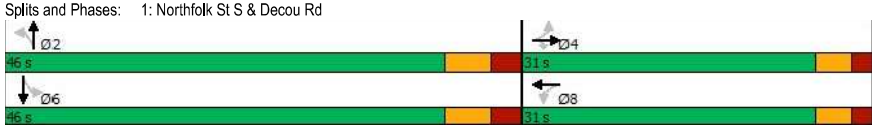
Queues
1: Northfolk St S & Decou Rd

Existing AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	20	40	35	10	15	305	50	195
Future Volume (vph)	75	20	40	35	10	15	305	50	195
Lane Group Flow (vph)	0	114	48	42	90	0	415	0	301
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	26.0	26.0	26.0	26.0	26.0	39.0	39.0	39.0	39.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (%)	40.3%	40.3%	40.3%	40.3%	40.3%	59.7%	59.7%	59.7%	59.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		7.0		7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Min	Min	Min	Min
v/c Ratio		0.24	0.08	0.10	0.16		0.26		0.22
Control Delay		20.1	5.0	18.5	6.7		10.9		10.9
Queue Delay		0.0	0.0	0.0	0.0		0.0		0.0
Total Delay		20.1	5.0	18.5	6.7		10.9		10.9
Queue Length 50th (m)		11.8	0.0	4.2	1.2		16.3		11.8
Queue Length 95th (m)		21.4	4.7	9.8	8.7		22.2		17.1
Internal Link Dist (m)		47.3			130.2		300.4		256.9
Turn Bay Length (m)				15.0					
Base Capacity (vph)		474	567	407	554		1593		1357
Starvation Cap Reductn		0	0	0	0		0		0
Spillback Cap Reductn		0	0	0	0		0		0
Storage Cap Reductn		0	0	0	0		0		0
Reduced v/c Ratio		0.24	0.08	0.10	0.16		0.26		0.22

Intersection Summary
Cycle Length: 77
Actuated Cycle Length: 77
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Northfolk St S & Decou Rd



HCM Signalized Intersection Capacity Analysis
1: Northfolk St S & Decou Rd

Existing AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	20	40	35	10	65	15	305	25	50	195	5
Future Volume (vph)	75	20	40	35	10	65	15	305	25	50	195	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.95	
Frpb, ped/bikes		1.00	1.00	1.00	0.98			1.00			1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.87			0.99			1.00	
Flt Protected		0.96	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1841	1570	1674	1488			3345			3304	
Flt Permitted		0.73	1.00	0.68	1.00			0.93			0.80	
Satd. Flow (perm)		1406	1570	1205	1488			3130			2677	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	90	24	48	42	12	78	18	367	30	60	235	6
RTOR Reduction (vph)	0	0	32	0	52	0	0	7	0	0	2	0
Lane Group Flow (vph)	0	114	16	42	38	0	0	408	0	0	299	0
Confl. Peds. (#/hr)	5					5	10					10
Heavy Vehicles (%)	0%	0%	4%	9%	8%	11%	0%	8%	8%	6%	10%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Effective Green, g (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Actuated g/C Ratio		0.34	0.34	0.34	0.34			0.51			0.51	
Clearance Time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)		474	530	406	502			1585			1355	
v/s Ratio Prot					0.03							
v/s Ratio Perm		c0.08	0.01	0.03				c0.13			0.11	
v/c Ratio		0.24	0.03	0.10	0.08			0.26			0.22	
Uniform Delay, d1		18.4	17.1	17.5	17.3			10.8			10.6	
Progression Factor		1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.2	0.1	0.5	0.3			0.2			0.2	
Delay (s)		19.6	17.2	18.0	17.6			11.0			10.7	
Level of Service		B	B	B	B			B			B	
Approach Delay (s)		18.9			17.8			11.0			10.7	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	90.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Decou Rd & Brant St

Existing AM Peak Hour



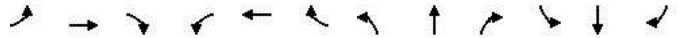
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	85	100	0	0	10
Future Volume (Veh/h)	10	85	100	0	0	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	12	101	119	0	0	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		154				
pX, platoon unblocked						
vC, conflicting volume	119				244	119
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	119				244	119
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1482				743	938

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	113	119	12
Volume Left	12	0	0
Volume Right	0	0	12
cSH	1482	1700	938
Volume to Capacity	0.01	0.07	0.01
Queue Length 95th (m)	0.2	0.0	0.3
Control Delay (s)	0.8	0.0	8.9
Lane LOS	A		A
Approach Delay (s)	0.8	0.0	8.9
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Decou Rd & Simson Ave

Existing AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	85	0	0	95	0	0	0	0	0	0	5
Future Volume (Veh/h)	0	85	0	0	95	0	0	0	0	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	0	105	0	0	117	0	0	0	0	0	0	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		307										
pX, platoon unblocked												
vC, conflicting volume	117			105			228	222	105	222	222	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			105			228	222	105	222	222	117
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	99
cM capacity (veh/h)	1484			1499			727	680	955	738	680	941

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	105	117	0	6
Volume Left	0	0	0	0
Volume Right	0	0	0	6
cSH	1484	1499	1700	941
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	0.0	8.9
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	8.9
Approach LOS			A	A

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	15.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Willow Wood Dr & Decou Rd

Existing AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	85	0	0	95	0	0
Future Volume (Veh/h)	85	0	0	95	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	106	0	0	119	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			106		225	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			106		225	106
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1498		768	954

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	106	119	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1498	1700
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		8.3%	ICU Level of Service A
Analysis Period (min)		15	

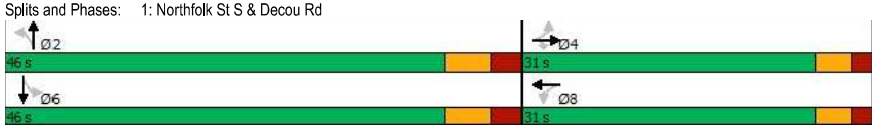
Queues
1: Northfolk St S & Decou Rd

Existing PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	30	85	25	25	25	220	75	375
Future Volume (vph)	75	30	85	25	25	25	220	75	375
Lane Group Flow (vph)	0	115	92	27	109	0	288	0	495
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	26.0	26.0	26.0	26.0	26.0	39.0	39.0	39.0	39.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (%)	40.3%	40.3%	40.3%	40.3%	40.3%	59.7%	59.7%	59.7%	59.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		7.0		7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Min	Min	Min	Min
v/c Ratio		0.24	0.15	0.06	0.18		0.18		0.33
Control Delay		20.0	5.1	17.9	7.5		10.1		12.0
Queue Delay		0.0	0.0	0.0	0.0		0.0		0.0
Total Delay		20.0	5.1	17.9	7.5		10.1		12.0
Queue Length 50th (m)		11.9	0.0	2.6	2.6		10.5		21.0
Queue Length 95th (m)		23.7	8.9	7.8	12.4		17.0		30.7
Internal Link Dist (m)		47.3			130.2		300.4		256.9
Turn Bay Length (m)				15.0					
Base Capacity (vph)		485	606	443	616		1583		1510
Starvation Cap Reductn		0	0	0	0		0		0
Spillback Cap Reductn		0	0	0	0		0		0
Storage Cap Reductn		0	0	0	0		0		0
Reduced v/c Ratio		0.24	0.15	0.06	0.18		0.18		0.33

Intersection Summary
Cycle Length: 77
Actuated Cycle Length: 77
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Northfolk St S & Decou Rd



HCM Signalized Intersection Capacity Analysis
1: Northfolk St S & Decou Rd

Existing PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	30	85	25	25	75	25	220	20	75	375	5
Future Volume (vph)	75	30	85	25	25	75	25	220	20	75	375	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.95	
Frt		1.00	0.85	1.00	0.89			0.99			1.00	
Flt Protected		0.97	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1855	1617	1825	1667			3504			3551	
Flt Permitted		0.75	1.00	0.68	1.00			0.88			0.83	
Satd. Flow (perm)		1438	1617	1312	1667			3110			2984	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	33	92	27	27	82	27	239	22	82	408	5
RTOR Reduction (vph)	0	0	61	0	54	0	0	8	0	0	1	0
Lane Group Flow (vph)	0	115	31	27	55	0	0	280	0	0	494	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	3%	0%	3%	0%	0%	2%	14%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Effective Green, g (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Actuated g/C Ratio		0.34	0.34	0.34	0.34			0.51			0.51	
Clearance Time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)		485	546	443	562			1575			1511	
v/s Ratio Prot					0.03							
v/s Ratio Perm		c0.08	0.02	0.02				0.09			c0.17	
v/c Ratio		0.24	0.06	0.06	0.10			0.18			0.33	
Uniform Delay, d1		18.4	17.2	17.2	17.5			10.3			11.2	
Progression Factor		1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.1	0.2	0.3	0.3			0.1			0.3	
Delay (s)		19.5	17.4	17.5	17.8			10.4			11.5	
Level of Service		B	B	B	B			B			B	
Approach Delay (s)		18.6			17.7			10.4			11.5	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.29			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	95.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Decou Rd & Brant St

Existing PM Peak Hour

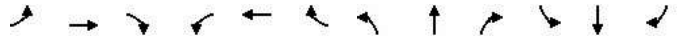
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	115	120	5	0	5
Future Volume (Veh/h)	10	115	120	5	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	128	133	6	0	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		154				
pX, platoon unblocked						
vC, conflicting volume	139				286	136
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139				286	136
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1457				703	918

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	139	139	6
Volume Left	11	0	0
Volume Right	0	6	6
cSH	1457	1700	918
Volume to Capacity	0.01	0.08	0.01
Queue Length 95th (m)	0.2	0.0	0.1
Control Delay (s)	0.6	0.0	8.9
Lane LOS	A		A
Approach Delay (s)	0.6	0.0	8.9
Approach LOS			A

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Decou Rd & Simson Ave

Existing PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	105	0	0	115	0	5	0	0	0	0	5
Future Volume (Veh/h)	10	105	0	0	115	0	5	0	0	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	10	107	0	0	117	0	5	0	0	0	0	5
Pedestrians								5				
Lane Width (m)								3.7				
Walking Speed (m/s)								1.1				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		307										
pX, platoon unblocked												
vC, conflicting volume	117			112			254	249	112	244	249	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			112			254	249	112	244	249	117
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	100	100	99
cM capacity (veh/h)	1484			1483			690	650	942	708	650	941

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	117	117	5	5
Volume Left	10	0	5	0
Volume Right	0	0	0	5
cSH	1484	1483	690	941
Volume to Capacity	0.01	0.00	0.01	0.01
Queue Length 95th (m)	0.2	0.0	0.2	0.1
Control Delay (s)	0.7	0.0	10.3	8.8
Lane LOS	A		B	A
Approach Delay (s)	0.7	0.0	10.3	8.8
Approach LOS			B	A

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	23.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
4: Willow Wood Dr & Decou Rd

Existing PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	105	0	0	115	0	0
Future Volume (Veh/h)	105	0	0	115	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	109	0	0	120	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			109		229	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			109		229	109
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1494		764	950

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	109	120	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1494	1700
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	9.4%	ICU Level of Service	A
Analysis Period (min)	15		

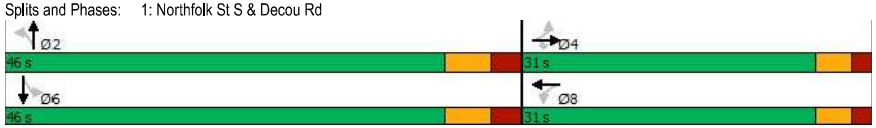
Queues
1: Northfolk St S & Decou Rd

Future Background AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	20	40	200	10	15	320	80	205
Future Volume (vph)	75	20	40	200	10	15	320	80	205
Lane Group Flow (vph)	0	104	43	217	136	0	462	0	315
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	26.0	26.0	26.0	26.0	26.0	39.0	39.0	39.0	39.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (%)	40.3%	40.3%	40.3%	40.3%	40.3%	59.7%	59.7%	59.7%	59.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		7.0		7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Min	Min	Min	Min
v/c Ratio		0.22	0.07	0.49	0.22		0.27		0.24
Control Delay		19.9	4.2	24.7	5.5		9.8		11.1
Queue Delay		0.0	0.0	0.0	0.0		0.0		0.0
Total Delay		19.9	4.2	24.7	5.5		9.8		11.1
Queue Length 50th (m)		10.7	0.0	24.6	1.1		16.1		12.5
Queue Length 95th (m)		21.9	4.7	44.3	11.8		24.6		19.8
Internal Link Dist (m)		47.3			130.2		300.4		256.9
Turn Bay Length (m)				15.0					
Base Capacity (vph)		463	583	447	631		1685		1336
Starvation Cap Reductn		0	0	0	0		0		0
Spillback Cap Reductn		0	0	0	0		0		0
Storage Cap Reductn		0	0	0	0		0		0
Reduced v/c Ratio		0.22	0.07	0.49	0.22		0.27		0.24

Intersection Summary
Cycle Length: 77
Actuated Cycle Length: 77
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Northfolk St S & Decou Rd



HCM Signalized Intersection Capacity Analysis
1: Northfolk St S & Decou Rd

Future Background AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	20	40	200	10	115	15	320	90	80	205	5
Future Volume (vph)	75	20	40	200	10	115	15	320	90	80	205	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.95	
Frt		1.00	0.85	1.00	0.86			0.97			1.00	
Flt Protected		0.96	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1848	1617	1825	1626			3476			3559	
Flt Permitted		0.72	1.00	0.69	1.00			0.94			0.73	
Satd. Flow (perm)		1374	1617	1325	1626			3266			2634	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	22	43	217	11	125	16	348	98	87	223	5
RTOR Reduction (vph)	0	0	28	0	83	0	0	32	0	0	1	0
Lane Group Flow (vph)	0	104	15	217	53	0	0	430	0	0	314	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%	0%	2%	0%	0%	1%	14%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Effective Green, g (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Actuated g/C Ratio		0.34	0.34	0.34	0.34			0.51			0.51	
Clearance Time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)		463	546	447	549			1654			1334	
v/s Ratio Prot					0.03							
v/s Ratio Perm		0.08	0.01	c0.16				c0.13			0.12	
v/c Ratio		0.22	0.03	0.49	0.10			0.26			0.24	
Uniform Delay, d1		18.3	17.0	20.2	17.5			10.8			10.6	
Progression Factor		1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.1	0.1	3.7	0.4			0.2			0.2	
Delay (s)		19.4	17.1	23.9	17.8			11.0			10.8	
Level of Service		B	B	C	B			B			B	
Approach Delay (s)		18.7			21.6			11.0			10.8	
Approach LOS		B			C			B			B	

Intersection Summary					
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.35				
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	124.9%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
2: Decou Rd & Brant St

Future Background AM Peak Hour



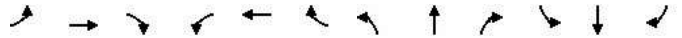
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	150	280	0	0	10
Future Volume (Veh/h)	10	150	280	0	0	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	167	311	0	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		154				
pX, platoon unblocked						
vC, conflicting volume	311				500	311
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	311				500	311
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1261				529	734

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	178	311	11
Volume Left	11	0	0
Volume Right	0	0	11
cSH	1261	1700	734
Volume to Capacity	0.01	0.18	0.01
Queue Length 95th (m)	0.2	0.0	0.3
Control Delay (s)	0.6	0.0	10.0
Lane LOS	A		A
Approach Delay (s)	0.6	0.0	10.0
Approach LOS			A

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		26.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
3: Decou Rd & Simson Ave

Future Background AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	140	10	0	250	0	25	0	5	0	0	5
Future Volume (Veh/h)	0	140	10	0	250	0	25	0	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	143	10	0	255	0	26	0	5	0	0	5
Pedestrians								5				
Lane Width (m)								3.7				
Walking Speed (m/s)								1.1				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		307										
pX, platoon unblocked												
vC, conflicting volume	255			158			413	408	153	408	413	255
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	255			158			413	408	153	408	413	255
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			95	100	99	100	100	99
cM capacity (veh/h)	1322			1427			545	533	894	552	530	789

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	153	255	31	5
Volume Left	0	0	26	0
Volume Right	10	0	5	5
cSH	1322	1427	581	789
Volume to Capacity	0.00	0.00	0.05	0.01
Queue Length 95th (m)	0.0	0.0	1.3	0.1
Control Delay (s)	0.0	0.0	11.5	9.6
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	11.5	9.6
Approach LOS			B	A

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		28.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
4: Willow Wood Dr & Decou Rd

Future Background AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	145	0	0	250	0	0
Future Volume (Veh/h)	145	0	0	250	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	151	0	0	260	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			151		411	151
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			151		411	151
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1442		601	901

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	151	260	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1442	1700
Volume to Capacity	0.09	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		16.5%	ICU Level of Service A
Analysis Period (min)		15	

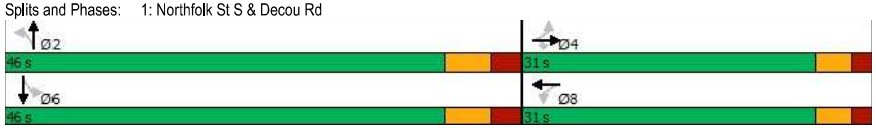
Queues
1: Northfolk St S & Decou Rd

Future background PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	30	90	135	25	25	220	145	385
Future Volume (vph)	75	30	90	135	25	25	220	145	385
Lane Group Flow (vph)	0	115	98	147	152	0	511	0	581
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	26.0	26.0	26.0	26.0	26.0	39.0	39.0	39.0	39.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (%)	40.3%	40.3%	40.3%	40.3%	40.3%	59.7%	59.7%	59.7%	59.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		7.0		7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Min	Min	Min	Min
v/c Ratio		0.24	0.16	0.33	0.24		0.31		0.46
Control Delay		20.2	5.0	21.7	6.4		6.0		13.6
Queue Delay		0.0	0.0	0.0	0.0		0.0		0.0
Total Delay		20.2	5.0	21.7	6.4		6.0		13.6
Queue Length 50th (m)		11.9	0.0	15.8	2.6		10.3		26.7
Queue Length 95th (m)		23.8	9.1	30.1	14.2		18.5		39.1
Internal Link Dist (m)		47.3			130.2		300.4		256.9
Turn Bay Length (m)				15.0					
Base Capacity (vph)		471	610	443	642		1655		1272
Starvation Cap Reductn		0	0	0	0		0		0
Spillback Cap Reductn		0	0	0	0		0		0
Storage Cap Reductn		0	0	0	0		0		0
Reduced v/c Ratio		0.24	0.16	0.33	0.24		0.31		0.46

Intersection Summary
Cycle Length: 77
Actuated Cycle Length: 77
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Northfolk St S & Decou Rd



HCM Signalized Intersection Capacity Analysis
1: Northfolk St S & Decou Rd

Future background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	30	90	135	25	115	25	220	225	145	385	5
Future Volume (vph)	75	30	90	135	25	115	25	220	225	145	385	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.95	
Frt		1.00	0.85	1.00	0.88			0.93			1.00	
Flt Protected		0.97	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1855	1617	1825	1657			3347			3567	
Flt Permitted		0.73	1.00	0.68	1.00			0.90			0.69	
Satd. Flow (perm)		1395	1617	1312	1657			3032			2509	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	33	98	147	27	125	27	239	245	158	418	5
RTOR Reduction (vph)	0	0	65	0	83	0	0	121	0	0	1	0
Lane Group Flow (vph)	0	115	33	147	69	0	0	390	0	0	580	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%	0%	2%	0%	0%	1%	14%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Effective Green, g (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Actuated g/C Ratio		0.34	0.34	0.34	0.34			0.51			0.51	
Clearance Time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)		471	546	443	559			1535			1270	
v/s Ratio Prot					0.04							
v/s Ratio Perm		0.08	0.02	c0.11				0.13			c0.23	
v/c Ratio		0.24	0.06	0.33	0.12			0.25			0.46	
Uniform Delay, d1		18.4	17.2	19.0	17.6			10.8			12.2	
Progression Factor		1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.2	0.2	2.0	0.5			0.2			0.5	
Delay (s)		19.6	17.5	21.0	18.1			10.9			12.7	
Level of Service		B	B	C	B			B			B	
Approach Delay (s)		18.6			19.5			10.9			12.7	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	128.3%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Decou Rd & Brant St

Future background PM Peak Hour

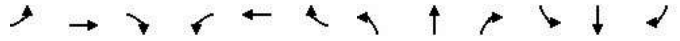
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	325	235	5	0	5
Future Volume (Veh/h)	10	325	235	5	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	361	261	6	0	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		154				
pX, platoon unblocked						
vC, conflicting volume	267				647	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	267				647	264
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1308				435	780

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	372	267	6
Volume Left	11	0	0
Volume Right	0	6	6
cSH	1308	1700	780
Volume to Capacity	0.01	0.16	0.01
Queue Length 95th (m)	0.2	0.0	0.2
Control Delay (s)	0.3	0.0	9.7
Lane LOS	A		A
Approach Delay (s)	0.3	0.0	9.7
Approach LOS			A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Decou Rd & Simson Ave

Future background PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	285	30	5	210	0	25	0	0	0	0	5
Future Volume (Veh/h)	10	285	30	5	210	0	25	0	0	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	10	291	31	5	214	0	26	0	0	0	0	5
Pedestrians								5				
Lane Width (m)								3.7				
Walking Speed (m/s)								1.1				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		307										
pX, platoon unblocked												
vC, conflicting volume	214			327			560	556	312	550	571	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			327			560	556	312	550	571	214
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			94	100	100	100	100	99
cM capacity (veh/h)	1368			1238			432	435	730	443	427	831

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	332	219	26	5
Volume Left	10	5	26	0
Volume Right	31	0	0	5
cSH	1368	1238	432	831
Volume to Capacity	0.01	0.00	0.06	0.01
Queue Length 95th (m)	0.2	0.1	1.5	0.1
Control Delay (s)	0.3	0.2	13.9	9.4
Lane LOS	A	A	B	A
Approach Delay (s)	0.3	0.2	13.9	9.4
Approach LOS			B	A

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	36.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
4: Willow Wood Dr & Decou Rd

Future background PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	285	0	0	215	0	0
Future Volume (Veh/h)	285	0	0	215	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	297	0	0	224	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			297		521	297
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			297		521	297
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1276		519	747

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	297	224	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1276	1700
Volume to Capacity	0.17	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

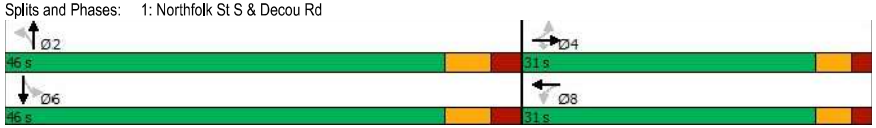
Queues
1: Northfolk St S & Decou Rd

Future Total AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	20	40	225	10	15	320	90	205
Future Volume (vph)	75	20	40	225	10	15	320	90	205
Lane Group Flow (vph)	0	104	43	245	174	0	473	0	326
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	26.0	26.0	26.0	26.0	26.0	39.0	39.0	39.0	39.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (%)	40.3%	40.3%	40.3%	40.3%	40.3%	59.7%	59.7%	59.7%	59.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		7.0		7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Min	Min	Min	Min
v/c Ratio		0.23	0.07	0.55	0.27		0.28		0.25
Control Delay		20.1	4.2	26.3	5.1		9.6		11.3
Queue Delay		0.0	0.0	0.0	0.0		0.0		0.0
Total Delay		20.1	4.2	26.3	5.1		9.6		11.3
Queue Length 50th (m)		10.7	0.0	28.5	1.1		16.1		13.1
Queue Length 95th (m)		22.0	4.7	50.5	13.1		24.7		20.6
Internal Link Dist (m)		47.3			130.2		300.4		256.9
Turn Bay Length (m)				15.0					
Base Capacity (vph)		450	583	447	654		1685		1296
Starvation Cap Reductn		0	0	0	0		0		0
Spillback Cap Reductn		0	0	0	0		0		0
Storage Cap Reductn		0	0	0	0		0		0
Reduced v/c Ratio		0.23	0.07	0.55	0.27		0.28		0.25

Intersection Summary
Cycle Length: 77
Actuated Cycle Length: 77
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Northfolk St S & Decou Rd



HCM Signalized Intersection Capacity Analysis
1: Northfolk St S & Decou Rd

Future Total AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	20	40	225	10	150	15	320	100	90	205	5
Future Volume (vph)	75	20	40	225	10	150	15	320	100	90	205	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.95	
Frt		1.00	0.85	1.00	0.86			0.97			1.00	
Flt Protected		0.96	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1848	1617	1825	1621			3467			3556	
Flt Permitted		0.69	1.00	0.69	1.00			0.94			0.71	
Satd. Flow (perm)		1334	1617	1325	1621			3257			2554	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	22	43	245	11	163	16	348	109	98	223	5
RTOR Reduction (vph)	0	0	28	0	108	0	0	37	0	0	1	0
Lane Group Flow (vph)	0	104	15	245	66	0	0	436	0	0	325	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%	0%	2%	0%	0%	1%	14%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Effective Green, g (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Actuated g/C Ratio		0.34	0.34	0.34	0.34			0.51			0.51	
Clearance Time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)		450	546	447	547			1649			1293	
v/s Ratio Prot					0.04							
v/s Ratio Perm		0.08	0.01	c0.18				c0.13			0.13	
v/c Ratio		0.23	0.03	0.55	0.12			0.26			0.25	
Uniform Delay, d1		18.3	17.0	20.7	17.6			10.8			10.7	
Progression Factor		1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.2	0.1	4.8	0.5			0.2			0.2	
Delay (s)		19.5	17.1	25.5	18.1			11.0			11.0	
Level of Service		B	B	C	B			B			B	
Approach Delay (s)		18.8			22.4			11.0			11.0	
Approach LOS		B			C			B			B	

Intersection Summary					
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.38				
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	128.3%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis
2: Decou Rd & Brant St

Future Total AM Peak Hour



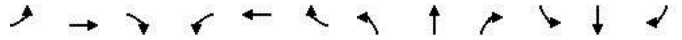
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	170	340	0	0	10
Future Volume (Veh/h)	10	170	340	0	0	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	189	378	0	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		154				
pX, platoon unblocked						
vC, conflicting volume	378				589	378
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	378				589	378
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	98
cM capacity (veh/h)	1192				470	673

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	200	378	11
Volume Left	11	0	0
Volume Right	0	0	11
cSH	1192	1700	673
Volume to Capacity	0.01	0.22	0.02
Queue Length 95th (m)	0.2	0.0	0.4
Control Delay (s)	0.5	0.0	10.4
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	10.4
Approach LOS			B

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		27.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
3: Decou Rd & Simson Ave

Future Total AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	140	30	0	250	0	85	0	10	0	0	5
Future Volume (Veh/h)	0	140	30	0	250	0	85	0	10	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	143	31	0	255	0	87	0	10	0	0	5
Pedestrians								5				
Lane Width (m)								3.7				
Walking Speed (m/s)								1.1				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		307										
pX, platoon unblocked												
vC, conflicting volume	255			179			424	418	164	424	434	255
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	255			179			424	418	164	424	434	255
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			84	100	99	100	100	99
cM capacity (veh/h)	1322			1402			536	526	882	536	516	789

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	174	255	97	5
Volume Left	0	0	87	0
Volume Right	31	0	10	5
cSH	1322	1402	559	789
Volume to Capacity	0.00	0.00	0.17	0.01
Queue Length 95th (m)	0.0	0.0	4.7	0.1
Control Delay (s)	0.0	0.0	12.8	9.6
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	12.8	9.6
Approach LOS			B	A

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		31.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
4: Willow Wood Dr & Decou Rd

Future Total AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	150	0	0	250	0	0
Future Volume (Veh/h)	150	0	0	250	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	156	0	0	260	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			156		416	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			156		416	156
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1436		597	895

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	156	260	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1436	1700
Volume to Capacity	0.09	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		16.5%	ICU Level of Service A
Analysis Period (min)		15	

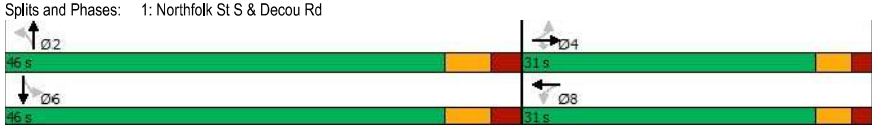
Queues
1: Northfolk St S & Decou Rd

Future Total PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	30	90	155	25	25	220	165	385
Future Volume (vph)	75	30	90	155	25	25	220	165	385
Lane Group Flow (vph)	0	115	98	168	174	0	549	0	602
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	26.0	26.0	26.0	26.0	26.0	39.0	39.0	39.0	39.0
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	46.0	46.0	46.0	46.0
Total Split (%)	40.3%	40.3%	40.3%	40.3%	40.3%	59.7%	59.7%	59.7%	59.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		7.0		7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Min	Min	Min	Min
v/c Ratio		0.25	0.16	0.38	0.27		0.33		0.49
Control Delay		20.3	5.0	22.5	6.1		5.7		14.1
Queue Delay		0.0	0.0	0.0	0.0		0.0		0.0
Total Delay		20.3	5.0	22.5	6.1		5.7		14.1
Queue Length 50th (m)		11.9	0.0	18.3	2.6		10.3		28.3
Queue Length 95th (m)		23.8	9.1	34.3	14.9		18.7		41.5
Internal Link Dist (m)		47.3			130.2		300.4		256.9
Turn Bay Length (m)				15.0					
Base Capacity (vph)		463	610	443	654		1670		1228
Starvation Cap Reductn		0	0	0	0		0		0
Spillback Cap Reductn		0	0	0	0		0		0
Storage Cap Reductn		0	0	0	0		0		0
Reduced v/c Ratio		0.25	0.16	0.38	0.27		0.33		0.49

Intersection Summary
Cycle Length: 77
Actuated Cycle Length: 77
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Northfolk St S & Decou Rd



HCM Signalized Intersection Capacity Analysis
1: Northfolk St S & Decou Rd

Future Total PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	30	90	155	25	135	25	220	260	165	385	5
Future Volume (vph)	75	30	90	155	25	135	25	220	260	165	385	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.95	
Frt		1.00	0.85	1.00	0.87			0.92			1.00	
Flt Protected		0.97	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1855	1617	1825	1650			3331			3563	
Flt Permitted		0.71	1.00	0.68	1.00			0.90			0.67	
Satd. Flow (perm)		1373	1617	1312	1650			3021			2424	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	33	98	168	27	147	27	239	283	179	418	5
RTOR Reduction (vph)	0	0	65	0	97	0	0	140	0	0	1	0
Lane Group Flow (vph)	0	115	33	168	77	0	0	409	0	0	601	0
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%	0%	2%	0%	0%	1%	14%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Effective Green, g (s)		26.0	26.0	26.0	26.0			39.0			39.0	
Actuated g/C Ratio		0.34	0.34	0.34	0.34			0.51			0.51	
Clearance Time (s)		5.0	5.0	5.0	5.0			7.0			7.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)		463	546	443	557			1530			1227	
v/s Ratio Prot					0.05							
v/s Ratio Perm		0.08	0.02	c0.13				0.14			c0.25	
v/c Ratio		0.25	0.06	0.38	0.14			0.27			0.49	
Uniform Delay, d1		18.4	17.2	19.4	17.7			10.8			12.5	
Progression Factor		1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.3	0.2	2.5	0.5			0.2			0.6	
Delay (s)		19.7	17.5	21.8	18.2			11.0			13.1	
Level of Service		B	B	C	B			B			B	
Approach Delay (s)		18.7			20.0			11.0			13.1	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	128.3%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
2: Decou Rd & Brant St

Future Total PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	380	275	5	0	5
Future Volume (Veh/h)	10	380	275	5	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	422	306	6	0	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		154				
pX, platoon unblocked						
vC, conflicting volume	312				753	309
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	312				753	309
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1260				377	736

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	433	312	6
Volume Left	11	0	0
Volume Right	0	6	6
cSH	1260	1700	736
Volume to Capacity	0.01	0.18	0.01
Queue Length 95th (m)	0.2	0.0	0.2
Control Delay (s)	0.3	0.0	9.9
Lane LOS	A		A
Approach Delay (s)	0.3	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Decou Rd & Simson Ave

Future Total PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	285	85	10	210	0	65	0	5	0	0	5
Future Volume (Veh/h)	10	285	85	10	210	0	65	0	5	0	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	10	291	87	10	214	0	66	0	5	0	0	5
Pedestrians								5				
Lane Width (m)								3.7				
Walking Speed (m/s)								1.1				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		307										
pX, platoon unblocked												
vC, conflicting volume	214			383			598	594	340	594	637	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			383			598	594	340	594	637	214
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			84	100	99	100	100	99
cM capacity (veh/h)	1368			1181			406	412	704	410	389	831

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	388	224	71	5
Volume Left	10	10	66	0
Volume Right	87	0	5	5
cSH	1368	1181	418	831
Volume to Capacity	0.01	0.01	0.17	0.01
Queue Length 95th (m)	0.2	0.2	4.6	0.1
Control Delay (s)	0.3	0.4	15.4	9.4
Lane LOS	A	A	C	A
Approach Delay (s)	0.3	0.4	15.4	9.4
Approach LOS			C	A

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	41.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
4: Willow Wood Dr & Decou Rd

Future Total PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	290	0	0	220	0	0
Future Volume (Veh/h)	290	0	0	220	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	302	0	0	229	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			302		531	302
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			302		531	302
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1270		512	742

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	302	229	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1270	1700
Volume to Capacity	0.18	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C:
Signal Timing Plan

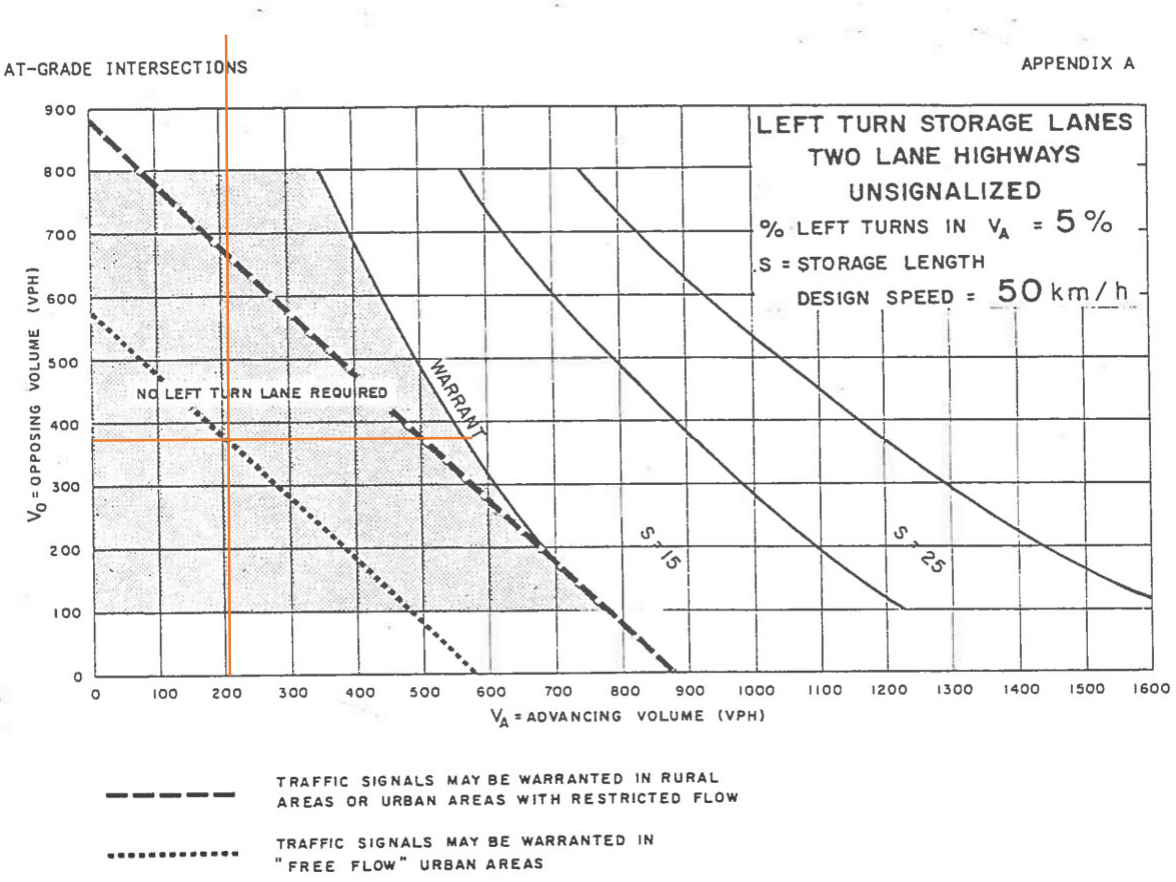
PHASE	1	2	3	4	5	6	7	8
MIN. GREEN	5	33	5	15	5	33	0	15
WALK		23	0	13	0	23	0	5
PED CLEAR	7	10	7	7	0	10	7	7
VEH EXT	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MAX EXT	0	4	0	0	0	0	0	0
MAX 1	10	39	35	20	10	39	35	35
MAX 2		40	40	40	40	40	40	40

DARNELL – TIMINGS FOR DECOU AND HWY AND HWY #24

Appendix D:
MTO Left Turn Warrant

Project Number: 8116-03
Project Name: 18 Decou Rd
Date: 2025-03-31

	AM Warrant	PM Warrant
VA	250	220
VO	170	380
VL	0	10
VL/VA	0%	5%
	No Lane Required	**No Lane Required**



Appendix E:
Parking Allocation Plan

SITE PLAN and BUILDING STATISTICS		
1	ZONING	
		REQUIRED
2	LOT AREA (INTERIOR)	156 m² (MIN.)
3	LOT AREA (CORNER)	264 m² (MIN.)
4	LOT FRONTAGE (INTERIOR)	6.0 m (MIN.)
5	LOT FRONTAGE (CORNER)	8.7 m (MIN.)
6	FRONT YARD SETBACK	6.0 m (MIN.)
7	REAR YARD SETBACK	4.4 m (MIN.)
8	INT. SIDE YARD SETBACK	1.2m (MIN.)
9	EXT. SIDE YARD SETBACK	2.4 m (MIN.)
10	BUILDING HEIGHT	11.0 m (MAX)



NOTE:

- THESE ARE NOT FINAL SITINGS.
- THIS SITE PLAN IS FOR DISCUSSION PURPOSES ONLY.
- ENGINEERING AND ZONING TO BE CONFIRMED

STAMP & HAMMER
1135 STELLAR DRIVE
NEWMARKET ON L3Y 7B8
905-235-3933
info@stampandhammer.com

No.	DESCRIPTION	DATE	BY
1	ISSUED FOR CONSULTANT COORDINATION	2025-03-26	M.S.

TIME | DATE | STAMP
2025-03-26 10:00:04 AM

BIG SKY | SIMCOE 1B
TOWNHOUSE UNITS + BASEMENT ADU'S

SCALE: As indicated

DATE: MARCH 2025

TITLE: SITE PLAN

A-004

NOTE: CONTRACTOR WILL CHECK AND VERIFY ALL DIMENSIONS AND CHECK ALL CONDITIONS ON THE JOB SITE BEFORE PROCEEDING WITH ANY WORK.

FUNCTIONAL SERVICING REPORT IN SUPPORT OF ENGINEERING APPROVAL

Big Sky Subdivision – Phase 1B
18 Decou Road Residential Development

8395 Jane Street, Suite 100
Vaughan, Ontario L4K 5Y2
Tel: (905) 326-1404
File Number: 21102

Prepared For:

Big Sky Simcoe Limited Partnership

3	Issued for ZBLA	April 28, 2025
2	Issued for 2nd Submission	September 26, 2023
1	Issued for 1st Submission	January 20, 2023
No.	**Revision**	**Date**

EXECUTIVE SUMMARY

Counterpoint Engineering (CPE) has been retained by Big Sky Simcoe Limited Partnership (the Owner) to prepare the detailed engineering design for Phase 1B of the Big Sky Subdivision (the Subdivision) located at 18 Decou Road, Simcoe, Norfolk County, Ontario. Proposed Phase 1B is 2.92 ha within the Big Sky Subdivision lands and is proposed to consist of 86 townhouse lots, each with 1 townhouse unit and 1 additional dwelling unit (ADU), a single right-of-way (Butternut Drive), and a reserve block for a future municipal trailway. The purpose of this report is to outline the detailed site grading, servicing, and stormwater management design for development approval of Phase 1B. The County refers to these lands with the file number 28TPL2022079. The servicing strategy for the proposed development is summarized as follows:

WATER SERVICING:

Phase 1B is proposed to be serviced by a 200 mm local watermain within the right-of-way from two connections to the existing water network at Butternut Drive and Tulip Crescent. These external connections would complete an external watermain loop. Peak water demands for the proposed development is estimated to be 273.1 L/min under normal operating conditions and 4,654 L/min under emergency conditions. A hydraulic analysis was conducted by R.V. Anderson Associates Limited (RVA) that concluded that the existing water system has the capacity to adequately support the proposed development.

SANITARY SERVICING:

Phase 1B is proposed to be serviced by 200 mm local sanitary sewers within the right-of-way, connected to existing 200 mm sanitary sewer stubs at the ends of Tulip Crescent and Butternut Drive. The sanitary drainage area for Phase 1B is 2.92 ha with a design occupancy of 345 people, with a proposed total peak sanitary outflow of 5.43 L/s. Sanitary sewer hydraulic modelling was completed by R.V. Anderson Associates Limited (RVA) that concluded that the existing sanitary sewer system has the capacity to support the proposed development.

STORMWATER SERVICING:

The proposed Phase 1B storm network will convey stormflows via Phase 1A to the existing wetland SWMF located at the northwest corner of the site. Due to the increase in imperviousness for townhouse units in Phase 1B an orifice tube is proposed to control peak stormflows from Phase 1B to design rates in the downstream sewers. Stormwater quantity storage has been designed within the Phase 1B storm sewers to detain the excess stormflow restricted by the orifice. And, alterations to the existing wetland SWMF are proposed to accommodate the higher quality and quantity control requirements for Phase 1B.

A by-pass storm sewer is proposed through Phase 1B to convey drainage from external lands through the subdivision. A municipal drain (Decou Road Drain) will be constructed as part of the Subdivision works to provide outlet for the by-pass storm sewer, wetland SWMF, and other external lands to the Lynn River and ultimately to Lake Erie.

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1.0 INTRODUCTION

Counterpoint Engineering (CPE) has been retained by Big Sky Simcoe Limited Partnership (the Owner) to prepare the detailed engineering design for Phase 1B of the Big Sky Subdivision (the Subdivision) located at 18 Decou Road, Simcoe, Norfolk County, Ontario. The purpose of this report is to outline the detailed site grading, servicing, and stormwater management design for development approval of Phase 1B. The County refers to these lands with the file number 28TPL2022079.

1.1 BACKGROUND

The entire Big Sky Subdivision (formerly Dream Villas Subdivision) is 7.35 ha located on the south side of Decou Road. Proposed Phase 1B is 2.92 ha within the subdivision lands and is proposed to consist of 86 townhouse lots, a single right-of-way (Butternut Drive), and a municipal trail block. The existing phase of the Subdivision, Phase 1A, consists 51 single-family lots, a sanitary pumping station block, a wetland SWMF, and three rights-of-way (Butternut Drive, Tulip Crescent, and Bird Street). Adjacent lands to the Big Sky Subdivision are as follows:

- North – Decou Road and existing single family residential lots;
- East – Municipally owned abandoned railway corridor and vacant agricultural lands;
- South – Agricultural lands; and,
- West – Existing residential and minor commercial lots and Norfolk Street South.

Refer to **Appendix A** for the subdivision location plan (**Figure 1**) and Site Plan (dwg. A-003).

In April 2025 a Planning Amendment was submitted to Norfolk County to include 1 additional dwelling unit for each of the 86 townhouse lots in Phase 1B. An additional dwelling unit (ADU) is a separate, self-contained living space on the same property as a primary dwelling. This Planning Amendment increased the maximum unit count for Phase 1B to 86 townhouse units and 86 ADUs, for a total of 172 mixed dwelling units.

2.0 STUDY PARAMETERS

This servicing assessment is based on the following background documents and sources:

- Norfolk County Integrated Sustainable Master Plan, 2016
- Design Guidelines for Drinking-Water Systems, MOE, 2008
- Ontario Building Code Compendium, 2024
- Stormwater Management Planning and Design Manual, MOE, 2003
- Correspondence with Agency staff
- Dream Villas Subdivision Functional Servicing Report – Ashenhurst Nouwens & Associated Inc. Revised April 25, 2019
- Decou Road Drain design – G. Douglas Vallee Ltd., March, 2012
- Simcoe 18 Decou Road Sanitary Model Technical Memo – RV Anderson Associates Ltd. July 19, 20
- Simcoe 18 Decou Road Water Modelling Technical Memo – RV Anderson Associates Ltd. July 19, 2022

And, for the April 2025 design amendment, the following draft updated design County guidelines were referenced to update the site servicing calculations for the addition of 86 ADUs.

- Norfolk County - Engineering Standards Development Industry Consultation, 2025

3.0 WATERMAIN SERVICING

3.1 EXISTING WATER SUPPLY

The subject site has existing watermain adjacent to the site. The existing watermain is summarized as follows:

- Existing 200 mm PVC watermain stubbed on Butternut Drive north of the site.
- Existing 150 mm PVC watermain stubbed on Tulip Crescent north of the site.

Refer to **Appendix A** for a record of the Big Sky Subdivision Phase 1A as-constructed watermain (as-constructed drawings 21-039-03 and 21-039-07).

3.2 PROPOSED WATER SUPPLY

Per Norfolk County design standards, the water distribution system shall be designed to meet the following criteria:

- Normal operating pressure between 275 to 690 kPa;
- Minimum pressure under max day plus fire flow conditions of 140 kPa;
- Fire flow in accordance with the requirements of the latest edition of the Ontario Building Code Compendium;

Additionally, the water system shall be designed with the following design factors. Note that these factors were revised to reflect the Norfolk County 2025 design guideline update:

- 2.4 people/townhouse unit;
- 1.6 people/unit for ADUs;
- 285 L/cap/day;
- Max day demand factor of 2.25; and,
- Peak hour factor of 4.0;

Average Daily Demand, Maximum Day Demand and Peak Hourly Demand calculated in accordance with Norfolk guidelines were as follows:

- Average Day Demand = 68.3 L/min
- Maximum Day Demand = 153.6 L/min
- Maximum Hour Demand = 273.1 L/min

Water supply to the site would be provided from a proposed 200 mm local watermain within the right-of-way with two connection points to the existing watermain network in Phase 1A:

- Connection to the existing 200 mm PVC watermain stubbed on Butternut Drive north of the site; and,
- Connection to the existing 150 mm PVC watermain stubbed on Tulip Crescent north of the site.

These external connections would complete an external watermain loop with the existing watermain on Butternut Drive and Tulip Crescent. The proposed watermain for Phase 1B is shown on engineering drawing WTR-01 – Water Distribution Plan included in **Appendix E**.

A hydraulic analysis of the County watermain network was conducted by R.V. Anderson Associates Limited (RVA) to determine the impact of the proposed residential development on the existing water distribution system. The results of the analysis were summarized in a technical memo which concluded that the existing water system has the capacity to adequately support the proposed development. The memo stated that the watermain network could supply a peak flow of approximately 112-115 L/s (6,720-6,900 L/min) to the site for firefighting during maximum day demand conditions, and that the pressure during peak hour demand would be approximately 69-71 psi (475-490 kPa), which is within the Norfolk County recommended range.

According to Norfolk County's recent development standards update, fire flow requirements for the townhouse development were evaluated using the Ontario Building Code (OBC) methodology for determining adequate water supply. Preliminary designs provided by the architect of the townhouse blocks indicate a standard gross floor area (GFA) of 775 ft2 (72 m2) for each townhouse unit. The fire flow assessment assumed that the buildings would be constructed using combustible materials and that the floor heights would be 10 ft (3m) or less. Based on these assumptions, the OBC method calculated a worst-case fire flow requirement of 75 L/s for an 8-unit townhouse block.

Norfolk County's updated development standards specify that the minimum fire flow target for townhouses should be the greater of the flow calculated by the OBC method or 150 L/s. Under typical conditions, this would set the new fire flow target at 150 L/s. However, according to the RVA watermain network analysis, the maximum fire flow available to the development ranges between 112 and 115 L/s (6,720 to 6,900 liters per minute). Therefore, while the available fire flow meets the OBC water supply requirement, the municipal watermain system falls short of the County's preferred flow target of 150 L/s.

Refer to **Appendix B** for the water demand calculations.

4.0 SANITARY SERVICING

4.1 EXISTING SANITARY SERVICING

The subject site has existing sanitary sewers adjacent to the site. The existing sanitary infrastructure is summarized as follows:

- Existing 200 mm sanitary sewer stubbed on Butternut Drive draining north;
- Existing 200 mm sanitary sewer stubbed on Tulip Crescent draining north;

Refer to **Appendix A** for a record of the Big Sky Subdivision Phase 1A as-constructed sanitary sewers (as-constructed drawings 21-039-03 and 21-039-07). Both sanitary sewers listed above drain to an existing sanitary pumping station within Phase 1A of the subdivision, and ultimately to the Simcoe Wastewater Treatment Plant (WWTP).

4.2 PROPOSED SANITARY SERVICING

Per Norfolk County design standards, the sanitary system shall be designed to meet the following criteria. Note that these factors were revised to reflect the Norfolk County 2025 design guideline update:

- 2.4 people/unit for Townhouses;
- 1.6 people/unit for ADU's;
- 285 L/cap/day;
- Harmon's peaking factor ($2 < M < 5$); and,
- Infiltration Allowance of 0.28 L/s/ha;

Phase 1B is proposed to be serviced by 200 mm local sanitary sewers within the right-of-way, connected to the existing 200 mm sanitary sewer stubs at the ends of Tulip Crescent and Butternut Drive. The proposed sanitary servicing layout for Phase 1B is shown on drawing SAN-01 – Sanitary Area Plan, included in **Appendix E**.

The sanitary drainage area for Phase 1B is 2.92 ha with a design occupancy of 345 people based on the 86 townhouse units and 86 ADUs. Design peak flow for the development was 5.43 L/s, split between the two downstream connections. The sanitary sewer design for the proposed and existing Phase 1A developments was updated with the new occupancy and the Norfolk County 2025 design guideline updates. The sanitary design sheet demonstrates that the

proposed and existing sanitary sewers have adequate capacity to accommodate the Phase 1B development. The worst-case location was in Phase 1A where existing MH 1A drains into the sanitary pumping station, which has a design flow of 26% of the available pipe capacity during peak wet-weather flow. Refer to **Appendix C** for the supporting sanitary sewer design sheet.

Sanitary sewer hydraulic modeling was completed by R.V. Anderson Associates Limited (RVA) to analyze the impact of the proposed development on the capacity of the existing sanitary sewer system. The results were summarized in a memo, which concluded that the proposed development would increase peak sanitary flow to the wastewater treatment plant by approximately 5.84 L/s. The memo concluded that the existing sanitary sewer system has the capacity to support the proposed development.

5.0 STORMWATER SERVICING

5.1 EXISTING CONDITIONS/STORMWATER DRAINAGE

As discussed in section 1.1, proposed Phase 1B is part of a previously approved Draft Plan of Subdivision known as Dream Villas located in the community of Simcoe in Norfolk County. The original SWM design for the Subdivision was completed by Ashenhurst Nouwens & Associates Inc., with last revision date of April 25, 2019. Refer to “Dream Villas Subdivision, Town of Simcoe, Functional Servicing Report” prepared for Simtrek Ltd.

Under the previously approved subdivision design and corresponding wetland SWMF, the Phase 1A and 1B lands were designed to consist of a combination of various blocks for municipal servicing purposes and single-family residential lots. It is noted that the approved Storm Sewer Drainage Areas drawing indicated that the entire subject site is draining to the wetland SWMF, while the approved Lot Grading – Phase One drawing indicates that rear lots of Phase 1A abutting the east property line drain towards the Former Lake Erie and Northern Railway lands. Upon review of appendix C (SWM Facility Details) of the Ashenhurst Nouwens & Associated FSR (2019) it is evident that the wetland SWMF was designed for a total area of 6.7 ha, thereby confirming that rear lots abutting the east property line were originally designed to drain towards the Former Lake Erie and Northern Railway lands, and not to the wetland SWM facility.

The SWM facility was designed to provide erosion, quality, and quantity controls for a total area of 6.7 ha at 45% imperviousness, see Table 1. Percent impervious value was based on a sample catchment area and was applied to the design of pond water quality components such as sizing of permanent pool and extended detention.

Table 1 - Original Design of Existing Wetland SWM Facility (servicing Phases 1A and 1B)

Description	Area (ha)	C	AC	Imp (%)
Total Area	6.7	0.52	3.45	45%

Municipal servicing for Phase 1A was constructed in 2014 and 2015. Furthermore, it is CPE's understanding that the wetland SWM facility proposed in the original FSR has been constructed as designed.

5.2 PROPOSED PHASE 1B DEVELOPMENT

The proposed Phase 1B lands were altered from the original design by a land-use change from single lots to townhouse blocks. Table 2 provides an update to the site areas drainage conveyance from both phases.

Table 2 - Current Proposed Design

Description	Area (ha)	C	AC	Imp (%)
Phase 1A: existing servicing				
Ph. 1A to pond	3.97	0.52	2.04	45%
Ph. 1A uncontrolled to Railway	0.44	0.52	0.23	45%
Total Phase 1A	4.41			
Phase 1B: proposed development				
Ph. 1B to Pond	2.63	0.75	1.97	79%
External through site to Pond	0.19	0.20	0.04	
Ph. 1B uncontrolled to Railway	0.24	0.75	0.18	79%
Ph. 1B to pond (incl. External)	2.82	0.71	2.01	73%
Total Phase 1B	3.06			
Total Area to Pond	**6.79**	**0.60**	**4.06**	**57%**
Total Site Area	**7.47**			

In addition, the April 2025 Planning Amendment for the Phase 1B site allocated each townhouse lot an additional dwelling unit (ADU), along with an extra off-street parking space per ADU. To accommodate these parking spaces, the driveway size for each townhouse lot was increased. This modification contributes to a greater overall impervious surface area within the development. An analysis of the preliminary townhouse siting plans revealed that the average imperviousness for the Phase 1B blocks, including the ADUs, would be 57%. The original site imperviousness for Phase 1B was based on the Norfolk County stormwater management design standards, which recommend using a typical runoff coefficient of 0.75 for townhouse blocks. This coefficient corresponds to an average imperviousness value of 79%. Therefore, even with the inclusion of the ADUs, no adjustments were necessary for the site area analysis provided in Table 2 above.

5.3 PROPOSED STORMWATER SERVICING

Under the proposed conditions, stormwater flows within the site will be directed to the existing wetland SWMF through proposed and existing storm sewers.

External flows entering the Subdivision will also be captured by proposed storm sewers along the west limit of the site and routed through the Subdivision directly to Decou Road via a by-pass storm sewer. The external flows will not enter the wetland SWMF within the Subdivision nor be controlled within the Subdivision.

As noted above, the original design for Phase 1B by Ashenhurst Nouwens & Associates included single-family units. The change in land-use intensity from single-family to townhouse units was not accounted for in the existing sewers within Phase 1A. Per the original design, peak storm flow from Phase 1B into the Phase 1A storm sewers was 199.7 L/s. Therefore, to accommodate the higher imperviousness from the townhouses in Phase 1B and maintain the level of service in the storm sewers through Phase 1A, an orifice tube is proposed at the phase limit to restrict peak flows into the Phase 1A storm sewers. Upstream of the orifice tube stormwater quantity storage has been designed within the Phase 1B storm sewers to detain the excess stormflow restricted by the orifice.

The proposed orifice tube is a 300 mm diameter pipe that shall restrict flows in the storm sewer from Phase 1B to a peak rate of 204 l/s. At this peak flow rate, the quantity storage required to detain the excess stormflow from the sewer catchment area is 86 m^3. Upstream of the orifice tube 86.4 m of 1050 mm superpipe is proposed to provide the necessary quantity storage. The calculated stormwater storage available below the obvert of the lowest pipe within the Phase 1B storm sewers and manholes is 97 m^3. Therefore, there is sufficient storage in the storm system to detain the excess stormflow restricted by the orifice.

Refer to **Appendix E** for the Master Plan of Services and Storm Area Plans and Storm Design Sheet.

5.4 PROPOSED STORMWATER MANAGEMENT

As noted above, the original design for Phase 1B by Ashenhurst Nouwens & Associates was for single-family lots. The proposed change to townhouse units requires alterations to the existing wetland SWMF to accommodate a higher overall imperviousness from the Subdivision lands. The wetland SWMF alteration design proposed can accommodate the increase in overall imperviousness and will provide the required quantity and quality controls within the SWMF.

5.4.1 Allowable Release Rate

The original FSR based the allowable release rates on the rational method, while post development modeling had been completed through Miduss modelling. For consistency in pre and post development assessment, the existing conditions as presented in the original FSR have been remodeled in Visual OTTHYMO for the 3-hr Chicago distribution and are based on a total site area of 7.47ha. The approved original FSR report's hydrologic values for the subject land ,including CN=85 and TC=49min, have been confirmed and used in the existing condition modeling. Table 3 below provides a summary of the pre-development peak flow rates which are taken as the total allowable discharge from the subject site under various storm events. Refer to **Appendix D** for a summary of time of concentration calculations, site characteristics used in the model, and for Visual OTTHYMO modeling output.

Table 3 - Pre-development Peak Flows

Storm Event (Year)	3hr Chicago m^3/s
2	0.126
5	0.225
10	0.299
25	0.396
50	0.475
100	0.553

5.4.2 QUANTITY CONTROL

Hydrologic modeling was completed in Visual OTTHYMO to assess existing pond design volumes based on overall site development. In accordance with Norfolk County Integrated Sustainable Master Plan, a 3-hour duration Chicago distribution with a 5 minute time step was used for the development of design storms, from the 2-year to 100-year events as proposed in the Norfolk County's Design Criteria. Refer to **Appendix D** for modeling input parameters and output files. Route Reservoir command had been used to reconfirm pond function based on updated allowable release rates and exiting pond volumes. Table 4 below presents modelling results along with original pond design volumes.

Table 4 - SWMF Volumes

Stage	Elevation [m]	Accumulative Volume (m^3)	Quantity Volume Provided (m^3)	Re-modeled Required Storage (m^3)
BL	209.77	0		
NWL	210.07	558	0	-
EDL	210.72	1,665	1,107	1,065
2-Year	210.82	1,868	1,310	1,225
5-Year	211.07	2,408	1,850	1,771
10-Year	211.17	2,638	2,080	2,072
25-Year	211.32	2,997	2,439	2,371

50-Year	211.40	3,196	2,638	2,590
100-Year	211.47	3,374	2,816	2,804
Spillway Invert	211.58	3.662	3,104	
Top of Pond	211.88			

These model results show that the existing pond with the proposed improvements, including modified outlet design, has sufficient capacity to accommodate the increase in land use proposed in Phase 1B. A control manhole will be constructed with an orifice plate and a rectangular opening to control the release rates. Flows through the control manhole will be controlled via a 75mm orifice control plate at an invert of 210.07m, and a rectangular opening 0.24m wide x 0.98m high at an invert of 210.90m. Moreover, an emergency spillway has been proposed for emergency conditions. Refer to **Appendix D** and **Drawing SWM-01** for more detail.

Post development modeling further confirms that proposed post development drainage will be controlled to below the pre-development release rate for the overall site based on controlled pond and uncontrolled areas draining towards the east. Table 5 below summarizes the post development peak flow rates from the site.

Table 5 - Post development peak flow rates

Storm Event (Year)	Allowable Release Rate m^3/s	Pond Outflow m^3/s	Uncontrolled Outlet m^3/s	Total Site Outflow m^3/s
2	0.126	0.010	0.093	0.096
5	0.225	0.036	0.171	0.176
10	0.299	0.068	0.219	0.225
25	0.396	0.114	0.263	0.268
50	0.475	0.150	0.310	0.316
100	0.553	0.187	0.359	0.366

5.4.3 QUALITY CONTROL

SWM facility quality control requirements were based on the original Wetland SWMF design (see select relevant copies in **Appendix D**). Table 6 below provides a summary of water quality

requirements based on Table 3.2 of Stormwater Management Planning and Design Manual, MOEE 2003.

Table 6 - Stormwater Quality Control Requirements for Wetland SWM Facility

			Required Volumes (m^3)*		
Description	Area (ha)	Imp (%)	Total Quality	Extended Detention	Permanent Pool
Original Design of Wetland SWM Facility	6.7	45%	619	268	351
Updated Design – Ph 1B change	6.4	50%	631	255	376

** Based on Water Quality Sizing Criteria for Wetland Facility, MOEE 2003.*

As shown on Table 4 – SWMF Volumes above, the proposed SWMF alteration design provides sufficient quality storage volume for “Enhanced” level treatment for the catchment area.

Proposed additional LID measures of downspout disconnection, reduced lot grading and soil amendment will provide a treatment train approach to meet the quality control criterion.

5.4 EXTERNAL STORMWATER CONVEYANCE

As noted above, an existing partially buried 900 mm storm culvert conveys external run off from the west side of Norfolk Street South towards the proposed site. A by-pass storm sewer was previously designed for the Subdivision (Dream Villas Subdivision FSR by Ashenhurst Nouwens & Associates, Apr. 2019) to convey the external flows from the 900 mm culvert and other abutting lands to the west through the Subdivision to a municipal drain (Decou Road Drain) on Decou Road and ultimately to the Lynn River which flows to Lake Erie. The ultimate catchment area for the Decou Road Drain was established within the Decou Road Drain design (Vallee Engineers, Nov. 2012), however construction of the Drain did not proceed through the Drainage Act and will instead be constructed as part of the Subdivision works. Downstream of the Subdivision the Decou Road Drain also captures outflow from the Subdivision SWMF and another large tributary

area. Refer to Storm Drainage Area Plan STM-02 for the Decou Drain catchment area and Storm Design Sheet Plan STM-03 for the Decou Drain sewer design.

The by-pass storm sewer is a 675mm storm pipe through Phase 1B, from CBMH D3 located within a Servicing Easement between Blocks 13 and 14 to STMH D5 located at the west intersection of Birds Street and Butternut Drive in Phase 1A. And the Decou Road Drain is approximately 600m of 900mm storm pipe in the south boulevard of Decou Road, from the Subdivision SWMF to the Lynn River. Both the storm by-pass and Decou Drain sewers were designed to convey the Norfolk 25-year storm event under gravity flow conditions for the catchment area and can convey up to the Norfolk 100-year storm event under surcharge conditions.

Refer to **Appendix D** for stormwater management figures, calculations, and the storm sewer design sheets.

6.0 CONCLUSIONS

Based on the assessment provided above, the existing Phase 1A infrastructure, proposed by-pass storm sewer and Decou Road Drain to the Lynn River, and proposed internal servicing have sufficient capacity to service the proposed the Phase 1B development.

We trust the information provided in the report meets with your requirements. Should there be any questions or comments, please feel free to contact the undersigned.

Sincerely,

Counterpoint Engineering Inc.



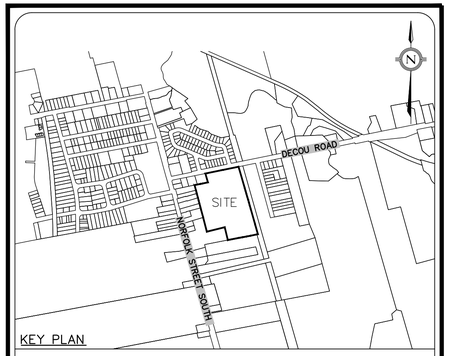
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Appendix A

Site Plan and Figures





LEGEND

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0	--	--	--	
8.0	--	--	--	
7.0	--	--	--	
6.0	--	--	--	
5.0	--	--	--	
4.0	--	--	--	
3.0	--	--	--	
2.0	--	--	--	
1.0	ISSUED FOR 1ST SUBMISSION	2022-03-11	PT	

counterpoint ENGINEERING
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8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

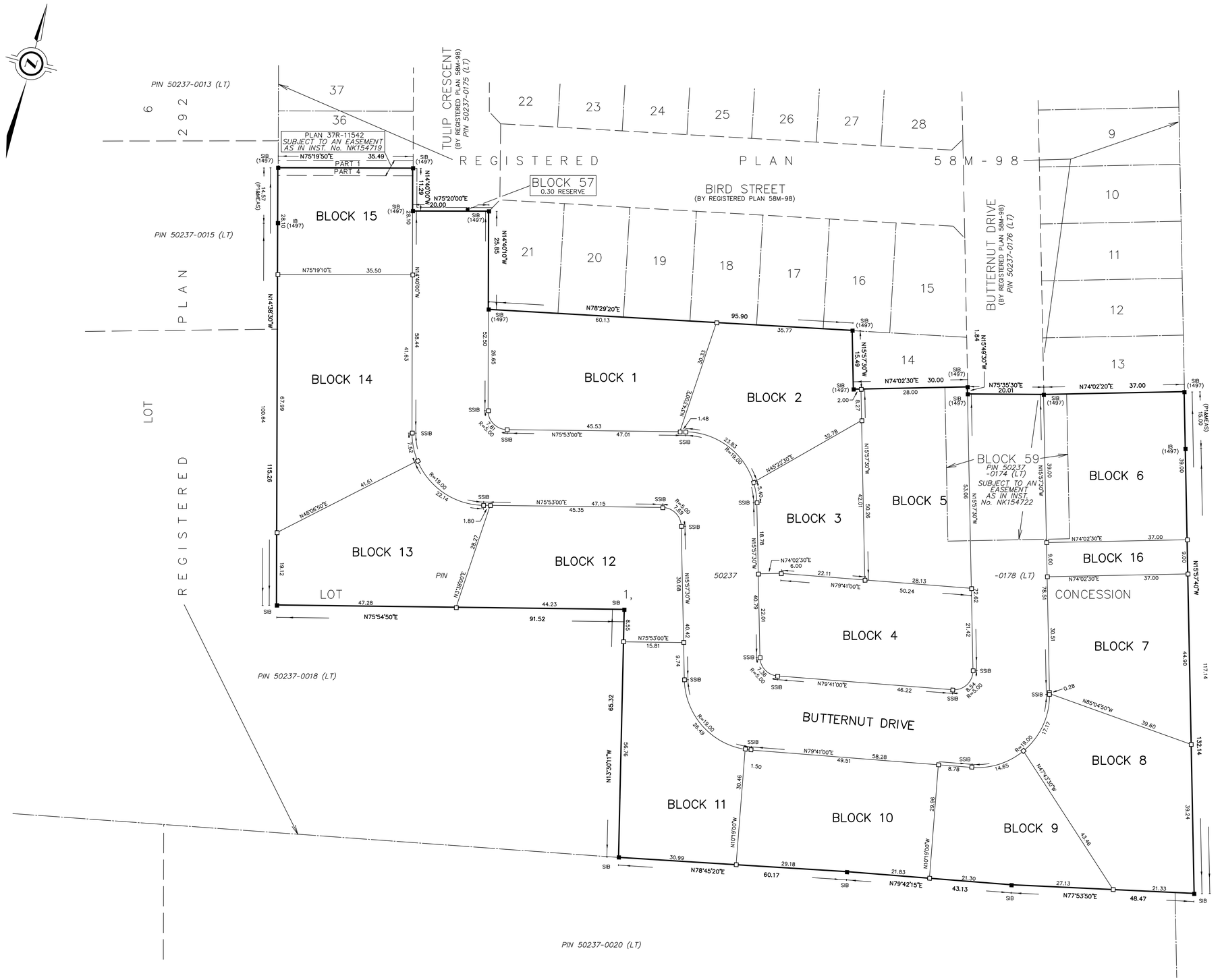
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR DRIVE,
NEWMARKET, ONTARIO
L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE ONTARIO

SITE LOCATION PLAN

DESIGNED BY: SS	CHECKED BY: PT	DATE: MARCH 2022
DRAWING BY: SC	CHECKED BY: PT	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: 1:1000m (0m 20m 40m 60m)		DRAWING NO. F-1

REGION FILE No.:


PIN 50237-0013 (LT)
PIN 50237-0015 (LT)
PIN 50237-0018 (LT)
PIN 50237-0020 (LT)
PIN 50237-0031 (LT)
PIN 50237-0178 (LT)
LOT 6 REGISTERED PLAN 292
LOT 1, CONCESSION 4
TULIP CRESCENT (BY REGISTERED PLAN 58M-98) PIN 50237-0175 (LT)
REGISTERED PLAN 58M-98
BIRD STREET (BY REGISTERED PLAN 58M-98)
BUTTERNUT DRIVE (BY REGISTERED PLAN 58M-98) PIN 50237-0176 (LT)
BUTTERNUT DRIVE
PLAN 37R-11542 SUBJECT TO AN EASEMENT AS IN INST. No. NK154719
BLOCK 57 0.30 RESERVE
BLOCK 59 PIN 50237-0174 (LT) SUBJECT TO AN EASEMENT AS IN INST. No. NK154722
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
BLOCK 5
BLOCK 6
BLOCK 7
BLOCK 8
BLOCK 9
BLOCK 10
BLOCK 11
BLOCK 12
BLOCK 13
BLOCK 14
BLOCK 15
BLOCK 16
37
36
22 23 24 25 26 27 28
21 20 19 18 17 16 15
9 10 11 12 13 14
N75°19'50"E 35.49
PART 1
PART 4
N14°40'00"W 11.29
N75°20'00"E 20.00
N14°40'10"W 25.85
N78°29'20"E 60.13 95.90 35.77
N15°57'30"W 15.49
N74°02'30"E 30.00 28.00
N75°35'30"E 20.01
N74°02'20"E 37.00
N14°38'30"W 69.99 100.64 115.26
N75°19'10"E 35.50
N14°40'00"W 58.44 41.63
N75°54'50"E 47.28 44.23 91.52
N75°53'00"E 45.53 47.01 47.15 45.35 15.81
N48°06'50"E 41.61
N37°26'00"E 28.27
N15°57'30"W 30.68 40.42 42.01 50.26 53.06 39.00 78.51 30.51 44.90 117.14
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N79°41'00"E 46.22
N45°22'30"E 32.78
N85°04'50"W 39.60
N47°43'30"W 43.46
N78°45'20"E 60.17
N79°42'15"E 43.13
N77°53'50"E 48.47
N00°19'00"W 29.96
N45°04'10"W 65.32 56.76
R=19.00 20.49
R=5.00 7.85
R=19.00 22.14
R=19.00 23.83
R=19.00 17.17
R=19.00 14.65
R=5.00 7.36
R=5.00 8.54
R=5.00 7.69
R=19.00 16.59
R=19.00 14.29
R=19.00 1.50
R=19.00 26.48
R=19.00 24.39
R=19.00 22.14
R=19.00 20.91
R=19.00 7.52
SIB (1497)
SSIB
IB (1497)
RIB (1497)
(P1&MEAS) 74.57
(P1&MEAS) 15.00
(P1&MEAS) 39.00
(P1&MEAS) 117.14
1.84
2.00
8.27
1.48
5.40
1.80
8.55
7.26
8.54
0.28
1.50
8.78
7.52
19.12
8.10
28.10
58.44
41.63
30.33
26.65
52.50
30.49
29.18
21.83
18.78
22.01
40.79
21.42
72.62
9.00
9.00
39.00
39.00
39.24
132.14
44.90
30.51
78.51
53.06
42.01
50.26
40.42
30.68
9.74
56.76
65.32
30.99
29.18
21.83
21.30
27.13
21.33
47.28
44.23
91.52
15.81
60.17
43.13
48.47
6.00
22.11
28.13
50.24
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39.60
43.46
14.65
17.17
29.96
39.24
1.50
30.49
8.78
0.28
2.00
8.27
1.48
5.40
1.80
8.55
7.26
8.54

SITE PLAN and BUILDING STATISTICS		
1	ZONING	
		REQUIRED
2	LOT AREA (INTERIOR)	156 m² (MIN.)
3	LOT AREA (CORNER)	264 m² (MIN.)
4	LOT FRONTAGE (INTERIOR)	6.0 m (MIN.)
5	LOT FRONTAGE (CORNER)	8.7 m (MIN.)
6	FRONT YARD SETBACK	6.0 m (MIN.)
7	REAR YARD SETBACK	4.4 m (MIN.)
8	INT. SIDE YARD SETBACK	1.2m (MIN.)
9	EXT. SIDE YARD SETBACK	2.4 m (MIN.)
10	BUILDING HEIGHT	11.0 m (MAX)



NOTE:

- THESE ARE NOT FINAL SITINGS.
- THIS SITE PLAN IS FOR DISCUSSION PURPOSES ONLY.
- ENGINEERING AND ZONING TO BE CONFIRMED

STAMP & HAMMER
1135 STELLAR DRIVE
NEWMARKET ON L3Y 7B8
905-235-3933
info@stampandhammer.com

No.	DESCRIPTION	DATE	BY
1	ISSUED FOR CONSULTANT COORDINATION	2025-03-26	M.S.

2025-04-29 12:43:06 PM

BIG SKY | SIMCOE 1B
TOWNHOUSE UNITS + BASEMENT ADU'S

SCALE: As indicated

DATE: APRIL 28, 2025

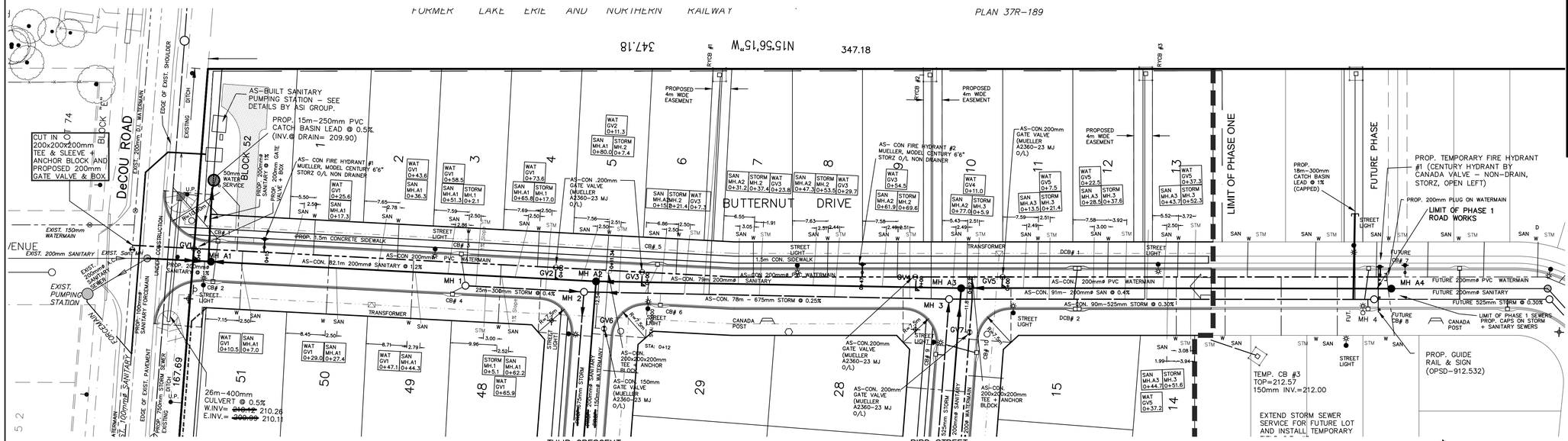
TITLE: SITE PLAN
PRELIMINARY SITINGS - ISSUED FOR ZBLA

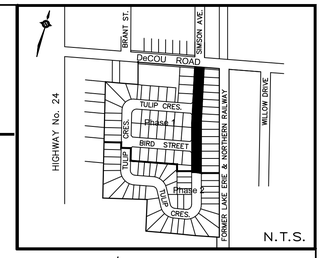
A-004

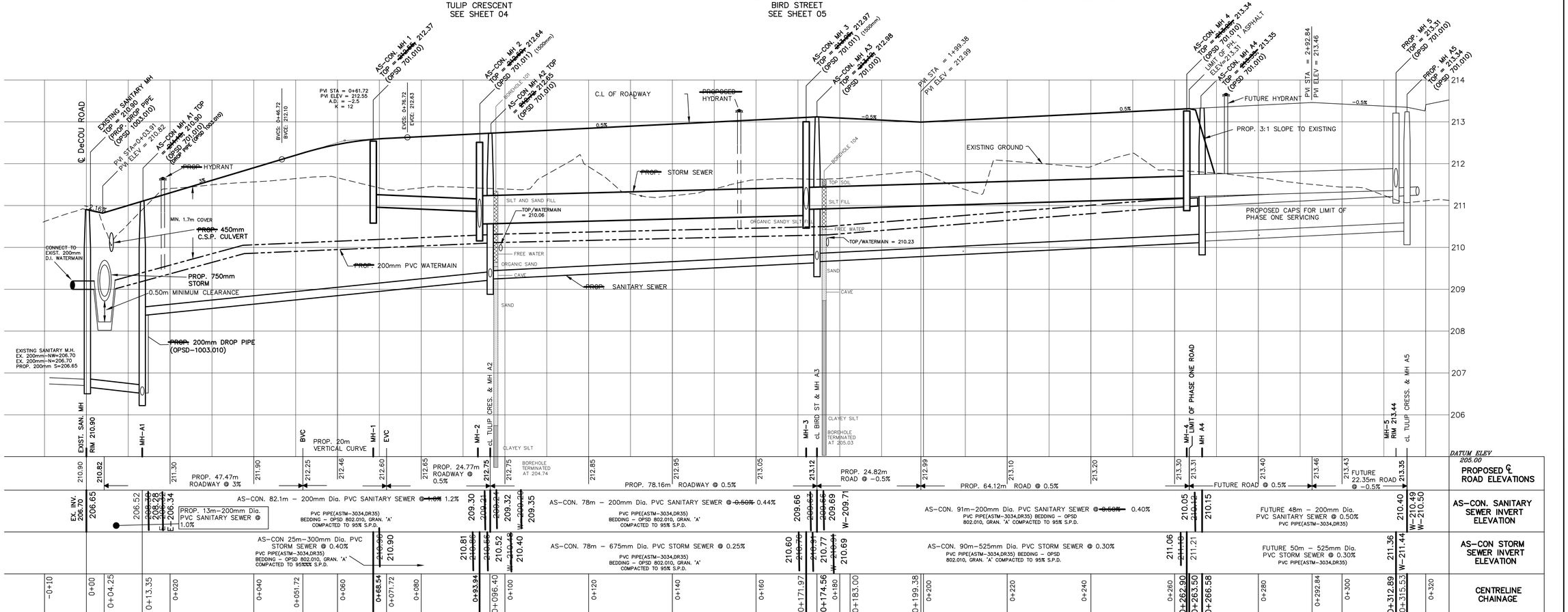
NOTE: CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND CHECK ALL CONDITIONS ON THE JOB SITE BEFORE PROCEEDING WITH ANY WORK.

BUTTERNUT DRIVE

FORMER LAKE ERIE AND NORTHERN RAILWAY — PLAN 37R-189







N°	Date	REVISIONS
10.	DEC 2, 2015	DECREASED LOT 1 & INCRESAED BLOCK 52
9.	SEPT. 23, 2013	LOT 1 & BLOCK 52 REVISED
8.	JUNE 5, 2013	STORM DRAIN + PUMP STATION REVISED
7.	APR. 10, 2013	AS PER COUNTY COMMENTS DATED MAR. 18, 2013
6.	JAN. 28, 2013	AS PER COUNTY COMMENTS DATED JAN. 10, 2013
5.	NOV. 23, 2012	AS PER COUNTY COMMENTS DATED NOV. 7, 2012
4.	OCT. 11, 2012	AS PER COUNTY COMMENTS DATED SEPT. 24, 2012
3.	AUG. 24, 2012	AS PER COUNTY COMMENTS DATED JUNE 13, 2112.
2.	FEB. 13, 2012	PHASE ONE LIMITS REVISED
1.	DEC. 19, 2011	AS PER COUNTY COMMENTS DATED NOV. 23, 2011

REVISIONS CONTINUED

12.	JAN 31, 2022	AS-CONSTRUCTED INFO. ADDED
11.	SEPT. 20, 2021	REVISED LOT LAYOUT AND NEW OWNER

BENCHMARK

Tablet in top of concrete abutment at northwest corner of bridge over Lynn River at Decou Road. — ELEVATION=202.928m.

SITE BENCH MARK — Top of Manhole Lid on Decou Road at intersection of centreline of Simson Avenue. — ELEVATION = 210.90m

UP — UTILITY POLE

STAMP

AS- CONSTRUCTED INFO

ASHENHURST NOUWENS + ASSOCIATES INC.
Professional Engineers & Ontario Land Surveyors
204-225 KING WILLIAM STREET., HAMILTON, ONTARIO L8R 1B1
(905) 529-6316 / 529-4314 - FAX (905) 529-6651
email: "ANL@ASHENHURSTNOUWENS.COM"

PROPOSED SUBDIVISON OF PART OF LOT 1, CONCESSION 4 (Township of Woodhouse) in the FORMER TOWN OF SIMCOE now in NORFOLK COUNTY

CALIBREX

BIG SKY

PLAN SHOWING AS -CONSTRUCTED

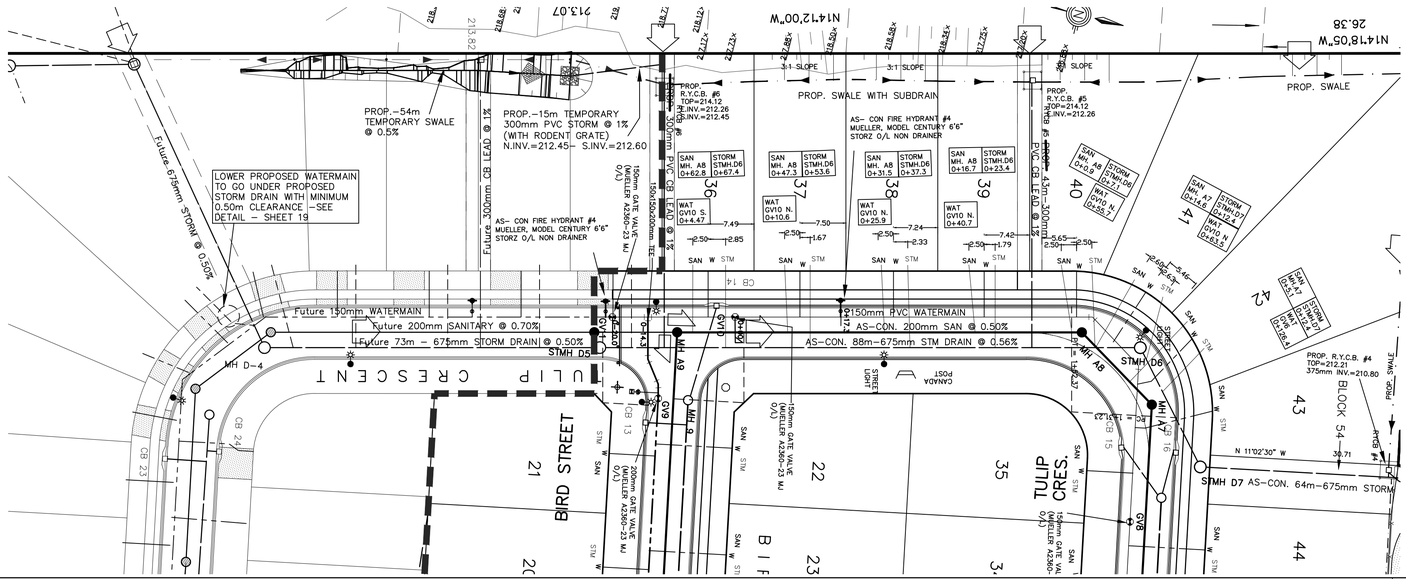
BUTTERNUT DRIVE

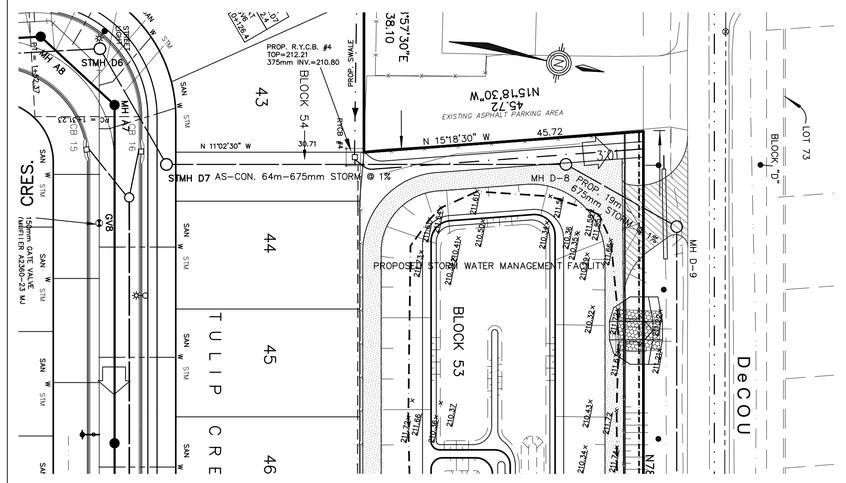
DeCOU ROAD to Southerly Limit of Phase One

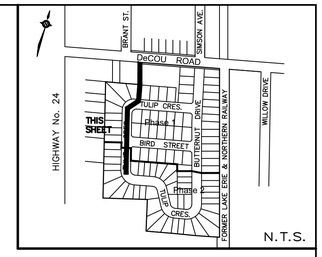
Scales:
HORIZONTAL: 1: 500
VERTICAL: 1: 50

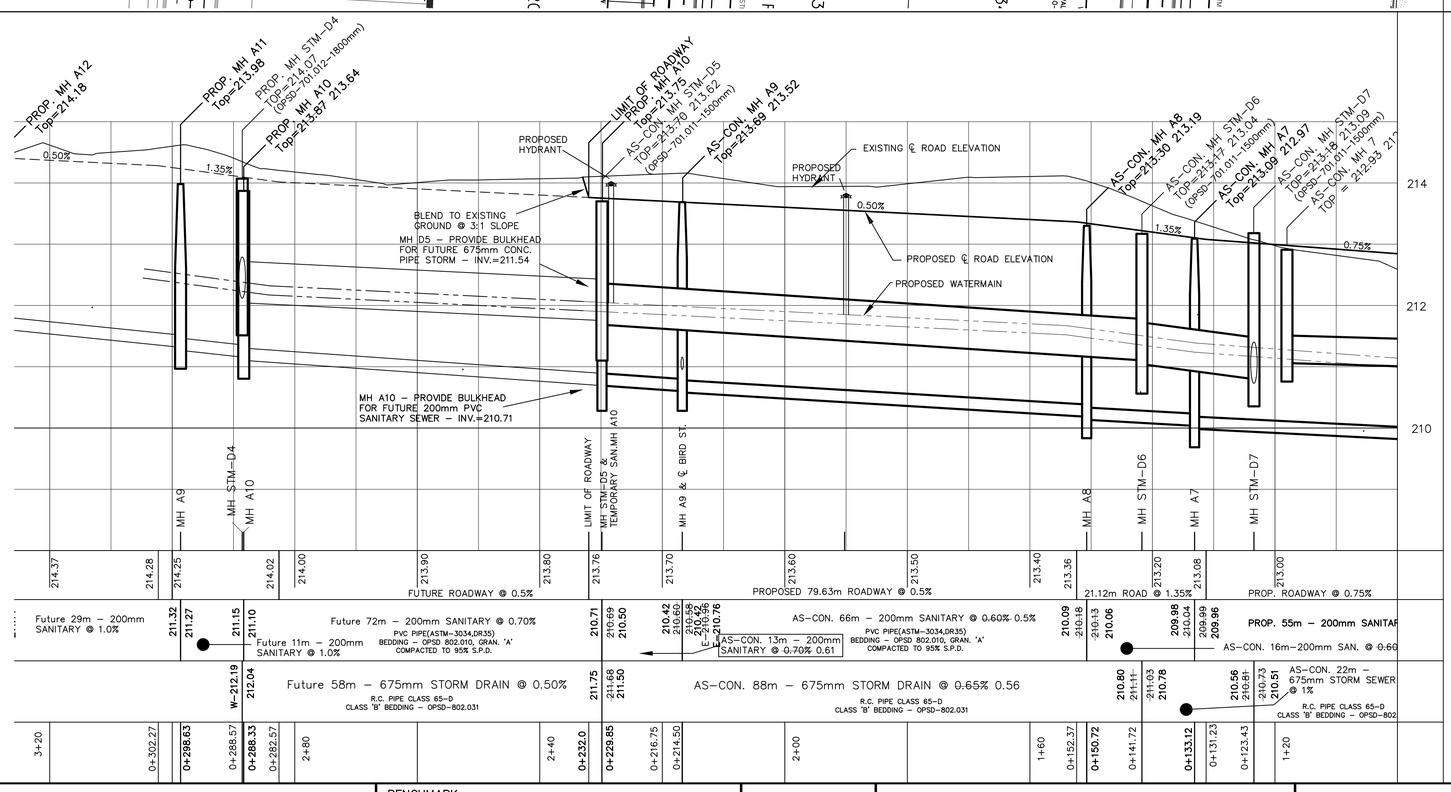
Drawing Date: JAN 11, 2022
Dwg. No. 21--243 03 AC

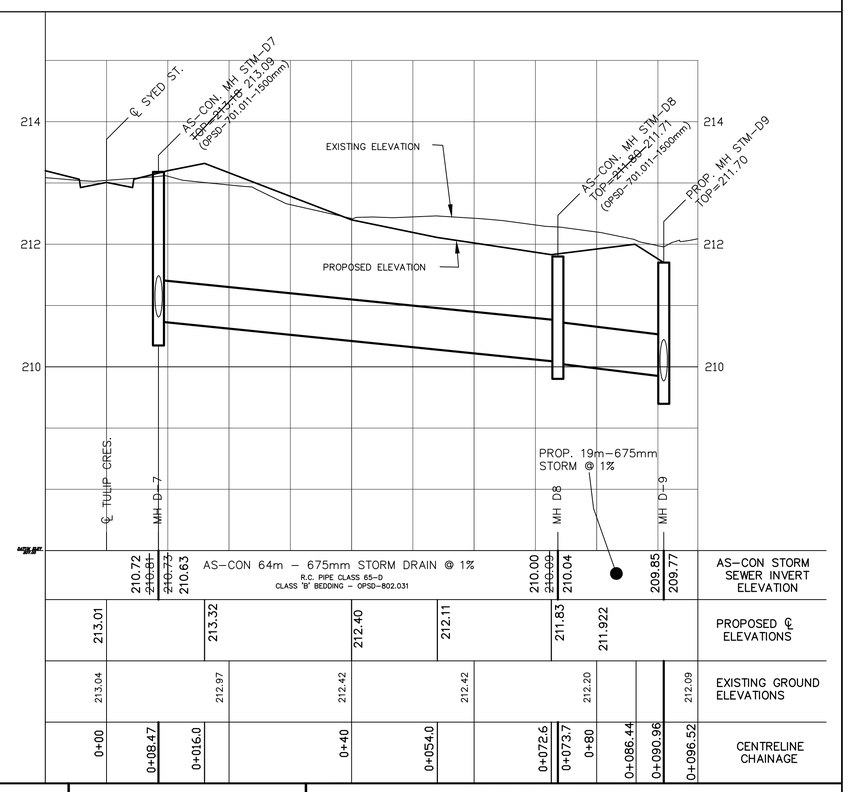
TULIP CRESCENT











N°	Date	REVISIONS
4.	JAN 11, 2022	AS-CONSTRUCTED INFO. ADDED
3.	SEPT. 20, 2021	LOT LAYOUT REVISED and NEW OWNER
2.	MAY 29, 2013	STORM SEWER REVISED
1.	MARCH 28, 2013	AS PER COUNTY COMMENTS DATED MARCH 18, 2013

BENCHMARK

Tablet in top of concrete abutment at northwest corner of bridge over Lynn River at Decou Road. - ELEVATION=202.928m.

SITE BENCH MARK - Top of Manhole Lid on Decou Road at intersection of centreline of Simson Avenue. - ELEVATION = 210.90m

STAMP

AS-CONSTRUCTED

ASHENHURST NOUWENS + ASSOCIATES INC.
Professional Engineers & Ontario Land Surveyors
204-225 KING WILLIAM STREET., HAMILTON, ONTARIO L8R 1B1
(905) 529-6316 / 529-4314 - FAX (905) 529-6651
email: "ANL@ASHENHURSTNOUWENS.COM"

AS- CONSTRUCTED INVERT LEVELS SHOWN WERE PROVIDED BY HDC (HOWLETT DEVELOPMENT & CONSTRUCTION SERVICES LTD)

PROPOSED SUBDIVISON OF PART OF LOT 1, CONCESSION 4 (Township of Woodhouse) in the FORMER TOWN OF SIMCOE now in NORFOLK COUNTY

CALIBREX

BIG SKY

PLAN SHOWING AS CONSTRUCTED

STORM DRAIN - Tulip Cres. + Block 53

From: Tulip Crescent To: DeCou Road

Scales:
HORIZONTAL: 1:500
VERTICAL: 1; 50

Drawing Date: JAN 11, 2022

Dwg. No. 21-243 - 07

Big Sky Simcoe Limited Partnership

18 Decou Road

Appendix B

Water Demand & Fire Flow Calculations

Counterpoint Engineering Inc.

Water Demand Design Calculations

Project: **Big Sky Simcoe Limited Partnership**
Project No: **22019**
Location: **18 Decou Road, Simcoe**
Site Area: 2.92 ha

Persons Per Unit and per Land Use

Residential (Townhouse)	2.4	Persons/Unit
ADU	1.6	Persons/Unit
Commercial	90	Persons/Ha

	Residential Units
Townhouse Units	86
ADU	86
TOTAL UNITS / AREA (m^2)	**172**

	Residential	Commercial	Industrial	TOTAL POPULATION
Townhouse	207	0	0	207
ADU	138	0	0	138
Total Equivalent Population				**345**

Residentail Per Capita Demand

Average flow	285	litres/person/day

Peaking Factors

Land Use	Maximum Hour	Maximum Day
Residential	4.00	2.25

Water Demand based on Equivalent Population

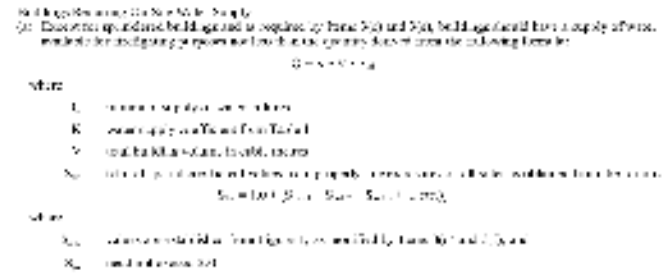
Land Use	Population	Average Daily Demand (l/min)	Maximum Hour (l/min)	Maximum Day (l/min)	Fire Flow Required (l/min)	Max Day + Fire Flow (l/min)
Townhouse	207	41.0	163.9	92.2	**4500**	
ADU	138	27.3	109.3	61.5		
Totals	**345**	**68.3**	**273.1**	**153.6**		**4654**

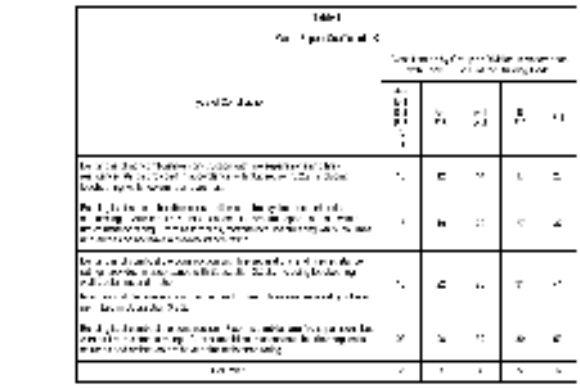
Counterpoint Engineering Inc.

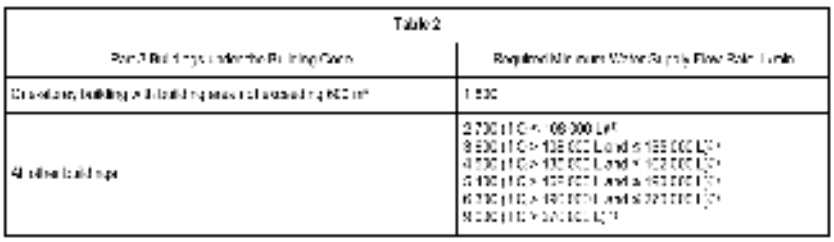
REQUIRED FIRE FLOW WORKSHEET
Ontario Building Code

Project : **Big Sky Simcoe Limited Partnership**
Project No: **22019**
Location: **18 Decou Road, Simcoe**

Guide for Determination of Required Fire Flow







1) **Table 1 Water Supply Coefficient**

Classification Group	C	Residential
Type of Construction	Combustible	
K=	23	

2)

Total Spacial C	Distance (m)	Spacial coef	
Initial Value	n/a	1	*worst case Block 10
S side 1 (North)	>10	0.5	
S side 2 (East)	2.6	0	
S side 3 (South)	>10	0	
S side 4 (West)	2.6	0.5	
S tot		**2**	*Must not exceed 2.0

3) **Total Building Volume**

Floor area (m2)	72	
Units	8	*8 unit block
Height (m)	3	*Assumed 3m (10 feet)
Storeys	2	
Volume	**3456**	m3

4) **Required on site water supply**

Q = K*V*S tot 158,976 L

5) **Required Min Water Supply Flow Rate (L/min)**

Flow Rate =	**4500**	**L/min**
Flow Rate =	**75**	**L/s**
Flow Rate =	**1189**	**GPM**

FORM FFD1 - FIRE FLOW DETERMINATION - REQUIRE FIRE FLOW (RFF) AND AVAILABLE FIRE FLOW (AFF)

Project:	**Big Sky Simcoe Limited Partnership**	
Project No:	**22019**	
Location:	**18 Decou Road, Simcoe**	
Site Area:	2.92	ha

1. a) REQUIRED FIRE FLOW - RFF a) Ontario Building Code

Required fire volume as calculated using Q=KVStot	158,976	L
A. Required min. Water Supply Flow rate (Table 2 OBC A.3.2.5.7)	75	L/s
B. Sprinkler Requirements (per NFPA 13)	n/a	L/s
C. Standpipe Requirements (per NFPA 14)	n/a	L/s
Total OBC Requirements (A+B+C)	75	L/s

1 b) RFF b) Land Use Based and Community Area

Residential - Multi greater than 3 units	Target RFF:	150	L/s

1 c) Required Fire Flow - RFF c)

Higher of a) or b) from above	150	L/s

2 a) Available Fire Flow - AFF a)

Hydraulic analysis of County watermain network by R.V. Anderson	112-115	L/s

Municipal system cannot achieve target but can achieve OBC requirement

Big Sky Simcoe Limited Partnership

18 Decou Road

Appendix C

Sanitary Design

Counterpoint Engineering Inc.

Project: Big Sky Simcoe Limited Partnership
Project No: 22019
Location: 18 Decou Road, Simcoe
Site Area: 2.92 ha

Proposed Sanitary Flow Calculations

As per Engineering Design Guidelines, Norfolk County, 2025

Design flow = (Population in Thousands x Average Daily Flow x Peaking Factor)/86.4 + (Infiltration Rate x Area)

Persons Per Unit and per Land Use

Residential (Townhouse)	2.4	Persons/Unit
ADU	1.6	Persons/Unit
Commercial	90	Persons/Ha

	Residential Units
Townhouse Units*	86
ADU	86
TOTAL UNITS / AREA (m^2)	**172**

*Per site statistics circulated December 13th, 2022

	Residential	Commercial	Industrial	TOTAL POPULATION
Townhouse	206	0	0	207
ADU	138	0	0	138
Total Equivalent Population				**345**

Residential flow Design Parameters

Average flow	285	litres/person/day
Infiltration	0.28	litres/second/ha

Harmon Peaking Factor

PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Residential Population	Harmon Peak Factor
345	**4.05**

Residential Flow	4.61	**l/s**
Infiltration	0.82	**l/s**
Total Peak Flow	**5.43**	**l/s**

NORFOLK COUNTY SANITARY DESIGN SHEET

RESIDENTIAL POPULATION DENSITIES

AREA BASIS

Residential
Commercial/Industrial

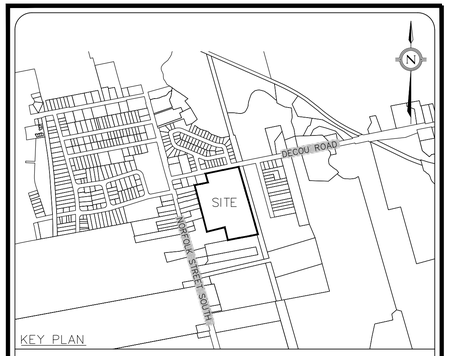
FLOW CRITERIA

PF={1+[14/(4+p^0.5)]}
where PF=peaking factor, P=population/1000
and maximum PF = 4.00

PROPOSED UNITS PER TOWNHOUSE LOT EQUALS 1 TOWNHOUSE UNIT @ 2.4 PPU AND 1 ADDITIONAL DWELLING UNIT (ADU) @ 1.6 PPU. TOTALING 2 UNITS PER LOT AT AN AVERAGE PPU OF 2.0.

PROJECT No. 22019
DESIGNED BY: SS
DATE: 2025-03-25

LOCATION				AREA			POPULATION					SEWAGE FLOW ACCUMULATED												
AREA	STREET	FROM	TO	NET	FROM	TO	PER	PER	of	SUM	TOTAL	PEAKING	INFILT	SEWAGE	TOTAL	SIZE	SLOPE	CAP	n	VEL	DROP	LENGTH	UPPER	LOWER
No.		MH	MH	GRO	MH	MH	ha	UNIT	UNITS	POP	POP	FACTOR	L/s	L/s	L/s	mm	%	L/s		m/s			INVERT	INVERT
Area 219	Butternut Dr	MH A18	MH A19	0.1	MH A18	MH A19	92.9	2.0	8	16	16	4.0	0.0	0.2	0.3	200	1.0	33.4	0.013	1.05		14.8	211.70	211.55
Area 218	Butternut Dr	MH A19	MH A11	0.4	MH A19	MH A11	146.6	2.0	34	68	84	4.0	0.2	1.1	1.3	200	0.5	23.5	0.013	0.74		51.8	211.50	211.24
Area 217	Butternut Dr	MH A11	MHA 12	0.1	MH A11	MHA 12	82.3	2.0	8	16	100	4.0	0.2	1.3	1.6	200	0.7	26.9	0.013	0.85		6.1	211.19	211.15
	Butternut Dr	MHA 12	MHA 10	0.0	MHA 12	MHA 10	0.0	0.0	0	0	100	4.0	0.2	1.3	1.6	200	0.5	24.3	0.013	0.76		5.6	211.10	211.07
Area 216	Butternut Dr	MHA 10	MH A10	0.3	MHA 10	MH A10	112.0	2.0	18	36	136	4.0	0.3	1.8	2.1	200	0.5	23.8	0.013	0.75		60.0	211.02	210.71
Area 215	Tulip Crescent	MH A10	MH A9	0.0	MH A10	MH A9	103.2	2.0	4	8	144	4.0	0.3	1.9	2.2	200	0.6	25.3	0.013	0.80		13.8	210.50	210.42
Area 214	Tulip Crescent	MH A9	MH A8	0.4	MH A9	MH A8	32.1	3.0	5	15	159	4.0	0.5	2.1	2.6	200	0.5	23.6	0.013	0.74		65.3	210.42	210.09
Area 213	Tulip Crescent	MH A8	MH A7	0.2	MH A8	MH A7	54.2	3.0	5	15	174	4.0	0.6	2.3	2.8	200	0.5	22.8	0.013	0.72		17.0	210.06	209.98
Area 212	Tulip Crescent	MH A7	MH A6	0.4	MH A7	MH A6	37.8	3.0	5	15	189	4.0	0.7	2.5	3.2	200	0.4	21.9	0.013	0.69		55.2	209.97	209.73
Area 211	Tulip Crescent	MH A6	MH A2	0.5	MH A6	MH A2	35.0	3.0	6	18	207	4.0	0.8	2.7	3.5	200	0.5	22.5	0.013	0.71		78.1	209.71	209.35
Area 222	Bird St	MH A9	MH A13	0.4	MH A9	MH A13	36.1	3.0	5	15	15	4.0	0.1	0.2	0.3	200	0.9	31.0	0.013	0.97		66.6	210.76	210.18
Area 221	Bird St	MH A13	MH A3	0.5	MH A13	MH A3	47.0	3.0	8	24	39	4.0	0.3	0.5	0.8	200	0.5	24.6	0.013	0.77		78.5	210.14	209.71
Area 210	Butternut Dr	MH A18	MH A17	0.0	MH A18	MH A17	128.6	2.0	6	12	12	4.0	0.0	0.2	0.2	200	1.0	33.9	0.013	1.07		13.4	211.33	211.19
Area 209	Butternut Dr	MH A17	MH A16	0.0	MH A17	MH A16	48.8	2.0	2	4	16	4.0	0.0	0.2	0.3	200	0.5	23.9	0.013	0.75		30.7	211.17	211.01
Area 208	Butternut Dr	MH A16	MH A15	0.1	MH A16	MH A15	87.4	2.0	8	16	32	4.0	0.1	0.4	0.5	200	0.6	25.0	0.013	0.79		12.3	210.96	210.89
Area 207	Butternut Dr	MH A15	MH A14	0.4	MH A15	MH A14	153.9	2.0	36	72	104	4.0	0.2	1.4	1.6	200	0.5	23.8	0.013	0.75		62.0	210.81	210.49
Area 206	Butternut Dr	MH A14	MH A5	0.2	MH A14	MH A5	77.5	2.0	10	20	124	4.0	0.3	1.6	1.9	200	0.6	24.6	0.013	0.78		12.7	210.44	210.37
Area 204,Area 205	Butternut Dr	MH A5	MH A4	0.6	MH A5	MH A4	123.4	2.0	38	76	200	4.0	0.5	2.6	3.1	200	0.5	23.4	0.013	0.74		76.1	210.29	209.91
	Butternut Dr	MH A4	CAP	0.0	MH A4	CAP	0.0	0.0	0	0	200	4.0	0.5	2.6	3.1	200	0.3	17.7	0.013	0.56		3.5	209.89	209.88
Area 203	Butternut Dr	CAP	MH A3	0.3	CAP	MH A3	38.2	3.0	5	15	215	4.0	0.6	2.8	3.4	200	0.3	19.6	0.013	0.62		54.4	209.88	209.69
Area 202	Butternut Dr	MH A3	MH A2	0.4	MH A3	MH A2	32.5	3.0	5	15	269	4.0	1.0	3.5	4.5	200	0.4	21.9	0.013	0.69		78.2	209.66	209.32
Area 201	Butternut Dr	MH A2	MH A1	0.6	MH A2	MH A1	40.8	3.0	9	27	503	4.0	2.0	6.6	8.6	200	1.2	36.7	0.013	1.15		83.6	209.30	208.28
EXT 200	Butternut Dr	EX. MH	MH A1	5.9	EX. MH	MH A1	35.6	3.0	71	213	213	4.0	1.7	2.8	4.5	200	1.1	34.8	0.013	1.09		11.8	206.65	206.52
	Butternut Dr	MH A1	P.S.	0.0	MH A1	P.S.	0.0	0.0	0	0	716	3.9	3.6	9.2	12.8	200	2.2	49.4	0.013	1.55		15.4	206.34	206.00



LEGEND

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E, #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
2.0	ISSUED FOR CUP SIGN-OFF	2024-11-05	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

SAN DESIGN SHEET

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: N.T.S.		DRAWING NO. SAN-02

Z:\Shared\Projects\2022\22019_Caithness_Decou Road\Design\00_Design\Master\Drawings\Drawings\22019_SAN Design Sheets.dwg

Appendix D

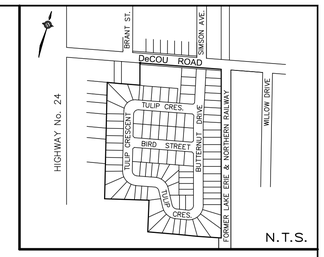
Stormwater Design

Big Sky Simcoe Limited Partnership

18 Decou Road

Phase 1B Flow Restrictions





N°	Date	REVISIONS
1	APRIL 18, 2019	REVISED LOT LAYOUT & CATCHMENT INFORMATON

BENCHMARK

Tablet in top of concrete abutment at northwest corner of bridge over Lynn River at Decou Road. – ELEVATION=202.928m.

SITE BENCH MARK – Top of Manhole Lid on Decou Road at intersection of centreline of Simson Avenue. – ELEVATION = 210.90m

STAMP

NOT FOR CONSTRUCTION UNTIL SIGNED AND DATED

ASHENHURST NOUWENS + ASSOCIATES INC.
Professional Engineers & Ontario Land Surveyors
204-225 KING WILLIAM STREET., HAMILTON, ONTARIO L8R 1B1
(905) 529-6316 / 529-4314 - FAX (905) 529-6651
email: "ANL@ASHENHURSTNOUWENS.COM"

PROPOSED SUBDIVISON OF
PART OF LOT 1, CONCESSION 4
(Township of Woodhouse)
in the
FORMER TOWN OF SIMCOE
now in
NORFOLK COUNTY

SIMTREK

DREAM VILLAS

PLAN SHOWING

Storm Drainage Areas

Scales:
HORIZONTAL: 1:1000
VERTICAL: n/a

Drawing Date: SEPT. 19, 2017
Dwg. No. 17174 - 19

Site: DREAM VILLAS SUBDIVISION, Simcoe — **STORM DRAINAGE DESIGN CHART** — ***Design Storm - 5 yr.***

for — *i=A/((T+B)^C)*

ASHENHURST NOUWENS LIMITED — **PROPOSED "Dream Villas" SUBDIVISION** — A = 583.017

Town of Simcoe — B = 3.007

Date: April 25, 2019 — **County of Norfolk** — C = 0.703

Pipe Material - PVC n = 0.013 — MAX. 95% FULL

				AREA			AREA			Flow			STORM FLOW		PIPE SELECTION					
		LOCATION		Increment			Cumulative			Time to				TOTAL	Slope	Diameter	Length	Velocity		Time of	
Area		From	To							Section	Time of Concentration			Q'	S	D	L	full	Capacity	Seciton	% Full
No.	STREET	u/s MH	d/s MH	(ha)	'C'	A x C	(ha)	'C'	A x C	(min.)	Inital	Total	I	(l/s)	(%)	(mm)	(m)	(m/s)	Q	(min.)	
13	Tulip Cresc.	11	18	0.350	0.45	0.158	0.350	0.45	0.158	0.00	15.00	15.75	74.23	**32.5**	*0.60*	300	*48*	1.06	74.9	0.75	43%
7	Tulip Cresc.	18	17			0.158	0.350	0.45	0.158	15.75	15.75	16.02	73.49	**32.2**	*0.60*	300	*17*	1.06	74.9	0.27	43%
	Tulip Cresc.	17	16	0.353	0.45	0.159	0.703	0.45	0.316	16.02	16.02	16.92	71.14	**62.5**	*0.30*	375	*47*	0.87	96.0	0.90	65%
	Tulip Cresc.	16	15				0.703	0.45	0.316	16.92	16.92	17.11	70.66	**62.1**	*0.30*	375	*10*	0.87	96.0	0.19	65%
6	Tulip Cresc.	15	14	0.450	0.45	0.203	1.153	0.45	0.519	17.11	17.11	17.74	69.15	**99.7**	*0.30*	450	*37*	0.98	156.2	0.63	64%
	Tulip Cresc.	14	5				1.153	0.45	0.519	17.74	17.74	18.01	68.52	**98.8**	*0.30*	450	*16*	0.98	156.2	0.27	63%
5	Butternut Drive	5	4	0.451	0.45	0.203	1.604	0.45	0.722	17.74	17.74	18.31	67.86	**136.1**	*0.30*	525	*37*	1.09	235.6	0.57	58%
4	Butternut Drive	4	3	0.857	0.45	0.386	2.461	0.45	1.107	18.31	18.31	19.70	64.90	**199.7**	*0.30*	525	*91*	1.09	235.6	1.39	85%
10	Bird Street	9	13	1.097	0.45	0.494	1.097	0.45	0.494	15.00	15.00	15.97	73.64	**101.0**	*0.30*	450	*57*	0.98	156.2	0.97	65%
11	Bird Street	13	3	0.408	0.45	0.184	1.505	0.45	0.677	15.97	15.97	17.26	70.31	**132.3**	*0.30*	450	*76*	0.98	156.2	1.29	85%
3	Butternut Drive	3	2	0.500	0.45	0.225	4.466	0.45	2.010	19.70	19.70	20.81	62.77	**350.4**	*0.25*	675	*78*	1.17	420.3	1.11	83%
2	Butternut Drive	1	2	0.157	0.45	0.071	0.157	0.45	0.071	15.00	15.00	15.48	75.00	**14.7**	*0.40*	300	*25*	0.87	61.2	0.48	24%
8	Tulip Cresc.	2	6	0.263	0.45	0.118	4.886	0.45	2.199	20.81	20.81	21.41	61.68	**376.7**	*0.25*	675	*42*	1.17	420.3	0.60	90%
9	Tulip Cresc.	7	6	1.197	0.45	0.539	1.197	0.45	0.539	15.00	15.00	16.24	72.91	**109.1**	*0.30*	450	*73*	0.98	156.2	1.24	70%
	Easement	6	17	0.000	0.45	0.000	6.083	0.45	2.737	21.41	21.41	21.97	60.70	**461.6**	*0.35*	675	*47*	1.39	497.3	0.56	93%

SWM DESIGN CALCULATIONS (Appendix A2)
Orifice Calculations (In MH 9 / Downstream Side)

Project Name: Decou Subdivision
Municipality: Norfolk
Project No.: 22019
Date: 18-Jan-23

Prepared by: ss
Last Revised: 26-Sep-23

Area: Parking Lot (In MH9 D/S Side)

Orifice Characteristics

Orifice Diameter (mm)	300
C_d	0.8
Orifice Invert Elevation (m)	210.99
5-Year Ponding HGL (m)	212.06
Downstream Tailwater (m)	211.25
Head on Orifice (m)	0.66
Flow from Orifice (m^3/s)	**0.204**
Allowable Flow (m^3/s)	0.200

Orifice Equation:

$$Q = C_d x A x (2gH)^{0.5}$$

where:

Q =flow rate (m3/s)
H = head on the weir (m)
A =area of orifice (m^2)

g=9.81 (m/s^2) gravity
C_d = coefficient of discharge
C_d = 0.6 for Sharp Orifice
C_d = 0.8 for Tube Orifice

SWM DESIGN CALCULATIONS
Required Storage Calculations - Additional Quantity Control

Project Name: 18 Decou Road Simcoe
Municipality: County of Norfolk
Project No.: 22019
Date: 26-Sep-23

Prepared by: Y.K.
Last Revised: 26-Sep-23

Rainfall Data

Location:	Norfolk County	a	583.017
Event	5-Year	b	3.007
		c	0.703

Site Data

Area (ha)	2.13
Runoff Coefficient	0.70
AC	1.49
Tc (min)	18.28
Time Increment (min)	1
Release Rate (l/s)	204
Storage Required (m^3)	86

The Rational Equation:

$$Q = \frac{(C)(I)(A)}{360}$$

where,

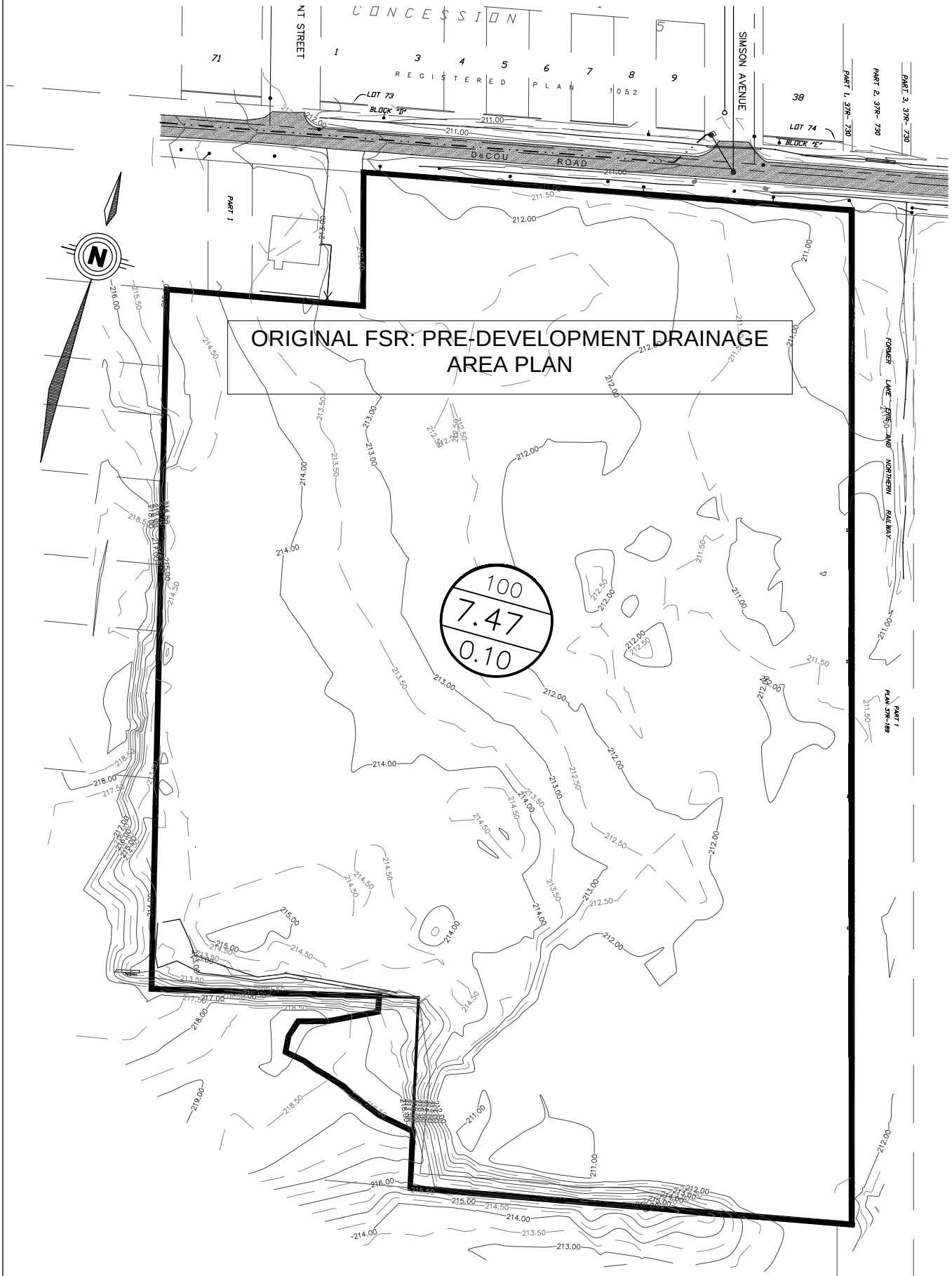
Q = the design flow (m^3/s)
C = the site specific runoff coefficient
A = the drainage area (ha)
I = rainfall intensity (mm/hr)

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
18.28	68	0.28	309	224	86	********
19.28	66	0.27	316	236	80	
20.28	64	0.26	322	248	74	
21.28	62	0.26	328	260	68	
22.28	60	0.25	334	273	61	
23.28	59	0.24	340	285	55	
24.28	57	0.24	345	297	48	
25.28	56	0.23	350	309	41	
26.28	54	0.23	355	322	34	
27.28	53	0.22	360	334	26	
28.28	52	0.22	365	346	19	
29.28	51	0.21	370	358	11	
30.28	50	0.21	374	371	4	
31.28	49	0.20	379	383	0	
32.28	48	0.20	383	395	0	
33.28	47	0.19	387	407	0	
34.28	46	0.19	391	420	0	

Big Sky Simcoe Limited Partnership

18 Decou Road

Dream Villas
Wetland SWMF
Design



PLAN SHOWING
PRE-DEVELOPED DRAINAGE AREAS
for
DREAM VILLAS SUBDIVISON
TOWN OF SIMCOE

Dream Villas subdivision

July 24, 2018

Percent Impervious Estimate for Water Quality Calculations

Catchment #4 was used as a sample Catchment

Total Catchment Area	0.555	ha.
Total Area of Lots in catchment	3709	m2

Proposed Impervious Area

a) Future Roof Area @ 35% max. coverage	1298	m2
b) Future Lot Driveways	404	m2
c) Proposed Roadways	610	m2
Total Impervious Area	2312	m2

Percent Impervious Area (Impervous / Total Area) 42%

For Calculation purposes, overall % Impervious value used = 45%

ORIGINAL FSR: SWM WETLAND FACILITY DESIGN

Storm Water Management Facility Information **Date: January 3, 2019**

1. Pond depths and volumes:

a) Permanent Pool -

- normal water elevation	210.07	m
- base elevation	209.77	m
- average Depth	0.30	m
- pool volume -	351.0	m3
- Area	925	m2

Sediment Forebay -

- maximum depth -	1.00	m
- forebay volume -	99.0	m3
- forebay area -	219	m2

Total permanent pool volume 351 m3

b) Extended Detention Storage:

- Quality Control - elevation	210.30	m
- depth	0.23	m
- volume	268	m3
- 100-Year event- elevation	211.57	m
- depth	1.50	m
- volume	2,734	m3

c) Length to width ratio of forebay

- Length =	22.2	m
- Width =	10.0	m
- Length / width ratio -	2.2	

2. Draw down time + Falling Head Orifice Equation:

$t = (2\ Ap\ \ (h_1^{0.5} - h_2^{0.5})) / (C\ Ao\ (2g)^{\wedge 0.5})$

where - Ap – surface area of pond (m2)
h_1 - starting elevation above orifice (0.00 m)
h_2 - ending elevation above orifice (0.23 m)
C - discharge coefficient (0.60)
Ao - area of orifice (m)
T - drawdown time in seconds (86,4000)
For this pond Ap is given by the equation - Ap= 930.85 h + 1120.12

Solving the equation for the Ao results in an Orifice diameter = 78 mm.

3. Sediment Forebay:

a) Settling Calculation: ORIGINAL FSR: SWM WETLAND FACILITY DESIGN

Dist = $((r * Qp) / Vs)^{0.5}$ where: r = length/width ratio
Qp = Peak flow from pond (Quality) = 0.0058 cms
Vs = particle settling velocity = 0.0003 m/s.

Required Dist = 6.5m
Actual provided = 22.2 m

b) Dispersion Length:

Dist = 8Q / d Vf where: Dist = dispersion length
Q = peak inlet flow rate – quality event
d = depth of permanent pool in forebay = 1.0m
Vf = desired velocity in forebay = 0.5 m/s

Q = C i A where: Q = peak flowrate

C =runoff coefficient = 0.45
A = contributing area = 6.7 ha.
i = 43C+5.9 = 25.5

Q = 0.21 m3/s, and

Dist = 3.36 m (Min.) - Actual length of deep pool in forebay = 17 m

c) Minimum Forebay bottom width:

Width = Dist / 8 = 3.36 / 8 = 0.42m (Min.) – Actual width = 2.3 m

d) Velocity check:

Q = V x A where: Q = peak inflow (quality) = 0.21 cms.
V = Max. average velocity (desired = 0.15 m/s)
A = flow area over forebay berm

For depth = 0.23, A = 2.56 m^2

Therefore V = Q/A = 0.08 m/s.

4. Fore bay & Wetland Areas:

Fore bay Area (@ 210.07) =	219 m^2
Wetland Area (@ 210.07) =	925 m^2
Total =	1,144 m^2

Fore bay / Total = 19.1% (Max. = 20%)

ORIGINAL FSR: SWM WETLAND FACILITY DESIGN

Big Sky Simcoe Limited Partnership

18 Decou Road

Wetland SWMF Alteration

SWM DESIGN CALCULATIONS
SWM Wetland Storage Calculations

Project Name: 18 Decou Road Simcoe
Municipality: County of Norfolk / Town of Simcoe
Project No.: 22019
Date: 25-Sep-23

Prepared by: R.K.
Checked by by:
Last Revised: 25-Sep-23

Stage	Elevation [m]	Area [m]	Accumulative Volume (m^3)	Quantity Volume (m^3)	Required Storage (m^3)
BL	209.77	0	0		
NWL	210.07	1,420	558	0	
EDL	210.72	1,983	1,665	1,107	1,065
2-Year	210.82	2,062	1,868	1,310	1,225
	210.87	2,101	1,972	1,414	
	210.92	2,141	2,078	1,520	
	210.97	2,180	2,186	1,628	
	211.02	2,219	2,296	1,738	
5-Year	211.07	2,259	2,408	1,850	1,771
	211.12	2,298	2,522	1,964	
10-Year	211.17	2,337	2,638	2,080	2,072
	211.22	2,377	2,755	2,197	
	211.27	2,416	2,875	2,317	
25-Year	211.32	2,455	2,997	2,439	2,371
	211.37	2,495	3,121	2,563	
50-Year	211.40	2,518	3,196	2,638	2,590
	211.45	2,558	3,323	2,765	
100-Year	211.47	2,573	3,374	2,816	2,804
	211.50	2,597	3,452	2,894	
	211.55	2,636	3,583	3,025	
Emergency Spillway Invert	211.58	2,660	3,662	3,104	
	211.80				
Top of Pond	211.88				

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SWM DESIGN CALCULATIONS
SWM Wetland Outlet Structure Calculation

Project Name: 18 Decou Road Simcoe
Municipality: County of Norfolk / Town of Simcoe
Project No.: 22019
Date: 25-Sep-23

Prepared by: RK
Checked by:
Last Revised: 25-Sep-23

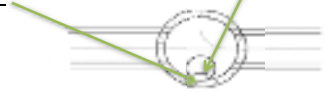
Use Minimum of Pond Level minus Control structure and Pond Level minus TW

Return Period	Elevation	$H_{ORIFICE}$	H_{WEIR}	Head Difference to TW	$Q_{EXT\ DET}$	$Q_{WEIR\ (Acts\ Weir)}$	$Q_{WEIR\ (Acts\ Orifice)}$	$Q_{FROM\ GRATE\ TOP\ OF\ OUTLET\ STRUCTURE}$	$Q_{TOTAL_PROVIDED}$
	[m]	[m]	[m]	[m]	[m^3/s]	[m^3/s]	[m^3/s]	[m^3/s]	[m^3/s]
EXT DET	**210.72**	0.613	0.000	0.650	0.009	0.00			**0.009**
2YR	210.82	0.713	0.000	0.750	0.010	0.00			**0.010**
5YR	211.07	0.963	0.170	1.000	0.012	0.03			**0.040**
10YR	211.17	1.063	0.270	1.100	0.012	0.06			**0.069**
25YR	**211.32**	1.213	0.420	1.250	0.013	0.11			**0.124**
50YR	211.40	1.293	0.500	1.330	0.013	0.14			**0.158**
100YR	**211.47**	1.363	0.570	1.400	0.014	0.18			**0.189**

* Uncontrolled 100-year storm inflow to the pond, assuming outlet structure's all openings are blocked.

Rectangular Orifice	
Width(m):	Height(m):
0.24	**0.98**
INV.=	**210.90m**

Orifice Plate	
Diameter (mm)	**75**
INV.=	**210.07m**



Weir equation: $Q = BxC_dxH^{3/2}$ $C_d = 1.7$

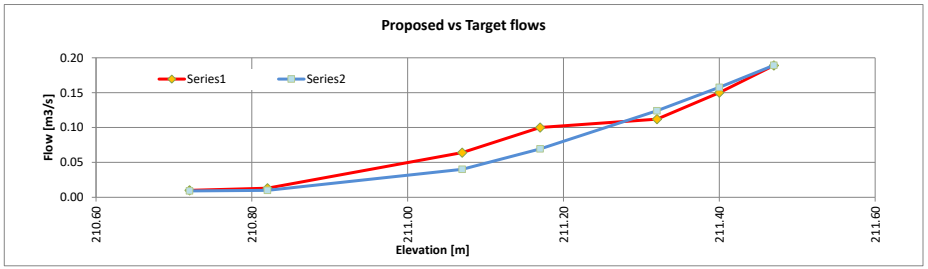
where:
q=flow rate (m^3/s)
h= head on the weir (m)
b=width of the weir (m)
g=9.81 (m/s^2) gravity
C_d = coefficient of discharge

Orifice equation: $Q = C_dxAx(2gH)^{0.5}$ $C_d = 0.6$, $A=(1/4*\pi*D^2)$

where:
q=flow rate (m^3/s)
h= head on the orifice centroid (m)
a= area of orifice (m^2)
g=9.81 (m/s^2) gravity
C_d = coefficient of discharge

Emergency Spillway equation: $Q = BxC_dxH^{3/2} + SxC_dxH^{5/2}$

where:
q=flow rate (m^3/s)
h= head on the weir (m)
b=width of the weir (m)
$C_d = 1.5$
S = 5% (20:1)
g=9.81 (m/s^2) gravity
C_d = coefficient of discharge



SWM DESIGN CALCULATIONS
Wetland Permanent Pool Volume Calculations

Project Name: 18 Decou Road Simcoe
Municipality: County of Norfolk / Town of Simcoe
Project No.: 22019
Date: 25-Sep-23

Prepared by: R.K.
Checked by:
Last Revised: 25-Sep-23

Wet Land Water Quality Storage Requirements
(MOE Stormwater Management Planning and Design Manual 2003, Table 3.2)

Impervious Level (%)	Water Quality Volume m^3/ha	Extended Detention Volume m^3/ha	Permanent Pool Volume m^3/ha
35%	80	40	40
55%	105	40	65
70%	120	40	80
85%	140	40	100
Interpolated Permanent Pool and Extended Detention Storage Requirements:			
50%	99.1	40	**59.1**

Drainage Area= 6.4 ha
Imperviousness= 50%

	Stage [m]	Required Volume $[m^3]$	Provided Volume $[m^3]$
PERM POOL	**210.07**	**376**	**558**

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Big Sky Simcoe Limited Partnership

18 Decou Road

VO6 Model Results

Pre-developmetn VO6 Model Schematic



AREA [ha] - 7.470
NasHyd - 1
1 **PKFW [m^3/s] - 0.553**

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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37c5-5129-4c97-89b0-ee072e2d4b77\scen


DATE: 09-21-2023                          TIME: 12:36:24

USER: Reza Kazemi



COMMENTS: 2-100 Year 3-hour Chicago Storms using Norfolk County IDF Data

--------------------------------------------------------------------------------
------------------------
  ********************************************
  ** SIMULATION : Run 01                     **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 529.711
| Ptotal= 32.58 mm |                          B=   4.501
```

```
--------------------                              C=   0.745
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 hrs
                        Storm time step    =  5.00 min
                        Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	3.22	0.83	14.72	1.58	8.03	2.33	4.07
0.17	3.48	0.92	32.16	1.67	7.18	2.42	3.88
0.25	3.79	1.00	98.99	1.75	6.51	2.50	3.71
0.33	4.18	1.08	40.96	1.83	5.97	2.58	3.55
0.42	4.67	1.17	23.39	1.92	5.52	2.67	3.41
0.50	5.32	1.25	16.55	2.00	5.14	2.75	3.28
0.58	6.23	1.33	12.92	2.08	4.82	2.83	3.16
0.67	7.59	1.42	10.68	2.17	4.53	2.92	3.05
0.75	9.90	1.50	9.14	2.25	4.29	3.00	2.95

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   7.47   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.519

     PEAK FLOW       (cms)=   0.126 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  10.504
     TOTAL RAINFALL   (mm)=  32.578
     RUNOFF COEFFICIENT   =   0.322

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

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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

         OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
```

```
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\d90b
4f3f-d8d5-4792-a337-0dc0df639d04\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\d90b
4f3f-d8d5-4792-a337-0dc0df639d04\scen


DATE: 09-21-2023                          TIME: 12:36:24

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : Run 02                       **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 583.017
| Ptotal= 44.90 mm |                          B=   3.007
--------------------                          C=   0.703
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    =  5.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
```

0.08	4.97	0.83	19.68	1.58	11.41	2.33	6.17
0.17	5.34	0.92	40.71	1.67	10.32	2.42	5.91
0.25	5.78	1.00	135.06	1.75	9.45	2.50	5.67
0.33	6.32	1.08	51.41	1.83	8.73	2.58	5.45
0.42	6.99	1.17	30.06	1.92	8.14	2.67	5.25
0.50	7.87	1.25	21.89	2.00	7.63	2.75	5.06
0.58	9.08	1.33	17.51	2.08	7.19	2.83	4.90
0.67	10.85	1.42	14.74	2.17	6.81	2.92	4.74
0.75	13.77	1.50	12.83	2.25	6.47	3.00	4.60

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   7.47   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.519

     PEAK FLOW       (cms)=   0.225 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  18.787
     TOTAL RAINFALL   (mm)=  44.897
     RUNOFF COEFFICIENT   =   0.418

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

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****
```

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\be5d213b-0859-4bb5-b595-ead4cd69e3b2\scen
Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\be5d213b-0859-4bb5-b595-ead4cd69e3b2\scen

DATE: 09-21-2023 TIME: 12:36:24

USER:

COMMENTS: _____

****
** SIMULATION : Run 03 **
****

| CHICAGO STORM |
| Ptotal= 52.98 mm |

IDF curve parameters: A= 670.324
B= 3.007
C= 0.698
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	5.96	0.83	23.29	1.58	13.58	2.33	7.38
0.17	6.40	0.92	47.83	1.67	12.29	2.42	7.07
0.25	6.92	1.00	156.91	1.75	11.26	2.50	6.78
0.33	7.55	1.08	60.27	1.83	10.41	2.58	6.52
0.42	8.36	1.17	35.44	1.92	9.71	2.67	6.28
0.50	9.40	1.25	25.89	2.00	9.11	2.75	6.07
0.58	10.83	1.33	20.75	2.08	8.59	2.83	5.87
0.67	12.92	1.42	17.50	2.17	8.14	2.92	5.68
0.75	16.35	1.50	15.24	2.25	7.74	3.00	5.51

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   7.47   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.519

     PEAK FLOW       (cms)=   0.299 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  24.807
     TOTAL RAINFALL   (mm)=  52.982
     RUNOFF COEFFICIENT   =   0.468

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

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\48db
ffe1-ef66-4198-92e7-b381e656ce6d\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\48db
```

ffe1-ef66-4198-92e7-b381e656ce6d\scen

DATE: 09-21-2023 TIME: 12:36:24

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : Run 04                        **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 721.533
| Ptotal= 63.14 mm |                          B=   2.253
--------------------                          C=   0.679
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 hrs
                        Storm time step    =  5.00 min
                        Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	7.44	0.83	27.30	1.58	16.36	2.33	9.15
0.17	7.97	0.92	54.38	1.67	14.88	2.42	8.77
0.25	8.59	1.00	187.92	1.75	13.69	2.50	8.43
0.33	9.35	1.08	68.12	1.83	12.71	2.58	8.12
0.42	10.29	1.17	40.69	1.92	11.88	2.67	7.83
0.50	11.52	1.25	30.18	2.00	11.18	2.75	7.57
0.58	13.19	1.33	24.47	2.08	10.57	2.83	7.33
0.67	15.60	1.42	20.82	2.17	10.04	2.92	7.11
0.75	19.52	1.50	18.26	2.25	9.57	3.00	6.90

```
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   7.47   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55
```

```
      Unit Hyd Qpeak  (cms)=   0.519

      PEAK FLOW       (cms)=   0.396 (i)
      TIME TO PEAK    (hrs)=   1.667
      RUNOFF VOLUME    (mm)=  32.828
      TOTAL RAINFALL   (mm)=  63.140
      RUNOFF COEFFICIENT   =   0.520

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

---------------------------------------------------------------------------
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        V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
        V    V   I    SS     U   U   A A   L
         V  V    I     SS    U   U  AAAAA  L
         V  V    I      SS   U   U  A   A  L
          VV     I    SSSSS  UUUUU  A   A  LLLLL

         OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
        O   O    T      T    H   H   Y Y   MM MM  O   O
        O   O    T      T    H   H    Y    M   M  O   O
         OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\7744
9b5d-2b1c-4ecb-b4ba-c62159cb57dc\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\7744
9b5d-2b1c-4ecb-b4ba-c62159cb57dc\scen


DATE: 09-21-2023                          TIME: 12:36:24

USER:
```

COMMENTS: _____

```
---------------------------------------------------------------------------------------
------------------------
  ***********************************************
  ** SIMULATION : Run 05                       **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 766.038
| Ptotal= 71.08 mm |                          B=   1.898
--------------------                          C=   0.668
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    =  5.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.08    8.61 |  0.83   30.52 |  1.58   18.57 |  2.33   10.53
                0.17    9.20 |  0.92   59.65 |  1.67   16.93 |  2.42   10.11
                0.25    9.90 |  1.00  210.85 |  1.75   15.61 |  2.50    9.72
                0.33   10.76 |  1.08   74.40 |  1.83   14.52 |  2.58    9.37
                0.42   11.82 |  1.17   44.97 |  1.92   13.60 |  2.67    9.05
                0.50   13.20 |  1.25   33.65 |  2.00   12.82 |  2.75    8.76
                0.58   15.05 |  1.33   27.45 |  2.08   12.13 |  2.83    8.48
                0.67   17.73 |  1.42   23.47 |  2.17   11.53 |  2.92    8.23
                0.75   22.05 |  1.50   20.67 |  2.25   11.00 |  3.00    8.00


---------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   7.47   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.519

     PEAK FLOW       (cms)=   0.475 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=  39.369
     TOTAL RAINFALL   (mm)=  71.077
     RUNOFF COEFFICIENT   =   0.554

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

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
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9e09-64b8-4649-98b3-90fd7be138ac\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\e342
9e09-64b8-4649-98b3-90fd7be138ac\scen


DATE: 09-21-2023                          TIME: 12:36:24

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  **********************************************
  ** SIMULATION : Run 06                       **
  **********************************************
```

```
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 801.041
| Ptotal= 78.82 mm |                          B=   1.501
--------------------                          C=   0.657
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    =  5.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.08    9.80 |  0.83   33.56 |  1.58   20.74 |  2.33   11.93
                0.17   10.46 |  0.92   64.21 |  1.67   18.96 |  2.42   11.46
                0.25   11.24 |  1.00  234.17 |  1.75   17.52 |  2.50   11.03
                0.33   12.18 |  1.08   79.66 |  1.83   16.33 |  2.58   10.64
                0.42   13.36 |  1.17   48.82 |  1.92   15.32 |  2.67   10.29
                0.50   14.87 |  1.25   36.89 |  2.00   14.45 |  2.75    9.96
                0.58   16.91 |  1.33   30.30 |  2.08   13.70 |  2.83    9.66
                0.67   19.83 |  1.42   26.03 |  2.17   13.04 |  2.92    9.38
                0.75   24.50 |  1.50   23.01 |  2.25   12.46 |  3.00    9.12


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   7.47   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.519

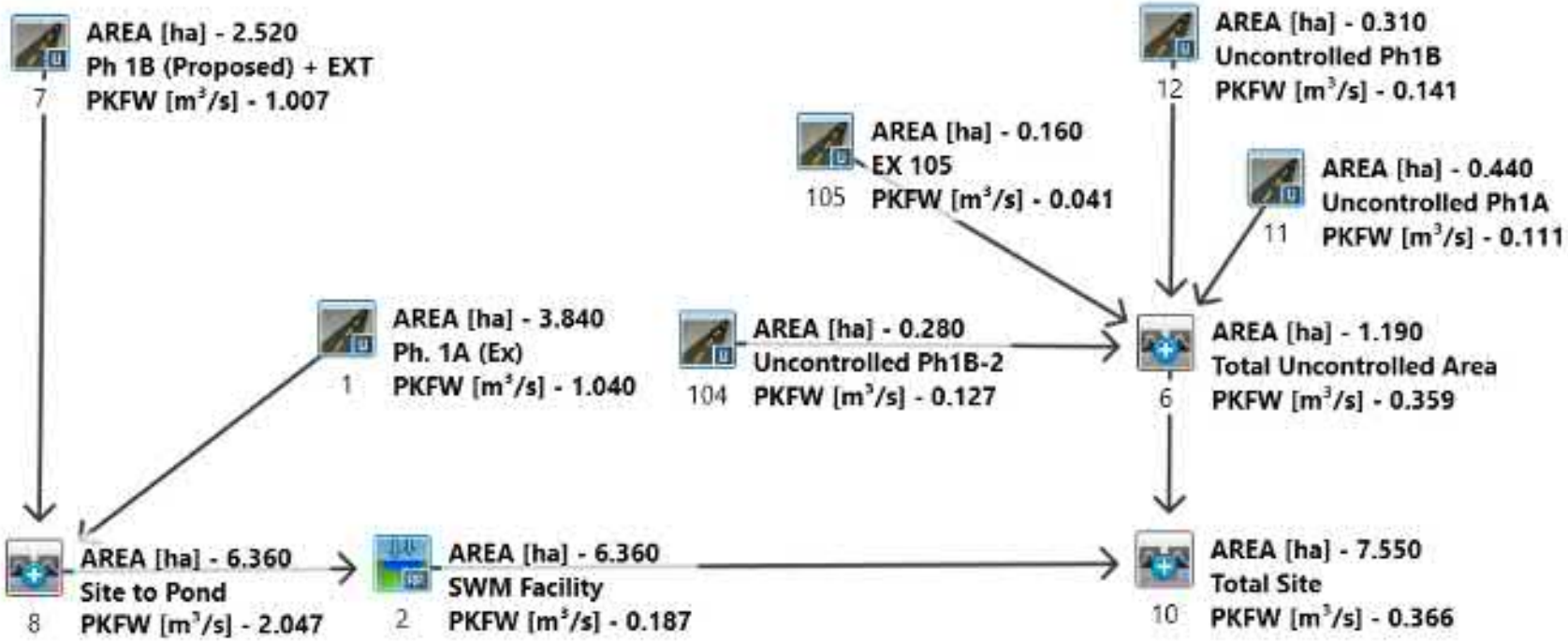
     PEAK FLOW       (cms)=   0.553 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=  45.926
     TOTAL RAINFALL   (mm)=  78.816
     RUNOFF COEFFICIENT   =   0.583

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

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

 FINISH
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```

Post-developmetn VO6 Model Schematic



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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\2208
b4d5-87cd-4b32-861b-a0f512cc10f9\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\2208
b4d5-87cd-4b32-861b-a0f512cc10f9\scen


DATE: 09-21-2023                          TIME: 10:41:59

USER: Reza Kazemi



COMMENTS: 2-100 Year 3-hour Chicago and 25mm 4-hour Chicago Storms using Norfolk
County IDF Data


--------------------------------------------------------------------------------
------------------------
  ********************************************
  ** SIMULATION : Run 01                     **
  ********************************************
```

```
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 529.711
| Ptotal= 32.58 mm |                          B=   4.501
--------------------                          C=   0.745
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    =  5.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.08    3.22 |  0.83   14.72 |  1.58    8.03 |  2.33    4.07
                0.17    3.48 |  0.92   32.16 |  1.67    7.18 |  2.42    3.88
                0.25    3.79 |  1.00   98.99 |  1.75    6.51 |  2.50    3.71
                0.33    4.18 |  1.08   40.96 |  1.83    5.97 |  2.58    3.55
                0.42    4.67 |  1.17   23.39 |  1.92    5.52 |  2.67    3.41
                0.50    5.32 |  1.25   16.55 |  2.00    5.14 |  2.75    3.28
                0.58    6.23 |  1.33   12.92 |  2.08    4.82 |  2.83    3.16
                0.67    7.59 |  1.42   10.68 |  2.17    4.53 |  2.92    3.05
                0.75    9.90 |  1.50    9.14 |  2.25    4.29 |  3.00    2.95


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   3.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  36.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.38         2.46
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     160.00        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      98.99        17.13
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       3.40 (ii)   17.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.26         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.32         0.06          0.326 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.33           1.00
     RUNOFF VOLUME    (mm)=      31.58        10.50          18.09
     TOTAL RAINFALL   (mm)=      32.58        32.58          32.58
     RUNOFF COEFFICIENT   =       0.97         0.32           0.56
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0007)|   Area    (ha)=   2.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  54.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.81         0.71
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.61        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      98.99        54.30
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.00 (ii)   12.01 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.28         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.32         0.06          0.341 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.25           1.00
     RUNOFF VOLUME    (mm)=      31.58        15.35          24.11
     TOTAL RAINFALL   (mm)=      32.58        32.58          32.58
     RUNOFF COEFFICIENT   =       0.97         0.47           0.74



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     3.84   0.326     1.00    18.09
```

```
      + ID2= 2 (  0007):     2.52   0.341     1.00    24.11
        ================================================
        ID = 3 (  0008):     6.36   0.667     1.00    20.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1240      0.2439
                          0.0090     0.1107   |   0.1580      0.2638
                          0.0099     0.1310   |   0.1893      0.2816
                          0.0400     0.1850   |   0.2430      0.3104
                          0.0693     0.2080   |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0008)      6.360      0.667      1.00      20.47
   OUTFLOW: ID= 1 (  0002)      6.360      0.010      3.33      19.98

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.43
                  TIME SHIFT OF PEAK FLOW         (min)=140.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1225

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0011)|   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.16         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      54.16        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      98.99        48.74
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.78 (ii)   11.18 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.32         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.02          0.021 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.17
     RUNOFF VOLUME    (mm)=      31.58        14.77          14.92
```

```
      TOTAL RAINFALL   (mm)=      32.58        32.58          32.58
      RUNOFF COEFFICIENT   =       0.97         0.45           0.46


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.24         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      45.46        40.00
     Mannings n             =    0.013        0.250

     Max.Eff.Inten.(mm/hr)=      98.99       265.00
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.60 (ii)    6.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.04          0.039 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      31.58        24.21          24.27
     TOTAL RAINFALL   (mm)=      32.58        32.58          32.58
     RUNOFF COEFFICIENT   =       0.97         0.74           0.75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0104)|   Area    (ha)=   0.28
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.22         0.06
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      43.20        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      98.99       265.00
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.55 (ii)    6.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.03          0.035 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      31.58        24.21          24.27
     TOTAL RAINFALL   (mm)=      32.58        32.58          32.58
     RUNOFF COEFFICIENT   =       0.97         0.74           0.75



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0105)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      32.66        40.00
     Mannings n             =     0.013        0.250
```

```
      Max.Eff.Inten.(mm/hr)=      98.99        48.74
                   over (min)      5.00        15.00
      Storage Coeff.  (min)=      1.31 (ii)   10.72 (ii)
      Unit Hyd. Tpeak (min)=      5.00        15.00
      Unit Hyd. peak  (cms)=      0.33         0.09
                                                          *TOTALS*
      PEAK FLOW       (cms)=      0.00         0.01          0.008 (iii)
      TIME TO PEAK    (hrs)=      1.00         1.17           1.17
      RUNOFF VOLUME    (mm)=     31.58        14.77          14.90
      TOTAL RAINFALL   (mm)=     32.58        32.58          32.58
      RUNOFF COEFFICIENT   =      0.97         0.45           0.46


        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0104):     0.28   0.035     1.08    24.27
      + ID2= 2 (  0105):     0.16   0.008     1.17    14.90
        ====================================================
        ID = 3 (  0006):     0.44   0.040     1.08    20.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     0.44   0.040     1.08    20.86
      + ID2= 2 (  0011):     0.44   0.021     1.17    14.92
        ====================================================
        ID = 1 (  0006):     0.88   0.057     1.17    17.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

```
--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     0.88   0.057     1.17    17.89
      + ID2= 2 (  0012):     0.31   0.039     1.08    24.27
        ================================================
        ID = 3 (  0006):     1.19   0.093     1.08    19.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):     6.36   0.010     3.33    19.98
      + ID2= 2 (  0006):     1.19   0.093     1.08    19.55
        ================================================
        ID = 3 (  0010):     7.55   0.096     1.08    19.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\a7ff
```

96e0-e5db-4670-a5be-fa20c2817b33\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\a7ff
96e0-e5db-4670-a5be-fa20c2817b33\scen

DATE: 09-21-2023 TIME: 10:42:00

USER:

COMMENTS: _____

  ****
  ** SIMULATION : Run 02 **
  ****

| CHICAGO STORM |
| Ptotal= 44.90 mm |

IDF curve parameters: A= 583.017
B= 3.007
C= 0.703
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	4.97	0.83	19.68	1.58	11.41	2.33	6.17
0.17	5.34	0.92	40.71	1.67	10.32	2.42	5.91
0.25	5.78	1.00	135.06	1.75	9.45	2.50	5.67
0.33	6.32	1.08	51.41	1.83	8.73	2.58	5.45
0.42	6.99	1.17	30.06	1.92	8.14	2.67	5.25
0.50	7.87	1.25	21.89	2.00	7.63	2.75	5.06
0.58	9.08	1.33	17.51	2.08	7.19	2.83	4.90
0.67	10.85	1.42	14.74	2.17	6.81	2.92	4.74
0.75	13.77	1.50	12.83	2.25	6.47	3.00	4.60

| CALIB |
| STANDHYD (0001)| Area (ha)= 3.84

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  36.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.38         2.46
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     160.00        40.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     135.06        30.67
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       3.00 (ii)   14.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.28         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.45         0.12          0.482 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.25           1.00
     RUNOFF VOLUME    (mm)=      43.90        18.79          27.83
     TOTAL RAINFALL   (mm)=      44.90        44.90          44.90
     RUNOFF COEFFICIENT   =       0.98         0.42           0.62


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0007)|   Area    (ha)=   2.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  54.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.81         0.71
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.61        40.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     135.06        89.30
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.65 (ii)    7.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.13
                                                          *TOTALS*
```

```
      PEAK FLOW       (cms)=       0.45         0.13          0.522 (iii)
      TIME TO PEAK    (hrs)=       1.00         1.08           1.00
      RUNOFF VOLUME    (mm)=      43.90        25.34          35.36
      TOTAL RAINFALL   (mm)=      44.90        44.90          44.90
      RUNOFF COEFFICIENT   =       0.98         0.56           0.79


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     3.84   0.482     1.00    27.83
      + ID2= 2 (  0007):     2.52   0.522     1.00    35.36
        ====================================================
        ID = 3 (  0008):     6.36   1.004     1.00    30.81

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |   (cms)     (ha.m.)
                           0.0000     0.0000    |   0.1240      0.2439
                           0.0090     0.1107    |   0.1580      0.2638
                           0.0099     0.1310    |   0.1893      0.2816
                           0.0400     0.1850    |   0.2430      0.3104
                           0.0693     0.2080    |   0.0000      0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0008)      6.360      1.004      1.00      30.81
   OUTFLOW: ID= 1 (  0002)      6.360      0.036      3.08      30.32

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.54
                  TIME SHIFT OF PEAK FLOW         (min)=125.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1771

--------------------------------------------------------------------------------
```

```
--------------------
| CALIB            |
| STANDHYD (  0011)|   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.16         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      54.16        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     135.06        81.04
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.57 (ii)    9.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.04          0.041 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      43.90        24.57          24.75
     TOTAL RAINFALL   (mm)=      44.90        44.90          44.90
     RUNOFF COEFFICIENT   =       0.98         0.55           0.55



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.24         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      45.46        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     135.06       380.90
```

over (min)		5.00	10.00	
Storage Coeff. (min)=		1.41 (ii)	5.55 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.33	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.06	0.060 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08
RUNOFF VOLUME	(mm)=	43.90	36.02	36.09
TOTAL RAINFALL	(mm)=	44.90	44.90	44.90
RUNOFF COEFFICIENT	=	0.98	0.80	0.80

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

CALIB				
STANDHYD (0104)	Area (ha)=	0.28		
ID= 1 DT= 5.0 min	Total Imp(%)=	79.00	Dir. Conn.(%)=	1.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.22	0.06	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	43.20	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		135.06	380.90	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.37 (ii)	5.50 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.33	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.05	0.054 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08
RUNOFF VOLUME	(mm)=	43.90	36.02	36.09
TOTAL RAINFALL	(mm)=	44.90	44.90	44.90
RUNOFF COEFFICIENT	=	0.98	0.80	0.80

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0105)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      32.66        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     135.06        81.04
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.16 (ii)    8.83 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.02          0.015 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      43.90        24.57          24.73
     TOTAL RAINFALL   (mm)=      44.90        44.90          44.90
     RUNOFF COEFFICIENT   =       0.98         0.55           0.55




       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0104):     0.28   0.054     1.08    36.09
      + ID2= 2 (  0105):     0.16   0.015     1.08    24.73
        ================================================
        ID = 3 (  0006):     0.44   0.070     1.08    31.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     0.44   0.070     1.08    31.96
      + ID2= 2 (  0011):     0.44   0.041     1.08    24.75
        ================================================
        ID = 1 (  0006):     0.88   0.111     1.08    28.36

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     0.88   0.111     1.08    28.36
      + ID2= 2 (  0012):     0.31   0.060     1.08    36.09
        ================================================
        ID = 3 (  0006):     1.19   0.171     1.08    30.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):     6.36   0.036     3.08    30.32
      + ID2= 2 (  0006):     1.19   0.171     1.08    30.37
        ================================================
        ID = 3 (  0010):     7.55   0.176     1.08    30.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

 FINISH
================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
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2c34-f028-40ba-a2ff-43c772634f91\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\8ca5
2c34-f028-40ba-a2ff-43c772634f91\scen


DATE: 09-21-2023                          TIME: 10:41:59

USER:



COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ********************************************
  ** SIMULATION : Run 03                     **
  ********************************************

--------------------
```

```
| CHICAGO STORM    |    IDF curve parameters: A= 670.324
| Ptotal= 52.98 mm |                          B=   3.007
--------------------                          C=   0.698
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    =  5.00 min
                       Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	5.96	0.83	23.29	1.58	13.58	2.33	7.38
0.17	6.40	0.92	47.83	1.67	12.29	2.42	7.07
0.25	6.92	1.00	156.91	1.75	11.26	2.50	6.78
0.33	7.55	1.08	60.27	1.83	10.41	2.58	6.52
0.42	8.36	1.17	35.44	1.92	9.71	2.67	6.28
0.50	9.40	1.25	25.89	2.00	9.11	2.75	6.07
0.58	10.83	1.33	20.75	2.08	8.59	2.83	5.87
0.67	12.92	1.42	17.50	2.17	8.14	2.92	5.68
0.75	16.35	1.50	15.24	2.25	7.74	3.00	5.51

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   3.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  36.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.38         2.46
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     160.00        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     156.91        50.32
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       2.83 (ii)   12.12 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.28         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.53         0.18          0.585 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.00
     RUNOFF VOLUME    (mm)=      51.98        24.81          34.59
     TOTAL RAINFALL   (mm)=      52.98        52.98          52.98
     RUNOFF COEFFICIENT   =       0.98         0.47           0.65
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0007)|   Area    (ha)=   2.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  54.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.81         0.71
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.61        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     156.91       113.91
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.49 (ii)    7.02 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.54         0.17         0.628 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08          1.00
     RUNOFF VOLUME    (mm)=      51.98        32.29         42.92
     TOTAL RAINFALL   (mm)=      52.98        52.98         52.98
     RUNOFF COEFFICIENT   =       0.98         0.61          0.81



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     3.84   0.585     1.00    34.59
      + ID2= 2 (  0007):     2.52   0.628     1.00    42.92
```

```
        ================================================
        ID = 3 (  0008):     6.36   1.213     1.00    37.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1240      0.2439
                          0.0090     0.1107   |   0.1580      0.2638
                          0.0099     0.1310   |   0.1893      0.2816
                          0.0400     0.1850   |   0.2430      0.3104
                          0.0693     0.2080   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0008)      6.360      1.213      1.00      37.89
   OUTFLOW: ID= 1 (  0002)      6.360      0.068      3.08      37.40

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.59
                  TIME SHIFT OF PEAK FLOW         (min)=125.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2072

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0011)|   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.16         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      54.16        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     156.91       103.89
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.48 (ii)    8.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.06         0.056 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08          1.08
     RUNOFF VOLUME    (mm)=      51.98        31.44         31.63
     TOTAL RAINFALL   (mm)=      52.98        52.98         52.98
```

RUNOFF COEFFICIENT	=	0.98	0.59	0.60

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

CALIB
STANDHYD (0012) | Area (ha)= 0.31
ID= 1 DT= 5.0 min | Total Imp(%)= 79.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.24	0.07	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	45.46	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		156.91	457.30	
over (min)		5.00	10.00	
Storage Coeff.	(min)=	1.33 (ii)	5.17 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.33	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.07	0.074 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08
RUNOFF VOLUME	(mm)=	51.98	43.89	43.95
TOTAL RAINFALL	(mm)=	52.98	52.98	52.98
RUNOFF COEFFICIENT	=	0.98	0.83	0.83

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

```
--------------------
| CALIB            |
| STANDHYD (  0104)|   Area    (ha)=   0.28
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.22         0.06
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      43.20        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     156.91       457.30
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.29 (ii)    5.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.07        0.067 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08         1.08
     RUNOFF VOLUME    (mm)=      51.98        43.89        43.95
     TOTAL RAINFALL   (mm)=      52.98        52.98        52.98
     RUNOFF COEFFICIENT   =       0.98         0.83         0.83



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0105)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      32.66        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     156.91       103.89
```

over (min)		5.00	10.00	
Storage Coeff. (min)=		1.09 (ii)	8.04 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.02	0.021 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08
RUNOFF VOLUME	(mm)=	51.98	31.44	31.61
TOTAL RAINFALL	(mm)=	52.98	52.98	52.98
RUNOFF COEFFICIENT	=	0.98	0.59	0.60

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

ADD HYD (0006)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	0.28	0.067	1.08	43.95
+ ID2= 2 (0105):	0.16	0.021	1.08	31.61
ID = 3 (0006):	0.44	0.088	1.08	39.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)
3 + 2 = 1

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0006):	0.44	0.088	1.08	39.47
+ ID2= 2 (0011):	0.44	0.056	1.08	31.63
ID = 1 (0006):	0.88	0.144	1.08	35.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     0.88   0.144     1.08    35.55
      + ID2= 2 (  0012):     0.31   0.074     1.08    43.95
        ====================================================
        ID = 3 (  0006):     1.19   0.219     1.08    37.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------


--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):     6.36   0.068     3.08    37.40
      + ID2= 2 (  0006):     1.19   0.219     1.08    37.74
        ====================================================
        ID = 3 (  0010):     7.55   0.225     1.08    37.45

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\9174
a9eb-cd07-4f90-bc11-eba82de25393\scen
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Summary filename:
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DATE: 09-21-2023 TIME: 10:42:00

USER:

COMMENTS: _____

****
** SIMULATION : Run 04 **
****

| CHICAGO STORM |
| Ptotal= 63.14 mm |

IDF curve parameters: A= 721.533
B= 2.253
C= 0.679
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	7.44	0.83	27.30	1.58	16.36	2.33	9.15
0.17	7.97	0.92	54.38	1.67	14.88	2.42	8.77
0.25	8.59	1.00	187.92	1.75	13.69	2.50	8.43
0.33	9.35	1.08	68.12	1.83	12.71	2.58	8.12
0.42	10.29	1.17	40.69	1.92	11.88	2.67	7.83
0.50	11.52	1.25	30.18	2.00	11.18	2.75	7.57
0.58	13.19	1.33	24.47	2.08	10.57	2.83	7.33
0.67	15.60	1.42	20.82	2.17	10.04	2.92	7.11
0.75	19.52	1.50	18.26	2.25	9.57	3.00	6.90

| CALIB |
| STANDHYD (0001)| Area (ha)= 3.84
|ID= 1 DT= 5.0 min | Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

```
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.38          2.46
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     160.00         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     187.92         67.24
               over (min)         5.00         15.00
     Storage Coeff.  (min)=       2.63 (ii)    10.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.29          0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.64          0.26          0.730 (iii)
     TIME TO PEAK    (hrs)=       1.00          1.17           1.00
     RUNOFF VOLUME    (mm)=      62.14         32.83          43.38
     TOTAL RAINFALL   (mm)=      63.14         63.14          63.14
     RUNOFF COEFFICIENT   =       0.98          0.52           0.69


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0007)|   Area    (ha)=   2.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  54.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.81          0.71
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     129.61         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     187.92        145.62
               over (min)         5.00         10.00
     Storage Coeff.  (min)=       2.32 (ii)     6.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.30          0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.65          0.22          0.778 (iii)
```

```
      TIME TO PEAK    (hrs)=       1.00         1.08          1.00
      RUNOFF VOLUME    (mm)=      62.14        41.33         52.57
      TOTAL RAINFALL   (mm)=      63.14        63.14         63.14
      RUNOFF COEFFICIENT   =       0.98         0.65          0.83


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     3.84   0.730     1.00    43.38
      + ID2= 2 (  0007):     2.52   0.778     1.00    52.57
        ================================================
        ID = 3 (  0008):     6.36   1.507     1.00    47.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.1240      0.2439
                          0.0090     0.1107    |   0.1580      0.2638
                          0.0099     0.1310    |   0.1893      0.2816
                          0.0400     0.1850    |   0.2430      0.3104
                          0.0693     0.2080    |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0008)      6.360      1.507      1.00      47.02
   OUTFLOW: ID= 1 (  0002)      6.360      0.114      3.00      46.53

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.53
                  TIME SHIFT OF PEAK FLOW         (min)=120.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2371

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```

```
| CALIB             |
| STANDHYD (  0011)|   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.16         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      54.16        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     187.92       133.42
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.37 (ii)    7.66 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.08         0.077 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08          1.08
     RUNOFF VOLUME    (mm)=      62.14        40.38         40.59
     TOTAL RAINFALL   (mm)=      63.14        63.14         63.14
     RUNOFF COEFFICIENT   =       0.98         0.64          0.64



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0012)|   Area    (ha)=   0.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.24         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      45.46        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     187.92       552.98
               over (min)        5.00         5.00
```

```
      Storage Coeff.  (min)=       1.24 (ii)    4.80 (ii)
      Unit Hyd. Tpeak (min)=       5.00         5.00
      Unit Hyd. peak  (cms)=       0.33         0.22
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.00         0.10         0.106 (iii)
      TIME TO PEAK    (hrs)=       1.00         1.00          1.00
      RUNOFF VOLUME    (mm)=      62.14        53.83         53.90
      TOTAL RAINFALL   (mm)=      63.14        63.14         63.14
      RUNOFF COEFFICIENT   =       0.98         0.85          0.85



        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0104)|   Area    (ha)=   0.28
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       0.22         0.06
      Dep. Storage     (mm)=       1.00         5.00
      Average Slope     (%)=       1.00         2.00
      Length            (m)=      43.20        40.00
      Mannings n             =     0.013        0.250

      Max.Eff.Inten.(mm/hr)=     187.92       552.98
                over (min)        5.00         5.00
      Storage Coeff.  (min)=       1.20 (ii)    4.76 (ii)
      Unit Hyd. Tpeak (min)=       5.00         5.00
      Unit Hyd. peak  (cms)=       0.33         0.22
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.00         0.09         0.096 (iii)
      TIME TO PEAK    (hrs)=       1.00         1.00          1.00
      RUNOFF VOLUME    (mm)=      62.14        53.83         53.90
      TOTAL RAINFALL   (mm)=      63.14        63.14         63.14
      RUNOFF COEFFICIENT   =       0.98         0.85          0.85
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0105)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      32.66        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     187.92       133.42
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.01 (ii)    7.30 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.13
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.03          0.029 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      62.14        40.38          40.57
     TOTAL RAINFALL   (mm)=      63.14        63.14          63.14
     RUNOFF COEFFICIENT   =       0.98         0.64           0.64




       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
        ID1= 1 (  0104):     0.28   0.096     1.00    53.90
      + ID2= 2 (  0105):     0.16   0.029     1.08    40.57
        ================================================
        ID = 3 (  0006):     0.44   0.112     1.00    49.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     0.44   0.112     1.00    49.05
      + ID2= 2 (  0011):     0.44   0.077     1.08    40.59
        ================================================
        ID = 1 (  0006):     0.88   0.171     1.08    44.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     0.88   0.171     1.08    44.82
      + ID2= 2 (  0012):     0.31   0.106     1.00    53.90
        ================================================
        ID = 3 (  0006):     1.19   0.263     1.00    47.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):     6.36   0.114     3.00    46.53
      + ID2= 2 (  0006):     1.19   0.263     1.00    47.19
        ================================================
        ID = 3 (  0010):     7.55   0.268     1.00    46.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
```

```
         V  V    I     SS    U   U  AAAAA  L
         V  V    I      SS   U   U  A   A  L
          VV     I    SSSSS  UUUUU  A   A  LLLLL

         OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
        O   O    T      T    H   H   Y Y   MM MM  O   O
        O   O    T      T    H   H    Y    M   M  O   O
         OOO     T      T    H   H    Y    M   M   OOO
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                    *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\8d14
9743-5dd5-46c6-b50b-50c3093f5e94\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\8d14
9743-5dd5-46c6-b50b-50c3093f5e94\scen


DATE: 09-21-2023                          TIME: 10:41:59

USER:



COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : Run 05                       **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 766.038
| Ptotal= 71.08 mm |                          B=   1.898
--------------------                          C=   0.668
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
```

Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	8.61	0.83	30.52	1.58	18.57	2.33	10.53
0.17	9.20	0.92	59.65	1.67	16.93	2.42	10.11
0.25	9.90	1.00	210.85	1.75	15.61	2.50	9.72
0.33	10.76	1.08	74.40	1.83	14.52	2.58	9.37
0.42	11.82	1.17	44.97	1.92	13.60	2.67	9.05
0.50	13.20	1.25	33.65	2.00	12.82	2.75	8.76
0.58	15.05	1.33	27.45	2.08	12.13	2.83	8.48
0.67	17.73	1.42	23.47	2.17	11.53	2.92	8.23
0.75	22.05	1.50	20.67	2.25	11.00	3.00	8.00

CALIB STANDHYD (0001) ID= 1 DT= 5.0 min	Area (ha)= 3.84 Total Imp(%)= 36.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	1.38	2.46	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	160.00	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		210.85	80.75	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.51 (ii)	10.20 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.29	0.09	
				TOTALS
PEAK FLOW	(cms)=	0.73	0.33	0.843 (iii)
TIME TO PEAK	(hrs)=	1.00	1.17	1.00
RUNOFF VOLUME	(mm)=	70.08	39.37	50.42
TOTAL RAINFALL	(mm)=	71.08	71.08	71.08
RUNOFF COEFFICIENT	=	0.99	0.55	0.71

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0007)|   Area    (ha)=   2.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  54.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.81         0.71
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.61        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     210.85       170.21
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.21 (ii)    6.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.74         0.27          0.891 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      70.08        48.56          60.18
     TOTAL RAINFALL   (mm)=      71.08        71.08          71.08
     RUNOFF COEFFICIENT   =       0.99         0.68           0.85


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     3.84   0.843     1.00    50.42
      + ID2= 2 (  0007):     2.52   0.891     1.00    60.18
        ================================================
        ID = 3 (  0008):     6.36   1.734     1.00    54.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
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```

```
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.1240      0.2439
                          0.0090     0.1107    |   0.1580      0.2638
                          0.0099     0.1310    |   0.1893      0.2816
                          0.0400     0.1850    |   0.2430      0.3104
                          0.0693     0.2080    |   0.0000      0.0000

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0008)      6.360      1.734      1.00      54.29
   OUTFLOW: ID= 1 (  0002)      6.360      0.150      2.75      53.80

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.64
                  TIME SHIFT OF PEAK FLOW         (min)=105.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2590

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0011)|   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.16         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      54.16        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     210.85       156.40
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.31 (ii)    7.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.09          0.094 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      70.08        47.54          47.76
     TOTAL RAINFALL   (mm)=      71.08        71.08          71.08
     RUNOFF COEFFICIENT   =       0.99         0.67           0.67
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.24         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      45.46        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     210.85       624.92
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.18 (ii)    4.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.23
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.12          0.123 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.00           1.00
     RUNOFF VOLUME    (mm)=      70.08        61.65          61.72
     TOTAL RAINFALL   (mm)=      71.08        71.08          71.08
     RUNOFF COEFFICIENT   =       0.99         0.87           0.87




       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0104)|   Area    (ha)=   0.28
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
```

Surface Area (ha)=	0.22	0.06	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	43.20	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	210.85	624.92	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.15 (ii)	4.54 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.23	
			TOTALS
PEAK FLOW (cms)=	0.00	0.11	0.111 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	70.08	61.65	61.72
TOTAL RAINFALL (mm)=	71.08	71.08	71.08
RUNOFF COEFFICIENT =	0.99	0.87	0.87

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

CALIB			
STANDHYD (0105)	Area (ha)=	0.16	
ID= 1 DT= 5.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)= 1.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.06	0.10	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	32.66	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	210.85	156.40	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.97 (ii)	6.87 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
			TOTALS
PEAK FLOW (cms)=	0.00	0.03	0.035 (iii)

```
      TIME TO PEAK    (hrs)=       1.00         1.08          1.08
      RUNOFF VOLUME    (mm)=      70.08        47.54         47.74
      TOTAL RAINFALL   (mm)=      71.08        71.08         71.08
      RUNOFF COEFFICIENT   =       0.99         0.67          0.67


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0104):     0.28   0.111     1.00    61.72
      + ID2= 2 (  0105):     0.16   0.035     1.08    47.74
        ====================================================
        ID = 3 (  0006):     0.44   0.132     1.00    56.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     0.44   0.132     1.00    56.64
      + ID2= 2 (  0011):     0.44   0.094     1.08    47.76
        ====================================================
        ID = 1 (  0006):     0.88   0.202     1.08    52.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     0.88   0.202     1.08    52.20
      + ID2= 2 (  0012):     0.31   0.123     1.00    61.72
        ====================================================
```

```
         ID = 3 (  0006):     1.19   0.310     1.00    54.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (  0002):     6.36   0.150     2.75    53.80
       + ID2= 2 (  0006):     1.19   0.310     1.00    54.68
         ================================================
         ID = 3 (  0010):     7.55   0.316     1.00    53.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\63d2
d876-21a6-4f59-a4c7-f53370637bbd\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\63d2
d876-21a6-4f59-a4c7-f53370637bbd\scen


DATE: 09-21-2023                          TIME: 10:41:59
```

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : Run 06                        **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 801.041
| Ptotal= 78.82 mm |                          B=   1.501
--------------------                          C=   0.657
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    =  5.00 min
                       Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.08	9.80	0.83	33.56	1.58	20.74	2.33	11.93
0.17	10.46	0.92	64.21	1.67	18.96	2.42	11.46
0.25	11.24	1.00	234.17	1.75	17.52	2.50	11.03
0.33	12.18	1.08	79.66	1.83	16.33	2.58	10.64
0.42	13.36	1.17	48.82	1.92	15.32	2.67	10.29
0.50	14.87	1.25	36.89	2.00	14.45	2.75	9.96
0.58	16.91	1.33	30.30	2.08	13.70	2.83	9.66
0.67	19.83	1.42	26.03	2.17	13.04	2.92	9.38
0.75	24.50	1.50	23.01	2.25	12.46	3.00	9.12

```
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   3.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  36.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.38         2.46
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     160.00        40.00
```

```
      Mannings n            =      0.013         0.250

      Max.Eff.Inten.(mm/hr)=     234.17         94.28
                 over (min)        5.00         10.00
      Storage Coeff.  (min)=       2.41 (ii)     9.64 (ii)
      Unit Hyd. Tpeak (min)=       5.00         10.00
      Unit Hyd. peak  (cms)=       0.30          0.11
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.82          0.41          1.040 (iii)
      TIME TO PEAK    (hrs)=       1.00          1.08           1.00
      RUNOFF VOLUME    (mm)=      77.82         45.93          57.41
      TOTAL RAINFALL   (mm)=      78.82         78.82          78.82
      RUNOFF COEFFICIENT   =       0.99          0.58           0.73


        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0007)|   Area    (ha)=   2.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  54.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       1.81          0.71
      Dep. Storage     (mm)=       1.00          5.00
      Average Slope     (%)=       1.00          2.00
      Length            (m)=     129.61         40.00
      Mannings n            =      0.013         0.250

      Max.Eff.Inten.(mm/hr)=     234.17        194.41
                 over (min)        5.00         10.00
      Storage Coeff.  (min)=       2.12 (ii)     5.99 (ii)
      Unit Hyd. Tpeak (min)=       5.00         10.00
      Unit Hyd. peak  (cms)=       0.31          0.15
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.82          0.32          1.007 (iii)
      TIME TO PEAK    (hrs)=       1.00          1.08           1.00
      RUNOFF VOLUME    (mm)=      77.82         55.71          67.65
      TOTAL RAINFALL   (mm)=      78.82         78.82          78.82
      RUNOFF COEFFICIENT   =       0.99          0.71           0.86
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     3.84   1.040     1.00    57.41
      + ID2= 2 (  0007):     2.52   1.007     1.00    67.65
        ================================================
        ID = 3 (  0008):     6.36   2.047     1.00    61.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.1240      0.2439
                          0.0090     0.1107    |   0.1580      0.2638
                          0.0099     0.1310    |   0.1893      0.2816
                          0.0400     0.1850    |   0.2430      0.3104
                          0.0693     0.2080    |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0008)      6.360      2.047      1.00      61.46
   OUTFLOW: ID= 1 (  0002)      6.360      0.187      2.50      60.97

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.15
                  TIME SHIFT OF PEAK FLOW         (min)= 90.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2804

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0011)|   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.16         0.28
```

Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	54.16	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		234.17	179.05	
over (min)		5.00	10.00	
Storage Coeff.	(min)=	1.26 (ii)	6.85 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.33	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.11	0.111 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08
RUNOFF VOLUME	(mm)=	77.82	54.64	54.86
TOTAL RAINFALL	(mm)=	78.82	78.82	78.82
RUNOFF COEFFICIENT	=	0.99	0.69	0.70

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

CALIB			
STANDHYD (0012)	Area (ha)=	0.31	
ID= 1 DT= 5.0 min	Total Imp(%)=	79.00	Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.24	0.07	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	45.46	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		234.17	694.89	
over (min)		5.00	5.00	
Storage Coeff.	(min)=	1.13 (ii)	4.38 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	5.00	
Unit Hyd. peak	(cms)=	0.34	0.23	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.14	0.141 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00

```
      RUNOFF VOLUME    (mm)=      77.82        69.28          69.36
      TOTAL RAINFALL   (mm)=      78.82        78.82          78.82
      RUNOFF COEFFICIENT   =       0.99         0.88           0.88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0104)|   Area    (ha)=   0.28
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.22         0.06
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      43.20        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     234.17       694.89
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       1.10 (ii)    4.35 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.23
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.13           0.127 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.00           1.00
     RUNOFF VOLUME    (mm)=      77.82        69.28          69.36
     TOTAL RAINFALL   (mm)=      78.82        78.82          78.82
     RUNOFF COEFFICIENT   =       0.99         0.88           0.88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0105)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      32.66        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     234.17       179.05
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       0.93 (ii)    6.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.04          0.041 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      77.82        54.64          54.85
     TOTAL RAINFALL   (mm)=      78.82        78.82          78.82
     RUNOFF COEFFICIENT   =       0.99         0.69           0.70



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0104):     0.28   0.127     1.00    69.36
      + ID2= 2 (  0105):     0.16   0.041     1.08    54.85
        ================================================
        ID = 3 (  0006):     0.44   0.152     1.00    64.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     0.44   0.152     1.00    64.08
      + ID2= 2 (  0011):     0.44   0.111     1.08    54.86
        ================================================
        ID = 1 (  0006):     0.88   0.232     1.08    59.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     0.88   0.232     1.08    59.47
      + ID2= 2 (  0012):     0.31   0.141     1.00    69.36
        ================================================
        ID = 3 (  0006):     1.19   0.359     1.00    62.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):     6.36   0.187     2.50    60.97
      + ID2= 2 (  0006):     1.19   0.359     1.00    62.05
        ================================================
        ID = 3 (  0010):     7.55   0.366     1.00    61.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
```

```
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```
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```
                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\69a1
0a26-002c-4192-a3e8-b3cbe5ca06b2\scen
  Summary filename:
C:\Users\rkazemi\AppData\Local\Civica\VH5\c2d006a5-60fa-4d4c-ad7c-7e8c3426ee4d\69a1
0a26-002c-4192-a3e8-b3cbe5ca06b2\scen


DATE: 09-21-2023                          TIME: 10:41:59

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
------------------------
  ********************************************
  ** SIMULATION : Run 07                     **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 605.000
| Ptotal= 29.58 mm |                          B=   6.000
--------------------                          C=   0.800
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    =  5.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.08    1.73 |  1.08    8.19 |  2.08    5.08 |  3.08    2.34
```

0.17	1.84	1.17	12.82	2.17	4.60	3.17	2.24
0.25	1.97	1.25	29.90	2.25	4.20	3.25	2.16
0.33	2.11	1.33	88.85	2.33	3.88	3.33	2.08
0.42	2.29	1.42	38.47	2.42	3.60	3.42	2.00
0.50	2.49	1.50	21.37	2.50	3.37	3.50	1.94
0.58	2.75	1.58	14.61	2.58	3.16	3.58	1.87
0.67	3.07	1.67	11.07	2.67	2.98	3.67	1.82
0.75	3.48	1.75	8.92	2.75	2.82	3.75	1.76
0.83	4.04	1.83	7.48	2.83	2.68	3.83	1.71
0.92	4.83	1.92	6.45	2.92	2.55	3.92	1.66
1.00	6.05	2.00	5.67	3.00	2.44	4.00	1.62

CALIB			
STANDHYD (0001)	Area (ha)= 3.84		
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 36.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	1.38	2.46	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	160.00	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)	=	88.85	12.16	
over (min)		5.00	20.00	
Storage Coeff.	(min)=	3.55 (ii)	19.95 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	0.26	0.06	
				TOTALS
PEAK FLOW	(cms)=	0.28	0.05	0.288 (iii)
TIME TO PEAK	(hrs)=	1.33	1.67	1.33
RUNOFF VOLUME	(mm)=	28.58	8.71	15.86
TOTAL RAINFALL	(mm)=	29.58	29.58	29.58
RUNOFF COEFFICIENT	=	0.97	0.29	0.54

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

```
| CALIB             |
| STANDHYD (  0007)|   Area    (ha)=   2.52
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  54.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.81         0.71
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.61        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      88.85        46.01
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.13 (ii)   12.76 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.27         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.29         0.05          0.301 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58           1.33
     RUNOFF VOLUME    (mm)=      28.58        13.09          21.45
     TOTAL RAINFALL   (mm)=      29.58        29.58          29.58
     RUNOFF COEFFICIENT   =       0.97         0.44           0.73



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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


--------------------
| ADD HYD  (  0008)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     3.84   0.288     1.33    15.86
      + ID2= 2 (  0007):     2.52   0.301     1.33    21.45
        ==================================================
        ID = 3 (  0008):     6.36   0.589     1.33    18.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
```

	(cms)	(ha.m.)		(cms)	(ha.m.)
	0.0000	0.0000		0.1240	0.2439
	0.0090	0.1107		0.1580	0.2638
	0.0099	0.1310		0.1893	0.2816
	0.0400	0.1850		0.2430	0.3104
	0.0693	0.2080		0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0008)	6.360	0.589	1.33	18.07
OUTFLOW: ID= 1 (0002)	6.360	0.009	4.25	17.58

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.47
TIME SHIFT OF PEAK FLOW (min)=175.00
MAXIMUM STORAGE USED (ha.m.)= 0.1065

CALIB	
STANDHYD (0011)	Area (ha)= 0.44
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.16	0.28	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	54.16	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		88.85	33.78	
over (min)		5.00	15.00	
Storage Coeff. (min)=		1.85 (ii)	12.75 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.32	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.00	0.02	0.017 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.58
RUNOFF VOLUME	(mm)=	28.58	12.55	12.69
TOTAL RAINFALL	(mm)=	29.58	29.58	29.58
RUNOFF COEFFICIENT	=	0.97	0.42	0.43

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0012)|   Area    (ha)=   0.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.24         0.07
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      45.46        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=      88.85       234.71
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.67 (ii)    6.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.03          0.033 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.42
     RUNOFF VOLUME    (mm)=      28.58        21.39          21.45
     TOTAL RAINFALL   (mm)=      29.58        29.58          29.58
     RUNOFF COEFFICIENT   =       0.97         0.72           0.73



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0104)|   Area    (ha)=   0.28
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.22         0.06
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
```

```
      Length            (m)=      43.20        40.00
      Mannings n            =      0.013        0.250

      Max.Eff.Inten.(mm/hr)=      88.85       234.71
                over (min)        5.00        10.00
      Storage Coeff.  (min)=       1.62 (ii)    6.64 (ii)
      Unit Hyd. Tpeak (min)=       5.00        10.00
      Unit Hyd. peak  (cms)=       0.32         0.14
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.00         0.03          0.030 (iii)
      TIME TO PEAK    (hrs)=       1.33         1.42           1.42
      RUNOFF VOLUME    (mm)=      28.58        21.39          21.44
      TOTAL RAINFALL   (mm)=      29.58        29.58          29.58
      RUNOFF COEFFICIENT   =       0.97         0.72           0.72



       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0105)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      32.66        40.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      88.85        33.78
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.37 (ii)   12.26 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.33         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.01          0.006 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58           1.58
     RUNOFF VOLUME    (mm)=      28.58        12.55          12.67
     TOTAL RAINFALL   (mm)=      29.58        29.58          29.58
```

```
      RUNOFF COEFFICIENT   =       0.97         0.42          0.43


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0104):     0.28   0.030     1.42    21.44
      + ID2= 2 (  0105):     0.16   0.006     1.58    12.67
        ================================================
        ID = 3 (  0006):     0.44   0.034     1.42    18.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     0.44   0.034     1.42    18.25
      + ID2= 2 (  0011):     0.44   0.017     1.58    12.69
        ================================================
        ID = 1 (  0006):     0.88   0.048     1.50    15.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     0.88   0.048     1.50    15.47
      + ID2= 2 (  0012):     0.31   0.033     1.42    21.45
        ================================================
        ID = 3 (  0006):     1.19   0.078     1.42    17.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):     6.36   0.009     4.25    17.58
      + ID2= 2 (  0006):     1.19   0.078     1.42    17.03
        ================================================
        ID = 3 (  0010):     7.55   0.081     1.42    17.50

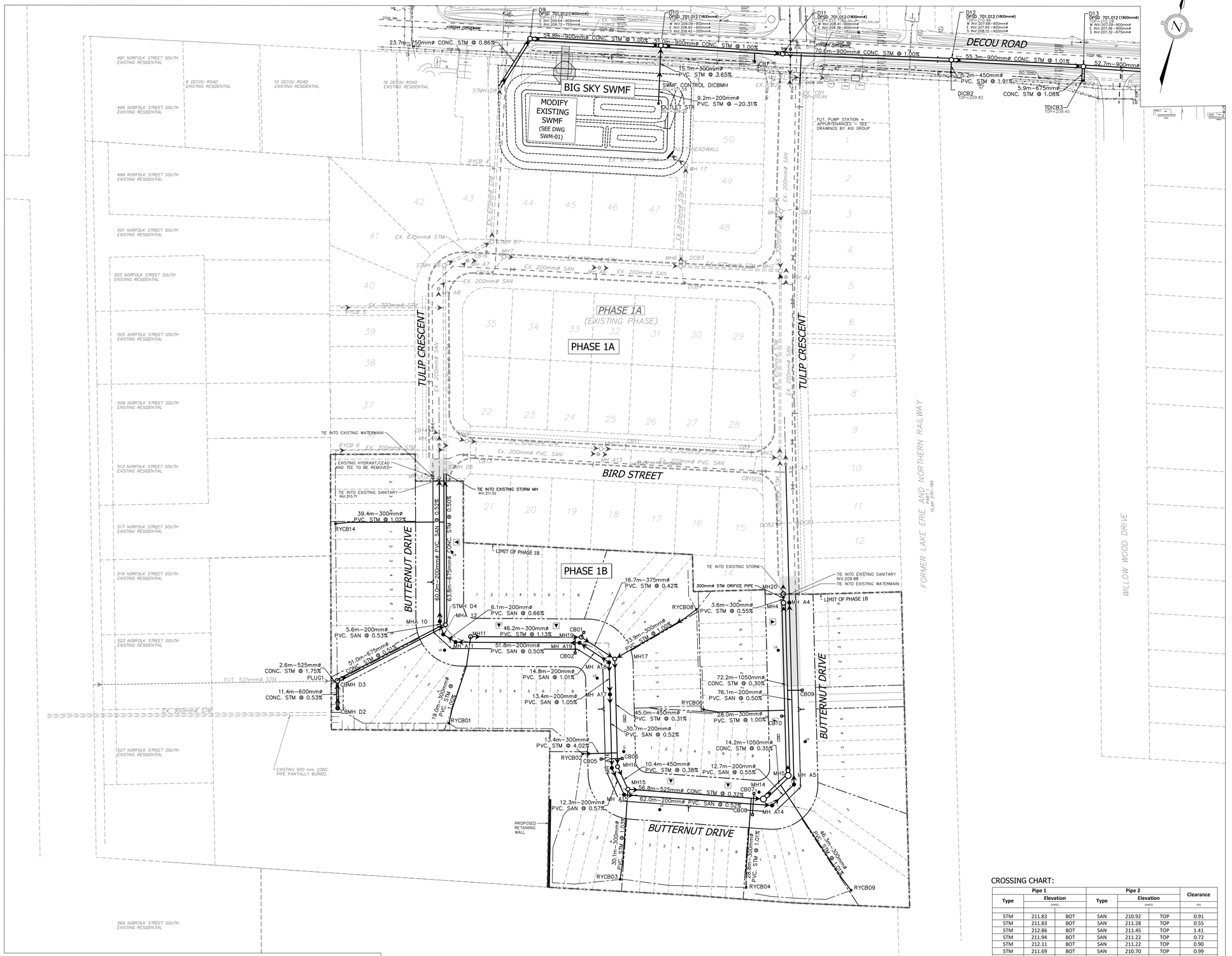
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

Big Sky Simcoe Limited Partnership

18 Decou Road

Appendix E

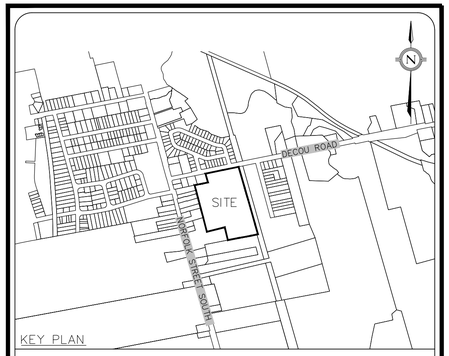
Engineering Figures



NOTE: STORM SEWER FROM DICB D2 TO STMH D5 ARE AN EXTENSION OF THE EXISTING EXTERNAL DRAINAGE BY-PASS SEWER OUTLETTING TO THE LYNN RIVER (DECOU DRAIN). DESIGN STORM FOR THE DECOU DRAIN IS THE 25-YEAR STORM EVENT.

CROSSING CHART:

Pipe 1 Type	Pipe 1 Elevation		Pipe 2 Type	Pipe 2 Elevation		Clearance
	(mMSL)			(mMSL)		(m)
STM	211.83	BOT	SAN	210.92	TOP	0.91
STM	211.83	BOT	SAN	211.28	TOP	0.55
STM	212.86	BOT	SAN	211.45	TOP	1.41
STM	211.94	BOT	SAN	211.22	TOP	0.72
STM	212.11	BOT	SAN	211.22	TOP	0.90
STM	211.69	BOT	SAN	210.70	TOP	0.99
STM	212.23	BOT	SAN	210.70	TOP	1.53
STM	211.76	BOT	SAN	210.70	TOP	1.06
STM	211.75	BOT	SAN	210.58	TOP	1.17
STM	211.57	BOT	SAN	210.29	TOP	1.29



LEGEND

- EXISTING FIRE HYDRANT
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- H&V — PROPOSED FIRE HYDRANT AND VALVE
- V&B — PROPOSED VALVE AND BOX
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED SANITARY SEWER AND MANHOLE
- PROPERTY LINE
- PHASING LIMIT
- PROPOSED TRANSFORMER
- PROPOSED LIGHT POLE
- CROSSING ID

NOTE:

EXISTING SERVICING INVERTS AND LOCATIONS HAVE BEEN BASED ON THE AS-CONSTRUCTED DRAWINGS COMPLETED BY ASHENHURST NOUWENS + ASSOCIATES INC. DATED JAN 11, 2022

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E, #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
2.0	ISSUED FOR CUP SIGN-OFF	2024-11-05	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

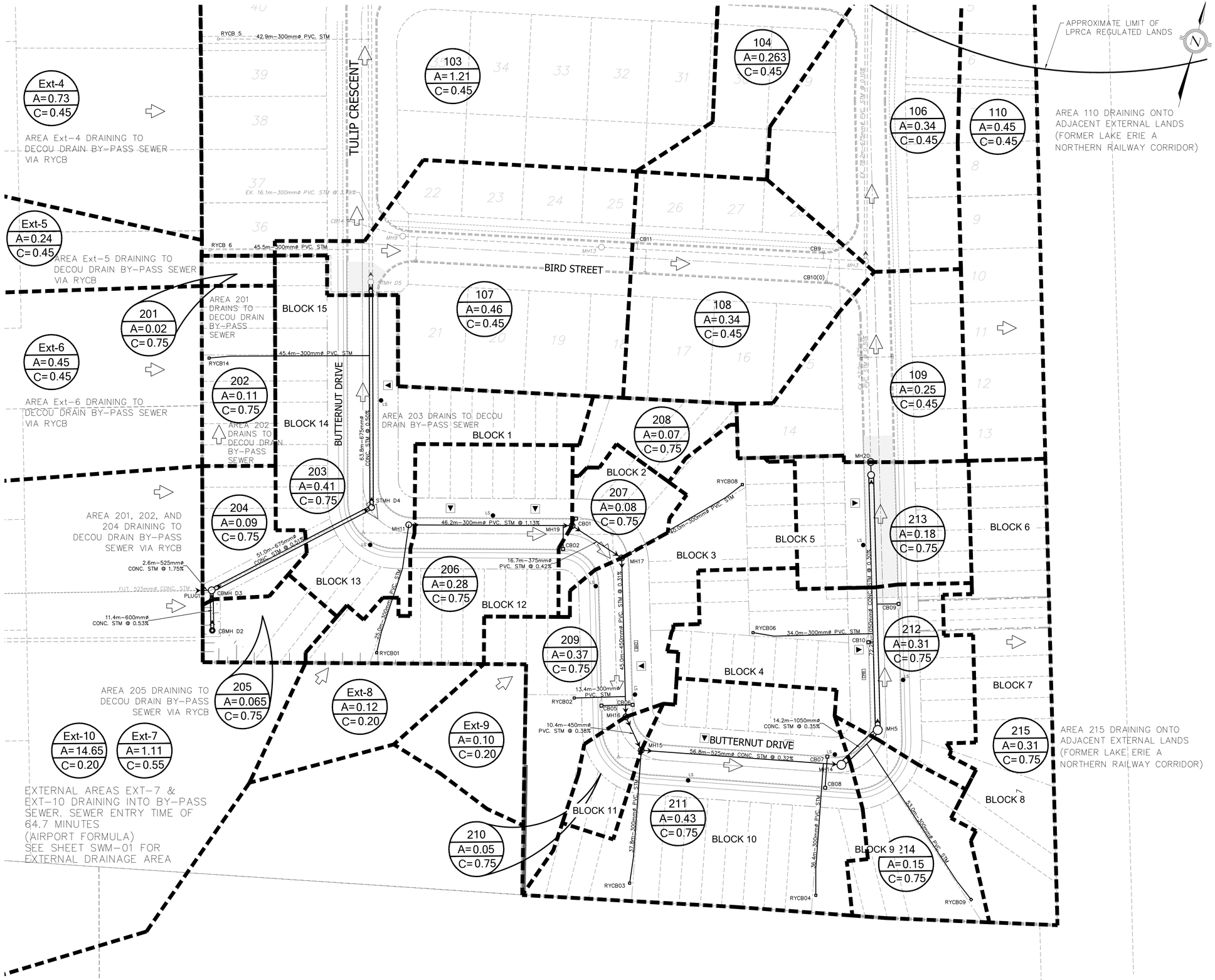
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

PHASE 1B - MASTER PLAN OF SERVICES

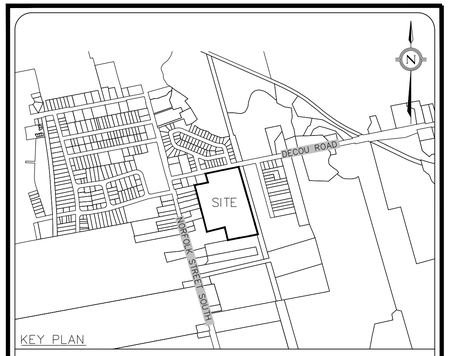
DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022	
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO.	22019
SWM BY:	CHECKED BY:		
SCALE: 1:750m (0m 10m 20m 30m 40m)		DRAWING NO.	GP-01

Z:\Shared\Projects\2022\22019_Caliterx_Decou Road\Design\00_Design Master\Drawings\Servicing\22019_Servicing.dwg



NOTE: STORM SEWER FROM DICB D2 TO STMH D5 ARE AN EXTENSION OF THE EXISTING EXTERNAL DRAINAGE BY-PASS SEWER OUTLETTING TO THE LYNN RIVER (DECOU DRAIN). DESIGN STORM FOR THE DECOU DRAIN IS THE 25-YEAR STORM EVENT.
SEE SHEET STM-02 FOR STORM SEWER DESIGN SHEETS

NOTE: EXTERNAL DRAINAGE AREAS SHOWN AS PER DECOU ROAD DRAIN DRAINAGE AREA PLAN (G. DOUGLAS VALLEE LIMITED DECOU ROAD DRAIN DRAWING NO. 01, AUG. 2012) AND BIG SKY PHASE 1A FUNCTINOAL SERVICING REPORT (ASHENHURST NOUWENS & ASSOCIATES, APR, 2019)



KEY PLAN

LEGEND

AREA 201
A=0.16
C=0.75

- AREA ID
- DRAINAGE AREA
- RUNOFF CO-EFFICIENT
- DRAINAGE BOUNDARY
- PROPERTY BOUNDARY
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PHASE LIMIT

NOTES:

1. ARROWS INDICATE DIRECTION OF FLOW FOR MINOR STORM SYSTEM.

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E., #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
2.0	ISSUED FOR CUP SIGN-OFF	2024-11-05	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

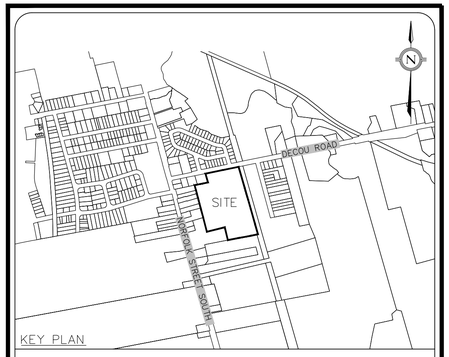
PHASE 1B - POST DEVELOPMENT DRAINAGE AREA PLAN

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022	
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO.	22019
SWM BY:	CHECKED BY:		
SCALE: 1:500m (0m 5m 10m 20m 30m)		DRAWING NO.	STM-01



NOTE: STORM SEWER FROM DICB D2 TO STMH D5 ARE AN EXTENSION OF THE EXISTING EXTERNAL DRAINAGE BY-PASS SEWER OUTLETTING TO THE LYNN RIVER (DECOU DRAIN). DESIGN STORM FOR THE DECOU DRAIN IS THE 25-YEAR STORM EVENT.
SEE SHEET STM-02 FOR STORM SEWER DESIGN SHEETS

NOTE: DRAINAGE AREAS TO BIG SKY SWMF AS PER APPROVED PLAN 21-039-16, BIG SKY SUBDIVISION (ASHENHURST NOUWENS & ASSOCIATES, SEP, 2021)
NOTE: EXTERNAL DRAINAGE AREAS SHOWN AS PER DECOU ROAD DRAIN DRAINAGE AREA PLAN (C. DOUGLAS VALLEE LIMITED DECOU ROAD DRAIN DRAWING NO. 01, AUG. 2012 AND BIG SKY PHASE 1A FUNCTINOAL SERVICING REPORT (ASHENHURST NOUWENS & ASSOCIATES, APR, 2019)



KEY PLAN

LEGEND

AREA
A=0.13
I= 0.50

AREA ID
DRAINAGE AREA
IMPERVIOUSNESS

DRAINAGE BOUNDARY
PROPERTY BOUNDARY
EXISTING STORM SEWER
PROPOSED STORM SEWER
PHASE LIMIT

NOTES:

1. ARROWS INDICATE DIRECTION OF FLOW FOR MINOR STORM SYSTEM.

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E. #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
2.0	ISSUED FOR CUP SIGN-OFF	2024-11-05	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

PHASE 1B - EXTERNAL DRAINAGE AREA PLAN

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: 1:2000		DRAWING NO. STM-02

Norfolk County Storm Sewer Design Sheet

JOB DESCRIPTION: Simcoe 1B
PROJECT No.: 22019
PIPE MATERIAL: n=0.013
STORM FREQUENCY: 5-Year Storm

Qdesign = 2.78xAIR
Qfull = AV

DESIGN BY: SS
CHECKED BY: AB

DATE: 2023-10-25

LOCATION				DRAINAGE AREA						RAINFALL/ RUNOFF			PIPE SELECTION							
AREA	STREET	FROM	TO	AREA	Area Accum	RUN OFF COEF	AC	CUMMUL AC	2.78xAxR	T of C	I	Qdesign	PIPE LENGTH	PIPE SLOPE	Calculated PIPE DIA.	Used PIPE Dia.	Q (FULL FLOW)	V (FULL FLOW)	Q/Q full	TIME OF FLOW
		MH#	MH#	(ha)	(ha)	C	A*C	A*C		(min)	(m/h)	m3/sec	m	%	(mm)	(mm)	m3/sec	(m/s)	(%)	(MIN)
AREA 206,Ext-8	Butternut Dr	MH11	MH19	0.40	0.40	0.59	0.23	0.23	0.65	15.00	0.08	0.05	46.2	1.13	300	299.36	0.10	1.4	48%	0.53
AREA 207	Butternut Dr	MH19	MH17	0.08	0.48	0.75	0.06	0.30	0.82	15.53	0.07	0.06	16.7	0.42	375	366.42	0.11	1.0	58%	0.28
AREA 209,Ext-9	Butternut Dr	MH17	MH16	0.47	0.95	0.63	0.30	0.59	1.65	15.81	0.07	0.12	45.0	0.31	450	447.87	0.16	1.0	78%	0.75
AREA 210	Butternut Dr	MH16	MH15	0.05	1.00	0.75	0.04	0.63	1.75	16.56	0.07	0.13	10.4	0.38	450	447.87	0.17	1.1	72%	0.16
AREA 211	Butternut Dr	MH15	MH14	0.43	1.43	0.75	0.32	0.95	2.65	16.72	0.07	0.19	56.8	0.32	525	533.4	0.25	1.1	75%	0.84
AREA 214	Butternut Dr	MH14	MH5	0.15	1.58	0.75	0.11	1.07	2.96	17.55	0.07	0.21	14.2	0.35	1050	1066.7	1.69	1.9	12%	0.13
AREA 212	Butternut Dr	MH5	MH4	0.15	1.73	0.75	0.11	1.18	3.28	17.68	0.07	0.23	72.2	0.30	1050	1066.7	1.57	1.8	14%	0.68
	Butternut Dr	MH4	MH20	0.00	0.00	--	0.00	0.00	0.00	18.36	0.07	0.00	3.6	0.55	300	299.36	0.07	1.0	281%	0.06
AREA 213,109	Butternut Dr	MH20	MH3	0.43	0.43	0.57	0.25	0.25	0.68	18.42	0.07	0.05	57.0	0.30	525	527.99	0.24	1.1	103%	0.87
AREA 203,107	Bird Street	MH9	MH13	0.87	0.87	0.59	0.51	0.51	1.43	15.00	0.08	0.11	56.3	0.36	450	447.87	0.17	1.1	65%	0.88
AREA 208,108	Bird Street	MH13	MH3	0.42	1.28	0.50	0.21	0.72	2.00	15.88	0.07	0.15	74.8	0.44	525	527.99	0.29	1.3	51%	0.94
106	Butternut Dr	MH3	MH2	0.34	2.06	0.45	0.15	1.12	3.12	19.30	0.07	0.20	78.2	0.10	675	669.42	0.26	0.7	154%	1.75
105	Butternut Dr	MH1	MH2	0.10	0.10	0.45	0.04	0.04	0.12	15.00	0.08	0.01	25.0	0.36	300	299.36	0.06	0.8	16%	0.51
103	Tulip Crescent	MH7	MH6	1.21	1.21	0.45	0.55	0.55	1.52	15.00	0.08	0.12	74.0	0.16	450	447.87	0.11	0.7	102%	1.71
104	Tulip Crescent	MH6	MH 17	2.40	3.61	0.53	1.27	1.82	5.06	21.60	0.06	0.31	42.3	0.19	675	685.8	0.38	1.0	134%	0.68
101,102	Tulip Crescent	MH 17	OUTLET HEADWALL	0.85	4.46	0.45	0.38	2.20	6.12	22.28	0.06	0.37	8.1	0.74	675	685.8	0.76	2.0	75%	0.07

**ORIFICE PIPE. PEAK FLOW D/S CONTROLLED TO 200 L/s

Norfolk County Storm Sewer Design Sheet

JOB DESCRIPTION: Simcoe 1B
PROJECT No.: 22019
PIPE MATERIAL: n=0.013
STORM FREQUENCY: 25-Year Storm

Qdesign = 2.78xAIR
Qfull = AV

DESIGN BY: SS
CHECKED BY: AB

DATE: 2024-03-15

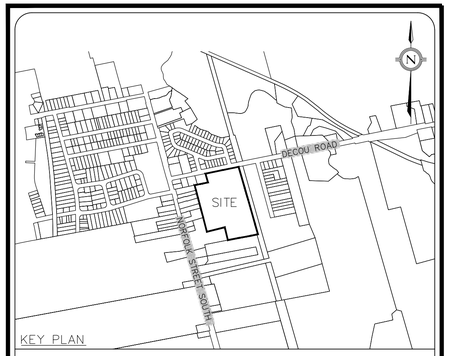
LOCATION				DRAINAGE AREA						RAINFALL/ RUNOFF			PIPE SELECTION							
AREA	STREET	FROM	TO	AREA	Area Accum	RUN OFF COEF	AC	CUMMUL AC	2.78xAxR	T of C	I	Qdesign	PIPE LENGTH	PIPE SLOPE	Calculated PIPE DIA.	Used PIPE Dia.	Q (FULL FLOW)	V (FULL FLOW)	Q/Q full	TIME OF FLOW
		MH#	MH#	(ha)	(ha)	C	A*C	A*C		(min)	(m/h)	m3/sec	m	%	(mm)	(mm)	m3/sec	(m/s)	(%)	(MIN)
EXT-101,EXT-102	Butternut Dr	CBMH D2	CBMH D3	15.62	15.62	0.24	3.81	3.81	10.59	64.7	0.04	0.44	11.4	0.5	600	609.5	0.46	1.6	94.6%	0.12
	Butternut Dr	CBMH D3	STMH D4	0.00	15.62	--	0.00	3.81	10.59	64.8	0.04	0.44	51.0	0.5	675	685.8	0.63	1.7	70.1%	0.50
EXT-104	Butternut Dr	STMH D4	STMH D5	0.28	15.90	0.82	0.23	4.04	11.23	65.3	0.04	0.46	63.8	0.5	675	685.8	0.62	1.7	74.6%	0.63
EXT-103	Tulip Crescent	STMH D5	STMH D6	2.04	17.94	0.22	0.45	4.49	12.48	66.0	0.04	0.51	86.6	0.8	675	685.8	0.79	2.1	64.9%	0.68
	Tulip Crescent	STMH D6	STMH D7	0.00	17.94	--	0.00	4.49	12.48	66.6	0.04	0.51	22.1	1.0	675	685.8	0.87	2.4	58.1%	0.16
EXT-105	Tulip Crescent	STMH D7	STMH D8	0.16	18.10	0.50	0.08	4.57	12.70	66.8	0.04	0.52	64.9	0.8	675	685.8	0.78	2.1	66.5%	0.51
EXT-201	Decou Road	STMH D8	D9	0.93	19.03	0.50	0.46	5.03	13.98	67.3	0.04	0.57	23.7	0.9	750	761.9	1.08	2.4	52.4%	0.17
EXT-202,EXT-213,EXT-214	Decou Road	D9	D10	0.36	19.39	0.61	0.22	5.25	14.59	67.5	0.04	0.59	54.8	1.0	900	914.3	1.89	2.9	31.2%	0.32
EXT-203,EXT-212,SWMF	Decou Road	D10	D11	0.29	19.68	0.61	0.18	5.42	15.07	67.8	0.04	0.72	51.0	1.0	900	914.3	1.89	2.9	38.1%	0.30
	Decou Road	D11	D12	0.00	19.68	--	0.00	5.42	15.07	68.1	0.04	0.72	70.6	1.0	900	914.3	1.89	2.9	38.1%	0.41
EXT-204,EXT-211,UNC-1,UNC-2	Decou Road	D12	D13	0.88	20.56	0.55	0.48	5.91	16.42	68.5	0.04	0.77	55.3	1.0	900	914.3	1.90	2.9	40.6%	0.32
EXT-200,EXT-205,EXT-210	Decou Road	D13	D14	52.17	72.73	0.22	11.54	17.45	48.51	104.6	0.03	1.58	52.7	1.0	900	914.3	1.89	2.9	83.7%	0.31
	Decou Road	D14	D15	0.00	72.73	--	0.00	17.45	48.51	104.9	0.03	1.58	79.8	1.0	900	914.3	1.89	2.9	83.5%	0.46
EXT-206,EXT-209	Decou Road	D15	D16	0.37	73.10	0.61	0.22	17.67	49.13	105.4	0.03	1.59	69.2	1.4	900	914.3	2.25	3.4	70.8%	0.34
EXT-207,EXT-208	Decou Road	D16	D17	0.22	73.32	0.60	0.13	17.81	49.50	105.7	0.03	1.60	86.4	2.3	900	914.3	2.89	4.4	55.3%	0.33
	Decou Road	D17	HW1	0.00	73.32	--	0.00	17.81	49.50	106.0	0.03	1.60	19.4	1.0	900	914.3	1.92	2.9	83.3%	0.11

**DECOU DRAIN BRANCH B

**DECOU ROAD
**BIG SKY SWMF

**DECOU DRAIN BRANCH A

**25-YEAR CONTROLLED FLOW FROM SWMF IS 114 L/s.



KEY PLAN

LEGEND

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E., #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
2.0	ISSUED FOR CUP SIGN-OFF	2024-11-05	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

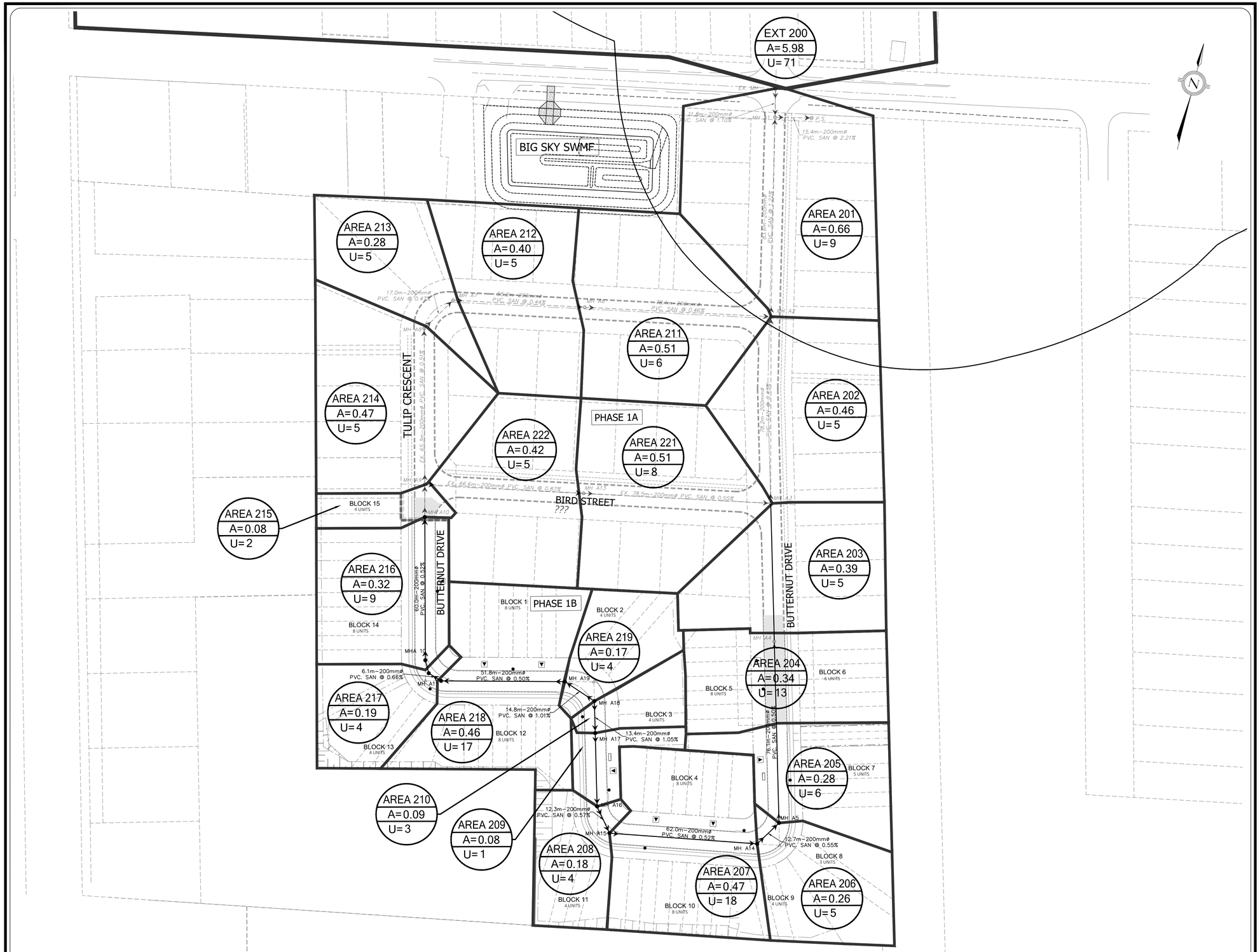
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

STM DESIGN SHEET

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: N.T.S.		DRAWING NO. STM-03

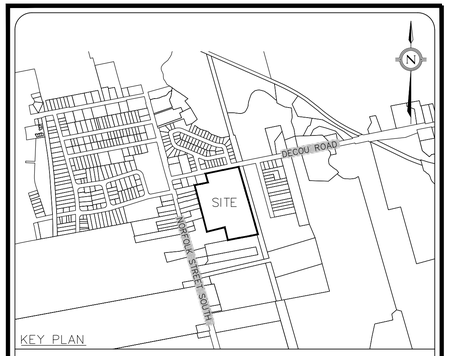
Z:\Shared\Projects\2022\22019_Collins_Decou Road\Design\00_Design Master\Drawings\Drainage\22019_STM Design Sheets.dwg



SEE SHEET SAN-02 FOR SANITARY SEWER DESIGN SHEETS

NOTE: EACH UNIT INCLUDES 1 TOWNHOUSE UNIT (2.4 PPU) AND 1 AVAILABLE ADDITIONAL DWELLING UNIT (ADU) (1.6 PPU). COMBINED PPU OF 2.4 + 1.6 = 4.0 POP. PER UNIT

NOTE: EXISTING DRAINAGE AREAS TO BIG SKY SWMF AS PER APPROVED PLAN 21-039-15, BIG SKY SUBDIVISION (ASHENHURST NOUWENS & ASSOCIATES, SEP, 2021)



KEY PLAN

LEGEND

AREA 201
A=1.2
U=4

AREA ID
DRAINAGE AREA
NUMBER OF UNITS
DRAINAGE BOUNDARY
PROPERTY BOUNDARY
EXISTING SANITARY SEWER
PROPOSED SANITARY SEWER
PHASE LIMIT

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST E, #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
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No.	REVISIONS/ISSUED	DATE	BY	CITY
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5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
2.0	ISSUED FOR CUP SIGN-OFF	2024-11-05	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

SANITARY DRAINAGE AREA PLAN

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022	
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO.	22019
SWM BY:	CHECKED BY:		
SCALE: 1:750m	0m 10m 20m 30m 40m	DRAWING NO.	SAN-01

NORFOLK COUNTY SANITARY DESIGN SHEET

RESIDENTIAL POPULATION DENSITIES

AREA BASIS

Residential
Commercial/Industrial

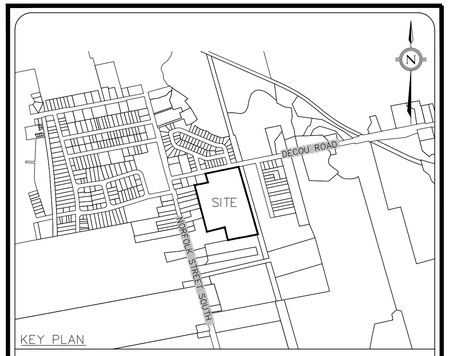
FLOW CRITERIA

PF={1+[14/(4+p^0.5)]}
where PF=peaking factor, P=population/1000
and maximum PF = 4.00

PROPOSED UNITS PER TOWNHOUSE LOT EQUALS 1 TOWNHOUSE UNIT @ 2.4 PPU AND 1 ADDITIONAL DWELLING UNIT (ADU) @ 1.6 PPU. TOTALING 2 UNITS PER LOT AT AN AVERAGE PPU OF 2.0.

PROJECT No. 22019
DESIGNED BY: SS
DATE: 2025-03-25

LOCATION				AREA			POPULATION					SEWAGE FLOW ACCUMULATED												
AREA	STREET	FROM	TO	NET or	DIMENS.	TOTAL	PER	PER	of	SUM	TOTAL	PEAKING	INFILT	SEWAGE	TOTAL	SIZE	SLOPE	CAP	n	VEL	DROP	LENGTH	UPPER	LOWER
No.		MH	MH	GROSS		ha	ha	UNIT	UNITS	POP	POP	FACTOR	L/s	L/s	L/s	mm	%	L/s		m/s			INVERT	INVERT
Area 219	Butternut Dr	MH A18	MH A19	0.17		0.17	92.9	2.0	8	16	16	4.0	0.0	0.2	0.3	200	1.0	33.4	0.013	1.05		14.8	211.70	211.55
Area 218	Butternut Dr	MH A19	MH A11	0.46		0.64	146.6	2.0	34	68	84	4.0	0.2	1.1	1.3	200	0.5	23.5	0.013	0.74		51.8	211.50	211.24
Area 217	Butternut Dr	MH A11	MHA 12	0.19		0.83	82.3	2.0	8	16	100	4.0	0.2	1.3	1.6	200	0.7	26.9	0.013	0.85		6.1	211.19	211.15
	Butternut Dr	MHA 12	MHA 10	0.00		0.83	0.0	0.0	0	0	100	4.0	0.2	1.3	1.6	200	0.5	24.3	0.013	0.76		5.6	211.10	211.07
Area 216	Butternut Dr	MHA 10	MH A10	0.32		1.15	112.0	2.0	18	36	136	4.0	0.3	1.8	2.1	200	0.5	23.8	0.013	0.75		60.0	211.02	210.71
Area 215	Tulip Crescent	MH A10	MH A9	0.08		1.23	103.2	2.0	4	8	144	4.0	0.3	1.9	2.2	200	0.6	25.3	0.013	0.80		13.8	210.50	210.42
Area 214	Tulip Crescent	MH A9	MH A8	0.47		1.70	32.1	3.0	5	15	159	4.0	0.5	2.1	2.6	200	0.5	23.6	0.013	0.74		65.3	210.42	210.09
Area 213	Tulip Crescent	MH A8	MH A7	0.28		1.97	54.2	3.0	5	15	174	4.0	0.6	2.3	2.8	200	0.5	22.8	0.013	0.72		17.0	210.06	209.98
Area 212	Tulip Crescent	MH A7	MH A6	0.40		2.37	37.8	3.0	5	15	189	4.0	0.7	2.5	3.2	200	0.4	21.9	0.013	0.69		55.2	209.97	209.73
Area 211	Tulip Crescent	MH A6	MH A2	0.51		2.88	35.0	3.0	6	18	207	4.0	0.8	2.7	3.5	200	0.5	22.5	0.013	0.71		78.1	209.71	209.35
Area 222	Bird St	MH A9	MH A13	0.42		0.42	36.1	3.0	5	15	15	4.0	0.1	0.2	0.3	200	0.9	31.0	0.013	0.97		66.6	210.76	210.18
Area 221	Bird St	MH A13	MH A3	0.51		0.93	47.0	3.0	8	24	39	4.0	0.3	0.5	0.8	200	0.5	24.6	0.013	0.77		78.5	210.14	209.71
Area 210	Butternut Dr	MH A18	MH A17	0.09		0.09	128.6	2.0	6	12	12	4.0	0.0	0.2	0.2	200	1.0	33.9	0.013	1.07		13.4	211.33	211.19
Area 209	Butternut Dr	MH A17	MH A16	0.08		0.18	48.8	2.0	2	4	16	4.0	0.0	0.2	0.3	200	0.5	23.9	0.013	0.75		30.7	211.17	211.01
Area 208	Butternut Dr	MH A16	MH A15	0.18		0.36	87.4	2.0	8	16	32	4.0	0.1	0.4	0.5	200	0.6	25.0	0.013	0.79		12.3	210.96	210.89
Area 207	Butternut Dr	MH A15	MH A14	0.47		0.83	153.9	2.0	36	72	104	4.0	0.2	1.4	1.6	200	0.5	23.8	0.013	0.75		62.0	210.81	210.49
Area 206	Butternut Dr	MH A14	MH A5	0.26		1.08	77.5	2.0	10	20	124	4.0	0.3	1.6	1.9	200	0.6	24.6	0.013	0.78		12.7	210.44	210.37
Area 204,Area 205	Butternut Dr	MH A5	MH A4	0.62		1.70	123.4	2.0	38	76	200	4.0	0.5	2.6	3.1	200	0.5	23.4	0.013	0.74		76.1	210.29	209.91
	Butternut Dr	MH A4	CAP	0.00		1.70	0.0	0.0	0	0	200	4.0	0.5	2.6	3.1	200	0.3	17.7	0.013	0.56		3.5	209.89	209.88
Area 203	Butternut Dr	CAP	MH A3	0.39		2.09	38.2	3.0	5	15	215	4.0	0.6	2.8	3.4	200	0.3	19.6	0.013	0.62		54.4	209.88	209.69
Area 202	Butternut Dr	MH A3	MH A2	0.46		3.48	32.5	3.0	5	15	269	4.0	1.0	3.5	4.5	200	0.4	21.9	0.013	0.69		78.2	209.66	209.32
Area 201	Butternut Dr	MH A2	MH A1	0.66		7.03	40.8	3.0	9	27	503	4.0	2.0	6.6	8.6	200	1.2	36.7	0.013	1.15		83.6	209.30	208.28
EXT 200	Butternut Dr	EX. MH	MH A1	5.98		5.98	35.6	3.0	71	213	213	4.0	1.7	2.8	4.5	200	1.1	34.8	0.013	1.09		11.8	206.65	206.52
	Butternut Dr	MH A1	P.S.	0.00		13.01	0.0	0.0	0	0	716	3.9	3.6	9.2	12.8	200	2.2	49.4	0.013	1.55		15.4	206.34	206.00



LEGEND

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E, #100, KITCHENER ONTARIO, N2P 2E9
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E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
2.0	ISSUED FOR CUP SIGN-OFF	2024-11-05	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

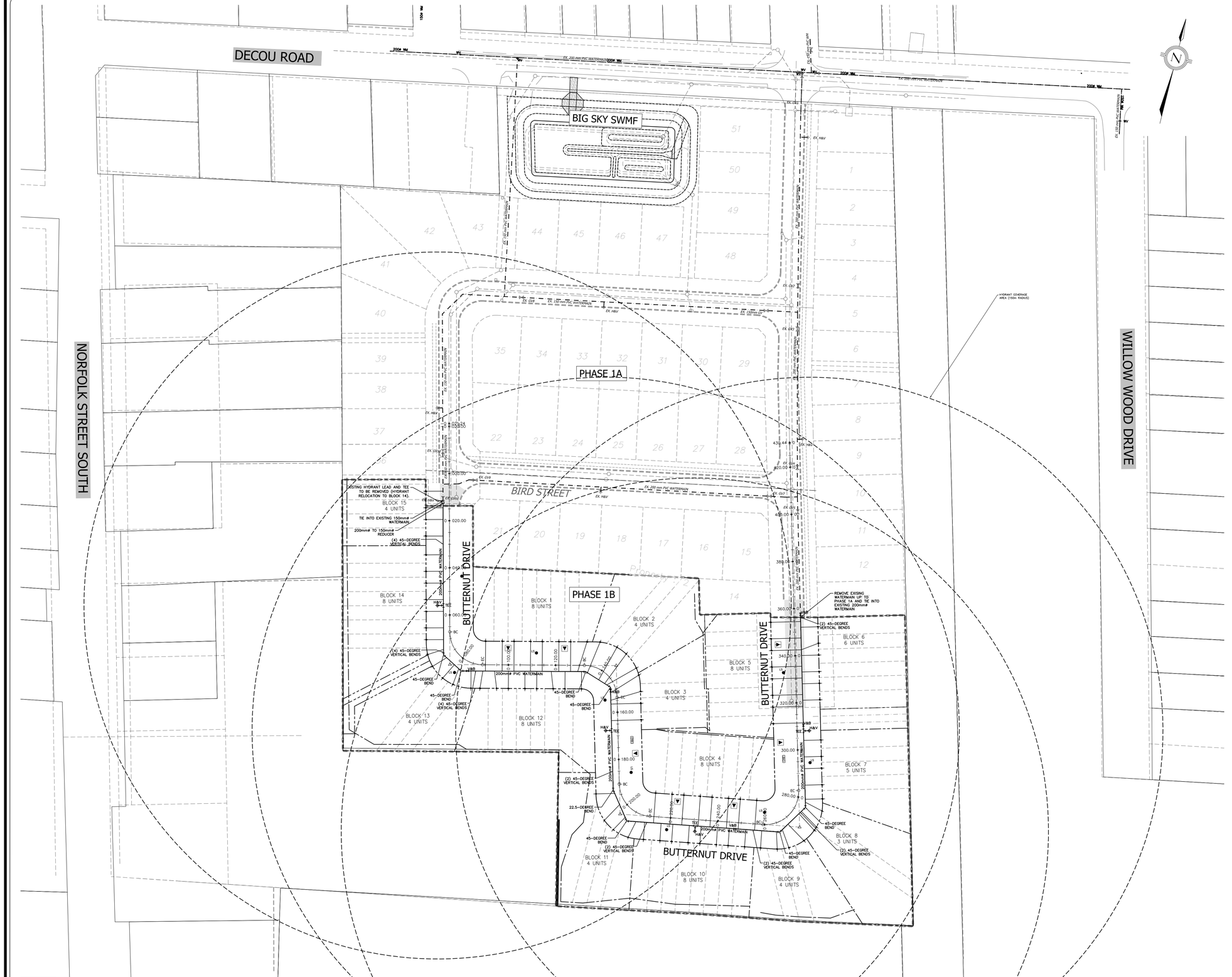
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

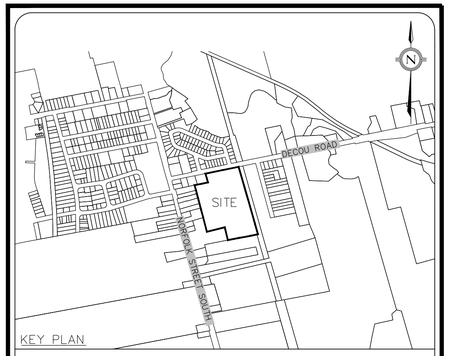
SAN DESIGN SHEET

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: N.T.S.		DRAWING NO. SAN-02

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SEE SHEET GN-01 FOR TYPICAL WATERMAIN NOTES AND SPECIFICATIONS



LEGEND

- EXISTING FIRE HYDRANT
- EXISTING WATERMAIN
- PROPOSED FIRE HYDRANT AND VALVE
- PROPOSED VALVE AND BOX
- PROPERTY LINE
- PHASING LIMIT
- PROPOSED TRANSFORMER
- PROPOSED LIGHT POLE

LEGAL & TOPOGRAPHY

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LAND INFORMATION SPECIALISTS
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APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

PHASE 1B WATER DISTRIBUTION PLAN

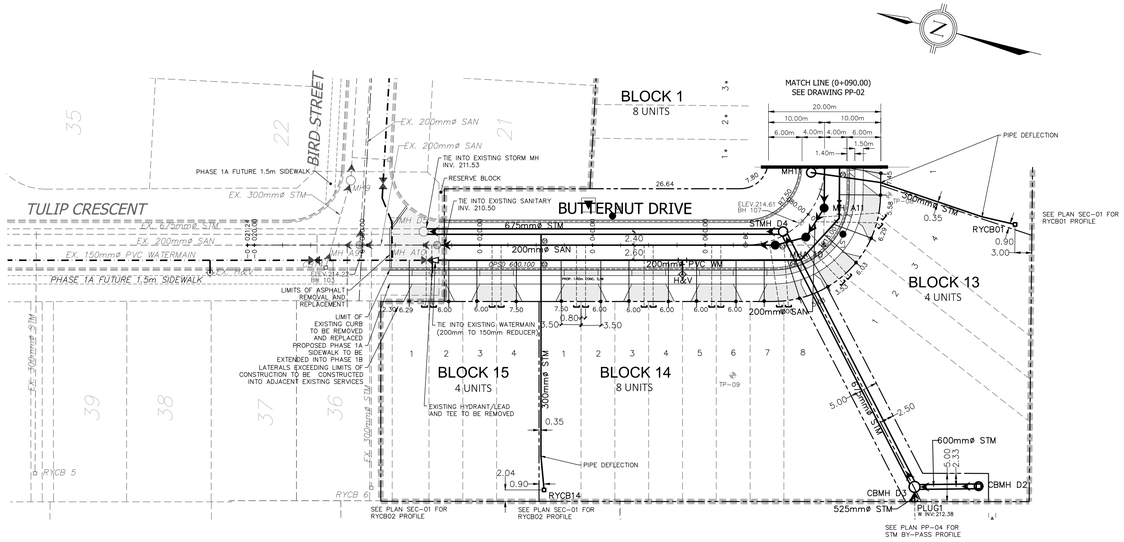
DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: 1:750m (0m 10m 20m 30m 40m)		DRAWING NO. WTR-01

PROFILE NOTES

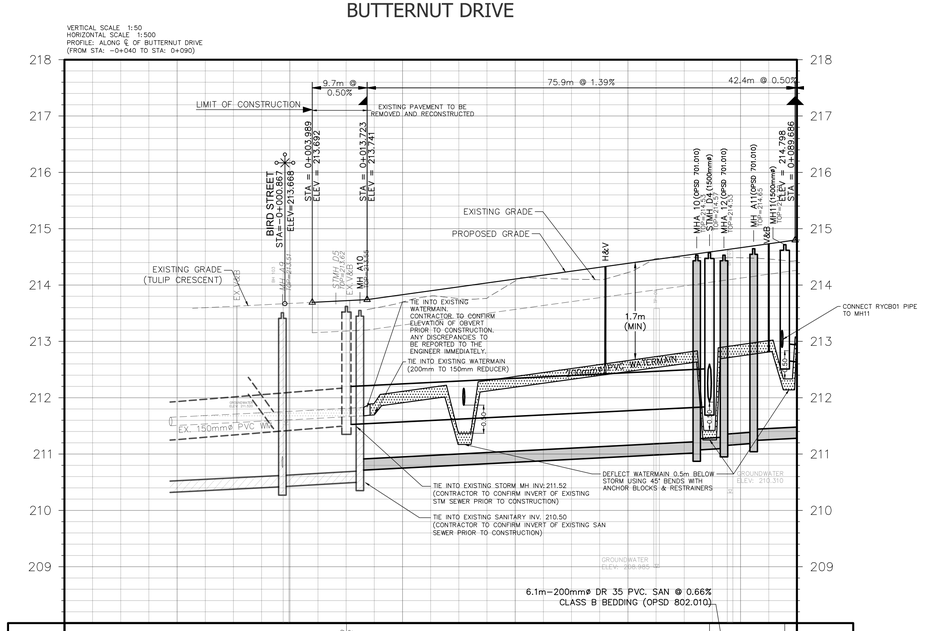
1. PRIOR TO CONSTRUCTION, THE OWNER'S CONTRACTOR SHALL OBTAIN LOCATES FOR, EXPOSE AND CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE LIMIT OF CONSTRUCTION. OWNER'S CONTRACTOR SHALL SUPPORT EXISTING UNDERGROUND UTILITIES AS REQUIRED TO THE SATISFACTION OF THE UTILITY OWNER.
2. REFER TO GRADING PLANS FOR ASPHALT ELEVATIONS AT INTERSECTIONS.
3. SEE PAVEMENT DESIGN TABLE ON SHEET GN-01 FOR NEW ROAD STRUCTURE AND EXTERNAL ROAD RESTORATIONS.
4. THE OWNER'S CONTRACTOR SHALL MECHANICALLY RESTRAIN ALL WATERMAIN APPURTANCES IN ACCORDANCE WITH NORFOLK COUNTY STANDARDS. IN AREAS OR ENGINEERED FILL, AN ADDITIONAL RESTRAINED LENGTH OF PIPE SHALL APPLY ABOVE THE STANDARDS REQUIREMENTS.
5. ROTATE MANHOLE CONES TO AVOID CONFLICTS WITH CURBS.
6. CATCHBASINS AND MANHOLE LIDS TO BE CONSTRUCTED TO BASE ASPHALT ELEVATION. RAISE LID TO FINISHED GRADE JUST PRIOR TO TOP SHEET PAVING.
7. INSTALL PARSON MANHOLE INSERTS IN ALL SANITARY MANHOLES.
8. IF GROUNDWATER INFILTRATION INTO THE SEWER TRENCH OCCURS, THE OWNER'S CONTRACTOR WILL BE REQUIRED TO WATERPROOF PIPE CONNECTIONS TO MANHOLES AND MANHOLE JOINTS.
9. MANHOLES SHALL BE PER OPSD AT THE SIZES INDICATED.
10. INSTALL TEMPORARY MANUFACTURED SILT SACKS IN ALL ROAD CATCHBASINS (ALL CB TYPES) AND MAINTAIN FOR DURATION OF CONSTRUCTION.
11. REFER TO SHEETS GN-01 , DET-01 AND DET-02 FOR STANDARD LOT SERVICING INSTALLATION NOTES AND DETAILS
12. CURB AND GUTTER AS PER OPSD 600.100.
13. SIDEWALK AS PER OPSD 310.010.

CROSSING CHART:

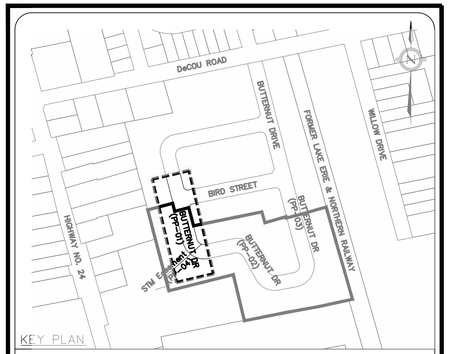
MARK	Pipe 1 Type	Pipe 1 Elevation (mASL)		Pipe 2 Type	Pipe 2 Elevation (mASL)		Clearance (m)
01	STM	211.83	BOT	SAN	210.92	TOP	0.91
02	STM	211.86	BOT	WATER	211.36	TOP	0.50
03	STM	211.83	BOT	SAN	211.28	TOP	0.55
04	STM	211.84	BOT	WATER	211.34	TOP	0.50
05	STM	212.84	BOT	WATER	212.13	TOP	0.71



BUTTERNUT DRIVE



SEE SHEET SEC-01 FOR REAR YARD CATCH BASIN PLAN



LEGEND

- EXISTING FIRE HYDRANT
- EXISTING VALVE AND BOX
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- H&V — PROPOSED FIRE HYDRANT AND VALVE
- V&B — PROPOSED VALVE AND BOX
- PROPOSED STORM SEWER AND MANHOLE
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- PROPERTY LINE
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- PROPOSED 1.5m TALL CHAINLINK FENCE
- PROPOSED TRANSFORMER
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- CROSSING ID

LEGAL & TOPOGRAPHY

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PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
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8.0				
7.0				
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4.0				
3.0	ISSUED FOR ZBLA	2025-04-28	AB	
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counterpoint ENGINEERING
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DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

BUTTERNUT DRIVE
(0+000.00 TO 0+090.00)

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
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SWM BY:	CHECKED BY:	
SCALE: H: 1:500 V: 1:50 (0m 5m 10m 20m 30m)		PP-01

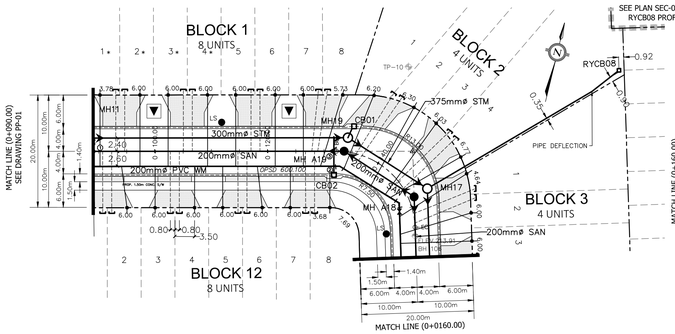
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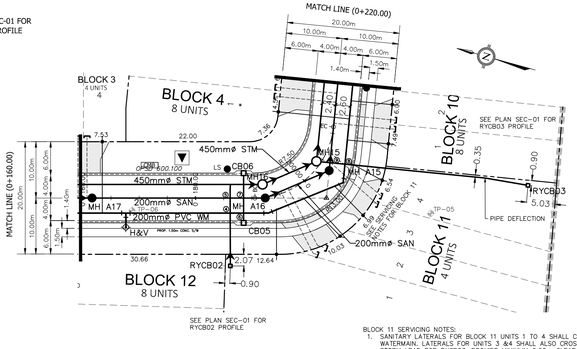
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2. REFER TO GRADING PLANS FOR ASPHALT ELEVATIONS AT INTERSECTIONS.
3. SEE PAVEMENT DESIGN TABLE ON SHEET GN-01 FOR NEW ROAD STRUCTURE AND EXTERNAL ROAD RESTORATIONS.
4. WATER SERVICES CROSSING STORM SEWER MUST BE INSULATED PER OPSD 1109.030 WHERE MINIMUM 1.7m COVER IS NOT ACHIEVED AND/OR 0.5m OR LESS SEPARATION FROM SEWER OR STRUCTURE IS NOT ACHIEVED.
5. THE OWNER'S CONTRACTOR SHALL MECHANICALLY RESTRAIN ALL WATERMAIN APPURTANCES IN ACCORDANCE WITH NORFOLK COUNTY STANDARDS. IN AREAS OR ENGINEERED FILL, AN ADDITIONAL RESTRAINED LENGTH OF PIPE SHALL APPLY ABOVE THE STANDARDS REQUIREMENTS.
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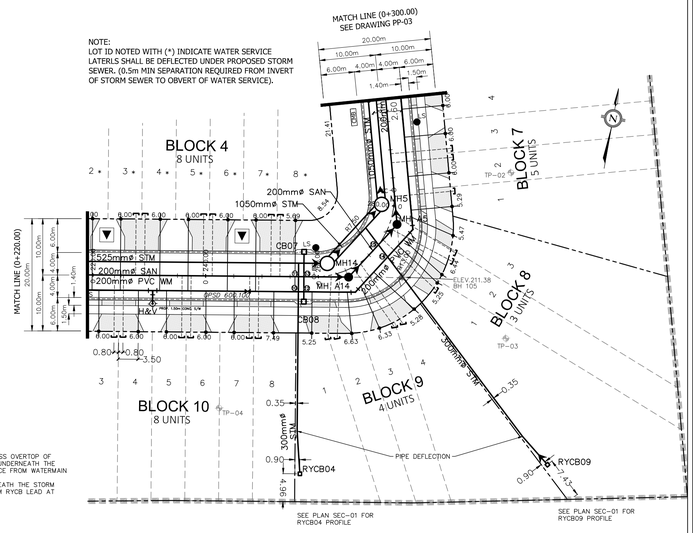
MARK	Pipe 1 Type	Pipe 1 Elevation (mASL)		Pipe 2 Type	Pipe 2 Elevation (mASL)		Clearance (m)
1	STM	212.86	BOT	SAN	211.45	TOP	1.41
2	STM	213.37	BOT	WATER	212.87	TOP	0.50
3	STM	212.66	BOT	WATER	212.05	TOP	0.61
4	STM	212.72	BOT	WATER	211.99	TOP	0.73
5	STM	213.23	BOT	SAN	211.72	TOP	0.13
6	STM	212.42	BOT	WATER	211.26	TOP	1.16
7	STM	213.11	BOT	SAN	211.72	TOP	0.90
8	STM	211.70	BOT	WATER	211.20	TOP	0.50
9	STM	211.69	BOT	SAN	210.70	TOP	0.99
10	STM	212.33	BOT	WATER	211.72	TOP	0.61
11	STM	212.93	BOT	SAN	210.70	TOP	1.53
12	STM	212.25	BOT	WATER	211.64	TOP	0.61
13	STM	211.76	BOT	SAN	210.70	TOP	1.06
14	STM	211.79	BOT	WATER	211.29	TOP	0.50
15	STM	211.75	BOT	SAN	210.58	TOP	1.17

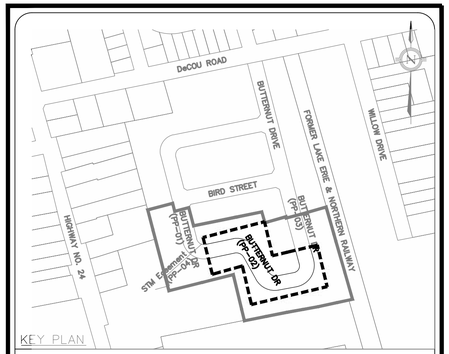




BLOCK 11 SERVICING NOTES:
1. SANITARY LATERALS FOR BLOCK 11 UNITS 1 TO 4 SHALL CROSS OVERTOP OF WATERMAIN. LATERALS FOR UNITS 3 &4 SHALL ALSO CROSS UNDERNEATH THE STORM LEAD FOR RYCB03. PROVIDE MINIMUM 0.50m CLEARANCE FROM WATERMAIN AT CROSSING.
2. WATER SERVICE FOR BLOCK 11 UNIT 4 SHALL CROSS UNDERNEATH THE STORM LEAD FOR RYCB03. PROVIDE MINIMUM 0.50m CLEARANCE FROM RYCB LEAD AT CROSSING.

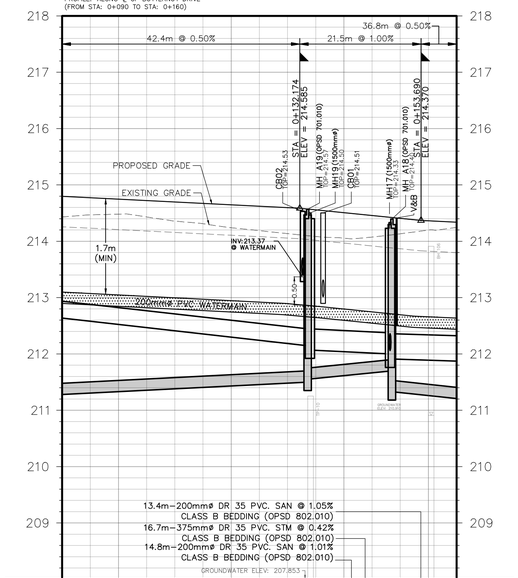
NOTE:
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BUTTERNUT DRIVE

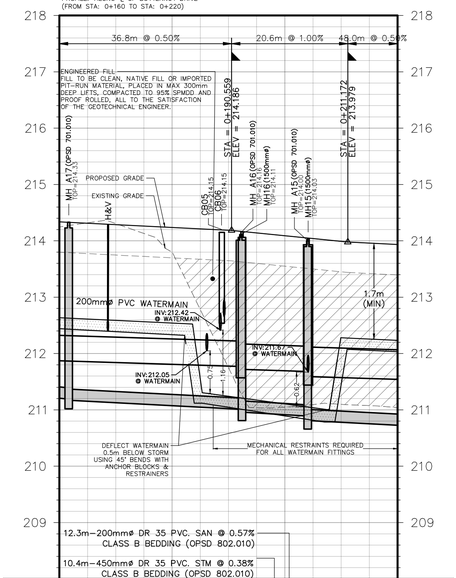
VERTICAL SCALE 1:50
HORIZONTAL SCALE 1:500
PROFILE: ALONG ℄ OF BUTTERNUT DRIVE
(FROM STA: 0+090 TO STA: 0+160)



STORM SEWER	46.2m–300mmø DR 35 PVC. STM @ 1.13% CLASS B BEDDING (OPSD 802.010)				STORM SEWER
SANITARY SEWER	51.8m–200mmø DR 35 PVC. SAN @ 0.50% CLASS B BEDDING (OPSD 802.010)				SANITARY SEWER
℄ ELEV		E.G.E. 215.34 ℄ 214.75	E.G.E. 215.31 ℄ 214.65	E.G.E. 215.47 ℄ 214.51	E.G.E. 215.43 ℄ 214.34 ℄ ELEV
CHAINAGE		0+100	0+120	0+140	CHAINAGE

BUTTERNUT DRIVE

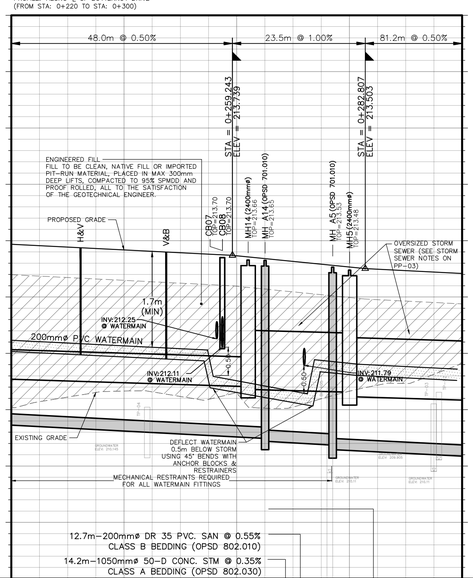
VERTICAL SCALE 1:50
HORIZONTAL SCALE 1:500
PROFILE: ALONG ℄ OF BUTTERNUT DRIVE
(FROM STA: 0+160 TO STA: 0+220)



STORM SEWER	45.0m–450mmø DR 35 PVC. STM @ 0.31% CLASS B BEDDING (OPSD 802.010)				STORM SEWER
SANITARY SEWER	30.7m–200mmø DR 35 PVC. SAN @ 0.52% CLASS B BEDDING (OPSD 802.010)				SANITARY SEWER
℄ ELEV		E.G.E. 211.43 ℄ 214.34	E.G.E. 211.42 ℄ 214.24	E.G.E. 209.85 ℄ 214.09	E.G.E. 209.90 ℄ 213.94 ℄ ELEV
CHAINAGE			0+180	0+200	CHAINAGE

BUTTERNUT DRIVE

VERTICAL SCALE 1:50
HORIZONTAL SCALE 1:500
PROFILE: ALONG ℄ OF BUTTERNUT DRIVE
(FROM STA: 0+220 TO STA: 0+300)



STORM SEWER	56.8m–525mmø 65–D CONC. STM @ 0.32% CLASS B BEDDING (OPSD 802.030)				STORM SEWER
SANITARY SEWER	62.0m–200mmø DR 35 PVC. SAN @ 0.52% CLASS B BEDDING (OPSD 802.010)				SANITARY SEWER
℄ ELEV		E.G.E. 213.84 ℄ 213.84	E.G.E. 213.71 ℄ 213.70	E.G.E. 213.51 ℄ 213.53	E.G.E. 213.41 ℄ 213.42 ℄ ELEV
CHAINAGE			0+240	0+260	0+280 CHAINAGE

SEE SHEET SEC-01 FOR REAR YARD CATCH BASIN PLAN

LEGEND

LEGEND:

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SITE LOCATION:
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BUTTERNUT DRIVE
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DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	22019
SWM BY:	CHECKED BY:	
SCALE: H: 1:500 V: 1:50	0m 5m 10m 20m 30m	PP-02

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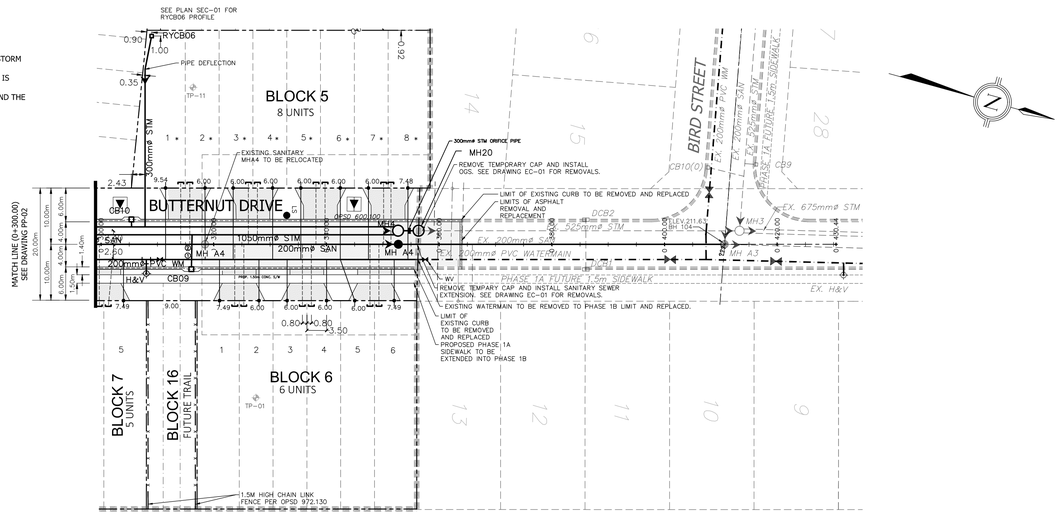
STORM SEWER NOTES

1. CONTROLLED FLOW ORIFICE PIPE IS PROVIDED TO RESTRICT THE PHASE 1B MINOR (5-YEAR) STORM FLOWS TO THE PEAK DESIGN FLOW RATE IN THE PHASE 1A STORM SEWER AND SWM POND DESIGNS.
2. OVERSIZED STORM SEWER IS PROVIDED FOR SUPERPIPE STORAGE OF THE ORIFICE RESTRICTED MINOR STORM FLOWS FROM PHASE 1B. THE SUPERPIPE STORAGE IS PROVIDED TO KEEP THE STORM SEWER HYDRAULIC GRADE LINE (HGL) BELOW THE OBVERT OF THE SEWER DURING THE MINOR (5-YEAR) STORM EVENT.
3. REFER TO COUNTERPOINT'S SEPTEMBER 2023 FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT (FSSR) FOR BIG SKY SUBDIVISION - PHASE 1B, AND THE STORM SEWER DESIGN SHEET FOR THE DETAILED DESIGN OF THE STORMWATER MANAGEMENT FACILITIES IN NOTES 1 TO 2 ABOVE.

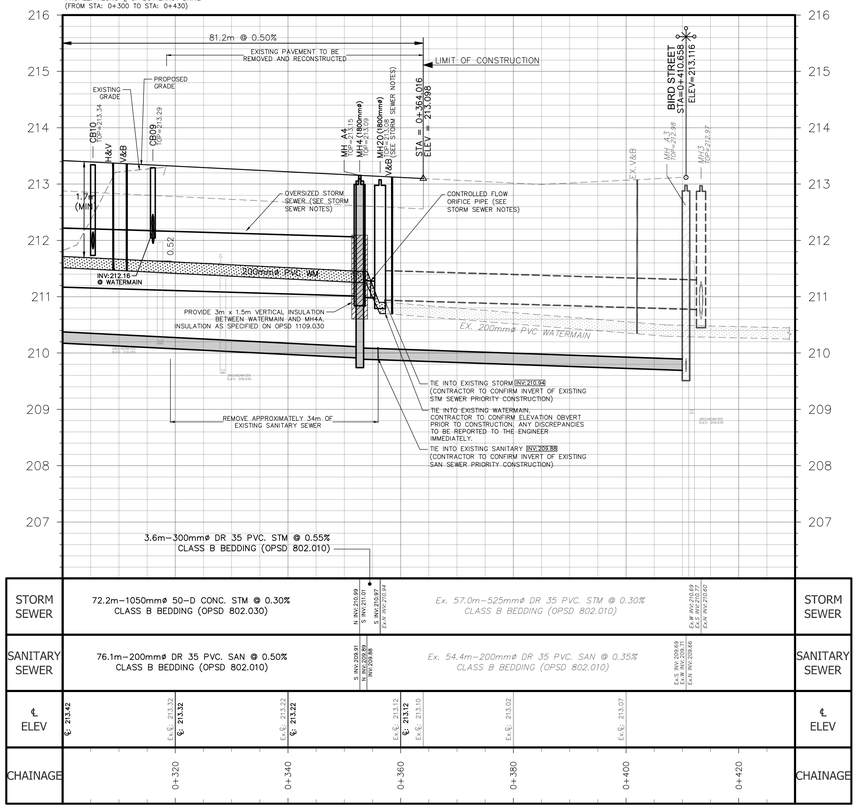
CROSSING CHART:

MARK	Pipe 1			Pipe 2			Clearance
	Type	Elevation (mASL)		Type	Elevation (mASL)		(m)
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2	STM	211.57	BOT	SAN	210.29	TOP	1.29

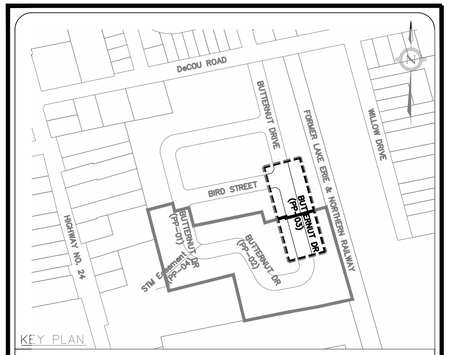
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BUTTERNUT DRIVE



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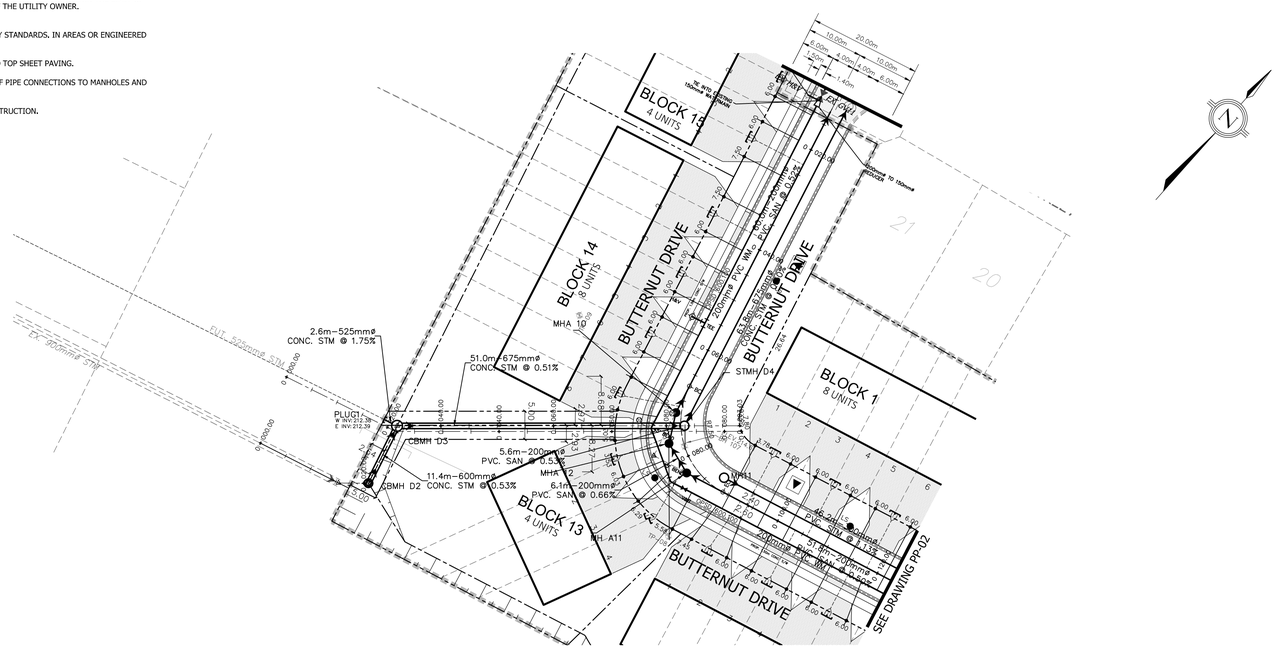
BUTTERNUT DRIVE
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DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	22019
SWM BY:	CHECKED BY:	
SCALE: H: 1:500 V: 1:50 (0m 5m 10m 20m 30m)		PP-03

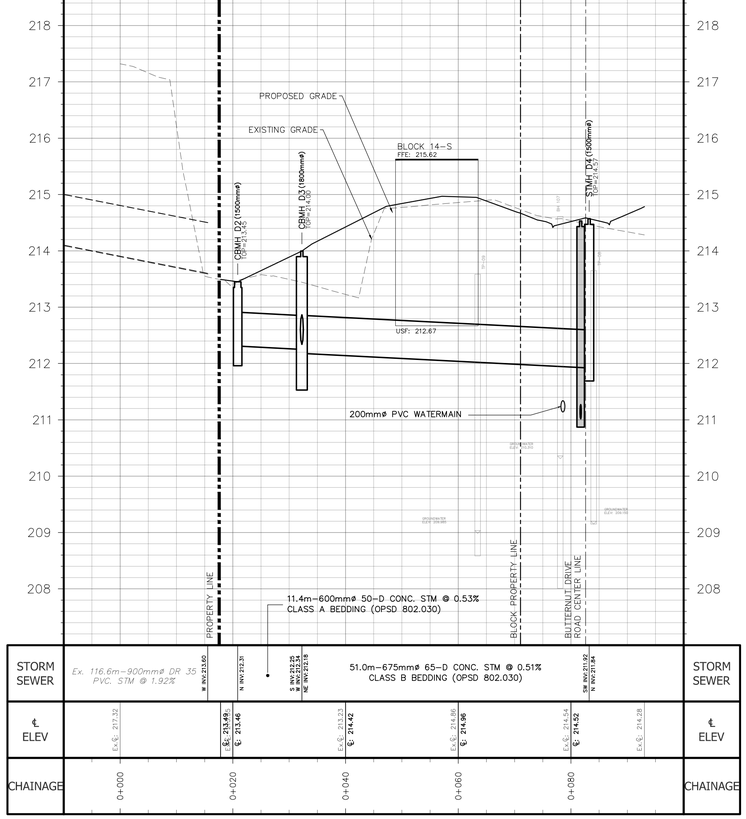
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PROFILE NOTES

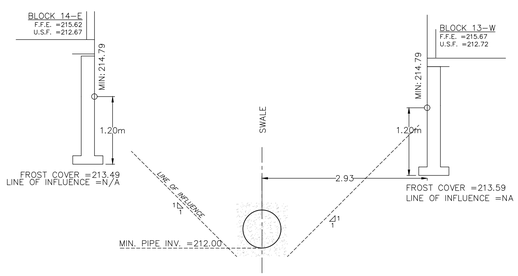
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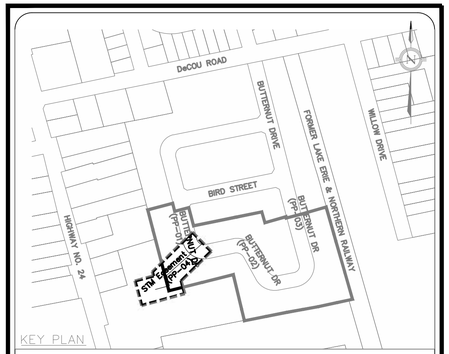


STM EASEMENT



STORM SEWER EASEMENT





LEGEND

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- PHASING LIMIT
- PROPOSED TRANSFORMER
- LS — PROPOSED LIGHT POLE
- CROSSING ID

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E. #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578–2220, FAX: (519) 650–5625
E–mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0	ISSUED FOR ZBLA	2025–04–28	AB	
2.0	ISSUED FOR CUP SIGN–OFF	2024–11–05	AB	
1.0	ISSUED FOR PRE–SERVICING CONSTRUCTION	2024–09–05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

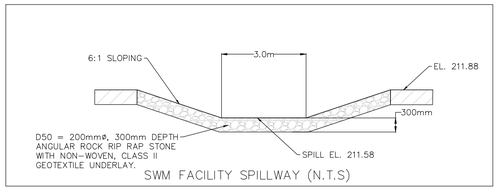
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

STM EASEMENT (0+000.00 TO 0+095.37)

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	22019
SWM BY:	CHECKED BY:	
SCALE: H: 1:500 V: 1:50	0m 5m 10m 20m 30m	PP-04

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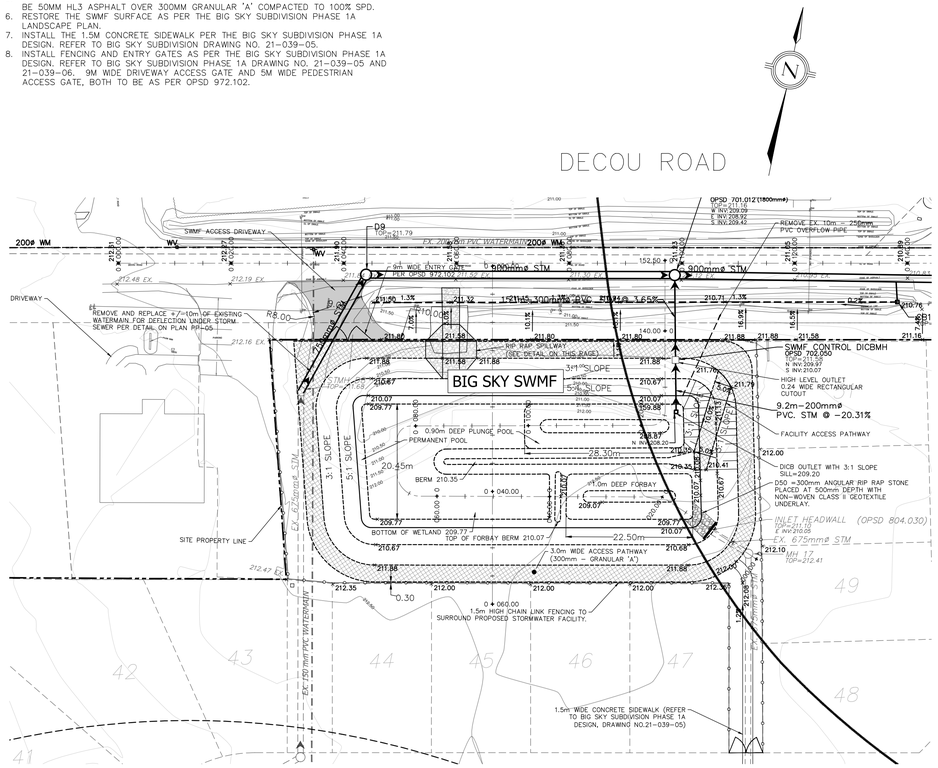
SWM FACILITY SPILLWAY (N.T.S)

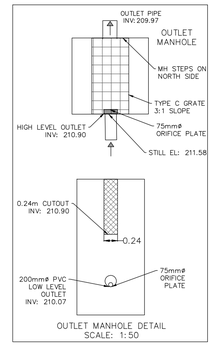
SWM POND NOTES:

1. EXISTING POND TO BE CLEANED OUT, STRIPPED, AND REGRADED AS SHOWN.
2. REMOVE THE EXISTING TEMPORARY SWMF OUTLET AND REPLACE IT WITH THE ULTIMATE POND OUTLET AS SHOWN ON THIS PLAN.
3. INSTALL RIP RAP AT SWMF INLET, OUTLET, AND OVERFLOW WEIR AS SHOWN.
4. INSTALL 3M WIDE SWMF ACCESS PATHWAY AS SHOWN. PATHWAY TO BE 300MM GRANULAR 'A' COMPACTED TO 100% SPD.
5. INSTALL SWMF ACCESS DRIVEWAY FROM DECOU ROAD AS SHOWN. DRIVEWAY TO BE 50MM HL3 ASPHALT OVER 300MM GRANULAR 'A' COMPACTED TO 100% SPD.
6. RESTORE THE SWMF SURFACE AS PER THE BIG SKY SUBDIVISION PHASE 1A LANDSCAPE PLAN.
7. INSTALL THE 1.5M CONCRETE SIDEWALK PER THE BIG SKY SUBDIVISION PHASE 1A DESIGN. REFER TO BIG SKY SUBDIVISION DRAWING NO. 21-039-05.
8. INSTALL FENCING AND ENTRY GATES AS PER THE BIG SKY SUBDIVISION PHASE 1A DESIGN. REFER TO BIG SKY SUBDIVISION PHASE 1A DRAWING NO. 21-039-05 AND 21-039-06. 9M WIDE DRIVEWAY ACCESS GATE AND 5M WIDE PEDESTRIAN ACCESS GATE, BOTH TO BE AS PER OPSD 972.102.

CONSTRUCTION NOTES:

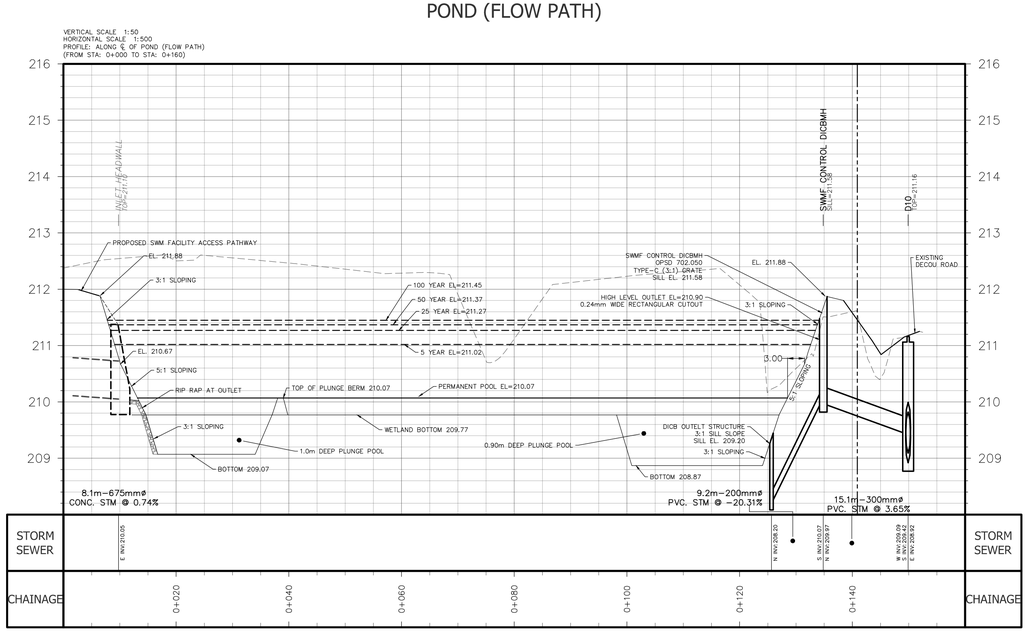
1. CONTRACTOR SHALL ADEQUATELY PROTECT AND SUPPORT ALL UTILITIES, HP/LP, GUY WIRES, PEDESTALS, ETC. WHEN WORKING IN THE VICINITY.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN LOCATES AND CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE LIMIT OF CONSTRUCTION.



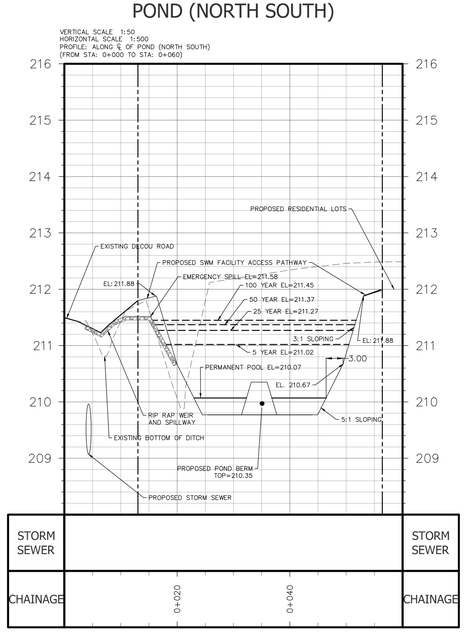


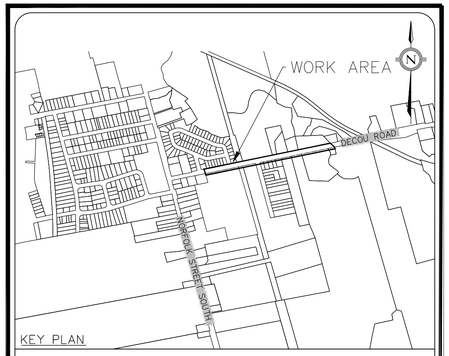
OUTLET MANHOLE DETAIL
SCALE: 1:50

POND (FLOW PATH)



POND (NORTH SOUTH)





KEY PLAN

LEGEND

- EXISTING HYDRANT
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED STORM SEWER AND MH
- PROPOSED AREA DRAIN
- PROPOSED SANITARY SEWER AND MH
- PROPERTY LINE

LEGAL & TOPOGRAPHY

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1135 STELLAR
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ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

SWM POND PLAN AND PROFILE

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: 1:500m 0m 5m 10m 20m 30m		DRAWING NO. SWM-01

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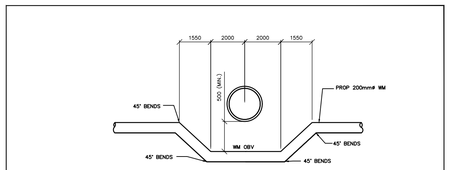
CONSTRUCTION NOTES:

ALL WORK SHALL REMAIN WITHIN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL NOT ENCROACH UPON OR CAUSE DAMAGE TO PRIVATE PROPERTY.

CONTRACTOR SHALL MAINTAIN ACCESS TO EXISTING ROADS AND DRIVEWAYS

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NOTES:
1. MINIMUM 0.50m SEPARATION BETWEEN STORM AND WATERMAIN TO BE MAINTAINED AT ALL TIMES.
2. WATERMAIN DEFLECTION TO BE CENTERED TO EXISTING STORM.
3. CONTRACTOR TO VERIFY INVERTS IN THE FIELD AND REPORT DISCREPANCIES TO THE ENGINEER.
4. GRANULAR BEDDING AS PER GEOTECHNICAL AND MUNICIPAL REQUIREMENTS.
5. INSTALL THRUST BLOCKS AT BENDS AS PER COUNTY STANDARD.
6. ALL DIMENSIONS ARE IN MILLIMETERS.

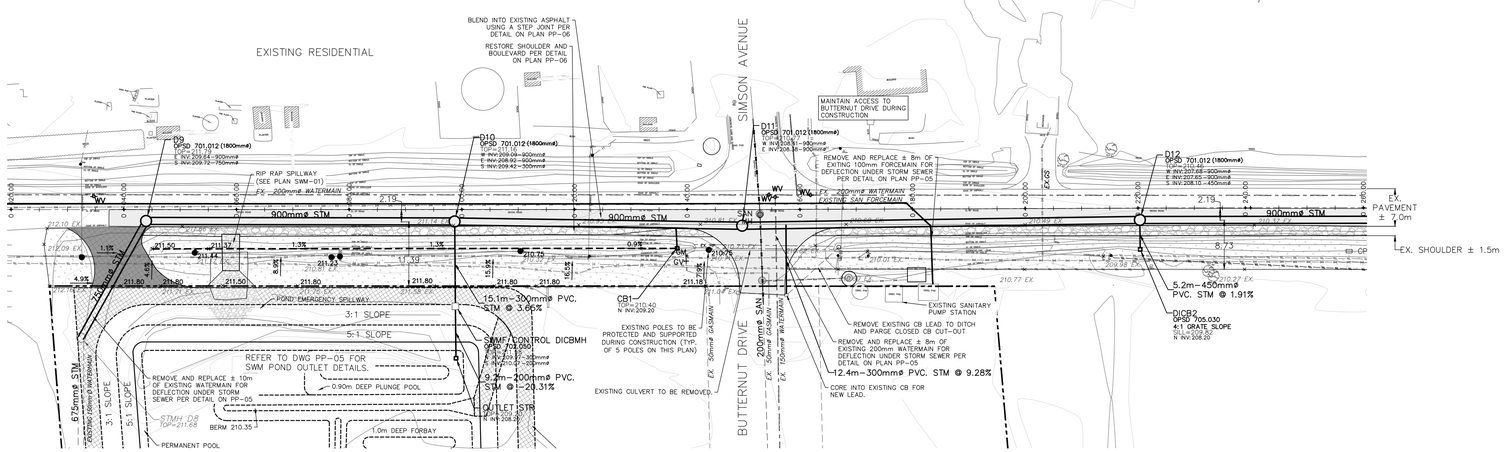
WATERMAIN DEFLECTION DETAIL

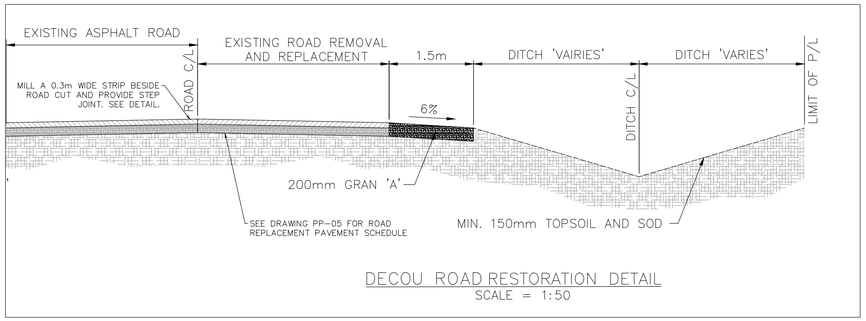
JAN 2016	REV	1	DT-400-A
SCALE	N.T.S		

PAVEMENT DESIGN TABLE

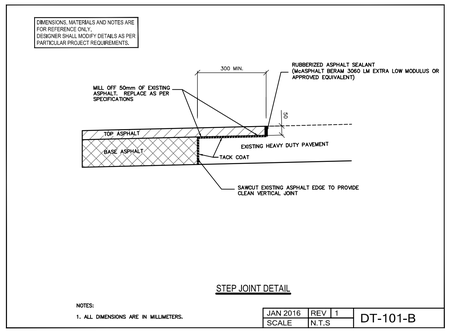
STREET	SURFACE COURSE HL 3	BINDER COURSE HL 8	GRANULAR BASE 'A'	GRANULAR SUB-BASE 'B'
DECOU ROAD	40mm	50mm	150mm	350mm
BUTTERNUT DRIVE	40mm	50mm	150mm	350mm
WILLOW WOOD DRIVE	40mm	50mm	150mm	350mm

NOTES:
1. GRANULAR 'A' SHALL BE COMPACTED TO 100% S.P.M.D.D.
2. GRANULAR 'B' SHALL BE COMPACTED TO 100% S.P.M.D.D.
3. ASPHALT MATERIAL SHALL BE SUPPLIED AND PLACED IN ACCORDANCE WITH O.P.S.S FORMS 310, CONFORM TO REQUIREMENTS OF O.P.S.S. 1150 AND UNIFORMLY COMPACTED TO 92-96.5% M.R.D.
4. SHOULD CONSTRUCTION TAKE PLACE UNDER WET SUB-GRADE OR WEATHER CONDITIONS, SUB-GRADE PREPARATION AND GRANULAR REQUIREMENTS SHOULD BE REVIEWED BY THE GEOTECHNICAL ENGINEER.
5. GRANULAR 'B' SUB-BASE MAY BE REVISED AT THE GEOTECHNICAL ENGINEER'S DISCRETION.
6. SUB-GRADE IMPROVEMENT OR GEOTEXTILE REINFORCEMENT MAY BE REQUIRED SUBJECT TO GEOTECHNICAL ENGINEER'S INSPECTION AND RECOMMENDATION.


EXISTING RESIDENTIAL
BLEND INTO EXISTING ASPHALT USING A STEP JOINT PER DETAIL ON PLAN PP-06
RESTORE SHOULDER AND BOULEVARD PER DETAIL ON PLAN PP-06
SIMSON AVENUE
MAINTAIN ACCESS TO BUTTERNUT DRIVE DURING CONSTRUCTION
D9
OPSD 701.012 (1800mmø)
TOP=212.10
I: INV.209.72 - 750mmø
S: INV.209.72 - 750mmø
D10
OPSD 701.012 (1800mmø)
TOP=211.79
W: INV.209.09 - 900mmø
E: INV.208.92 - 900mmø
S: INV.209.42 - 300mmø
D11
OPSD 701.012 (1800mmø)
TOP=210.75
W: INV.208.91 - 900mmø
E: INV.208.76 - 900mmø
D12
OPSD 701.012 (1800mmø)
TOP=210.46
W: INV.207.68 - 900mmø
E: INV.207.65 - 900mmø
S: INV.208.10 - 450mmø
RIP RAP SPILLWAY (SEE PLAN SWM-01)
EX. 200mmø WATERMAIN
REMOVE AND REPLACE ± 8m OF EXITING 100mm FORCEMAIN FOR DEFLECTION UNDER STORM SEWER PER DETAIL ON PLAN PP-05
EX. 200mmø WATERMAIN
EXISTING SAN FORCEMAIN
900mmø STM
900mmø STM
900mmø STM
EX. PAVEMENT ± 7.0m
EX. SHOULDER ± 1.5m
POND EMERGENCY SPILLWAY
3:1 SLOPE
5:1 SLOPE
15.1m-300mmø PVC. STM @ 3.66%
CB1
TOP=210.40
N: INV.209.20
SWMT CONTROL DICBMH
OPSD 703.060
EXISTING POLES TO BE PROTECTED AND SUPPORTED DURING CONSTRUCTION (TYP. OF 5 POLES ON THIS PLAN)
EXISTING SANITARY PUMP STATION
REMOVE EXISTING CB LEAD TO DITCH AND PARGE CLOSED CB CUT-OUT
REMOVE AND REPLACE ± 8m OF EXISTING 200mm WATERMAIN FOR DEFLECTION UNDER STORM SEWER PER DETAIL ON PLAN PP-05
5.2m-450mmø PVC. STM @ 1.91%
DICB2
OPSD 705.030
4:1 GRATE SLOPE
SILL=209.82
N: INV.208.27
REFER TO DWG PP-05 FOR SWM POND OUTLET DETAILS.
9.2m-200mmø PVC. STM @ 20.31%
12.4m-300mmø PVC. STM @ 9.28%
CORE INTO EXISTING CB FOR NEW LEAD.
EXISTING CULVERT TO BE REMOVED.
REMOVE AND REPLACE ± 10m OF EXISTING WATERMAIN FOR DEFLECTION UNDER STORM SEWER PER DETAIL ON PP-05
0.90m DEEP PLUNGE POOL
OUTLET STR
STMH 'D8'
TOP=211.68
BERM 210.35
1.0m DEEP FOREBAY
PERMANENT POOL
675mmø STM
200mmø DIBMH @ WATERMAIN
BUTTERNUT DRIVE
200mmø SAN
EX. 450mmø STM
EX. 525mmø STM
EX. 150mmø WATERMAIN
EX. 300mmø SAN MAIN
EX. 200mmø WATERMAIN
EX. 200mmø SAN MAIN
EX. 300mmø STM
EX. 450mmø STM
EX. 525mmø STM
EX. 150mmø WATERM



DECOU ROAD RESTORATION DETAIL
SCALE = 1:50



STEP JOINT DETAIL

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.

JAN 2016	REV 1	DT-101-B	
SCALE	N.T.S		

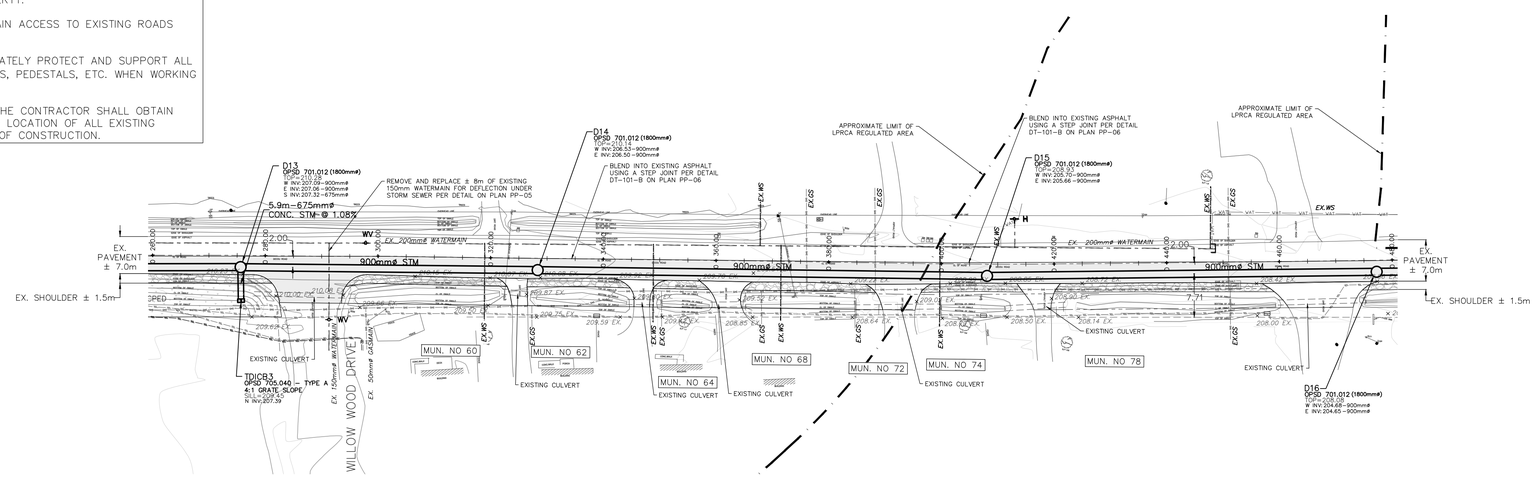
CONSTRUCTION NOTES:

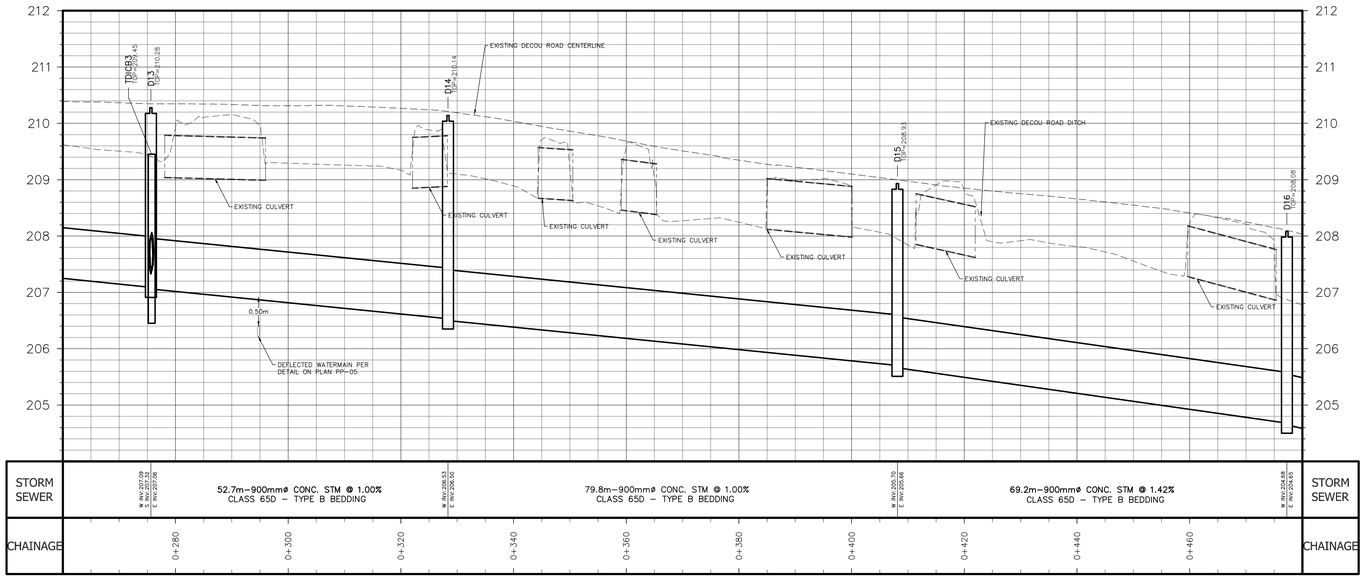
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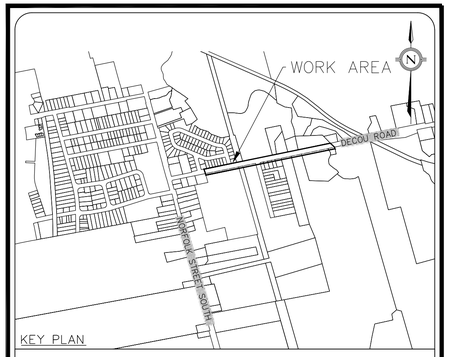
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LEGEND

- EXISTING HYDRANT
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED STORM SEWER AND MH
- PROPOSED SANITARY SEWER AND MH
- PROPERTY LINE
- LIMIT OF REMOVAL AND REPLACEMENT OF DRIVEWAY / ENTRANCE
- APPROXIMATE LIMIT OF ASPHALT REMOVAL AND REPLACEMENT
- APPROXIMATE LIMIT OF GRAVEL REMOVAL AND REPLACEMENT
- APPROXIMATE LIMIT OF TOPSOIL AND SEED REGRADING AND RESTORATION
- APPROXIMATE LIMIT OF ERONET P300 TURF REINFORCEMENT MATTING
- RETAINING WALL

LEGAL & TOPOGRAPHY

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ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

STORMWATER OUTELT PLAN AND PROFILE
STA. 0+260 TO 0+480

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: 1:500m (0m 5m 10m 20m 30m)		DRAWING NO. PP-06

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RETAINING WALL NOTES:

1. UNLESS OTHERWISE NOTED, RETAINING WALL ELEVATIONS INDICATED ARE THE FINISHED GRADE AT THE TOP OR BOTTOM OF THE WALL. TOP AND BOTTOM OF WALL ELEVATIONS MAY DIFFER FROM FINISHED GRADE DEPENDING ON THE WALL DESIGN.

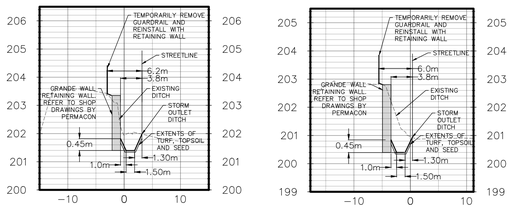
2. FACE OF RETAINING WALL AT PROPERTY LINES SHALL BE SETBACK A MINIMUM OF 300 mm FROM THE PROPERTY LINE UNLESS OTHERWISE NOTED.

3. RETAINING WALLS SHOWN HAVE BEEN DESIGNED FOR GRADING ONLY. WALL DETAILED DESIGN SHALL BE COMPLETED BY THE OWNER'S STRUCTURAL ENGINEER OR CONTRACTOR, AND SHALL BE DESIGNED IN CONFORMANCE WITH APPLICABLE O.B.C REQUIREMENTS AND GENERAL SITE GRADING.

4. RETAINING WALL DETAILED DESIGN (BY OTHERS) SHALL INCLUDE CONSIDERATION FOR THE FOLLOWING AS DEEMED NECESSARY BY THE DESIGNER:
- GEOTEXTILE PLACED BEHIND THE WALL,
- GRANULAR BACKFILL MATERIAL AND COMPACTION,
- WALL SUBDRAINAGE AND OUTLET LOCATIONS,
- SOIL BEARING CAPACITY OF THE SUBGRADE,
- WALL TIEBACKS
- VEHICULAR GUARDRAIL AT TOP OF WALL

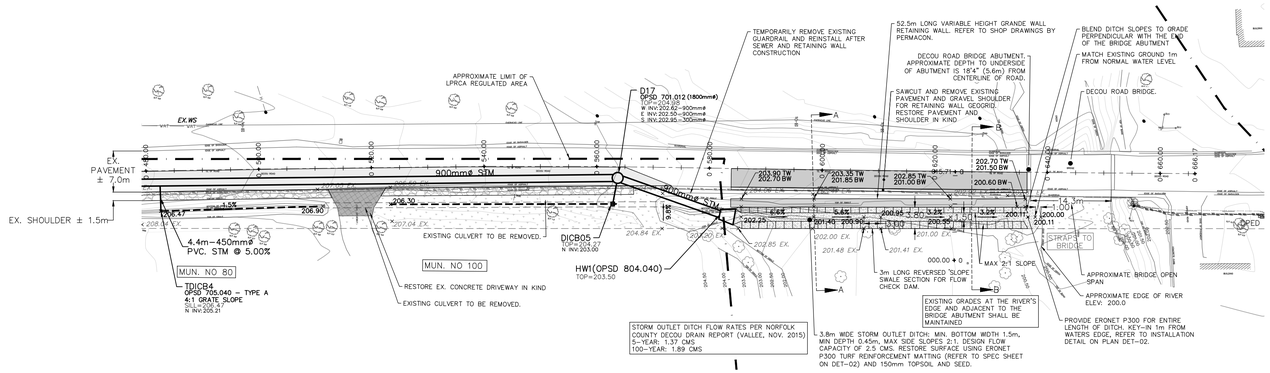
5. PRIOR TO CONSTRUCTION RETAINING WALL SHOP DRAWINGS SHALL BE SUBMITTED TO COUNTERPOINT ENGINEERING FOR REVIEW TO CONFIRM CONFORMANCE TO THE REQUIREMENTS ABOVE.

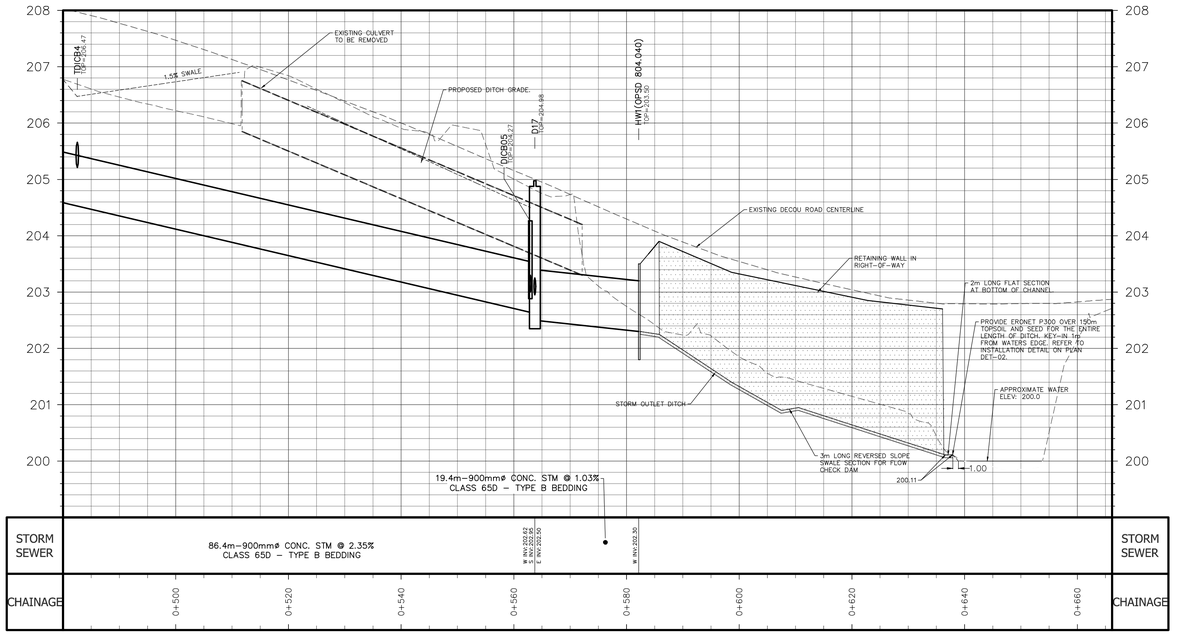
6. THE PARTY RESPONSIBLE FOR DETAILED DESIGN OF THE RETAINING WALL SHALL ALSO BE RESPONSIBLE FOR FINAL CERTIFICATION OF THE WALL.



SECTION A-A

SECTION B-B



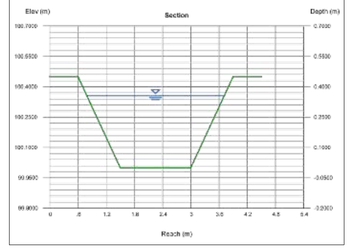


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Aug 13 2024

STORM OUTLET DITCH - SHALLOWEST SECTION

Trapezoidal		Highlighted	
Bottom Width (m)	= 1.5000	Depth (m)	= 0.2566
Side Slopes (z:1)	= 2.0000, 2.0000	Q (cms)	= 1.8900
Total Depth (m)	= 0.4500	Area (sqm)	= 0.7563
Invert Elev (m)	= 100.0300	Velocity (m/s)	= 2.3946
Slope (%)	= 3.2000	Wetted Perim (m)	= 3.0346
N-Value	= 0.030	Crit Depth, Yc (m)	= 0.4450
		Top Width (m)	= 2.2265
Calculations		EGL (m)	= 0.6401
Compute by:	Known Q		
Known Q (cms)	= 1.8900		

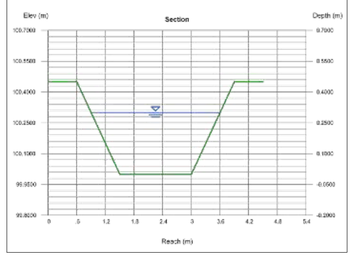


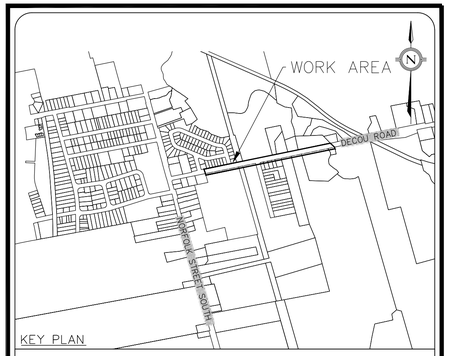
Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Aug 13 2024

STORM OUTLET DITCH - STEEPEST SECTION

Trapezoidal		Highlighted	
Bottom Width (m)	= 1.5000	Depth (m)	= 0.2967
Side Slopes (z:1)	= 2.0000, 2.0000	Q (cms)	= 1.8900
Total Depth (m)	= 0.4500	Area (sqm)	= 0.5055
Invert Elev (m)	= 100.0000	Velocity (m/s)	= 3.7367
Slope (%)	= 6.0000	Wetted Perim (m)	= 2.8356
N-Value	= 0.030	Crit Depth, Yc (m)	= 0.4450
		Top Width (m)	= 2.0948
Calculations		EGL (m)	= 0.7629
Compute by:	Known Q		
Known Q (cms)	= 1.8900		





LEGEND

- EXISTING HYDRANT
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED STORM SEWER AND MH
- PROPOSED SANITARY SEWER AND MH
- PROPERTY LINE
- LIMIT OF REMOVAL AND REPLACEMENT OF DRIVEWAY / ENTRANCE
- APPROXIMATE LIMIT OF ASPHALT REMOVAL AND REPLACEMENT
- APPROXIMATE LIMIT OF GRAVEL REMOVAL AND REPLACEMENT
- APPROXIMATE LIMIT OF TOPSOIL AND SEED REGRADING AND RESTORATION
- APPROXIMATE LIMIT OF ERONET P300 TURF REINFORCEMENT MATTING
- RETAINING WALL

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
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4273 KING ST.E, #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578-2220, FAX: (519) 650-5625
E-mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0				
2.0	ISSUED FOR ZBLA	2025-04-28	AB	
1.0	ISSUED FOR PRE-SERVICING CONSTRUCTION	2024-09-05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

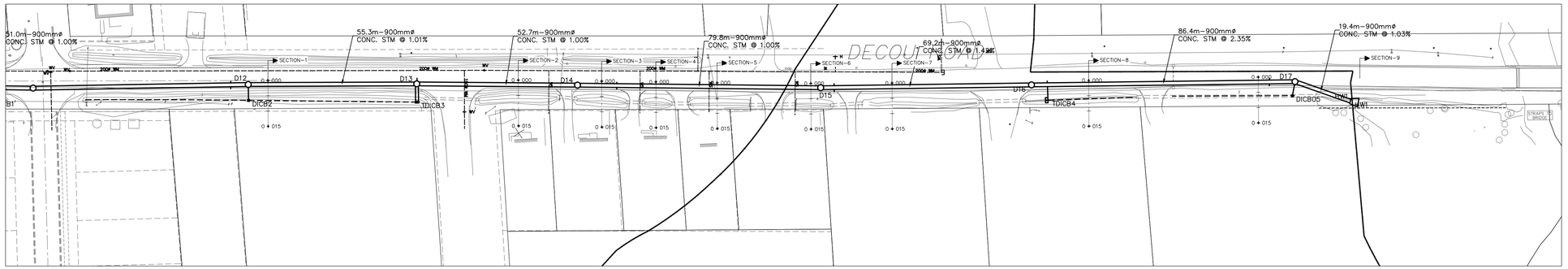
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

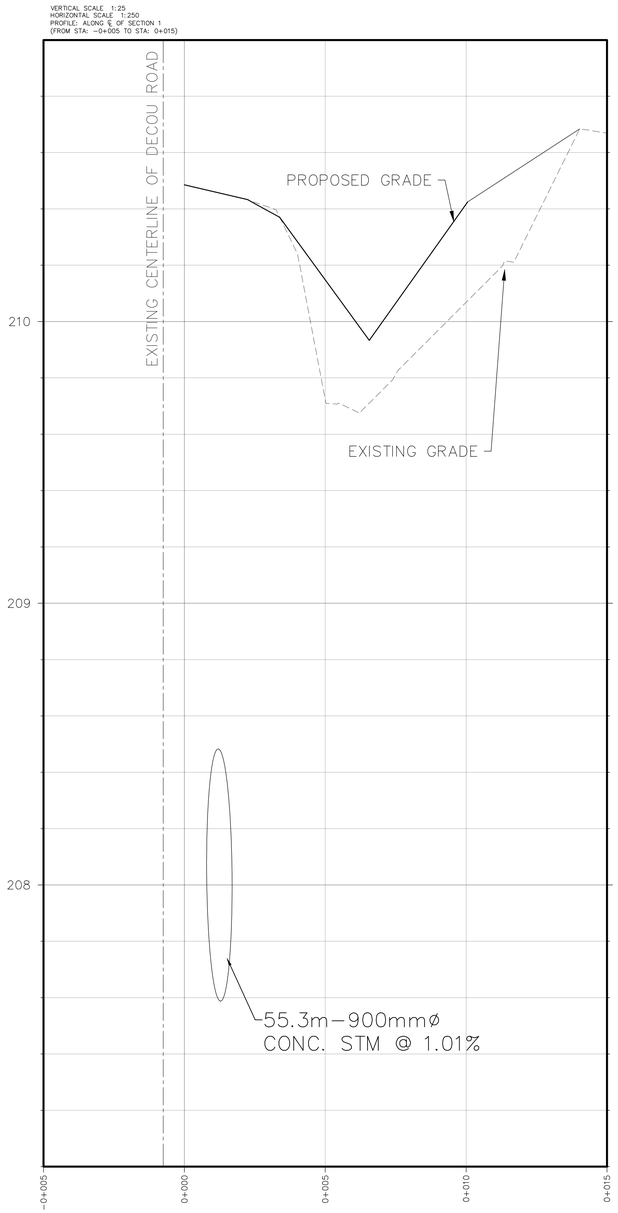
STORMWATER OUTELT PLAN AND PROFILE
STA. 0+480.00 TO 0+660

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
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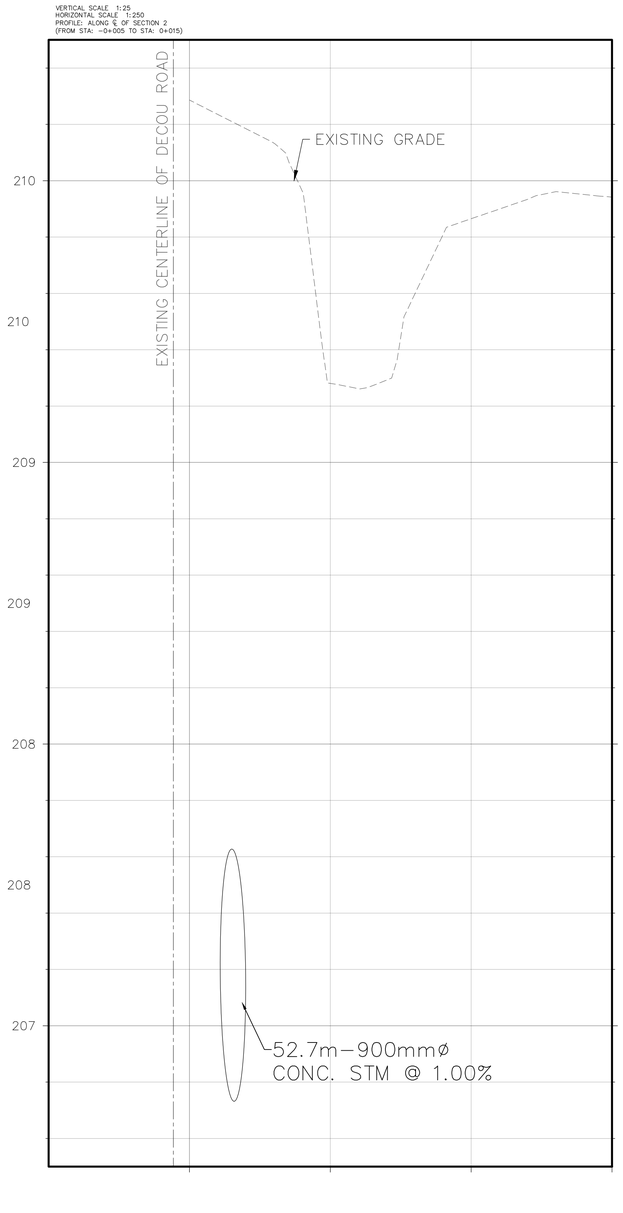
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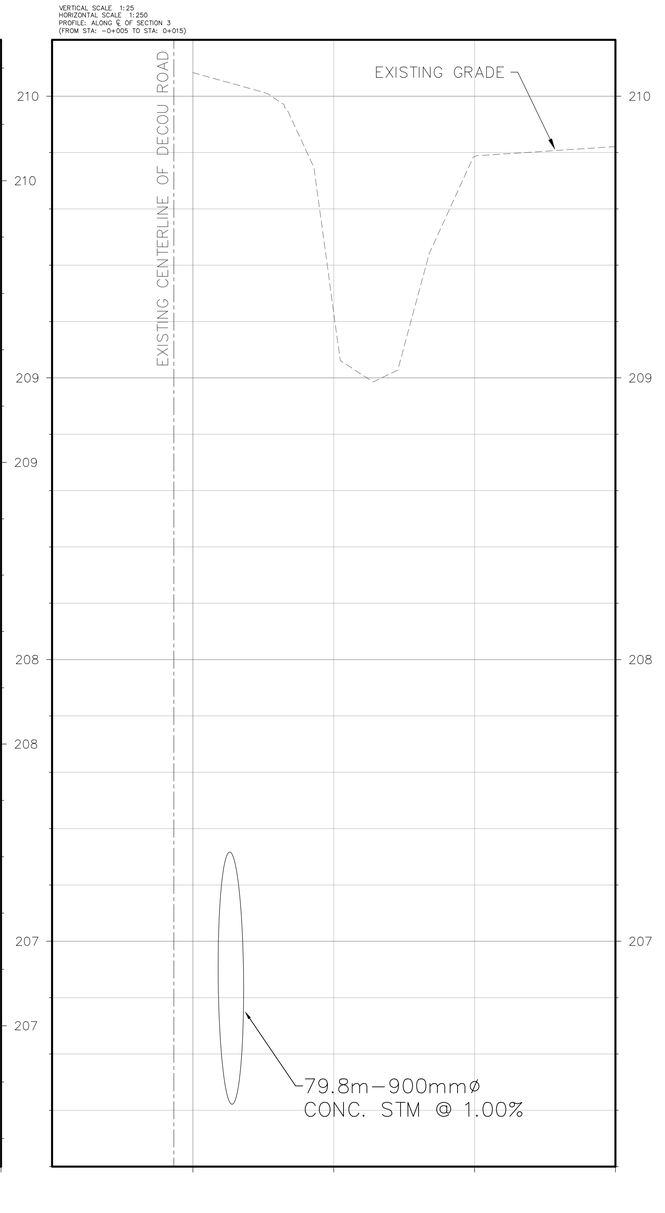
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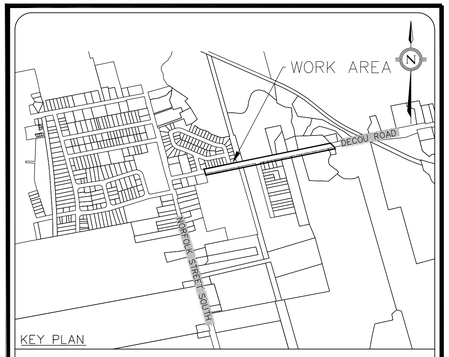
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SECTION 3



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LEGEND

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
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4273 KING ST.E, #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578–2220, FAX: (519) 650–5625
E–mail: www.jdbarnes.com

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6.0				
5.0				
4.0				
3.0				
2.0	ISSUED FOR ZBLA	2025–04–28	AB	
1.0	ISSUED FOR PRE–SERVICING CONSTRUCTION	2024–09–05	AB	

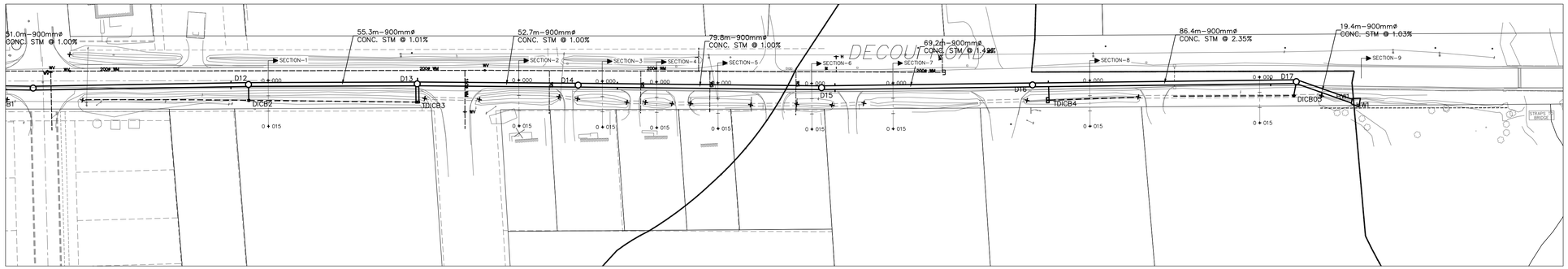
counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

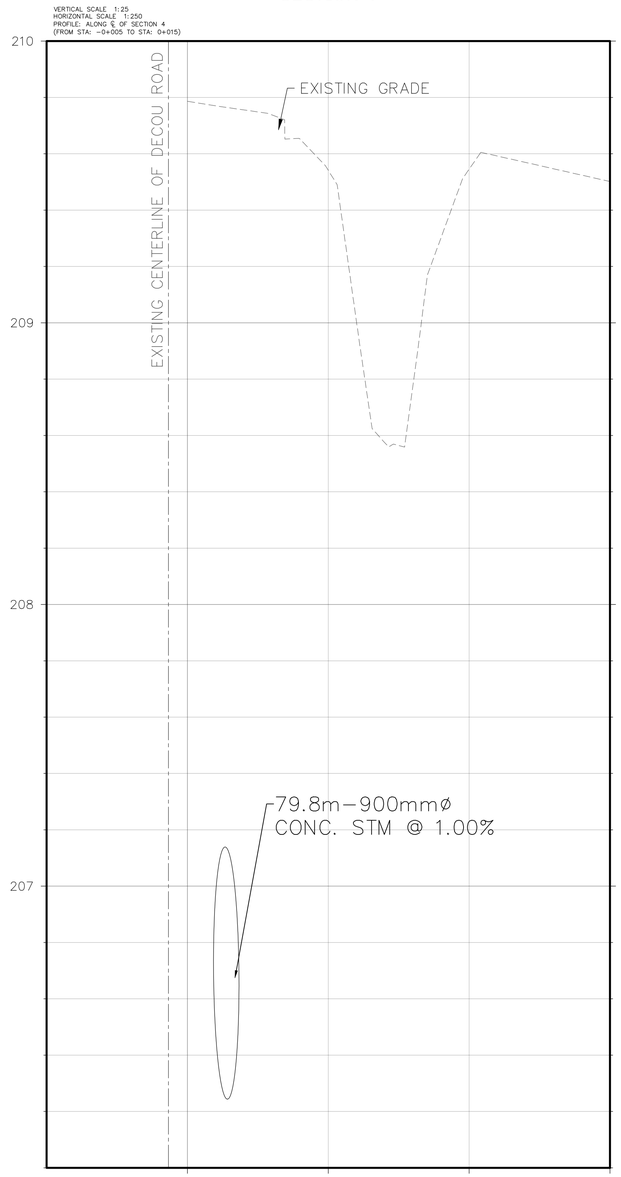
SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

DITCH SECTIONS (1–3)

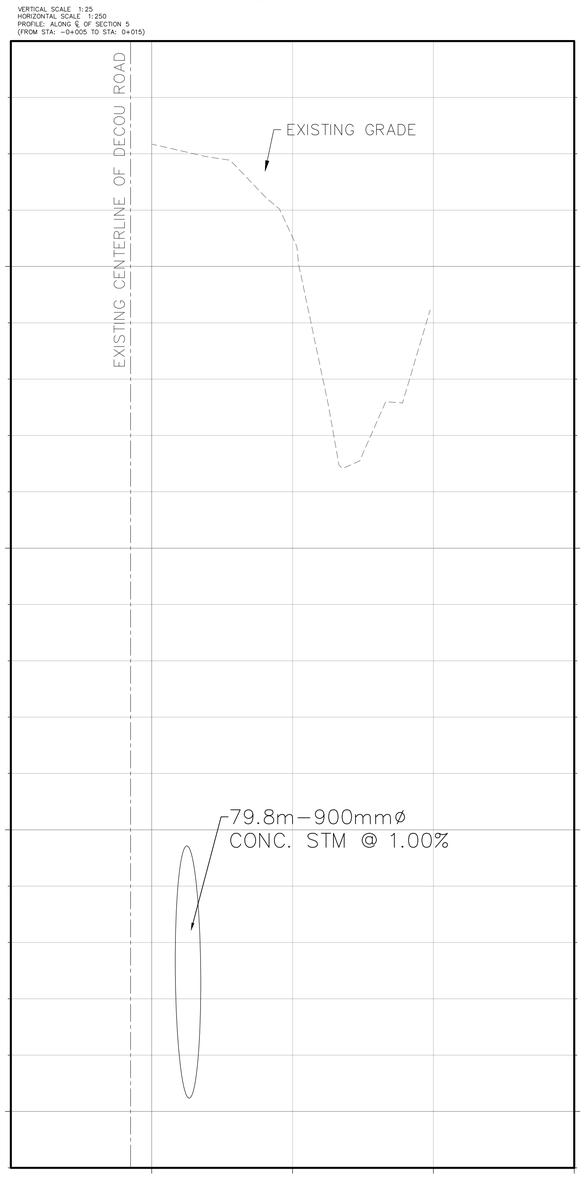
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DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
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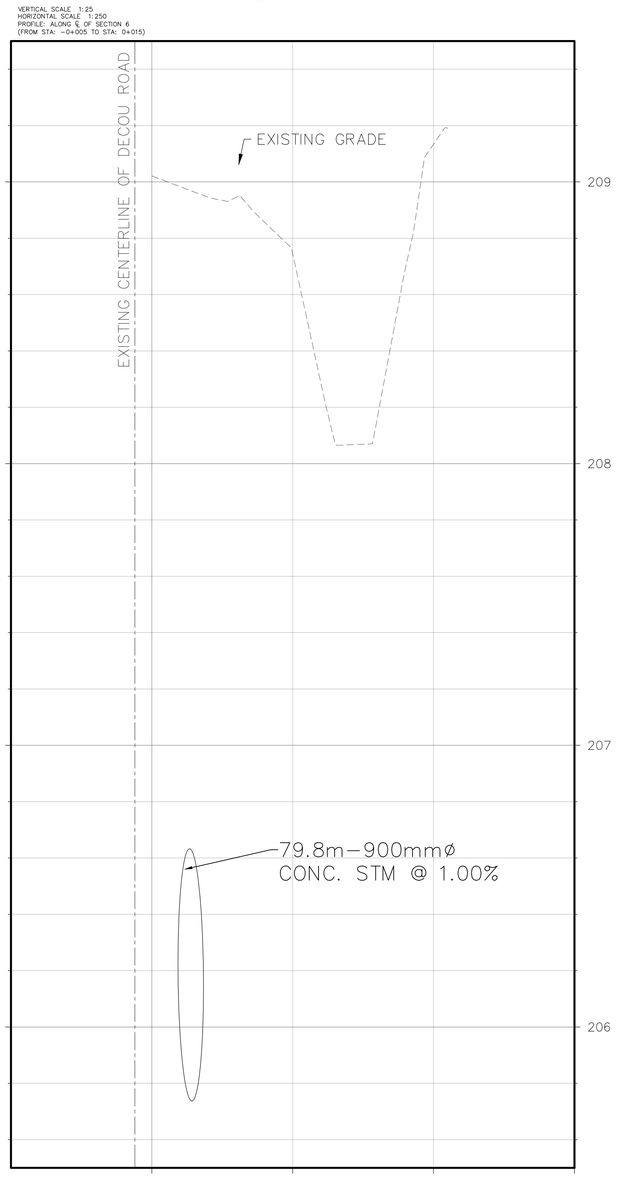
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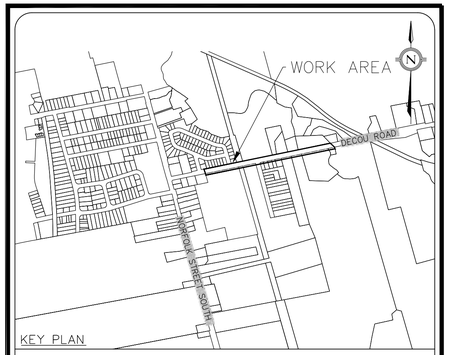


SECTION 5



SECTION 6





LEGEND

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E, #100, KITCHENER ONTARIO, N2P 2E9
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E–mail: www.jdbarnes.com

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1.0	ISSUED FOR PRE–SERVICING CONSTRUCTION	2024–09–05	AB	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

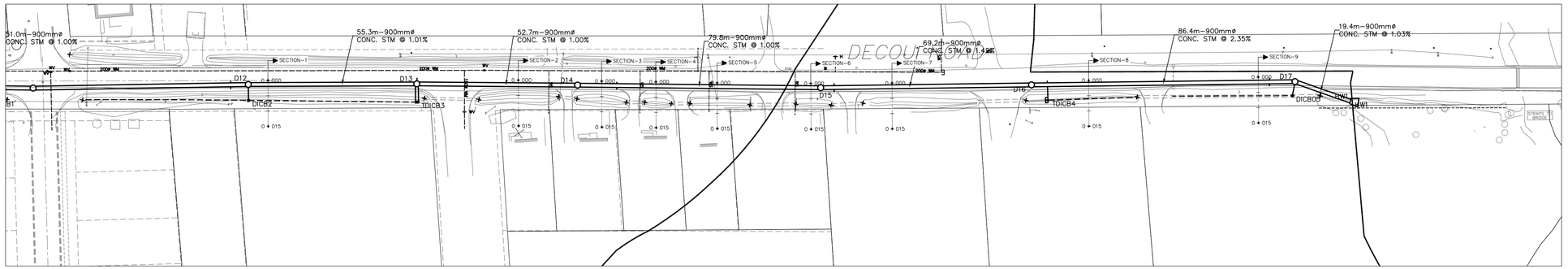
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

DITCH SECTIONS (4–6)

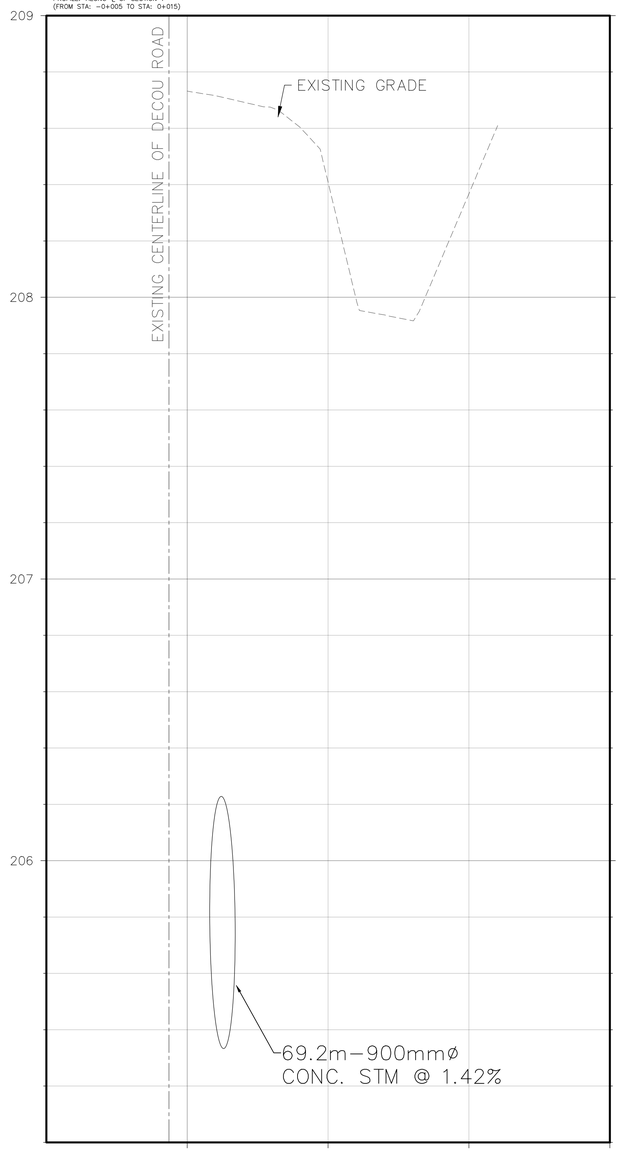
DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
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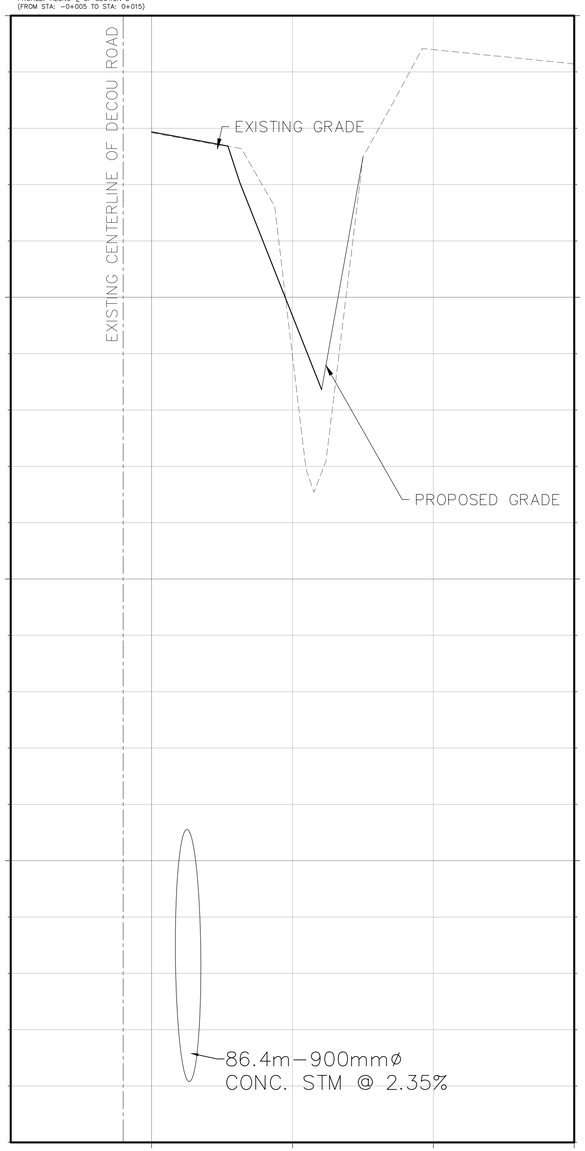
SECTION 7

VERTICAL SCALE 1:25
HORIZONTAL SCALE 1:250
PROFILE: ALONG ℄ OF SECTION 7
(FROM STA: –0+005 TO STA: 0+015)



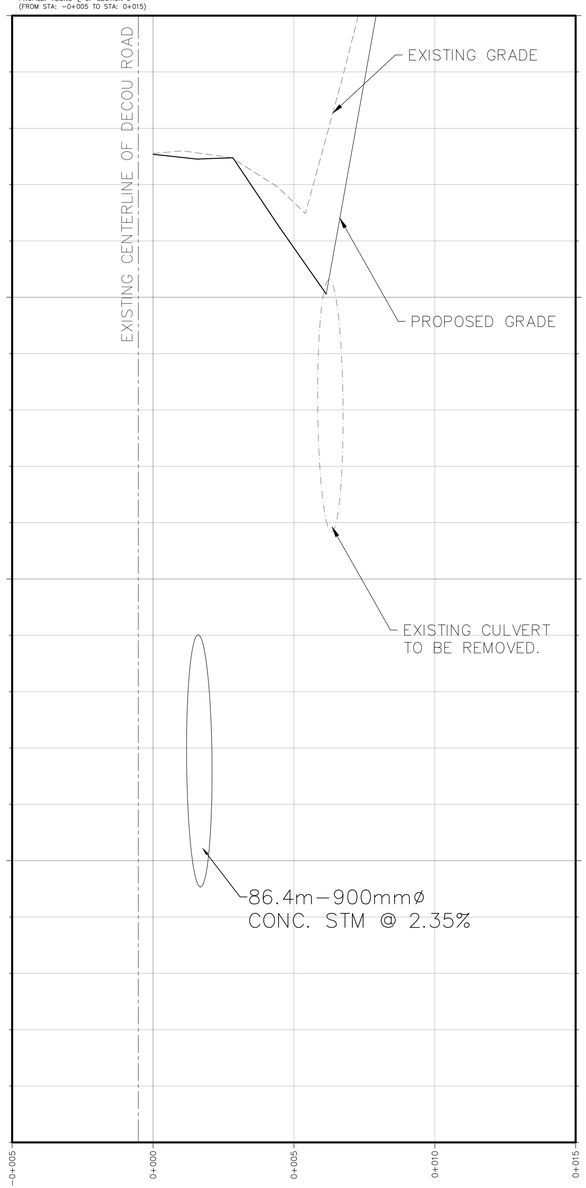
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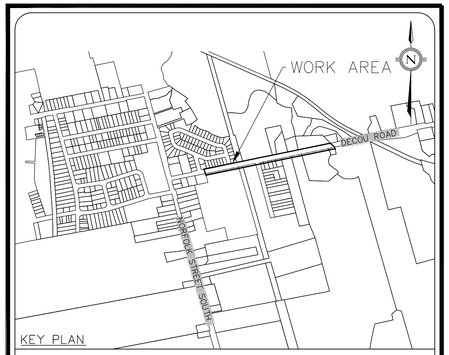
VERTICAL SCALE 1:25
HORIZONTAL SCALE 1:250
PROFILE: ALONG ℄ OF SECTION 8
(FROM STA: –0+005 TO STA: 0+015)



SECTION 9

VERTICAL SCALE 1:25
HORIZONTAL SCALE 1:250
PROFILE: ALONG ℄ OF SECTION 9
(FROM STA: –0+005 TO STA: 0+015)





LEGEND

LEGAL & TOPOGRAPHY

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS
4273 KING ST.E. #100, KITCHENER ONTARIO, N2P 2E9
PHONE: (519) 578–2220, FAX: (519) 650–5625
E–mail: www.jdbarnes.com

LEGAL DESCRIPTION:

BENCHMARK:
TOP NUT OF FIRE HYDRANT WITH AN ELEVATION OF 213.76m.

No.	REVISIONS/ISSUED	DATE	BY	CITY
9.0				
8.0				
7.0				
6.0				
5.0				
4.0				
3.0				
2.0	ISSUED FOR ZBLA	2025–04–28	AB	
1.0	ISSUED FOR PRE–SERVICING CONSTRUCTION	2024–09–05	AB	

COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

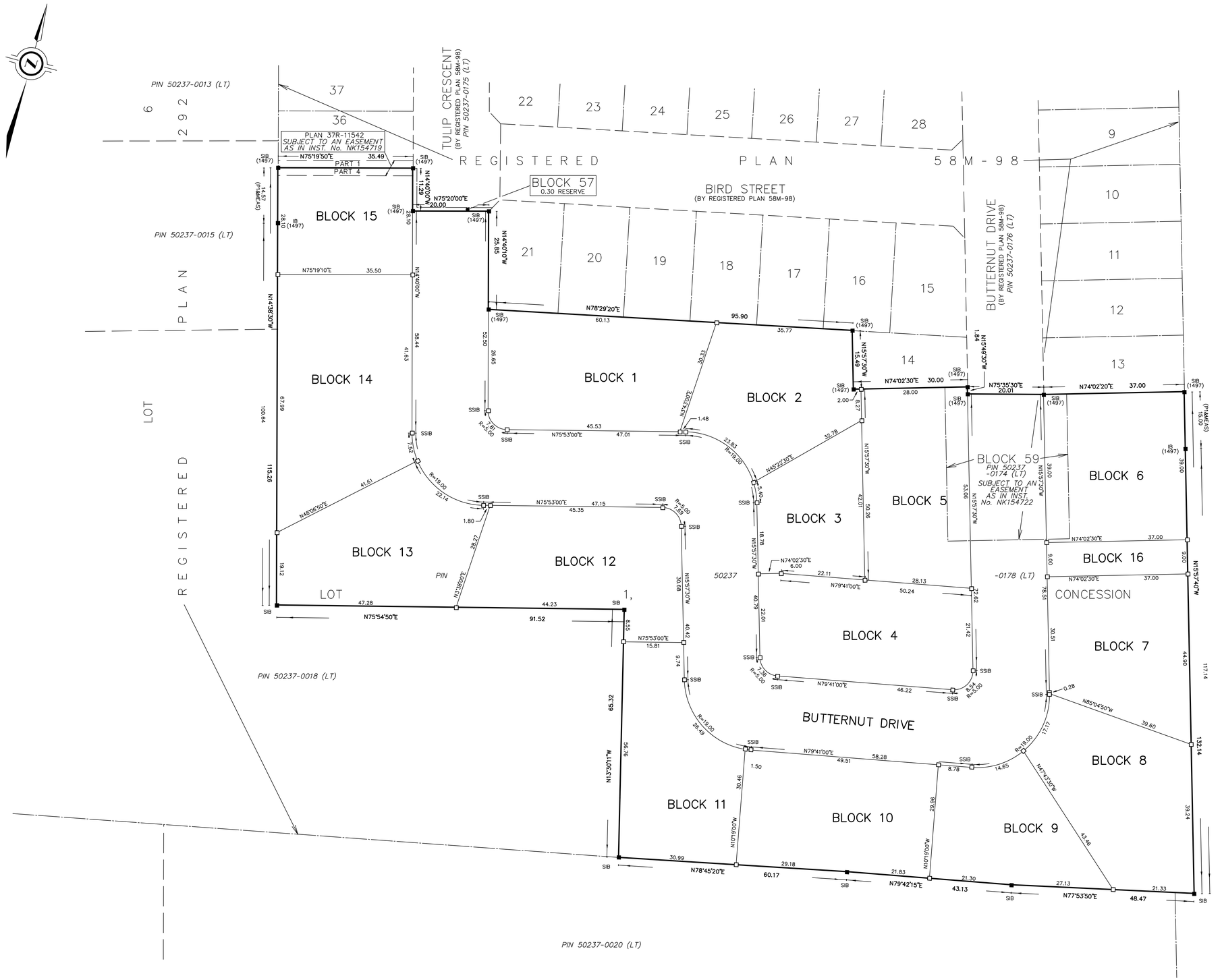
APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

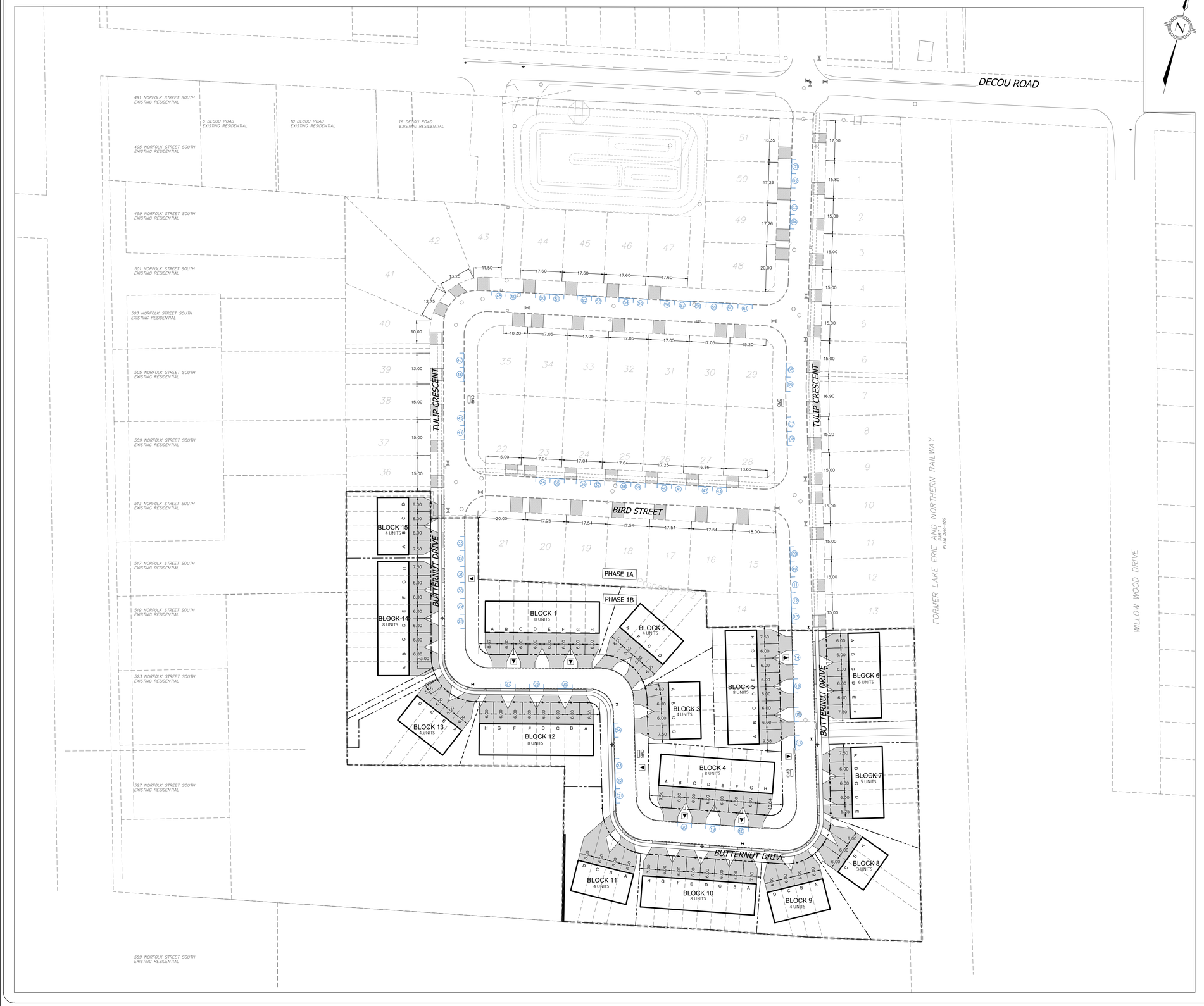
SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

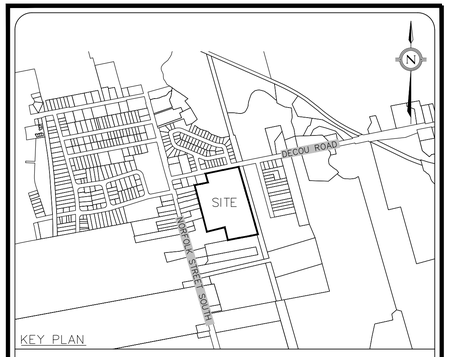
DITCH SECTIONS (7–9)

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: 1:750m (0m 10m 20m 30m 40m)		DRAWING NO. SEC–04

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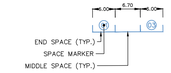

PIN 50237-0013 (LT)
PIN 50237-0015 (LT)
PIN 50237-0018 (LT)
PIN 50237-0020 (LT)
PIN 50237-0031 (LT)
PIN 50237-0178 (LT)
LOT 6 REGISTERED PLAN 292
LOT 1, CONCESSION 4
TULIP CRESCENT (BY REGISTERED PLAN 58M-98) PIN 50237-0175 (LT)
REGISTERED PLAN 58M-98
BIRD STREET (BY REGISTERED PLAN 58M-98)
BUTTERNUT DRIVE (BY REGISTERED PLAN 58M-98) PIN 50237-0176 (LT)
BUTTERNUT DRIVE
PLAN 37R-11542 SUBJECT TO AN EASEMENT AS IN INST. No. NK154719
BLOCK 57 0.30 RESERVE
BLOCK 59 PIN 50237-0174 (LT) SUBJECT TO AN EASEMENT AS IN INST. No. NK154722
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
BLOCK 5
BLOCK 6
BLOCK 7
BLOCK 8
BLOCK 9
BLOCK 10
BLOCK 11
BLOCK 12
BLOCK 13
BLOCK 14
BLOCK 15
BLOCK 16
37
36
22 23 24 25 26 27 28
21 20 19 18 17 16 15
9 10 11 12 13 14
N75°19'50"E 35.49
PART 1
PART 4
N14°40'00"W 11.29
N75°20'00"E 20.00
N14°40'10"W 25.85
N78°29'20"E 60.13 95.90 35.77
N15°57'30"W 15.49
N74°02'30"E 30.00 28.00
N75°35'30"E 20.01
N74°02'20"E 37.00
N14°38'30"W 69.99 100.64 115.26
N75°19'10"E 35.50
N14°40'00"W 58.44 41.63
N75°54'50"E 47.28 44.23 91.52
N75°53'00"E 45.53 47.01 47.15 45.35 15.81
N48°06'50"E 41.61
N37°26'00"E 28.27
N15°57'30"W 30.68 40.42 42.01 50.26 53.06 39.00 78.51 30.51 44.90 117.14
N74°02'30"E 6.00 22.11 79°41'00"E 28.13 50.24 37.00
N79°41'00"E 46.22
N45°22'30"E 32.78
N85°04'50"W 39.60
N47°43'30"W 43.46
N78°45'20"E 60.17
N79°42'15"E 43.13
N77°53'50"E 48.47
N00°19'00"W 29.96
N45°04'10"W 65.32 56.76
R=19.00 20.49
R=5.00 7.85
R=19.00 22.14
R=19.00 23.83
R=19.00 17.17
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R=19.00 22.14
R=19.00 20.91
R=19.00 7.52
SIB (1497)
SSIB
IB (1497)
RIB (1497)
(P1&MEAS) 74.57
(P1&MEAS) 15.00
(P1&MEAS) 39.00
(P1&MEAS) 117.14
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1.48
5.40
1.80
8.55
7.26
8.54





LEGEND

TYPICAL ROW OF PARKING SPACES



NOTE:
1. ALL PARKING SHALL BE PER NORFOLK COUNTY BYLAWS.

PROVIDING 1 SPACE PER 3 LOTS

PHASE 1A: 51 SF LOTS
PHASE 2: 86 TH LOTS

ON-STREET PARKING REQUIRED = 46
SPACES PROVIDED = 61

LEGAL & TOPOGRAPHY

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E-mail: www.jdbarnes.com

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6.0				
5.0				
4.0				
3.0				
2.0				
1.0	PARKING PLAN IN SUPPORT OF ZBLA	2025-05-09	ML	

counterpoint ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

APPLICANT:
BIG SKY SIMCOE LIMITED PARTNERSHIP
1135 STELLAR
DRIVE, NEWMARKET,
ONTARIO L3Y 7B8

SITE LOCATION:
18 DECOU ROAD
PROPOSAL FOR RESIDENTIAL BUILDINGS
SIMCOE, ONTARIO

PARKING PLAN

DESIGNED BY: SC	CHECKED BY: AB	DATE: OCTOBER 2022
DRAWING BY: SC	CHECKED BY: AB	PROJECT NO. 22019
SWM BY:	CHECKED BY:	
SCALE: 1:750m (0m 10m 20m 30m 40m)		DRAWING NO. PK-01

Z:\Shared\Projects\2022\22019_Caitbrex_Decou Road\Design\00_Design Master\Drawings\Street Signage\22019_Parking Plan.dwg

MAP A

CONTEXT MAP

Urban Area of SIMCOE

for ZNPL2025149



Legend

Subject Lands

2020 Air Photo

6/19/2025

N

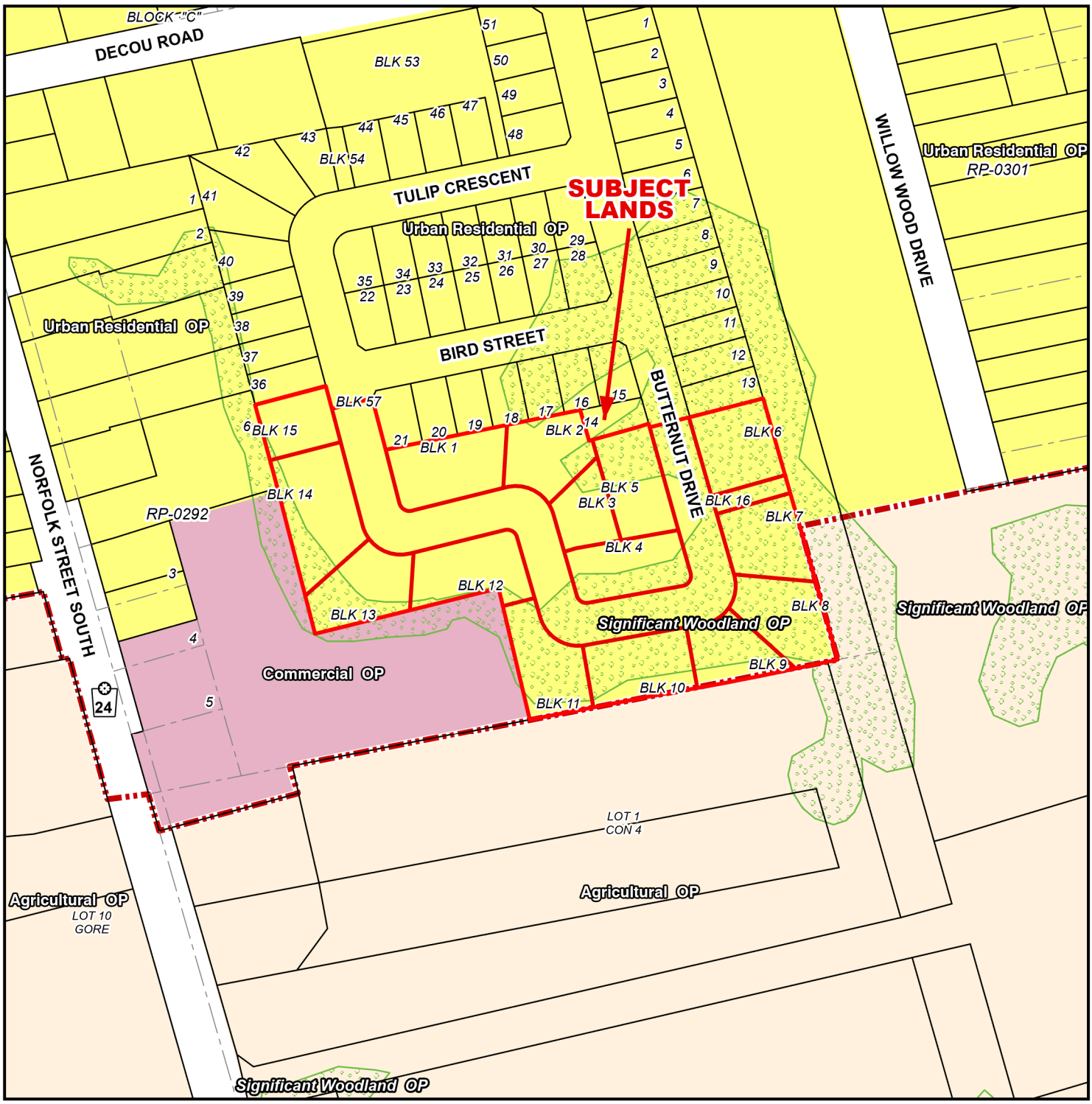
40 20 0 40 80 120 160 Meters

MAP B

for ZNPL2025149

OFFICIAL PLAN MAP

Urban Area of SIMCOE



Legend

Subject Lands

Official Plan Designations

Agricultural

Urban Residential

Commercial

Urban Area Boundary

Significant Woodland

6/19/2025

N

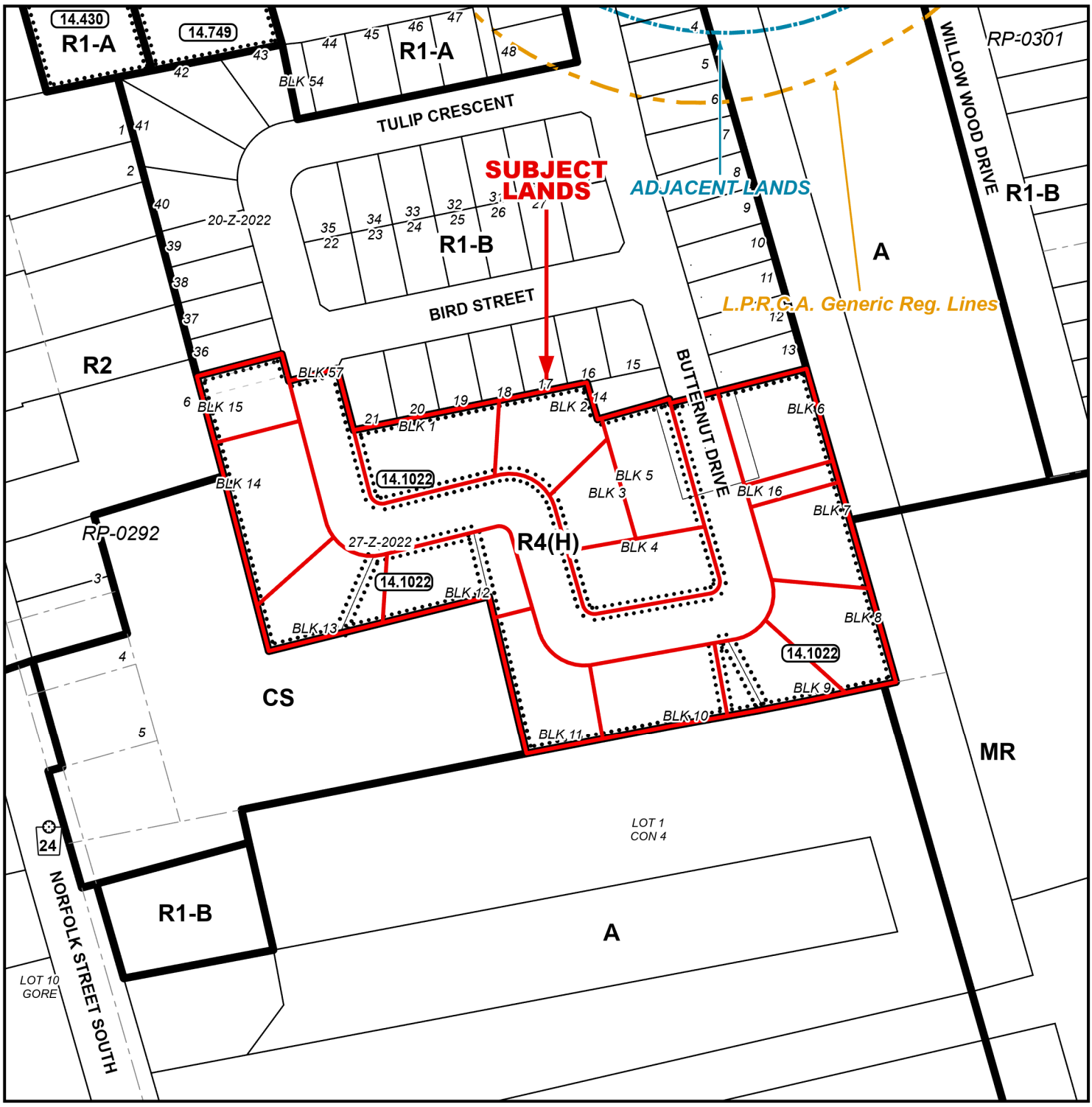
20 10 0 20 40 60 80 Meters

MAP C

for ZNPL2025149

PROPOSED ZONING BY-LAW AMENDMENT MAP

Urban Area of SIMCOE



LEGEND

- Subject Lands
- Adjacent Lands
- LPRCA Generic RegLines

ZONING BY-LAW 1-Z-2014

(H) - Holding

A - Agricultural Zone

CS - Service Commercial Zone

CN - Neighbourhood Commercial Zone

R1-A - Residential R1-A Zone

R1-B - Residential R1-B Zone

R2 - Residential R2 Zone

R4 - Residential R4 Zone

MR - Rural Industrial Zone

N

10 5 0 10 20 30 40 Meters

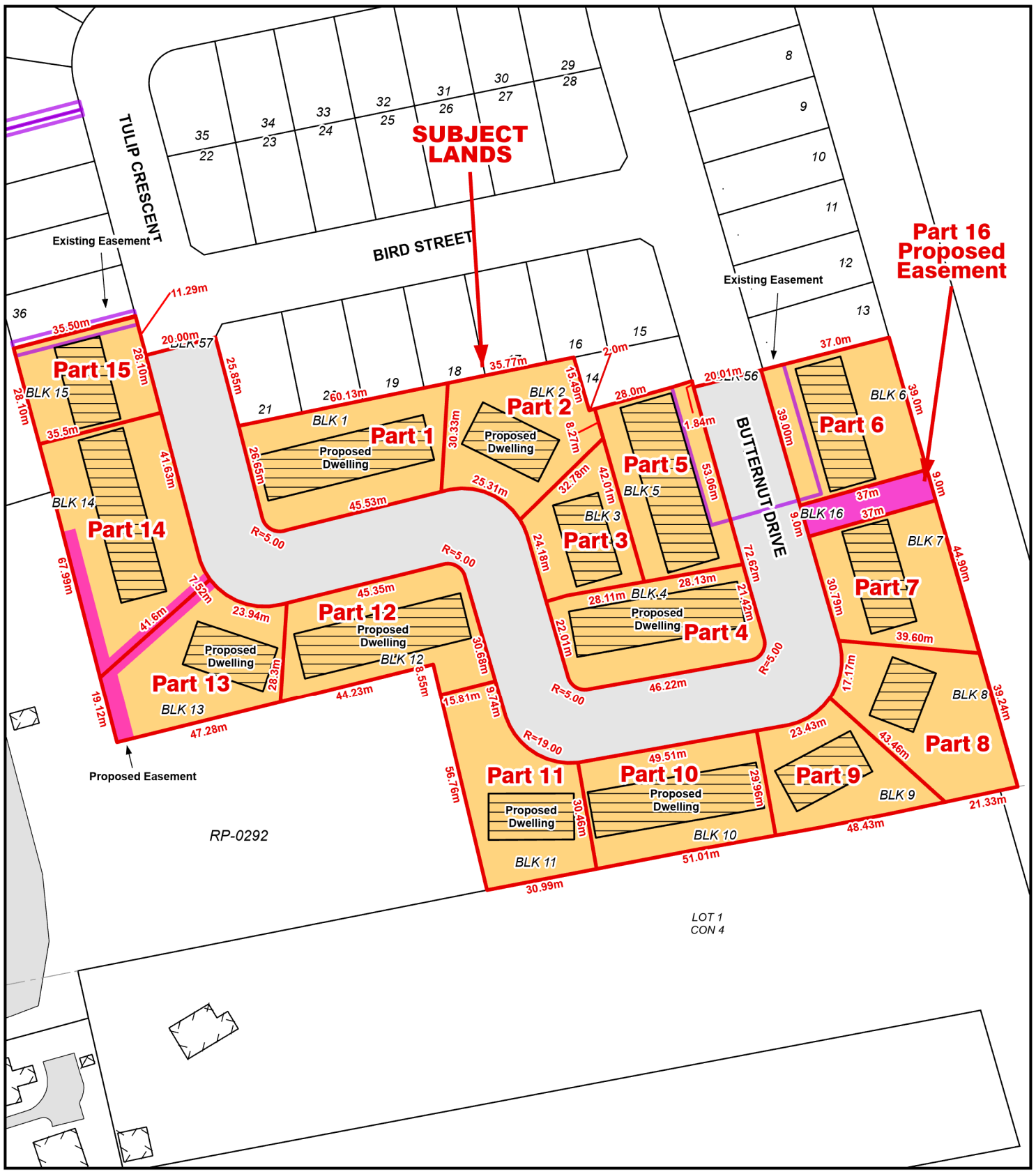
6/19/2025

MAP D

for ZNPL2025149

CONCEPTUAL PLAN

Urban Area of SIMCOE



Legend

- Subject Lands
- Existing Easements
- Proposed Easements

6/19/2025

N

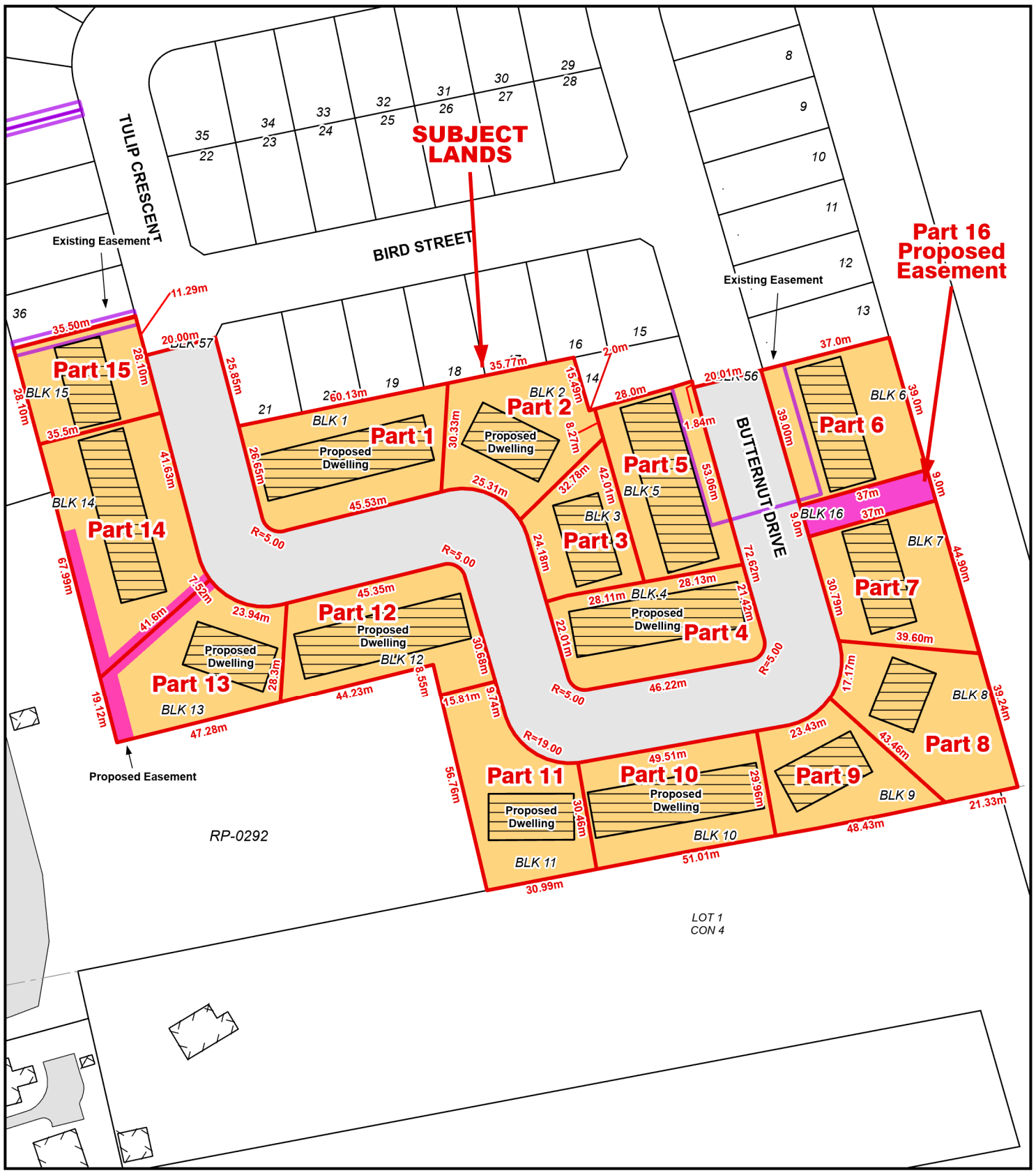
10 5 0 10 20 30 40 Meters

LOCATION OF LANDS AFFECTED

for ZNPL2025149

CONCEPTUAL PLAN

Urban Area of SIMCOE



Legend

- Subject Lands
- Existing Easements
- Proposed Easements

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10 5 0 10 20 30 40 Meters