



To: Chair and Members of Rothesay Planning Advisory Committee
From: Brian L. White, MCIP, RPP
 Director of Planning and Development Services
Date: Friday, July 02, 2021
Subject: Supplemental Report - 48 Unit Apartment Building – Rezoning Chapel Road (PID 30206882)

Applicant:	Sean Hall & Luke Moffett	Property Owner:	637339 NB Inc.
Mailing Address:	76 Highland Avenue Rothesay NB E2E 5N3	Mailing Address:	317 Hampton Road Quispamsis NB E2E 4M9
Property Location:	Chapel Road	PID:	30206882
Plan Designation:	Commercial	Zone:	General Commercial
Application For:	48 Unit Apartment Building		
Input from Other Sources:	Operations, KVFD, KRPF, Anglophone South District School Board		

RECOMMENDATION:

PAC HEREBY removes from the TABLE the rezoning application of the lands located off Chapel Drive (PID 30206882) to allow for the development a 48-unit apartment building subject to the execution of a Development Agreement.

ORIGIN:

At the regular meeting of PAC May 3rd, 2021 PAC tabled the application for a 48 unit apartment building located off Chapel Road pending the receipt of a supplemental staff report containing the following:

1. Traffic impact assessment results and review;
2. Polling results;
3. Review by KVFD; and
4. Draft development agreement and rezoning By-law.

BACKGROUND:

Staff have received the traffic impact statement and revised architectural drawings (see Attachment A) for the application to develop a 48 unit apartment building on the 1 ½ acre vacant lot off Chapel Road. Staff’s review of the supplemental information is contained in the sections that follow.

TRAFFIC IMPACT

Staff did review the submitted Traffic Impact Statement (Attachment B) and have reviewed the findings with the applicant. Staff’s major concern was the level of service (LOS) with the development on the Chapel Road / Marr Road intersection. The report states “that delays at the southbound approach of the Chapel Road / Marr Road intersection will increase slightly (4 – 8 seconds per vehicle); however the approach will remain below capacity and the intersection will continue to perform efficiently overall.” The report continues to conclude, “Traffic signals are not warranted at the intersection in the 2027 horizon period.” Notwithstanding, the study’s conclusion regarding the need for traffic signals Staff have included a clause with the development agreement (Attachment A) that secures a capital cost

contribution toward signalization should conditions arise that require Rothesay to implement traffic signals.

POLLING RESULTS

Staff circulated polling letters to inform the immediate neighbours of the application and to invite any comments they may wish to make with respect to the application. As of July 2, 2021 no comments were received by Staff as a result of our polling efforts.

KENNEBECASIS VALLEY FIRE DEPARTMENT:

As is required by Municipal Plan **Policy FR-7**, the KVFD must review proposals for new development projects to ensure that public safety and firefighting concerns are addressed. The KVFD reviewed the proposal and are satisfied that the proposal fulfills their requirements.



Figure 1 – Revised Rendering 48 unit Apt Building – ZZAP Architecture + Planning

DEVELOPMENT AGREEMENT:

A development agreement is a contract between Rothesay and the property owner that specifies the details and obligations of the individual parties concerning the proposed development. The draft development agreement is Attachment A. 2. The Development Agreement requires that the proposed building as seen before PAC and Council will be constructed in conformance the details and Schedules attached to the agreement as follows:

- Schedule A Legal Description of Parcels
- Schedule B Proposed Site Plan and Location of Building
- Schedule C Building Elevations (4)
- Schedule D Landscape Plan
- Schedule E Storm Water Management Plan

Staff would like draw special attention to Parts 5 through 11 of the agreement which layout the mechanisms by which the affordable housing component of the project will regulated. As noted in the

previous report Staff were concerned that the proposed methodology could result in rents as high as \$2200 and be deemed “affordable”. Staff have consulted with CMHC and other municipalities to determine the most effective approach to ensuring the agreed rental rates. Staff also note that the developer is unable to access the Affordable Rental Housing Program or Provincial Rent Supplement Assistance Program with the Province of New Brunswick, for that reason, Staff have created agreement clauses as follows:

1. The Developer agrees to maintain for a period of twenty (20) years, calculated from the first day of building occupancy, no less than 8 affordable 2 bedroom apartment units with monthly rental rates based at or below 30% of the Single Parent Median Income in Rothesay as determined by the most recent available data from Statistics Canada.
2. The Developer further agrees that once the base rents are established in the first year of occupancy, they can only be raised by the higher of Consumer Price Index (CPI).
3. The Developer agrees to provide to Rothesay an annual audit or legal affidavit prepared by a licensed member of the Chartered Professional Accountants of New Brunswick that provides reasonable assurance that an audit conducted of the affordable units complies with this agreement in accordance with Canadian generally accepted auditing standards.

APPROVAL PROCESS:

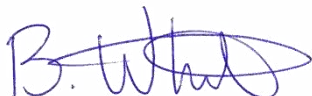
The application is rezone the subject property to the R-4 Multi-Unit Residential Zone to permit a 48-unit apartment building by development agreement. The application is being reviewed pursuant to the policies of Rothesay Municipal Plan 1-20. The standard procedure for a rezoning is that Council receive from PAC a recommendation to hold a Public Hearing and that both the rezoning (by-law amendment) and the development agreement be prepared in advance of the public hearing.

RECOMMENDATIONS:

Staff recommend the Planning Advisory Committee consider the following MOTION:

The Rothesay Planning Advisory Committee HEREBY recommends that Rothesay Council schedule a public hearing to consider rezoning the lands located off Chapel Drive (PID 30206882) from General Commercial (GC) to Multi-Unit Residential (R4) to allow for the development a 48 unit apartment building subject to the execution of a Development Agreement in accordance with the Community Planning Act.

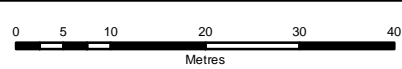
Map 1	Location Map
Attachment A	Proposed Development Agreement & By-law
Attachment B	Traffic Study



Report Prepared by: Brian L. White, MCIP, RPP
Date: Friday, July 02, 2021

Subject Property: PID 30206882

2021 July 120 Open Session FINAL_199



Chapel Rd



**BY-LAW 2-10-28
A BY-LAW TO AMEND THE ZONING BY-LAW
(No.2-10 Rothesay)**

The Council of the town of Rothesay, under authority vested in it by the Community Planning Act, and amendments thereto, hereby amends By-Law 2-10 “Rothesay Zoning By-law” and enacts as follows:

That Schedule A, entitled “Zoning” as attached to By-Law 2-10 “ROTHESAY ZONING BY-LAW” is hereby amended, as identified on the attached sketch, identified as Attachment “2-10-28”.

The purpose of the amendment is to rezone lands located off Chapel Drive (PID 30206882) from General Commercial (GC) to Multi-Unit Residential (R4) to allow for the development a 48-unit apartment building subject to the execution of a Development Agreement in accordance with the Community Planning Act, supra.

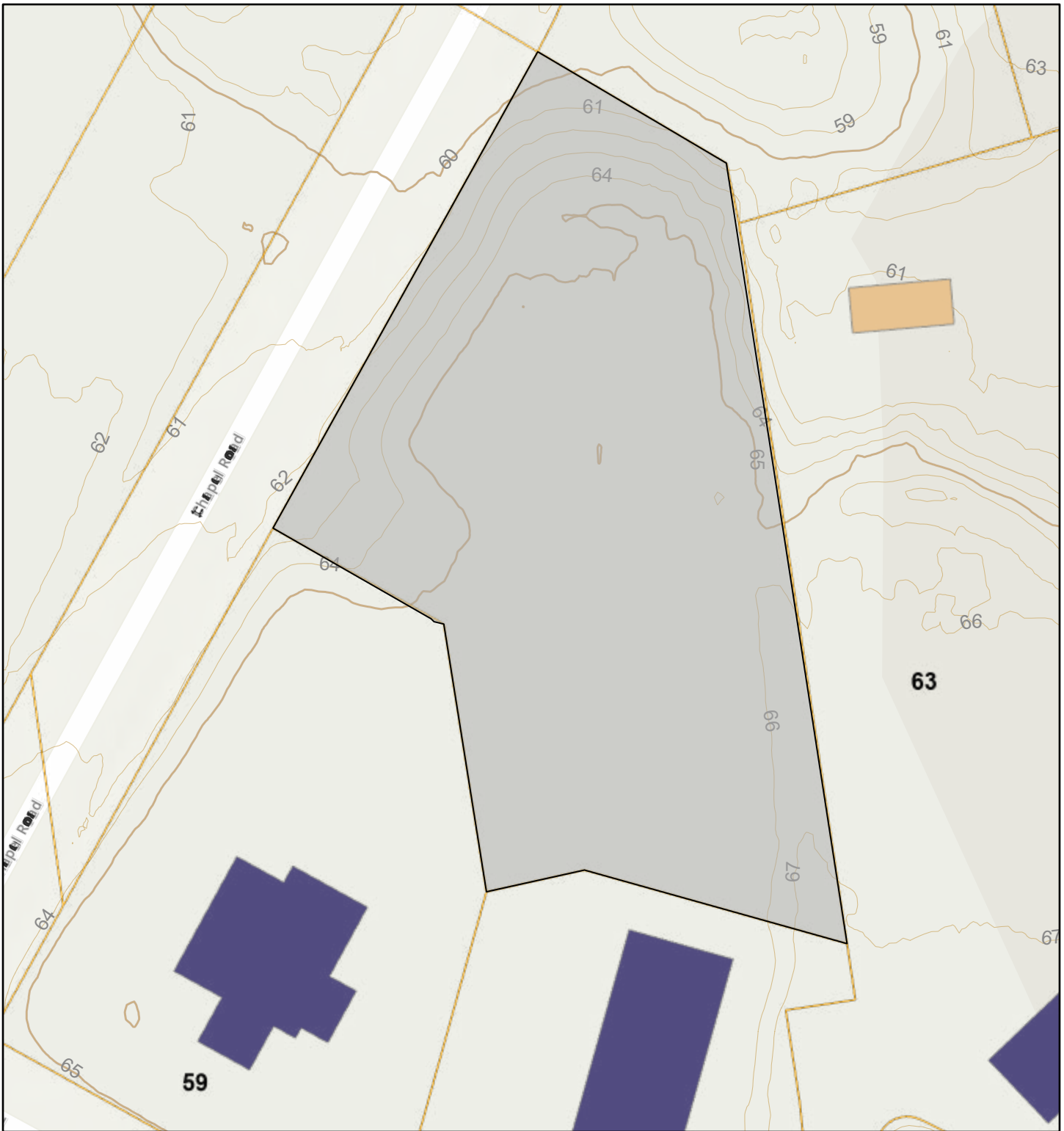
FIRST READING BY TITLE :
SECOND READING BY TITLE :
READ IN ENTIRETY :
THIRD READING BY TITLE :
AND ENACTED :

MAYOR

CLERK





Attachment - Bylaw 2-10- G Subject Property - PID:30206882

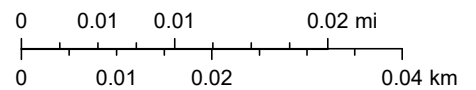
2021 July 12 Open Session FINAL_201



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1:1,128

- Building**
-  Commercial
-  Industrial
-  Rothesay Boundary
-  Property
- Civic Address**



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodataslyrselen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Rothesay

DEVELOPMENT AGREEMENT

Land Titles Act, S.N.B. 1981, c.L-1.1, s.24

Parcel Identifier 30206882
of Parcel Burdened
by Agreement:

Owner of Land Parcels: **637339 N.B. INC.**
Tammy Moffett, Director
76 Highland Avenue
Rothesay NB
E2E 5N9 (Hereinafter called the "Developer")

Agreement with: **Rothesay**
70 Hampton Road
Rothesay, N.B.
E2E 5L5 (Hereinafter called the "Town")

a body corporate under and by virtue of the Local
Governance Act, RSNB 2021, Chapter 18, located
in the County of Kings and Province of New
Brunswick

WHEREAS the Developer is the registered owner of certain lands located off Chapel Road (PID 30206882) and which said lands are more particularly described in Schedule A hereto (hereinafter called the "Lands");

AND WHEREAS the Developer is now desirous of entering into a development agreement to allow for the development of a forty-eight (48) unit apartment building with underground parking on the Lands as described in Schedules B through D. (herein after called the "Project")

AND WHEREAS Rothesay Council did, on **INSERT DATE**, authorize the Mayor and Clerk to enter into a Development Agreement with 637339 N.B. INC. to develop a residential apartment complex on the Lands.

NOW THEREFORE THIS AGREEMENT WITNESSETH that for and in the consideration of the mutual covenants and agreements herein expressed and contained, the parties hereto covenant and agree as follows:

1. The Developer agrees that the number of residential units situated on the Lands shall not exceed forty-eight (48) residential apartment units.

Schedules

2. The Developer agrees to develop the Lands in a manner, which, in the opinion of the Development Officer, is generally in conformance with the following Schedules attached to this Agreement:
 - a. Schedule A Legal Description of Parcels
 - b. Schedule B Proposed Site Plan and Location of Building
 - c. Schedule C Building Elevations (4)
 - d. Schedule D Landscape Plan
 - e. Schedule E Storm Water Management Plan

Site Development

3. The Developer agrees that except as otherwise provided for herein the use of the Lands shall comply with the requirements of the Rothesay Zoning By-law and Subdivision By-law, as may be amended from time to time.
4. The Developer agrees to develop the Lands in a manner, which, in the

opinion of the Development Officer, is generally in conformance with Schedules B, C, D and E.

Affordable Housing

5. The Developer agrees to maintain for a period of **twenty (20)** years, calculated from the first day of building occupancy, no fewer than 8 'affordable' 2 bedroom apartment units with monthly rental rates based at or below 30% of the Single Parent Median Income in Rothesay as determined by the most recent available data from Statistics Canada.
6. The Developer further agrees that once the base rents for the affordable are established in the first year of occupancy, they can only be raised by a maximum of the Consumer Price Index (CPI), annual average not seasonally adjusted for Saint John, N.B.
7. The Developer agrees to provide to Rothesay an annual audit or legal affidavit prepared by a licensed member of the Chartered Professional Accountants of New Brunswick that provides reasonable assurance that an audit conducted of the affordable units complies with this agreement in accordance with Canadian generally accepted auditing standards.
8. The Developer agrees to bear all costs associated with the annual audit or legal affidavit referenced in paragraph 7 and to fully cooperate with Rothesay relating to such audit monitoring and evaluation.
9. The Developer agrees that during the full Term of this Agreement, that any failure by the Developer to maintain the affordability provisions as set out in paragraphs 5, 6 and 7 or any other violation of any material term of the affordability principles shall constitute a default under this Agreement.
10. The Developer agrees that upon any such default, Rothesay may demand that Developer pay to Rothesay an amount equal to twice the difference of the actual rent received and the maximum amount of rent permitted under clause 6. The Developer agrees to pay interest on any balance in arrears at the rate of 1.25% percent per month compounded monthly.
11. Rothesay and the Developer agree that nothing contained in this agreement shall make or be construed to make any tenant or resident of the Project the responsibility of Rothesay.

Universal Design Barrier-Free Apartments

12. The Developer agrees to construct two (2) apartments utilizing Universal Design principles to achieve an accessible barrier-free standard to the satisfaction of the Development Officer in consultation with the Town's Building Inspector.
13. The Developer agrees that the building occupancy permit shall not be granted by Rothesay until the requirements set out in paragraph 12 are substantially completed and approved by Rothesay.

Architectural Guidelines

14. The Developer agrees that an objective of this development is to provide a high quality and visually attractive development, which exhibits an architectural design that reinforces the community character and that is generally consistent with the existing styles of housing in Rothesay. The Developer agrees to ensure the following:
 - a. The architectural design of the building shall be, in the opinion of the Development Officer, generally in conformance with Schedule C.
 - b. All exterior mounted ventilation and related mechanical equipment, including roof mechanical units, shall be concealed by screening in a

manner to reduce clutter and negative impacts on the architectural character of the building.

Storm Water

15. The Developer shall carry out, subject to inspection and approval by Town representatives, the installation of a storm water system as per Schedule E of this agreement. The Developer agrees to accept responsibility for all costs associated such installation including the following:
 - a. Construction, to Town standards, of a storm water system including pipes, fittings, precast sections for manholes and catch basins capable of removing surface water from the entire developed portion of the lands to a predetermined location selected by the Developer's Engineer and approved by the Town Engineer,
 - b. topsoil and hydro-seeding of shoulders of roadways.
16. The Developer agrees to submit for approval by the Town, prior to commencing any work on the storm water system such plans, as required by the Town, that shall conform with the design schematics and construction standards of the Town, unless otherwise acceptable to the Town Engineer.
17. The Developer agrees that all roof leaders, down spouts, and other storm water drains from the building, parking lot and landscape features shall not be directed or otherwise connected or discharged directly to the Town's storm water or sanitary collection system.
18. The Developer agrees to provide to the Town Engineer written certification of a Professional Engineer, licensed to practice in New Brunswick that the storm water system has been satisfactorily completed and constructed in accordance with the Town specifications.

Traffic Signals – Cost Contribution

19. The Developer agrees to pay to Rothesay upon receipt of an invoice an amount not exceeding thirty-three percent (33%) of the actual cost incurred and expended by Rothesay for traffic signalization including, curbing, sidewalks, road widening, traffic lights, poles, controllers, accessories, electrical equipment and appurtenances necessary for their installation and initial operation, installed at the intersection of Marr Road and Chapel Drive.
20. Rothesay and the Developer agree that the capital cost contribution obligation (paragraph 19) shall expire in twenty 20 years from the date of the execution of this agreement should Rothesay not proceed with the traffic signalization as referenced in paragraph 20.
21. The Town and Developer agree that the design and construction of the intersection and related improvements shall be solely determined by the Town.

Water Supply

22. The Developer agrees to connect to the Town's nearest and existing water system at a point to be determined by the Town Engineer and utilizing methods of connection approved by the Town Engineer.
23. The Town agrees to supply potable water for the purposes and for those purposes only for a maximum of forty-eight (48) residential dwellings and for minor and accessory purposes incidental thereto and for no other purposes whatsoever.
24. The Developer agrees to pay the Town a fee for connection of the building to the Town water system including sprinkler feed to the Town water system calculated in the manner set out in By-law 1-18, Rothesay Water

By-law as amended from time to time, to be paid to the Town twelve (12) months following the issuance of the building permit.

25. The Developer agrees that the Town does not guarantee and nothing in this Agreement shall be deemed a guarantee of an uninterrupted supply or of a sufficient or uniform water pressure or a defined quality of water. The Town shall not be liable to the Developer or to any person, firm or corporation for any damage or injury caused by the interruption of the supply of water, the lack of uniform pressure thereof or the quality of water.
26. The Developer agrees that all connections to the Town water mains shall be approved and inspected by the Town Engineer or such other person as is designated by the Town prior to backfilling and that the operation of water system valves is the sole responsibility of the Town.
27. The Developer agrees to comply with the Town's Water By-law and furthermore that a separate water meter shall be installed, at their expense, for each residential connection made to the Town's water system.
28. The Developer agrees that the Town may terminate the Developer's connection to the Town water system in the event that the Town determines that the Developer is drawing water for an unauthorized purpose or for any other use that the Town deems in its absolute discretion or if an invoice for water service is more than 90 days in arrears..
29. The Developer agrees to provide, prior to the occupation of any buildings or portions thereof, written certification of a Professional Engineer, licensed to practice in New Brunswick that the connection of service laterals and the connection to the existing Town water system have been satisfactorily completed and constructed in accordance with the Town specifications.

Sanitary Sewer

30. The Developer agrees to connect to the existing sanitary sewer system at a point to be determined by the Town Engineer and utilizing methods of connection approved by the Town Engineer.
31. The Developer agrees to pay the Town a fee for connection to the Town sewer system calculated in the manner set out in By-law 1-15 Rothesay Sewage By-law, as amended from time to time, to be paid to the Town twelve (12) months following the issuance of the building permit.
32. The Developer agrees to carry out subject to inspection and approval by Town representatives, and pay for the entire actual costs of Engineering design, supply, installation, inspection and construction of all service lateral(s) necessary to connect to the existing sanitary sewer system inclusive of all pipes, laterals, fittings, and precast concrete units.
33. The Developer agrees to submit for approval by the Town, prior to commencing any work to connect to the sanitary sewer system, any plans required by the Town, with each such plan meeting the requirements as described in the Town specifications for such development.
34. The Developer agrees that all connections to the Town sanitary sewer system shall be supervised by the Developer's engineer and inspected by the Town Engineer or such other person as is designated by the Town prior to backfilling and shall occur at the sole expense of the Developer.

Retaining Walls

35. The Developer agrees that dry-stacked segmental concrete (masonry block) gravity walls shall be the preferred method of retaining wall construction for the purpose of erosion control or slope stability on the Lands and furthermore that the use of metal wire basket cages filled with rock (gabions) is not an acceptable method of retaining wall construction.
36. The Developer agrees to obtain from the Town a Building Permit for any

retaining wall, as required on the Lands, in excess of 1.2 meters in height and that such retaining walls will be designed by a Professional Engineer, licensed to practice in New Brunswick.

Indemnification

37. The Developer does hereby indemnify and save harmless the Town from all manner of claims or actions by third parties arising out of the work performed hereunder, and the Developer shall file with the Town prior to the commencement of any work hereunder a certificate of insurance naming the Town as co-insured evidencing a policy of comprehensive general liability coverage on "an occurrence basis" and containing a cross-liability clause which policy has a limit of not less than Two Million Dollars (\$2,000,000.⁰⁰). The aforesaid certificate must provide that the coverage shall stay in force and not be amended, canceled or allowed to lapse within thirty (30) days prior to notice in writing being given to the Town. The aforesaid insurance coverage must remain in full force and effect during the period available to the Developer pursuant to this agreement to complete the work set out as described in this Agreement.

Notice

38. Any notice or advice which is to be given under this Agreement shall be deemed to have been satisfactorily given to the Developer if delivered personally or by prepaid mail addressed to **637339 N.B. INC.**, 76 Highland Avenue, Rothesay NB, E2E 5N9 and to the Town if delivered personally or by prepaid mail addressed to **ROTHESAY**, 70 HAMPTON ROAD, ROTHESAY, NEW BRUNSWICK, E2E 5L5. In the event of notice by prepaid mail, the notice will be deemed to have been received four (4) days following its posting.

By-laws

39. The Developer agrees to be bound by and to act in accordance with the By-laws of the Town as amended from time to time and such other laws and regulations that apply or that may apply in the future to the site and to activities carried out thereon.

Termination

40. The Town reserves the right and the Developer agrees that the Town has the right to terminate this Agreement without compensation to the Developer if the specific proposal has not been completed on or before **INSERT DATE** being a date 5 years (60 months) from the date of Council's decision to enter into this Agreement. Accordingly, the Agreement shall have no further force or effect and henceforth the development of the Lands shall conform to the provisions of the Rothesay Zoning By-law.

41. Notwithstanding paragraph 40, the Parties agree that the development shall be deemed to have commenced if within a period of not less than three (3) months prior to **INSERT DATE** the construction of the municipal service infrastructure has begun and that such construction is deemed by the Development Officer in consultation with the Town Engineer as being continued through to completion as continuously and expeditiously as deemed reasonable.

42. The Developer agrees that should the Town terminate this Agreement the Town may call the Letter of Credit described herein and apply the proceeds to the cost of completing the work or portions thereof as outlined in this Agreement. If there are amounts remaining after the completion of the work in accordance with this Agreement, the remainder of the proceeds shall be returned to the Institution issuing the Letter of Credit. If the proceeds of the Letter of Credit are insufficient to compensate the Town for the costs of completing the work mentioned in this Agreement, the Developer shall promptly on receipt of an invoice pay to the Town the full amount owing as required to complete the work.

Security & Occupancy

43. The Town and Developer agree that Final Occupancy of the proposed building(s), as required in the Building By-law, shall not occur until all conditions above have been met to the satisfaction of the Development Officer and an Occupancy Permit has been issued.
44. Notwithstanding Schedule D and E of this Agreement, the Town agrees that the Occupancy Permit may be issued provided the Developer supplies a security deposit in the amount of one hundred twenty percent (120%) of the estimated cost to complete the required storm water management and landscaping. The security deposit shall comply with the following conditions:
- a. security in the form of an automatically renewing, irrevocable letter of credit issued by a chartered bank dispensed to and in favour of Rothesay;
 - b. Rothesay may use the security to complete the work as set out in Schedule D and E of this Agreement including landscaping or storm water works not completed within a period not exceeding six (6) months from the date of issuance of the Occupancy Permit;
 - c. all costs exceeding the security necessary to complete the work as set out in Schedule D and E this Agreement shall be reimbursed to Rothesay; and
 - d. any unused portion of the security shall be returned to the Developer upon certification that the work has been completed and acceptable to the Development Officer.

Failure to Comply

45. The Developer agrees that after sixty (60) days written notice by the Town regarding the failure of the Developer to observe or perform any covenant or condition of this Agreement, then in each such case:
- (a) The Town shall be entitled to apply to any court of competent jurisdiction for injunctive relief including an order prohibiting the Developer from continuing such default and the Developer hereby submits to the jurisdiction of such Court and waives any defense based upon the allegation that damages would be an adequate remedy;
 - (b) The Town may enter onto the Lands and perform any of the covenants contained in this Agreement or take such remedial action as is considered necessary to correct a breach of the Agreement, whereupon all reasonable expenses whether arising out of the entry onto the Lands or from the performance of the covenants or remedial action, shall be a first lien on the Lands and be shown on any tax certificate issued under the Assessment Act;
 - (c) The Town may, by resolution of Council, discharge this Agreement whereupon this Agreement shall have no further force or effect and henceforth the development of the Lands shall conform with the provisions of the Land Use By-law; and/or
 - (d) In addition to the above remedies, the Town reserves the right to pursue any other remediation under the *Community Planning Act* or Common Law in order to ensure compliance with this Agreement.

Entire Agreement

46. This Agreement contains the whole agreement between the parties hereto and supersedes any prior agreement as regards the lands outlined in the plan hereto annexed.

Severability

47. If any paragraph or part of this agreement is found to be beyond the powers

of the Town Council to execute, such paragraph or part or item shall be deemed to be severable and all other paragraphs or parts of this agreement shall be deemed to be separate and independent therefrom and to be agreed as such.

Reasonableness

48. Both parties agree to act reasonably in connection with any matter, action, decision, comment or approval required or contemplated under this Agreement.

This Agreement shall be binding upon and endure to the benefit of the Parties hereto and their respective heirs, administrators, successors and assigns.

IN WITNESS WHEREOF, each of the parties set out below has caused this Agreement, made in duplicate, to be duly executed by its respective, duly authorized officer(s) as of _____, 2021.

Witness: 637339 N.B. INC.

Tammy Moffett, Director

Witness: Rothesay:

Nancy E. Grant, Mayor

Mary Jane E. Banks, Clerk

SCHEDULE A

PID: | 30206882

Form 45

AFFIDAVIT OF CORPORATE EXECUTION

Land Titles Act, S.N.B. 1981, c.L-1.1, s.55

Deponent: Tammy Moffett
 76 Highland Avenue
 Rothesay NB
 E2E 5N9

Office Held by Deponent: **Director**

Corporation: 637339 N.B. INC.

Place of Execution: Rothesay, Province of New Brunswick.

Date of Execution: _____, 2021

I, **Tammy Moffett**, the deponent, make oath and say:

1. That I hold the office specified above in the corporation specified above, and am authorized to make this affidavit and have personal knowledge of the matters hereinafter deposed to;
2. That the attached instrument was executed by me as the officer(s) duly authorized to execute the instrument on behalf of the corporation;
3. the signature "**Tammy Moffett**" subscribed to the within instrument is the signature of me and is in the proper handwriting of me, this deponent.
4. the Seal affixed to the foregoing indenture is the official seal of the said Corporation was so affixed by order of the Board of Directors of the Corporation to and for the uses and purposes therein expressed and contained;
5. That the instrument was executed at the place and on the date specified above;

DECLARED TO at Rothesay,
 in the County of Kings,)
 and Province of New Brunswick,)
 This ___ day of _____, 2021)

BEFORE ME:)

 Commissioner of Oaths)

 Tammy Moffett

Form 45

AFFIDAVIT OF CORPORATE EXECUTION

Land Titles Act, S.N.B. 1981, c.L-1.1, s.55

Deponent: MARY JANE E. BANKS

Rothesay
70 Hampton Road
Rothesay, N.B.
E2E 5L5

Office Held by Deponent: Clerk

Corporation: Rothesay

Other Officer Who Executed the Instrument: NANCY E. GRANT

Rothesay
70 Hampton Road
Rothesay, N.B.
E2E 5L5

Office Held by Other Officer Who Executed the Instrument: Mayor

Place of Execution: Rothesay, Province of New Brunswick.

Date of Execution: _____, 2021

I, MARY JANE E. BANKS, the deponent, make oath and say:

- 1. That I hold the office specified above in the corporation specified above, and am authorized to make this affidavit and have personal knowledge of the matters hereinafter deposed to;
6. That the attached instrument was executed by me and NANCY E. GRANT, the other officer specified above, as the officer(s) duly authorized to execute the instrument on behalf of the corporation;
7. The signature "NANCY E. GRANT" subscribed to the within instrument is the signature of Nancy E. Grant, who is the Mayor of the town of Rothesay, and the signature "Mary Jane E. Banks" subscribed to the within instrument as Clerk is the signature of me and is in the proper handwriting of me, this deponent, and was hereto subscribed pursuant to resolution of the Council of the said Town to and for the uses and purposes therein expressed and contained;
8. The Seal affixed to the foregoing indenture is the official seal of the said Town and was so affixed by order of the Council of the said Town, to and for the uses and purposes therein expressed and contained;
9. That the instrument was executed at the place and on the date specified above;

DECLARED TO at town of
Rothesay, in the County of Kings,)
and Province of New Brunswick,)
This ___ day of _____, 2021)

BEFORE ME:)
)
)
)
Commissioner of Oaths)

_____)
MARY JANE E. BANKS



Notes:
 1. All work to be performed in accordance with the Town of Roberval General By-Laws/Code, Land Use/By-Laws.
 2. All work to be performed based on Service Meter Installation Action Control (SMI) using model CONV303A.
 3. The approximate location of Service Infrastructure is shown on the above based on the best available information of the firm. However, the contractor accepts no responsibility for the accuracy or completeness of this information.
 4. Contractor to confirm horizontal location and vertical elevation of all existing services prior to commencing work. Contractor to immediately report any discrepancies to the engineer.
 5. It is the responsibility of the contractor to become familiar with and understand the nature and extent of the work to be executed, the nature of the soil, surface water drainage, the general form of the surface of the ground, and generally of all matters which may be or may have influenced the construction of the project.
 6. All required permits must be obtained in advance of construction.
 7. All applicable City by-laws, Provincial and Federal statutes and regulations must be adhered to.
 8. Contractor may not substitute any materials unless approved by the engineer.
 9. Contractor to notify the Town of Roberval regarding construction schedule prior to commencing construction.
 10. Contractor shall be responsible for traffic control and safety measures during the work.
 11. The contractor shall check and verify all dimensions and utility locations and report all errors and omissions prior to commencing work.
 12. All structural, electrical, plumbing, utility, natural gas, and other infrastructure must be located in the field prior to the start of construction.
 13. Contractor to ensure proper erosion and sedimentation control methods are used to control the runoff during construction.
 14. All required permits must be obtained in advance of construction.

- New Building Area
- New Asphalt Areas
- New Concrete Areas
- New Gravel Areas
- New Grass Areas
- New Wooded Areas

Revision:

No.	Date y/m/d	Issued for Review	Description
1	2021-04-06		

Dwg: 1918BESP4
 Designed by: A. Toole
 Drawn by: A. Toole
 Checked by: A. Toole
 Scale: Horizontal 1:250 Vertical N/A
 Date: April 6, 2021
 If this bar is not 25mm long, adjust your plotting scale

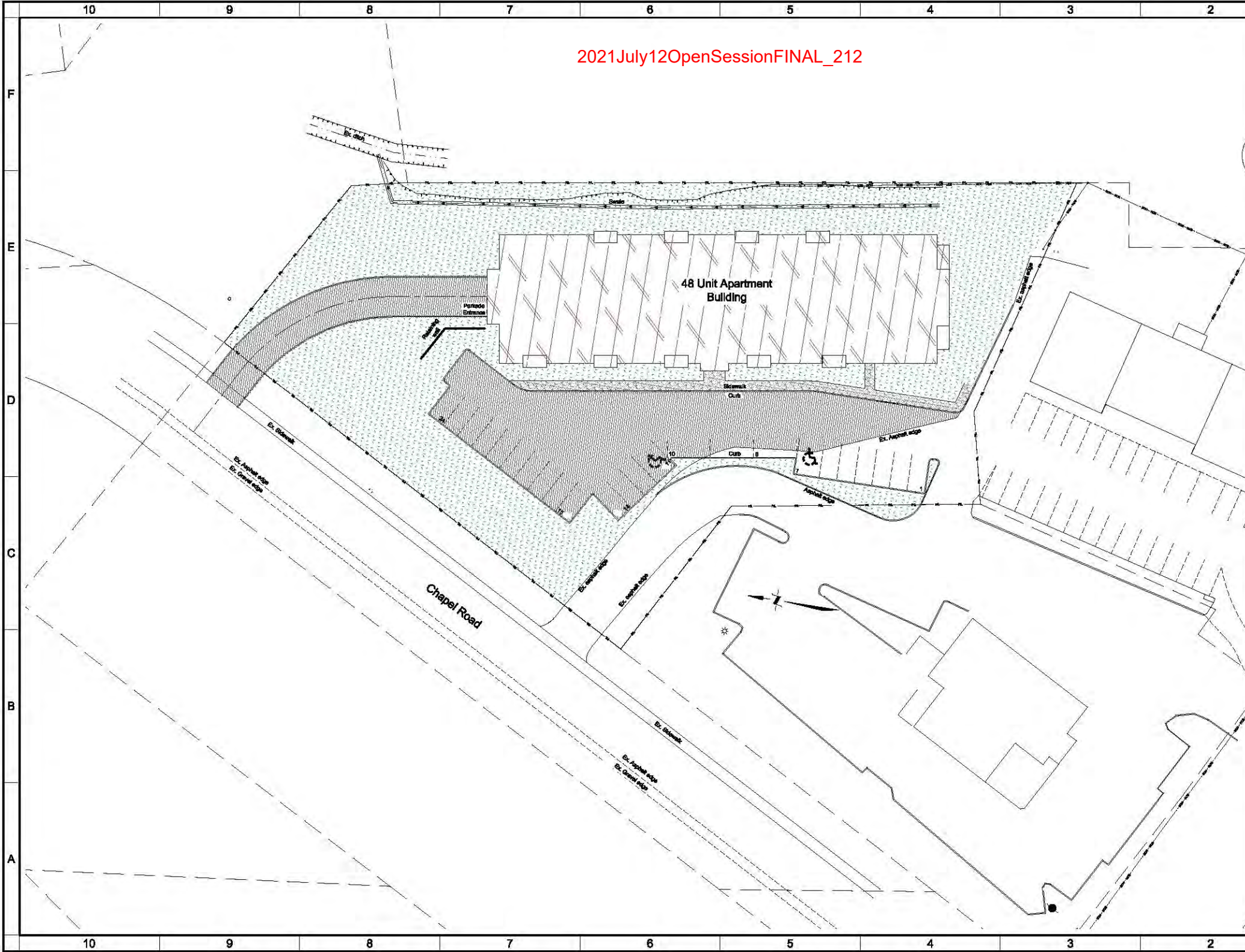
Client:
 Luke Moffett

Project:
 Apartment Building
 Chapel Road, Roberval, NB

Title:
 Site Plan

Sheet C2 of 6

Issue:	Rev #
Issued for Review Date of: 2021-04-06	1



EXTERIOR MATERIALS LEGEND	
1	MASONRY VENEER
2	ALUMINUM CURTAIN WALL SYSTEM
3	PREFINISHED CLADDING TYPE I_COLOUR I_PROFILE I
4	PREFINISHED CLADDING TYPE I_COLOUR II_PROFILE I
5	PREFINISHED CLADDING TYPE I_COLOUR III_PROFILE II
6	PREFINISHED CLADDING TYPE II
7	ALUMINUM FRAMED GLASS GUARD
8	ARCHITECTURAL CONCRETE
9	PATIO DOOR
10	PVC WINDOW

NOTE:
CLADDING TO BE NON-COMBUSTIBLE, NON-VINYL TYPE.



EXTERIOR MATERIALS LEGEND	
1	MASONRY VENNEER
2	ALUMINUM CURTAIN WALL SYSTEM
3	PREFINISHED CLADDING TYPE I_COLOUR I_PROFILE I
4	PREFINISHED CLADDING TYPE I_COLOUR II_PROFILE I
5	PREFINISHED CLADDING TYPE I_COLOUR III_PROFILE II
6	PREFINISHED CLADDING TYPE II
7	ALUMINUM FRAMED GLASS GUARD
8	ARCHITECTURAL CONCRETE
9	PATIO DOOR
10	PVC WINDOW

NOTE:
CLADDING TO BE NON-COMBUSTIBLE, NON-VINYL TYPE.



NORTH ELEVATION



SOUTH ELEVATION

EXTERIOR MATERIALS LEGEND	
1	MASONRY VENEER
2	ALUMINUM CURTAIN WALL SYSTEM
3	PREFINISHED CLADDING TYPE I_COLOUR I_PROFILE I
4	PREFINISHED CLADDING TYPE I_COLOUR II_PROFILE I
5	PREFINISHED CLADDING TYPE I_COLOUR III_PROFILE II
6	PREFINISHED CLADDING TYPE II
7	ALUMINUM FRAMED GLASS GUARD
8	ARCHITECTURAL CONCRETE
9	PATIO DOOR
10	PVC WINDOW

NOTE:
CLADDING TO BE NON-COMBUSTIBLE, NON-VINYL TYPE.





Notes:
 1. All work to be performed in accordance with the Town of Roberval General By-Bylaws, Land Use.
 2. All work to be performed in accordance with the Town of Roberval Acton Control Licensing Code CONV003.
 3. The approximate location of known infrastructure is shown on the plan based on the best available information of the firm. However, the contractor accepts no responsibility for the accuracy or completeness of this information.
 4. Contractor to confirm horizontal location and vertical elevation of all existing services prior to commencing work. Contractor to immediately report any discrepancies to the engineer.
 5. It is the responsibility of the contractor to liaise with and coordinate the work in and about the work to be executed, the nature of the soil, surface water drainage, the general form of the surface of the ground, and generally of all matters which may be or may have influence the construction of the project.
 6. All required permits must be obtained in advance of construction.
 7. All applicable City bylaws, Provincial and Federal statutes and regulations must be adhered to.
 8. Contractor may not substitute any materials unless approved by the engineer.
 9. Contractor to notify the Town of Roberval regarding construction schedule prior to commencing construction.
 10. Contractor shall be responsible for traffic control and safety measures during the work.
 11. The contractor shall check and verify all dimensions and utility locations and report all errors and omissions prior to commencing work.
 12. All municipal infrastructure, such as utility, natural gas mains, and other infrastructure must be located in full prior to the start of construction.
 13. Contractor to ensure proper erosion and sedimentation control methods are used to control the runoff during construction.
 14. All required permits must be obtained in advance of construction.

- New Building Area
- New Asphalt Areas
- New Concrete Areas
- New Gravel Areas
- New Grass Areas
- New Wooded Areas

Revision:

No.	Date y/m/d	Description
2	2021-04-28	Revised Parking
1	2021-04-08	Issued for Review

Dwg: 18185ESP4
 Designed by: A. Toole
 Drawn by: A. Toole
 Checked by: A. Toole
 Scale: Horizontal 1:250 Vertical N/A
 Date: April 8, 2021
 If this bar is not 25mm long, adjust your plotting scale

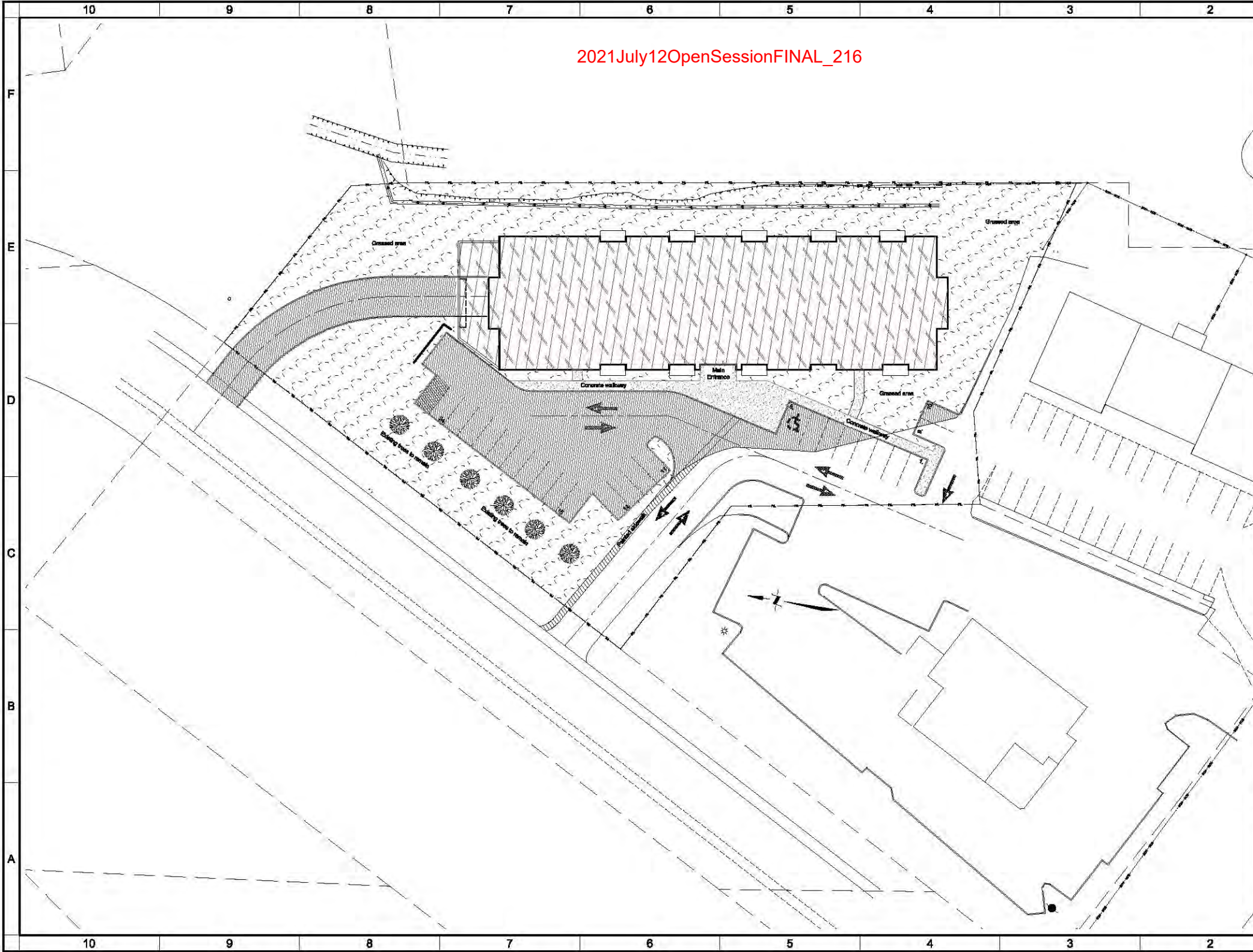
Client:
 Luke Moffett

Project:
 Apartment Building
 Chapel Road, Rothesay, NB

Title:
 Site Plan

Sheet C2 of 6

Issue:	Date of:	Rev #
Issued for Review	2021-04-28	2



Stormwater Management Notes

- Storm water modeled using HydroCAD V10.00 software, using the USDA Natural Resources Conservation Service Method (formerly SCS).
1. Work completed in accordance with the City of Saint John Storm Drainage Design Criteria Manual, March 7, 2018 version.
 2. 2 and 24hr Chicago storm distribution used.
 - 100 year storm (24hr) - total rainfall: 181mm
 - 5 year storm (24hr) - total rainfall: 116mm
 3. IAS Ratio = 0.2
 4. Antecedent Moisture Condition = 2 (average (normal) conditions)
 5. Pre-development catchment drainage boundaries match post-development boundaries.



Notes:
 -AS work to be performed in accordance with the Town of Highway Council Requirements, Land Division.
 -All work shall be done in accordance with the Service Area Intersecting Action Control (SAC) and the City of Saint John Storm Drainage Design Criteria Manual, March 7, 2018 version.
 -The approximate location of storm infrastructure is shown on the plan based on the best available information of the firm. However, the consultant accepts no responsibility for the accuracy or completeness of the information.
 -Contractor to confirm horizontal location and vertical elevation of all existing storm infrastructure prior to commencing work. Contractor to immediately report any discrepancies to the engineer.
 -It is the responsibility of the contractor to liaise with the Town of Saint John regarding the location and extent of the work to be carried out. The location of all existing storm infrastructure, the general form of the surface of the ground, and generally of all matters which may be relevant to the work, shall be confirmed by the contractor.
 -All required permits must be obtained in advance of construction.
 -Contractor must not substitute any materials unless approved by the engineer.
 -Contractor to notify the Town of Highway regarding construction schedule prior to commencing construction.
 -Contractor shall be responsible for traffic control and safety measures during the work.
 -The contractor shall check and verify all elevations and utility locations and report all errors and omissions prior to commencing work.
 -All required infrastructure, such as utility, natural gas mains, and other infrastructure shall be located in full before the start of construction.
 -Contractor to ensure proper siting and installation of all storm infrastructure and to ensure that all work is carried out in accordance with the requirements of the relevant codes and standards.
 -All required permits must be obtained in advance of construction.

Flow to Rooftop Pond (3P)

Area label	Area (m ²)	CN	Tc(min)	1:5 yr (m ³ /s)	1:100 yr(m ³ /s)
3	1429	98	5	0.0817	0.0628

3P- Flow to Rooftop Pond	0.0028	0.0096
--------------------------	--------	--------

Flow to Chapel Pond (Total Post-Development)

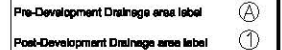
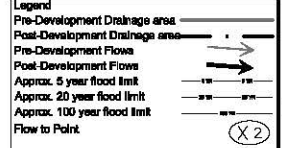
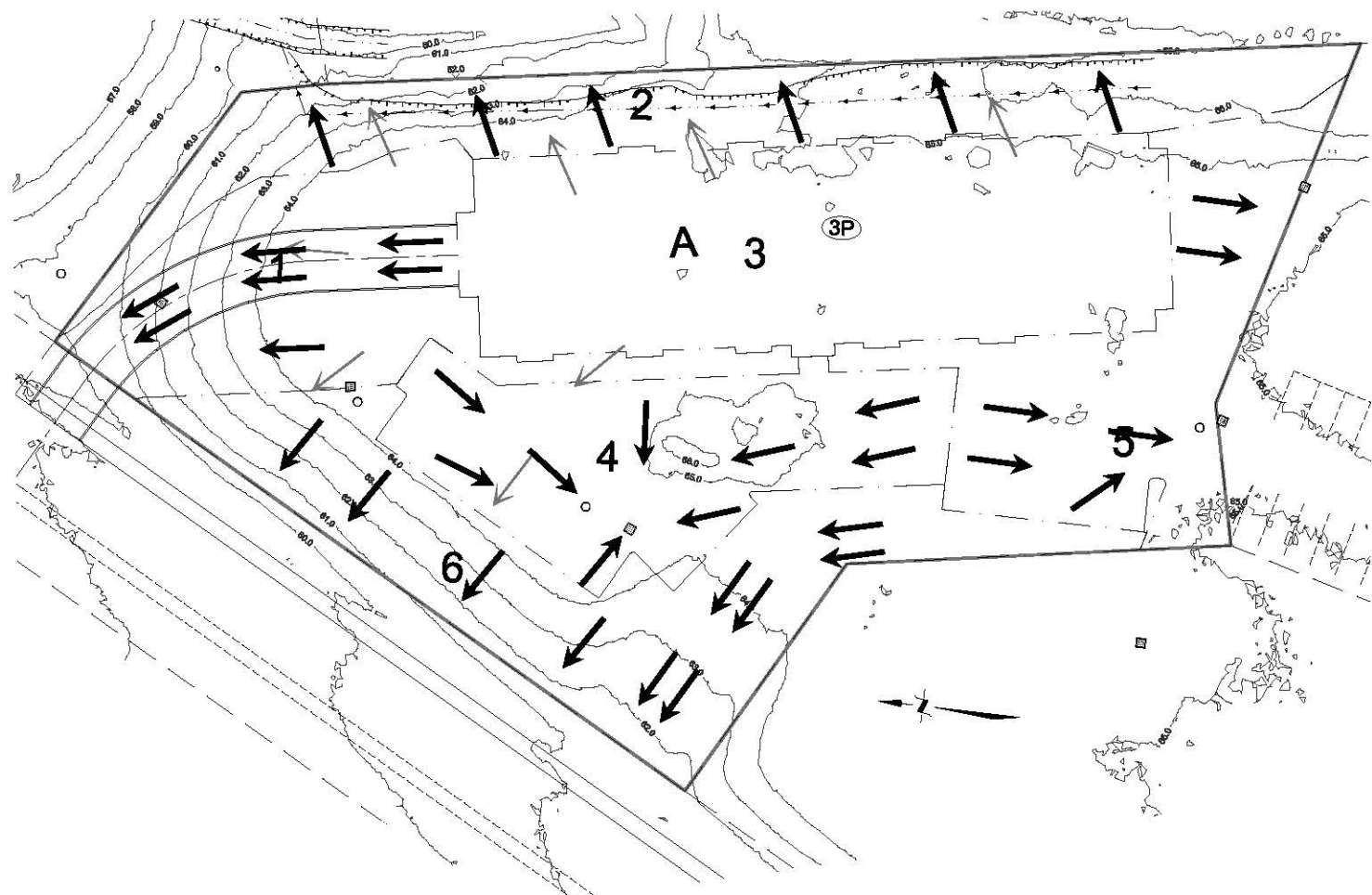
Area label	Area (m ²)	CN	Tc(min)	1:5 yr (m ³ /s)	1:100 yr(m ³ /s)
1	817	98	5.9	0.0037	0.0133
2	943	39	6.8	0.0001	0.0028
4	641	98	5.0	0.0187	0.0311
5	836	73	7.3	0.0091	0.0210
6	1103	66	7.4	0.0036	0.0156

Post-development flow to Chapel Road Pond (1+2+4+5+6+3P)	0.0360	0.0836
--	--------	--------

Flow to Chapel Road Pond (Total Pre-Development)

Area label	Area (m ²)	CN	Tc(min)	1:5 yr (m ³ /s)	1:100 yr(m ³ /s)
A	5874	85	5	0.0450	0.1242

Pre-development flow to Chapel Road Pond	0.0450	0.1242
--	--------	--------



Revision:

No.	Date y/m/d	Description	Drawn by	Checked by	Date:
1	2021-04-08	Issued for Review	A. Toole	A. Toole	April 8, 2021

Dwg: 18188ESP4

Designed by: A. Toole
 Drawn by: A. Toole
 Checked by: A. Toole

Scale: Horizontal 1:500 Vertical N/A

SCALE: 1:500 METRIC

Client:

Luke Moffett

Project:

**Apartment Building
 Chapel Road, Rothesay, NB**

Title:

**Stormwater
 Management Plan**

Sheet C5 of 6

Issue:	Rev #
Issued for Review Date of: 2021-04-08	1

2021 July 12 Open Session FINAL_218

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Notes:
 #1. All work to be performed in accordance with the Town of Roberval General By-Laws/Ordinances, Landfill Rules.
 #2. All activities are provided based on Service New Brunswick Active Control utilizing geospatial mode CONCEPT.
 #3. The approximate location of known infrastructure is shown on the plans based on the best available information of the firm. However, the contractor accepts full responsibility for the accuracy and completeness of this information.
 #4. Contractor to confirm horizontal location and vertical elevation of all existing services prior to commencing work. Contractor to immediately report any discrepancies to the engineer.
 #5. It is the responsibility of the contractor to become familiar with and understand the nature and extent of the work to be executed, the nature of the soil, surface water drainage, the general form of the surface of the ground, and generally of all matters which may be or may have an influence on the execution of the work.
 #6. All required permits must be obtained in advance of construction.
 #7. All applicable City by-laws, Provincial and Federal statutes and regulations must be followed to.
 #8. Contractor must not introduce any materials unless approved by the engineer.
 #9. Contractor to notify the Town of Roberval regarding construction schedule prior to commencing construction.
 #10. Contractor shall be responsible for traffic control and safety measures during the work.
 #11. The contractor shall check and verify all elevations and utility locations and report all errors and omissions prior to commencing work.
 #12. All materials, infrastructure, utility, utility, natural gas mains, and other infrastructure located in the field shall be the responsibility of the contractor.
 #13. Contractor to ensure proper erosion and sedimentation control methods are used to control the runoff during construction.
 #14. All required permits must be obtained in advance of construction.

LEGEND	PROPOSED	EXISTING
EDGE OF PAVEMENT	---	---
UTILITY	---	---
WATERMAIN & DATE VALVE	---	---
SANITARY PIPE & MANHOLE	---	---
STORM PIPE & MANHOLE	---	---
UTILITY LINES & POLE	---	---
STREET BOUNDARY	---	---
PROPERTY BOUNDARY	---	---
CAVEMANT	---	---
CLPI & BIRKENHEAD CUT	---	---
CATCH BASIN	---	---
DRY WELLS	---	---
STREET TREE	---	---
ROAD SIGN	---	---

Revision:

No.	Date	Issued for Review	Description
1	2021-04-06	Issued for Review	

Dwg: 18188ESP4
 Designed by: A. Toole
 Drawn by: A. Toole
 Checked by: A. Toole
 Scale: Horizontal 1:250 Vertical N/A
 Date: April 6, 2021
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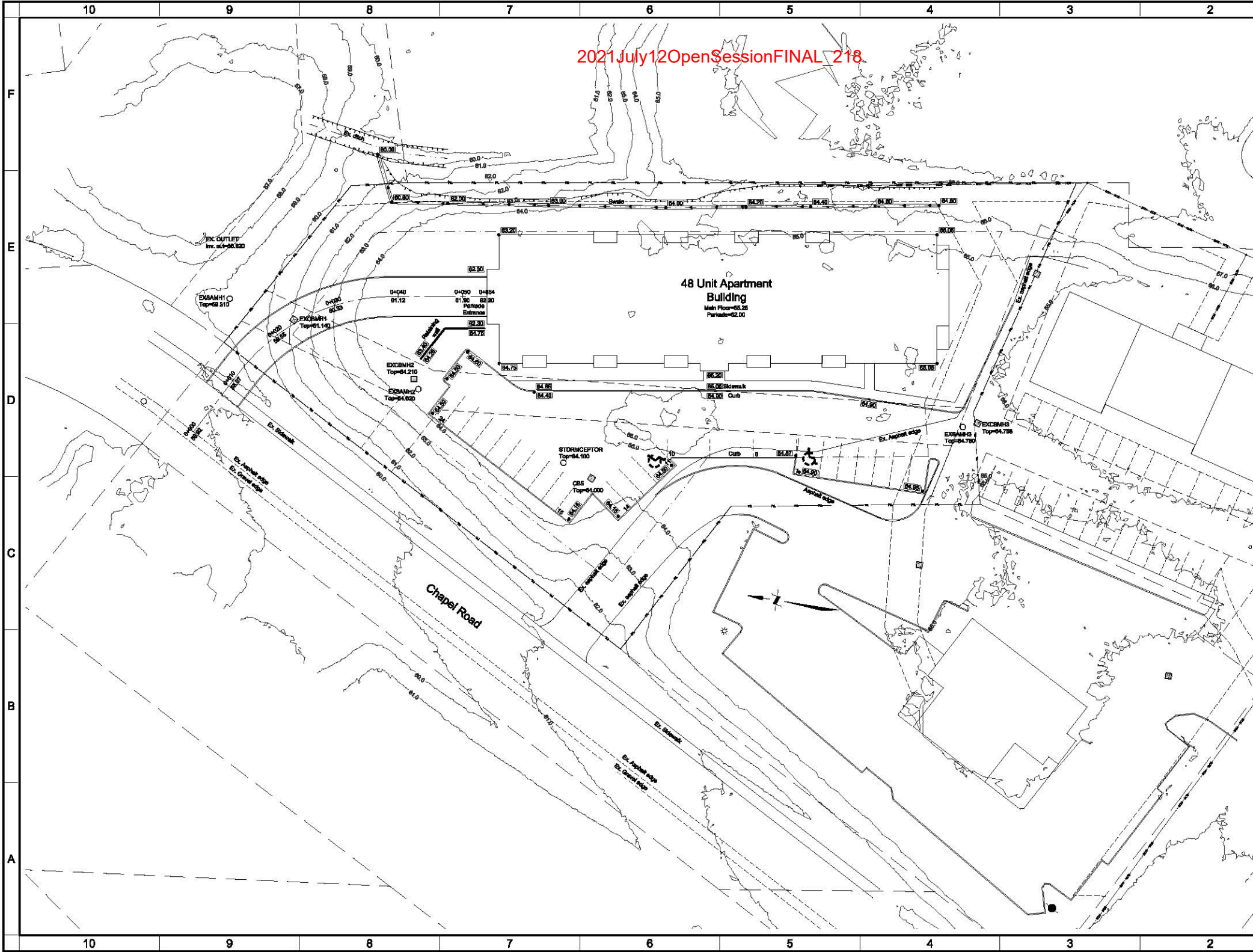
Client:
Luke Moffett

Project:
**Apartment Building
Chapel Road, Rothesay, NB**

Title:
Grading Plan

Sheet C3 of 6

Issue: Issued for Review Date of: 2021-04-06	Rev # 1
--	------------



2021 July 12 Open Session FINAL_219

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SURVEYS &
ENGINEERING LTD.



Notes:

- All work to be performed in accordance with the Town of Rothesay General Bylaws/Ordinances, Land Use/Bylaws.
- All activities are permitted based on Service Area Inspections Action Control (SAC) issued under the authority of the Town of Rothesay.
- The approximate location of Service Infrastructure is shown on the plan based on the best available information of the firm. However, the contractor shall be responsible for the accuracy of the location of the infrastructure.
- Contractor to confirm horizontal location and vertical elevation of all existing services prior to commencing work. Contractor to immediately report any discrepancies to the engineer.
- It is the responsibility of the contractor to become familiar with and understand the location and extent of the work to be executed, the nature of the soil, surface water drainage, the general form of the surface of the ground, and generally of all matters which may be or may have influenced the construction of the project.
- All required permits must be obtained in advance of construction.
- All applicable City bylaws, Provincial and Federal statutes and regulations must be followed to.
- Contractor must not substitute any materials unless approved by the engineer.
- Contractor to notify the Town of Rothesay regarding construction schedule prior to commencing construction.
- Contractor shall be responsible for traffic control and safety measures during the work.
- The contractor shall check and verify all dimensions and utility locations and report all errors and omissions prior to commencing work.
- All municipal infrastructure, such as utility, natural gas mains, and other infrastructure located in the field shall be the responsibility of the contractor.
- Contractor to ensure proper siting and authorization of all structures and to ensure all work is completed in accordance with the approved plan.
- All required permits must be obtained in advance of construction.

LEGEND:

SILT FENCE	---
CHECK DIM	---
HORIZONTAL	---
CLAY PIT	---
SMILE / DITCH	---
RUMBLE STRIP	---

Revision:

No.	Date	Issued for Review	Description
1	2021-04-06	Issued for Review	

Dwg: 1818EESP4 Dated: April 6, 2021

Designed by: A. Toole If this bar is not: 25mm long, adjust your plotting scale

Drawn by: A. Toole

Checked by: A. Toole

Scale: Horizontal 1:500 Vertical N/A

SCALE: 1:500 METRIC

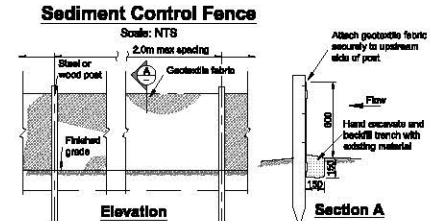
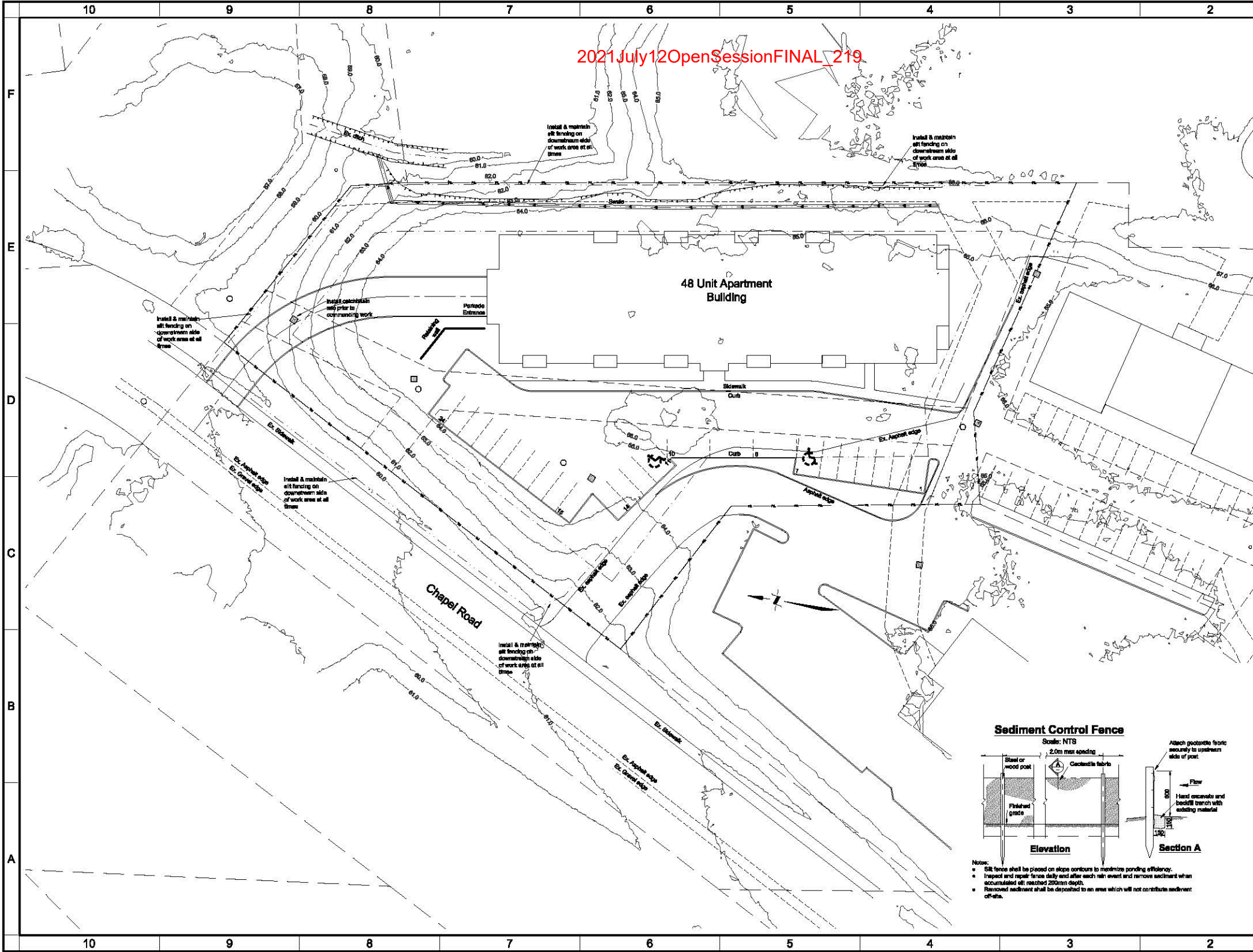
Client:
Luke Moffett

Project:
**Apartment Building
Chapel Road, Rothesay, NB**

Title:
Erosion and Sedimentation Control Plan

Sheet C6 of 6

Issue:	Rev #
Issued for Review Date of: 2021-04-06	1



- Notes:**
- Silt fence shall be placed on slope contours to maximize ponding efficiency.
 - Inspect and repair fence daily and after each rain event and remove sediment when accumulated silt reached 200mm depth.
 - Removed sediment shall be deposited to an area which will not contribute sediment off-site.

CHAPEL ROAD APARTMENT TRAFFIC IMPACT STATEMENT

Traffic Impact Study
Proj. No.2104646


May 5, 2021

Revision No.: 0

James Avery Grace



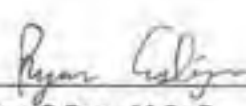
Prepared by:



Jill DeMerchant, P.Eng., M.Eng.

Transportation Engineer
Civil and Transportation Engineering

Reviewed by:



Ryan Eslihar, P.Eng., M.Sc.E.

Team Leader - Transportation Engineering
Civil and Transportation Engineering

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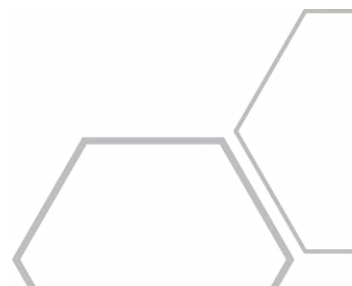


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APPENDICES

- Appendix A:Development Site Plans
- Appendix B:Traffic Count Data
- Appendix C:Level of Service Reports
- Appendix D:Signal Warrant Worksheet

1 INTRODUCTION

1.1 PROJECT BACKGROUND

A new 4-storey residential development has been proposed along Chapel Road in the Town of Rothesay. The development will consist of 48 units as well as an underground parking garage and a surface parking lot. The proposed development site plan, which is included in **Appendix A**, shows 61 parking spaces, including 24 surface level spaces and 37 underground spaces. The plan also includes 2 barrier free spaces – 1 underground and 1 at surface level. The surface level parking lot will be accessible via two existing development accesses – one off Marr Road and one off Chapel Road – that provide access to two existing commercial development properties along Marr Road. A third access is also included in the site plan, which will be located north of the building and will provide access to the underground parking facility. Site photos of existing conditions are shown in **Figure 2**.

The proposed residential development requires rezoning of the property from General Commercial to Multi-Unit Residential. As part of the development approval and rezoning process, the Town of Rothesay requires that a Traffic Impact Statement (TIS) be completed for this development. The primary concerns are how the development will impact traffic at the intersection of Marr Road and Chapel Road and how the additional traffic generated by the development will impact traffic flows at the development accesses and within the existing parking facility. James Avery Grace retained Englobe Corp. to complete this TIS. The Study Area for this TIS includes the intersection of Marr Road and Chapel Road as well as the existing and proposed development accesses, as shown in **Figure 1**.

Figure 1 – Study Area



Figure 2 – Site Photos



Proposed Development Site, looking north from existing parking lot



Existing Chapel Road Access



Existing Marr Road Access

1.2 STUDY TASKS

The main objectives of this TIS were to estimate how much additional traffic the residential development would generate and determine what impact, if any, the development traffic would have on the existing commercial parking lot, its accesses and the intersection of Marr Road and Chapel Road. The following activities were undertaken as part of this TIS:

- Englobe staff visited the study area to review existing conditions;
- Traffic volumes were collected at the intersection of Marr Road and Chapel Road and at the two existing development accesses;
 - A 1.0 % annual growth rate was applied to these traffic volumes to estimate the future (2027) background traffic volumes for the Study Area. 2027 represents the 5-year horizon period beyond the anticipated full build-out of the development;
- Level of Service (LOS) analyses were completed for the existing traffic conditions;
- ITE Trip Generation rates were used to estimate the amount of traffic that will be generated by the new development. These were added to the background traffic volumes to estimate the 2027 total traffic volumes with the development in place;
- LOS analyses were completed for the 2027 future conditions with full build out of the development;
- A review of the existing development accesses and parking facility was completed to identify any potential areas of concern. Alternative parking lot and access scenarios were evaluated following feedback from discussions with the existing tenants of adjacent commercial properties;
- A review of pedestrian connectivity in the area of the proposed development was completed;
- A review of service vehicle access was completed to ensure proper circulation and traffic flows within the existing parking facility; and
- The methodology, findings, and recommendations of the TIS were documented in this written report.

1.3 HORIZON YEAR

A 5-year horizon period was utilized for the analysis. Should all approvals be granted it is expected that the proposed development will be fully operational in 2022, therefore 2027 was chosen as the future horizon year for the analysis.

2 INFORMATION GATHERING

2.1 STREET AND DEVELOPMENT CHARACTERISTICS

Chapel Road is a collector road with an AADT of approximately 1,500 vehicles/day. Chapel Road is oriented in the north-south direction. It features one lane in each direction and has a speed limit of 40 km/h. Within the Study Area, Chapel Road features a sidewalk along the east side of the street. A narrow gravel shoulder extends along the west side of the street.

Marr Road is a collector road with an AADT of approximately 7,000 vehicles/day. Marr Road is oriented in the east-west direction, has one lane in each direction and a speed limit of 50 km/h. Marr Road features unidirectional bike lanes along both sides of the street and a sidewalk along the north side of the street.

The intersection of **Marr Road and Chapel Road** is a stop-controlled intersection. Marr Road is free flowing and a stop sign is present at the north leg on Chapel Road. The south leg consists of a commercial development access. A crosswalk is present across the Chapel Road approach.

2.2 TRAFFIC DATA AND COVID ADJUSTMENTS

Traffic volumes were collected at the intersection of Marr Road and Chapel Road and at both existing development accesses on Monday, April 26th 2021. The traffic counts were completed during the morning and evening peak periods. The traffic count data are provided in **Appendix B**.

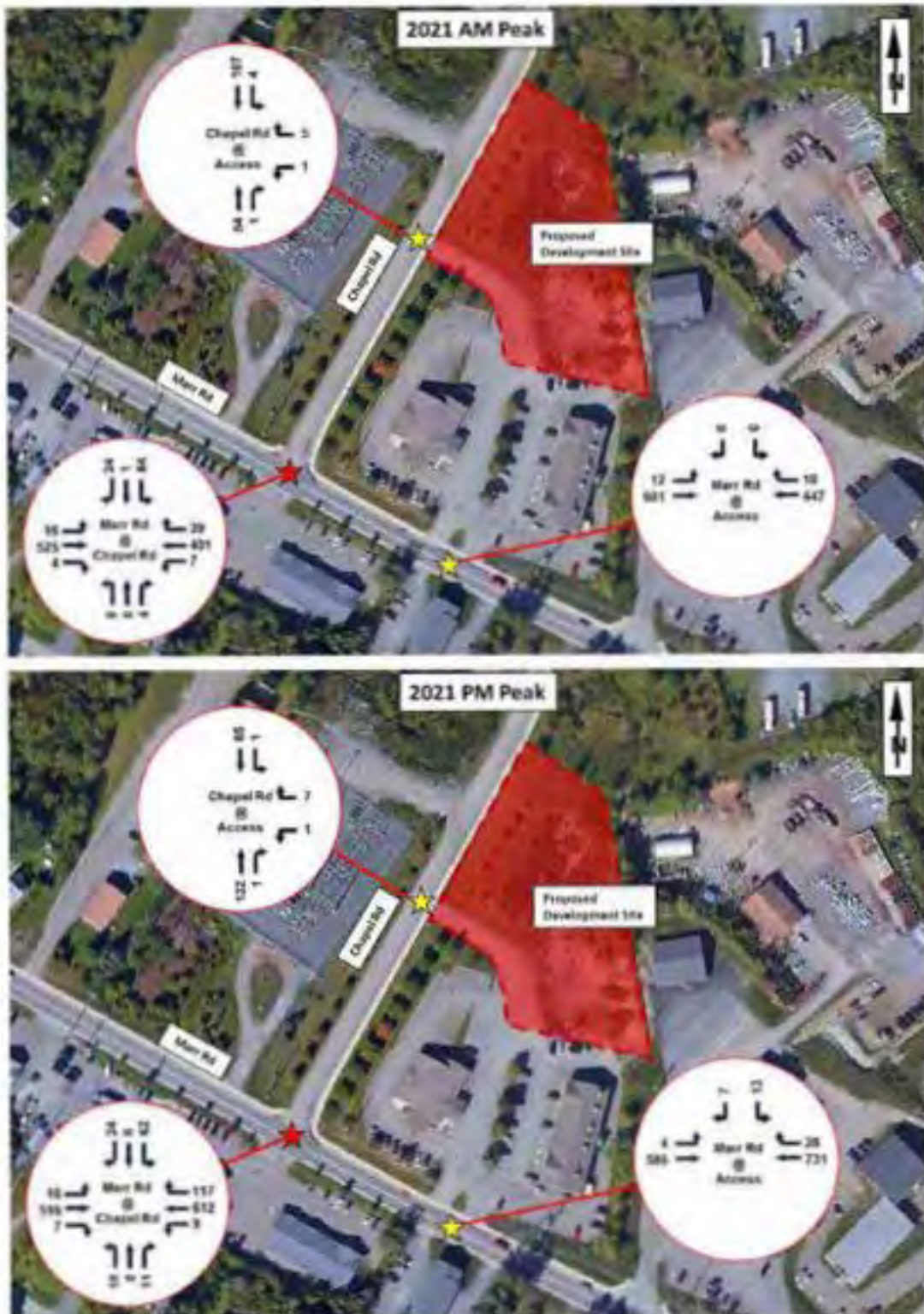
Since traffic patterns have decreased as a result of the current COVID-19 pandemic, the Study Team determined that the traffic count data collected as part of this study should be adjusted to better represent typical traffic volumes under normal conditions. Adjustment factors that were developed by the Study Team as part of a January 2021 study were used. This study compared traffic data that were collected in 2016 at two locations in Fredericton, NB to traffic volumes that were collected during the COVID-19 pandemic. The average AM and PM peak hour adjustment factors were calculated for the two Fredericton locations and applied to the traffic volume data in this study. The adjustment factors that were used in this study are shown in **Table 1**.

Table 1 – COVID-19 Adjustment Factors

Study	Date	AM Peak	PM Peak
Fredericton, NB	January, 2021	1.26	1.20
Fredericton, NB	January, 2021	1.36	1.25
Applied to This Study	April, 2021	1.31	1.22

The adjustment factors were applied to the peak hour volumes at the intersection. The adjusted 2021 AM and PM background traffic volume estimates are shown in **Figure 3**.

Figure 3 – 2021 Background Peak Hour Volumes



3 EXISTING LEVEL OF SERVICE

A Level of Service (LOS) analysis was completed for the existing and future (2027) traffic conditions at the intersection of Marr Road and Chapel Road and at the two existing development accesses. The findings are discussed in this section.

3.1 LEVEL OF SERVICE CRITERIA

The LOS analyses were completed with Synchro 10, which is a traffic analysis software that uses the Highway Capacity Manual and Intersection Capacity Utilization procedures.

The intersection performance was evaluated mainly in terms of the level of service (LOS), which is a common performance measure of an intersection. LOS is determined based on vehicle delay and is expressed on a scale of A through F, where LOS A represents very short delay (<10 seconds per vehicle) and LOS F represents very long delay (>50 seconds per vehicle at a stop controlled intersection and >80 seconds per vehicle at a signalized intersection). A LOS D is often considered acceptable in urban locations; however, some communities will accept a LOS E. The LOS criteria for both signalized and stop control intersections are shown in Table 2.

Table 2 – Intersection Level of Service Criteria

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop (Excellent)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (Very Good)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	greater than 80.0	greater than 50.0

3.2 EXISTING LOS ANALYSIS

A LOS analysis was completed for the existing traffic conditions at the intersection of Marr Road and Chapel Road and at the two existing development accesses on Marr Road and Chapel Road. The LOS results are summarized as follows:

- The Marr Road / Chapel Road intersection and both existing development accesses operate efficiently at an overall LOS A during both peak periods.
- At the Marr Road / Chapel Road intersection, the southbound approach operates at LOS E and F with a v/c ratios of 0.50 and 0.58 during the AM and PM peak periods, respectively.
- At the Marr Road development access, the southbound approach operates at a LOS D with a v/c ratio of 0.11 during the PM peak.
- All other movements operate efficiently at a LOS C or better during both peak periods.

The LOS results indicate that the southbound approach at the Marr Road / Chapel Road intersection experiences delay during both peak periods; however, the approach is well below capacity. The southbound approach at the Marr Road development access also experiences some delay but is also well below capacity.

The LOS results, including average delay, volume to capacity (v/c) ratios, and the 95th percentile queue lengths for the existing conditions are summarized in **Table 3**. Detailed Synchro analysis outputs are included in **Appendix C**.

3.3 FUTURE BACKGROUND LOS ANALYSIS

A LOS analysis was completed for the future 2027 background traffic volumes at the intersection of Marr Road and Chapel Road and at the two existing development accesses on Marr Road and Chapel Road. The peak hour traffic volumes for the 2027 horizon year were estimated by applying an annual growth rate of 1.0 % to the 2021 background traffic volumes.

The future background LOS results indicate that the delay for the southbound approach at the Marr Road/Chapel Road intersection will increase by 10 – 20 seconds per vehicle as a result of the background traffic growth; however, both movements will remain well below capacity and all intersections will continue to operate efficiently overall.

The LOS results, including average delay, volume to capacity (v/c) ratios, and the 95th percentile queue lengths for the future background conditions are summarized in **Table 4**. Detailed Synchro analysis outputs are included in **Appendix C**.

The study team completed a traffic signal warrant for the intersection of Marr Road and Chapel Road for the future 2027 background condition. A score of 100 points or more would typically warrant traffic signals. A warrant score of 32 points was achieved for the intersection, therefore traffic signals would not be warranted in the future condition. The signal warrant worksheet is provided in **Appendix D**.

Table 3 – 2021 Existing LOS Results

Intersection			Overall LOS, Delay (sec/veh)	Turning Movement LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)] 95 th Percentile Queue (m)											
				Eastbound			Westbound			Northbound			Southbound		
East-West Street @ North-South Street	Traffic Control	Time Period		L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷
Marr Road @ Chapel Road		AM Peak	LOS A 3.8	Shared	A 0.4 [0.02] <1	Shared	Shared	A 0.2 [0.01] <1	Shared	Shared	B 11.9 [0.01] <1	Shared	Shared	E 35.0 [0.50] 20	Shared
		PM Peak	LOS A 4.0	Shared	A 0.5 [0.02] <1	Shared	Shared	A 0.2 [0.01] <1	Shared	Shared	C 24.8 [0.11] 3	Shared	Shared	F 52.5 [0.56] 23	Shared
Marr Road @ Existing Access		AM Peak	LOS A 0.2	Shared	A 0.3 [0.01] <1	-	-	A 0.0 [0.29] <1	Shared	-	-	-	A 0.0 [0.00] 0	-	A 0.0 [0.00] 0
		PM Peak	LOS A 0.4	Shared	A 0.1 [0.00] <1	-	-	A 0.0 [0.47] <1	Shared	-	-	-	D 26.0 [0.11] 3	-	D 26.0 [0.11] 3
Existing Access @ Chapel Road		AM Peak	LOS A 0.5	-	-	-	A 8.7 [0.01] <1	-	A 8.7 [0.01] <1	-	A 0.0 [0.03] <1	Shared	Shared	A 0.3 [0.00] <1	-
		PM Peak	LOS A 0.3	-	-	-	A 9.1 [0.01] <1	-	A 9.1 [0.01] <1	-	A 0.0 [0.08] <1	Shared	Shared	A 0.1 [0.00] <1	-

Table 4 – 2027 Background LOS Results

Intersection			Overall LOS, Delay (sec/veh)	Turning Movement LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)] 95 th Percentile Queue (m)											
				Eastbound			Westbound			Northbound			Southbound		
East-West Street @ North-South Street	Traffic Control	Time Period		L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷
Marr Road @ Chapel Road		AM Peak	LOS A 4.9	Shared	A 0.5 [0.02] <1	Shared	Shared	A 0.2 [0.01] <1	Shared	Shared	B 12.3 [0.01] <1	Shared	Shared	E 45.9 [0.60] 27	Shared
		PM Peak	LOS A 5.5	Shared	A 0.6 [0.02] <1	Shared	Shared	A 0.3 [0.01] <1	Shared	Shared	D 28.2 [0.13] 4	Shared	Shared	F 75.0 [0.69] 31	Shared
Marr Road @ Existing Access		AM Peak	LOS A 0.2	Shared	A 0.4 [0.01] <1	-	-	A 0.0 [0.31] <1	Shared	-	-	-	A 0.0 [0.00] 0	-	A 0.0 [0.00] 0
		PM Peak	LOS A 0.5	Shared	A 0.1 [0.00] <1	-	-	A 0.0 [0.50] <1	Shared	-	-	-	D 29.4 [0.13] 4	-	D 29.4 [0.13] 4
Existing Access @ Chapel Road		AM Peak	LOS A 0.5	-	-	-	A 8.8 [0.01] <1	-	A 8.8 [0.01] <1	-	A 0.0 [0.04] <1	Shared	Shared	A 0.3 [0.00] <1	-
		PM Peak	LOS A 0.4	-	-	-	A 9.1 [0.01] <1	-	A 9.1 [0.01] <1	-	A 0.0 [0.09] <1	Shared	Shared	A 0.1 [0.00] <1	-

4 DEVELOPMENT TRAFFIC GENERATION

4.1 TRAFFIC GENERATION AND ASSIGNMENT

Trip generation rates for the proposed development were estimated using the ITE TripGen Web-based App, which is based on the 10th Edition of the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*. The Developer provided information regarding the size and type of development that is planned. The building will consist of 4 stories with a total of 48 dwelling units.

ITE Land Use #221 (Multifamily Housing – Mid-Rise) was used to generate trips for the development. The resulting vehicle trip generation is shown in **Table 5**. It was assumed that all of these trips would be made by motor vehicle as that would represent a conservative approach in estimating traffic generation.

Table 5 - Traffic Generation for the Proposed Development

Development	Size	AM Peak Hour			PM Peak Hour			Daily Total
		In	Out	Total	In	Out	Total	
Multifamily Housing - Mid-Rise (ITE Land Use #221)	48 Dwelling Units	4	13	17	13	8	21	261

The development traffic was assigned to the accesses. Based on the configuration of the parking facilities, it was assumed that 75% of the generated trips would be assigned to the underground parking access, while 25% of the trips would be assigned to the surface level parking facility accesses. This is because most residents will use the underground parking facility, while the surface level parking lot will mostly be used as overflow parking for residents and their guests. The generated traffic was assigned to each access based on the existing traffic volume distributions at the Marr Road / Chapel Road intersection. The traffic assignments are shown in **Figure 4**.

The peak hour traffic volumes for the 2027 horizon year were estimated by applying an annual growth rate of 1.0 % to the 2021 background traffic volumes and adding the traffic generated by the development. The 2027 traffic volumes with the development in place are shown in **Figure 5**.

Figure 4 – Development Traffic Assignments

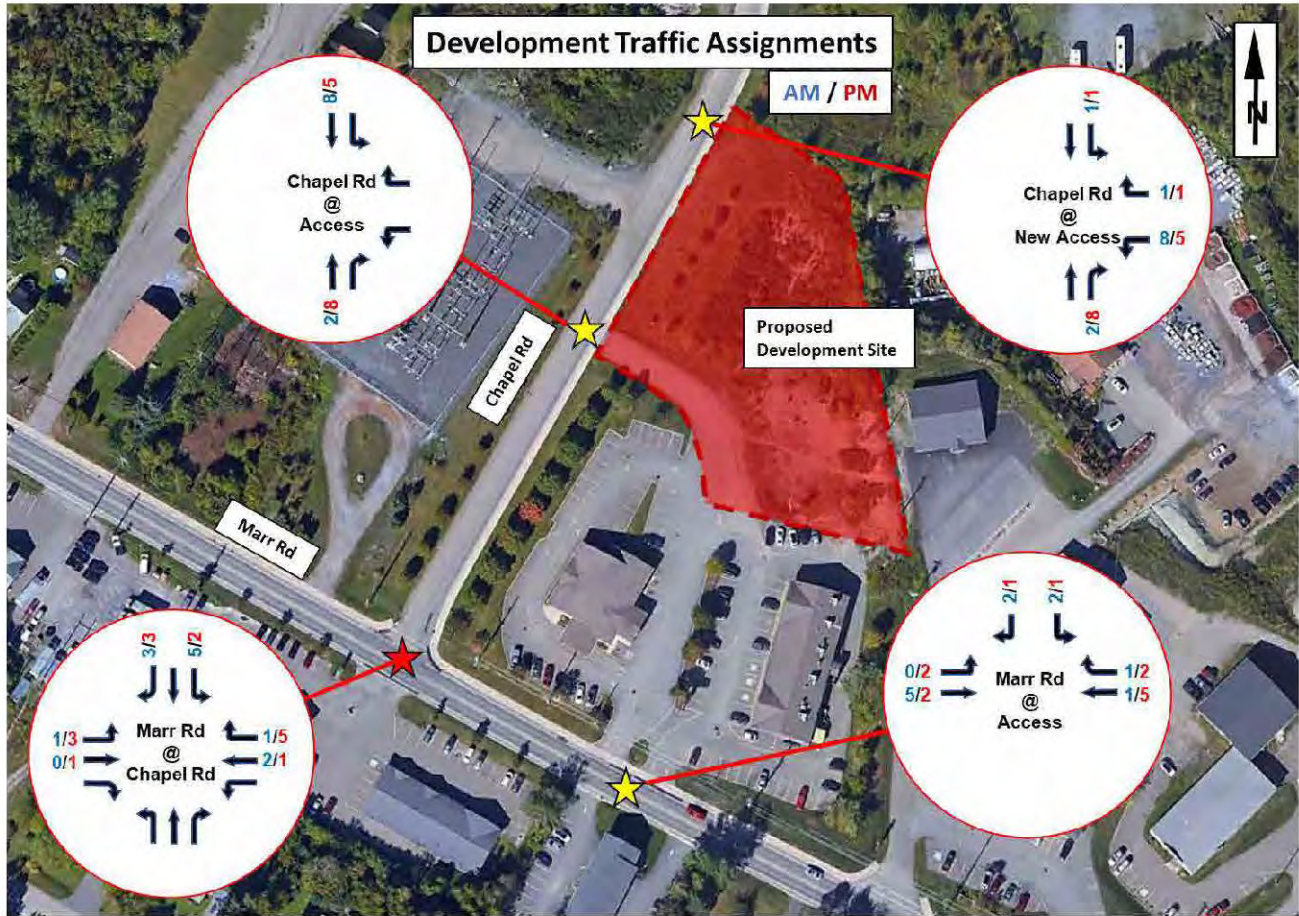
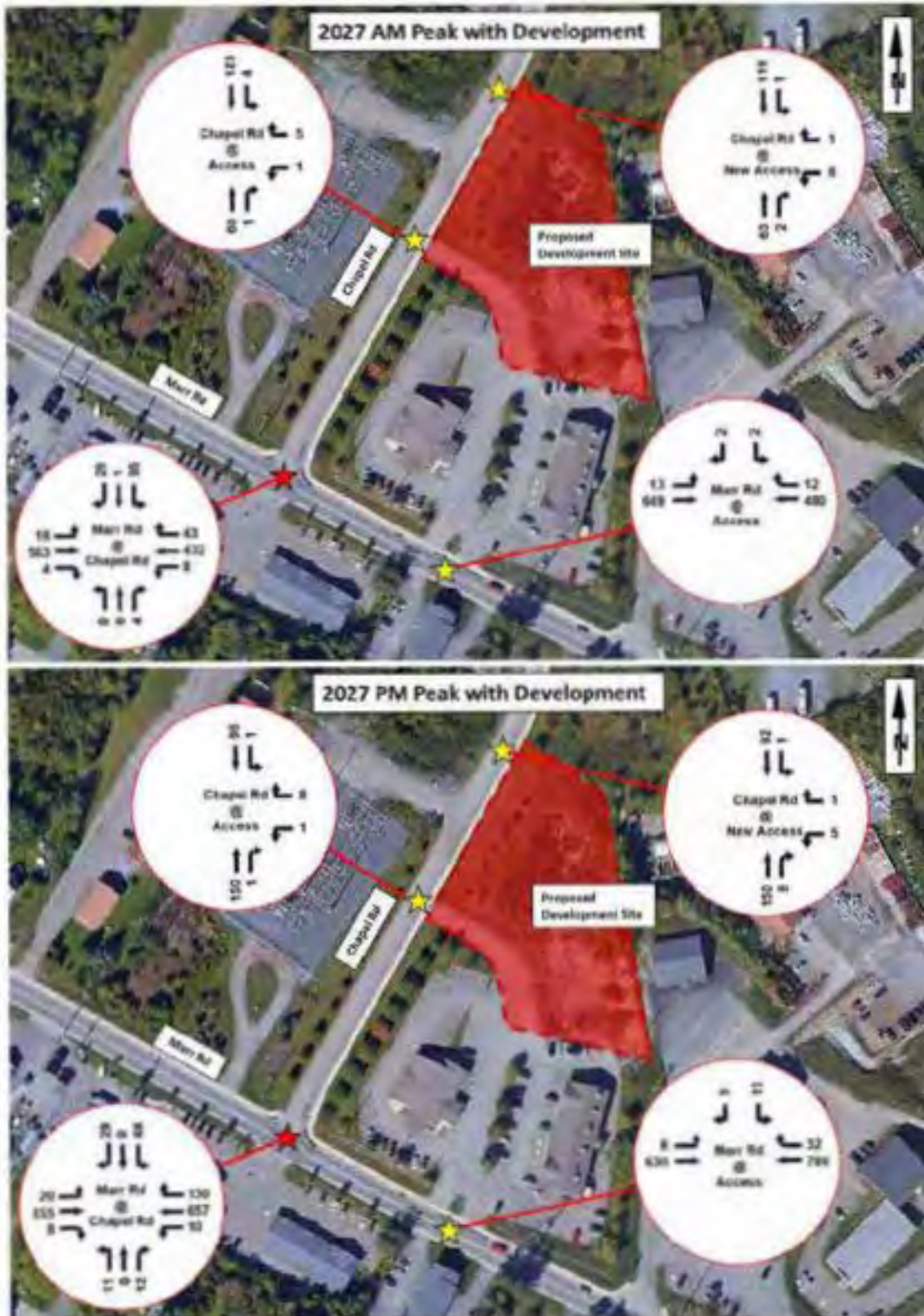


Figure 5 – 2027 Peak Hour Traffic Volumes with Development in Place



4.2 EFFECT OF REZONING

The proposed development property is currently zoned for General Commercial use; however, the developer is proposing that it be rezoned to Multi-Unit Residential. According to the *Rathesay Zoning By-Law No. 02-10*, the General Commercial Zone applies to larger commercial operations that require an emphasis on automobile access. Examples of permitted land uses include, but are not limited to, restaurants, retail stores, hotels, gasoline retailing, etc. These types of properties typically generate a large number of vehicle trips, particularly in comparison to residential properties. **Table 6** summarizes examples of daily vehicle trips that were generated as part of various studies completed by the Study Team for a variety of General Commercial land use properties and sizes.

Table 6 – General Commercial Zone Land Use Trip Generation Examples

Location	Land use	Size	Daily Trips Generated
Moncton, NB	Gas Station	8 Fuelling Pumps	1,474
Moncton, NB	Coffee Shop with Drive Thru	167 m ²	1,348
Pennfield, NB	Gas Station	6 Fuelling Pumps	1,011
Pennfield, NB	Coffee Shop with Drive Thru	186 m ²	2,851
Moncton, NB	Restaurant	558 m ²	763
Moncton, NB	Restaurant	465 m ²	636
Moncton, NB	Fast Food Restaurant	335 m ²	1,786
Moncton, NB	Convenience Store / Gas Bar	10 Fuelling Pumps	1,686
Moncton, NB	Hotel	120 Rooms	980

The commercial property trip generation examples above are much greater than the trips that are expected to be generated at the proposed residential development, as detailed in Section 4.1. The proposed residential development is expected to generate approximately 261 vehicle trips daily. This represents roughly 10% - 40% of the daily traffic volumes generated by the commercial developments listed above. If the proposed development property were to remain zoned for General Commercial and be developed, it would be expected that the trips generated by the commercial development would far exceed the number of trips expected for the proposed residential development.

5 LOS ANALYSIS WITH DEVELOPMENT

A Level of Service (LOS) analysis was completed for the 2027 traffic conditions with the proposed residential development in place. The analysis included the intersection of Marr Road and Chapel Road, the existing development accesses on Marr Road and Chapel Road, and at the proposed development access on Chapel Road. The LOS results are summarized as follows:

- In 2027, the Marr Road / Chapel Road intersection, both existing development accesses and the proposed development access would operate efficiently at overall LOS A during both peak periods.
- At the Marr Road / Chapel Road intersection, the southbound approach would operate at LOS E and F with v/c ratios of 0.65 and 0.74 during the AM and PM peak periods, respectively. All other movements at Marr Road / Chapel Road would operate efficiently with a LOS D or better during both peak periods.
- In 2027, the southbound approach at the Marr Road access would operate at a LOS D with a v/c ratio of 0.15 during the PM peak. All other movements at the access will operate efficiently with a LOS C or better during both peak periods.
- At the existing and proposed Chapel Road accesses, all individual turning movements are expected to operate at a LOS A.

The LOS results indicate that, in 2027 with the additional development traffic, the delays at the southbound approaches at the Marr Road / Chapel Road intersection are expected to increase slightly (4 – 8 seconds more than in the background conditions); however, these movements will remain below capacity. This is not uncommon at stop control intersections where the traffic volumes on the major street are much higher than the volumes on the minor street. The overall intersection delay and LOS are expected to remain acceptable up to 5 years beyond the anticipated full build-out. The development accesses on Chapel Road (existing and proposed) are expected to operate efficiently with minimal delay.

The LOS results, including average delay, volume to capacity (v/c) ratios, and the 95th percentile queue lengths for the 2027 traffic conditions with the development in place are summarized in **Table 7**. Detailed Synchro analysis outputs are included in **Appendix C**.

Table 7 – 2028 LOS with Development

Intersection			Overall LOS, Delay (sec/veh)	Turning Movement LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)] 95 th Percentile Queue (m)											
				Eastbound			Westbound			Northbound			Southbound		
East-West Street @ North-South Street	Traffic Control	Time Period		L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷
Marr Road @ Chapel Road		AM Peak	LOS A 5.6	Shared	A 0.5 [0.02] <1	Shared	Shared	A 0.3 [0.01] <1	Shared	Shared	B 12.3 [0.01] <1	Shared	Shared	E 49.7 [0.65] 31	Shared
		PM Peak	LOS A 6.3	Shared	A 0.7 [0.03] <1	Shared	Shared	A 0.3 [0.01] <1	Shared	Shared	D 29.7 [0.15] 4	Shared	Shared	F 83.2 [0.74] 35	Shared
Marr Road @ Existing Access		AM Peak	LOS A 0.3	Shared	A 0.4 [0.01] <1	-	-	A 0.0 [0.31] <1	Shared	-	-	-	C 17.8 [0.01] <1	-	C 17.8 [0.01] <1
		PM Peak	LOS A 0.6	Shared	A 0.2 [0.01] <1	-	-	A 0.0 [0.51] <1	Shared	-	-	-	D 30.0 [0.15] 4	-	D 30.0 [0.15] 4
Existing Access @ Chapel Road		AM Peak	LOS A 0.4	-	-	-	A 8.8 [0.01] <1	-	A 8.8 [0.01] <1	-	A 0.0 [0.04] <1	Shared	Shared	A 0.2 [0.00] <1	-
		PM Peak	LOS A 0.3	-	-	-	A 9.2 [0.01] <1	-	A 9.2 [0.01] <1	-	A 0.0 [0.09] <1	Shared	Shared	A 0.1 [0.00] <1	-

Intersection			Overall LOS, Delay (sec/veh)	Turning Movement LOS Average Delay (seconds per vehicle) [Volume to Capacity Ratio (v/c)] 95 th Percentile Queue (m)											
				Eastbound			Westbound			Northbound			Southbound		
East-West Street @ North-South Street	Traffic Control	Time Period		L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷	L ↶	T ↑	R ↷
New Access @ Chapel Road		AM Peak	LOS A 0.5	-	-	-	A 9.5 [0.01] <1	-	A 9.5 [0.01] <1	-	A 0.0 [0.04] <1	Shared	Shared	A 0.1 [0.00] <1	-
		PM Peak	LOS A 0.2	-	-	-	A 9.8 [0.01] <1	-	A 9.8 [0.01] <1	-	A 0.0 [0.10] <1	Shared	Shared	A 0.1 [0.00] <1	-

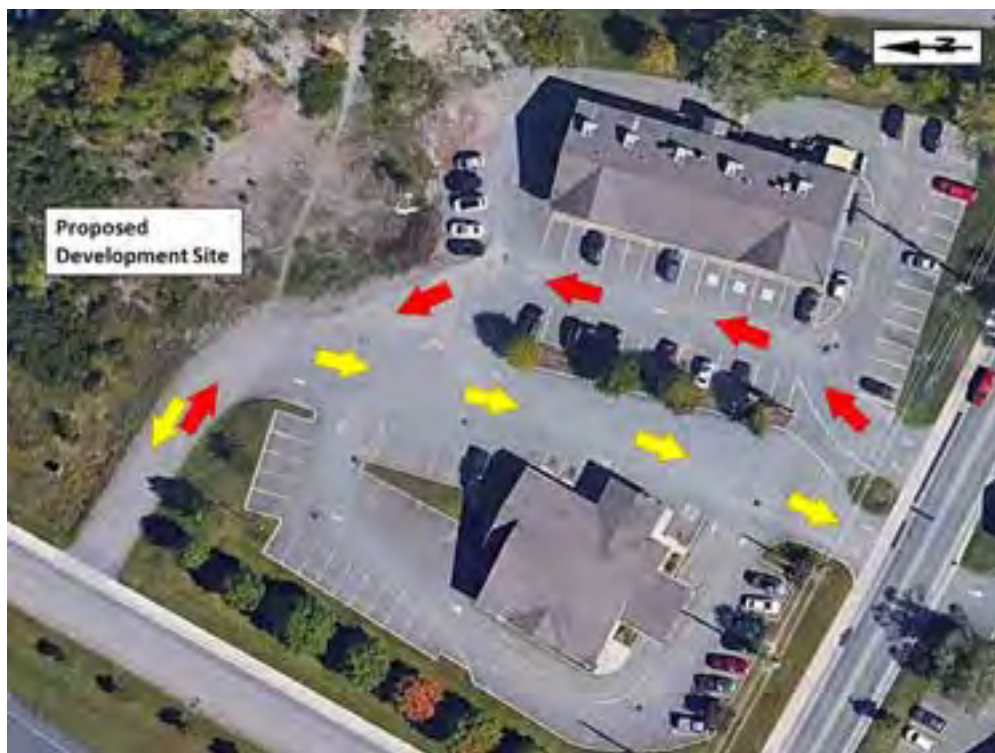


6 ADDITIONAL CONSIDERATIONS

6.1 EXISTING PARKING LOT CIRCULATION

The two existing development accesses are currently being used to access a parking lot that is shared between two commercial developments. The parking lot encompasses three parcels of land, the two commercial development properties and the proposed development property, and is subject to a Reciprocal Access Agreement between the owners of the three properties. The agreement states that vehicles requiring access to each property are entitled to use the parking lot and its accesses to do so. The agreement also references the internal circulation within the parking lot, which is complex and is defined by pavement markings and signage throughout the lot. **Figure 6** shows how the proposed development traffic would circulate through the existing parking lot. The red arrows represent how vehicles entering the development would circulate and the yellow arrows represent how vehicles exiting the development would circulate.

Figure 6 –Development Traffic Circulation in Existing Lot



There have been some questions regarding the implications of allowing the additional traffic generated by the development to circulate through the existing parking lot and whether this will have a negative impact on the facility and its accesses. The existing Chapel Road access is located on the proposed development property and, therefore, the option is available to separate the existing parking lot from the proposed surface parking lot. This would limit the Chapel Road access to the proposed residential

development while all traffic travelling to the existing commercial developments would have to use the Marr Road access. In this situation all traffic that is currently passing through the Chapel Road access to the existing commercial developments would be switched over to the Marr Road access. **Table 8** outlines the peak hour traffic volumes that would be expected in 2027 at each access with and without separation of the existing and proposed parking facilities.

Table 8 – Peak Hour Traffic Volumes at Each Access With and Without Parking Lot Separation

Scenario	Marr Road Access		Chapel Road Access	
	AM Peak	PM Peak	AM Peak	PM Peak
Maintain Circulation Between Lots	29	62	11	11
Separate Existing Lot and Proposed Lot	35	67	5	6

The peak hour traffic volumes summarized above show that if the parking lots were separated the traffic volumes at the Marr Road access would actually increase. This is because the volume of traffic that currently uses the Chapel Road access to access the commercial developments outweighs the volume of traffic that would use the Marr Road access to access the proposed residential development. In order to optimize the circulation of traffic within the parking lots and to minimize impacts on the Marr Road access, it is recommended that internal circulation between the parking lots be maintained.

6.2 PEDESTRIAN ACCESS

The Study Team completed a review of the existing pedestrian infrastructure near the proposed development. Chapel Road currently features a monolithic concrete sidewalk along the east side of the street that connects to the pedestrian facilities along Marr Road. As per the proposed development site plan, a sidewalk is planned for the space between the surface parking lot and the apartment building to accommodate pedestrian traffic between the parking lot and apartment building. To improve pedestrian connectivity, a connection between the existing sidewalk on Chapel Road and the sidewalk along the building should be considered. This could be achieved by extending a sidewalk or pedestrian pathway along the edge of the existing driveway off Chapel Road or by adding a path that would extend west from the north edge of the surface parking lot to the existing sidewalk on Chapel Road.

6.3 COMMERCIAL VEHICLE ACCESS

Commercial vehicle access will be dependent on vehicle type. Delivery, moving and similar types of service vehicles will be able to access the building using the surface level parking lot accesses. A turn-around area is provided in front of the building at the north end of the parking lot so that vehicles can turn around and exit back onto Chapel Road. Garbage truck access will be depend on the location of the garbage receptacle. If a dumpster is used, it will be located in the southeast corner of the development property and will be accessible by travelling around the eastern-most commercial development and back through the parking lot. If smaller receptacles are selected, these would be located inside the underground parking facility and will be accessible via the northern access on Chapel Road.

7 CONCLUSIONS AND RECOMMENDATIONS

The key findings and recommendations of this Traffic Impact Statement are summarized as follows:

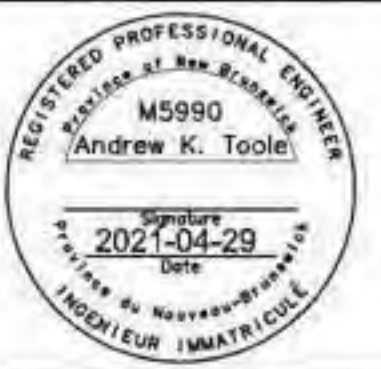
1. The proposed development, which would be located near the corner of Marr Road and Chapel Road, is a 4-storey apartment complex consisting of 48 dwelling units. The proposed development plan shows 61 parking spaces, including 23 regular and 1 barrier-free surface level parking spaces and 36 regular and 1 barrier-free underground parking spaces. The surface level parking facility would be accessible via two existing accesses on Marr Road and Chapel Road and the underground parking facility would be accessible via a new access off of Chapel Road.
2. The LOS results for the 2021 existing scenario at the intersection of Marr Road and Chapel Road and at the two existing accesses showed that, although the intersection of Marr Road and Chapel Road currently operates efficiently overall, the southbound approach on Chapel Road experiences some delay.
3. It is expected that the proposed development will generate 17 vehicle trips during the AM Peak hour (4 entering/13 exiting) and 21 vehicle trips during the PM Peak hour (13 entering/8 exiting) and a total of 261 trips daily. Based on the proposed site plan, 75% of these trips are expected to be generated at the new access, while 25% of these trips are expected to be generated at the existing accesses.
4. The proposed development requires that the property be rezoned to Multi-Unit Residential from General Commercial. By rezoning the property, development traffic volumes are expected to be significantly less than they would be if the property were developed under its currently designated land use.
5. The LOS results for the 2027 horizon period with the development in place indicate that delays at the southbound approach of the Chapel Road / Marr Road intersection will increase slightly (4 – 8 seconds per vehicle); however the approach will remain below capacity and the intersection will continue to perform efficiently overall. Traffic signals are not warranted at the intersection in the 2027 horizon period.
6. The proposed surface parking lot will be connected to an existing parking lot that is shared between two commercial properties. There has been some concern that traffic generated by the proposed residential development will cause congestion within the existing parking lot and at the accesses and there has been some debate as to whether the parking lots should be separated. However, a review of traffic volumes indicated that if the parking lots and accesses were separated, the traffic volumes at the Marr Road access would actually increase, while the traffic volumes at the Chapel Road access would be expected to decrease. Maintaining the connection between both parking lots will help balance the traffic between the accesses and it is recommended that the existing circulation within the existing parking facility be maintained.

7. Based on a review of the existing pedestrian facilities near the development property, it is recommended that a sidewalk connection be provided between the apartment building and the Chapel Road sidewalk.
8. Commercial vehicles will be able to access the development via the proposed accesses. Delivery, moving and other service vehicles will be able to access the development from the front of the building and garbage trucks will either access the development at the southeast corner of the building or from within the underground parking facility.

Appendix A: Development Site Plans



DON-MORE SURVEYS & ENGINEERING LTD.



- Notes:
- All work to be performed in accordance with the Town of Rothesay General Specifications, Latest Revision.
 - All elevations are geoidal based on Service New Brunswick Active Control using geoid model CGVD2013.
 - The approximate location of known infrastructure is shown on the plans based on the best available information at the time. However, the consultant accepts no responsibility for the accuracy or completeness of this information.
 - Contractor to confirm horizontal location and vertical elevation of all existing services prior to commencing work. Contractor to immediately report any discrepancies to the engineer.
 - It is the responsibility of the contractor to become familiar with and understand the nature and extent of the work to be executed, the nature of the soil, surface water drainage, the general form of the surface of the ground, and generally of all matters which can in any way influence the construction of this project.
 - All required permits must be obtained in advance of construction.
 - All applicable City by-laws, Provincial and Federal statutes and regulations must be adhered to.
 - Contractor may not substitute any materials unless approved by the engineer.
 - Contractor to notify the Town of Rothesay regarding construction schedule prior to commencing construction.
 - Contractor shall be responsible for traffic control and safety measures during the work.
 - The contractor shall check and verify all dimensions and utility locations and report all errors and omissions prior to commencing work.
 - All municipal infrastructure, public utilities, natural gas mains, and other infrastructure must be located in the field prior to the start of excavation.
 - Contractor to ensure proper erosion and sedimentation control methods are used to control site runoff during construction.
 - All required permits must be obtained in advance of construction.

	New Building Areas
	New Asphalt Areas
	New Concrete Areas
	New Gravel Areas
	New Grass Areas
	New Wooded Areas

Revision:		
No.	Date y/m/d	Description
2	2021-04-29	Revised Parking Issued for Review
1	2021-04-06	Issued for Review

Dwg: 19195ESP4 Dated: April 6, 2021

Designed by: A. Toole If this bar is not 25mm long, adjust your plotting scale

Drawn by: A. Toole

Checked by: A. Toole

Scale: Horizontal 1:250 Vertical N/A

SCALE: 1:250 METRIC

Client:

Luke Moffett

Project:

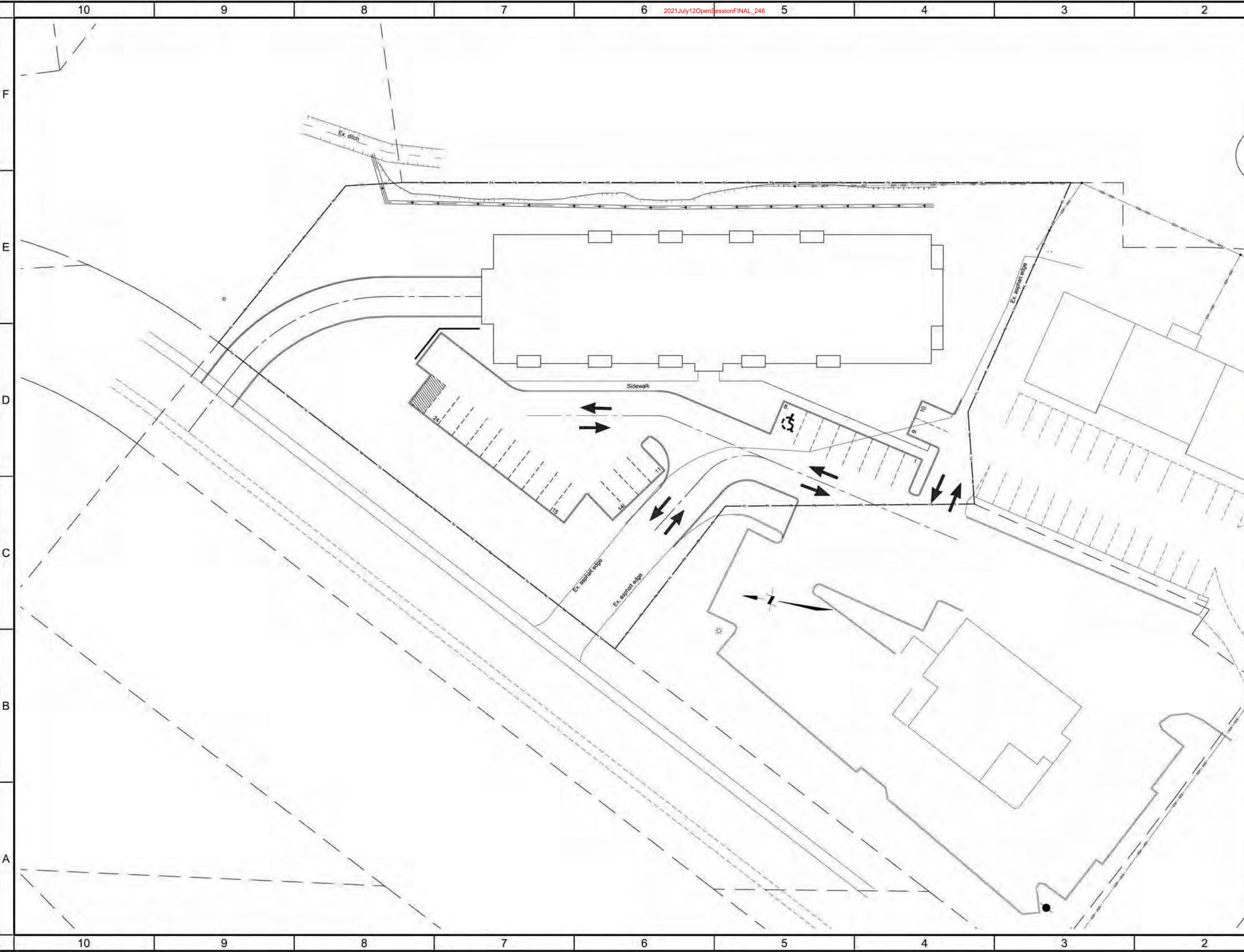
Apartment Building
Chapel Road, Rothesay, NB

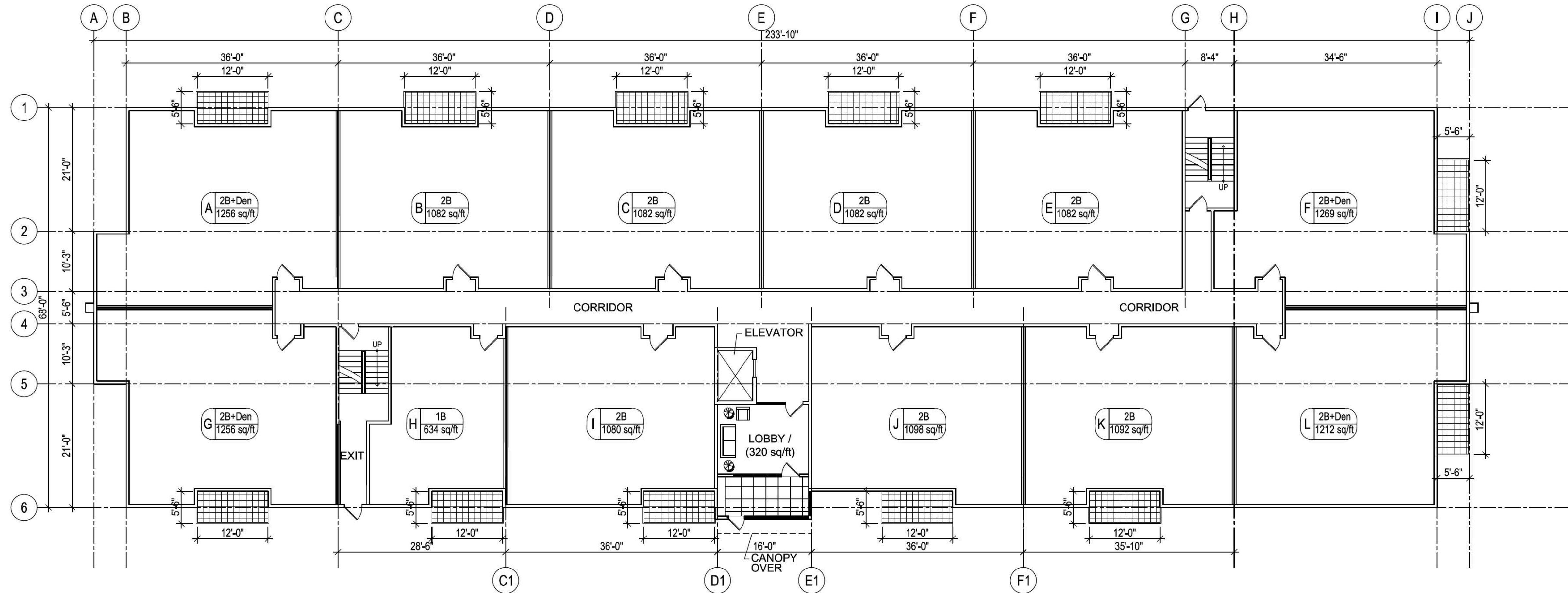
Title:

Site Plan

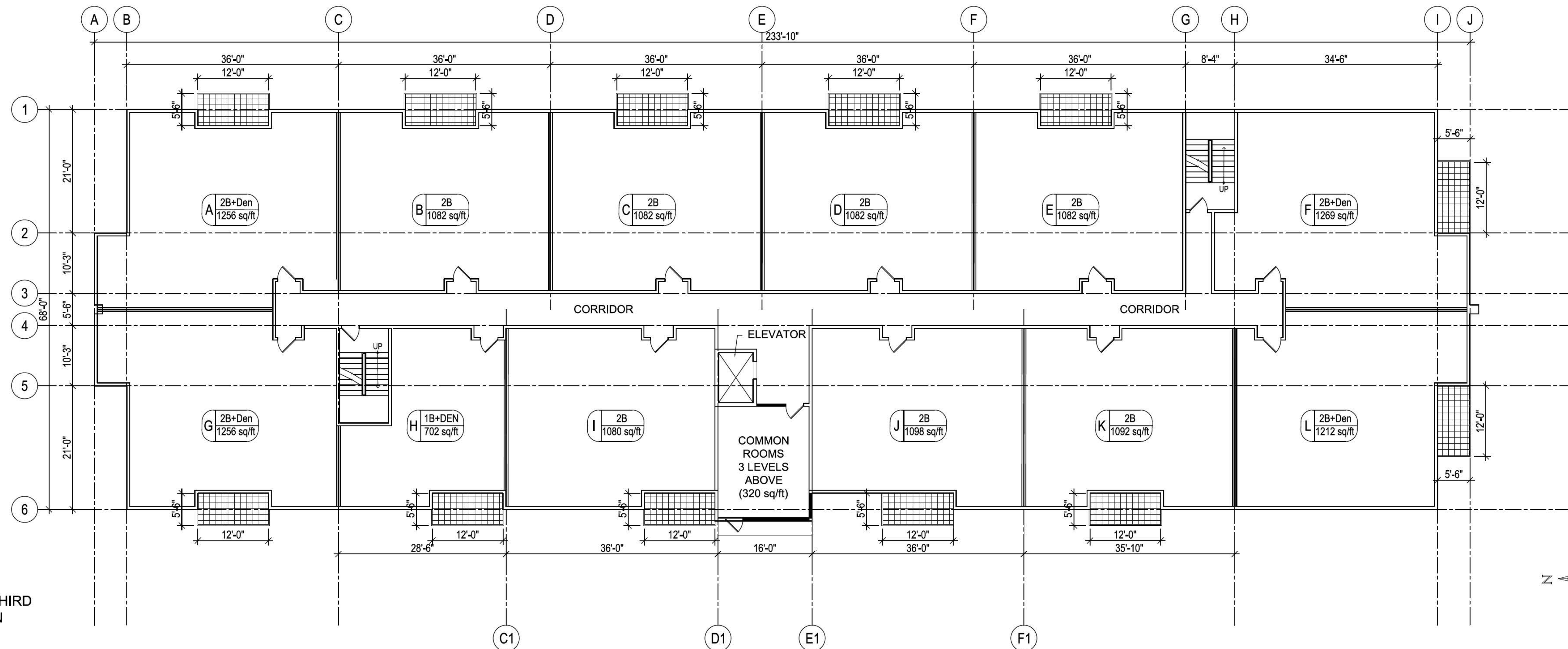
Sheet **C2** of 6

Issue:	Rev #
Issued for Review	2
Date of: 2021-04-29	





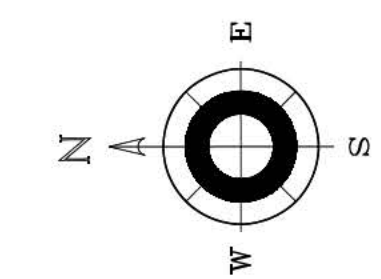
1 PROPOSED FIRST FLOOR PLAN
 A1 SCALE: $\frac{3}{32}'' = 1'$



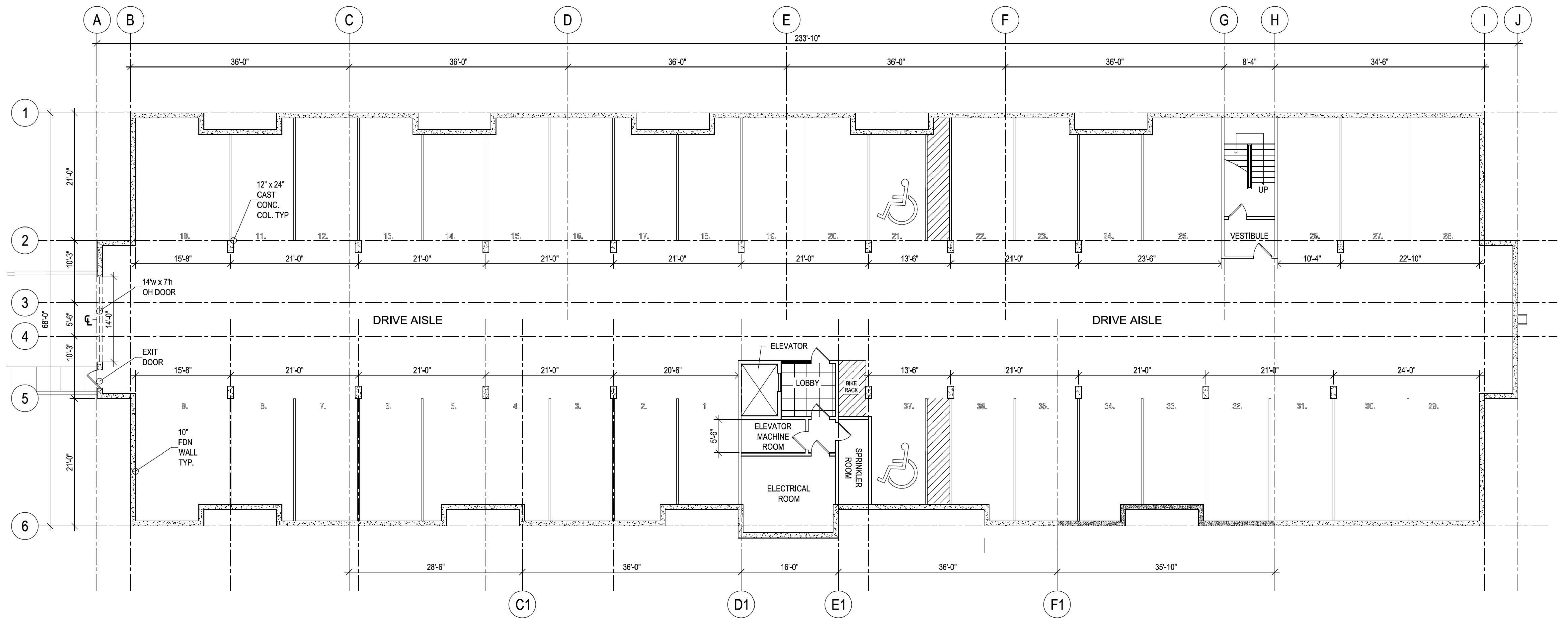
2 PROPOSED SECOND, THIRD & FOURTH FLOOR PLAN
 A1 SCALE: $\frac{3}{32}'' = 1'$

**PRELIMINARY
 NOT FOR
 CONSTRUCTION**

1, 09 APR 2021 ISSUED FOR REVIEW	
NO.	REVISION DESCRIPTION
COMEAU MACKENZIE ARCHITECTURE <small>183 CHARLOTTE STREET, SAINT JOHN, NB E2L 2C7 TEL: (506) 857-1611 mackearc@nbnet.nb.ca</small>	
CHAPEL ROAD 48 UNIT APARTMENT ROTHESAY, NB	
PROPOSED FLOOR PLAN	
DRAWN BY: JM	CHECKED BY:
SCALE: AS SHOWN	DATE: APR. 2021
PROJECT # 221364	DWG # A1



Peter Mackenzie, Comeau Mackenzie Architecture 09/04/2021 2:03pm 221364-Chapel Road.dwg



1
P1 PROPOSED PARKADE LEVEL
SCALE: 1/8" = 1'

**PRELIMINARY
NOT FOR
CONSTRUCTION**

1, 09 APR 2021 ISSUED FOR REVIEW		
NO.	DATE	REVISION DESCRIPTION
<p>COMEAU MACKENZIE ARCHITECTURE 18 CHARLOTTE STREET, SAINT-JOHN, NB E5L 5C7 TEL: (506) 857-1611 mackenz@cmnet.nb.ca</p>		
<p>PROJECT NAME CHAPEL ROAD 48 UNIT APARTMENT ROTHESAY, NB</p>		
<p>PROPOSED FLOOR PLAN</p>		
DRAWN BY: JM	CHECKED BY:	
SCALE: AS SHOWN	DATE: APR. 2021	
PROJECT # 221364	DWG # P1	

Peter Mackenzie, Comeau Mackenzie Architecture 09/04/2021 2:00pm 221364-Chapel Road.dwg

Appendix B: Traffic Count Data



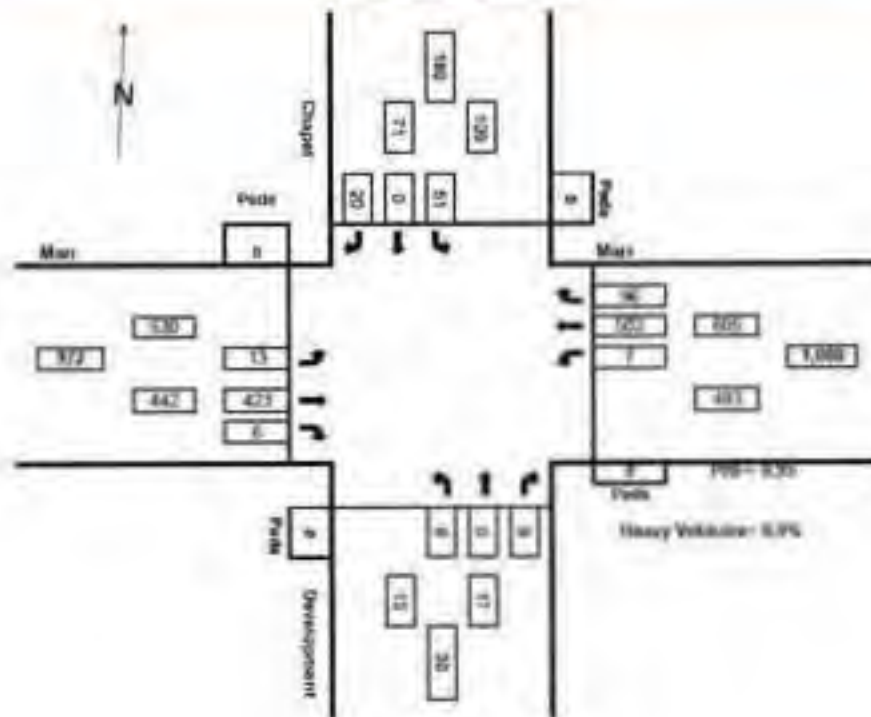
Traffic Count Summary AM and PM Peak Hours

Marr @ Chapel

AM Peak Hour 07:30 - 08:30



PM Peak Hour 16:15 - 17:15



Marr Road @ Development Access					
	In		Out		Access Hourly
	EBL	WBR	SBL	SBR	
7:30	0	2	0	1	
7:45	0	3	0	2	
8:00	2	2	0	0	
8:15	3	1	0	0	16
8:30	1	4	0	0	18
8:45	2	2	0	0	17
4:00	1	7	3	2	
4:15	2	8	5	2	
4:30	0	5	2	1	
4:45	0	3	1	1	43
5:00	2	4	1	2	39
5:15	1	2	3	3	31
5:30	2	3	1	2	31
5:45	1	1	3	5	36

AM Peak	8	9	0	0
PM Peak	3	23	11	6

Chapel Rd @ Development Access					
	In		Out		Access Hourly Total
	SBL	NBR	WBL	WBR	
7:30	0	0	0	0	
7:45	1	0	0	0	
8:00	0	0	0	2	
8:15	0	0	1	2	6
8:30	2	1	0	0	9
8:45	0	1	0	0	9
4:00	0	0	1	2	
4:15	0	1	0	2	
4:30	0	0	0	1	
4:45	1	0	0	1	9
5:00	0	0	0	1	7
5:15	0	0	0	1	5
5:30	0	0	0	0	4
5:45	0	2	1	1	6

AM Peak	3	1	1	4
PM Peak	1	1	1	6

Appendix C: Level of Service Reports



3: Development/Chapel Rd & Marr Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Traffic Volume (veh/h)	16	525	4	7	401	39	0	0	4	84	1	24
Future Volume (Veh/h)	16	525	4	7	401	39	0	0	4	84	1	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	17	559	4	7	427	41	0	0	4	89	1	26
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	468			563			1083	1077	561	1060	1058	448
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	468			563			1083	1077	561	1060	1058	448
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pD queue free %	98			99			100	100	99	55	100	96
cM capacity (veh/h)	1094			1008			183	214	527	197	220	611

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	580	475	4	116
Volume Left	17	7	0	89
Volume Right	4	41	4	26
cSH	1094	1008	527	232
Volume to Capacity	0.02	0.01	0.01	0.50
Queue Length 95th (m)	0.4	0.2	0.2	20.4
Control Delay (s)	0.4	0.2	11.9	35.0
Lane LOS	A	A	B	E
Approach Delay (s)	0.4	0.2	11.9	35.0
Approach LOS			B	E













Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		56.3%	ICU Level of Service B
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		4	
Traffic Volume (veh/h)	12	601	447	10	0	0
Future Volume (Veh/h)	12	601	447	10	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	639	478	11	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	487				1146	482
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	487				1146	482
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
pD queue free %	99				100	100
cM capacity (veh/h)	1076				218	585
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	652	487	0			
Volume Left	13	0	0			
Volume Right	0	11	0			
cSH	1076	1700	1700			
Volume to Capacity	0.01	0.29	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	0.3	0.0	0.0			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			44.6%	ICU Level of Service		A
Analysis Period (min)			15			

						
Movement	WBL	WBR	NBT	NBR	SEL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	5	54	1	4	107
Future Volume (Veh/h)	1	5	54	1	4	107
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	5	57	1	4	114
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	180	58			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	180	58			58	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	100	100			100	
cM capacity (veh/h)	808	1009			1546	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	6	58	118			
Volume Left	1	0	4			
Volume Right	5	1	0			
cSH	969	1700	1546			
Volume to Capacity	0.01	0.03	0.00			
Queue Length 95th (m)	0.1	0.0	0.1			
Control Delay (s)	8.7	0.0	0.3			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	0.3			
Approach LOS	A					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			18.9%	ICU Level of Service		A
Analysis Period (min)			15			

3: Development/Chapel Rd & Marr Rd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	16	516	7	9	612	117	10	0	11	62	0	24
Future Volume (Veh/h)	16	516	7	9	612	117	10	0	11	62	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	543	7	9	644	123	11	0	12	65	0	25
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	767			550			1329	1368	546	1316	1308	706
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	767			550			1329	1368	546	1316	1308	706
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pD queue free %	98			99			91	100	98	50	100	94
cM capacity (veh/h)	851			1025			122	144	539	129	156	438
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	567	776	23	90								
Volume Left	17	9	11	65								
Volume Right	7	123	12	25								
cSH	851	1025	205	161								
Volume to Capacity	0.02	0.01	0.11	0.56								
Queue Length 95th (m)	0.5	0.2	3.0	23.0								
Control Delay (s)	0.5	0.2	24.8	52.5								
Lane LOS	A	A	C	F								
Approach Delay (s)	0.5	0.2	24.8	52.5								
Approach LOS			C	F								
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			57.4%		ICU Level of Service				B			
Analysis Period (min)			15									



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↘	↙		↘	↙
Traffic Volume (veh/h)	4	586	731	28	13	7
Future Volume (Veh/h)	4	586	731	28	13	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	617	769	29	14	7
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	798				1408	784
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	798				1408	784
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
pD queue free %	100				91	98
cM capacity (veh/h)	829				153	395
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	621	798	21			
Volume Left	4	0	14			
Volume Right	0	29	7			
cSH	829	1700	192			
Volume to Capacity	0.00	0.47	0.11			
Queue Length 95th (m)	0.1	0.0	2.9			
Control Delay (s)	0.1	0.0	26.0			
Lane LOS	A		D			
Approach Delay (s)	0.1	0.0	26.0			
Approach LOS			D			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			50.2%	ICU Level of Service		A
Analysis Period (min)			15			












Movement	WBL	WBR	NBT	NBR	SEL	SBT
Lane Configurations	Y		T			4
Traffic Volume (veh/h)	1	7	132	1	1	85
Future Volume (Veh/h)	1	7	132	1	1	85
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	7	139	1	1	89
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	230	140			140	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	140			140	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	100	99			100	
cM capacity (veh/h)	759	911			1449	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	8	140	90			
Volume Left	1	0	1			
Volume Right	7	1	0			
cSH	889	1700	1449			
Volume to Capacity	0.01	0.08	0.00			
Queue Length 95th (m)	0.2	0.0	0.0			
Control Delay (s)	9.1	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			17.0%		ICU Level of Service	A
Analysis Period (min)			15			

3: Development/Chapel Rd & Marr Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SBR
Lane Configurations		+			+			+			+	
Traffic Volume (veh/h)	16	525	4	7	401	39	0	0	4	84	1	24
Future Volume (Veh/h)	16	525	4	7	401	39	0	0	4	84	1	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	18	598	5	8	456	44	0	0	5	96	1	27
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	500			603			1158	1152	600	1136	1133	478
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			603			1158	1152	600	1136	1133	478
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pD queue free %	98			99			100	100	99	45	99	95
cM capacity (veh/h)	1064			975			161	193	501	174	198	587
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	621	508	5	124								
Volume Left	18	8	0	96								
Volume Right	5	44	5	27								
cSH	1064	975	501	206								
Volume to Capacity	0.02	0.01	0.01	0.60								
Queue Length 95th (m)	0.4	0.2	0.2	27.3								
Control Delay (s)	0.5	0.2	12.3	45.9								
Lane LOS	A	A	B	E								
Approach Delay (s)	0.5	0.2	12.3	45.9								
Approach LOS			B	E								
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			59.3%		ICU Level of Service				B			
Analysis Period (min)			15									



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		4	
Traffic Volume (veh/h)	12	601	447	10	0	0
Future Volume (Veh/h)	12	601	447	10	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	14	684	509	11	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	520				1226	514
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520				1226	514
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
pD queue free %	99				100	100
cM capacity (veh/h)	1046				194	560
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	698	520	0			
Volume Left	14	0	0			
Volume Right	0	11	0			
cSH	1046	1700	1700			
Volume to Capacity	0.01	0.31	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	0.4	0.0	0.0			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			47.5%	ICU Level of Service		A
Analysis Period (min)			15			










						
Movement	WBL	WBR	NBT	NBR	SEL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	5	54	1	4	107
Future Volume (Veh/h)	1	5	54	1	4	107
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	6	61	1	5	122
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	194	62			62	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	194	62			62	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	100	99			100	
cM capacity (veh/h)	793	1004			1541	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	7	62	127			
Volume Left	1	0	5			
Volume Right	6	1	0			
cSH	967	1700	1541			
Volume to Capacity	0.01	0.04	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	8.8	0.0	0.3			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	0.3			
Approach LOS	A					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			19.5%	ICU Level of Service		A
Analysis Period (min)			15			

3: Development/Chapel Rd & Marr Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Traffic Volume (veh/h)	16	516	7	9	612	117	10	0	11	62	0	24
Future Volume (Veh/h)	16	516	7	9	612	117	10	0	11	62	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	581	8	10	689	132	11	0	12	70	0	27
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	821			589			1423	1462	585	1408	1400	755
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	821			589			1423	1462	585	1408	1400	755
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pD queue free %	98			99			89	100	98	37	100	93
cM capacity (veh/h)	813			991			104	125	513	111	136	410
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	607	831	23	97								
Volume Left	18	10	11	70								
Volume Right	8	132	12	27								
cSH	813	991	178	140								
Volume to Capacity	0.02	0.01	0.13	0.69								
Queue Length 95th (m)	0.5	0.2	3.5	31.4								
Control Delay (s)	0.6	0.3	28.2	75.0								
Lane LOS	A	A	D	F								
Approach Delay (s)	0.6	0.3	28.2	75.0								
Approach LOS			D	F								
Intersection Summary												
Average Delay			5.5									
Intersection Capacity Utilization			60.9%		ICU Level of Service				B			
Analysis Period (min)			15									



Movement	EBL	EBT	WBT	WBR	SEL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	4	586	731	28	13	7
Future Volume (Veh/h)	4	586	731	28	13	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	660	823	32	15	8
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	855				1509	839
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	855				1509	839
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
pD queue free %	99				89	98
cM capacity (veh/h)	789				133	367
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	665	855	23			
Volume Left	5	0	15			
Volume Right	0	32	8			
cSH	789	1700	170			
Volume to Capacity	0.01	0.50	0.13			
Queue Length 95th (m)	0.2	0.0	3.7			
Control Delay (s)	0.2	0.0	29.4			
Lane LOS	A		D			
Approach Delay (s)	0.2	0.0	29.4			
Approach LOS			D			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			53.0%	ICU Level of Service		A
Analysis Period (min)			15			

						
Movement	WBL	WBR	NBT	NBR	SEL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	7	132	1	1	85
Future Volume (Veh/h)	1	7	132	1	1	85
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	8	149	1	1	96
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	248	150			150	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	248	150			150	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	100	99			100	
cM capacity (veh/h)	743	900			1437	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	9	150	97			
Volume Left	1	0	1			
Volume Right	8	1	0			
cSH	879	1700	1437			
Volume to Capacity	0.01	0.09	0.00			
Queue Length 95th (m)	0.2	0.0	0.0			
Control Delay (s)	9.1	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.1	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			17.5%	ICU Level of Service		A
Analysis Period (min)			15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Traffic Volume (veh/h)	18	563	4	8	432	43	0	0	4	95	1	29
Future Volume (Veh/h)	18	563	4	8	432	43	0	0	4	95	1	29
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	19	599	4	9	460	46	0	0	4	101	1	31
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	506			603			1172	1163	601	1144	1142	483
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	506			603			1172	1163	601	1144	1142	483
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pD queue free %	98			99			100	100	99	41	99	95
cM capacity (veh/h)	1059			975			156	189	500	172	195	584
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	622	515	4	133								
Volume Left	19	9	0	101								
Volume Right	4	46	4	31								
cSH	1059	975	500	206								
Volume to Capacity	0.02	0.01	0.01	0.65								
Queue Length 95th (m)	0.4	0.2	0.2	30.8								
Control Delay (s)	0.5	0.3	12.3	49.7								
Lane LOS	A	A	B	E								
Approach Delay (s)	0.5	0.3	12.3	49.7								
Approach LOS			B	E								
Intersection Summary												
Average Delay			5.6									
Intersection Capacity Utilization			60.1%		ICU Level of Service				B			
Analysis Period (min)			15									



Movement	EBL	EBT	WBT	WBR	SEB	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	13	649	480	12	2	2
Future Volume (Veh/h)	13	649	480	12	2	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	14	690	511	13	2	2
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	524				1236	518
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	524				1236	518
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
pD queue free %	99				99	100
cM capacity (veh/h)	1043				192	558
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	704	524	4			
Volume Left	14	0	2			
Volume Right	0	13	2			
cSH	1043	1700	288			
Volume to Capacity	0.01	0.31	0.01			
Queue Length 95th (m)	0.3	0.0	0.3			
Control Delay (s)	0.4	0.0	17.8			
Lane LOS	A		C			
Approach Delay (s)	0.4	0.0	17.8			
Approach LOS			C			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			54.6%	ICU Level of Service		A
Analysis Period (min)			15			



Movement	WBL	WBR	NBT	NBR	SEL	SBT
Lane Configurations	Y		T			T
Traffic Volume (veh/h)	1	5	60	1	4	123
Future Volume (Veh/h)	1	5	60	1	4	123
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	5	64	1	4	131
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	204	64			65	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	64			65	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	100	99			100	
cM capacity (veh/h)	783	1000			1537	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	6	65	135			
Volume Left	1	0	4			
Volume Right	5	1	0			
cSH	956	1700	1537			
Volume to Capacity	0.01	0.04	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	8.8	0.0	0.2			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	0.2			
Approach LOS	A					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			19.7%		ICU Level of Service	A
Analysis Period (min)			15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Volume (veh/h)	8	1	63	2	1	119
Future Volume (Veh/h)	8	1	63	2	1	119
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	9	1	67	2	1	127
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	197	68			69	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	197	68			69	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	99	100			100	
cM capacity (veh/h)	791	995			1532	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	10	69	128			
Volume Left	9	0	1			
Volume Right	1	2	0			
cSH	808	1700	1532			
Volume to Capacity	0.01	0.04	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	9.5	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			17.1%	ICU Level of Service		A
Analysis Period (min)			15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Traffic Volume (veh/h)	20	555	8	10	857	130	11	0	12	68	0	29
Future Volume (Veh/h)	20	555	8	10	857	130	11	0	12	68	0	29
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	584	8	11	892	137	12	0	13	72	0	31
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	829			592			1444	1481	588	1426	1416	760
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	829			592			1444	1481	588	1426	1416	760
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pD queue free %	97			99			88	100	97	33	100	92
cM capacity (veh/h)	807			989			99	121	511	108	133	407

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	613	840	25	103
Volume Left	21	11	12	72
Volume Right	8	137	13	31
cSH	807	989	171	138
Volume to Capacity	0.03	0.01	0.15	0.74
Queue Length 95th (m)	0.6	0.3	4.0	35.1
Control Delay (s)	0.7	0.3	29.7	83.2
Lane LOS	A	A	D	F
Approach Delay (s)	0.7	0.3	29.7	83.2
Approach LOS			D	F

Intersection Summary			
Average Delay		6.3	
Intersection Capacity Utilization		61.5%	ICU Level of Service B
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	6	630	789	32	15	9
Future Volume (Veh/h)	6	630	789	32	15	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	663	831	34	16	9
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	865				1523	848
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	865				1523	848
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
pD queue free %	99				88	98
cM capacity (veh/h)	782				130	363
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	669	865	25			
Volume Left	6	0	16			
Volume Right	0	34	9			
cSH	782	1700	169			
Volume to Capacity	0.01	0.51	0.15			
Queue Length 95th (m)	0.2	0.0	4.1			
Control Delay (s)	0.2	0.0	30.0			
Lane LOS	A		D			
Approach Delay (s)	0.2	0.0	30.0			
Approach LOS			D			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			53.5%	ICU Level of Service		A
Analysis Period (min)			15			



Movement	WBL	WBR	NBT	NBR	SEL	SBT
Lane Configurations	Y		T			T
Traffic Volume (veh/h)	1	8	150	1	1	96
Future Volume (Veh/h)	1	8	150	1	1	96
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	8	158	1	1	101
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	262	158			159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	262	158			159	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	100	99			100	
cM capacity (veh/h)	729	889			1427	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	9	159	102			
Volume Left	1	0	1			
Volume Right	8	1	0			
cSH	868	1700	1427			
Volume to Capacity	0.01	0.09	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	9.2	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			18.0%		ICU Level of Service	A
Analysis Period (min)			15			



Movement	WBL	WBR	NBT	NBR	SEL	SBT
Lane Configurations	Y		T			T
Traffic Volume (veh/h)	5	1	150	8	1	92
Future Volume (Veh/h)	5	1	150	8	1	92
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	1	158	8	1	97
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	261	162			166	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	162			166	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
pD queue free %	99	100			100	
cM capacity (veh/h)	730	885			1418	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	6	166	98			
Volume Left	5	0	1			
Volume Right	1	8	0			
cSH	752	1700	1418			
Volume to Capacity	0.01	0.10	0.00			
Queue Length 95th (m)	0.2	0.0	0.0			
Control Delay (s)	9.8	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			18.4%	ICU Level of Service		A
Analysis Period (min)			15			

Appendix D: Signal Warrant Worksheet

