BRANT + GHENT MASTERPLAN

SUN SHADOW ANALYSIS

NOVEMBER 7, 2022
PROJECT #2004219

SUBMITTED TO

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INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by the Molinaro Group to conduct a Sun Shadow Study for the proposed Brant Street and Ghent Avenue Masterplan development in Burlington, Ontario based on updates to the masterplan design (as shown in Figure 1).

The objectives of this study were to illustrate the shadow patterns for the proposed development and determine the potential exposure to sunlight and shadow on and around the study site.

RWDI has conducted this analysis per the requirements of the City of Burlington's Shadow Study Guidelines and Terms of Reference.

This study involved the use of a three-dimensional (3D) computer model of the existing surroundings and the updated proposed development in place. The 3D model was used to produce renderings of the new shadows cast by the proposed development. The following report provides a discussion of the methodology and graphic results of the Sun/Shadow Study.

Note that the results presented herein are based on the updated 3D model received by RWDI by Graziani and Corazza Architects on October 4, 2022.



Figure 1: Rendering of the Proposed Project – View from the Southwest

SITE & BUILDING INFORMATION

The proposed masterplan is located on both sides of Brant Street and Ghent Avenue intersection (see Figure 2). The latitude and longitude of the project site is 43.33266° and -79.808712° respectively. The location was determined by a site plan provided by Graziani and Corazza and Google Earth. All Images are oriented with true north at the top of the page.

The heights of the proposed buildings for Phases 1, 2 and 3 are approximately 25 stories (86 m), 25 stories (86 m) and 7 stories (32m) respectfully.

Currently the site consists of low-rise residential buildings and a parking lot. The immediate surroundings consist of low-rise residential buildings punctuated with isolated mid-rise and high-rise buildings. (see Images 1 and 2).

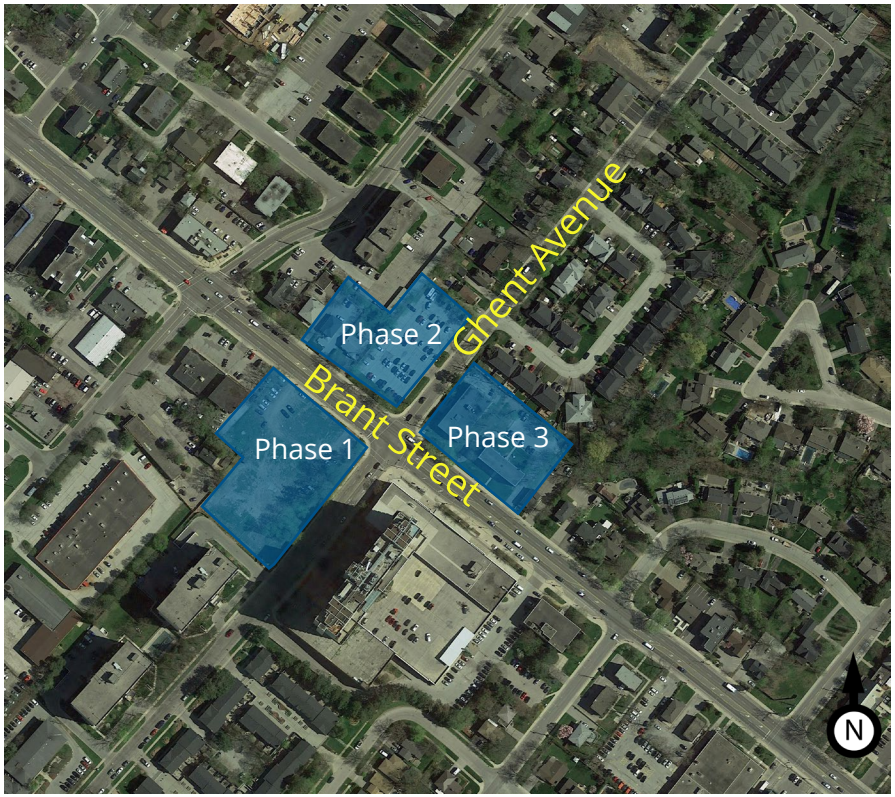


Figure 2 – Aerial View of Existing Site and Surroundings (Map Credit: Google Earth)

METHODOLOGY

The shadow plots illustrated in this report (found in Appendix A) were generated with the aid of RWDI's in-house proprietary *Eclipse* software. The software was configured to simulate the appropriate geographic characteristics and solar angles for this site.

Based on the concept plan prepared by Graziani and Corazza Architects (received by RWDI on October 4th, 2022), a three-dimensional computer model of the study site was created by RWDI.

The computer-generated renderings exhibit the simulated shadow conditions anticipated to occur in the vicinity of the study site. The tests conducted in this study assume bright sunlight from sunrise to sunset to properly identify shadow patterns created by the proposed structure.

The output of this study illustrates the *net-new shadowing* created by the proposed development (coloured purple on roof surfaces and light blue on ground surfaces). That is to say, the shadowing created by the proposed development, less any shadows that occur due to the existing built environment (coloured in dark grey in the plots).

The Sun Access Factors (SAF) at various areas of interest were also computed per the requirements of the City of Burlington Shadow Study Guidelines and Terms of Reference. Each area of interest was subdivided into sub-areas approximately 0.2 m² in area for the purposes of this study.

Per standard industry practice, shadowing due to trees has been purposely neglected as a conservatism.

SUMMARY/CONCLUSIONS

Per the City of Burlington requirements, the new shadows cast by the proposed building were predicted for every hour between 9:00 am EDT and 6:00 pm EDT on March 21 and September 21, as well as for December 21 between 11:00 am EST and 3:00 pm EST and June 21 between 8:00 am EDT and 7:00 pm EDT.

1. Intermittent new shadowing from the proposed project is expected to fall across the residential properties to the north and east of the site. Shadowing is mostly confined to the area south of Prospect St. and west of Deyncourt Dr. New shadowing in these areas is predicted intermittently during the afternoon hours throughout the year.

2. Areas as far west at Legion Rd. can also experience new shadowing, though generally only before 11:00 am. Shadows are also anticipated to fall at grade and onto the roofs of neighboring commercial properties.

3. No shadow impacts were predicted on the yards of Tom Thomson Public, St. John Elementary, Central Public or Central High schools. Likewise no impacts were predicted on Optimist Park.

4. The roof top amenity spaces of Phase 1 are on all sides of the building. For those north of the tower, they can be shadowed much of the year during the afternoon. For the east and west amenity spaces, they can each be in shade for the morning hours and evening hours, respectively. It is important to note that in some cases (e.g. the southern terrace amenity space of Phase 1) the "net new shadows" predicted are due to an existing building but are flagged as new shadow because the *space itself is new* not because the shadow is from the proposed building. This is a consequence of how new shadowing is to be computed.

5. The amenity space of Phase 2 is mainly south of the tower and therefore was predicted to have improved solar access even though it will experience shadow from Phase 1 and 3. During the equinoxes, predicted shadowing here is minimal before 2:00pm and is largely caused by the terrace railings and Phase 2 building. During summer, higher solar elevations allow sun across the majority of the amenity space essentially all day.

6. The grade level 'open spaces' outlined in green that are located adjacent to Brant Street are predicted to be shadowed during the morning hours and again in the evening hours. For the open space to the north of the Phase 2 development, shadows are anticipated in afternoon hours all year, though the extent of the shadowing is minimal during summer.

7. The private terraces in the Phase 3 building are on the north and south elevations. Aside from the first hours of the day, the north side is expected to be in shadow the majority of the time. The south facing terraces were predicted to receive more sun, with shadows occurring mostly in the early morning hours and evening. On the equinoxes, essentially the entire terrace area is in full sun from 11:00 am until 4:00 pm. In summer this time frame extends until 6:00 pm.

SUMMARY/CONCLUSIONS

Sun Access Factor (SAF) Results

The sun access factor (SAF) as defined by the City of Burlington's Shadow Study Guidelines and Terms of Reference is a measure of sun penetration on a given area during specified time frames. In total, 92 feature areas based on the City's requirements were created and simulated to determine whether they meet the criteria.

1. For outdoor amenity spaces, the criterion is met if the SAF is at least 0.22 on the March 21st test date. Two properties were found to not meet this target: the rear yards of 2091 Prospect St. and 2087 Prospect St., with SAF values of 0.14. Though RWDI would note that these properties are not predicted to be affected by the proposed development in the graphic results, indicating that these properties' low SAF is due to existing buildings.

2. For parks and open spaces, the criterion is met if the SAF is at least 0.5 on the March, September and December 21st, test dates. Of the park features studied, only the park area immediately to the south of phase 1 did not meet the threshold on September 21st with a SAF value of 0.48.

3. Lastly, the public realm and sidewalk criterion is met if the SAF is at least 0.5 on the March 21st test date. Of the boulevard features simulated the following boulevards did not pass the required criteria:
    - The boulevard on Ghent St., opposite the northeast elevation of phase 1 with a SAF value of 0.36.
    - The boulevard on Brant St., opposite the southwest elevation of the phase 2 tower with a SAF value of 0.38.
    - Lastly, the boulevard on Ghent Ave., opposite the northwest elevation of Phase 3 with a SAF value of 0.49.
4. Tabular data summarizing the SAF values for each of the studied locations is included in a separate document.

GENERAL STATEMENT OF LIMITATIONS

This report entitled Brent + Ghent Masterplan Sun Shadow Analysis (Dated November 7, 2022) was prepared by Rowan Williams Davies and Irwin Inc. ("RWDI") for Molinaro Group ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared.

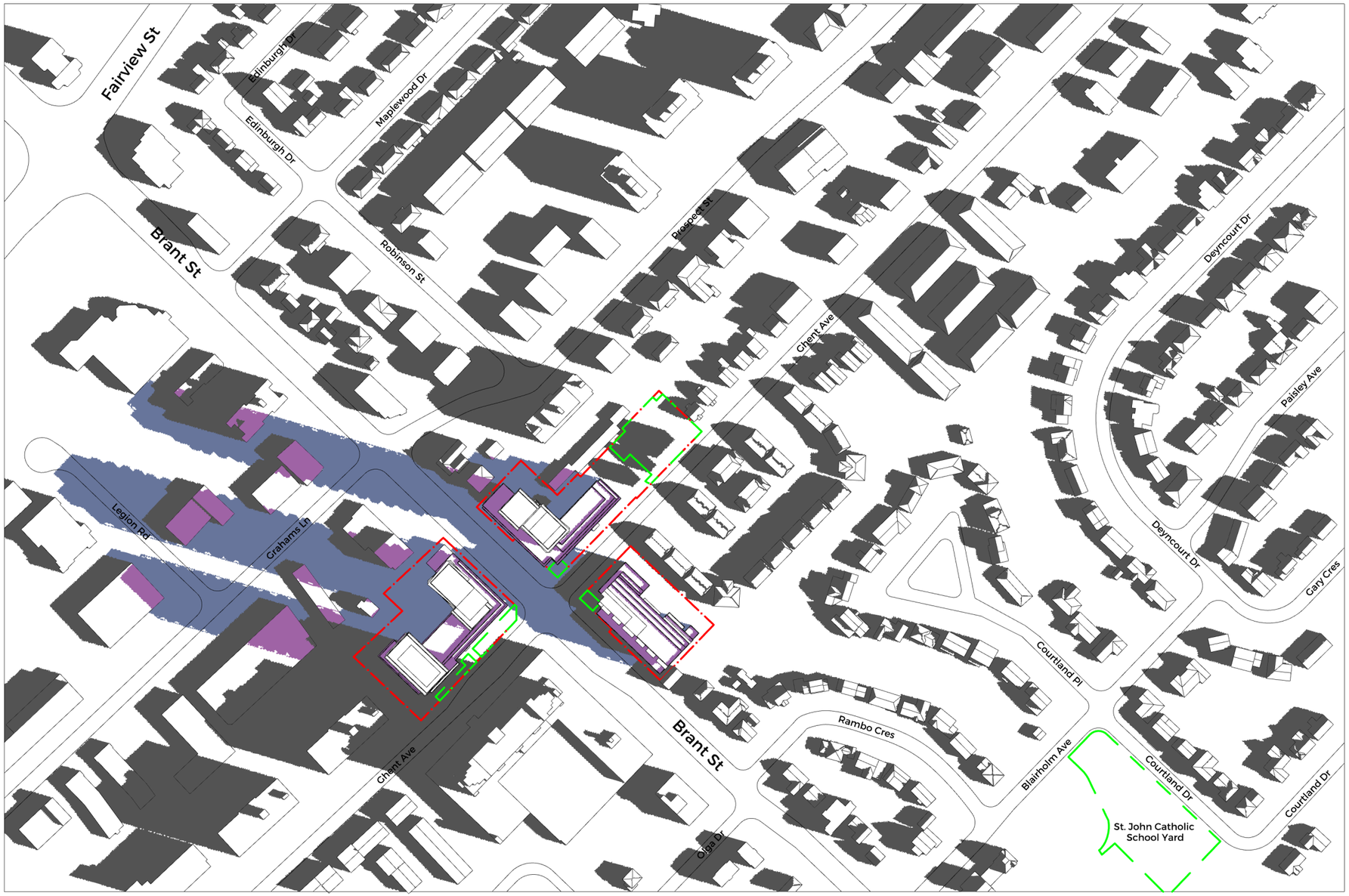
Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

APPENDIX A

SHADOW PLOTS



Sun Shade Assessment

Proposed Site Configuration | March 21st, 09:00 EDT

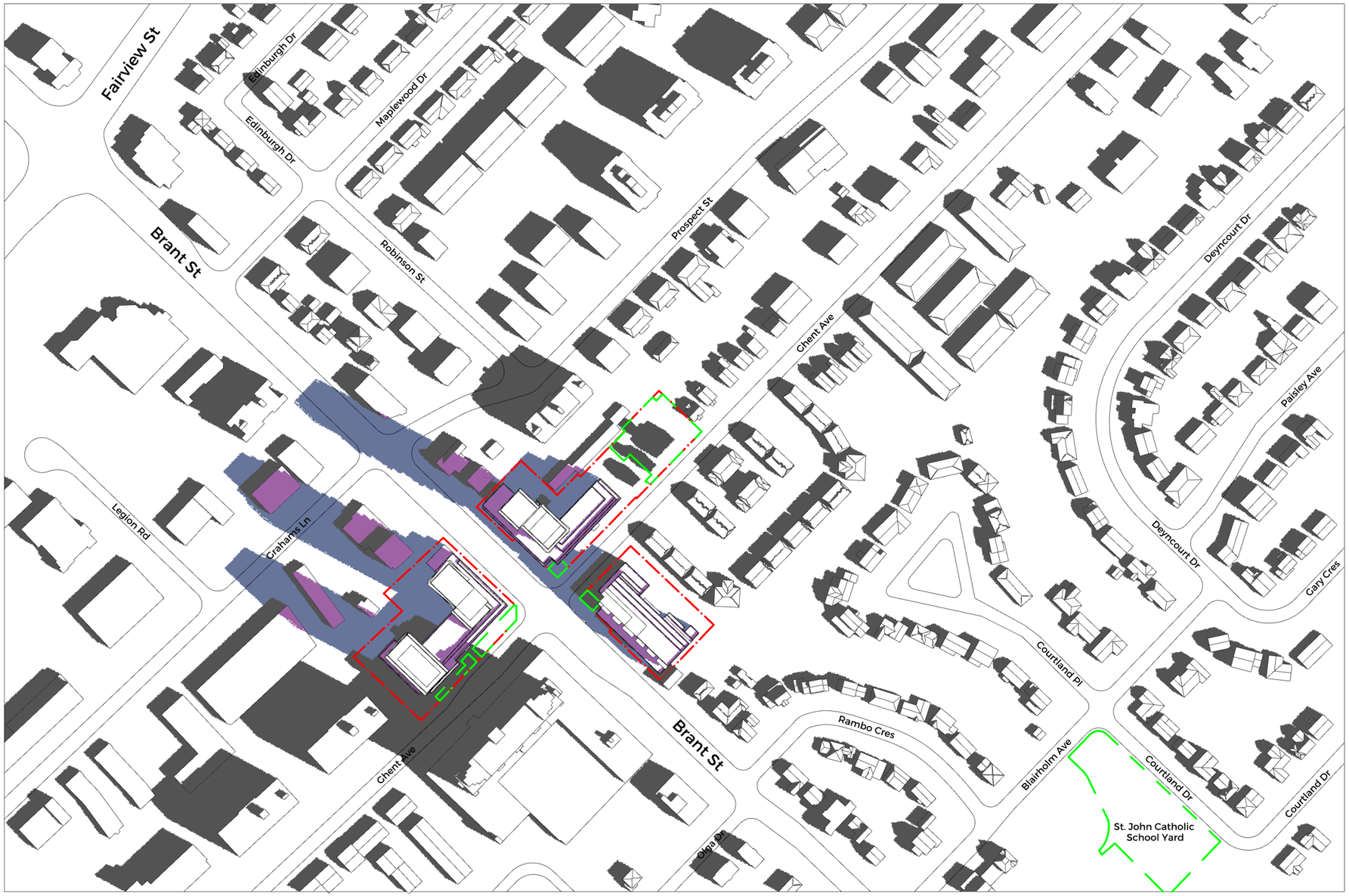
Brant & Ghent - Burlington, ON
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- Net New Shadows Cast on Roof Surfaces
- Net New Shadows Cast on Ground Surfaces
- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | March 21st, 10:00 EDT

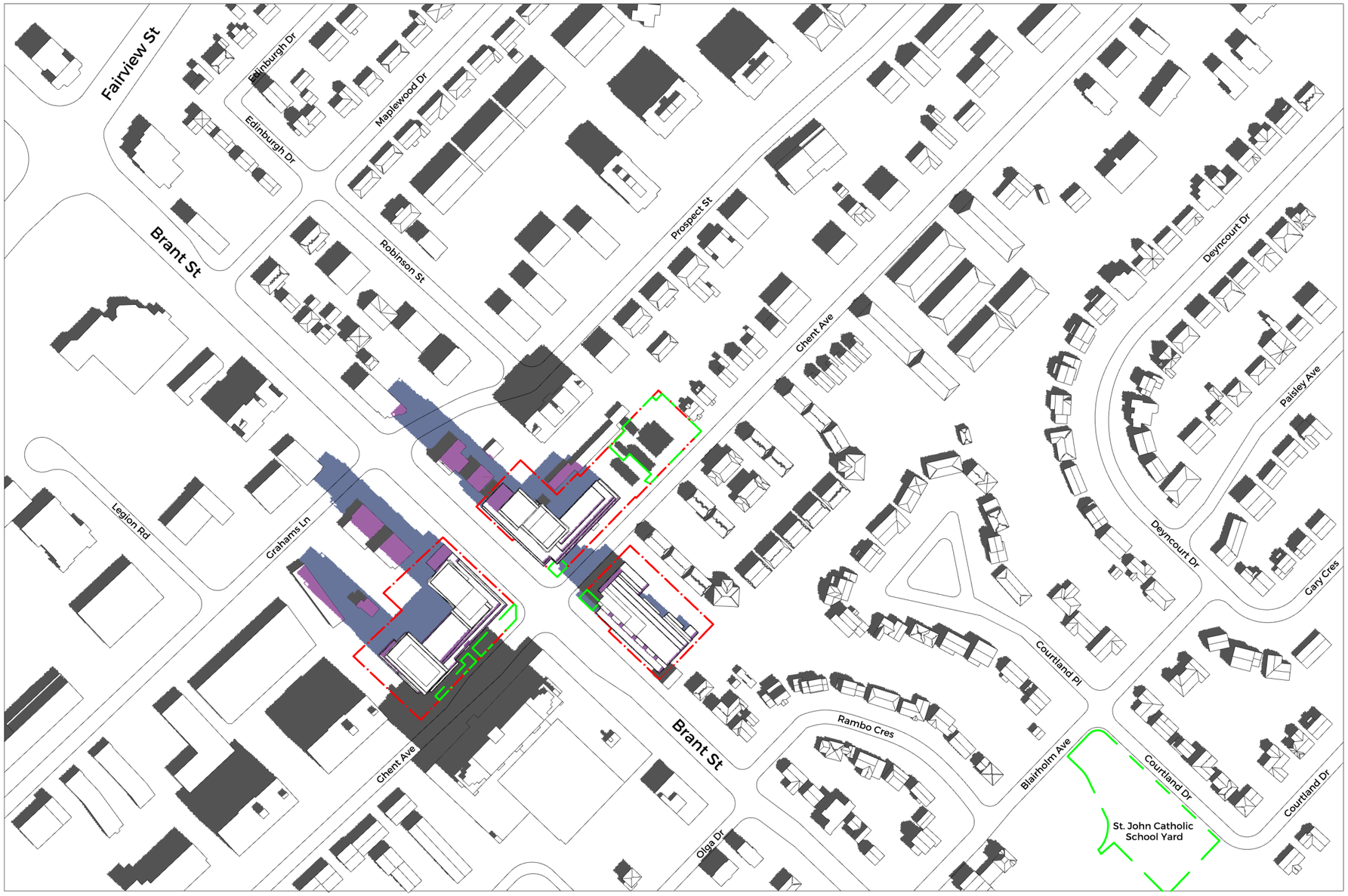
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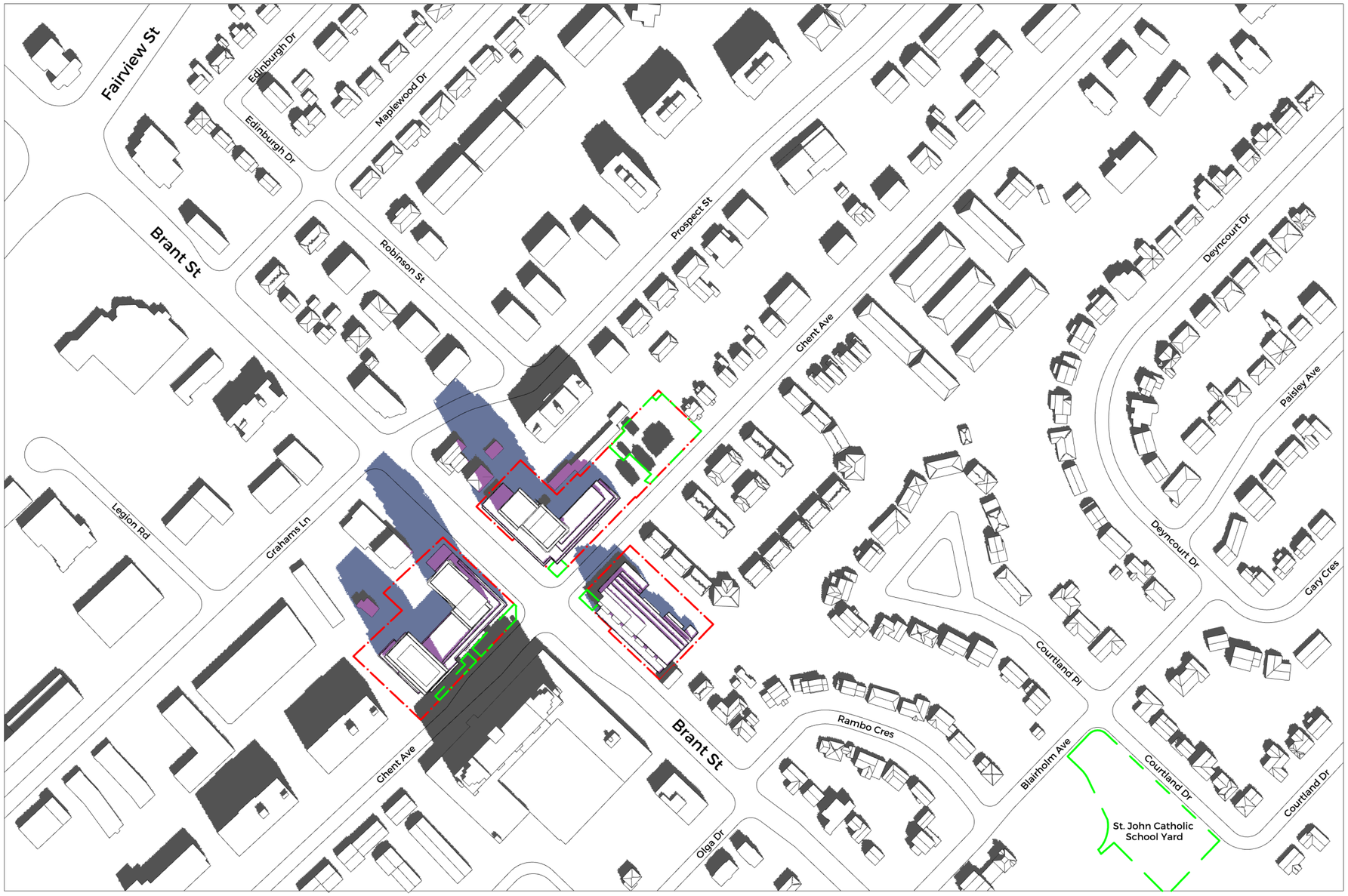
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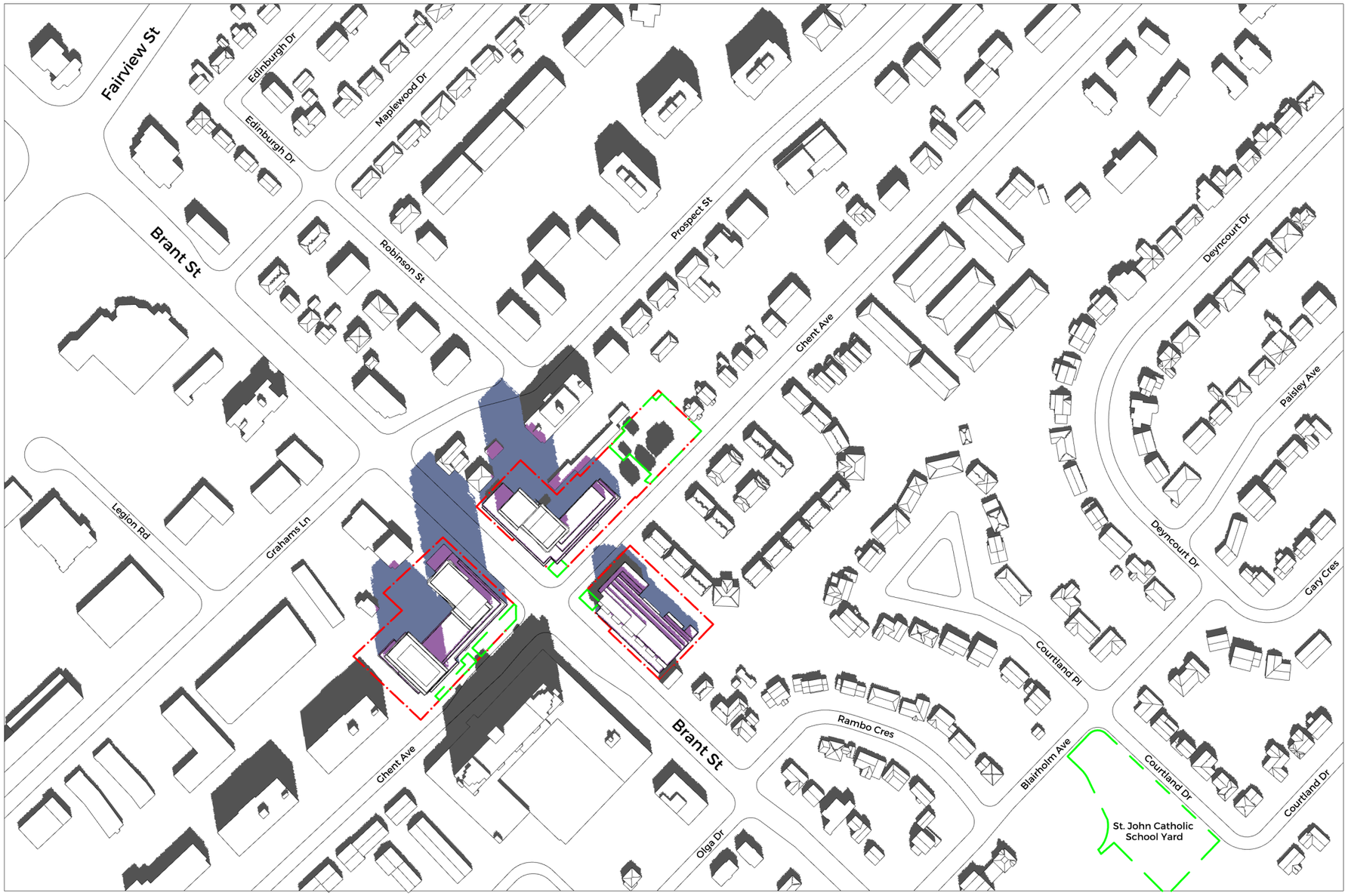
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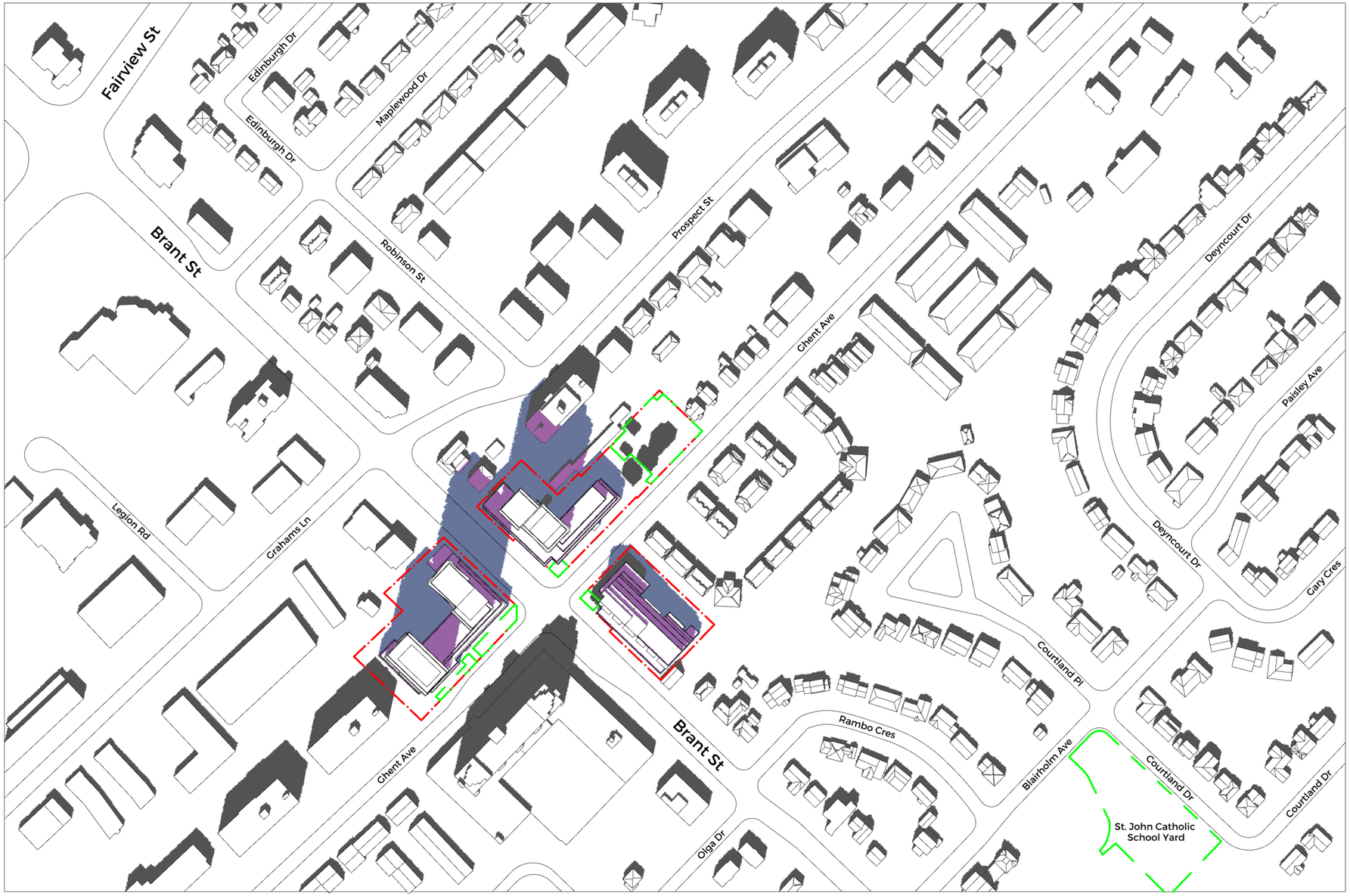
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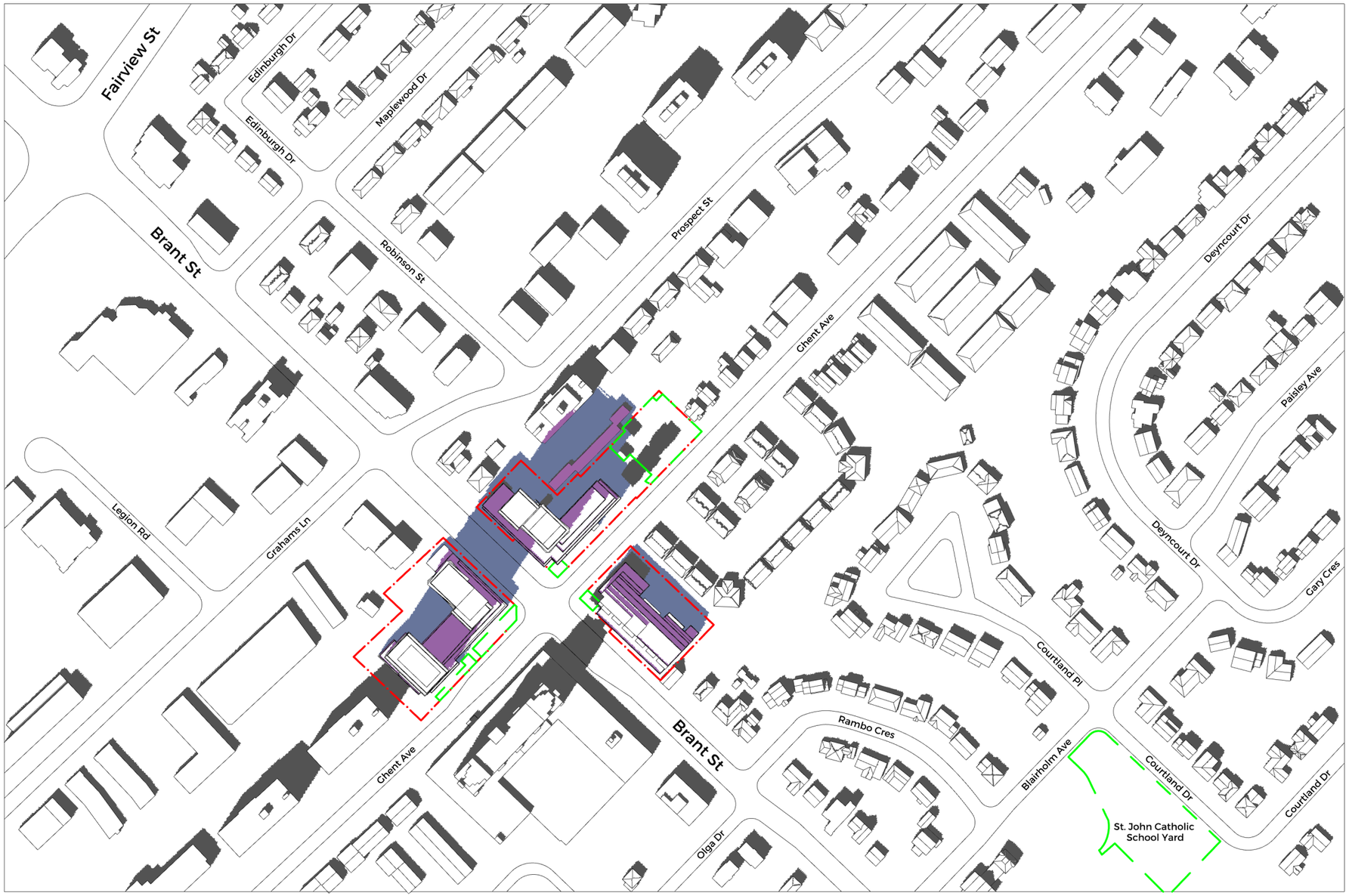
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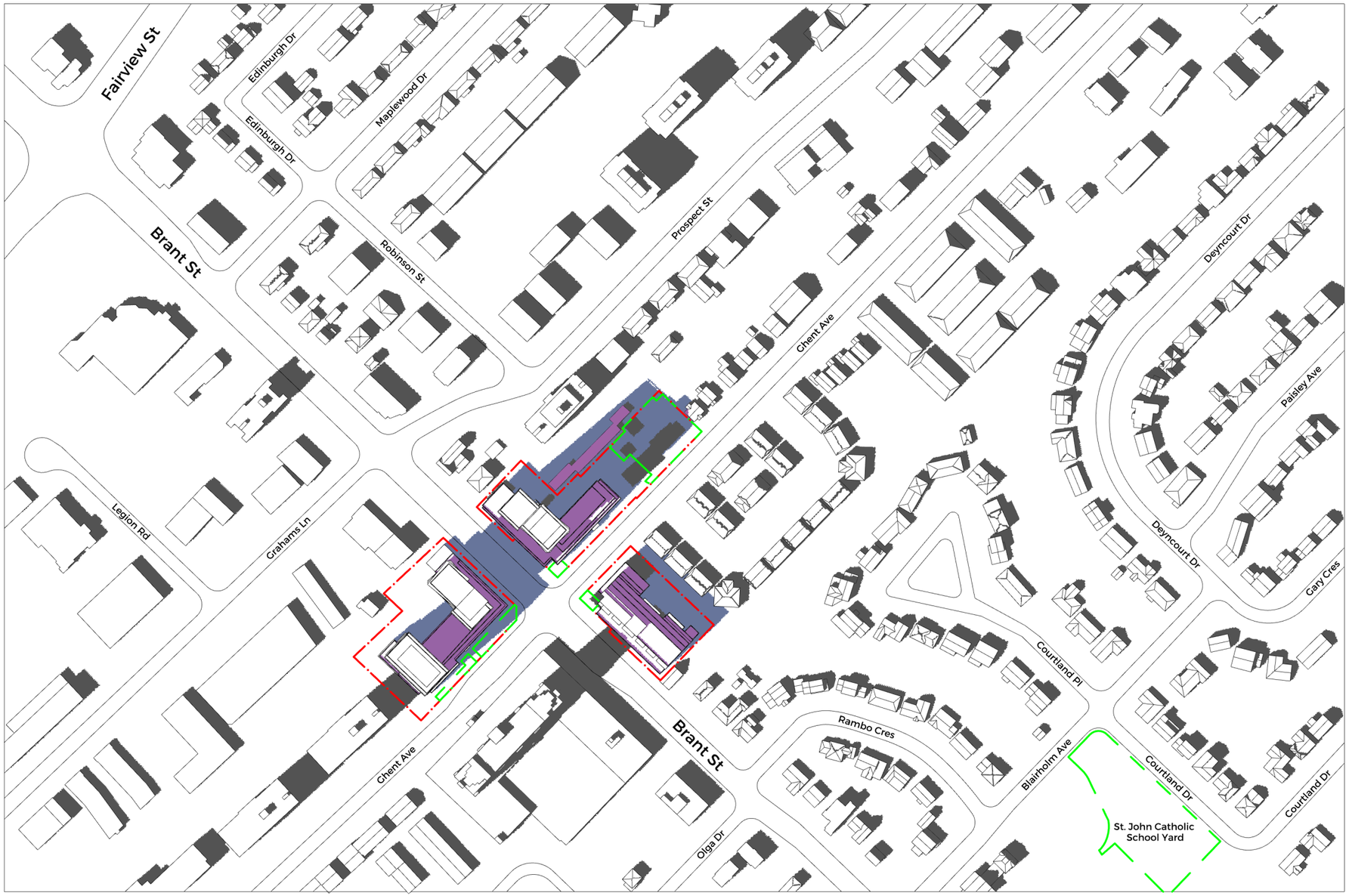
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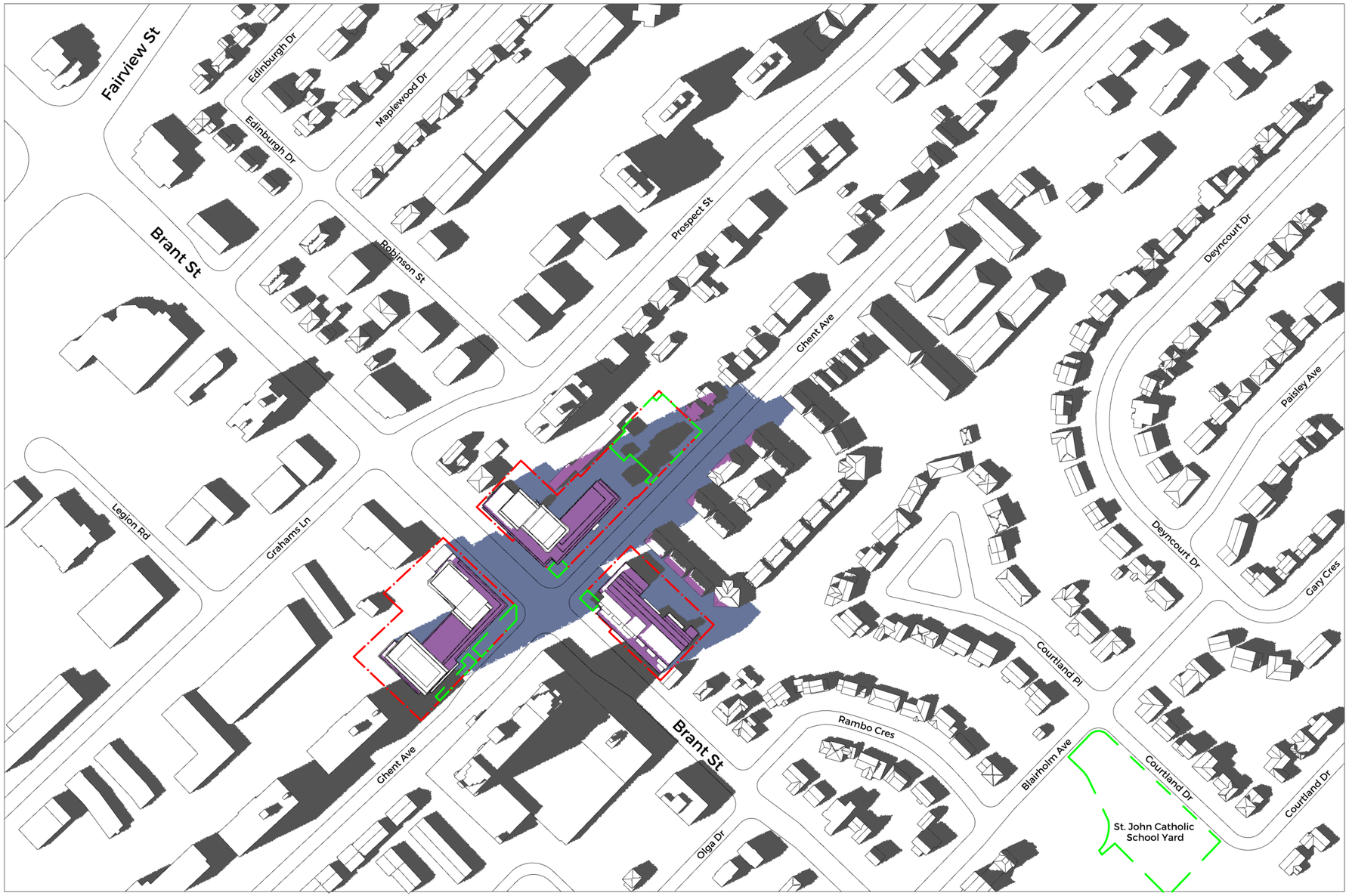
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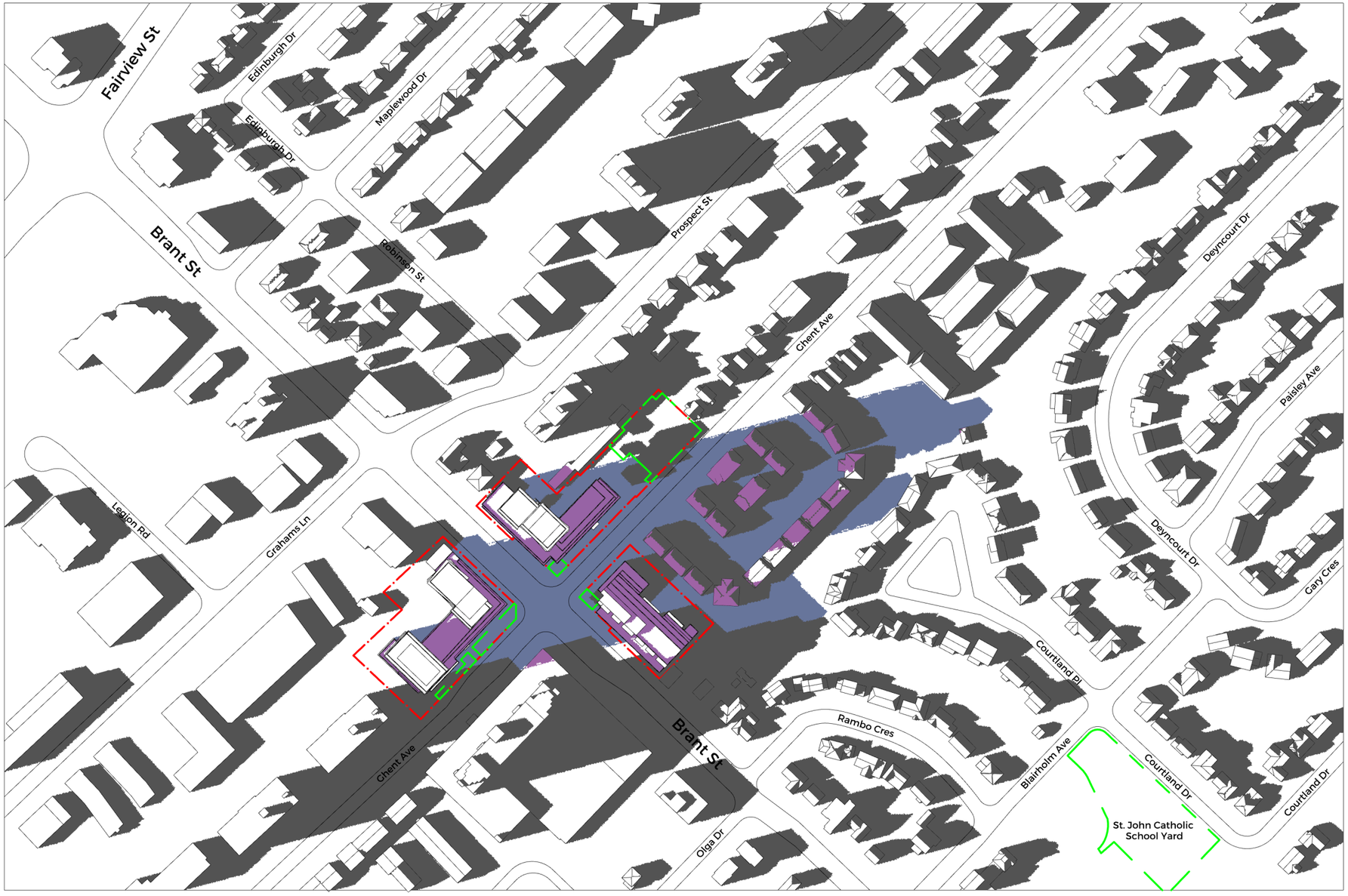
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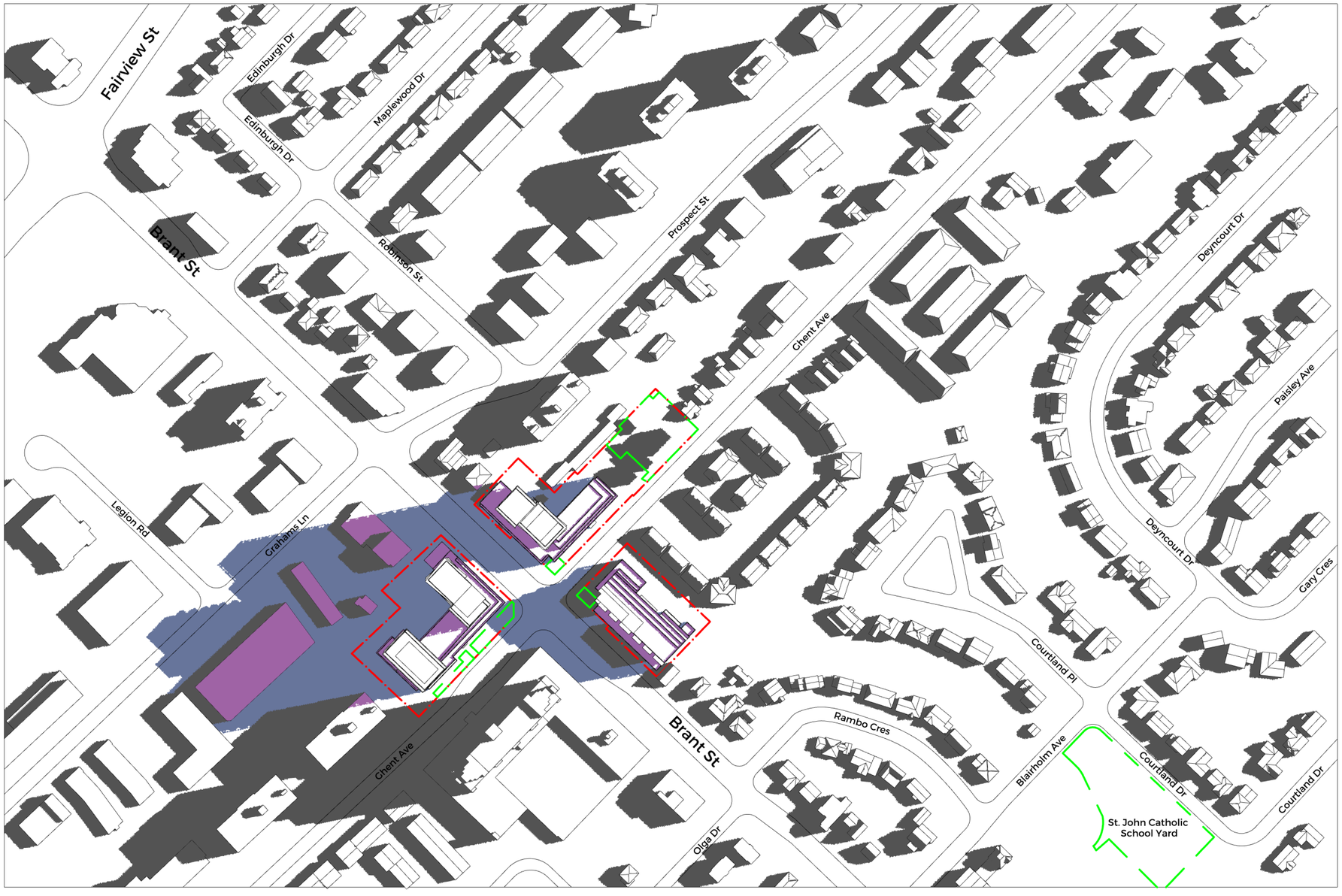
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Sun Shade Assessment

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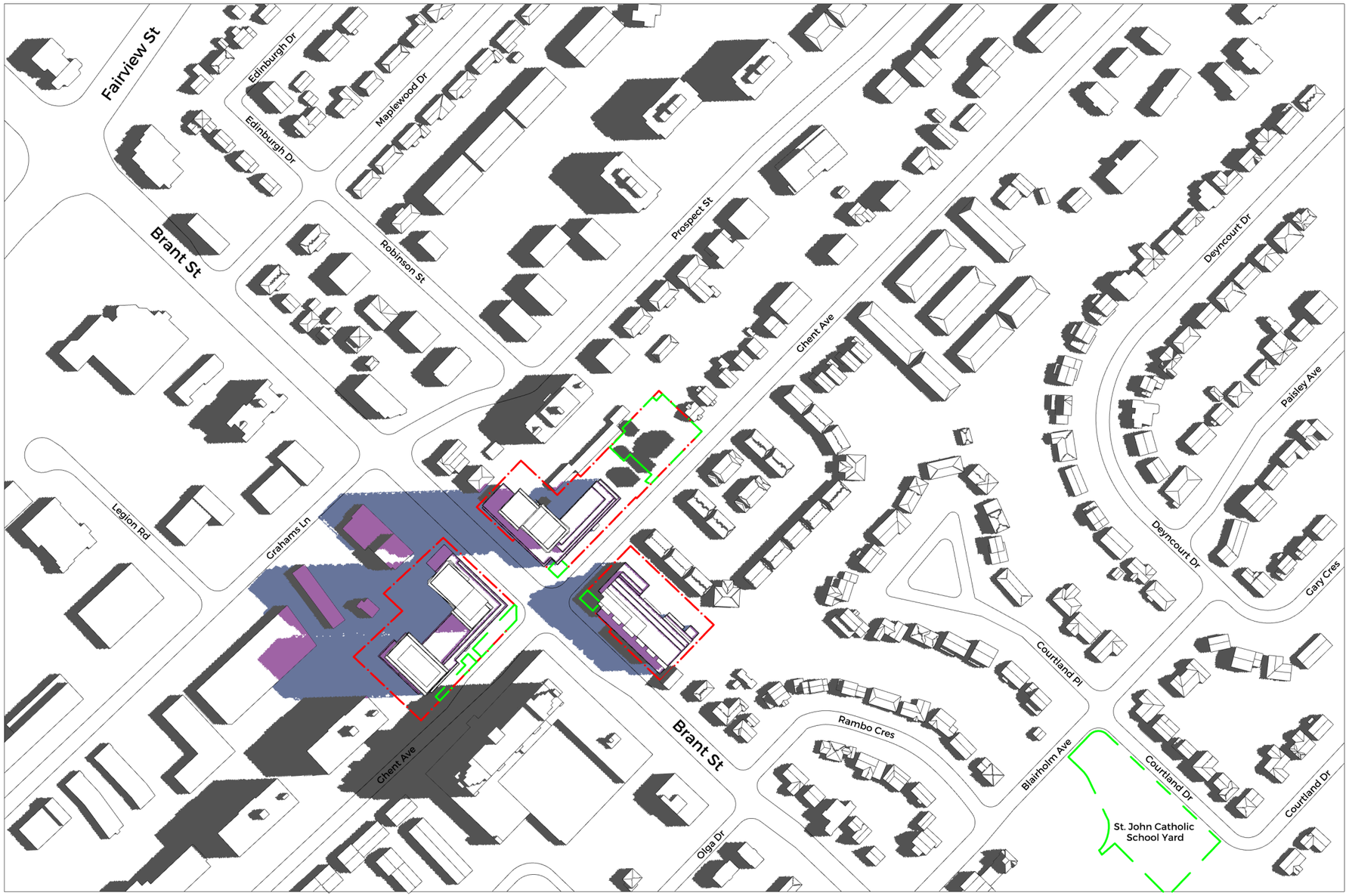
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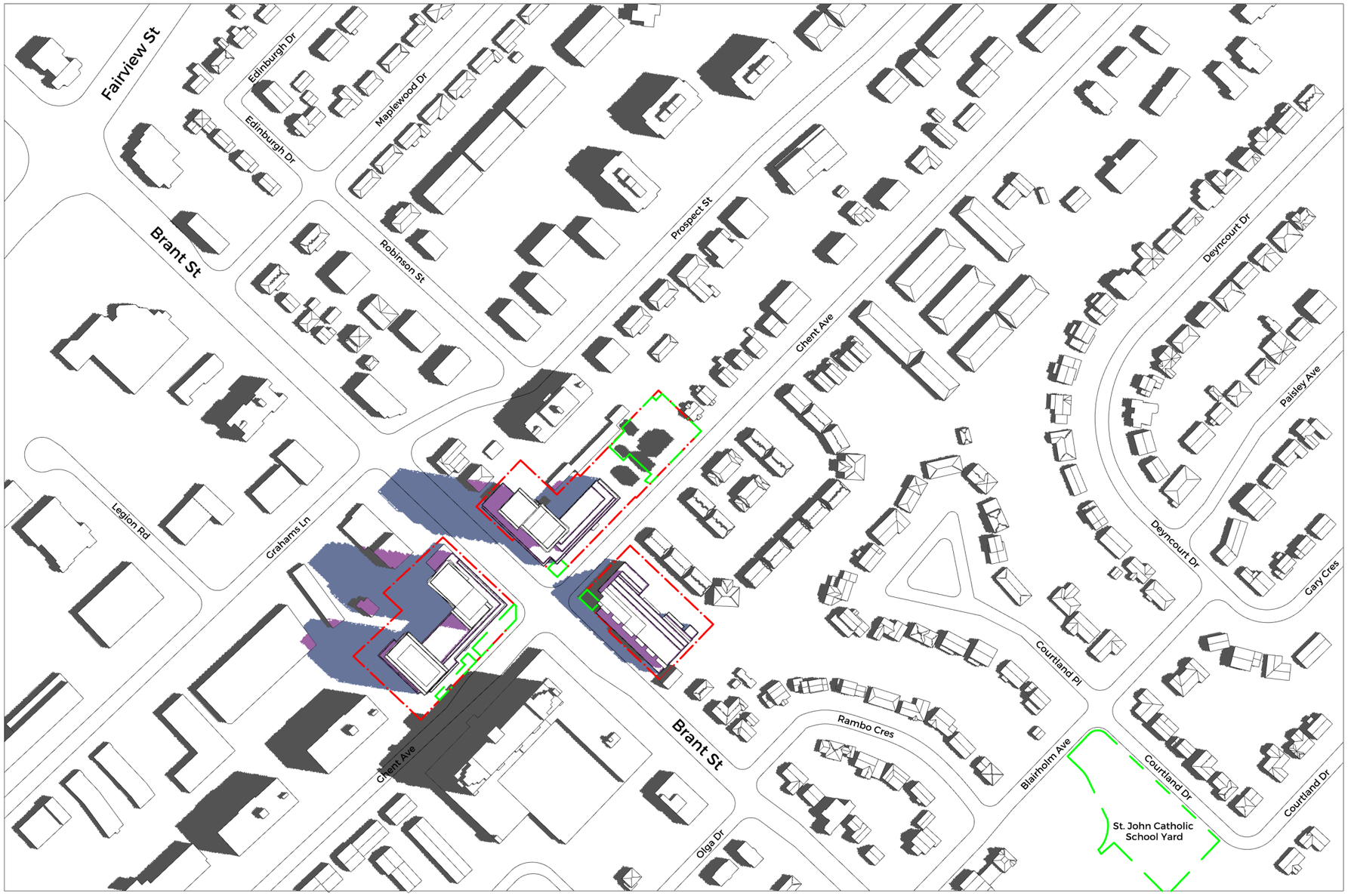
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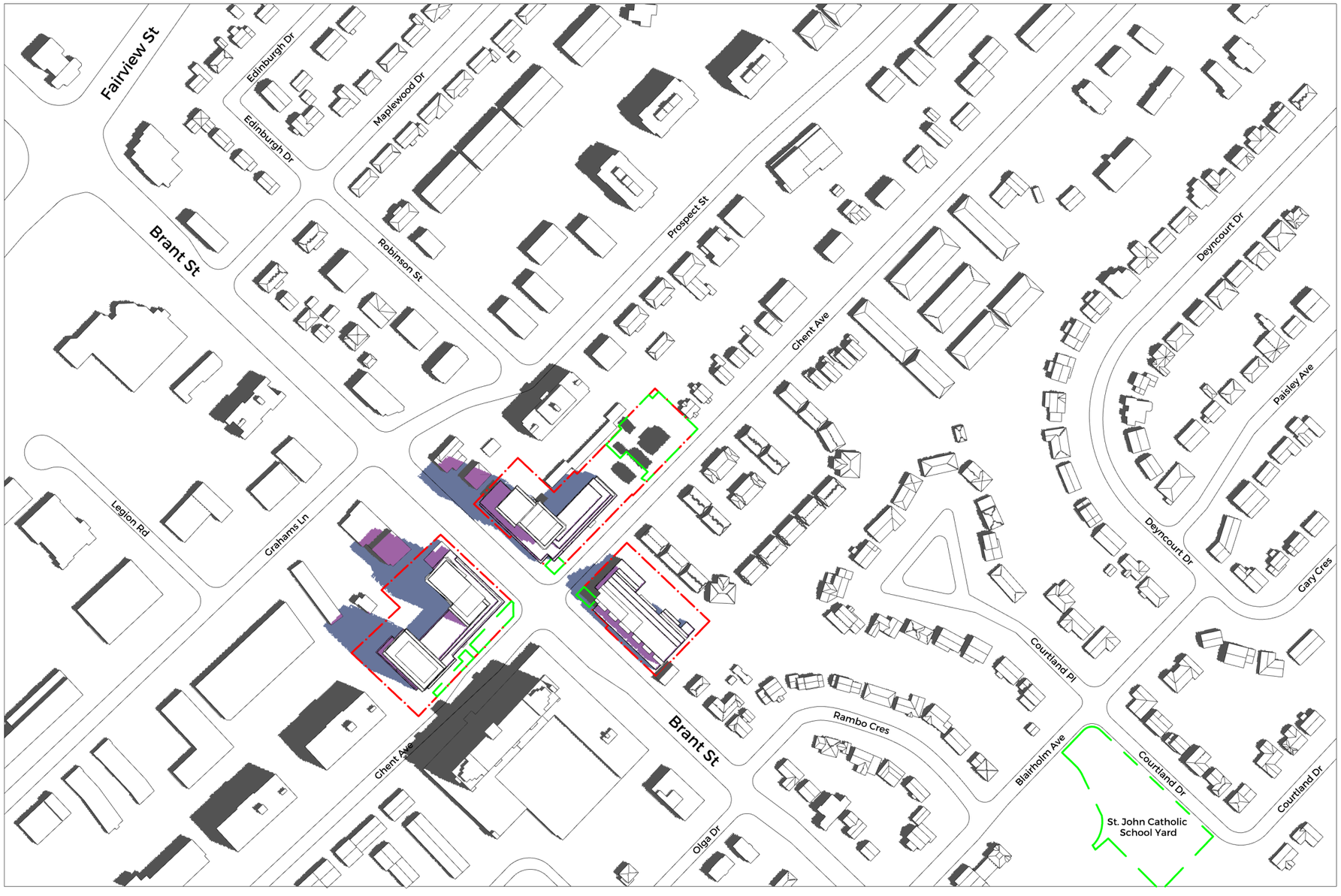
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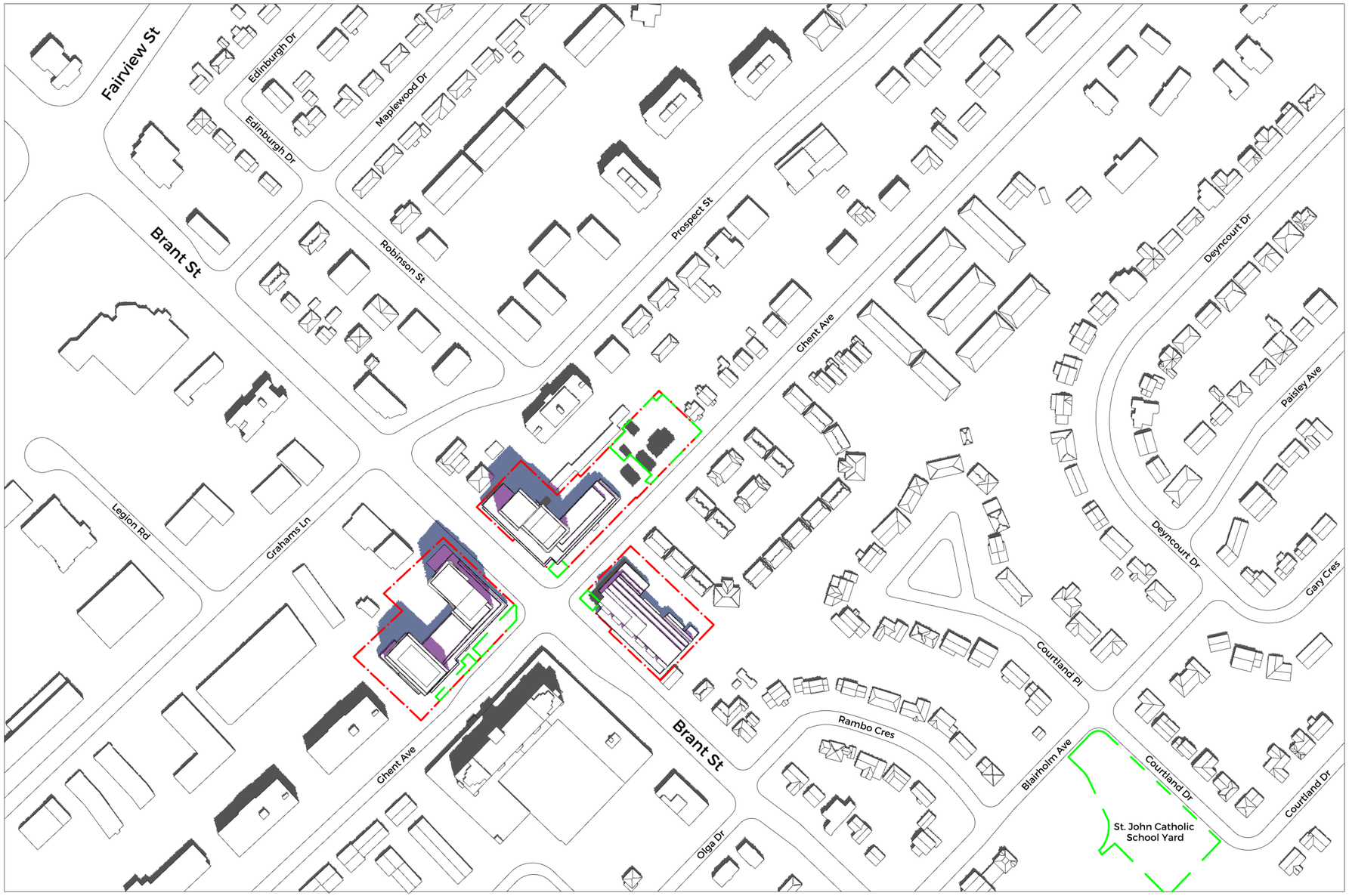
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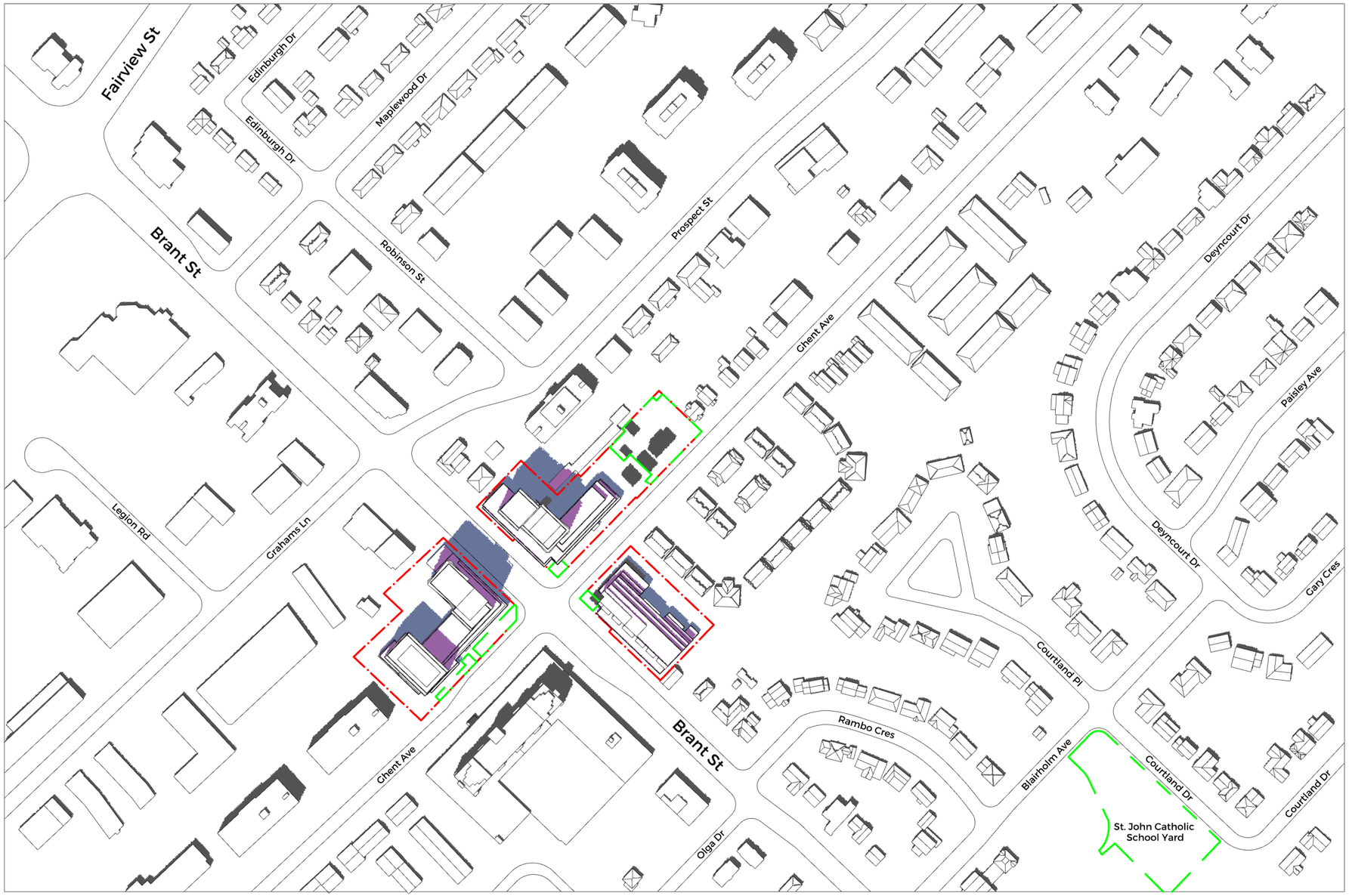
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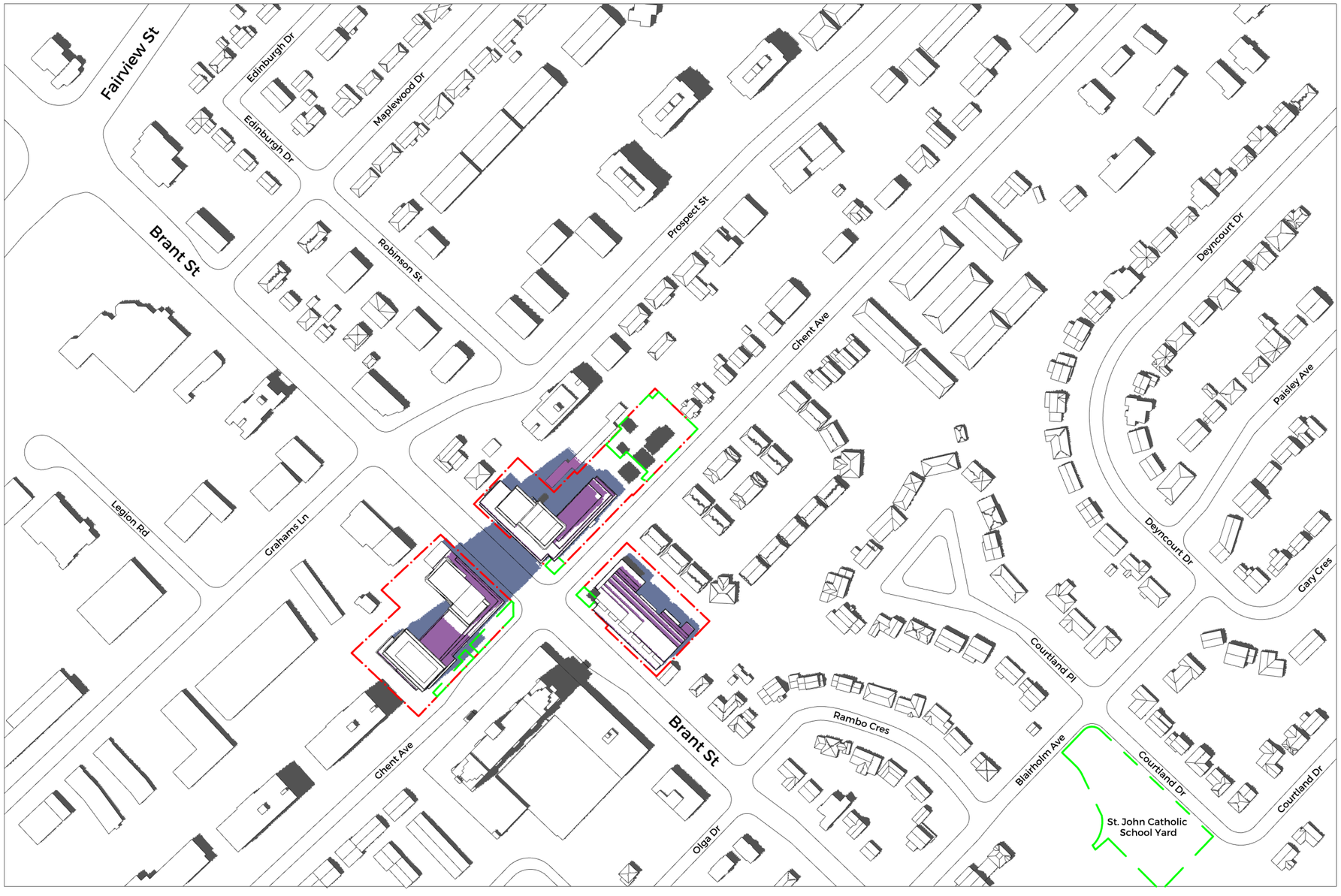
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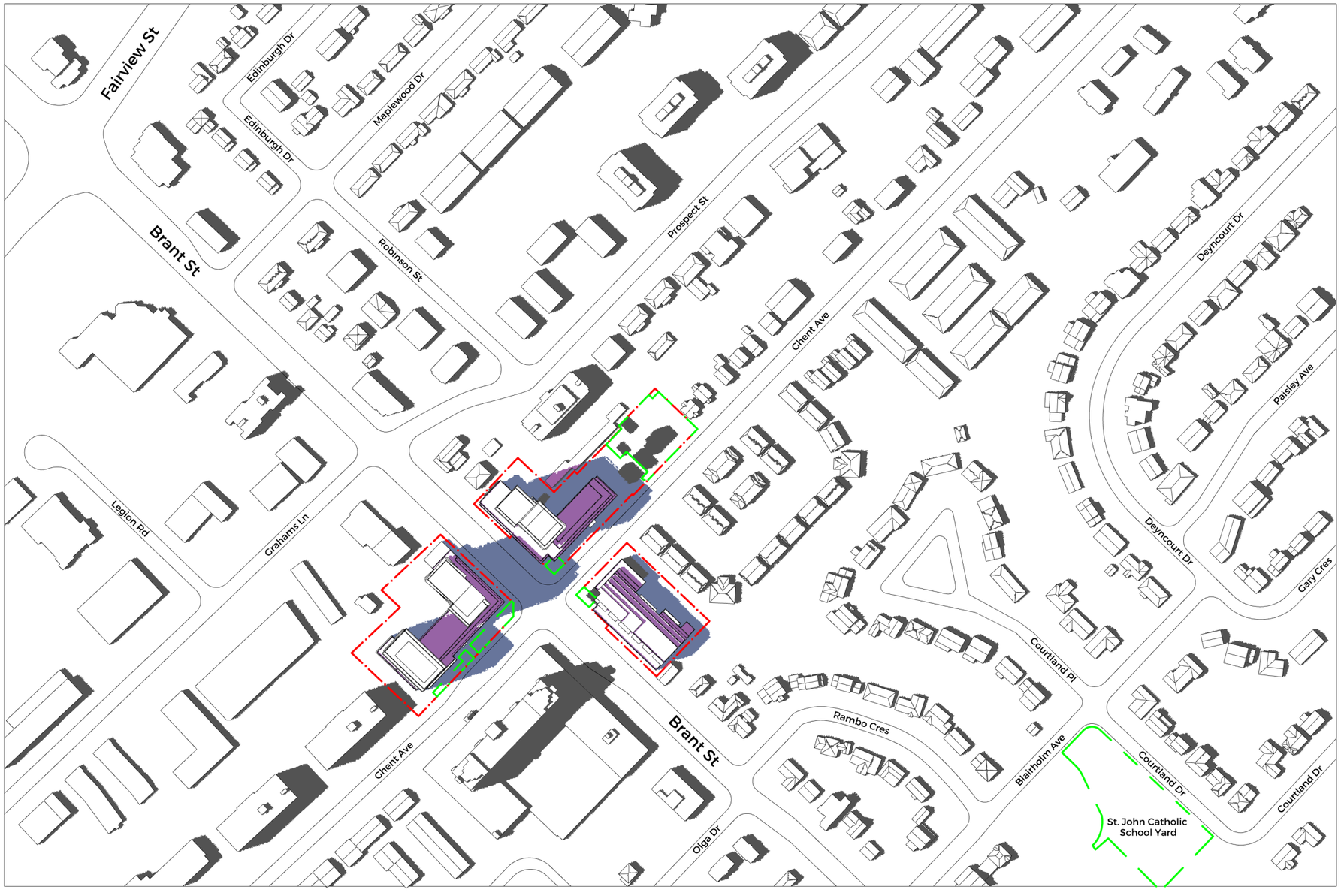
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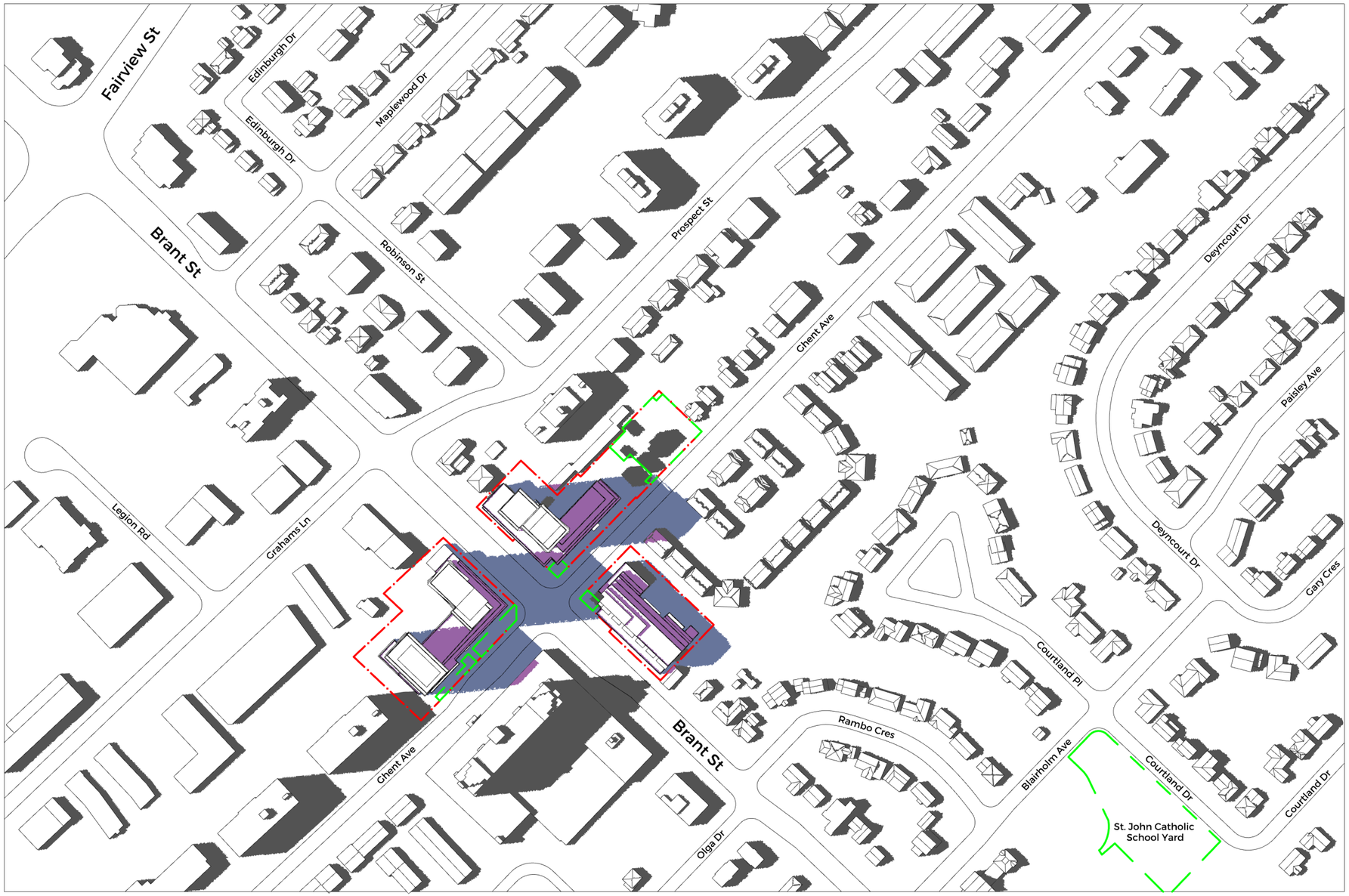
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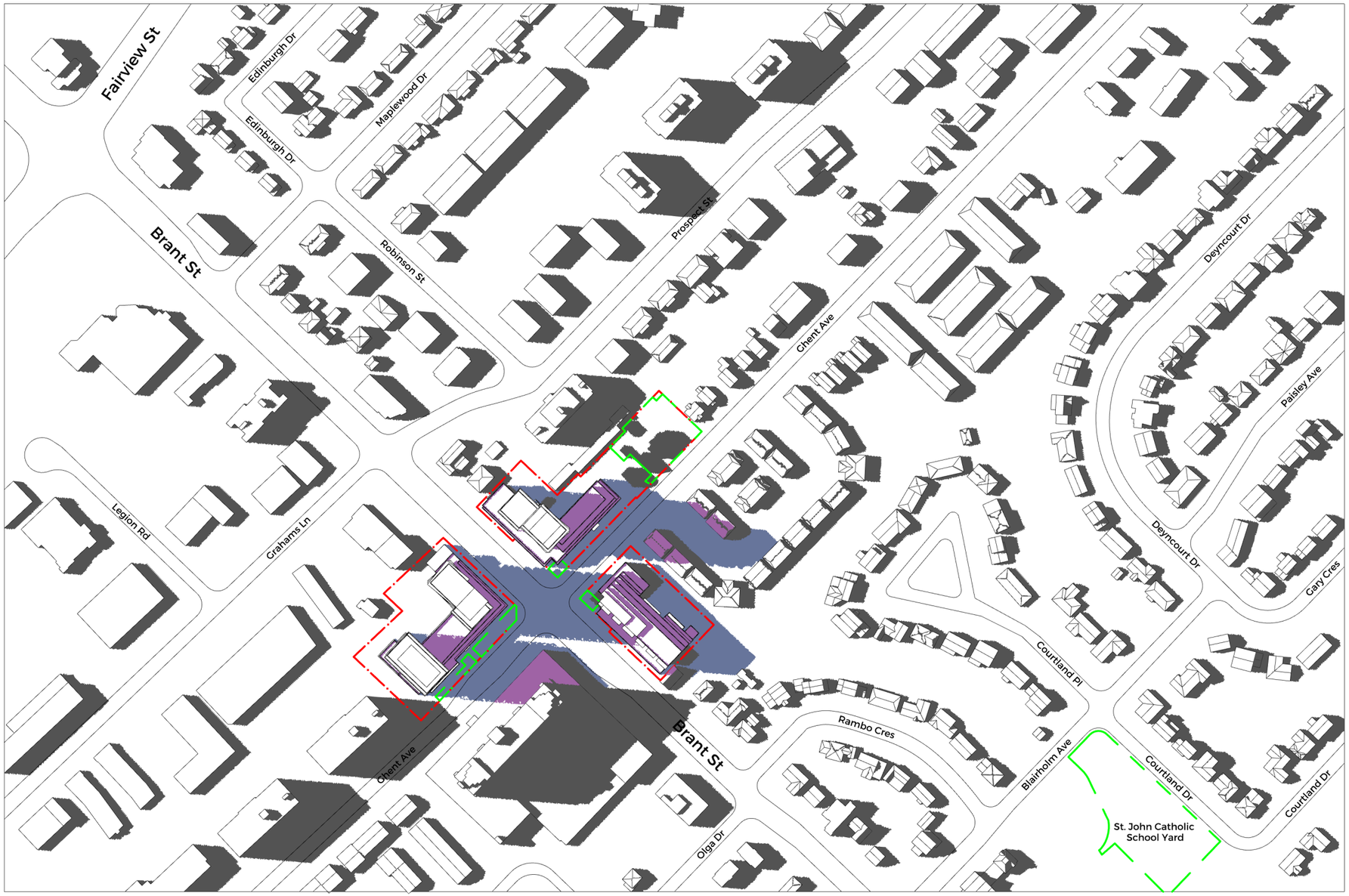
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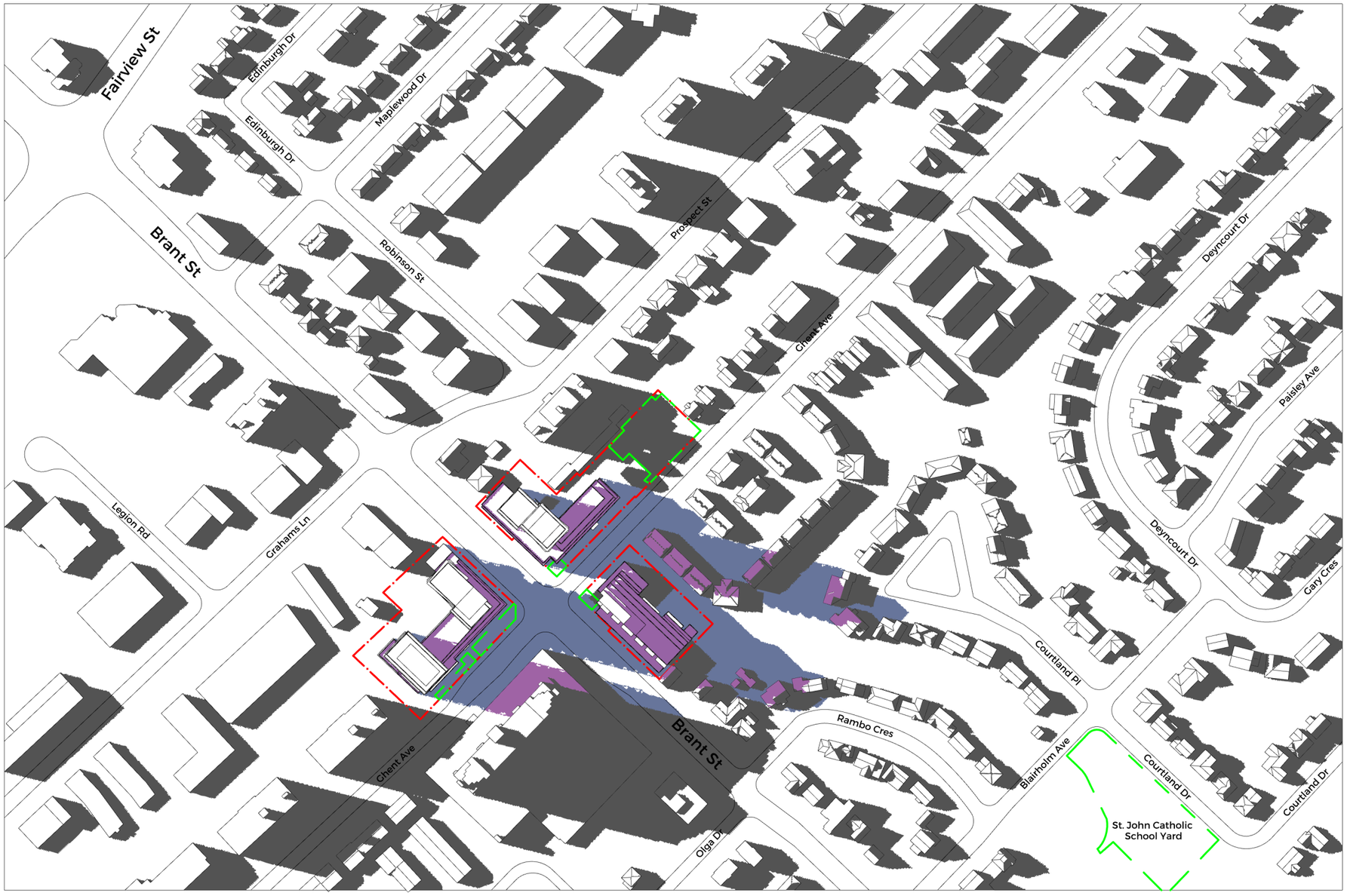
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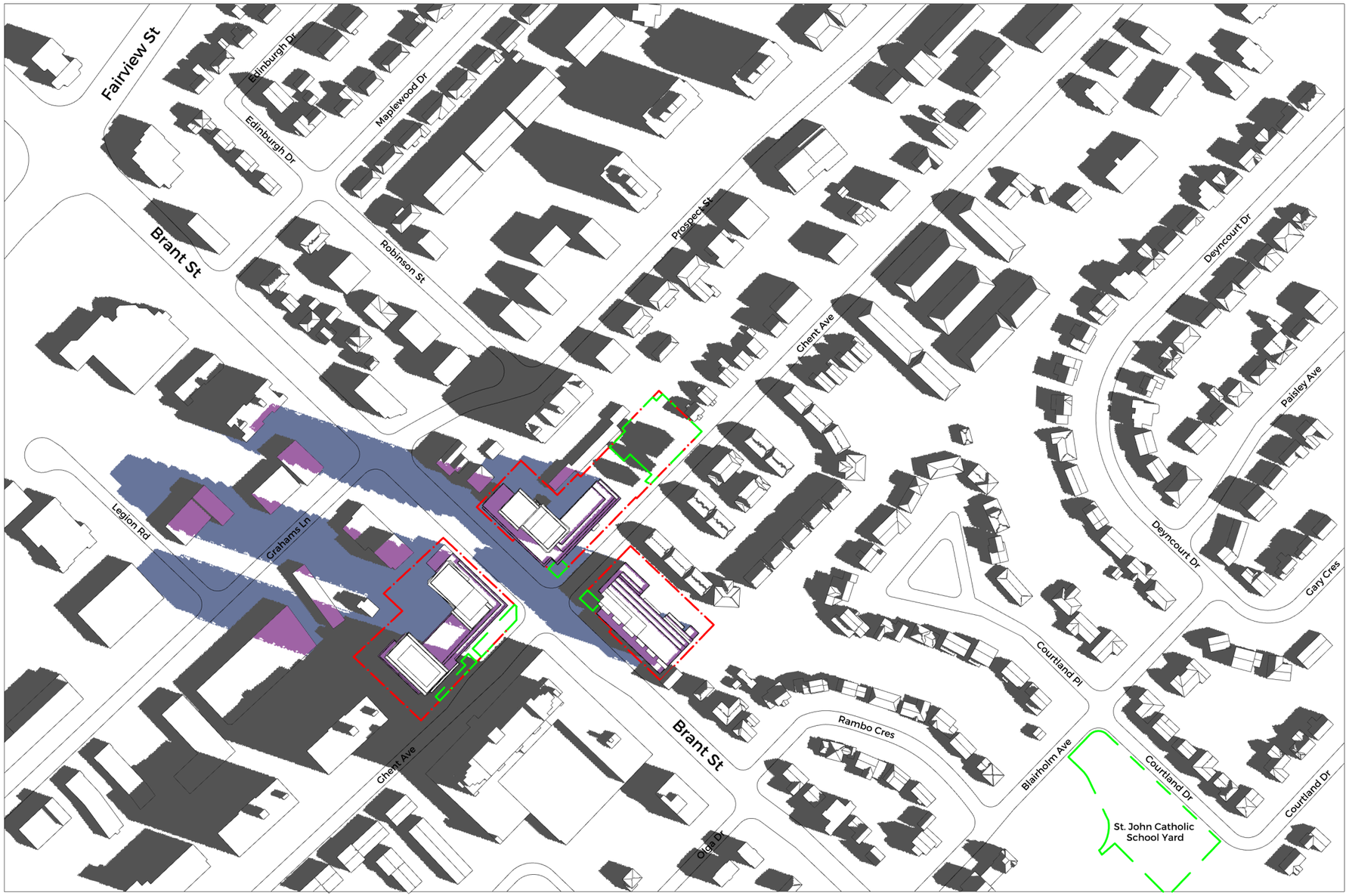
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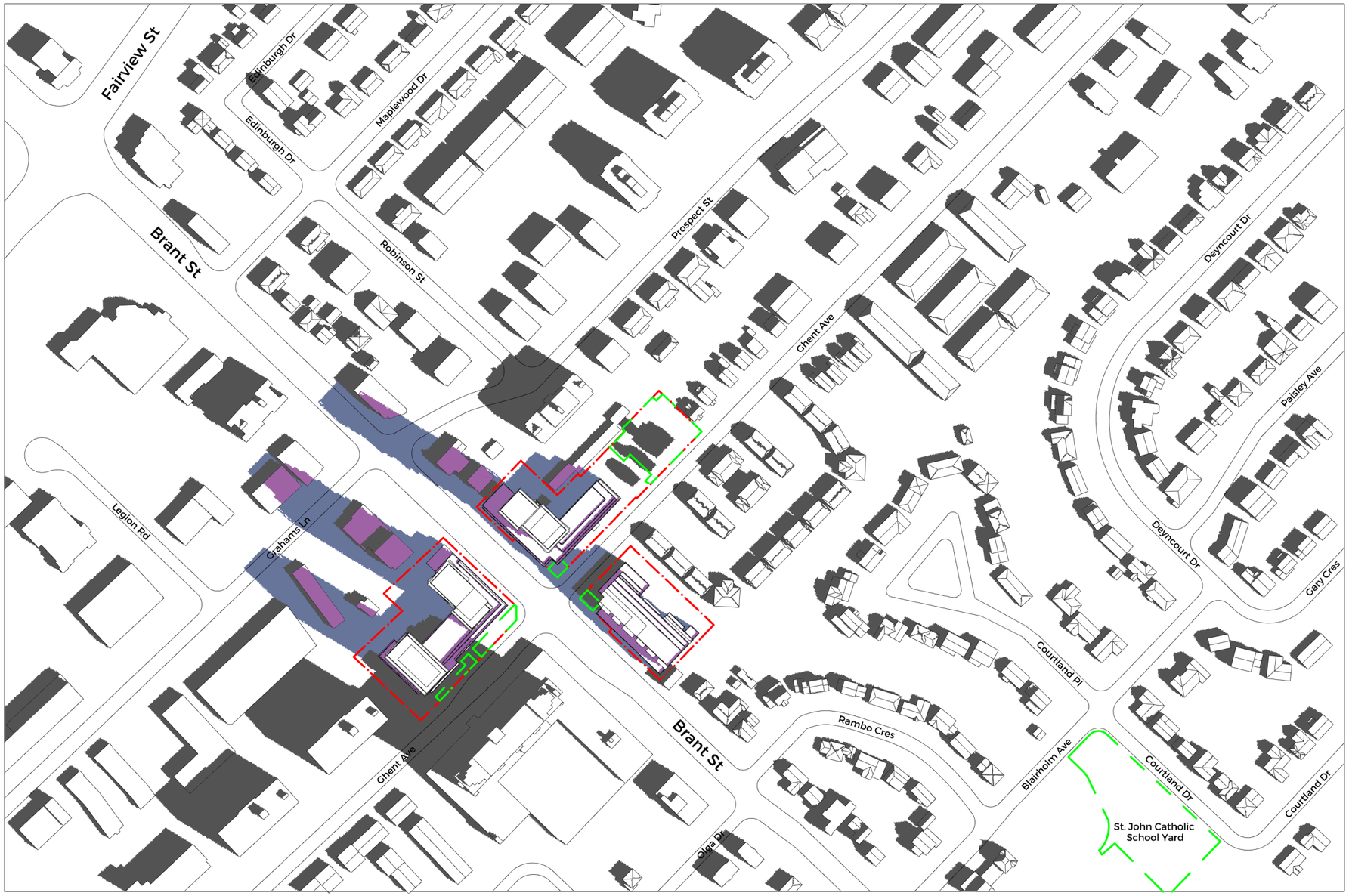
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Project # 2004219

- Net New Shadows Cast on Roof Surfaces
- Net New Shadows Cast on Ground Surfaces
- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 10:00 EDT

Brant & Ghent - Burlington, ON
Project # 2004219

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- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 11:00 EDT

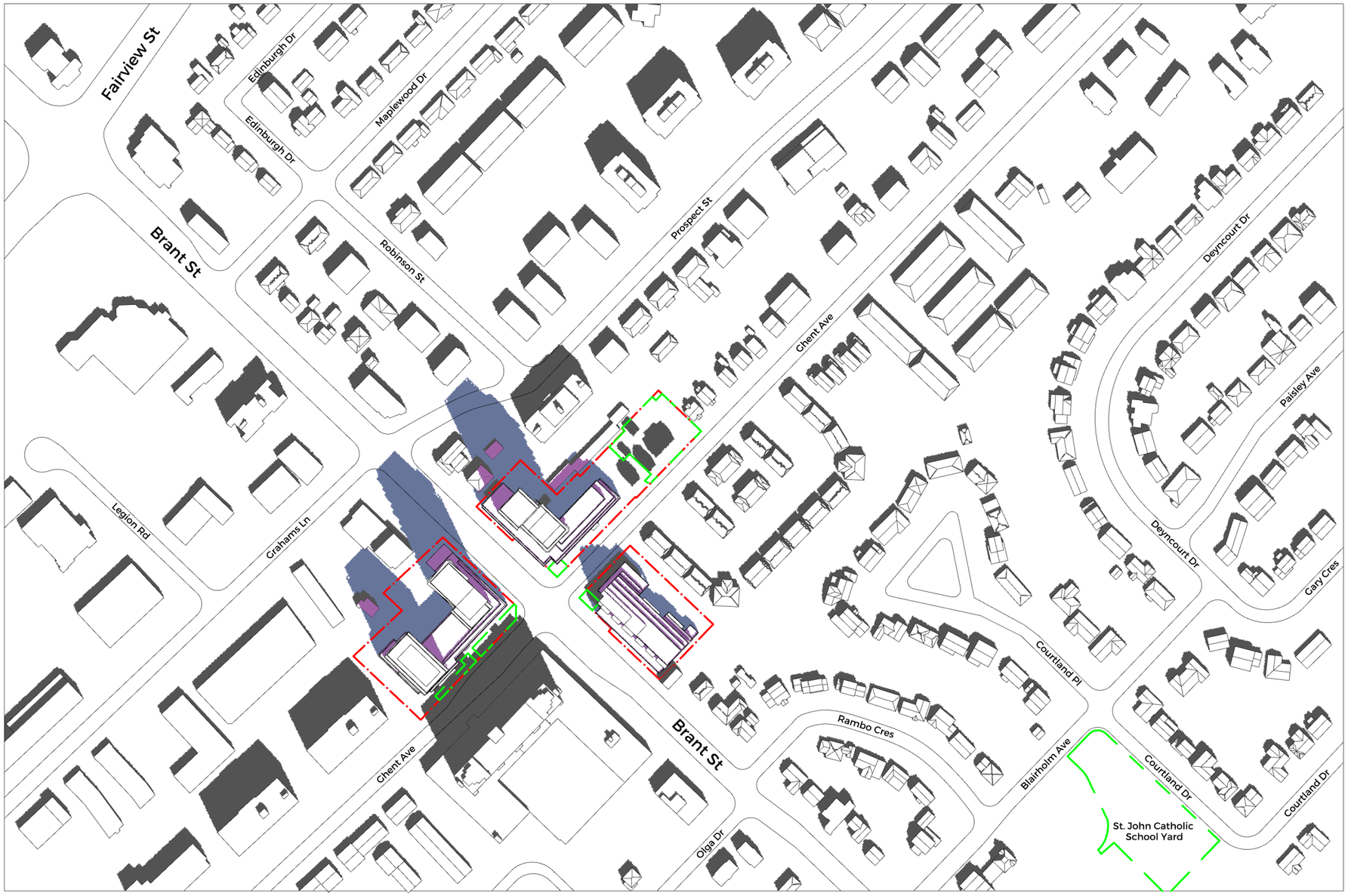
Brant & Ghent - Burlington, ON
Project # 2004219

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- Net New Shadows Cast on Ground Surfaces
- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 12:00 EDT

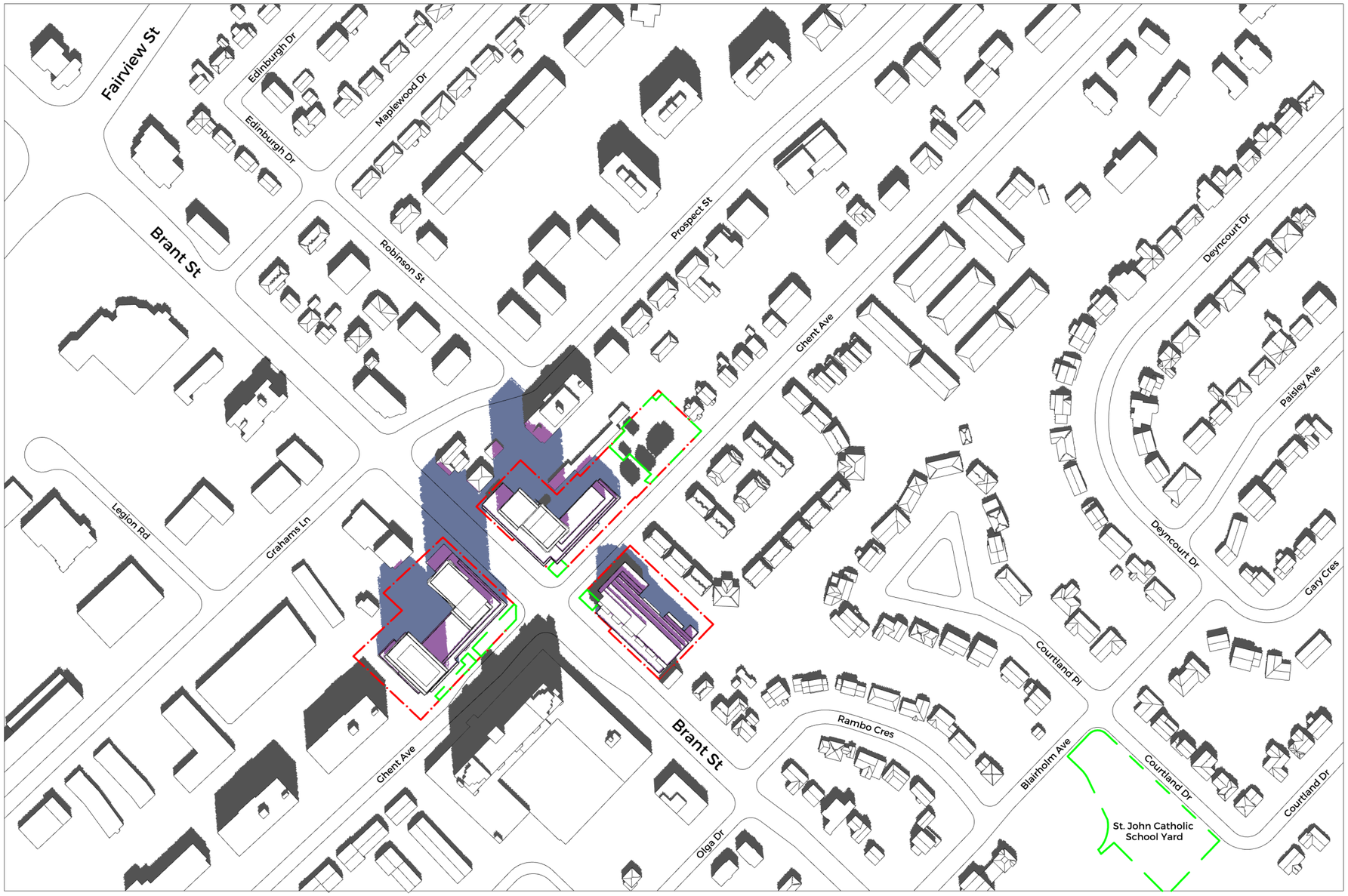
Brant & Ghent - Burlington, ON
Project # 2004219

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- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 13:00 EDT

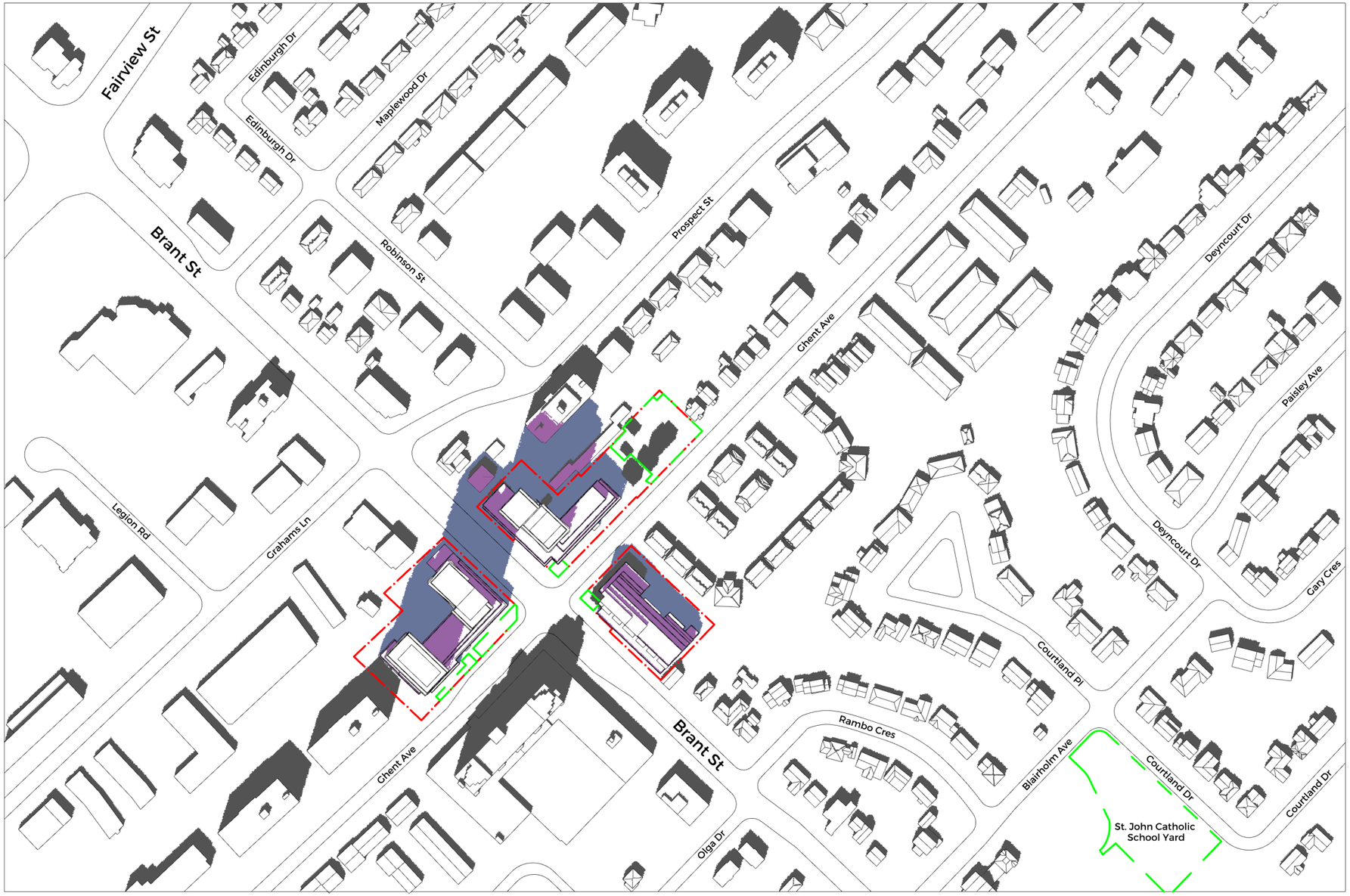
Brant & Ghent - Burlington, ON
Project # 2004219

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- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 14:00 EDT

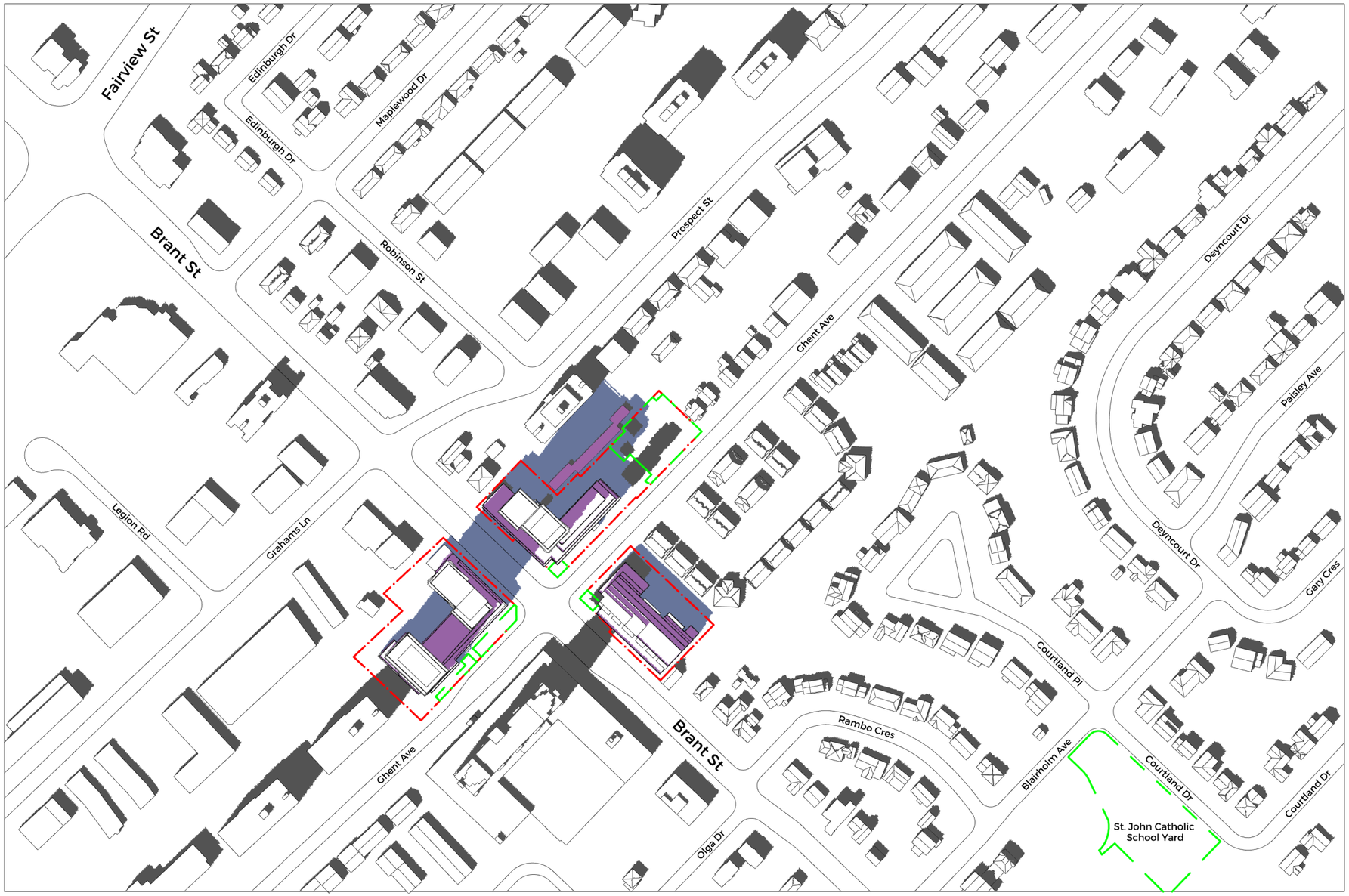
Brant & Ghent - Burlington, ON
Project # 2004219

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- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 15:00 EDT

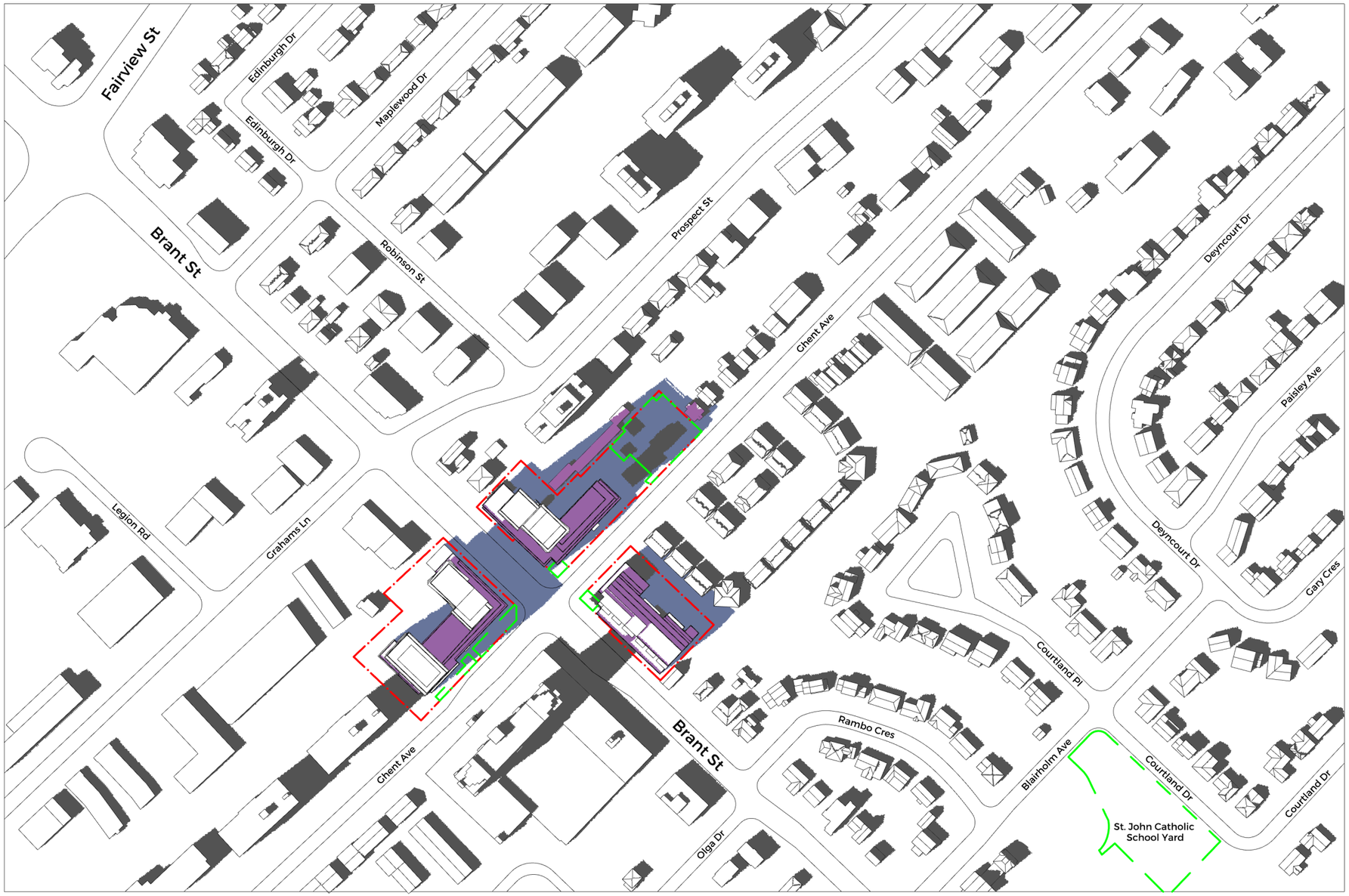
Brant & Ghent - Burlington, ON
Project # 2004219

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- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 16:00 EDT

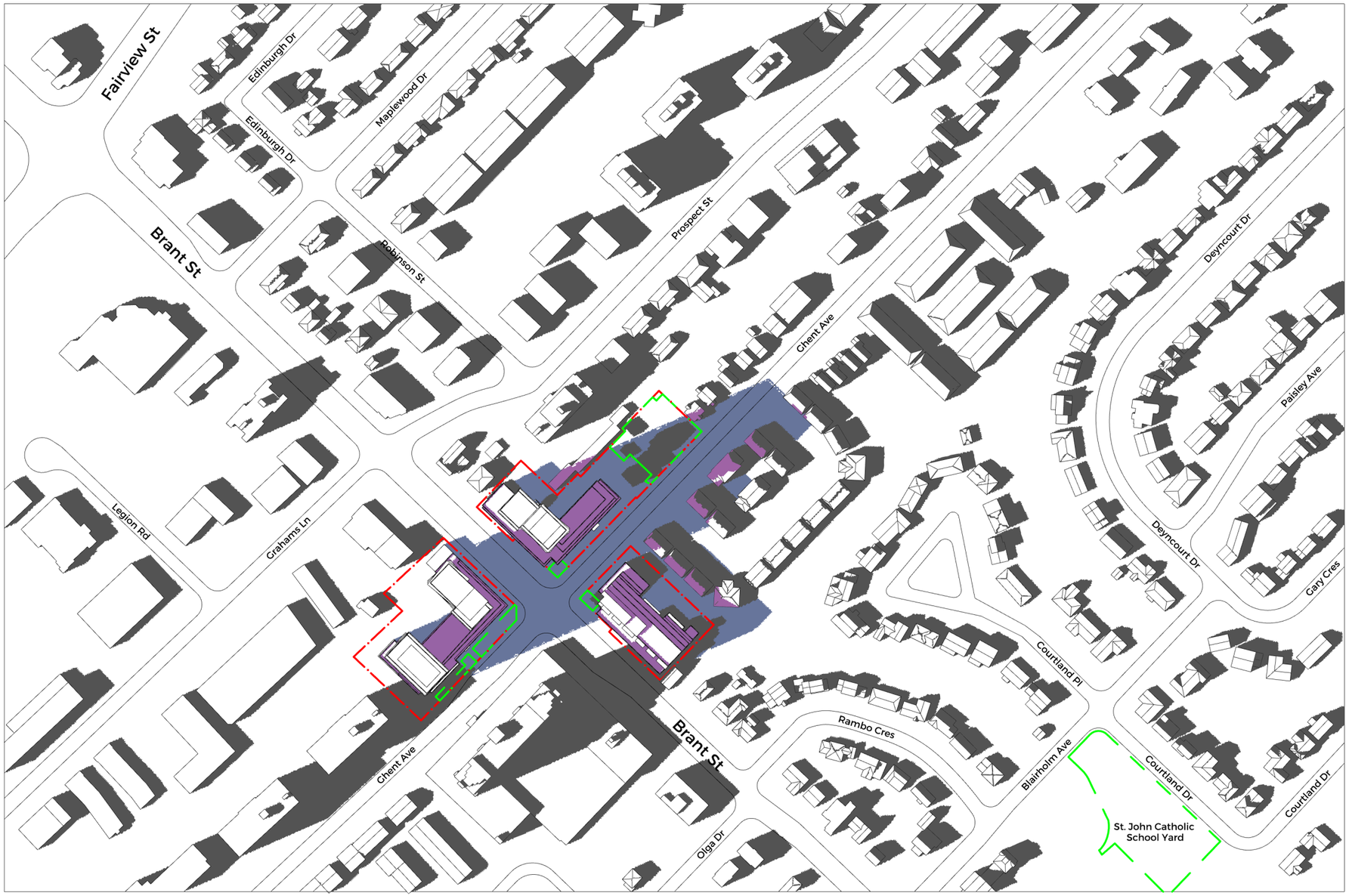
Brant & Ghent - Burlington, ON
Project # 2004219

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- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 17:00 EDT

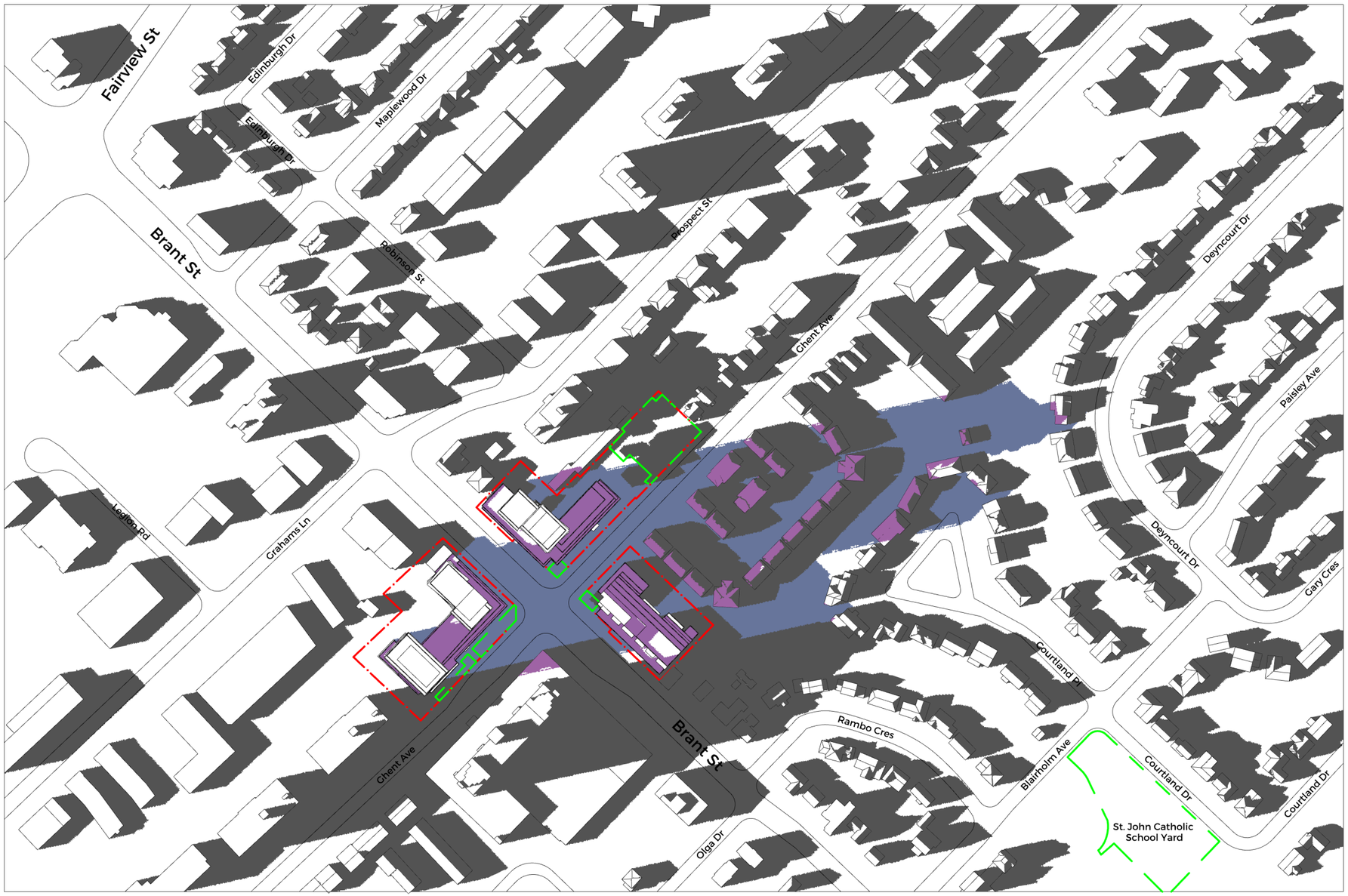
Brant & Ghent - Burlington, ON
Project # 2004219

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- Shadows Cast by Existing Buildings on All Surfaces
- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | September 21st, 18:00 EDT

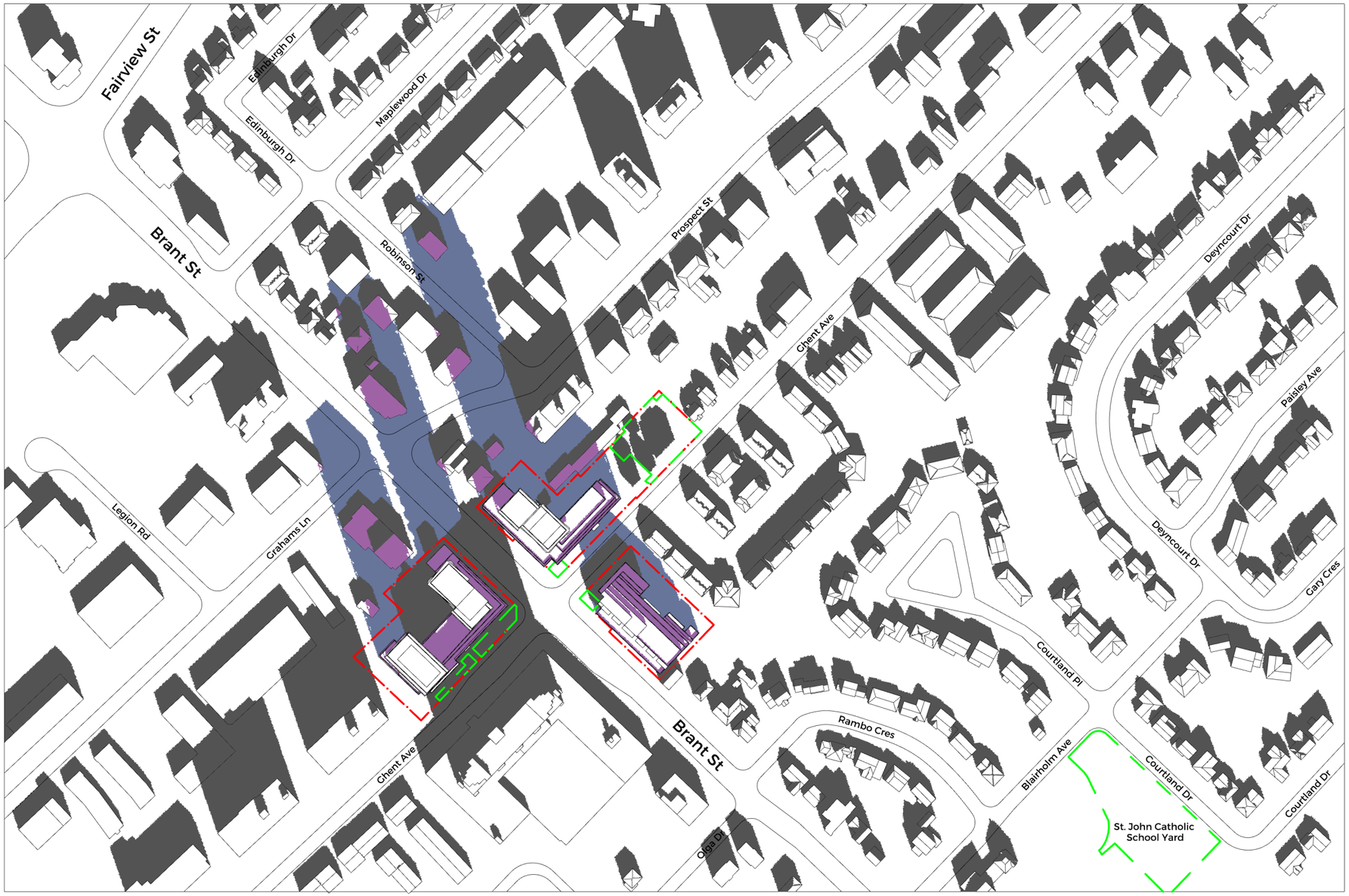
Brant & Ghent - Burlington, ON
Project # 2004219

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- Open Space
- Site Boundary

True North

Scale = 1:3000

0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | December 21st, 11:00 EST

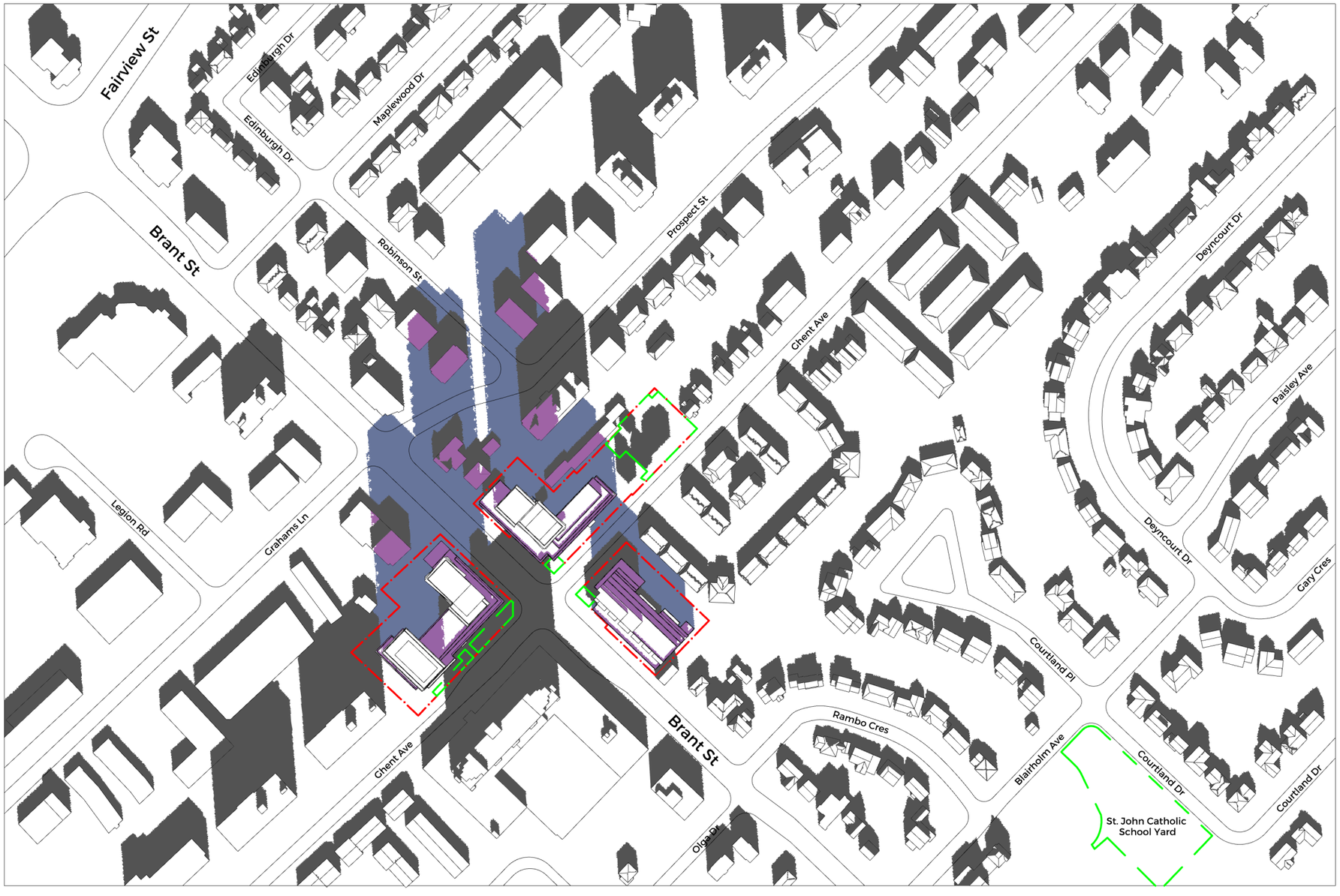
Brant & Ghent - Burlington, ON
Project # 2004219

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- Open Space
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True North

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0 25 50 75 150 m



Sun Shade Assessment

Proposed Site Configuration | December 21st, 12:00 EST

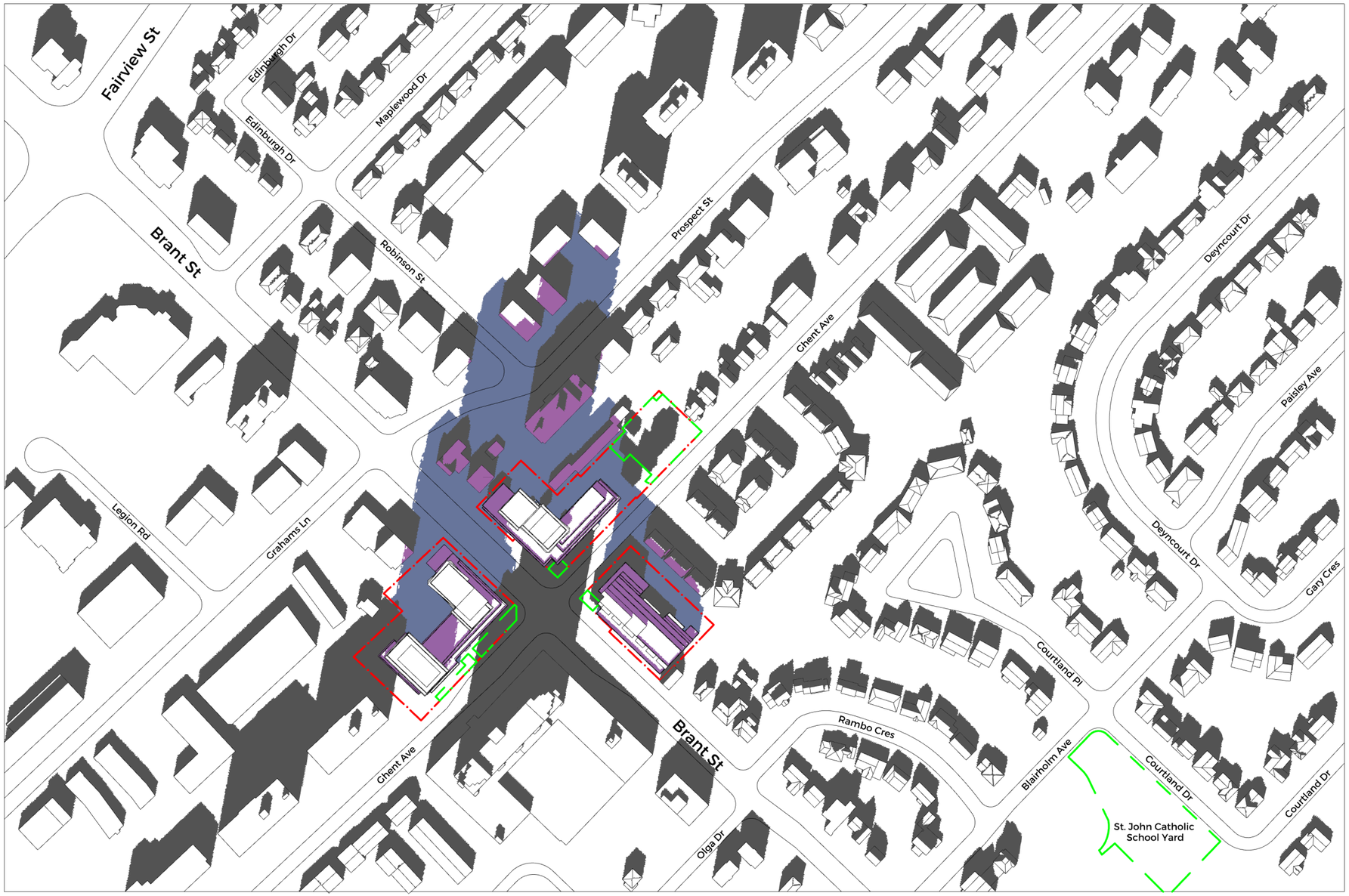
Brant & Ghent - Burlington, ON
Project # 2004219

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Sun Shade Assessment

Proposed Site Configuration | December 21st, 13:00 EST

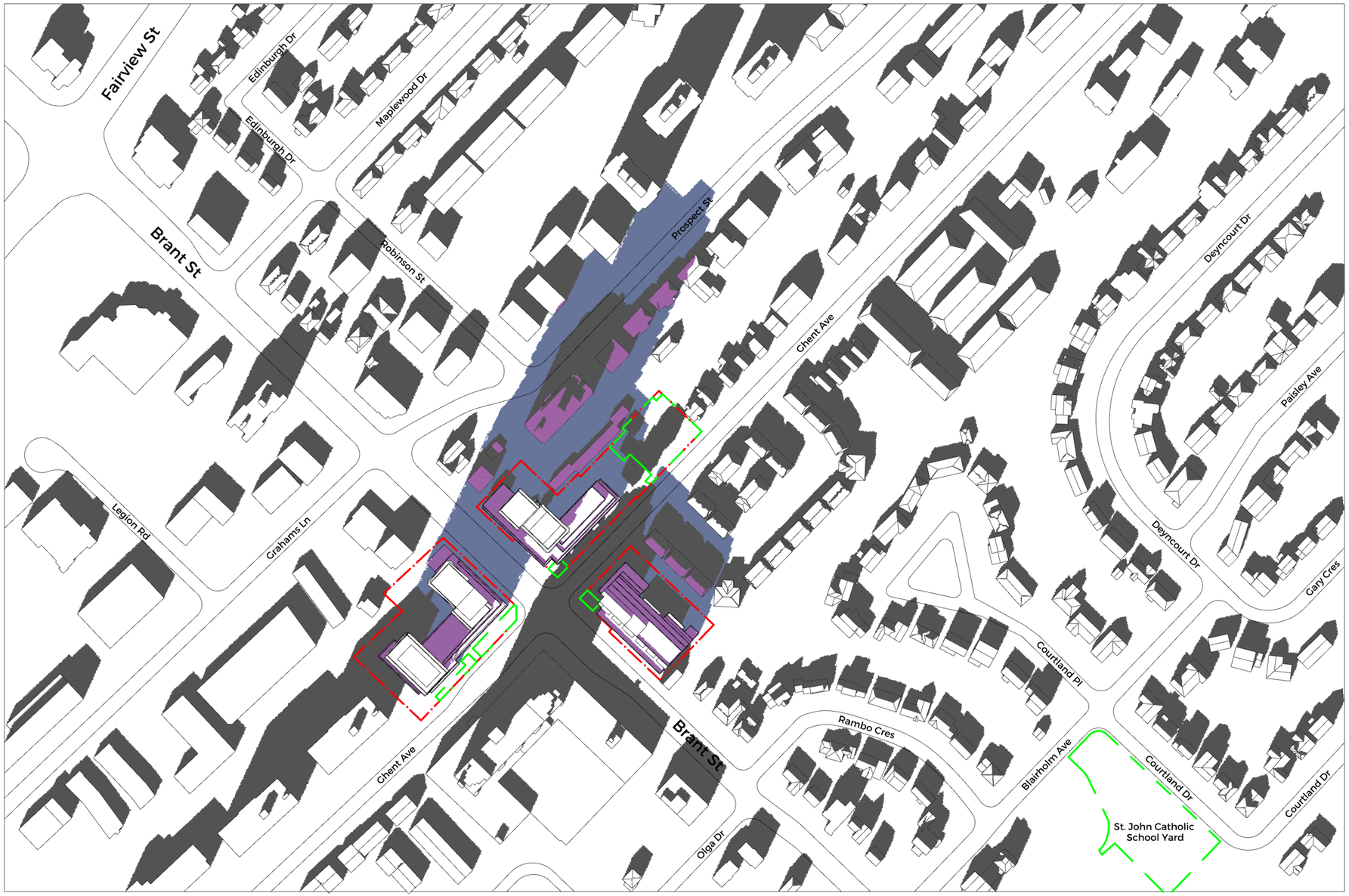
Brant & Ghent - Burlington, ON
Project # 2004219

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Sun Shade Assessment

Proposed Site Configuration | December 21st, 14:00 EST

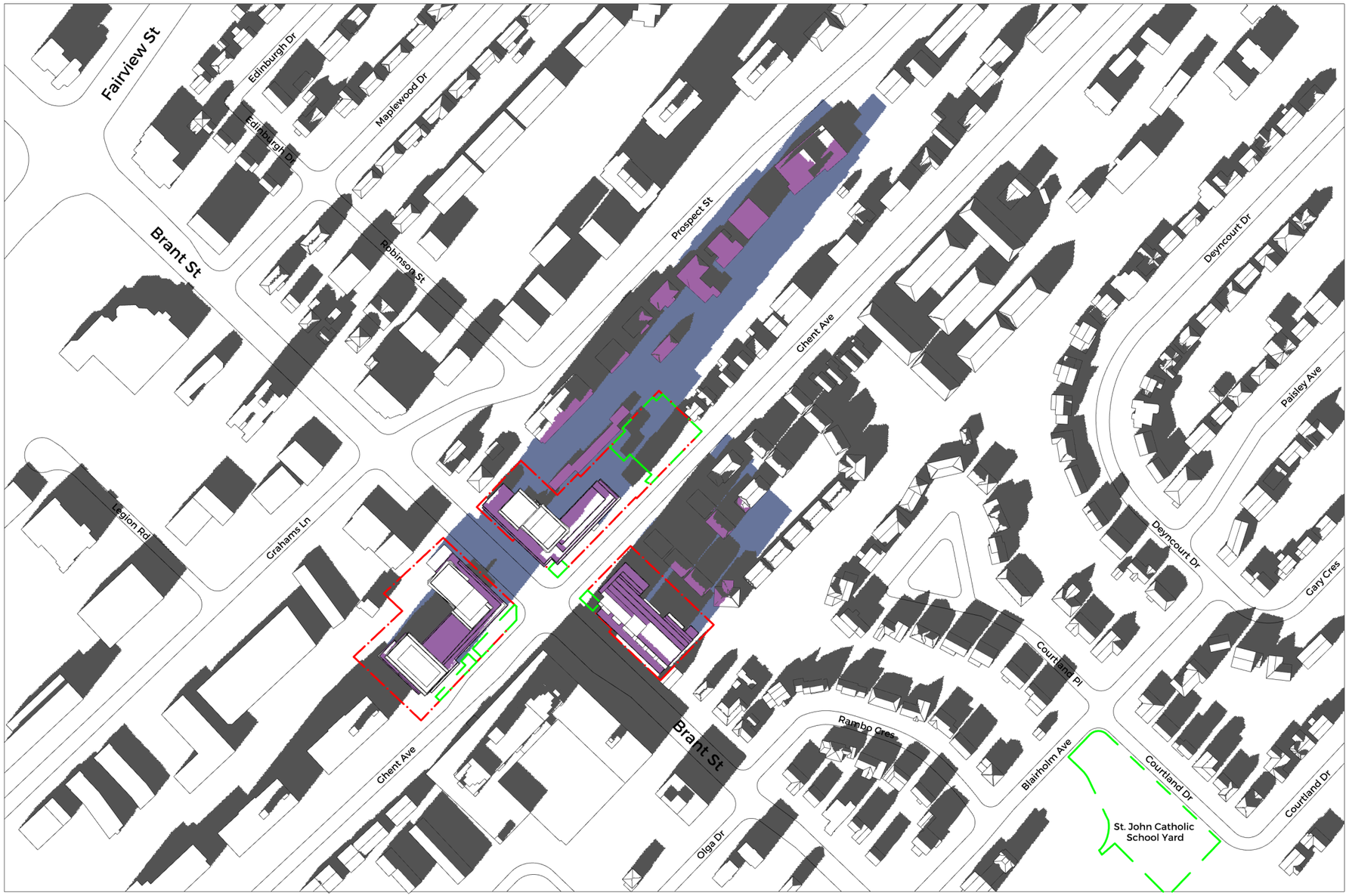
Brant & Ghent - Burlington, ON
Project # 2004219

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Sun Shade Assessment

Proposed Site Configuration | December 21st, 15:00 EST

Brant & Ghent - Burlington, ON
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