



*This rendering is for illustrative purposes only and the design is subject to further revision through the iterative design process.

The Woolverton

13 Mountain St & 19 Elm St

Sun Shadow Study

25 May, 2021

SvN

Prepared For:
Valentine Coleman 1 Inc. &
Valentine Coleman 2 Inc.

Table of Contents

1.0 Introduction	
1.1 Executive Summary	2
1.2 Methodology	3
2.0 Shadow Study Analysis	
2.1 September 21 (March 21) - Equinox	4
2.2 June 21 - Summer Solstice	5
2.3 December 21 - Winter Solstice	6
2.4 Site Design (Comparison with As-of-Right Building Massing)	7
2.5 Conclusion	7
3.0 Shadow Study - Equinox	
3.1 September 21 (March 21) - Equinox	8
4.0 Shadow Study - Summer Solstice	
4.1 June 21 - Summer Solstice	14
5.0 Shadow Study - Winter Solstice	
5.1 December 21 - Winter Solstice	22
6.0 Appendix	
6.1 Terms of Reference	26

1.0 Introduction

1.1 Executive Summary

Introduction

SvN Architects + Planners Inc. has prepared this Sun Shadow Study on behalf of Valentine Coleman 1 Inc. and Valentine Coleman 2 Inc., the owners of the site municipally known as 13 Mountain Street and 19 Elm Street (the “subject property”). The subject property is located in the Town of Grimsby, Regional Municipality of Niagara, Ontario. The Sun Shadow Study has been prepared in support of the Official Plan Amendment and Zoning By-Law Amendment application for the subject property.

The subject property is located north of the Niagara Escarpment in the built-up area of downtown Grimsby at the northeast corner of Mountain Street and Elm Street, south of Main Street. It comprises an area of 0.3188 ha (0.79 acres). The site contains two existing brick buildings: Woolverton House and former church, Woolverton Hall.

The proposed mixed use development includes the adaptive re-use of two existing buildings on site and a new seven storey building element to the rear of the property. The existing buildings are envisioned to support commercial, community, cultural and residential uses and the new building element will support primarily residential uses. The proposed development will also contain 2.5 levels of underground parking, indoor and outdoor bicycle parking, a significant amount of publicly accessible open spaces and green features.

Purpose

The purpose of the Sun and Shadow Study is to provide a visual display of shadow impacts the proposed development has on neighbouring streets, parks and other land uses. The study uses key dates and times, as defined in the Official Plan, to visualize how the future development may affect solar access.

In the study, two massing schemes are being tested:

1. The proposed massing (7-storey building plus existing portions of Woolverton Hall and Woolverton House), as per the OPA/ZBA application.
2. As-of-Right massing, which is an L-shaped, 4-storey massing situated along the lengths of Mountain Street and Elm Street. In the As-of-Right scheme, all of the existing buildings are removed.

The approved Terms of Reference, (March 31, 2021) are attached in the Appendix of this report.

Applicable Policies

The Sun and Shadow Study will address the Town of Grimsby Official Plan (May 2012 with Amendments) including the following sections:

- 2.5.5
In considering applications for infill and intensification, the Town shall consider the impact on adjacent residential uses including overlook and shadowing, the character of the surrounding area and the need for a transition in heights and densities adjacent to existing residential uses as per Section 3.4.7.
- 4.5.3
When considering building forms, development which results in extensive loss of sunlight to adjacent land uses shall be discouraged.
- 12.6.9.4
Microclimate and Shadows

1.2 Methodology

A model of the context within a 200m radius of the subject property was prepared that identified existing building footprints, streets, parks and open spaces.

The context model was imported from www.cadmapper.com into Revit 2020 modeling software. The model was geolocated to the latitude and longitude of the site (Lat 43.1925, Lon 79.5627). The model was aligned to astronomical north using the shadow line at Solar Noon (12:16pm on December 21).

The sun shadow studies were taken at hourly intervals before and after Solar Noon up to and including 1.5 hours after sunrise and 1.5 hours before sunset as set out in the Town of Grimsby Official Plan.

Shadows from the proposed development were reviewed on a site by site basis to determine impacts to nearby streetscapes, natural areas and private and shared outdoor amenities on adjacent properties and internal to the proposed development.

2.0 Shadow Study Analysis

2.1 September 21 (March 21) - Equinox

On September 21, Solar Noon occurs at 13:10. 11 hourly intervals between 8:35 and 17:47 were analyzed to determine shadow impacts and number of sunlight hours. These test intervals represent approximately 9 hours of sunlight time.

Shadows on March 21 are similar to shadows on September 21. Therefore the September 21 shadow study can reasonably represent shadow conditions at March 21.

Streetscapes

- Shadowing of the Mountain Street streetscape is limited to 4 hours in the morning. The Mountain Street streetscape will receive 5 hours of sunlight.
- There are no impacts to the Main Street Streetscape.
- Shadow impacts to Balsam Lane are limited to 2.5 hours in the evening. It will receive 6.5 hours of sunlight.
- There are no shadow impacts to Elm Street.

Parks and Natural Areas

- There are no shadow impacts to the natural areas surrounding 40 Mile Creek, including Coronation Park and the environmental conservation area.

Outdoor Amenity Areas - Adjacent Properties

- There are no shadow impacts to the Grimsby Lions Community Pool.
- Shadowing of the adjacent residential properties at 12 and 14 Mountain Street is limited to 1.5 hours in the early morning. These properties will receive 7.5 hours of sunlight.
- Shadowing of the adjacent residential property at 21 Elm Street is limited to 2.5 hours in the late afternoon.

21 Elm street will receive 6.5 hours of sunlight.

- Shadowing of adjacent residential property at 23 Elm Street is limited to 1 hours in the late afternoon. 23 Elm street will receive 8 hours of sunlight.

Outdoor Amenity Areas - Proposed Development

- The proposed Plaza receives 5 hours of sunlight.
- The proposed Outdoor Amenity space receives 5 hours of sunlight.

2.2 June 21 - Summer Solstice

On June 21, Solar Noon occurs at 13:20. 15 hourly intervals between 7:09 and 19:32 were analyzed to determine shadow impacts and number of sunlight hours. These test intervals represent approximately 12.5 hours of sunlight time.

Streetscapes

- Shadowing of the Mountain Street streetscape is limited to 2.5 hours in the morning. The Mountain Street streetscape will receive 10 hours of sunlight.
- There are no shadow impacts to the Main Street Streetscape.
- Shadow impacts to Balsam Lane are limited to 0.5 hours in the evening. It will receive 12 hours of sunlight.
- Shadow impacts to Elm Street are limited to 1 hour in the morning. It will receive 11.5 hours of sunlight.

Parks and Natural Areas

- There are no shadow impacts to the natural areas surrounding 40 Mile Creek, including Coronation Park and the environmental conservation area.

Outdoor Amenity Areas - Adjacent Properties

- There are no shadow impacts to the Grimsby Lions Community Pool.
- Shadowing of adjacent residential properties at 12 and 14 Mountain Street is limited to 1.5 hours in the early morning. These properties will receive 11 hours of sunlight.
- Shadowing of the adjacent residential property at 21 Elm Street is limited to 4 hours in the late afternoon. 21 Elm street will receive 8.5 hours of sunlight.

- Shadowing of the adjacent residential property at 23 Elm Street is limited to 2.5 hours in the late afternoon. 23 Elm street will receive 10 hours of sunlight.

Outdoor Amenity Areas - Proposed Development

- The proposed Plaza receives 6.5 hours of sunlight.
- The proposed Outdoor Amenity space receives 6 hours of sunlight.

2.3 December 21 - Winter Solstice

On December 21, Solar Noon occurs at 12:16. 7 hourly intervals between 9:16 and 15:16 were analyzed to determine shadow impacts and number of sunlight hours. These test intervals represent 6 hours of sunlight time.

Streetscapes

- The Mountain Street streetscape is shadowed for 3 hours in the morning. The Mountain Street streetscape will receive 3 hours of sunlight.
- Main Street is shadowed by the proposed development for 1 hour in the evening, and will receive 5 hours of sunlight.
- There are no shadow impacts to Elm Street.

Parks and Natural Areas

- There are no shadow impacts to the natural areas surrounding 40 Mile Creek, including Coronation Park and the environmental conservation area.

Outdoor Amenity Areas - Adjacent Properties

- There are no shadow impacts to the Grimsby Lions Community Pool.
- There are no shadow impacts to the 14 Mountain Street property.
- The 12 Mountain Street property is shadowed by the proposed development for 1 hour, and will receive 5 hours of sunlight.
- The 21 Elm Street residential property is shadowed for 0.5 hours in the evening, and receives 5.5 hours of sunlight.
- There are no shadow impacts to the residential property at 23 Elm Street.

Outdoor Amenity Areas - Proposed Development

- The proposed Plaza will be shadowed throughout the day, due to both the proposed development and the existing buildings.
- The Proposed Outdoor Amenity will receive 5 hours of sunlight .

2.4 Site Design

Comparison with As-of-Right Building Massing

Locating the tallest mass of the proposed building at the eastern side of the subject property, rather than locating the building immediately at the corner of Mountain and Elm Streets (as per the as-of-right building massing) is at times preferable from a sun-shadow study perspective.

The most significant area where the proposed scheme has more shadow impacts than the As-of-Right scheme occurs to the north-east of the site where there is increased shadows on the municipal parking lot and Balsam Lane, starting at 16:10 on the Equinox and 16:20 on the Summer Solstice. In the latest hour of the Winter Solstice the shadow of the proposed scheme hits its longest point to reach Main Street West.

The following comments apply to the Equinox, Summer Solstice, and Winter Solstice studies.

Streetscapes

- Due to the larger setback of the proposed development from Mountain Street compared to the As-of-Right massing, the proposed scheme results in less shadow impact to the streetscape Mountain Street and Elm Street streetscapes.
- There is no impact on the Main Street West streetscape in the As-of-Right scheme.

Parks and Natural Areas

- There are no shadow impacts to the natural areas surrounding 40 Mile Creek, including Coronation Park and the environmental conservation area in either the proposed scheme nor the As-of-Right scheme.

Outdoor Amenity Areas - Adjacent Properties

- The impacts to the residential properties at 12 & 14 Mountain Street, and at 21 & 23 Elm Street are similar

in the As-of-Right scheme and the proposed scheme.

- There is an additional hour of shadow on 23 Elm during the Summer Solstice in the proposed scheme.

Outdoor Amenity Areas - Proposed Development

In the As-of-Right scheme, the outdoor space would be located in the north-east portion of the site and would be in shadow for some portion of the afternoon throughout the year.

In the proposed scheme, the outdoor spaces are split between the western Plaza and the eastern Outdoor Amenity space. This allows for outdoor spaces that receive sun and shadow at different times of the day.

2.5 Conclusion

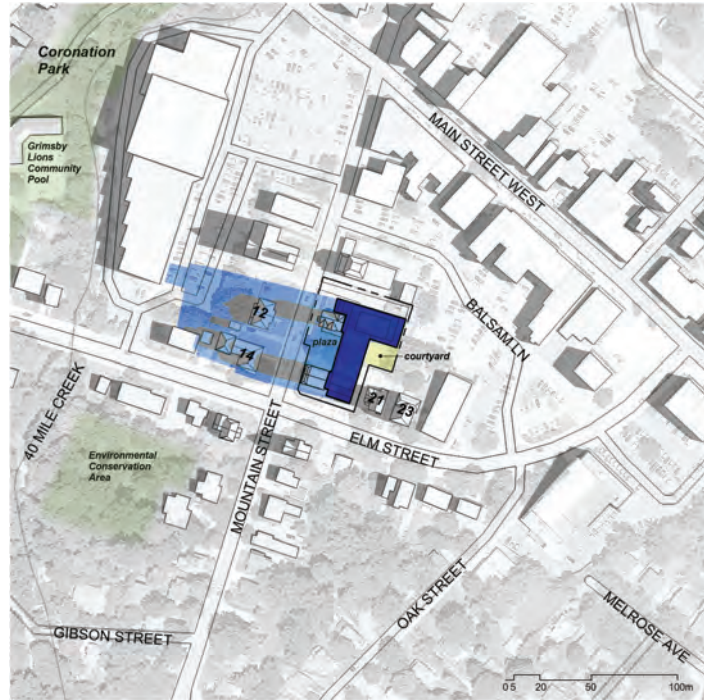
Based upon the analysis of the Shadow Study it is our opinion that the proposed development, with its proposed height of 7 storeys, will not have a negative overall effect on the neighbourhood and surrounding context.

- Compared to the As-of-Right massing, there are only minor additional impacts to the surrounding properties and streetscapes.
- The impact to Main Street West is limited with 1 hour in the evening at the Winter Solstice.
- Minor impact to the properties to the west (12 & 14 Mountain Street) is noted.
- Minor afternoon impacts to the properties to the east (21 & 23 Elm Street) are noted.
- There are no impacts to the natural areas surrounding 40 Mile Creek, including Coronation Park and the environmental conservation area.

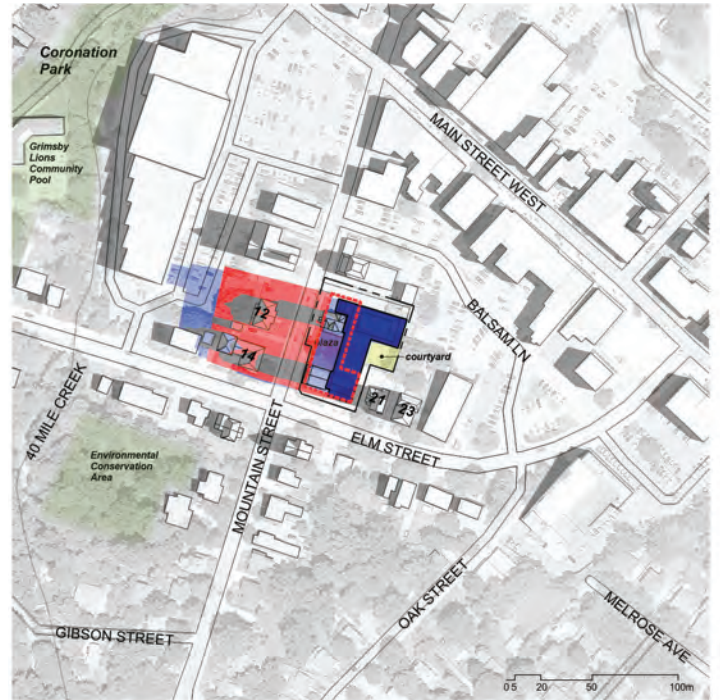
3.0 Shadow Study - Equinox

3.1 September 21 (March 21) - Equinox

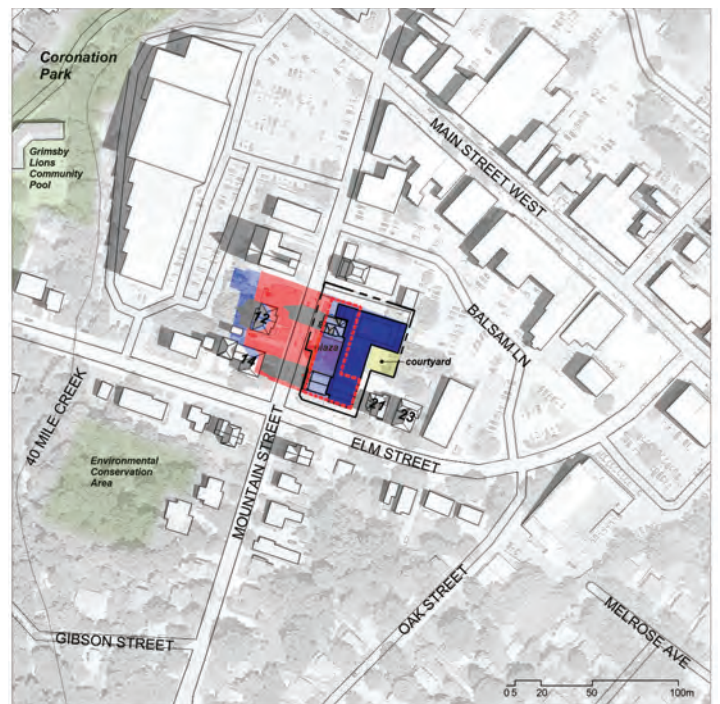
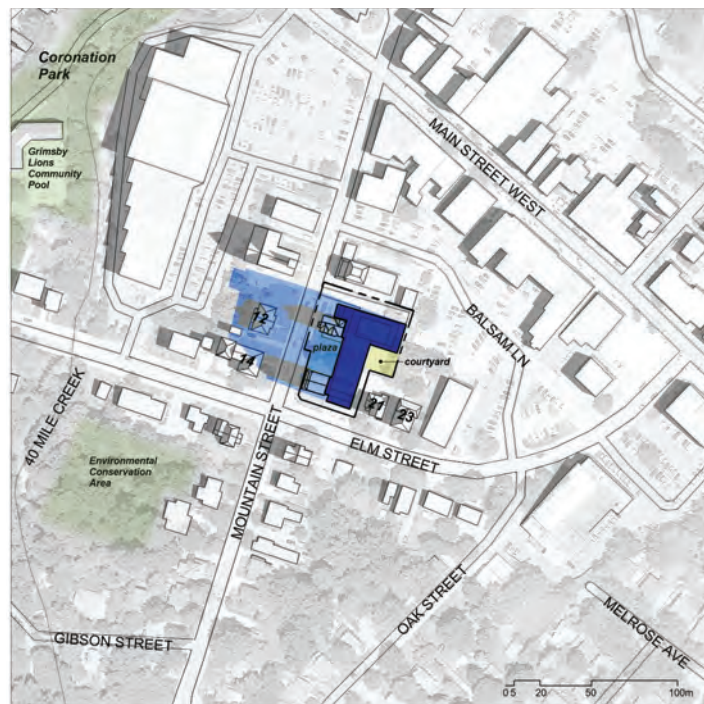
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



8:35



- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- Residential Property Street Number

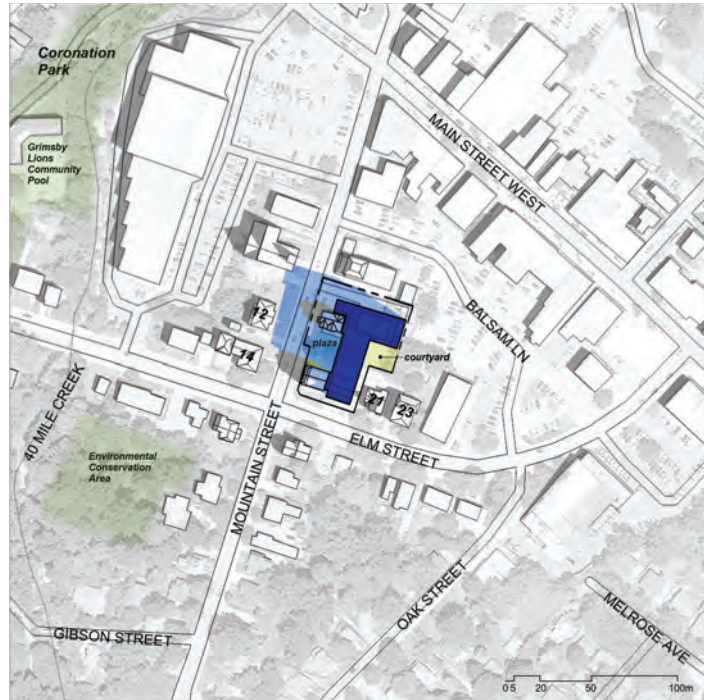
Lat 43.1925, Lon -79.5627
Scale 1:4000

9:10

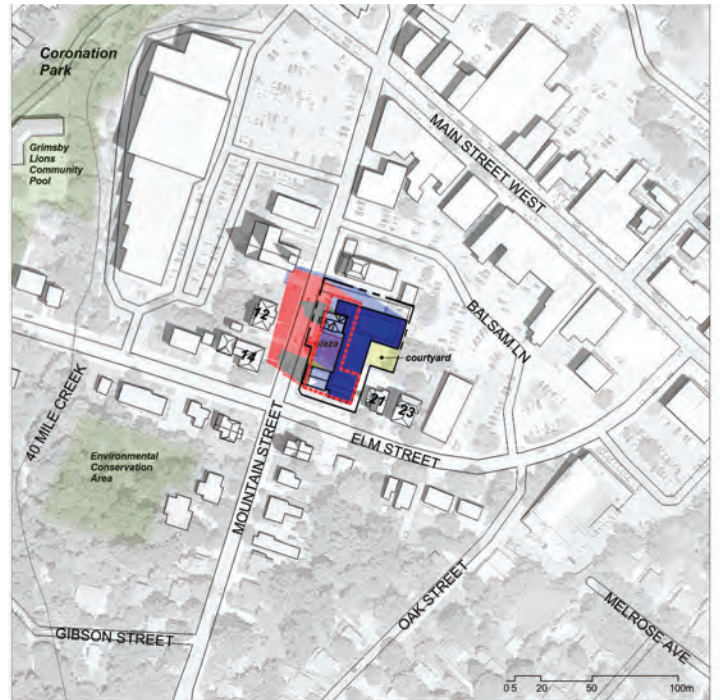


3.1 September 21 (March 21) - Equinox, cont'd

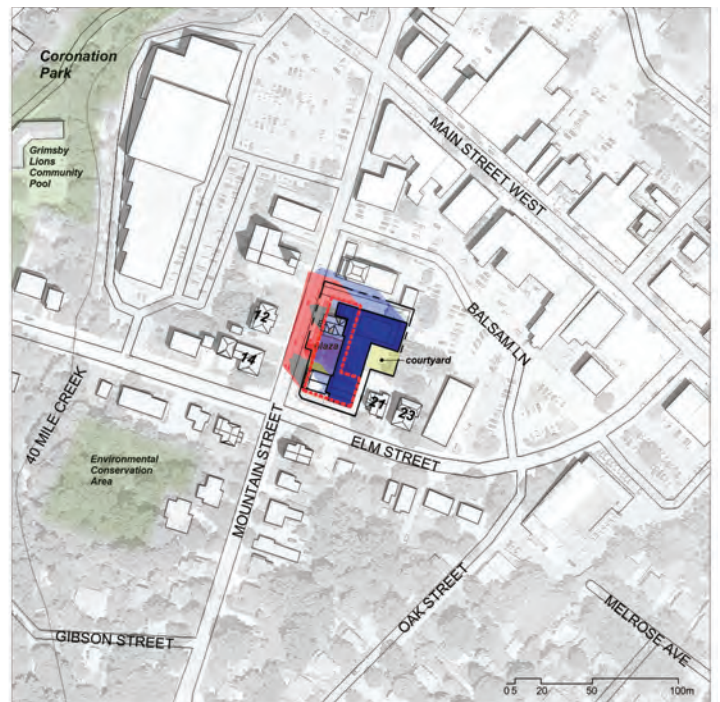
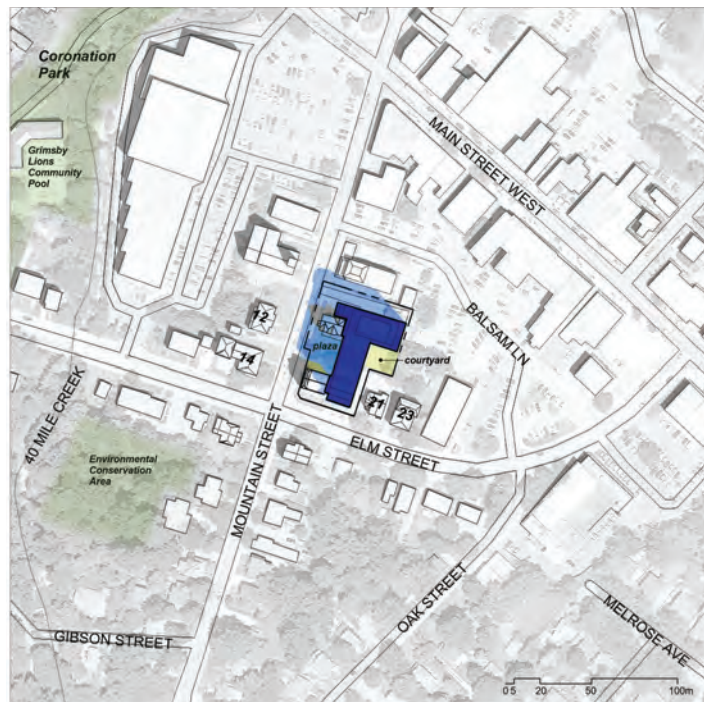
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



10:10



11:10

- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

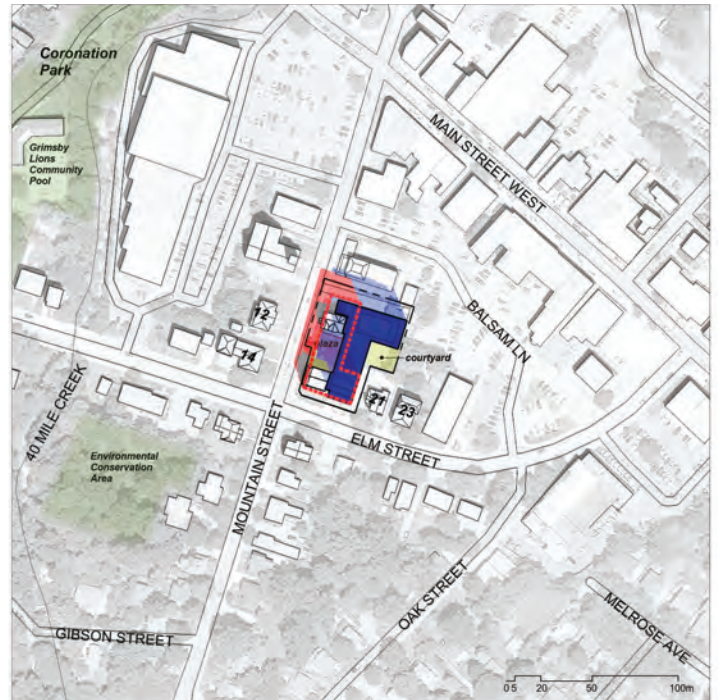


3.1 September 21 (March 21) - Equinox, cont'd

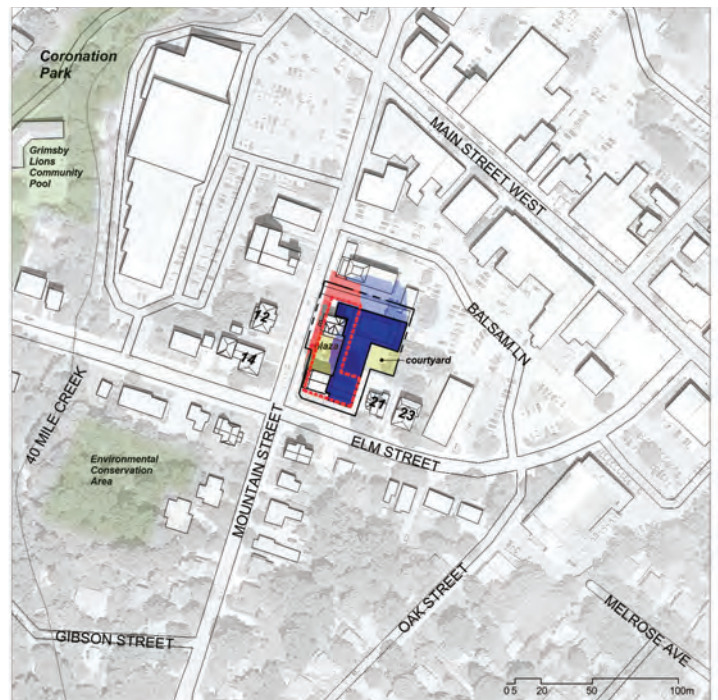
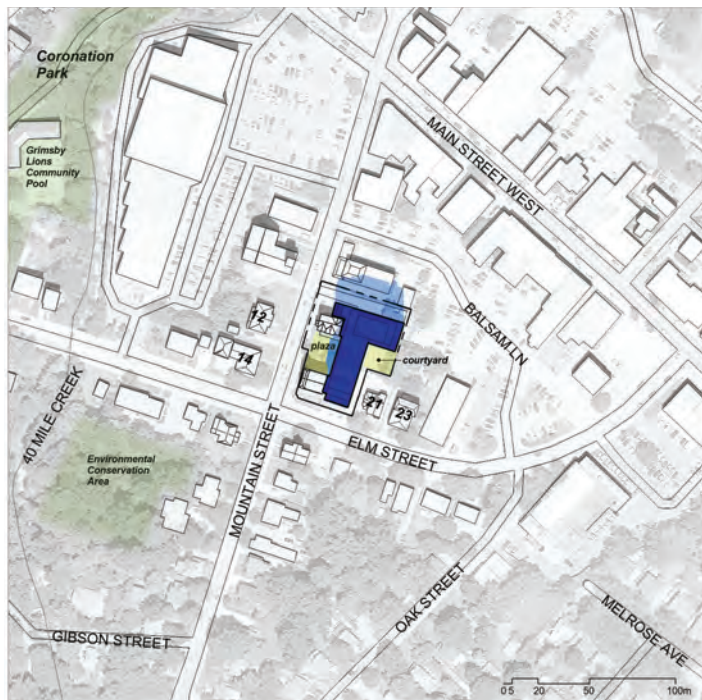
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



12:10



13:10

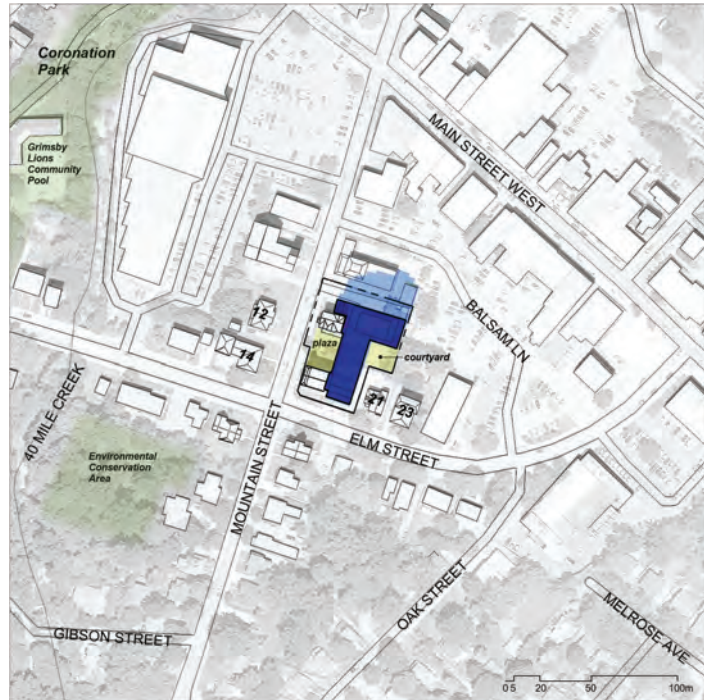
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

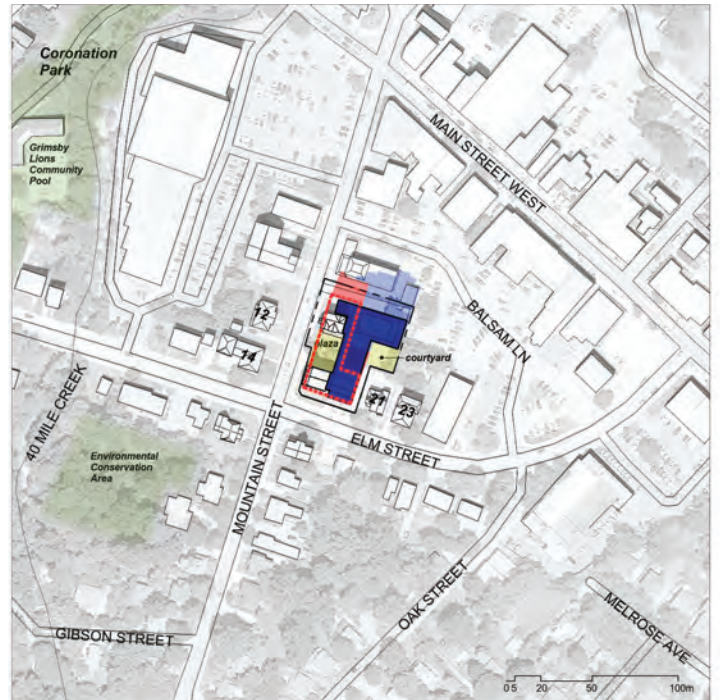


3.1 September 21 (March 21) - Equinox, cont'd

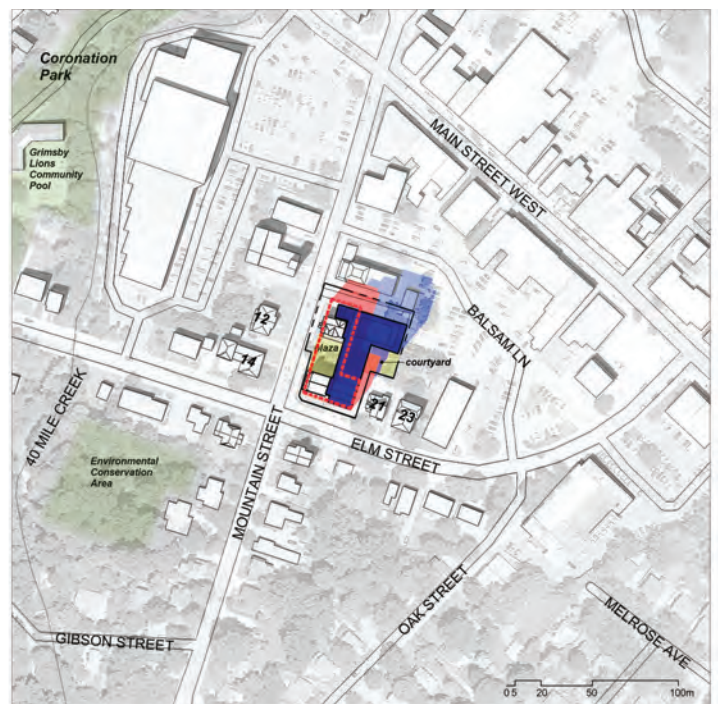
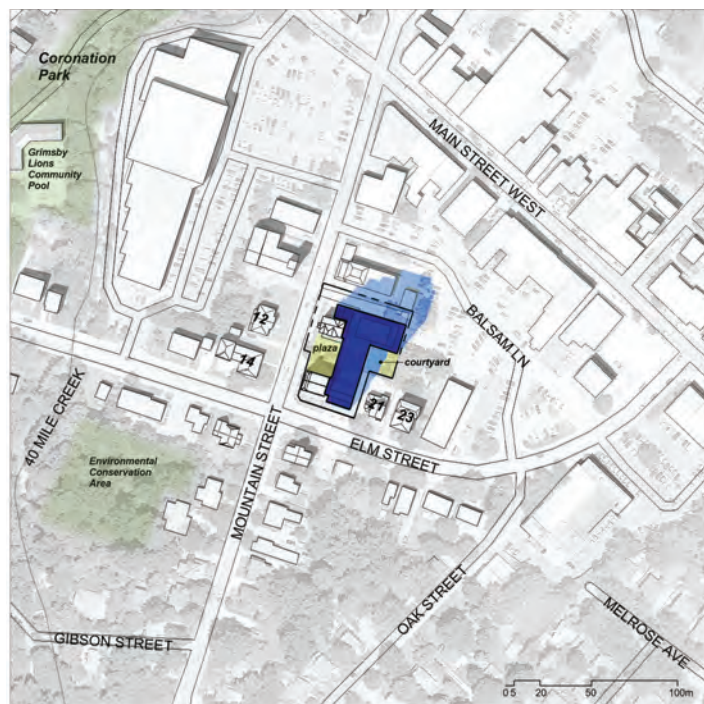
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



14:10



- Subject Property
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

15:10

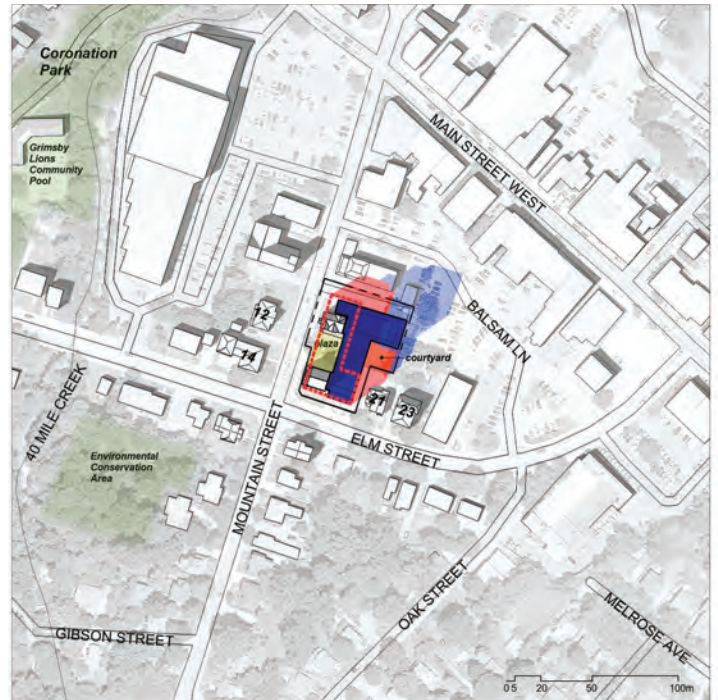


3.1 September 21 (March 21) - Equinox, cont'd

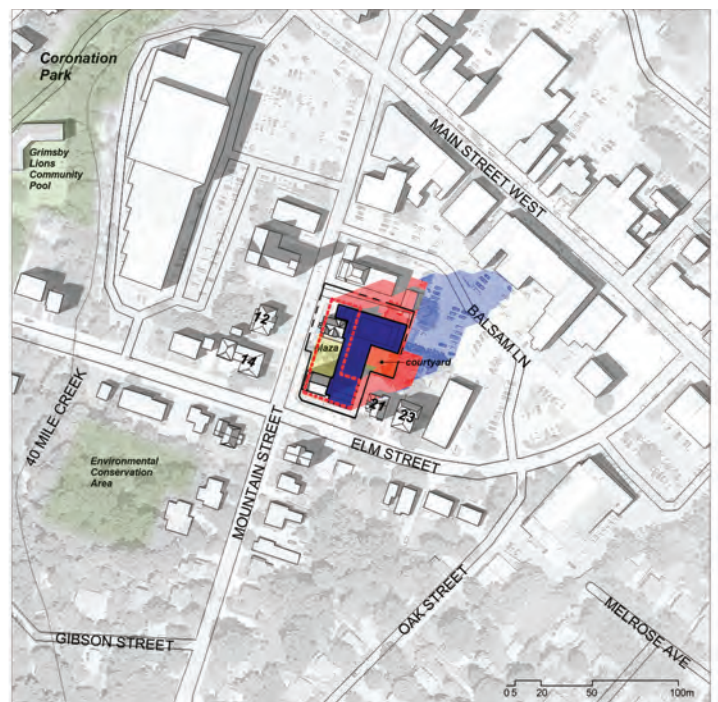
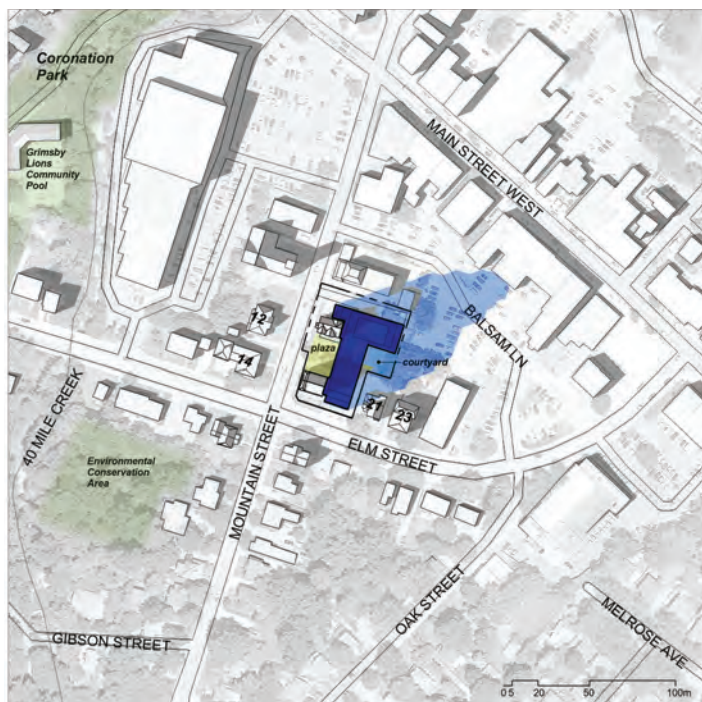
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



16:10



17:10

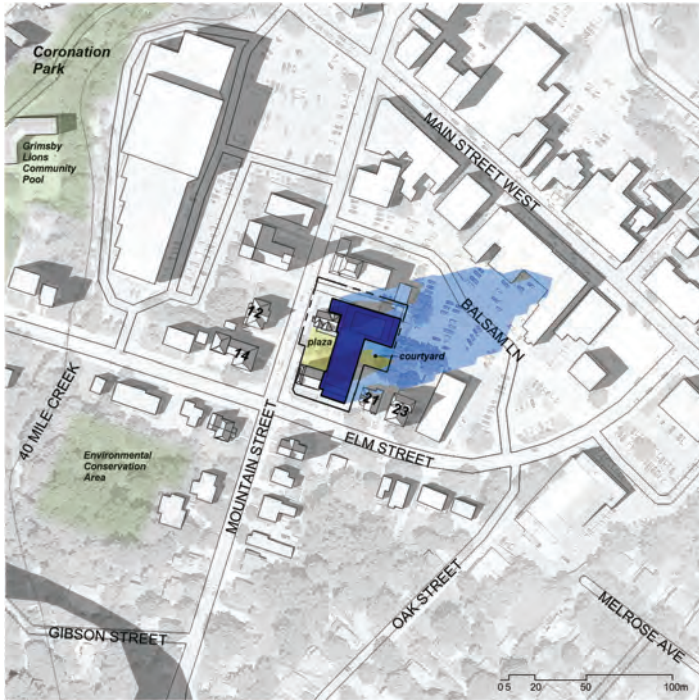
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

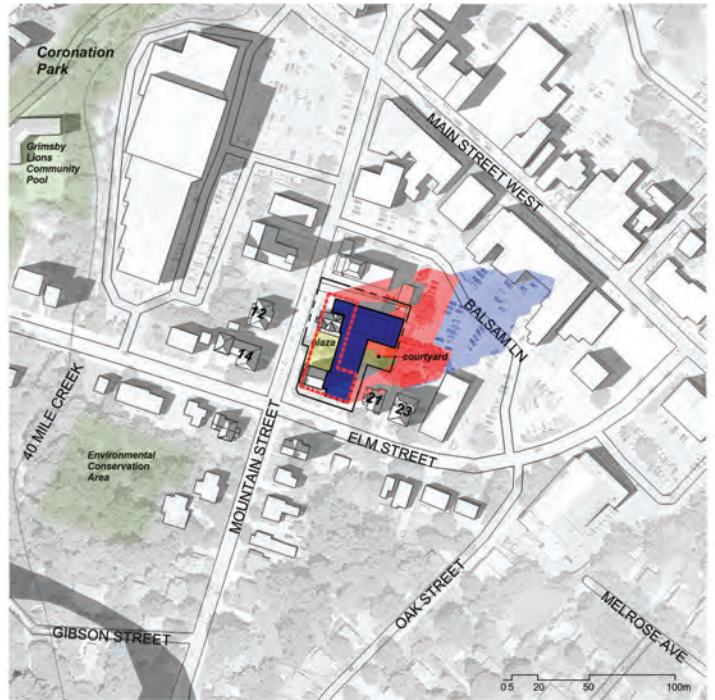


3.1 September 21 (March 21) - Equinox, cont'd

Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



17:47

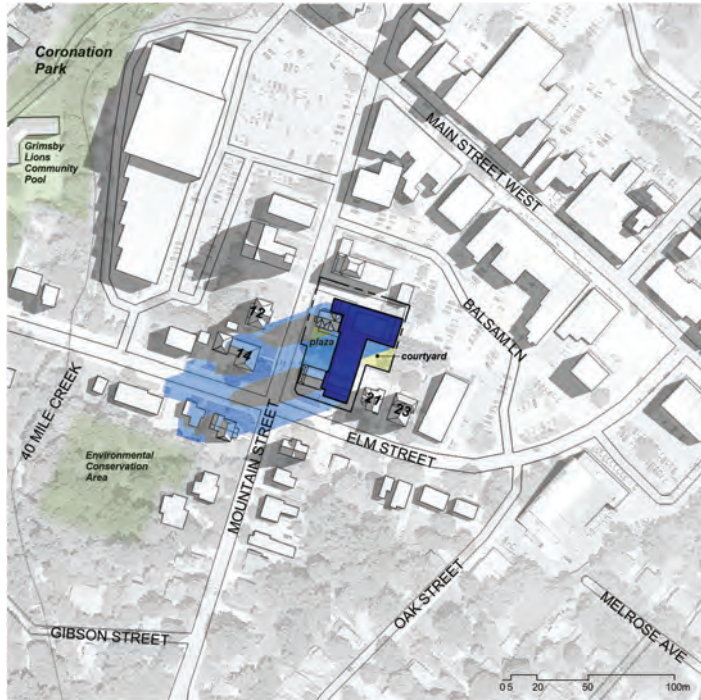
- Subject Property Property Line
 - As of Right Building Massing
 - Shadow cast by As of Right Building Massing
 - Proposed Building
 - Shadow cast by Proposed Building
 - Parks & Natural Areas
 - Proposed Outdoor Amenities
 - 21 Residential Property Street Number
- Lat 43.1925, Lon -79.5627
Scale 1:4000



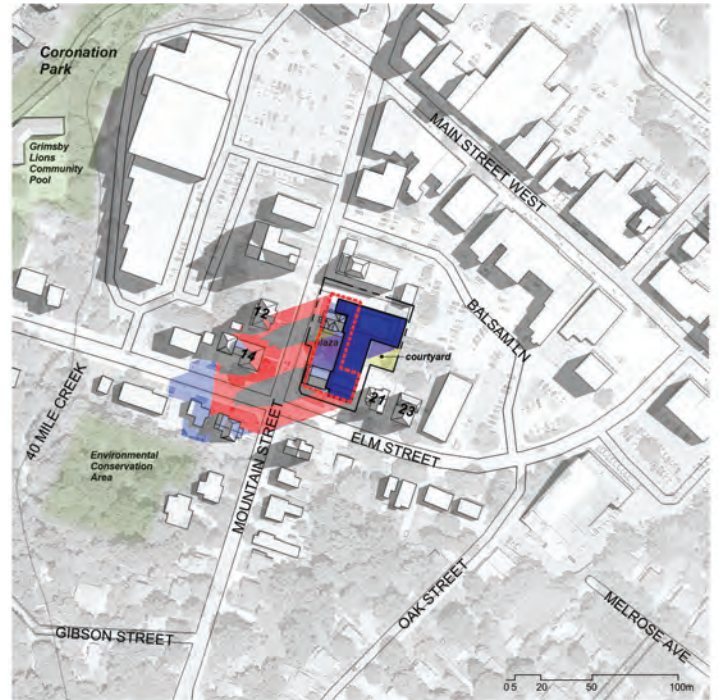
4.0 Shadow Study - Summer Solstice

4.1 June 21 - Summer Solstice

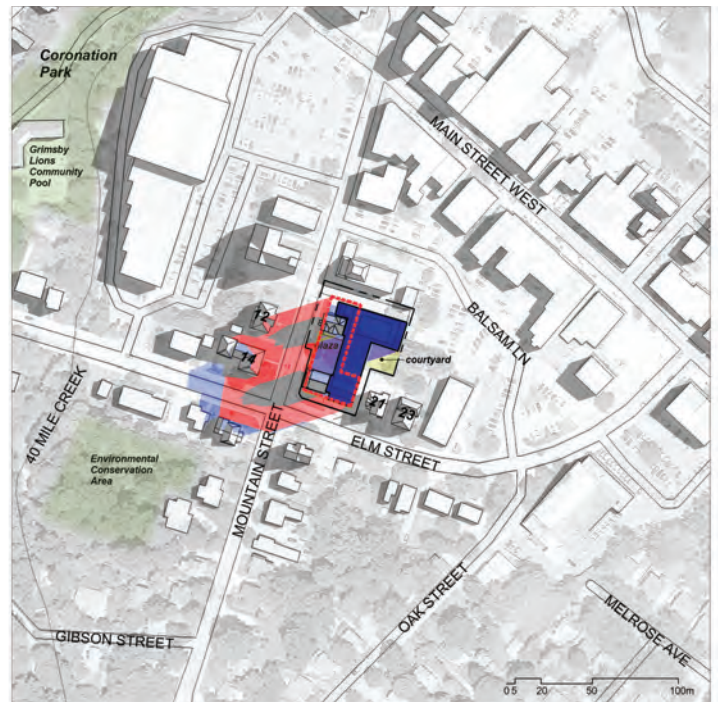
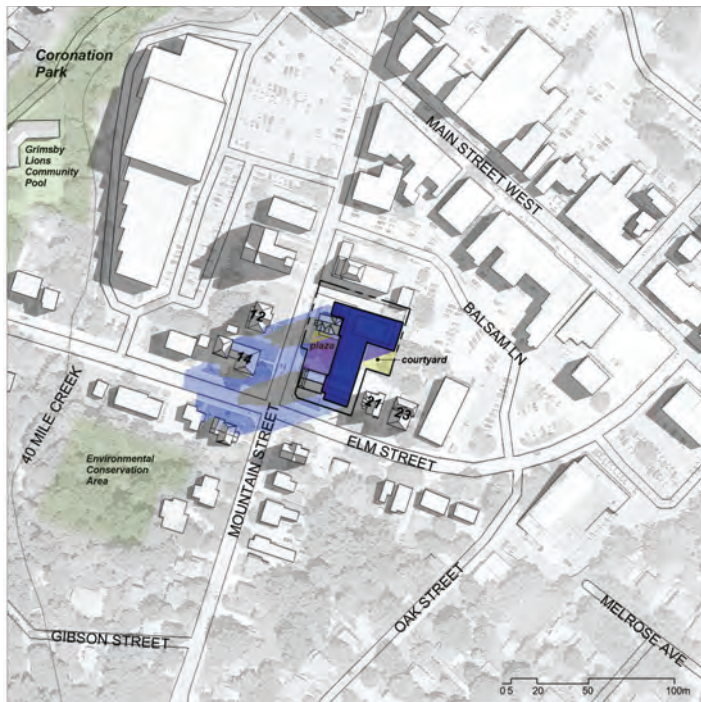
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



7:09



7:20

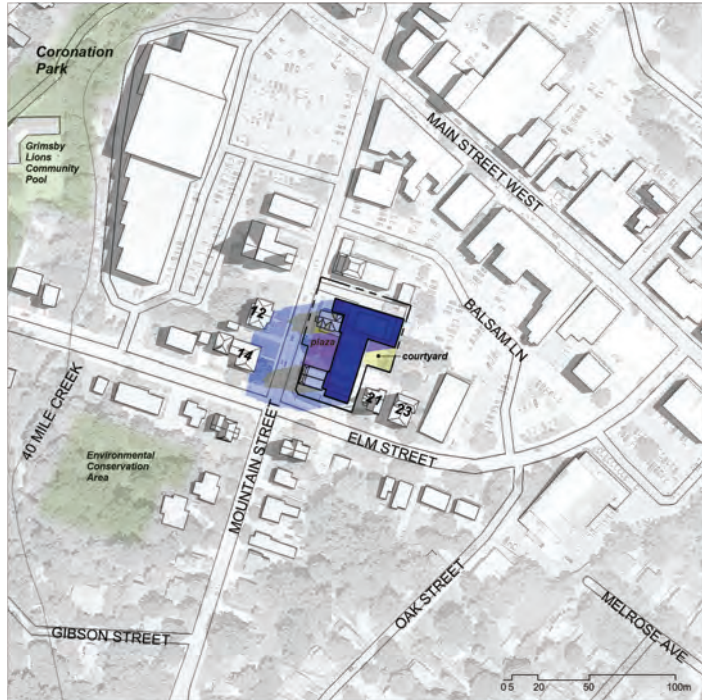
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

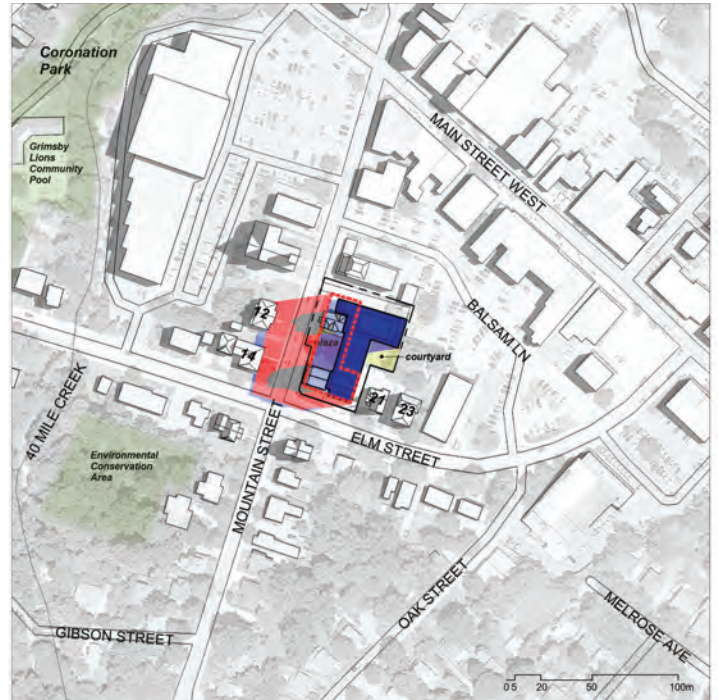


4.1 June 21 - Summer Solstice, cont'd

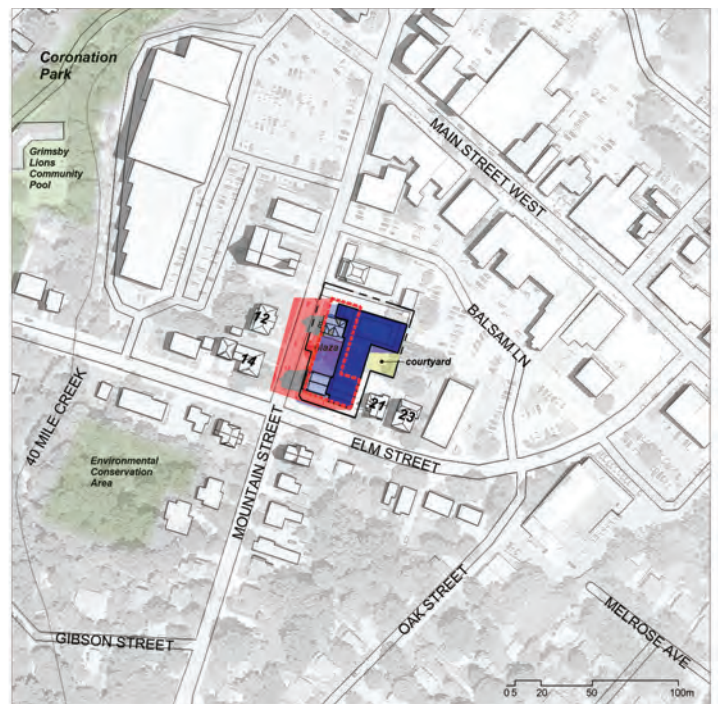
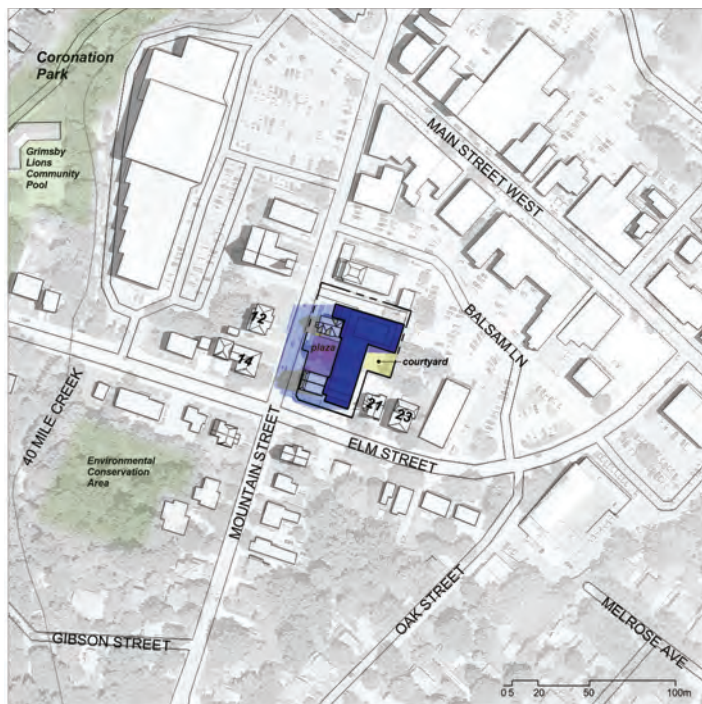
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



8:20



9:20

- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

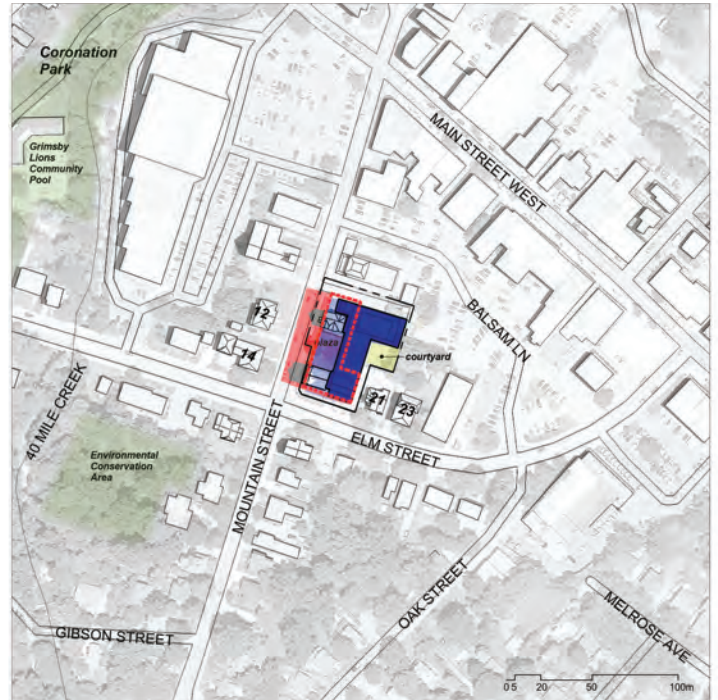


4.1 June 21 - Summer Solstice, cont'd

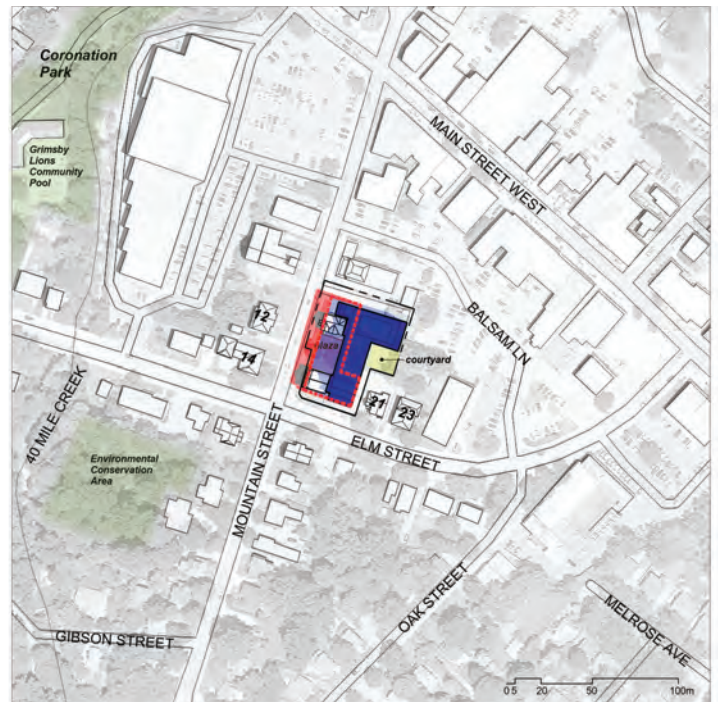
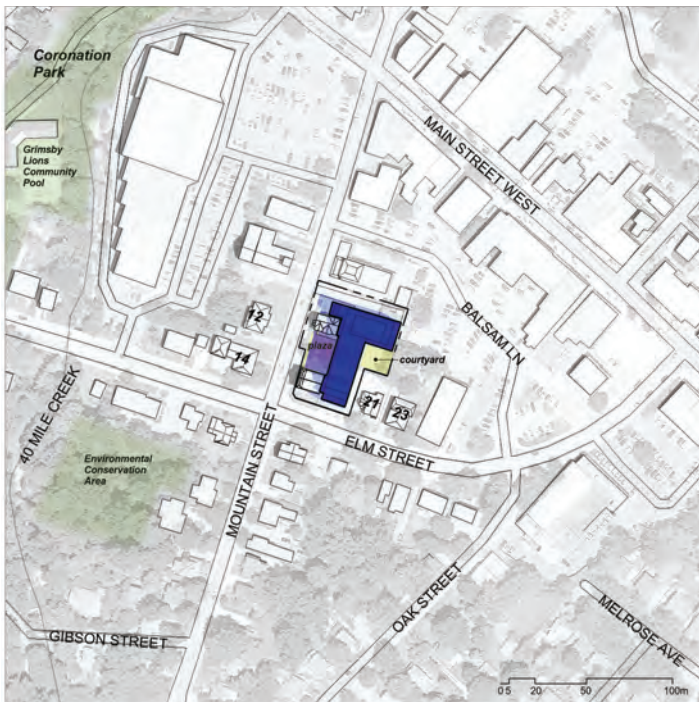
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



10:20



11:20

- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

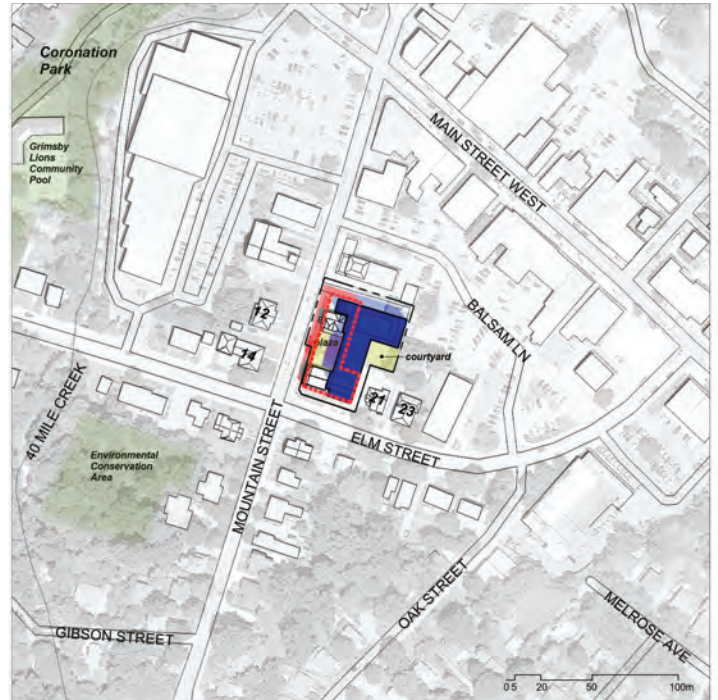


4.1 June 21 - Summer Solstice, cont'd

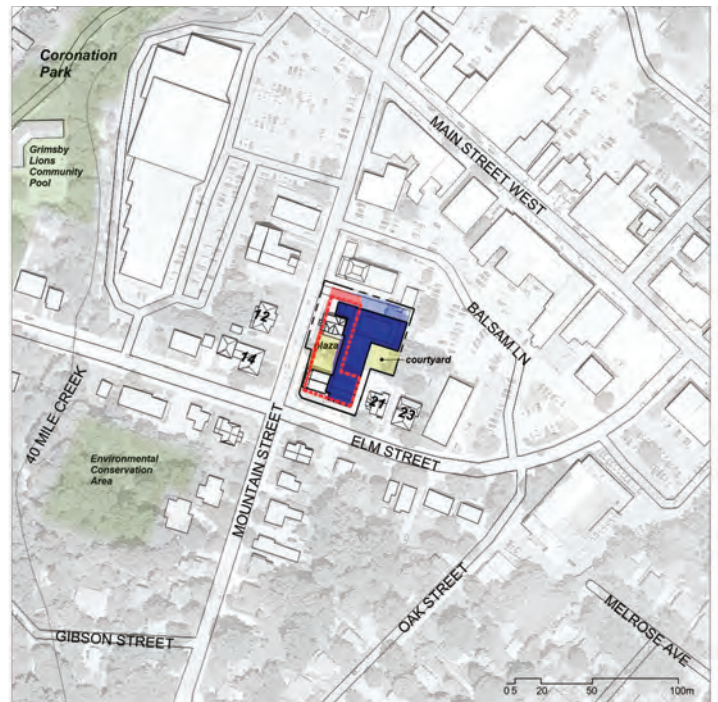
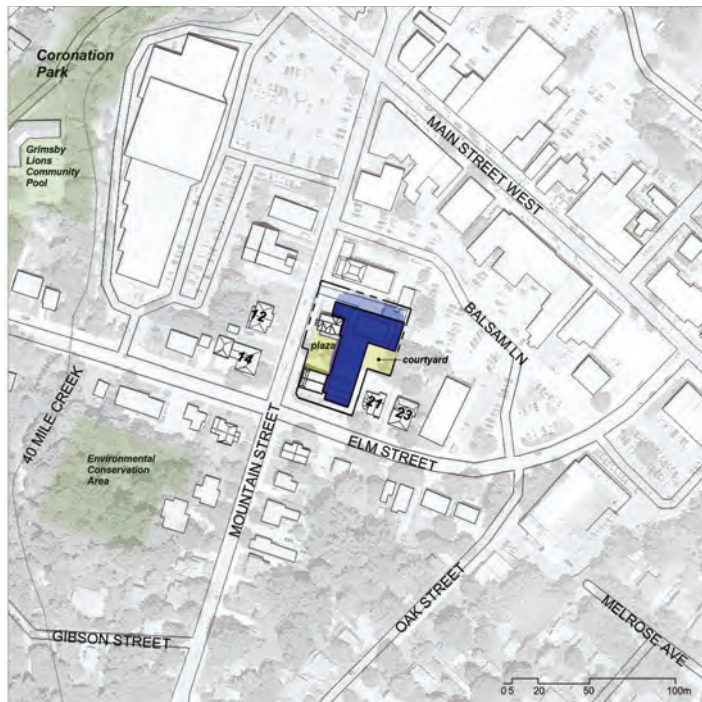
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



12:20



13:20

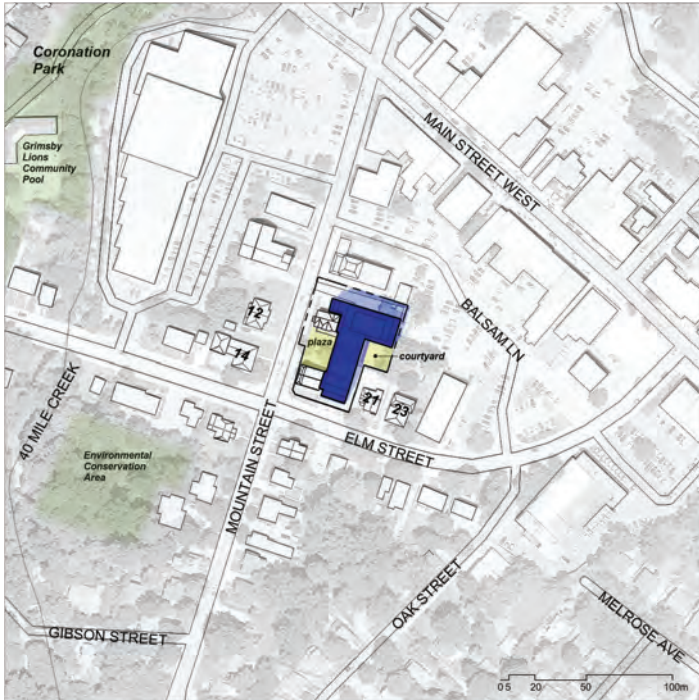
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

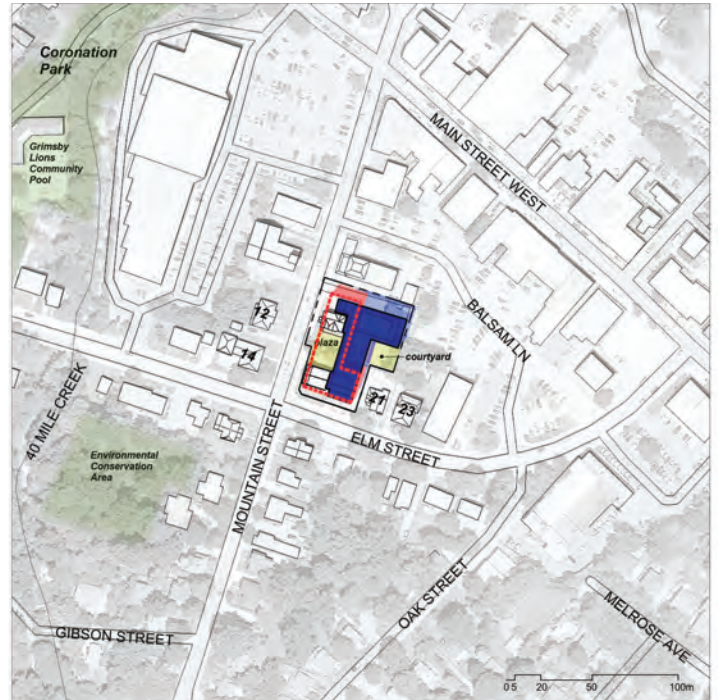


4.1 June 21 - Summer Solstice, cont'd

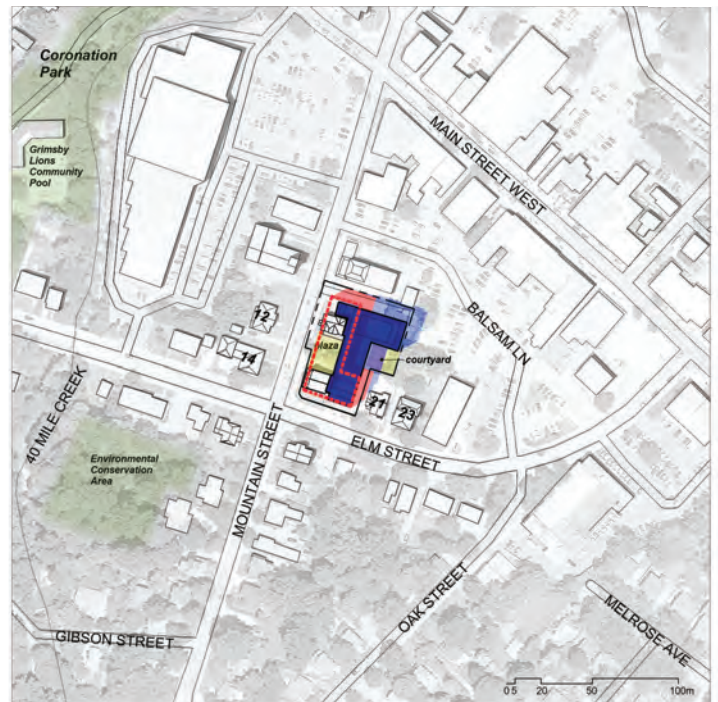
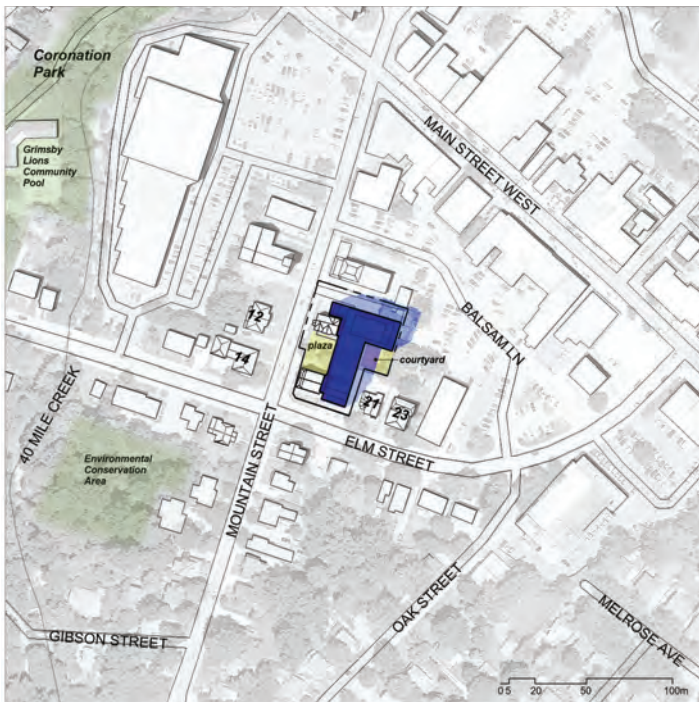
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



14:20



15:20

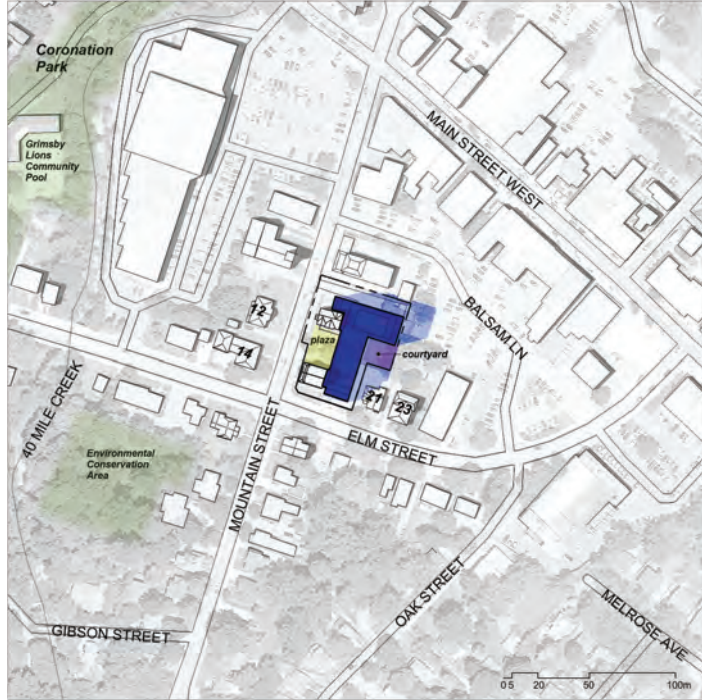
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

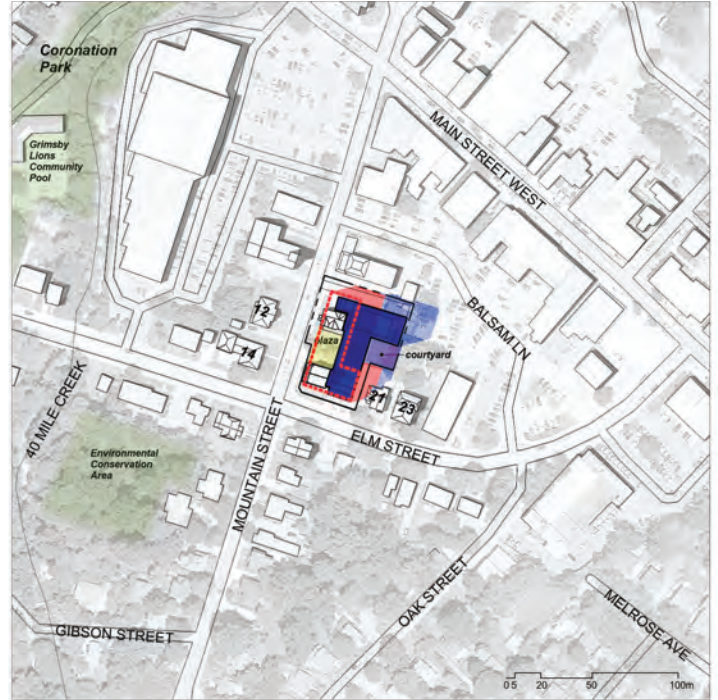


4.1 June 21 - Summer Solstice, cont'd

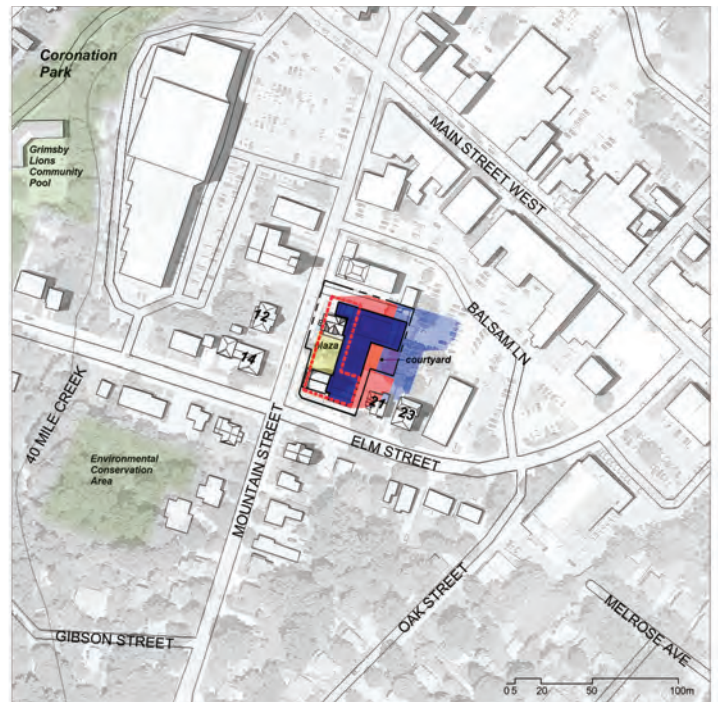
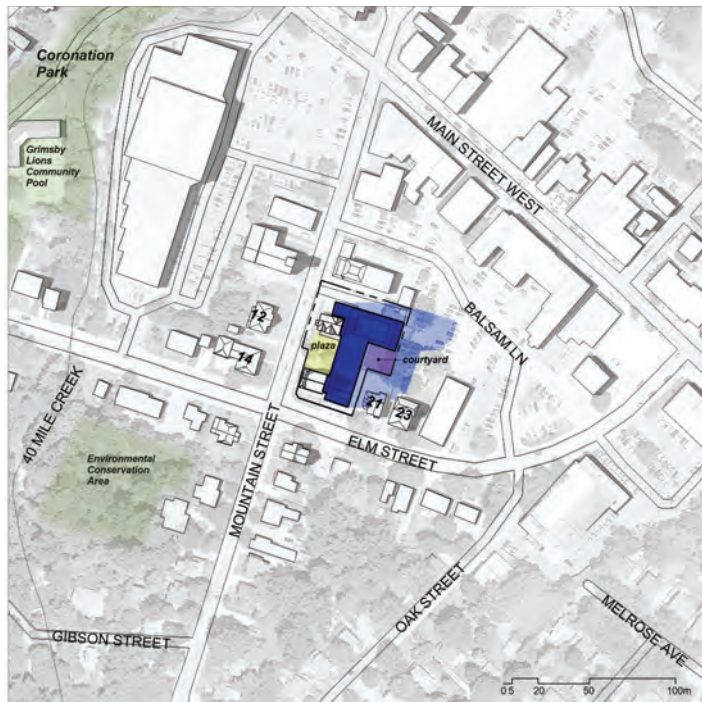
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



16:20



17:20

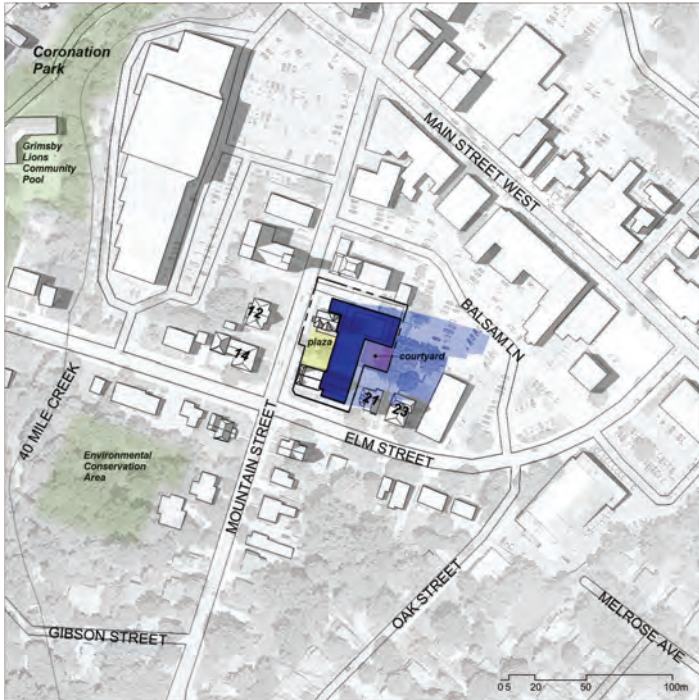
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

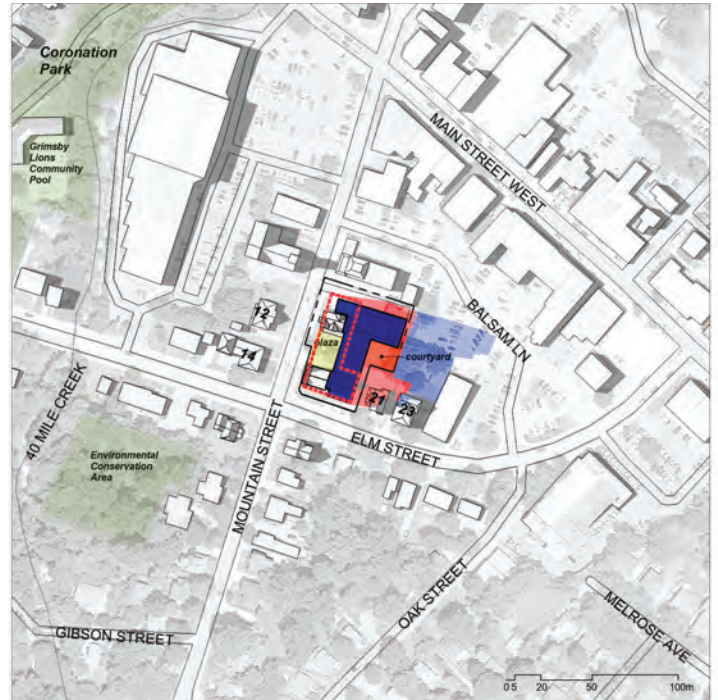


4.1 June 21 - Summer Solstice, cont'd

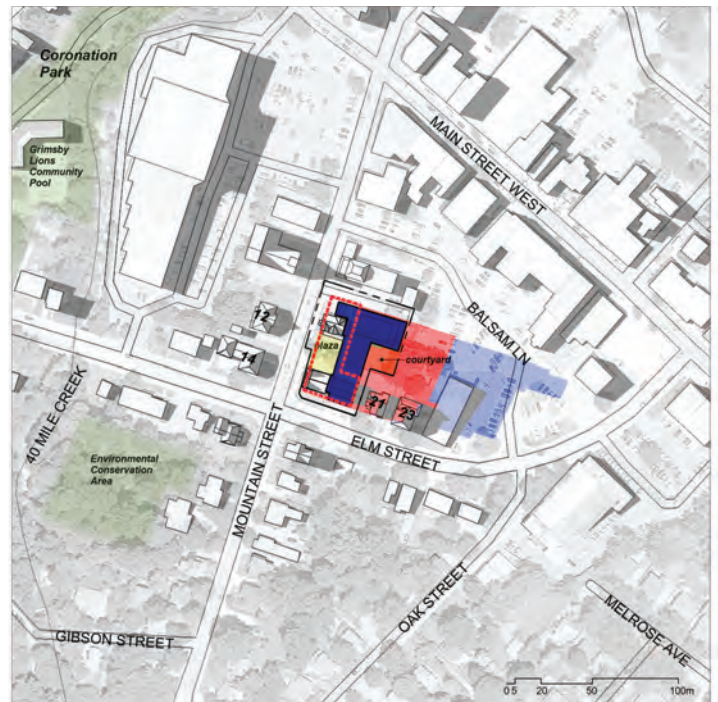
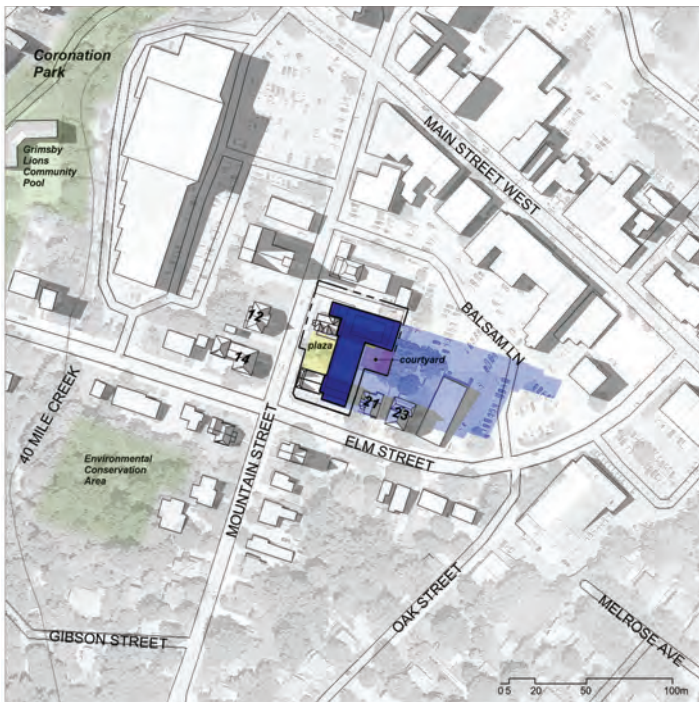
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



18:20



19:20

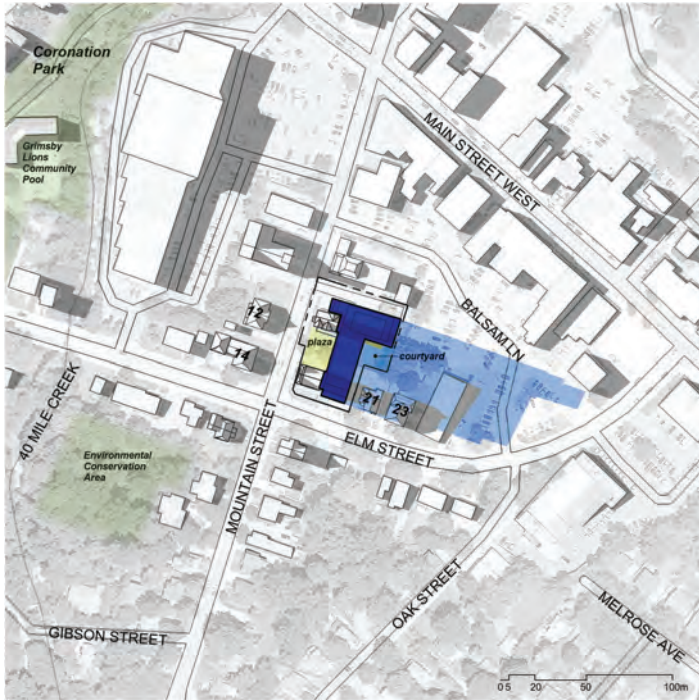
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

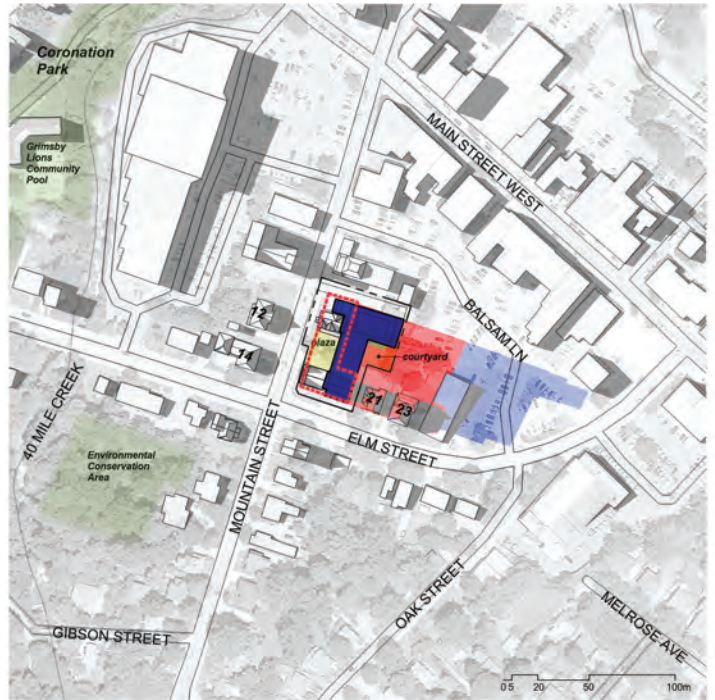


4.1 June 21 - Summer Solstice, cont'd

Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



19:32

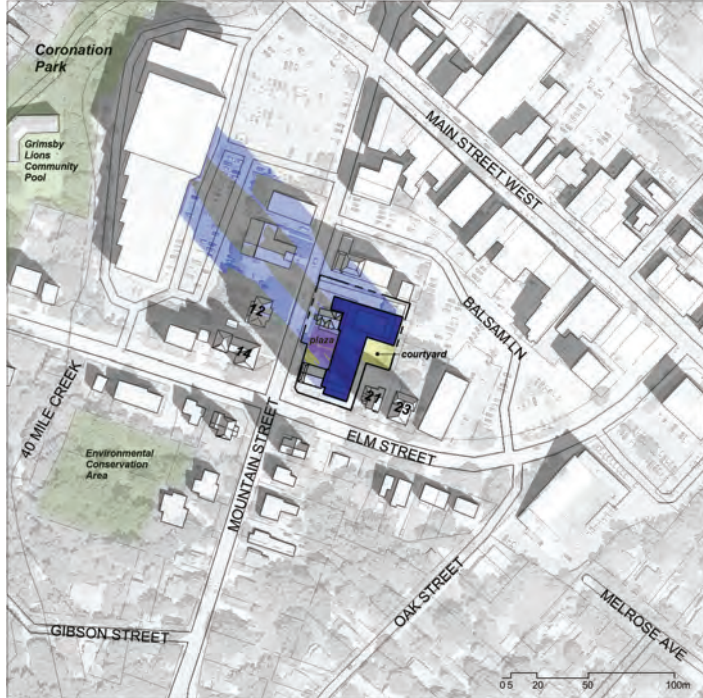
- Subject Property Property Line
 - As of Right Building Massing
 - Shadow cast by As of Right Building Massing
 - Proposed Building
 - Shadow cast by Proposed Building
 - Parks & Natural Areas
 - Proposed Outdoor Amenities
 - Residential Property Street Number
- Lat 43.1925, Lon -79.5627
Scale 1:4000



5.0 Shadow Study - Winter Solstice

5.1 December 21 - Winter Solstice

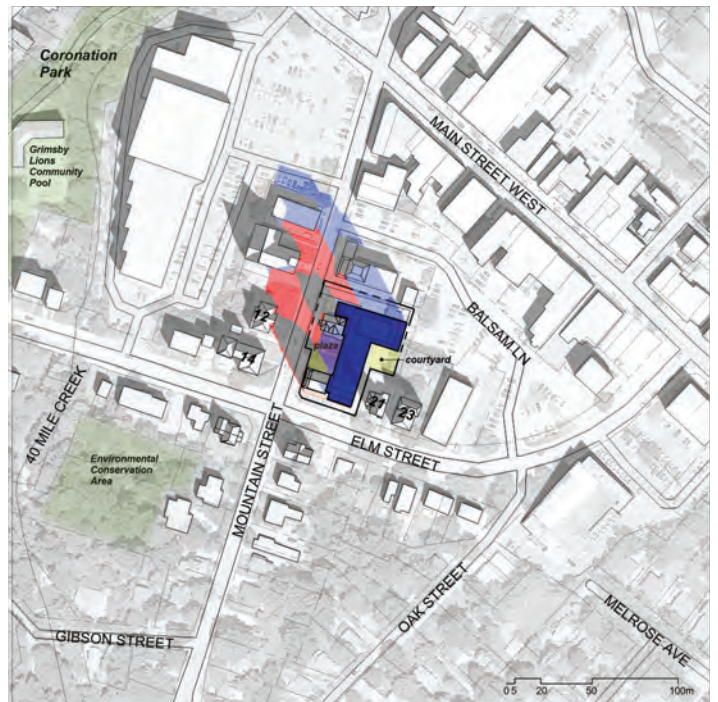
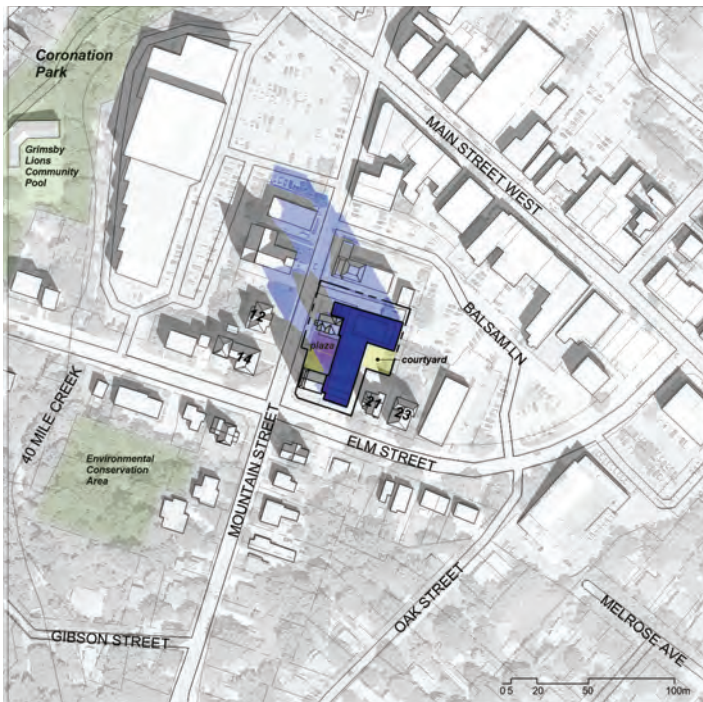
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



9:16



- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

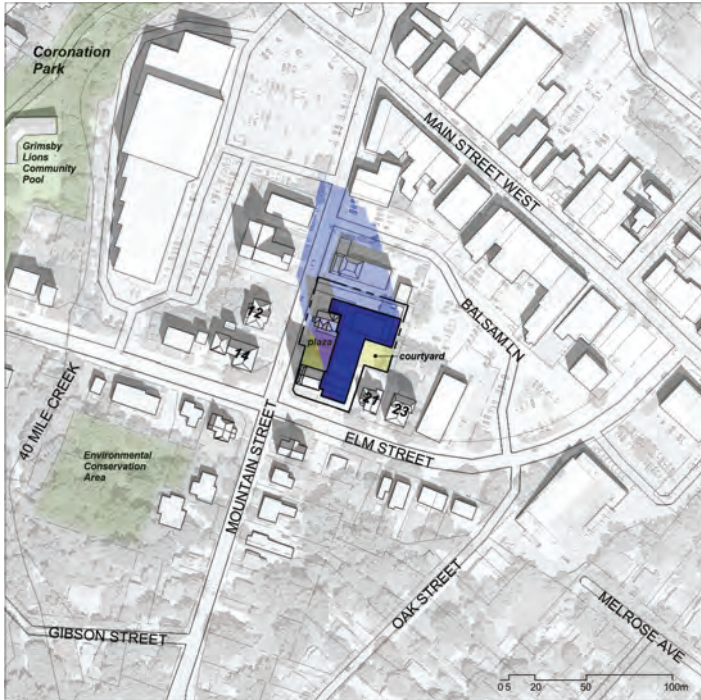
Lat 43.1925, Lon -79.5627
Scale 1:4000

10:16



5.1 December 21 - Winter Solstice, cont'd

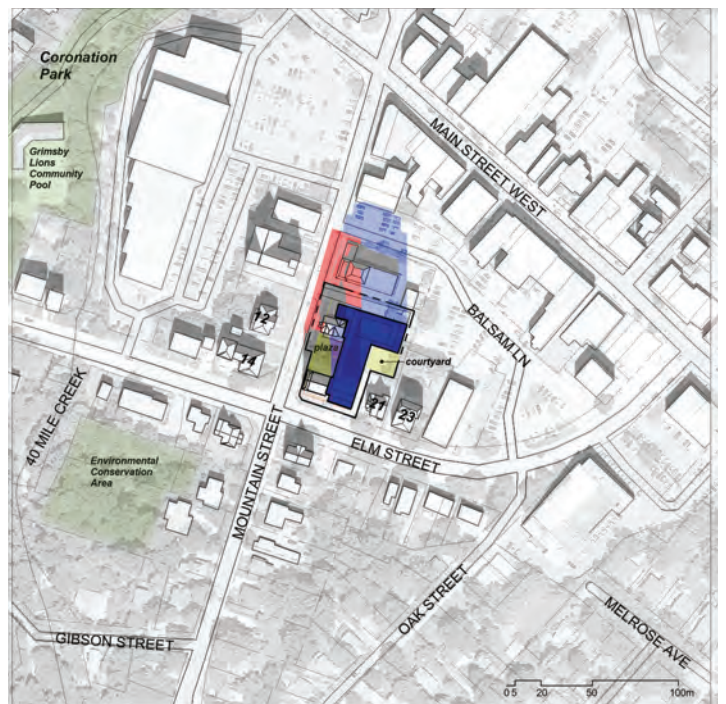
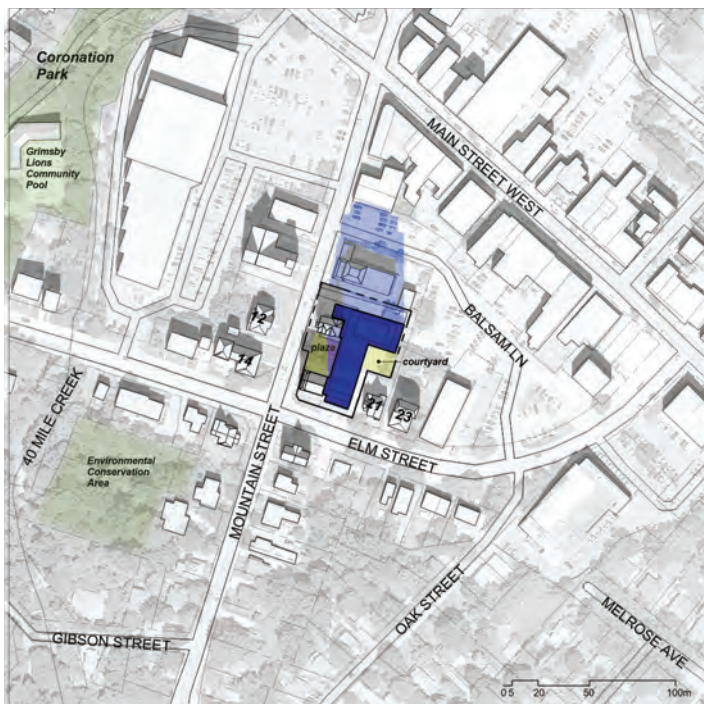
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



11:16



12:16

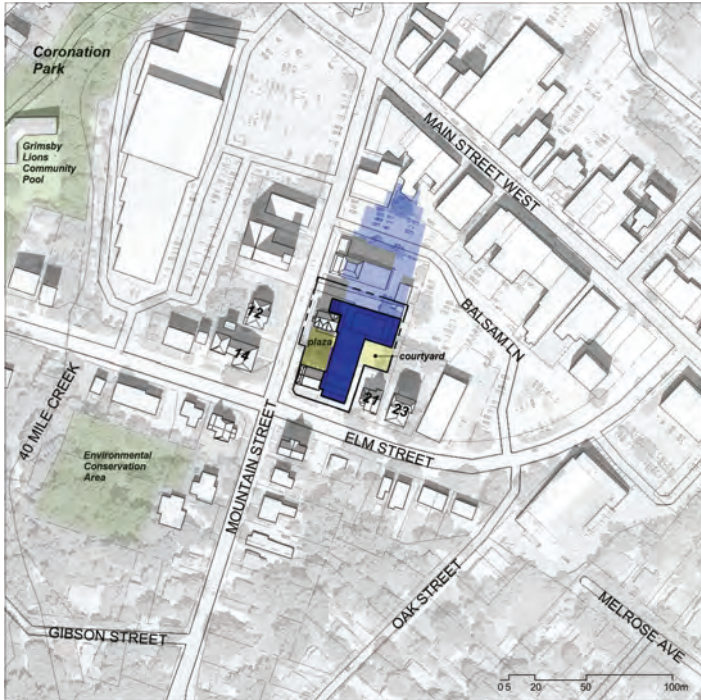
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

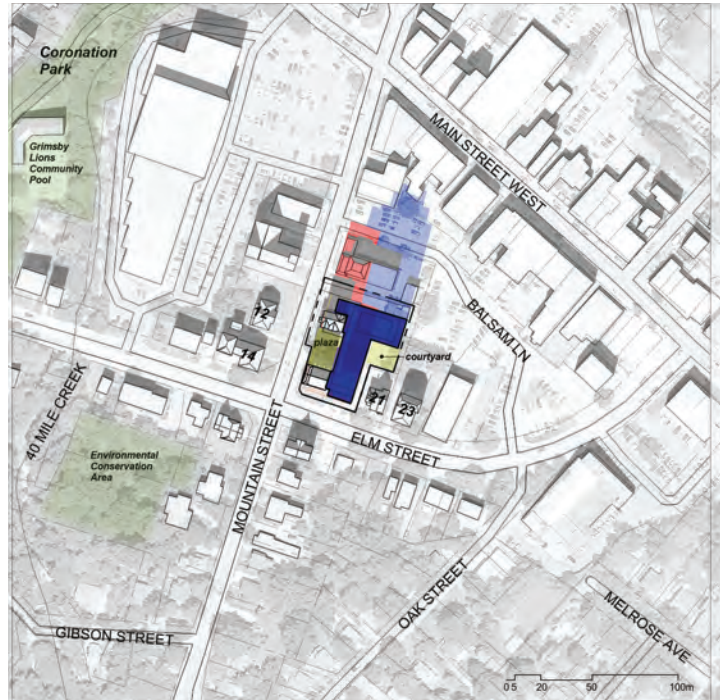


5.1 December 21 - Winter Solstice, cont'd

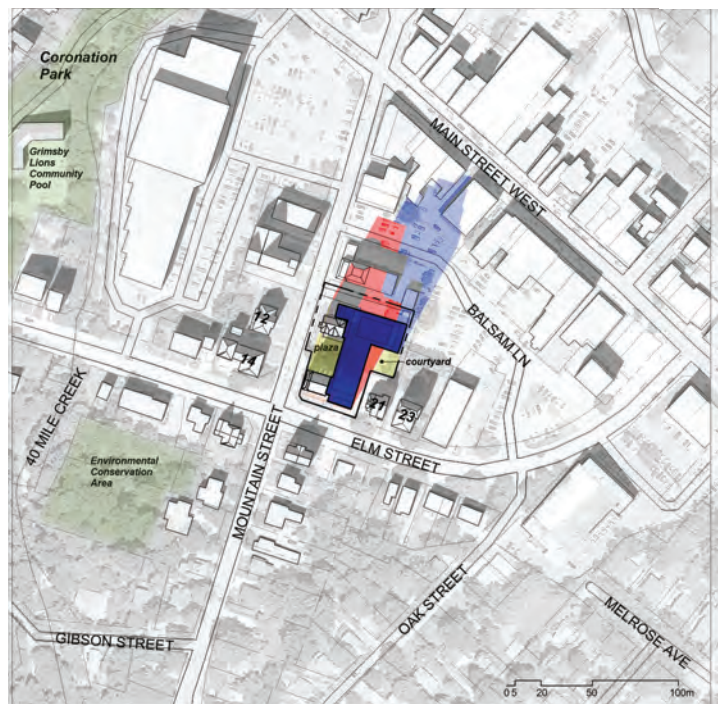
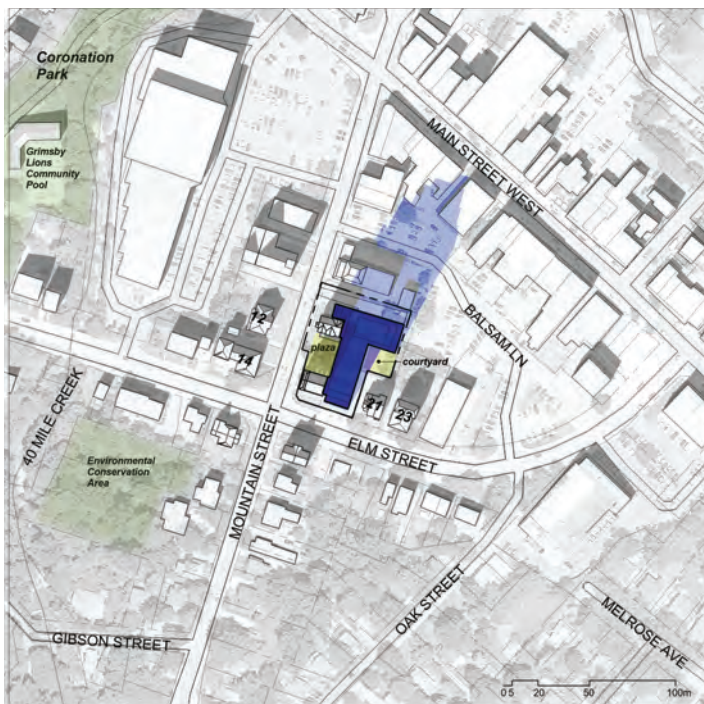
Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



13:16



14:16

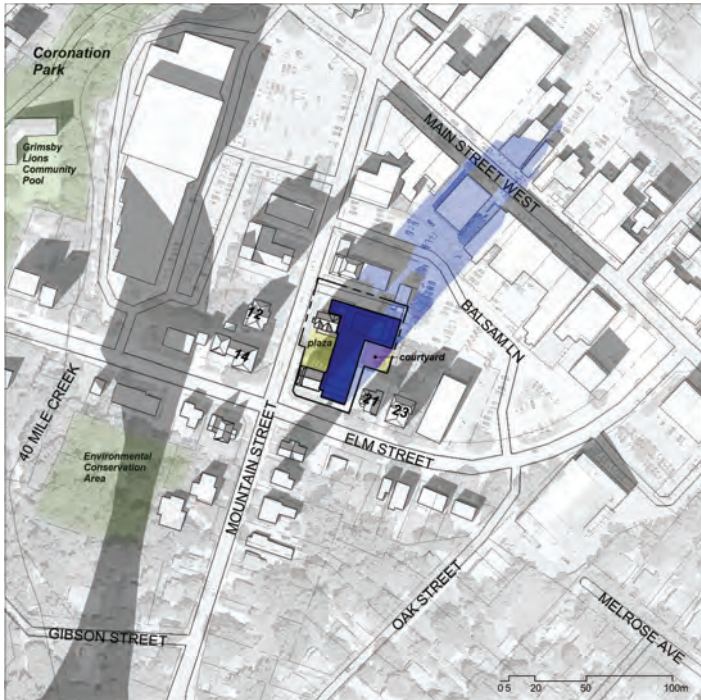
- Subject Property Property Line
- As of Right Building Massing
- Shadow cast by As of Right Building Massing
- Proposed Building
- Shadow cast by Proposed Building
- Parks & Natural Areas
- Proposed Outdoor Amenities
- 21 Residential Property Street Number

Lat 43.1925, Lon -79.5627
Scale 1:4000

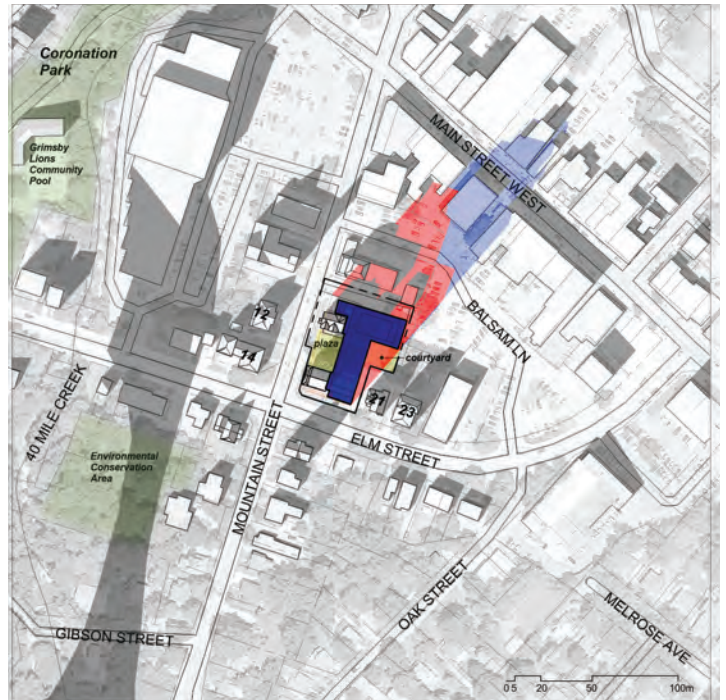


5.1 December 21 - Winter Solstice, cont'd

Proposed Building Shadows



Proposed Building Shadows + As of Right Shadows



15:16

- Subject Property Property Line
 - As of Right Building Massing
 - Shadow cast by As of Right Building Massing
 - Proposed Building
 - Shadow cast by Proposed Building
 - Parks & Natural Areas
 - Proposed Outdoor Amenities
 - Residential Property Street Number
- Lat 43.1925, Lon -79.5627
Scale 1:4000





6.0 Appendix

Sun Shadow Study – Terms of Reference (TOR)

SvN has been retained by Valentine Coleman 1 and Valentine Coleman 2 as both the architects and landscape architects for the proposed redevelopment of the 13 Mountain Street and 19 Elm Street properties in the Town of Grimsby (“Subject Site”).

A pre-application meeting was held with the Town of Grimsby on February 18, 2021 in advance of a formal submission for an Official Plan Amendment and Zoning By-law Amendment. Through this meeting and the submission of a conceptual design package, the Pre-Consultation Agreement identified the need for a Sun and Shadow Study to be undertaken as part of this submission and that a project-specific TOR be developed for approval by the Town prior to proceeding with the Study.

Site Location:

The Subject Site is north of the Niagara Escarpment in the built-up area of downtown Grimsby at the corner of Mountain and Elm Streets and to the south of Main Street. The site contains two existing brick buildings, the Woolverton House and a former church building.

Project Description:

The project includes the adaptive re-use of the Woolverton House at 13 Mountain Street and the former church at 19 Elm Street with the addition of a 7-storey mixed use building totalling approximately 80 residential units and a non-residential GFA of approximately 450 square metres. The maximum building height measured from the lowest point on the site (north property line) is approximately 26 metres above grade not including mechanical penthouse. Attached in Appendix A is a Context Map, Conceptual Site Plan and Conceptual Block Massing of the proposed development for reference. The building massing is still in design development and final elevations and heights will be confirmed prior to initiating the visual assessment work.

Applicable Policies:

The Sun and Shadow Study will address the Town of Grimsby Official Plan (May 2012 with Amendments) including the following sections:

- 2.5.5 In considering applications for infill and intensification, the Town shall consider the impact on adjacent residential uses including overlook and shadowing, the character of the surrounding area and the need for a transition in heights and densities adjacent to existing residential uses as per Section 3.4.7.
- 4.5.3 When considering building forms, development which results in extensive loss of sunlight to adjacent land uses shall be discouraged.
- 12.6.9.4 Microclimate and Shadows

Description:

The massing of the new contemporary building on the Subject Site is based on a set of relationships between the existing buildings on the site and the surrounding context. The proposed Sun and Shadow Study will provide a visual display of any shadow impacts the proposed new development has on neighbouring streets, parks and other land uses. The study will use key dates and times as defined in the Official Plan future development affects solar access.

Methodology (Work Plan):

- 1) A model of the context within a 150 to 200m radius of the site will be prepared with existing buildings footprints, streets, parks and open spaces. The context model will be imported from GIS, www.cadmapper.com or an approved Town source into 3D CAD modeling software such as Revit or Rhino with Grasshopper.
- 2) The proposed development 3D model will be placed into the context model using a different colour to differentiate from existing context. The model will be geo-located to the latitude and longitude of the site (43.1925° N, 79.5627° W).
- 3) The model will be aligned to astronomical north using the shadow line at solar noon (12:16) on December 21st to determine the correct north direction.
- 4) The Sun/Shadow tests will be undertaken on equinoxes (21 March and 21 September) and solstices (21 June and 21 December) at:
 - a. Solar Noon (21 March @ 13:25 EDT, 21 June @ 13:20 EDT, 21 September @ 13:10 EDT, 21 December @ 12:16 EST);
 - b. And hourly intervals before and after Solar Noon up to and including 1.5 hours after sunrise and 1.5 hours before sunset as set out in the Town of Grimsby Official Plan.

Drawings

- 5) Drawings will be produced for each hourly interval at the four identified times of the year.
- 6) All times will be based in the Eastern Time Zone and will take into account Daylight Saving Time.
- 7) Drawings will be plotted to a standard metric scale to include the shadow coverage area.
- 8) Drawings will include a title with date and time, latitude and longitude, north arrow, bar scale, and the person who prepared the drawing and the person who reviewed the drawing.
- 9) Drawings will clearly indicate the development site boundary, the footprint of the buildings (existing, as-of-right and proposed), surrounding streets and public open spaces.
- 10) Drawings will be arranged side by side with shadows of existing context and shadows of the proposed development with the as-of-right in a different colour or hatch.
- 11) A legend on each drawing will describe the colour or hatch.

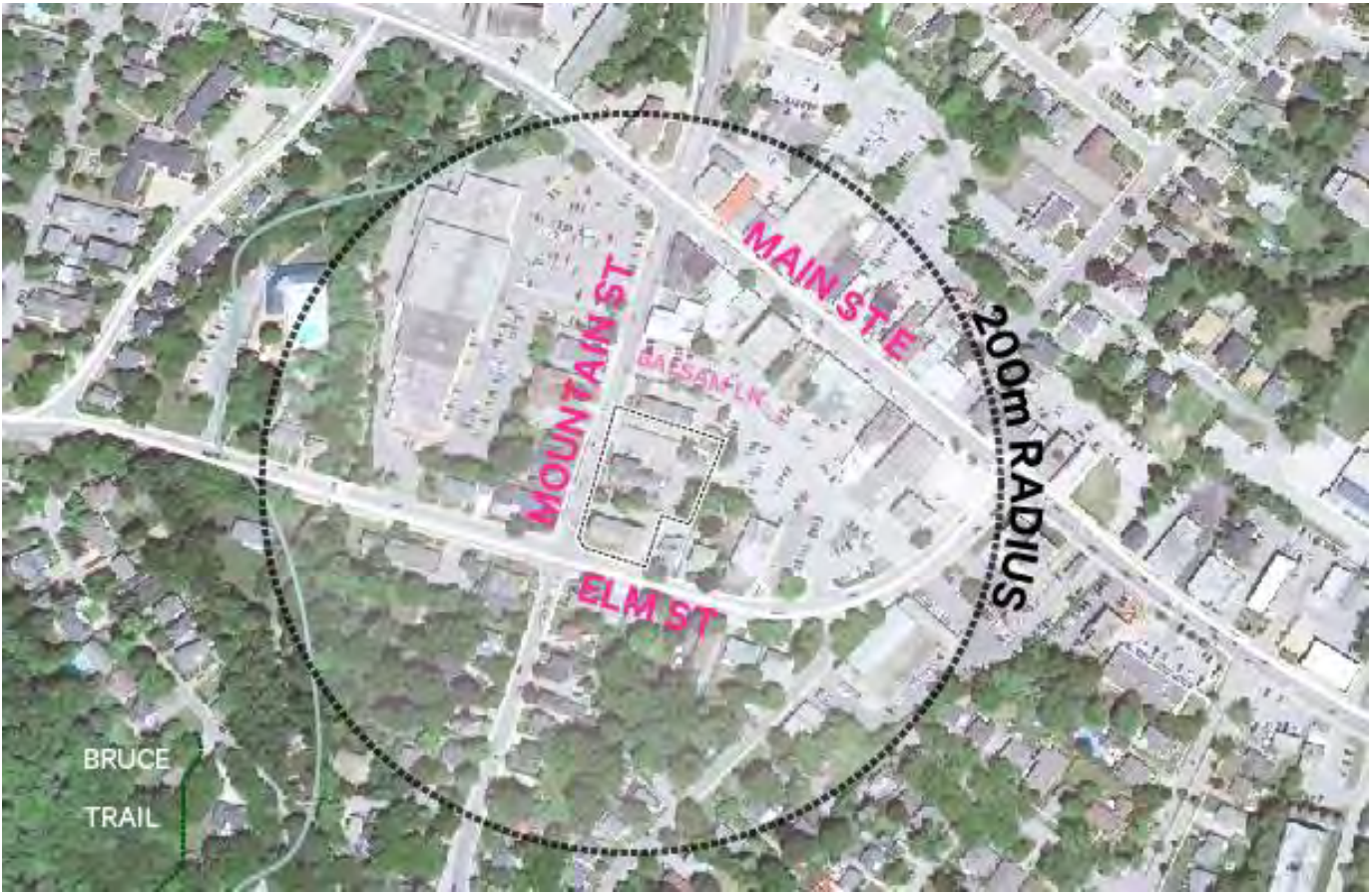
Written Analysis

- 12) The Sun Shadow Study will include:
 - a. A letter summarizing the sun/shadow impacts of the proposed development and measures that have been taken to minimize shadow impacts by the development on neighbouring streets, parks and public open spaces.
 - b. Confirmation of site latitude and longitude.
 - c. A statement describing how astronomic north was determined.
 - d. Source of base information and model software used in the simulations/analysis.
 - e. A description, quantification and assessment of all locations where shadow impacts are observed.

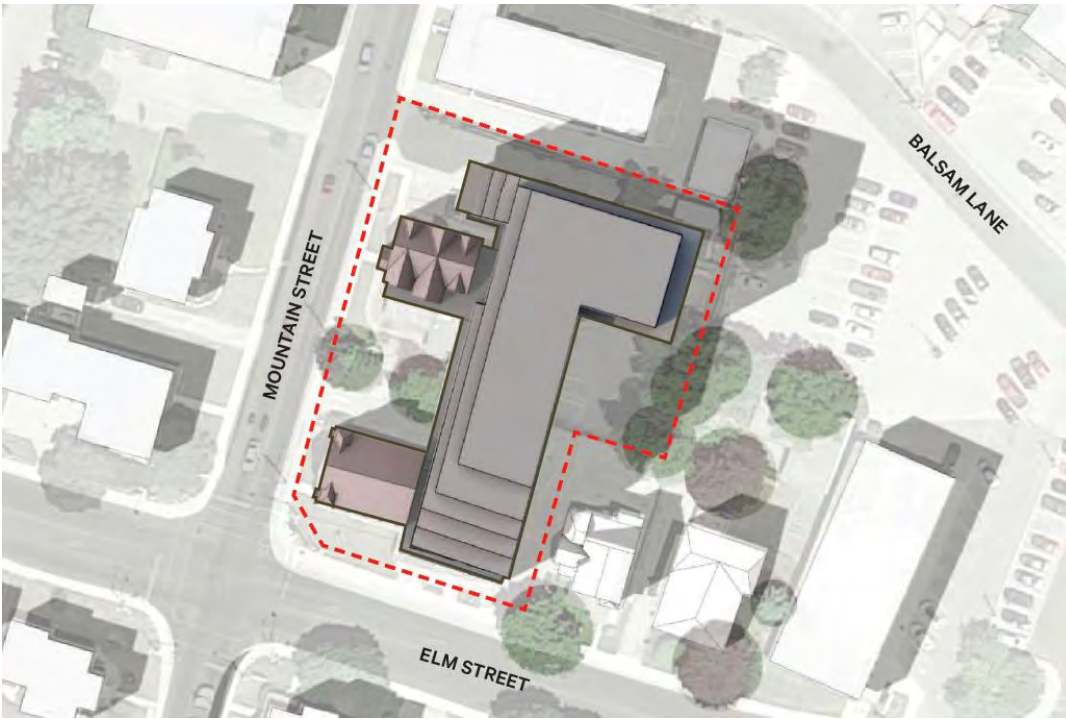
Submission Document:

The Sun and Shadow Study will be compiled in a document with a summary of the project, the methodology and software used in the study followed by the written analysis and the drawings as indicated above.

Appendix A



A.1 Context Map



A.2 Conceptual Site Plan (NTS)



A.3 Conceptual 3D Massing