



1027458 Ontario Inc.

## Official Plan Amendment and Zoning By-law Amendment

Shadow Impact Study

North Neighbourhood Phase 7 – North of Wyandotte Street East

Windsor, Ontario

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# Introduction

Dillon Consulting Limited (Dillon) has prepared the following Shadow Impact Study, on behalf of our client, 1027458 Ontario Inc., (Applicant), to assess the potential impact of the shadows created by the proposed multiple dwelling residential development. The property is located north of Wyandotte Street East in the North Neighbourhood within the East Riverside Planning Area in the City of Windsor (“Subject Site”).

As per the City of Windsor Official Plan – Chapter 8: Urban Design, Shadow Impact Studies may be required for medium, high, and very high-profile development proposals within the City of Windsor to evaluate the impact of the shadows cast by the development and to determine the appropriate design measures to reduce or mitigate any undesirable shadow conditions (City of Windsor Official Plan, Section 8.6.2.3).

The size, shape, and orientation of new buildings creates new shadows at different times of day and year that may limit penetration of direct sunlight into both public and private spaces. By analyzing the existing and proposed shadows of an area together, both incremental and cumulative shadow impacts can be evaluated. The purpose of the Shadow Impact Study is to encourage high-quality development that maintains adequate access to sunlight, for the enjoyment of public and private spaces, within the City of Windsor.

Within the East Riverside Planning Area, North Neighbourhood the Applicant is proposing a seven (7) phased residential development. The Shadow Impact Study will consider Phase 7 of the larger residential development, which is proposed to be developed with two (2) 11-storey buildings containing 154 units each and associated parking (“proposed development”). Refer to *Appendix A (Conceptual Development Plan – Master Phasing Plan)*.

This Shadow Impact Study has been prepared in support of the Official Plan Amendment and Zoning By-law Amendment applications, required to permit the proposed development.

## Description of Site

The Subject Site is located north of Wyandotte Street East and south of Riverside Drive East, within the East Riverside Planning Area in the City of Windsor. The property is municipally known as 0 Wyandotte Street East, and has a legal description of Part of Block A on Plan 1161 and Part 6 on Plan 12R-15252 in the City of Windsor.

The total site area under application is approximately 1.65 hectares (4.07 ac) in size, with a frontage of 78.9 metres (258.8ft) along Wyandotte Street East. The Subject Site is undeveloped and is currently vacant.

The surrounding area supports a mix and range of residential uses with some open space and institutional uses. There are a number of single detached, semi-detached, and townhome dwellings that make up the

residential fabric of the area. Nearby the Subject Site is the Riverside Sportsmen Club and the Ganatchio Trail. Just north of the Subject Site is the Detroit River.

## 1.2 Proposed Development

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The proposed development includes the construction of two (2) 11-storey buildings containing 154 units each for a total of 308 dwelling units proposed. The development will provide 373 parking spaces between the proposed 1-storey underground parking area and a surface parking lot on site. Access to the Subject Site is proposed via a driveway along Wyandotte Street East. There is a pedestrian trail proposed along the western limit of the property to provide connection to the Ganatchio Trail System.

Refer to *Appendix B (Conceptual Development Plan – Phase 7)*.

## Methodology

The Shadow Impact Study was prepared in accordance with the following methodology:

- Utilization of Google Sketch Up for the shadow simulations;
- Generation of the surrounding massing data from municipal Land Fabric data and by using municipal aerial imagery;
- Preparation of the preliminary massing of the proposed development using Google Sketch Up;
- Surrounding context building heights and proposed building heights were determined through standardized floor to floor heights:
  - Single storey: 4.5 metres;
  - Two storeys: 7.5 metres; and
  - Each storey of multiple dwelling buildings: 4.0m.

The shadow diagrams include the following features:

- The subject site identified in a red outline with the proposed building footprint;
- Surrounding existing and approved building footprints;
- Underlying parcel fabric;
- Shadows from the proposed development are colour coded in a dark grey hue;
- Shadows from existing and approved buildings are colour coded in a light grey hue; and
- All streets, blocks, open spaces, and existing building structures are shown to a distance that shows the shadow impacts during the requested times.

The shadow analysis and impact assessment are based on the following criteria:

- Impact on surrounding residential properties and the duration of shadows;
- Impact on the public realm;
- Impact on any parks and open spaces; and
- Impact on outdoor amenity areas of the proposed development.

## Study Test Dates

The shadow impacts of the proposed residential development have been evaluated at the following dates:

- March 21<sup>st</sup> (vernal equinox);
- June 21<sup>st</sup> (summer solstice);
- September 21<sup>st</sup> (autumnal equinox); and
- December 21<sup>st</sup> (winter solstice).

The study test dates were selected to reflect the variety of shadow impacts that may occur within the year. The solstices, June 21<sup>st</sup> and December 21<sup>st</sup>, represent the seasonal extremes for each season. June

21<sup>st</sup> is the longest day of the year when the sun is at its highest and the shadows are the shortest, while December 21<sup>st</sup> is the shortest day of the year when the sun angle is at its lowest and the shadows are the longest.

## 2.2 Study Test Times

The shadow impacts of the proposed residential development have been evaluated at the following test times:

- 7:00 am
- 7:30 am
- 8:00 am
- 9:00 am
- 10:00 am
- 11:00 am
- 2:00 pm
- 3:00 pm
- 4:00 pm
- 4:30 pm
- 5:00 pm
- 6:00 pm
- 7:00 pm

Study test times may vary depending on the study test date. The study test times have been appropriately selected to evaluate the relevant shadow impacts at the selected time of year.

## 2.3 Time Zone

The Shadow Impact Study was prepared using the following time zone standards:

- Eastern Time Zone;
- Standard Time: Universal Time minus 5 hours (Winter Solstice – December 21<sup>st</sup>); and
- Daylight Saving Time: Universal Time minus 4 hours (Summer Solstice – June 21<sup>st</sup>, Autumnal Equinox – September 21<sup>st</sup>, and Vernal Equinox – March 21<sup>st</sup>).

## 3.0 Shadow Impact Analysis

### 3.1 March 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on March 21<sup>st</sup> using the study time intervals of 7:30 am through and up until 6:00 pm.

At 7:30 am, the proposed shadows extend beyond the Subject Site causing impacts on the adjacent property to the west known as 10835 Riverside Drive East and a number of the residential dwellings located north of Wyandotte Street East along Clover Avenue and Elinor Street. At this time, the proposed shadow of Building 'A' does extend across the Wyandotte Street East right-of-way. These potential shadow impacts are not sustained in duration and are therefore not anticipated to have any significant impact on the affected properties or the experience of the public realm.

By 8:00 am, the shadow impacts on the residential dwellings located along Clover Avenue and Elinor Street are resolved. The shadow impacts on the structure located at 10835 Riverside Drive East (Riverside Sportsmen Club) remain as a result of Building 'B'. The proposed shadow of Building 'A' extends across the southern portion of the 10835 Riverside Drive East property, which is currently a vacant parcel of land with possible future residential development. From 9:00 am through and until 10:00 am, there continues to be shadow impacts on the 10835 Riverside Drive East property. During these hours there are also shadow impacts to the proposed surface parking lot located on the Subject Site.

At 3:00 pm, the proposed shadows shift east causing some shadow impacts to the vacant parcel known as 10965 Riverside Drive East. There are also some anticipated impacts to the public realm as the proposed shadow of Building 'B' causes some shadow coverage along the Ganatchio Trail. During this time there also remains some impacts to the proposed associated surface parking of the development. From 4:00 pm through and until 6:00 pm the proposed shadow impacts to the vacant property known as 10965 Riverside Drive East and the Ganatchio Trail are sustained.

In summary, shadow impacts impacted by the proposed development on March 21<sup>st</sup> are anticipated for the longest duration and most significant impact during the morning hours due to the anticipated shadow coverage that affects the structure located at 10835 Riverside Drive East (Riverside Sportsmen Club). The shadow impacts to the Riverside Sportsmen Club are not anticipated to have any negative impacts to user experience as the facility does not open until 11:00 am (as of the date of this report). During the evening hours, the majority of the potential shadow impacts occur on vacant parcels of land. There are however some shadow impacts anticipated to the public realm, notably along the Ganatchio Trail. The impacts of the proposed shadow on the public realm are anticipated to occur for a short period of time, with any affected pedestrian sidewalks experiencing at least 50% sun coverage during the daytime hours. The proposed shadows are not expected to have any negative impacts on user experience or quality of life as the cumulative effect of the proposed shadows and the existing shadows maintains adequate sun coverage.

Refer to *Appendix C (Shadow Diagrams – March 21)*.

### 3.2 June 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on June 21<sup>st</sup> using the study time intervals of 7:00 am through and up until 7:00 pm.

At 7:00 am, there are some potential shadow impacts as a result of the proposed development on the adjacent property to the west known as 10835 Riverside Drive East. The impacts to this property include shadow coverage to the structure on the property (Riverside Sportsmen Club) and impacts to the southern portion of the property. The southern portion of the property known as 10835 Riverside Drive East is currently vacant with potential for future residential development. During this time there are minor potential shadow impacts to the public realm as the proposed shadow of Building 'A' extends across the Wyandotte Street East right-of-way.

At 8:00 am, there continues to be shadow impacts to the 10835 Riverside Drive East property. An hour later, at 9:00 am, there remains minor shadow impacts to the structure located at 10835 Riverside Drive East. For the remainder of the morning hours there are no anticipated shadow impacts to the public realm as majority of the proposed shadows are contained within the Subject Site.

In the evening hours, the shadow impacts as a result of the proposed residential development are either limited to the Subject Site or occur on the vacant parcel of property to the east known as 10965 Riverside Drive East.

In summary, shadow impacts as a result of the proposed development on June 21<sup>st</sup> are anticipated to have limited impact on the surrounding area. Majority of the potential shadow impacts occur to parcels of land that are currently vacant. The proposed shadow impacts to the property known as 10835 Riverside Drive East are not anticipated to have any negative impact to the user experience as the Riverside Sportsmen Club facility does not open until 11:00 am (as of the date of this report) and any potential shadow impacts to the structure are resolved by 10:00 am. There are no notable shadow impacts to the public realm as any anticipated impacts are less than two (2) hours in duration and allow for adequate sun exposure during the daytime hours.

Refer to *Appendix D (Shadow Diagrams – June 21)*.

### 3.3 September 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on September 21<sup>st</sup> using the study time intervals of 7:00 am through and up until 6:00 pm.

At 7:00 am, the shadow impacts of the proposed development do not have any new impacts on the surrounding residential area. The proposed shadow of Building 'A' does however contribute to additional shadow coverage along the Wyandotte Street East right-of-way and the proposed shadow of Building 'B'



does cause shadow coverage to the structure (Riverside Sportsmen Club) located at 10835 Riverside Drive East.

By 8:00 am, the shadow impacts as a result of the proposed development are limited to the Subject Site and the adjacent property to the west known as 10835 Riverside Drive East. The proposed shadows at this time causes shadow coverage to both the Riverside Sportsmen Club structure and the vacant area of the parcel. These conditions continue to improve throughout the remainder of the morning hours with little to no new shadow impacts to the surrounding area by 10:00 am.

During the afternoon and evening hours, 3:00 pm – 6:00 pm, the anticipated shadow impacts are contained primarily to the Subject Site and the adjacent property to the east known as 10965 Riverside Drive East. The parcel of land known as 10965 Riverside Drive East is currently vacant, as such no negative impacts as a result of the proposed development are expected. During these hours there are some anticipated impacts to the public realm as the proposed shadow of Building 'B' encroaches onto the Riverside Drive East right-of-way and the adjacent Ganatchio Trail.

In summary, the shadow impacts as a result of the proposed development on September 21<sup>st</sup> have the greatest potential impact on the public realm as the noted right-of-way and the Ganatchio Trail experience shifting shadow coverage. The shadow coverage affecting the public realm are not sustained at any given location for a prolonged period of time. Any affected pedestrian sidewalks/trails will maintain at least 50% of sun coverage during the daytime hours with no anticipated negative impacts to the quality of experience within the public realm. The shadow impacts that occur within the Subject Site affect the associated surface parking area and are not expected to have any negative impact to user experience or quality of life. The shadow coverage affecting the structure (Riverside Sportsmen Club) located at 10835 Riverside Drive East is not anticipated to have any negative impact to the user experience as the Riverside Sportsmen Club facility does not open until 11:00 am (as of the date of this report).

Refer to *Appendix E (Shadow Diagrams – September 21)*.

### 3.4 December 21 Analysis

The shadow impacts of the proposed development on the surrounding area have been evaluated on December 21<sup>st</sup> using the study time intervals of 9:00 am through and up until 4:30 pm.

At 9:00 am, the proposed shadow extends northwest towards the Detroit River, causing shadow coverage to a number of residential dwellings and extending across the Riverside Drive East right-of-way. The proposed shadow also causes shadow coverage to occur to the adjacent property at 10835 Riverside Drive East. The shadow impacts to the property known as 10835 Riverside Drive East primarily affect the vacant areas of the parcel with some impacts to the structure (Riverside Sportsmen Club).

By 10:00 am, majority of the above noted shadow impacts are resolved. There remain some impacts to the 10835 Riverside Drive East property and the Riverside Drive East right-of-way. As the proposed

shadows shift east, there the shadow coverage continues to affect the Riverside Drive East right-of-way and the Ganatchio Trail.

Beginning at 3:00 pm and continuing until sunset, the proposed shadow impacts a number of residential properties located north of Riverside Drive East. The proposed shadow begins to encroach into the front yards and eventually causes shadow coverage to a number of residential dwellings. The shadow impacts are minor in nature as they are limited in duration and maintain appropriate sun exposure for all affected residential properties. During these afternoon and evening hours, there are shadow impacts experienced by the property known as 10965 Riverside Drive East. This parcel is currently vacant, as such no negative impacts are anticipated. The Riverside Drive East right-of-way and Ganatchio Trail also continue to experience prolonged, yet shifting, shadow coverage.

In summary, the shadow impacts as a result of the proposed development on December 21<sup>st</sup> are anticipated for the longest duration and significance during the evening hours. The proposed shadow impacts a number of the surrounding residential properties and the Riverside Drive East right-of-way during this time. The prolonged impacts at this time of year are largely due to the low angle of the sun throughout the winter. The sun exposure experienced within the public realm and at each residential property remains at an acceptable level. No negative impacts to the experience of the public realm or surrounding area are anticipated as a result of the proposed development.

Refer to *Appendix F (Shadow Diagrams – December 21)*.

## 4.0

## Summary

In summary, it is our opinion that the shadow impacts from the proposed residential development are overall limited and short in duration. The proposed shadows have a limited level of impact for the following reasons:

- The majority of cumulative shadowing impacts are moderate and shorter in duration, with shadow impact falling primarily away from residential properties;
- Of the shadowing impacts identified, the majority occur around sunrise or sunset, meaning that the neighbouring residents will continue to retain adequate sunshine access in their respective amenity areas during the daytime and increasingly in the warmer months; and
- The public realm is anticipated to experience some shadow coverage; however, the shadowing is limited in duration and by time of year. Any affected pedestrian sidewalks/trails maintain at least 50% sun coverage during the daytime hours. As such, it will not cause unreasonably negative impacts for, or deter from, the ability for community members to use the public realm in these particular areas.

## 4.1

### Design Strategies for Shadow Mitigation

In an effort to reduce any potential negative shadow impacts, certain design strategies have been included such as:

- Building massing adjustments such as building setbacks. The proposed residential buildings have been setback in a manner that includes appropriate space separation and massing; and
- Building placement and orientation. The orientation of the proposed residential buildings on the Subject Site is in a manner as to reduce the proposed shadow impacts on the surrounding residential, institutional, and public realm areas.

Other design strategies may be considered at the Site Plan Control stage including, but not limited to, the following:

- Massing, such as incremental changes in building height;
- Architectural proportion; and
- Volumes of defined space.

## 4.2

### Conclusion

In conclusion, it is our opinion that shadow impacts from the proposed development are limited overall. This is due to the duration that the shadows are anticipated to last, as the shadows caused by the

proposed residential development will occur for approximately 50% or less of daytime hours at any given location.

Any significant shadow impacts for extended periods of time on adjacent properties remains at an acceptable level. Access to sunlight during the daytime hours has been maintained in relation to the public realm and the neighbouring residential dwellings, institutional uses, and private outdoor amenity spaces.

# Appendix A

## *Conceptual Development Plans*

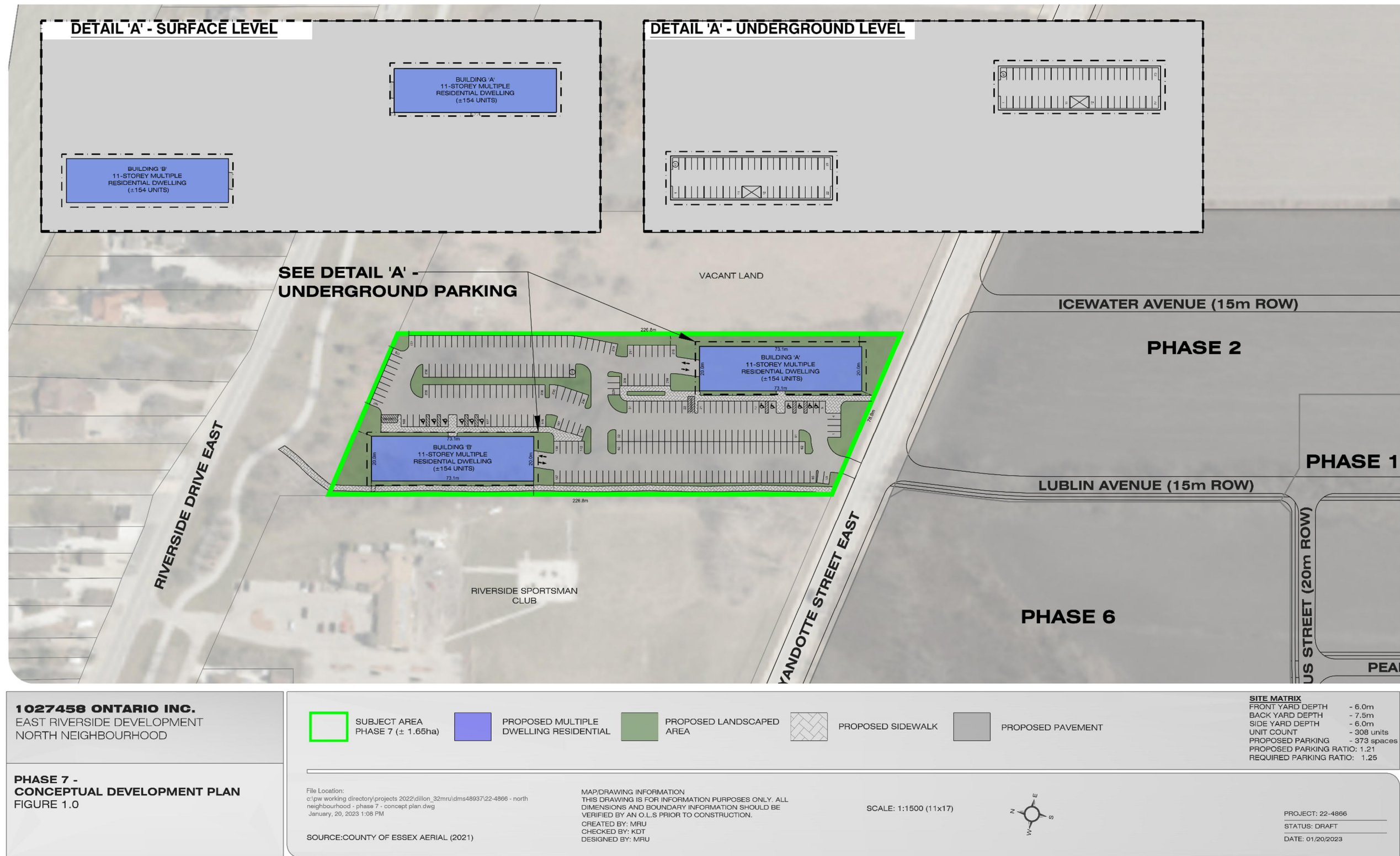
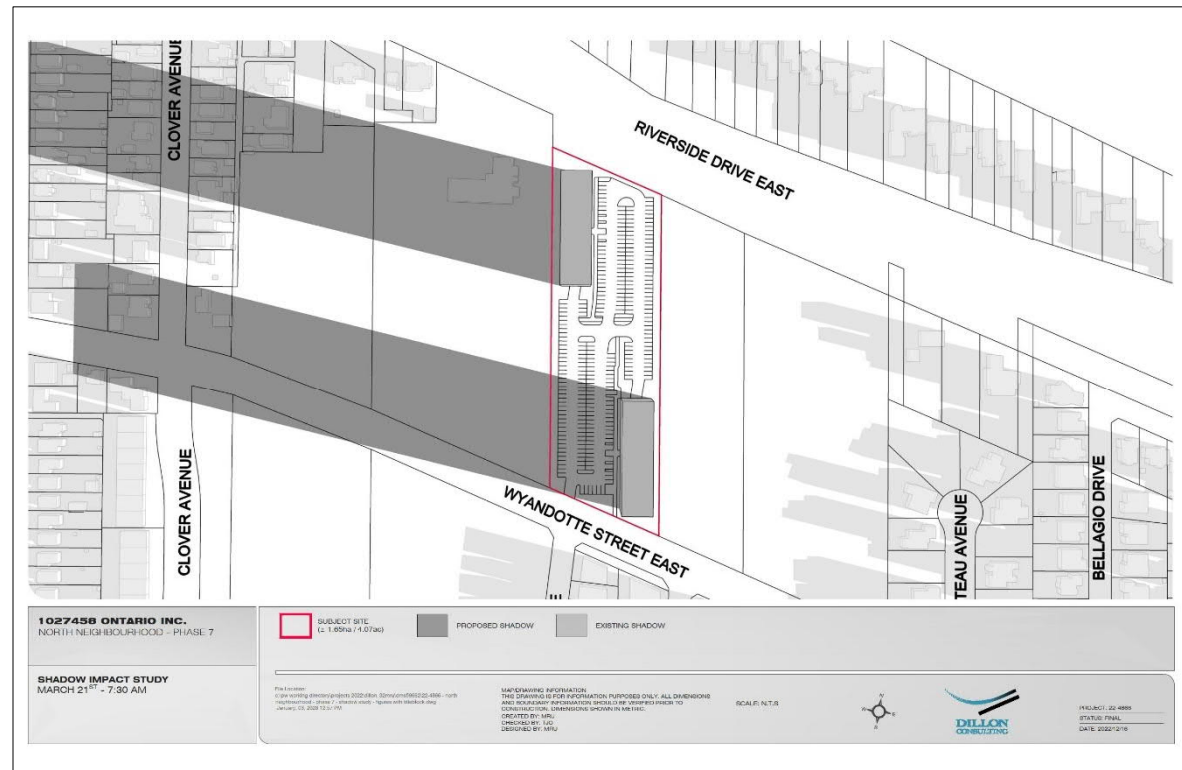


Figure 1: Concept Plan –

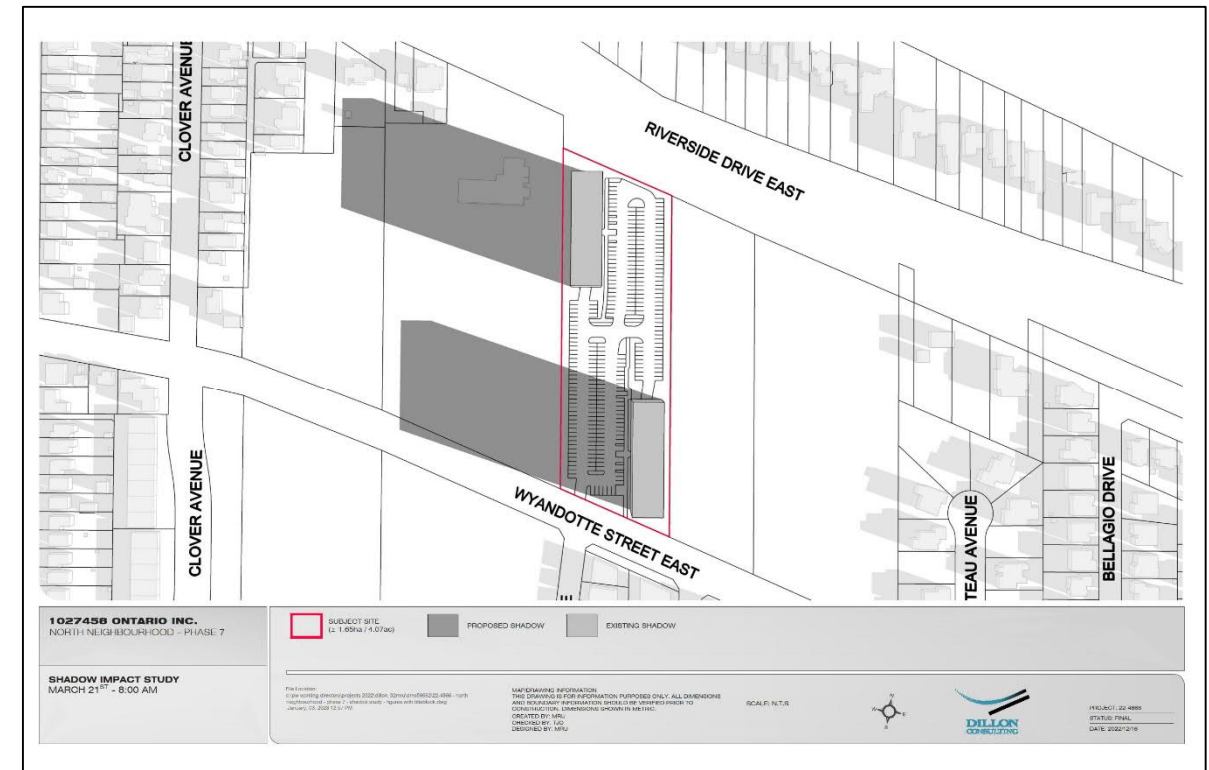
# Appendix B

## *Shadow Diagrams: March 21*

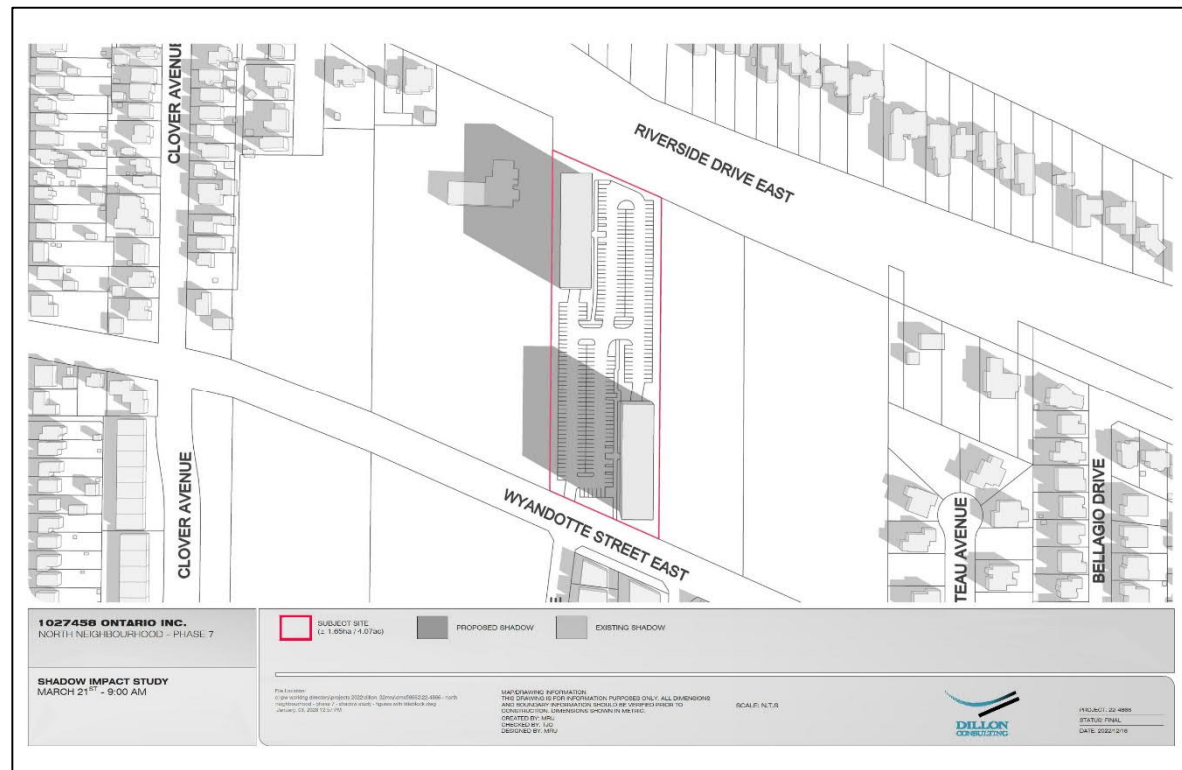




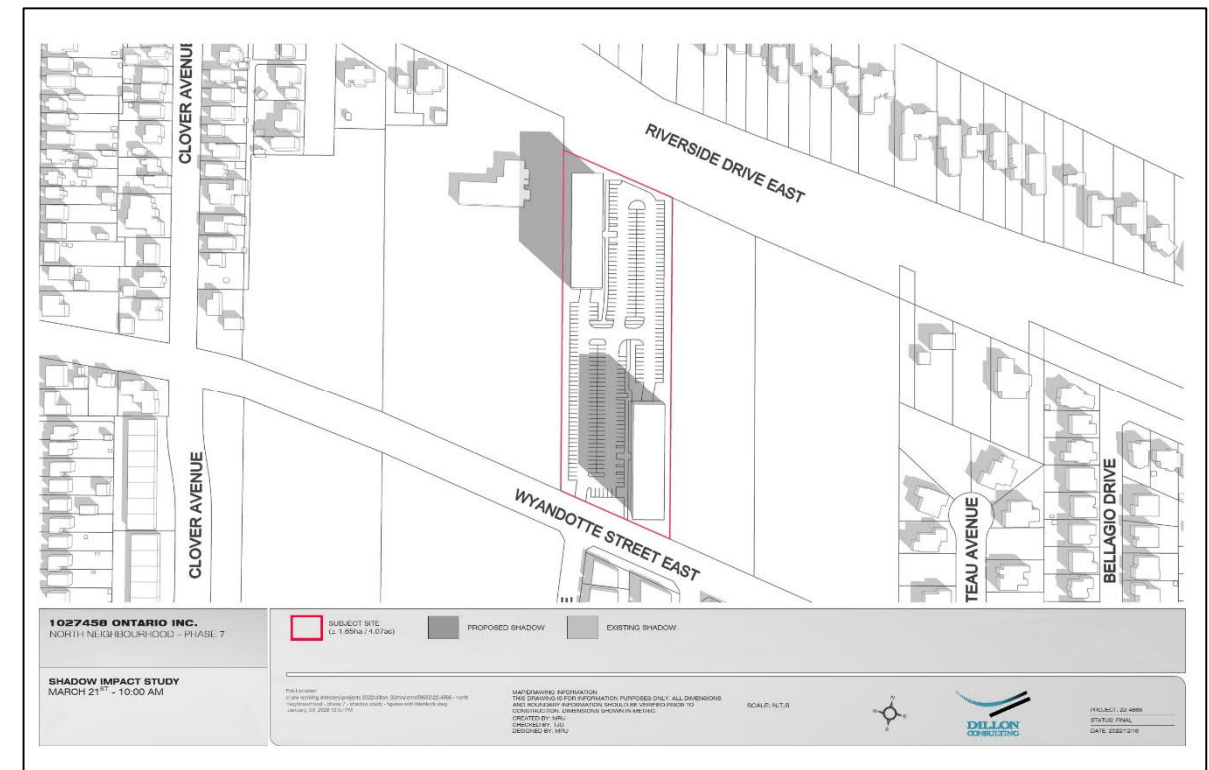
March 21 - 7:30 am



March 21 - 8:00 am

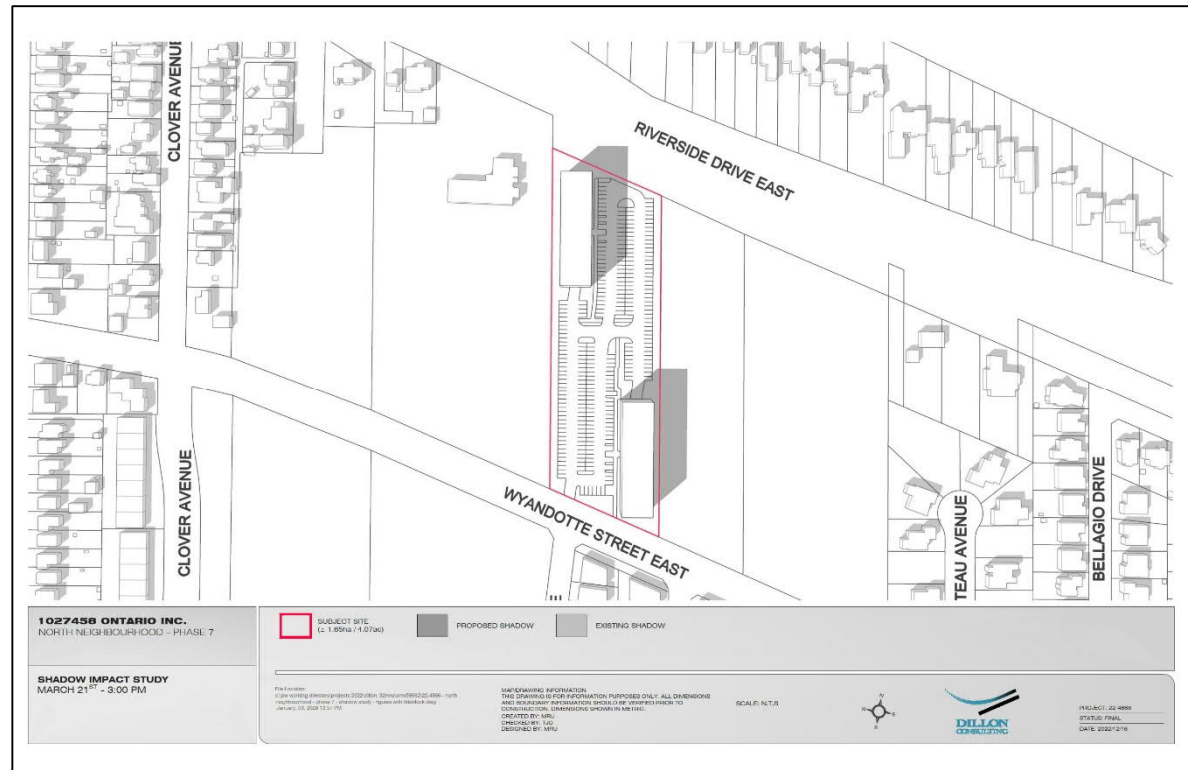


March 21 - 9:00 am

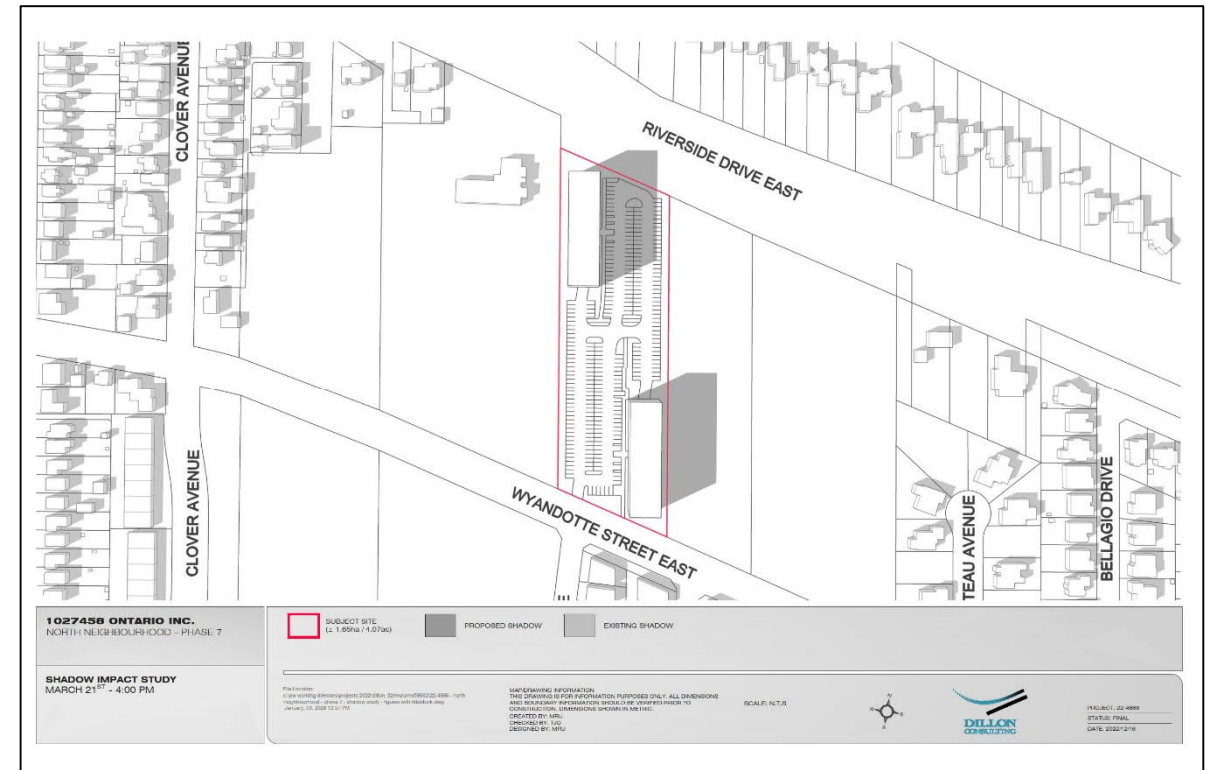


March 21 - 10:00 am

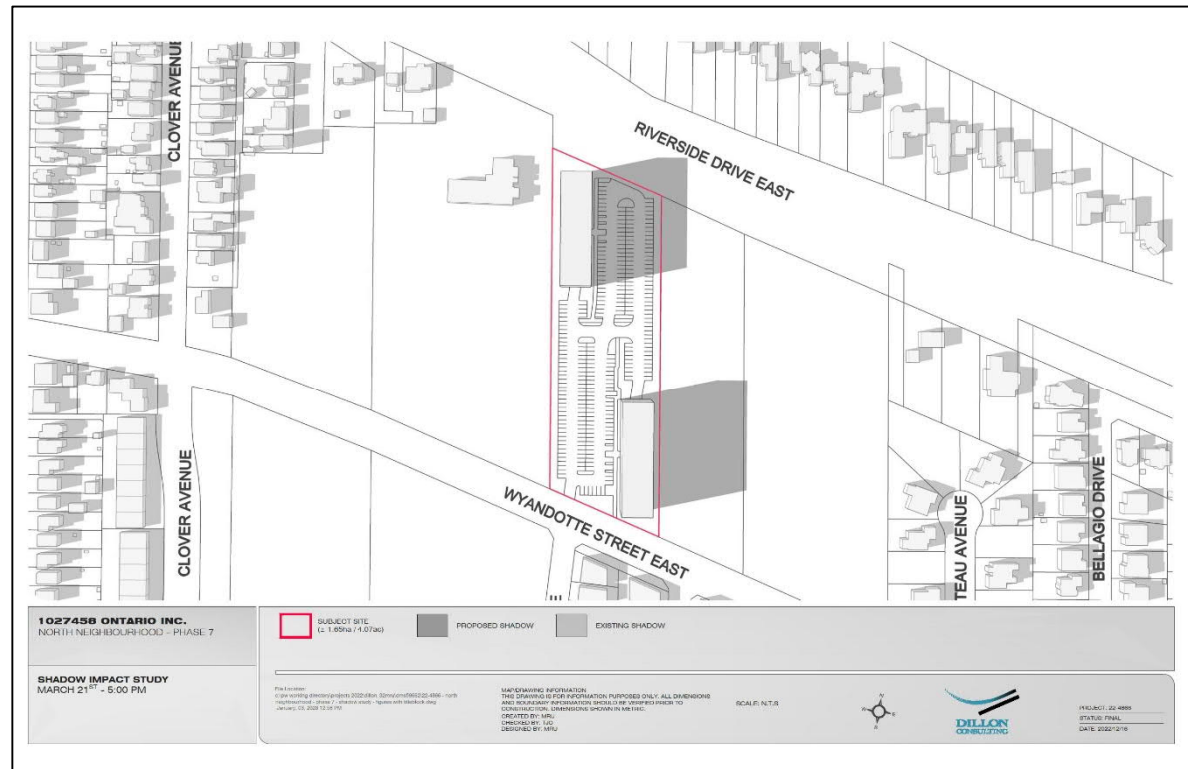




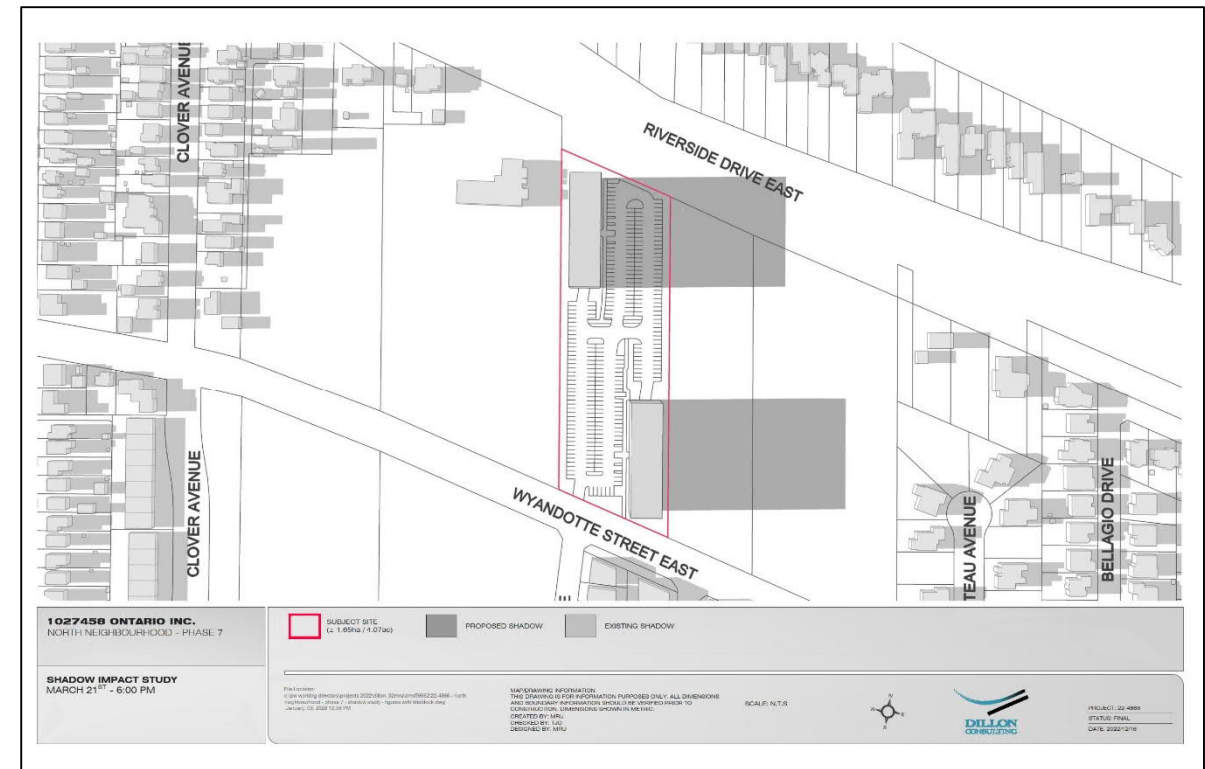
March 21 - 3:00 pm



March 21 - 4:00 pm



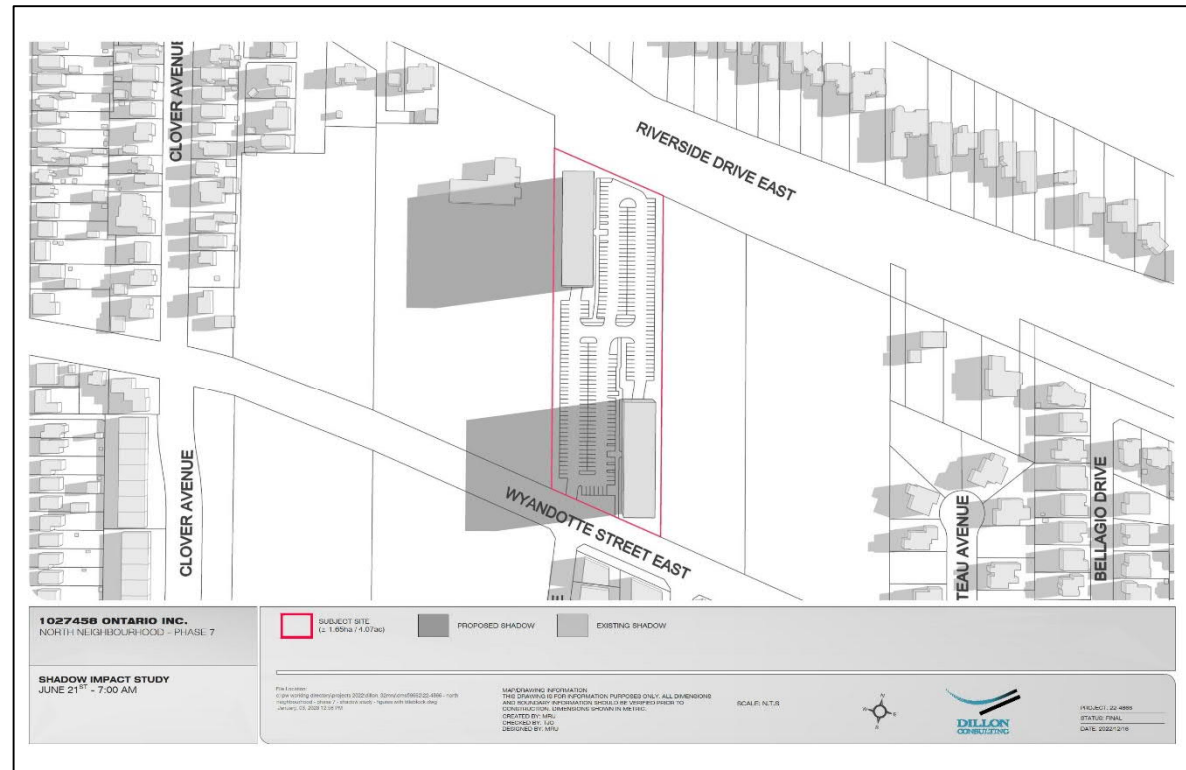
March 21 - 5:00 pm



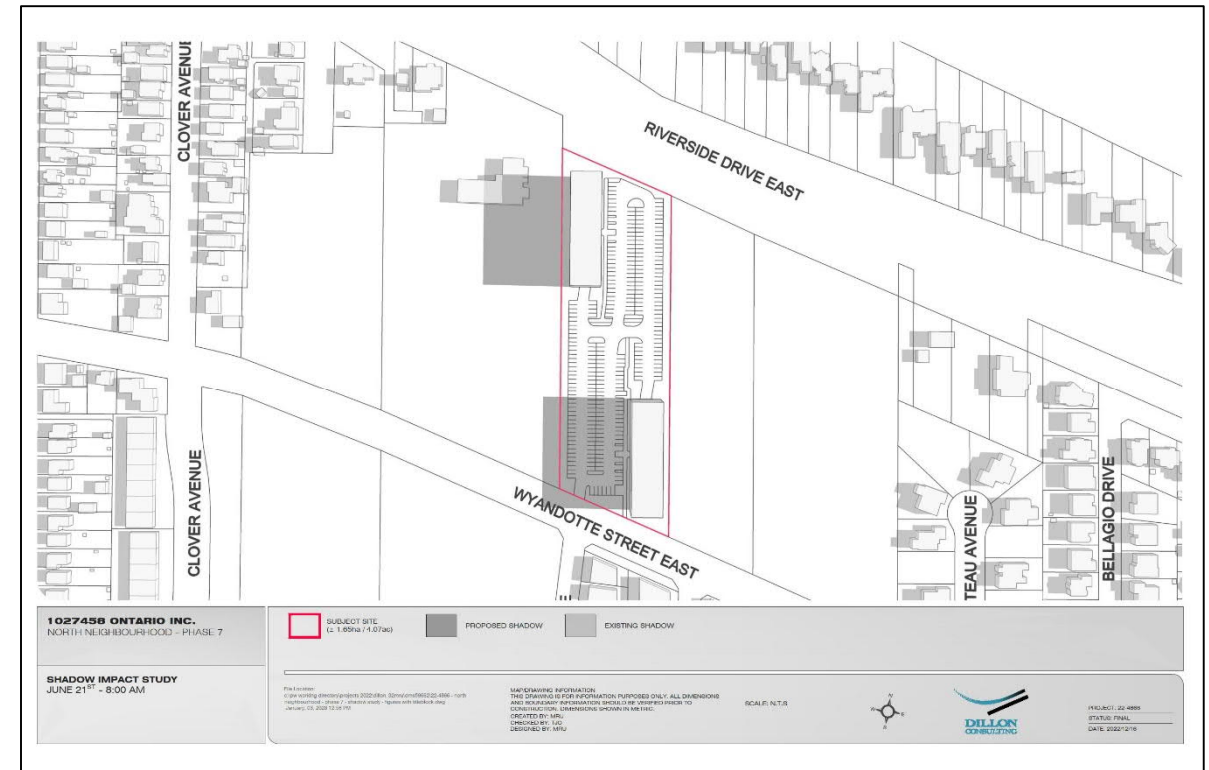
March 21 - 6:00 pm

# Appendix C

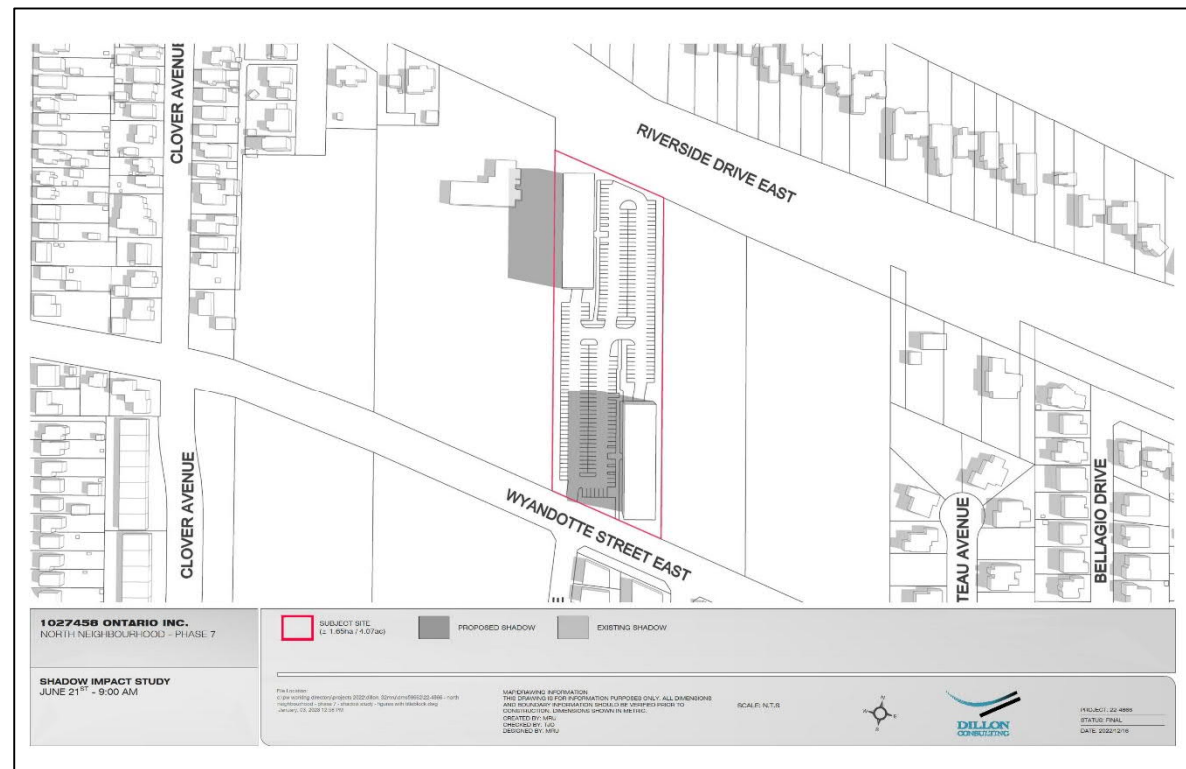
## *Shadow Diagrams: June 21*



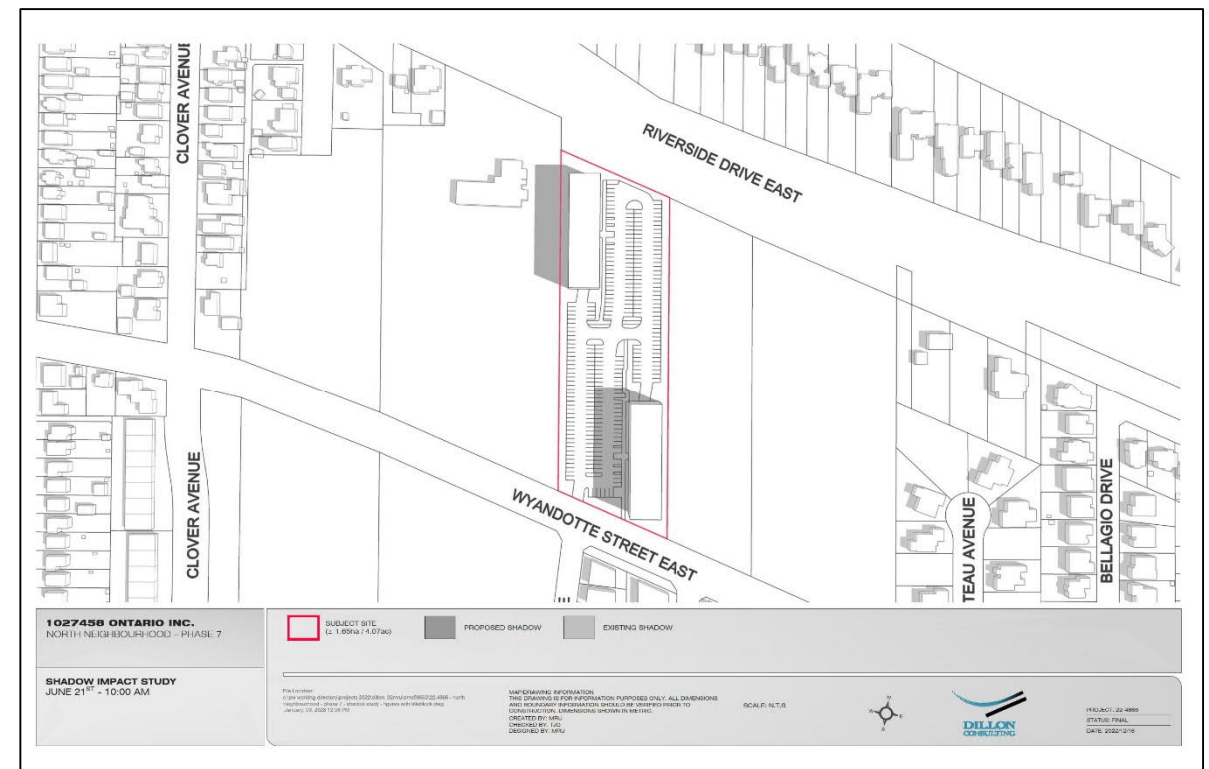
June 21 – 7:00 am



June 21 – 8:00 am

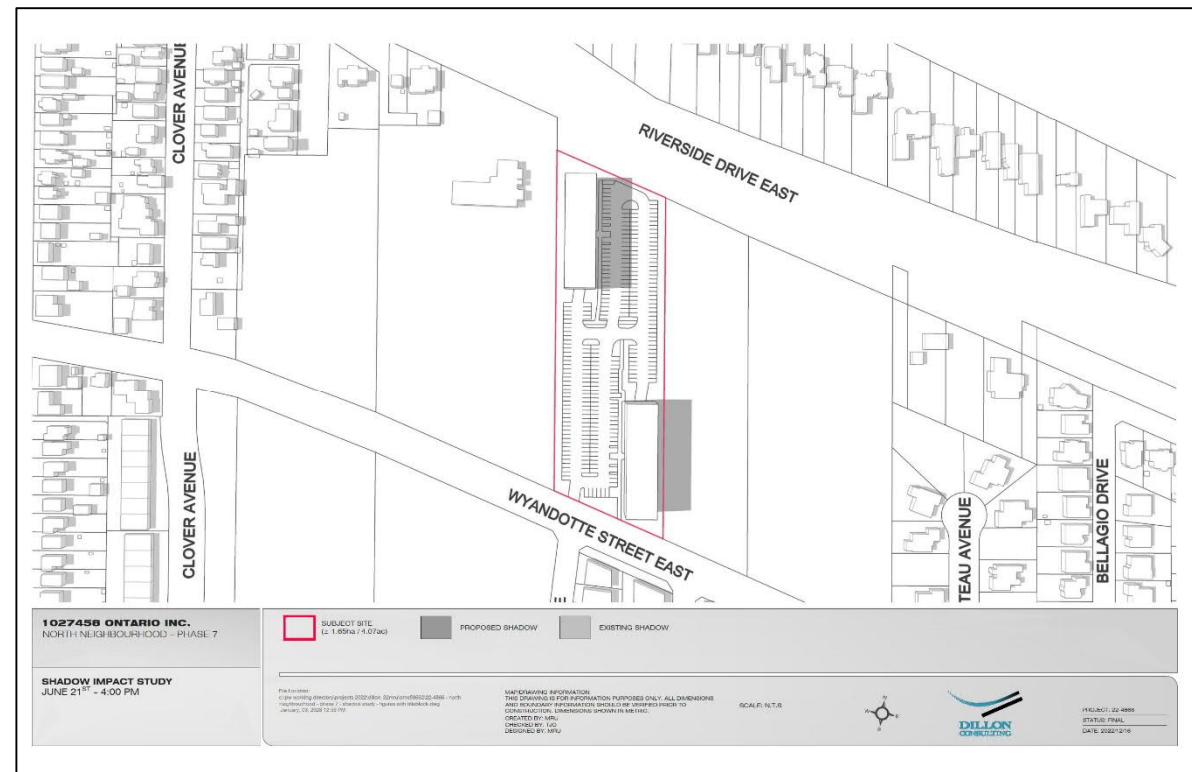


June 21 – 9:00 am

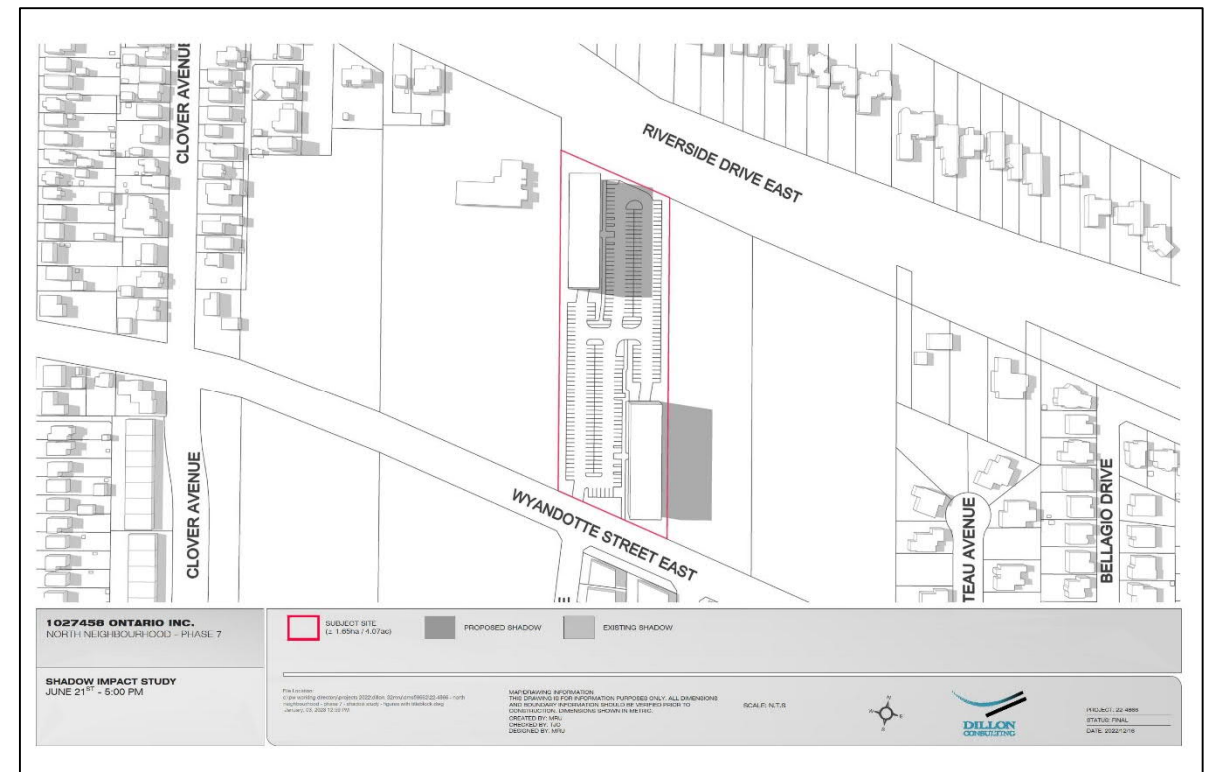


June 21 – 10:00 am

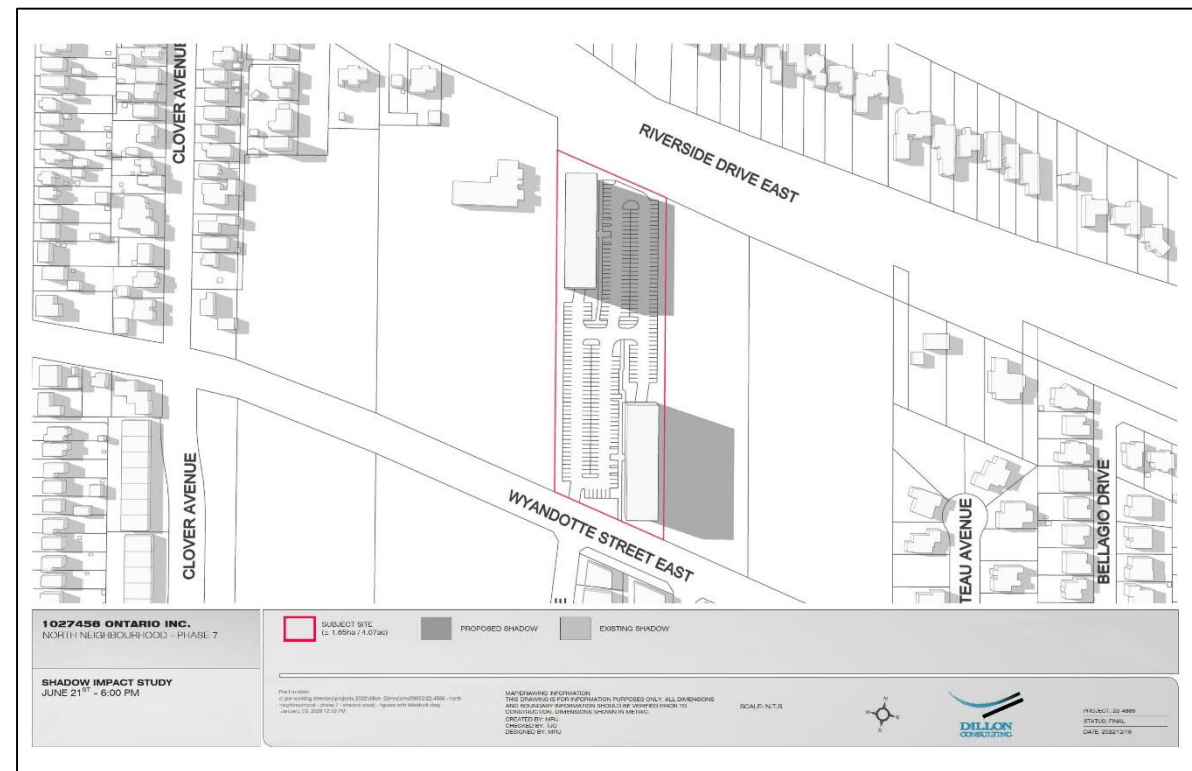




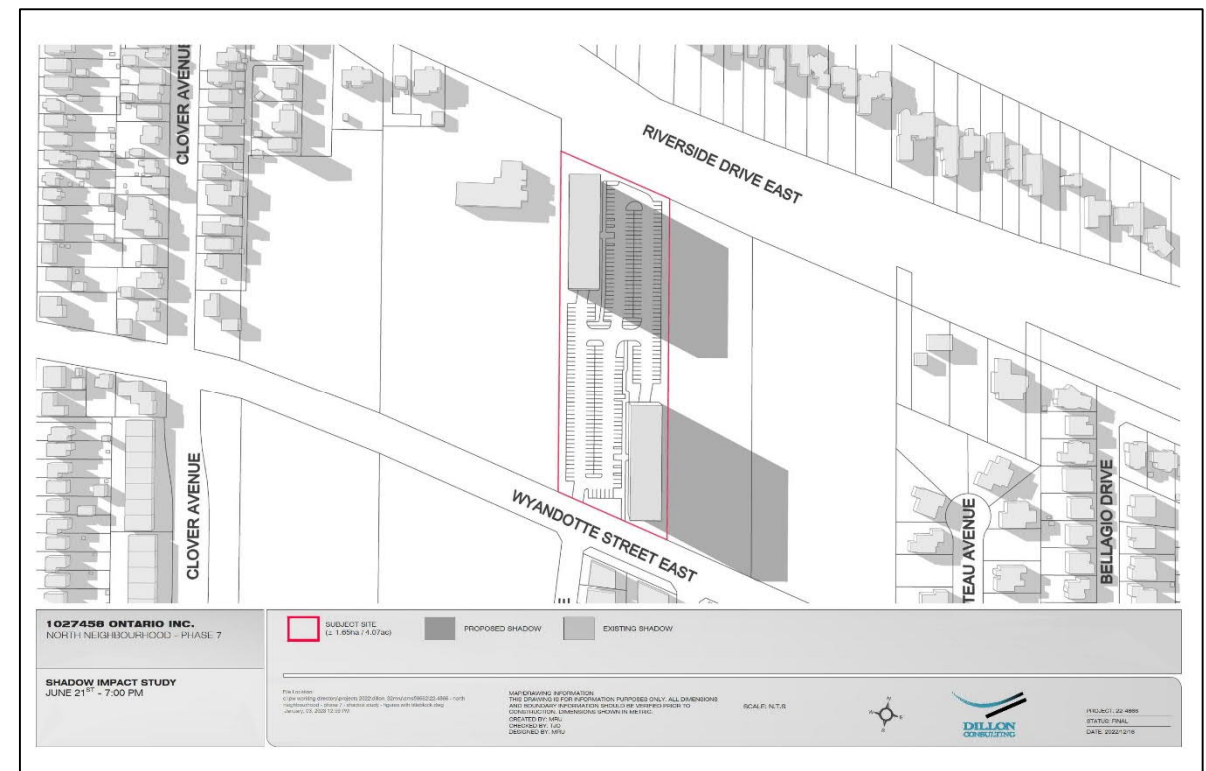
June 21 – 4:00 pm



June 21 – 5:00 pm



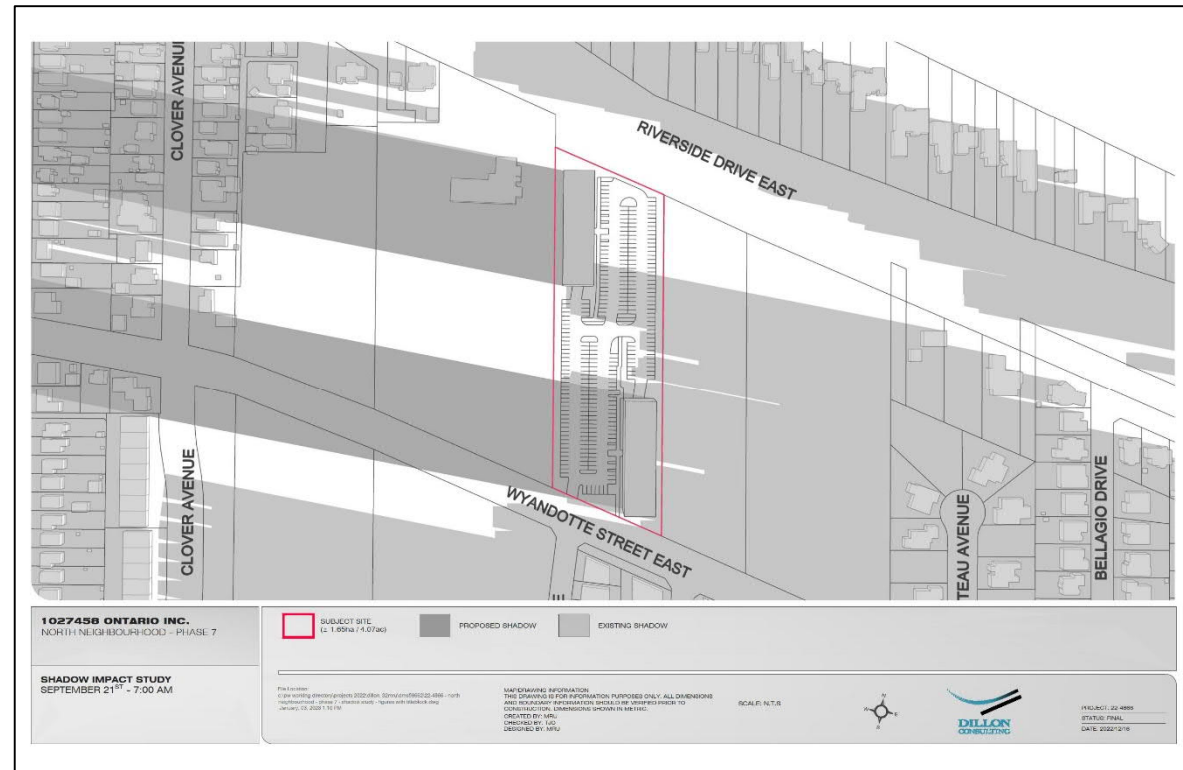
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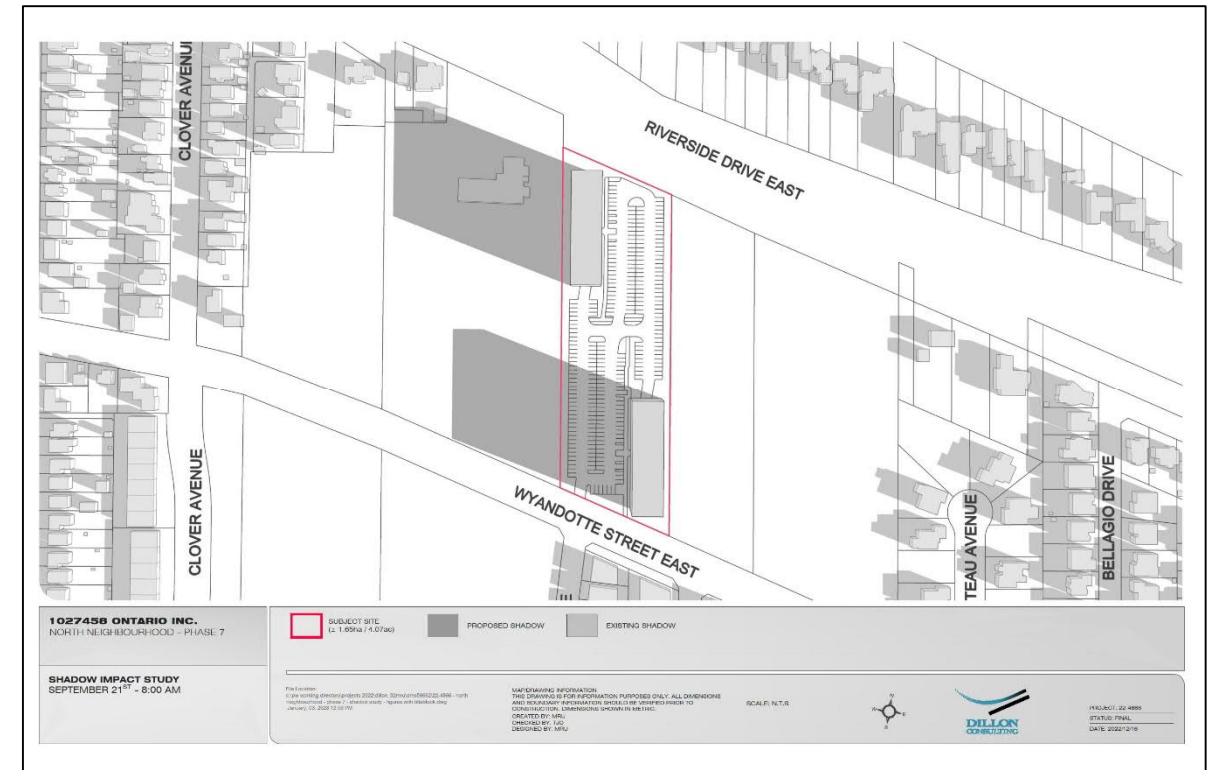
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# Appendix D

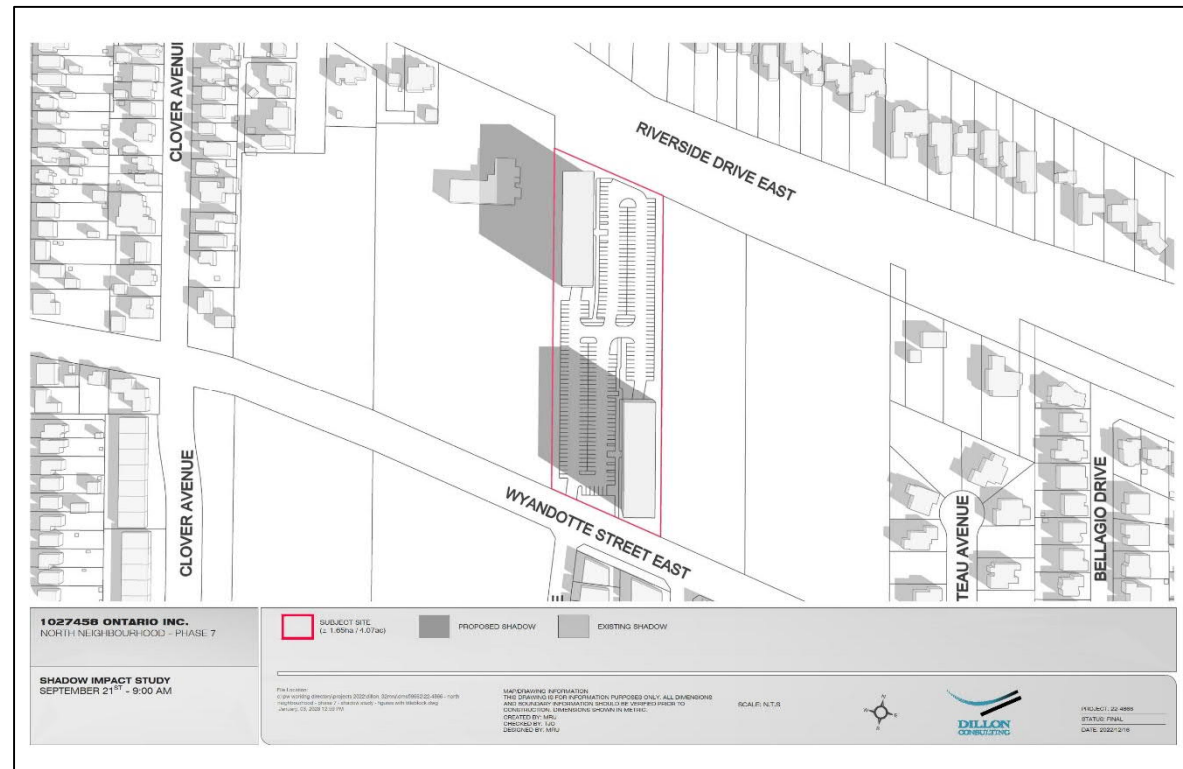
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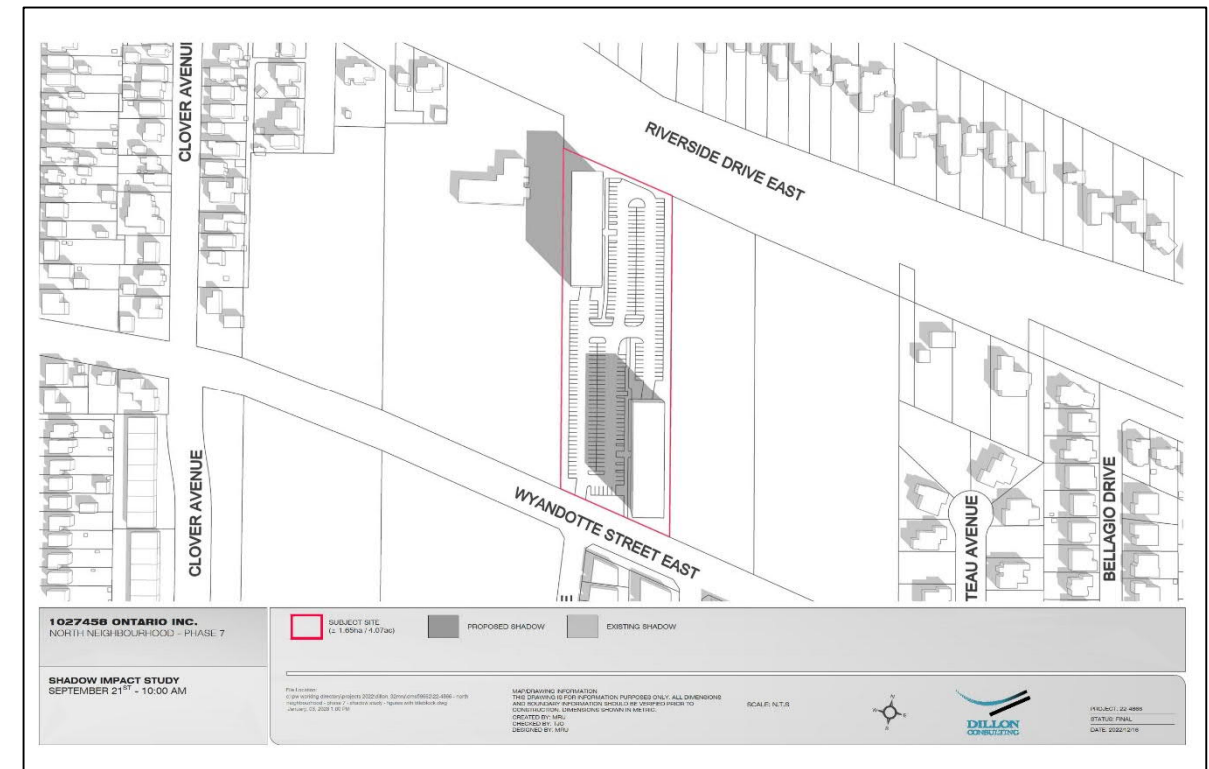
September 21 – 7:00 am



September 21 – 8:00 am

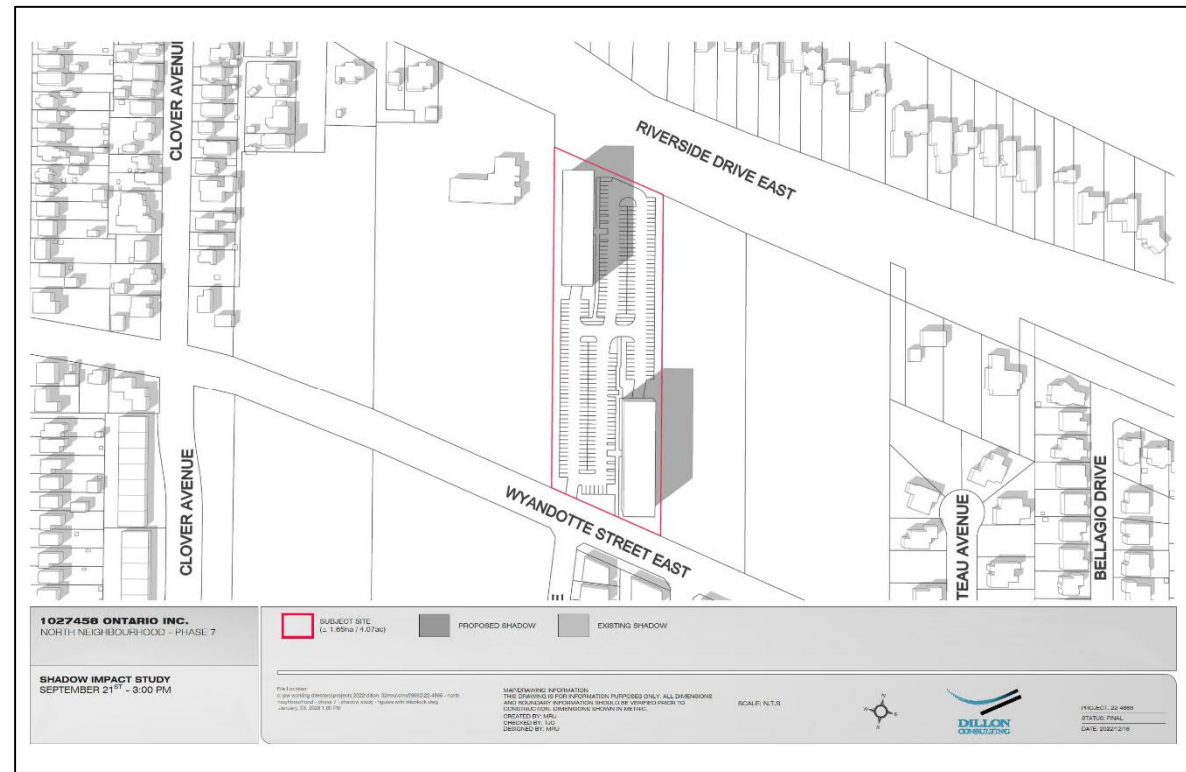


September 21 – 9:00 am

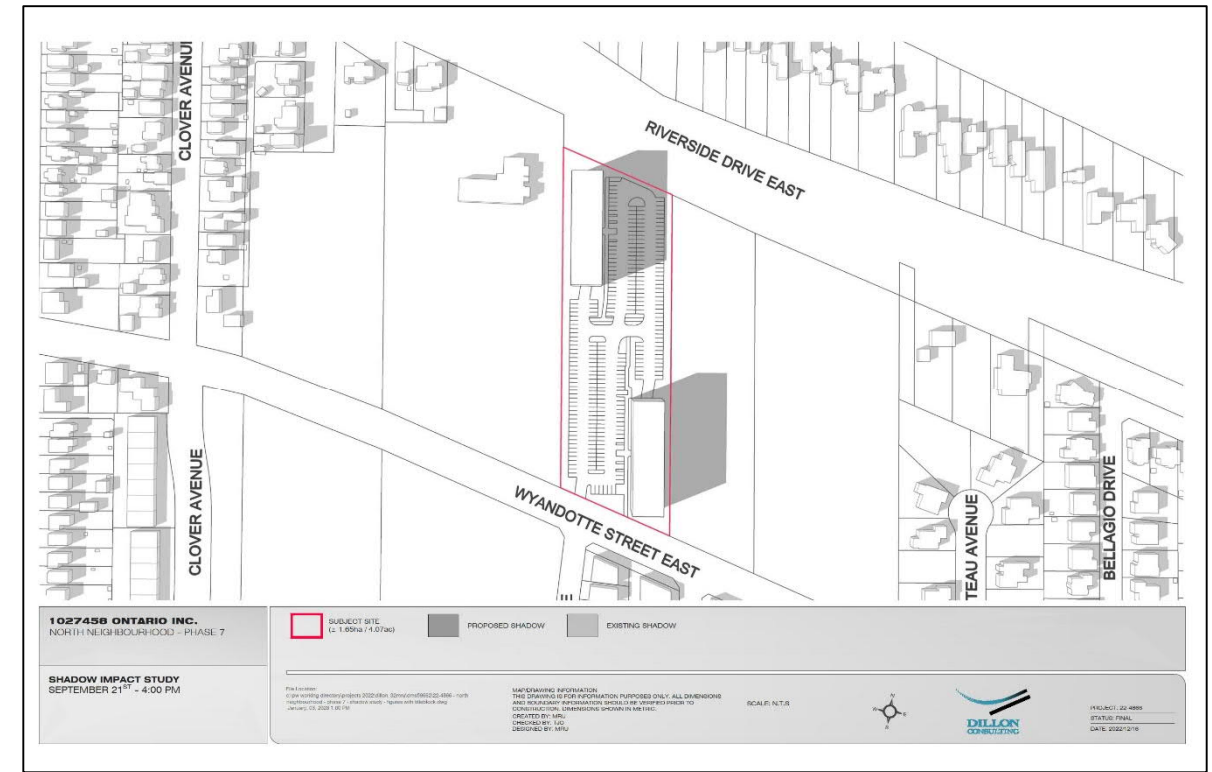


September 21 – 10:00 am

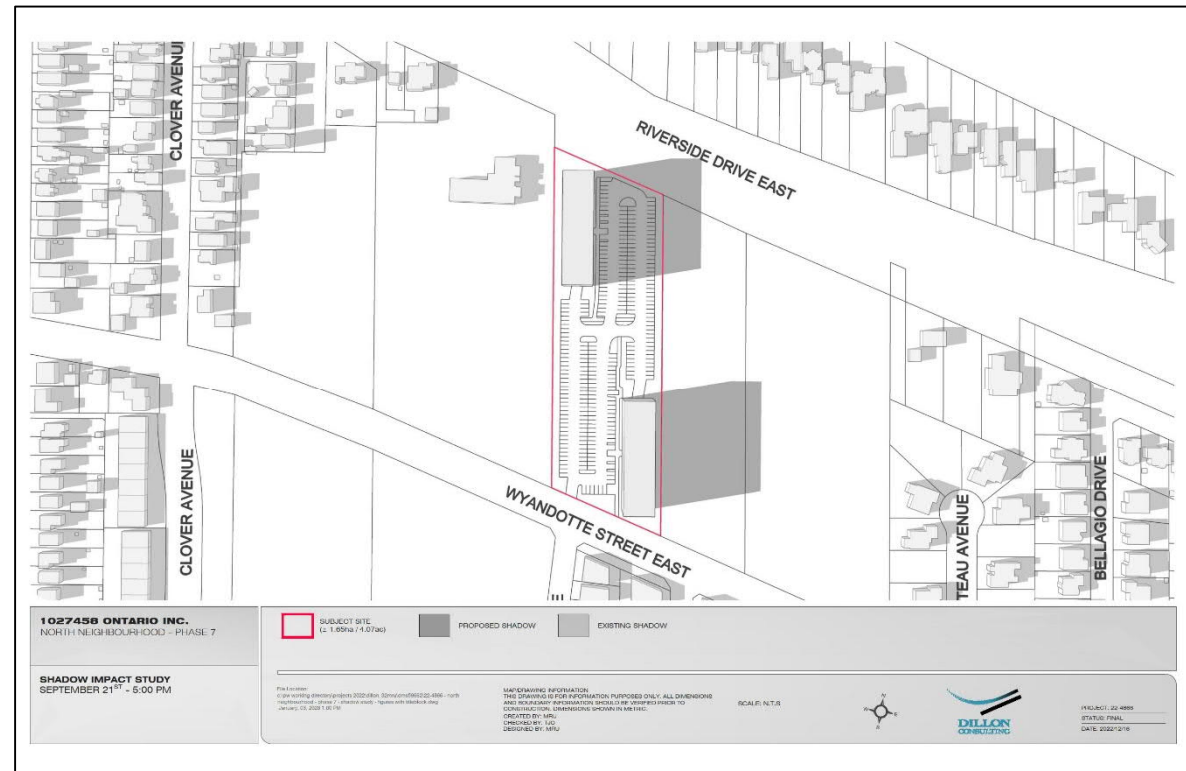




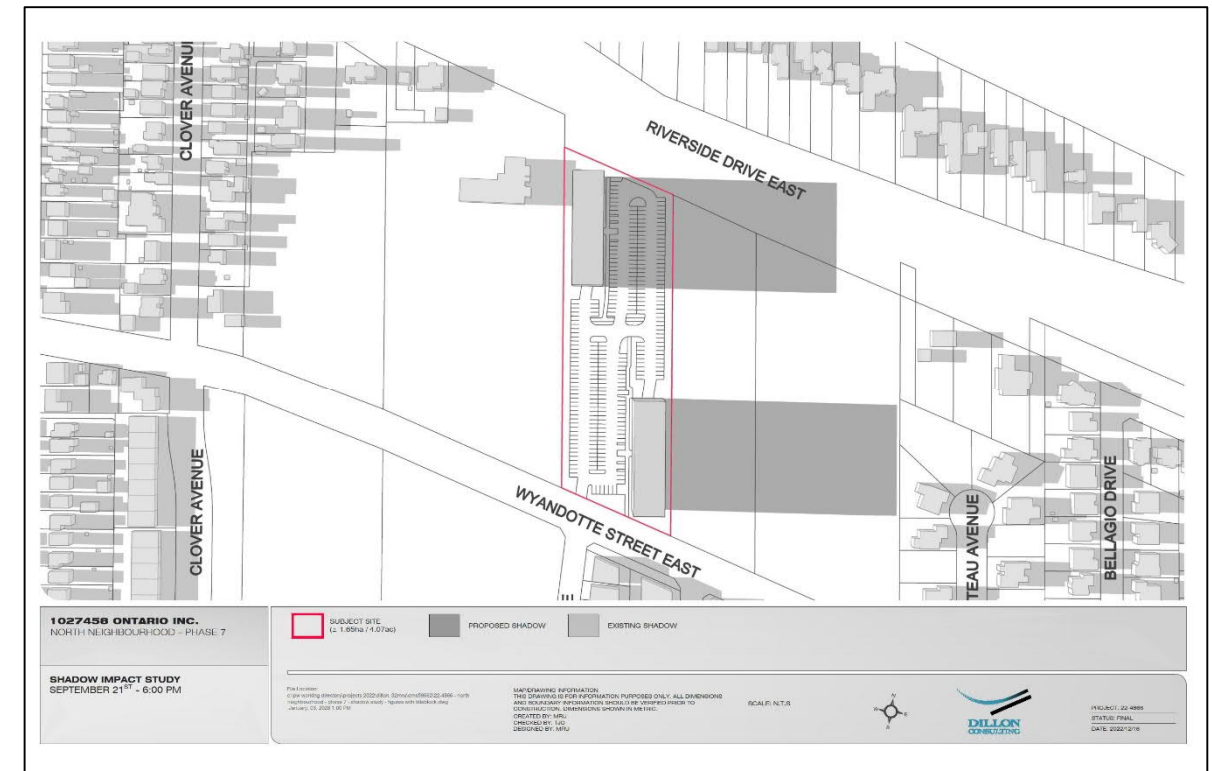
September 21 - 3:00 pm



September 21 - 4:00 pm



September 21 - 5:00 pm

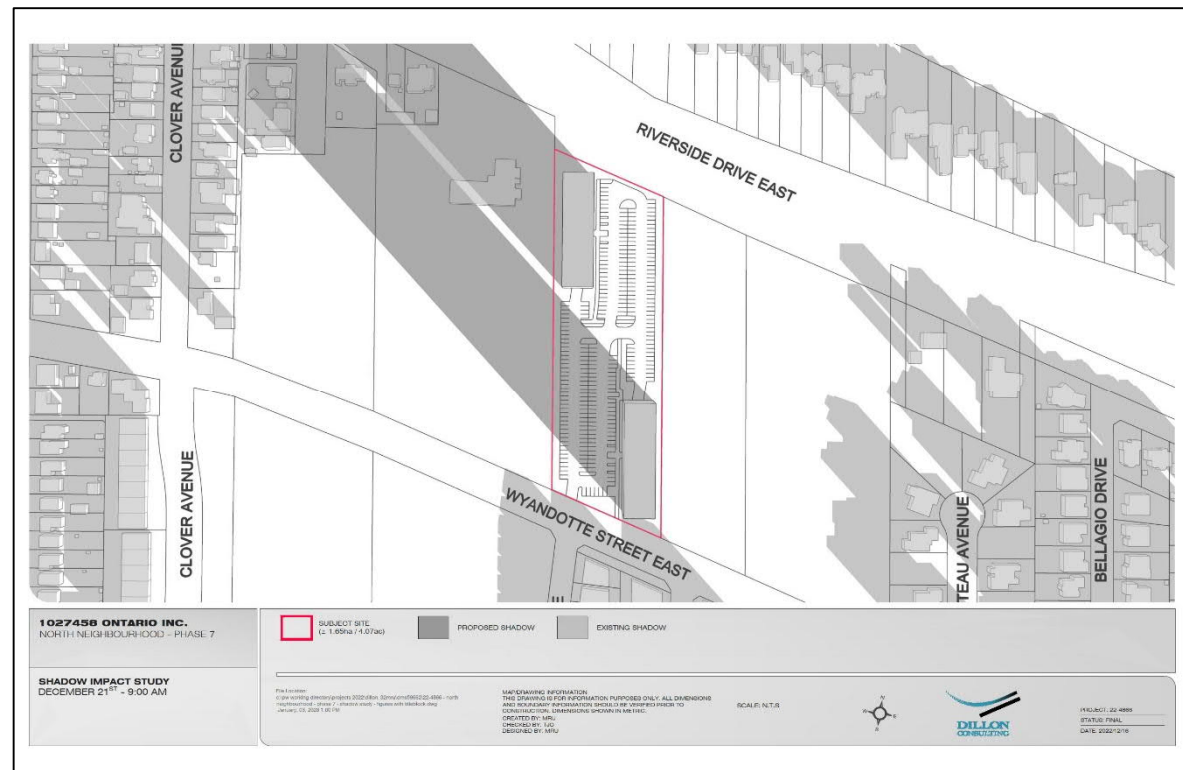


September 21 - 6:00 pm

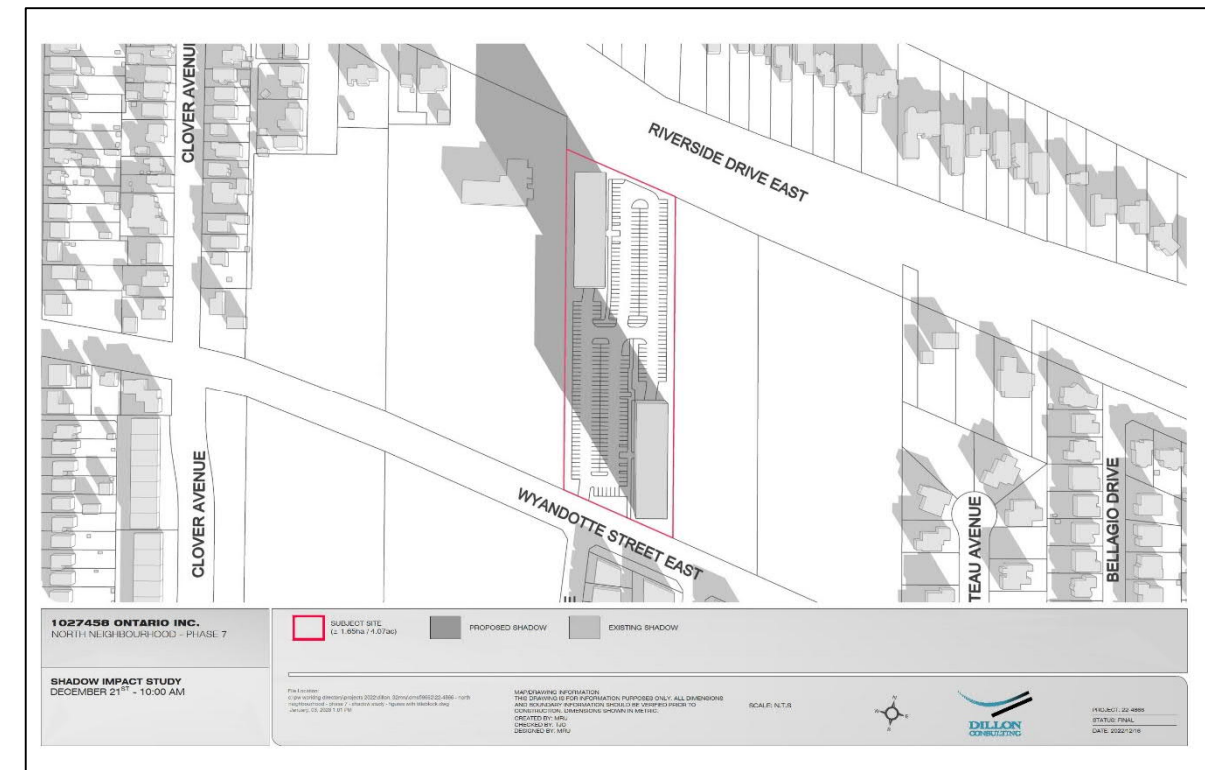
# Appendix E

## *Shadow Diagrams: December 21*

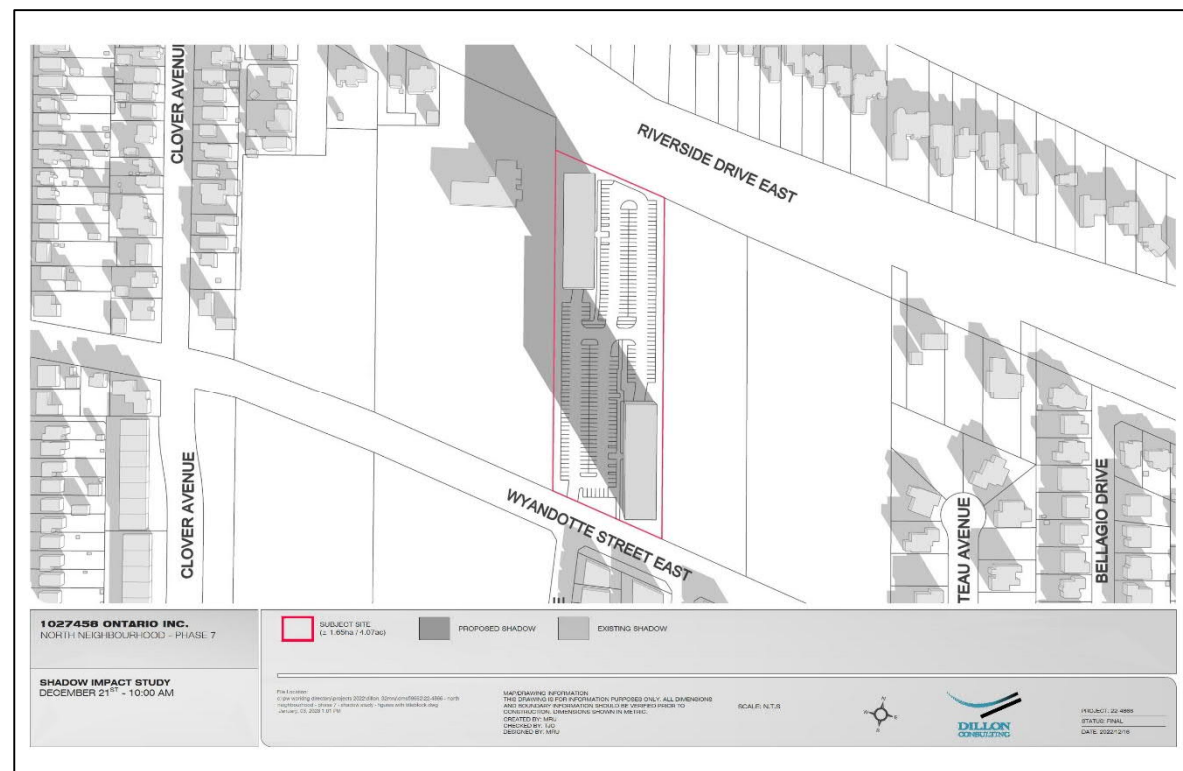




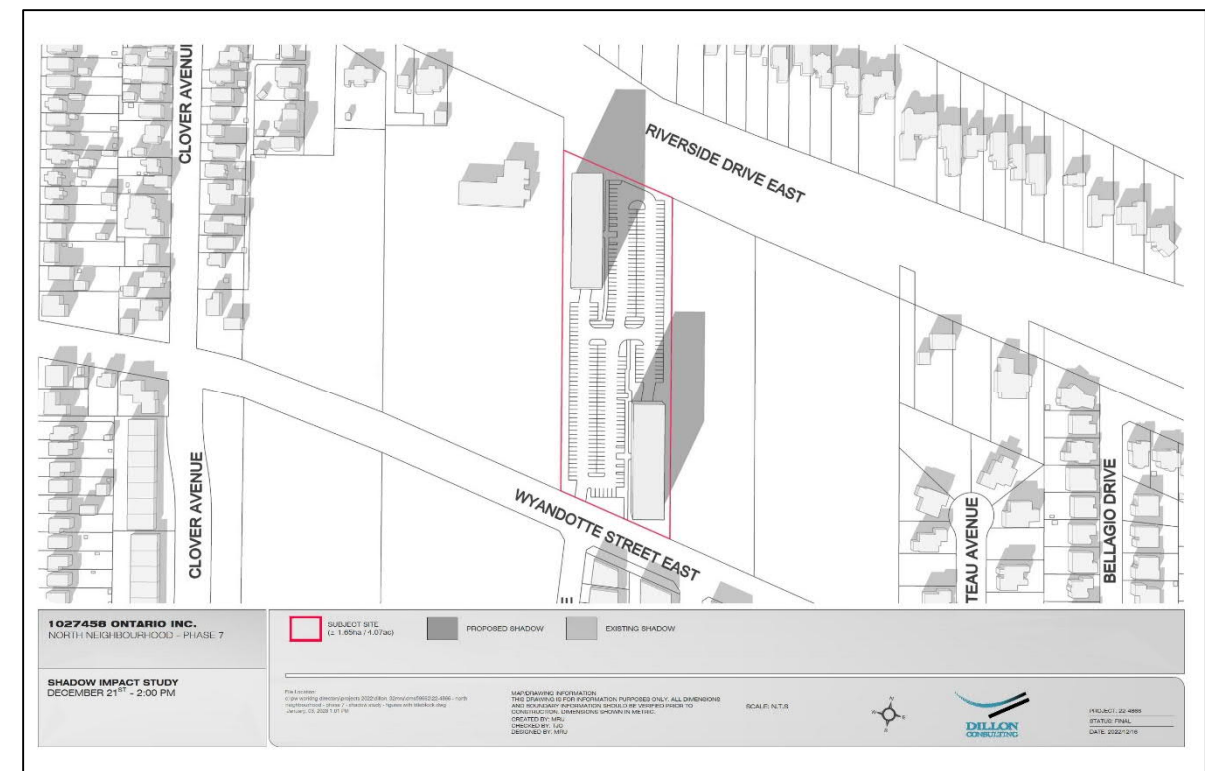
December 21 – 9:00 am



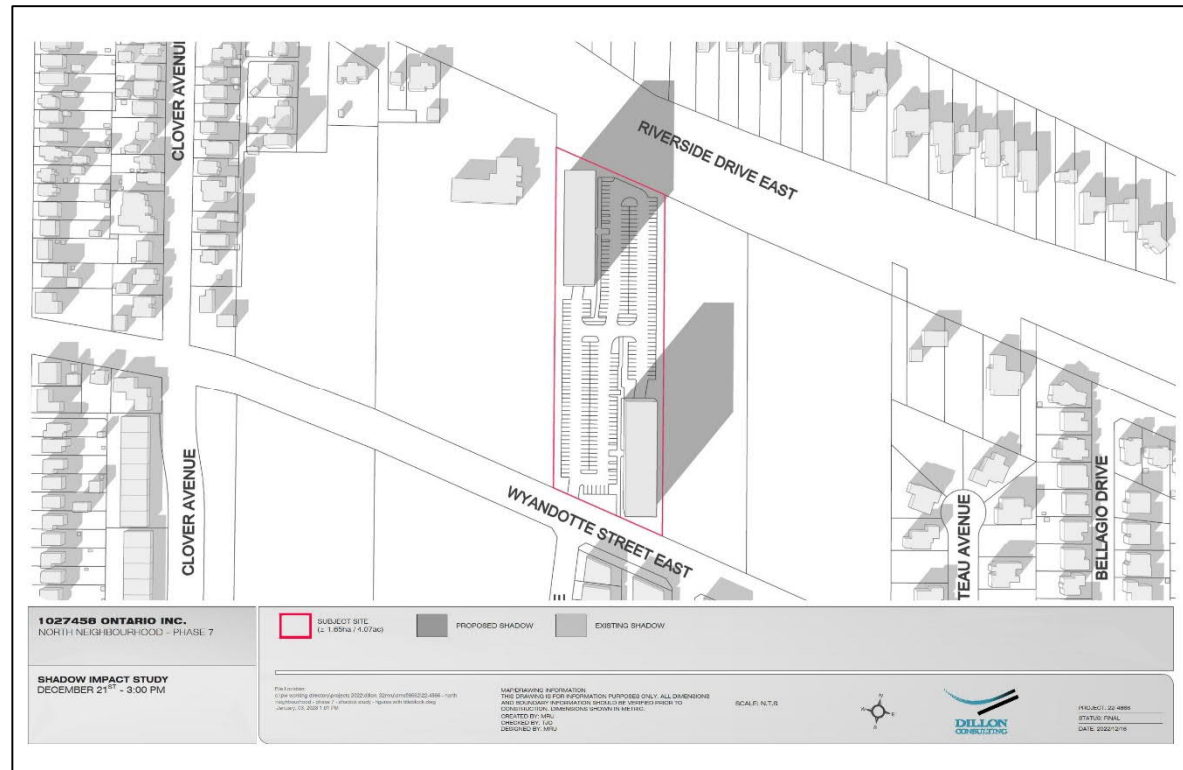
December 21 – 10:00 am



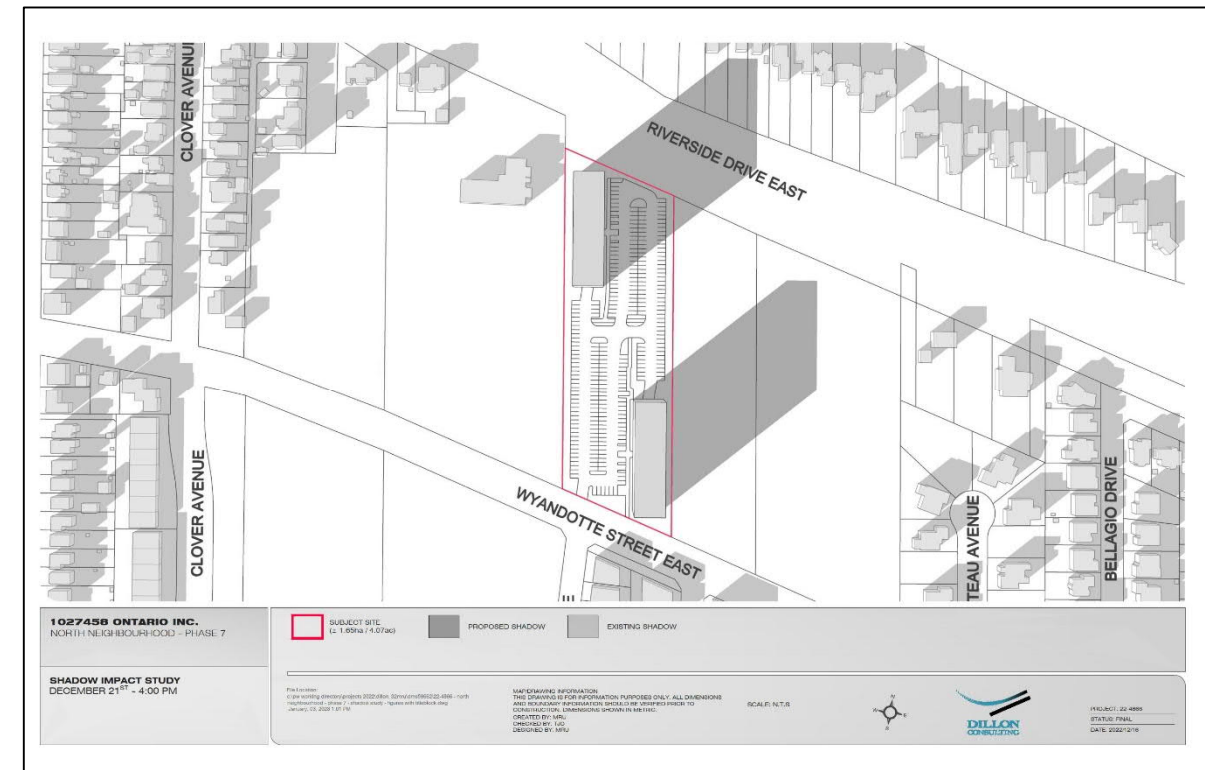
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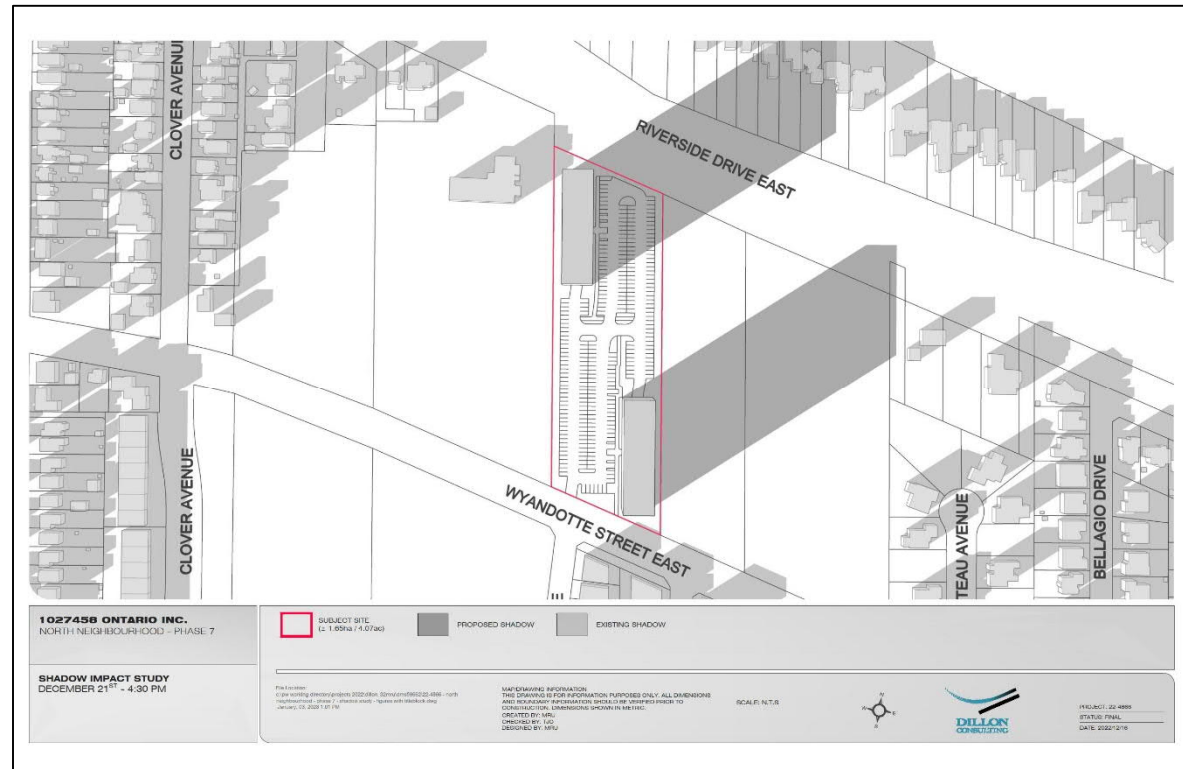
December 21 – 2:00 pm



December 21 – 3:00 pm



December 21 – 4:00 pm



December 21 – 4:30 pm