

Shadow Study Report

Proposed Mixed-Use Hotel and Commercial Development

5234-5278 + 5284 Ferry St & 5928 Clark Ave
Niagara Falls
Ontario

*Prepared by: Jason Pizzicarola Design – Architects Inc.
209 Ridge Road North
Ridgeway , ON
905-894-8300*

22091

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Shadow Study Report

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Purpose

The following Sun/Shadow Study has been prepared by Jason Pizzicarola Design in support of the redevelopment of the lands municipally addressed as 5234-5278 + 5284 Ferry St & 5928 Clark Ave (referred to as “the Site”). The purpose of this report is to demonstrate the effect of the proposed development of a mixed use hotel and commercial building upon the current location and upon adjacent properties.

This is done by using a series of computer generated Shadow Diagrams, which generates the pattern of shadows cast upon the ground by buildings. The study conforms to the Sun/Shadow Study Terms of Reference produced by the Niagara Falls Planning Department December 2023. The size of the study area and shadow sample times are specified by the Terms of Reference.

The Site is located at the south-east corner of Ferry St. And Clarke Avenue. The assembled land parcel is approximately 7490 square meters in area (after road widening). The site has 109.5 m lot frontage onto Clark Ave., and 122m frontage onto Ferry St. The site is currently made up of 4 land parcels, each with an existing building all primarily 2 storeys tall operating as a mix of hotels and restaurants. The balance of the site is used for vehicle circulation and parking.

The proposed mixed-use Hotel /commercial development will include a building of +/- 6575 square meters in building area. The balance of the site area, approximately 784 square meters (19.42%) of the land, will be converted to a “Landscaped Open Space” use. The Landscaped Open Space will comprise of sidewalks for pedestrian circulation, ground cover plantings as well as deciduous trees proposed on along Ferry Street and Clarke Ave. The roof top of the 4 story podium will be used for planted amenity space for the hotel facilities. The proposed development is comprised of two (2) 26-storey hotel towers extending out of a 4-storey podium. (total height 30 storeys)

The objective of the City of Niagara Falls’ Terms of Reference: Sun/ Shadow Study is to: *“contribute to and inform the design of buildings and the arrangement of buildings on sites. By understanding the nature of existing shadows and new shadows, new developments can proposals ensure adequate access to sunlight enhancing the livability and sustainability of public and private spaces.”*

The shadow impact study is required for buildings 10 storeys or higher, for the support of a complete application for development proposals within the urban settlement areas of the City .

The following shadow analysis demonstrates how the proposed development will cast shadow on the surrounding urban context and discuss the mitigation strategies, if required, for any undue shadow impact.

Analysis Method

Following the guidelines from the City of Niagara Falls' Terms of Reference: Sun/ Shadow Study dated December 2023 , the shadow analysis is conducted for the following:

Dates and time

- at hourly intervals (9) from 10 a.m. To 6 p.m. (Eastern Time Zone)
- April 21st. (Daylight Saving time)
- June 21st Summer Solstice (Daylight Saving time)
- September 21st, Fall Equinox (Daylight Saving time),
- December 21st , Winter Solstice (Standard Time)
- Eastern Standard Time: Universal Time minus 5 hours
- Daylight Saving Time: Universal Time minus 4 hours Geographical Coordinates
- Latitude: N 43 degrees 05'20"
- Longitude: W 79 degrees 04'52"

Coverage Area

- area extending a minimum 10 times the building height to the north, east, and west of subject property and a minimum distance of 2 times the building height to the south

The shadow analysis incorporates three simulated conditions:

1. It illustrates the existing shadow conditions in the coverage area, shaded in the colour grey. Shadows of existing buildings on site are shown in the colour red.
2. It establishes an as-of-right condition based on the height as per the previously approved zoning by-law amendment: Maximum height of 12m (40ft). The as-of-right shadows are shaded yellow in the shadow analysis diagrams.
3. It establishes the proposed condition based on the proposed 30-storey towers with a 4-storey podium. The net new shadow (new shadow minus the as-of-right shadow) is shaded in a light blue in the shadow analysis diagrams.
4. It illustrates approved but unbuilt buildings within the coverage area, these buildings shadows are shown in brown

Assessment Criteria and Analysis

The City's Terms of Reference for Sun/ Shadow Study Section 4.0 provides a description of the Shadow Impact Criteria that is required to be applied in the analysis as follows:

Private Realm

Criteria:

- 1. Outdoor Residential Amenity Spaces on Adjacent Properties** - adjacent residential amenity areas should receive at a minimum of 6 hours of sunlight between 10am to 6pm.
 - April 21 to September 21

Assessment of Proposed Shadows:

On subject dates April 21 to September 21 shadows are not cast on any residential amenity areas.

Public Realm

Criteria:

- 1. Public Outdoor Amenity Spaces** - including Communal Outdoor Amenity Spaces include school yards, children's play areas, public outdoor pools, community gardens, privately owned public spaces, Civic and Cultural Spaces, and other outdoor public areas
Shadows cast by existing buildings and shadows from proposed buildings should allow for 5 hours of full sun between 10am-6pm on:
 - April 21

School yards and children's play areas should receive at least 3hours of sun on: • December 21st (10am to 3pm)

Assessment of Proposed Shadows:

On subject dates April 21st shadows are not cast on any public amenity areas as noted in the *Terms of Reference* such as not to allow for 5 hours of full sun between 1am and 6pm.

There are no schoolyards or children's play areas within the area impacted by shadows cast by the proposed development on December 21 between the hours of 1am to 3pm.

Criteria:

- 2. Sidewalk areas and boulevards along the frontage of the development** -should continue to receive a minimum of 4 hours of sun 10am to 6pm.
 - April 21st (The south sides of streets with East and West orientations may receive less sunlight)

Assessment of Proposed Shadows:

The proposed development allows for a minimum 4 hours of sun coverage along most of Ferry Street and Clarke Avenue, but fails to meet the criteria immediately North of the proposed development on portions of the south side of Ferry Street and will have less than 2-3 hours of sunlight in some areas along the front of the development. However, with any proposed High-Rise development, and given our geographical location on the northern hemisphere, avoiding casting any shadows onto Ferry Street sidewalks would be difficult to achieve. However with the application of step-backs and slender tower design, the proposed development successfully mitigates any undue shadow impact and will have 3 to 5 hours of sun coverage between 10am to 6pm.

Criteria:

- 3. Parks, Open spaces, and natural heritage areas** - Shadows cast by existing buildings and proposed developments surrounding parks and other open spaces should not exceed 3 hours in duration between the hours of 10am to 6pm on:
 - April 21st • September 21st

Assessment of Proposed Shadows:

Shadows cast by the proposed development do not exceed 3 hours in duration on any parks or other public open spaces on the test dates from April 21 to September 21st (inclusive).

Mitigation Measures

Orientation

This proposed location and the orientation will have the least shadow impact on the sidewalks given the geographic location of the site.

Massing

The sleek point tower floor plates with an average area of only 640 sq m, reduces any undue shadow impact on the properties in the area.

Step-backs and Building Separation

The proposed building steps back above the podium at level 5, reducing the overall massing along the street edge. Additionally the towers have a separation of 24-25 m, which minimizes the shadow impacts within the property and rooftop amenity area.

The application of these mitigation measures results in minimal shadows impact from the proposed development.

Conclusions

This assessment of the proposed development proves to generally meet the shadow impact criteria outlined in the City of Niagara Falls Terms of Reference for the Sun/Shadow Study. With the application of sleek massing, building separation, step-backs, articulation and building orientation, the proposed development has a minimal shadow impact and has implemented the mitigation methods applicable on the site and therefore it is concluded that the proposed development satisfactorily meets the City's shadow impact criteria.






References

- 1) *Terms of Reference for Sun /Shadow Study, December 2023.*
- 2) *Sun rise and sun set times for the City of Niagara Falls, [timeanddate.com](https://www.timeanddate.com/sun/canada/niagara-falls)*
- 3) *Adjacent building location and height, [Cadmapper.com](https://www.cadmapper.com).*

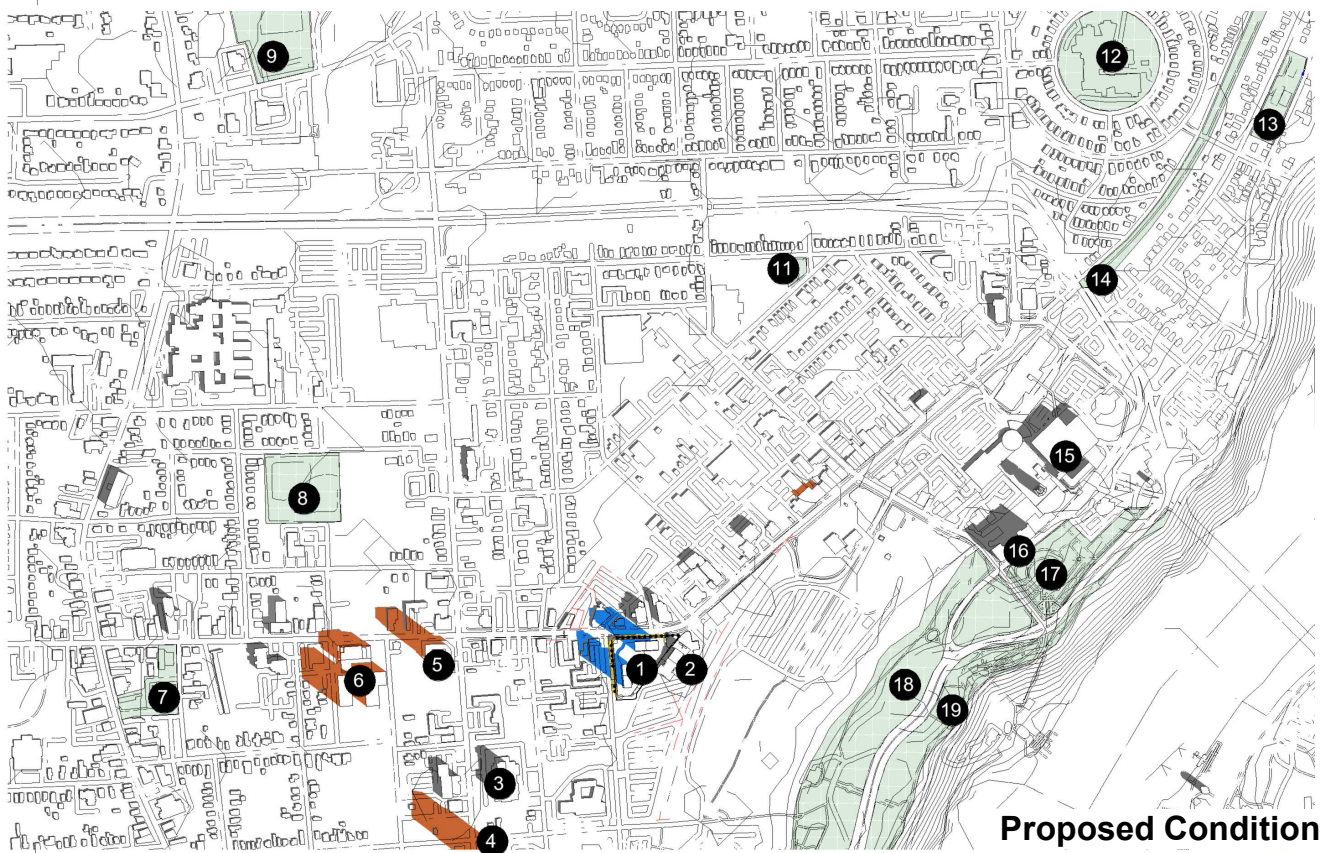
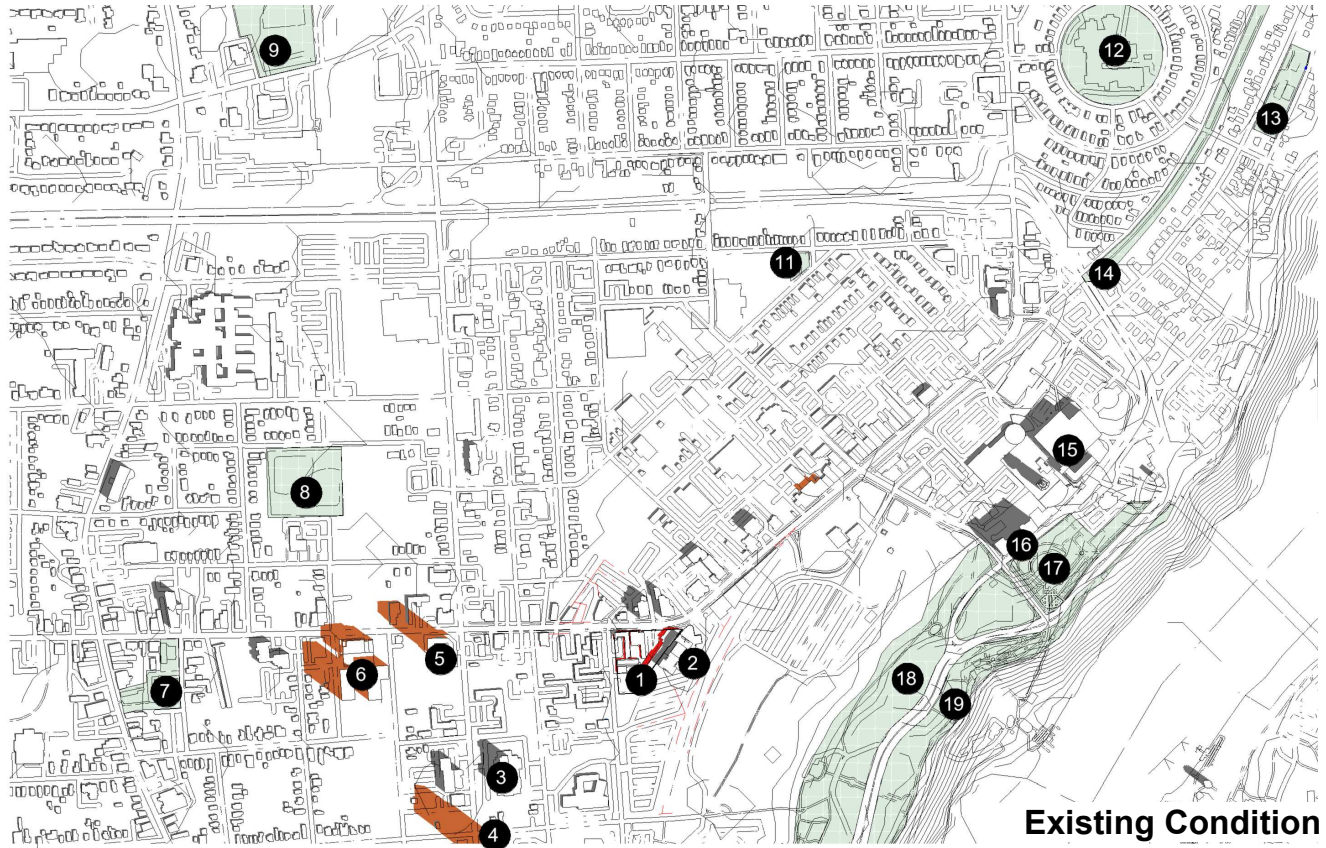
Area of Study



- | | |
|--|--|
| 1 Proposed Site | 11 Kitchener Park |
| 2 Courtyard by Marriott | 12 Kent School, Niagara Centre for the arts |
| 3 Double Tree Fallsview | 13 Ontario Park |
| 4 Niagara 77- Condominium | 14 Olympic Torch Run Legacy Trail |
| 5 5438 Ferry St. | 15 The Crown Plaza Niagara Falls- Fallsview |
| 6 The Stanley Condo's Project | 16 Sheraton Fallsview |
| 7 Niagara Falls History Museum, The eXchange, and the N.F. Farmers Market | 17 Oakes Garden Theatre |
| 8 Don W. Johnson Park | 18 Queen Victoria Park |
| 9 WL Houck Park | 19 Fallsview Trail |
| 10 Unused | |

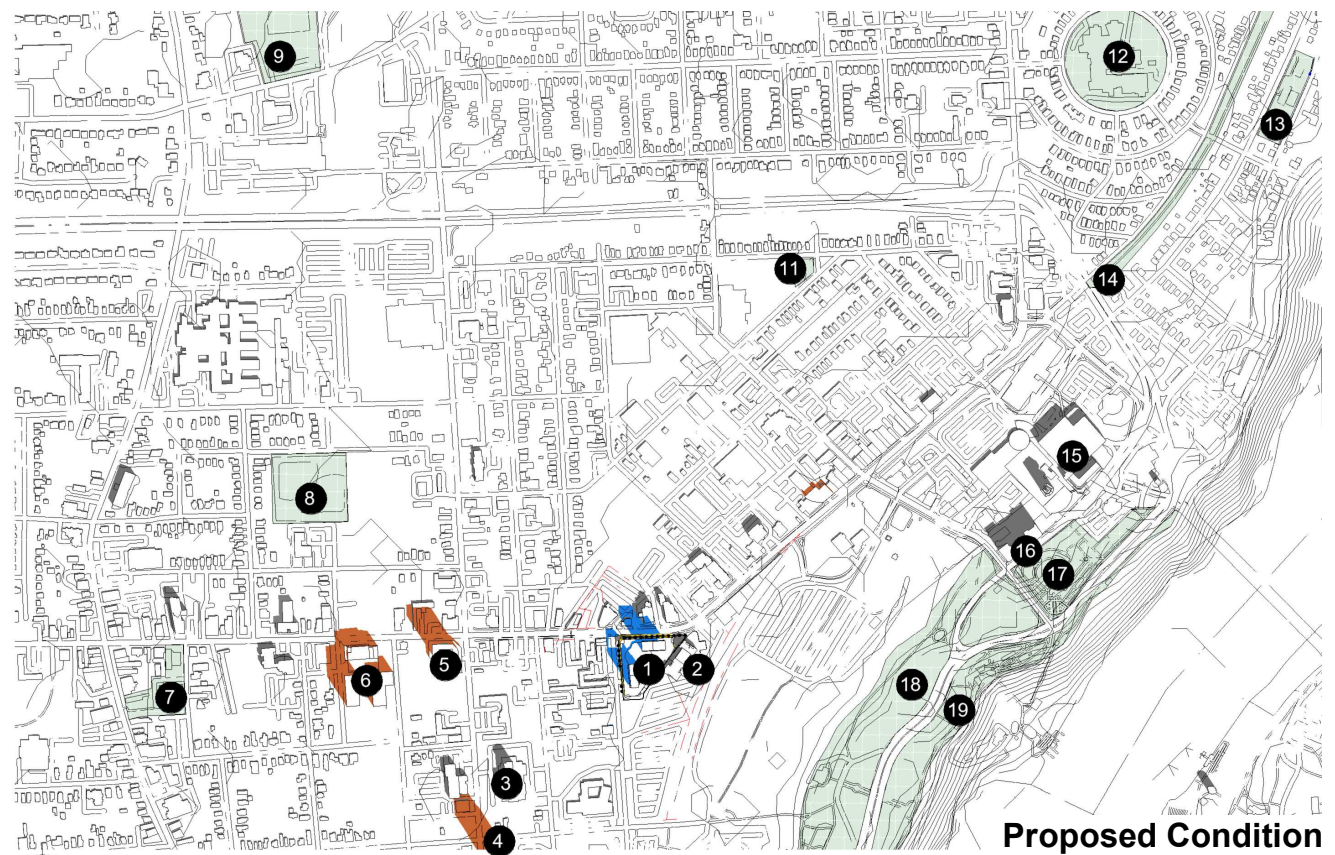
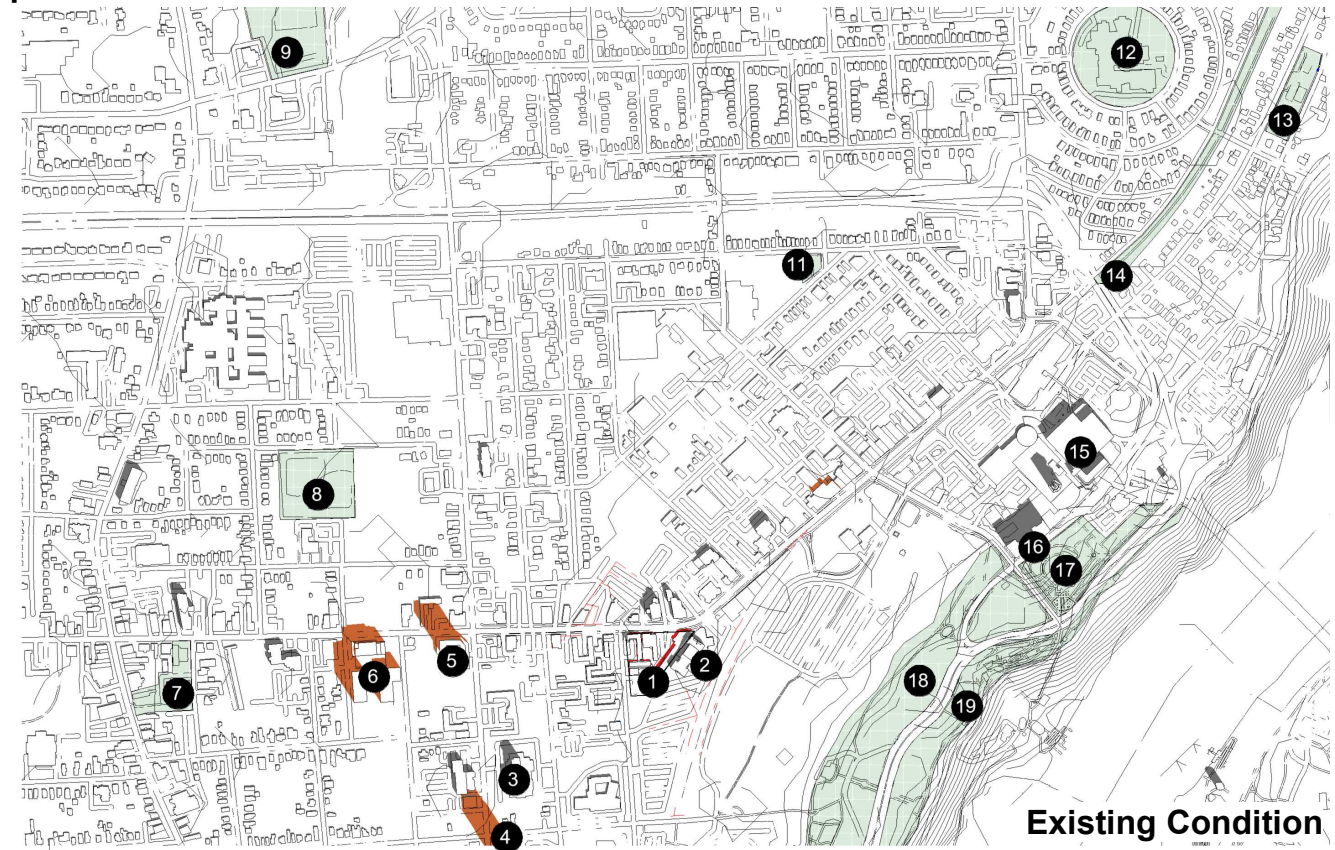
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 Net New Shadows	 Approved but unbuilt Shadows	



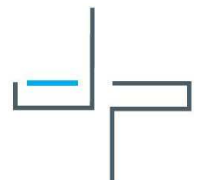


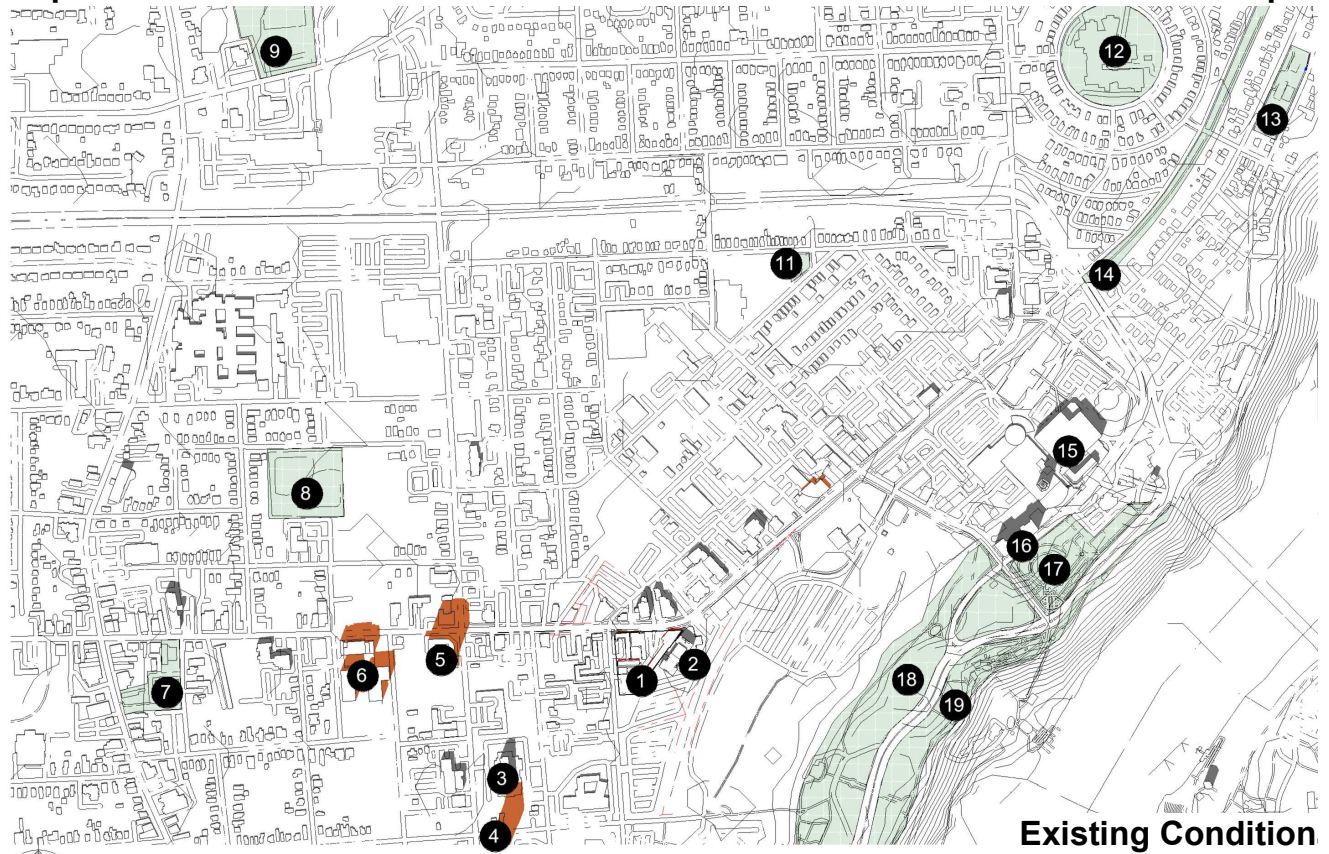
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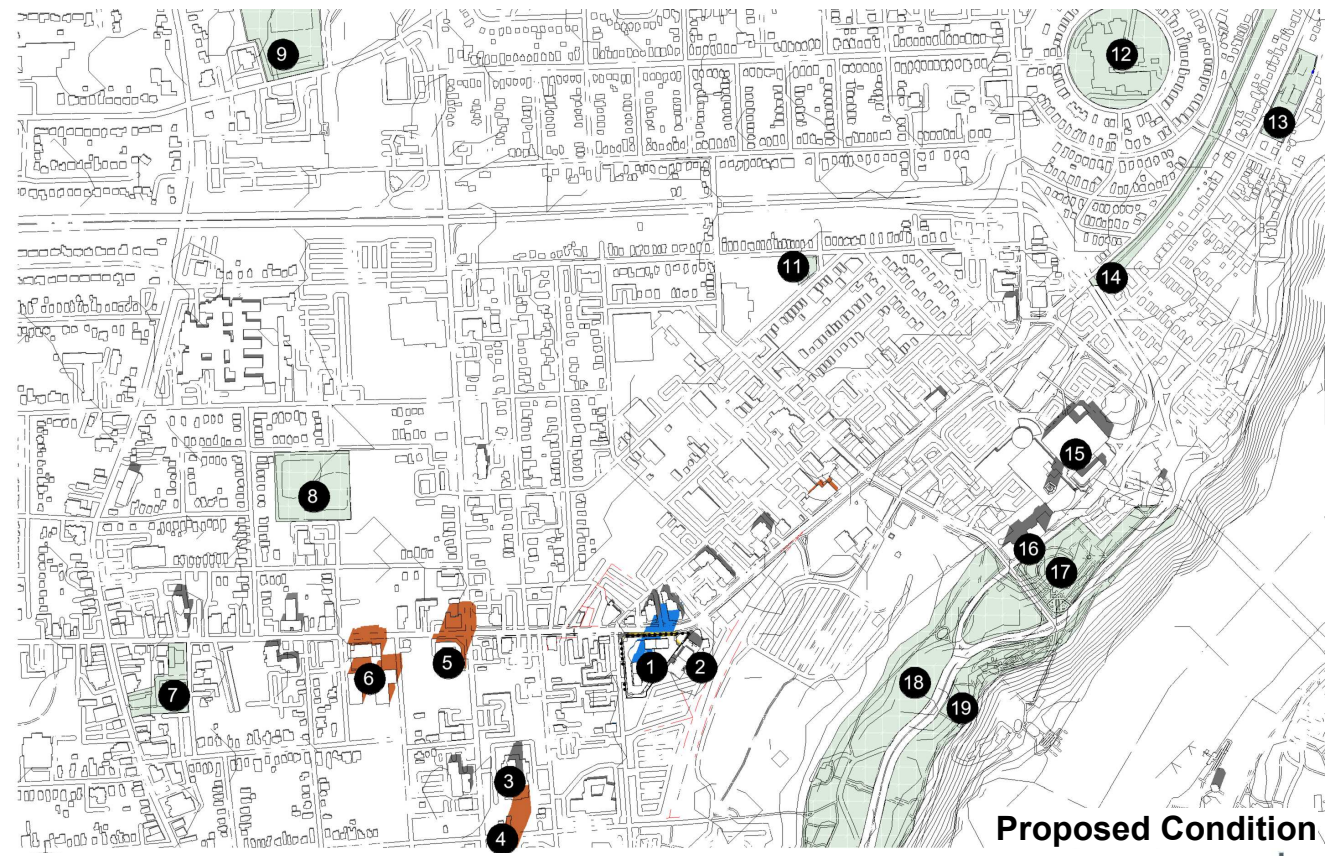
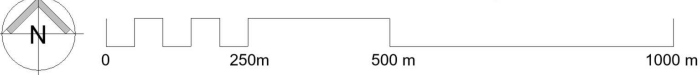


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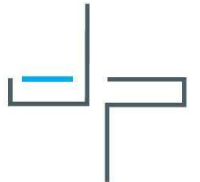


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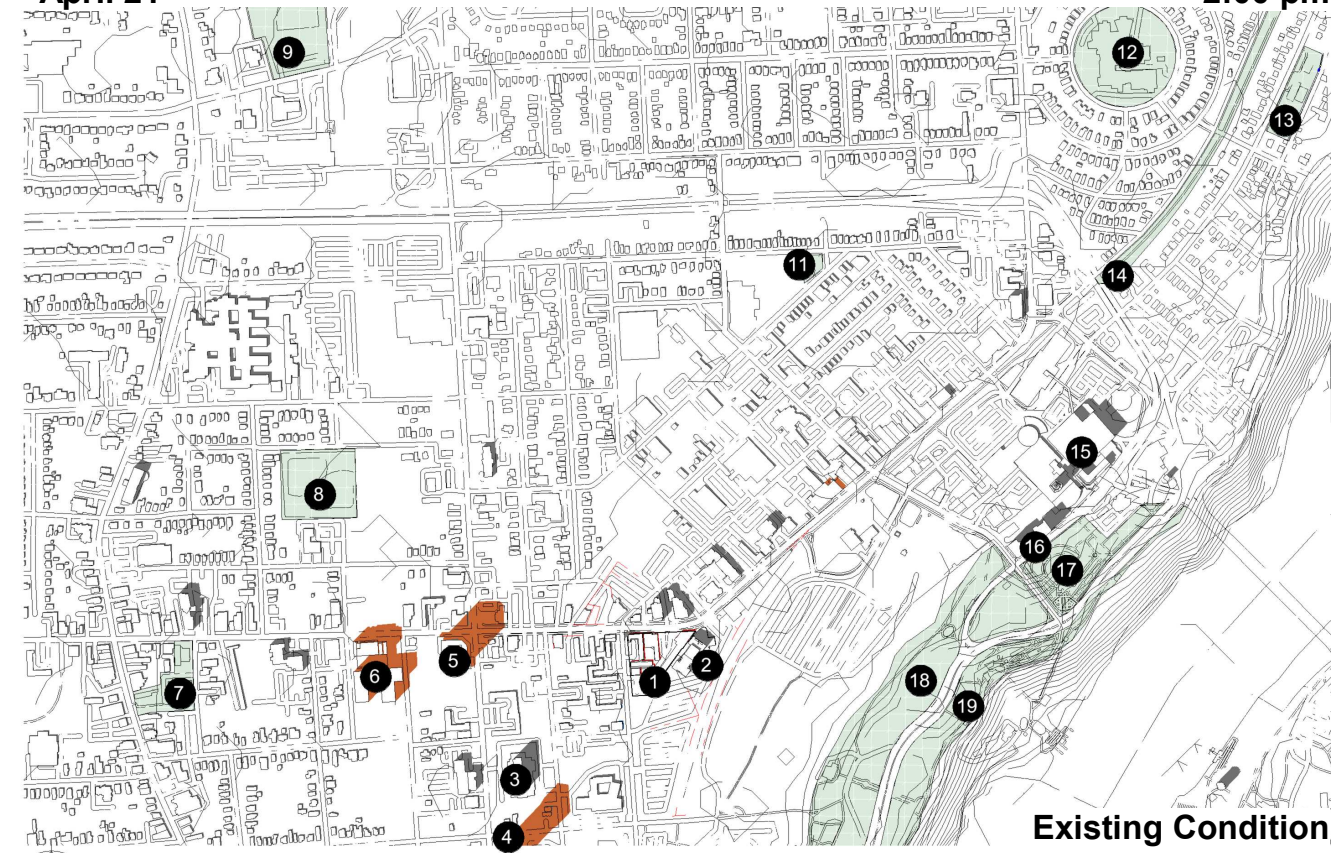
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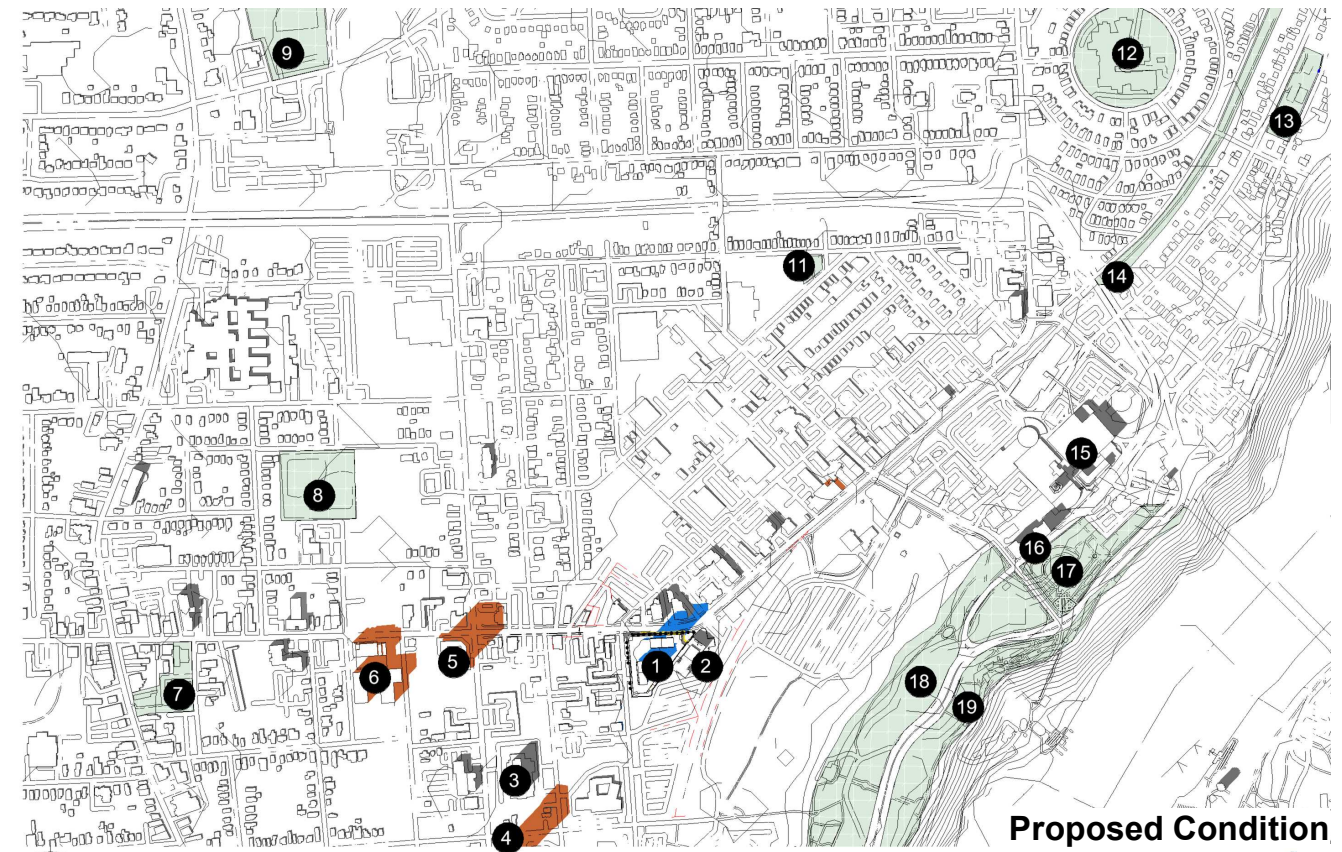


April 21

12
2:00 pm

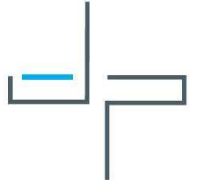


Existing Condition



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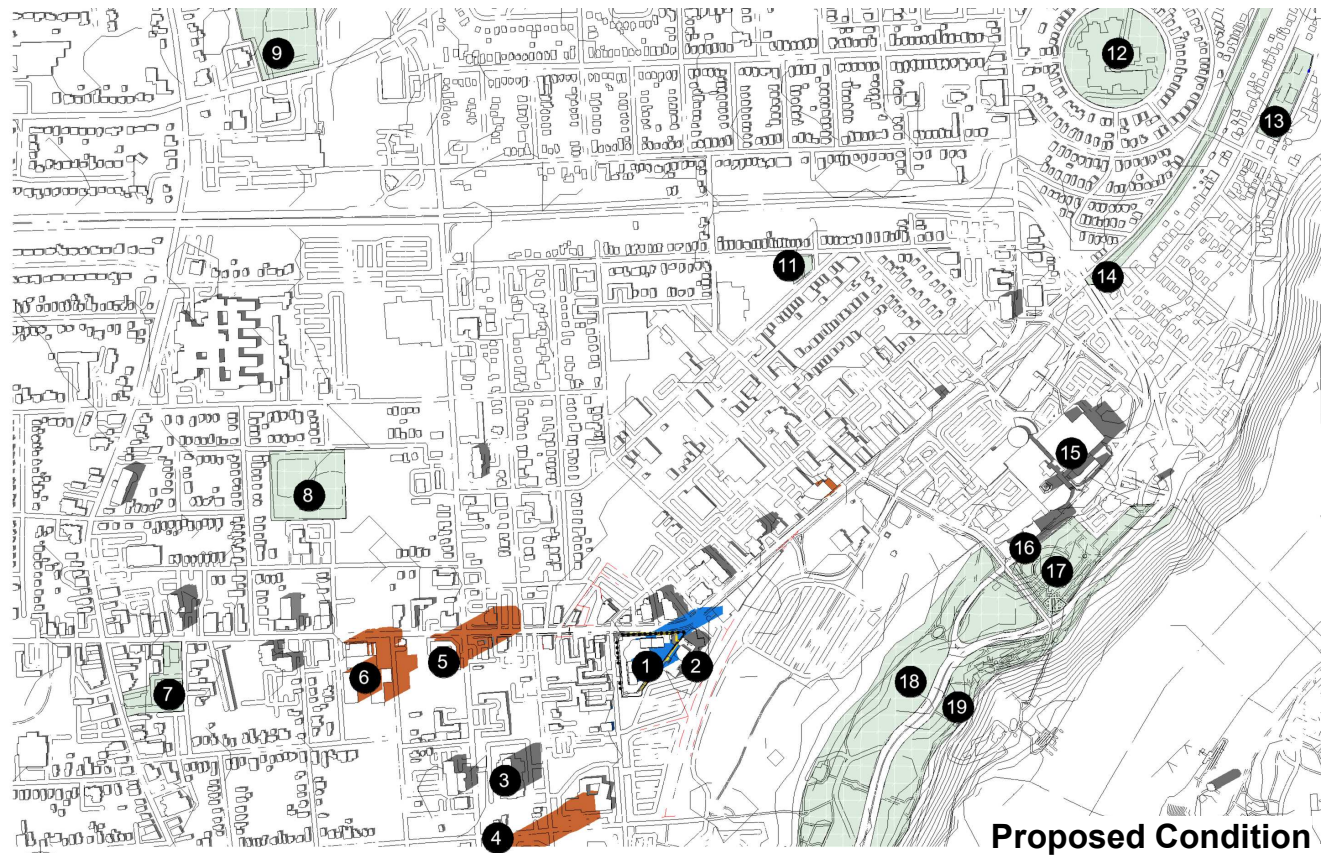


April 21

3:00 pm

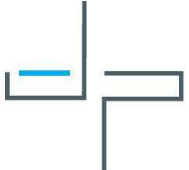


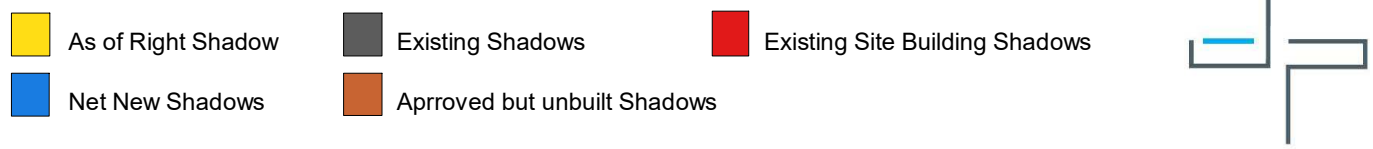
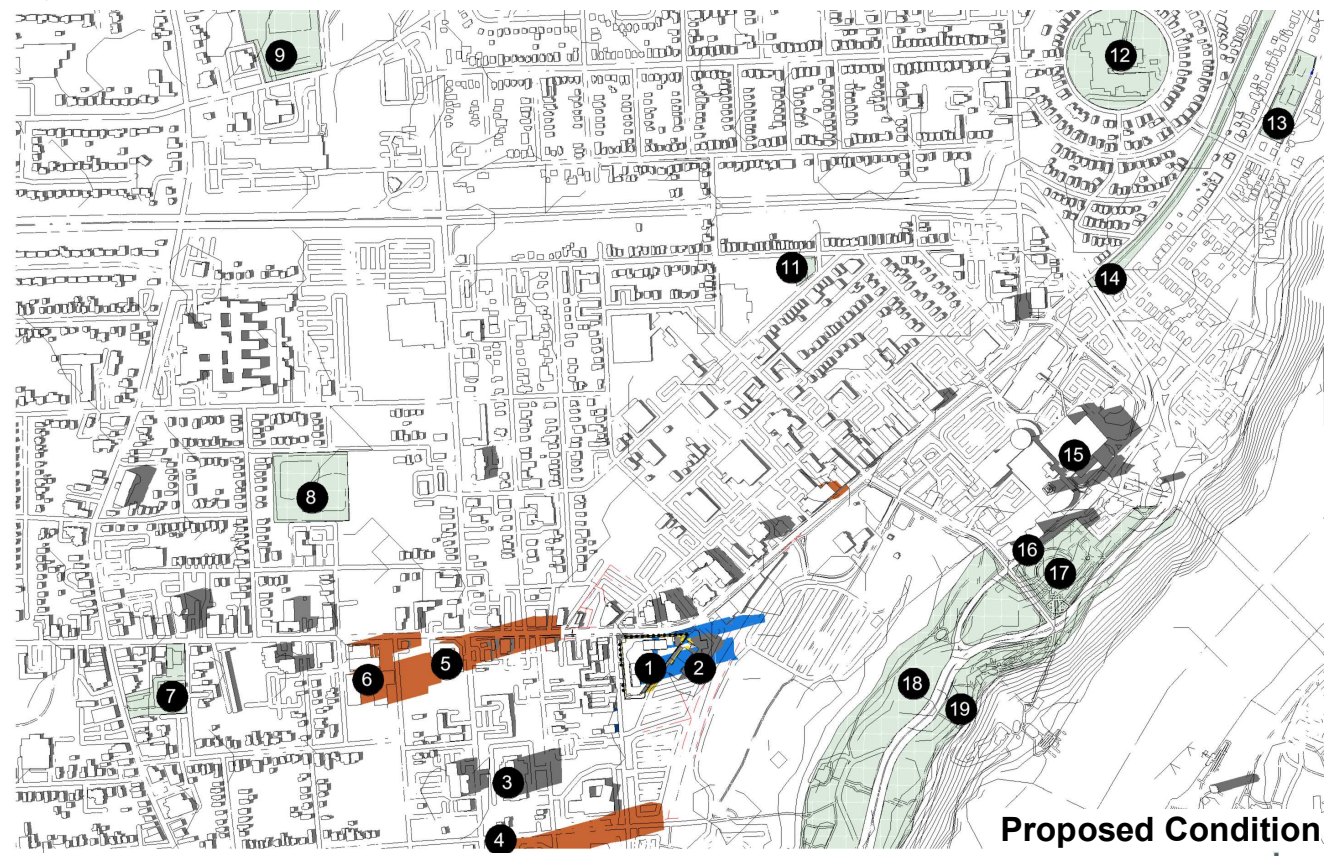
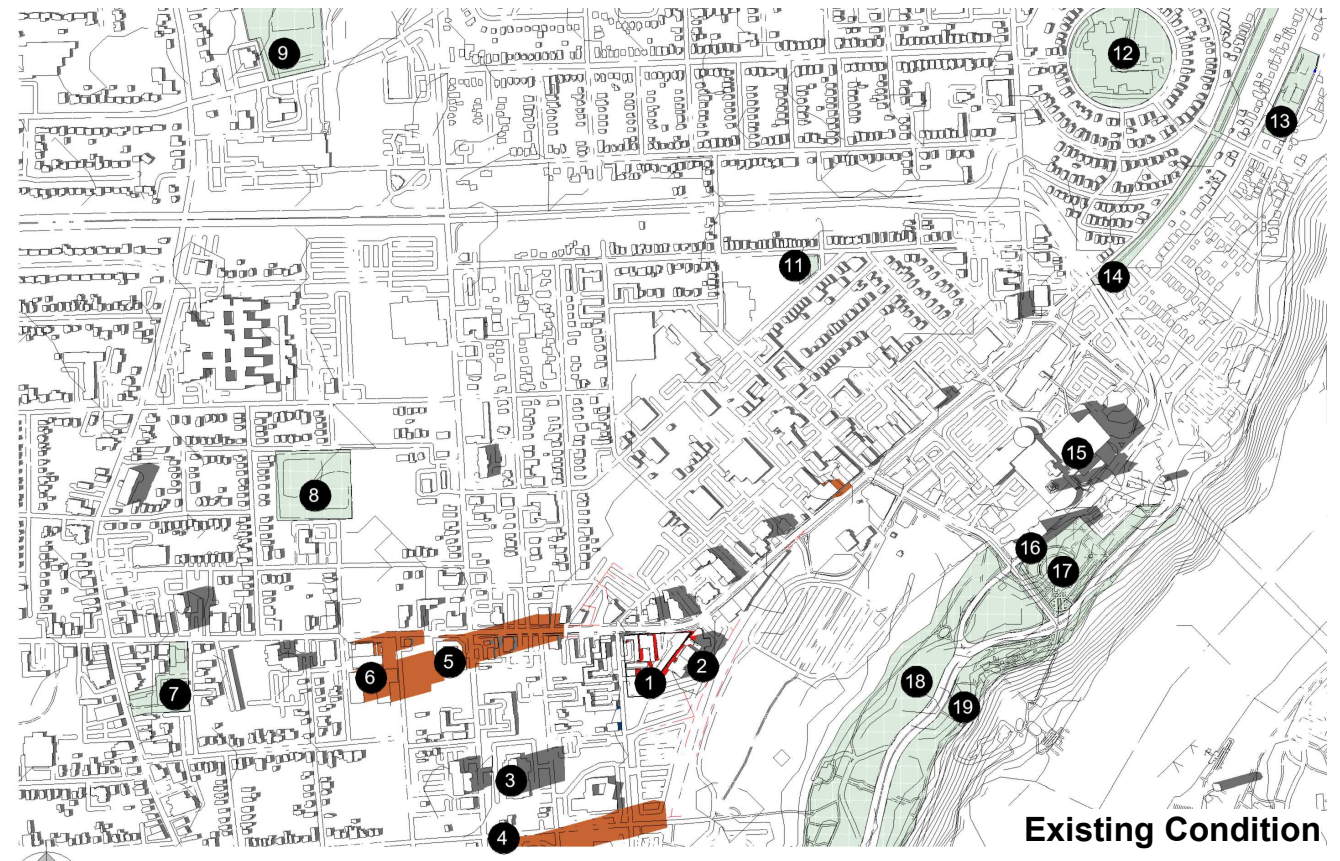
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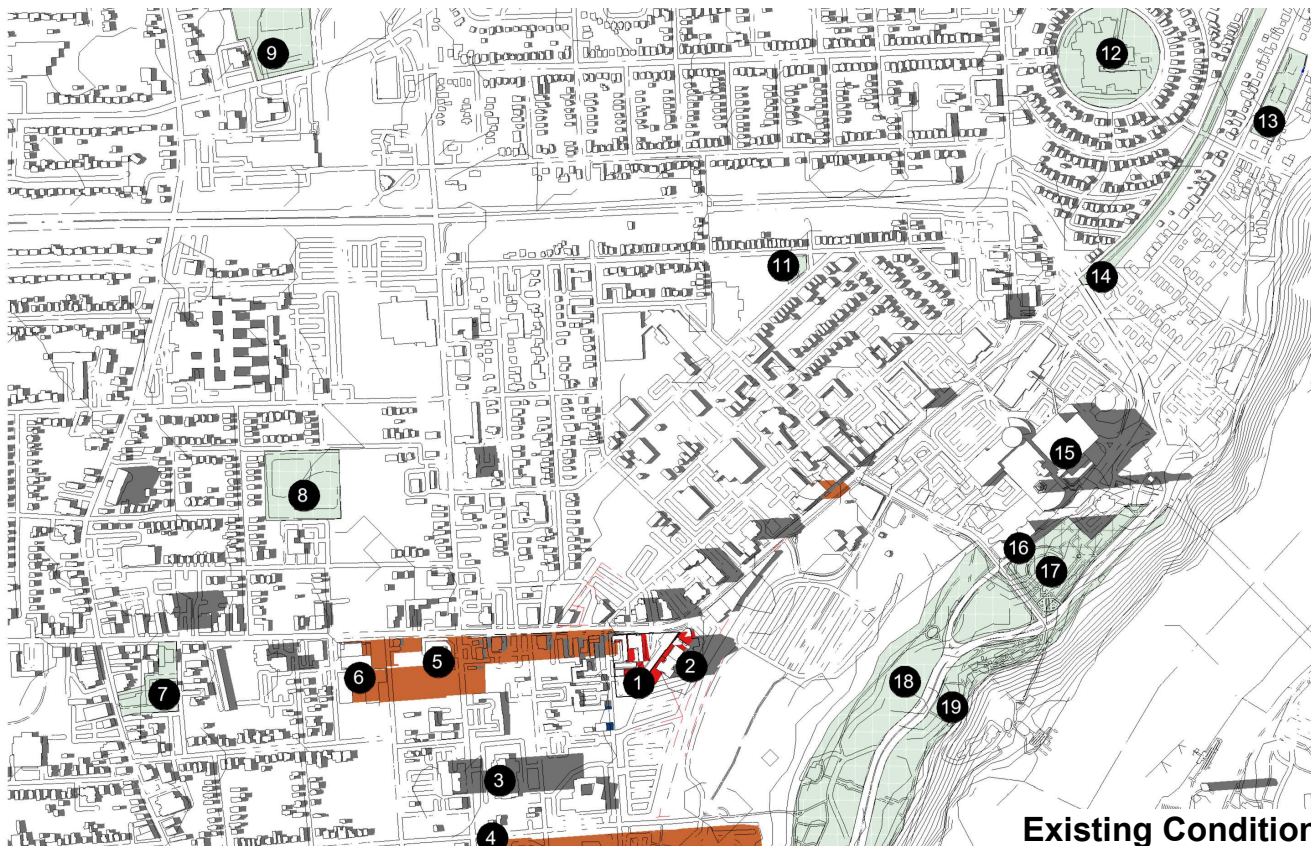


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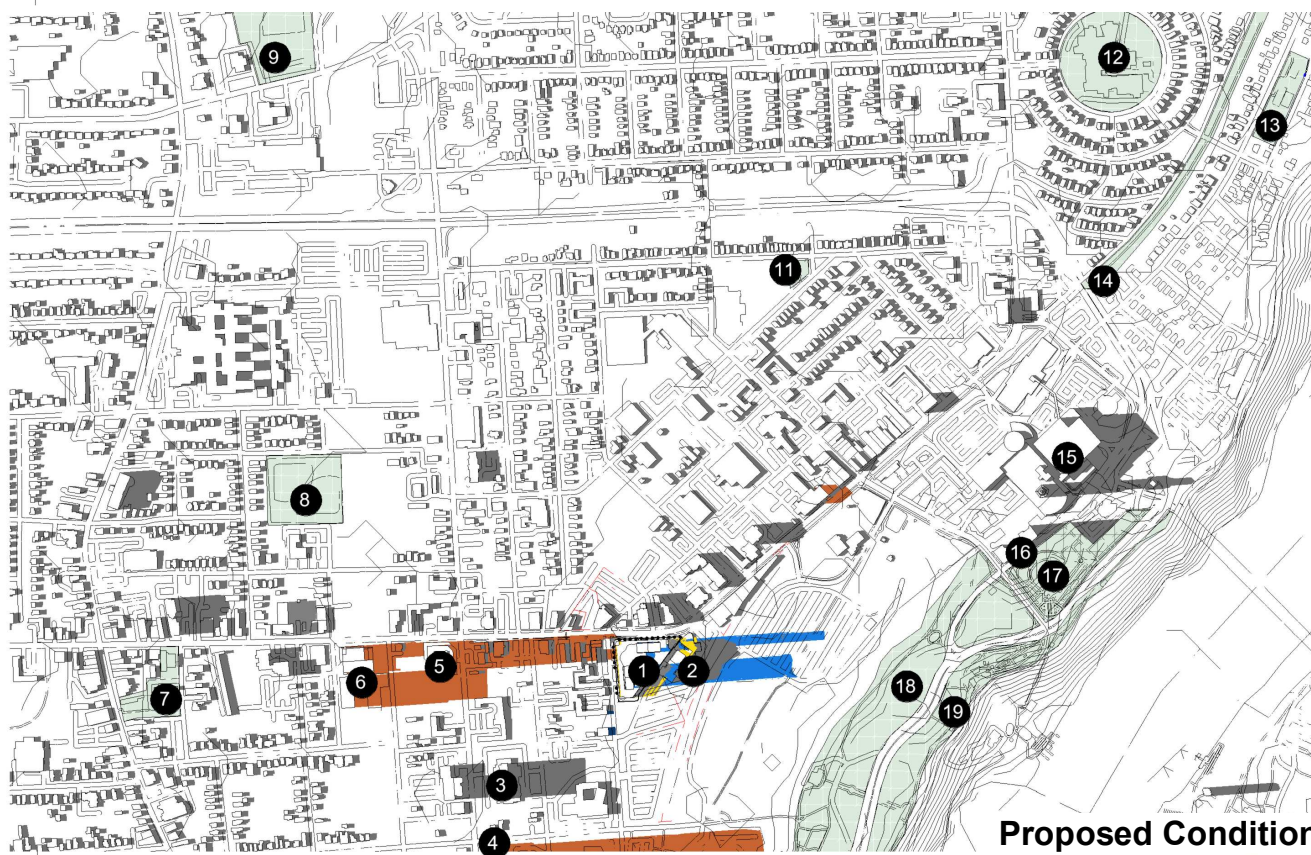
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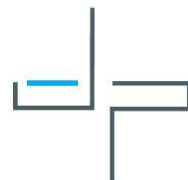


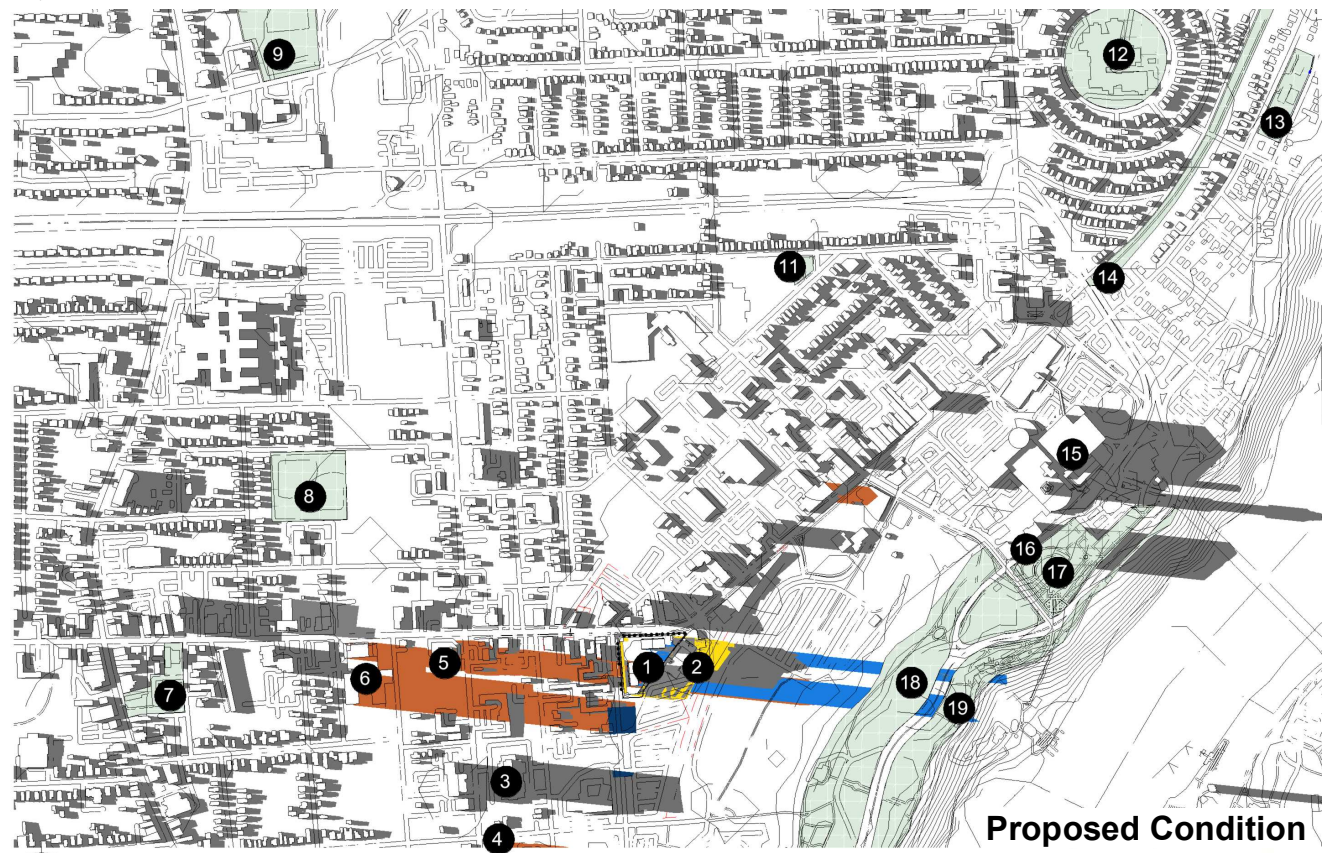
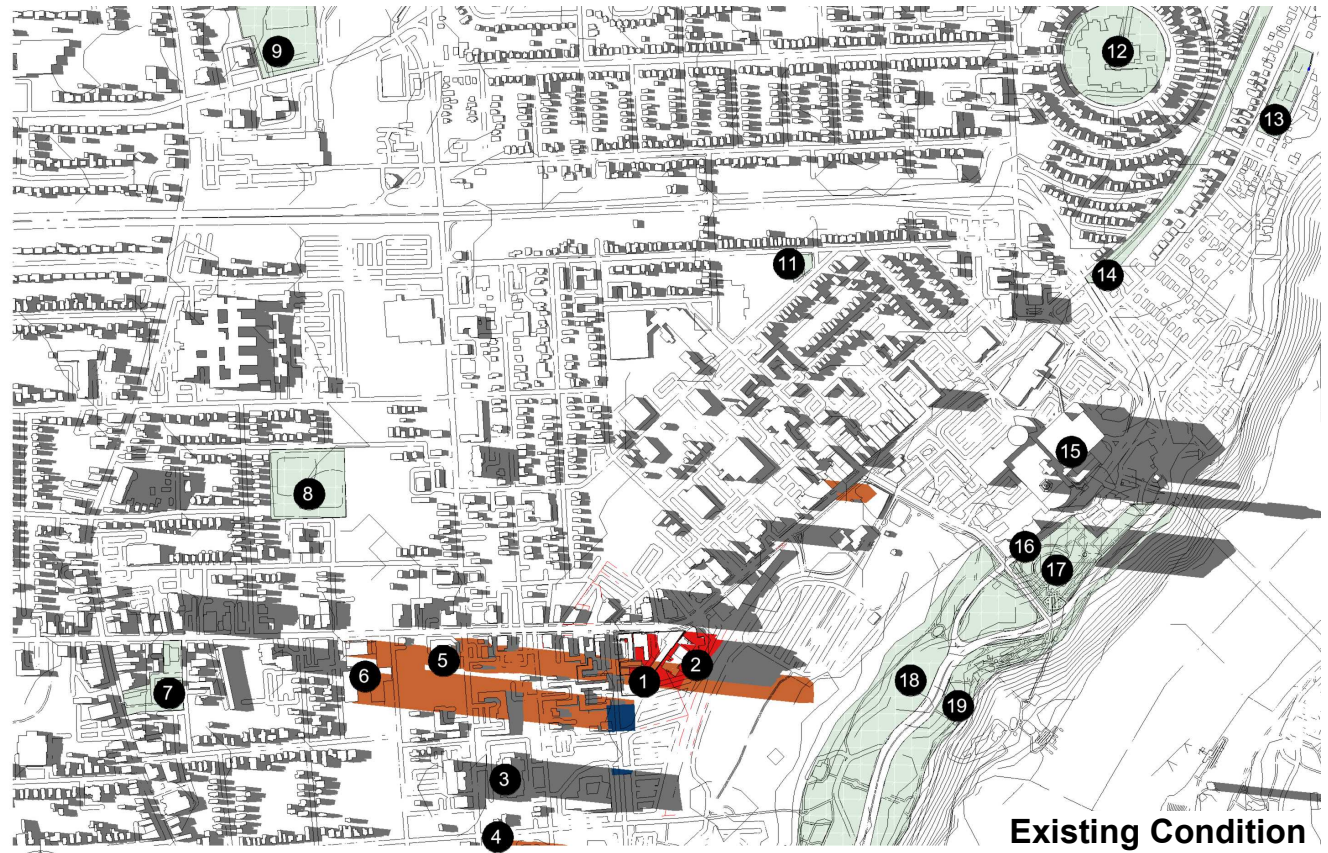
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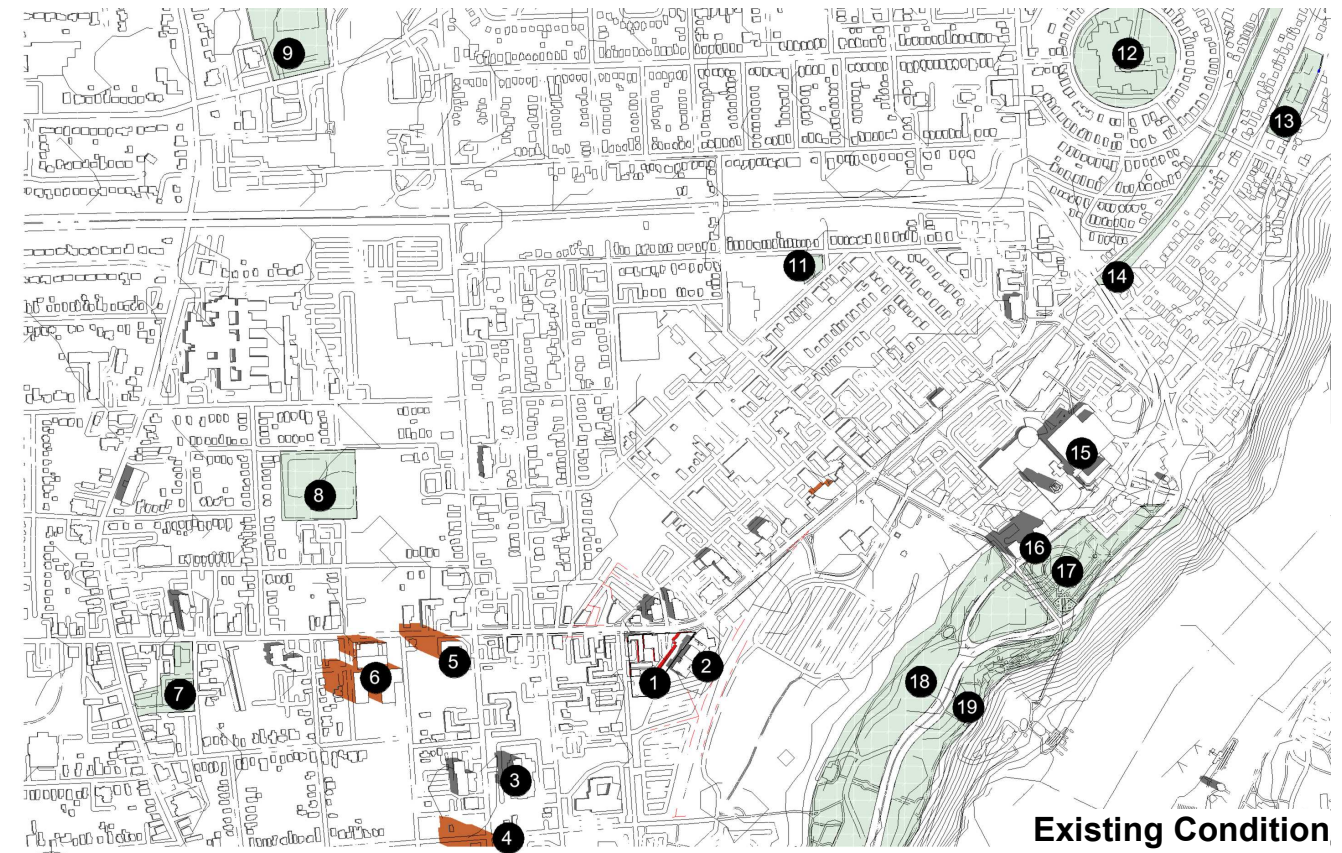
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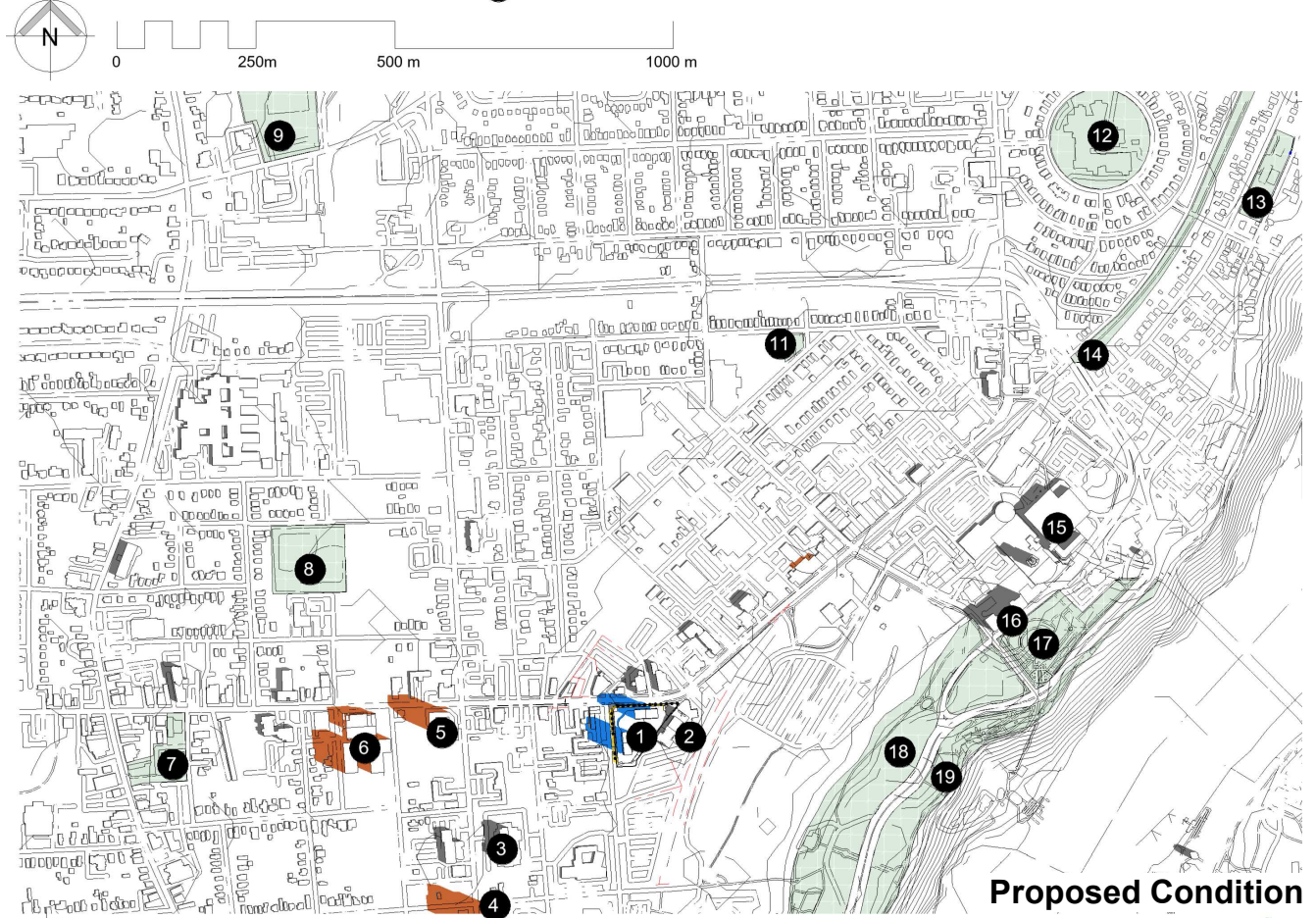


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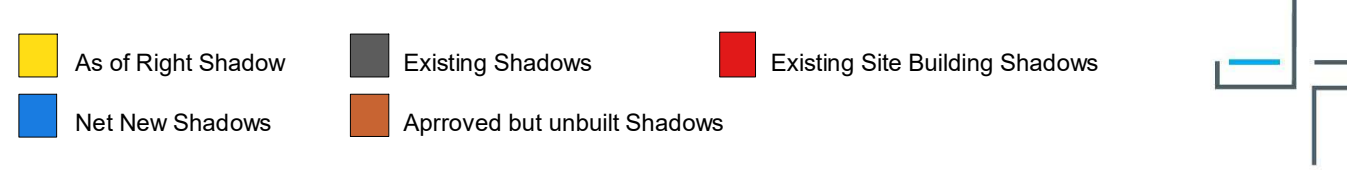
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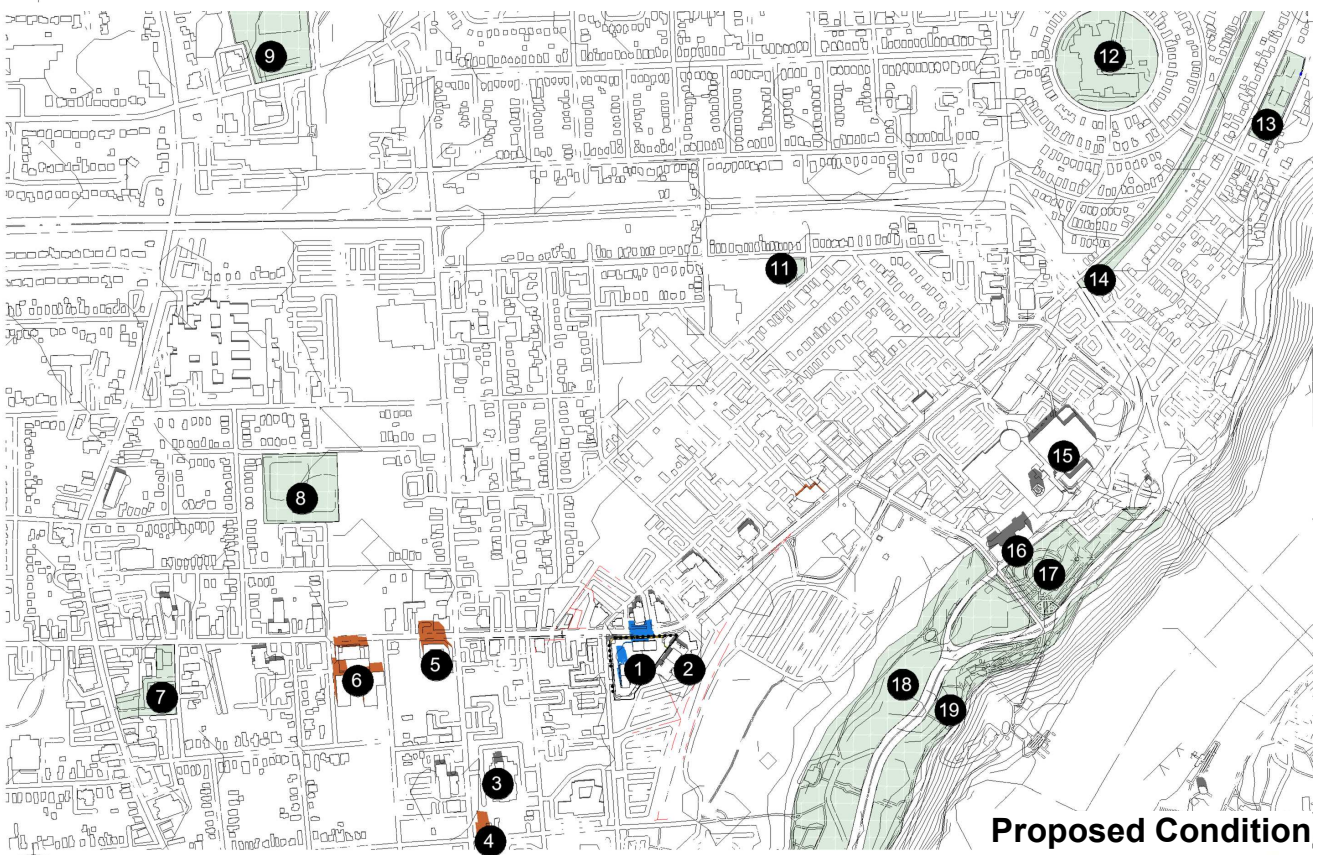
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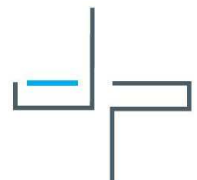


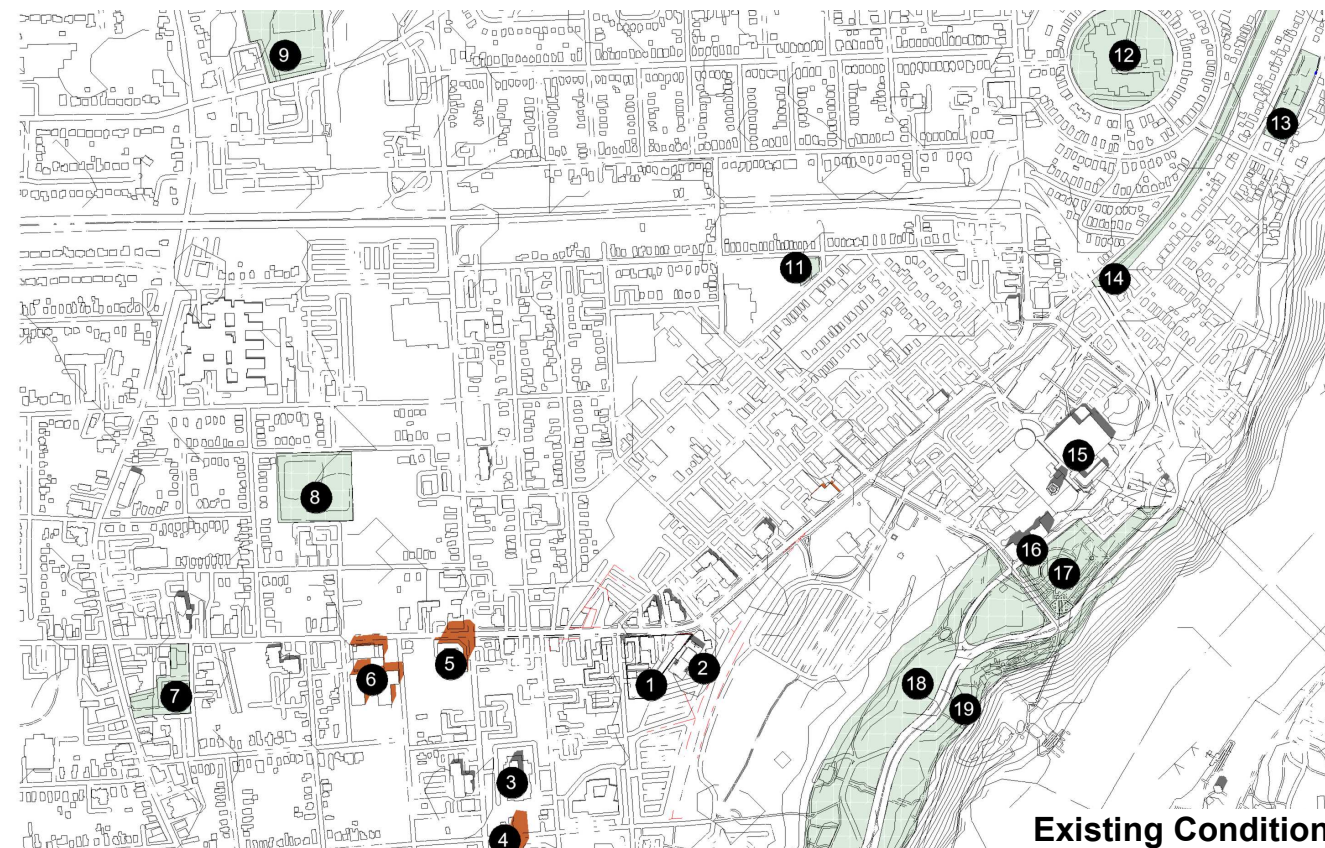
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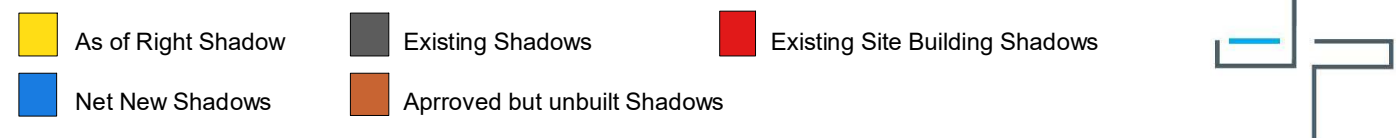
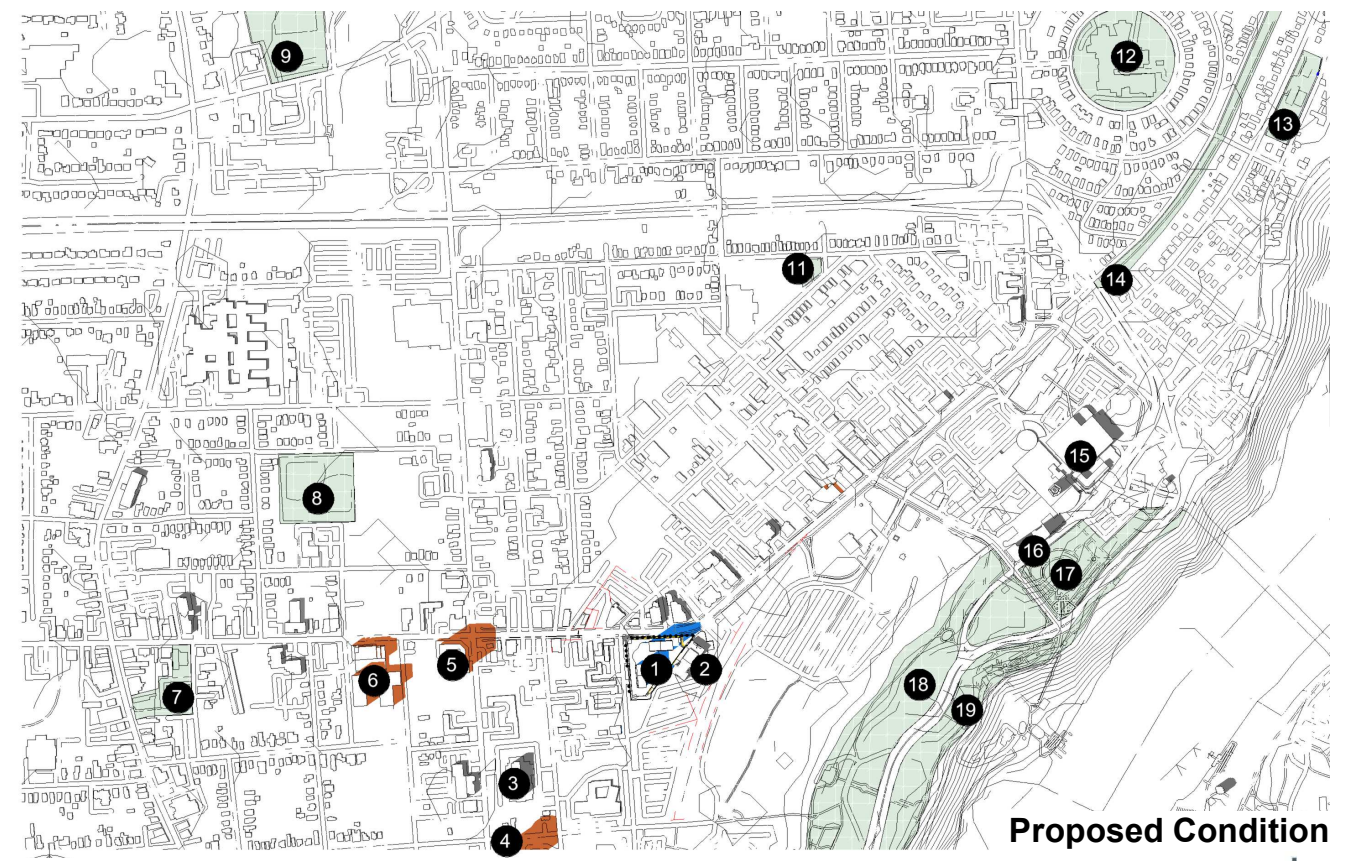
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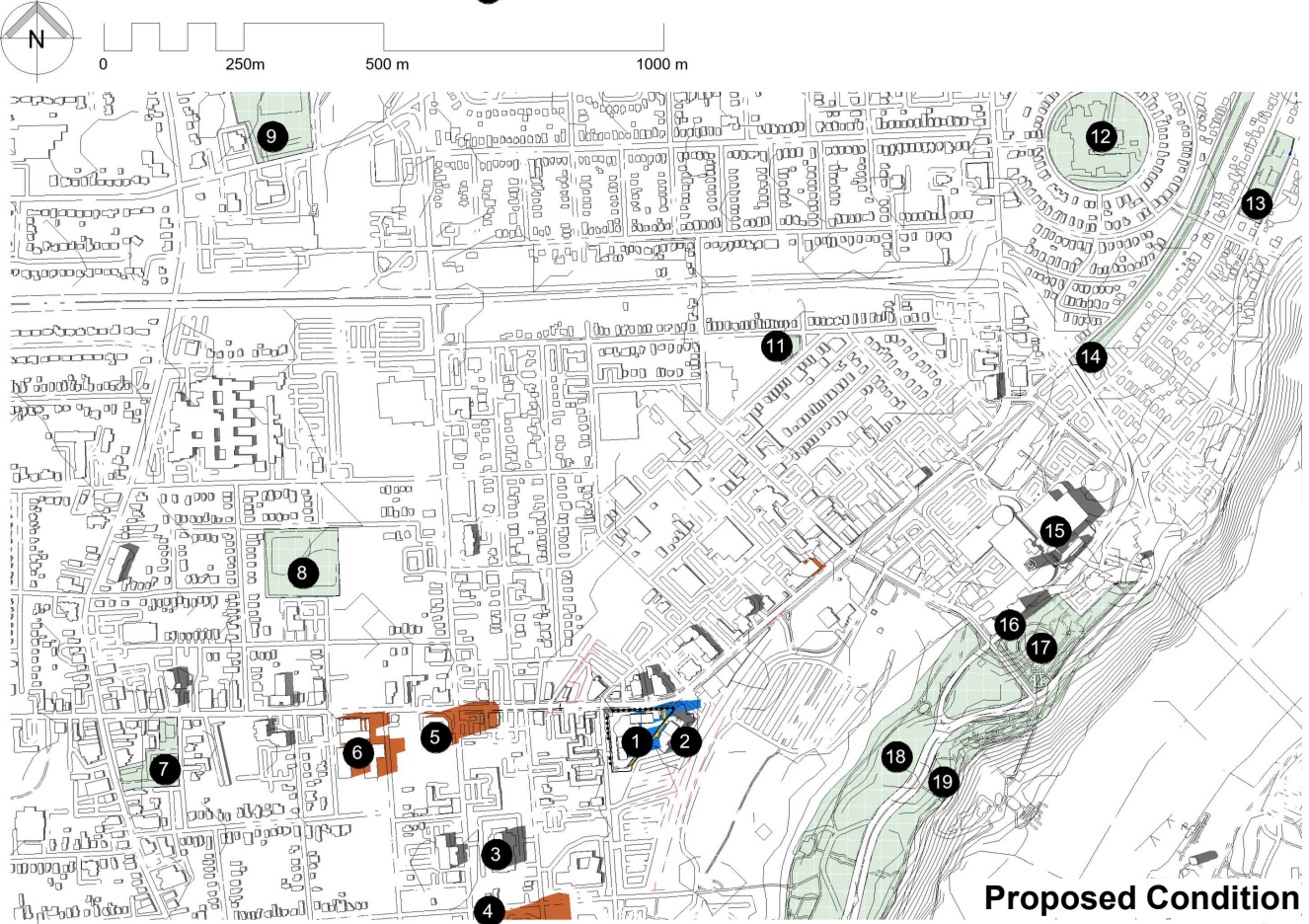


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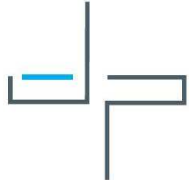
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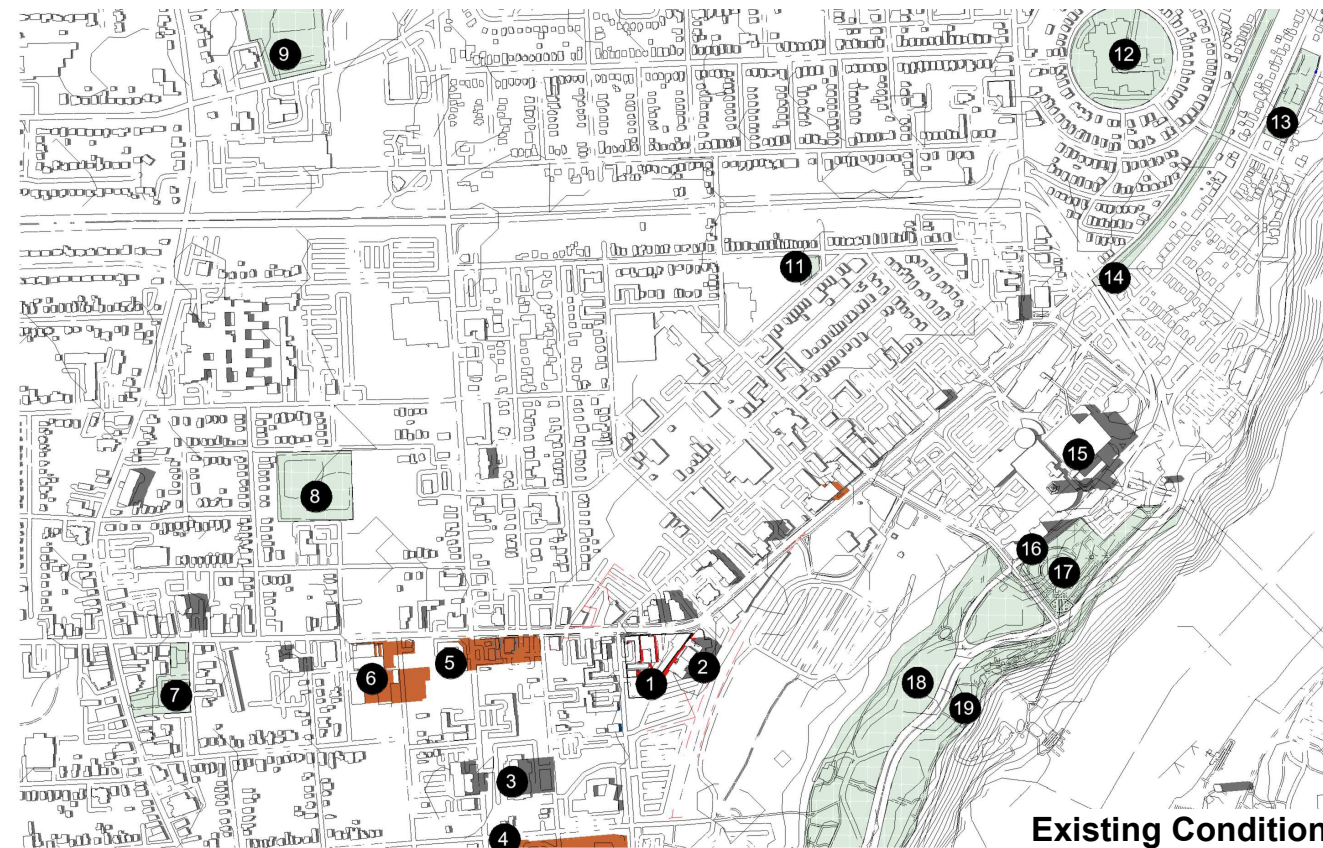




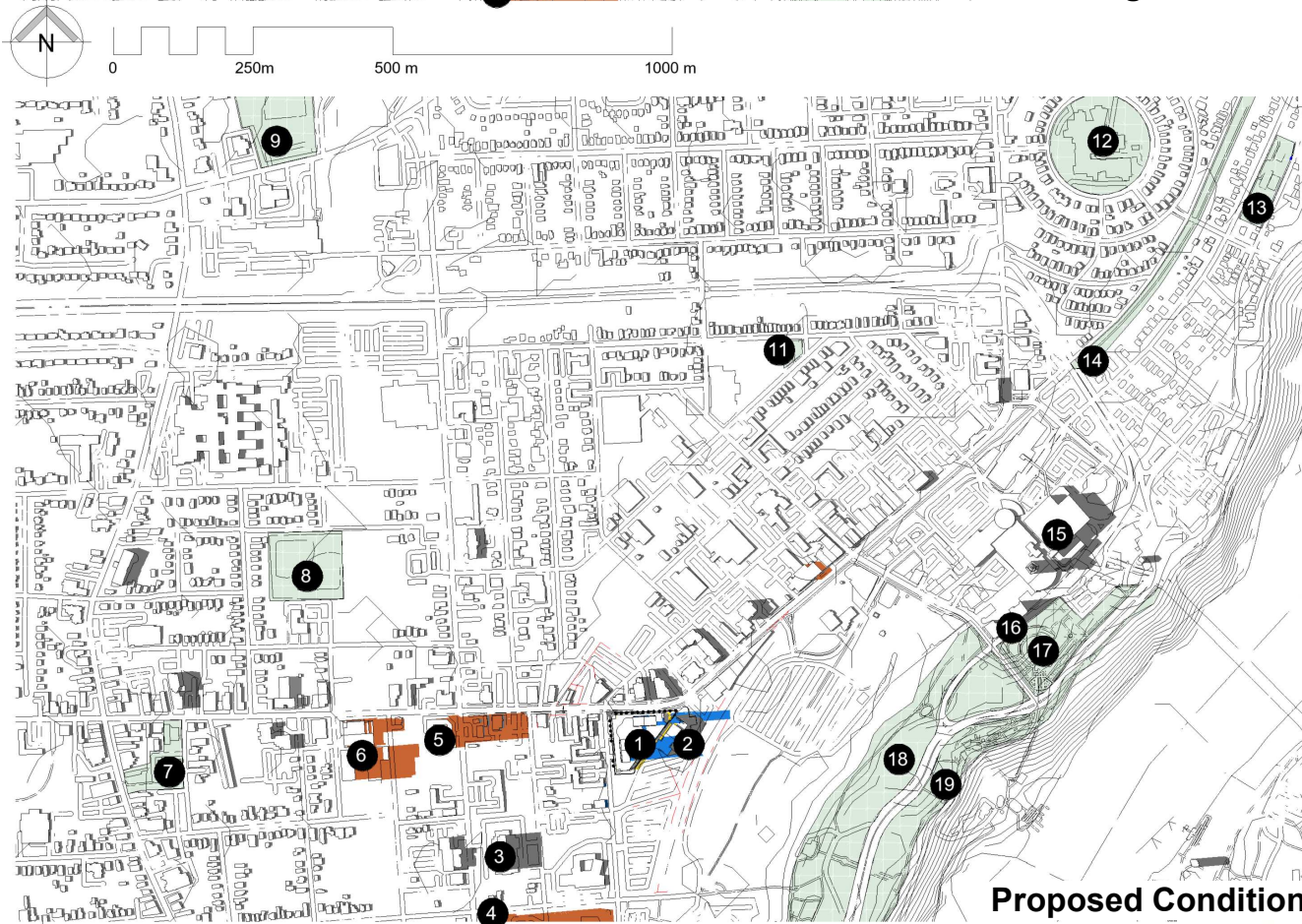


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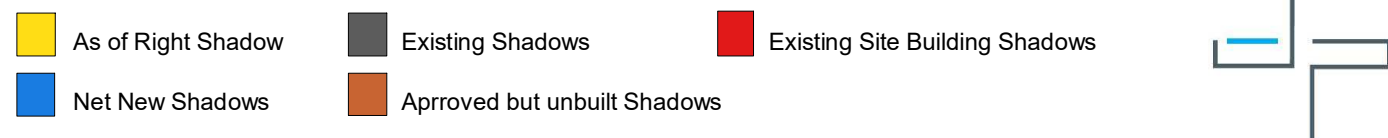




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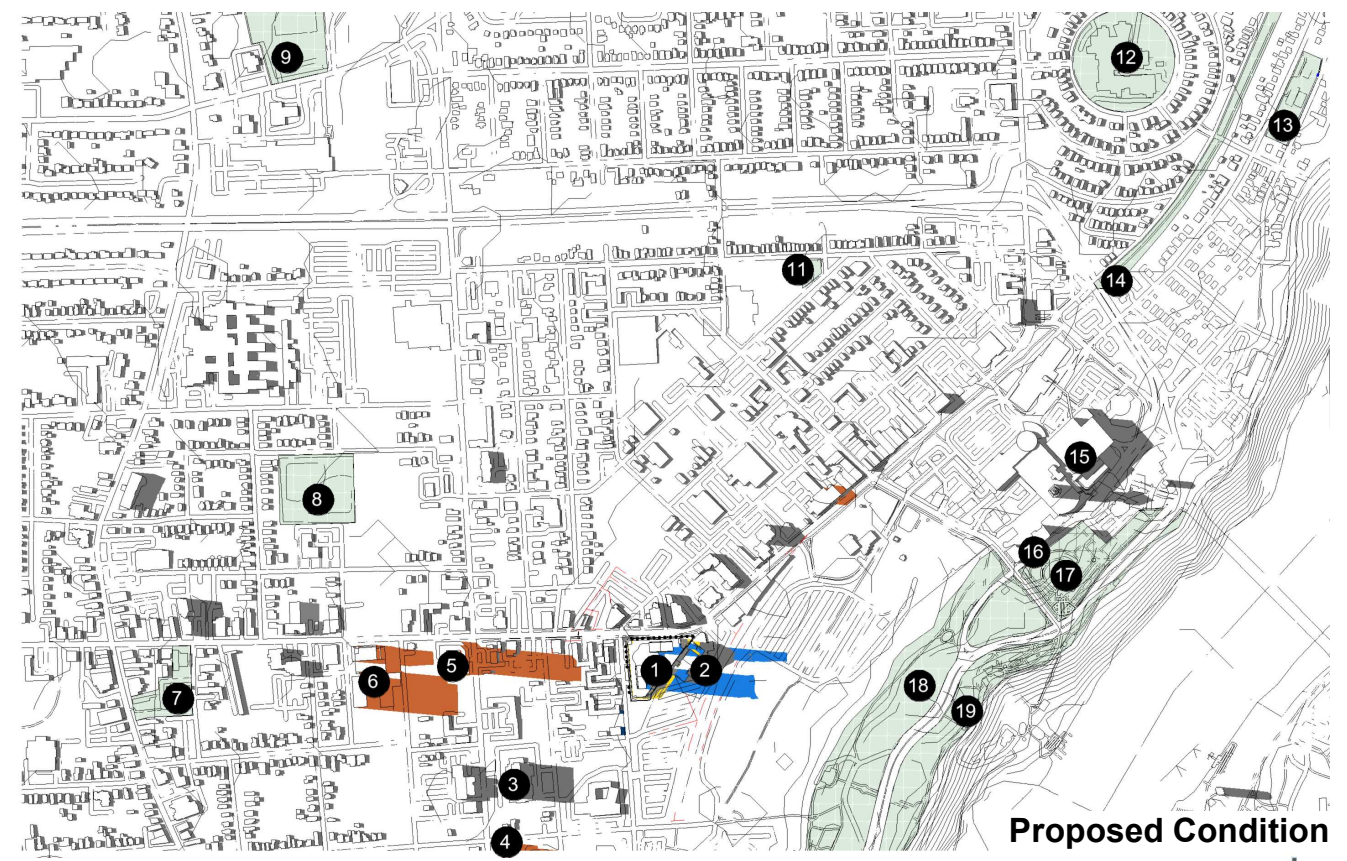


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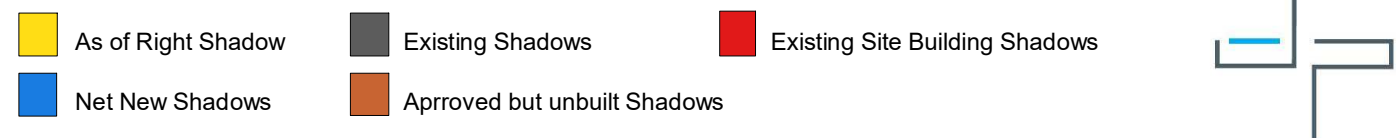


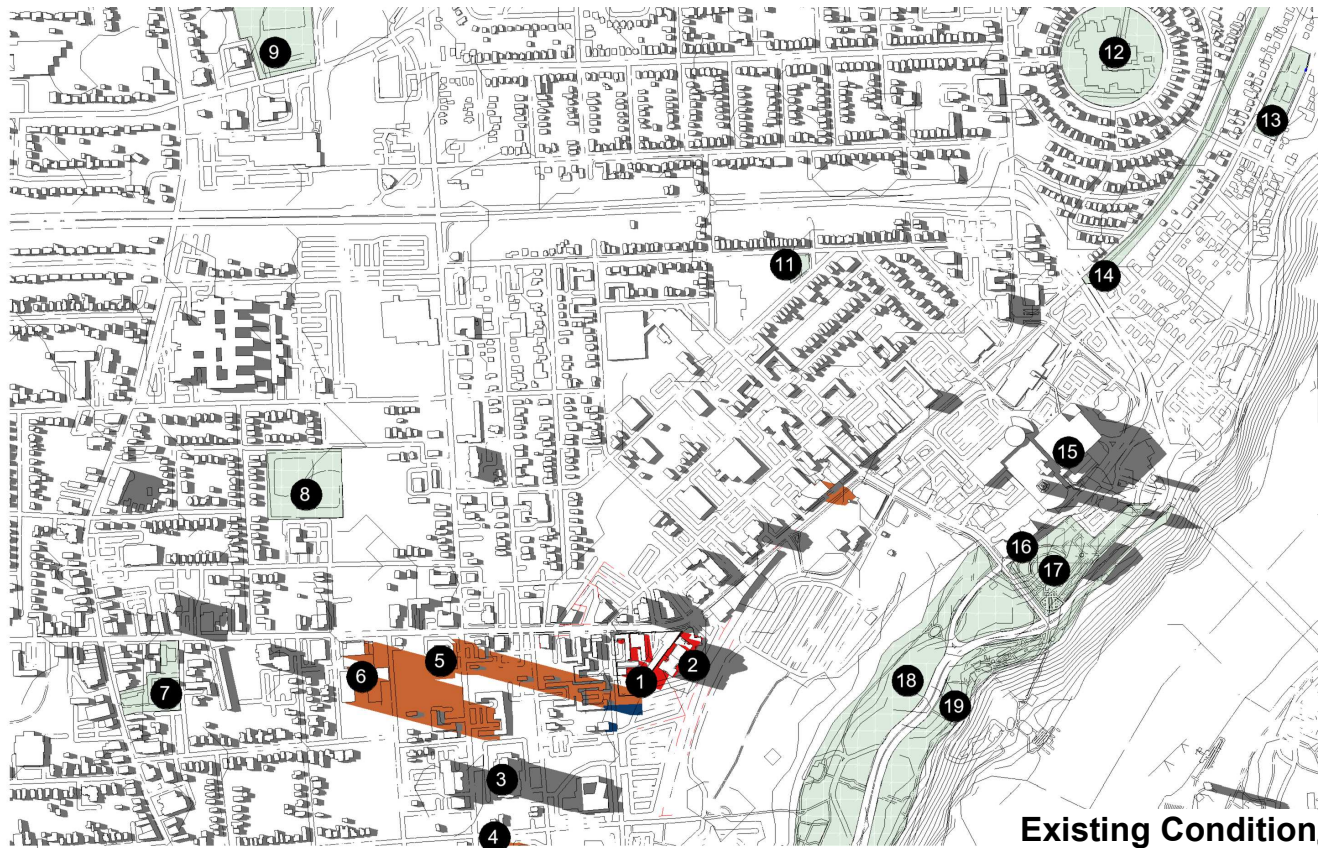


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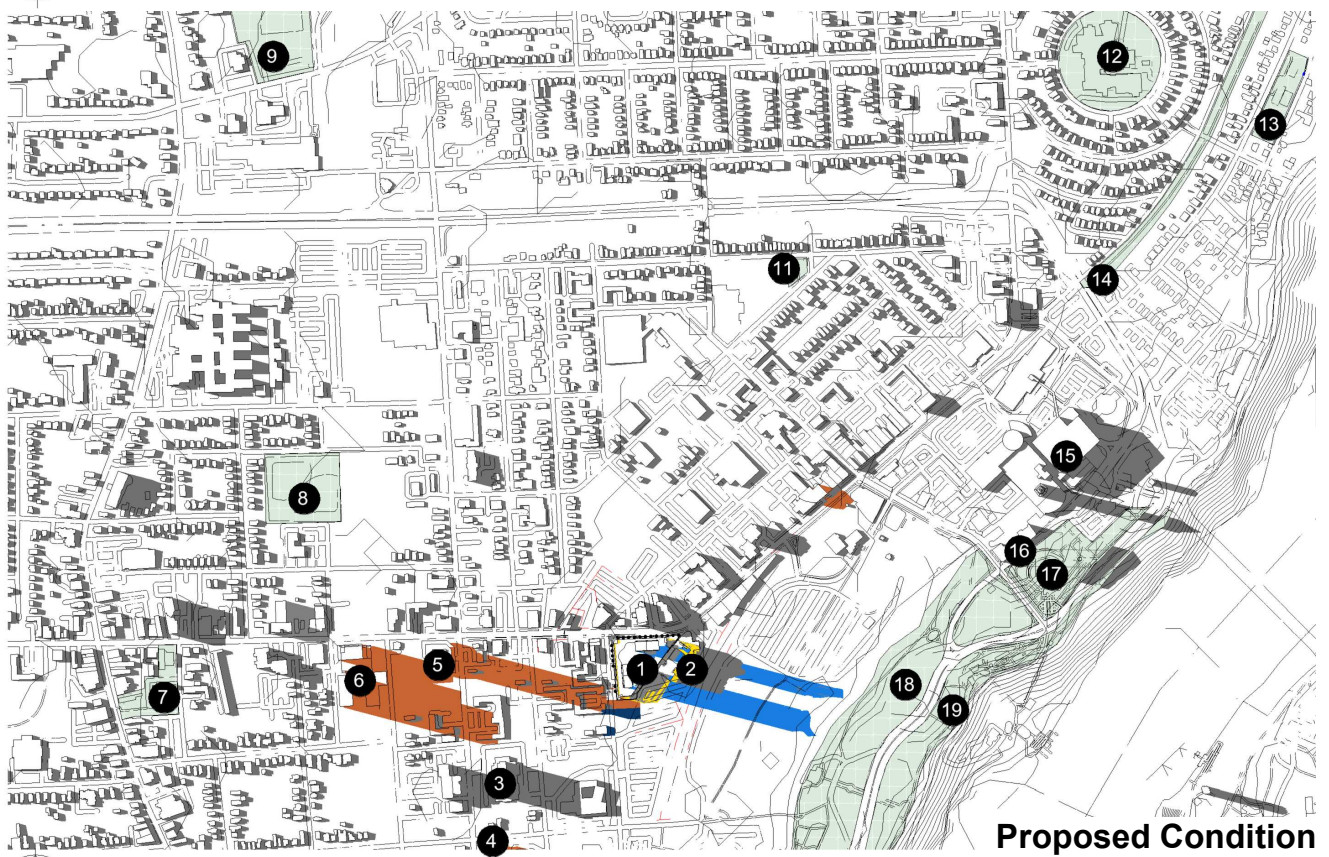


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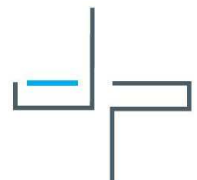


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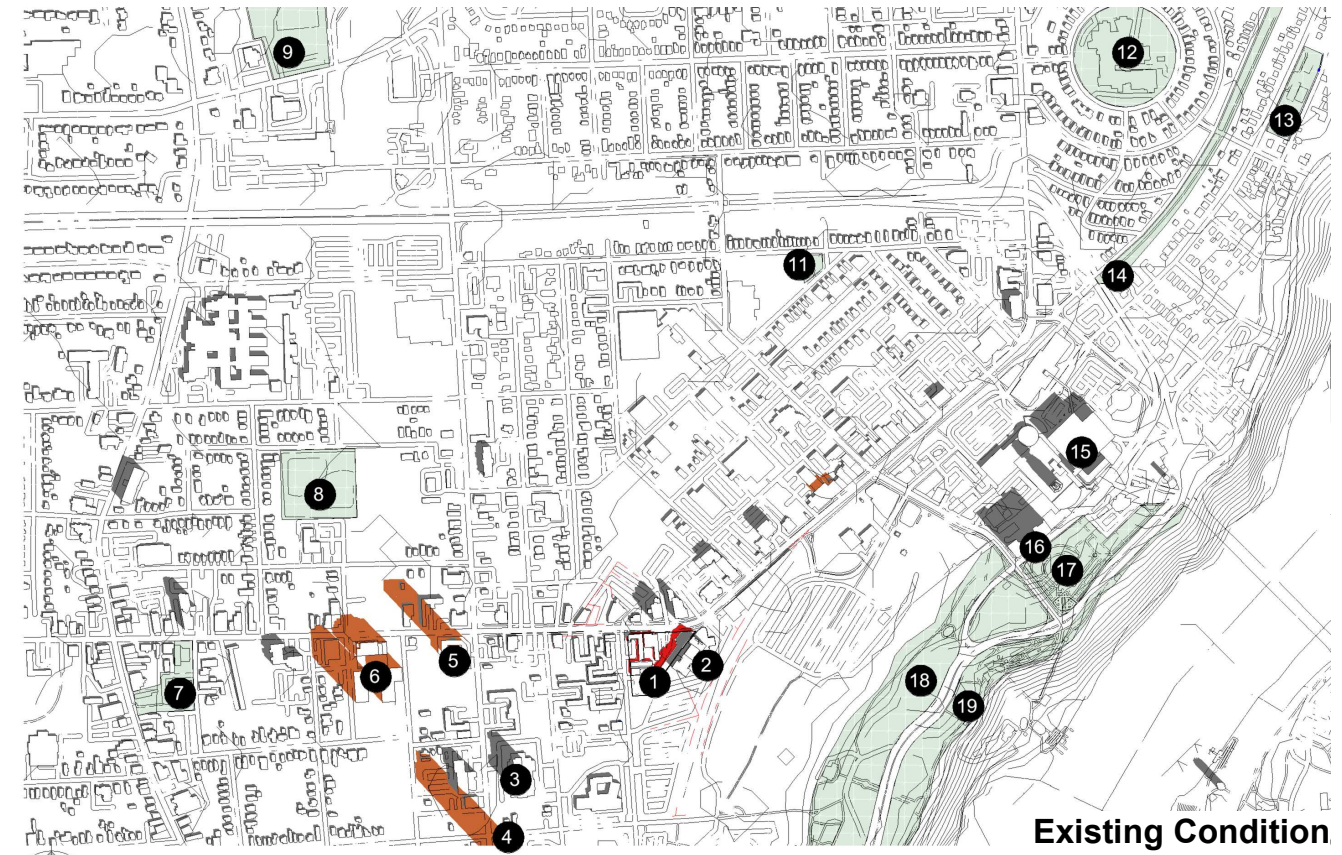
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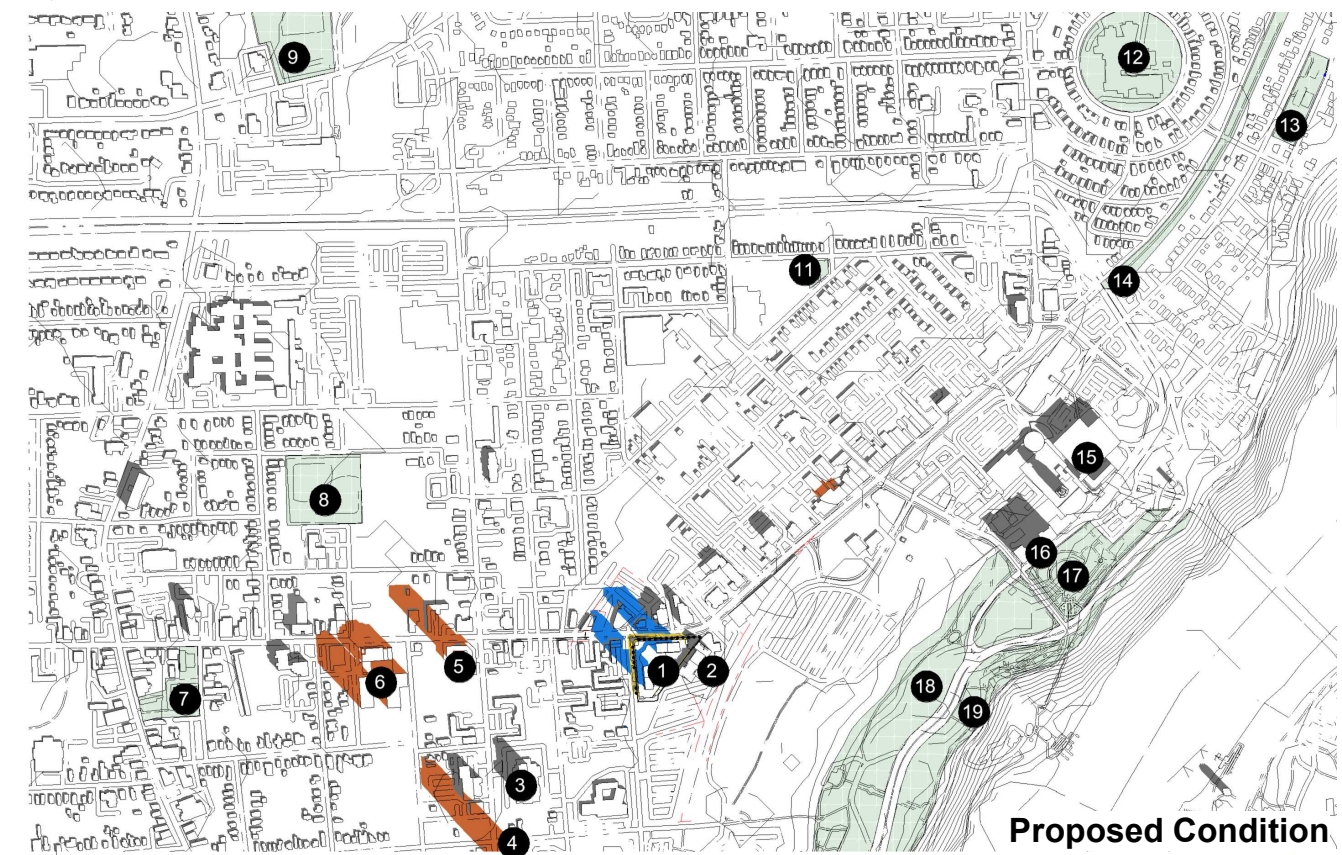


September 21

10:00 am - Sunrise +3hr

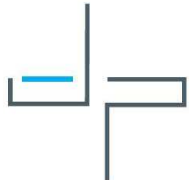


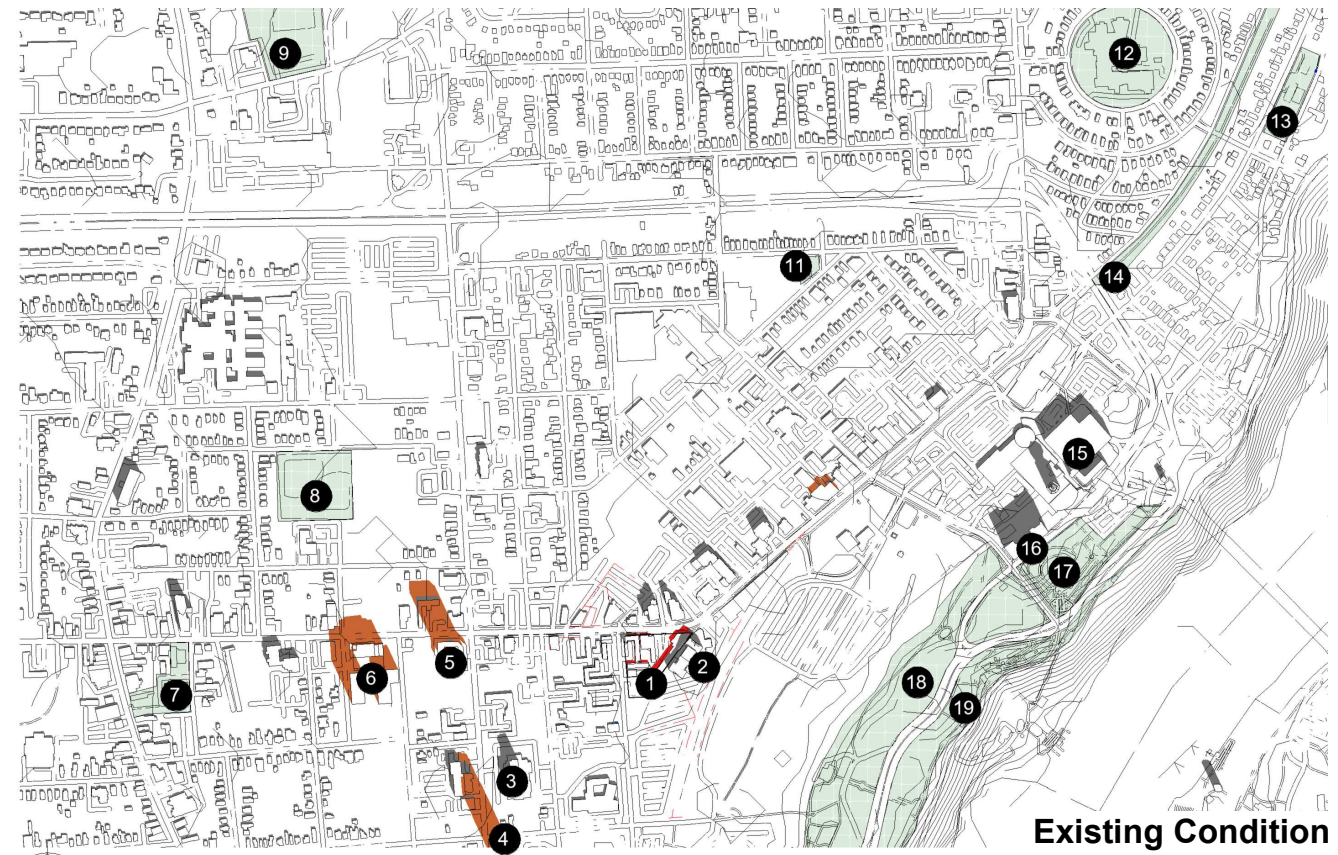
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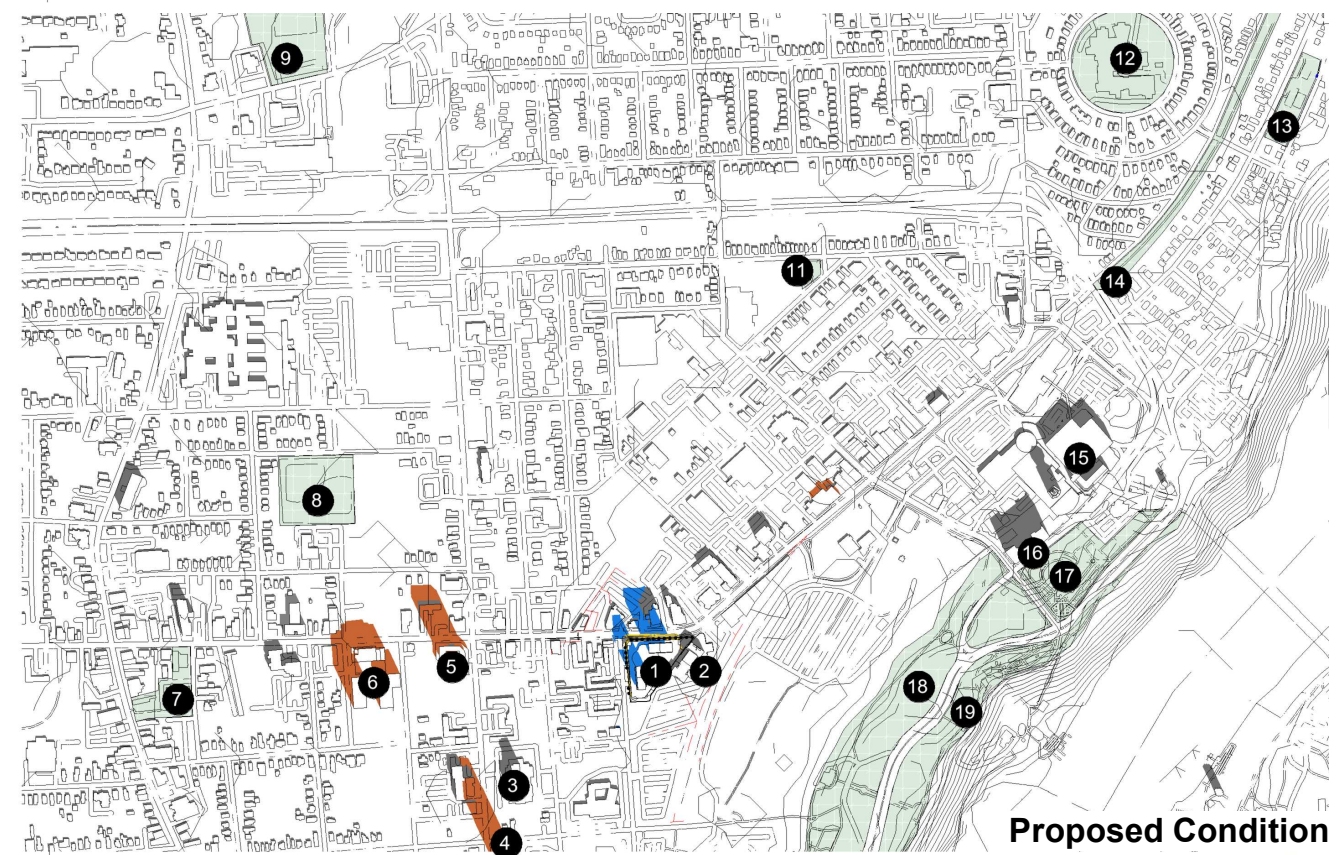
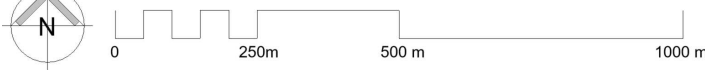
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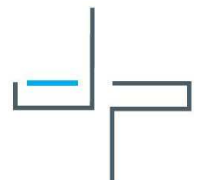
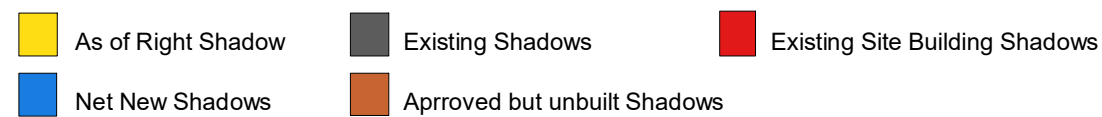


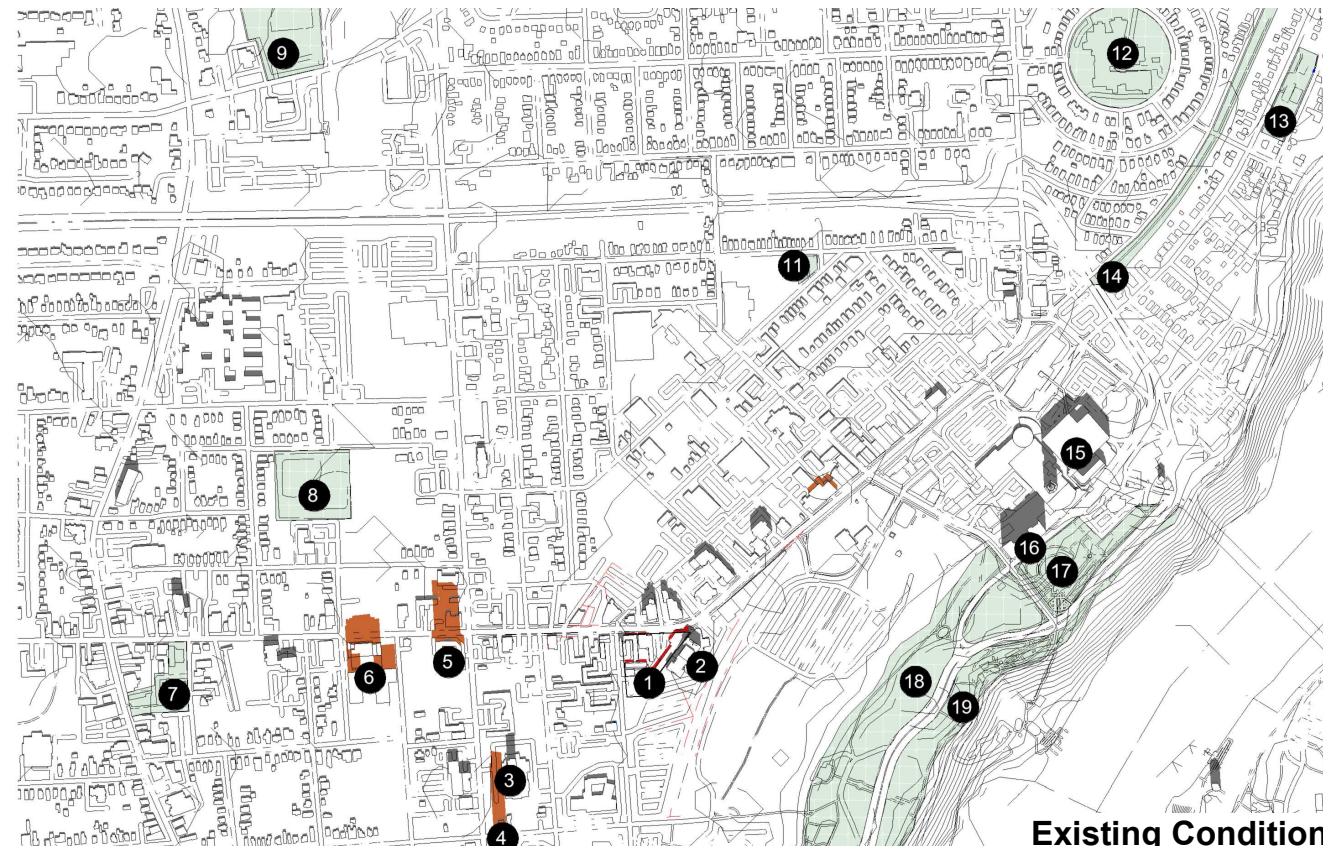


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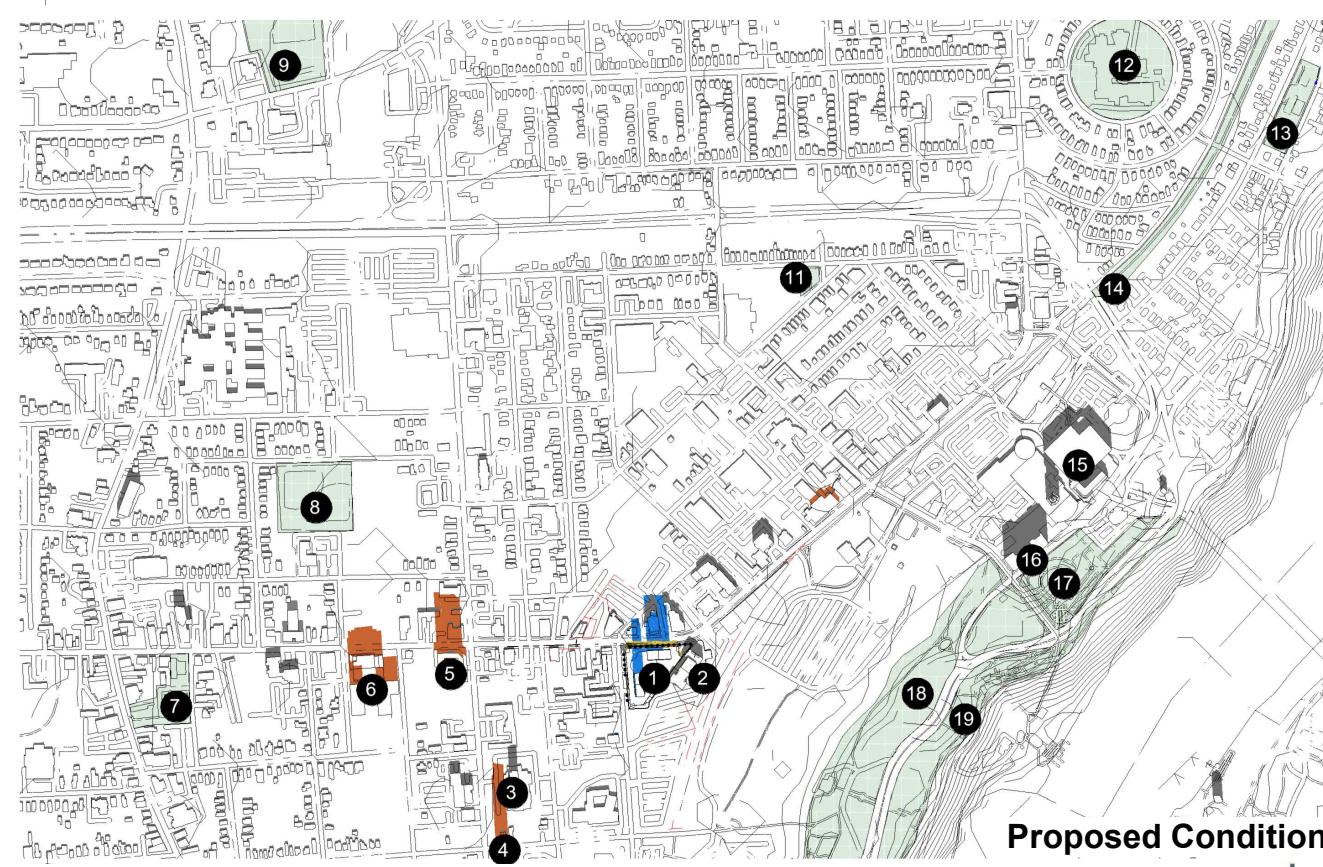


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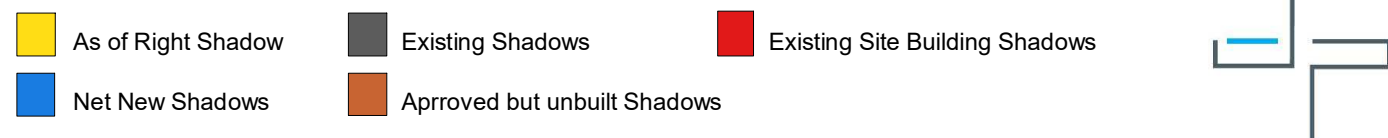


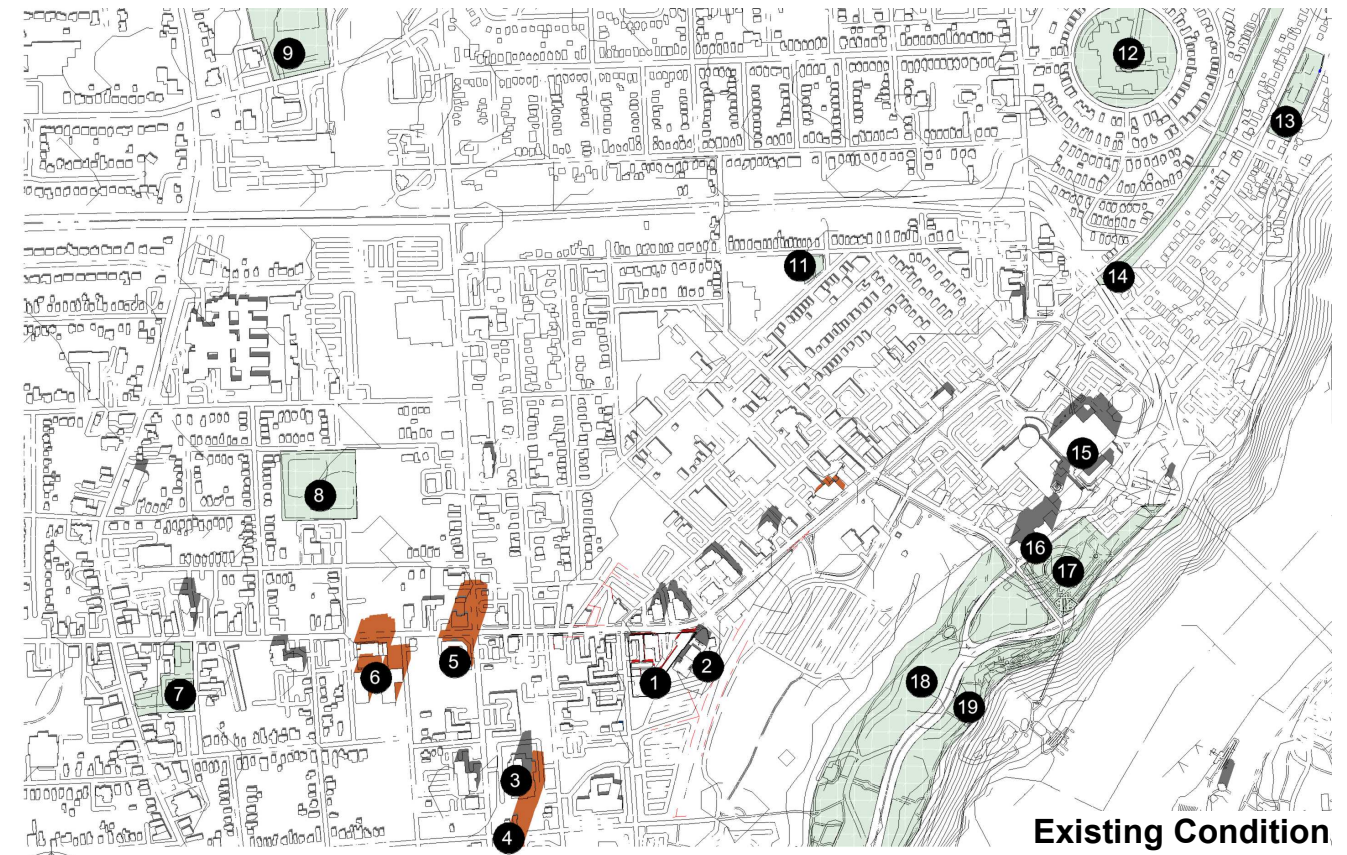


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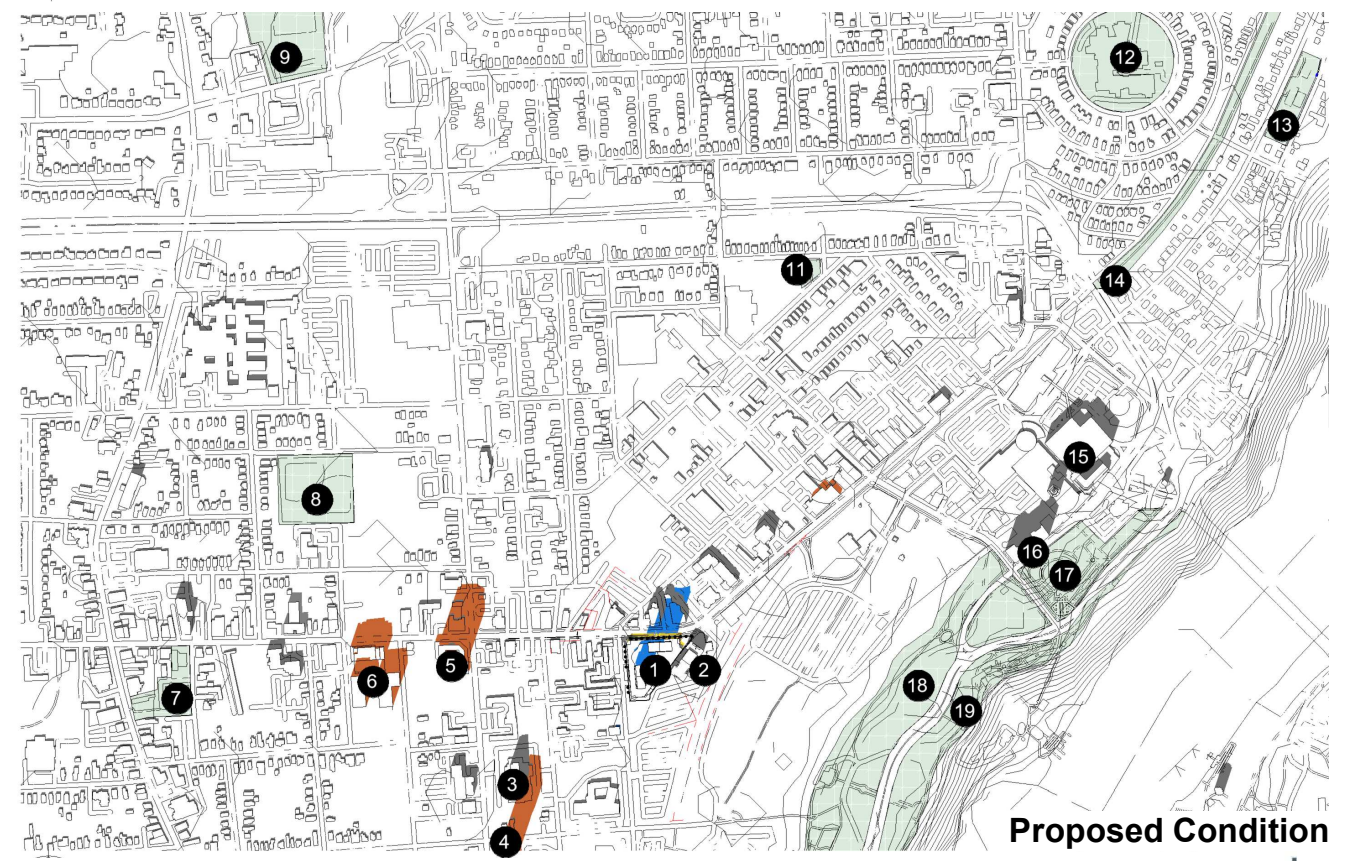


Proposed Condition





Existing Condition



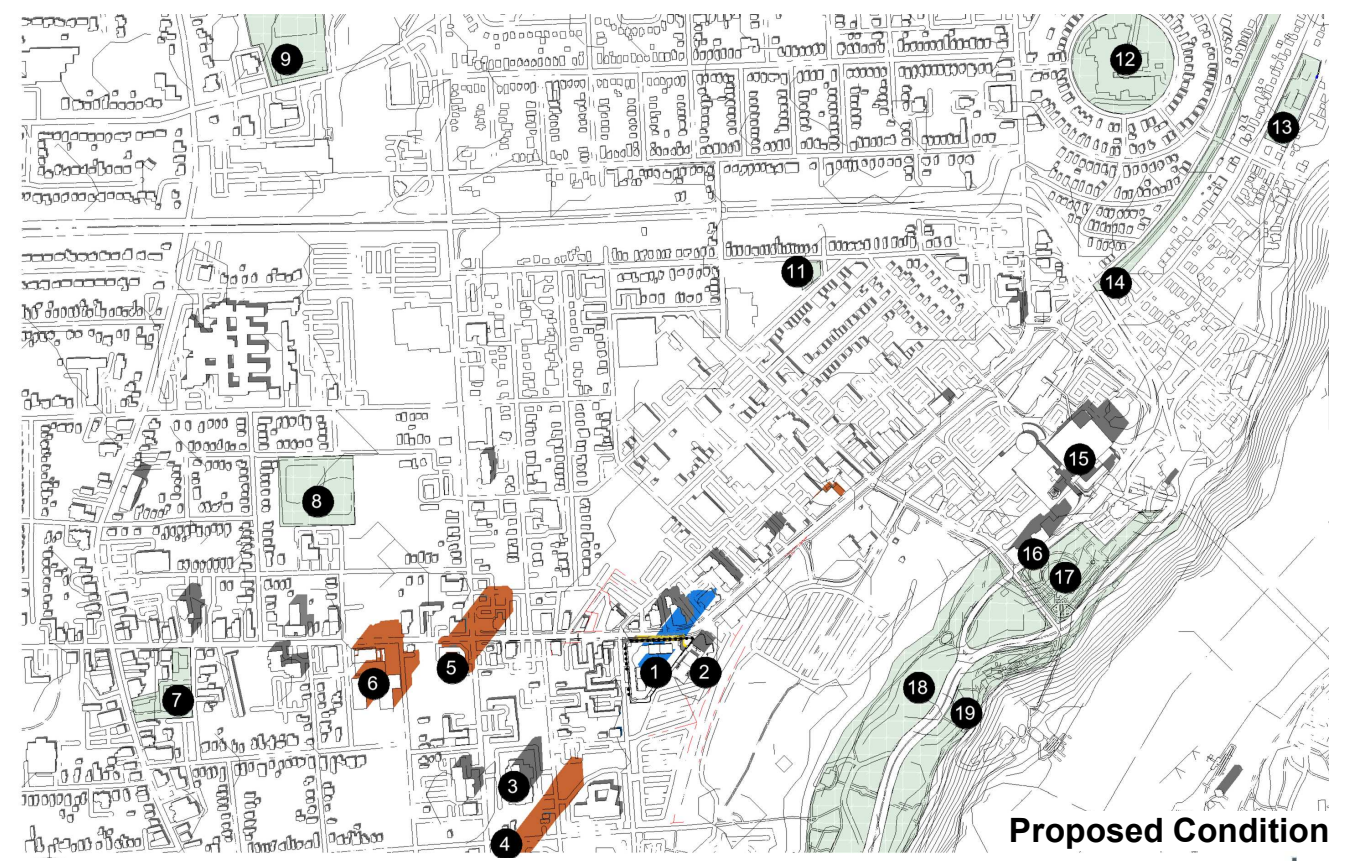
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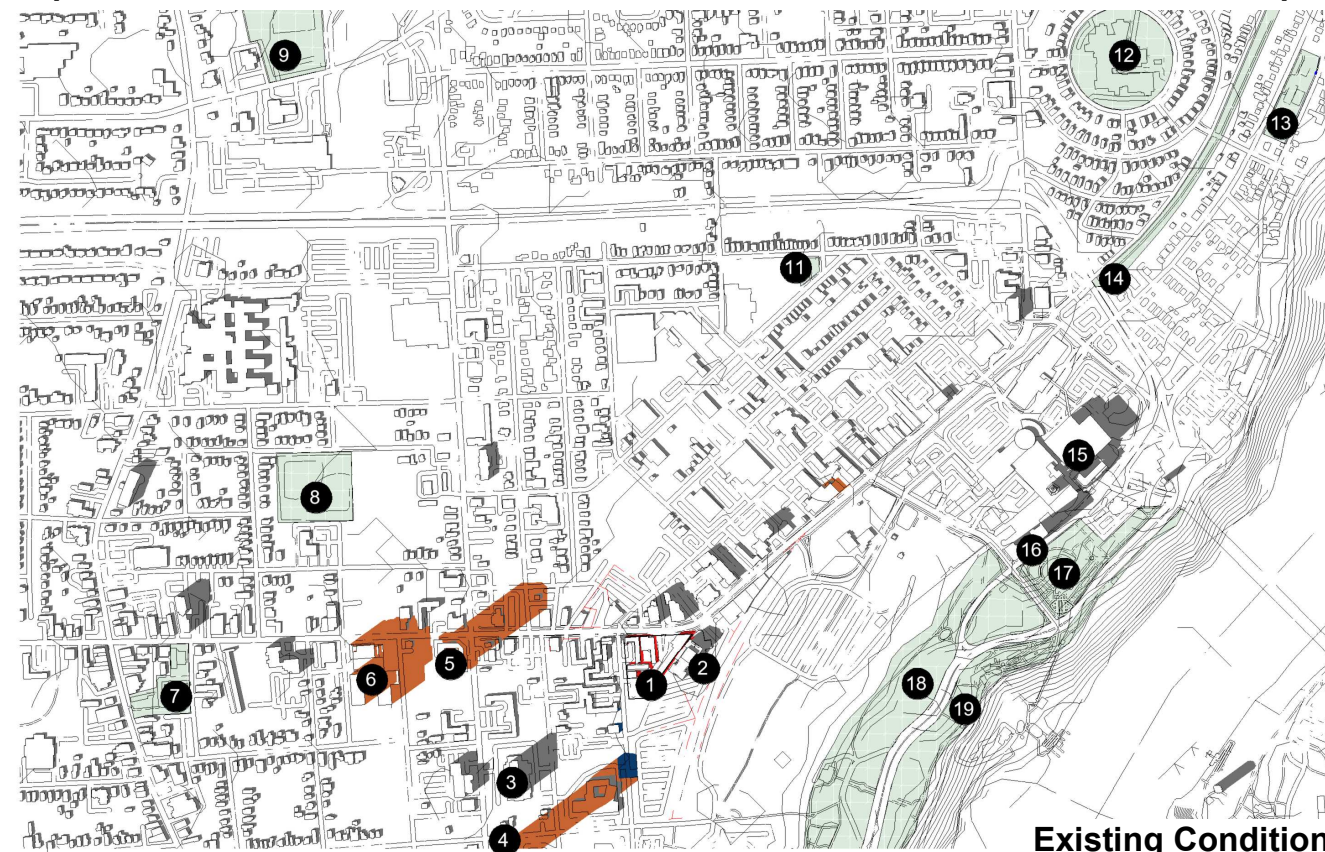


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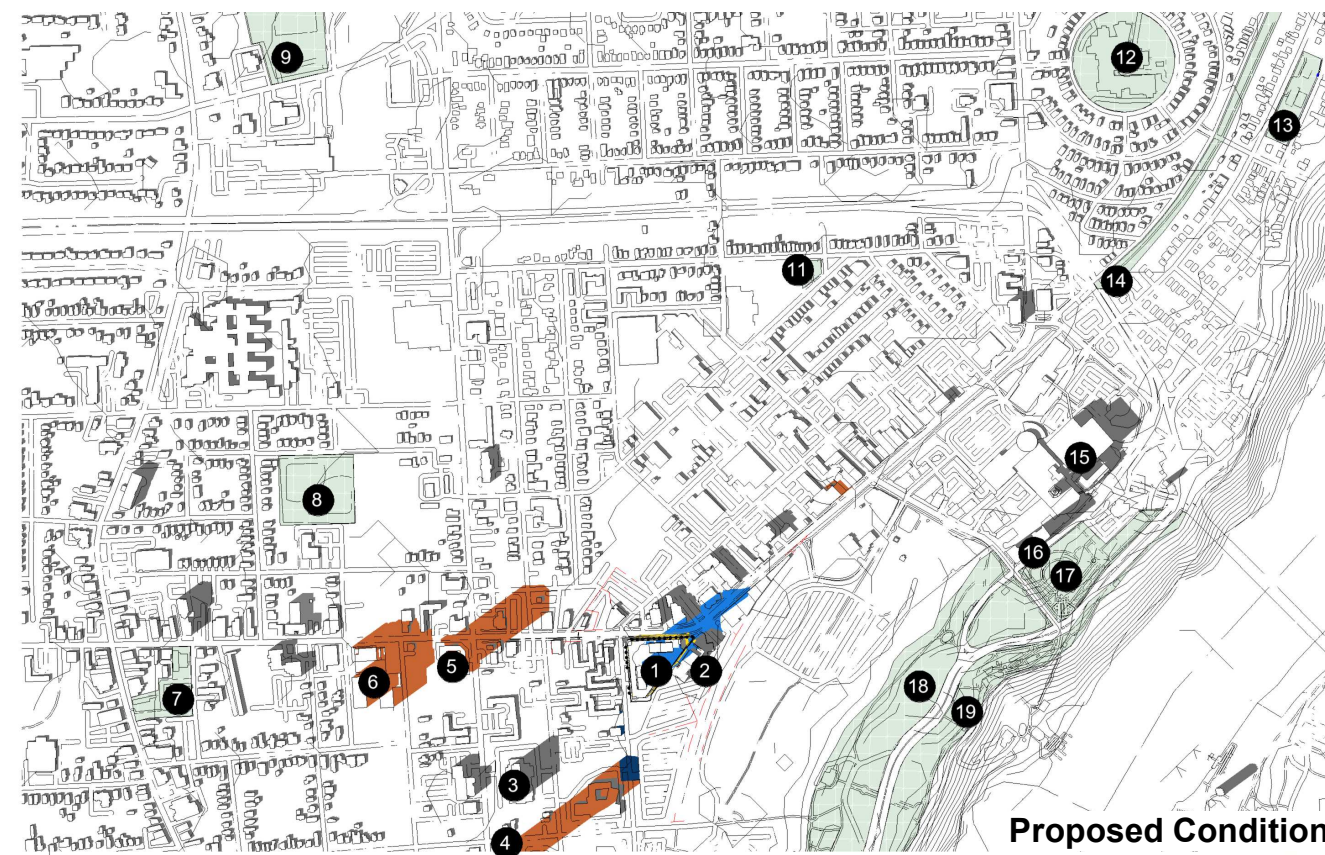


Proposed Condition





Existing Condition



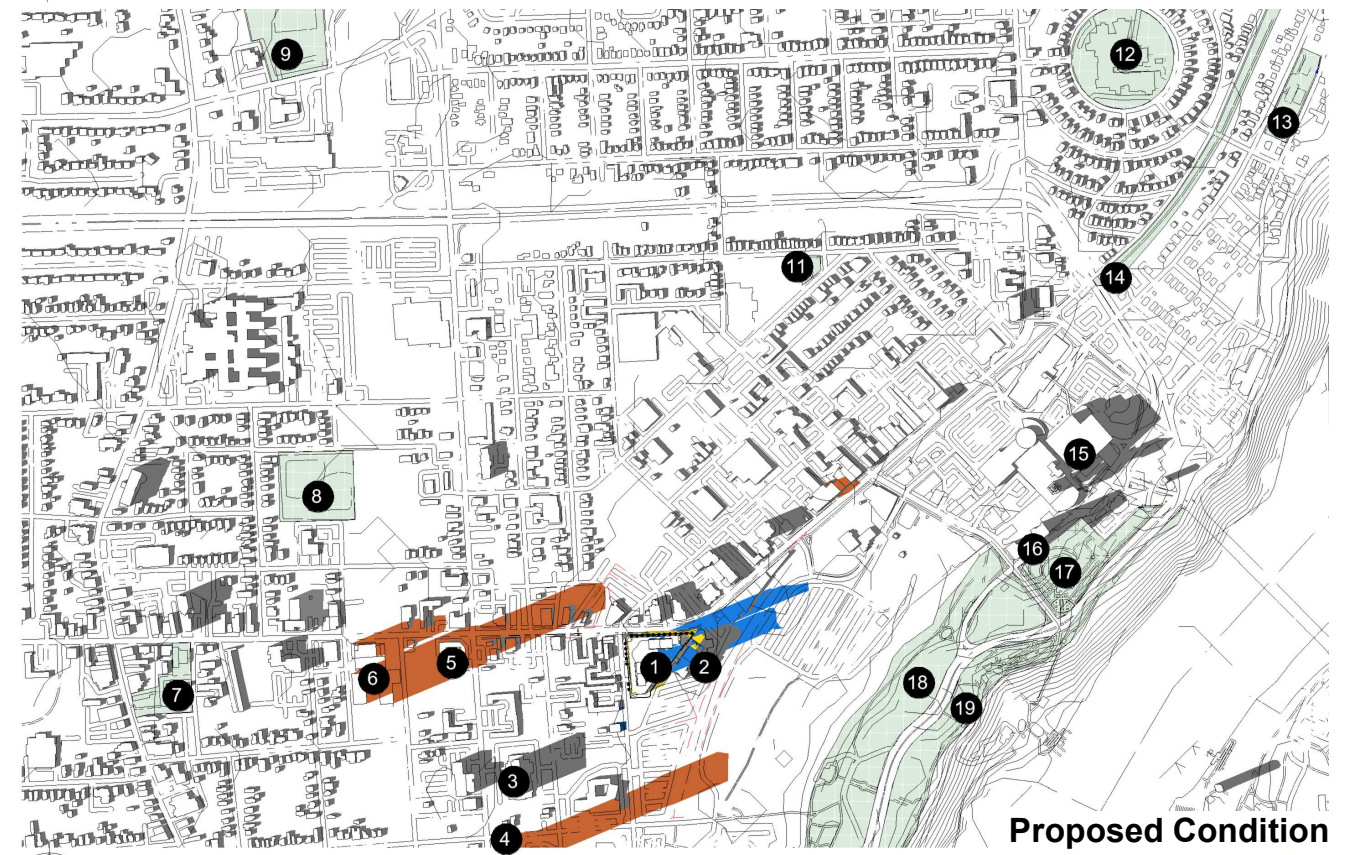
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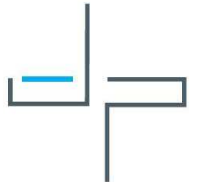


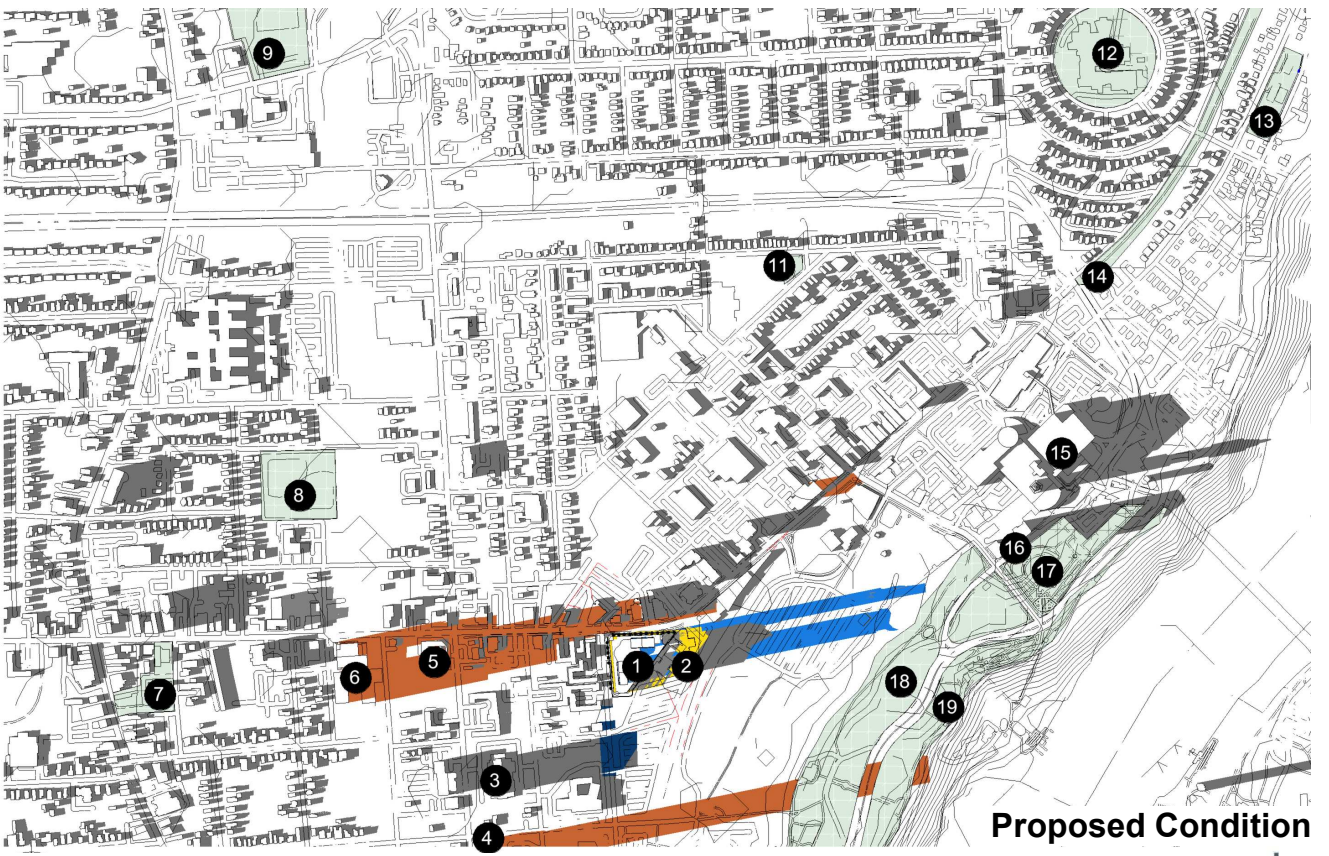
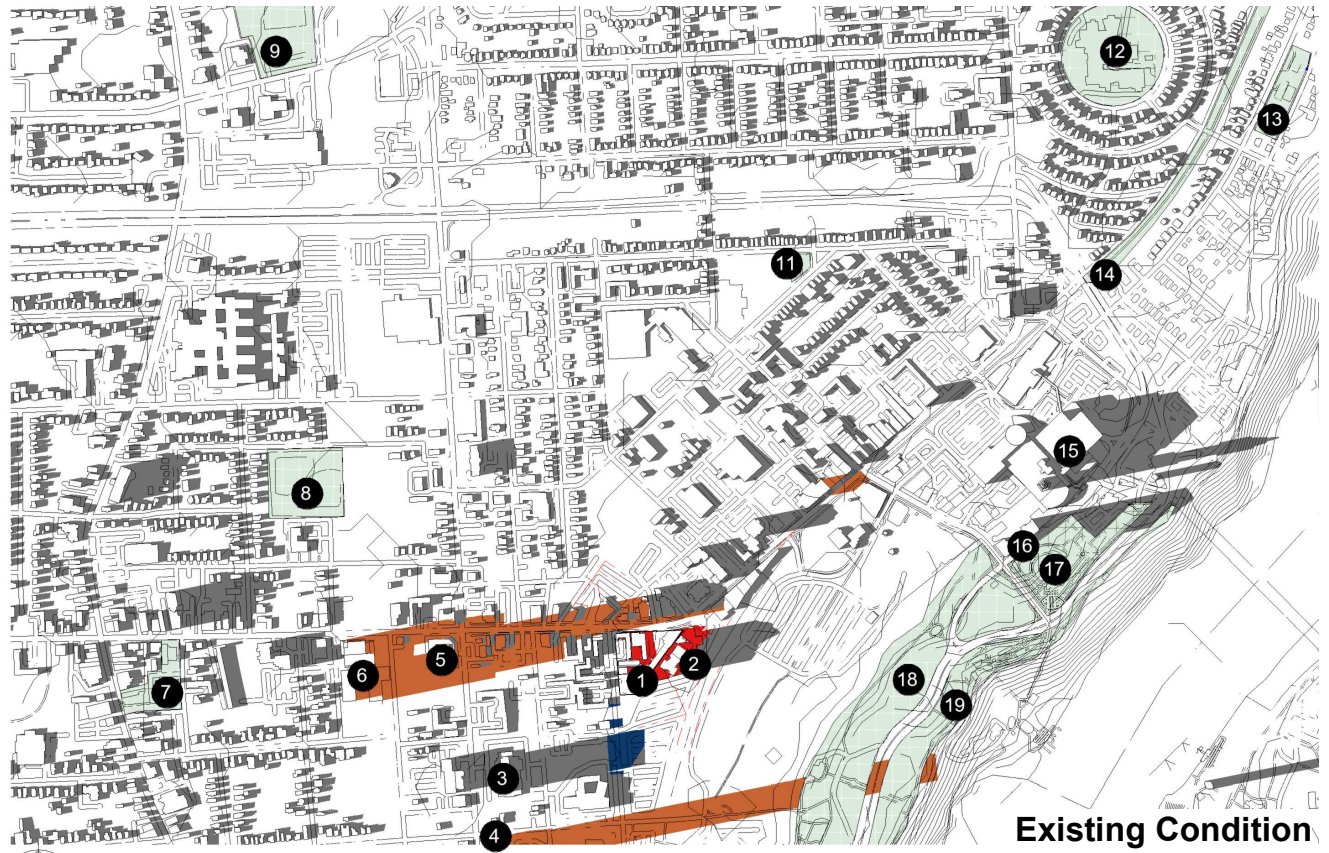
Existing Condition








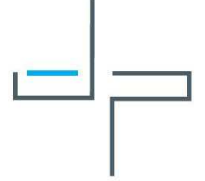
Proposed Condition

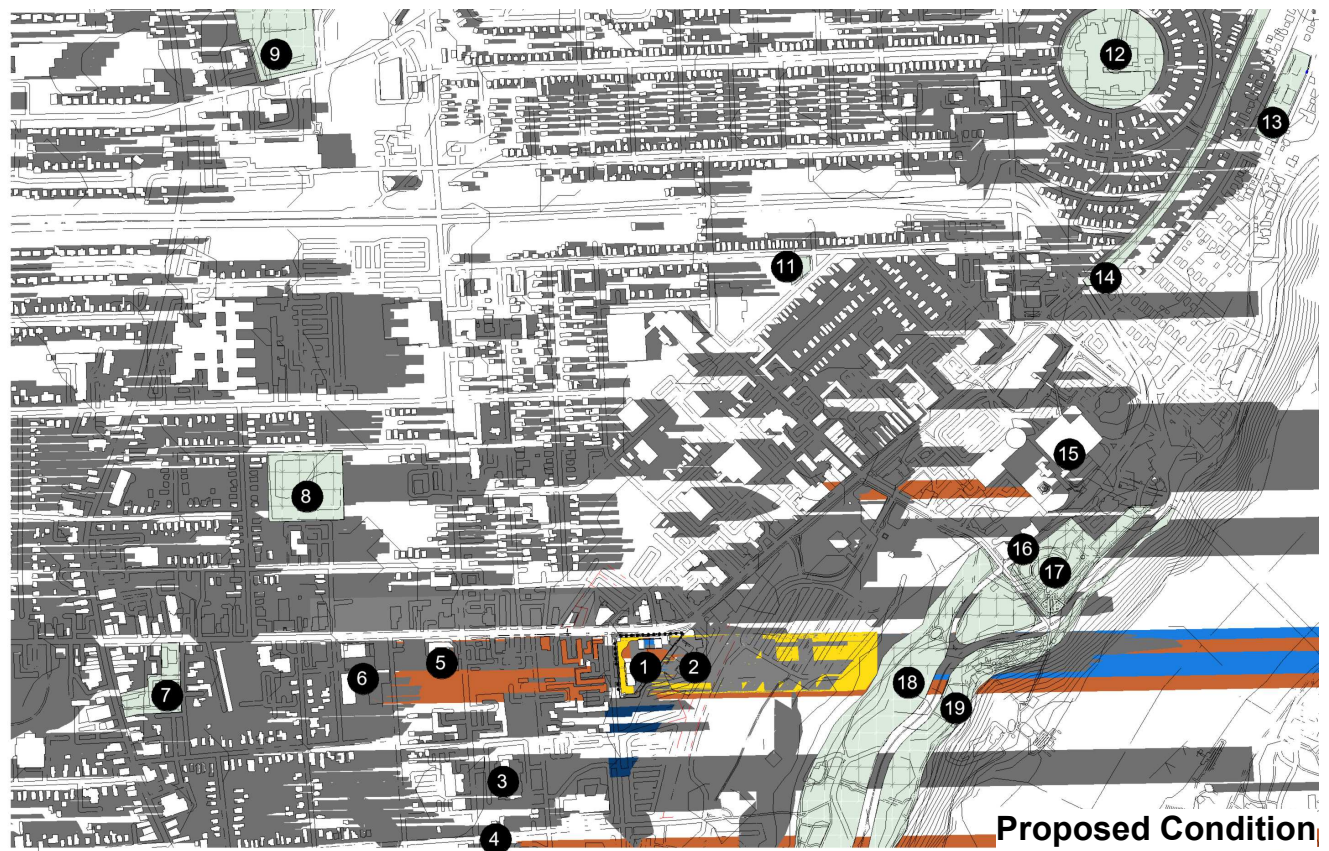
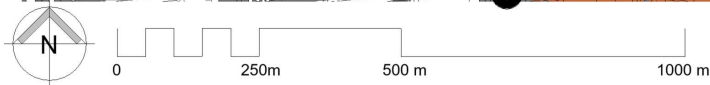
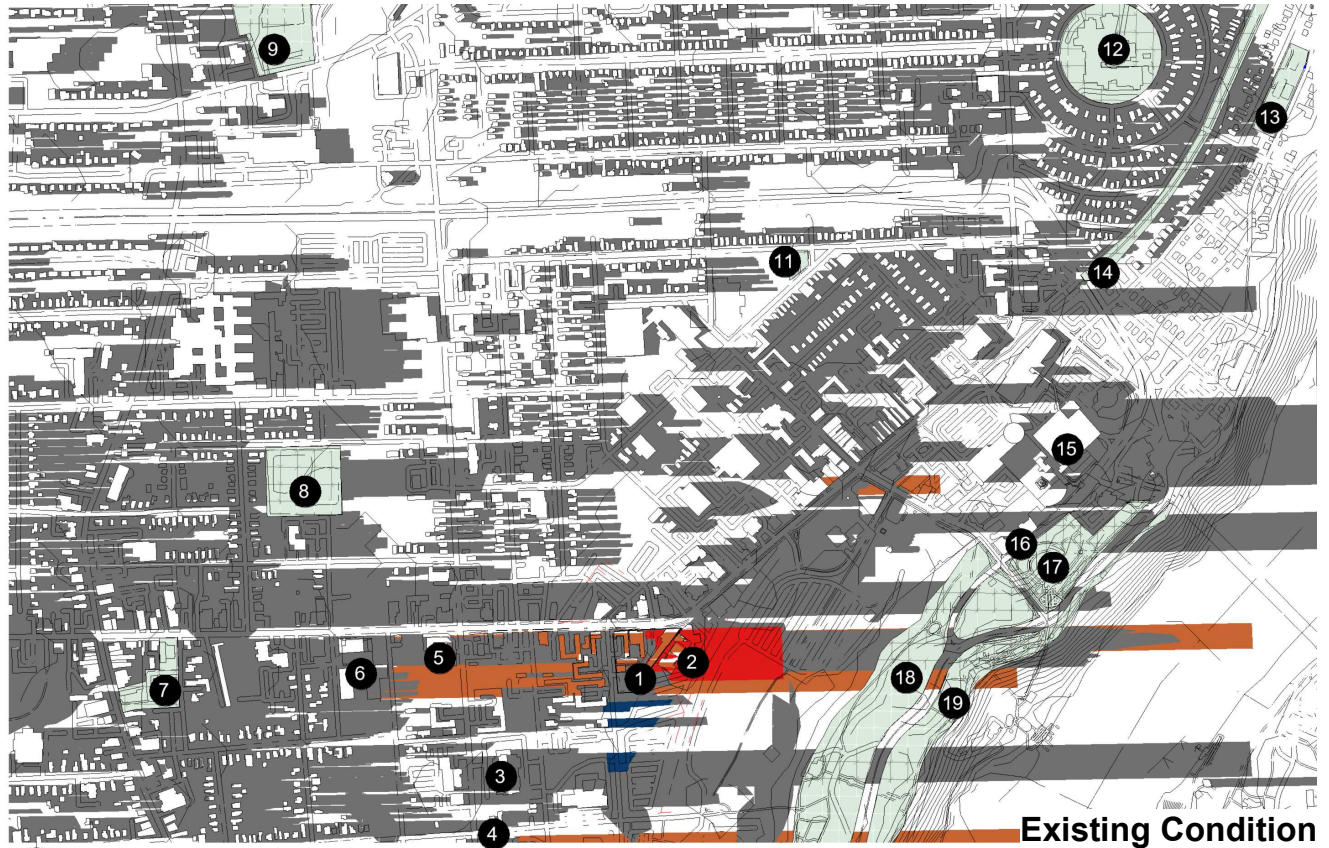
- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows








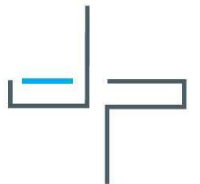


-  As of Right Shadow
-  Existing Shadows
-  Existing Site Building Shadows
-  Net New Shadows
-  Approved but unbuilt Shadows





- | | | |
|--|--|--|
|  As of Right Shadow |  Existing Shadows |  Existing Site Building Shadows |
|  Net New Shadows |  Approved but unbuilt Shadows | |

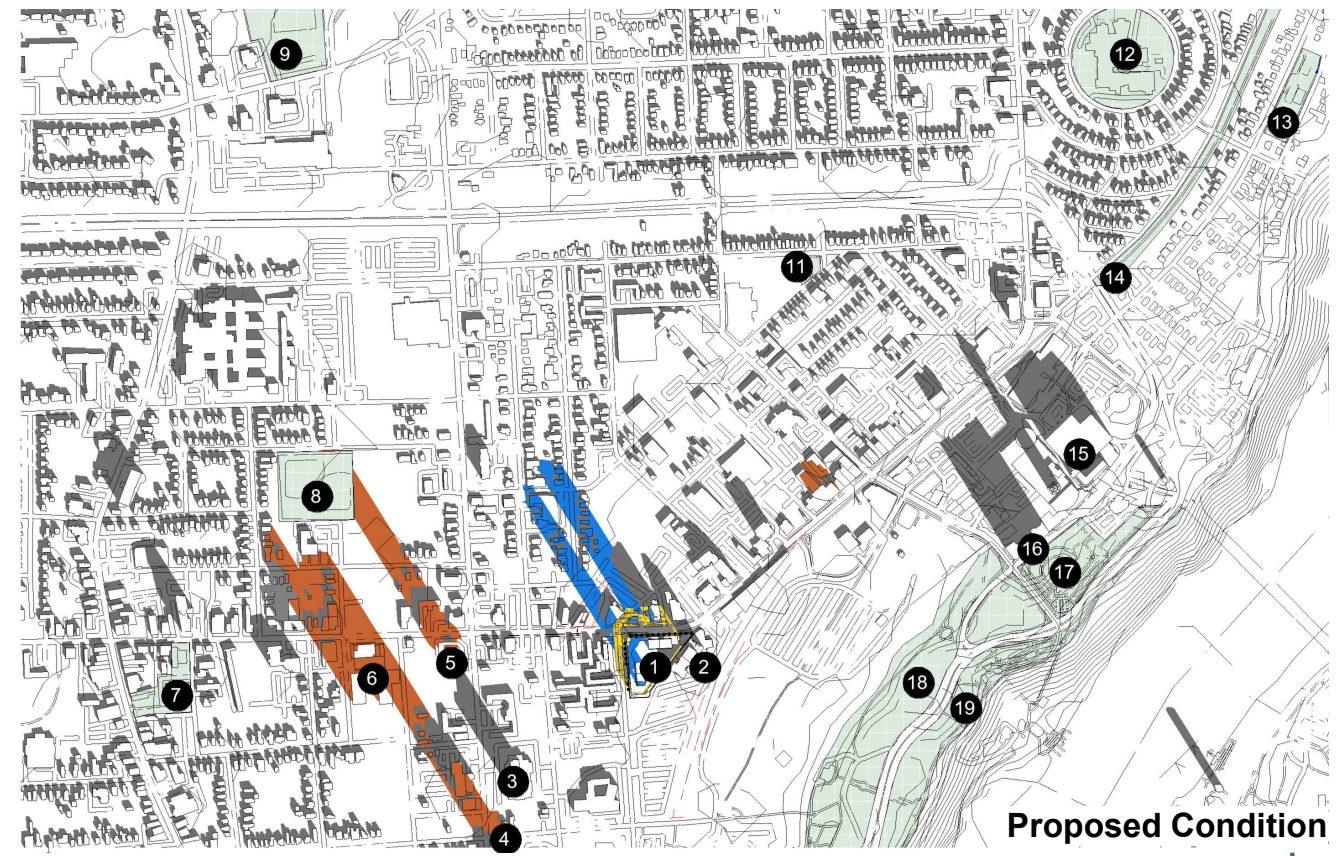


December 21

10:00 am - Sunrise +2.25hr

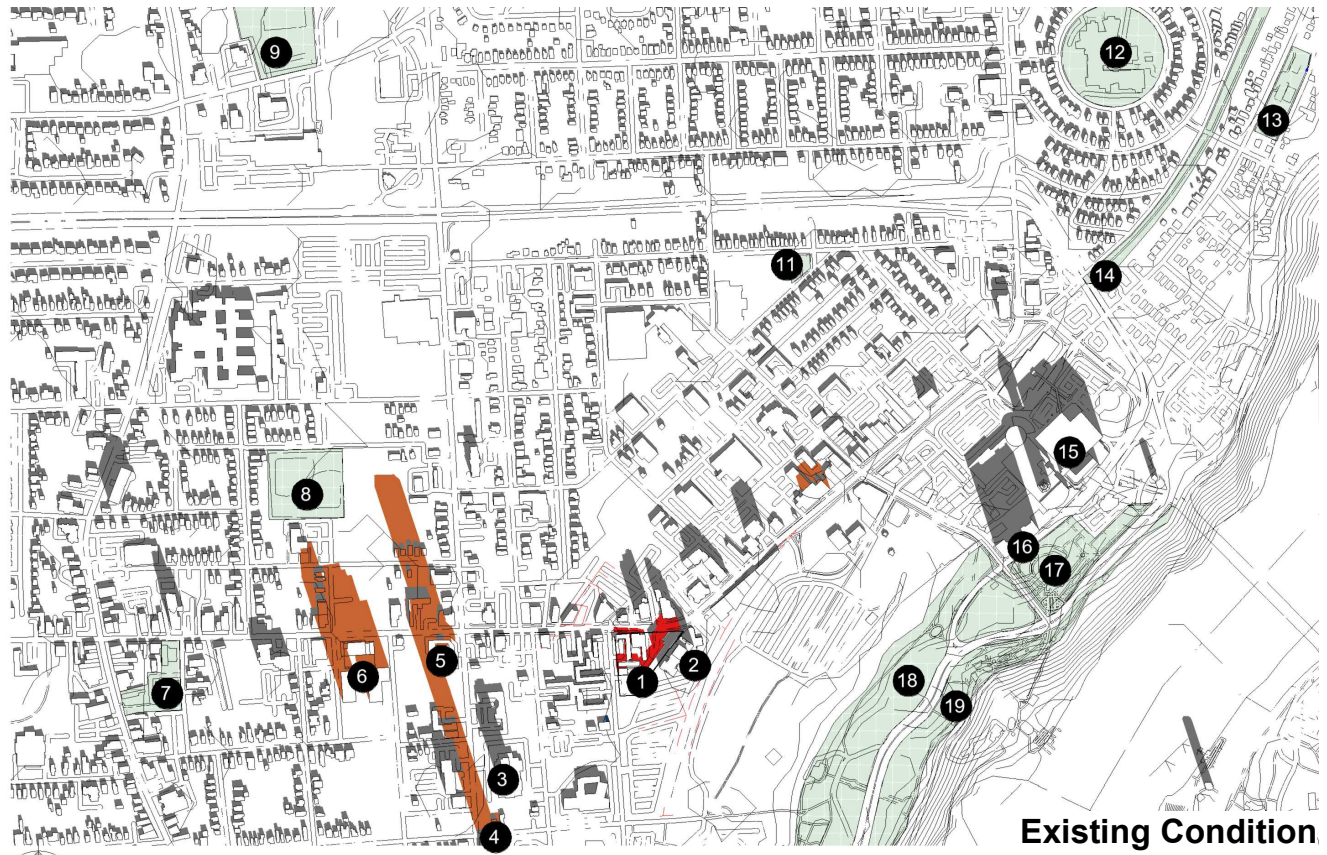


Existing Condition

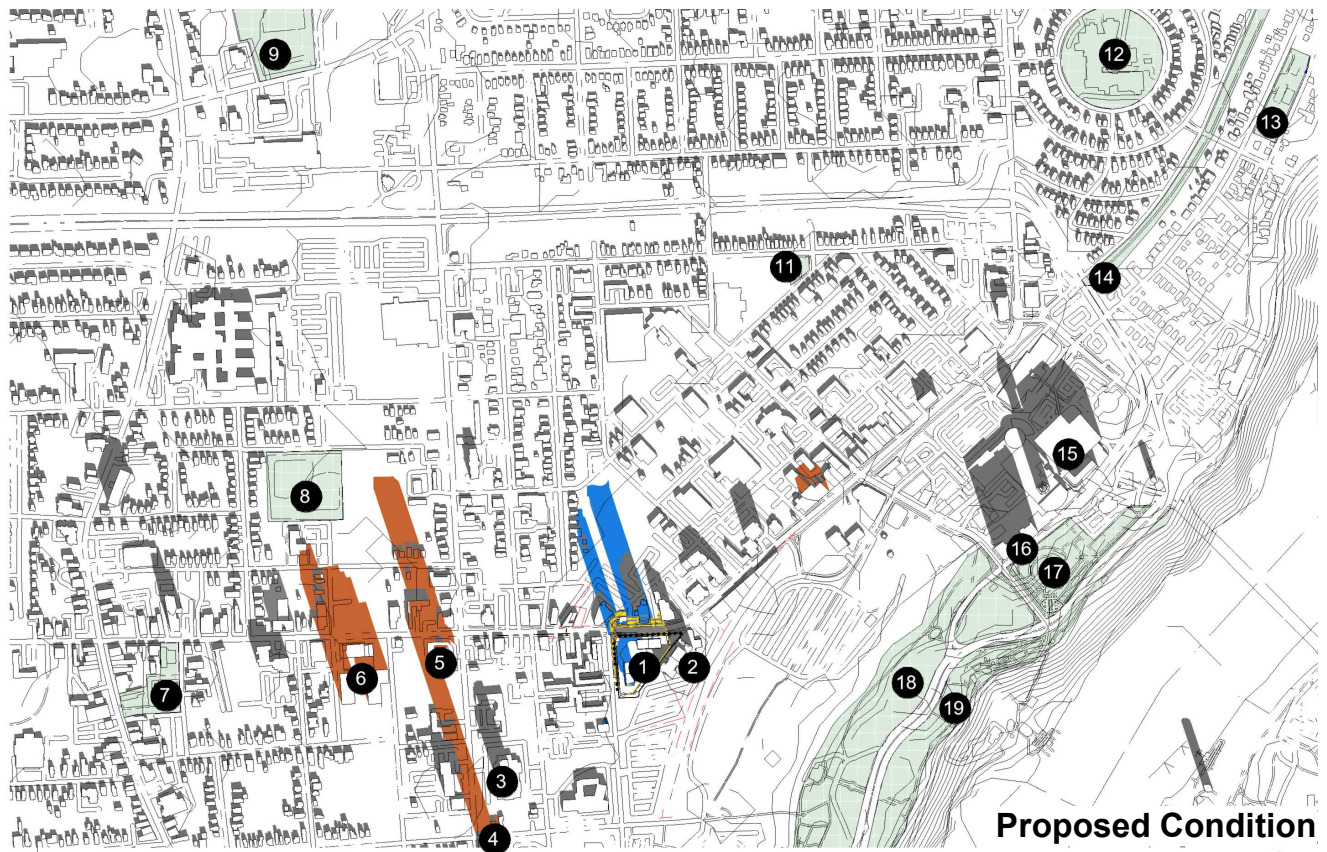


Proposed Condition



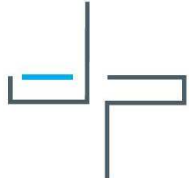


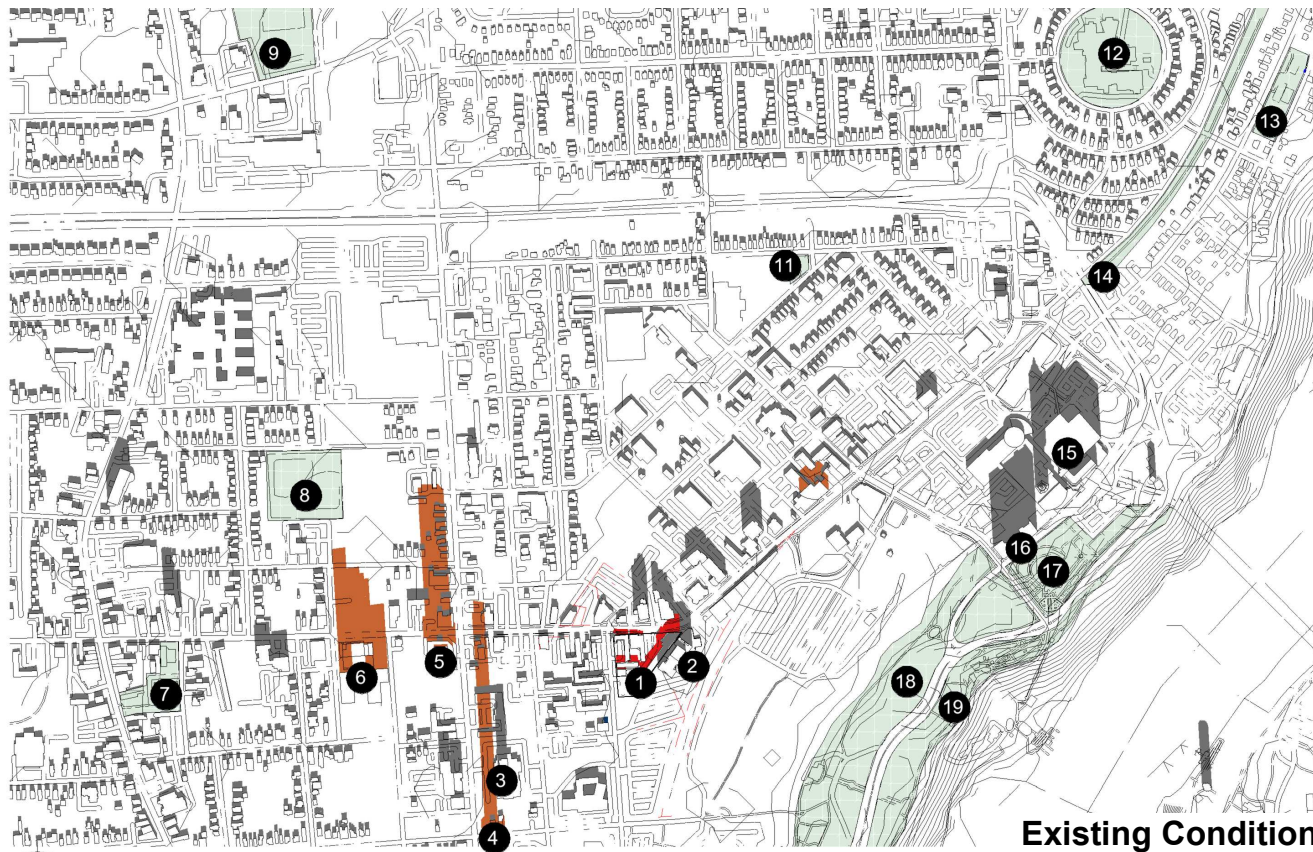
Existing Condition



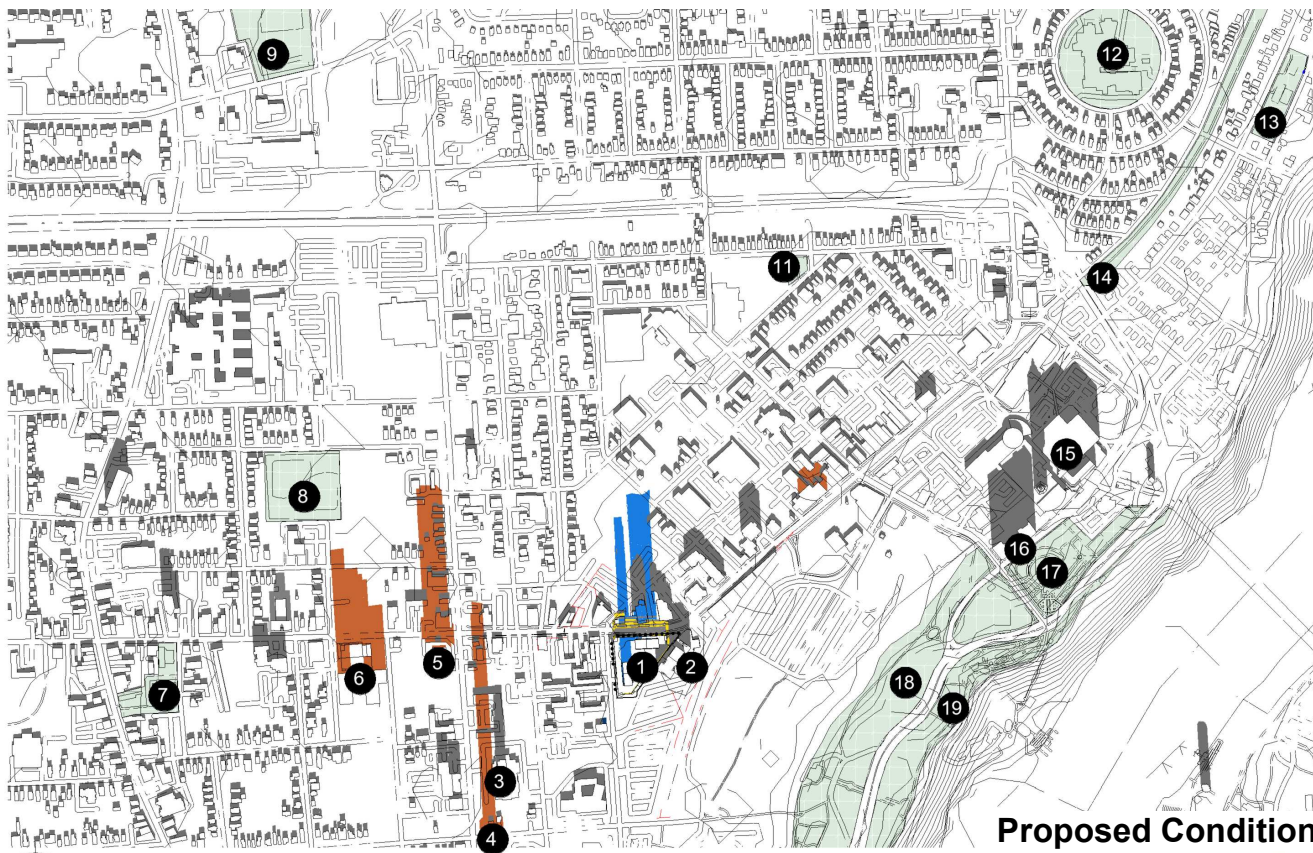
Proposed Condition

- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows



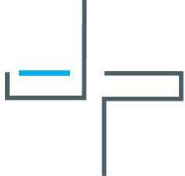


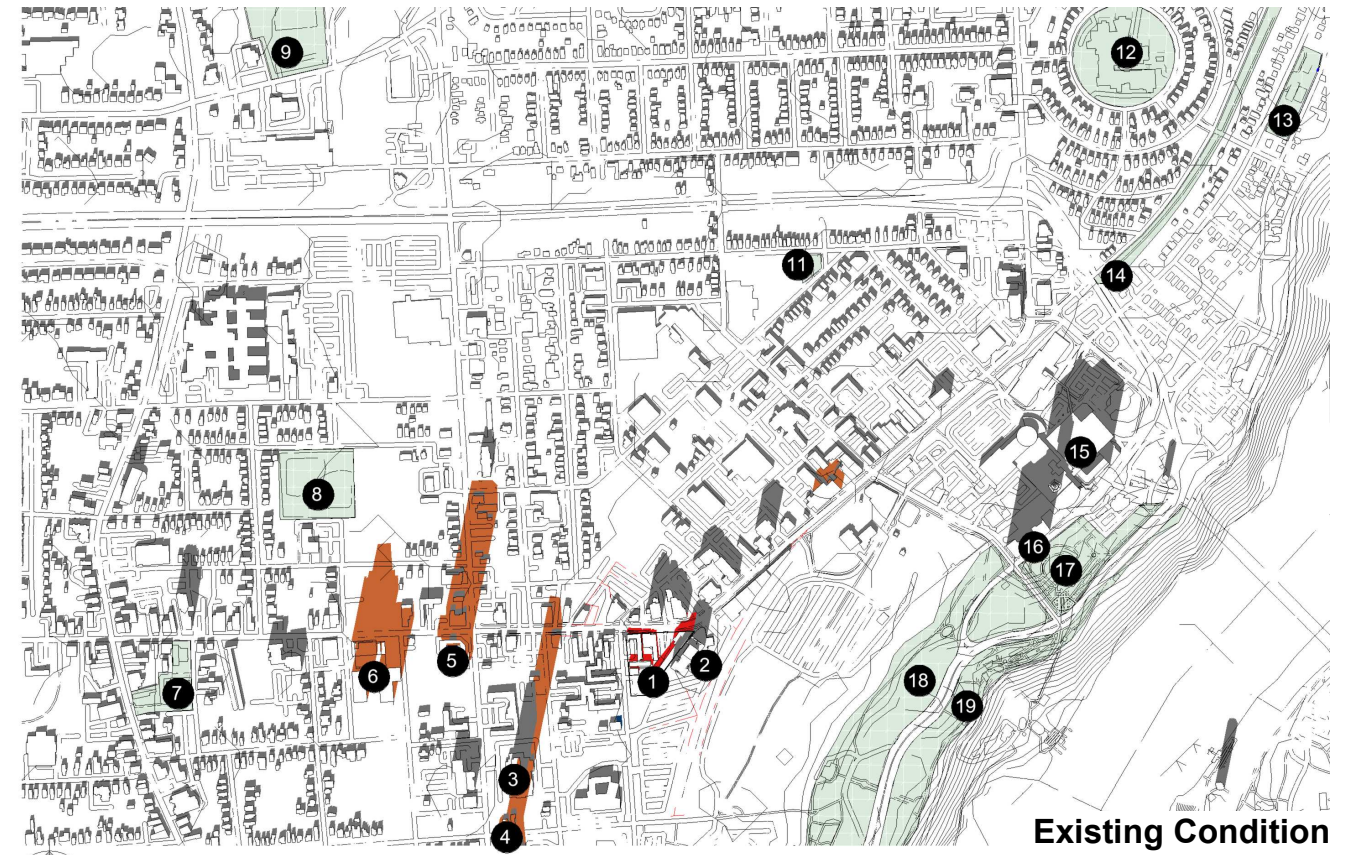
Existing Condition



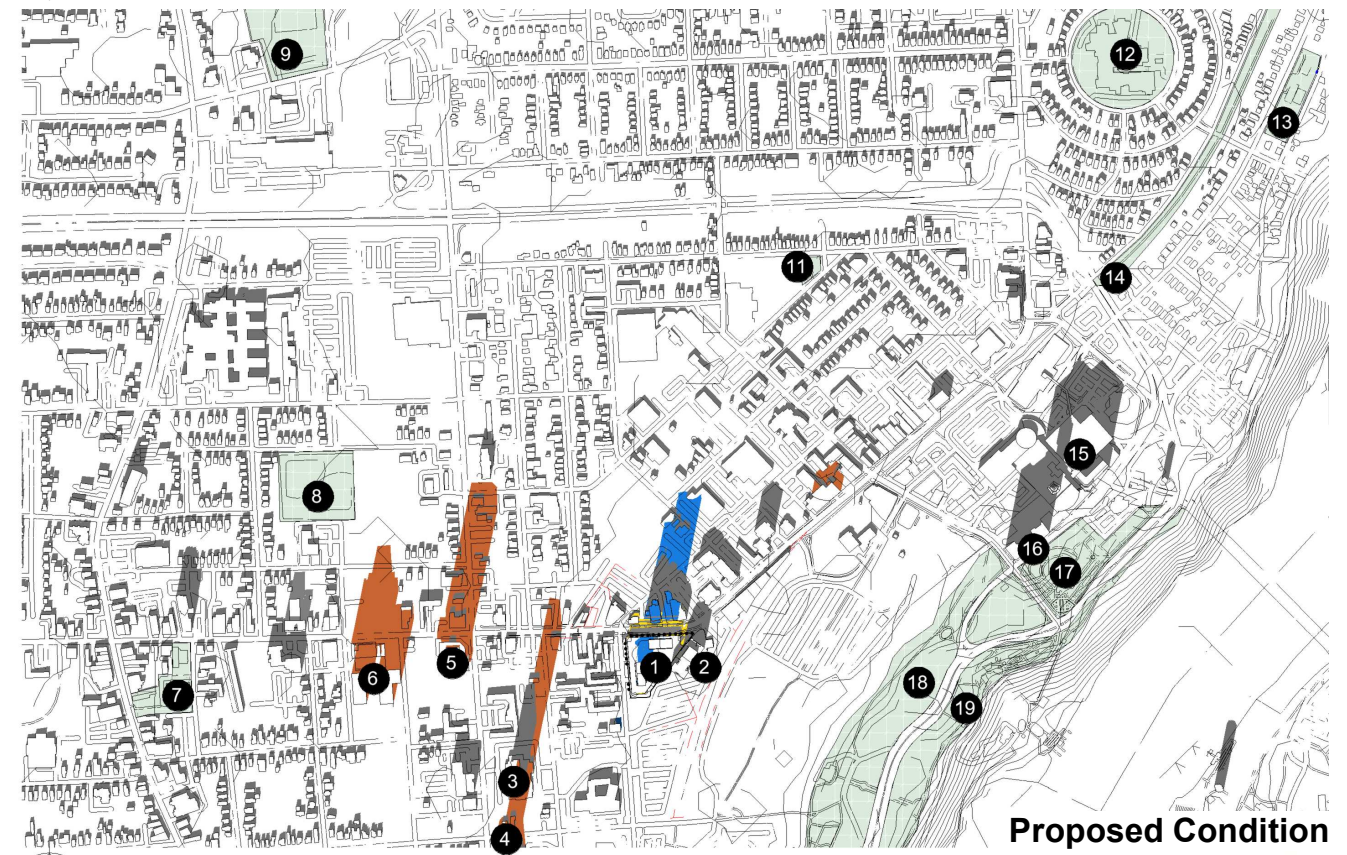
Proposed Condition

- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows



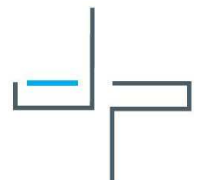


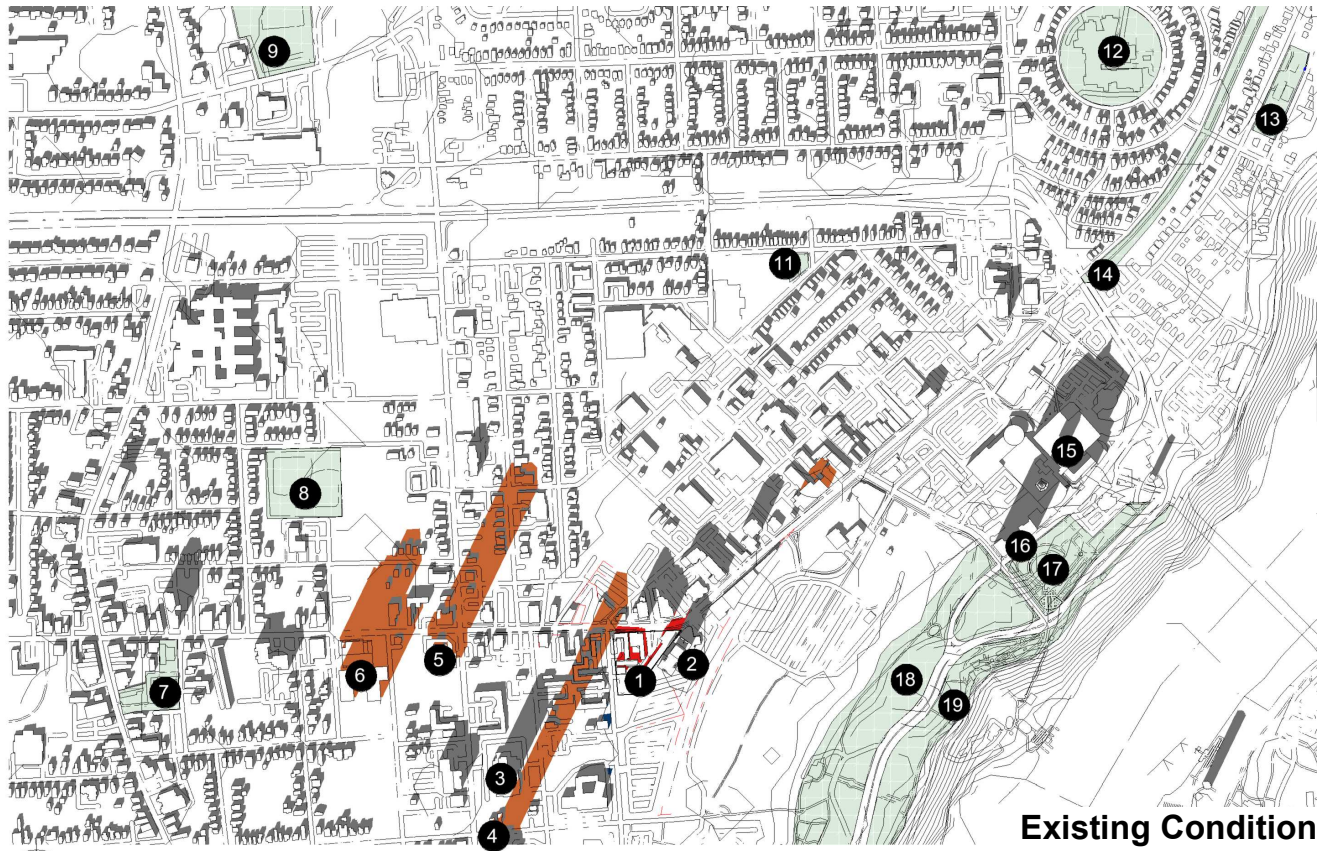
Existing Condition



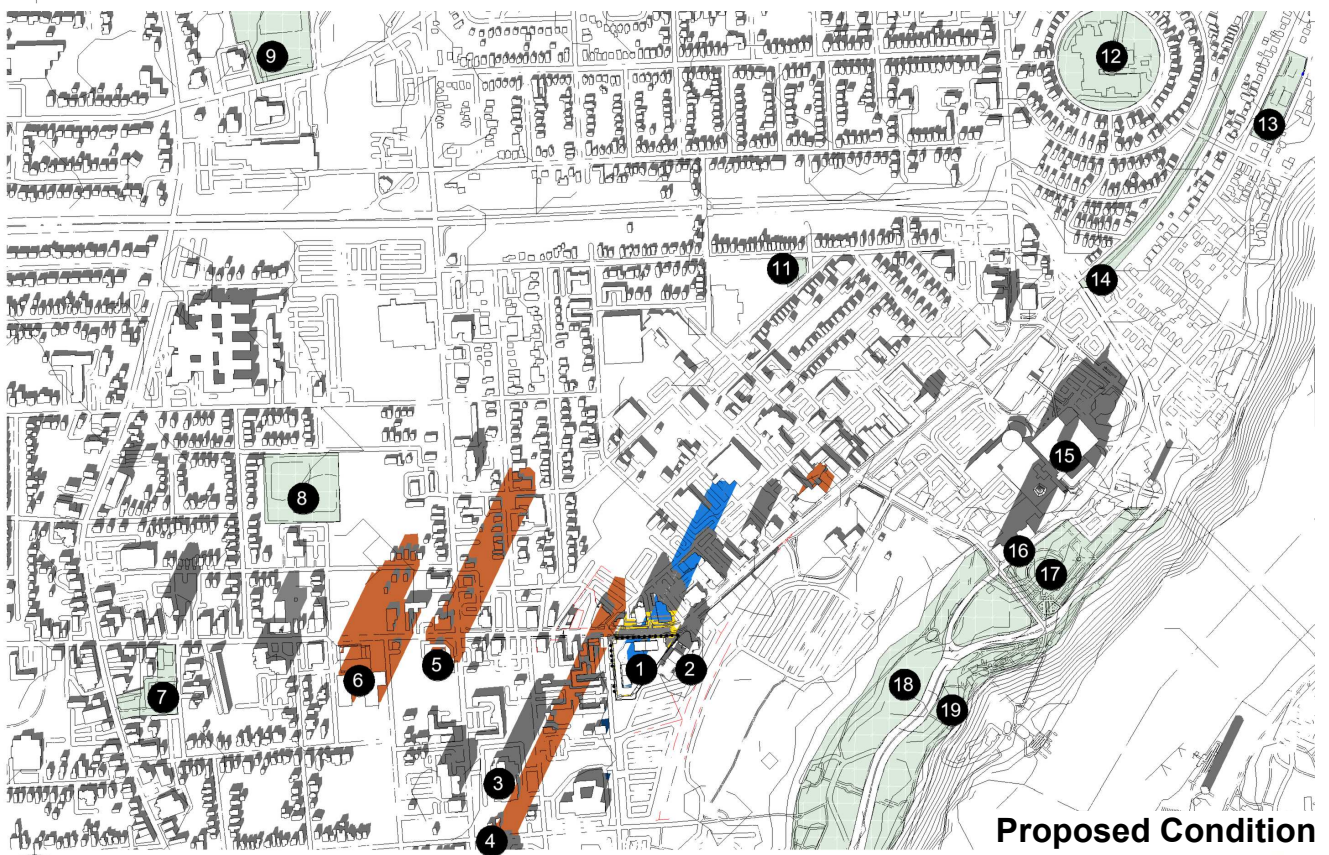
Proposed Condition

- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows





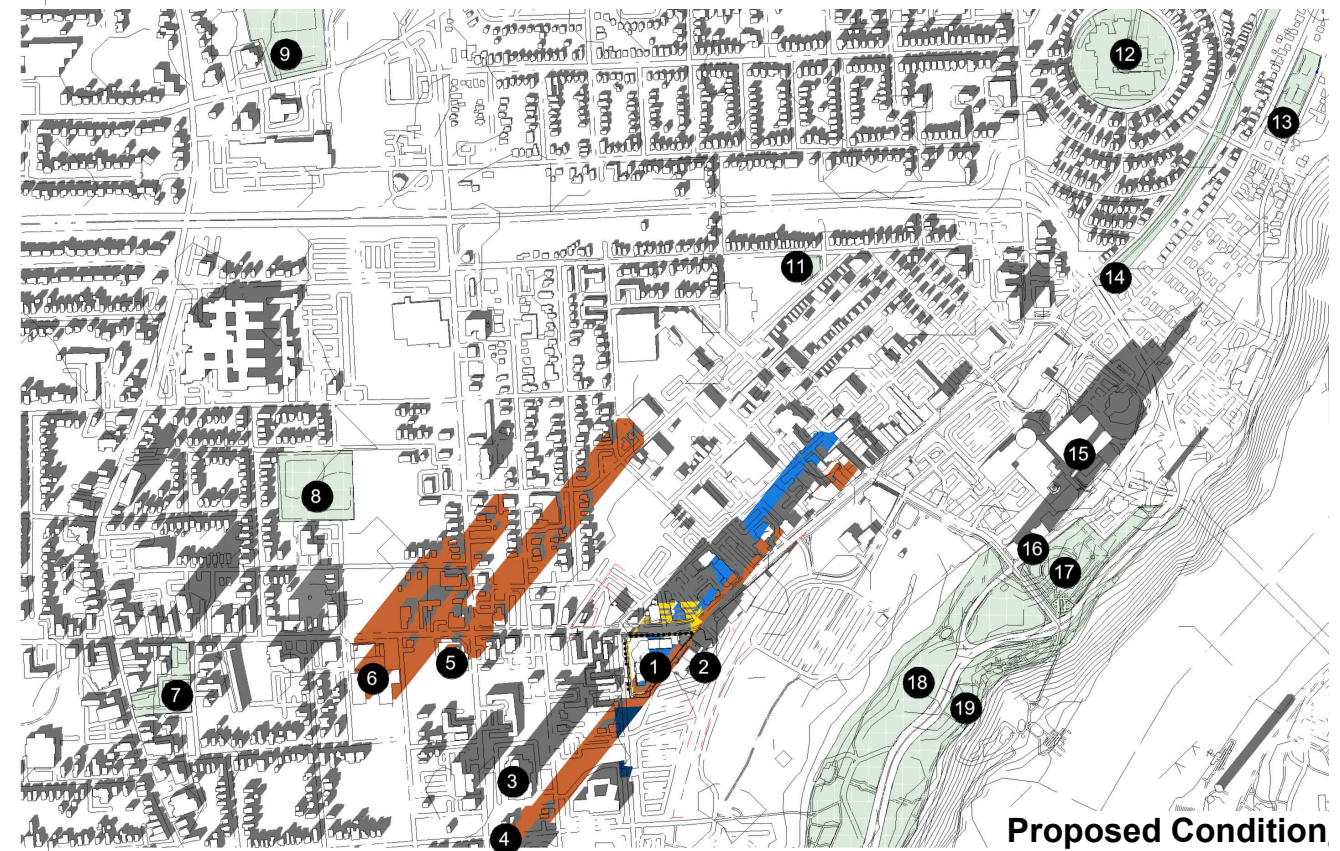
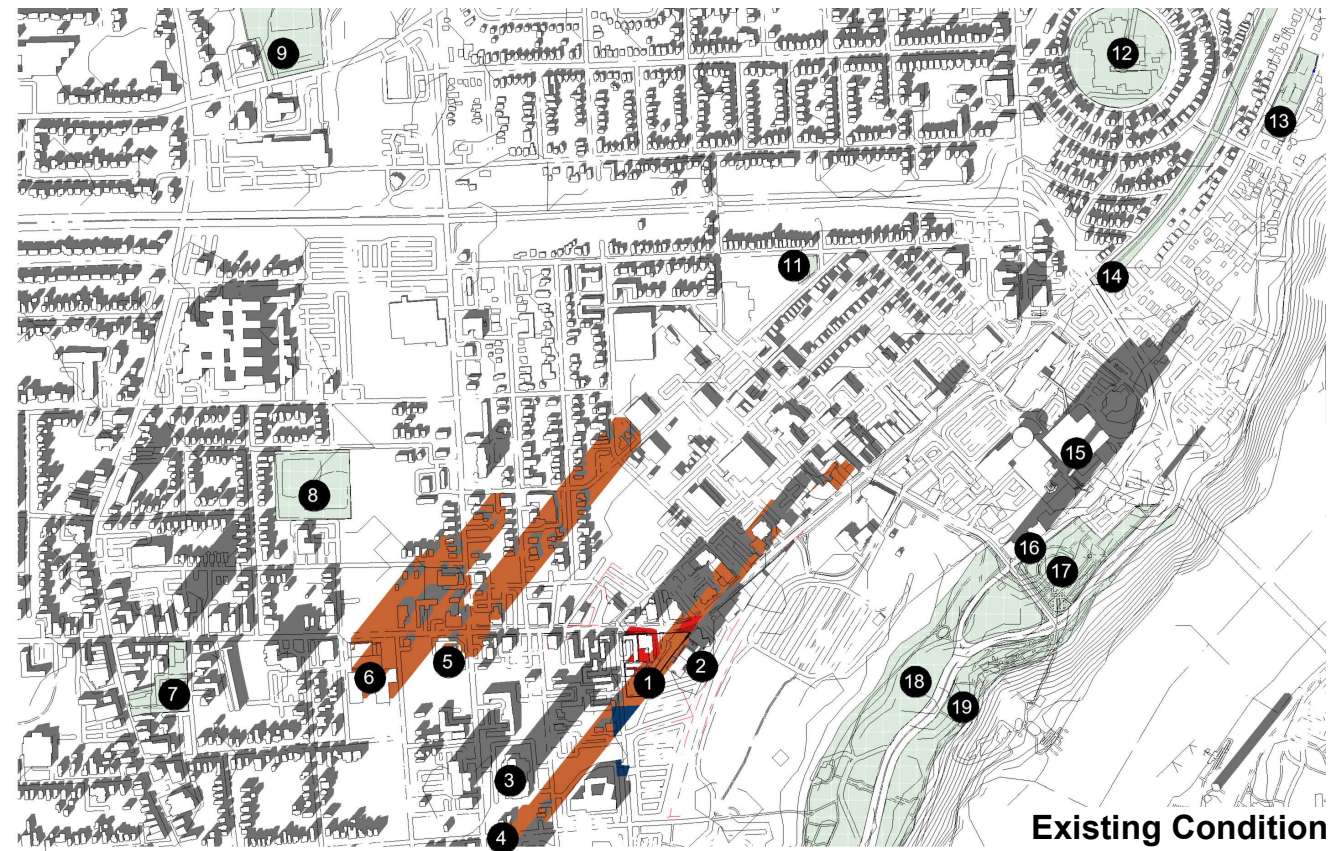
Existing Condition

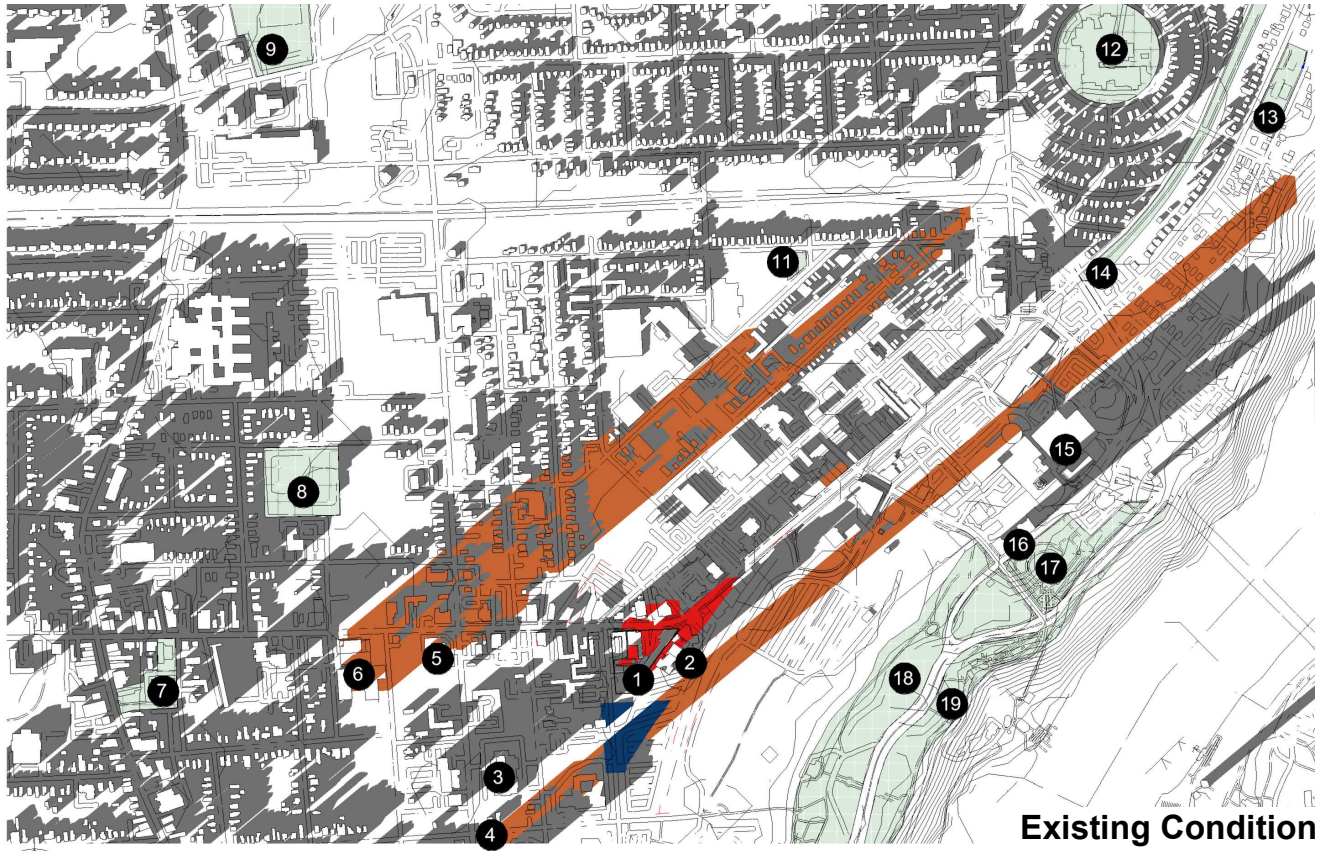


Proposed Condition

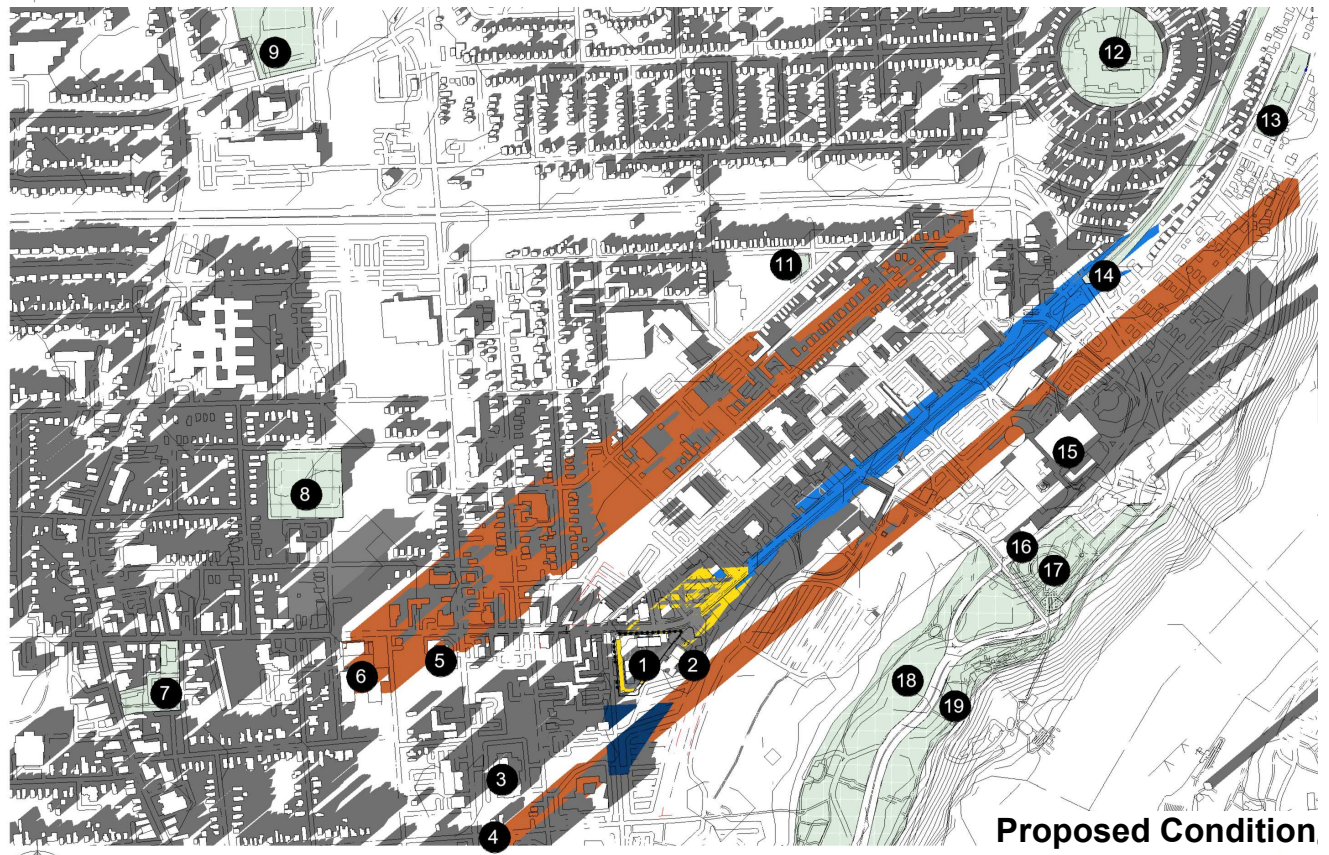
- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows





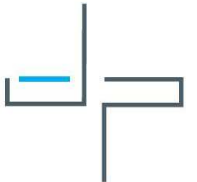


Existing Condition



Proposed Condition

- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows

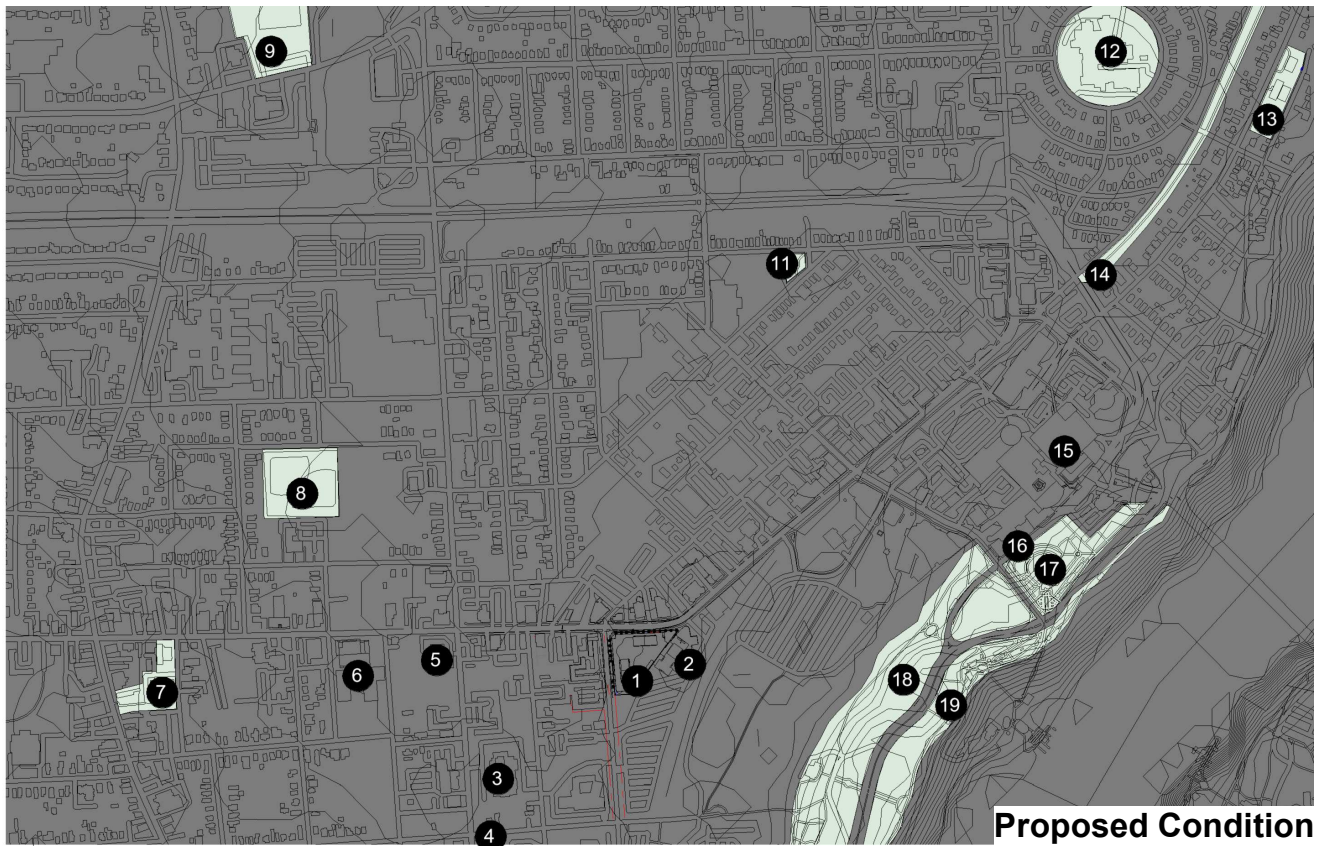
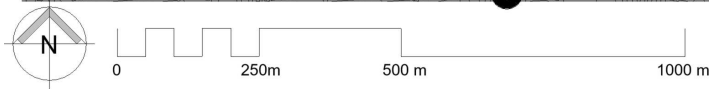


December 21

5:00 pm Sunset +0.25hrs



Existing Condition



Proposed Condition

- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows

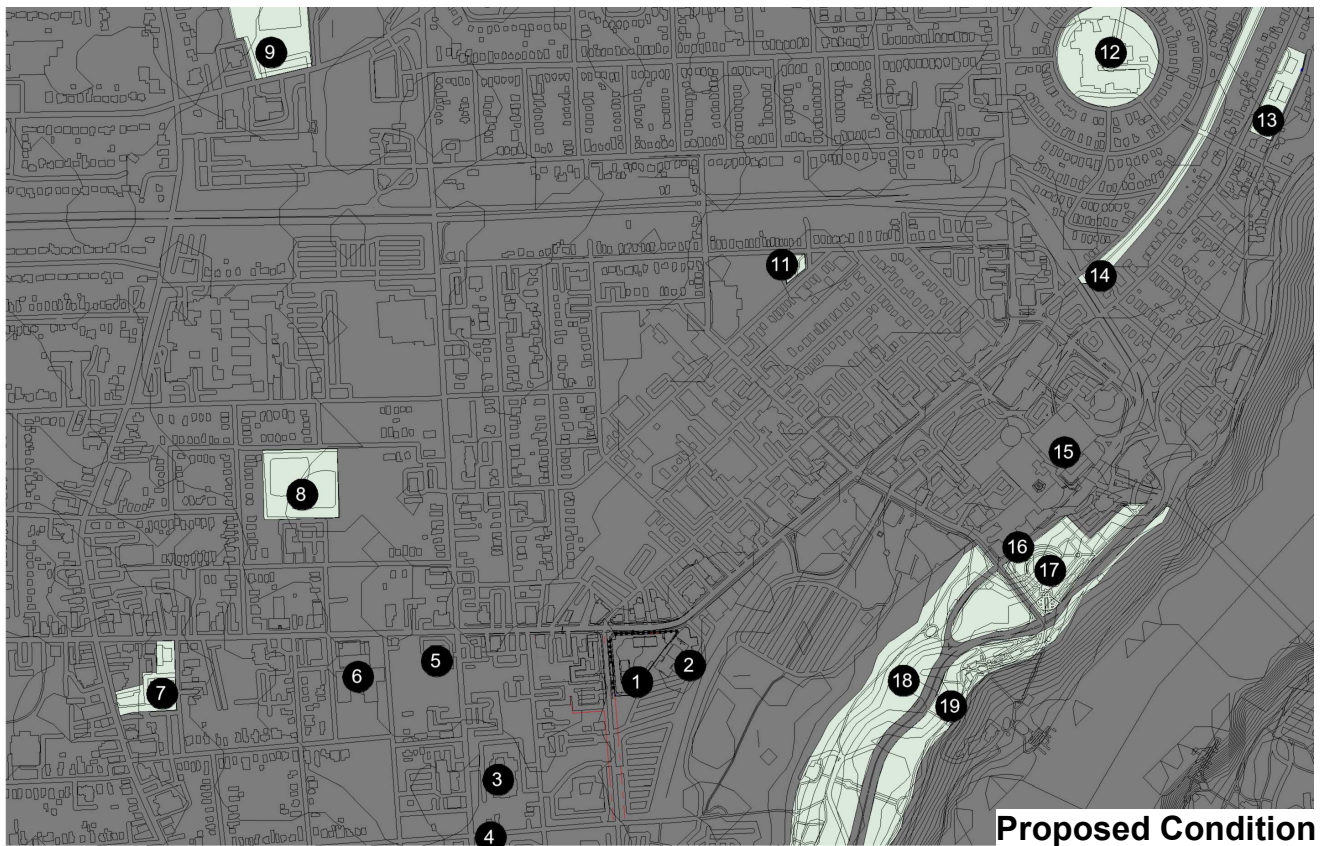
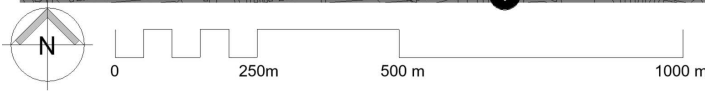


December 21

6:00 pm Sunset +1.25hrs



Existing Condition



Proposed Condition

- As of Right Shadow
- Existing Shadows
- Existing Site Building Shadows
- Net New Shadows
- Approved but unbuilt Shadows

