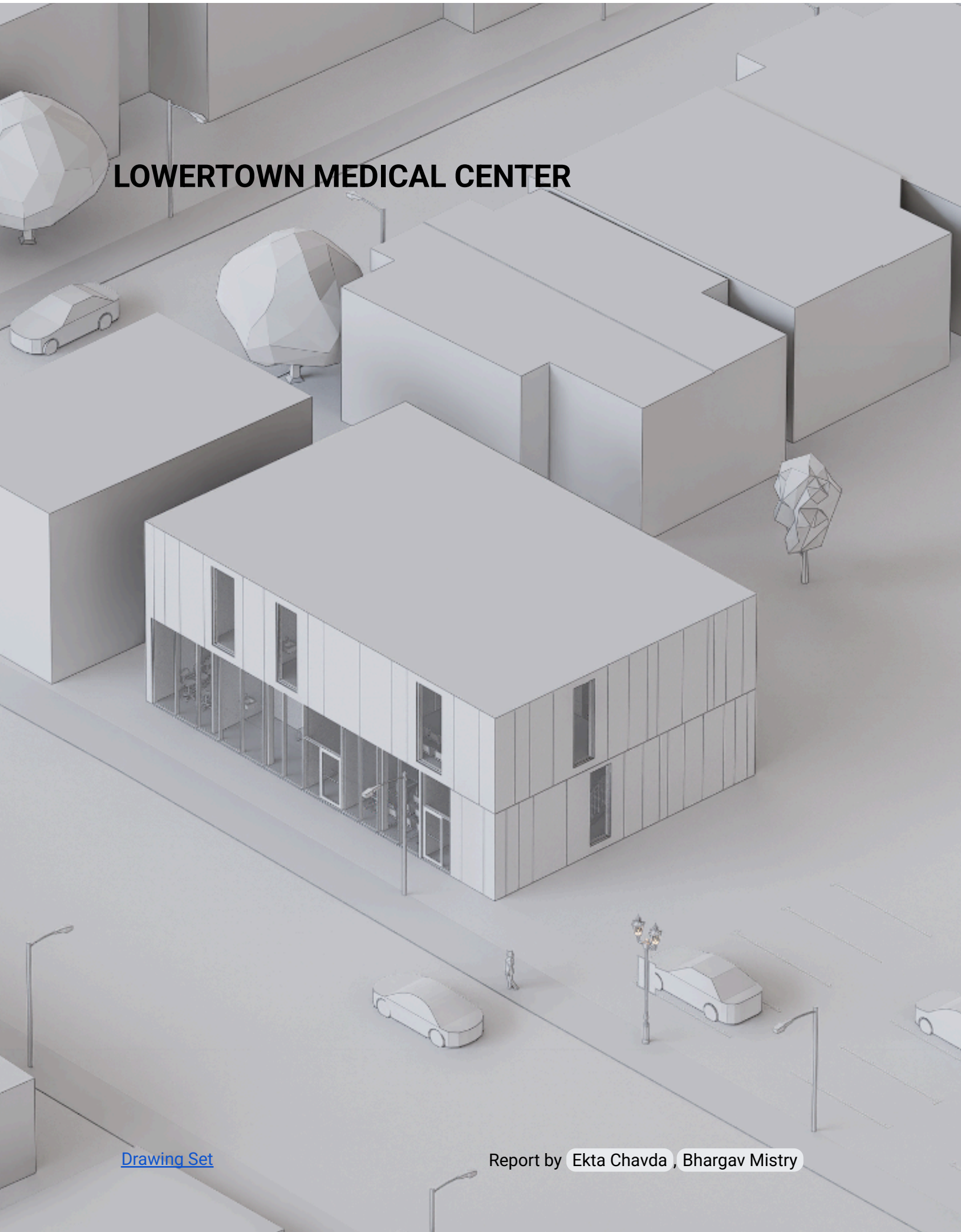
LOWERTOWN MEDICAL CENTER



Drawing Set

Report by Ekta Chavda , Bhargav Mistry

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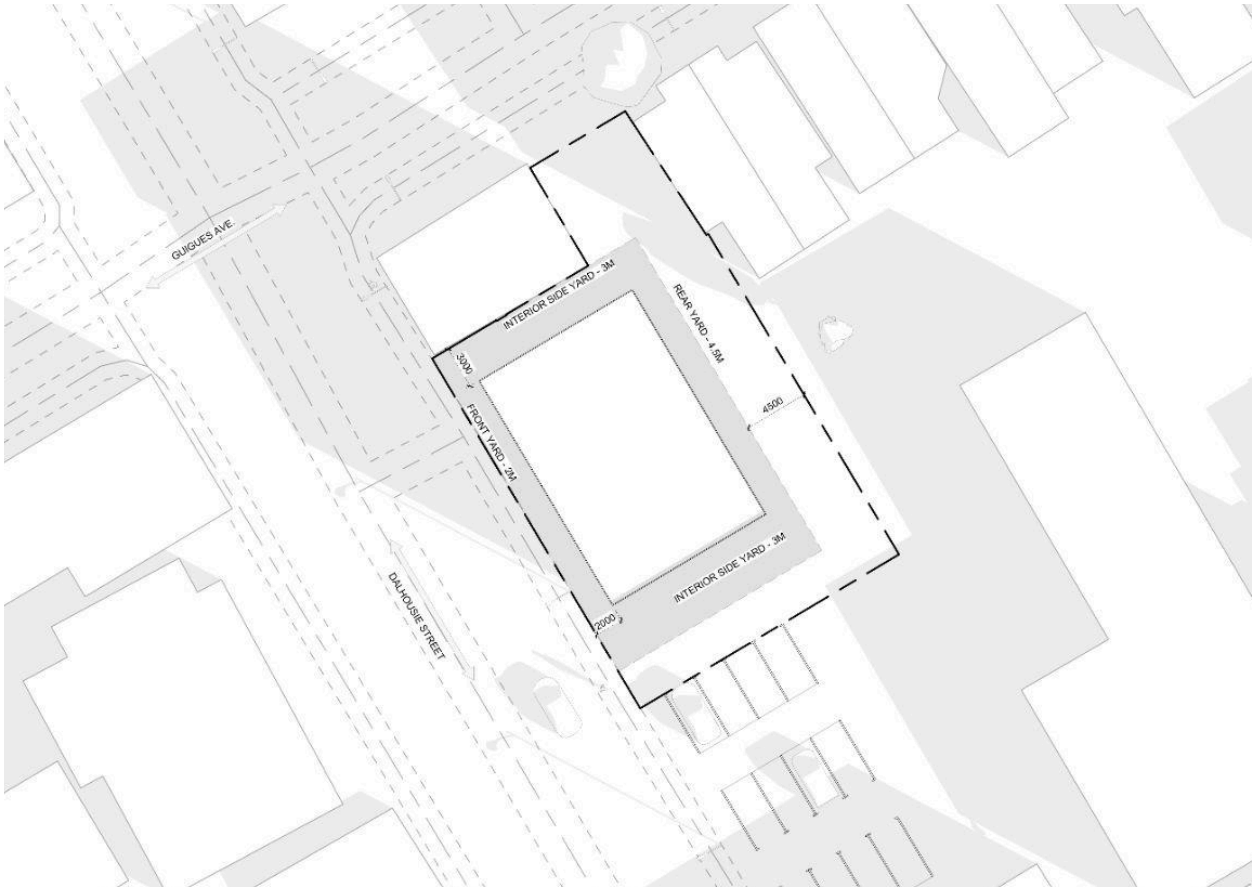
1.1 General Information

Main Address:
245 Dalhousie St



Property Parcel:
Calculated Parcel Area[i]: 661.49 m² (7120.25 ft²) (0.07 ha)

Solid Waste Collection:
Waste Contractor: City
Zone: 3

Pickup Day/Calendar: **TUESDAY/A**
Garbage and Recycling Collection Calendar
Ward Information:
Number: 12
Ward Name: **Rideau-Vanier**
Councillor Name: **Stéphanie Plante**

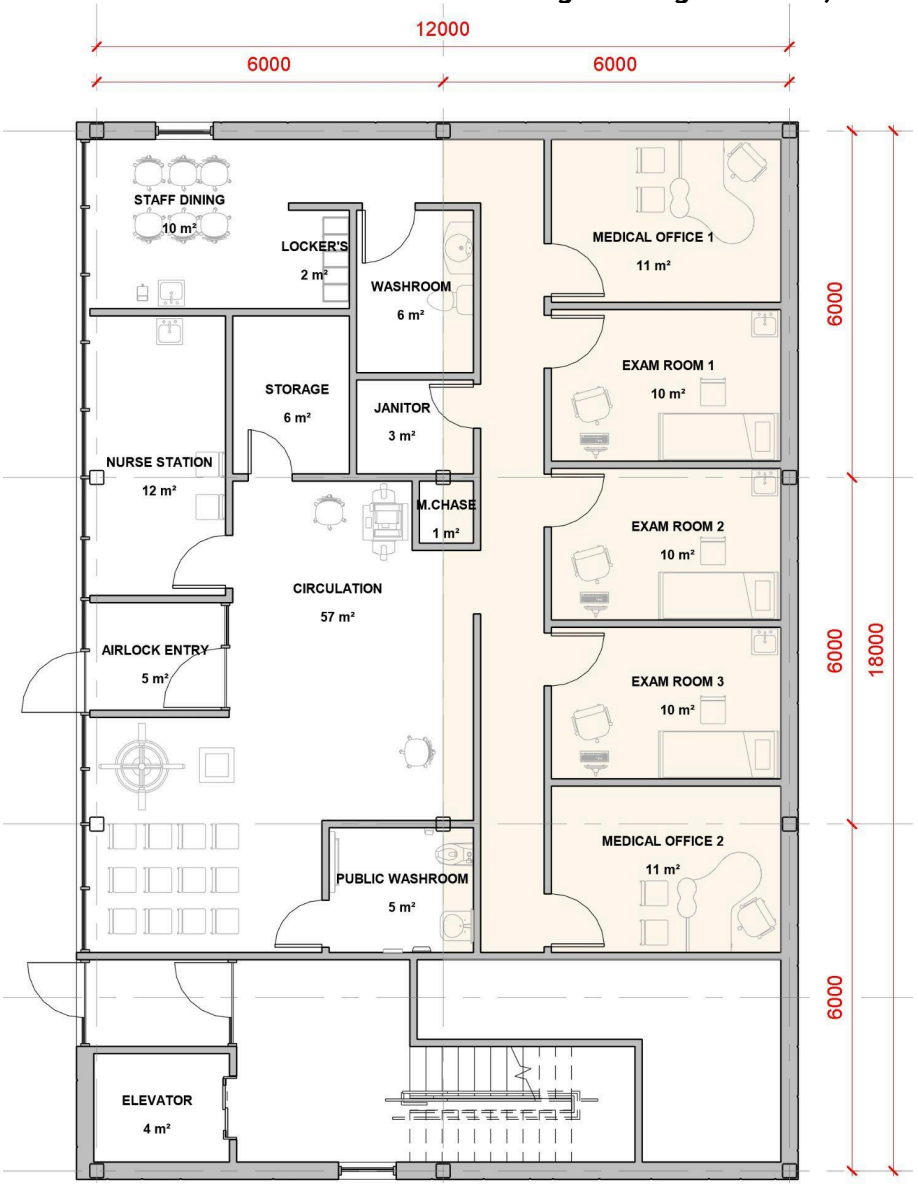
Building Height: **2 Storey**
Applicable part of the Code: **Part 9**

Occupancy Type

Major occupancy is **Group D** (Medical Offices), **Business and Personal Services Table 9.10.2.1(1), OBC 3.1.2.1(1).9**
Subsidiary occupancy is **Group D** (Medical Facility) **Business and Personal Services Table 9.10.2.1(1), OBC 9.10.2.3(1)**

197. In the TM Zone: Permitted Non-Residential Uses

(1) The following non-residential uses are permitted subject to: **(a)** the provisions of subsections 197(3) to (14); (By-law 2019-410) **(b)** where in a commercial or mixed use building and located on the **ground floor abutting a street having direct pedestrian access to that street**, residential, **office** and research and development centre uses **must not be located within a depth of six metres of the front wall of the main building abutting the street;**



1.2 Building Classification

The Building is classified under **3.2.2.65 Group D**, up to **2 storeys sprinkled**. The building is allowed to be of **noncombustible or combustible construction**.

1.3 Fire Separation and Fire Resistance Ratings

Article OBC 9.10.3.1(1)
Where a fire-resistance rating or a fire-protection rating is required in this section for an element of a building, such rating shall be determined in conformance with methods of **Part 3, SB-2**.
Article OBC 9.10.3.2
(1) Where a flame spread rating is required for a building element, such rating shall be determined following the test methods described in **Part 3 and SB-2**.

(2) Unless the flame-spread rating is referred to in this Part as a “surface flame spread rating”, it shall be applied to any surface of the element being considered that would be exposed by cutting through it as well as to the exposed surface of the element.

Article OBC 9.10.3.3
(1) Floor, Roof, and Ceiling assemblies shall be rated for exposure to fire on the underside.
(2) Exterior Walls shall be rated for exposure to fire from inside the building, except that such walls need not comply with the temperature rise limitations required by the standard tests referred to in **Article 9.10.3.1**. If such walls have a limiting distance of **not less than 1.2m**, and due allowance is made for the effects of **heat radiation** following the requirements in **Part 3**.
(3) Firewalls and interior vertical fire separations required to have a fire-resistance rating shall be rated for exposure to fire on each side.

Article OBC 9.10.3.4
(1) Where a ceiling construction has a suspended membrane ceiling with lay-in panels or tiles that contribute to the required fire-resistance rating, hold-down clips or other means shall be provided to prevent the lifting of such panels or tiles in the event of a fire.

Article OBC 9.10.4.4
(1) Rooftop enclosure provided for elevator machinery, stairway, or service rooms, used for no purpose other than for service to the building, shall not be considered as a storey in calculating the building height.

Article OBC 9.10.4.4
(2) A wall or ceiling membrane forming part of an assembly required to have a fire-resistance rating is permitted to be pierced by openings for electrical and similar service outlet boxes,

provided such outlet boxes and the penetrations conform to **Table 9.10.9.8 Penetration by outlet Boxes or Service Equipment in Concealed Spaces.**

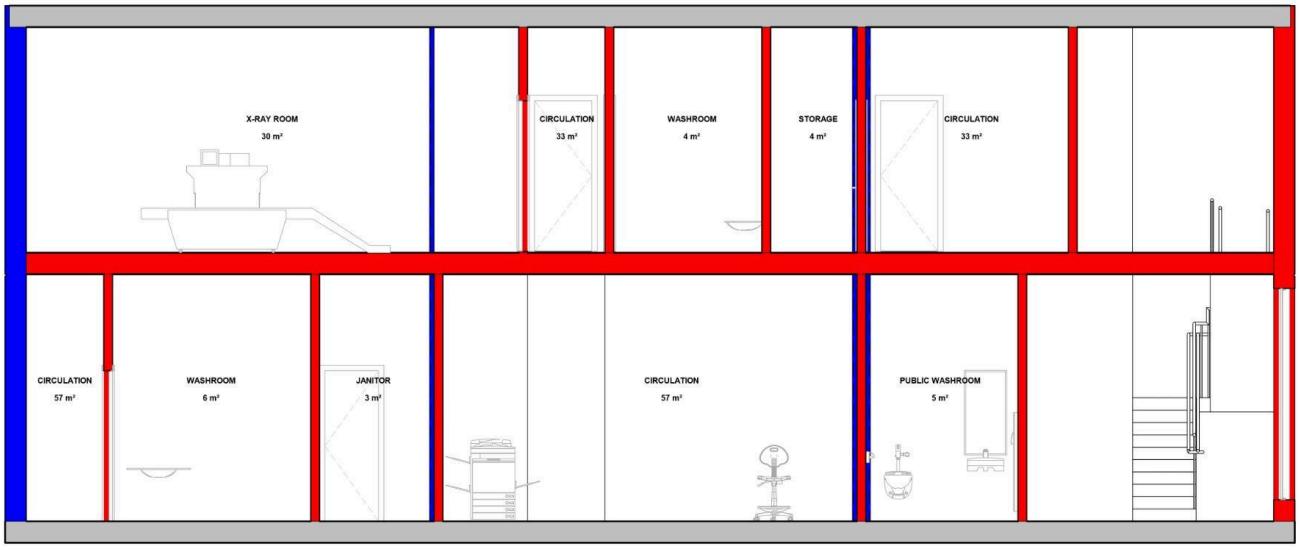
Article 9.10.9.15(2) & Article 3.3.1.4(3)
If a storey is sprinkled, no fire-resistance rating is required for fire separation between a public corridor and the remainder of the storey provided the corridor does not serve care, care and treatment, detention, or residential occupancy.

Article 9.10.13.3
(1)Doors required to provide a 20 min fire-protection rating or permitted to be 45 mm solid core wood shall be mounted in a wood frame of at least 38mm thickness where the frame has not been tested and rated.

Article 9.10.13.10
(2) **Self-closing devices** are **not required** between public corridors and suits in business and personal service occupancies, except in,

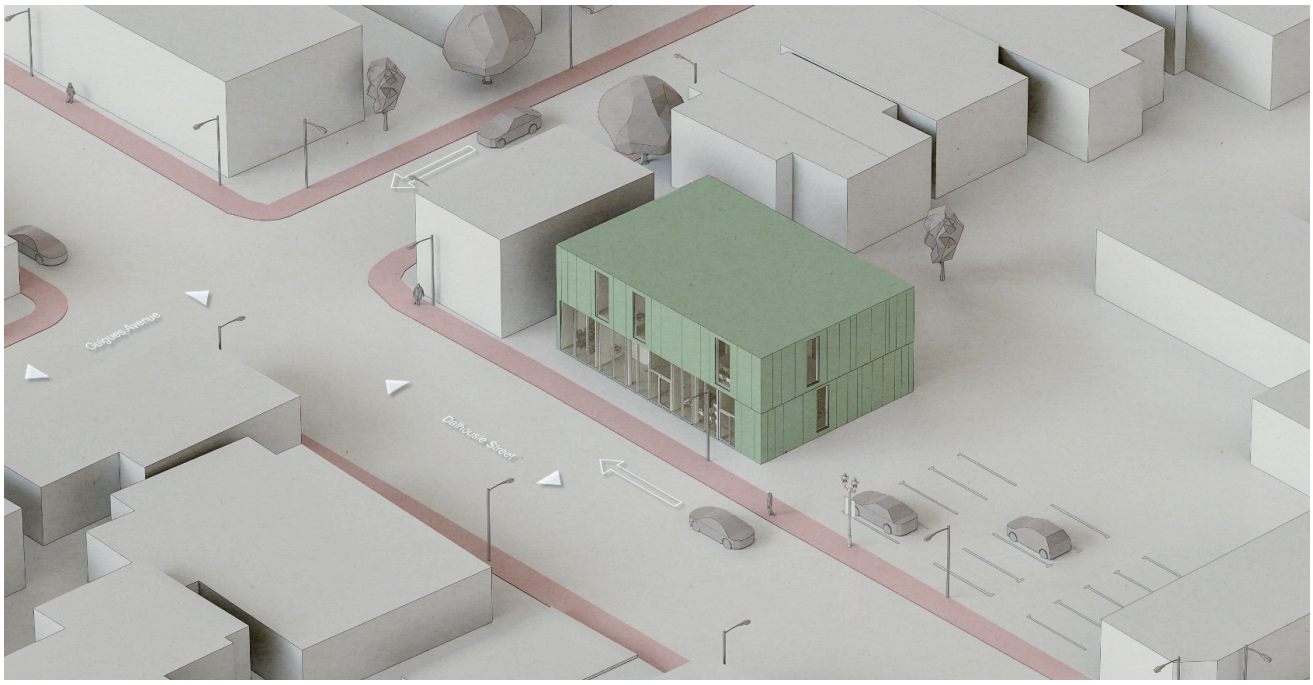
(a) Dead-end corridor in,
(b) A corridor that serves a hotel.

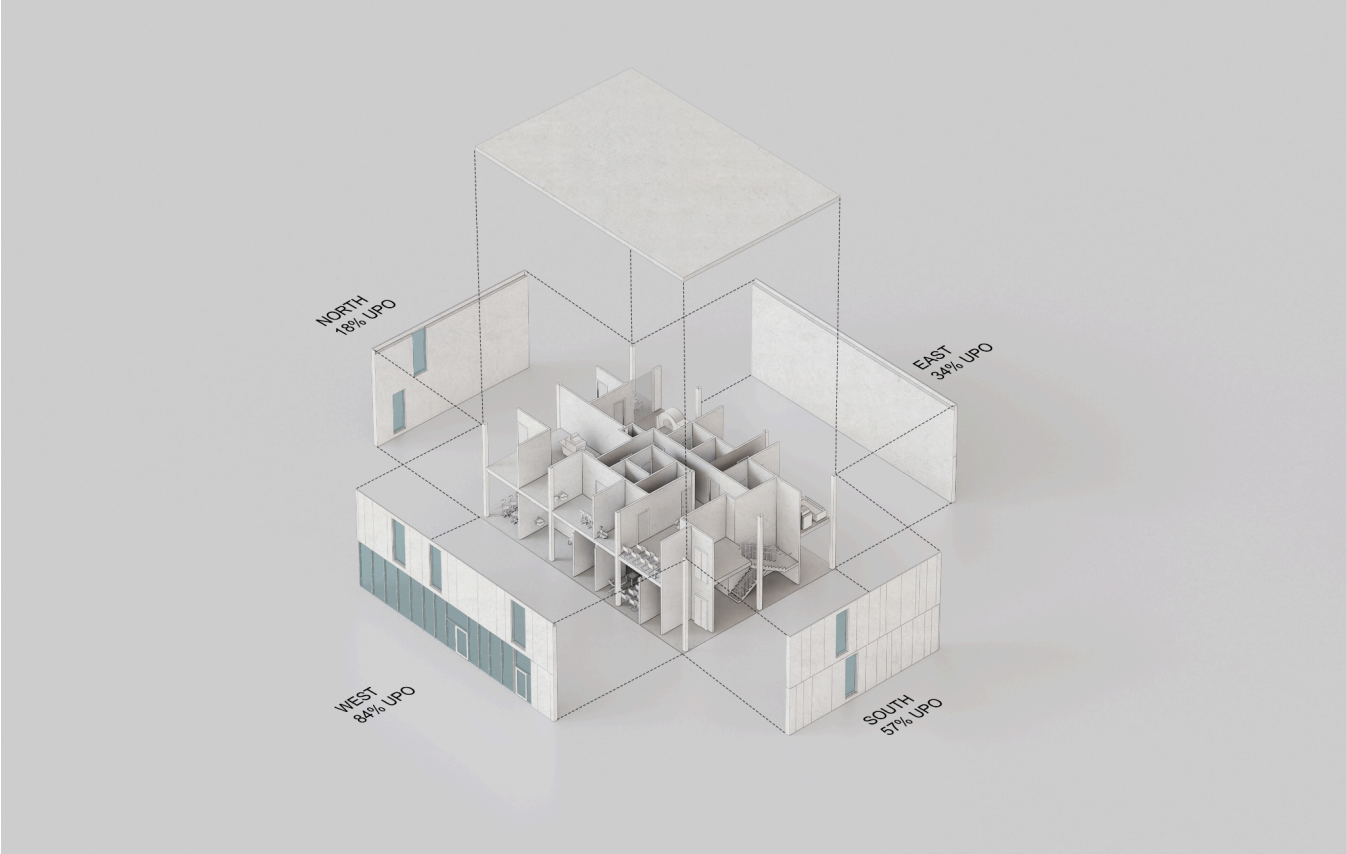
Item	Fire Resistance Rating	Fire Separations	Code Reference
Roof	-	No	9.10.8.7(1) Table 9.10.8.1
Floor Assemblies	45 min	Yes	Table 9.10.8.1
Load-bearing walls and columns	45 min	Yes	9.10.8.3(1)
Exit Stairs	45 min	Yes	9.9.4.2.(1)
Elevator Shaft	45 min	Yes	9.10.1.3(1) 3.5.3.1(1), Table 3.5.3.1
Vertical Service Shaft (Mechanical Shaft)	45 min	Yes	9.10.1.3(7) 3.6.3.1(1) Table 3.6.3.1
Janitor's Room	-	No	9.10.8.11(1) 3.3.1.22(3)
Structural Steel Members (Load bear Walls, Columns, Arches)	1hr	Yes	9.10.7.1(1) 3.2.2.3 3.2.3.9(1)



1.4 Spatial Separation

Article 9.10.14.2
(1) The area of an exposed building face shall be,
(b) calculated as,
(ii) the area of each fire compartment, where a building is divided into fire compartments by fire separations with a fire-resistance rating of not less than 45 minutes.

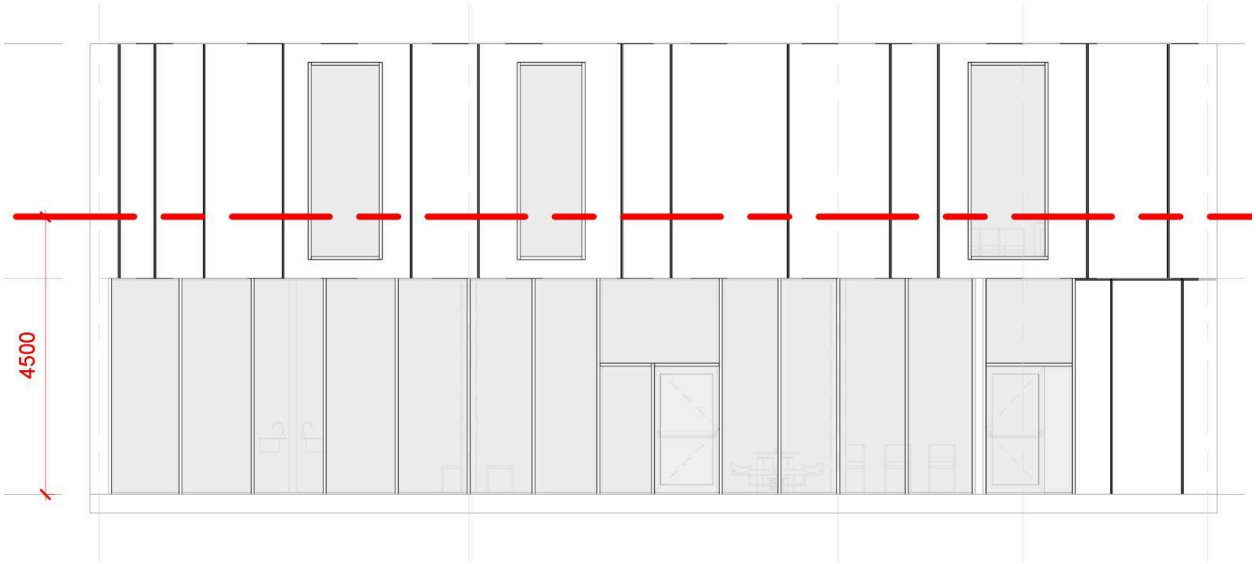




Elevation	Floors	Area of EBF (sq.m)	L.D (m)	% Permitted max. Unprotected opening (Table 9.10.14.4)	FRR (Table 9.10.14.5)	Type of construction	Type of Cladding
North	1st	50	3	18	1hr	Non combustible or Combustible	Non combustible
	2nd	50	3	18	1hr		
South	1st	50	7	57	45 min		Non combustible or Combustible
	2nd	50	7	57	45 min		
East	1st	80	6	34	45 min		
	2nd	80	6	34	45 min		
West	1st	80	11	84 50 (A)	45 min		
	2nd	80	11	84	45 min		

Additional requirements according to Geo Ottawa bylaw provisions.
A_197. In the TM Zone: Permitted Non-Residential Uses

(1) The following non-residential uses are permitted subject to:
(c) a minimum of **50%** of the ground floor façade facing the main street, measured from the average grade to a height of **4.5 meters**, must comprise transparent windows and active entrances; and where an active entrance is angled on the corner of the building, such that it faces the intersection of the main street and an intersecting side street, it is deemed to face the main street;(By-law 2015-190). **[Glazing provided 68.68%]**



9.10.17.1 Flame Spread Rating of Interior Surfaces
(1) Except as otherwise provided in this subsection the exposed surface of every interior wall and ceiling, including skylight, and glazing shall have a surface flame spread rating of not more than 150.
(2) Doors need not conform to sentence (1) provided they have a surface flame spread rating of not more than 200.

9.10.17. 2 Ceiling in Exit or Public Corridors
(1) At least 90% of the exposed surface of every ceiling in an exit.

9.10.17.3 Walls in Exit
(2) At least 75% of the wall surface of a lobby used as an exit in article 9.9.8.5 shall have a surface flame spread rating of not more than 25.

1.5 Provision for Firefighting

Fire Department Access to Buildings
According to **OBC 9.10.20.3 & 3.2.5.6(1)**
(1) Access to the fire department equipment shall be provided to each building utilizing a street, private roadway, or yard.
(2) Where access to a building as required by Sentence(1) is provided using a roadway, the design, and location of such roadway or yard shall take into account connection with public thoroughfares, the weight of firefighting equipment, width of roadway, radius of corners, overhead clearance, location of fire hydrants, location of fire department connections and vehicular parking.

According to **Article 9.10.20.1**
(1) A window or access panels are not required to be provided as the building is sprinklered.

1.6 Fire Alarm and Detection System

According to **OBC 9.10.18.2,** a Fire Alarm System is not required.

Major Occupancy Classification	**Occupant Load Above which Fire Alarm System is Required**
Business and personal services, mercantile	150 above or below the first storey

1.7 Standpipe System

According to **OBC 9.10.1.3(9)** and **OBC 3.2.5.8 (1)**, a Standpipe System is not required to be installed in a building less than 3 storeys in height.

1.8 Occupant Load

OBC 3.1.17.1 Occupant Load Determination
3.1.17.1(1)(c) The occupant load of a floor area or part of a floor area, shall be based on the number of persons for which the area is designed for which the area is designed, but not less than that determined from **Article 9.9.1.3(1)(b)(ii) & Table 3.1.17.1** for occupancies other than Assembly or Dwelling Units, unless it can be shown that fewer persons will occupy the area.

Floors	Occupant Load	Water Closet	Barrier Free	Universal	Lavatories
1st Floor	25	2	1	1	2
2nd Floor	25	2	-	-	2

Plumbing Facilities shall be determined by **Article 9.31.1.1 & Article 3.7.4.2(1),** except that the area per person in a **Group D occupancy** shall be **14m².**

According to **Article 3.8.2.3**, a minimum of **1 universal washroom** is required per Building for up to 3 storeys.
According to **Article 3.7.4.2(9)** Where one water closet is required for males and one water closet is required for females, the following may be
provided in lieu of the water closets otherwise required by this Subsection:
(a) one universal washroom conforming to Sentence 3.8.3.12.(1), and
(b) one washroom containing one water closet that is permitted to be used by both sexes provided the door to the room can be locked from the inside.

1.9 Barrier Free Design

In accordance with **Article 9.5.2.1(1)**, Barrier-free requirements apply to all buildings. According to Article 3.8.1.1, Article 3.8.1.2(1) states that all pedestrian entrances to a building's barrier-free story shall be barrier-free and shall conform to the barrier-free exterior path of travel compiled with **Article 3.8.2.2(1)(c).**

According to **Article 3.8.2.1 (2)(b), a** Barrier-free path of travel **is not required** in a building with Group C or D occupancy of 3 or fewer storeys and a building area of less than 600m².

Article 3.8.1.2(2) - A barrier-free entrance shall,
(a) be designed following **3.8.3.3**. and
(b) lead from
(i) the outdoors at sidewalk level or
(ii) a ramp that conforms to **Article 3.8.3.4** and leads from a sidewalk.
So, a barrier-free entrance can be provided with a ramp following **Article 3.8.3.4** and the City of Ottawa accessibility design standards. Or it can lead to the **entrance via the sidewalk**.

Article 3.8.2.2. (1) - A direct barrier-free path of travel shall be provided between a barrier-free entrance referred to **Article 3.8.1.2**
(b) an exterior passenger-loading zone, where provided.

According to **Article 3.8.3.3(11)**
The vestibule in a barrier-free entrance
(a) shall be arranged to allow the movement of wheelchairs between doors, and
(b) shall provide
(i) where the doors into the vestibule are in series, a distance between the doors of **at least 1500 plus the width of any door** that swings into the space in the path of travel from one door to another.

Article 3.8.3.3(19) - A normally occupied floor area that is not required by **Article 3.8.2.1** to have a barrier-free path of travel shall comply with the following requirements
(a) all doorways in public corridors in the normally occupied floor area shall comply with Sentence(1) **[Door width 850mm min.]**
(b) door opening devices that are the only means of operation on doors in the normally occupied floor area shall comply with Sentence(3). **[Mounted not less than 900mm and not more than 1100mm above the finished floor]**
(c) where a vision panel is provided in a door in the normally occupied floor area shall comply with Sentence(14) **[vision panel shall be 75mm in width and located not more than 900mm above the finished floor and edge of the panel closest to the latch is not more than 250mm from the latch side of the door]** and
(d) door consisting of a sheet of glass in the normally occupied floor area shall comply with Sentence(15) **[door with sheet glass requires to have a marked strip of 50mm wide and located across the width of the door at a height of 1350mm to 1500mm above the finished floor, may have a logo or a symbol does not diminish the opacity, width, color, brightness, and continuity of the strip across the width of the door]**
(e) where a power door operator is installed for doors in the normally occupied floor area, the control for the power door operator and proximity scanning device shall comply with **Article 3.8.3.3(17).**

1.10 Exit & Egress

Item	Specification	Code Reference
Number of exits	Permitted 1 Exit	9.9.8.2(2) 9.9.7.4
Travel Distance within the floor area	The distance from any point in the floor area to an exit is measured along the path of the travel to the exit. **45m** in a Group D occupancy	9.9.8.2(1)(b)
Exit Width (Door)	No active leaf shall be less than **810mm** wide where only one leaf is active. **Barrier-free entrance** requires to have a clear width of **not less than 850mm** for a vestibule	9.9.6.3(1)(a)(b) (2)(a) 3.8.3.3(1)
Exit Width (Stairs)	Required Exit stairs and public stairs shall have a width of not less than **900mm**	9.8.2.1(1)
Exit Width (Ramps)	Ramps shall not be less than **1100mm** wide.	9.8.5.2(1)
Exit Width (Corridor)	The width of the corridor	9.9.3.3
Clear Height	The minimum clear height in the exit and access to the exit shall be **2100mm**	9.9.3.4

Item	Specification	Code Reference
Number of Egress doorways	**1 egress door is permitted** as the area of a room or suite **does not exceed 200m²**, and the distance measured from any point of the room to an egress door is **not more than 25m**.	9.9.7.2 9.9.8.2(2) 9.9.7.4(1)(a)(b)
The direction of a door swing	The exit door **need not swing** in the direction of **exit travel** where it serves as a means of egress from more than one floor area and the floor areas so served have a total **occupant load** of **not more than 60.**	9.9.6.5

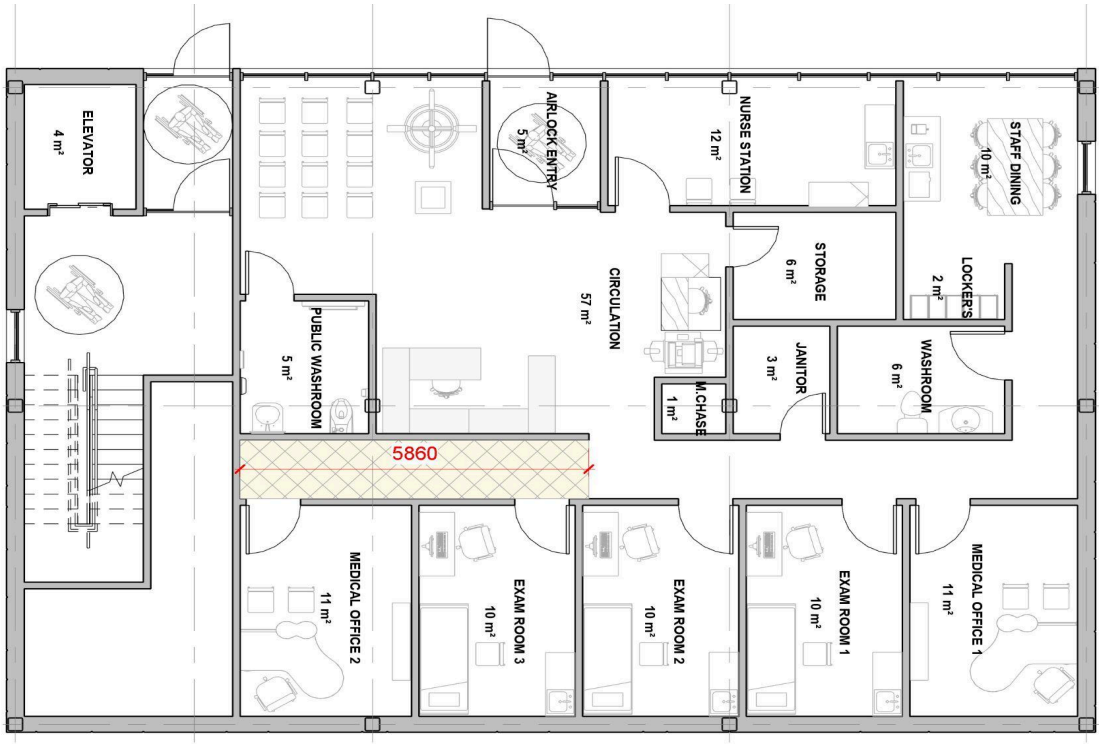
According to **Article 9.9.7.3**
(1) **A dead-end public corridor** is permitted in an occupancy shown in **Table 9.9.7.3**., where,
(a) the dead-end corridor,
(i) does not exceed the distance of travel measured from the most remote point of the dead-end to a point where
it is possible to go in opposite directions to each of the two separate exits, and
(ii) is provided with doors equipped with self-closing devices, or
(b) there is a second and separate egress doorway from each room or suite not leading into the dead-end corridor.

Article 9.9.7.3(2) Dead-end public corridors in business and personal service occupancy shall contain only suite door openings arranged so that not more than two such doors have to be passed to reach the nearest exit.

Table 9.9.7.3

Occupancy	Maximum length of Dead-end Public Corridor	Maximum Occupant Load
Group D	6	30

Article 9.8.6.3 Dimensions of Landings
(1) Landings shall be at least as wide and as long as the width of the stair or ramp in which they occur.

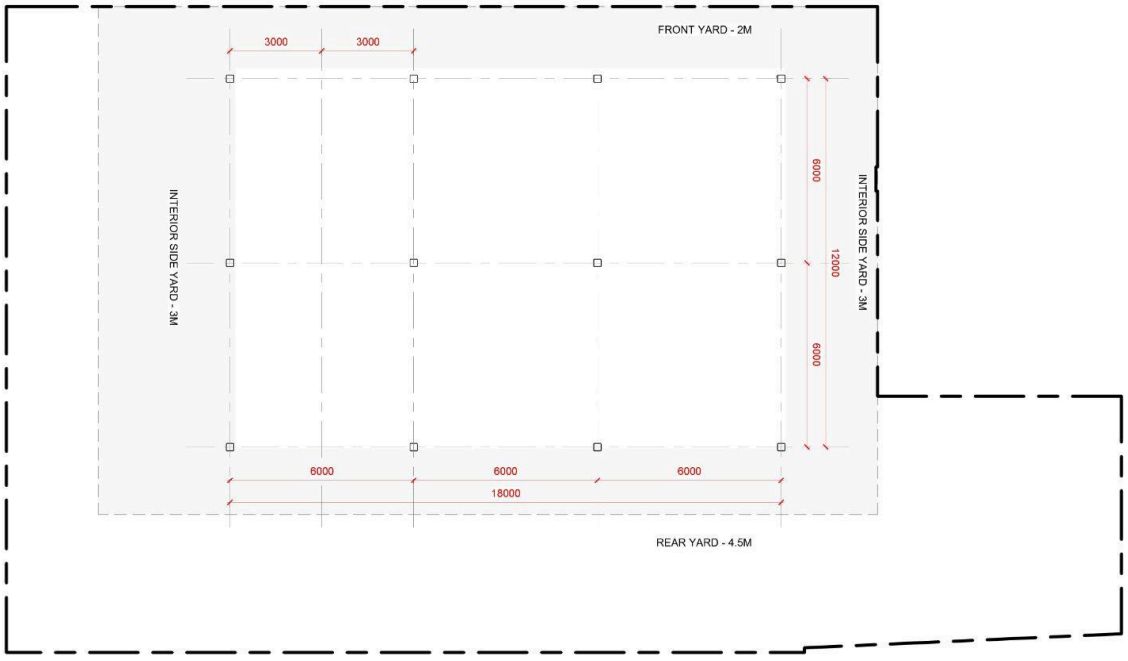


1.11 Revit Analysis

The Lower Town Medical Center project utilized **Revit** for the development and refinement of the drawing set, ensuring precision and clarity in documentation. Advanced modeling techniques were used to produce high-quality drawings that effectively communicate design intent. Revit's design options feature was adopted to generate two distinct floor plan styles and building elevations, facilitating a comparative analysis of design alternatives. Additionally, the Ontario Building Code was regularly reviewed and implemented to ensure compliance, leading to necessary updates and refinements in the drawings throughout the design process. This approach enhanced visualization, streamlined decision-making, and maintained regulatory standards by presenting multiple design possibilities within a single model.

Step 1: Establishing Grid and Structural Layout

- Created grid lines in accordance with Geo Ottawa's by-laws.
- Ensured the functional part of the building, in this case, the medical offices and examination rooms, was positioned at least 6 meters from the front wall.
- Design brief specified the use of HSS columns, which were incorporated into the layout.



LOT - 245 Dalhousie Street, Ottawa

Step 2: Defining Walls and Refining Floor Plan

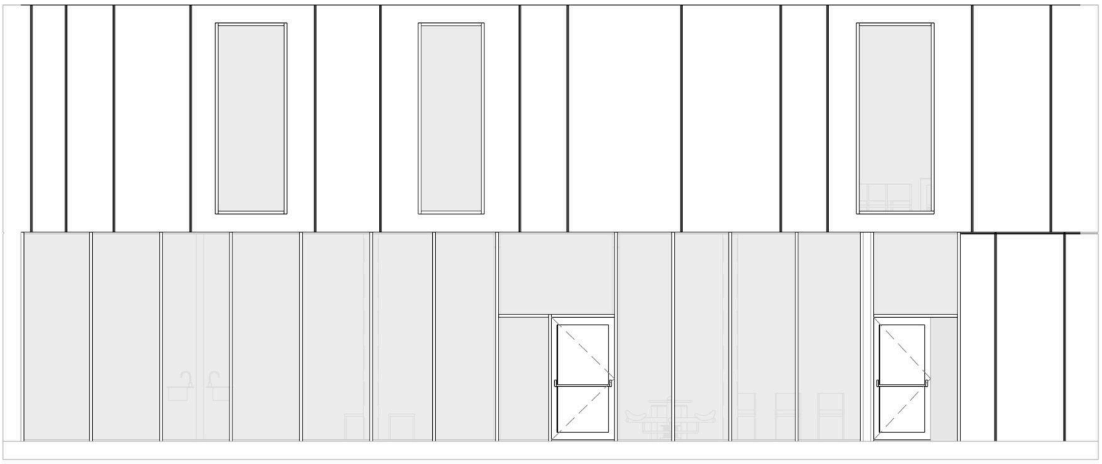
- Used the wall thicknesses specified in the design brief for interior and exterior walls.
- Implemented the Ontario Building Code (OBC) to refine the floor plan, including adjustments for corridor width, airlock vestibule, washrooms, and other barrier free compliance requirements.

First Floor Plan

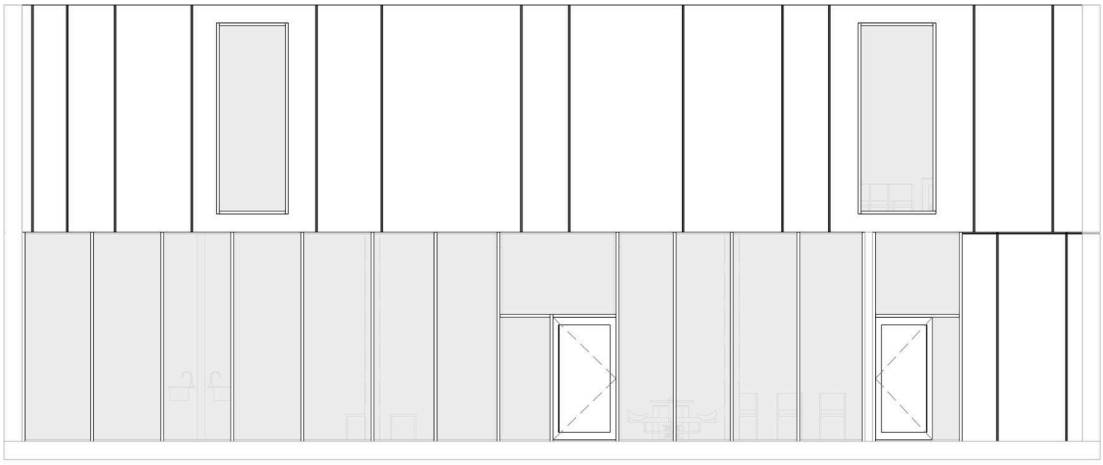
Step 3: Designing the Exterior with Curtain Walls

- The by-law text specified the entrance should be from the street, so the west wall facing Dalhousie Street was designated as the front of the building.
- Designed a curtain wall system for the street-facing exterior wall to comply with the by-law's glazing requirements.

West Elevation (Option 1)

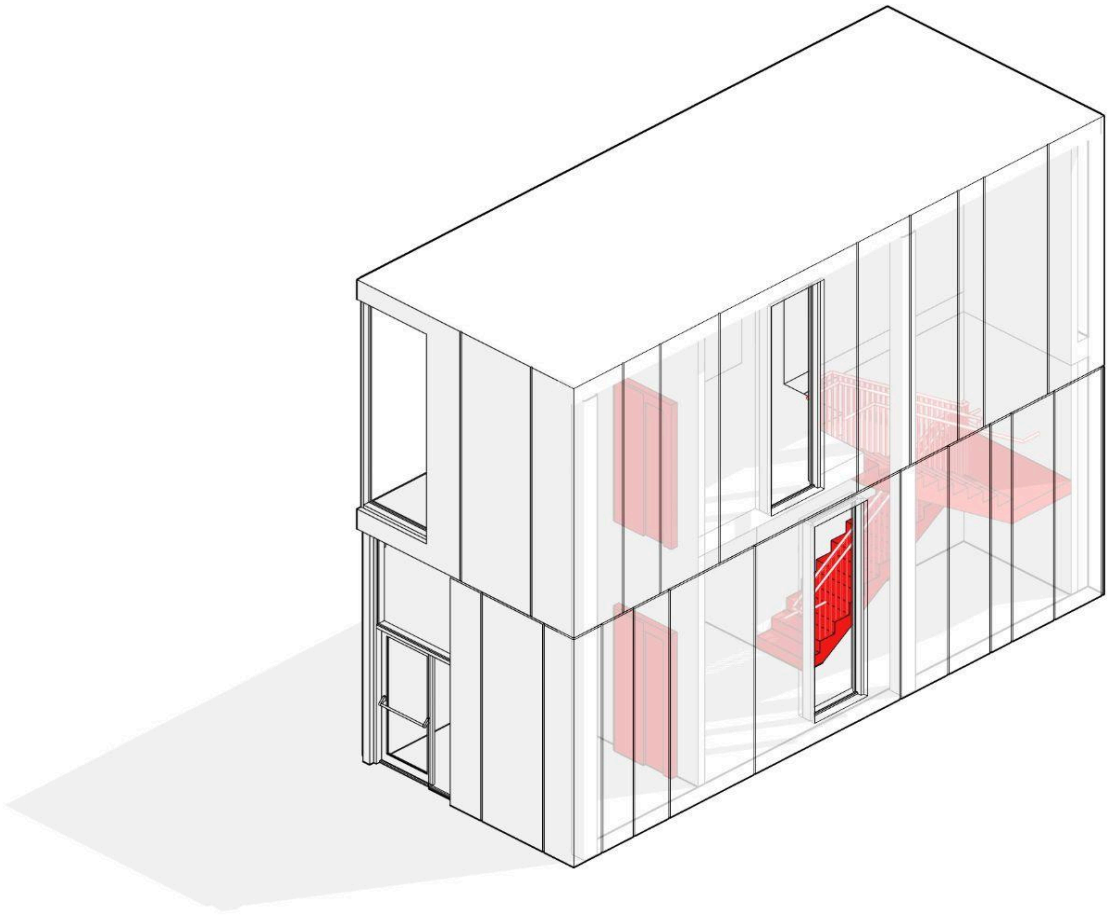


West Elevation (Option 2)



Step 4: Ensuring Accessibility and Compliance

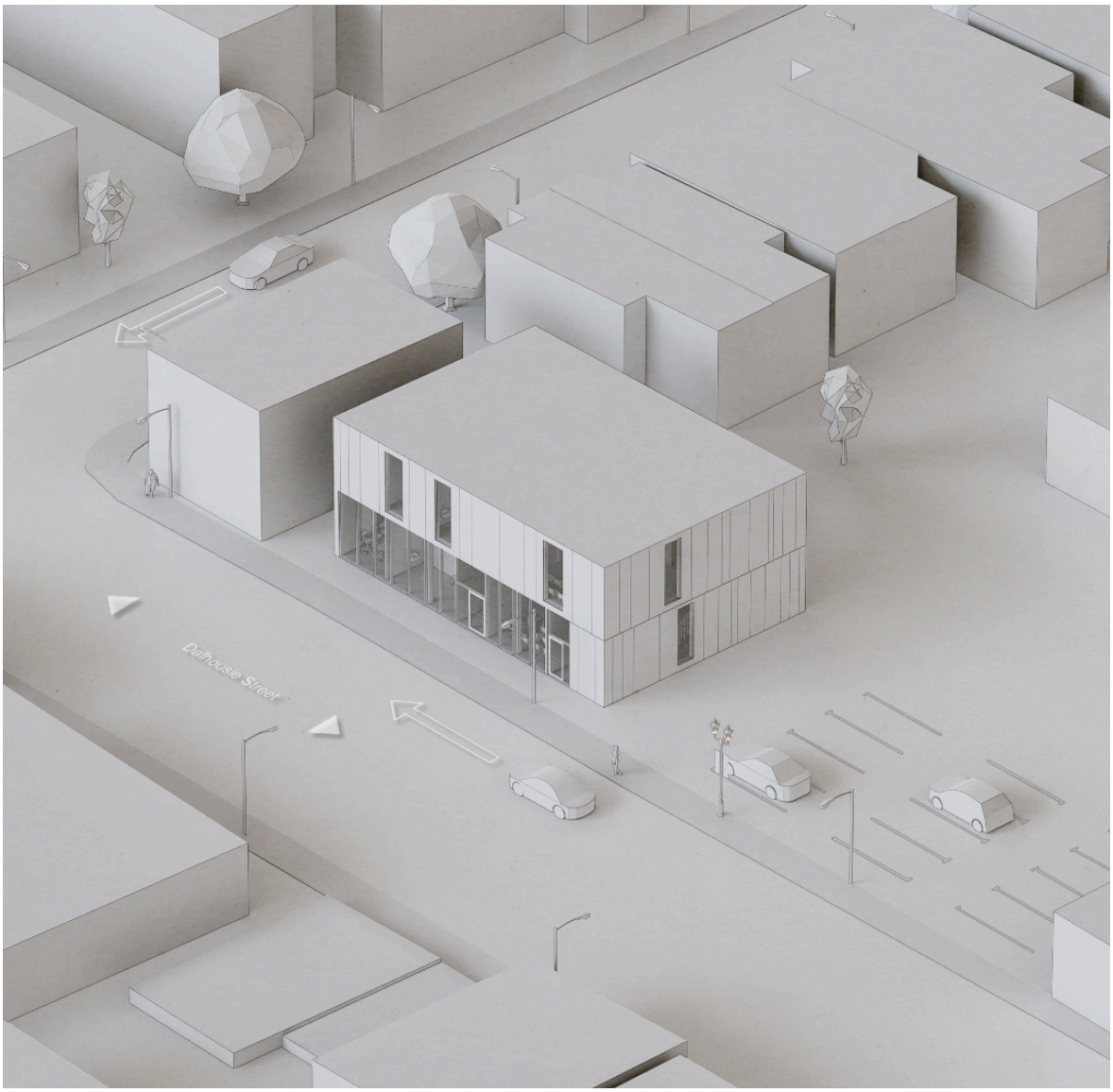
- Designed washrooms in accordance with Ottawa's accessibility standards and Ontario Building Code (OBC) requirements.
- Applied OBC standards to determine the required size of the barrier-free entrance vestibule.
- Designed the staircase to comply with OBC regulations, ensuring proper handrail and guardrail dimensions, as well as landing and stair width.
- Incorporated an elevator to provide accessibility to the top floor.



Staircase and Elevator

Step 5: Incorporating Context and Orientation

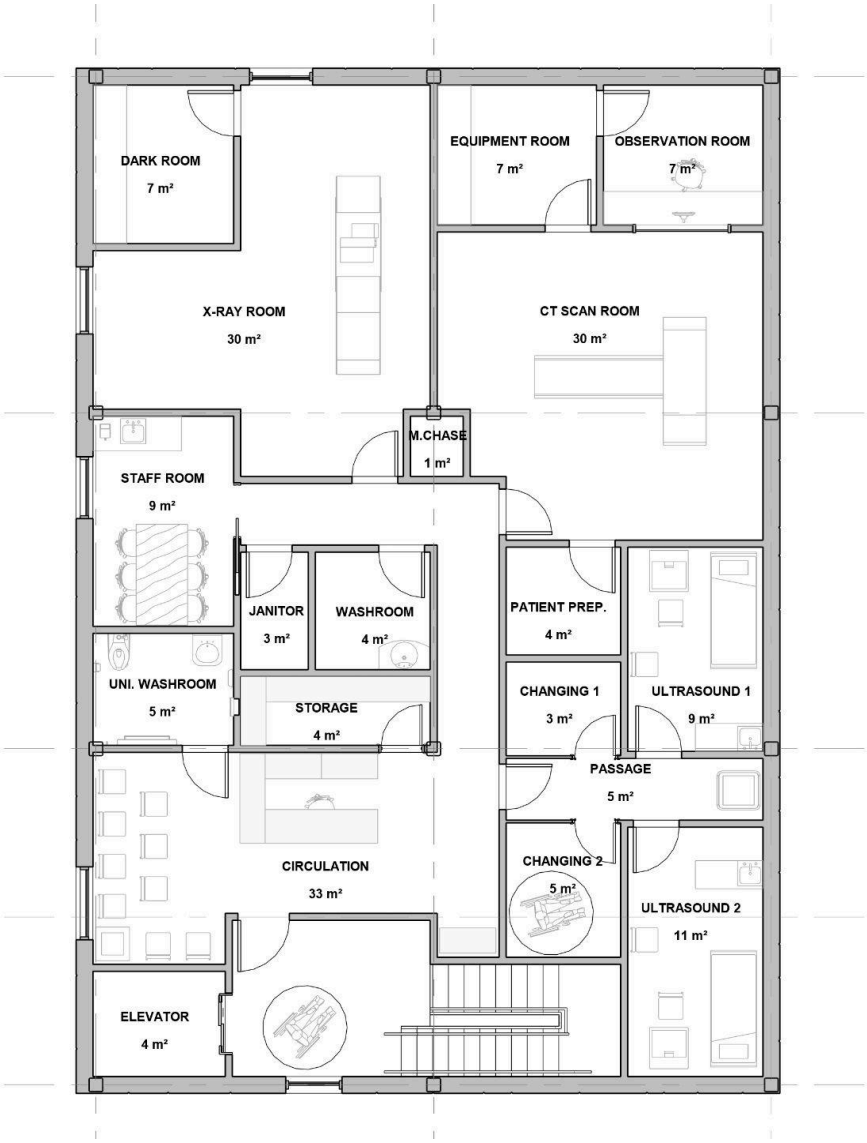
- Acquired a CAD file from **Topoexport** and integrated it into the main Revit model.
- Adjusted the true north to accurately reflect the original site orientation.
- Developed custom view templates in Revit to manage the visibility of various elements within the linked CAD file, including buildings, contours, roads, and road outlines.
- Hide unnecessary layers to enhance clarity in plans and diagrams.



Building Context

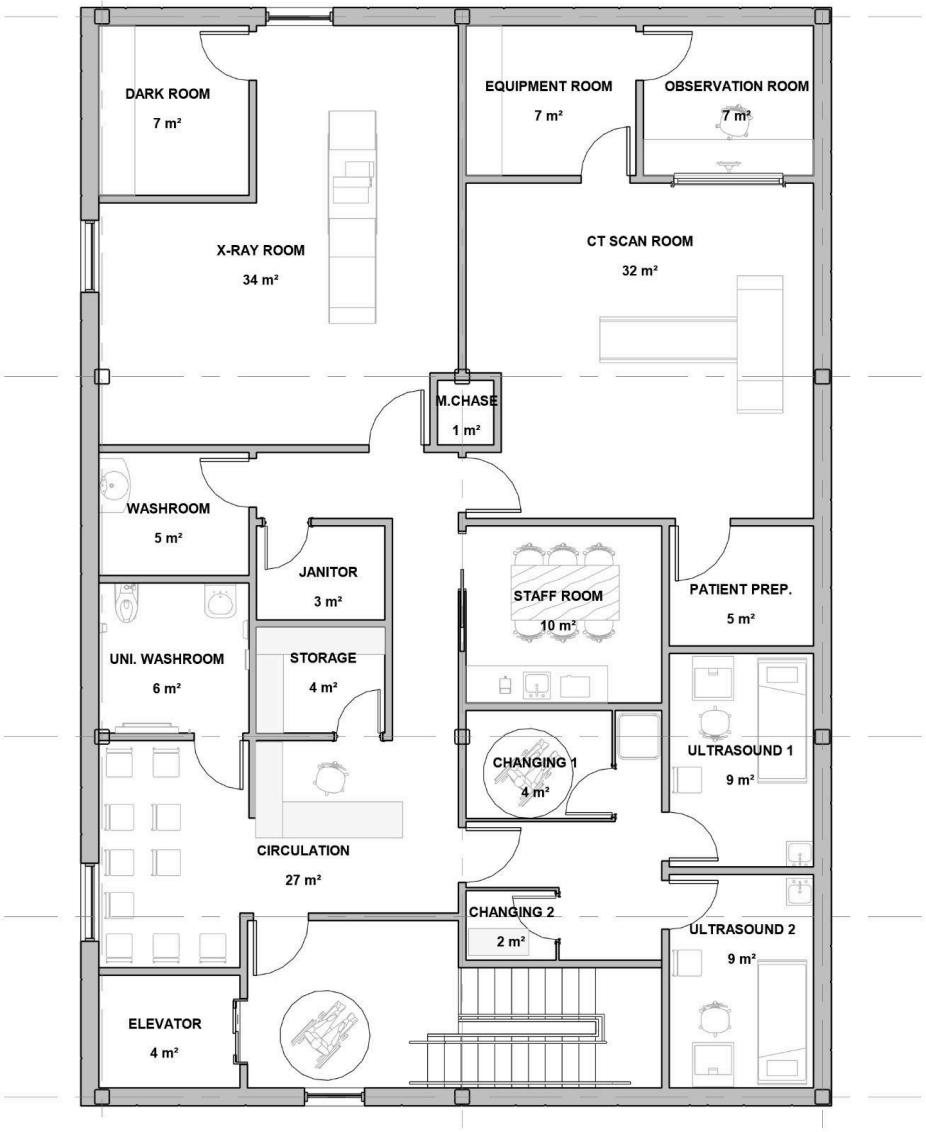
Step 6: Developing Multiple Design Options

- Created two distinct floor plans and corresponding building elevations.



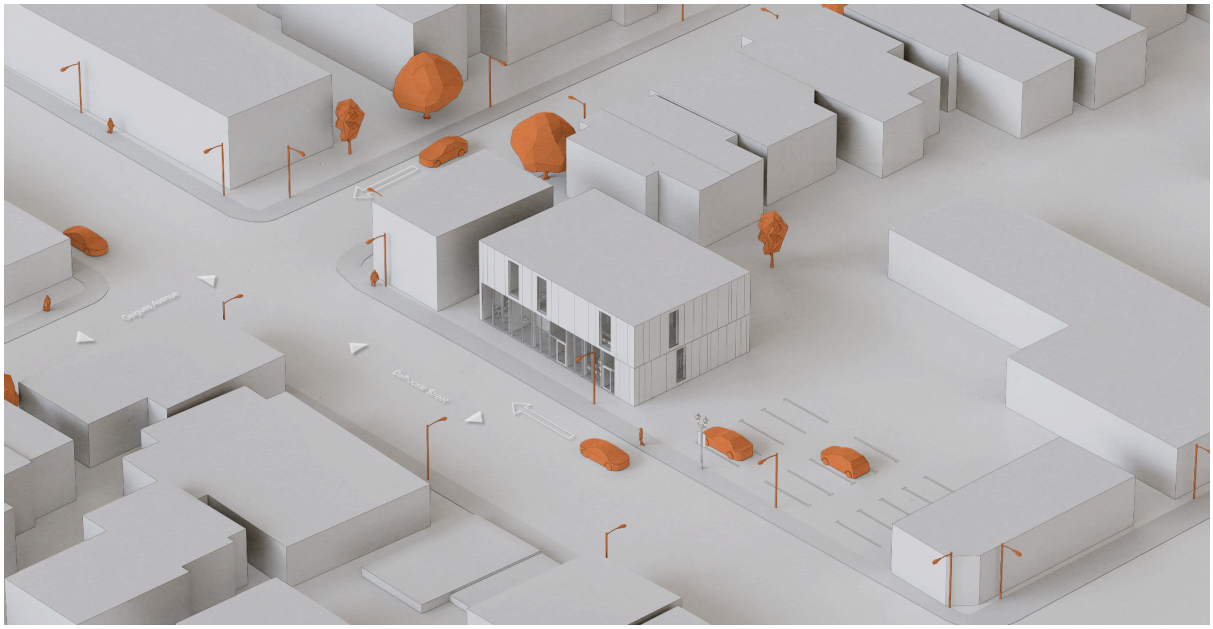
Second Floor (Option 1)

- Utilized Revit’s Design Options tool to explore layout variations.



Second Floor (Option 2)

- Managed Enscape assets within design options to control their visibility while generating diagrams.



Enscape Assets in Design Options

Step 7: Visualization Studies

- Utilized D5 Render to create high-quality renderings for the design concept phase.
- Enabled realistic visualizations to explore lighting, material finishes, and spatial relationships.
- Used the renderings to enhance presentations of early design options.
- Focused on creating immersive 3D models to communicate the design intent clearly.

Exterior Night

Exterior Day

Exterior Night