

Arch 463
ECS
Fall 2020

Name _____

Quiz #4

"Duke of York Redux"

For this problem you have the privilege of revisiting the café and speculating on its environmental performance.

Climate Context. London.

Architect's Intent. In creating a restaurant for all seasons we sought a dynamic relationship between the interior of the restaurant and Duke of York Square. It is the windows that give the restaurant this sense of performance: three large, curved panels, 3.2m high and 9.5m wide, glide into the basement on a counterweight, like a sash window. Our materials selection balanced a desire for refined transparency with structural requirements and stringent environmental standards. A perimeter frame for the glazing is powder-coated mild steel section, which can withstand the high stresses induced by the large moving units. The panels within the three wider openings are retractable, completely opening up the ground-floor space during fine weather and allowing the restaurant to spill onto the surrounding Duke of York Square, while the roof continues to provide shade.



Although similar retraction systems have been installed outside the UK, all have used straight panels. This makes the restaurant the world's first example of a retractable curved glass system, while celebrating a mechanism that is as strikingly simple as a weighted sash window, sliding down gracefully into a basement trench.

Nex Architecture was commissioned by Cadogan following an international design competition that sought a distinctive restaurant which could be a focal point for Duke of York Square, London SW3. We looked to add further value by creating a dynamic building that respects and enhances its surroundings, while incorporating new public space and greenery.

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The Duke of York peering in the NW window, retracted. And it has a roof garden!

The spiral form is defined by a slender, off-white, concrete wall that curls upwards from the square, giving both a sense of movement and pleasing views from all sides. Large openings housing the main restaurant space enhance the building's welcoming presence and allow the restaurant to spill out onto the square in fine weather. A curving staircase in the outermost limb of the spiral leads to a roof garden, which is open to the public and accessed independently from the square. This is a generous 'gift' to the neighborhood where people can spend time among the canopy of the surrounding trees.

Dedicated to sustainability, this is one of the greenest restaurant buildings in London and makes use of a semi-passive system to maximise performance and minimise energy use, with the retractable glazing also enabling the public spaces to be naturally ventilated throughout the year. Inside, the sculptural arches and large, retractable windows emphasize the restaurant's spaciousness. Ash ceiling slats are carefully arranged to celebrate the building's spiral form and to contrast with the tougher surfaces elsewhere. Alongside a private dining space, the basement contains the restaurant kitchen, WCs and plant—including trenches for the glazing mechanism, where its large, steel counterweights are housed.

Despite its relatively small scale, the restaurant is the result of an extraordinarily thoughtful design process. The glazing system alone amounted to about 2,500 hours of research and development by Nex and manufacturers and experts across Europe, while the design for the precast concrete wall segments was tested many times to ensure its slender 150mm profile could carry the building's loads.

—Alan Dempsey, director, Nex Architecture



Here's the Duke of York Café under construction in its context in London.



Here's the Duke of York Café window partially raised.

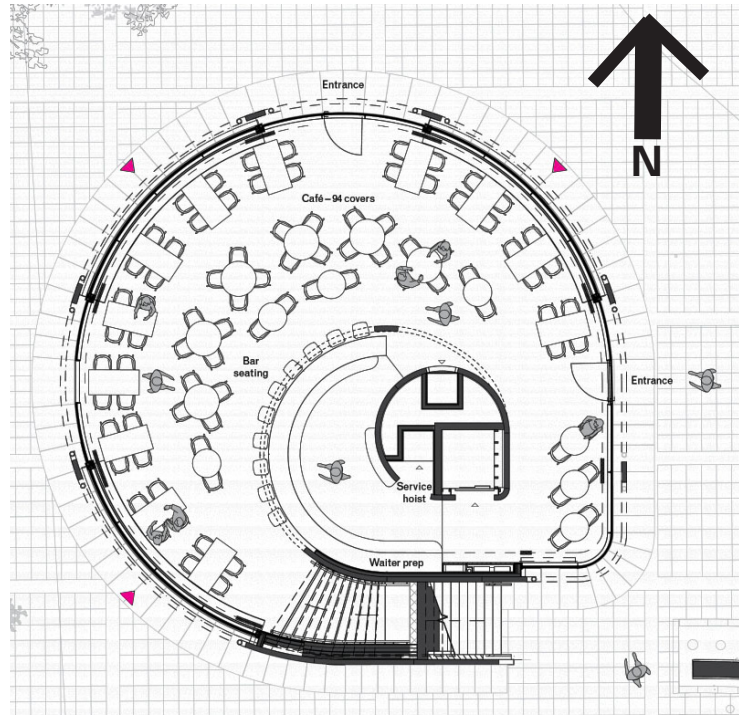


Here's the Duke of York Café at night.

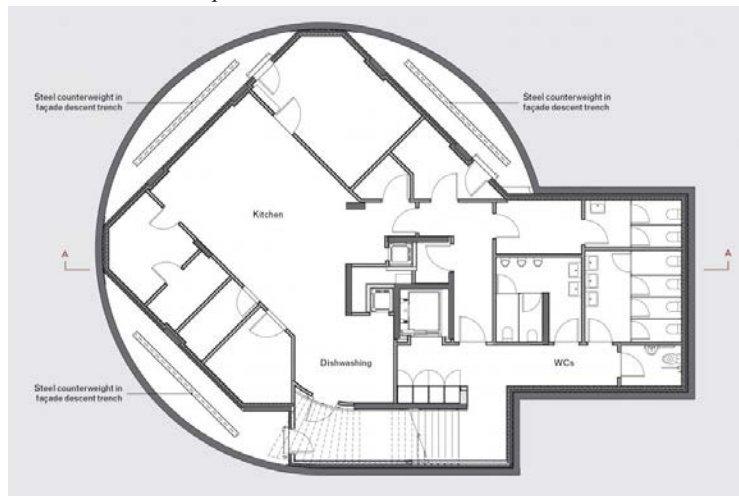
2 points

Thermal Zoning

1. Propose an elegant thermal zoning strategy for the building and explain your strategy and how and why it is feasible. Show the zones on the plans below.



Duke of York Café plans. Ground floor plan above. The magenta arrows indicate the three retractable windows, which face SW, NW, and NE. Basement plan below.



Glazing Selection

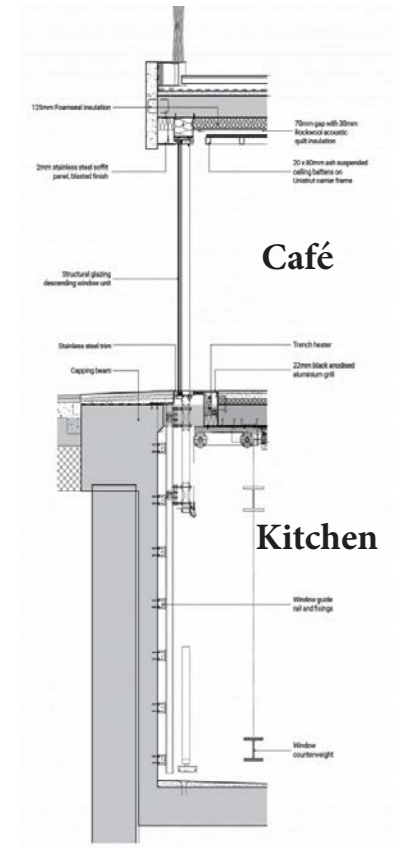
3 points

2. For each of the 3 curved glazing types listed below, indicate whether it would be suitable for the architect's concept for the retractable windows. Explain why or why not, based on the glass' visual and thermal characteristics.

1. Nanawall

2. Kalwall with Silica Aerogel

3. Evacuated Glazing



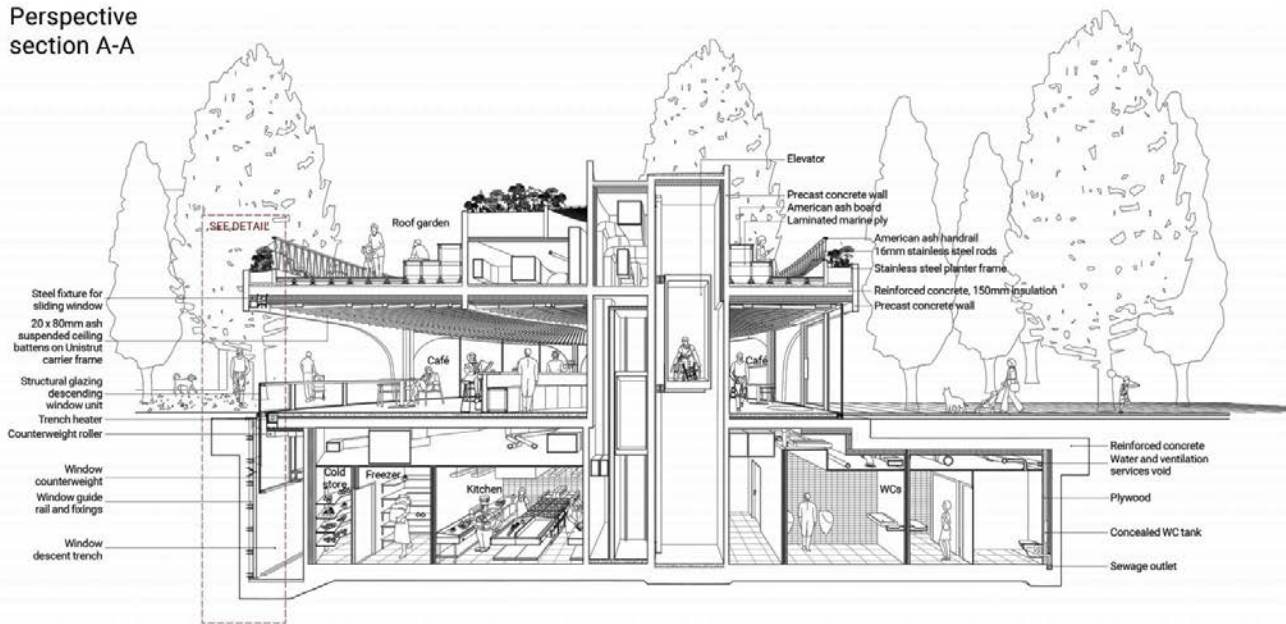
Retractable glazing detail.

Elevator Selection

3. There are two vertical transportation systems in the building, one for people (elevator) and one for food (dumbwaiter). Explain why each of the elevator types below is or is not suitable for each of the building's two lifts.

3 points

Perspective section A-A



1. Traction Elevator

The section perspective cuts through the elevator shaft and the dumbwaiter shaft to the left of the elevator.

2. Hydraulic Elevator

3. Rack and Pinion Elevator

Green Architecture Strategies

2 points

4. Describe four green architecture strategies that have been implemented successfully in the building.

1.

2.

3.

4.