EAU CLAIRE PLAZA REVIEW

AUGUST 2026

Eau Claire Plaza features a fog-based water feature engineered to stay comfortable and inviting through one of Canada's most demanding climates. This paper uses the project as a reference project in evaporative cooling for cold, dry cities — covering the engineering decisions behind its low-flow, fog-based system, the science behind urban heat mitigation, and how the feature converts into a lighting installation through Calgary's winters.

CREDITS

Owner
City Of Calgary

Landscape Architects
DIALOG

Water Feature Designer & Manufacturer
Crystal Fountains Inc.

Fog Specialist
Koolfog Inc.

Mechanical Engineering Consultant
AME Consulting Group Ltd.

Electrical Engineering Consultant
AES Engineering Ltd.

Water Feature Contractor
Ful Flo Industries Ltd.

General Contractor
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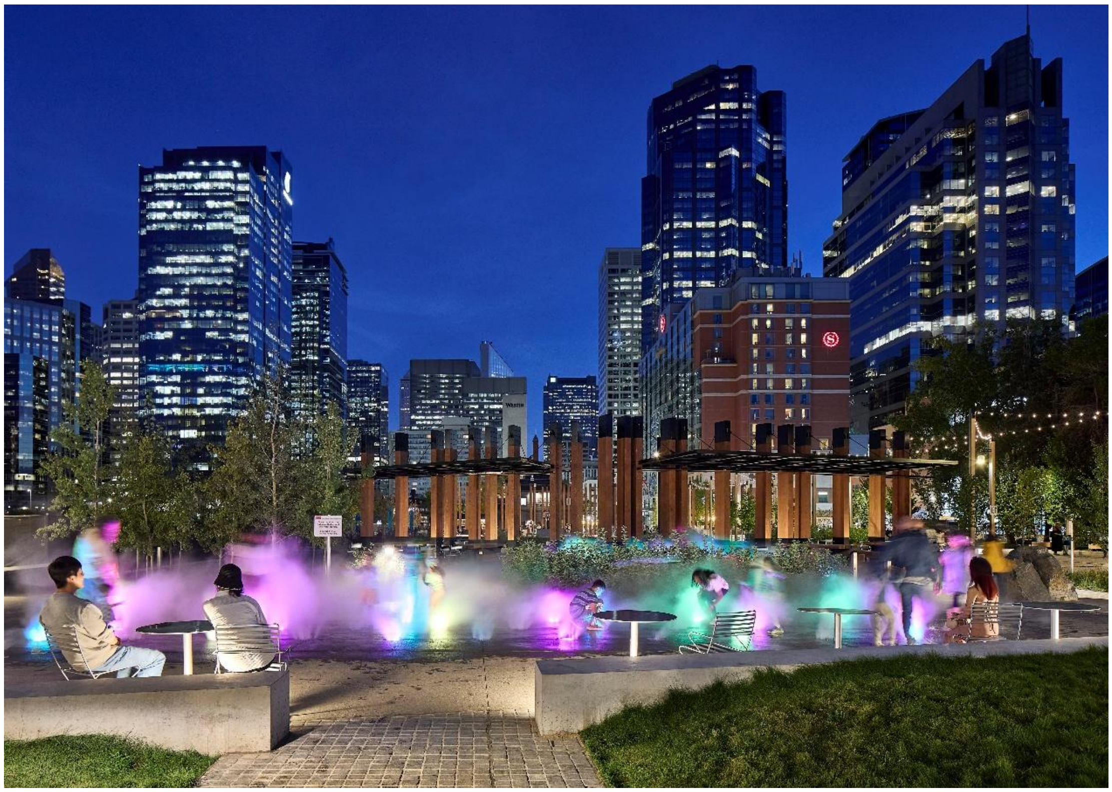
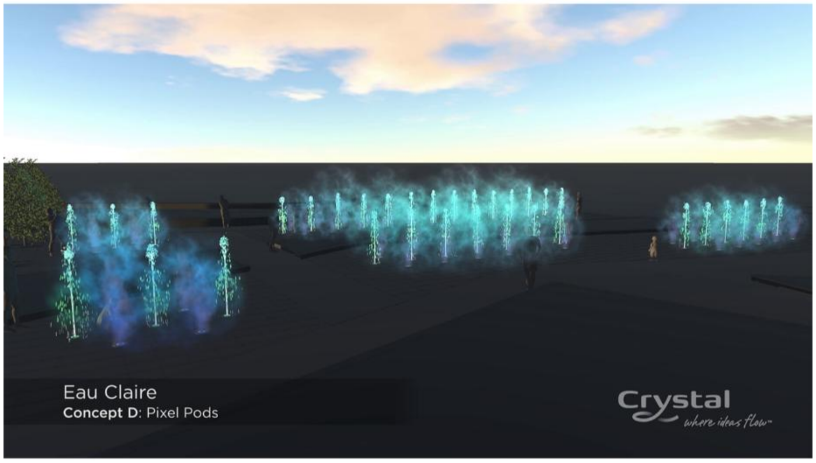


Eau Claire Plaza at Night

PROJECT INTRODUCTION

Located along the banks of the Bow River, Eau Claire Plaza connects the Eau Claire Promenade with the parkland of Prince's Island. Redeveloped as part of the City of Calgary's broader Eau Claire Area Improvements Program, the plaza reflects the district's history while creating an engaging, adaptable public space for year-round community use. The broader revitalization initiative also incorporates flood-protection measures designed to reduce risk to Calgary's downtown core.

Soft transitions unify the plaza's distinct elements, connecting its urban character with the living green of the river's edge. Positioned alongside the canopy and seating of the Riverside Terraces and the historic Eau Claire & Bow River Lumber Company building is a fog-based water feature designed by Crystal Fountains in collaboration with DIALOG design.



A simulation still of the Pixel Pods Concept

DESIGN PROCESS

The project began as a blue dot, providing a full-scope opportunity. From concept through commissioning, Crystal Fountains was responsible for water feature design, choreography, and the manufacturing of all feature components.

While several distinct design concepts were explored, beginning first with a more traditional closed-loop system, key inputs from DIALOG, the City of Calgary and the Alberta Health Services transformed the final iteration into a low-flow, flow-through (open-loop), fully fog-based interactive feature to emphasize public comfort, infrastructure costs and maintenance considerations. With Koolfog technology, the design incorporates fog-emitter niches that consume less than one-tenth of the water required by conventional vertical sequencing jets with a flow-through system within a comparable footprint.

The design vision centered on two primary goals:

MULTI-GENERATIONAL ENGAGEMENT – Create an inclusive, interactive public space that invites people of all ages and backgrounds to gather and engage in the way that suits them best.

MICROCLIMATE ENHANCEMENT – Improve the microclimate through evaporative cooling.

In the final design iteration, light takes centre stage after dusk. By day, fog softens the environment and creates a more comfortable setting for visitors. In the evening, sequenced RGBW LEDs transform the atmosphere, creating shifting sculptures within the drifts of fog and against the architecture of the plaza, giving the space a distinct nighttime identity.

CALGARY’S CLIMATE

Calgary’s high elevation contributes to its semi-arid climate, characterized by warm, sunny summers and cold, dry winters. Average temperatures range from approximately 16.9 °C (62.4 °F) in July to −7.6 °C (18.3 °F) in January, although winter lows can fall below −30 °C (−22 °F) (Environment and Climate Change Canada, 2026). Summer days that start cool can heat up rapidly by midday, only to drop again immediately after sunset.

The city experiences a pronounced seasonal temperature range, along with rapid and often unpredictable shifts in weather. Influenced by Calgary’s proximity to the Rocky Mountains, temperatures can fluctuate dramatically within a matter of hours, creating challenging conditions for year-round public-space design.

CHINOOK

These rapid temperature shifts are largely driven by Chinook winds, a regional form of foehn wind. As moist Pacific air rises over the Rocky Mountains, it releases much of its moisture on the western slopes. The descending air on the eastern side becomes progressively warmer and drier, creating the rain-shadow conditions experienced in Calgary.

Within a matter of hours, Chinook can raise temperatures by 20 °C (36 °F) or more, with some shifts approaching 30 °C (54 °F) and lasting for several days. This degree of climatic variability presents a significant challenge for landscape architecture, requiring public spaces and their materials to withstand sudden and repeated changes in temperature.

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SUMMER

CALGARY’S SUMMER CLIMATE

During summer, daytime temperatures typically range from 10 to 25 °C (50 to 77 °F), although heat waves can push highs into the low-to-mid 30s. Unlike many major Canadian cities, Calgary generally experiences dry summer conditions with relatively low humidity. Evenings remain cool, with average overnight lows of approximately 10 °C (50 °F) throughout the season.

URBAN HEAT ISLAND EFFECT

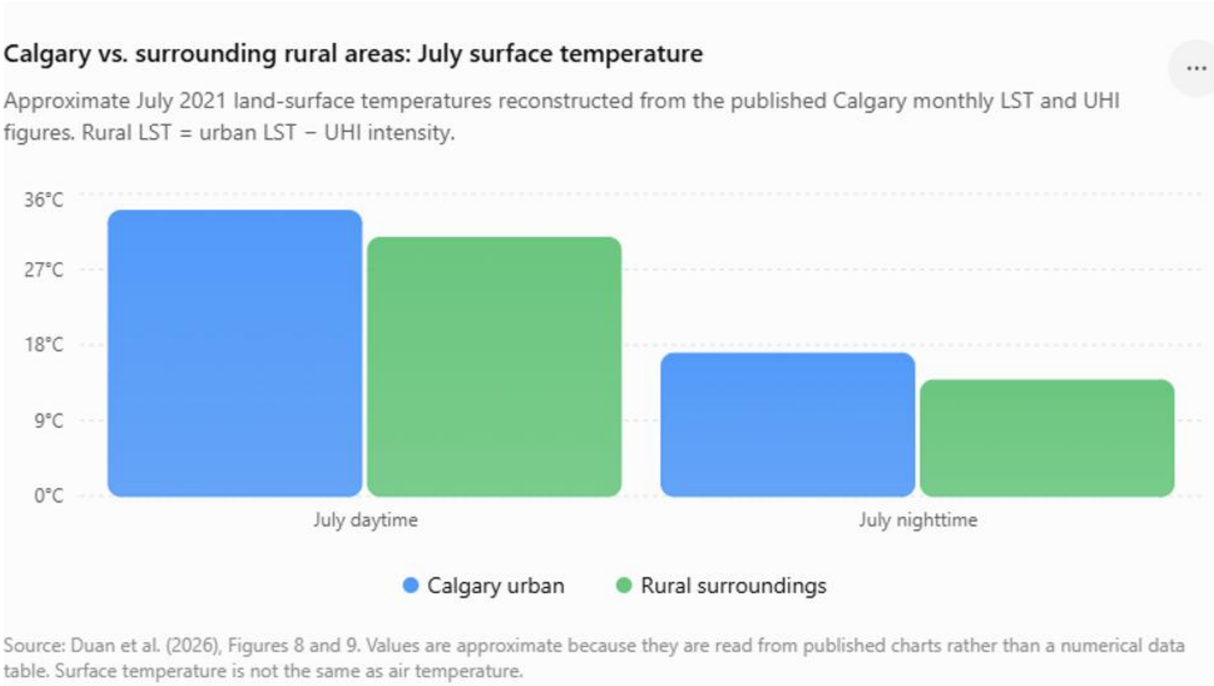
Urban areas routinely experience higher temperatures than the rural landscapes that surround them, a phenomenon known as the Urban Heat Island effect. This warming is largely shaped by the materials and structure of the built environment. Concrete, asphalt, and other impervious surfaces absorb solar radiation throughout the day and release the stored heat gradually, often keeping cities warmer well into the evening.

At the same time, urban development frequently replaces vegetation and permeable ground with buildings and paved surfaces, reducing evapotranspiration, the natural cooling process through which water moves from soil and plants into the atmosphere. Heat generated by human activity, including vehicle traffic, industrial processes, lighting, and HVAC further intensify local temperatures.

Together, these conditions can create temperature differences of approximately 5 °C or more between urban centres and their surrounding areas. The consequences extend beyond ambient temperature alone. Urban heat islands increase the energy required to cool buildings, place additional strain on electrical infrastructure, and heighten heat exposure at pedestrian level. Public spaces can become less comfortable and less inviting, particularly during prolonged periods of extreme heat.

Addressing the urban heat island effect has therefore become an important consideration in contemporary urban design. Strategies such as expanding tree canopy, increasing planted and permeable surfaces, introducing shade, selecting reflective materials, and incorporating water or fog-based cooling features can help moderate local temperatures and improve outdoor comfort.

URBAN HEAT ISLAND EFFECT AND CALGARY



KEY INSIGHTS

Calgary demonstrates an urban heat island effect, with built-up areas consistently experiencing higher summer surface temperatures than the surrounding rural landscape.

Combining the land-surface-temperature and UHI-intensity figures published in Duan et al. (2026), Calgary's urban surfaces were approximately 34°C during the day and 17°C at night in July 2021, versus roughly 31°C and 14°C in nearby rural areas. These are approximate figures reconstructed from published charts rather than a single reported measurement and reflect surface rather than air temperature. Longer-term research covering 2001 to 2020 reinforces this pattern.

During July, Calgary’s surface UHI intensity averaged approximately 1.26°C during the day and 0.85°C at night relative to surrounding rural areas (Ejiagha et al., 2022). The same study identified a statistically significant increase in July daytime heat island intensity of approximately 0.033°C per year, indicating that the thermal contrast between urban and rural environments has strengthened over time (Ejiagha et al., 2022).

The City of Calgary identifies paved and built surfaces as contributors to urban heat, while vegetation can provide cooling through shading and evapotranspiration (The City of Calgary, n.d.).

THE ROLE OF WATER IN URBAN HEAT MITIGATION

Water features can help reduce urban heat through evaporation and convection. As water evaporates, it absorbs heat from the surrounding air and converts it into latent energy. Fine droplets are particularly effective because their greater surface area accelerates evaporation, allowing cooling to occur close to pedestrian height, typically between one and two metres above ground.

The effectiveness of evaporative cooling depends on several conditions, including air temperature, humidity, droplet size and distribution, and wind. Benefits are generally strongest in hot, dry, and relatively calm environments, while high humidity and stronger winds can reduce cooling performance.

INTEGRATION INTO URBAN SYSTEMS

Water-based cooling forms part of a broader blue infrastructure approach. Its effectiveness is strengthened when combined with green infrastructure, including trees and parks, and heat-reducing materials such as reflective roofs and pavements. Depending on climate and configuration, integrated strategies may reduce district-scale temperatures by approximately 2-3°C (Ulpiani, 2019). In research conducted in Arizona, a combination of shade and mist resulted in a Physiological Equivalent Temperature (PET) reduction of 15.5°C (Vanos et al., 2022).

TEMPORAL PERFORMANCE

Evaporative cooling systems respond quickly, with measurable effects often occurring within seconds of activation. This makes them particularly well suited to periods of peak daytime heat and short-duration extreme heat events. Unlike longer-term strategies such as tree canopy growth, they can provide immediate, targeted relief when conditions demand it.

Field and experimental studies of evaporative and fog-based cooling have recorded localized air-temperature reductions of approximately 1-5°C (Ulpiani, 2019), but more dramatic decreases are possible in arid desert environments, which are the most thermodynamically favourable for evaporative cooling interventions, such as a study conducted at Masdar Institute, Abu Dhabi, which recorded a maximum cooling effect of 16.2°C (Dhariwal et al., 2019).

This reduction is in line with the temperature difference between no fog and fog activation found by Koolfog, who recently logged a drop from 38.3°C (100.9 °F) without fog to 30.5°C (86.9°F) with fog a few feet away from the source on-site in California.

On-site temperature readings near the source documented in Koolfog field notes.

SPATIAL PERFORMANCE

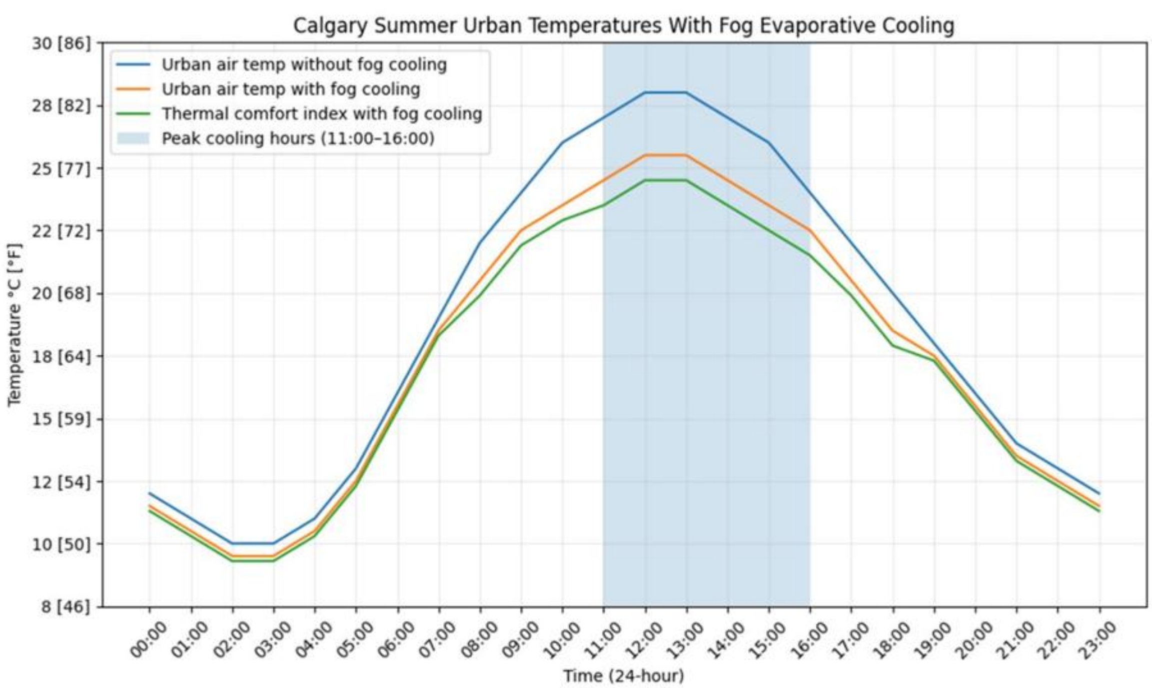
Cooling effectiveness varies according to the surrounding environment. Evaporative systems are generally most valuable in dense urban areas with limited vegetation and in hardscape-dominated spaces, making it an ideal solution for a plaza. Their performance may be reduced in humid conditions where evaporation slows, but they perform well in low-humidity climates like Calgary.

Water features such as the Eau Claire fog feature can also reduce surface temperatures through direct wetting and evaporative heat removal. By limiting the amount of heat absorbed, stored, and later released by paving and other urban materials, they can lower radiant heat exposure at pedestrian level and help reduce the nighttime warming associated with the urban heat island effect. It's worth noting that the fog effect itself performs differently across the day: from purely a cooling standpoint, hot, dry daytime conditions produce the greatest benefit, but the visual impact of the fog effect is greater in cooler, more humid conditions — including overnight — compared with hot, dry daytime conditions.

THERMAL COMFORT AND THE HUMAN ELEMENT

Cooling systems influence both measured air temperature and the way heat is experienced by the body. Outdoor misting can also reduce physiological heat stress. Huang et al. (2025) found reductions in modelled human skin temperature of approximately 0.27°C under hot, humid conditions and 0.53°C under hot, dry conditions. While these numbers may seem small, gains in perceived thermal comfort are often far greater than the measured reduction in air temperature alone would suggest.

System characteristics, including droplet size, water flow rate and operating conditions, can further influence evaporative cooling effectiveness. Combined with localized air cooling and evaporation from the skin, this can reduce heat stress and improve the usability of outdoor spaces during periods of high temperature.



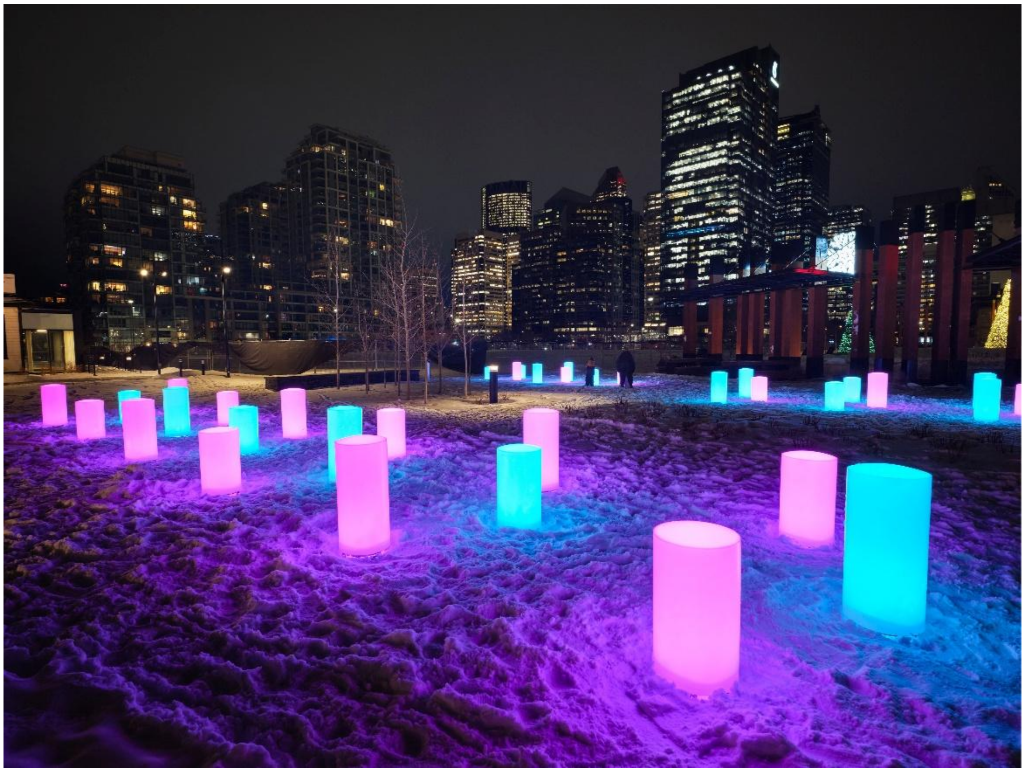
An illustrative model of temperature differences between Calgary's summer temperatures and the potential gains of fog evaporative cooling, using ECCC climate normals.

WINTER

DESIGNING A YEAR-ROUND SPACE

The city's cold winters and dramatic temperature swings do little to discourage a community known for its Western hospitality and enthusiasm for the great outdoors.

When freezing conditions bring the fog system's seasonal operation to a close, the feature transitions into a winter-ready lighting installation. Decorative covers protect the fog emitters from snow and ice while allowing the integrated full-spectrum RGBW lighting to remain visible.



The result is an illuminated winter wonderland that invites visitors to continue exploring the plaza. DMX programming supports a range of sequenced light shows for events and seasonal occasions, while interactive bollards positioned around the feature allow visitors to trigger selected displays on site.

CUSTOM STAINLESS STEEL PRODUCTS

Calgary's demanding climate and substantial temperature swings called for robust components manufactured from high-grade materials. The water feature therefore incorporates Crystal Fountains components made from 316 stainless steel, selected for its greater durability and corrosion resistance.

Grade 316 stainless steel retains its strength and toughness at low temperatures, while its enhanced resistance to moisture, chlorides, and localized corrosion makes it particularly well suited to exposed water-feature components in demanding winter conditions. As an austenitic stainless steel, it retains its strength and ductility at low temperatures, reducing the risk of brittle fracture during severe winter conditions. It also withstands repeated cycles of expansion and contraction without becoming brittle, a hallmark of a Calgary winter.

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Its composition offers an additional advantage in exposed outdoor environments. It provides greater resistance to pitting and localized corrosion, particularly where components are exposed to moisture, snow, ice, chlorinated water, or de-icing salts. A naturally forming chromium-rich passive layer further protects the surface, helping to limit deterioration and reduce long-term maintenance requirements (Outokumpu Oyj, n.d.).

CONCLUSION

Eau Claire Plaza shows that a well-engineered water feature can extend a public space's usability across all four seasons, even in a climate defined by extremes — hot, dry summers, sudden Chinook-driven swings, and severe winters. The shift to a low-flow, fully fog-based system met the project's goals for public comfort, infrastructure cost, and maintenance, while custom 316 stainless steel components and a winter lighting mode carried that year-round function through Calgary's harshest months.

For cities and designers weighing water features in similarly demanding or water-conscious climates, Eau Claire offers a practical model — a feature tuned to the specific thermal, seasonal, and infrastructure demands of its site, rather than a design ported in unchanged from a warmer or wetter market.

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