

PEDESTRIAN COMFORT AND SAFETY



Orchestrating wind, sun, humidity and temperature to create pleasant outdoor spaces

Quirks of local climate can spoil the experience of an otherwise excellent design. (Think of a lovely, seaside dining terrace—where strong winds blow at sunset.) But those quirks can also be exploited to improve human comfort and safety.



Shade created where people need it, breezes brought into overheated corners, windbreaks positioned on high terraces—little fixes can have big benefits. With correct data and planning, the interplay among wind, sun, humidity and temperature can be orchestrated to create a pleasant experience for patrons and passers-by.

Our Service

We evaluate how comfortable people will be around your project. Our goal is to help you create a project—an outdoor environment, a development, a stadium, a community—that is physically better suited to the pedestrian, patron or participant experience.

We're experts in identifying the little things that can change how people experience an outdoor space. We can reconstruct or predict the weather in the immediate vicinity of your location, at any moment, anywhere in the

Redefining possible.

world. We can model exactly how the wind will flow around building features and exactly where and when shadows will fall. Through years of experience working in a wide variety of climates, we know how to adapt standard comfort metrics to accurately reflect human experience of cold, heat and humidity.

The following are some examples:

- A design for a residential tower sports a bold, skyline-defining feature and an exclusive rooftop terrace. However, we find that this feature will create wind vortices that will make the terrace unusable. We can quickly test modifications in our models to find a shape that retains the desired aesthetic while promoting occupant comfort on the terrace itself.
- An office building's courtyard gets unbearably hot at midday, so workers can't enjoy lunch outdoors. We can show how to position a "wind scoop" to direct prevailing winds, creating breezes in areas where normally there wouldn't be any.
- Sports fans or athletes get too hot or too cold at the stadium. We can adjust the shaping and siting of a stadium to balance sun, shade and wind to keep both patrons and athletes comfortable during more of the game or match—and for more of the season.

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RWDI is a valuable partner to clients seeking to...

Explore Innovations

- Arrange active cooling systems (e.g., misted water) for best effect
- Manage planned developments to create optimum public experiences
- Manage multi-building interactions in dense urban environments to maintain pedestrian-level comfort

Create Opportunities

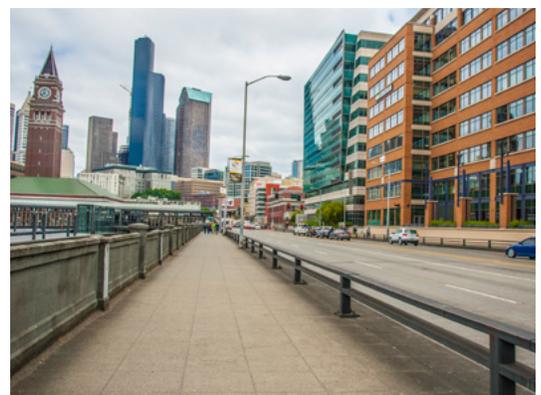
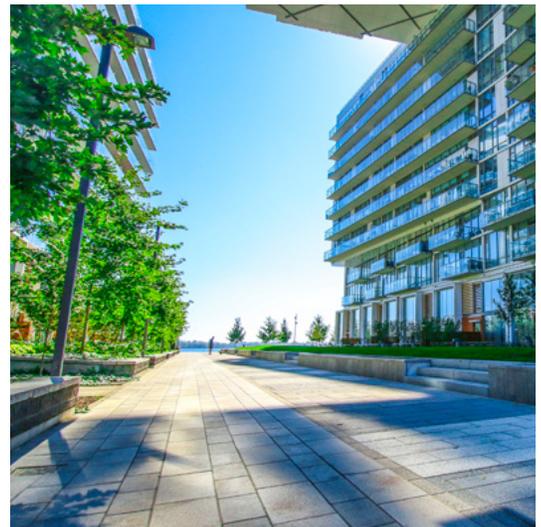
- Expand siting options by mitigating adverse conditions
- Design comfortable, popular public and community spaces that invite pedestrian use

Meet Challenges

- Make hot conditions tolerable by manipulating available airflows and shade
- Balance comfort criteria for stadium patrons and athletes

Fulfill Expectations

- Satisfy patrons' expectations by matching perceived conditions to the purpose of the space
- Meet municipal requirements to demonstrate absence of negative impact to the public realm
- Ensure the public's safety, especially in high winds



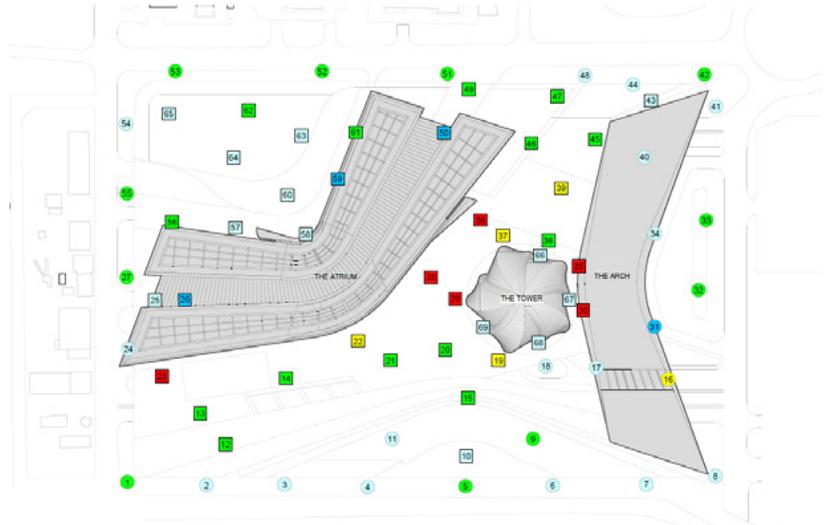
How we work

Our first step is always to understand the weather data and the surrounding context in light of your questions. We might look at where the wind is coming from, where the sun is at every minute, what the temperature trends are, what the terrain or urban context is.

Then we do a predictive assessment: How do we expect the winds to interact with this facility? How fast will shadows move? On how many days will heat or humidity reach levels that people perceive as uncomfortable? We also have custom techniques for quickly considering multiple factors: for example, does a prevailing breeze offset the heat?

Next, we evaluate how people interact with the space. What are the usage patterns? What do people expect? How do they adapt to the weather? Then we work with you to decide which patterns you consider a problem.

With that guidance, we work with appropriate parties—designers, architects, landscape architects, owners—to create a plan that will help mitigate the problems identified. We might recommend changing the usage around the building. Or we might show how adding correctly designed landscaping or architectural features would help mitigate negative conditions. Solutions can be tested quickly in our models to prove their efficacy before construction.



In developing our predictive assessment and recommendations for mitigation, we rely on several tools. One is an experience-based assessment, drawing on decades of results from projects of all shapes and sizes. For a more detailed review, we use computational fluid dynamics (CFD) models for wind and heat flow. These computational models integrate what we know about the weather conditions, the surrounding landscape and the important features of the structure. Where appropriate, we also test physical models in wind tunnels.

The results tell us in detail how pedestrians or patrons might experience the environment. Each mitigation strategy is tested in these models and refined on the basis of the results. We present our final results in simple ways that quickly reveal problem areas, and we're always happy to explain our results and discuss their implications.