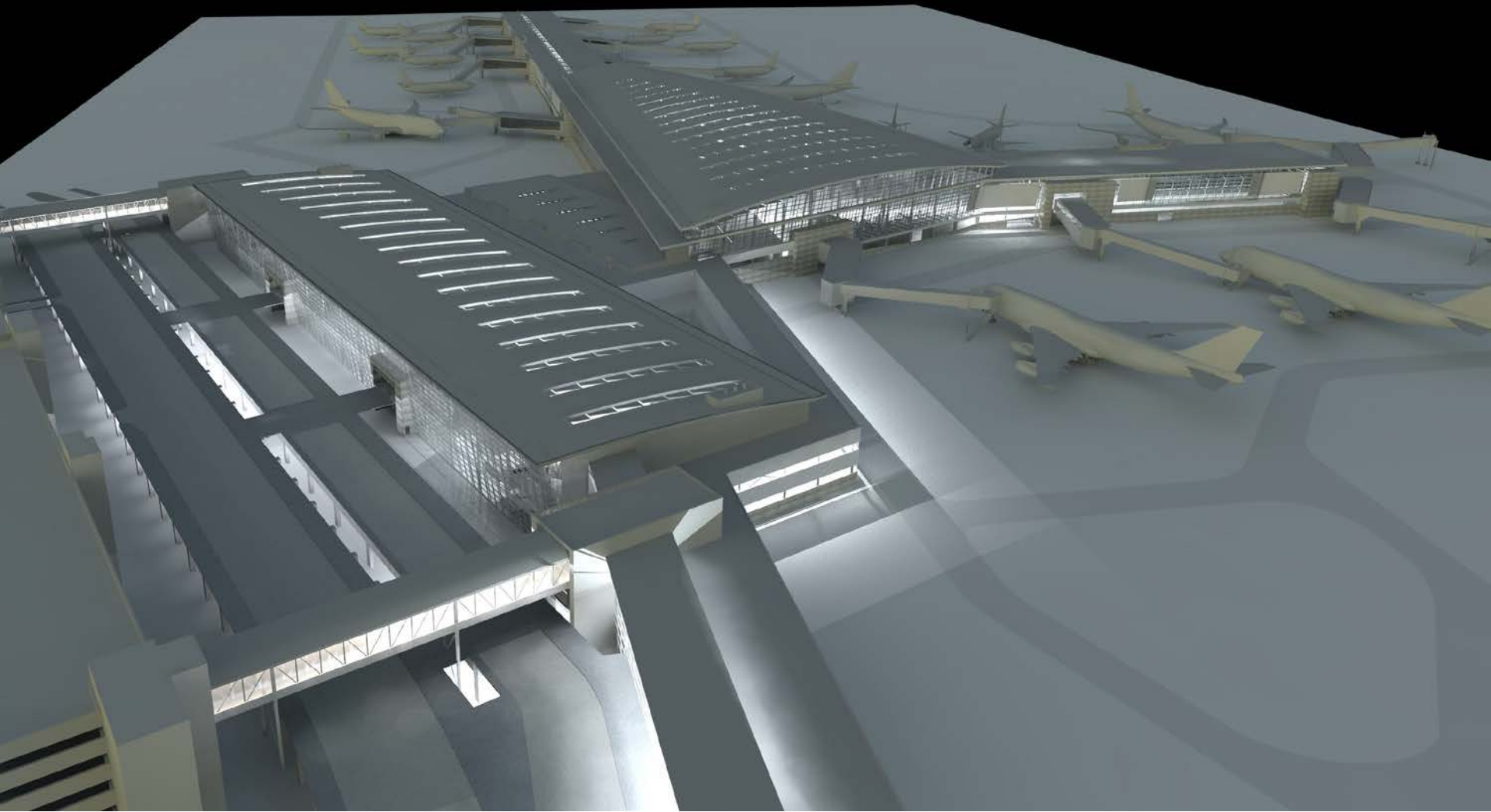




Airports and Sustainable Design– **High Performance Building Takes Flight**

DIALOG®



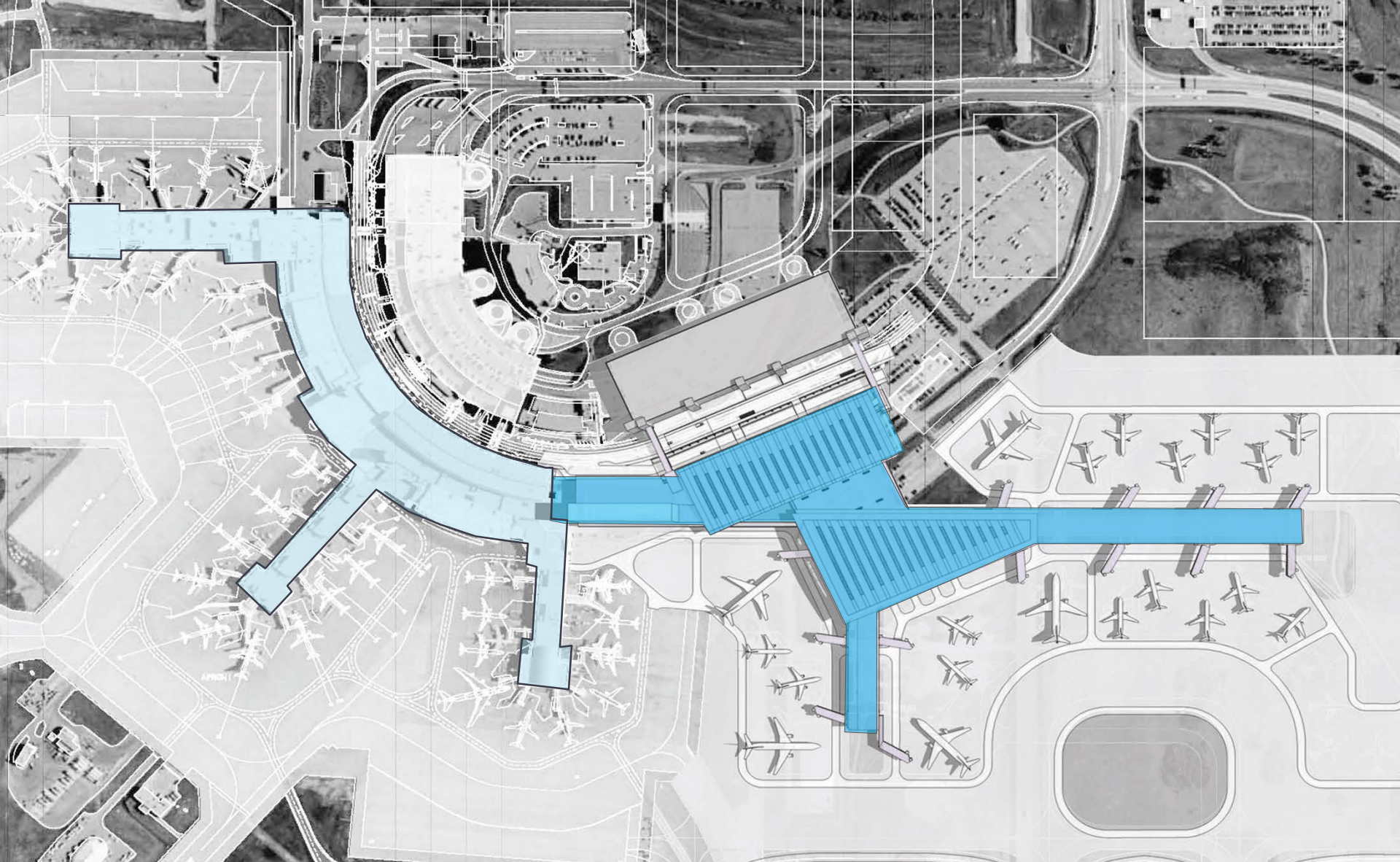
## YYC International Facilities Project – **A Case Study**

DLG®



## YYC International Facilities Project – **A Case Study**

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## YYC International Facilities Project – **The Basics**

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1.8 Million Square Feet  
Tracking LEED Gold  
Largest Current International Expansion

YYC International Facilities Project – **Overview**



# Sustainability Principles - EFOS

## Environmental

YYC and the IFP minimizes waste and conserves resources through effective design and management.

## Financial

IFP systems design provides positive return on investment within a reasonable time frame.

## Operational

The IFP improves workforce effectiveness and operational flexibility through the design, and the use technology, policies, and procedures.

## Service & Social Performance

The IFP provides a high quality service environment for users/stakeholders while YYC as an organization displays social responsibility.

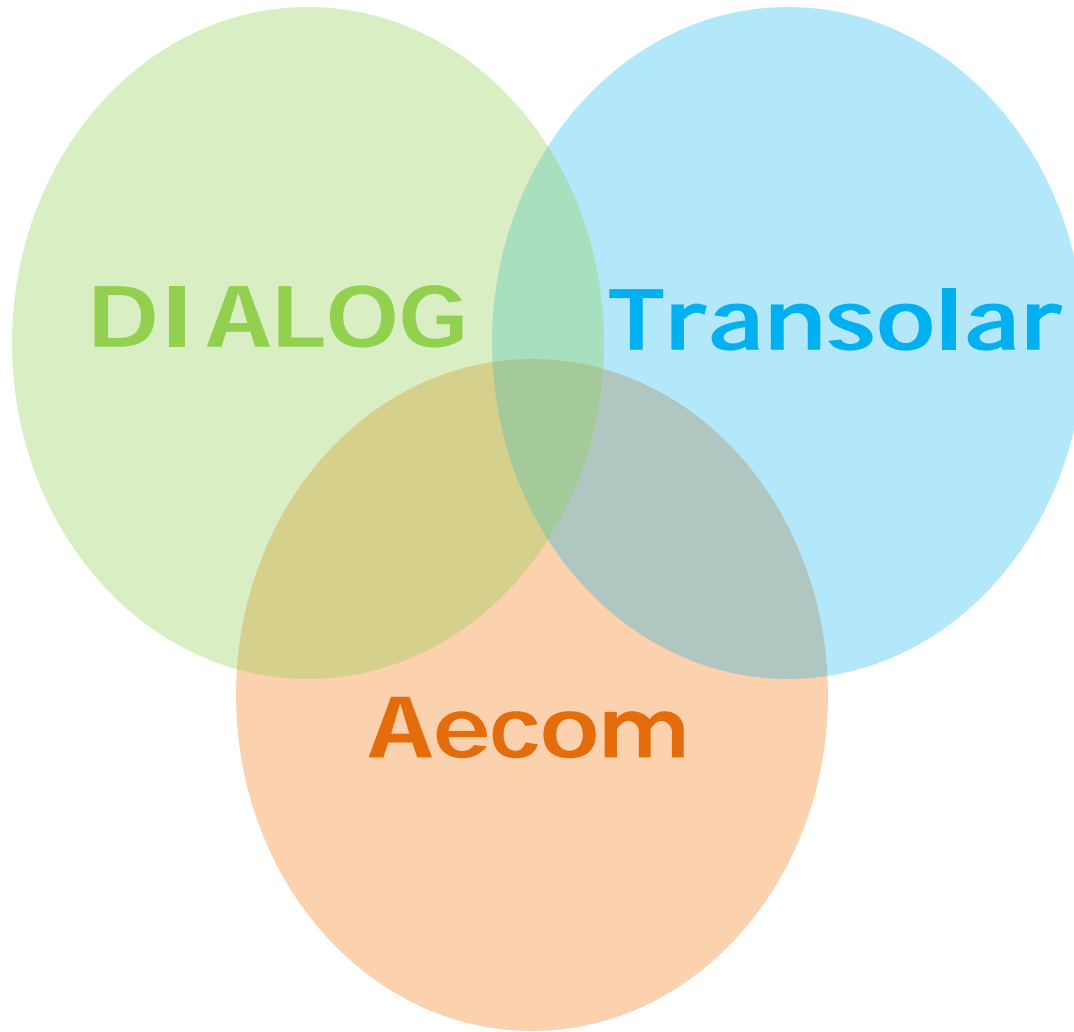


# Sustainability Philosophy



## Conclusion











































The International Facilities Project development team will incorporate sustainable design and building practices to optimize the performance (Environmental, Financial, Operational, Service - EFOS) of the new International Concourse within the approved project budget.



YYC International Facilities Project – **Sustainable Design Team**

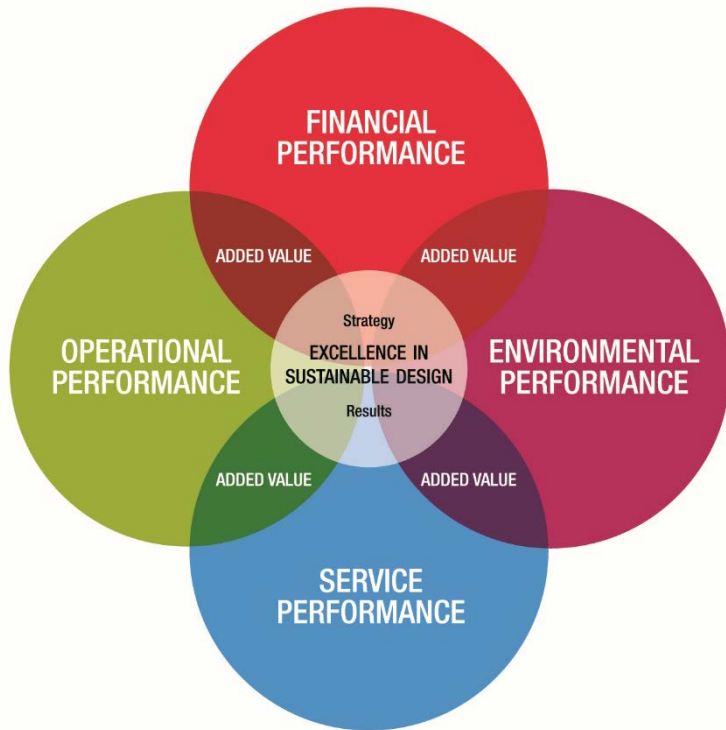
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Option	Sensible Heat Recovery	Enthalpy Heat Recovery	Central Plant Expansion	De-centralized Plant	Upgraded Building Envelope	Low Flow Plumbing Fixtures	Ultra Low Flow or Waterless Fixtures	Day Lighting Controls	Radiant Slab	Displacement Ventilation	Earth Tube or Geothermal	Cogeneration	Rain Water Harvesting	Photo Voltaics	Wind Generated Power
V0															
V1															
V2															
V3															
V4															
V5															

YYC International Facilities Project – **Direction to Proceed**



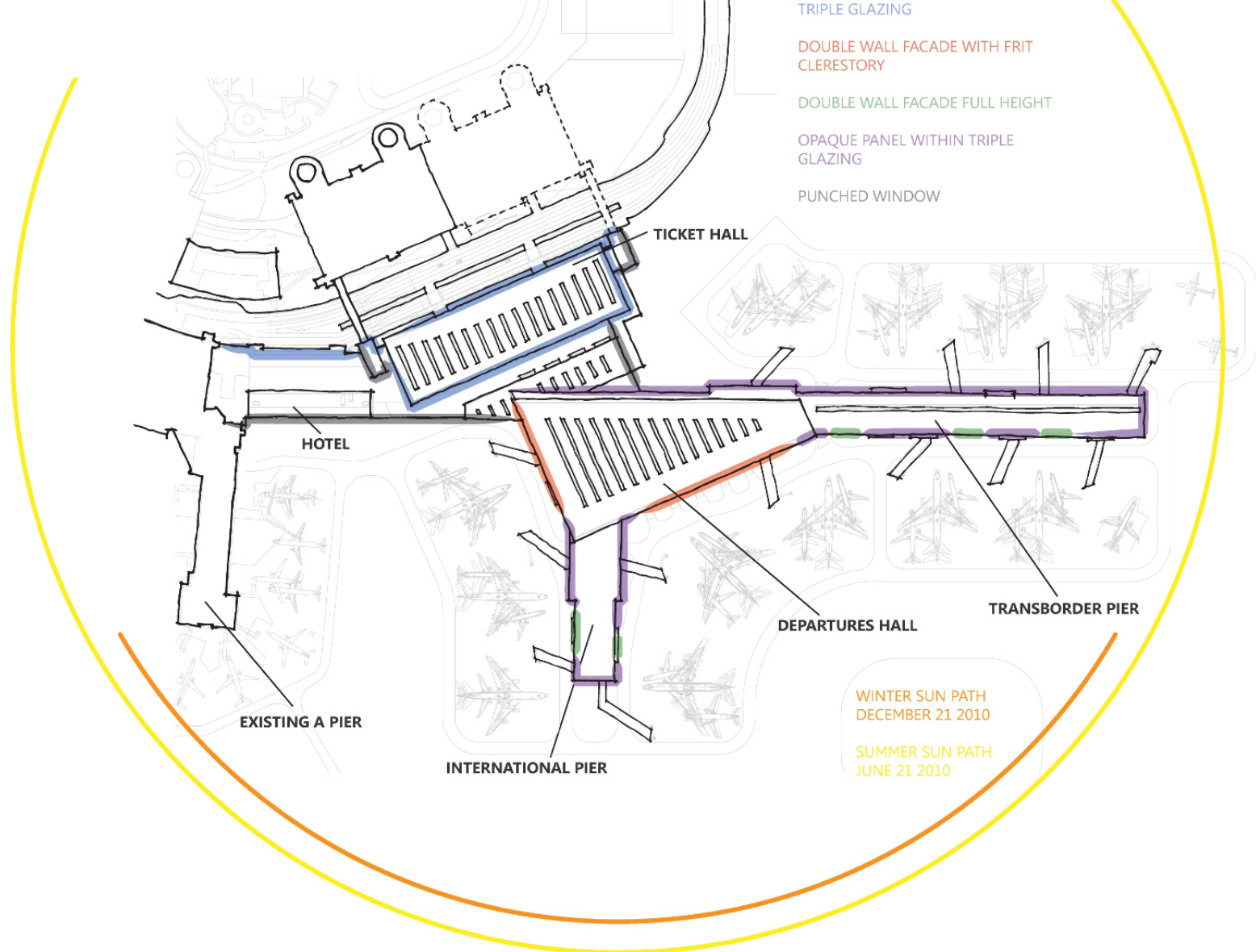


- High Performance Building Envelope Design
- Balanced Window to Wall Ratio
- Optimize Natural Lighting
- Specify Sustainable Materials
- Promote & Design for Water Conservation
- Optimize Use of Long Span Structural Systems
- Promote Recycling
- Geothermal Energy Usage
- Radiant Floor Heating and Cooling
- Stratification of Conditioned Air
- Displacement Ventilation
- Minimize the use of Mechanical Vertical Conveyance
- Study Value of Cogeneration
- Study Value of Rain Water Harvesting
- Making the Building PV Ready

YYC International Facilities Project – **Sustainable Design Strategies**



YYC International Facilities Project – **Sustainable Design Elements**



TRIPLE GLAZING

DOUBLE WALL FACADE FULL HEIGHT

OPAQUE PANEL WITHIN TRIPLE GLAZING

PUNCHED WINDOW

TICKET HALL

HOTEL

EXISTING A PIER

INTERNATIONAL PIER

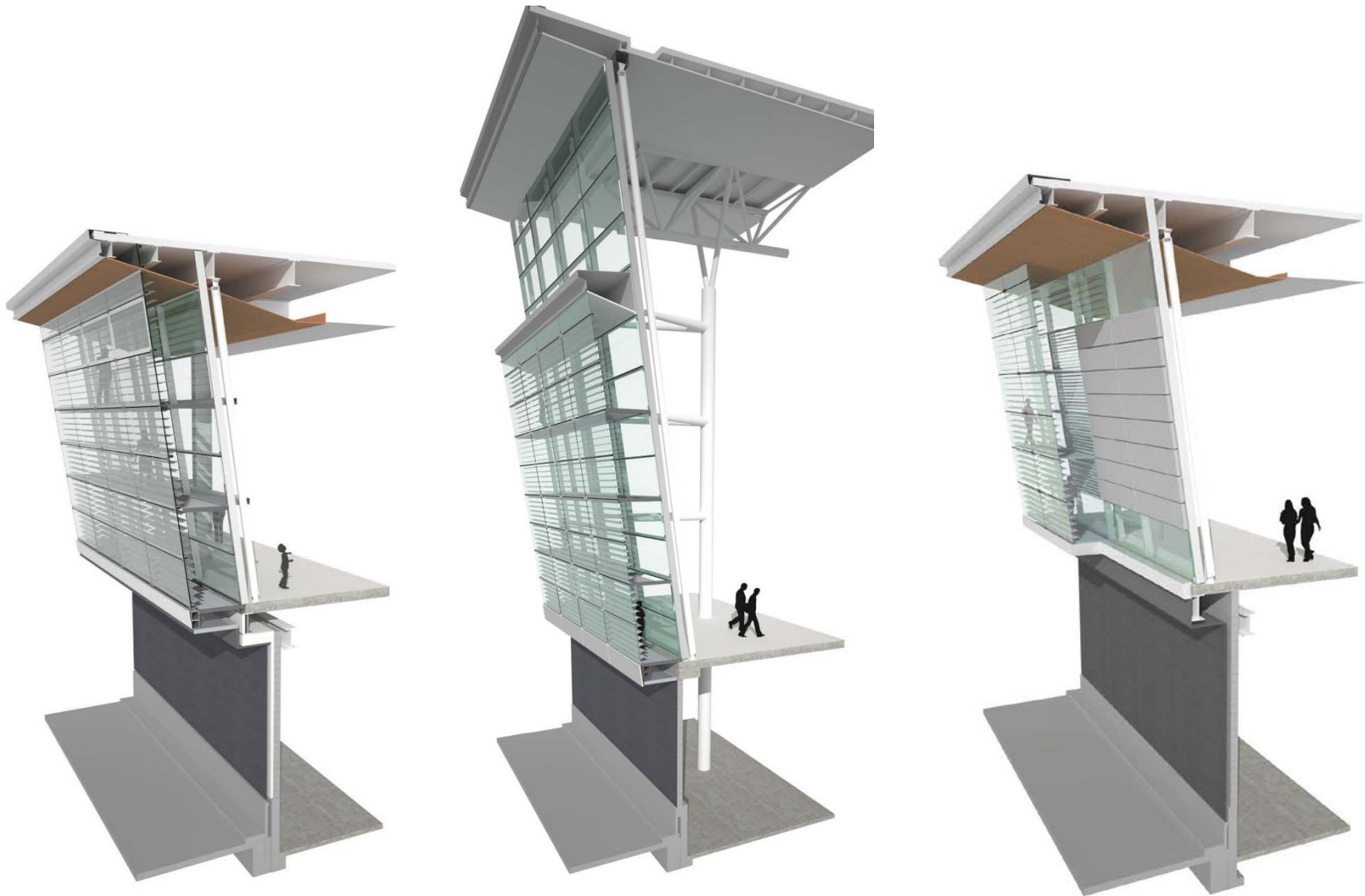
DEPARTURES HALL

TRANSBORDER PIER

WINTER SUN PATH  
DECEMBER 21 2010

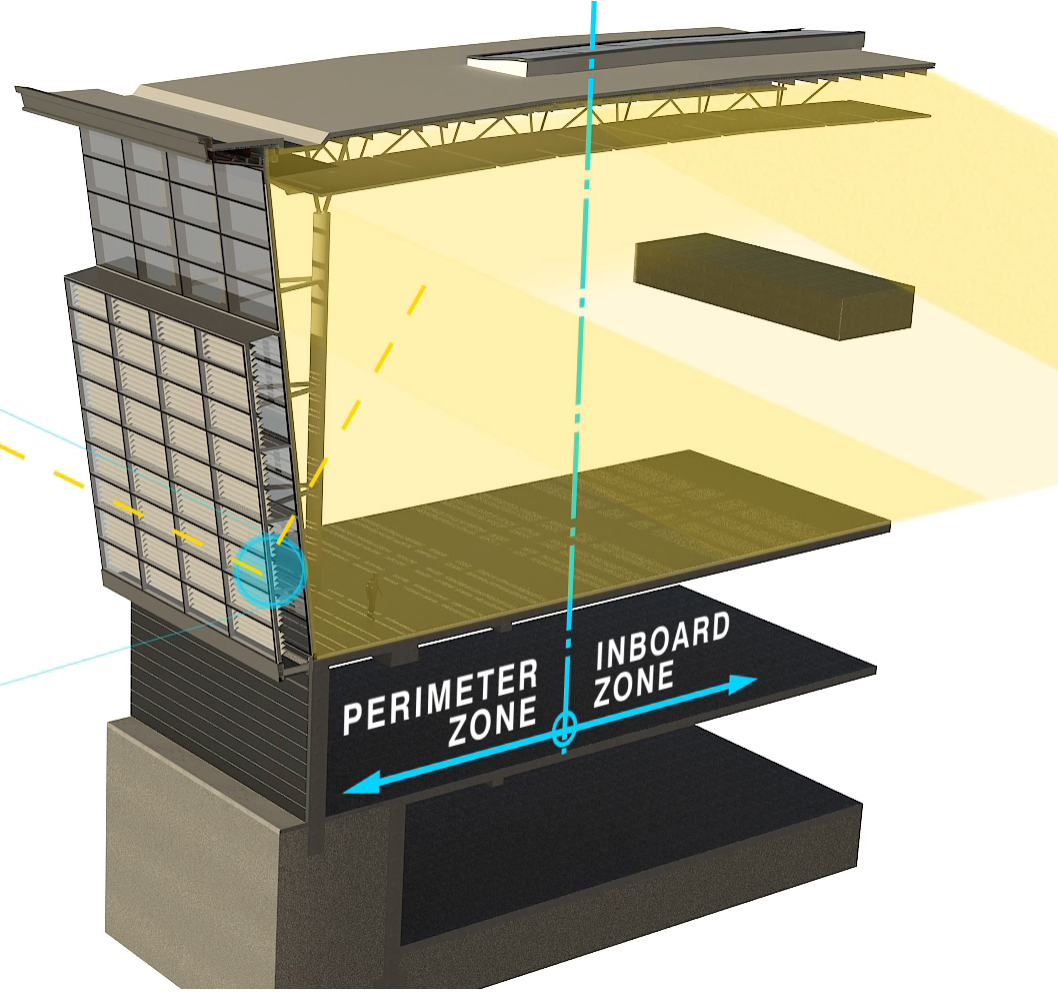
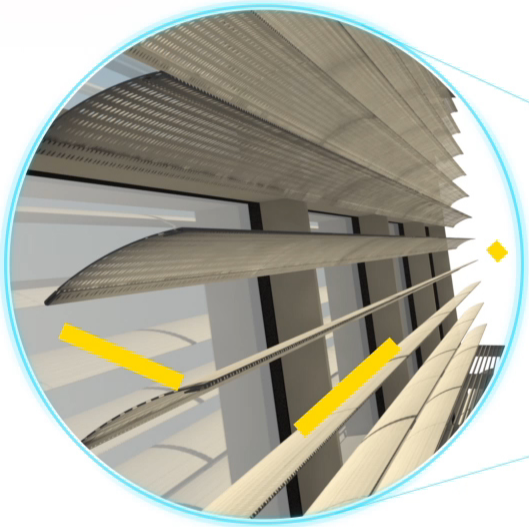
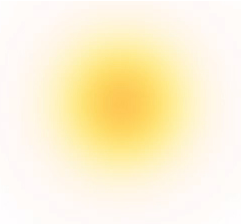
SUMMER SUN PATH  
JUNE 21 2010

# YYC International Facilities Project – Environmental Influences



YYC International Facilities Project – **Envelop Design Responses**

DIALOG®



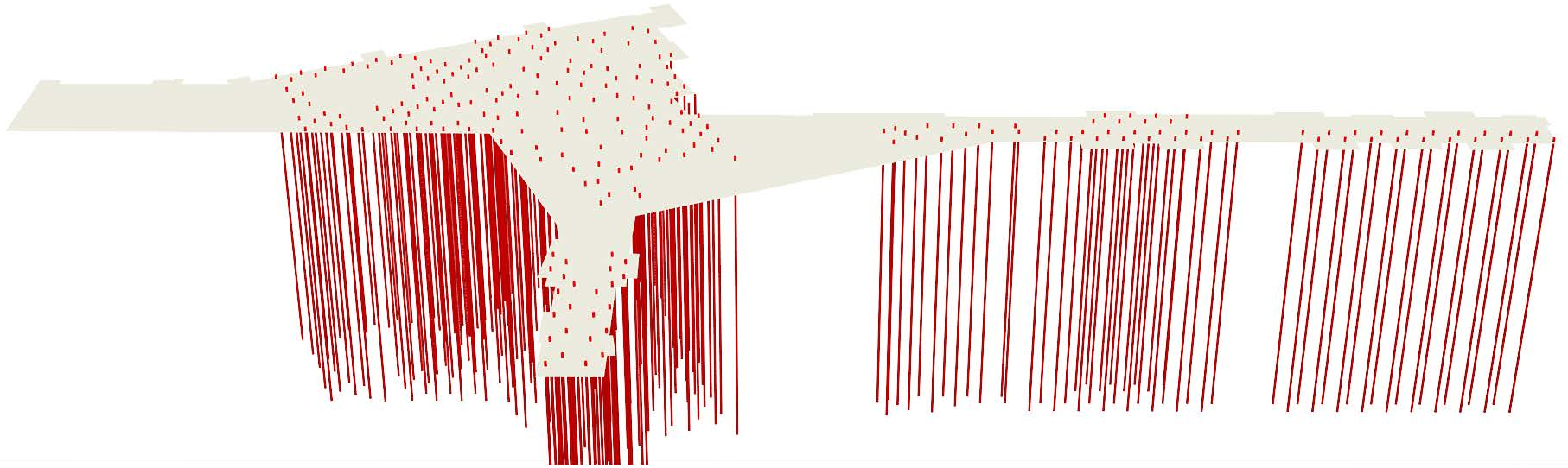
Louvers bounce light back into space

# YYC International Facilities Project – Daylight Harvesting





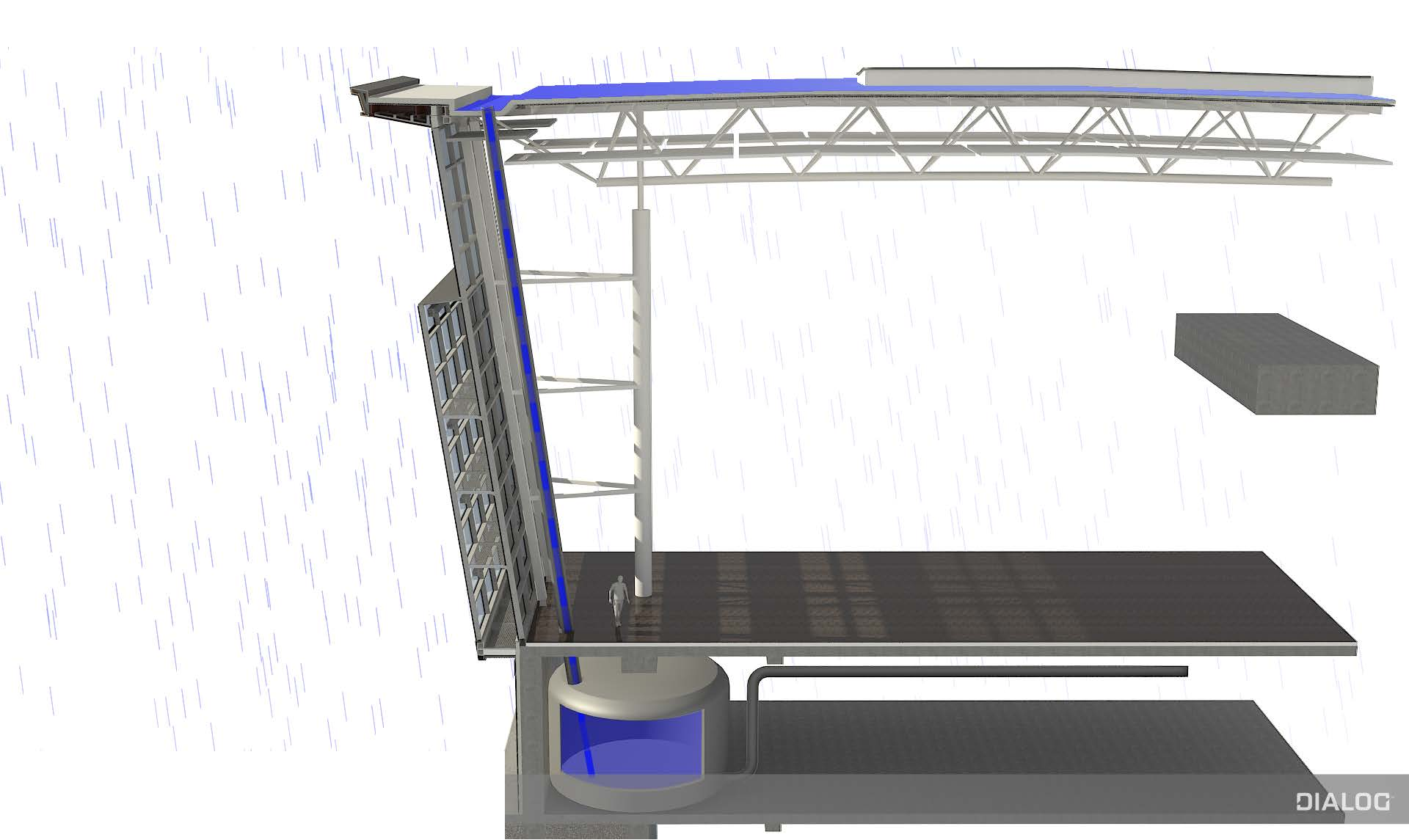
YYC International Facilities Project – **Daylight Harvesting**  
DIALOG®



YYC International Facilities Project – **600 Geothermal Wells**

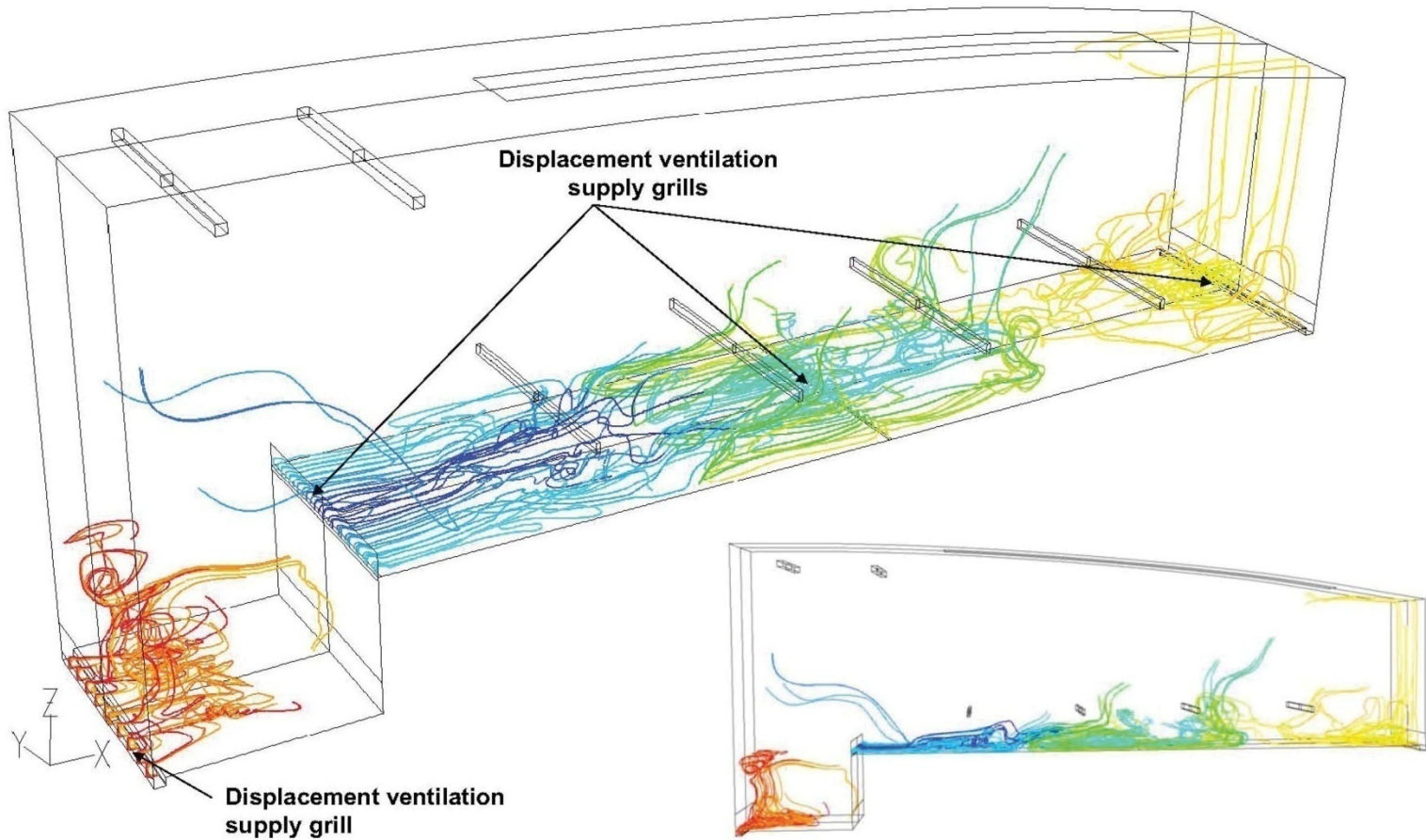
IALOG®





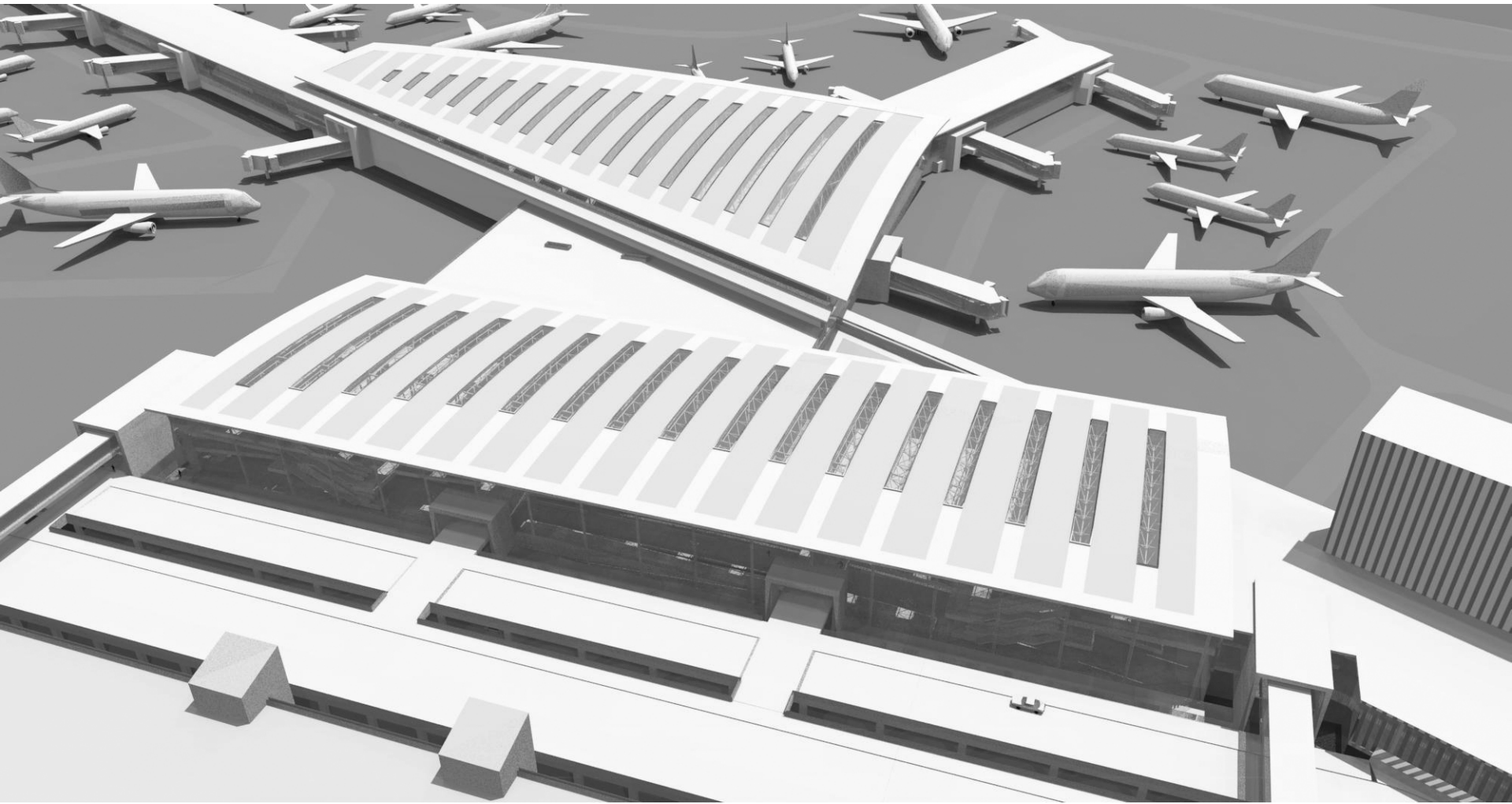
YYC International Facilities Project – **Rain Water Harvesting**

DIALOG®



# YYC International Facilities Project – Displacement Ventilation





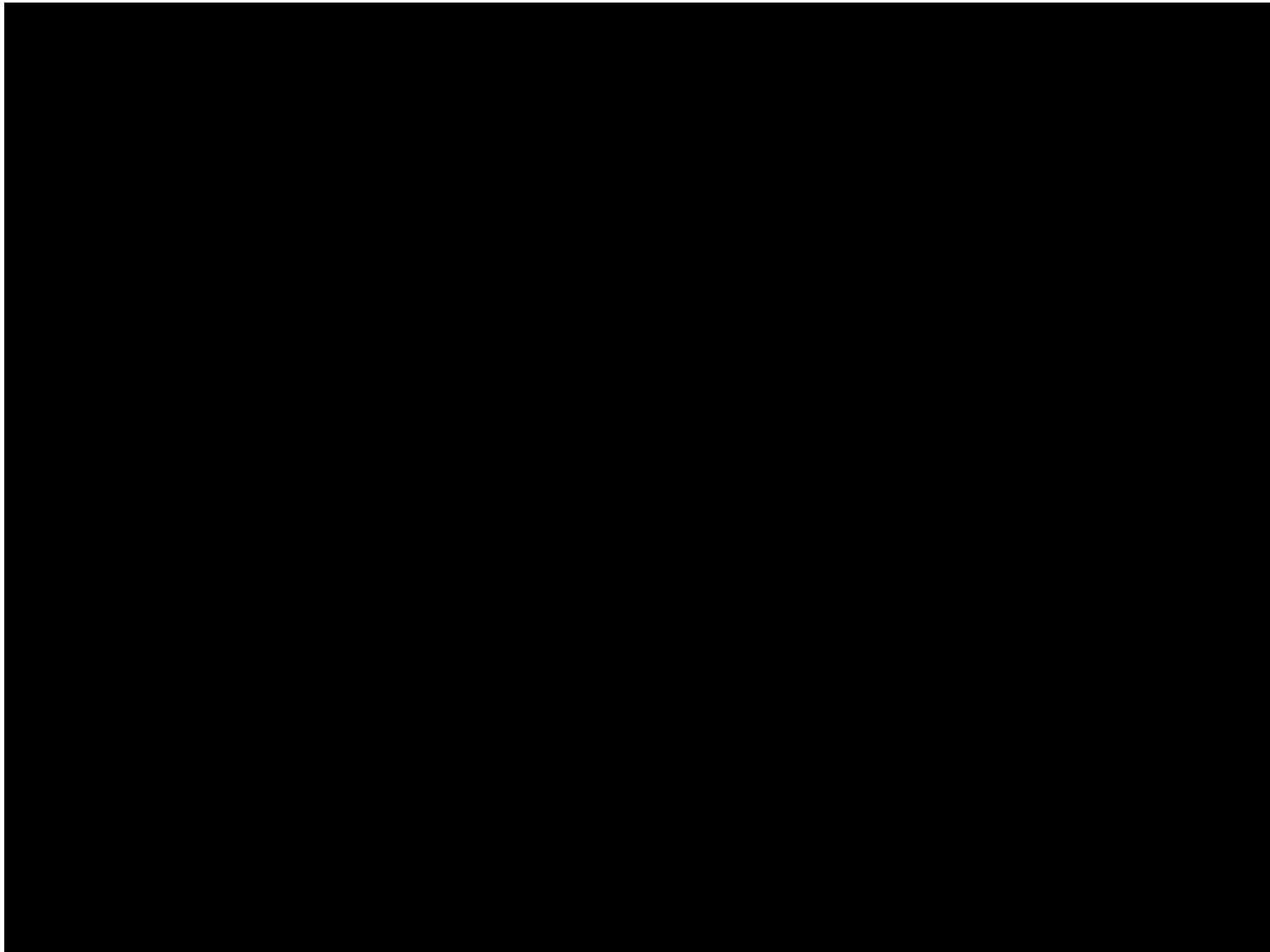
YYC International Facilities Project – **Future Proofing – PV Ready**

IALOG®

## Reduction over V0

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Heating Load	68%	
Cooling Load	74%	
Peak Power	28%	
Annual Energy Consumption	83%	(95% with PV)
Potable Water	52%	
CO2 emissions	55%	(62% with PV)
Operating Cost	42%	



YYC International Facilities Project – **Sustainable Design Summary**

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## YYC International Facilities Project - **DISCUSSION**

DLA|LOG®



LEED Canada NCv1.0

39	4	26	1	TARGETED CERTIFICATION:	<b>Gold</b>
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Sustainable Sites	4	0	10	0	Responsibility
<b>Erosion &amp; Sedimentation Control</b>					
PREREQUISITE					
Site Selection	1		1		SSp1 Civil Engineer
Development Density	1		1		SSo1
Redevelopment of Contaminated Sites	1		1		SSo2
Alternative Transportation - Public Transportation Access	1	1			SSo3
Alternative Transportation - Bicycle Storage & Changing Rooms	1		1		SSo4.1 LEED Consultant
Alternative Transportation - Alternative Fuel Vehicles	1		1		SSo4.2
Alternative Transportation - Parking Capacity	1		1		SSo4.3
Reduced Site Disturbance - Protect or Restore Open Space	1		1		SSo4.4
Reduced Site Disturbance - Development Footprint	1		1		SSo5.1
Stormwater Management - Rate and Quantity	1		1		SSo5.2
Stormwater Management - Treatment	1		1		SSo6.1
Heat Island Effect - Non-Roof	1	1			SSo6.2
Heat Island Effect - Roof	1	1			SSo7.1 Architect
Light Pollution Reduction	1	1			SSo7.2 Architect
	1	1			SSo8 Electrical Engineer
<b>Water Efficiency</b>					
PREREQUISITE					
Water Efficient Landscaping - Reduce by 50%	1		1		WEe1.1
Water Efficient Landscaping - No Potable Use or No Irrigation	1		1		WEe1.2
Innovative Wastewater Technologies	1	1			WEb2 Mechanical Engineer
Water Use Reduction - 20% Reduction	1	1			WEb3.1 Mechanical Engineer
Water Use Reduction - 30% Reduction	1	1			WEb3.2 Mechanical Engineer
<b>Energy &amp; Atmosphere</b>					
PREREQUISITE					
Fundamental Building Systems Commissioning	10	3	3	1	EAp1 Commissioning Agent
Minimum Energy Performance					EAp2 Energy Modeler
CFC Reduction in HVAC&R Equipment & Elimination of Halons					EAp3 Mechanical Engineer
Optimize Energy Performance	3	7	3		EAc1 Energy Modeler
Renewable Energy	1			3	EAc2
Best Practice Commissioning	1	1			EAc3 Commissioning Agent
Elimination of HCF C's	1	1			EAc4 Mechanical Engineer
Measurement & Verification	1	1			EAc5 M&V Consultant
Green Power	1			1	EAc6 Client/Owner
<b>Materials &amp; Resources</b>					
PREREQUISITE					
Storage & Collection of Recyclables	7	1	6	0	MRp1 Architect
Building Reuse - Maintain 75% Existing Walls, Floors, and Roof	1		1		MRc1.1
Building Reuse - Maintain 95% Existing Walls, Floors, and Roof	1		1		MRc1.2
Building Reuse - Maintain 50% of Interior Non-Structural Spaces	1		1		MRc1.3
Construction Waste Management - Divert 50% From Landfill	1	1			MRc2.1 Contractor
Construction Waste Management - Divert 75% From Landfill	1	1			MRc2.2 Contractor
Resource Reuse - 5% Salvaged Materials	1		1		MRc3.1
Resource Reuse - 10% Salvaged Materials	1		1		MRc3.2
Recycled Content - 7.5% (post consumer + 1/2 post industrial)	1	1			MRc4.1 Contractor
Recycled Content - 15% (post consumer + 1/2 post industrial)	1	1			MRc4.2 Contractor
Regional Materials - 10% manufactured regionally	1	1			MRc5.1 Contractor
Regional Materials - 20% manufactured regionally	1		1		MRc5.2 Contractor
Rapidly Renewable Materials	1		1		MRc6
Certified Wood	1	1			MRc7 Architect
Durable Building	1	1			MRc8 Building Scientist
<b>Indoor Environmental Quality</b>					
PREREQUISITE					
Minimum IAQ Performance	10	0	5	0	ESp1 Mechanical Engineer
Environmental Tobacco Smoke (ETS) Control					ESp2 Architect
Carbon Dioxide (CO2) Monitoring	1	1			EQo1 Mechanical Engineer
Increased Ventilation Effectiveness	1	1			EQo2 Mechanical Engineer
Construction IAQ Management Plan - During Construction	1	1			EQo3.1 Contractor
Construction IAQ Management Plan - Before Occupancy	1		1		EQo3.2
Low-Emitting Materials - Adhesives and Sealants	1	1			EQo4.1 Architect
Low-Emitting Materials - Paints and Coatings	1	1			EQo4.2 Architect
Low-Emitting Materials - Carpets	1	1			EQo4.3 Architect
Low-Emitting Materials - Composite Wood	1	1			EQo4.4 Architect
Indoor Chemical & Pollutant Source Control	1	1			EQo5 Architect
Controllability of Systems - Perimeter Zones	1		1		EQo6.1
Controllability of Systems - Non-Perimeter Zones	1		1		EQo6.2
Thermal Comfort - Comply with ASHRAE Standard 55-2004	1	1			EQo7.1 Mechanical Engineer
Thermal Comfort - Permanent Monitoring System	1	1			EQo7.2 Mechanical Engineer
Daylight & Views - Daylight 75% of Spaces	1		1		EQo8.1
Daylight & Views: Views for 90% of Spaces	1		1		EQo8.2
<b>Innovation In Design</b>					
PREREQUISITE					
Innovation in Design: Water Use Reduction 40%	1	1			Idc1.1 Client/Owner
Innovation in Design: Green Education	1	1			Idc1.2 Client/Owner
Innovation in Design: Green Housekeeping	1	1			Idc1.3 Client/Owner
Innovation in Design: Low-Mercury Lamps	1	1			Idc1.4 Client/Owner
LEED® Accredited Professional	1				Idc2 LEED Consultant

TARGETED TOTAL	39	4	26	1	39 / 70
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Updated: 15-12-2014 CERTIFIED 26-32 SILVER 19-30 GOLD 13-51 PLATINUM 62-70

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# YYC International Facilities Project Sustainable Design Results

