The Evolution of the YOW De-Icing Facility

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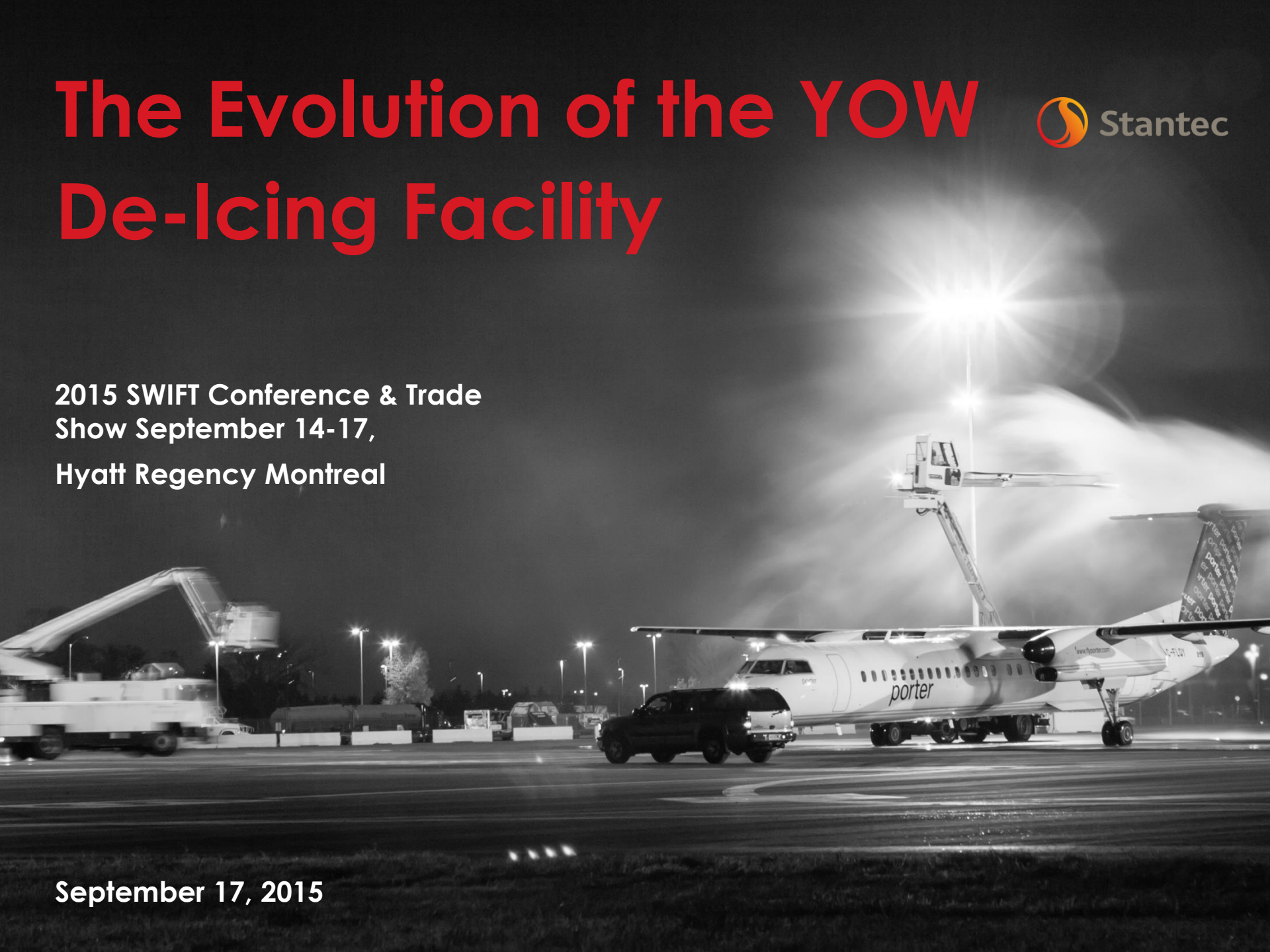
2015 SWIFT Conference & Trade Show September 14-17,

Hyatt Regency Montreal



September 17, 2015

Agenda

1. The Origin of the Ottawa Airport
2. Central De-icing Facilities
3. CDF Recent Upgrades - YOW
4. CDF Construction - YOW
5. Closure - Questions

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1 Origins of the Ottawa Airport

The first powered flight over Ottawa occurred in 1911.

In 1927, aviator Charles Lindbergh lands in the "Spirit of St. Louis", to celebrate the Diamond Jubilee of Canada's Confederation

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Origins of the Ottawa Airport

Ottawa Flying Club

- The Ottawa International Airport was originally opened in 1928 as a flying field for the Ottawa Flying Club. The site was located on a large plot of agricultural land, outside the city limits.
- The Department of Transportation bought the 300 acre aerodrome site from Laurentian Air in 1938 and immediately built a small terminal and resurfaced the runways.
- By 1939 the airport was designated for military use which included the establishment of a military flight training school.

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Origins of the Ottawa Airport

Uplands Airport

Image courtesy of Urbsite

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Origins of the Ottawa Airport

Uplands Airport

- Construction of the airport terminal building began in 1957.
- In 1959 Uplands had the highest volume of air traffic in Canada, reaching 307,079 annual takeoffs and landings due of its combined military and civilian operations.
- The terminal was designed for 900,000 passengers per year.
- By 1980 it was over-capacity at 2.0 million travelers per year.

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Origins of the Ottawa Airport

Ottawa Airport 1960

Image courtesy of Urbsite

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Origins of the Ottawa Airport

Uplands Airport

As the construction neared completion, a military demonstration proved disastrous;

- A U.S. Airforce F104 Starfighter broke the sound barrier and almost every window in the structure. causing significant structural damage
- This mishap added approximately one year to the construction schedule, and $300,000 to the budget of $5.0 million.

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Origins of the Ottawa Airport

Ottawa International Airport

- The terminal was opened by Prime Minister John Diefenbaker on June 30th, 1960.
- Uplands was officially designated as the Ottawa International Airport in 1964 and renamed Ottawa Macdonald-Cartier International in 1993.
- In 1997, the Minister of Transport transferred the facility to the Ottawa Macdonald-Cartier International Airport Authority (OMCIAA), an independent corporation governed by a 14 member board of directors.

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Origins of the Ottawa Airport

Macdonald-Cartier International Airport

- A new Passenger Terminal Building was constructed in 2003 and expanded in 2008 to acts as a gateway to Canada and National Capital Region.
- In 2014 the airport served 4.7 million passengers.
- Since 1997 over $510 million has been judiciously spent on airport improvements including upgrading and expanding the Central De-icing Facility, including a recent expansion in 2015.

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YESTERDAY

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TODAY

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Origins of the Ottawa Airport

Hangar 11 - 1956, with 1960's addition.
Government VIP Reception Centre for receiving dignitaries and official ceremonies.

Image courtesy of Urbsite

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2 Central De-icing Facility

New environment friendly central de-icing facility constructed 2002.

Followed by an award-winning "**Glycol Biotreatment System**", the brainchild of the OMCIAA Director of Environmental Affairs;

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Central De-icing Facility

Image courtesy of Stantec

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Central De-icing Facility (CDF)

Regulations and Guidelines

- **When in Doubt... TP 10643** Aircraft Critical Surface Contamination Training For Aircrew & Groundcrew
  - *Chapter 1 - Air Law, The Clean Aircraft Concept*
- **Canadian Aviation Regulations** (CARs) 602.11 states, in part that: *"No person shall conduct or attempt to conduct a take-off in an aircraft that has frost, ice or snow adhering to any of its critical surfaces"*;
- **General Operating Flight Rules Standard** (GOFR) 622.11, outlines the requirements of an approved ground icing program (AGIP).

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Central De-icing Facility (CDF)

Regulations and Guidelines

- **FAA – Airport Cooperative Research Program**

  ACRP Fact sheets on De-Icing Practices

- **FAA – Advisory Circular AC No: 150/5300-14C**

  Design of Aircraft De-icing Facilities 2013

- **International Civil Aviation Organization,** International Standards and Recommended Practices, Annex 14, Aerodromes, Volume 1, Aerodrome Design & Operations, 5th Edition, July 2009.

- **Aerodrome Standards and Recommended Practices (TP312),** 4th Edition, March 1993.

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Central De-icing Facility (CDF)

Why?

- A central deicing facility or pad has been found to be more cost effective than on-gate deicing.
- Strategically located it allows for a more orderly, efficient and safe movement of aircraft and recovery of glycol fluids.
- Management and containment of fluids contributes to re-cycling and mitigating contamination of the surrounding environment.
- "Pink" snow is contained and run-off controlled.
- Ottawa Airport is located next to the Rideau River and canal system a UNESCO World Heritage site.

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Central De-icing Facility (CDF)

Who?

- This CDF is operated by **Aéro Mag**, a private company, incorporated in 1994 and headquartered in Ville St-Laurent, Québec.
- They are responsible for:
  - Aircraft de-icing
  - De-icing centre management
  - Recycling of used de-icing products in certified and reusable products for aircraft de-icing.
  - In Ottawa they are a single service provider to all airlines.
- Under the jurisdiction of OMCIAA

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Central De-icing Facility

Image courtesy of AeroMag

3 CDF Recent Upgrades - YOW

Take a sows ear and make it into a silk purse.

Not as prestigious as the CDF at Pearson Airport,

(reported to be the largest in North America)

.....but we like it

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CDF Recent Upgrades - YOW

The problem – three fold.

1. **Aircraft capacity;** with increased passenger volume to >4.7 million more put through capacity was required.
2. **FOD and glycol contamination due to lack of bituminous pavement durability;** increased cycles of freezing and thawing reduce pavement life expectancy to approximately 8-10 years from normal pavements, expected to last >15 years.
3. **Pavement capacity;** constructed over various substrates including, DND hangar floor slabs, former apron slabs, and flexible asphalt pavement portions of Taxiway A. Required for Code E aircraft

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CDF Recent Upgrades - YOW

The problem

- A plan to re-stripe the existing facility for additional lanes resulted in directing aircrafts to pavement structures that lacked the capacity for long term support of their wheel loads, exacerbating durability issues.
- Lighting and wayfinding did not suit the revised configuration.
- Drainage and glycol loss was a concern at the peripheral lanes.
- A cost effective solution for the next 15 years keeping airfield expansion and central location in mind.

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CDF Recent Upgrades - YOW

The solution

- Review CDF location and pavement surfacing requirements.
- Investigate the pavement structure and provide recommendations for expansion of the facility.
- No signs of subgrade distress such as rutting or alligator cracking. This based on:
  - High strength of existing subgrade & subbase.
  - Excellent drainage under the pavement.
  - Excellent frost performance due to lack of silt or clay in the subgrade and very low water table.

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CDF Recent Upgrades - YOW

The solution

- Modify site grading to improve drainage and better capture glycol run-off.
- Refine the layout based on expanding towards Taxi Alpha and to meet TP312 requirement.
- Add more lights and instrumentation for signals and way-finding to improve pilot and de-icing staff visibility, traffic direction and safety.

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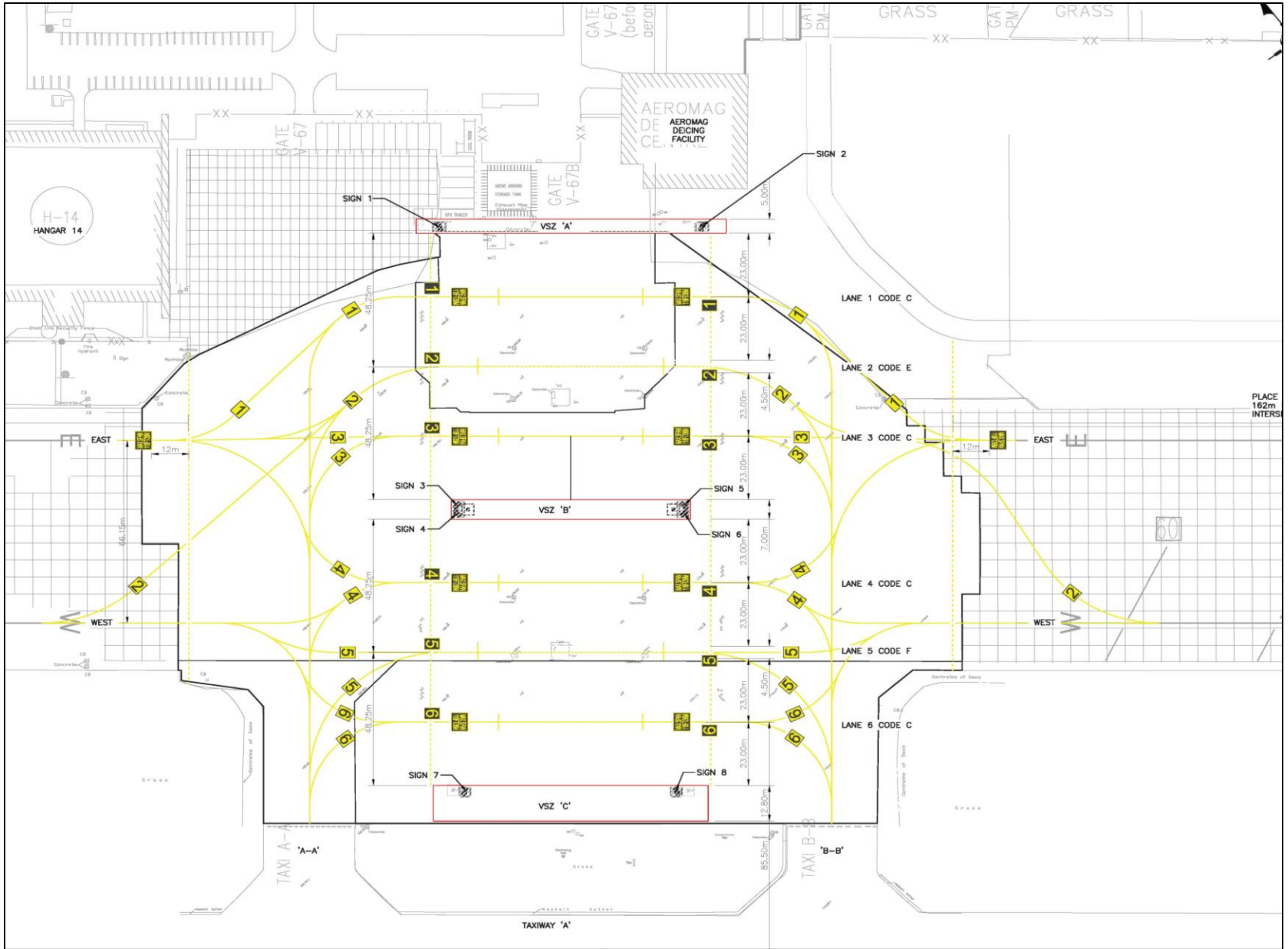
CDF Recent Upgrades - YOW



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CDF Recent Upgrades - YOW

The solution

- Innovative use of slot drains and modifications to the storm diversion infrastructure.
- A bonded hot mix asphalt overlay was incorporated in areas where the substrate consisted of concrete slabs and panels.
- The pavement along grassy areas within the graded strip was redesigned and strengthened.
- A constraint to the expansion was the clear distance requirement to active Taxiway A.

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CDF Recent Upgrades - YOW

The solution

- To assist in understanding the proposed development, our airport designers created a 3D "drive-through" model in animations of the site, allowing stakeholders to have a pilot's eye view of the lighting, signage, and construction, before any decisions were finalized.
- Conducted several charrettes and stakeholder meetings to understand needs and constraints.

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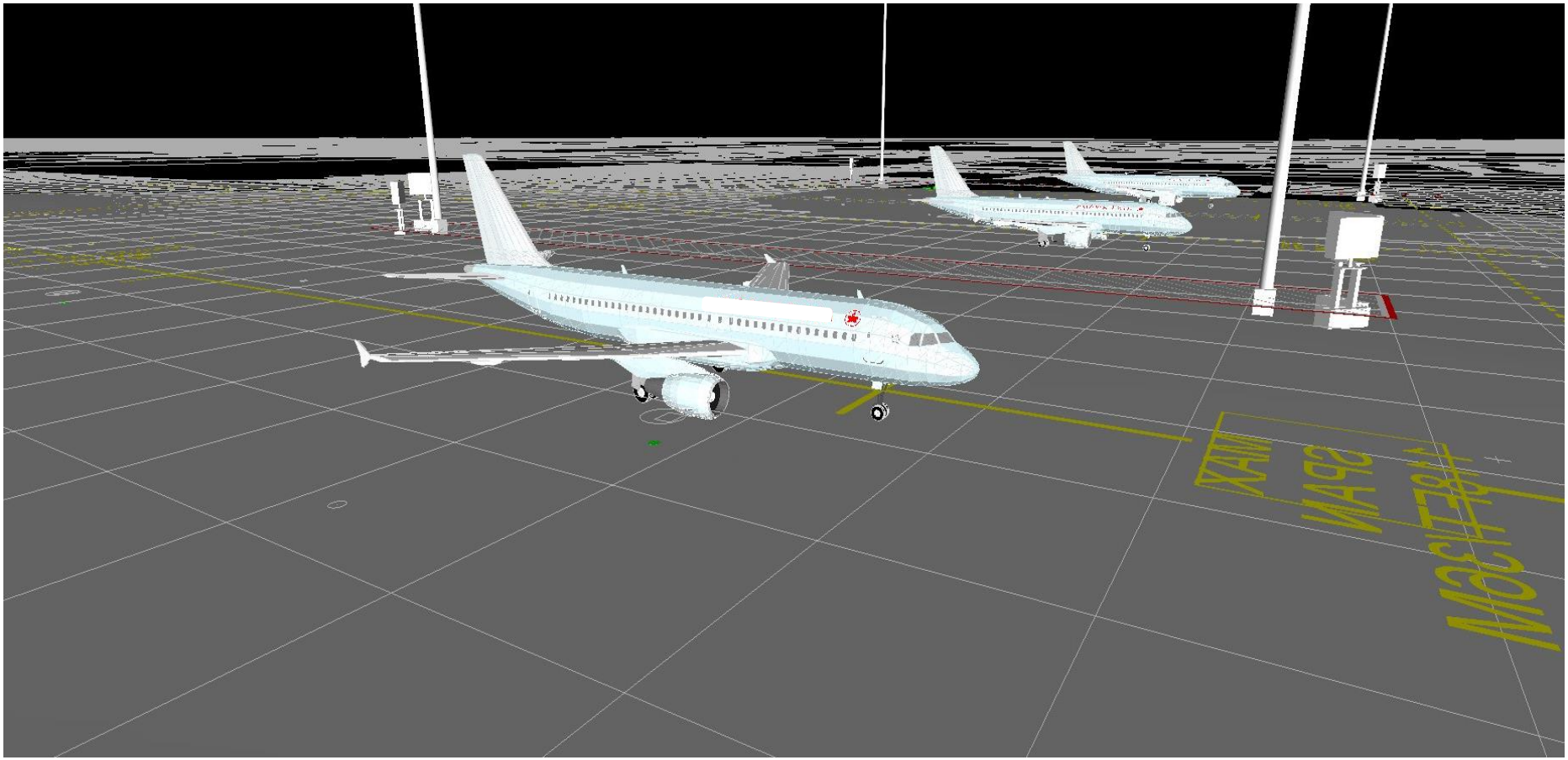
CDF Recent Upgrades - YOW

Pilot view 3-D Modelling



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CDF Recent Upgrades - YOW

Pilot view 3-D Modelling

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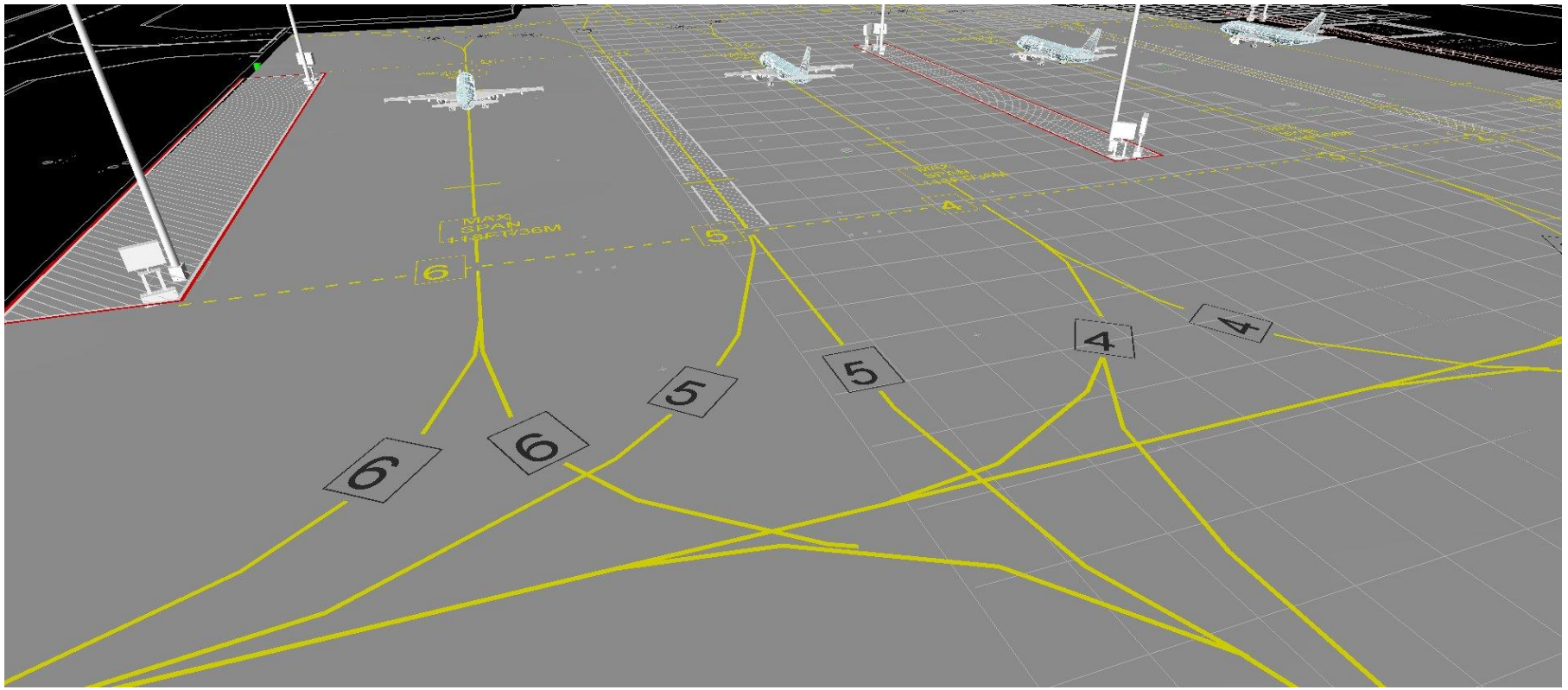
CDF Recent Upgrades - YOW

Pilot view 3-D Modelling



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CDF Recent Upgrades - YOW

Cost savings value engineering

- Pavement intended for service vehicles in the restricted areas (Vehicle Safe Zone) constructed as light duty and marked accordingly.
- Re-use and purchase of electronic sign boards was an important consideration to the cost of the rehabilitation.

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4 CDF Construction 2013- YOW

Make it work and keep everyone happy.

Deal with the surprises.

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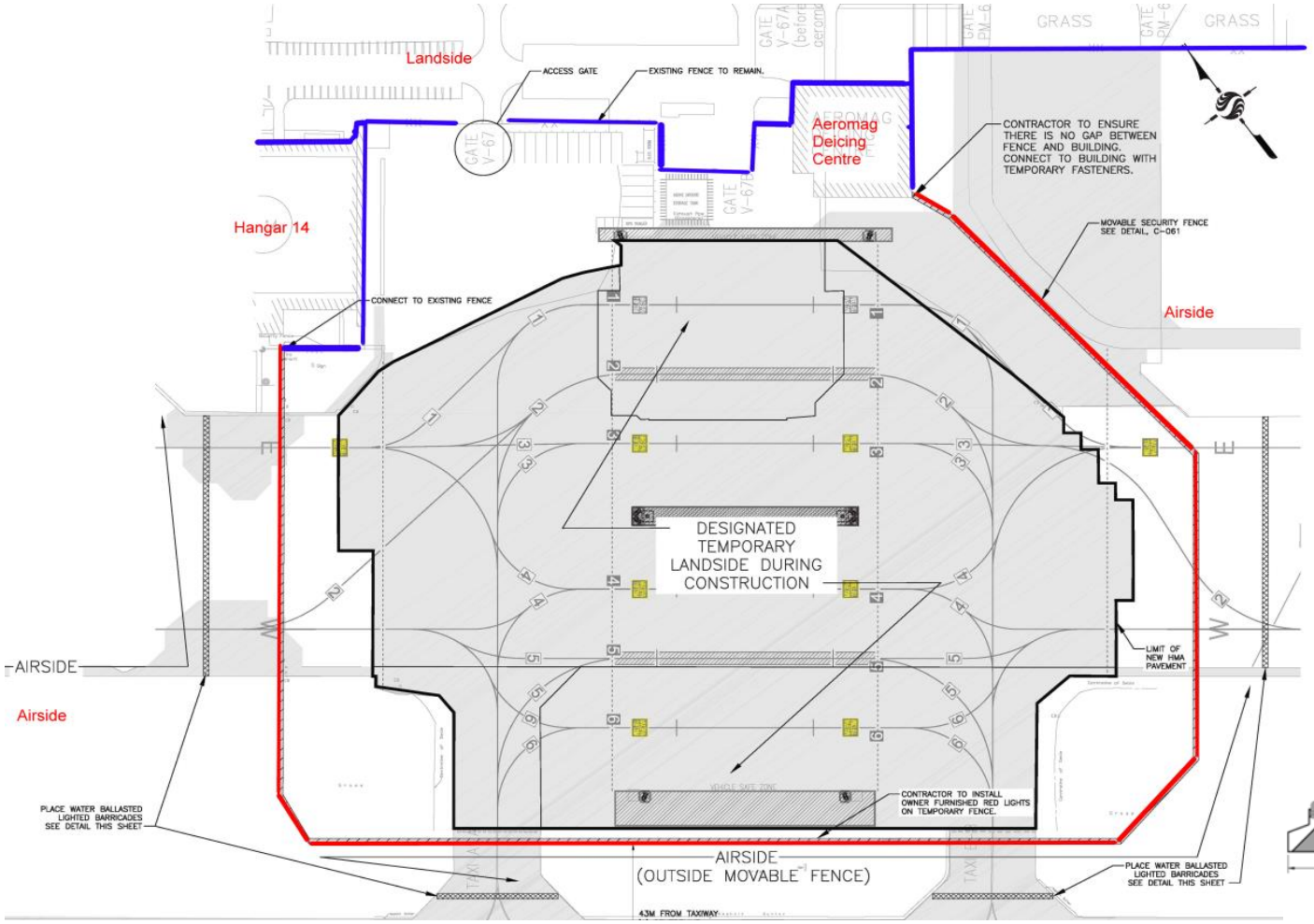
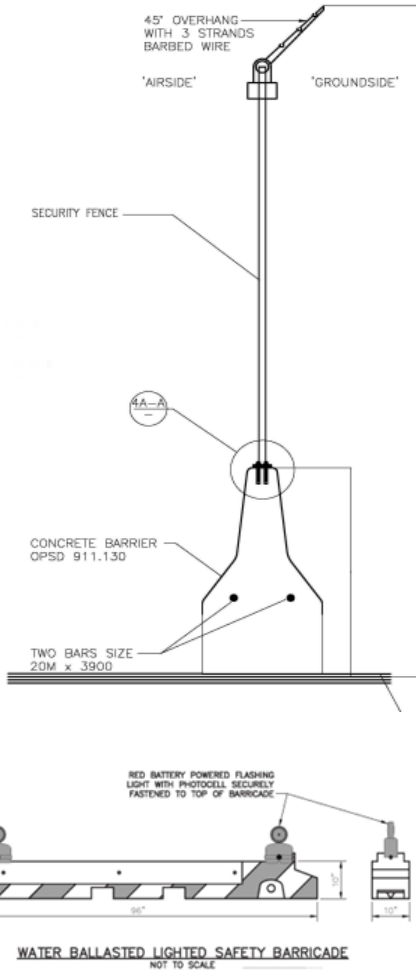
CDF Construction 2013 - YOW

Creating a safe worksite. (all groundside)





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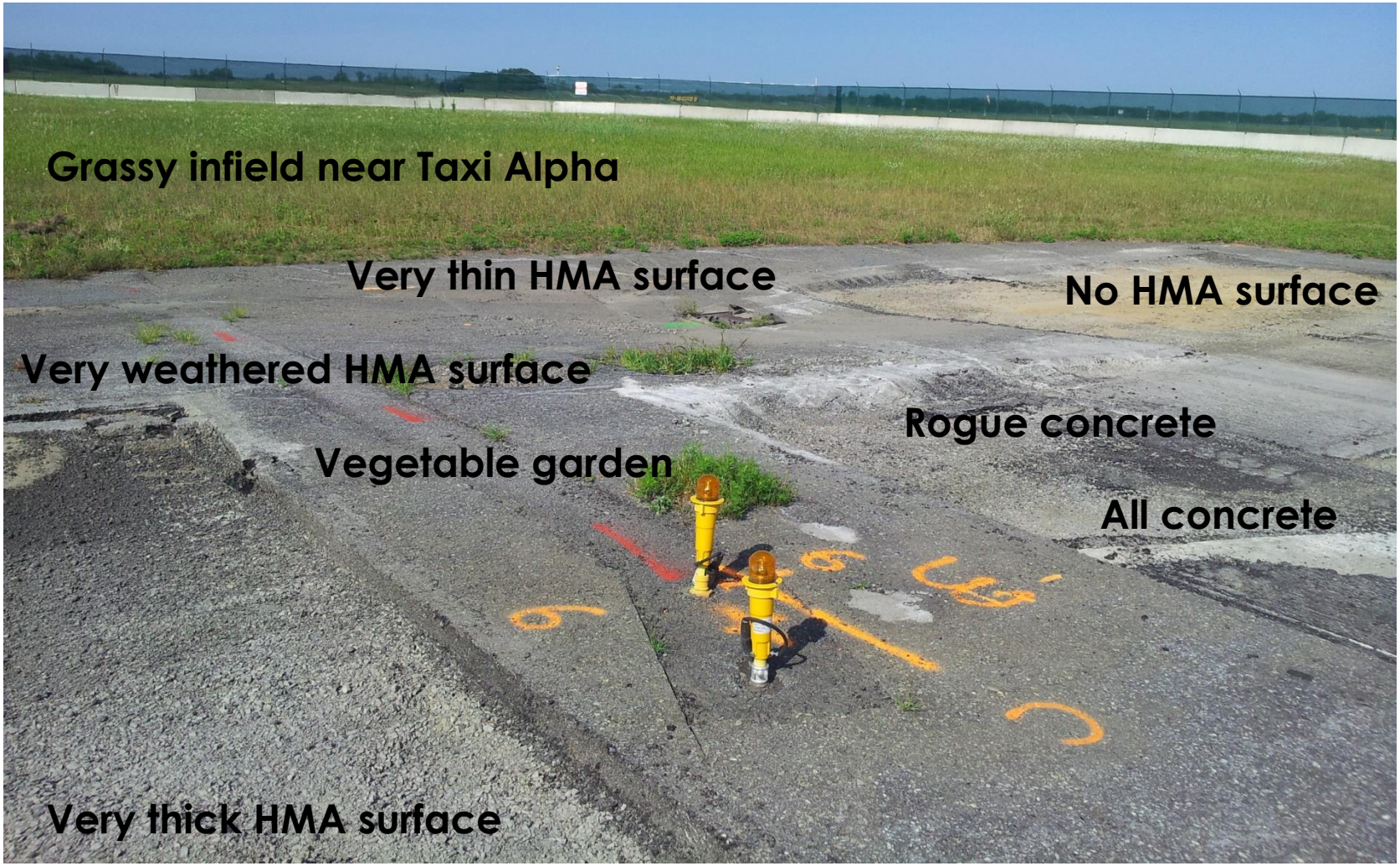
CDF Construction 2013 - YOW

Cornucopia of pavement structure(s)



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Note “skinny” pavement structure within electrical trench confines.

Concrete apron slab with asphalt overlay removed.

CDF Construction 2013 - YOW

Trenching for electrical and lighting

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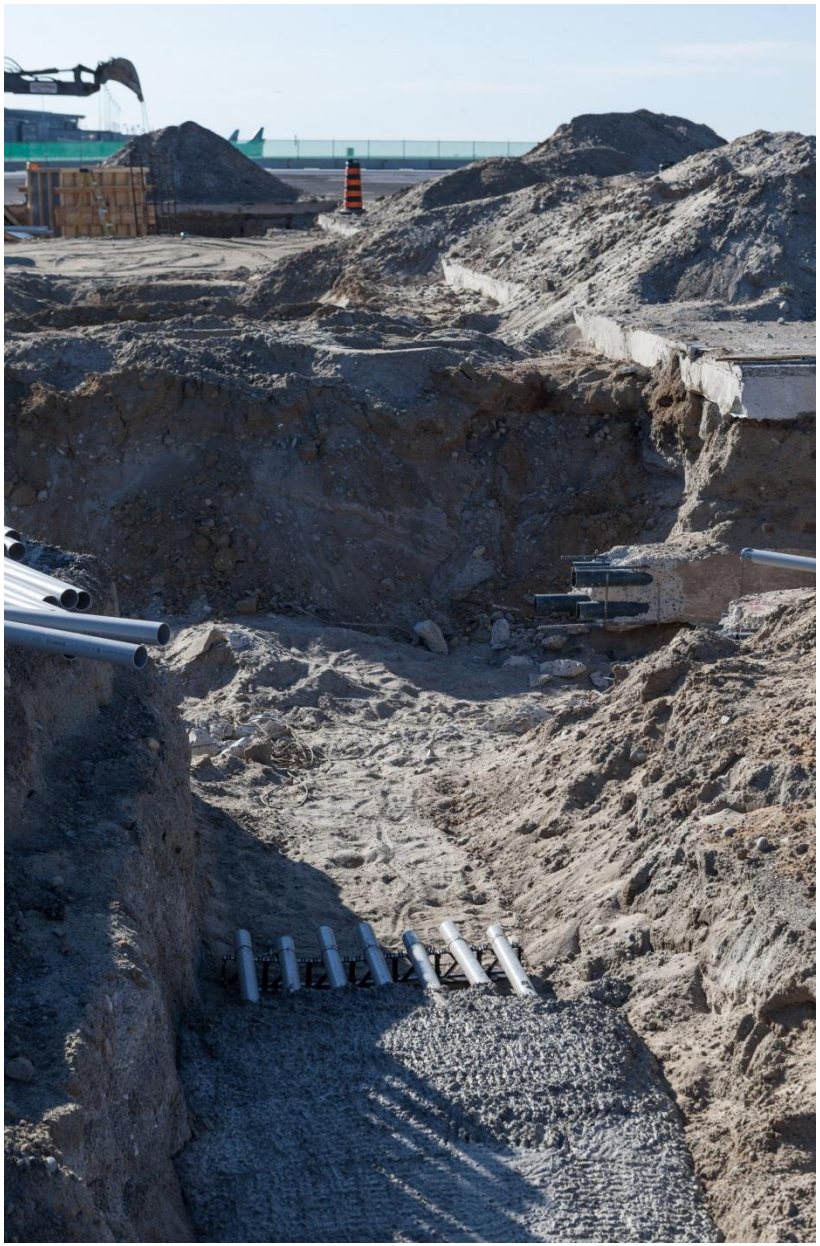
Trenching to expose existing conduit



Trenching to construct new conduit.

CDF Construction 2013 - YOW

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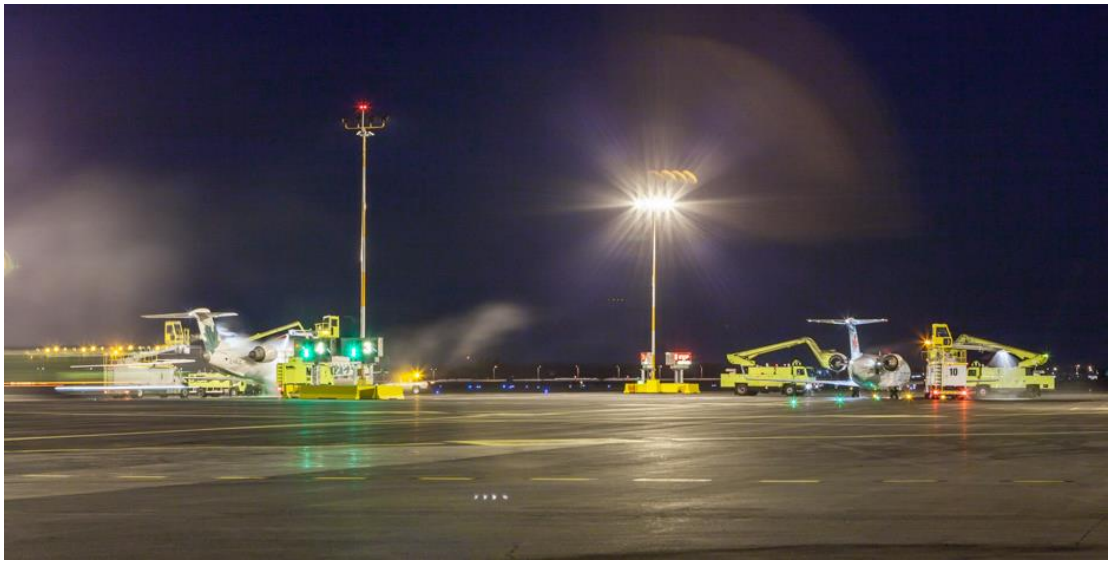
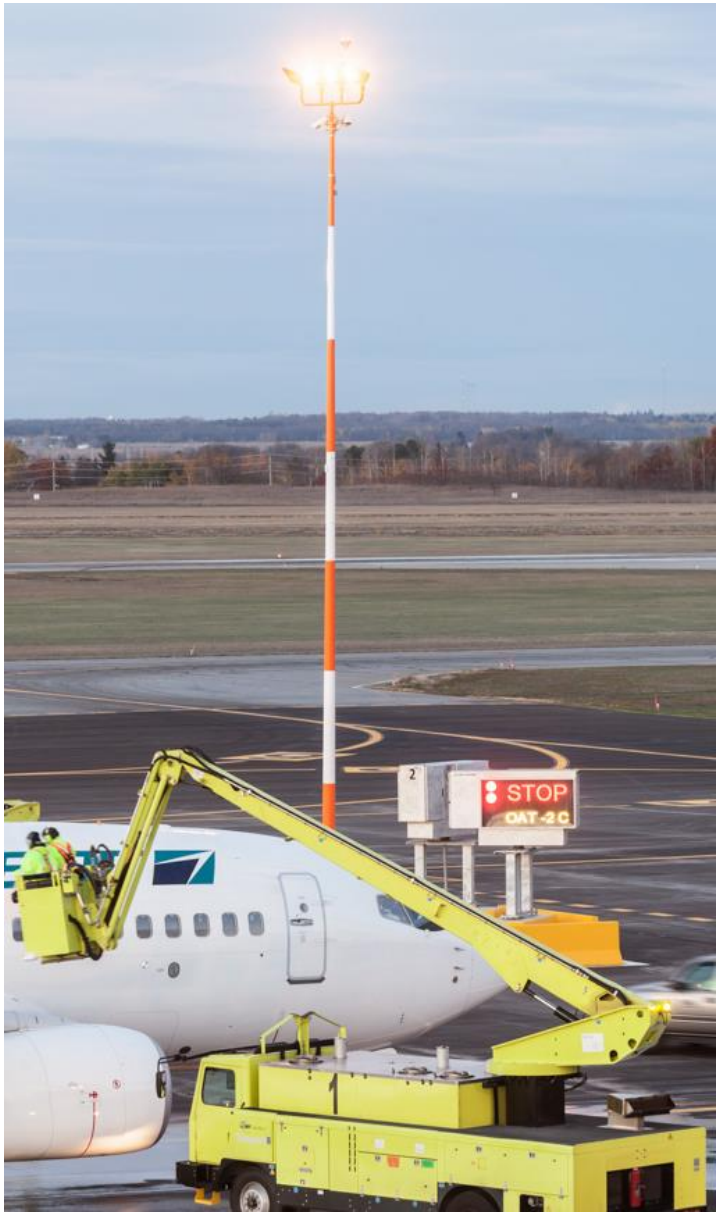
Electrical and signage



Deicing Operations Building
View of Signage and Inset Lighting



Signage improved for visibility and safety.

CDF Construction 2013 - YOW

Slot drains and site grading

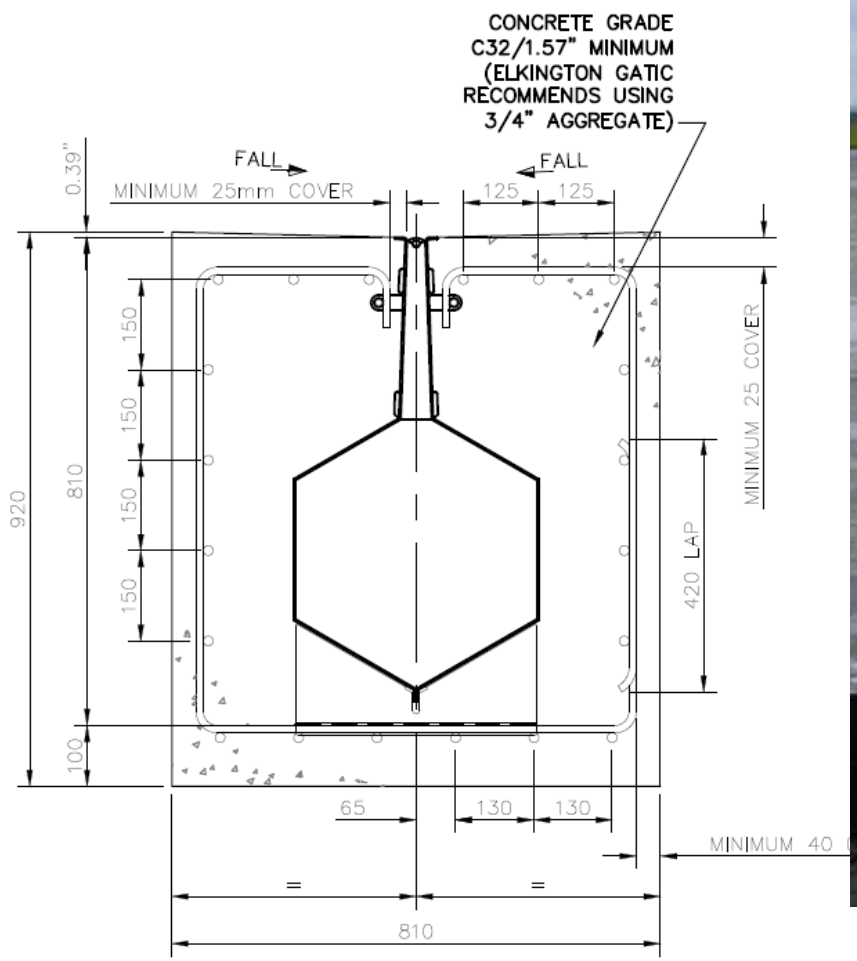


Image courtesy of Elkington Gatic

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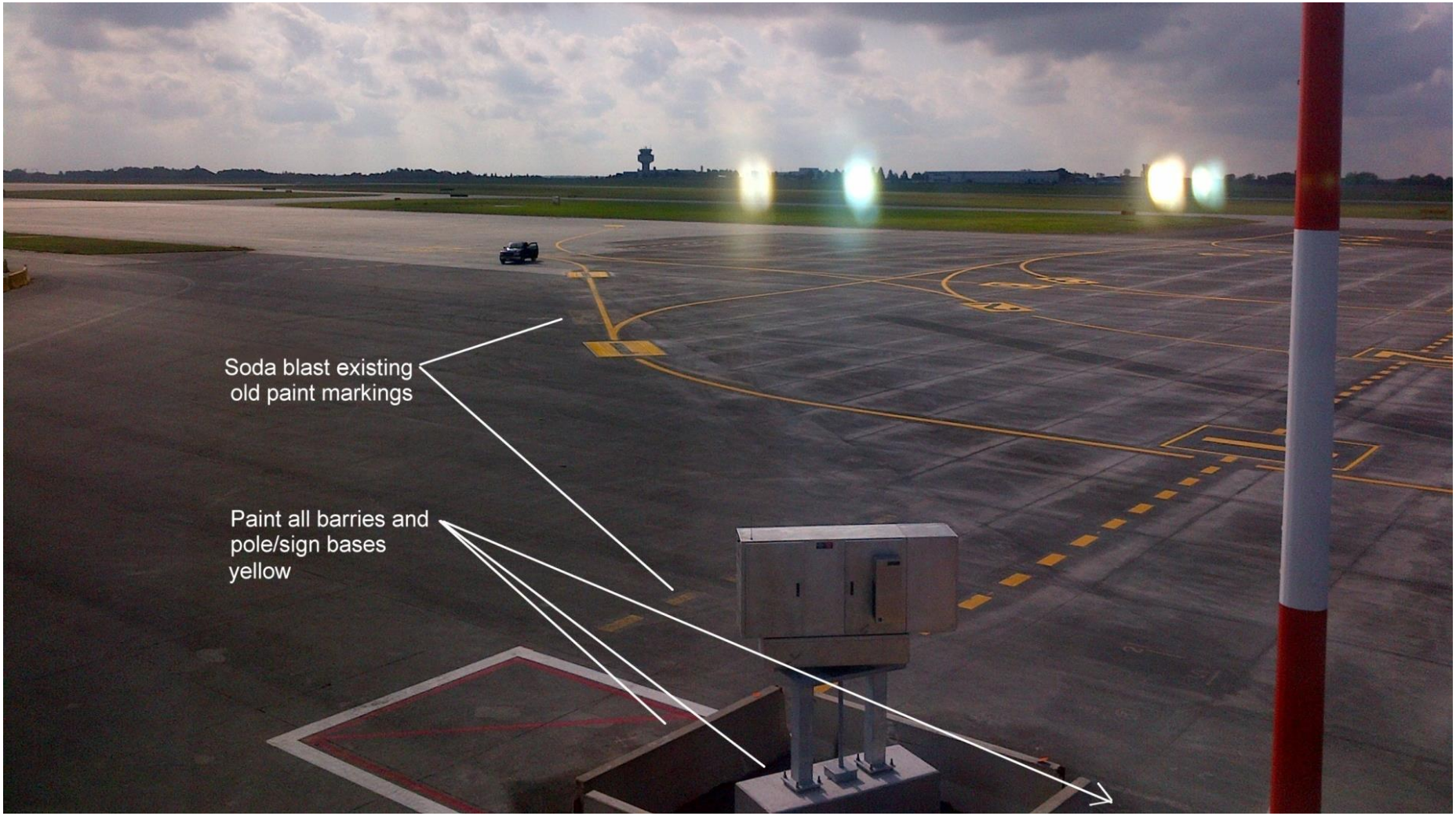
Slot drains located at north and south ends of CDF

Pavement adjacent to slot drains is holding up very well.

CDF Construction 2013 - YOW

Line painting



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Project initiated early 2013; investigated, designed, tendered, and fully constructed for opening in October the same year.

Throughout the process, Stantec conducted meetings and value engineering reviews with all stakeholders to deliver this project;

100% on time and on budget

..... the OMCIAA way!

Questions?

Paul R. Walkington, CET, rcca, LEED®AP
Principal - Buildings Engineering (Construction)

paul.walkington@stantec.com