

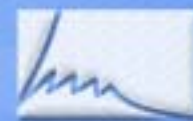


# Pavement Recycling Success at GTAA

**Umair Syed Shah, P.Eng.**

2011 SWIFT Conference, Montreal, Canada

September 12, 2011



Hatch Mott  
MacDonald

[www.hatchmott.com](http://www.hatchmott.com)

# Presentation Outline

- Background – Airport Development Program and HMM role
- GTAA's Material Recycling Targets
- Material Recycling Achievements
- Existing PCC Pavement Recycling Processes

# **BACKGROUND – AIRPORT DEVELOPMENT PROGRAM AND HMM ROLE**



# Toronto Pearson Airport Development Program (ADP)

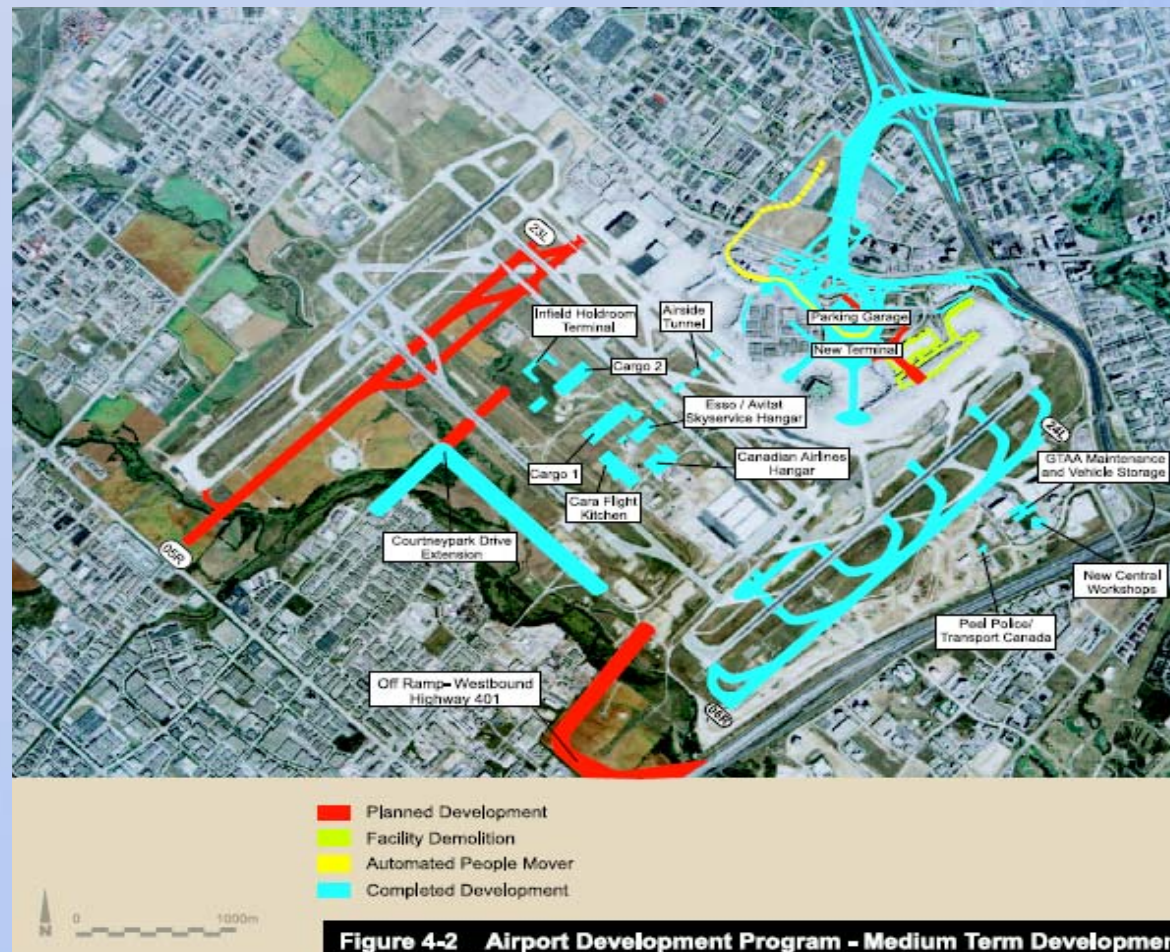


Figure 4-2 Airport Development Program - Medium Term Development

# HMM ROLE

- HMM - Civil and Airside Engineer responsible for the \$400 million in civil and airside projects
  - ❖ Civil and Ramp Services Design
  - ❖ Civil Enabling Works
  - ❖ Decommissioning and Demolition
  - ❖ Aircraft Gating Mix Consultation
  - ❖ Site Compliance Administration



# Stage 1 – Start 1999; Complete 2003



Hatch Mott  
MacDonald

## Stage 2 – Start 2003; Complete 2007



Hatch Mott  
MacDonald

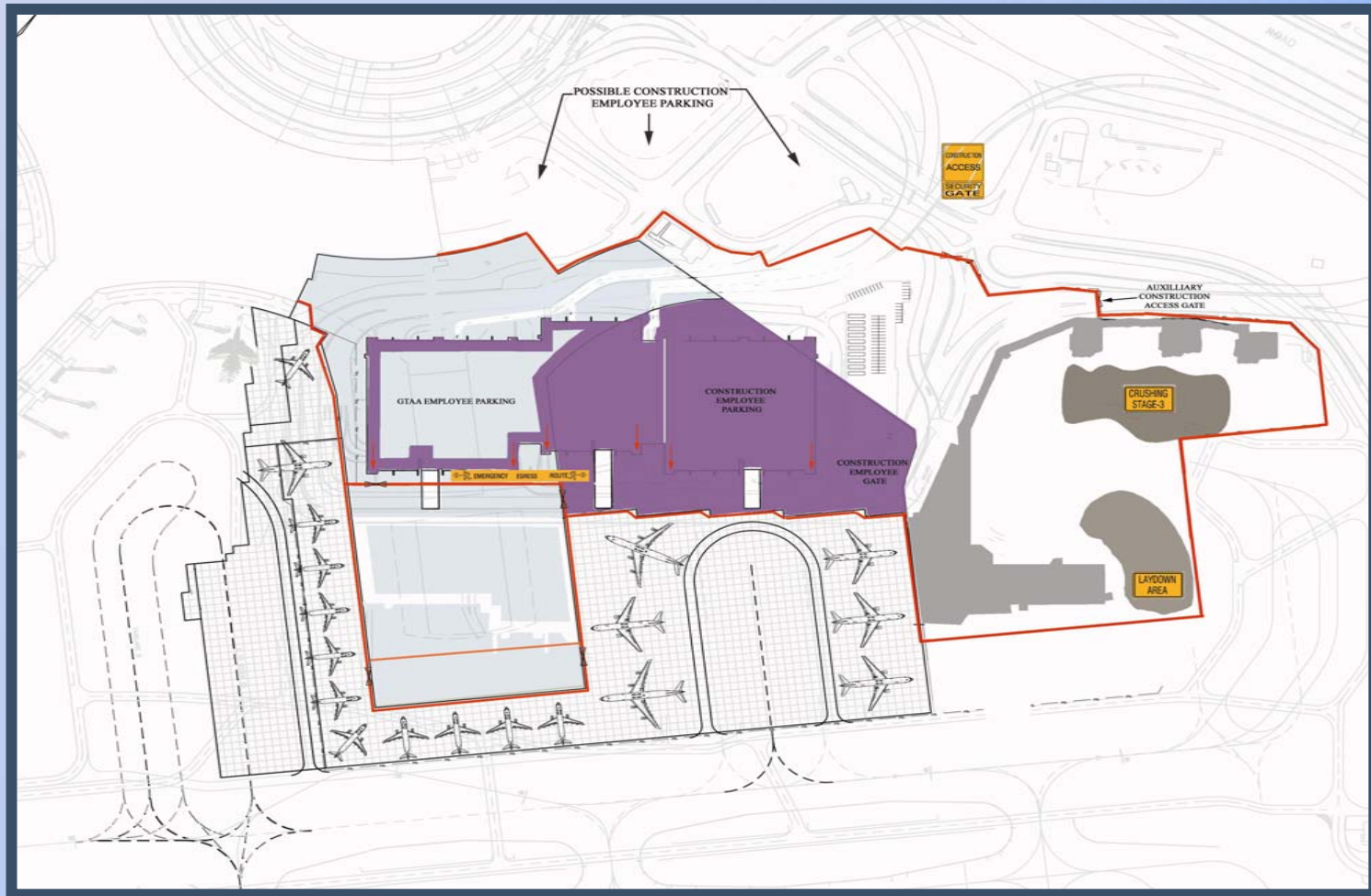


# Stage 3.1 – Start 2007; Complete 2008





# Stage 3.2 – Start 2010; Ongoing



# GTAA MATERIAL RECYCLING TARGETS



# Material Recycling Targets

- GTAA Environmental Management System is ISO 14001 Certified
- HMM Recycling Goals for building Demolition and Apron Design Projects
- Safe Hazardous Material Decommissioning
- Recycling of Existing Pavements
- On-site Soil Remediation

# HMM Recycling Goals

- Recycle minimum of 80% of construction and demolition waste
  - ❖ Scrap metals, concrete, asphalt, drywall, brick rubble, wood and waste
- Remediate minimum of 95% of petroleum hydrocarbon and glycol impacted soil and/or gravel



# Hazardous Material Decommissioning

- Hazardous material decommissioning included material such as:
  - ❖ Asbestos containing material, PCB's from transformers and fluorescent ballasts, refrigerants and ozone depleting substances, lead, bird guano, mould, lead and other items
- Structural Demolition using Conventional methods including Pneumatic Impact, Shears, Grapples, Torching etc.,

# Old Terminal One - Demolition

Equipment – Shear (left), Pneumatic Hammer and Grapple (right)





# Old Terminal One - Demolition



# Old Terminal One – Processing of Steel and Rebar





# Terminal Two - Demolition



# Terminal Two - Demolition



# Recycling of Existing Pavements

## ➤ Recycling of existing pavements included:

- ❖ Existing PCC apron pavement from the Old T1 and T2 and associated areas
- ❖ Existing asphalt pavement from the parking garage and roads within Old T1 and T2



# Existing Pavement - Demolition



# On-Site Soil Remediation

- GTAA Soil Remediation facility (Bio pile)
- On site remediation of Hydrocarbon impacted material
- Minimum 95% soil remediation target



# **MATERIAL RECYCLING ACHIEVEMENTS**



# Material Recycling – Old T1

- Recycled material from Old T1 included scrap metals, concrete, asphalt, brick rubble, drywall and waste
  - ❖ Scrap metals recycled off-site at appropriate steel brokers and vendors locations
  - ❖ Concrete from columns, beams, slabs and walls were processed within the site
  - ❖ Asphalt from the parking garage and roads within Old T1 recycled off-site at local asphalt plants
  - ❖ Brick rubble, drywall and waste recycled off-site at various recycling and disposal services

## Old T1 Recycling Achievement – 98%

Material Category	Tonnes	Percentage Recycled
Scrap Metal	24000	100%
Concrete	253000	100%
Asphalt	10000	99%
Waste	2900	95%
Brick Rubble	1500	100%
Drywall	110	99%
Hazardous Materials (Asbestos, Vermiculite Panels, etc.,)	2900	100% Reduction

# Material Recycling – Airport Development Program (ADP)

- Material Recycling (99%) exceeded the GTAA requirements under ISO 14001
  - ❖ Scrap metals recycled off-site to appropriate steel brokers and vendor's locations
  - ❖ Concrete from columns, beams, apron slabs and walls were processed within the site
  - ❖ Asphalt removed from the parking garage and roads within Old T1 and T2 were recycled offsite at local asphalt plants
  - ❖ Drywall, brick rubble and waste were recycled at various recycling and disposal services

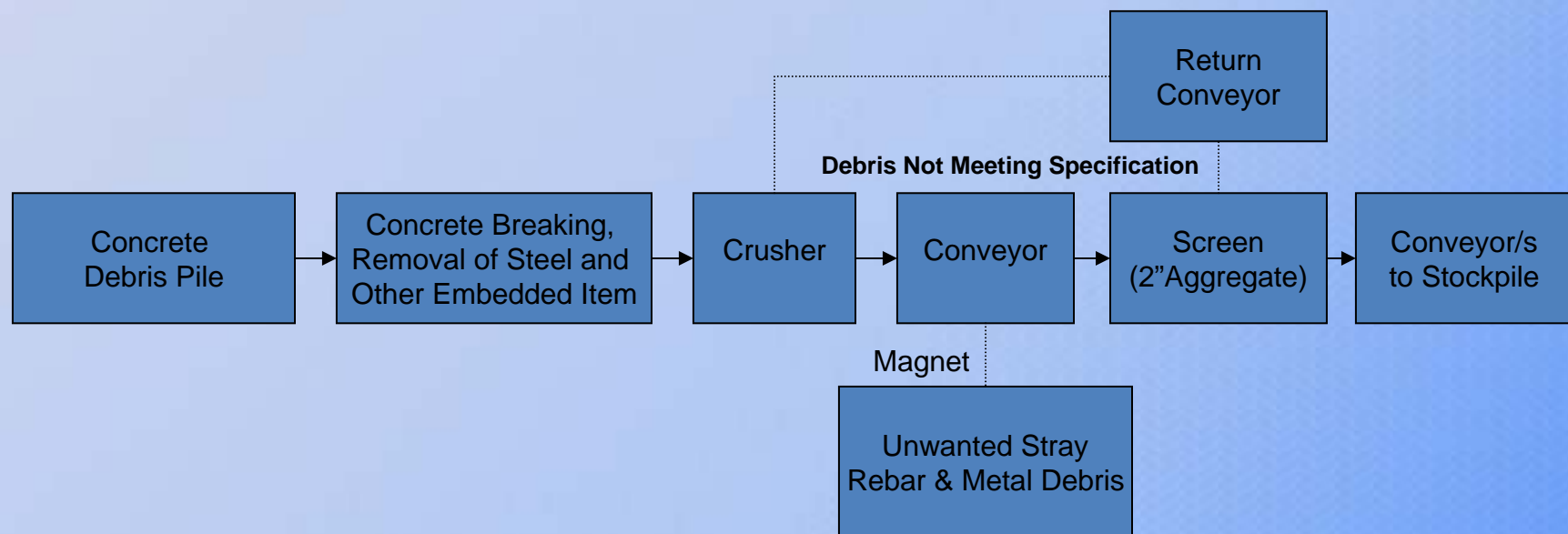


# ADP-Recycling Achievement – 99%

TPIA- Airside Development Project (2009)		
Material Category (Quantities rounded)	Tonnes	Percentage Recycled
<i>Scrap Metal</i>	44,000	100%
<i>Concrete</i>	390,000	100%
<i>Asphalt</i>	16,500	99%
<i>Drywall</i>	770	99%
<i>Hazardous Materials (Asbestos, Vermiculite Panels, etc)</i>	3,300	100% Reduction
<i>Hydrocarbon Impacted Material</i>	5,100 (Stage 3)	100%
<i>Average Percentage Recycled</i>		99% Achieved

# **EXISTING PCC PAVEMENT RECYCLING PROCESS**

# Flow Chart – Pavement Recycling





# Pavement Recycling - Pictures



# Pavement Recycling - Pictures



# Pavement Recycling - Pictures

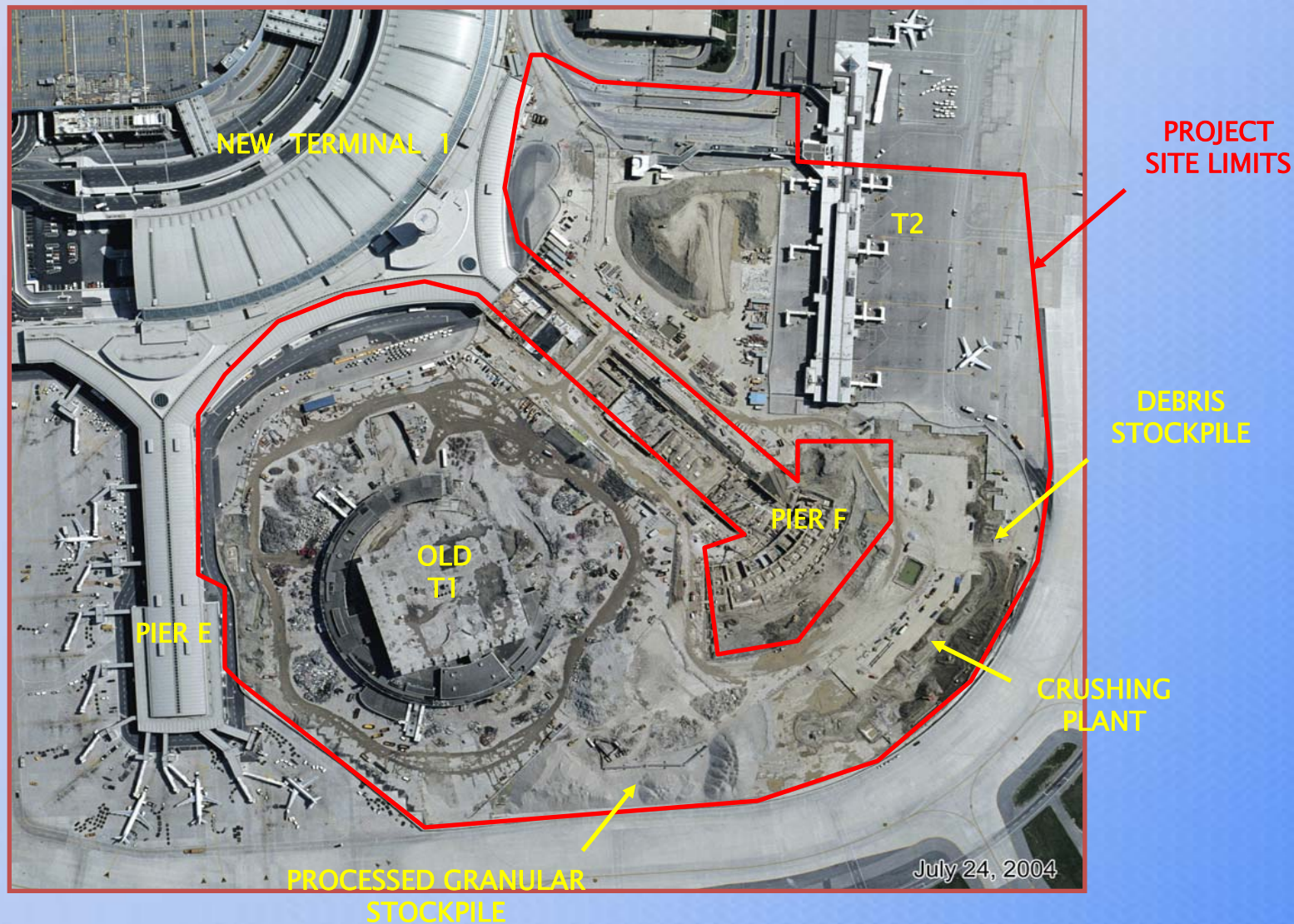




# Granular Specification (Pavement Sub-base & Backfill)

Sieve Designation	% Passing
<i>75 mm</i>	<i>100</i>
<i>12.5 mm</i>	<i>40-80</i>
<i>4.75mm</i>	<i>25-70</i>
<i>0.425 mm</i>	<i>10-30</i>
<i>.075 mm</i>	<i>3-8</i>

# Crushing and Processing of Existing Pavement – Stage 2



# **Quality Control – Crushed Aggregates**

- Engineer and Contractor Coordination
- Contractor Quality Control Testing
- Owner's Quality Assurance Testing



# Pavement Recycling – Environmental Measures

ACTIVITY	CONTROL MEASURES
Stockpile Management	<ul style="list-style-type: none"><li>• Designated pile areas</li><li>• Height and Fence clearance restriction</li><li>• Dust Suppression</li></ul>
Drainage Structure Protection	<ul style="list-style-type: none"><li>• Sedimentation Controls</li></ul>
Haul Road Maintenance and Vehicle Washing	<ul style="list-style-type: none"><li>• Dust Suppression</li><li>• Wash Areas</li></ul>

# SUMMARY

- GTAA recycling targets for TPIA exceeded ISO 14001 requirements.
- Hazardous material decommissioning a milestone
- 99% of Pavement debris recycled
- PCC Crushing and Recycling met all the Quality Control and Environmental Measures

The background of the slide is a photograph of a sunset or sunrise. The sky is filled with dark, heavy clouds on the left and bright, orange and yellow light on the right, where the sun is setting or rising. In the foreground, there is a dark silhouette of a city skyline across a body of water. An airplane is visible in the upper right portion of the sky, flying towards the right.

# Thank You

## Q & A