出國報告（出國類別：其他）

澳洲機場安全管理觀摩

服務機關：交通部民用航空局
姓名職稱：黃意真技正
派赴國家：澳洲
出國期間：**97.11.22~11.29**
報告日期：**98.02.25**

摘要

安全管理系統爲國際民航組織（International Civil Aviation Organization，ICAO）附約 14（Annex 14)之要求要項之一,亦爲 ICAO 全球飛航安全計畫(Global Aviation Safety Plan）重點之一，近年來積極呼籲會員國視此爲當務之急、確切落實之。

我國自 2002 年起展開機場認證計畫,並自 2006 年起著手國際機場之安全管系統建置。在整體推動過程中，面臨許多 ICAO 規定落實可行性及執行策略問題。

澳洲爲機場認證推動之佼佼者，並以安全管理系統之經驗爲著稱，本次參訪拜會澳洲民航局（CASA）、雪梨國際機場（Sydney International Airport）以及湯斯維爾軍民合用機場（Townsville Airport），實際了解澳洲機場認證及安全管理系統推動法制面之架構以及作業面之成效，期透過他國經驗，提供我國機場認證方向調整以及機場相關單位安全管理與作業之參考。

目錄

一、目的

國際民航組織（International Civil Aviation Organization，ICAO）於 2001 年將機場認證（Aerodrome Certification）納入附約 14（Annex14），積極推動機場設施、作業標準化以及安全管理系統之建置。爲期能與國際接軌並有效提升我國飛航安全，我國自 2002 年起推動機場認證，並自 2006 年起著手國際機場之安全管理系統建置。

目前我國機場認證整體架構已大致具備，惟實務上，同許多國家一樣，亦面臨落實 Annex14 要求之務實性、可行性問題。此外，ICAO 所規範之機場認證主要目的爲民航督導單位稽核、確保民營機場之安全，此一概念無法完全適用於我民航組織架構、國情、文化，因此，我國機場認證暨安全管理系統之推動策略與方向仍需持續調整，以尋求最適切我國之推動做法。

澳洲在機場認證，尤其在安全管理系統領域上，爲公認之翹楚之一，國際上機場認證與安全管理系統之會議與訓練，不乏聘用澳洲專家及講師。我國所面臨機場認證之議題，在無法直接獲得 ICAO 之協助下，國際經驗的學習，乃最能提供我國不同的見解與多元的視野。

法規架構爲一切系統執行之源頭，爲能透徹澳洲機場安全管理系統之做法，首先拜訪澳洲民航局（CASA）了解澳洲整體機場認證機制與規定；並另擇定雪梨國際機場（Sydney International Airport）以及湯斯維爾軍民合用機場（Townsville Airport），觀摩機場實際安全管理與空側作業，了解作業面之觀點及其安全管理成效。期能藉由與他國之交流，以利我國尋求機場認證推動上理想面與務實面之平衡點。

二、行程紀要

日期	工作摘要	備註
11/21-11/22	去程。	搭乘中華航空 CI51 班次，自台灣桃園飛往澳洲雪梨。
11/24（一）	澳洲民航局（CASA）拜會。	由該局機場事務協調員（Aerodrome Coordinator）Mr. Richard Allen 負責接待與說明。
11/25（二） ｜ 11/26（三）	雪梨國際機場（Sydney International Airport）參訪。	由該機場安全部門經理（Manager Airport Safety）Mr. Peter Adams 負責接待與說明。
11/27（四） ｜ 11/28（五）	湯斯維爾軍民合用機場（Townsville Airport）參訪。	1. 搭乘捷星航空 JQ912 自雪梨飛往湯斯維爾。 2. 由該機場主任（Manager Aviation）Mr. Rod Ward 負責接待與說明。
11/29-30	返程。	1. 搭乘澳洲航空 QF977 班機自湯斯維爾轉機至布里斯本。 2. 搭乘華航 CI54 班機自澳洲布里斯本飛返台灣桃園。

三、參訪

澳洲民航局（Civil Aviation Safety Authority，CASA）

澳洲民航局（以下簡稱 CASA）於 1995 年 7 月 6 日依民航法（*Civil Aviation Act 1988*）第 8 章成立，係獨立於澳洲政府（Commonwealth）外之法人團體。主要負責澳洲民航法規建制與推動，以及航空器作業安全事宜；民航產業之安全教育與訓練計畫亦屬其權責之一。

其成立主旨在建立健全、有效之法規制度，並推動航空產業之標準化作業，以整體提升、改善飛航安全。

CASA 在澳洲民航安全推動上所扮演的角色，與政府基礎交通建設部（澳洲交通安全局【Australian Transport Safety Bureau】隸屬其下）及澳洲飛航服務公司（Airservices Australia）同等重要，三者間有互相分工但又密不可分的合作關係。

而其中，CASA 和澳洲交通安全局間簽訂有備忘錄（Memorandum of Understanding）明定安全目標與兩者間之合作關係，以追求最大飛航安全與大眾福祉爲最終目標。

組織架構

CASA 組織架構如圖 1 所示。其中，有關機場標準與機場認證相關事宜由「航空及機場法規組（Airspace and Aerodrome Regulation Group）」管轄，機場檢查人員（Aerodrome Inspector）亦屬其下編制。

與本國不同之處，該單位不隸屬任何單位、直接對執行長（CEO）負責，以收執行實效。

CASA 在全澳洲有 5 個分區辦公室（東區、南區、雪梨區、西區與北區），負責各區相關飛航業務；雪梨區、西區與北區並各有 1、1、2 個子辦公室。有關確保 CASA 核心規範之有效遵守、CASA 角色之有效發揮以及民航發展相關推動及業務推展事宜，統由南區辦公室負責。

機場認證相關法規

與機場認證（Aerodrome Certification）相關法規涵括於民航安全規範（Civil Aviation Safety Regulations 1998（CASR）、標準（Manual of Standards (MOS)）以及指導方針（Advisory Circulars (ACs)）之中：

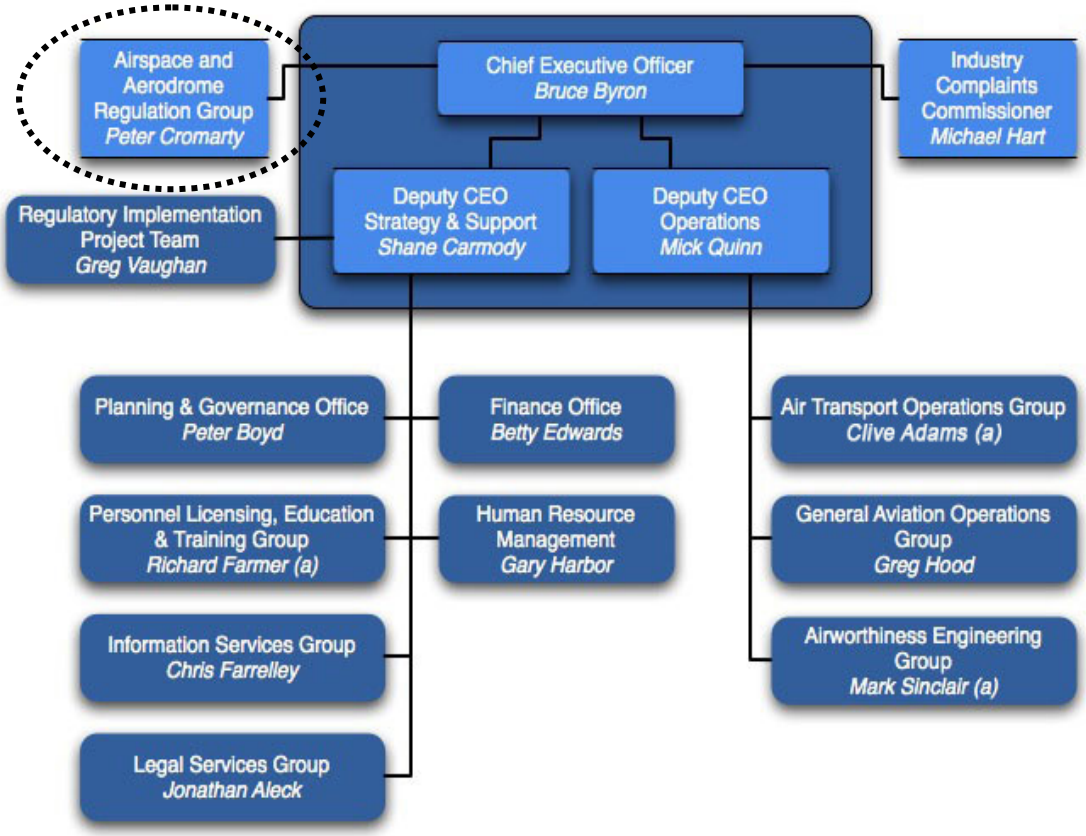


圖 1　CASA 組織圖

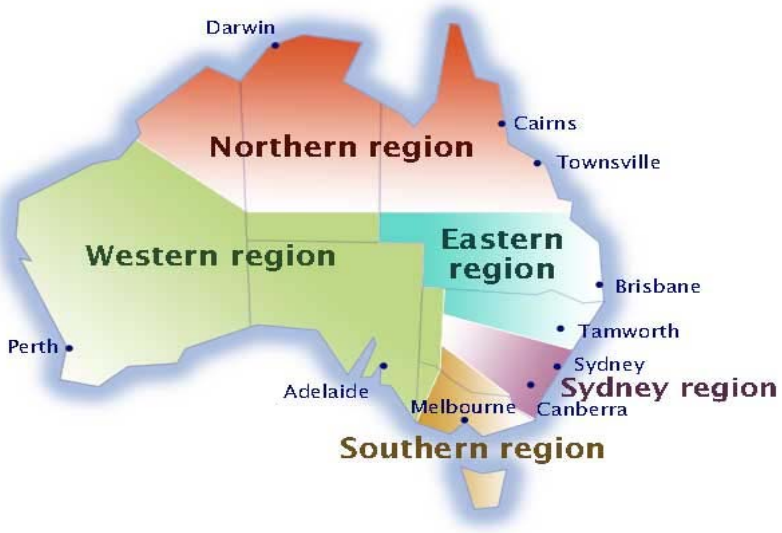


圖 2　CASA 區域辦公室分佈

◆ **Civil Aviation Act 1988**

民航法中並未有與機場直接相關之規定，但授予 CASA 人員執法的權力。

◆ **Civil Aviation Safety Regulations 1998 (CASR)**

CASR 包含諸多篇（Part），規範適航、人員證照、飛航標準、航管、機場、危險物品、藥品酒精檢驗等，而有關機場之規定列於第 139 篇（CASR Part 139），主要規定以下事項：

- 機場認證規定與認證機場（Certified Aerodrome）作業規定
- 機場註冊規定與註冊機場（Registered Aerodrome）作業規定
- 其他提供大眾運輸服務或有包機作業機場之通報官（reporting officer）和安全檢查（safety inspection）相關規定
- 機場障礙物及相關危害
- 機場無線電作業

CASR Part 139 於 2003 年 5 月 2 日開始生效，機場有 3 年過渡時間辦理改善以符合新規定之要求。

◆ **Manual of Standards (MOS)**

CASR 各篇（Part）中有其所屬 MOS 規範飛航安全應遵循之細項。有關 CASR Part 139 的 MOS 共計 14 章，列述以下相關作業規定：

- 機場認證證書（Aerodrome Certificate）申請
- 註冊機場之申請
- 機場資訊
- 幾何特性
- 障礙物限制
- 助導航設施
- 認證機場之其他作業規定標準
- 註冊機場作業規定標準
- 其他小機場之作業規定標準等
- 無線電通訊作業

其各章內容雷同本局「民用機場設施暨運作規範」及「航空站空側設施及作業認證辦法」。

◆ **Advisory Circulars (ACs)**

與 MOS 同爲 CASR Part 下之規範細則文件，主要目的提供不同的建議措施或指導方針（包含各項解釋圖文資料），以利機場達成 CASR 下之各項要求規定。

機場分類

依據 CASR Part 139，機場分爲四大類（如表 1）：

- 認證機場
- 註冊機場
- 其他機場_提供 9~30 人座航空器作業者
- 其他機場__依據 CASR 135 作業者

依據 CARS139.040，提供航空器 30 人座以上或總重 3400kg 以上大眾運輸或包機之機場，屬於認證機場，必須申請機場認證。在機場認證申請流程中，機場手冊乃必要要素。此外，認證機場並需有一運作中之安全管理系統。

表 1　澳洲機場分類表

	認證機場 Certified Aerodromes	**註冊機場** Registered Aerodromes	**其他機場__提供 9~30 人座航空器作業者** Other Aerodromes - more than 9 but not more than 30 passengers	**其他機場__依據 CASR 135 作業者** Other Aerodromes - operations under proposed CASR 135
是否應具備機場手冊	是	否	否	否
提供服務	提供消救或 30 人次以上航空器服務	設施標準同認證機場	非認證或註冊機場，但提供消救服務或每個禮拜至少提供一次包機服務	
認證和註冊稽核單位	CASA	CASA 認可之人員	AOC 持有者之責任	AOC 持有者之責任
標準依據	MOS	MOS	MOS	MOS 第 13 章
是否應具備機場手冊	是	否	否	否
是否應有機場安全管理系統	是	否	否	否
是否需要機場技術檢查（Technical	是	否	否	否

	認證機場 Certified Aerodromes	**註冊機場** Registered Aerodromes	**其他機場__提供 9~30 人座航空器作業者** Other Aerodromes - more than 9 but not more than 30 passengers	**其他機場__依據 CASR 135 作業者** Other Aerodromes - operations under proposed CASR 135
Inspection）				
是否需要機場安全檢查（Safety Inspection）	否	是 (若提供消救服務或有 9 人座以上之包機服務)	是	否
是否需要經過訓練的通報人員（Reporting Officer）	是	是	是	AOC 持有者之責任
機場資料是否應公告於 ERSA/NOTAM	是	是	否	否
是否需要監控障礙物	是	是	AOC 持有者之責任	AOC 持有者之責任
是否有非精確儀器進場程序	有	有	否	否

註冊機場在機場設施要求原則與認證機場一致。主要的不同，乃機場手冊與機場安全管理系統乃非強制性。

機場認證證書（Aerodrome Certificate）

澳洲之機場認證證書一經核發除非經撤除，否則永久有效。證書範本如附件 1。所有核准之事項（包括豁免事項）並未列述於證書中，而回歸於機場手冊及相關文件程序中。

CASA 於 2003 年 8 月 27 日核發第一張機場認證證書；本次參訪機場－雪梨機場及湯斯維爾機場－則分於 2006 年 1 月 13 日及 2005 年 12 月 16 日通過認證。截至參訪為至，計有 178 個機場通過認證、120 個註冊機場。

機場手冊（Aerodrome Manual）

CASA 要求機場手冊所應涵括內容分爲三部分：

1. 第一部分：機場資訊
2. 第二部分：機場管理組織及機場作業程序
   - ▶ 機場組織架構、權責
   - ▶ 機場作業程序：包括機場緊急應變、機場燈光、機場通報、機場通行管制、機場巡場維護檢查、機場技術檢查、機場施工安全、航空器停機管理、空側車輛管制、鳥及野生動物防治、障礙物管制、故障航空器移離、危險物品處理、雷達及助導航設施保護、低能見度作業、地方相關程序等
3. 第三部分：AIP 資訊
   - ▶ 一般資訊
   - ▶ 跑道資訊
   - ▶ 目視助導航系統資訊
   - ▶ 地方資訊
   - ▶ 無線電服務

除此之外，手冊應有修正歷程、分送名單等。

所要求事項原則依循 ICAO 所要求一致，並無特別不同之處。

機場查核

◆ 機場認證查核

認證機場之查核主要針對 CASR Part 139.095 規定應包含於機場手冊內之資訊進行檢視。主要查核事項分爲四大系統：

1. 機場管理（Aerodrome Management）
2. 機場環境（Aerodrome Environment）
3. 檢查與通報（Inspecting and Reporting）
4. 空側管制（Airside Control）

在機場管理部分，主要檢視機場安全管理系統、機場手冊、機場管理、AIP、機場緊急應變五大項；機場環境則針對機場設施、機場燈光、鳥及野生動物防治管理、障礙物管制、危險物品處理、雷達及助導航設施保護六大項；檢查與通報，主要檢視機場通報、例行巡場維護、機場技術檢查（Aerodrome technical inspection）、機場無線電

服務四大項；空側管理則針對機場、機場施工安全、航空器停機管理、空側車輛管制、故障航空器移離、低能見度作業六大項。

檢查結果報告範例如附件 2。

◆ 安全檢查（Safety Inspection）

安全檢查主要針對註冊機場，以及非認證亦非註冊機場、但每個禮拜至少提供一次 9 人座以上航空器大眾運輸或包機之機場。該檢查每年至少一次，由 CASA 核准之檢查員辦理(人員名冊列於 CASA 網頁 http://www.casa.gov.au/aerodromes/app_persons.htm)

其檢查事項主要包含：（詳細資料請參 AC139-09 Aerodrome Safety Inspections）

1. 文件：包括歷年安全檢查報告（至少兩年）、通報紀錄、機場檢查紀錄機場意外/事故報告、維護紀錄、緊急應變通報、道面狀況報告、鳥擊報告、NOTAM、與 CASA 的相關公文(包括機師等作業人員意見、CASA 豁免事項)、機場的管理方式（包含資源分配、權責是否明確、溝通、航空最大機型、機場夜間作業程度、航空器起降頻率、機場作業程序之適切性)、ERSA 上資訊的正確性（包含機場圖、機場位置、備註資料、地勤裝備、旅客設施、機場障礙物、跑道資訊、機場燈光、交通規定資訊、機場聯絡資訊、公告長度）等。
2. 實際機場作業：包含檢查作業、NOTAM 作業、機場各項作業紀錄等。
3. 通報作業
4. 活動區設施檢查：跑道、滑行道、停機坪、燈光、風向指示器、障礙物限制面、標線、指示牌、雙向無線電、鳥及野生動物驅趕設備、機場圍籬、輸油等。

◆ 技術檢查（Technical Inspection）

技術檢查爲認證機場自身應辦理事項，依循 MOS 標準所進行「機場設施」之檢查。主要目的爲確保任何對於航空器不安全的狀況能被即時地發現。依據 CASR Part 139.230，技術檢查項目必須包含：

- 儀器進場、起飛爬升面、轉接面
- 機場燈光及迴路系統測試、檢查（目視進場滑降指示燈）
- 活動區舖面及排水
- 活動區指示牌
- 提供機場應變、危險物品處理、鳥及野生動物防治以及備用/緊急燈光系統之設備
- 檢查空側車輛管理（若有的話）
- 確認 AIP 公告的資訊與機場作業程序爲最新版

是項檢查必須每年至少一次，可分項辦理。而年度檢查紀錄必須保存至少三年。

另有關技術檢查作業之進行，機場必須擇具相關學經歷、經驗專業人員辦理，如舖面檢查人員應有土木背景或相關經驗；燈光檢查應由具機電執照或相關背景人員辦理；障礙物限制面之檢查，亦應由具相關經驗者辦理。

機場安全管理系統（Aerodrome Safety Management System）

CASA 規定已認證之機場，必須在 2007 年 1 月 1 日前完成安全管理系統的建置。爲利機場建置所屬機場安全管理系統手冊，CASA 網站上有提供相關指導方針與範本供建置參考（http://www.casa.gov.au/aerodromes/sms/index.htm），機場可依所提供範本或視機場屬性自行發展適切之安全管理系統。

依據 AC 139-16，安全管理系統應涵蓋下述 8 大事項：

1. 安全政策
2. 管理執掌權責
3. 風險管理
4. 危害風險之通報與因應措施
5. 教育訓練
6. 作業稽核與意外事件事故調查
7. 文檔資料管控
8. 系統稽核評估

而針對風險管理中有關危害風險之判定，CASA 提供簡單範例如表 2。用簡單的概念說明，機場手冊中各作業程序之標題即是機場可能面臨的危害風險，作業程序即是各風險的管控，越周詳的作業程序越能降風險降至最低。

換言之，原則上各機場已有某一程度風險管理在進行，安全管理系統的導入主要爲了讓機場整體作業更有效連結，並利用確實的記錄以及完整的資料庫系統協助其他潛在風險的辨識，以強化預防措施、落實安全管理系統所謂前瞻性（Proactive）的管理機制。

認證查核經驗

◆ 豁免（Exemption）的運用

依據 ICAO Doc9774，機場設施不符合 Annex 14 SARPs 之事項，可進行航空研究提出同等級之安全措施後，由民航局進行豁免。

表 2　危害風險識別範例表

Ref No.	Hazard	Risk	Risk treatments/controls	Residual risk
1	Aerodrome emergencies		Aerodrome Emergency Plan	
2	Non-standard aerodrome facilities including lighting		Aerodrome Manual	
3	Inadequate Aerodrome Reporting		Aerodrome Manual	
4	Unauthorised entry to aerodrome		Aerodrome Manual Transport Security Plan	
5	Aerodrome unserviceability		Aerodrome Manual	
6	Aerodrome works		Aerodrome Manual	
7	Aircraft ground activities		Aerodrome Manual	
8	Airside vehicles		Aerodrome Manual Transport Security Plan	
9	Birds and animals		Aerodrome Manual	
10	Obstacles		Aerodrome Manual	
11	Disabled aircraft		Aerodrome Manual	
12	Hazardous materials		Aerodrome Manual	
13	Interference with radar or navigational aids		Aerodrome Manual	
14	Low visibility operations		Aerodrome Manual	
15	Ineffective aerodrome radio communications		Aerodrome Manual	
16	Incorrect aerodrome information		Aerodrome Manual	
17	***Add hazards specific to your aerodrome***		Aerodrome Manual	

在 CASR 139.020 中即將此概念納入，CASA 得書面豁免機場符合 CARS Part139 或 MOS 要求。A380 飛航雪梨國際機場，即透過此程序豁免跑道地帶不足以及週遭天然障礙物（樹）之移除。

但此豁免之同意，必須由機場提出完整航空研究以及安全因應措施，並應遵循 CASA 書面同意之豁免條件及事項。

另外，針對機場飛航大型航空器之豁免前提，航空公司首先必須先取得 CASA 飛航標準單位（Flight Operation）的飛行運作豁免，確保航空器在受限之機場條件下仍能安全操作無虞，機場認證單位才會另針對是否有提供額外訓練、額外巡場機制等等，整體評估決定是否豁免機場符合規範要求。

◆ **軍民合用機場之認證**

CASA 對於軍民合用機場原則上並不進行認證，機場安全由機場經營者全權負責。

惟湯斯維爾（Towansville）機場及達爾文（Darwin）機場仍向 CASA 提出認證要求，CASA 依法無法拒絕，但仍僅針對民用"作業"之部分進行認證，不認證"設施"之部分；意即 CASA 僅檢視作業是否與規範要求一致。此乃因考量軍民合用機場管轄權在軍方，設施之改善民航單位並無主控權。

另有關機場跑道之攔截繩索，由於爲軍方必要設施，但考量民航作業安全，CASA 乃積極推動機場與軍方簽訂協議書，議定民用航空器作業時軍方能將攔截繩索平放降下；目前僅有湯斯維爾和達爾文機場與軍方有是項協議書。

◆ **跑道端安全區（Runway End Safety Area, RESA）**

ICAO Annex 14 中，規定 RESA 應自跑道地帶起向外延伸 90m；即自跑道端 60m 外處起向外延伸 90m。

澳洲在 2003 年前，對於 RESA 之定義乃由跑道端向外延伸；配合 ICAO 推動機場標準化提升飛安之目標，乃重新修定其 MOS 標準內對於 RESA 規定，意即機場需額外延伸 60m 始得符合規定。

惟針對該項要求，僅限於國際機場爲立即性應辦理改善事項，對於國內機場則可於新建或改建時再納入辦理。

另對於國際上普遍討論將 RESA 最小值 90m 調整爲 240m，CASA 機場事務協調員 Mr. Richard Allen 表示，若 ICAO 將 240m 之建議值改爲強制性，CASA 將提出"差異（difference）"之公告。

◆ **PCN-ACN 議題**

基本上，CASA 並不允許航空器 ACN 大於跑道 PCN 的狀況。但實務上，仍可由機場提出因應配套措施確保整體安全後進行豁免。

◆ **直昇機機場**

只有認證機場內的直昇機屬於 CASA 檢查人員之管轄事項；純直昇機機場，CASA 檢查人員並不負責查核事項。

◆ **機場檢查人員**

澳洲 CASA 機場檢查人員編制於「航空及機場法規組（Airspace and Aerodrome Regulation Group）」之「航路與機場部（Airways and Aerodromes Branch）」下，人力計有12員，全職負責澳洲大大小小計180個已認證機場之查核作業。人力之分配：

布里斯本（Brisbane）及北區辦公室：3 員
雪梨（Sydney）辦公室：2 員
坎培拉（Canberra）辦公室：1 員
墨而本（Melbourne）辦公室：2 員
柏斯（Perth）辦公室：2 員
亞得雷得（Adelaide） 辦公室：2 員

認證機場年度查核作業所需檢查人員人力，除墨而本、雪梨和布里斯本機場由 2 員會同辦理外，餘機場原則由 1 員負責；所需辦理天數 1.5 天~5 天不等。

在澳洲機場認證查核作業中，並不包含消救之檢查，消救之查核 CASA 另有一專責檢查人員負責。主要乃因澳洲機場之消救服務，係統由 Airservices Australia 提供而非機場管控。另外，輸油作業爲 ICAO Doc9774 規定應納入之項目之一，澳洲針對此一項目，僅檢視是否有相關協議書與安全程序措施，並不進行實際輸油設施與作業查核。

每定期三個月，所有機場檢查人員會聚集召開會議，討論查核作業之做法以及有關規範、流程作業上的疑慮，並彼此交流分享經驗，俾確保稽核標準與決策拿捏之一致性。此外，檢查人員還會定期參加年度 Australian Airport Associated，以了解機場之需求與發展。

對於在機場查核作業時，機場可能會提出相關技術疑問時，基本上會建議另至 CASA 網頁” Aviation Safety Advisors”尋求解答。機場檢查人員即使提供建議，僅限於原則性的方向，不會提出明確做法。

CASA 之機場檢查人員以前由公務人員擔任，現改以聘僱方式辦理，並調高其薪資報酬以吸引並留住優秀人才（約爲航務檢查人員薪資之 1/2，但仍高於機務檢查人員之薪資）。

CASA 機場檢查人員並無證照制度，對機場檢查人員之聘用資格亦無明確之定義。惟經受訪人員提供最新受聘 3 位檢查人員之資歷：第一位爲墨爾本機場之空側安全經理人（Airfield Safety Manager），第二位曾擔任小、中型機場之顧問，並爲 CASA 認可之註冊機場(Registered Aerodrome)檢查人員，最後一位則曾任柏斯機場(Perth Airport)之空側安全經理人及標準經理人（Standard Manager），三者皆爲經歷豐富之資深機場人。

雪梨國際機場 Sydney International Airport

雪梨國際機場（Sydney International Airport）（亦稱金斯福德·史密斯機場 Kingsford Smith International Airport）位於雪梨市郊馬斯科區（Mascot），臨植物灣（Botany Bay），面積 907 公畝，由雪梨機場公司（Sydney airport Corportation Limited，SACL）所經營，爲澳洲最重要也最繁忙之機場，也是澳洲航空（Qantas）主要營運基地。

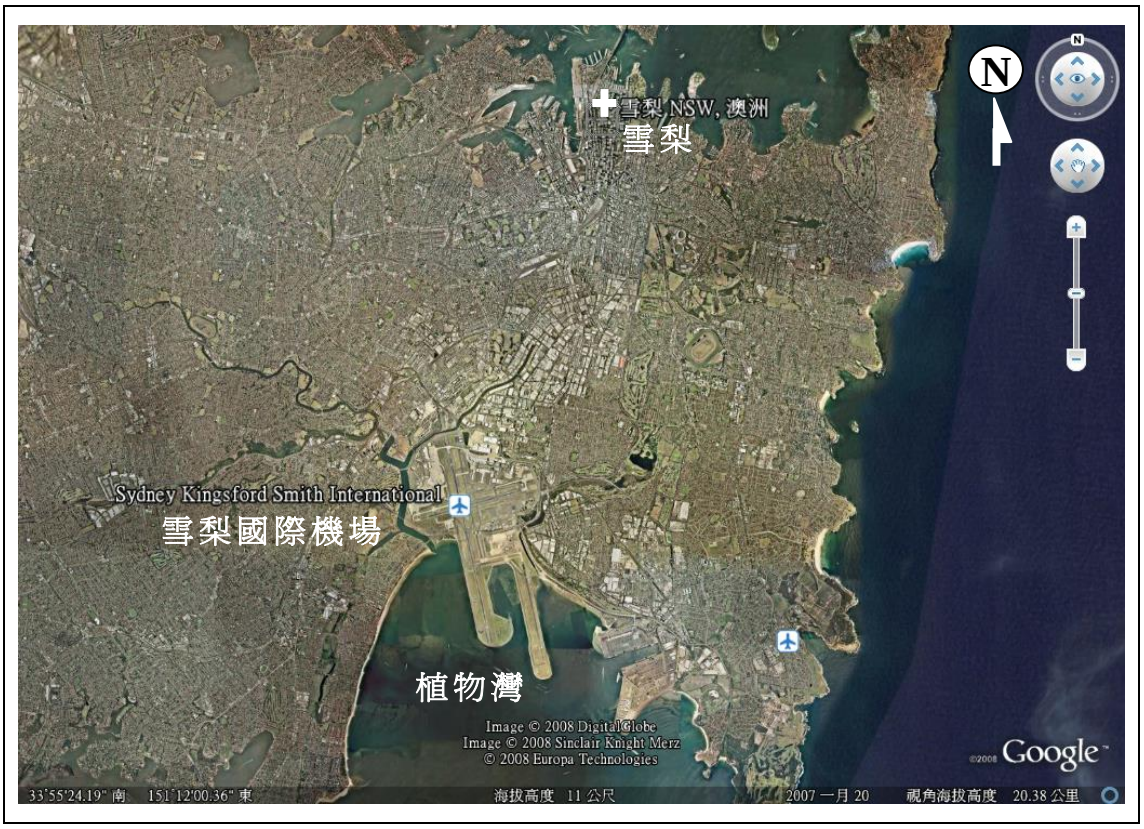


圖 3　雪梨機場位置圖

機場共有三個航廈提供旅客服務。航廈 1（T1）爲國際航廈、航廈 2（T2）爲國內航廈，由雪梨機場公司經營；航廈 3（T3）爲澳洲航空國內航廈，由澳洲航空管理。

T1：34 個登機門；26 個空橋。
T2：18 個登機門、9 個遠端停機位；13 個空橋。
T3：13 個登機門。

而在空側方面，計有三條跑道，其中 16L/34R 跑道供國內線使用：

16R/34L：3962m × 45 m
16L/34R：2438m × 45 m
07/25：2530m × 45m

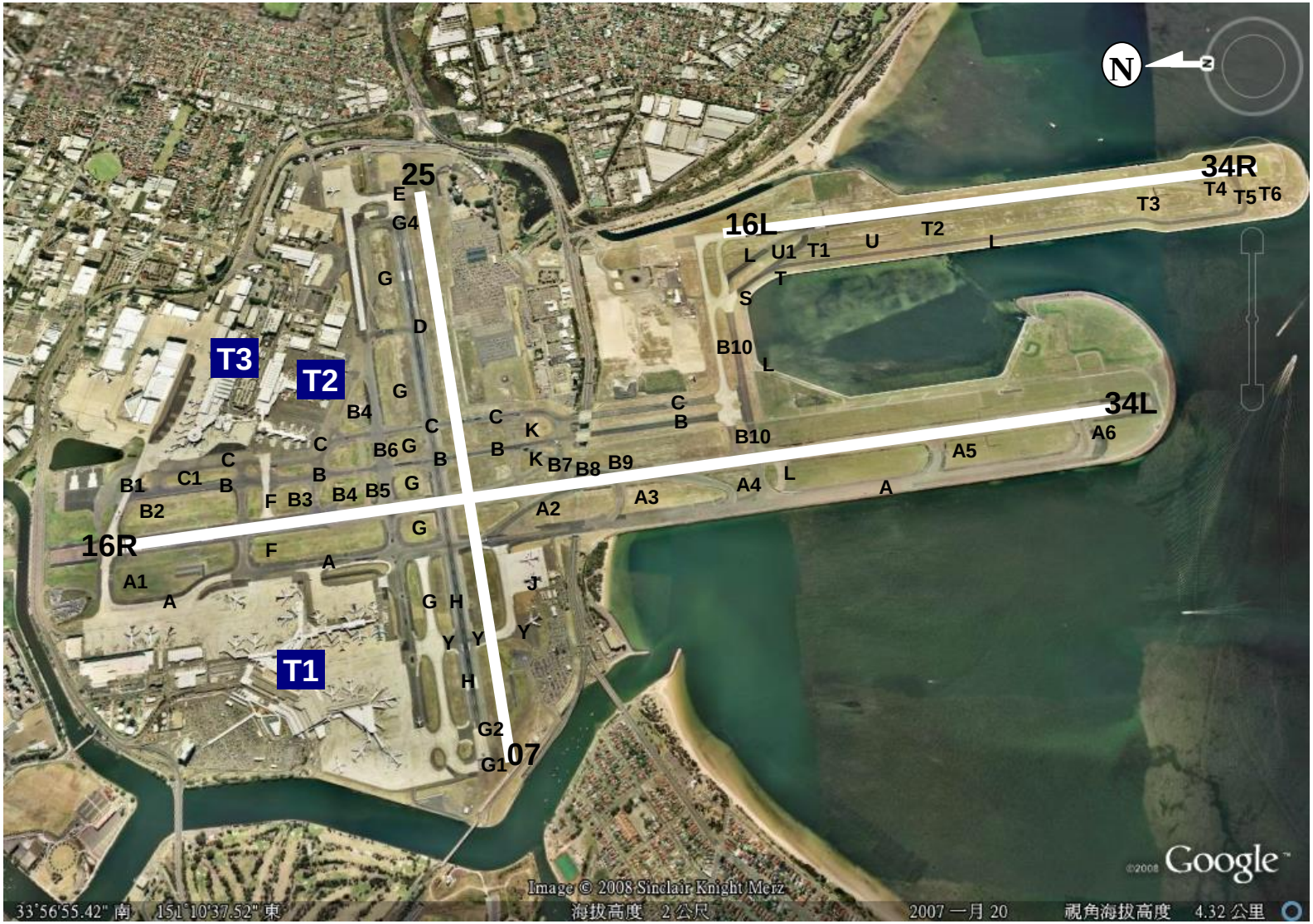


圖 4　雪梨機場跑、滑道位置圖

目前機場服務最大飛航空器爲 A380。

機場組織

雪梨機場組織架構如圖 5 所示。其中，機場安全、保安、緊急應變、航務作業、航空公司公關、作業協調、航廈服務、作業規劃部門平行隸屬於機場營運組（Airport Operations）下。與我國機場不同之處，雪梨機場有「機場安全部門（Airport Safety）」專責負責所有機場安全督核以及安全管理系統之運作；而我國機場有關該部分之任務則由航務組兼任，並無專責單位負責。

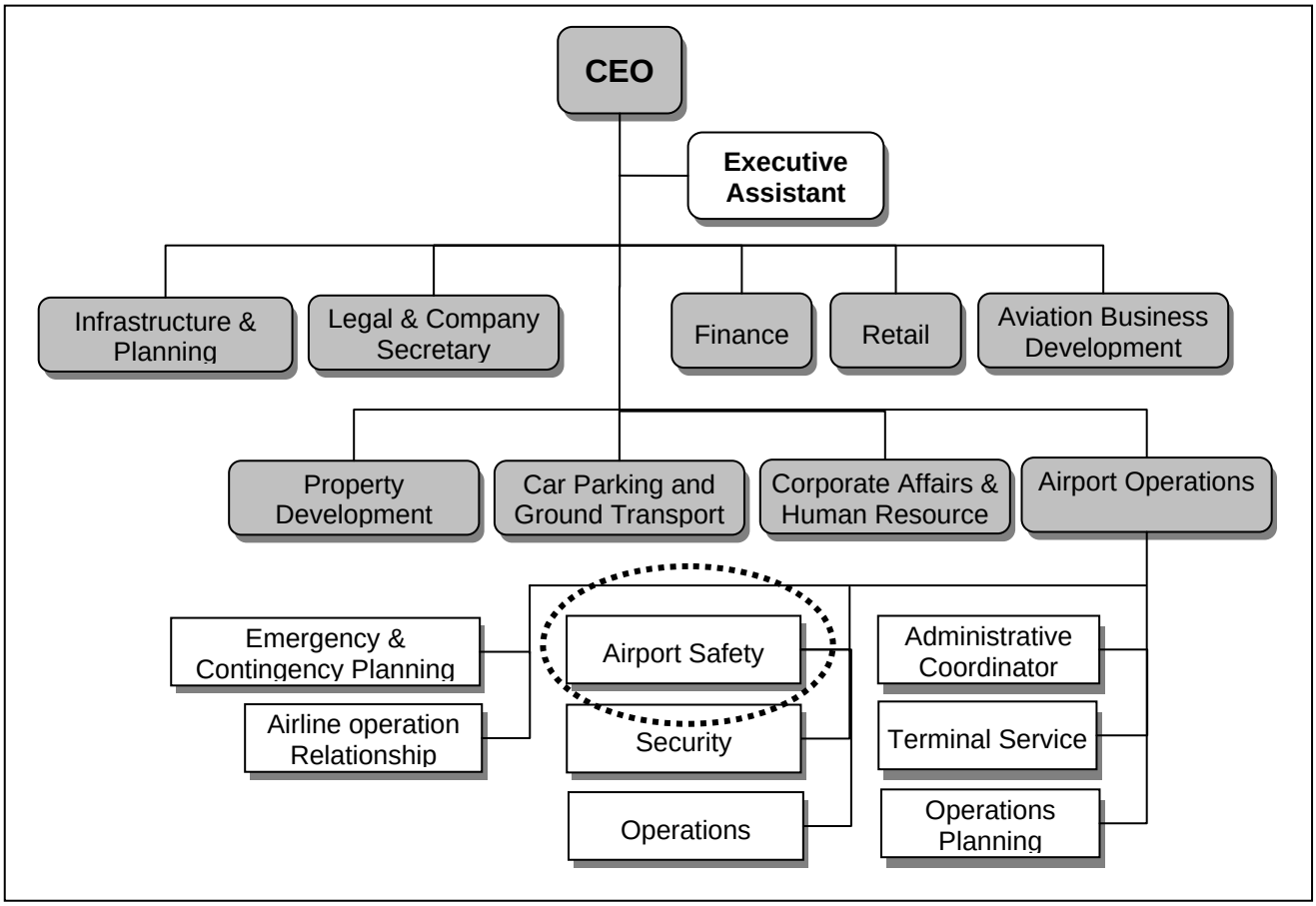


圖 5 雪梨機場公司組織圖

安全管理系統

CASR139.250 中明文規定供國際航空器運作之機場應有一運作中之 SMS。

依據雪梨機場之 SMS 手冊，主要包含 4 大事項：安全政策與目標、安全風險管理、安全確保、安全提升。

◆ 安全政策與目標

雪梨機場公司之機場安全部門，除了機場運作安全，職業健康與安全議題亦屬其職責範圍。每年安全部門需提出機場安全計畫，列出機場安全與職業安全健康目標。

➢ 安全權責

- 機場執行長（CEO）：監控整個安全政策、提撥經費解決安全問題，並確保安全管理系統之正常運作並經定期評估。
- 安全、保安、環境與健康委員會（Safety, Security, Environment & Health Committee，以下簡稱 SSE&H 委員會）：由高階主管經理組成（機場安全部門爲當然成員），董事長擔任主席。委員會每年至少召開四次，主要討論空側安全政策的制定、安全績效稽核與評量，以及職業安全與健康政策之檢視與調整等。
- 主管經理：負責確保管理階層對於安全政策之重視、安全管理系統的持續改進、主動發掘安全死角還有安全風險的解決與管理。
- 機場安全部門：設置在機場營運組之內，其下有健康及安全稽核經理、空側標準經理、職業安全與健康協調員以及安全管理系統經理。主要負責監督危害辨識系統、監督提供機場服務單位的安全狀況、對高層提出安全管理建議、幫助基層經理從事安全管理。
- 機場安全部門經理：直接向 CEO 負責。執掌內外溝通、安全議題之協調、重大危安事件調查、安全法令遵循之監督、以及可能影響遵守安全法規事項之通報。
- 安全系統經理：隸屬機場安全部門，負責對違反營運規範事件調查、提出報告與提出改進建議、檢視外部單位提出的事故報告並視需要進行進一步調查、代表機場公司和法令主官機關聯繫，空側駕駛證核發亦屬其職責。
- 基層經理與督導員：負責透過危安辨認、風險評估與風險控制來確保安全系統的執行、確保管理區域內員工都受到適當的安全教育、確保安全設備都齊全、保養完善與正確使用等。
- 機場公司員工：必須對自己的行爲負責、在公司之內必須要關注他人的安全以及利用機會參與安全規範擬定，並應在經理督導管轄之下遵行機場公司的安全政策與程序、參與緊急事故應變演練、向上級通報安全事件、妥善使用維護個人安全裝備。
- 契約人員：包含顧問、機場公司簽約以及由第三方僱用的契約人員。各契約人員應遵守安全法令、建立自己的維安政策與程序，並應充分監控、教育與指導所屬人員，確保其具備從事契約工作所需一切證照、許可與技能證明。

- **安全因應小組**

  安全因應小組視需要召集，檢討安全措施的成效與評估作業程序改變對安全的衝擊，包含：機場職業安全建康（OH&S）委員會、安全委員會、機場相關單會議、機坪作業委員會（每月召集 1 次）、航廈使用者委員會、跑道入侵工作小組（每半年召集 1 次）、澳洲航空地安會議（每年召集 4 次）、澳洲鳥及野生動物危害工作小組（每年召集 4 次）、風險管理工作會議、機場約聘人員會議等。

  同時 SSE&H 也會定期召開會議確認安全議題都有被有效解決，並將會議紀錄公告於公司內部網路上。

◆ 安全風險管理

雪梨機場風險管理可能由機場、承包商、後端使用者（作業和維護端）進行評估。

- **風險評估（Risk Assessments）**

  依據雪梨機場 SMS 手冊，在以下情形會進行風險評估：

  1. 活動區內特定任務/作業，意即可能會影響航空器安全之事項。
  2. 機場相關規劃、發展、設計。
  3. 施工
  4. 在資產移交使用者之作業和維護議題
  5. 其他可能的變動

  而在進行風險評估進行時主要考量事項：

  1. 列出可能的或是實際的特定任務/作業
  2. 找出每個作業/任務潛在的危害
  3. 評估風險的可能性與危險程度
  4. 發展出管控風險的措施，並文件化

- **風險管理工具**

  雪梨機場管理風險之方式計有：

  1. 風險評估工具

     爲一般熟知的風險矩陣圖，主要協助員工自身崗位工作風險評估之進行。

  2. 風險評估
     - ▶ 被動式：用於以發生的事件，如意外事件等。
     - ▶ 主動式：藉由分析公司內的活動作業以找出安全上的風險。
     - ▶ 前瞻式：屬於即時紀錄系統的狀態

  3. 安全工作程序（Safe Work Proceudres）

     該文件協助各單位規劃任務/作業時之步驟與流程。

4. 雪梨機場運作手冊（Sydney Airport Aerodrome Operation Manual）

   該手冊主要處理涉及規範與標準議題，其因應方式有：

   - ▶ 提出釋疑：正式函請 CASA 解釋 MOS 和/或規範。
   - ▶ 作業評估：針對 MOS 和/或規範無提及之事項，協請 CASA 辦理作業評估。
   - ▶ 豁免申請：針對設施部份無法符合 MOS 和/或規範之部分，於辦理安全案例研究後，向 CASA 提出豁免申請。

5. 風險管理工作會議（Risk Management Worshops）

   發展案和專案計畫需要進行風險管理工作會議。藉由各單位面對面之討論，於計畫執行前找出可能的危害和計畫之風險，以找出適切的管控機制。

- ➢ **作業風險管理**

雪梨機場機場作業上之安全危害判定其及風險評估爲機場公司每一份子的責任，風險管理（包含危害因子判定、風險評估與管控、管控程序有效性之評估）之流程詳盡於雪梨機場「風險評估策略與程序」中。

完整的風險評估需考慮：

1. 所有預計或是實際上要做的任務/活動
2. 找出所有潛在風險
3. 評估風險的發生可能性及後果之嚴重性，並且列出運用不同控管方法的優先順序
4. 執行控管程序來排出或是減緩風險。

在進行風險判定前，需將評估事項先進行分類：

1. 設計
2. 工程
3. 策略
4. 作業
5. 財務
6. 法制
7. 聲譽
8. 人員
9. 技術

之後針對判定之風險進行發生可能性及發生後果嚴重性之等級判定（皆分爲五等級，如表 3 及表 4），再利用五乘五風險矩陣工具排序風險處理優先順序如圖 6：

VH：極優先應處理之風險

H：高優先應處理之風險

M：中優先應處理之風險
L：低優先應處理之風險

表 3 風險發生可能性等級

Likelihood of Risk Event Occurring				
The number of times within a specified period which a risk event may occur either as a consequence of business operations or through failure of operating systems, policies or procedures.				
Score	Rating	Description	Occurrence	Probability
5	Common	Event expected to occur in most circumstances	Multiple/ 1 Year	> 80%
4	Likely	Event will probably occur in most circumstances	Once / 1 Year	61- 80%
3	Moderate	Event might occur within a specific time period	Once /2 – 5 Years	41 - 60%
2	Unlikely	Event could occur during a specific time period	Once / 5 – 25 Years	21 -40%
1	Rare	Event may only occur in exceptional circumstances	Once / >25 Years	<20%
0	Occurred	Event has occurred and is specific actions and treatments implemented to address.	Single or Multiple/ 1 Year	100%

表 4 危害發生後果嚴重性等級

Consequences (Impact) for Business Objectives if Risk Event Occurs		
Adverse Consequences (Risk)		**Score**
Rating	**Description ***	
Catastrophic	Loss of ability to sustain ongoing operation.	**5**
Major	Severe impact on achievement of strategic objectives and goals/targets for business unit plan.	**4**
Moderate	Disruption to normal operations with limited effect on achievement of strategic objectives and goals/targets for business unit plan.	**3**
Minor	No material impact on achievement of strategic objectives or business unit plan.	**2**
Insignificant	Negligible impact.	**1**
Notes * Specific financial ranges to be specified at time of each risk assessment.		

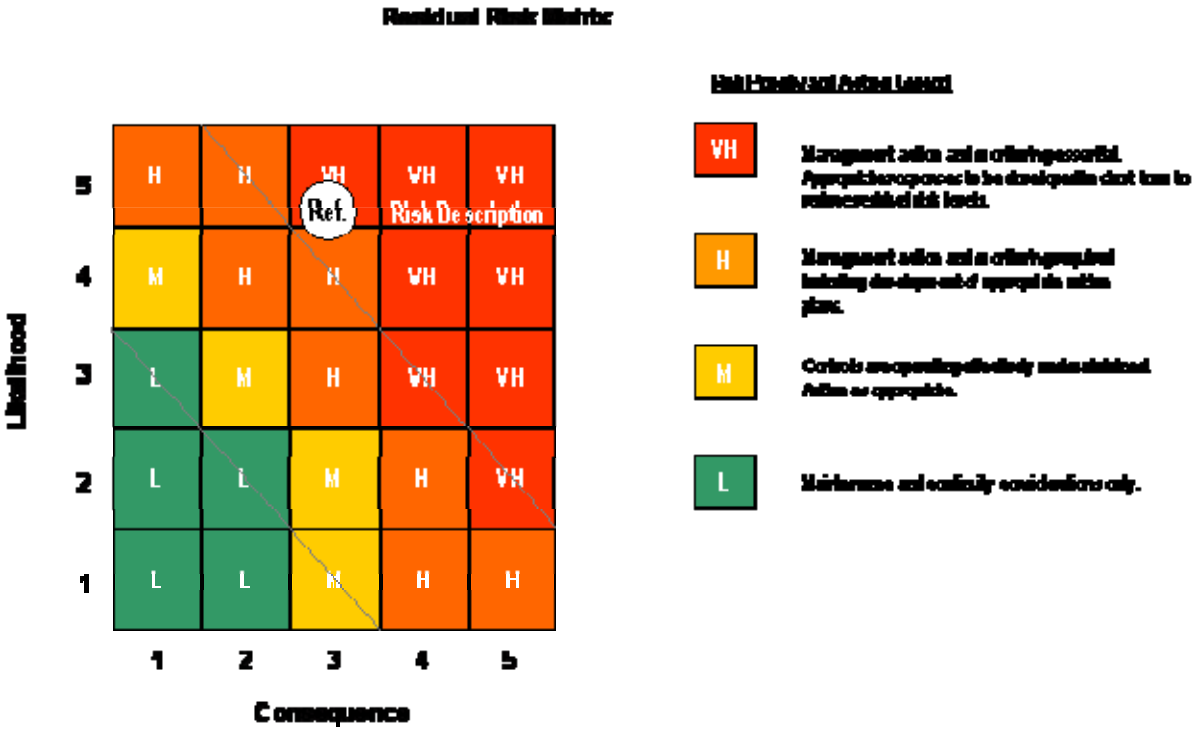


圖 6 風險矩陣圖

在風險控管上，有移除、替代、利用工程機制、利用監督機制四種管控方式，實務上並應依據實際狀況靈活結合四種方式運用。

而在制定安全工作程序（Safe Work Proceudres）時，必須清楚描述如何有效管控經判定之風險，且所有相關人員都必須接受適切之訓練。

針對重要發展案或專案計畫之風險管理工作會議（Risk Management Workshops），其流程如下：

1. 了解專案的背景
2. 找出風險
3. 評估風險
4. 風險因應與管控之有效性
5. 殘餘風險的評估
6. 所有程序之監控與報告
7. 量化指標（如有必要）
8. 監控、檢討與報告

- **有效的安全通報**

雪梨機場有許多機制收集、發布安全資訊以達開放、有效的安全通報。相關安全資訊包括意外、事件、系統失效、設備缺失、危害辨識、風險評估、預防與改善性措施。事件、意外與傷害的紀錄都由機場安全部門保管。這些紀錄主要可用以進行趨勢分析。危安因子、意外事件與傷害資料分析在必要時必須向

SSE&H 委員會與 OH&S 委員會報告。機場安全部門則會針對預防與改善性措施加以檢討。

- 安全績效報告（透過稽核）

  安全績效報告是用來檢視安全標準是否被遵守，稽核內容包括年度技術檢查（Technical Inspection）、CASA 稽核、石棉材料狀況稽核、非正式契約工的職業健康與安全稽核、火災系統稽核等。另有其他四種稽核也可視情況實施：空調系統稽核、飲用水品質稽核、燈光系統稽核、環境稽核。

- 事故與系統故障通報

  機場營運通報中心專線爲全年無休之通報專線。一般大眾以及和機場運作相關人士都可以用這個電話通報和安全有關的問題或是尋求協助。需要額外協助的事件會轉給機場公司值班經理。機場公司員工可用下列兩個管道通報事故與系統故障：員工事故報告與調查表—放在人事內部網路可供下載；事故通報系統—在內部網路上，此系統存有所有和機場危安、事故與意外相關的事件資訊。

- 危害辨識通報

  MAXIMO 和 IRS 系統是兩個管道用來保存維修、危害與事故紀錄相關資訊。前者紀錄所有機場公司之工廠、設備的維修問題；IRS 系統是紀錄維修、危安與事故紀錄相關資訊。

  缺失通報專線：和機場作業相關人士可用此專線通報缺失。缺失的細節會被存進 MAXIMO 維修系統並且通報到值班的維修經理處。問題的改善會由設備部門在 MAXIMO 系統中追蹤。

  連絡卡：提供危害、事故與緊急事件通報之相關資訊。

  航廈使用者指南：提供航廈使用者通報危害與事故程序之資訊。

  空側作業報告：該報告由空側作業協調員每日記載，記錄違規、缺失、異物與鳥擊等資訊。

  地勤服務裝備（GSE）報告：該報告由地勤協調員每日報告地勤服務的設備存量；該報告會在每月 T1&T2 機坪會議中提報。

  督導或是經理：透過電子郵件或是面報直屬上司反應安全問題。

  機場施工協調員/專案經理：在員工發現施工處有危害或事故時，可直接與其連絡。

  健康/安全代表：每個機場公司部門都有職業安全健康代表列席在 OH&S 委員會。和職業安全健康有關的議題都是經由機場公司的事故通報系統或是員工事故報告與調查表通報到機場安全部門經理。

- 危害/風險評估報告

- 預防與改善性措施報告

  此類報告在 1) 事故調查 2) 非正式契約工稽核 和 3）年度技術檢查後辦理，由經理/專案經理/協調員與契約人員提報改善措施，並由各部門經理或

主管執行改善。整體改善情形與改善措施之有效性由機場安全部門經理督導，並視情況提供建議。

內部通報

- SSE&H：重大安全事故、機場緊急事故、公共責任事故與鳥擊等安全問題，需通報到 SSE&H 安全委員會。
- 機坪
  機坪事件發生係經由機場公司事故通報系統網站通報，並會提報到 SSE&H 委員會和國際機場協會（ACI）。
- 公共責任：公共責任相關事故透過機場公司的事件通報系統通報到機場安全部門經理與其他特定人員。
- 機場緊急事故應變計畫
- 機場保安：保安事件由機場公司的事件通報系統通報、記錄。
- 液體外洩通報

外部報告

- 國際機場協會：只有機坪相關事件需呈報到國際機場協會，並需於每年 11 月提報，由機場安全部門經理負責製表、提交。

◆ 安全確保

➢ 安全績效：

雪梨機場針對安全績效指標事項，目前仍在研議中，尚無明確量化性之安全目標。

➢ 安全調查：

調查之主要目的係爲找出系統需改善事項而非基於懲處的目的。當危害通報時，由機場安全部門經理會進行判定是否進行調查，並指派內部安全因應小組或委外顧問進行調查。調查結果報告會由機場安全部門經理保存，年限 7 年。

➢ 安全稽核：

而在安全稽核方面，爲確保安全標準有被遵守並爲考核安全方案之有效性，雪梨機場公司會透過年度技術檢查與其他安全進行相關稽核。包括：年度技術檢查、CASA 稽核、非正式簽約工職業健康與安全標準稽核、危險物品、火災系統稽核、空調系統稽核、飲用水水質稽核、照明稽核與環境稽核等。

稽核作業後，需改善事項會知會機場安全部門尋求解決方案。若屬其他部門之職掌，則將另照會其他部門，由該部門經理完成解決方案之執行後通報機場安全部門經理。整體稽核結果及建議措施將由機場安全部門經理提交報告 SSE&H 委員會。

◆ 安全提升

雪梨機場針對安全提升主要方法乃透過教育訓練，其訓練種類主要有：

- 新生訓練：對象爲所有新進人員（包含部門轉換），可能包含承包商、地勤業者、航空公司、航廈作業人員、車輛駕駛、參訪人員等，因不同身分有不同的職責、作業需求以及其所應了解潛在的危害，所受訓練不盡相同。
- 通識訓練：所有機場員工必須在實際開始工作前線上完成該項訓練，其他安全訓練與資訊亦可由安全手冊、安全事件報告、風險判定和風險評估訓練中獲得。
- 專業訓練：該訓練乃依個人職務不同分門辦理。如航務人員、機場通報人員和施工安全人員必須受過 CASR 和 MOS 規範之訓練，而其他職務則依所在領域應受其相關法規等訓練。
- 特定任務/危害訓練：是項訓練乃在發現員工執行其職務工作時，可能致相關危害或風險時進行，可能是訓練內容包含安全工作方式、安全作業程序、法規要求、施工安全、化災安全、個人防護訓練、空側駕照訓練等。
- 消救訓練：該項訓練僅限於特定職務所需，訓練內容包含火災演習、火警訓練、急救訓練、心肺復甦訓練等。
- 在職訓練：在某些情況，安全訓練可能由資深員工帶領訓練。
- 訓練紀錄訓練：各種訓練之出席或完成由員工自行紀錄於 Employee Self Service 系統，因此需要進行是項訓練。

另外，雪梨機場提供多樣管道以利安全交流與溝通：

- OHS 委員會
- 內部網路：公告資訊包括 OHS 委員會紀錄、重要宣布事項、政策等事項。
- 機場期刊
- 機場標示
- 提示卡：如緊急應變聯絡小卡、緊急事項因應小卡等
- 警示訊息：利用傳真等方式迅速發布緊急事項（如惡劣天氣、強風等）
- 安全告示：如機坪程序、作業改變、特定安全議題之公告。
- 時訓練紀錄訓練：各種訓練之出席或完成由員工自行紀錄 Employee Self Service 系統，因此需要進行是 項訓練。
- 重要工程檢視：每月定期開會檢視風險、預算及安全事項。

空側安全管理經驗

◆ A380

雪梨機場爲了能夠容納 A380，自 2004 年起進行空側及陸側工程之改善，包含道肩之拓寬、16R/34L 與 07/25 以及許多滑行道轉彎道面加寬、A 滑行道位移等。

另外一項工程，是針對部分 G 滑行道（D 滑行道東側部分）重新定位，以提供 A380 足夠之翼展淨空需求。

◆ 跑道安全提升計畫

跑道端安全區爲 ICAO 爲一設置於跑道端之一塊整平區域，主要用以減低飛機衝出跑道時人機之傷亡。依 ICAO Annex14 要求，跑道端安全區（RESA）應自跑道地帶向外延伸至少 90m，及自跑道端外 60m 起向外延伸 90m。

依據原澳洲標準手冊（MOS-Manual of Standards）規定，跑道端安全區乃由跑道末端開始延伸計算。然 2003 年全球機場意外事件頻傳，澳洲乃重新檢討其規範，並修訂其 RESA 要求，與 ICAO 標準一致—自跑道地帶末端延伸。據此，雪梨機場所有 RESA 都需要額外延伸 60m 方得符合規範。

在雪梨機場三條跑道六端，其中 5 個跑道端後之腹地足夠，皆已於 2006 年完成 RESA 的延伸；而 25 跑道之 RESA 設置，因 07 跑道前有諸多必要設施（包括澳洲最大抽水站 SWOSS--Sydney Water's South and Western Suburbs Ocean Outfall Sewer、EnergyAustralia 的高壓電纜、COOKS 河下的 M5 東高速隧道、機場道路、天然氣管以及 Airservices Australia 發電和光纖電纜.）而且鄰近 COOKS 河，使得 RESA 之設置特別棘手。

爲此，雪梨機場曾考慮縮短跑道、設置 EMAS（Engineering Material Arrestor System）、延伸 25 跑道端等方案，惟因各方案分別可能影響現有 B740 及 A340 作業、腹地不足、影響現有滑行道系統等等因素不予採納，最終乃採以施作長 90m 寬 180m、陸橋型式之 RESA 以實際符合 CASA 之要求。所需經費初估約需 8 千 5 百萬澳元，工程於 2008 年 8 月 5 日核准、2008 年 10 月中展開，預計 2010 年完成。

◆ 空側設施改善

經詢問雪梨機場針對大型航機飛航或爲符合規範之相關改善計畫，成本龐大，是否有財源上與安全上的抉擇。

經其表示，雪梨機場與航空公司間有協議，相關機場改善，若屬必要的新投資（ necessary new investmet），航空公司必須負擔部分經費。因此在財源方面通常不會有太大議題。

圖 7 雪梨機場現有 07 跑道頭前暨有 RESA

圖 8 雪梨機場 07 跑道頭前 RESA 延伸規劃圖

◆ 風險評估實務範例

雪梨機場針對新的計畫案，在概念規劃、設計階段，會進行風險管理工作會議。通常先邀集公司內部人員開會討論，之後才會擴及至外部有關單位。案例詳附件 3：RESA 工程風險會議。

工程發包後，工程之風險評估（Risk Assessments）由承包商辦理。此爲澳洲法律明文規定應辦理事項。

在工程完成準備移交前，須針對作業面與維護面進行風險評估。附件 4 爲雪梨機場 T1 移交所辦理之風險評估。

此外，雪梨機場亦會從”使用者”的角度，針對設施、廠房、設備等之實際使用進行風險評估，如附件 5：T1 倉儲區的風險評估。

◆ **機場安全管理系統之專家意見**

雪梨機場安全部門經理 Mr. Peter Adams 分享，SMS 只是反應機場各項作業，不應視爲機場新增業務或事項。意即 SMS 的導入，只是將機場”現行"作業更整體化、系統化、文件化。

針對風險管理，其舉了個簡單的例子：房間裡有兩個洞，一個在桌子下，一個在門邊，兩個危害，利用風險管理，可以列出其風險發生的高低。就桌子下的洞而言，桌子其實就是一個控制（controller），發生的可能性降低，而門邊的洞則未受任何遮蔽或管控，風險明顯較桌下洞高，需優先處理。

另外有關風險矩陣工具，主要係爲協助快速列出危害風險高低以及找出優先處理事項，但不需要過於拘泥其準確性，而應將重點著重在在”control”的部分，即如何有效控制高風險之危害。

Mr. Peter Adams 表示，雪梨機場在 SMS 推動初期，針對風險評估程序的確有受到某程度的不接受，但現在大家都非常願意採行如是模式，因爲可以幫大家省事，使得工作更有效率，並且把事情做對。

◆ **ICAO 安全管理系統稽核**

ICAO 現階段並未對所屬會員國進行 SMS 稽核。但雪梨機場前爲向 CASA 證明所現有各項作業已符合 SMS 各項要求，爰特商請 ICAO 協助辦理該機場 SMS 外部稽核。

該查核結果雪梨機場無法分享，但提供檢查表單如附件 6。

查核結果 ICAO 表示雪梨機場 SMS 所需要素皆已具備，但仍應強化系統之整合與連結。

◆ 安全小組（Safety Committee）成員

安全小組成員共有 12 人，每 6 個禮拜召開一次會議，並定期每 3 個月提報董事正式報告。成員小組中僅有純粹機場的人，航空公司、地勤業者等並無納入其小組成員中。每次會議討論事項包含：事件（incident）報告、各單位報告、航空公司報告。

在參訪上個月所討論事件有跑道入侵、合約商違約事件（contract violation）、機坪事件、機場工作人員受傷等被列爲高等級處理事項。

◆ 正向、無懲性文化

正向、無懲性之文化係安全管理系統推動重要關鍵元素。雪梨機場表示，這種文化的推動的確需要時間，截至目前，機場公司內公務人員還是不太願意分享安全資訊，仍需要時間慢慢解除人員之疑惑與不信任。

在安全事件通報上，依其經驗，主要都是直接向安全經理反應，目前安全信箱還未有人使用。

◆ 航空研究

雪梨機場主要會針對跑滑道關係、跑道地帶、障礙物淨空區（OFZ）、Collision Risk Model、Taxiway Deviation Study 等議題進行航空研究。之前雪梨機爲了 A380 之飛航，因跑、滑道間距不足而滑行道無法短時間內位移，因此即進行航空研究提報 CASA 申請短期豁免。

航空研究之進行，有時候也會與學校合作，如之前 25 跑道側之樹木因有環保議題無法移除，而與學校合作進行航空研究評估對機場作業之影響。

◆ 程序補足設施之不完善（如下照片說明）

雪梨機場有部分滑行道與勤務車道之間距不足。

大型航空器作業時翼展範圍落於勤務車道上。

雪梨機場於滑行道與勤務車道交叉處設置指示牌規範車輛，在滑行道上有 C 類以上航空器滑行時應停等。

參訪是日，對向有台車輛尾隨於大型航空器後，但因該航空器停等於滑行道未直接轉彎，不久其他大型航空器接踵而來，致該車輛滯留於勤務車道上動彈不得，無法前進亦無法後退。

判斷失誤之作業車輛終於脫困，但可能必須進行相關安全報告。

其他參訪照片

雪梨機場臨灣海，對向處爲 16L/34R 跑道。

澳洲航空 A380 客機。

雪梨機場施工組絕設施。

本區域常有航空器誤入禁區，雪梨機場暫時利用施工組絕設施標示界圍。

機場安全巡場車。

施工安全巡場車。

機坪巡場車。

雪梨機場消防站，統由 Airservices Australia 提供服務，非屬機場管轄。

跑道地帶內助導航設施，爲 ATC 權責，非雪梨機場公司管轄。

緊急應變指揮車。

緊急應變指揮站。

寬大之滑行道道肩（繪設有黃色道肩橫向標線）及其側邊勤務道路。

07 跑道端之 RESA 工程阻絕設施。

07 跑道端 之 RESA 工程阻絕設施。

停機坪標線。

停機坪標線。

停機位標線。

停機位標線。

停機位標線。

湯斯維爾機場（Townsville Airport）

湯斯維爾機場爲軍民合用機場，由昆士蘭機場公司（Queensland Airport Limited）經營。機場座落於羅爾斯灣（Rowes Bay）與波勒河（Bohle River）間，位湯斯維爾市區西側約 5 公里處。爲北昆士蘭（North Queensland）地區主要機場。

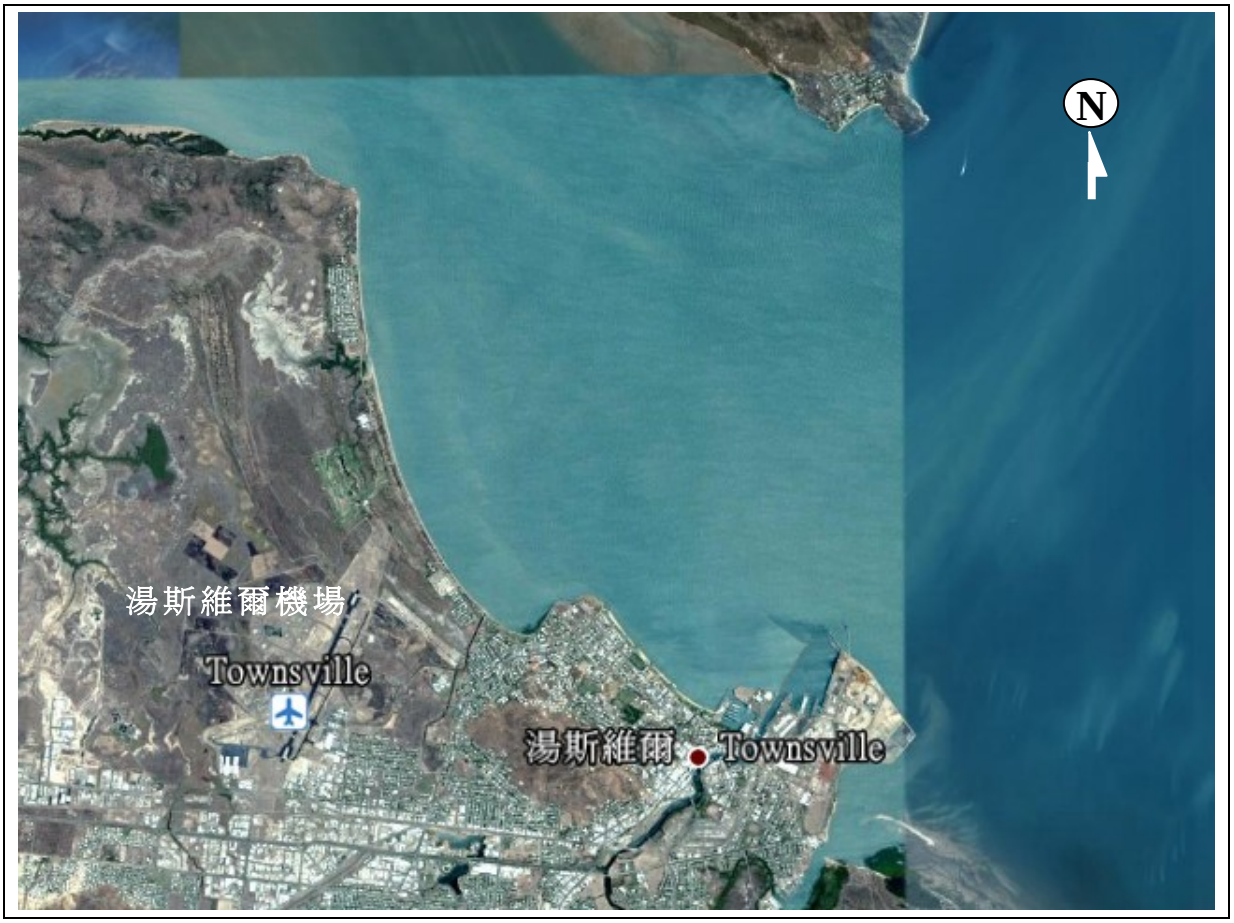


圖 9　湯斯維爾機場位置圖

機場管轄權隸屬軍方，民航作業區約 81 公頃，場內作業依循軍民協議書辦理；機場的規劃與發展則軍民雙方共同分擔。

2008 年湯斯維爾機場年運量約 140 萬人次，主要爲國內旅次，並以昆士蘭地區爲最大宗。駐站航空公司有澳洲航空（Qantas Airlines）、捷星航空（Jetstar Airlines）、維京藍航空（Virgin Blue Airlines）、聯盟航空（Alliance Airlines）、 天迅航空（Skytrans Airlines）、麥克航空（MacAir Airlines），其中，聯盟、天迅和麥克航空爲昆士蘭地區航線。此外，機場亦有不少普通航空業作業。

目前機場服務最大航空器爲 B747。

機場設施

◆ 跑道

湯斯維爾機場有兩條跑道：01/19 及 07/25 跑道，其中 7/25 跑道主要供普通航空業小型航空器使用。

01/19 跑道：長 2438m，寬 45m。跑道地帶寬 300m。清除區長 202m，寬 150m。跑道除兩端爲混凝土舖面外，餘皆爲瀝青舖面，PCN 值爲 71/F/C/1750(254PSI)/T。距跑道頭 445m 處有可升降式之 BAK12/14 攔截索。

0725 跑道：長 1100m，寬 30m。跑道地帶寬 90m。爲瀝青舖面，PCN 值爲 20/F/C/580(84PSI)/U。

◆ 滑行道

供民航機使用之滑行道計有：A1~A7、B1~B3、D1~D3、E1、F、G1、K、I、L，餘滑行道原則上不供民航機使用。其中，寬體客機之滑行路徑僅限於 A1~A3、D2 與 K 滑行道，因此以 01 跑道降落之航空器必須自 19 跑道端迴轉在跑道上滑行自 D2 滑行道脫離跑道。

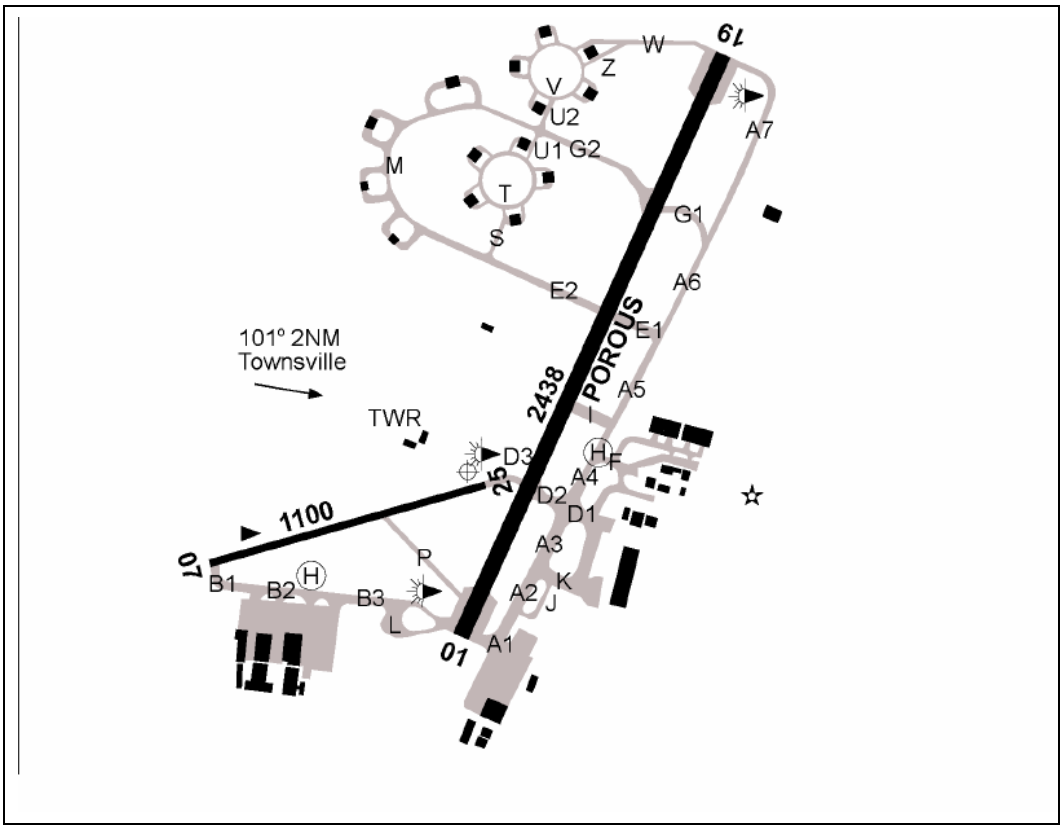


圖 10 湯斯維爾機跑、滑道位置圖

軍民合用機場作業

我國機場軍民合用機場所遭遇的問題，主要在於如何協調軍方進行場內設施改善使機場符合我國「民用機場設計暨運作規範」之要求。在湯斯維爾機場跑道除了攔截索以外，並無如我國機堡、GCA 相關軍事障礙物。而針對攔截索乙項，經機場人員表示，依據協議書，在民航機作業期間，攔截索皆處於降下之狀況。

而在設施維護（包括燈光、道面、除草等）以及場內與場外障礙物管制權等，皆由軍方負責維護。軍方了解民航作業必須符合民航法規之需求，因此任何問題都會盡力協助，溝通合作無問題。

對於我國在軍民合用機場所遭遇議題，湯斯維爾機場並無法提供類似解決經驗。

圖 11 湯斯維爾機場攔截索設施

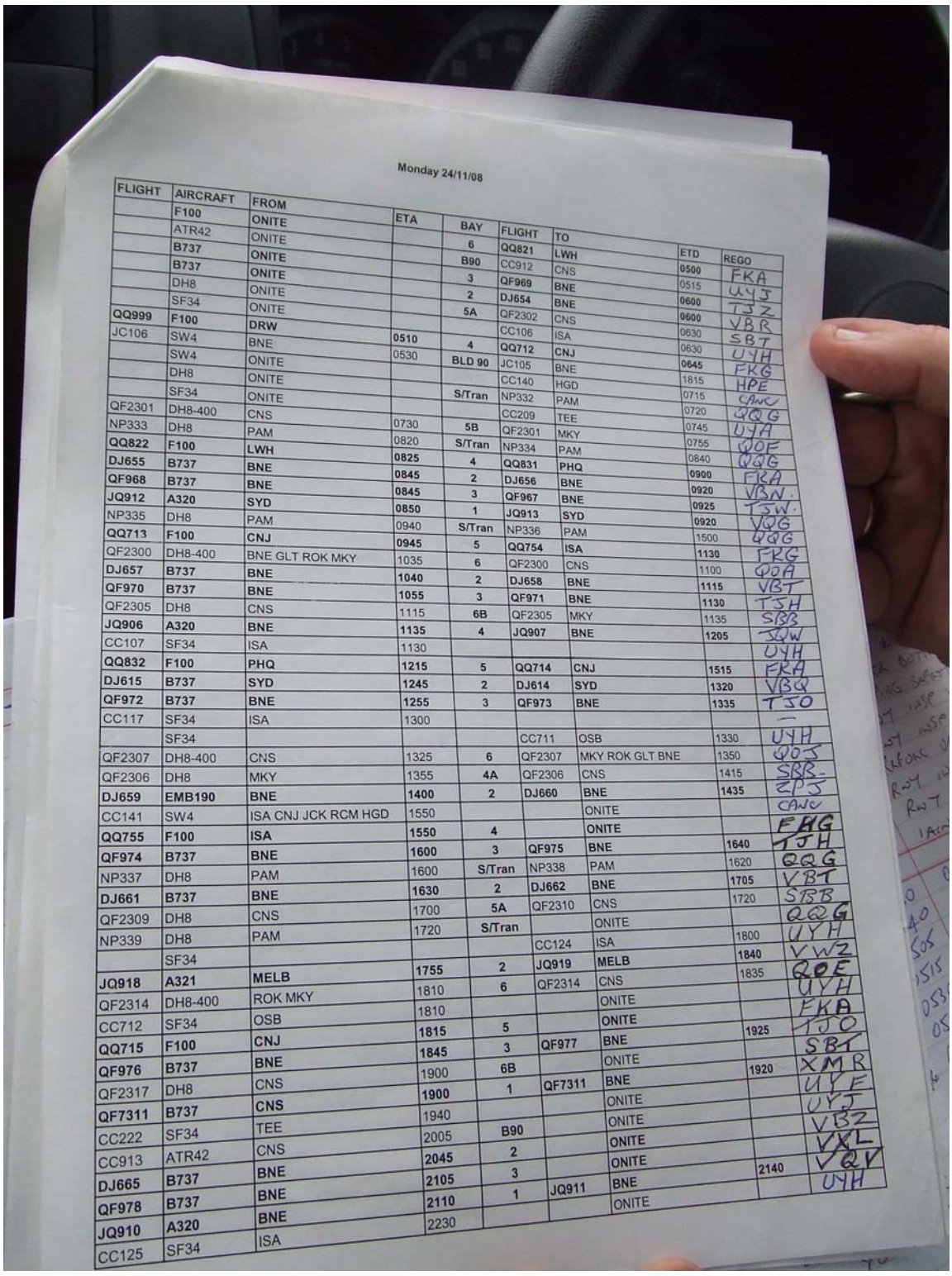
機場空側作業

◆ 安全官（Safety Officer）

湯斯維爾機場編制內共有 5 個安全官，負責場面安全巡視作業，類似我國機場航務員之場面巡場任務。其每日工作幾乎終日駕車於場面上，隨時於航空器起降前以及降落

後進行跑、滑道之檢視。其每日作業有整日班機預計時程表如圖 12，於每次巡場後即立即紙本紀錄如圖 13。

而在行車管制上，安全官只有上跑道時需要聯繫塔台核准，滑行道上之作業僅需隨時無線電守聽，無需塔台授權。



Monday 24/11/08

FLIGHT	AIRCRAFT	FROM	ETA	BAY	FLIGHT	TO	ETD	REGO
	F100	ONITE		6	QQ821	LWH	0500	FKA
	ATR42	ONITE		B90	CC912	CNS	0515	UYJ
	B737	ONITE		3	QF969	BNE	0600	TJZ
	B737	ONITE		2	DJ654	BNE	0600	VBR
	DH8	ONITE		5A	QF2302	CNS	0600	SBT
	SF34	ONITE			CC106	ISA	0630	UYH
QQ999	F100	DRW		4	QQ712	CNJ	0630	FKG
JC106	SW4	BNE	0510	BLD 90	JC105	BNE	0645	HPE
	SW4	ONITE	0530		CC140	HGD	1815	CANC
	DH8	ONITE		S/Tran	NP332	PAM	0715	QQG
	SF34	ONITE			CC209	TEE	0720	UYA
QF2301	DH8-400	CNS		5B	QF2301	MKY	0745	QOF
NP333	DH8	PAM	0730	S/Tran	NP334	PAM	0755	QQG
QQ822	F100	LWH	0820	4	QQ831	PHQ	0840	FKA
DJ655	B737	BNE	0825	2	DJ656	BNE	0900	VBN
QF968	B737	BNE	0845	3	QF967	BNE	0920	TSW
JQ912	A320	SYD	0845	1	JQ913	SYD	0925	VQG
NP335	DH8	PAM	0850	S/Tran	NP336	PAM	0920	QQG
QQ713	F100	CNJ	0940	5	QQ754	ISA	1500	FKG
QF2300	DH8-400	BNE GLT ROK MKY	0945	6	QF2300	CNS	1130	QOA
DJ657	B737	BNE	1035	2	DJ658	BNE	1100	VBT
QF970	B737	BNE	1040	3	QF971	BNE	1115	TSH
QF2305	DH8	CNS	1055	6B	QF2305	MKY	1130	SBB
JQ906	A320	BNE	1115	4	JQ907	BNE	1135	SQW
CC107	SF34	ISA	1135				1205	UYH
QQ832	F100	PHQ	1130	5	QQ714	CNJ	1515	FKA
DJ615	B737	SYD	1215	2	DJ614	SYD	1320	VBQ
QF972	B737	BNE	1245	3	QF973	BNE	1335	TSO
CC117	SF34	ISA	1255					—
	SF34		1300		CC711	OSB	1330	UYH
QF2307	DH8-400	CNS	1325	6	QF2307	MKY ROK GLT BNE	1350	QOJ
QF2306	DH8	MKY	1355	4A	QF2306	CNS	1415	SBB
DJ659	EMB190	BNE	1400	2	DJ660	BNE	1435	ZPJ
CC141	SW4	ISA CNJ JCK RCM HGD	1550			ONITE		CANC
QQ755	F100	ISA	1550	4		ONITE		FKG
QF974	B737	BNE	1600	3	QF975	BNE	1640	TJH
NP337	DH8	PAM	1600	S/Tran	NP338	PAM	1620	QQG
DJ661	B737	BNE	1630	2	DJ662	BNE	1705	VBT
QF2309	DH8	CNS	1700	5A	QF2310	CNS	1720	SBB
NP339	DH8	PAM	1720	S/Tran		ONITE		QQG
	SF34				CC124	ISA	1800	UYH
JQ918	A321	MELB	1755	2	JQ919	MELB	1840	VW2
QF2314	DH8-400	ROK MKY	1810	6	QF2314	CNS	1835	QOE
CC712	SF34	OSB	1810			ONITE		UYH
QQ715	F100	CNJ	1815	5		ONITE		FKA
QF976	B737	BNE	1845	3	QF977	BNE	1925	TJO
QF2317	DH8	CNS	1900	6B		ONITE		SBT
QF7311	B737	CNS	1900	1	QF7311	BNE	1920	XMR
CC222	SF34	TEE	1940			ONITE		UYE
CC913	ATR42	CNS	2005	B90		ONITE		UYJ
DJ665	B737	BNE	2045	2		ONITE		VBZ
QF978	B737	BNE	2105	3		ONITE		VXL
JQ910	A320	BNE	2110	1	JQ911	BNE	2140	VQV
CC125	SF34	ISA	2230			ONITE		UYH

圖 12 每日航機起降預計資訊

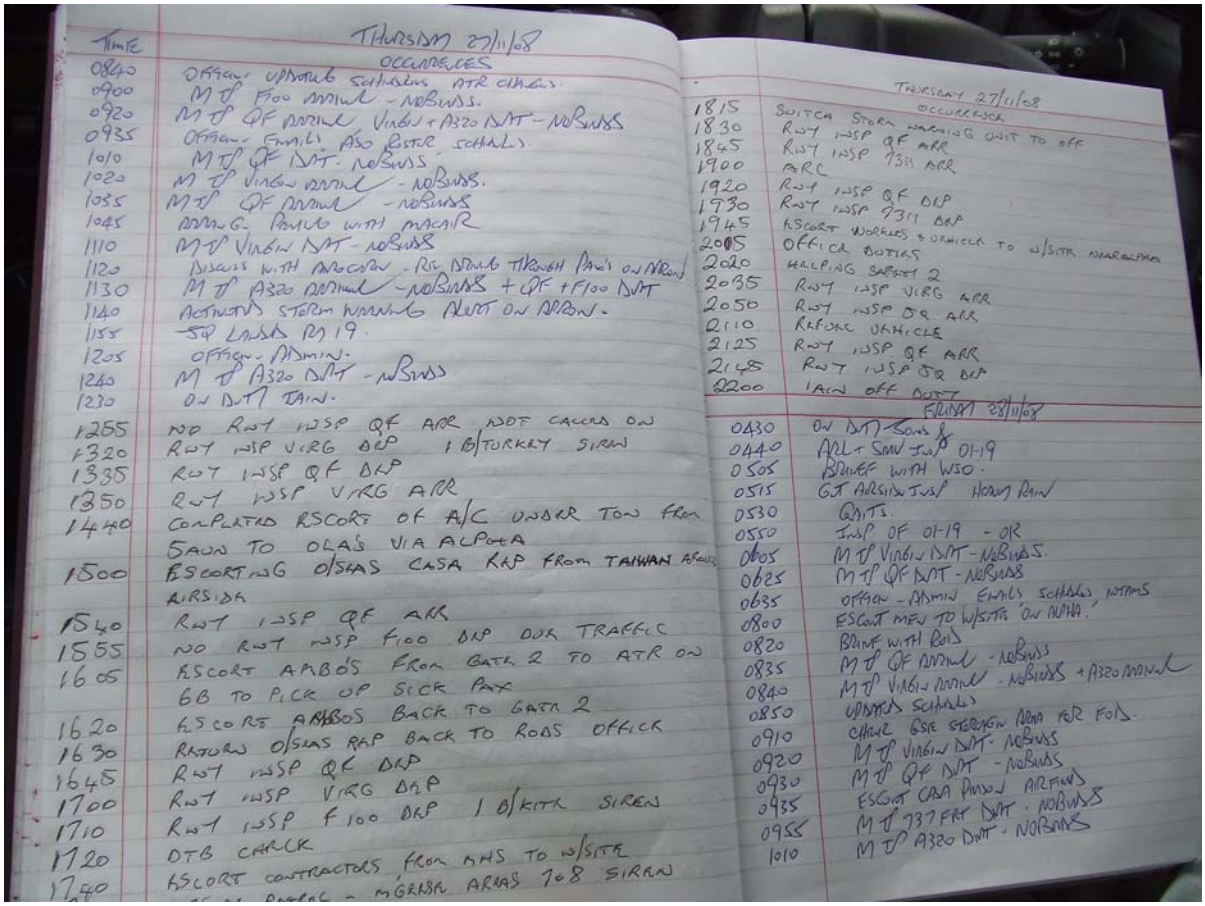


圖 13 巡場紀錄

◆ 施工監視員，

依據 CASA 規定，當機場有工程時，必須有專職施工監視員在施工時段全程在場監控。工作事項不涉及工程技術，僅負責監視作業人員是否有違機場相關規定，如障礙物限制面、施工安全等。Mr. Rod Ward 表示該工作冗長無聊且專業性低，一般會以聘僱方式或由安全官兼任。

◆ 道面維護

湯斯維爾機場之道面摩擦係數軍方辦理，依據 CASA 的規定，每年至少辦理檢測 1 次。

◆ 機場安全議題

湯斯維爾機場在安全議題上，以鳥的問題爲最大宗，尤其在 12~3 月間。

鳥的檢視爲安全官每日巡場重點是項之一。每個禮拜 3 與禮拜 6 會進行鳥擊事件小計，彙整種類、發生次數等，並進行必要之研究與分析。與我國不同之處，湯斯維爾機場安全官有權可以開槍殺鳥，不需一定要由航警執行。

另由於機場跑道排水往北流，雨季時也常造成 19 跑道頭區域積水，也是安全官必須密切注意事項。

其他參訪照片

湯斯維爾機場，參訪是日雷雨。

機坪標線。

空橋及裝備區標線。

停機坪。

普通航空業停機坪。

跑道頭前區域。

01/19 跑道。

指示牌。

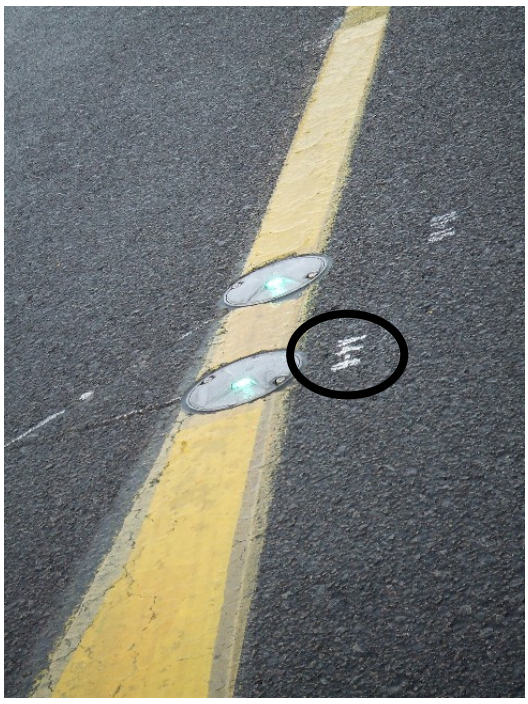
D2 滑行道往跑道方向。

跑道燈光系統。

跑道頭標線。

風向指示器。

D3 滑行道轉 D2 滑行道。



燈光編碼以利維護紀錄。

滑行道地帶施工區。

滑行道地帶施工區。

四、心得與建議

- 安全管理系統（Safety Management System）爲機場認證（Aerodrome Certification）要項之一，機場認證之對象界定，決定安全管理系統建制之必要性。依據我國之機場認證規定，認證對象並無明確列述，此爲尚需釐清之事項。而澳洲經驗，可提供我國一個參考，尤其針對軍民合用機場部分：

  「僅針對"作業"進行認證，設施部份不列入認證事項」

  而針對本局離島或其他小機場，亦可比照澳洲"註冊機場（Registered Aerodrome）"之分類，機場手冊（Aerodrome Manual）以及安全管理系統建置非強制性作爲，但仍需進行定期查核以確保機場安全。如是，除可爲我國機場認證架構解套，亦或爲較合乎實務之做法。

  惟澳洲民航局（CASA）機場事務協調員（Aerodrome Coordinator） Mr. Richard Allen 表示，從檢查員的角度來看，註冊機場仍宜備有機場手冊，文件之一致性較有利稽核作業之進行；此亦爲 CASA 後續可能會調整之事項。

- 普遍對於安全管理系統之認知，尤其針對風險管理機制、風險管理工具，會有畏懼、排斥之觀感，澳洲安全管理系統之推動亦曾面臨如是情況。但雪梨國際機場（Sydney International Airport）經驗證明風險管理之引入確可強化作業上之效率、加速決策之速度，進而提升整體作業流程與安全。而在整體風險流程中，一般極爲強調之要素－風險管理工具，其實僅供決策輔助、以快速找出危害處理之優先順序，重點仍應著重在控制危害之方法以及策略，將危害有效排除、控制爲是。

- 我國長期在機場認證作業上有個迷思，是否機場完全符合「民用機場設計暨運作規範」之要求方得符合認證證書？要如何運用國際民航組織（ICAO）9774 文件（Doc. 9774）所述之豁免（Exemption）而仍得確保機場安全品質？本次觀摩提供非常好的經驗：雪梨機場透過航空研究及風險管理機制，在設施未完全符合 F 類標準下，經 CASA 豁免飛航 A380，並透過程序管制，以彌補設施未完善處。惟其豁免之運用，有諸多關鍵仍待我國民航與機場單位一番努力與思索：

  1. 航空研究之進行，由機場進行；機場安全之確保措施，由機場擬定。
  2. CASA 對於大型航空器作業之豁免，前提航空公司必須先獲飛航標準單位之豁免同意，確定該航空器之作業於該機場無虞，始會進行其他與機場有關之檢視。

- 爲與 ICAO Annex 14 要求一致、提升機場安全，CASA 於 2003 年修改澳洲跑道端安全區（RESA）之規定，機場因此必須額外延伸 60 m 之區域始符合標準。而針對此一規定修改，雪梨機場於 2006 年內據以完成 5 端跑道 RESA 之延伸，並

針對棘手的另一跑道端研擬方案、預定於 3 年內投入約 8 千 5 百萬澳元之經費辦理改善，其對機場安全所展現之效率以及決心，值得仿效與學習。

- 我國有許多軍民合用機場，其內相關民航作業安全需軍方之配合與協助；在機場認證之設施、作業標準化之推動上，因軍民作業需求、立場不同，仍留有極大改善空間。

  觀摩湯斯維爾機場（Townsville Airport），對於理所當然攔截索應於民航機作業期間放下之事項，看似簡單的作為，在我國卻難以完成，但也顯示在我國可能達成之可能性，惟需智慧與決心尋求軍民兩照之平衡點。

- 事實上，我國對於機場認證、安全之提升與推動上並不遜色於此次觀摩國－澳洲，在許多思維、作業以及軟硬體設施等上，我國甚至較為完善、靈活、機動而彈性。但無可否認，我國冗長的行政與決策過程削弱了推動執行力與效率性。如何截長補短、轉化他人經驗、在既有架構體系上找出最佳執行策略以達事半功倍之成效，乃是我國仍應持續努力之課題。

附件

附件 1

Australian Government
Civil Aviation Safety Authority

CIVIL AVIATION ACT 1988

Aerodrome Certificate

Certificate Number **C022**

This certificate authorises

TOWNSVILLE AIRPORT PTY LTD

ARN 556680 ACN 081257490

to operate the following aerodrome

TOWNSVILLE/Townsville INTL

This certificate is issued under regulation 139.050 of the *Civil Aviation Safety Regulations 1998 (CASR 1998)*. The certificate is subject to any conditions set out on page 2 of this certificate or notified under subregulation 139.060(3) of *CASR 1998*.

This certificate is effective from 16 December 2005, and remains in force until cancelled, except during any period in which it is suspended.

Richard Allen
Coordinator, Aerodromes
Air Transport Operations Group

Delegate of the Civil Aviation Safety Authority

16 December 2005

Aerodrome Certificate No. C022
Page 1 of 2

Safe Skies for All

Australian Government
Civil Aviation Safety Authority

AVIATION SAFETY AUDIT REPORT
L City Council
Audit Reference: Y August 2008

1. AUDIT INFORMATION

Auditee details

Auditee's Aviation Reference Number: 901640

Auditee name & address: L City Council
PO Box 23A
L NSW 2480

Audit details

Type: **Scheduled**

Location: **L**

Date: **11 August 2008**

Scope: **Aerodrome management**
Safety Management System
Aerodrome Manual
Particulars to be notified within AIP
Aerodrome emergency plan

Aerodrome environment
Aerodrome facilities
Aerodrome lighting
Bird and animal hazard management
Obstacle control

Inspecting and reporting
Aerodrome reporting
Aerodrome serviceability inspections
Aerodrome technical inspections

Airside control

Aircraft parking control

Aerodrome Works Safety

Distribution

Ms Ruth Povall
Manager Economic Development
L City Council

Richard Allen
Manager – Aerodromes
Sydney

Auditor(s)

Aerodromes Inspector
Brisbane

Auditor signature and date

…….

2. AUDIT SUMMARY

Background

The L aerodrome is serviced daily by Rex Airlines (using SAAB 340 aircraft). Other aviation activities include fixed wing and helicopter charter flights, flying training and aircraft maintenance facilities. Refuelling is also available.

Summary

Aerodrome management representative Mr C was met at the aerodrome on the morning of 18 August 2008. An outline of the audit and inspection timelines was provided and a facilities inspection was carried out. This was followed by the aerodrome manual procedures audit. A night inspection of the aerodrome lighting was conducted that evening. A summary of my findings was provided at the conclusion of the audit.

Conclusion

With the exception of the audit findings that are detailed in the Audit Element Summary, Council have suitable systems in place to ensure the safe operation and management of the aerodrome.

3. INDEX OF FINDINGS

System	Element	Number	Type
Aerodrome management	Safety Management System		Observation
	Aerodrome manual	YLIS 01/08	RCA
	Particulars to be notified in AIP		Observation
	Aerodrome emergency plan		Observation
Aerodrome environment	Aerodrome facilities		Observation
	Aerodrome lighting		Observation
	Bird and animal hazard management	YLIS 02/08	RCA
	Obstacle control		Observation
Inspecting and reporting	Aerodrome reporting		No findings
	Aerodrome serviceability inspections		No findings
	Aerodrome technical inspection		Observation
Airside control	Aircraft Parking Control		Observation
	Aerodrome Works		No findings

4. AUDIT ELEMENT SUMMARY

Aerodrome management

4.1 Safety Management Systems

Richard Allen audited the L Aerodrome SMS with the Aerodrome Manager ().

Observation

It was agreed that the Aerodrome Manager would ensure that all hazards that could impact on aerodrome safety would be assessed and not just those that are located airside (for example obstacles may be off-aerodrome). It was agreed that the Aerodrome Manager will amend the SMS to include a copy of the reporting form and correct the appendix numbering. Meetings of the Safety Committee have not been recorded, but in future they will be held in conjunction with the OH&S Committee and recorded in their minutes. The SMS document (including the hazard register) needs to be reviewed by the Safety Committee/OH&S Committee at their next meeting and the OH&S committee need to be made aware of the SMS for their future aerodrome auditing activities. The Safety Committee should consider introducing a pro-active hazard identification form as the one they are using is a post-accident report.

4.2 Aerodrome manual

A current copy of the aerodrome manual was held at the Airport Office and was accessible to the Reporting Officer. The maintenance of the manual is presently coordinated by the nominated Manual Controller (Mr). However, the most recent manual amendment was dated 1 March 2006 (the initial issue date). A revision of the document was partial undertaken (but not distributed) which has led to CASA's and the aerodrome operator's versions being different.

RCA No. YLIS 01/08

Amendments identified at the previous audit had not yet been incorporated. In addition, a number of minor amendments were identified through this audit process. These were noted by the Aerodrome Manager. The manual versions held by the aerodrome operator and CASA were different. A review/update of the manual is required.

4.1 Particulars notified in AIP

A review of the AIP (ERSA and RDS) information did not reveal any discrepancies.

Observation

AIP information within Part 3 of the aerodrome manual requires minor updating/corrections. This should be completed in conjunction with the manual review now due.

4.2 Aerodrome emergency plan

An assessment of the records associated with this procedure, showed that a full exercise was conducted on 11 July 2007. Debrief notes were provided and minutes showed that a review of the exercise had been undertaken and that no amendments to the procedure were required. Meeting minutes verified that a table-top exercise is programmed and was to be held within the next 3 months. This was in accordance with the procedure requirements.

Observation

The AEP should be reviewed and revised as part of the manual update. Consideration to using the national format/template should be given.

Aerodrome environment

4.3 Aerodrome facilities

An inspection of the physical characteristics of the movement area was undertaken on the morning of 18 August 2008. The following items were noted as requiring attention are listed within the observation below.

Observation

1. Many cone and boundary markers were in need of cleaning and/or repainting.
2. Runway pavement markings were in a faded condition.
3. The aircraft parking areas bordered by the drain along the southern side of the GA taxiway should be defined. In addition the drain limits should be marked with unserviceability cones.
4. Parking clearance lines should be placed adjacent to the fuel bowsers to ensure wing tip clearance is maintained.

4.5 Aerodrome lighting

A night inspection of the lighting system (including obstacle lights) was undertaken on the evening of 18 August 2008. Apart from two minor outages all aerodrome lighting (including obstacle lighting) was considered to be in a serviceable condition.

Observation

1. It was noted that some aspects of the weekly serviceability inspections had not been recorded accurately.
2. A resurvey of the PAPI boxes to verify correct approach angles should be undertaken.

4.6 Bird and animal hazard management

Limited bird activity was noted during the aerodrome inspection. A number of bat strikes had occurred through the summer months and is an ongoing seasonal concern. Airlines avoid dawn and dusk flight scheduling where possible. There was no inadvertent animal intrusion noted within the inspection logbook. Bird counts have not been conducted or recorded in accordance with the procedure.

The Bird and Wildlife Hazard Management plan had been prepared by your consultants and a copy was available. The major safety related recommendations were under implementation but these actions were on-going.

RCA No YLIS 02/08

The conduct of bird counts has not been carried out in accordance with the manual procedure**.** In addition the nominated form (2/11/5) has not been used. The procedure should be updated in accordance with the requested review of the aerodrome manual previously requested within this report.

4.7 Obstacle control

An assessment of the obstacles reported within the aerodrome technical inspection was undertaken. Apart from the observation listed below, it appeared that the inspection/monitoring and reporting of obstacles were satisfactory. The reported

operational data within ERSA RDS (including current NOTAM) agreed with that nominated within the report.

Observation

The OLS plan requires revision to reflect that the approach inner edge width is 150m and the splay angles are 15%. This matter is carried over from the previous audit.

Inspecting and reporting

4.8 Aerodrome reporting

A review of NOTAMs issued since the last audit was undertaken. These were considered satisfactory. Reporting officers were appropriately trained and compliance with this procedure appeared satisfactory.

4.9 Aerodrome serviceability inspections

A sample of records held between 1/01/2008 and 17/08/2008 were reviewed. Satisfactory inspection and reporting had been undertaken which was in accordance with the checklist held within the manual procedure. An inspection had been undertaken each day that a passenger service operates (7 days per week). Reporting officers were suitably experienced and qualified.

4.10 Aerodrome technical inspections

The 2007 aerodrome technical inspection (conducted November 2007) was available and a copy provided. Recommendations of the consultant's report had been addressed. Matters raised within the report which require comment are included within the following observation.

Observation

1. Recommendation 7 recommends that CASA make an assessment of turbulence associated with a proposed building development. This detail should be supplied by the proponent as part of the application process as it is not CASA's responsibility

to assess LCC's risk in this matter. In addition LCC should be mindful that this proposed development should not:

- Infringe the OLS
- Create bird hazards
- Interfere with the weather information station (AWIS)

2. Recommendation 15 of the 2006 report required apron parking restrictions to be advised within ERSA. Further action on this matter is nominated within aircraft parking control (below).

Airside control

4.11 Aircraft parking control

The RPT apron can accommodate two jet turbine aircraft. Current schedules are timed to avoid simultaneous operations/parking if possible. Observed ground GSE positioning and operation appeared satisfactory.

Observation

1. The parking restrictions as set out within ERSA need to be included/advised within this aerodrome manual procedure.

2. The apron marking plan needs to be approved/signed.

4.12 Aerodrome Works Safety

Runway pavement re-construction/pavement strengthening works were completed under closed runway conditions. NOTAMs actioning this were sighted. No MOWPs were implemented within the past 12 months. Maintenance works were conducted by time limited works. The procedure has been adequately followed.

5. AUDITEE INFORMATION

Authority for the conduct of the audit

The audit identified in this report was carried out by CASA in pursuance of its functions under section 9 of the Civil Aviation Act 1988.

Confidentiality

This audit report is a confidential document between the CASA and the Aerodrome Operator. CASA will not disclose this report or any part of it to any third person except, in pursuance of its functions, with the express permission of the Aerodrome Operator, or as required by law.

Audit Method

The audit is a sampling exercise and does not purport to be a total systems review. The sampling provides a snapshot of the system and any deficiencies detected could point to a systemic problem, requiring a total systems review by the Aerodrome Operator. The operator as outlined below must address deficiencies and problems identified in the audit findings.

Audit Findings

Audit findings may be in the form of Requests for Corrective Action (RCA), Safety Alerts (SA) or Audit Observations (AO).

RCA (Request for Corrective Action)

RCAs detail deficiencies that involve non-compliance with legislation and must be addressed. The deficiency is described in the 'details of deficiency' field. For RCAs, the following actions must be taken to address the deficiency/deficiencies:

1. Remedial action: to remedy the immediate situation so that operations are brought within safe parameters; for example: the REMEDIAL ACTION to address an identified deficiency of 'Aerodrome facilities not in compliance with MOS Part 139' would be to close the affected area until it can be repaired.
2. Investigative action: to identify the deficiency/problem and determine the root cause;
3. Corrective action(s): to address the root cause of the problem; for example, the CORRECTIVE ACTION would be to implement a system to ensure that staff are aware of the standards and the need to monitor the aerodrome facilities for compliance.

The Aerodrome Operator must record both the remedial and corrective action taken, on the 'recipient's response' page of the RCA and return it to the address shown, by the due date. Where the corrective action cannot be completed by the due date, the Aerodrome Operator must indicate the date by which the corrective action will be completed. (Note: To avoid unnecessary pages in this report, only one copy of the 'recipient's response' page is included at the end. Please photocopy as required).

Safety Alerts

A SAFETY ALERT is a particular type of REQUEST FOR CORRECTIVE ACTION that must be addressed IMMEDIATELY. The Aerodrome Operator must take action to ensure that the deficiency is rectified carrying out RCA steps 2) and 3) above before the continued operation of the aerodrome facility concerned.

Audit Observations

An AUDIT OBSERVATION draws attention to latent conditions or minor deficiencies in a system that cannot be attributed to a current legislative requirement. The intention is to raise awareness with a view to avoiding problems in the future.

Response to OBSERVATIONS is not required. However, auditees are advised to take appropriate action as part of their continuous improvement processes. Actions taken should be reported to CASA and may be covered in future surveillance.

附件 3 ：RESA 工程風險會議

Sydney Airport Corporation Limited — **RISK REGISTER**

SCACH Group
Project: RESA
Business Unit: Asset Planning & Services

Risk No.	Risk Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Control Operating Status	Control Effectiveness Rating	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating						Likelihood	Consequence	Rating		
Risk Category: A. Operations														
	Airfield Safety													
1	Plant and equipment may (Unplanned) penetrate the OLS or the Glidepath	2 - Unlikely	5 - Catastrophic		Crane Approvals	SACL (Ops)		4 - Enhanced	4 - Effective	1 - Rare	5 - Catastrophic		Managing Contractor , SACL	Monthly PCG Report, Monthly MC Report, Daily Ops Report
2					monitoring of crane approvals	Project Manager							Managing Contractor, SACL	Monthly PCG Report, Monthly MC Report, Daily Ops Report
3					Inductions	Project Manager							Managing Contractor	Monthly PCG Report, Monthly MC Report, Daily Ops Report
4					SACL Safety Management Plan	Project Manager							SACL	Monthly PCG Report, Monthly MC Report, Daily Ops Report
					MC Safety Management Plan	Managing Contractor							Managing Contractor	Monthly PCG Report, Monthly MC Report, Daily
5					AWPs	Project Manager							Managing Contractor, SACL	Monthly PCG Report, Monthly MC Report, Daily Ops Report
6	The project has no alternative but to penetrate the OLS and/or the Glidepath with plant equipment (Planned)	4 - Likely	4 - Major		Close runway, MOWPs, AWPs, Inductions, SACL and MC Safety Management Plans, Coordinate with ASA	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	SACL, Managing Contractor	Monthly MC Report, Daily Ops Report
9	Delay to construction due to a requirement for the use of a runway in case in emergency	1 - Rare	1 - Insignificant	Low	MOWPs, AWPs, Communications	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	SACL	PCG Report
10	Delay to construction as a result of an airport emergency.	1 - Rare	1 - Insignificant	Low	MOWPs, AWPs, Communications	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	SACL	PCG Report
11	Impact on Project if MC is unable to hand over the runway in accordance with AWP due to late finishing construction works.	1 - Rare	2 - Minor	Low	MOWP's, AWPs, Construction Methods, short term programmes	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor	Monthly MC Report, Daily Ops Report
12	Damage to operational ISACL) infrastructure	3 - Moderate	3 - Moderate		MOWPs, AWPs, Inductions, MC's SMS, Workshops, revised work methods	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Managing Contractor	Monthly MC Report, Daily Ops Report
13	Managing Contractor' s radio system causes interference with airport communications system	1 - Rare	1 - Insignificant	Low	Managing Contractor's Safety Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor	Monthly MC Report, Daily Ops Report
14	Construction work increases requirements for wildlife management	2 - Unlikely	2 - Minor	Low	SACL Wildlife Plan and Managing Contractor's Environmental Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Managing Contractor	Monthly MC Report, Daily Ops Report
15	Emergency Services unable to respond to airfield emergency due to construction work preventing access	2 - Unlikely	4 - Major		Airport emergency plan, Managing Contractor's Safety Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	4 - Major		Managing Contractor	Monthly MC Report, Daily Ops Report .
16	Effect on night time airfield operations due to construction lighting	1 - Rare	1 - Insignificant	Low	Managing Contractor's Safety Management Plan MOWP	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor	Monthly MC Report, Daily Ops Report
17	Access to construction site for deliveries of materials impacts on airport and airfield operations.	4 - Likely	2 - Minor		Managing Contractor's Safety Management Plan, Traffic Management Plan, Security Programme, WSO	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor	Monthly MC Report, Daily Ops Report
	Security													
18	Time required to obtain ASIC delays mobilisation of personnel exceeds 6 weeks	3 - Moderate	1 - Insignificant	Low	Managing Contractor's programme and procurement procedures for subcontractors. Escorts	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	1 - Insignificant	Low	Managing Contractor	Monthly Report
19	Difficulty manning access points, new and existing, including gate 24.	2 - Unlikely	1 - Insignificant	Low	Communications wit contractor	SACL (Ops)		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	SACL Security Ops	Daily Ops Report
20	Construction work results in difficulty in maintaining perimeter security and security patrols	4 - Likely	2 - Minor		Inductions, AWPs, SACL security requirements (Contract 1427 - Specification part B)	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	2 - Minor	Low	Managing Contractor	Monthly Report and 3 Wk Lookahead Programme
21	Construction work results in unauthorised access on airfield	3 - Moderate	2 - Minor	Medium	Inductions, AWPs, SACL security requirements (Contract 1427 - Specification part B)	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	2 - Minor	Low	Managing Contractor, SACL Security	Daily Ops Report, Daily Ops Report
Risk Category: B. Legal														
22	Delays and additional costs as a result of subcontractors not agreeing to std conditions	3 - Moderate	2 - Minor	Medium	Managing Contractor's programme and procurement procedures for subcontractors,	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	1 - Insignificant	Low	Project Manager, Managing Contractor	Monthly PCG Report, Monthly MC Report
23	Delays and additional costs as a result of changes in regulatory requirements	1 - Rare	2 - Minor	Low	Managing Contractor's programme and Management Plan	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager, Managing Contractor	Monthly PCG Report, Monthly MC Report
Risk Category: C. Finance														
24	Delays in project impact on recovery of costs from airlines (NNI funding)	2 - Unlikely	2 - Minor	Low	????????	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	PCG	Monthly PCG Report

Project: RESA
Business Unit: Asset Planning & Services

Risk No.	Risk Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Control Operating Status	Control Effectiveness Rating	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating						Likelihood	Consequence	Rating		
Risk Category: D. Asset Planning Services														
	Facilities Management													
25	Required handover documentation is not issued to SACL, as-builts, maintenance manuals etc.	4 - Likely	1 - Insignificant	Medium	MC Contract conditions, MC contract programme	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	PCG, Project Manager	Monthly PCG Report
	Design													
26	Design does not consider safety during construction	2 - Unlikely	4 - Major	High	Designer's QA System, Design Reviews, Buildability Workshops	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, Designers, Independent Varifier	Monthly PCG Report, Verifiers Report.
		2 - Unlikely	4 - Major	High	Hold safety in design workshops to address MC issues prior to detailed design. SACL/BH/CW to undertake a formal safety in design workshop (Note CW has conducted internal Safety in design workshops and BH has conducted internal safety in construction workshops, however these have been independent)	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, Designers, Independent Varifier	Monthly PCG Report, Verifiers Report.
27	Design does not consider safety during ongoing maintenance and use	2 - Unlikely	4 - Major	High	Designer's QA System, Design Reviews, Buildability Workshops	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, Designers, Independent Varifier, Managing Contractor	Monthly PCG Report, Designer and Verifiers Report.
		2 - Unlikely	4 - Major	High	Hold safety in operations/maintenance workshops to address SACL issues prior to detailed design. SACL/CW to undertake a formal safety in operations/maintenance workshop (Note CW has conducted internal Safety in design workshops and risk assessments, however these have been largely independent of SACL.	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, Designers, Independent Varifier, Managing Contractor	Monthly PCG Report, Designer and Verifiers Report.
28	Design does not fully consider the impact on stakeholder infrastructure	2 - Unlikely	4 - Major	High	Designer's QA System, Design Reviews, Buildability Workshops	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	3 - Moderate	Medium	Project Manager, Designers, Independent Varifier, SACL PM	Monthly PCG Report, Verifiers Report.
		2 - Unlikely	4 - Major	High	Liaison undertaken with SACL/external stakeholders to obtain design criteria and acceptance of design, and formal comments sought from stakeholders on design documentation	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	3 - Moderate	Medium	Project Manager, Designers, Independent Varifier, SACL PM	Monthly PCG Report, Verifiers Report.
29	Design does not fully consider the impact of an airport emergency	2 - Unlikely	4 - Major	High	Designer's QA System, Design Reviews, Buildability Workshops	Project Manager,		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, Designers, Independent Varifier, Operations	Monthly PCG Report, Verifiers Report.
		2 - Unlikely	4 - Major	High	Hold safety in operations/maintenance workshops to address SACL issues prior to detailed design. SACL/CW to undertake a formal safety in operations/maintenance workshop (Note CW has conducted internal Safety in design workshops and risk assessments, however these have been largely independent of SACL.	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, Designers, Independent Varifier, Operations	Monthly PCG Report, Verifiers Report.
30	Design does not fully consider buildability issues	2 - Unlikely	4 - Major	High	Designer's QA System, Design Reviews, Buildability Workshops	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, MC, Designers, Independent Varifier	Monthly PCG Report, Verifiers Report.
		2 - Unlikely	4 - Major	High	CW/BH/SACL conducted Buildability workshop 27/6/2007 and MC to formally comment on design documentation prior to detailed design	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager, MC, Designers, Independent Varifier	Monthly PCG Report, Verifiers Report.
	Construction													
31	Construction impacts or damages the M5 East Tunnel	2 - Unlikely	2 - Minor	Low	Construction Methodology, MOWPs, AWPs, Inductions, MC's SMS, consultation	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
32	Construction impacts or damages the SWSOOS	2 - Unlikely	5 - Catastrophic	High	AWPs, Inductions, MC's SMS, Certifiede Temp Works Design, work shops	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	5 - Catastrophic	High	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
33	Construction impacts or damages the EA Final Cable location	2 - Unlikely	4 - Major	High	AWPs, Inductions, MC's SMS, Work sequence, EA approval	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	4 - Major	High	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
	Construction impacts or damages the EA Existing Cable location,	2 - Unlikely	4 - Major	High	EA approval of working adjacent to cable, Work methods	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	4 - Major	High	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
34	Construction impacts or damages the perimeter road	5 - Common	4 - Major	High	AWPs, Inductions, MC's SMS, sequencing, alternative access	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
36	Construction impacts or damages other above or below ground services	4 - Likely	3 - Moderate	High	MOWPs, AWPs, Inductions, MC's SMS,	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	3 - Moderate	Medium	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
37	Site storage and lay down areas are reduced by SACL	1 - Rare	3 - Moderate	Medium	MOWPs, Consultaton	SACL (Mgt - GMs)		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report

Project: REBA
Business Unit: Asset Planning & Services

Risk No.	Risk Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Control Operating Status	Control Effectiveness Rating	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating						Likelihood	Consequence	Rating		
38	MC is delayed in gaining access to the site due to airport operations and activities	1 - Rare	2 - Minor	Low	Managing Contractor's Programme	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
	Construction impacts on access to secondary site compound	5 - Common	3 - Moderate		Correct Sequencing, alternative access	Managing Contractor		4 - Enhanced	5 - Highly Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractos, Project Manager	Daily and Monthly MC and PCG Report
	Construction Safety													
	Safety issue identification and management relating to site establishment not identified and managed	2 - Unlikely	4 - Major		BH to ensure safety systems are developed and implemented, SACL Auditing	Project Manager	31/08/07	4 - Enhanced	4 - Effective	1 - Rare	4 - Major		Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to Excavation not identified and managed	2 - Unlikely	4 - Major		Risk Assessment done on excavation including permit to dig verification prior to excavation work commencing. Ongoing monitoring activity	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	4 - Major		Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to Piling not identified and managed	2 - Unlikely	4 - Major		Risk Assessment done on excavation including permit to dig verification prior to excavation work commencing. Ongoing monitoring activity	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to Piling not identified and managed over SWSOOS	2 - Unlikely	4 - Major		Risk Assessment done on excavation including permit to dig verification prior to excavation work commencing. Ongoing monitoring activity	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to Formwork not identified and managed	2 - Unlikely	4 - Major		Risk Assessment done and work monitored to ensure work follows agreed procedure. Communications protocol	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to Steel Fixer not identified and managed	2 - Unlikely	1 - Insignificant	Low	Risk Assessment done and work monitored to ensure work follows agreed procedure. Communications protocol	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to Concrete place not identified and managed	2 - Unlikely	1 - Insignificant	Low	Risk Assessment done and work monitored to ensure work follows agreed procedure. Communications protocol	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to precast concrete place to identified and managed	2 - Unlikely	1 - Insignificant	Low	Risk Assessment done and work monitored to ensure work follows agreed procedure. Communications protocol	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to precast concrete place to identified and managed, specifically placement of Super T's	2 - Unlikely	1 - Insignificant	Low	Risk Assessment done and work monitored to ensure work follows agreed procedure. Communications protocol	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to Post stressing not identified and managed	2 - Unlikely	1 - Insignificant	Low	Risk Assessment done and work monitored to ensure work follows agreed procedure. Communications protocol	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
	Safety issue identification and management relating to False work not identified and managed	2 - Unlikely	1 - Insignificant	Low	Risk Assessment done and work monitored to ensure work follows agreed procedure. Communications protocol	Project Manager	Prior to Work activity commencing	4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Managing Contractor, Subcontractors, Auditor	Daily and Monthly MC for inclusion in the Monthly PCG Report
50	A construction incident affects airport operations	1 - Rare	2 - Minor	Low	Inductions, Managing Contractor's Safety Plan, SACL SMS Communications protocol to be established. AWP in place. Incident response plan (IRP) approved.	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Managing Contractor, Subcontractors, SACL Operations	Daily and Monthly MC for inclusion in the Monthly PCG Report, Daily Ops Report
	Access to site by third parties for lawful purpoes - Security, AFP	3 - Moderate	2 - Minor	Medium	Inductions, Managing Contractor's Safety Plan, SACL SMS	Managing Contractor		4 - Enhanced	4 - Effective	3 - Moderate	1 - Insignificant	Low	Managing Contractor	Monthly MC Report

RISK REGISTER

Project: RESA
Business Unit: Asset Planning & Services

Risk No.	Risk Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Control Operating Status	Control Effectiveness Rating	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating						Likelihood	Consequence	Rating		
	IT&T													
	IT&T Issues not considered	2 - Unlikely	2 - Minor	Low	Communications with IT&T relevant personnel, SACL approval Process	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager	PCG Report
	Programme													
56	Delays to programme due to diversion of existing services by others taking longer than planned	3 - Moderate	3 - Moderate	High	Managing Contrector's programme and Management Plan Coordination	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	2 - Minor	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
	Delays to Programme due to further OLS limitations by final structure	5 - Common	4 - Major	Extreme	Close runway, exceptions			4 - Enhanced	4 - Effective	1 - Rare	3 - Moderate	Medium	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
58	Delay to programme if Energy Australia is unable to resolve network 132KV cable issues, including its final location.	3 - Moderate	3 - Moderate	High	Managing Contractor's programme and Management Plan, contingency plan, SACL negotiations	Project Manager		4 - Enhanced	4 - Effective	2 - Unlikely	2 - Minor	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
	Delays to programme if EA suspend works due to network issues	3 - Moderate	3 - Moderate	High	Managing Contractor's programme and Management Plan, contingency plan			4 - Enhanced	4 - Effective	2 - Unlikely	3 - Moderate	Medium	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
59	Delays to programme due to non-availability of resources, including, plant, labour, supervision, materials etc	4 - Likely	3 - Moderate	Extreme	Managing Contractor's programme and Management Plan, procurement processes	Project Manager		4 - Enhanced	4 - Effective	3 - Moderate	2 - Minor	Medium	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
60	Delays to due to inclement weather (including fog, rain, wind, etc) in excess of allowance in programme.	2 - Unlikely	1 - Insignificant	Low	Managing Contractor's programme and Management Plan	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
61	Delays in approvals from external authorities (eg, ASC)	1 - Rare	1 - Insignificant	Low	Managing Contractor's programme and Management Plan	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
62	Delays in approvals from internal (SACL) stakeholders	1 - Rare	1 - Insignificant	Low	Managing Contractor's programme and Management Plan	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
63	Delays in approvals and signoff from eternal stakeholders (EA, Water board, CASA, etc)	1 - Rare	1 - Insignificant	Low	Managing Contractor's programme and Management Plan	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
64	Delays due to construction industrial issues	1 - Rare	1 - Insignificant	Low	Managing Contractor's Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
65	Delays due to in airport industrial issues	1 - Rare	2 - Minor	Low		Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
66	Delays due to subcontractor non conformances on and off site,	3 - Moderate	2 - Minor	Medium	Subcontract conditions, Managing Contractor's Management Plan, QA Systems	Managing Contractor		4 - Enhanced	5 - Highly Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
68	Lack of coordination and interface with other SACL Projects	1 - Rare	1 - Insignificant	Low	SACL Coordination Meetings	SACL (Mgt - GMs)		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
69	Latent conditions	1 - Rare	3 - Moderate	Medium	Managing Contractor Contract Conditions, Managing Contractor's programme, site investigations	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
70	Increase in scope and its effect on the project objectives	1 - Rare	2 - Minor	Low	Design Workshops, stakeholder engagment	SACL (Mgt - GMs)		4 - Enhanced	4 - Effective	1 - Rare	2 - Minor	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
72	Delays due to impact of APEC	1 - Rare	1 - Insignificant	Low	Managing Contractor's Programme and Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
	Construction Environmental Issue													
73	Issues arising from noise complaints due to construction activities	3 - Moderate	2 - Minor	Medium	Managing Contractor's Environmental Management Plan (EMP)	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
74	Adverse effect on water quality due to construction activities (Ground water)	2 - Unlikely	2 - Minor	Low	Review methodology, EMP and Geotech advice	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	2 - Minor	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
	Adverse effect on water quality due to construction activities (Storm water)	3 - Moderate	2 - Minor	Medium	EMP	Managing Contractor		4 - Enhanced	4 - Effective	2 - Unlikely	2 - Minor	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
75	Issues arising from Soil , water , etc contamination is encounter during construction	4 - Likely	3 - Moderate	Extreme	Review methodology, Review design for alternatives that are less noise, Noise shielding, EMP	Managing Contractor		3 - Formal	3 - Scope to Improve	2 - Unlikely	2 - Minor	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
76	Jet blast and dust effect on and/or limitations on construction activities,	1 - Rare	1 - Insignificant	Low	Managing Contractor's Environmental Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and Managing Contrcator	Daily and Monthly MC Report and PCG Report
	Risk Catagory: E. Aviation Business Development													
80	Increase projects cost are not covered by funding approved for recovery	1 - Rare	4 - Major	High	Project Cost Plan, Communication with ABD	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Project Manager and PCG	PCG Report and NNI Report
	Risk Catagory: F. Retail & Commercial Development													

Project: RASA
Business Unit: Asset Planning & Services

Risk No.	Risk Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Control Operating Status	Control Effectiveness Rating	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating						Likelihood	Consequence	Rating		
Risk Category: G. Property Development														
Bustling														
81	Construction results in a disruption to LTCP bussling operatonrs, (travel time)	3 – Moderate	2 – Minor	Medium	SACL's Project Management Plan	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR	PCG and SACL GM's
Car Parking														
82	Construction results in a disruption to Car parking operations (availability)	4 - Likely	1 - Insignificant	Medium	SACL's Project Management Plan	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR	PCG and SACL GM's
Risk Category: H. Corporate Affairs and HR														
Environmental														
83	Noise complaints from communtiy	4 - Likely	2 – Minor	High	Changing Contractor's Environmental Management Plan (EMP)	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Daily and Monthly MC Project Manager and Managing Contractor	Report and PCG Report
Corporate Reputation														
84	Adverse public and Government responses to environmental issues during construction	1 - Rare	1 – Insignificant	Low	SACL's Project Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR	PCG and SACL GM's
85	Public and Government response to effect on airport and airfield operations	2 - Unlikely	2 – Minor	Low	SACL's Project Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR	PCG and SACL GM's
Impact on Sharholdars														
86	Adverse publicity due to construction issues	1 - Rare	1 - Insignificant	Low	SACL's Project Management Plan	Managing Contractor		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR	PCG and SACL GM's
Risk Category: I. External Stakeholders														
EnergyAustralia														
87	Construction activities damage EA 132KV cables			#VALUE!								#VALUE!		
M5 East Motorway / Tunnel														
88	Construction activities damages M5 Tunnel and Motorway			#VALUE!								#VALUE!		
Sydney Water														
89	Construction activities damages SWSOOS			#VALUE!								#VALUE!		
Telecommunication					These items repeat 31 - 36 above									
90	Construction activities damages communication fibre optics and copper lines			#VALUE!								#VALUE!		
Air Services Australia														
91	Construction activities damages ASA infrastructure			#VALUE!								#VALUE!		
Other Services														
92	Construction activities damages other above ground services			#VALUE!								#VALUE!		
93	Construction activities damages other below ground services			#VALUE!								#VALUE!		
Risk Category: J. Regulators														
CASA														
94	SACL unable to meet mandated requirements relating to completion	4 - Likely	2 – Minor	High	Presentation and Communication with CASA	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR, PCG	PCG and SACL GM's
95	Construction work causes non-compliance with SACL SMS and Safety Cirange Plan.	1 - Rare	2 – Minor	Low	Presentation and Communication with CASA	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR, PCG	PCG and SACL GM's
96	Changes to the MOS 139 affect construction	1 - Rare	1 – Insignificant	Low	Presentation and Communication with CASA	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR, PCG	PCG and SACL GM's
DoTARS														
97	DoTARS will not grant SACL dispensations required for construction methodology.	2 - Unlikely	3 – Moderate	Medium	Presentation and Communication with DoTARS	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR, PCG	PCG and SACL GM's
98	Change in SACL and security regulations result in delays and extra costs	1 - Rare	2 – Minor	Low	Presentation and Communication with DoTARS	Project Manager		4 - Enhanced	4 - Effective	1 - Rare	1 - Insignificant	Low	Weekly SMR, PCG	PCG and SACL GM's

附件 4：雪梨機場 T1 移交風險評估

SACL Projects - Handover Safety Risk Assessment Rev. 0

Project Description: DRAFT -Stage 1 - T1 Southern Arrivals Reclaim # 1 and Infeed Conveyors (Blue Type Denotes Interim measures) V 4.0

SACL Client: SACL Operations

SACL Project Manager: Richard Jarvis

Person(s) & Company Undertaking Risk Assessment: Draft prepared by Les Lazic & Tim Henderson & Reviewed by SACL OHS

Date: 25th November, 2008

Risk No.	Hazard Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating				Likelihood	Consequence	Rating		
Risk Category: Operational End User												
A1	Manual Handling - Passengers Lifting heavy bags from new Reclaim Carousel # 1 in Arrivals Reclaim Hall Pier C	3 - Moderate	3 - Moderate		Carousel designed so that the bottom of bag sits 310mm AFFL (existing carousels bag sits 290mm AFFL)	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	As-builts
					Carousel designed so that bag needs to be lifted 150mm over side guard (existing carousels 120mm)	Construction Project Manager	25/11/08				Construction Project Manager	As-builts
A2	Personal Injury - Passengers hit by bags coming from Infeed conveyors onto new Reclaim Carousel # 1 in Arrivals Reclaim Hall Pier c	3 - Moderate	3 - Moderate		Crash Barriers installed where infeed conveyors feed reclaim carousel preventing the public from putting their hands in the way of inward baggage (as per other carousels)	Construction Project Manager	25/11/08	1 - Rare	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
A3	Personal Injury - Cuts to fingers running on joins to stainless steel skirting on new Reclaim Carousel # 1 in Arrivals Reclaim Hall Pier C	3 - Moderate	2 - Minor	Medium	Contractor to deburr all joins in stainless steel skirting	Construction Project Manager	25/11/08	1 - Rare	1 - Insignificant	Low	Construction Project Manager	Compliance Certificate ABC
A4	Passenger Traffic pinch points around new Reclaim Carousel # 1 in Arrivals Reclaim Hall Pier C preventing safe egress	3 - Moderate	3 - Moderate		3900mm clearance provided to Eastern column near DIAC Offices	SACL (Construct.)	25/11/08	2 - Unlikely	1 - Insignificant	Low	SACL (Construct.)	Compliance Certificate ABC
					8495mm clearance provided to Northern existing carousel (Carousel # 2)	SACL (Construct.)	25/11/08				SACL (Construct.)	Compliance Certificate ABC
					2900mm clearance provided to Western temporary boarding (to be removed at conclusion of works)	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					1300mm clearance provided to southern boarding (to be removed when arrivals hall rollers are open)	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
A5	Personal Injury -Passengers coming into contact with infeed conveyors to new Reclaim Carousel # 1 in Arrivals Reclaim Hall pier C	2 - Unlikely	3 - Moderate	Medium	Crash barriers installed requiring a reach of 1300mm fitted with Emergency Stops	Construction Project Manager	25/11/08	1 - Rare	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Six emergency stops located around the carousel	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Pinch points to be labelled with warning signs	Construction Project Manager	28/11/08				Construction Project Manager	Compliance Certificate ABC
					Warning signage	SACL (Construct.)	25/11/08				SACL (Construct.)	Compliance Certificate ABC
A6	Personal Injury -Passengers climing onto new Reclaim Carousel # 1 in Arrivals Reclaim Hall Pier C whilst in motion	2 - Unlikely	3 - Moderate	Medium	Two security cameras installed at either end of Carousel	SACL (Construct.)	25/11/08	1 - Rare	2 - Minor	Low	SACL (Construct.)	As-builts
					Six emergency stops located around the carousel	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Customs to monitor passengers around carousel as per existing	SACL (Ops)	25/11/08				SACL (Ops)	
					Warning signage	SACL Project Manager	25/11/08				SACL Project Manager	Compliance Certificate ABC
A7	Personal Injury -Pinch Points on New Reclaim Carousel # 1 Conveyor Slats in Arrivals Reclaim Hall Pier C	3 - Moderate	3 - Moderate		New design feature replacing hard rubber with soft rubber bump guards on end of carousel slats. Rubber is not underneath stainless steel trim guard specifically to eliminate pinch points and baggage strap catch points. Soft rubber eliminates chance for injury.	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Slats are secured tight on conveyor so that fingers can not be placed under them on main part of conveyor	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Design reviewed by SACL BHS amd SACL Long Range Planning - Baggage	SACL (Ops)	25/11/08				SACL (Ops)	As-builts
A7A	Personal Injury -Snag Points on New Reclaim Carousel # 1 Conveyor Slats in Arrivals Reclaim Hall Pier C - Dragging passengers around carousel	3 - Moderate	3 - Moderate		New design feature replacing hard rubber with soft rubber bump guards on end of carousel slats. Rubber is soft and unlikely to have sufficient strength to drag a person	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Six emergency stops located around the carousel	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Design reviewed by SACL BHS amd SACL Long Range Planning - Baggage	SACL (Ops)	25/11/08				SACL (Ops)	As-builts
A8	New Fire Protection Services required as a result of building extension to house new Arrivals Reclaim Carousel # 1 in Pier C	2 - Unlikely	3 - Moderate	Medium	Fire separation from Departures & ramp levels via Fire Rated enclosures and Roller Shutters activated by fire trip as per Building Code Requirements and approval by ABC	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Smoke detectors fitted to AS-1670.1:2004 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Fire Sprinklers fitted in new areas and beneath Reclaim Conveyor and infeed conveyors as per AS 2118.1:1999 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
A9	Emergency Evacuation and egress requirements as a result of Building Extension to house	2 - Unlikely	4 - Major		Exit signs fitted as per AS 2293.1:2005 and approved by ABC	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Emergency Lighting fitted as per AS 2293.1:2005 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Egress routes designated by Fire Engineer (Steve Watson & Partners) and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC

SACL Projects - Handover Safety Risk Assessment Rev. 0

Project Description: DRAFT -Stage 1 - T1 Southern Arrivals Reclaim # 1 and Infeed Conveyors (Blue Type Denotes Interim measures) V 4.0

SACL Client: SACL Operations

SACL Project Manager: Richard Jarvis

Person(s) & Company Undertaking Risk Assessment: Draft prepared by Les Lazic & Tim Henderson & Reviewed by SACL OHS

Date: 25th November, 2008

Risk No.	Hazard Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating				Likelihood	Consequence	Rating		
	new Arrivals Reclaim carousel # 1 in Pier C				Smoke Management System delgnated by Fire Engineer, designed by Mechanical Engineer and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					New EWIS Installation fitted as per AS 1670.4:2004 & AS 4428.4:2004 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Catwalks, access ladders and stairways for maintenance of conveyors fitted as per AS 1657:1992 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
A10	Poor Lighting in new areas of operation for new Arrivals Reclaim Carousel # 1 in Pier C	2 - Unlikely	2 - Minor	Low	New Lighting installed as per AS 1680:1998, designed by Electrical Engineer and approved by ABC	Construction Project Manager	25/11/08	1 - Rare	1 - Insignificant	Low	Construction Project Manager	Compliance Certificate ABC
A11	Build up of waste material under new Reclaim Carousel # 1 in Arrivals Reclaim Hall in Pier C creating Fire Hazard	2 - Unlikely	3 - Moderate	Medium	New Reclaim Carousel designed to enclose areas beneath conveyor	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	
					Fire Sprinklers fitted in new areas and beneath Reclaim Conveyor and Infeed conveyors as per AS 2118.1:1999 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					SACL BHS maintenance to address housekeeping procedures after building works complete, with Baggage Handling Contractor (GLIDEPATH) to ensure housekeeping procedures are met in the interim.	Construction Project Manager	25/11/08				Construction Project Manager	
A12	Slips and Falls around new Reclaim Carousel # 1 in Arrivals Reclaim Hall Pier C	2 - Unlikely	3 - Moderate	Medium	Vinyl flooring selected by Architect complying with AS 4586 for slip resistance and approved by ABC	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					SACL Operations to ensure adequate barriers and signage used when floor is wet	SACL (Ops)	25/11/08				SACL (Ops)	
A13	Electrocution Hazard due to Wiring Fault to new Reclaim Carousel # 1 in Arrivals Reclaim Hall Pier C	2 - Unlikely	5 - Catastrophic		Electrical Installation designed by Electrical Engineer and installed as per AS3000 and approved by SACL FM and ABC	Construction Project Manager	25/11/08	1 - Rare	3 - Moderate	Medium	Construction Project Manager	Compliance Certificate ABC
					Circuit Breakers fitted to Control Boards with RCD protection	Construction Project Manager	25/11/08				Construction Project Manager	As-builts
					Emergency Stop buttons for isolation in prominent locations	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
A14	Heat from conveyor Motors adds to thermal heat load of new building extension which houses new Reclaim Carousel # 1 in Arrivals Reclaim hall in Pier C	2 - Unlikely	1 - Insignificant	Low	New building extension air conditioning designed by Mechanical Engineer and approved by ABC	Construction Project Manager	25/11/08	1 - Rare	1 - Insignificant	Low	Construction Project Manager	Compliance Certificate ABC
A15	Manual Handling - Injuries associated with Baggage Handlers loading bags onto new Reclaim # 1 Infeed Lines A & B in new Outer Bag Room	2 - Unlikely	3 - Moderate	Medium	Lay down belt conveyor height is 290mm above finished floor level	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Plinth clearance from conveyor to kerb is minimum 900mm	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Rubber floor matting fitted to plinth floor with yellow safety edge strip	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC,
					Kerb height is 200mm preventing bags from mounting plinth	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Existing Baggage handling training in safe operating procedures in manual handling	SACL (Ops)	25/11/08				SACL (Ops)	
					Existing requirement not to leave baggage on floors to eliminate trip hazards and provide safe egress	SACL (Ops)	25/11/08				SACL (Ops)	
A16	Tug Traffic flow to new Reclaim # 1 Infeed lines A & B to new Outer Bag Room	3 - Moderate	2 - Minor	Medium	Stakeholder Committee undertaking separate study into Directional Traffic Flow in outer bag room when fully complete	SACL Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	SACL Project Manager	
					Interim measure for one way Tug Movement to Reclaim # 1 Infeed lines and around Carousel 36 and back out the same way with traffic barriers preventing traffic flowing through incomplete areas.	SACL Project Manager	25/11/08				SACL Project Manager	
					Tug Movement Alarm to be installed (as installed elsewhere but not in use)	SACL Project Manager	25/11/08				SACL Project Manager	
					Signage indicating traffic directions to be installed	Construction Project Manager	25/11/08				Construction Project Manager	
A17	Entanglement in belt assembly & pinch points for Baggage Handlers where two conveyors meet for new Infeed Lines to Reclaim Carousel # 1 in New Outer bag Room	3 - Moderate	3 - Moderate		New equipment designed and constructed to Australian Standards	Construction Project Manager	25/11/08	1 - Rare	3 - Moderate	Medium	Construction Project Manager	Compliance Certificate ABC
					Design reviewed by SACL BHS amd SACL Long Range Planning - Baggage	SACL (Facilities)	25/11/08				SACL (Facilities)	As-builts
					Emergency Stop buttons for isolation in prominent locations	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Pinch points to be labelled with warning signs	Construction Project Manager	28/11/08				Construction Project Manager	Compliance Certificate ABC
					Existing Baggage handling training in safe operating procedures and should be familiar with this type of equipment	SACL (Ops)	25/11/08				SACL (Ops)	
					New equipment designed so that drive motors are on opposite side of Baggage Handlers work area	Construction Project Manager	25/11/08				Construction Project Manager	As-builts

SACL Projects - Handover Safety Risk Assessment Rev. 1

Project Description: DRAFT -Stage 1 - T1 Southern Arrivals Reclaim # 1 and Infeed Conveyors (Blue Type Denotes Interim measures) V 4.0

SACL Client: SACL Operations

SACL Project Manager: Richard Jarvis

Person(s) & Company Undertaking Risk Assessment: Draft prepared by Les Lazic & Tim Henderson & Reviewed by SACL OHS

Date: 25th November, 2008

Risk No.	Hazard Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating				Likelihood	Consequence	Rating		
A18	Entrapment in motor drive shafts for Baggage Handlers operating new Infeed Lines to Reclaim Carousel # 1 in New Outer Bag Room	3 - Moderate	3 - Moderate	High	Design reviewed by SACL BHS and SACL Long Range Planning - Baggage	SACL (Facilities)	25/11/08	1 - Rare	3 - Moderate	Medium	SACL (Facilities)	As-builts
					Emergency Stop buttons for isolation in prominent locations	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Existing Baggage handling training in safe operating procedures and should be familiar with this type of equipment	SACL (Ops)	25/11/08				SACL (Ops)	
A19	Poor Lighting in new areas of operation for new Infeed Lines to Reclaim # 1 in New Outer Bag Room	2 - Unlikely	2 - Minor	Low	New Lighting installed as per AS 1680:1998, designed by Electrical Engineer and approved by ABC; Interim task lighting to infeed conveyors will be in place until additional permanenet lighting is installed in this location, no scheduled operation at night until Dock 6 is open	Construction Project Manager	25/11/08	1 - Rare	1 - Insignificant	Low	Construction Project Manager	Compliance Certificate ABC
A20	Personal Injury - Cuts to fingers due to sharp corners on new Infeed Lines to Reclaim Carousel # 1 in new Outer bag Room	3 - Moderate	2 - Minor	Medium	Contractor to deburr all joins and sheet metal covers to have safety folds	Construction Project Manager	25/11/08	1 - Rare	1 - Insignificant	Low	Construction Project Manager	Compliance Certificate ABC
A21	Personal Injury -Baggage Handlers climbing onto new Infeed Lines to Reclaim Carousel # 1 in new Outer Bag Room whilst in motion	2 - Unlikely	3 - Moderate	Medium	SACL BHS Personnel only to climb on belts during maintenance only when isolated	SACL (Facilities)	25/11/08	1 - Rare	2 - Minor	Low	SACL (Facilities)	
					SACL BHS Maintenance procedures require that belts be isolated during maintenance	SACL (Facilities)	25/11/08				SACL (Facilities)	
					Emergency Stop buttons for isolation in prominent locations	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Existing Baggage Handling training and procedures addresses when maintenance is called	SACL (Facilities)	25/11/08				SACL (Facilities)	
A22	Emergency Evacuation and egress requirements for Baggae Handlers as a result of Building Extension Works in new Outer Bag Room	2 - Unlikely	4 - Major	High	Exit signs fitted as per AS 2293.1:2005 and approved by ABC	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Emergency Lighting fitted as per AS 2293.1:2005 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Egress routes designated by Fire Engineer (Steve Watson & Partners) and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					New EWIS installation fitted as per AS 1670.4:2004 & AS 4428.4:2004 and approved by ABC	Construction Project Manager						Compliance Certificate ABC
					Catwalks, access ladders and stairways for maintenance of conveyors fitted as per AS 1657:1992 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
A23	Build up of waste material under new Infeed lines to Reclaim Carousel # 1 in new Outer Bag Room creating Fire Hazard	2 - Unlikely	3 - Moderate	Medium	Baggage Handling operating Procedures to address littering	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	
					Fire Sprinklers fitted in new Outer Bag Room as per AS 2118.1:1999 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					SACL BHS Maintenance to address housekeeping procedures after building works complete, with Baggage Handling Contractor (SALDEN/ATH) to ensure housekeeping procedures are met in the interim	Construction Project Manager	25/11/08				Construction Project Manager	
A24	Electrocution Hazard due to Wiring Fault to new Infeed Lines to Reclaim Carousel # 1 in new Outer Bag Room	2 - Unlikely	5 - Catastrophic	High	Electrical installaion designed by Electrical Engineer and installed as per AS3000 and approved by SACL FM and ABC	Construction Project Manager	25/11/08	1 - Rare	3 - Moderate	Medium	Construction Project Manager	Compliance Certificate ABC
					Circuit Breakers fitted to Control Boards	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Emergency Stop buttons for isolation in prominent locations	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
A25	Noise from new Infeed Conveyors to Reclaim Carousel #1 in New Outer Bag Room Conveyor can affect hearing for Baggage Handlers	2 - Unlikely	2 - Minor	Low	New equipment designed so that noise generated by new equipment meet noise regulations and target dose below 85dB	Construction Project Manager	25/11/08	1 - Rare	1 - Insignificant	Low	Construction Project Manager	As-builts
					Design reviewed by SACL BHS and SACL Long Range Planning - Baggage	SACL (Facilities)	25/11/08				SACL (Facilities)	As-builts
A26	Heat from conveyor Motors adds to thermal heat load of work area for baggage handlers working in New Outer Bag Room	2 - Unlikely	1 - Insignificant	Low	New Outer bag room ventilation designed by Mechanical Engineer and approved by ABC	Construction Project Manager	25/11/08	1 - Rare	1 - Insignificant	Low	Construction Project Manager	Compliance Certificate ABC
A27	Baggage falling off new Infeed Line Conveyors to Reclaim carousel # 1 in new Outer Bag room causing injury	2 - Unlikely	3 - Moderate	Medium	New Infeed conveyors designed with side guards to prevent baggage falling off	Construction Project Manager	25/11/08	1 - Rare	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Baggage Handling operating Procedures to address correct placement of bags onto conveyor	SACL (Ops)	25/11/08				SACL (Ops)	
					Baggage handlers to wear appropriate PPE and safety footwear	SACL (Safety)	25/11/08				SACL (Safety)	
					Infeed conveyors similar to existing infeed conveyors used elsewhere in Pier C Bagroom	SACL (Ops)	25/11/08				SACL (Ops)	
A28	Dangerous Chemical leaks from baggage placed on new Infeed conveyors to new Reclaim carousel # 1 in new Outer Bag Room	2 - Unlikely	3 - Moderate	Medium	Chemical resitent belt materials used as per elsewhere in airport	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	
					Existing Baggage Handling operating Procedures to address correct handling of these type of bags	SACL (Ops)	25/11/08				SACL (Ops)	

SACL Projects - Handover Safety Risk Assessment Rev. 0

Project Description: DRAFT -Stage 1 - T1 Southern Arrivals Reclaim # 1 and Infeed Conveyors (Blue Type Denotes Interim measures) V 4.0

SACL Client: SACL Operations

SACL Project Manager: Richard Jarvis

Person(s) & Company Undertaking Risk Assessment: Draft prepared by Les Lazic & Tim Henderson & Reviewed by SACL OHS

Date: 25th November, 2008

Risk No.	Hazard Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating				Likelihood	Consequence	Rating		
A29	Manual Handling Hazard when removing bags from cans onto new Infeed Conveyors to Reclaim Carousel # 1 in New Outer Bag Room when cans are not positioned correctly against plinth	2 - Unlikely	3 - Moderate	Medium	Existing Baggage Handling operating Procedures to address correct placement of cans alongside plinths	SACL (Ops)	25/11/08	2 - Unlikely	2 - Minor	Low	SACL (Ops)	
Risk Category: Facilities Management												
B1	Injuries associated when climbing over belts for Maintenance to New Reclaim Carousel # 1 and new Infeed Conveyors to Reclaim Carousel # 1	2 - Unlikely	3 - Moderate	Medium	Existing SACL EHS maintenance procedures require that belts be isolated during maintenance	SACL (Ops)	25/11/08	2 - Unlikely	2 - Minor	Low	SACL (Ops)	
					Maintenance of new Reclaim Carousel # 1 and Infeed Conveyors are the responsibility of Glidepath (T1CS Contractor) until the conclusion of Building Works to Dock 6	Construction Project Manager	25/11/08				Construction Project Manager	
					Emergency Stop buttons for isolation in prominent locations	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
B2	Emergency Evacuation and egress requirements for SACL Maintenance as a result of Building Extension Works in new Outer Bag Room	2 - Unlikely	4 - Major		Exit signs fitted as per AS 2293.1:2005 and approved by ABC	Construction Project Manager	25/11/08	2 - Unlikely	2 - Minor	Low	Construction Project Manager	Compliance Certificate ABC
					Emergency Lighting fitted as per AS 2293.1:2005 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					Egress routes designated by Fire Engineer (Steve Watson & Partners) and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
					New EWIS installation fitted as per AS 1670.4:2004 & AS 4428.4:2004 and approved by ABC	Construction Project Manager	25/11/08					Compliance Certificate ABC
					Catwalks, access ladders and stairways for maintenance of conveyors fitted as per AS 1657:1992 and approved by ABC	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC
B3	Injuries associated with access to power for Cleaning of new Reclaim Carousel # 1 and surrounding areas.	2 - Unlikely	3 - Moderate	Medium	Existing SACL FM Cleaning procedures regarding access to GPO's near carousels	SACL (Facilities)	25/11/08	2 - Unlikely	2 - Minor	Low	SACL (Facilities)	
					Emergency Stop buttons for isolation in prominent locations	Construction Project Manager	25/11/08				Construction Project Manager	Compliance Certificate ABC

附件 5：T1 倉儲區使用風險評估

SACL
T1 Dock 1

Risk Assessment 31st March 2008

Risk No.	Risk Description	Pre-Mitigation Risk Assessment			Key Controls and Risk Management Approach	By Who	By When	Control Operating Status	Control Effectiveness Rating	Post-Mitigation (Residual) Risk Assessment			Assurance Providers	Assurance Reports
		Likelihood	Consequence	Rating						Likelihood	Consequence	Rating		
Scope of Risk Assessment: Assess the risks of Dock 1, T1 Sydney International Airport					* Denotes control already in place									
Risk Area: Dock 1 internal storage area														
1	Tenancies temporarily storing items outside their storage areas, this reduces the space for movement areas	3 - Moderate	2 - Minor	Medium	Enforcing that goods must go straight into tenancies. Put into Site rules	Tenants and SACL - Legal/project				1 - Rare	1 - Insignificant	Low		
2	Tenants have items unsafely stacked high within their tenancies. Housekeeping poor	3 - Moderate	3 - Moderate		Health & safety inspections needed by tenants on regular basis. SACL inspections to be done on a subscribed ad hoc basis. This should be outlined in tenancy agreement. Put into Site rules	Tenants and SACL - Retail/Legal/Project				1 - Rare	1 - Insignificant	Low		
4	Fire extinguisher adjacent to door 1-59, needs testing and tagging	4 - Likely	4 - Major		Fire extinguisher to be reported	SACL				1 - Rare	1 - Insignificant	Low		
5	External and internal doors of storage area open and doors to sterile area open , unauthorised personnel can gain entry to sterile area	3 - Moderate	4 - Major		Dock manned when doors are open. Restricted times that doors are open to ensure that dock is manned. Procedures agreed by SACL security.	SACL				1 - Rare	1 - Insignificant	Low		
6	Persons walking through storage area that have no business in area (used as access to other SACL areas) - Incorrect PPE, more congestion, not aware of site operations and risks.	4 - Likely	2 - Minor		This practice should be stopped. Communicate to all airport personnel, Put into Site rules.	SACL				1 - Rare	1 - Insignificant	Low		
	Dock 1 external loading dock -unloading area													
7	Gas cylinders on Loading Dock, not chained, could fall	2 - Unlikely	4 - Major		Gas cylinders if on dock should be chained. Gas cylinders are retail tenants goods they should not be stored on dock. Tenancy agreement must ensure that all gas cylinders are collected on delivery for safe storage within their tenancies. Put into Site rules.	Tenants and SACL - Retail/Legal/Project				1 - Rare	1 - Insignificant	Low		
8	Group of people on loading dock eating breakfast and smoking, whilst items are being delivered. This leads to congestion on loading dock and un hygienic practices.	3 - Moderate	1 - Insignificant	Low	Put into site rules that loading docks are not areas for eating or smoking. Enforced by Dock Manager.	SACL-Project				1 - Rare	1 - Insignificant	Low		
9	Deliveries are unloaded where delivery driver want to leave them, this could lead to unsafe placement - close to edge of dock, in direct sunlight, obstructing walkway/movement area. Items stacked high too close to dock edge, this with the height of the dock leads to potential risk of items falling on head of person on lower driveway of dock	4 - Likely	3 - Moderate		Delineate areas that goods should be placed, have more racking in place specify to delivery persons/tenants where their goods should be placed - delivery plan document that is distributed to delivery drivers and tenants by SACL. Put into Tenants should be at loading dock to receive , this should be specified within tenancy agreement. Enforced by Dock Manager. Put into Site rules	Tenants and SACL - Retail/Project				1 - Rare	1 - Insignificant	Low		
10	Delivery items of food are left on dock for long periods of time, without being picked up. There is no fridge or freezer to store perishable items.	4 - Likely	3 - Moderate		Tenants should be at loading dock to receive and transport supplies to appropriate storage area promptly and safely , this should be specified within tenancy agreement. Enforced by Dock Manager. Put into site rules	Tenants and SACL - Retail/Legal/Project				1 - Rare	1 - Insignificant	Low		

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11	Delivery items of food are often delivered directly on dock floor, no segregation of food items with other items such as chemicals. Unhygienic practice	3 - Moderate	3 - Moderate	High	Specify to delivery persons/tenants where their goods should be placed, off floor on to clean pallets or racks and segregated. Put into Site rules	Tenants and SACL - Retail/Project				1 - Rare	1 - Insignificant	Low		
12	Pedestrians walking through driveway area of loading dock, delivery trucks reversing	3 - Moderate	4 - Major	High	Delivery drivers to be made aware of risks in area through signage, liaison with dock manager - delivery plan document that is distributed to delivery drivers and tenants by SACL	Tenants and SACL - Retail/Project				1 - Rare	1 - Insignificant	Low		
					Pedestrians to be made aware through signage that vehicles/trucks are in area, reversing	Tenants and SACL - Retail/Project								
					*Pedestrian marked areas -signage required that pedestrians should use pedestrian marked areas and that trucks are reversing	Tenants and SACL - Retail/Project								
					Certain parts of the dock be made pedestrian exclusion zones	Tenants and SACL - Retail/Project								
13	Due to the location of the door used for trolleys to enter terminal and the angle that the trolleys need to turn the trolleys are in a shared zone with vehicles and pedestrians. Potential collision	3 - Moderate	3 - Moderate	High	Delineate path of movement of trolleys	SACL-Project				1 - Rare	1 - Insignificant	Low		
					Delivery drivers to be made aware of risk of trolleys and that trolley movements have right of way - this should be done through signage and liaison with dock manager - delivery plan document that is distributed to delivery drivers and tenants by SACL	SACL-Project								
					Trolley collection contractor to be made aware of risks in area and communicate to their staff.	SACL-Project, Trolley Contractor								
15	Delivery drivers waiting for long periods, getting frustrated and irritated	2 - Unlikely	1 - Insignificant	Low	Tenants should be at loading dock to receive and transport supplies to appropriate storage area promptly and safely , this should be specified within tenancy agreement. Enforced maximum waiting time. Enforced by Dock Manager. Put into site	Tenants and SACL - Retail/Legal/Project				1 - Rare	1 - Insignificant	Low		
	Dock 1 external loading dock driveway/delivery bay area													
16	No signage on exiting driveway , such as speed signs, shared zone, crossing signs	3 - Moderate	3 - Moderate	High	Signage required. Delivery plan provided to delivery drivers and other users of parking bays.	SACL-Project				1 - Rare	1 - Insignificant	Low		
17	Traffic congestion at certain periods of the day, with delivery vehicles and contractors/other users that have allocated parking bays	3 - Moderate	3 - Moderate	High	*Traffic officers and dock manager undertaking traffic management.	SACL-Project/Ground Transport				1 - Rare	1 - Insignificant	Low		
					Delivery plan document developed by SACL that is distributed to delivery drivers, tenants and other users advising of procedures for using dock and bays.	SACL-Project				1 - Rare	1 - Insignificant	Low		
18	Lighting poor through driveway and bays when it is dark outside, before the truck only line of loading dock. Some deliveries are undertaken in this area in poor light.	2 - Unlikely	3 - Moderate	Medium	Lighting to be installed to cover all unloading/loading areas or specified that all loading/unloading to be undertaken in lit area when dark.	SACL-Project				1 - Rare	1 - Insignificant	Low		
19	Vehicles being parked illegally in area causing traffic management problems and irritated drivers	3 - Moderate	2 - Minor	Medium	*Signage is in place. *Traffic officers patrolling area. *Communication by Dock Manager. Delivery plan developed by SACL and provided to delivery drivers.	SACL-Project				1 - Rare	1 - Insignificant	Low		
20	Agrevated delivery drivers, being booked for illegal parking, abusing SACL personnel and traffic officers.	3 - Moderate	1 - Insignificant	Low	*Traffic officers trained in conflict management. *Clear signage depicting parking protocols in place. Delivery plan communicated.	SACL-Project				1 - Rare	1 - Insignificant	Low		
	Dock 1 entry point to driveway from road													
21	Pedestrians unfamiliar with area and traffic, causing accident.	2 - Unlikely	4 - Major	High	* Pedestrian marked area. Delivery drivers and users of this area provided with details of risks and pedestrian marked areas through delivery/user plan - pictograms, traffic routes. Additional signage	SACL-Project				1 - Rare	1 - Insignificant	Low		
22	Hire cars and public vehicles picking up passengers in non pick up zone. Congestion caused.	3 - Moderate	1 - Insignificant	Low	* Traffic officers patrolling. Signage depicting non pick up zone.	SACL-Project/Ground Transport				1 - Rare	1 - Insignificant	Low		
23	Road not suitable for two-way traffic at one time.	3 - Moderate	3 - Moderate	High	Traffic management by traffic officers and dock manager. Delivery drivers and other users provided with information to be aware of traffic coming from the other way.	SACL-Project/Ground Transport				1 - Rare	1 - Insignificant	Low		
24	Traffic enter into loading dock driveway zone off a bend straight into a pedestrian walkway	2 - Unlikely	4 - Major	High	Clear signage indicating that there is a pedestrian walking area off bend, vehicles to slow down. *Speed limit signs. Delivery drivers and users of area to be provided with a delivery plan outlining pedestrian crossing areas.	SACL-Project/Ground Transport				1 - Rare	1 - Insignificant	Low		

	Dock 1 Waste disposal area													
25	Paper waste compactor door left open, access by public possible. Paper/cardboard obstructing path to controls. Other items such as glass and sharp items being placed	3 - Moderate	4 - Major	High	* Only authorised person to turn compactor on. Notice/signage for only authorised users to put paper waste in compactor . Door to be kept closed at all times.* Procedures in place for only paper/cardboard. Authorised users to wear protective gloves and footwear to prevent lacerations from glass and/or sharp items.	SACL - FM				1 - Rare	1 - Insignificant	Low		
27	Housekeeping - Vermin, slips, trip & falls and fire. Glass bins overflowing, access by public.	2 - Unlikely	4 - Major	High	Ensure that there are adequate glass bins, especially for weekends. Increase cleaning schedule accordingly if required.	SACL - FM				1 - Rare	1 - Insignificant	Low		
	General													
28	Housekeeping - Vermin, slips, trip & falls and fire Common trip hazards are waste packaging, banded strapping loops and pallets., Common slip hazards are food stuffs, stretch wrapping, cleaning products, oil, water, dry powders and plastic bags	3 - Moderate	3 - Moderate	High	Ensure tenants keep areas clean, part of tenancy agreements and inspection checklist. cleaning contractor to keep SACL areas clean. Docks floors should be regularly cleaned. Cleaning schedule in place.	Tenants and SACL - Retail/Legal/Project				1 - Rare	1 - Insignificant	Low		
					All rubbish to be put in waste bins. All spills should be immediately cleaned. Ensure that cleaning equipment and products are available for small spillages.	Tenants and SACL - Retail/Project								
29	Storage Racking and pallets- potential safe working limit exceeded, poor condition, not suitable for type of unit load, load to collapse, crush injury.	2 - Unlikely	4 - Major	High	Information available to users of the Safe Working Limit (SWL) and unit load that they are designed for. Regular inspection of racking to be conducted to check its integrity, identify maintenance requirements and to stop racking being overloaded.	Tenants and SACL - Retail/Project				1 - Rare	2 - Minor	Low		
30	Work at height	1 - Rare	4 - Major	High	Dock Manager should not have need to work at height.					1 - Rare	2 - Minor	Low		
					Tenants should be aware of these risks for their own personnel and have appropriate controls in place.	Tenants								
31	Manual handling	3 - Moderate	3 - Moderate	High	Dock manager should be aware of manual handling risks and be trained in safe manual handling, but manual handling should not be a usual task of job.	SACL - Project				1 - Rare	2 - Minor	Low		
					Tenants should be aware of these risks for their own personnel and have appropriate controls in place.	Tenants								
31	Two non ride on forklifts and manual pallet jack being used within small area with pedestrian traffic - potential to be hit by moving equipment or items slipping from the equipment.	2 - Unlikely	4 - Major	High	*Warning devices to be fitted to forklifts	Tenants and SACL - Retail/Project				2 - Unlikely	2 - Minor	Low		
					Persons trained in use of equipment. Competent users only.	Tenants and SACL - Retail/Project								
					High Viz vests and safety shoes to be worn by all personnel within area	Teaants and SACL - Retail/Project								
					Equipment should be risk assessed. SACL owned equipment should have an inspection checklist to ensure that equipment is safe to use prior to the start of each day.	Tenants and SACL - Retail/Project								
					*Signage depicting that motorised machinery being used. * Signage depicting PPE to be worn in area.	SACL - Retail/Project								
32	Non ride on forklifts if in correctly operated can hit roof of external loading area	4 - Likely	2 - Minor	High	Competent forklift users only. Identify and make aware of the height the forklifts are allowed to operate in this area. Make part of site rules	Tenants and SACL - Retail/Project				1 - Rare	2 - Minor	Low		
33	SACL owned Roll Cages - roll cages overbalancing, musculoskeletal injuries from pushing/pulling and loading/unloading. Feet being trapped under casters. Brakes not working/or hard to activate - unstable.	2 - Unlikely	4 - Major	High	Risk Assessment of roll cages. Safety shoes and gloves to be worn when using roll cages.	Tenants and SACL - Retail/Project				1 - Rare	2 - Minor	Low		
					Tenants should be aware of the risks of using roll cages by SACL. Tenants should ensure their own personnel understand these risks and have appropriate controls in place e.g. training on use.	Tenants and SACL - Retail/Project								

附件 6　ICAO SMS 稽核表

APPENDIX B

ICAO SAFETY MANAGEMENT SYSTEM (SMS) AUDIT PROTOCOL

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
Element 1.1 – Management commitment and responsibility			
SMS 1.1/01	Is a safety management system with defined components established, maintained and adhered to?		
SMS 1.1/02	Is the safety management system appropriate to the size and complexity of the service provider?		
SMS 1.1/03	Is there a safety policy in place?		
SMS 1.1/04	Has the service provider based its safety management system on the safety policy?		
SMS 1.1/05	Is the safety policy approved and promoted by the Accountable Executive?		
SMS 1.1/06	Is the safety policy reviewed periodically?		
SMS 1.1/07	Is there a formal process to develop a coherent set of safety objectives?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 1.1/08	Are the safety objectives linked to the safety performance indicators, safety performance targets and safety requirements?		
SMS 1.1/09	Are the safety objectives publicized and distributed?		
SMS 1.1/10	Is there a policy in place that ensures effective safety reporting of safety deficiencies, hazards or occurrences including the conditions under which protection from disciplinary and /or administrative action applies?		
Element 1.2 – Safety accountabilities of managers			
SMS 1.2/01	Has the service provider identified an Accountable Executive who shall have ultimate responsibility and accountability, on behalf of the service provider, for the implementation and maintenance of the SMS?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 1.2/02	Does the Accountable Executive have responsibility for ensuring that the safety management system is properly implemented and performing to requirements in all areas of the service provider?		
SMS 1.2/03	Does the Accountable Executive have full control of the financial resources required for the operations authorized to be conducted under the operations certificate?		
SMS 1.2/04	Does the Accountable Executive have full control of the human resources required for the operations authorized to be conducted under the operations certificate?		
SMS 1.2/05	Does the Accountable Executive have final authority over operations authorized to be conducted under the operations certificate?		
Element 1.3 – Appointment of key safety personnel			
SMS 1.3/01	Has a qualified person been appointed to manage and oversee the day-to-day operation of the SMS?		
SMS 1.3/02	Does the person overseeing the operation of the SMS fulfil the required job functions and responsibilities?		
SMS 1.3/03	Are the safety authorities, responsibilities and accountabilities of personnel at all levels of the organization defined and documented?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
Element 1.4 – SMS implementation plan			
SMS 1.4/01	Has the service provider developed an SMS implementation plan that ensures that the SMS will meet the organization's safety needs?		
SMS 1.4/02	Has the SMS implementation plan been developed by a person or a planning group which comprises an appropriate experience base?		
SMS 1.4/03	Has the person or planning group received enough resources (including time for meetings) for the development of the SMS implementation plan?		
SMS 1.4/04	Has the SMS implementation plan been endorsed by the senior management of the service provider?		
SMS 1.4/05	Is the SMS implementation plan regularly reviewed by the senior management of the service provider?		
SMS 1.4/06	Does the SMS implementation plan propose an implementation in phases?		
SMS 1.4/07	Does the SMS implementation plan explicitly address the coordination between the service provider SMS and the SMS of other organizations the service provider must interface with during the provision of services?		
Element 1.5 – Coordination of emergency response planning			
SMS 1.5/01	Does the service provider have an emergency response/contingency plan appropriate to the size, nature and complexity of the organization?		
SMS 1.5/02	Have the emergency response/contingency procedures been documented, implemented and assigned to a responsible manager?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 1.5/03	Are the emergency response / contingency procedures periodically reviewed as part of the management review of the SMS, and after key personnel and organizational change?		
SMS 1.5/04	Does the service provider have a process to distribute and communicate the content the emergency response / contingency procedures to all personnel?		
SMS 1.5/05	Does the service provider conduct drills and exercises with all key personnel at specified intervals?		
SMS 1.5/06	Does the service provider coordinate its emergency response/contingency procedures with the emergency/response contingency procedures of other organizations it must interface with during the provision of services?		
Element 1.6 – Documentation			
SMS 1.6/01	Has the service provider developed and does it maintain SMS documentation, in paper or electronic form?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 1.6/02	Is the SMS documentation developed in a manner that describes the SMS and the consolidated interrelationships between all the SMS components?		
SMS 1.6/03	Has the service provider developed a safety management system manual (SMSM) as a key instrument for communicating the organization's approach to safety to the whole organization?		
SMS 1.6/04	Does the SMSM document all aspects of the SMS, including the safety policy, objectives, procedures and individual safety accountabilities?		
SMS 1.6/05	Does the SMSM clearly articulate the role of safety risk management as initial design activity and the role of safety assurance as continuous activity?		
SMS 1.6/06	Are relevant portions of SMS related documentation incorporated into approved documentation, such as Company Operations Manual, Maintenance Control/Policy Manual, Airport Operations Manual, as applicable?		
SMS 1.6/07	Does the service provider have a records system that ensures the generation and retention of all records necessary to document and support operational requirements?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 1.6/08	Is the service provider records system in accordance with applicable regulatory requirements and industry best practices?		
SMS 1.6/09	Does the records system provide the control processes necessary to ensure appropriate identification, legibility, storage, protection, archiving, retrieval, retention time, and disposition of records?		
[redacted]			
Element 2.1 – Hazard identification process			
SMS 2.1/01	Does the service provider have a formal safety data collection and processing system (SDCPS) of effectively collecting information about hazards in operations?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 2.1/02	Does the service provider SDCPS include a combination of reactive, proactive and predictive methods of safety data collection?		
SMS 2.1/03	Does the service provider have reactive processes that provides for the capture of information relevant to safety and risk management?		
SMS 2.1/04	Has the service provider developed training relevant to reactive methods of safety data collection?		
SMS 2.1/05	Has the service provider developed communication relevant to reactive methods of safety data collection?		
SMS 2.1/06	Is reactive reporting simple, accessible and commensurate with the size of the service provider?		
SMS 2.1/07	Are reactive reports reviewed at the appropriate level of management?		
SMS 2.1/08	Is there a feedback process to notify contributors that their reports have been received and to share the results of the analysis?		
SMS 2.1/09	Does the service provider have proactive processes that actively look for the identification of safety risks through the analysis of the organization's activities?		
SMS 2.1/10	Is there training relevant to proactive methods of safety data collection?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 2.1/11	Has the service provider developed communication relevant to proactive methods of safety data collection?		
SMS 2.1/12	Is proactive reporting simple, accessible and commensurate with the size of the service provider?		
SMS 2.1/13	Does the service provider have predictive processes that provide the capture of system performance as it happens in real-time normal operations?		
SMS 2.1/14	Is there training relevant to predictive methods of safety data collection?		
SMS 2.1/15	Has the service provider developed communication relevant to predictive methods of safety data collection?		
SMS 2.1/16	Is the predictive safety data capture process simple, accessible and commensurate with the size of the service provider?		
Element 2.2 – Risk assessment and mitigation process			
SMS 2.2/01	Does the service provider SMS documentation clearly articulate the relationship between hazards, consequences and risks?		
SMS 2.2/02	Is there a structured process for the analysis of the risk associated to the consequences of identified hazards, expressed in terms of probability and severity of occurrences?		
SMS 2.2/03	Are there criteria for assessing risks and establishing risk tolerability (i.e., the acceptable level of risk the organization is willing to accept?		
SMS 2.2/04	Does the service provider have risk mitigation strategies that include corrective/ preventive action plans to prevent recurrence of reported occurrences and deficiencies?		
SMS 2.2/05	Are corrective and preventive actions generated in response to event analysis?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
Element 3.1 – Safety performance monitoring and measurement			
SMS 3.1/01	Are regular and periodic planned reviews conducted regarding: 1. Company safety performance? Yes ☒ No ☐ 2. Internal audit reviews? Yes ☒ No ☐ 3. Hazard identification and occurrence investigations? Yes ☒ No ☐ 4. Hazard and occurrence analysis results? Yes ☒ No ☐ 5. Internal feedback analysis/results? Yes ☒ No ☐ 6. External feedback analysis/results? Yes ☒ No ☐ 7. Status of corrective actions? Yes ☒ No ☐ 8. Follow-up actions from previous management reviews? Yes ☒ No ☐ 9. Changes that could affect safety? Yes ☒ No ☐ 10. Recommendations for improvement? Yes ☒ No ☐ 11. Sharing of best practices across the organization? Yes ☒ No ☐		
SMS 3.1/02	Is there a process to evaluate the effectiveness of corrective actions?		
SMS 3.1/03	Are safety reports reviewed at the appropriate level of management?		
SMS 3.1/04	Is there a feedback process to notify contributors that their reports have been received and to share the results of the analysis?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 3.1/05	Is there a process in place to monitor and analyze trends?		
SMS 3.1/06	Has the service provider implemented self-evaluation processes, such as regularly scheduled reviews, evaluations, surveys and audits?		
SMS 3.1/07	Are corrective and preventive actions generated in response to hazard identification?		
SMS 3.1/08	Are there procedures in place for the conduct of internal investigations?		
SMS 3.1/09	Do measures exist that ensure all reported occurrences and deficiencies are investigated?		
SMS 3.1/10	Is there a process to ensure that occurrences and deficiencies reported are analyzed to identify all associated hazards		
SMS 3.1/11	Are corrective and preventative actions generated in response to event investigation and risk analysis?		
SMS 3.1/12	Does the service provider have a process for evaluating the effectiveness of the corrective/ preventive measures that have been developed?		
SMS 3.1/13	Does the service provider have a system to monitor the internal reporting process and the associated corrective actions?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 3.1/14	Is there an audit function with the independence and authority required to carry out effective internal evaluations?	Y N N	
SMS 3.1/15	Does the audit system cover all functions, activities and organizations within the service provider?	Y N N	
SMS 3.1/16	Are there defined audit scope, criteria, frequency and methods?	Y N N	
SMS 3.1/17	Are there selection/training processes to ensure the objectivity and competence of auditors as well as the impartiality of the audit process?	Y N N	
SMS 3.1/18	Is there a procedure for reporting audit results and maintaining records?	Y N N	
SMS 3.1/19	Is there a procedure outlining requirements for timely corrective and preventive action in response to audit results?	Y N N	
SMS 3.1/20	Is there a procedure to record verification of action(s) taken and the reporting of verification results?	Y N N	
SMS 3.1/21	Does the service provider perform periodic management reviews of safety critical functions and relevant safety issues that arise from the internal evaluations?	Y	
Element 3.2 – The management of change			
SMS 3.2/01	Has the service provider developed and does it maintain a formal process for the management of change?		
SMS 3.2/02	Does the formal process for the management of change analyze changes to operations or key personnel for risks?		
SMS 3.2/03	Does the service provider identify changes within the organization which may affect established processes and services?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 3.2/04	Has the service provider arrangement to ensure maintenance of safety performance prior to implementing changes?		
SMS 3.2/05	Has the service provider established a process to eliminate or modify safety risk controls that are no longer needed due to changes in the operational environment?		
Element 3.3 – Continuous improvement of the SMS			
SMS 3.3/01	Does the organization have a process for the proactive evaluation of facilities, equipment, documentation and procedures through audits and surveys?		
SMS 3.3/02	Does the organization have a process for the proactive evaluation of the individuals' performance, to verify the fulfilment of their safety responsibilities?		
SMS 3.3/03	Does the organization have a reactive process to verify the effectiveness of the system for control and mitigation of risks?		
Element 4.1 – Training and education			
SMS 4.1/01	Is there a documented process to identify training requirements so that personnel are trained and competent to perform the SMS duties?		
SMS 4.1/02	Is the safety training appropriate to the individual's involvement in the SMS		
SMS 4.1/03	Is the safety training incorporated into indoctrination training upon employment?		
SMS 4.1/04	Is there emergency response/contingency training for affected personnel?		

Audit protocol reference	Aspects to be analyzed or question to be answered	Answer	Status of implementation and/or observations/comments
SMS 4.1/05	Is there a process that measures the effectiveness of training?		
Element 4.2 – Safety communication			
SMS 4.2/01	Are there communication processes in place within the organization that permit the safety management system to function effectively?		
SMS 4.2/02	Are communication processes (written, meetings, electronic, etc.) commensurate with the size and scope of the service provider?		
SMS 4.2/03	Is information established and maintained in a suitable medium that provides direction regarding relevant SMS documents?		
SMS 4.2/04	Is there a process for the dissemination of safety information throughout the organization and a means of monitoring the effectiveness of this process?		