Attachment A – SAMPLE CONSTRAINTS MATRIX

ID NO	Constraint Category	Constraint Sub-Groups	Operational Constraint	Description	Normal conditions	Adverse conditions	Overall Impact	Remedial Activities/ Plans Studies	Operational Improvements	Remedial Action Impact	Cost Score	Expected Implementation Date	Action By
G1	Taxiway / Aprons	Communications & Information	High RTF and workload	Complicated clearance and readback procedures between ATC, pilots and tug/vehicle drivers can lead into frequency congestion and high workload during peak hours									
G2	Taxiway / Aprons		Lack or insufficient information sharing for efficient Gate Management	The communication networks of airlines, ATC and Airport Authorities are not integrated, which prevents optimal planning for the use of stands									
G3	Taxiway / Aprons	Infrastructure & Layout	Non optimal layout of Terminals and Gates	The access and layout of the stands could cause aircraft to block each other under push and tow									
G4	Taxiway / Aprons		Insufficient apron space	Limited availability of parking areas constrains the total airside capacity and reduces number of airport slots									
G5	Taxiway / Aprons		Limited space to exit / enter the apron area or specific stands	Aircraft entering an apron via too short a TWY after vacating or crossing a RWY can restrict the flow into or out of the apron									
G6	Taxiway / Aprons		Stand/ Gate Ratio versus terminal capacity	Inappropriate number of stands / gates compared with the landside infrastructure (i.e. gate equipment, security control, passenger access, baggage processing etc) and passenger flow restrictions									
G7	Taxiway / Aprons		Stand/ Gate Terminal restricted use	Dedicated areas allocated to airlines, immigration requirements (domestic, international and Schengen etc.) can influence the flexibility of use and constrain capacity									
G8	Taxiway / Aprons		Restricted Stand Configurations and operating parameters	Restricted stand configurations to cope with the traffic mix can reduce apron capacity in particular at peak moments									
G9	Taxiway / Aprons		Apron infrastructure and congestion	Apron areas manoeuvrability, efficient taxiing routes, ground flow coordination of vehicles and aircraft, signage, controlled/ uncontrolled crossings, ground equipment storage areas, static equipment installations (i.e. fuel hydrant systems, lighting, electrical power etc) all contribute to efficiency and capacity constraints									
G10	Taxiway / Aprons	Procedures	Stand operating procedures	Restrictive stand operating procedures, aircraft ARR and DEP safeguarding, engine start and the use of non-standard pushback procedures for varying aircraft types can result in a capacity or efficiency constraint									
G11	Taxiway / Aprons	Equipment & Services	Lack of Aircraft Parking Aids and use of 'follow me' vehicles and aircraft marshalling	If stand visual docking guidance systems are not used, the requirement for 'follow-me' vehicles and aircraft marshalling is needed. The continued aircraft movement can be interrupted for awaiting ground instructions, which may lead to potential bottlenecks									
G12	Taxiway / Aprons		Towing of aircraft	Towing of aircraft. Airport layout/operations involves excessive towing causing congestion, and impacts on normal operations									
G13	Taxiway / Aprons	Others	Limited or partial view from the TWR on the apron	Buildings, etc. may restrict TWR visibility onto the apron, which may constrain capacity or efficiency									
G14	Taxiway / Aprons	LVP	Reduced Ground Movements and TWY flexibility during Low Visibility	Once TWR and GND controllers cannot see the aircraft near or on the RWY anymore, GND movement capacity is becoming a determining factor for airside capacity. Without SMR LVO become procedural and directional flow									

Attachment A – SAMPLE CONSTRAINTS MATRIX CONTINUED

ID NO	Constraint Category	Constraint Sub-Groups	Operational Constraint	Description	Normal conditions	Adverse conditions	Overall Impact	Remedial Activities/ Plans Studies	Operational Improvements	Remedial Action Impact	Cost Score	Expected Implementation Date	Action By
R1	**RWY**	Configuration	Use of non-optimal RWY configuration	Due to operational agreements, environmental reasons, local noise factors, weather conditions, etc.									
R2	**RWY**	Runway Occupancy Times	High runway occupancy time	Runway Occupancy times (ROT) are directly related to pilot reaction times to ATC clearances, ATC delays to issue the clearances, slow line ups, positioning of Rapid exit TWYs.									
R3	**RWY**	Infrastructure & Layout	Restricted RWY Capabilities	Having to accommodate traffic on specific RWYs due to RWY length / strength requirements, obstacles, etc can disrupt the optimal flow and constrain capacity									
R4	**RWY**		RWYs & TWYs lacking infrastructure (Lights, signage, NAV Aids)	Most advantages to capacity RWY/TWY unable to be used because of infrastructure deficiencies									
R7	**RWY**		Lack of number / optimal holding points	Number and position of holding points effects departure capacity									
R8	**RWY Taxiway / Aprons**	Equipment	Lack of adequate surface surveillance radar for LVP	In LVP conditions, taxiing aircraft cannot be controlled visually anymore and revert to procedural control techniques with high RTF, high workload.									
R9	**RWY**	Procedures	Not applying Multiple line up Intersection take off and conditional line-up procedures	Not allowing multiple line-ups along intersections can prevent improved departure sequencing. Conditional clearances improve runway utilisation									
A1	**Approach / Departure**	Procedures	Approach/Area ATC unable to maximise arrival traffic rate to meet capacity demand	For whatever reason (lack of airspace, staffing, radar, infrastructure) ACC or approach control cannot service the require arrival rate.									
A2	**Approach / Departure**	Infrastructure	RWY change	Markedly different capacity figures for different RWYs or RWY configuration									
A3	**Approach / Departure**	Procedures	Departure Routings	Inefficient design, interference of arrival and departure traffic flows, complex mix of traffic on same ATS route, etc cannot sustain the required departure order									
A4	**Approach / Departure**	LVP	Low Visibility Procedures severely reduced capacity	The difference between normal and LVO is sufficiently large enough to adversely effect normal operation due to the number of days LVO takes place									
A5	**Approach / Departure**	Weather	Adverse weather conditions severely reduce capacity	The difference between normal and adverse weather operations is sufficiently large enough to unfavourably effect normal operation due to the number of days adverse weather takes place									
A6	**Approach / Departure**	Others	Wake Vortex Separation	Depending on traffic mix and RWY configuration, wake vortex separation can constrain capacity									
E1	**Environment**	Procedures	Use of non-optimal procedures	Due to environmental restrictions									
E2	**Environment**	Configuration	Use of non-optimal RWY configuration	Environmental constraints may require the use of departure procedures that reduce operational capacity e.g. Speed / Climb / Height restrictions. Reduced ability to use non standard procedures and tactical vectoring. Sometimes these procedures can be imposed by external authorities.									
E3	**Environment**	Infrastructure	The externally imposed use of non optimised infrastructure or the imposition of operational constraints.	Development or Operational restrictions based on air quality related emissions from sources on the ground or aircraft in the air (generally less than 1,000 Metres) e.g. restricted expansion plans on Aprons and TWY's due emission gases or compromised locations of Airport facilities from the onset									
E4	**Environment**	Development	Land use planning related restrictions on operations.	Land use planning requirements that either prevent new facilities, reduce the ability to optimise facilities or fail to safeguard existing or future capacity e.g. land use planning restricts SID's and STAR's changes									
E5	**Environment**		Land availability preventing additional facilities being delivered leading to non optimal operations	Non availability of land for development or operational purposes ultimately causing operational constraint e.g. Ecological restrictions prevent or slow growth by acquisition									