Melbourne Airport
M3R MDP

Glossary and Acronyms
Chapters A1–A8

Part A

MELBOURNE AIRPORT

ACRONYMS

Acronym	Definition
μg/m3	Microgram (1x10-6 g) per cubic metre
μm	Micron (millionth of a metre)
2030 Agenda	Transforming Our World 2030 Agenda for Sustainable Development
AAG	Airline Advisory Group
AAWT	Average Annual Weekday Travel
ABC	Airport Building Controller
ABS	Australian Bureau of Statistics
AC	Advisory Circular
ACA	Airport Carbon Accreditation
A-CDM	Airport Collaborative Decision Making
ACI	Airports Council International
ACM	Asbestos-Containing Material
ADS-B	Automatic Dependent Surveillance Broadcast
AEC	Area of Environmental Concern
AEDT	Aviation Environmental Design Tool
AEO	Airport Environment Officer
AEP	Annual Exceedance Probability
AEP Regulations	Airports (Environmental Protection) Regulations 1999 (Cth)
AERMOD	Regulatory air dispersion model (Victoria)
AES	Airport Environment Strategy
AFFF	Aqueous Film Forming Foams
AGL	Airfield Ground Lighting
AH Act	Aboriginal Heritage Act 2006 (Vic)
AHC	Australian Heritage Council
AHD	Australian Height Datum
AIP	Aeronautical Information Publication
Airport Regulations	Airports (Environment Protection) Regulations 1997
Airports Act	Airports Act 1996 (Cth)
ALER	Aerodrome Lighting Equipment Room
ALGA	Australian Local Government Association
AMAC	Australian Mayoral Aviation Council
AMSL	Above Mean Sea Level
ANEC	Australian Noise Exposure Concept
ANEF	Australian Noise Exposure Forecast
ANEI	Australian Noise Exposure Index
ANZECC	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand
APAM	Australia Pacific Airports (Melbourne) Pty Ltd
APAR	Airports (Protection of Airspace) Regulations
APRA	Australian Prudential Regulation Authority
APU	Auxiliary Power Unit
AQ	Air Quality

Acronym	Definition
AQAC	Air Quality Assessment Criteria
AQMP	Air Quality Monitoring Program
AQMS	Air Quality Monitoring Station
ARFFS	Aviation Rescue and Fire Fighting Service
ARG	Asphalt Reinforced Geogrid
ARI	Average Recurrence Interval
ARP	Aerodrome Reference Point
ARR	Australian Rainfall and Runoff
ASDA	Accelerate-Stop Distance Available
ASIC	Australian Securities and Investments Commission
A-SMGCS	Advanced-Surface Movement Guidance and Control Systems
ASPIRE	Asia and Pacific Initiative to Reduce Emissions
ATC	Air Traffic Control
ATM	Air Traffic Management
ATM	Air Traffic Movement
ATSB	Australian Transport Safety Bureau
AV	Aboriginal Victoria
BAU	Business as usual
BCR	Benefit Cost Ratio
BGL/bgl	Below Ground Level
BMO	Bushfire Management Overlay
BOD	Biological oxygen demand
BoM	Bureau of Meteorology
BRA	Building Restricted Area
BWD	Building-induced Wind Deficit
CAA	Central Activities Area
CAAP	Civil Aviation Advisory Publication
CACG	Community Aviation Consultation Group
CAGR	Compound Annual Growth Rate
CALD	Culturally and Linguistically Diverse
CAO	Civil Aviation Orders
CAR	Civil Aviation Regulations
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations
CATIS	Computerised Automatic Terminal Information Service
CBA	Cost Benefit Analysis
CBD	Central Business District
CBR	California Bearing Ratio
CC Act	Climate Change Act 2017 (Vic)
CCO	Continuous Climb Operations
CCR	Constant Current Regulator
CDA	Continuous Descent Approach
CDM	Collaborative decision-making

Acronym	Definition
CDO	Continuous Descent Operations
CEMP	Construction Environmental Management Plan
CERT	Carbon Emissions Reporting Tool
CFC	Chlorofluorocarbon
CGE	Computable General Equilibrium
CH4	Methane
CHC	Chlorinated hydrocarbons
CHL	Commonwealth Heritage List
CHMP	Cultural Heritage Management Plan
CMS	Control and Monitoring System
CNMP	Construction Noise Management Plan
CNS	Communication, Navigation and Surveillance
CO	Molecular formula for carbon monoxide
CO2	Carbon dioxide
CO2-e	Carbon dioxide equivalent
COAG	Council of Australian Governments
CoPS	Centre of Policy Studies (Victoria University)
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CoRTN	Calculation of Road Traffic Noise
CSF	Climate Solutions Fund
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTA	Control Area
Cth	Commonwealth
CTMP	Construction Traffic Management Plan
CTW	CityLink Tulla Widening
DAP	Departure and Approach Procedures
DAWE	Department of Agriculture, Water and the Environment (Cth)
dB(A)	Decibels
DEDRAT	Dedicated Departure Runway Management
DELWP	Department of Environment, Land, Water and Planning (Vic)
DITRDC	Department of Infrastructure, Transport, Regional Development and Communications (Cth)
DO	Dissolved oxygen
DoEE	Department of the Environment and Energy (Cth)
DoT	Department of Transport (Vic)
DoTARS	Department of Transport and Regional Services (Cth)
DPC	Department of Premier and Cabinet
E. coli	Escherichia coli
EAPL	Essendon Airport Pty Ltd
EC	Electrical Conductivity
EDMS	Emission Dispersion Modeling System – U.S. FAA airport model for air quality
EE Act	Environment Effects Act 1978 (Vic)
EES	Environment Effects Statement
EGR	Engine Ground Running

Acronym	Definition
EIA	Economic Impact Assessment
EIL	Ecological Investigation Level
EIS	Environmental Impact Statement
EJD	Effective Job Density
EMA (CRI) Act	Emergency Management Amendment (Critical Infrastructure Resilience) Act 2014
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMS	Environmental Management System
EMU	Environmental Monitoring Unit
EP Act	Environment Protection Act 1970 (Vic)
EP Act New Vic	Environment Protection Amendment Act 2018
EPA	Environmental Protection Authority (Vic)
EPA Act	Environment Protection Amendment Act 2018 (Vic)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EPNdB	Effective Pressure Noise (in decibels)
EPNL	Effective Perceived Noise Level
ERF	Emissions Reduction Fund
ERS	Environment Reference Standard
ESD	Ecologically Sustainable Development
ESG	Executive Steering Group
ESO	Environmental Significance Overlay
EVs	Environmental Values
EVC	Ecological Vegetation Class
FAA	Federal Aviation Administration (US)
FAC	Federal Airports Corporation
FCR	Fine Crushed Rock
FEGP	Fixed Electrical Ground Power
FFDI	Forest Fire Danger Index
FFG Act	Flora and Fauna Guarantee Act 1988 (Vic)
FOD	Foreign Object Debris
FSB	Financial Sustainability Board
FTE	Full-Time Equivalent
FTG	Fire Training Ground
GBAS	Ground-Based Augmentation System
GCP	Growth Corridor Plan
GDP	Gross Domestic Product
GDP	Ground Delay Program
GED	General Environmental Duty
GHG	Greenhouse Gas
GIS	Geographic Information System
GLC	Ground Level Concentration
GLS	GBAS Landing System
GLVIA	Guidance for Landscape and Visual Impact Assessment

Acronym	Definition
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GPU	Ground Power Unit
GRE	Ground Run-up Enclosure
GRESB	Global Real Estate Sustainability Benchmark
GRP	Gross Regional Product
GSE	Ground Support Equipment
GSP	Gross State Product
GVA	Gross Value Added
GWAZ	Green Wedge A Zone
GWZ	Green Wedge Zone
HDI	Household Disposable Income
HDPE	High-density polyethylene
HEPA	Heads of EPAs Australia and New Zealand
HF/VHF	High Frequency/Very High Frequency
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HIAL	High Intensity Approach Lighting
HIALS	High Intensity Approach Lighting System
HILATS	Hume Integrated Land Use and Transport Strategy
HIRL	High Intensity Runway Lights
HO	Heritage Overlay
HSE	Health and Safety Executive (UK)
HV	Heritage Victoria
HV	High Voltage
IA	Infrastructure Australia
IAF	Initial Approach Fix
IAP	Instrument Approach Procedure
IAP2	International Association for Public Participations
ICAO	International Civil Aviation Organisation
ICT	Information, Communications and Technology
IFD	Intensity Frequency Duration
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INM	Integrated Noise Model
IO	Input-Output
IPCC	Intergovernmental Panel on Climate Change
IPL	Infrastructure Priority List (Infrastructure Australia)
IRSAD	Index of Relative Socio-economic Advantage and Disadvantage (Australian Bureau of Statistics)
ISCA	Infrastructure Sustainability Council of Australia
ISO	International Standards Organization
ITS	Intelligent Transport Systems

Acronym	Definition
IV	Infrastructure Victoria
IVS	International Visitor Survey (Tourism Research Australia)
IWDI	Illuminated Wind Direction Indicator
IWMP	Industrial Waste Management Policy
IWRG	Industrial Waste Resource Guidelines
JUHI	Joint User Hydrant Infrastructure
LAHSO	Land And Hold-Short Operations
LCC	Low Cost Carrier
LDA	Landing Distance Available
LDAD	Low Density Artefact Distribution
LGV	Light Goods Vehicle
LiDAR	Light Detection and Ranging
LMC	Lean Mix Concrete
LOR	Limits of Reporting
LOTE	Language/s Other Than English
LPPF	Local Planning Policy Framework
LRET	Large-scale Renewable Energy Target
LSIO	Land Subject to Inundation Overlay
LTO	Landing and Take-Off
LULUCF	Land Use, Land-Use Change and Forestry
LV	Low Voltage
M3R	Melbourne Airport's Third Runway
MAE	Melbourne Airport East (AQMS)
MAEO	Melbourne Airport Environs Overlay
MAESP	Melbourne Airport Environs Strategy Plan
MAESSAC	Melbourne Airport Environs Safeguarding Standing Advisory Committee
MAGS	Movement Area Guidance Sign
MAP	Missed Approach Point
MAR	Melbourne Airport Rail
MAS	Melbourne Airport South (AQMS) Master Plan
MAS	Melbourne Airport Strategy (1990)
MDP	Major Development Plan
Micron	Millionth of a metre (μm)
MIL	Monitoring Investigation Level
MITM	Melbourne Integrated Transport Model
MLAT	Multilateration
MMRF	Monash Multi-Regional Forecasting
MNES	Matters of National Environmental Significance
MoS	Manual of Standards
MOWP	Method of Work Plan
MSS	Municipal Strategic Statement
MUSIC	Model for Urban Stormwater Conceptualisation Improvement
N2O	Nitrous oxide

Acronym	Definition
NADP	Noise Abatement Departure Procedure
NAP	Noise Abatement Procedure
NASAG	National Airports Safeguarding Advisory Group
NASF	National Airports Safeguarding Framework
NATS	National Air Traffic Services (UK)
NAVAID	Navigational Aid
NCIS	Noise Complaints and Information Service (Airservices Australia)
NEPC	National Environment Protection Council
NEPM	National Environmental Protection (Assessment of Site Contamination) Measure
NEPM	National Environment Protection (Ambient Air Quality) Measure
ng	Nanogram (one billionth of a gram)
NFPMS	Noise and Flight Path Monitoring System
NGER	National Greenhouse and Energy Reporting
NHL	National Heritage List
NHMRC	National Health and Medical Research Council
NMT	Noise Monitoring Terminal
NO2	Nitrogen dioxide
NOTAM	Notice to Airmen
NOx	Nitrate and nitrite
NOx	Oxides of nitrogen (for the purpose of this assessment, comprising NO and NO2)
NPD	Noise-Power-Distance
NPV	Net Present Value
NRMMC	Natural Resource Management Ministerial Council
NSESD	National Strategy for Ecologically Sustainable Development
NT Act	Native Title Act 1993 (Cth)
NTGVVP	Natural Temperature Grassland of the Victorian Volcanic Plain
NTU	Nephelometric Turbidity Unit
NVS	National Visitor Survey (Tourism Research Australia)
NZS	New Zealand Standard
O3	Ozone
OEMP	Operational Environmental Management Plan
OFFA	Objects Falling From Aircraft
OLM	Ozone Limiting Method
OLS	Obstacle Limitation Surface
OMP	Offset Management Plan
OMR	Outer Metropolitan Ring
OSAR	Outer Suburban Arterial Roads Program
OTP	On-Time Performance
P&E Act	Planning and Environment Act 1987 (Vic)
PAH	Polycyclic Aromatic Hydrocarbon
PANS-OPS	Procedures for Air Navigational Services – Aircraft Operations
PAPI	Precision Approach Path Indicator
PBN	Performance Based Navigation

Acronym	Definition
PCC	Portland Cement Concrete
PCF	Planning Coordination Forum
PCG	Program Control Group
PEM	Protocol for Environmental Management
PerCOW	Permits to commence work
PFAS	Per- and Poly-Fluoroalkyl Substances
PFAS NEMP	PFAS National Environmental Management Plan
PFHxS	Perfluorohexane sulfonate
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
PM10	Particulate matter 10 micron in equivalent aerodynamic diameter
PM2.5	Particulate matter less than 2.5 micron in equivalent aerodynamic diameter
ppb	Parts per billion (unit of concentration)
PPF	Planning Policy Framework
ppm	Parts per million (unit of concentration)
PPP	Purchasing Power Parity
PPRZ	Public Park and Recreation Zone
PPV	Peak Particle Velocity
PRM	Precision Runway Monitoring
PROSIG	Parallel Runway Operations Steering Implementation Group
PSA	Planning Scheme Amendment
PSA	Public Safety Area
PSP	Precinct Structure Plan area
PSZ	Public Safety Zones
PTV	Public Transport Victoria
PUZ	Public Use Zone
PV	Photovoltaic
PVC	Polyvinyl chloride
PWG	Program Working Group
QUT	Queensland University of Technology
RAAF	Royal Australian Air Force
RAP	Registered Aboriginal Party
RCP	Representative Concentration Pathway
RCZ	Rural Conservation Zone
RDMS	Runway Demand Management System
RDP	Runway Development Project
RDZ1	Road Zone, Category 1
RESA	Runway End Safety Area
RET	Rapid Exit Taxiway
RET	Renewable Energy Target
REW	Reinforced Earth Walls
RF	Radiative Forcing
RMF	Risk Management Framework

Acronym	Definition
RMO	Runway Mode of Operation
RNP	Required Navigation Performance
RPA	Remotely Piloted Aircraft
RPT	Regular Public Transport
RSS	Reinforced Soil Slope
RVR	Runway Visual Range
SAF	Sustainable Aviation Fuel
SAMI	Stress Alleviating Membrane Interlayer
SBAS	Space Based Augmentation System
SCC	Strategic Cycling Corridor
SCM	Supplementary Cementitious Material
SDG	Sustainable Development Goals (UN)
SEIFA	Socio-Economic Indexes for Areas (Australian Bureau of Statistics)
SEL	Sound Exposure Level
SEPP	State Environment Protection Policy
SEPP(AAQ)	State Environment Protection Policy (Ambient Air Quality)
SHLS	Strategically Important Helicopter Landing Sites
SHW	Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains
SIA	Social Impact Assessment
SID	Standard Instrument Departure
Significant impact guidelines 1.2	Significant impact guidelines 1.2 Environment Protection and Biodiversity Conservation Act 1999
SIT	Series Isolation Transformer
SMF	Sustainability Management Framework
SMR	Surface Movement Radar
SMS	Safety Management System
SO2	Sulphur dioxide
SODPROPS	Simultaneous Opposite Direction Parallel Runway Operations
SRES	Small-scale Renewable Energy Scheme
SRL	Suburban Rail Loop
SRO	Single Runway Operations
SRTM	Shuttle Radar Topography Mission (NASA)
STAR	Standard Terminal Arrival Route
STEL	Short-Term Exposure Limit
SUP	Shared User Path
SUZ	Special Use Zone
SWSQMP	Surface Water and Sediment Quality Monitoring Plan
T1, T2, T3, T4	Melbourne Airport Terminals
TCFD	Taskforce for Climate-related Financial Disclosures (G20 Financial Stability Board)
TMA	Terminal Movement Area
TODA	Take-Off Distance Available
TORA	Take-Off Run Available
TSP	Total Suspended Particulates
TSS	Total suspended solids

Acronym	Definition
TWA	Time Weighted Average
UN ICAO	United Nations International Civil Aviation Organisation
UNFCCC	United Nations Framework Convention on Climate Change
VAHR	Victorian Aboriginal Heritage Register
VCCAP	Victoria's Climate Change Adaptation Plan
VCCF	Victoria's Climate Change Framework
VCR	Volume to Capacity Ratio
VDV	Vibration Dose Value
VFR	Visual Flight Rules
VG	Victorian Government
VHI	Victorian Heritage Inventory
VHR	Victorian Heritage Register
Vic IWRR	Environment Protection (Industrial Waste Resource) Regulations 2009
VITM	Victorian Integrated Transport Model
VKT	Vehicle Kilometres Travelled
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOC	Volatile Organic Compound
VPA	Victorian Planning Authority
VPP	Victoria Planning Provisions
VURM	Victoria University Regional Model
WAM	Wide Area Multilateration
WBCSD	World Business Council for Sustainable Development
WHMP	Wildlife Hazard Management Plan
WHO	World Health Organisation
WMP	Waste Management Policy
WQ	Water Quality
WRI	World Resources Institute
WSUD	Water Sensitive Urban Design
WTC	Wake Turbulence Category
ZVI	Zone of Visual Influence

GLOSSARY AND TERMINOLOGY

Term	Definition
A-Weighted	Referred to as dB(A), convey the loudness of a sound by accounting for the varying sensitivity of the human ear to difference frequencies.
AERMOD	The air pollution model currently approved for regulatory purposes in Victoria is the AERMOD air pollution model.
Aeronautical Information Publication (AIP)	A publication containing aeronautical information of a lasting character essential to air navigation. The AIP contains details of regulations, procedures and other information pertinent to the operation of aircraft.
Air toxics	Hydrocarbons identified by the Australian Government as the most important hydrocarbons for monitoring and reporting; they are: benzene, toluene, xylenes, formaldehyde and polycyclic aromatic hydrocarbons (PAHs).
Aircraft apron	Airfield pavement where aircraft are parked and serviced, enabling passengers to board (where no aerobridge exists) and disembark, and cargo to be loaded and unloaded.
Aircraft noise contours	Contours that display the aircraft noise exposure patterns around an airport. These contours help land-use planning of acceptable development in close proximity to the airport.
Airport Master Plan	The principal planning document required under the Airports Act 1996, setting out a 20-year plan for each leased federal airport.
Airport-lessee company	A Commonwealth-owned airport can only be leased to a company. The company is called an airport- lessee company, which in the case of Melbourne Airport is Australia Pacific Airports Corporation Limited (APAC).
Airservices Australia	Government-owned corporation which provides national air navigation service and aviation rescue fire-fighting services.
Airside	Access controlled area of the airfield, adjacent land and buildings providing secure airport operations.
Australian Noise Exposure Concept (ANEC)	A map of noise contours based on aircraft operations at an airport in the future. ANEC maps are based on assumptions of future operations. These contours form the basis of an ANEF.
Australian Noise Exposure Forecast (ANEF)	A system developed as a land-use planning tool to control encroachment on airports by noise- sensitive buildings. ANEFs are the official forecasts of future noise exposure patterns around an airport and they constitute the contours on which land-use planning authorities base their controls.
Australian Noise Exposure Index (ANEI)	Contours developed under the ANEF framework showing historic noise exposure patterns used in environmental reporting and benchmarking
Beneficial use	The term used in the Victorian State Environment Protection Policy (SEPP) (Waters of Victoria) to describe the values and uses of water environments that Victorians want to protect.
Benefit Cost ratio	The total discounted value of the expected future stream of benefits, divided by the total discounted value of the expected future stream of costs. A value greater than 1 indicated benefits exceed costs.
Build scenario	The scenario in which the M3R is constructed and operational in accordance with this MDP.
Civil Aviation Safety Authority	An independent statutory authority responsible for regulating aviation safety in Australia and the safety of Australian aircraft overseas.
Class 1 indicator	State Environment Protection Policy (SEPP)(AQM) – a widely distributed substance established as an environmental indicator in the SEPP(AAQ) and that may threaten the beneficial uses of both local and regional air environments; the Class 1 indicators are: CO, NO2, SO2, PM10, and lead.
Class 2 indicator	State Environment Protection Policy (SEPP)(AQM) – a hazardous substance that may threaten the beneficial uses of the air environment by virtue of its toxicity, bio-accumulation or odorous characteristics; e.g., PM2.5 and formaldehyde.
Class 3 indicator	State Environment Protection Policy (SEPP)(AQM) – an extremely hazardous substance that may threaten the beneficial uses of the air environment due to its carcinogenic, mutagenic, teratogenic, highly toxic or highly persistent characteristics – SEPP(AQM); e.g., acrolein, benzene, PAH.
Climate change	A change in the pattern of weather, and related changes in oceans, land surfaces and ice sheets, occurring over time scales of decades or longer.
Climate risk	Climate-related risks are created by a range of hazards. Some are slow in their onset (such as changes in temperature and precipitation leading to droughts or agricultural losses), while others happen more suddenly (such as tropical storms and floods).
Code C aircraft	An aircraft that has a wingspan of between 24 metres and up to but not including 36 metres. Examples are the Airbus A320 series and Boeing 737 series.
Code E aircraft	An aircraft that has a wingspan of between 52 metres and up to but not including 65 metres. Examples are the Airbus A330 and Boeing 747-400/787
Code F aircraft	An aircraft that has a wingspan of between 65 metres and up to but not including 80 metres. An example is the Airbus A380.
Computerised General Equilibrium modelling	A highly detailed and regionalised method of conducting EIA

Term	Definition
Continuous Climb Operations (CCO)	An aircraft operating technique allowing the execution of a flight profile optimised to the performance of aircraft, leading to significant economy of fuel and environmental benefits in terms of noise and emissions reduction.
Continuous Descent Operations (CDO)	An aircraft operating technique in which an arriving aircraft descends from an optimal position with minimum thrust and avoids level flight to the extent permitted by the safe operation of the aircraft and compliance with published procedures and ATC instructions. The objective of CDO is to reduce aircraft noise, fuel burn and emissions.
Controlled airspace	Airspace of defined dimensions within which air traffic control services are provided in accordance with airspace classifications.
Cost Benefit Analysis	A method that calculates the present value of economic, social and environmental benefits of a project compared to the present value of the costs
Criteria pollutants	Considered by regulators to be important for monitoring and reporting. The criteria air pollutants measured at Melbourne Airport are: nitrogen dioxide (NO2), sulphur dioxide (SO2), ozone (O3), carbon monoxide (CO), and particles as particulate matter 10 (PM10) and particulate matter 2.5 (PM2.5).
Culvert	A structure that allows water to flow under a road, railroad or in this case, a runway or taxiway, from one side to the other side.
Development footprint	Maximum extent of potential ground disturbance during M3R construction and operation.
Domestic tourism	Tourists from Australia travelling within Australia. This may include business, leisure, education or family travel, and may include day trips, overnight stays or longer.
Economic Impact Assessment	A method that models the economywide impacts of a project, including immediate expenditure and flow-on expenditure through the economy.
Effective Job Density	An indicator of the relative number of jobs in an area compared to other areas. A high EJD area has a high number of jobs located within it compared to similar areas.
Employment	The total number of jobs in an area at any given time.
Environmental Management Framework	A practical outline of how environmental issues will be managed as part of the construction and operation of the Runway Development Program.
Environmental Management System	Melbourne Airport's Environmental Management System – an externally certified system conforming to the international standard, ISO 14001.
Foreign Object Debris	A substance, debris or article alien to a vehicle or system, which would present a hazard to an aircraft.
Green Wedge Zone	A State land-use planning zone to control use of the land and to recognise, protect and conserve green wedge land for its agricultural, environmental, historic, landscape, recreational and tourism opportunities, and mineral and stone resources.
Gross Value Added	Sum of wages paid to employees and gross operating surpluses (profits) generated by firms, excluding taxes. It estimates how much human effort has taken inputs and created higher value output in a given geographic location, and calculates the difference in value between the inputs and outputs.
Ground Support Equipment	Airport support equipment, for example, aircraft pushback tractors, baggage tugs, ground power units and engine air start units.
Ground water	Water held underground in the soil, in pores and/or crevices in rock (as opposed to surface water).
Hydraulics	The science concerned with the movement of liquids through pipes and channels, and in particular in this context, the movement of water.
Hydrogeology	The science (branch of geology) concerned with water occurring underground or on the surface of the earth. In this context, mainly referring to the impact and movement of groundwater.
Hydrology	The science concerned with the properties of the earth's water, and especially its movement in relation to land.
Industry	Industry classifications used in this report are from the Australian and New Zealand Standard Industrial Classification (ANZSIC). More details can be found here https://www.abs.gov.au/ausstats/abs@.nsf/mf/1292.0
Infrastructure Sustainability Council of Australia	The peak industry (public and private) body for advancing sustainability in Australia's infrastructure.
Instrument Approach Procedure	A series of predetermined manoeuvres that provide specific protection from obstacles and terrain. An IAP is used for the orderly transfer of an aircraft from the end of the STAR to a landing, or to a point from which a landing may be executed visually.
Instrument flight rules	Procedures to govern flight when the pilot is unable to navigate using visual references under visual flight rules. This involves flying by reference to instruments in the flight deck and navigating by reference to electronic signals.
Instrument landing system	A navigational aid that provides both directional and glide slope guidance for aircraft landing on a runway at an airport.
International Air Transport Association	An international organisation representing and serving the airline industry worldwide.

Term	Definition
International Civil Aviation Organisation	A UN specialised agency that brings together states and key industry organisations to determine areas of strategic priority, develop policies and standards, coordinate global monitoring, analysis and reporting initiatives.
International tourism	Overseas residents travelling in Australia for holidays, visiting relatives, business or education, for a period of twelve months or less.
LAeq	The equivalent continuous sound level is the energy average of the A-weight noise level over a sample period.
LAmax	The maximum A-weighted noise level that is either predicted or recorded over a period.
Land And Hold Short Operations	An air traffic control procedure for aircraft landing and holding short of an intersecting runway or point on a runway, to balance airport capacity and system efficiency with safety.
Landscape modification	Landscape modification refers to the change to the landscape that will occur as a result of a project. This includes direct impacts such as the removal of trees or parkland, but also indirect impacts, such as the functional change of an area of open space due to changing land use and accessibility.
Landside	The area of an airport and buildings which are publicly accessible without secure access control.
Leased Commonwealth airports	The 21 airports privatised under the Airports Act 1996, where the airport operators lease the airport land from the Commonwealth Government.
LiDAR	A surveying method which utilises laser.
Major Development Plan	A requirement under the Airports Act 1996 for airport-lessee companies to provide information to the Commonwealth Government and the public about significant planned development on leased federal airport sites.
Manual of Standards (MoS, CASA)	Legislative instruments which set out aviation standards.
Matters of National Environmental Significance	Under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) nine matters of national environmental significance (MNES) are defined and protected.
Melbourne Airport Environs Overlay	A planning control used to limit noise-sensitive uses and the impacts of aircraft noise on development through measures designed to minimise the noise. The areas where these controls apply are determined by an airport's forecast aircraft noise exposure contours (ANEF).
'Melbourne Basin'	Refers to the collective airspace around Melbourne including Melbourne Airport, Essendon Fields Airport, Moorabbin Airport, Avalon Airport and RAAF Base Point Cook.
Multilateration	A surveillance technique based on the measurement of the difference in distance to two stations at known locations by broadcast signals at known times.
N-above	Contours indicating the number of noise events that exceed a certain level. For example, an N70 contour level shows the number of events above 70 dB(A)
Net present value	The total discounted value of the expected future stream of benefits, minus the total discounted value of the expected future stream of costs. A value greater than zero indicates that benefits exceed costs.
No Build (BAU) scenario	A scenario in which M3R is not constructed, in which Melbourne Airport remains a two-runway airport for the indefinite future.
Noise Abatement Procedure/s (NAPs)	Specify which operating mode will be selected based on the available modes due to meteorological conditions, time of day, demand and a set of mode priorities
Non-aviation development	Non-aviation commercial developments, such as retail outlets, car parks and office buildings, on airport sites.
Obstacle Limitation Surfaces	A series of surfaces that define the volume of airspace at and around an aerodrome to be kept free of obstacles, in order to permit the intended aircraft operations to be conducted safely.
On-Time Performance	Measures the percentage of flights that are considered 'on-time', which is arriving or departing within 15 minutes of the scheduled time.
PM10	Particulate matter 10 – airborne particulate matter comprising a collection of particles with equivalent aerodynamic diameters less than or equal to 10 µm.
PM2.5	Particulate matter 2.5 – airborne particulate matter comprising a collection of particles with equivalent aerodynamic diameters less than or equal to 2.5 µm.
Precision Approach Path Indicator	A visual aid that provides guidance information to aid pilots to acquire and maintain the correct approach (in the vertical plane) to a runway.
Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS)	A set of ICAO rules for designing instrument approach and departure procedures at aerodromes. Such procedures are used to allow aircraft to land and take off when Instrument Meteorological Conditions (IMC) impose Instrument Flight Rules (IFR).
Rapid Exit Taxiway	Taxiways linked to runways at an angle that permit aircraft to exit the runway at high speeds.
SA2, SA3, SA3	A SA2 is a statistical area representing approximately one suburb. SA3s are statistical somewhat smaller than local government areas, SA4s are somewhat larger. The Australia' Bureau of Statistics official definition of these terms can be found on their website.

Term	Definition
Scope 1 emissions	Direct emissions from sources that are owned or operated by a reporting organisation (examples include combustion of diesel in company-owned vehicles or used in on-site generators).
Scope 2 emissions	Indirect emissions associated with the import of energy from another source (examples include importation of electricity or heat).
Scope 3 emissions	Other indirect emissions (other than scope 2 energy imports) which are a direct result of the operations of the organisation but from sources not owned or operated by them (examples include business travel by air or rail).
Scope 3a emissions	Emissions which an airport operator can influence, even though it does not control the sources.
Scope 3b emissions	Emissions which an airport controller cannot influence to any reasonable extent.
Standard Instrument Departure (SID)	A standard route identified in an instrument departure procedure by which aircraft should proceed from take-off phase to the en-route phase of a flight.
Standard Terminal Arrival Route (STAR)	A standard route identified in an approach procedure by which aircraft should proceed from the en-route phase of a flight to an initial approach fix.
Stormwater	Rainwater run-off.
Surface water	Water that collects on the surface of the ground (e.g. creeks, rivers, lakes, wetlands).
Taxiway	Pavement on the airfield to enable aircraft to traverse between runways, aprons, hangars and other facilities
Urban Growth Boundary	A planning scheme boundary set to control urban sprawl by mandating that the area inside the boundary be used for higher-density urban development, and the area outside be used for lower- density non-urban development.
Visual Flight Rules	A set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.
Visual sensitivity	Locations from which a view will potentially be seen for a longer duration, where there are higher numbers of potential viewers and where visual amenity is important to viewers can be regarded as having a higher visual sensitivity.
Volatile organic compound	Any chemical compound based on carbon chains or rings with a vapour pressure greater than 0.01 kPa at 293.15 K (i.e. 20°C), that participate in atmospheric photochemical reactions.

Chapter A1
The Project - Introduction

CHAPTER A1 CONTENTS

CHAPTER A1 FIGURES

CHAPTER A1 TABLES

Summary of key findings:

- Melbourne Airport is leased and operated by Australia Pacific Airports (Melbourne) Pty Ltd (APAM) and since the early 1990s it has planned for an ultimate four-runway system. Every Master Plan since then has provided for the construction of a parallel north-south runway and a parallel east-west runway in addition to the existing two runways.
- The emerging need for a third runway was identified in 2013. Planning for construction of an east-west oriented parallel runway was introduced in Master Plan 2013 and reaffirmed in Master Plan 2018.
- In 2019, Melbourne Airport announced that a planning review had determined the east-west orientation was no longer the optimal choice. Melbourne Airport's Third Runway (M3R) project with the north-south parallel runway was then initiated.
- Master Plan 2018 is the current approved Master Plan for Melbourne Airport. However, the changed third-runway orientation requires a corresponding update to the Master Plan. Master Plan 2022 is therefore being developed in conjunction with M3R.
- Although COVID-19 has significantly impacted the aviation industry, its disruption is expected to be short term: current forecasts reflect a return to 2019-equivalent activity in 2024. Melbourne Airport therefore expects that demand will recover and continue to grow, and that the need for M3R remains. Melbourne Airport is closely monitoring the industry's return to growth projections, although for this MDP it has not specifically modelled traffic and passenger forecasts for the recovery from COVID-19.
- 2026 is nominated as the reference opening year for M3R. It is the earliest possible year for opening and based upon leading timeframes for approvals, design and construction.
- APAM seeks MDP approval that is valid until 2035, allowing it the flexibility to build when industry and commercial conditions are most favourable.

A1.1 INTRODUCTION

A1.1.1 Context: requirement for a Major Development Plan

Australia Pacific Airports (Melbourne) Pty Ltd (APAM) has prepared this Major Development Plan (MDP) to support the assessment and approval process necessary to develop a third runway at Melbourne Airport.

The project comprises a new runway (parallel to the existing north-south oriented runway), modification of the existing east-west runway, extensive construction and modification of taxiways, and the associated support infrastructure. This is collectively referred to as Melbourne Airport's Third Runway (M3R) project.

M3R is to be constructed on Commonwealth land leased by APAM as the 'airport-lessee company' in accordance with the *Airports Act 1996* (Cth) (the Airports Act). The Act is administered by the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC).

As a 'major airport development' governed by the Airports Act, M3R requires the preparation of an MDP for which approval is sought from the Commonwealth Minister for Infrastructure, Transport and Regional Development (hereafter referred to as the Minister for Infrastructure).

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (the EPBC Act), administered by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) also applies to M3R. This MDP is tendered, via DITRDC referral to DAWE, for accreditation as an acceptable assessment of the potential environmental impacts of M3R under the EPBC Act.

Approval for M3R is therefore sought from the Minister for Infrastructure via the MDP process provisions of the Airports Act (inclusive of DAWE assessment and advice according to the EPBC Act).

A1.1.2 Context: Melbourne Airport planning

Melbourne Airport is Australia's second-busiest passenger airport and, as an important hub for Australia's international and domestic networks, it features in six of the nation's 10 busiest flight routes.

Since the airport was constructed in the 1960s, the population of Victoria has surged to over five million people and the aviation industry has been transformed. Melbourne Airport has evolved and expanded in line with industry advances and increased demand for movement of passengers and freight. Ongoing development of the airport is necessary to ensure that this critical infrastructure meets Victoria's social and economic needs into the future.

Melbourne Airport currently operates two intersecting runways. As the aviation industry has evolved, parallel runway operations have become the preferred option for safety, efficiency and operability. Melbourne is one of the busiest airports in the world without a parallel runway system.

Long-term development plans for Melbourne Airport have included a four-runway configuration since the 1960s. From 1990 onwards, development plans for the airport identified parallel east-west and north-south runway systems as the preferred ultimate configuration. Consistent with this concept – and in accordance with the airport's growing business demand – the need for development of a third runway was detailed in the 2013 Melbourne Airport Master Plan and reaffirmed in the 2018 Melbourne Airport Master Plan. It remains the intention that a fourth runway will be developed in the future as demand necessitates.

A1.1.2.1 The Runway Development Program

Following the Commonwealth's approval of the 2013 Master Plan, work commenced on the feasibility and early design of a third runway for Melbourne Airport. Analysis conducted at the time indicated that an east-west oriented runway (parallel to, and south of, existing runway 09/27) was preferable to the north-south option. This project was referred to as the Runway Development Program (RDP).

See Chapter A3: Options and Alternatives for further detail of the considerations, configuration and progression of RDP.

A1.1.2.2 Master Plan 2018

The 2018 Master Plan reaffirmed the important need for a third-runway development at Melbourne Airport and progressed the nomination of east-west as the solution under development.

Master Plan 2018 is the current, approved Master Plan for Melbourne Airport.

A1.1.2.3 Planning review

During 2018, it became apparent to APAM that several important factors in the 2013 east-west decision making had evolved and required review.

In November 2018, Melbourne Airport paused the RDP to conduct a planning review that encompassed regulatory, technological and environmental elements. This review concluded that the optimal third-runway alignment had changed from east-west to north-south. The analysis and its findings were extensively validated with government, regulators and airlines; and local communities were consulted in various ways including:

- Two direct mailouts to approximately 330,000 households advising of the review, engagement workshops and final decision
- Media coverage on TV, radio, daily and local newspapers
- Information on my.melbourneairport.com
- Flyers sent to approximately 3,000 people in the airport's vicinity
- 20 community workshops held in 14 locations
- Four 'Meet the Planner' sessions
- Federal, state and local government briefings
- Community group presentations
- Briefings for the Community Aviation Consultation Group (CACG) and Planning Coordination Forum (PCF). See Chapter A6: Stakeholder Engagement for further details.

In November 2019, Melbourne Airport formally announced that the third runway strategy required major change. The RDP project was concluded and replaced with the north-south runway project, called Melbourne Airport's Third Runway (M3R).

See Chapter A3: Options and Alternatives for more detail on the planning review's considerations and conclusions.

A1.1.2.4 Melbourne Airport's Third Runway (M3R)

Melbourne Airport is progressing development plans for the necessary third runway via the M3R project, which is the subject of this MDP.

M3R will support the objectives of the Airports Act, the Airport Lease (between APAM and the Commonwealth of Australia) and the airport Master Plan by enabling the growth of the airport and improving the efficiency of its operations.

M3R is projected to take between four and five years to construct, subject to Ministerial approval and commercial milestones. The project includes (see also Chapter A5: Project Construction):

- Development of a new parallel north-south runway (16R/34L) and associated taxiway system
- Shortening of the existing east-west runway (09/27) and associated taxiway modifications
- Supporting infrastructure including alternative access to the Airservices Australia (Airservices) compound, a culvert channelling Arundel Creek under 16R/34L, and additional Aviation Rescue Fire Fighting Service facilities
- Construction staging and facilities; and site works including a new stormwater drainage network, utilities and services.

In 2019, the existing runway system handled approximately 260,000 aircraft movements. Upon completion of M3R, Melbourne Airport will be capable of facilitating over 400,000 aircraft movements a year.

M3R has been designed to allow for the future development of a new terminal and fourth runway. These projects would be subject to separate approvals.

A1.1.2.5 Master Plan 2022 (proposed)

The progression from RDP to M3R is a substantial and fundamental change to the airport's planning context. APAM is therefore updating the Master Plan for Melbourne Airport, in conjunction with M3R, to reflect the changed orientation of the planned third runway.

For this reason, and to comply with section 91(1)(d) of the Airports Act, this Preliminary Draft MDP refers to both the approved 2018 Master Plan and the proposed new Master Plan.

Master Plan 2018 is referenced, where contextually appropriate, in this document as the current effective planning reference for Melbourne Airport. However, reference to Master Plan 2022 (proposed) is also included where necessary. '2022' has been assigned to the proposed Master Plan as it is expected to be the year in which it is approved by the Minister for Infrastructure.

The Preliminary Draft Master Plan 2022 and Preliminary Draft M3R MDP will be exhibited concurrently. This strategy endeavours to reduce potential confusion in the community arising from duplicated engagement processes.

Following exhibition of both documents, the Draft Master Plan 2022 will be submitted to the Minister for Infrastructure for consideration followed by the Draft M3R MDP. The Draft Master Plan 2022 approval decision will occur first, and consideration of approval of the M3R MDP will follow. This is because the M3R MDP cannot be approved while Master Plan 2018 remains applicable.

Given the above, before the Draft MDP is submitted to the Minister under section 92 of the Airports Act, Melbourne Airport will remove any references in this MDP to the 2018 Master Plan and the commentary about the 2018 Master Plan. When the Minister makes a decision on the Draft MDP, the 2022 Master Plan will be the effective final Master Plan.

M3R will be entirely consistent with Master Plan 2022, which reflects the changed orientation of the planned third runway and its associated construction footprint.

A1.2
MELBOURNE AIRPORT

A1.2.1
Introduction

Melbourne Airport is the major aviation gateway to Victoria and southern Australia for airline passengers and air freight. It operates without a curfew and serves more than 40 airlines.

The airport is located in Tullamarine, which is approximately 22 kilometres (by road) north-west of Melbourne's Central Business District (CBD). The airport site is bordered by non-urban and green wedge areas to the north and west, and a mix of industrial and residential zones to the east and south. Careful safeguarding of land uses around the airport helps minimise unfavourable impacts from, and upon, the airport.

Melbourne Airport operates 24 hours a day, 365 days a year to service a wide range of domestic and international destinations.

The majority of operations occur between 5am and 11pm. Within this period, the airport experiences two significant peaks for aircraft movements. The first in the morning, with a second in the late afternoon to evening. The morning peak is the combined result of international arrival schedules and domestic day-return passenger demand (people travelling to a domestic destination and returning the same day). The evening peak is driven more by domestic day-return passengers.

A1.2.2
Brief history

The Commonwealth Minister for Defence identified the need for a new airport site for Melbourne (to replace Essendon Airport) as early as 1939. The Tullamarine site was chosen because it offered the opportunity for long-term growth combined with convenient access to the Melbourne CBD.

Much of the existing airport infrastructure, including the two runways and main terminal complex, was constructed in the 1960s. The first scheduled international flights took place in 1970, followed by domestic flights a year later. Since the 1960s, it has been envisaged that the airport would ultimately have four runways.

The airport was originally operated by the Commonwealth Government. In 1997 Melbourne Airport was in the first tranche of Australian airports to be privatised, and APAM was granted the lease.

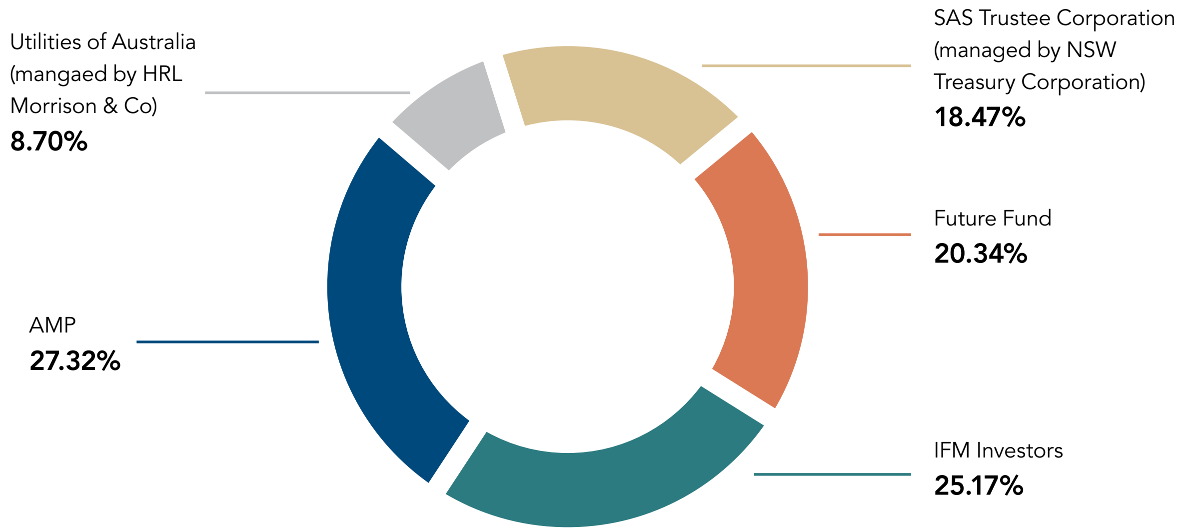
A1.2.3
Ownership

Melbourne Airport is located on Commonwealth land, which is leased by APAM in accordance with Division 3 of the Airports Act. APAM is responsible for managing the airport until 2047, with an option to extend this lease by a further 49 years to 2096.

APAM is part of Australia Pacific Airports Corporation Limited (APAC) which operates Melbourne and Launceston airports. APAC is a privately held company owned by investors who include a number of major Australian superannuation funds as shown in **Figure A1.1**.

APAM is bound by the terms of its Commonwealth lease agreement, and to its shareholders, to operate the airport as efficiently as possible and deliver a return on investment. One of the lease's most important obligations is:

Figure A1.1
Australia Pacific Airports Corporation Limited (APAC) ownership



Throughout the Term the Lessee must develop the Airport Site at its own cost and expense consistent with a Major International Airport having regard to:

a. *the actual and anticipated future growth in, and pattern of, traffic demand for the Airport Site;*

b. *the quality standards reasonably expected of such an airport in Australia; and*

c. *Good Business Practice.*

In addition, the Lessee must at all times provide for access to the airport by intrastate, interstate and international air transport.

A1.2.4
Site context

Melbourne Airport comprises aviation operations, commercial and aviation-related development and infrastructure. The airport site covers approximately 2,741 hectares –about 2,650 hectares of Commonwealth-leased land and about 90 hectares of freehold land – and is located in the City of Hume local-government area.

Figure A1.2 illustrates the existing land-use precincts at the airport, as shown in the current Master Plan, including:

- Airside operations precinct: incorporating the two runways, taxiways, apron and supporting infrastructure
- Terminal precinct: incorporating one international and three domestic passenger terminals
- Airport expansion precinct: incorporating the project area for M3R
- Landside main precinct: incorporating freight, car parks, ground transport and car rental facilities, hotels and offices
- Landside business precinct: incorporating car parking, the Business Park, aviation maintenance, cargo and catering processing facilities.

Figure A1.3 illustrates existing infrastructure at the airport, including:

- North-south runway (16/34) that is 3,657 metres long and 60 metres wide
- East-west runway (09/27) that is 2,286 metres long and 45 metres wide
- Airfield infrastructure including aircraft apron; taxiways; and aircraft-support infrastructure such as safety areas, ground-surface equipment, fuel storage and handling areas and navigational aids
- Four passenger terminals
- Freight-handling terminals and aircraft maintenance infrastructure
- Airservices compound including the air-traffic-control tower and Aviation Rescue Fire Fighting Service (ARFFS)
- Golf course
- Supporting infrastructure including car parking, catering and cargo processing
- Services and utilities including water supply, sewerage, stormwater drainage and electricity
- Extensive local road network connecting to the Tullamarine Freeway, Western Ring Road and Sunbury Road.

In addition to aviation infrastructure, there are a number of environmental characteristics within the airport site and its surrounds. These are recognised by the Melbourne Airport Environment Strategy and relevant legislation as described in Part B of this MDP.

Figure A1.2
Existing land-use precincts

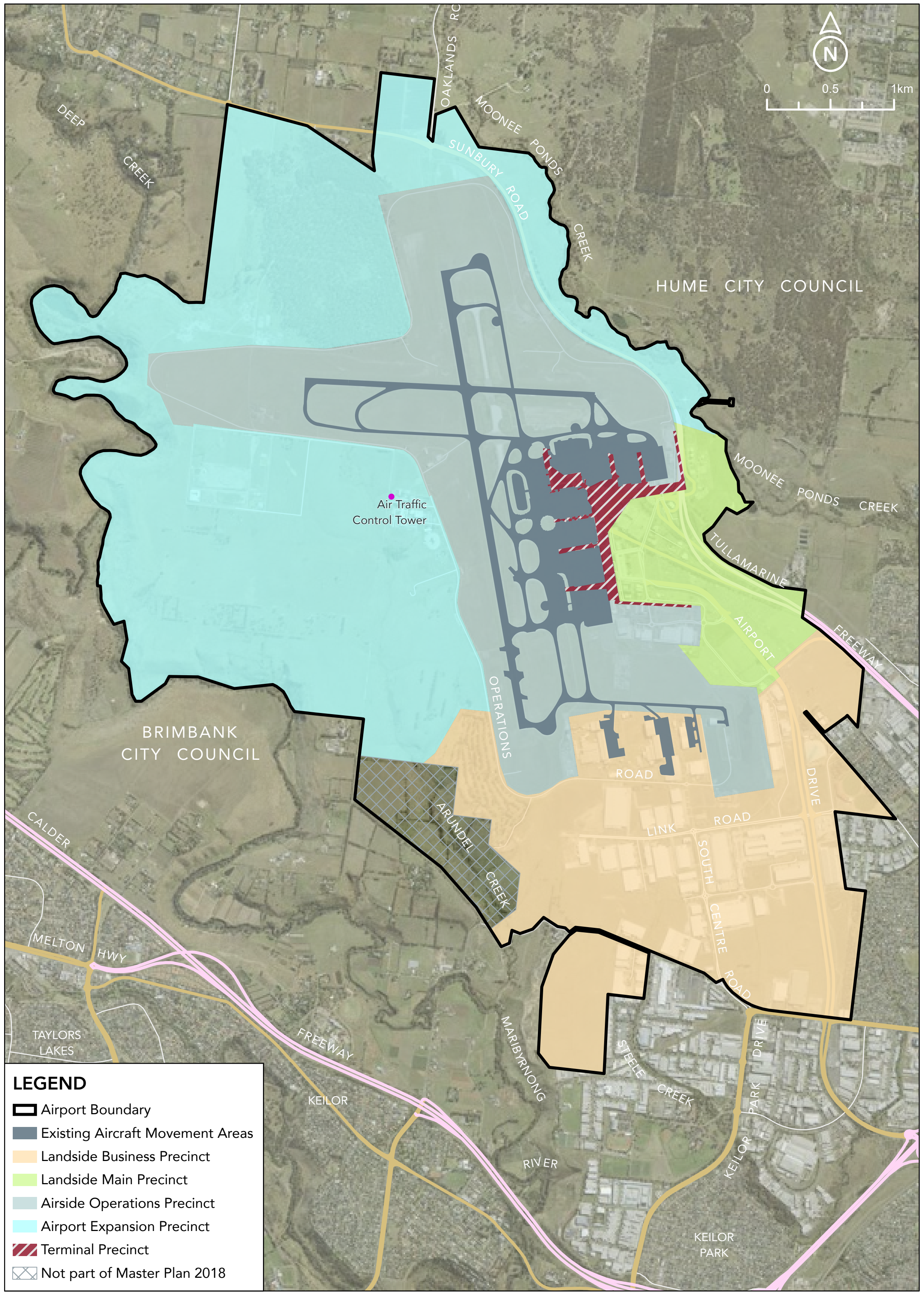


Figure A1.3
Existing infrastructure

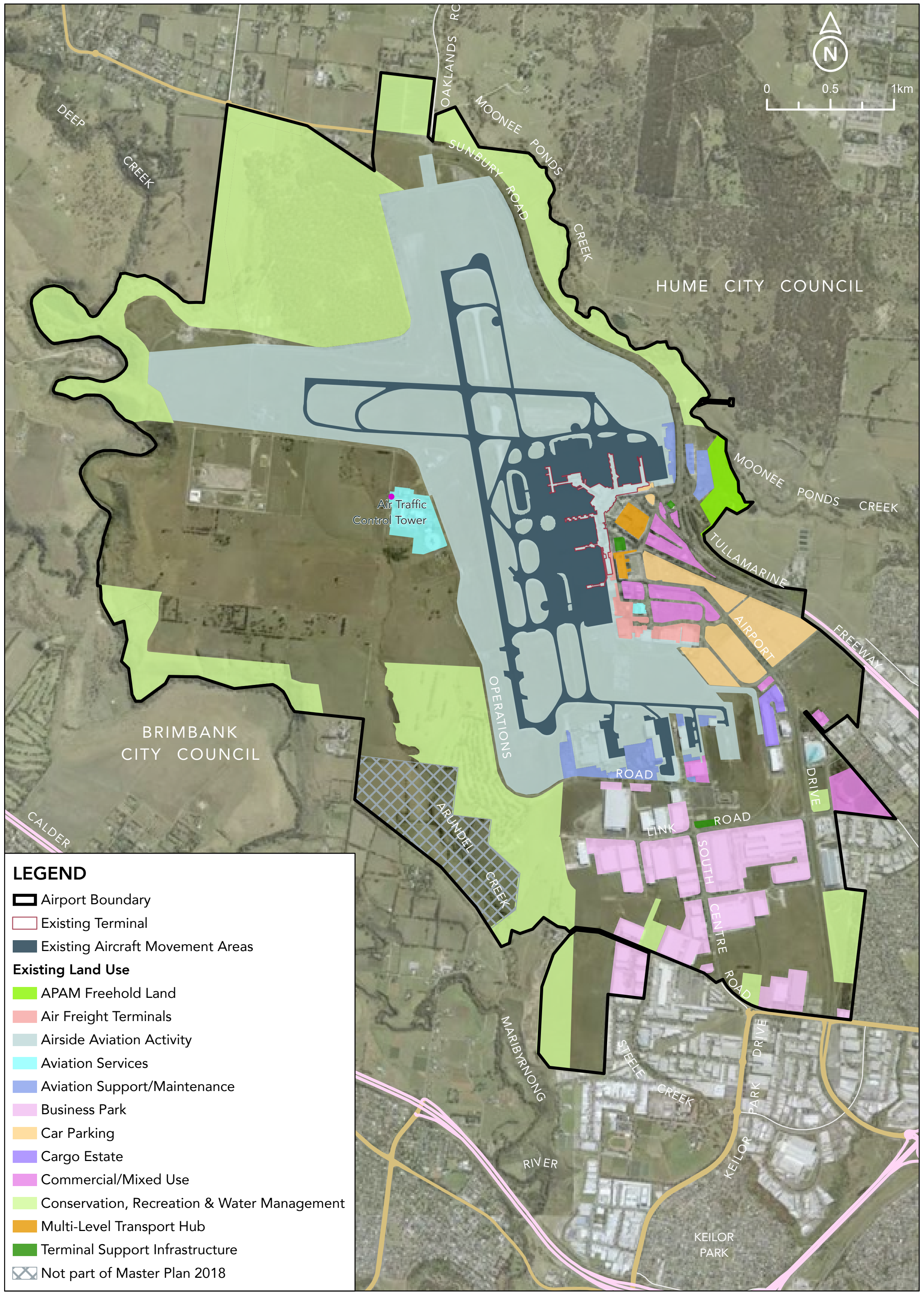
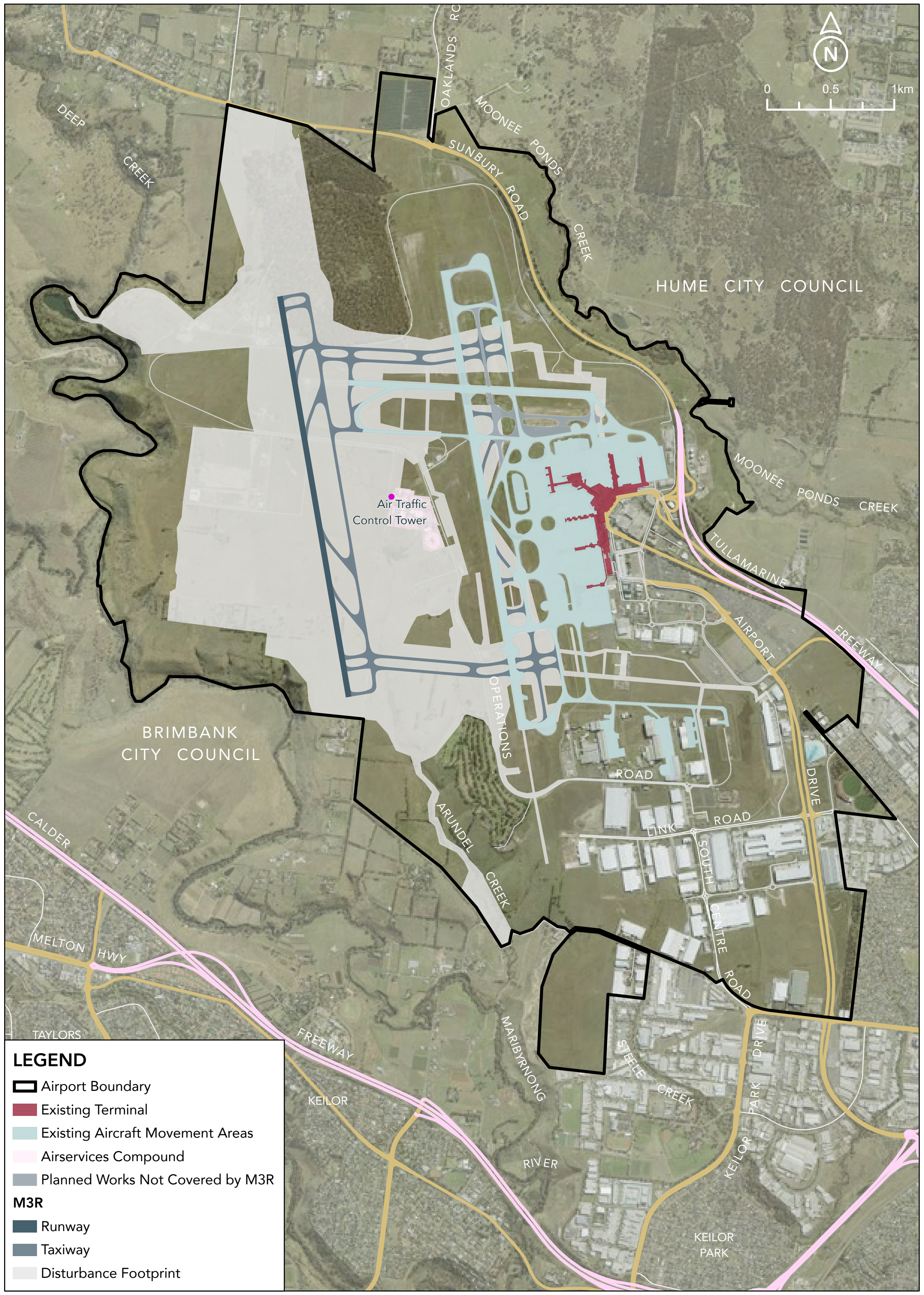


Figure A1.4
M3R overview including the 'disturbance footprint'



A1.3 PROJECT OVERVIEW

This MDP describes the governance of construction and operation phases for M3R at Melbourne Airport. Design and construction methodologies for M3R are described in detail in **Chapter A4: Project Description** and **Chapter A5: Project Construction**.

M3R encompasses:

- Construction of a new 3,000-metre long parallel north-south runway (16R/34L) with a 200-metre runway starter extension at the southern end and associated taxiway network
- Shortening of the east-west runway (09/27) from 2,286 meters to approximately 1,940 meters in order to deconflict with the new runway infrastructure
- Lighting and navigational aids
- Construction of alternate access to the Airservices compound by a tunnel under new cross-field taxiways
- Development of construction zones in the west to support the M3R works, including construction access roads from the north and south
- Provision for new Aviation Rescue Fire Fighting Service facilities and infrastructure as required to comply with regulatory requirements regarding emergency response to the new runway
- Site works: including installation of a new stormwater drainage network (with diversions of the existing drainage system, installation of new pipework, manholes, swales, culverts and outfall structures, services diversions) and installation of new utilities (water, electricity, sewerage, gas and communications) to support operations.

The maximum extent of the potential ground disturbance during construction and operation of M3R is illustrated in **Figure A1.4** as the 'disturbance footprint'. This area is influenced by undulating topography, Arundel Creek and the Maribyrnong River. The total estimated size of the disturbance footprint is approximately 833 hectares.

Figure A1.4 (and other layout figures in this MDP) also shows the Taxiway Zulu Project. It comprises additional areas of apron and taxiways to the north of the existing terminal complex. They are planned works and subject to a separate MDP.

A1.4 PROJECT OBJECTIVES

The project objectives for M3R have been defined to ensure that the development adequately addresses the capacity constraints and associated issues currently experienced – and which are becoming progressively more acute. These objectives are described in **Figure A1.5**.

Figure A1.5
M3R project objectives

Capacity	• Provide additional capacity at the right time to meet forecast demand requirements and minimise delays • Facilitate optimal aircraft mix in line with the Melbourne Airport's strategic position in the network of Australian airports • Support the economic growth of Melbourne and Victoria • As a key hub, support expansion of domestic network capacity with other Australian airports and associated growth
Operations	• Maintain Melbourne Airport's curfew free status • Maintain and where possible enhance safety compliance and performance across delivery, airspace management and airfield operations and maintenance • Ensure efficiency in ground movements and airspace management • Improve management of interdependencies with local airports, Airservices and CASA
Affordability	• Deliver commercially effective improvements that support the growth required by airlines, travellers and other aviation users • Minimise airspace management costs • Enable certainty of delivery timeframe and whole-of-life costs • Minimise the commercial impact to existing customers during the construction period
Sustainability	• Strengthen APAM's relationship with passengers, airlines, the local community, business and government • Manage impacts on land, noise, emissions and water in a responsible way, and where possible avoid or minimise such impacts • Fulfil regulatory obligations for airfield development • Maximise economic benefits and support the competitiveness of the Victorian economy

A1.5 PLANNING ASSUMPTIONS

A1.5.1 Planning baseline year: 2019

The need for additional runway capacity at Melbourne Airport was evident in 2019's operational performance. As demand has grown, and reached system capacity during substantial parts of the typical day, reliability has deteriorated.

To further compound this demand constraint, the existing runway system has issues around capacity resilience. These arise from local wind patterns that require Single Runway Operations (SRO) for approximately 30 per cent of the time on average, and are likely to worsen due to the impact of climate change on weather systems. The resultant flight delays and cancellations are becoming increasingly frequent and adversely impact the entire Australian aviation network.

A representative 'busy day' from October 2019 was selected as a foundation data set upon which the forecasts and projections underlying this MDP are based (discussed further in **Chapter A2: Need for the Project**.)

Modelling based on this data demonstrated, prior to COVID-19, that the airport would reach serious operational constraint by 2025 without a third runway, which would have direct implications for the performance of regional, domestic and international networks.

Chapter A2: Need for the Project further details the forecasting conditions applied to M3R.

A1.5.2 COVID-19

COVID-19 has substantially impacted air-transport passenger demand and airport development plans. However, industry intelligence in late-2020 predicts the industry will recover to 2019 levels by 2024.

Although COVID-19 has delayed the immediate need for a third runway, demand is expected to recover and grow. Melbourne Airport is confident that the project's justifications remain valid. This is discussed further in **Chapter A2: Need for the Project**.

The earliest possible opening year for M3R is 2026 (taking into account the timeframes associated with approvals, design and construction). The project is therefore unlikely to be affected by the intervening impacts of COVID-19 which are accordingly not modelled directly.

A1.5.3 Forecast opening year: 2026

M3R is projected to take between four and five years to construct and commission (including implementing the necessary changes to airspace and flight procedures). Logistically, the earliest potential opening year is 2026.

This MDP assumes M3R will be operational no earlier than 2026, and therefore that year is assumed representative for the purpose of impact assessments in this MDP. This reflects an early, and worst case, scenario for the impact assessments.

A1.5.4 MDP approval period

The nomination of 2026 as M3R opening year will be reviewed as the aviation industry recovers from COVID-19 – both in terms of actual traffic recovery, and the feasibility of the commercial agreements needed to fund the project.

APAM requests consideration of an extended validity period (to 2035) for the Ministerial approval of this MDP. The flexibility of a 10-year approval period allows APAM to execute the project when commercial considerations are optimised, and to introduce associated impacts only when necessary.

A1.5.5 Operational assumptions

Key assumptions underpinning the operational impact assessments include:

- For flight schedules: busy and average-day flight schedules based on forecast aircraft types, sizes, departure/arrival times and origins/destinations
- For meteorological conditions: that weather conditions change both in and with the seasons, affecting aircraft operations and runway usage.

The potential variability in these assumptions is addressed through the use of the average day and typical busy day (90th percentile) schedules as well as a 'composite case' scenario to demonstrate the potential range of runway usage. These tools, when used together with historic meteorological data, provide illustrative ranges of the potential variability.

A1.6 MDP STRUCTURE

This MDP is structured to address the requirements of the Airports Act and comprises:

- Part A: The Project establishes the context of Melbourne Airport and M3R
- Part B: Airport describes the land-based assessments and outcomes caused and influenced by the project (including detailed environmental impact evaluations)
- Part C: Airspace presents the technical assessments undertaken to evaluate the flight impacts of the project
- Part D: Community details the processes and outcomes of technical assessments focusing on expected impacts to the communities affected by the project (economic, health and social)
- Part E: Management Framework details the management structures and processes to be implemented in governance of M3R. Full-project impacts, mitigations and commitments are summarised.

This is illustrated in **Figure A1.6**.

Specialist consultants were engaged by APAM to undertake assessments and assist in preparing many of the chapters. **Table A1.1** specifies the structure of the document along with the contents, primary author including specialist consultants, and the scope of each chapter within the MDP.

Figure A1.6
MDP structure

A The Project	• A1 Introduction • A2 Need for the project • A3 Options and alternatives • A4 Project description	• A5 Project construction • A6 Stakeholder engagement • A7 Sustainability framework • A8 Assessment and approvals process
B Airport	• B1 Introduction • B2 Land use and planning • B3 Soils, groundwater and waste • B4 Surface water and erosion • B5 Ecology • B6 Indigenous cultural heritage • B7 European heritage	• B8 Surface transport • B9 Ground based noise and vibration • B10 Air quality • B11 Greenhouse gas emissions • B12 Landscape and visual • B13 Climate change and natural hazard risk
C Airspace	• C1 Introduction • C2 Airspace architecture and capacity • C3 Aircraft noise modelling methodology	• C4 Aircraft noise and vibration assessment • C5 Airspace hazards and risk assessment
D Community	• D1 Introduction • D2 Economic impact assessment	• D3 Health impact • D4 Social impact
E Management Framework	• E1 Introduction • E2 Environmental management framework • E3 Offset management strategy	• E4 Draft runway operating plan • E5 Risk management • E6 Summary commitments and conclusion

Table A1.1
Structure, content and scope of this MDP

Chapter	Title	Primary author/consultant	Scope
Part A The Project			
A1	Introduction	APAM	Brief overview introducing the document, the airport, M3R and Part A
A2	Need for the project	APAM	Outline of the reasons why Melbourne Airport is proposing M3R
A3	Options and alternatives	APAM	Outline of the feasible alternatives to M3R and indication of the reasons for choosing the preferred option
A4	Project description	APAM	Comprehensive description of M3R covering all aspects of the development (excluding construction)
A5	Project construction	APAM	Comprehensive description of the methodology for constructing M3R
A6	Stakeholder engagement	APAM	Outline of the consultation activities undertaken during the design and approval process for M3R
A7	Sustainability	APAM	Overview of building and infrastructure sustainability incorporated in M3R
A8	Assessment and approvals process	APAM	Overview of how the assessment has been undertaken in line with statutory requirements, and to give context as to how the individual topic assessments have been carried out
Part B Airport			
B1	Introduction	APAM	Brief overview introducing Part B
B2	Land use and planning	APAM	Comprehensive description of the project context, methodology, statutory and policy requirements, existing conditions and assessment of impacts and proposed mitigation for ground-based impacts associated with M3R
B3	Soils, groundwater and waste	Senversa	
B4	Surface water and erosion	APAM Beca Golders	
B5	Ecology	Biosis	
B6	Indigenous cultural heritage	Biosis	
B7	European heritage	Biosis	
B8	Surface transport	Jacobs	
B9	Ground-based noise and vibration	SoundIn	
B10	Air quality	Point Advisory	
B11	Greenhouse gas emissions	Point Advisory	
B12	Landscape and visual	Iris Visual Planning & Design	
B13	Climate change and natural hazard risk	Point Advisory	

Chapter (cont.)	Title (cont.)	Primary author/consultant (cont.)	Scope (cont.)
Part C Airspace			
C1	Introduction	APAM	Brief overview introducing Part C
C2	Airspace architecture and capacity	APAM Rehbein To70 SoundIn	Comprehensive description of the project context, methodology, statutory and policy requirements, existing conditions and assessment of impacts and proposed mitigation for airspace-based impacts associated with M3R
C3	Aircraft noise modelling and methodology	APAM SoundIn	
C4	Aircraft noise and vibration assessment	APAM Rehbein To70 SoundIn	
C5	Airspace hazards and risk assessment	APAM Rehbein	
Part D Community			
D1	Introduction	APAM	Brief overview introducing Part D
D2	Economic impact assessment	SGS Economics	Description of the project context, methodology, statutory and policy requirements, existing conditions and assessment of impacts and proposed mitigation for the benefits on the local, state and national economies including jobs and contribution to Gross State Product. Also explains that living under a flight path does not adversely affect property prices, identified through a report from RMIT
D3	Health impact	Quigley and Watts	Comprehensive description of the project context, methodology, statutory and policy requirements, existing conditions and assessment of impacts and proposed mitigation for airport and airspace-based impacts associated with M3R
D4	Social impact	Duneera Consulting	
Part E Management Framework and Summary			
E1	Introduction	APAM	Brief overview introducing Part E
E2	Environmental management framework	Point Advisory	Overview of the proposed procedures to manage the environment during the construction and operation of M3R
E3	Offset management strategy	Biosis	Overview of the proposed offsets required to meet obligations outlined in the EPBC Act and the strategy for achieving and delivering offsets
E4	Draft runway operating plan	APAM Rehbein To70 SoundIn	Draft Runway Operating Plan for M3R that APAM and Airservices currently envisage will be adopted once M3R becomes operational
E5	Risk management plan	APAM	Summary of the proposed procedures to manage probable risks anticipated during the construction and operation of M3R
E6	Summary commitments and conclusion	APAM	Summary of the impacts and proposed mitigation measures for M3R, and APAM commitments to project governance

A1.7 MDP REQUIREMENTS

The matters that must be addressed by this MDP are set out in section 91 of the Airports Act and section 5.04 of the *Airports Regulations 1997* (Cth) (Airports Regulations). **Table A1.2** shows where each requirement has been addressed in the MDP.

Table A1.2
Airports Act requirements checklist

Requirement	Where addressed in the MDP
Airports Act	
Section 91: Contents of major development plan (1) A major development plan, or a draft of such a plan, must set out: (a) the airport-lessee company's objectives for the development; and	**Part A – The Project:** • Chapter A1: Introduction • Chapter A4: Project description
(b) the airport-lessee company's assessment of the extent to which the future needs of civil aviation users of the airport, and other users of the airport, will be met by the development; and	**Part A – The Project:** • Chapter A2: Need for the project • Chapter A3: Options and alternatives **Part D – Community:** • Chapter D2: Economic impact assessment
(c) a detailed outline of the development; and	**Part A – The Project:** • Chapter A4: Project description • Chapter A5: Project construction
(ca) whether or not the development is consistent with the airport lease for the airport; and	**Part B – Airport:** • Chapter B2: Land use and planning
(d) if a final master plan for the airport is in force, whether or not the development is consistent with the final master plan; and	**Part B – Airport:** • Chapter B2: Land use and planning
(e) if the development could affect noise exposure levels at the airport – the effect that the development would be likely to have on those levels; and	**Part B – Airport:** • Chapter B9: Ground-based noise and vibration **Part C – Airspace:** • Chapter C3: Aircraft noise modelling Methodology • Chapter C4: Aircraft noise and vibration
(ea) if the development could affect flight paths at the airport – the effect that the development would be likely to have on those flight paths; and	**Part C – Airspace:** • Chapter C2: Airspace architecture and capacity
(f) the airport-lessee company's plans, developed following consultations with the airlines that use the airport, local government bodies in the vicinity of the airport and – if the airport is a joint user airport – the Department of Defence, for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels; and	**Part A – The Project:** • Chapter A6: Stakeholder engagement **Part C – Airspace:** • Chapter C3: Aircraft noise modelling methodology • Chapter C4: Aircraft noise and vibration **Part D – Community:** • Chapter D4: Social impact
(g) an outline of the approvals that the airport-lessee company, or any other person, has sought, is seeking or proposes to seek under Division 5 or Part 12 in respect of elements of the development; and	**Part B – Airport:** • Chapter B2: Land use and planning
(ga) the likely effect of the proposed developments that are set out in the major development plan, or the draft of the major development plan, on: traffic flows at the airport and surrounding the airport; and employment levels at the airport; and the local and regional economy and community, including an analysis of how the proposed developments fit within the local planning schemes for commercial and retail development in the adjacent area; and	**Part A – The Project:** • Chapter A2: Need for the project **Part B – Airport:** • Chapter B2: Land use and planning • Chapter B8: Surface transport **Part D – Community:** • Chapter D2: Economic impact assessment

Requirement (cont.)	Where addressed in the MDP (cont.)
Airports Act (cont.)	
(h) the airport-lessee company's assessment of the environmental impacts that might reasonably be expected to be associated with the development; and	**Part B – Airport:** • Chapter B3: Soils, groundwater and waste • Chapter B4: Surface water and erosion • Chapter B5: Ecology • Chapter B6: Indigenous cultural heritage • Chapter B7: European heritage • Chapter B8: Surface transport • Chapter B9: Ground-based noise and vibration • Chapter B10: Air quality • Chapter B11: Greenhouse gas emissions • Chapter B12: Landscape and visual • Chapter B13: Climate change and natural hazard risk **Part C – Airspace:** • Chapter C3: Aircraft noise modelling methodology • Chapter C4: Aircraft noise and vibration assessment • Chapter C5: Airspace hazards and risks **Part D – Community:** • Chapter D3: Health impact • Chapter D4: Social impact
(j) the airport-lessee company's plans for dealing with the environmental impacts mentioned in paragraph (h) (including plans for ameliorating or preventing environmental impacts); and	**Part B – Airport:** • Chapter B3: Soils, groundwater and waste • Chapter B4: Surface water and erosion • Chapter B5: Ecology • Chapter B6: Indigenous cultural heritage • Chapter B7: European heritage • Chapter B8: Surface transport • Chapter B9: Ground-based noise and vibration • Chapter B10: Air quality • Chapter B11: Greenhouse gas emissions • Chapter B12: Landscape and visual • Chapter B13: Climate change and natural hazard risks **Part C – Airspace:** • Chapter C3: Aircraft noise modelling methodology • Chapter C4: Aircraft noise and vibration • Chapter C5: Airspace hazards and risks **Part D – Community:** • Chapter D3: Health impact • Chapter D4: Social impact **Part E – Management Framework and Summary:** • Chapter E2: Environmental management framework • Chapter E3: Offset management strategy • Chapter E4: Draft runway operating plan • Chapter E5: Risk management
(k) if the plan relates to a sensitive development – the exceptional circumstances that the airport-lessee company claims will justify the development of the sensitive development at the airport; and	A sensitive development is the development of, or a redevelopment that increases the capacity of, any of the following: (a) a residential dwelling (b) a community care facility (c) a pre-school (d) a primary, secondary, tertiary or other educational institution (e) a hospital. Not applicable. The proposal is not a sensitive development.
(l) such other matters (if any) as are specified in the regulations	See Regulation 5.04 below
(3) The regulations may provide that, in specifying a particular objective, assessment, outline or other matter covered by subsection (1), a major development plan, or a draft of such a plan, must address such things as are specified in the regulations.	See Regulation 5.04 below

Requirement (cont.)	Where addressed in the MDP (cont.)
Airports Act (cont.)	
(4) In specifying a particular objective or proposal covered by paragraph (1)(a), (c) or (ga), a major development plan, or a draft of a major development plan, must address: (a) the extent (if any) of consistency with planning schemes in force under a law of the state in which the airport is located; and (b) if the major development plan is not consistent with those planning schemes – the justification for the inconsistencies.	**Part B – Airport:** • Chapter B2: Land use and planning
(6) In developing plans referred to in paragraph (l)(f), an airport-lessee company must have regard to Australian Standard AS2021 – 2000 ("Acoustics – Aircraft noise intrusion – Building siting and construction") as in force or existing at that time.	**Part C – Airspace:** • Chapter C3: Aircraft noise modelling methodology • Chapter C4: Aircraft noise and vibration
Airports Regulations	
Reg 5.04 Contents of major development plan For subsection 91(3) of the Act, a major development plan must address the obligations of the airport-lessee company as sub-lessor under any sub-lease of the airport site concerned, and the rights of the sub-lessee under any such sub-lease, including: (a) any obligation that has passed to the relevant airport-lessee company under subsection 22(2) of the Act or subsection 26(2) of the Transitional Act; or (b) any interest to which the relevant airport lease is subject under subsection 22(3) of the Act, or subsection 26(3) of the Transitional Act.	**Part B – Airport:** • Chapter B2: Land use and planning

Chapter A2
Need for the Project

Summary of key findings:

Melbourne Airport needs a parallel runway system by 2026 to meet aviation growth demands, support passenger choices, promote competition, improve reliability, reduce delays and airline costs, and boost economic growth for Victoria and Australia.

As detailed in Chapter A1: Introduction, although COVID-19 has enormously impacted the aviation industry, Melbourne Airport is confident demand will recover and grow, and that the additional capacity afforded by Melbourne Airport's Third Runway (M3R) therefore remains essential.

The lengthy timeframes associated with securing approvals and the detailed design and construction for this important infrastructure project are likely to last longer than the temporary impacts of COVID-19. Melbourne Airport is therefore progressing approval of the project to secure the airport's future as a key asset for Melbourne, Victoria and Australia.

The importance of Melbourne Airport

- Melbourne Airport is both a major international gateway to Australia and Victoria's primary domestic airport
- Between 2000 and 2019, the number of passengers passing through Melbourne Airport more than doubled, from 16 million to over 37 million
- Melbourne Airport plays an important role in the Australian aviation network by being part of six of the 10 busiest flight routes
- The routes of approximately 60 per cent of all aircraft operating domestic and narrow-body short-haul international flights typically cycle through Melbourne Airport each and every weekday
- Demand for domestic travel – particularly in busy periods – is forecast to return to pre-COVID 19 levels and then grow further.

Current capacity, reliability and resilience: impacts on passengers and airlines

- Melbourne Airport was already reaching capacity in 2019 and will have exceeded it by 2026. Flight cancellations, delays and schedule restrictions will become increasingly frequent, and recovery from delays will be problematic
- The existing two-runway system is not resilient in coping with Melbourne's wind patterns. This results in severe crosswind induced capacity constraints for an average 30 per cent of the time, and in some months for up to 50 per cent of the time.
- Melbourne Airport's on-time performance deteriorated to 74.9 per cent in 2019, the second-worst of Australia's five major airports.
- On busy days before COVID-19, morning delays did not recover until midday, and progressively impacted the performance of the Australian aviation network over the whole day. On busy days, average evening-service delays were longer than 15 minutes.
- Melbourne Airport is one of the busiest airports in the world without a parallel runway system – despite being forecast to handle 47 million passengers by 2026. Only three other airports in the world without a parallel runway system are able to process higher passenger numbers.

Impacts if M3R not built

- If M3R is not built – or even if it is delayed – growth would be inhibited, thereby reducing potential benefits to the Victorian economy while impacting national productivity. The impacts would include:
  - New jobs not being generated
  - The on-time performance of Melbourne Airport and the Australian aviation network deteriorating to the extent that airline services are constrained and demand cannot be effectively met
  - Competition being negatively impacted
  - Rising costs of air travel, restricting affordability and choice for passengers.
- With limited availability, new services will neither be attracted to, nor able to come to, Melbourne Airport.

Benefits of building M3R

- 37,000 additional jobs in Victoria, and an additional $4.6 billion a year to gross state product by 2046
- New runway capacity allowing an additional 23 million passengers a year by 2046 (20 years after opening) and an additional 136,500 aircraft movements a year. This represents 40 per cent more passengers and 43 per cent more aircraft movements
- Providing much-needed capacity and access at Melbourne Airport, and improving network reliability in all weather conditions.

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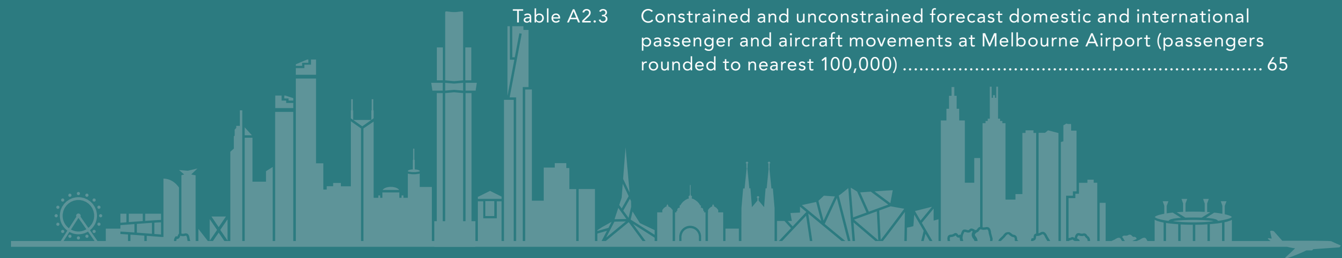


A2.1
THE IMPORTANCE OF MELBOURNE AIRPORT

As Victoria's primary international airport, and the state's leading domestic airport, Melbourne Airport plays a vital role in Victorian and Australian communities and economies.

In 2019, the airport facilitated the movement of 37.1 million domestic and international passengers; and in financial year 2018-19 handled 456,600 tonnes of air freight and mail. It is a leading Australian airport for freight exports, accounting for 28 per cent of the country's export air-freight market. Melbourne Airport is therefore Victoria's major gateway to the world for airline passengers and high-value air freight, having excellent transport links to regional areas and freeway connections to the ports of Melbourne and Geelong.

Melbourne is Australia's second-largest airport, the 26th -largest in the Asia-Pacific region, and the world's 58th-largest (based on 2019 passenger numbers sourced from SABRE).

As a major hub in the Australian network, Melbourne Airport is part of six of Australia's 10 busiest routes as shown in **Figure A2.1**.

These six routes grew by an average of six per cent in the five years to financial year 2019. This included a 10 per cent growth on the world's second-busiest route, Melbourne-Sydney.

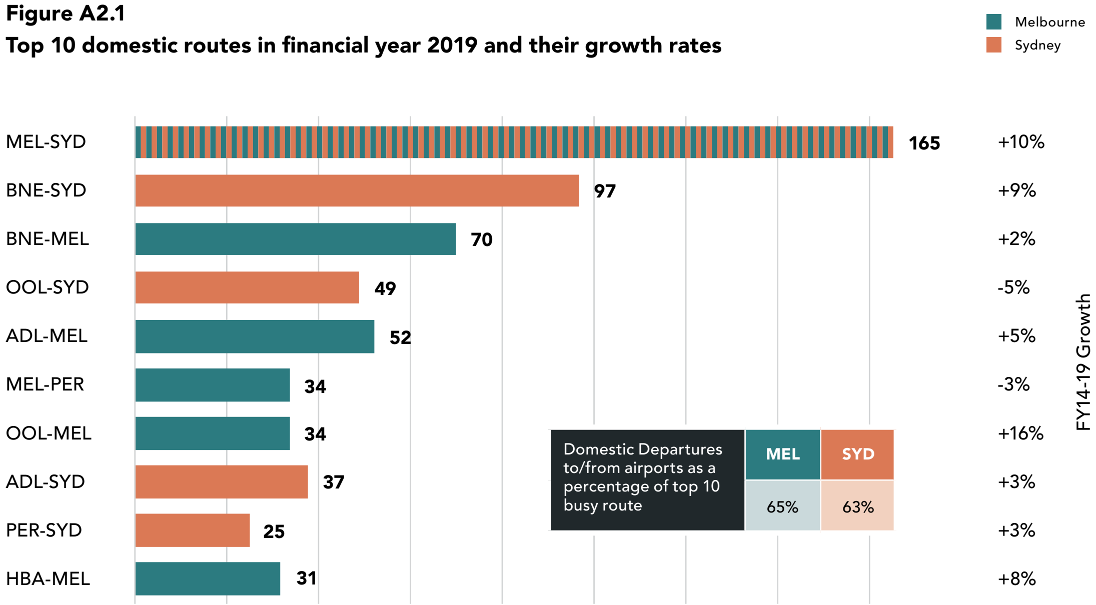
Approximately 60 per cent of all aircraft operating domestic routes and narrow-body short-haul international routes cycle through Melbourne Airport every day.

Over 50 per cent of these operate before 10am on weekdays. Between August and November 2017, there were approximately 250 active aircraft on the domestic and international short-haul networks and on average 150 of these cycled through Melbourne Airport each weekday (as shown in **Figure A2.2**).

Melbourne Airport is the principal gateway to Australia's second-largest city and its population of more than five million. Before COVID-19, it handled about 101,000 passengers a day. As Melbourne and Victoria grow, so does the need for Melbourne Airport to serve more passengers, facilitate the movement of more freight, and accommodate new aircraft and more flights – servicing a growing number of destinations.

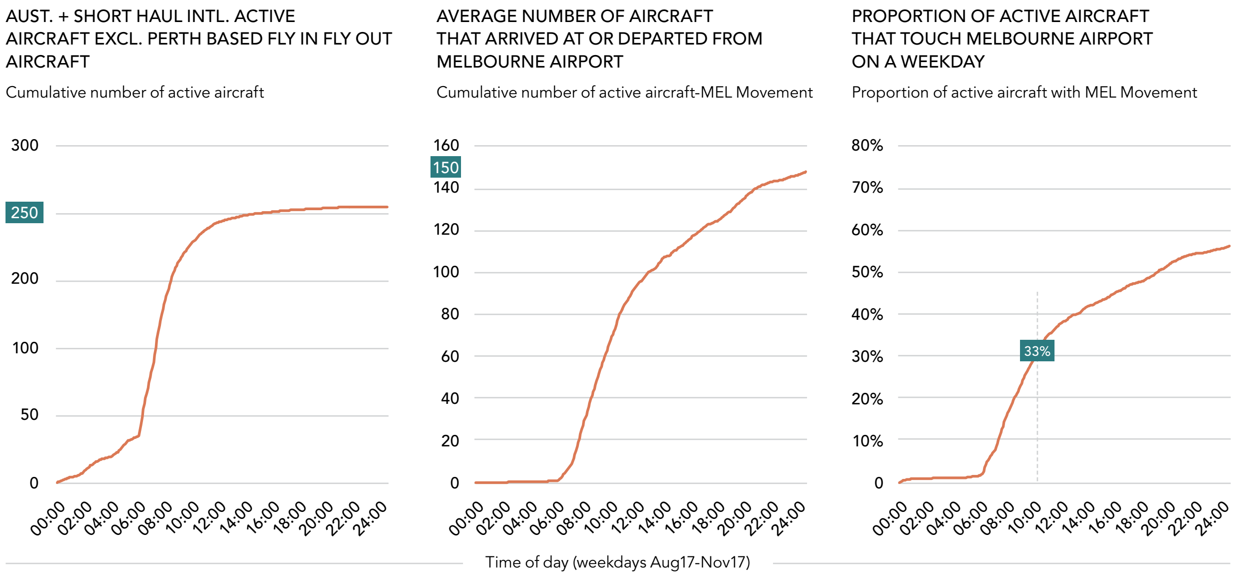
Melbourne has a large, diversified industry base and, with its surrounding areas, is a leading tourist destination. The National Visitor Survey found that 67 per cent of Victoria's interstate visits are by air, with an approximate value of $11.4 billion in 2019 (Tourism Research Australia, 2019).

Figure A2.1
Top 10 domestic routes in financial year 2019 and their growth rates



Source: BITRE

Figure A2.2
Melbourne Airport plays a significant role in domestic and narrow body short-haul international routes



Source: FKGaero

Located about 22 kilometres from Melbourne's Central Business District, the airport has direct access to Melbourne's primary road and freeway network which facilitates easy transportation to and from the airport.

In 2019, each week 43 airlines operated an average of 987 international and 3,563 domestic flights to over 74 destinations (31 domestic and 43 international) from Melbourne Airport. In the same year, it handled 37.1 million passengers. Domestic passengers accounted for about 70 per cent (25.8 million) of these and international passengers 30 per cent (11.3 million)

Since 2000 the number of passengers passing through Melbourne Airport has more than doubled, from 16 million to over 37 million: a compound average annual growth rate of 4.5 per cent. Continued growth will be supported by Melbourne's high population growth (see **Figure A2.3**) and strong demand for travel to and from Asia. Melbourne Airport is therefore expected to grow strongly, with passenger numbers more than doubling by 2046 to over 83 million. It will therefore continue to be the principal airport gateway to Melbourne and Victoria for domestic and international passengers.

A large proportion of passengers at Melbourne Airport travel domestically. The Melbourne-Sydney route is the second busiest in the world by aircraft movements with more than ten million passengers a year and growth of 19 per cent between financial years 2012 and 2019 (BITRE, 2019). Expansion of the Melbourne-Sydney route is forecast to continue as these two cities experience population growth and greater prominence, especially within the Asian market.

Sydney's Kingsford Smith Airport is projected to reach 65.6 million passenger movements by 2039, up from 43.3 million in 2017 (Sydney Airport, 2019). The importance of the Melbourne-Sydney route will therefore continue to grow and will be supported by the Western Sydney Airport planned to open in 2026.

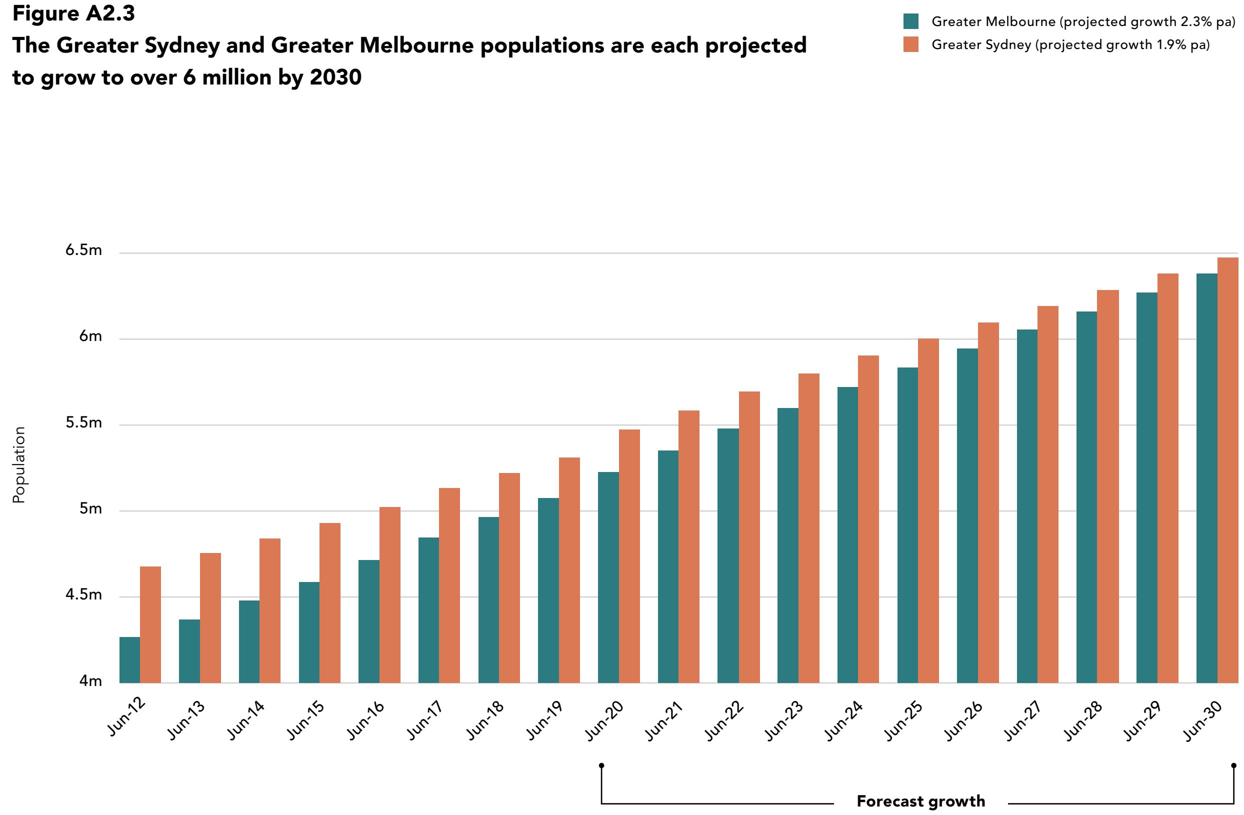
The international tourism market grew by seven per cent per year from 2010 to 2015, making it the fastest growing passenger segment at Melbourne Airport. International visitor expenditure in Victoria was more than $8.7 billion in 2019 (Tourism Research Australia, 2019). Domestic and international passengers to Melbourne Airport contributed a combined value of over $20 billion to the Victorian economy in 2019 according to Tourism Research Australia.

Melbourne is one of the busiest airports in the world without a parallel runway system. Of the top 60 busiest airports by passenger numbers, only Melbourne, Mumbai, Manilla and London Gatwick don't operate parallel runways, which limits their capacity for growth (Airports Council International, 2017). To meet growth demand, Manila Airport is planning a parallel runway system; Mumbai has no space for one and is instead developing a new airport at Navi Mumbai; London is served by four airports and, although Gatwick applied for a parallel runway, Heathrow Airport's third parallel runway was prioritised by the UK Government to best serve this international hub.

As Australia's second-busiest airport and a major domestic hub, the provision of sufficient capacity in Melbourne Airport's runways and airside infrastructure is fundamental in supporting demand, efficient operations and acceptable on-time performance. Ongoing growth across the Australian aviation network will be further supported by additional runway capacity at Brisbane, Western Sydney and Perth within the next 10 years. The Australian network's performance therefore relies on increased runway capacity at Melbourne Airport.

Because Melbourne Airport is a key domestic hub, it is essential that its runway capacity expands to support the increasing demand for air travel in Australia. Under its lease of the airport site from the Commonwealth Government, Australia Pacific Airports (Melbourne) Pty Ltd (APAM) is obliged to develop Melbourne Airport in a way consistent with a major international airport, having regard to actual and anticipated future growth in air traffic and demand. Under the lease it must – at all times – provide access to the airport for international, interstate and intrastate air transport.

Figure A2.3
The Greater Sydney and Greater Melbourne populations are each projected to grow to over 6 million by 2030



Source: ABS

A2.2 COVID-19 AND MELBOURNE AIRPORT

A2.2.1 Existing passenger movements

Between 1997 and 2019, Melbourne Airport's passenger numbers increased from 13.6 million to 37.1 million (BITRE, 2019). This represents overall growth of 173 per cent over the period and a 4.7 per cent Compound Annual Growth Rate (CAGR).

Domestic

During this time, significant events have impacted domestic and international activity at Melbourne Airport, ranging from airline collapses to the global financial crisis. As **Figure A2.4** demonstrates, Melbourne Airport's passenger numbers have generally remained resilient in the face of these big shocks to air travel demand and supply. The airport typically sees a recovery of passenger numbers and a return to growth within 12 months. The impacts of COVID-19 are discussed separately in **Section A2.3** and **Chapter A1: The Project - Introduction**.

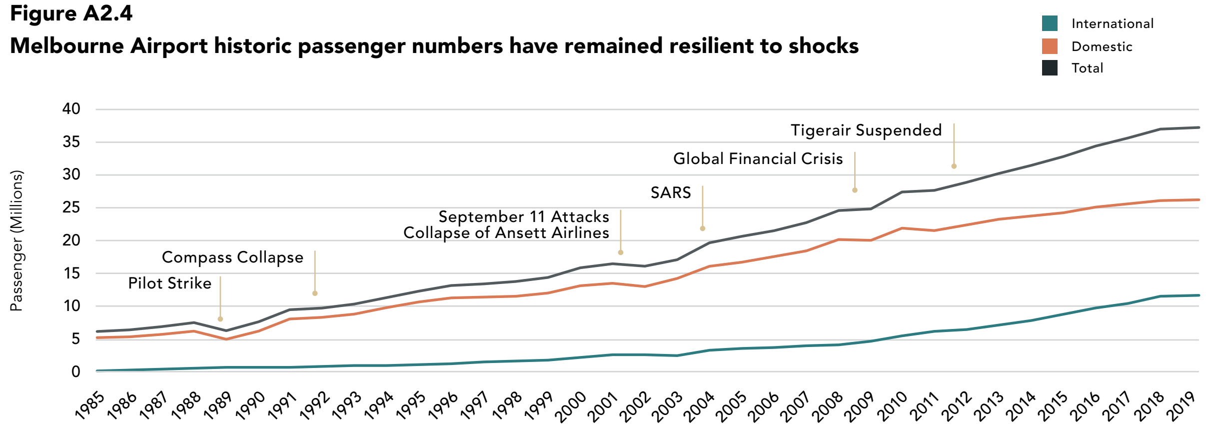
Summary of growth between 1997 and 2019:

- Increase in domestic passengers from 9.2 million to 25.8 million representing overall growth of 130 per cent and 3.9 per cent annually (CAGR)
- Increase in international passengers from 2.4 million to 11.3 million, representing overall growth of 377 per cent and 7.4 per cent annually (CAGR)
- Average of 2,930 additional passengers per day per year.

Over this 22-year period, domestic passenger growth has fluctuated in response to the Australian economy; and changes within the domestic aviation market such as the entry of low-cost carriers. Domestic growth has been more modest, at a rate of 2.5 per cent a year (CAGR) over the more recent 2011–19 period. This reflects the changing economy and factors such as reduced mining activity and the redirecting of routes and flights. This lower growth rate is expected to be more characteristic of the domestic market in the future.

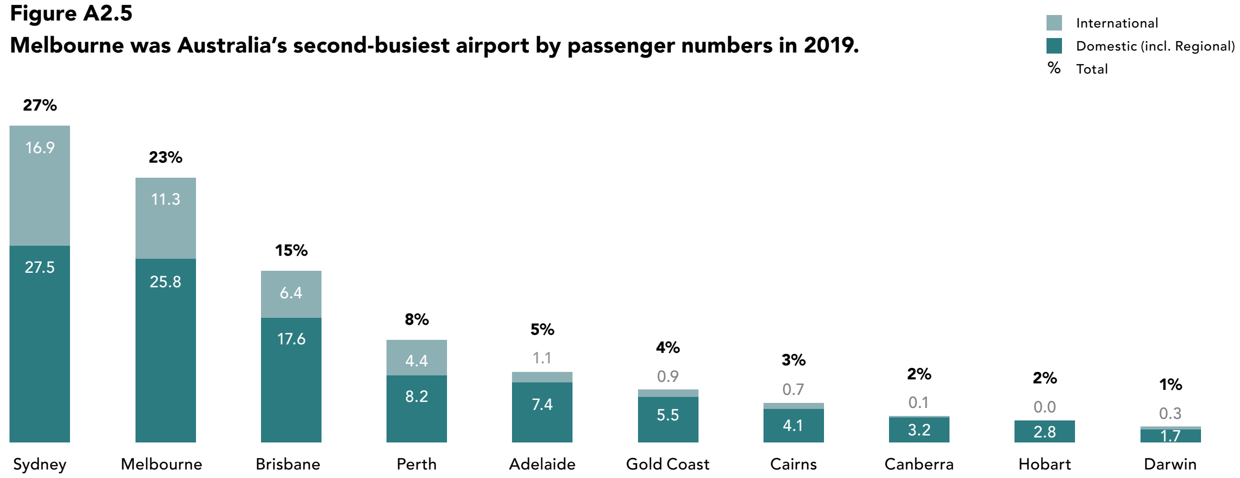
Melbourne Airport continues to grow its position in the overall domestic market, with domestic passenger demand currently just below Sydney (see **Figure A2.5**) but well above Brisbane and with a widening margin.

Figure A2.4
Melbourne Airport historic passenger numbers have remained resilient to shocks



Source: BITRE

Figure A2.5
Melbourne was Australia's second-busiest airport by passenger numbers in 2019.



Source: BITRE

International

International passenger growth continued to perform strongly over the same period, reflecting a significant increase in overseas holiday travel (both inbound and outbound) since 2011.

Technological advancements have driven greater fuel efficiency, and the increased range of aircraft has transformed the economics of air travel. This is enabling new direct services to Melbourne from airports across Asia, as well as opening up potential new routes across India and the Americas. And could be further enhanced with Qantas' Project Sunrise's potential non-stop flights between the east coast of Australia and London, Paris, Rio de Janeiro and New York.

In 2016, 55 per cent of Australian residents travelled internationally, illustrating the nation's desire to venture overseas. On average, Australians now make an average 0.8 international trips a year compared with less than 0.3 per cent in 1995 (ABS, 2017).

Australian residents are the largest share of international travellers (53 per cent). The next largest segment was from Asia (23 per cent), and visitors from Europe, Americas, Oceania and the rest of the world make up the remaining share with 22 per cent of the demand.

Melbourne Airport's share of Australia's international passenger movements increased from 17 per cent in 1995 to 27 per cent in 2019, significantly outstripping other Australian airports.

A2.2.2
Existing conditions

The design requirements of key airport features such as runways, taxiways, aprons, aircraft stands and terminal gates are determined by the volume of aircraft traffic and aircraft operating characteristics.

A2.2.2.1
Passengers

Most flights operating at major Australian airports are scheduled services facilitating passenger demand, which are referred to as Regular Public Transport (RPT) flights. Because aircraft seating capacity has increased over the years, the increase in passenger numbers has been greater than the growth in aircraft traffic.

Between 1997 and 2019, annual RPT aircraft movements at Melbourne Airport increased from 137,437 to 243,070 (BITRE, 2019). This was an annual growth rate of 2.6 per cent, notably lower than the 4.7 per cent annual passenger growth over the same period. The average number of passengers per aircraft rose from approximately 95 to 135 on domestic flights, and approximately 135 to 220 on international flights.

A2.2.2.2
Freight

Melbourne Airport is one of Australia's largest export hubs for air freight. In financial year 2018-19, 456,600 tonnes of freight and mail passed through Melbourne Airport. This included 183,100 tonnes of air-freight exports, which was 28 per cent of the Australian total.

There were 8,104 total freight-aircraft movements (international and domestic) in calendar year 2019, representing approximately three per cent of aircraft movements at Melbourne Airport. Dedicated freight carriers account for approximately 15 per cent of freight carried, the other 85 per cent is on passenger aircraft.

Air freight is generally high-value and time-sensitive commodities subject to spoilage. Unreliable aircraft operating conditions and delays can lead to spoilage of goods, and the double-handling of goods that require a return to cold storage.

A2.2.2.3
General Aviation

General Aviation traffic (e.g. helicopters, business jets, air ambulances) accounted for 1,478 aircraft movements at Melbourne Airport in 2019. This represents approximately 0.6 per cent of total aircraft movements. General aviation flights are unscheduled and use excess airport capacity as available.

A2.2.3
Existing runway system

Melbourne Airport currently has two intersecting runways: north-south runway (16/34) and east-west runway (09/27) and usually operates between these mode groups:

- Crossing modes (preferred): aircraft either land from the north on runway 16 and take-off to the west on runway 27 (when winds are south-westerly); or arrive from the east on runway 27 and take-off to the north on runway 34 and to the west on runway 27 (when winds are north-westerly)
- An additional daytime crossing mode: aircraft arrive on runway 09 and depart on runway 16. This provides additional capacity and resilience when the wind is easterly
- High-capacity arrival (Land And Hold Short Operations, LAHSO) crossing mode: aircraft arrive simultaneously from the east on runway 27 and the south on runway 34. When this mode is in operation, aircraft depart to the west on runway 27. This is the highest capacity mode available and used only when there is high arrival demand. Its effectiveness is dependent on the arrival/departure mix at any given time
- Single-runway modes: all aircraft arrive and depart on the same runway. These are used when winds are too strong to allow crossing runways to be used. Any of the four runway directions may be used, depending on the prevailing weather conditions.

The existing crossing runway system at Melbourne Airport has been effective since 1970 but will reach its maximum throughput rate before M3R opens, planned for 2026. In 2019, Melbourne Airport accommodated 242,899 RPT aircraft movements. 2026 movements are forecast to reach 276,800.

A2.2.4
Existing mode availability

The ability to use the modes described in **Section A2.2.3** is largely driven by weather conditions. Pilots typically operate towards the wind. However, aircraft can operate with some component of crosswind (i.e. wind blowing across the flight path) and, to a lesser extent, with a component of tailwind (i.e. wind blowing in the same direction as travel). In Australia, the nomination of a particular runway for use is set out in *Civil Aviation Safety Regulations 1998 Manual of Standards Part 172 - Air Traffic Services* (**Figure A2.6**).

The appropriate runway mode for use is nominated based on the weather conditions.

Wind patterns at Melbourne Airport are generally northerly for most of the year but during summer there is a more southerly component to prevailing winds. The predominant winds at Melbourne Airport result in the existing east-west runway (09/27) having a crosswind component for a large part of the year.

Based on Bureau of Meteorology weather data from 2003 to 2016, between the hours of 6am and 11pm a crossing-runway mode is available for 83 per cent of the year and a single-runway mode is required for the remainder.

Figure A2.6
Runway nomination criteria

10.3.1 Selection of Runway in Use

10.3.1.1 **Use of other than nominated runways.** Controllers must not nominate a particular runway for use if an alternative runway is available, when:

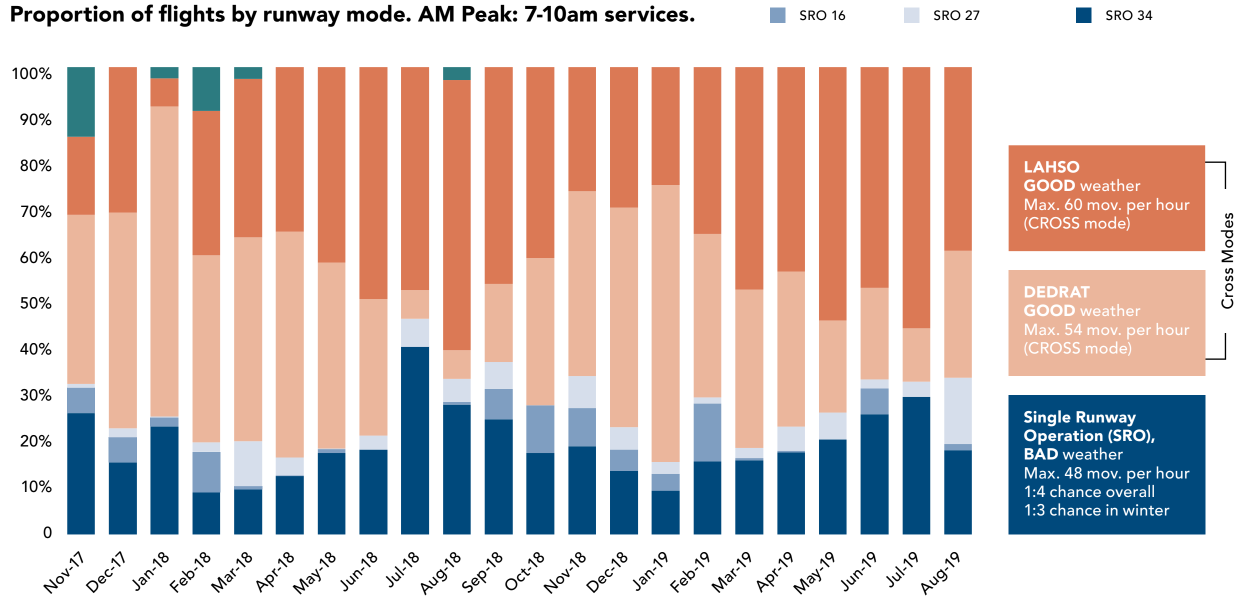
(a) For runway conditions that are completely dry, either:
   (i) the cross-wind component for the particular runway, including gusts, exceeds 20 knots; or
   (ii) the downwind component for the particular runway, including gusts, exceeds 5 knots;

(b) For runway conditions that are not completely dry, either:
   (i) the cross-wind component for the particular runway, including gusts, exceeds 20 knots; or
   (ii) there is a downwind component for the particular runway.

Source: Manual of Standards Part 172 - Air Traffic Services, Civil Aviation Safety Regulations 1998

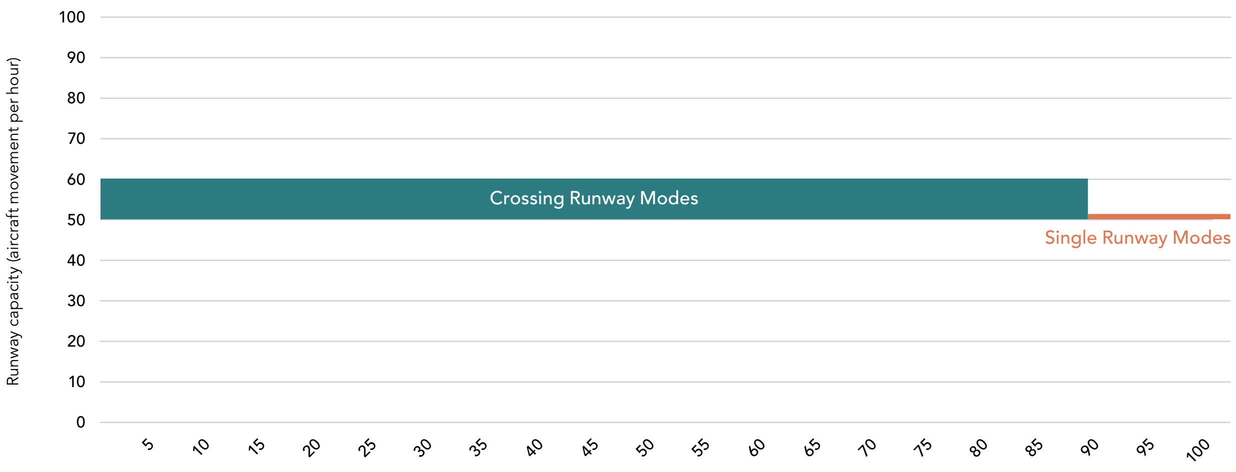
Runway availability is an annualised number and subject to seasonal and hourly variations. **Figure A2.7** shows the proportion of flights operating in each runway mode during the busy morning peak period (7am to 10am). There is a one-in-four chance of operations being in a single-runway mode across the year and a one-in-three chance during winter.

Figure A2.7
Proportion of flights by runway mode. AM Peak: 7-10am services.



Source: APAM (METAR)

Figure A2.8
Theoretical existing runway modes capacity and availability (visual meteorological conditions)



Source: APAM

A2.2.5
Existing capacity and demand

In good weather conditions, the existing runway operating modes have a theoretical capacity of between 48 and 60 total aircraft movement rates an hour. This is due to the intersection of the existing two runways, and the need for adequate separation between aircraft movements, as illustrated in **Figure A2.8**.

Runway capacity is significantly lower (between 18 and 40 movements an hour) in unfavourable weather conditions, due to the additional separation required between aircraft which typically occurs less than five per cent a year.

The runway system's actual maximum throughput is typically less than the theoretical capacities in **Figure A2.8**. Reasons include the proportions of arrival and departure aircraft, the mix of aircraft types, and adverse weather.

During the 2018-19 financial year, the 90th percentile day achieved a maximum hourly aircraft movement rate of 57. However, the average runway system throughput rate achieved across all working weekdays in the year was just above 50 movements during its busiest hour, as illustrated in **Figure A2.9**.

Scheduled demand currently exceeds average runway capacity during the busy weekday morning and afternoon peaks. During the morning peak, 10 flights an hour on average were overscheduled (compared to actual movements) in the 2018-19 financial year. The resulting delay is currently recovered by the runway system from mid-morning through to the middle of the day. This delay and recovery cycle occurs again in the afternoon and evening.

The majority of services at these busy times of day are domestic, reflecting the needs of domestic day-return passengers. However, Melbourne Airport's morning domestic peak period coincides with its international peak period, as shown in **Figure A2.10**. International passengers prefer to arrive at the start of the day, aligning with airline-driven connections activity at international hub airports.

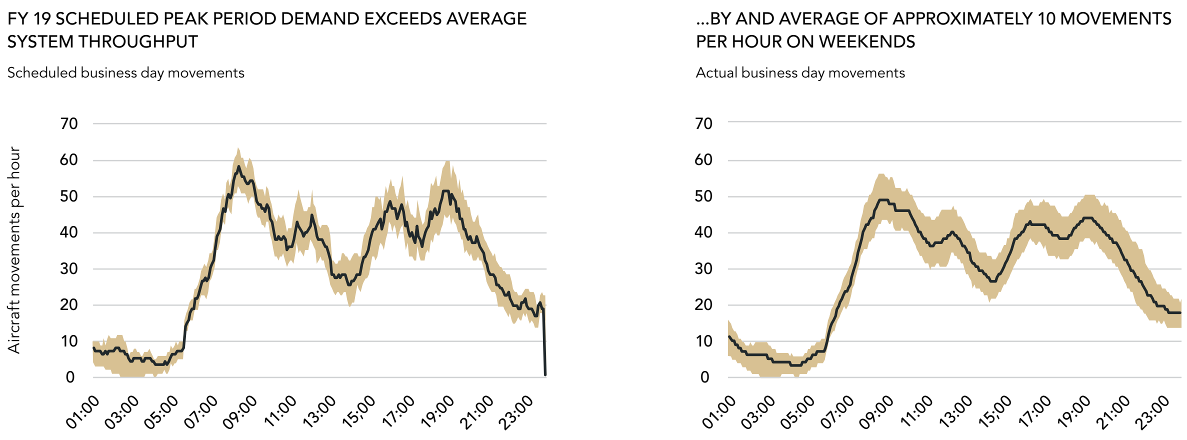
The imbalance between peak demand and achievable capacity leads to delays that are managed by airlines and Airservices Australia using a combination of delays on ground (at departure airports), airborne holding, and flight consolidation/cancellations. The action is tailored to scheduled movement demand, weather conditions and runway modes – at Melbourne Airport and at other Australian airports. Domestic flights bear the majority of delays.

Although the current runway system's constraints occur throughout the year, they deteriorate in winter when weather conditions require the use of a single runway mode more frequently.

A2.2.6
Delay and recovery

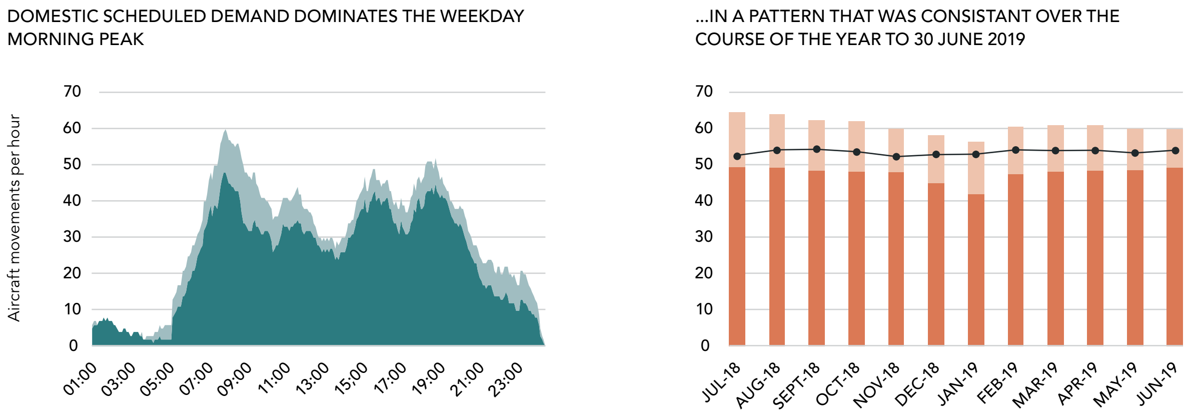
Morning delays at Melbourne Airport are greatest on days when demand is both high and sustained. In the aviation industry, On-Time Performance (OTP) is measured using the time of departure: a flight is deemed 'on time' if it departs within 15 minutes of the scheduled time and not cancelled. In these circumstances, delays are created early and continue until an opportunity to recover occurs later in the day (see **Figure A2.11**). Morning delays are currently not recovered until midday; and the evening delay recovery extends into night.

Figure A2.9
Peak hour scheduled movements consistently exceeded the average system throughput rate and actual aircraft movements in the 2019 financial year



Source: APAM

Figure A2.10
Domestic demand dominates the weekday peaks consistently throughout the year. International peak overlaps with the morning domestic peak



Source: APAM

Programmed recovery periods are known as 'firebreaks' because they prevent delays escalating throughout the day, allow schedules to recover, and restabilise Australia's aviation network before the afternoon and evening busy periods. However, the firebreak has become ineffective for the morning's second wave of scheduled domestic flights.

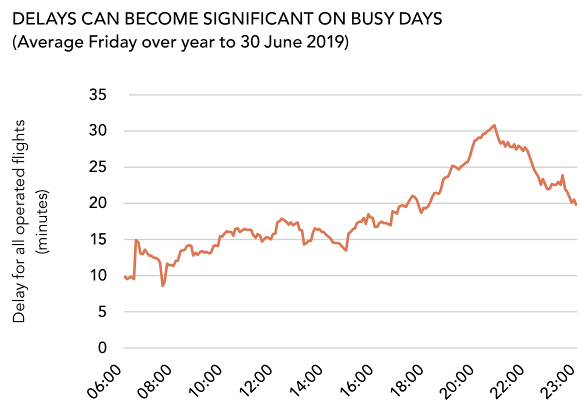
Actual delays (in minutes) continue to deteriorate until 11 am, introducing delays of more than 15 minutes into the network that can flow through the rest of the day. Furthermore, the firebreak between the afternoon and evening domestic waves is not completely effective on busy days.

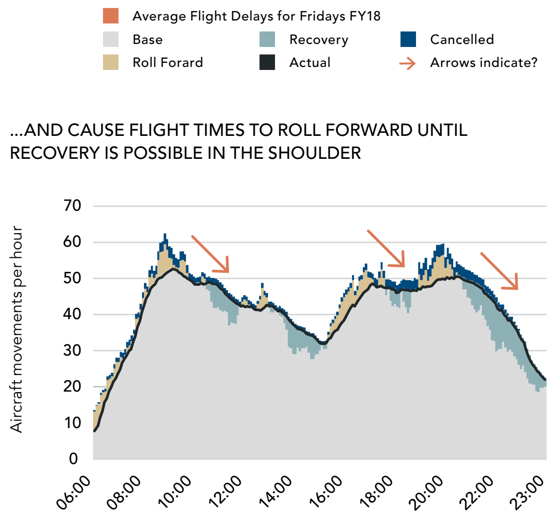
Morning peak OTP declines steadily with demand until the number of movements exceeds 150 over the busy morning three-hour period (averaging 50 per hour). After that point, OTP declines rapidly, as highlighted in **Figure A2.12**.

If movements over the day average 42 or more per hour, the firebreaks and off-peak periods are inadequate to recover the network schedule, and evening peak OTP declines rapidly, as highlighted in **Figure A2.12**.

The proportion of weekday mornings with an average of 50 or more scheduled movements per hour during the three-hour peak increased from 32 per cent in financial year 2015-16 to 80 per cent in 2018-19 (as shown in **Figure A2.13**). With this change, the proportion of flights that operated within 15 minutes of schedule (and were not cancelled) decreased from 82 per cent to 75 per cent. In the three hours to 8pm, on-time performance declined from 81 per cent to 70 per cent.

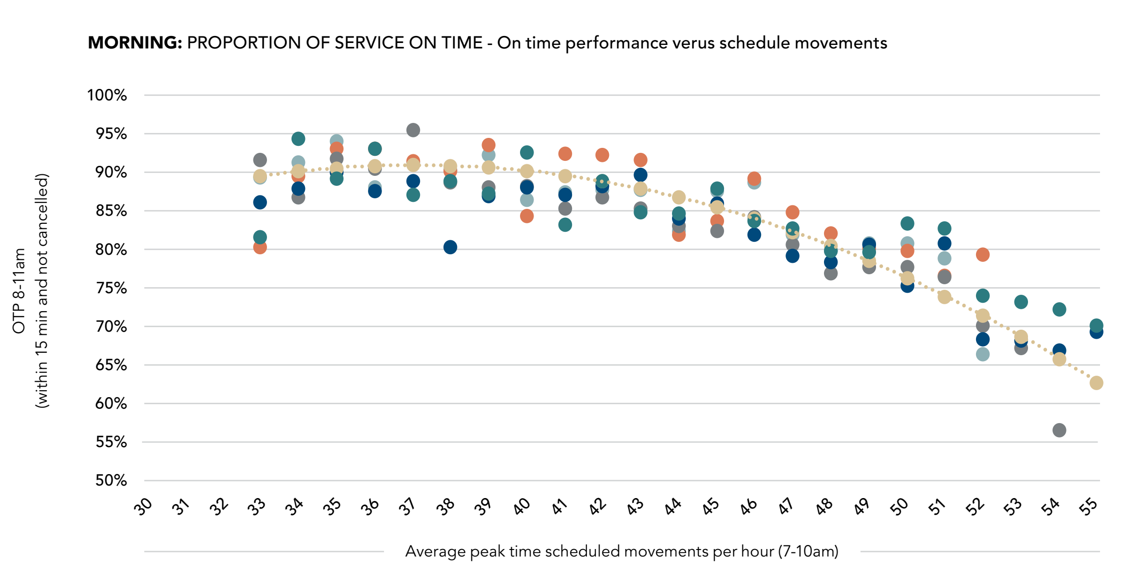
Figure A2.11
Scheduled flights result in delays that roll through the day until throughput exceeds demand and the schedule recovers

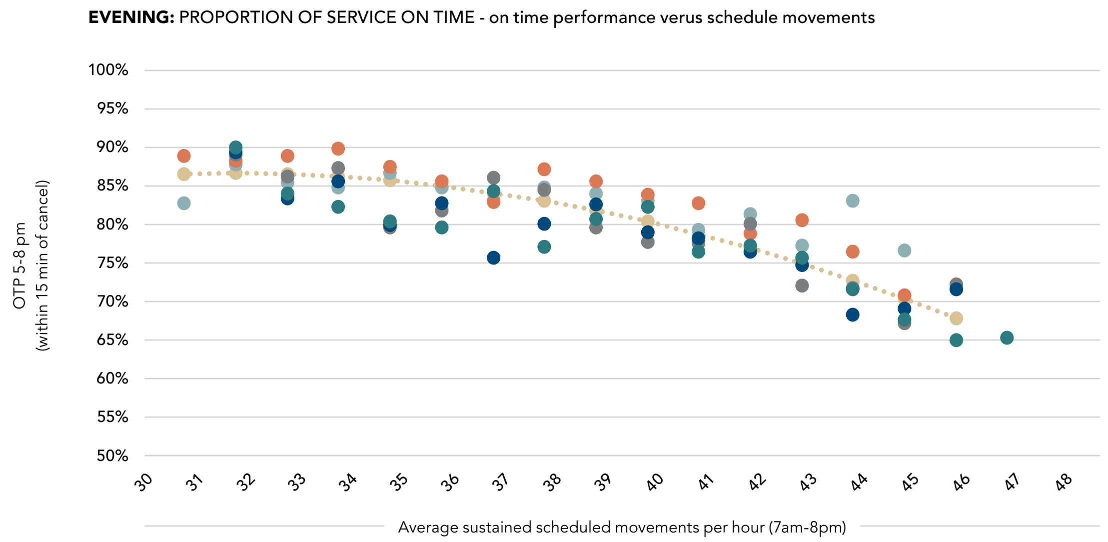




Source: APAM

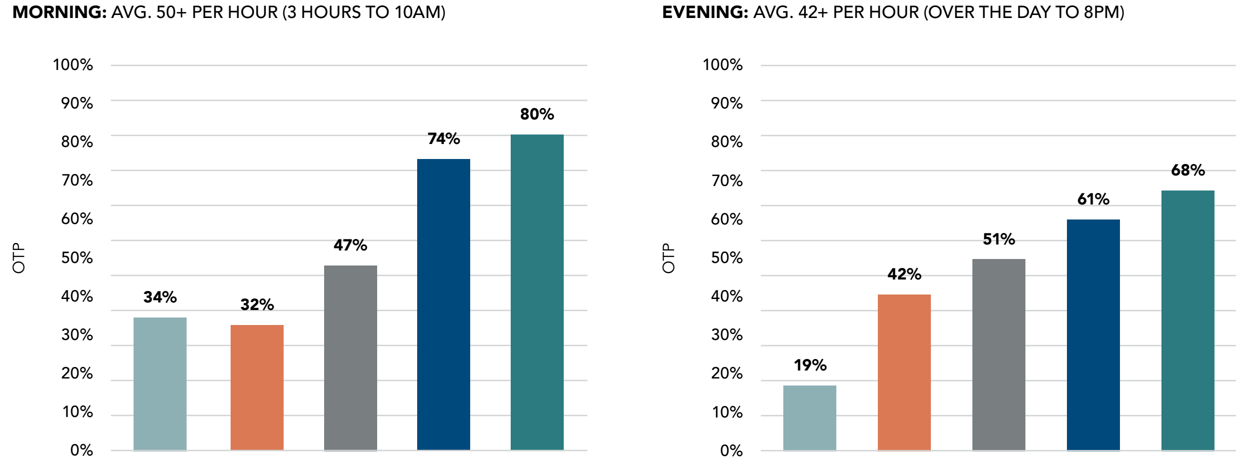
Figure A2.12
On-Time Performance (including cancellations) decreases as scheduled movements increase





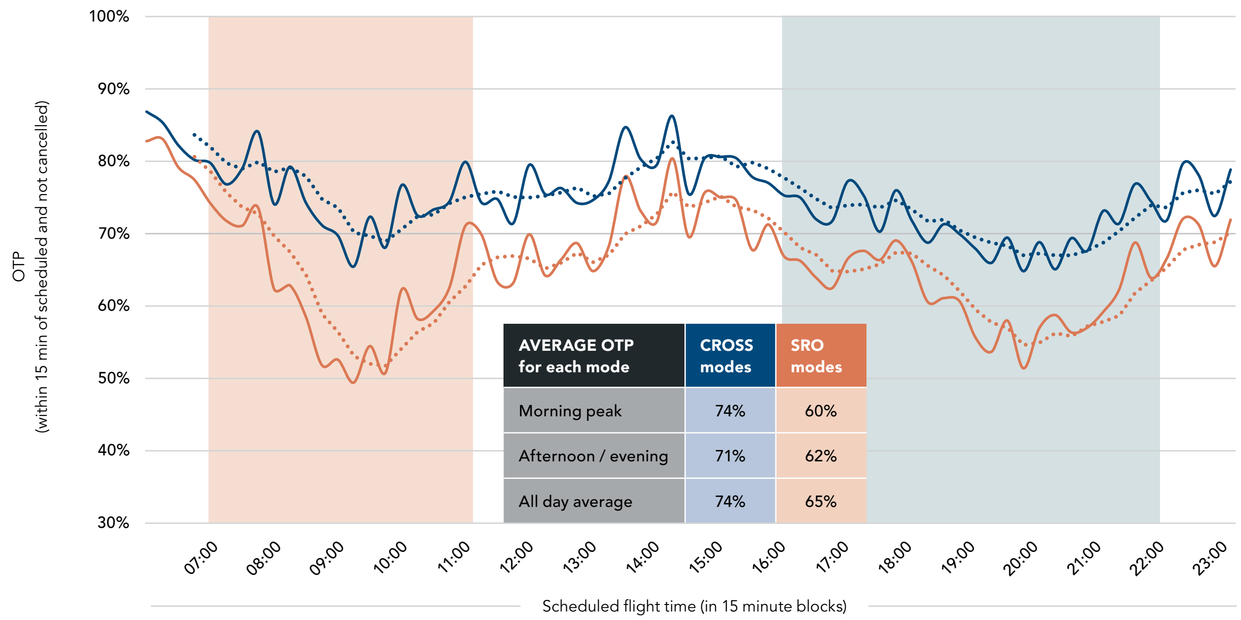
Source: APAM

Figure A2.13
Proportion of business days where movements exceed the threshold level is growing, and with it, OTP is declining



Source: APAM

Figure A2.14
Average OTP in crossing and SRO Modes: Business days over two years to September 2019



AVERAGE OTP for each mode	CROSS modes	SRO modes
Morning peak	74%	60%
Afternoon / evening	71%	62%
All day average	74%	65%

Source: APAM

A2.2.7
On-Time Performance

In 2019, the overall level of domestic flight OTP for Melbourne Airport was 74.9 per cent and 3.4 per cent of scheduled services were cancelled. This was a deterioration in performance compared to 2018 levels, when OTP was 76.4 per cent and cancellations were three per cent. Melbourne Airport's domestic flight OTP figure of 74.9 per cent for 2019 compares unfavourably to the national average of 78.6 per cent, 82.4 per cent for Brisbane Airport and 81.9 per cent for Perth Airport (BITRE, 2019).

OTP performance across business days is variable and depends on the mode of operation available. **Figure A2.15** shows that during peak periods OTP can drop to as low as ~70 per cent when a crossing-runway operating mode is available and as low as ~50 per cent when a single-runway operating mode is available.

The constrained runway system's failure to handle peak arrival demand is a key contributor to this OTP. An additional factor is late arrivals, which can then affect departure performance.

As illustrated in **Figure A2.15**, Melbourne Airport's OTP has generally deteriorated from 2012 to 2019 compared to the major Australian airports.

In 2019, Melbourne Airport ranked as the lowest OTP performer for five months, and second lowest for seven.

While OTP shows the percentage of aircraft that are delayed by 15 minutes or more, historic performance data shows that delayed flights are off-schedule by an average of over 40 minutes (refer to **Figure A2.16**).

Melbourne Airport is aware that a Runway Demand Management System (RDMS) could help improve OTP in the short-term by resetting the schedule to a managed profile. However, as discussed in **Chapter A3: Options and Alternatives**, it is incapable of adding much-needed additional capacity into an already-constrained runway system. At best, a RDMS would move some demand into off-peak periods but the more likely result is that demand and growth would be constricted.

A2.2.8
Runway simulation modelling

Runway simulation modelling has determined which delays are attributable to the existing runway system's constraints, while noting some delays are caused by other factors.

The runway-delay models are based on a good-weather day with optimum throughput rates and no network-induced delays. Modelling demonstrates that runway performance can account for up to half of the airport's total delay in busy periods on good weather days; on a poor-weather day, runway performance can contribute up to 100 per cent of total delay.

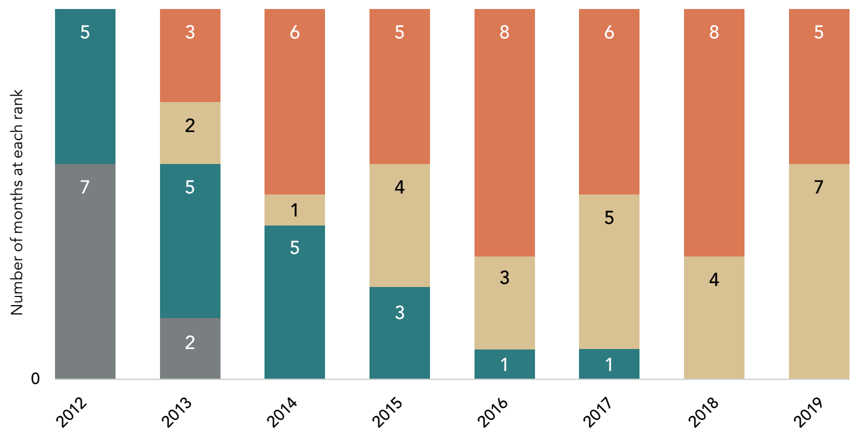
A2.2.9
Current delays and benchmarks

The average delay on a typical busy day is 18 minutes. In comparison, modelled runway-attributable delay averaged across the day for all runway modes is about four minutes, increasing to eight minutes in busy periods. The modelled runway-attributable delay averaged across a day in single-runway mode is more than 10 minutes.

The US Federal Aviation Administration (FAA) provides guidance indicating the level of airport congestion based on delay. It states that, when average delays reach four to six minutes, the airport is approaching practical capacity and generally considered congested. An average delay per operation of 10 minutes or more may therefore be considered severe congestion.

Based on the FAA guidelines, Melbourne Airport's runway system is approaching capacity, approaching severe congestion in the busy periods, and experiencing severe congestion whenever weather requires single-runway operations.

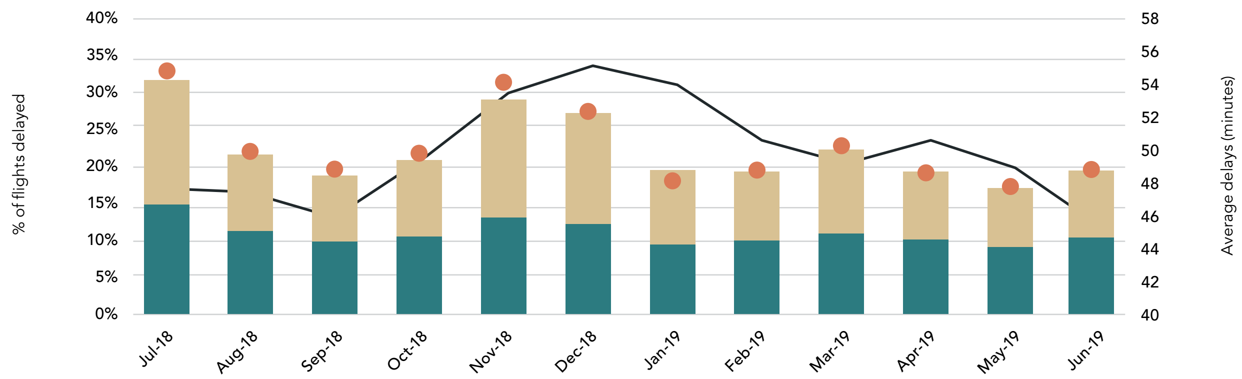
Figure A2.15
OTP results of the five major Australian airports



PORT	2018	2019
SYD	77.8%	74.6%
MEL	76.4%	74.9%
BNE	82.4%	81.9%
PER	81.9%	82.7%
ADL	82.5%	81.2%
MEL Rank	5th	4th
AUST.	78.8%	77.5%

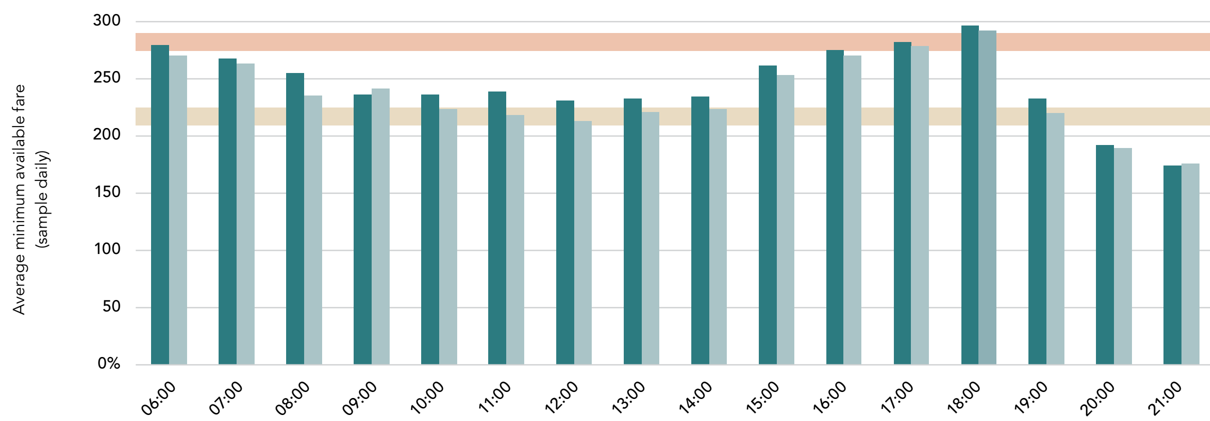
Source: BITRE

Figure A2.16
Delays are longer than the BITRE definition of '15min or more' suggests



Source: APAM

Figure A2.17
Business carrier weekday mel-syd average minimum available fare. Sampled daily for 4 weeks prior to the date of travel



Source: FKGaero

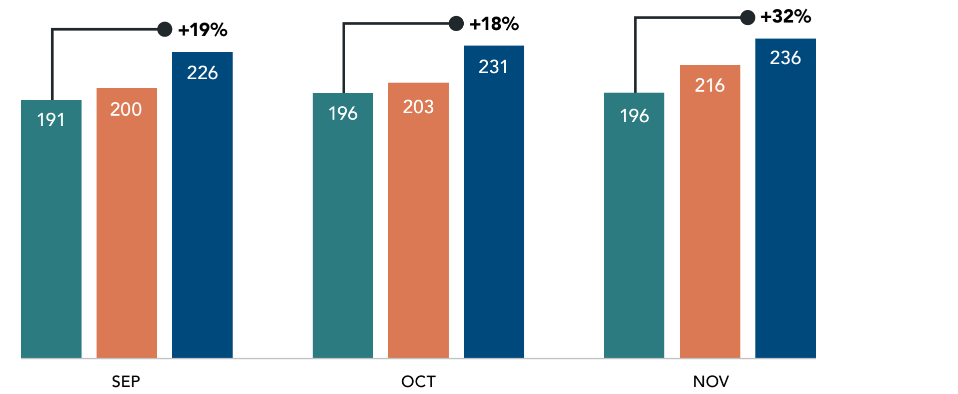
A2.2.10
Impact of the current situation on passengers

Progressive peak-period constraints at Melbourne Airport have the following impacts on the travelling public:

- Deteriorating OTP, resulting in more frequent delays. These are particularly problematic at the start of day-return interstate journeys
- Increasing ticket prices – particularly for weekday day-return journeys – when capacity is constrained and peak fares are already between 20 and 40 per cent higher than off-peak (for travel during the weeks ending 23 November and 30 November 2018).
- Impacts on productivity and efficiency for businesses around the country caused by delays to the network.

There is evidence to suggest price increases are already starting to happen. **Figure A2.18** illustrates the increasing cost of business-carrier fares on the Melbourne-Sydney route over the past few years. There was an average 20 per cent increase in fares (in nominal terms) between November 2016 and November 2018 (and a 1.4 per cent increase in the number of flights.

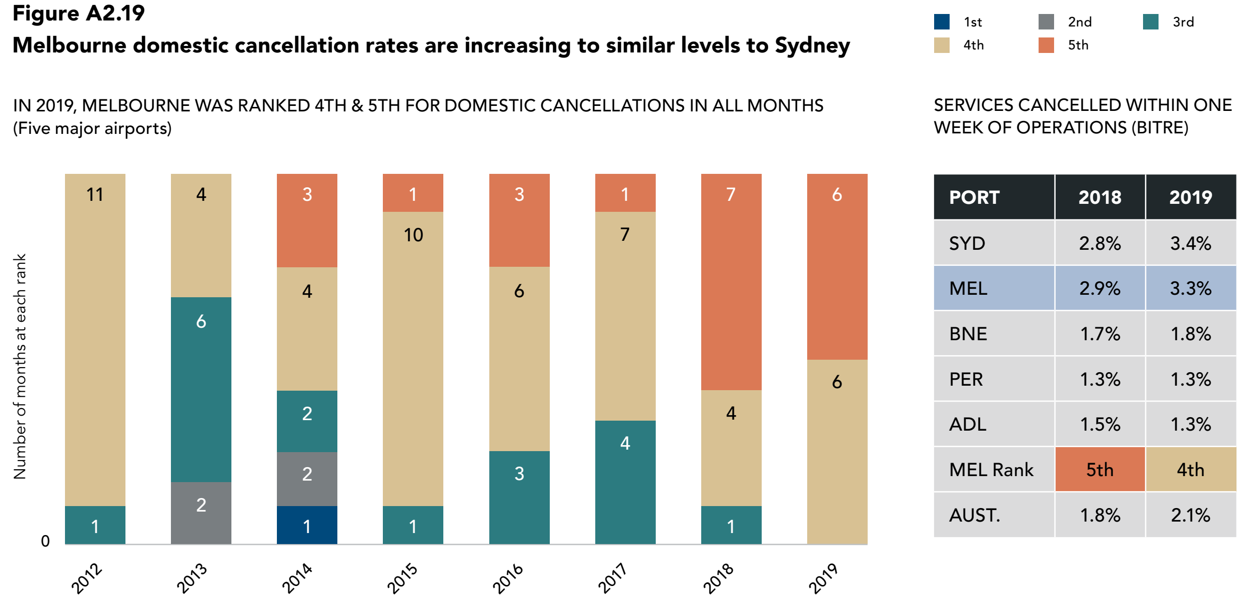
Figure A2.18
Fare increases on the Melbourne-Sydney route (2016 to 2018)



Source: FKGaero

Figure A2.19
Melbourne domestic cancellation rates are increasing to similar levels to Sydney

IN 2019, MELBOURNE WAS RANKED 4TH & 5TH FOR DOMESTIC CANCELLATIONS IN ALL MONTHS
(Five major airports)



SERVICES CANCELLED WITHIN ONE WEEK OF OPERATIONS (BITRE)

PORT	2018	2019
SYD	2.8%	3.4%
MEL	2.9%	3.3%
BNE	1.7%	1.8%
PER	1.3%	1.3%
ADL	1.5%	1.3%
MEL Rank	5th	4th
AUST.	1.8%	2.1%

Source: BITRE

A2.2.11
Impact of the current situation on airlines

Airline impacts due to the constrained peak periods at Melbourne Airport include:

- More flight cancellations (see **Figure A2.19**): Melbourne Airport's cancellation rate has been consistently above two per cent since 2015-16 and is similar to levels reported for Sydney Airport)
- Delays and deteriorating OTP at Melbourne Airport, with flow-on effects across the Australian domestic network
- Reputational damage due to these flight delays and cancellations
- Increased costs, including fuel and staff scheduling
- Scheduling uncertainty, due to Melbourne Airport's unpredictable runway system performance
- Network flow-on effects requiring the incorporation of inefficient redundancies into schedules (i.e. increased sector flying times, including recovery periods, and more aircraft needed to service the schedules)
- Overall impact on performance and productivity.

A2.2.12
Summary

Melbourne Airport has experienced strong long-term growth in both passenger numbers and aircraft movements. Over the past decade, its international traffic growth has outpaced that of other major Australian airports.

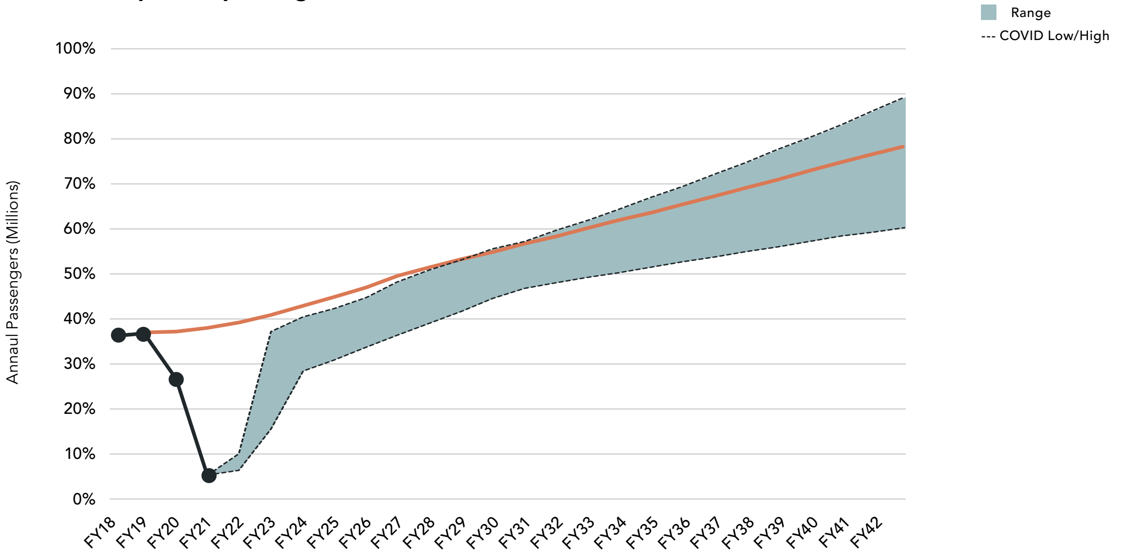
Before COVID-19, scheduled flight demand consistently exceeded operational capacity. This caused cancellations and delays that were increasingly frequent and severe. On a typical 'busy day', runway-system delays occurred in the morning peak and did not recover until midday – despite the implementation of increasingly ineffective firebreaks. Melbourne's delays impacted the entire Australian domestic network and continued through the rest of the day.

On most weekdays in financial year 2018-19, scheduled flights exceeded runway-system capacity and these busy days became more frequent. OTP at Melbourne Airport was falling and in 2019 was the second-worst of the five major Australian airports.

Although a RDMS could improve OTP in the short-term – by resetting the schedule and restricting growth to a manageable level – it would be incapable of injecting sufficient additional capacity into the constrained runway system.

Modelled delays across the day approaching an average of four minutes (excluding the undesirable network flow-on effects) confirm that runway-caused delay is a significant contributor to total day-long delays at Melbourne Airport. Based on FAA guidelines, Melbourne Airport's runway system is not only approaching its practical capacity but also experiencing severe congestion in busy periods and during single-runway operations.

Figure A2.20
COVID-19 impact on passenger numbers



Source: APAM

A2.3
MELBOURNE AIRPORT AFTER COVID-19

The scale and nature of COVID-19's disruption to the aviation industry is unprecedented. Although short-term recovery profiles can be unreliable (recovery will be driven by near and medium-term factors such as the reopening of borders and vaccination rates), Melbourne Airport is confident that demand will return and continue to grow, and likely within the timeframe required to develop M3R.

In July 2020, the International Air Transport Association (IATA) projected that the global aviation industry is expected to recover to 2019 activity levels in 2024 (IATA, 2020). Similar confidence is evident in Qantas' June 2020 announcement regarding a three-year plan to guide its recovery.

Various passenger and aircraft-movement recovery scenarios have been modelled for master planning purposes (source: the proposed Melbourne Airport Master Plan 2022) and are presented in **Figure A2.20** and **Figure A2.21**. The 'COVID low/high lines' represent a conservative range of potential recovery scenarios and are consistent with BITRE guidance.

A2.4
THE FUTURE AT MELBOURNE AIRPORT

A2.4.1
Forecasting demand

The growth forecasts adopted for this MDP are summarised in **Table A2.1**.

A2.4.1.1
Overview

Forecasts of passenger and aircraft movements provide the basis for evaluating future demand at Melbourne Airport.

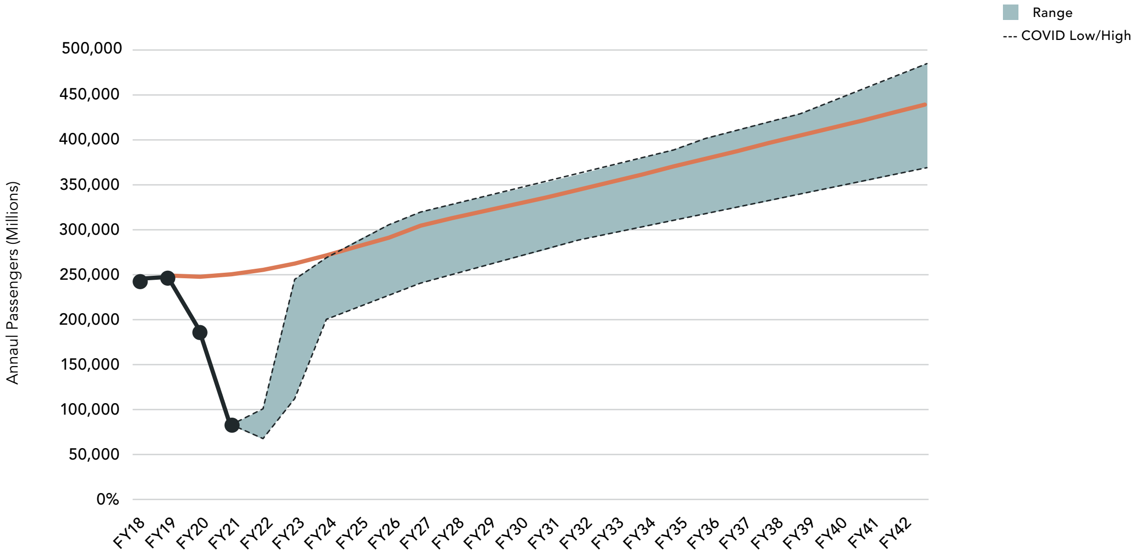
They are used to plan the facilities required to operate the airport efficiently in the years and decades ahead. Their annual and daily analyses give a detailed indication of the travel patterns that govern busy periods of passenger and aircraft movements. The forecasts also inform a range of MDP assessments, including surface transport, noise, air quality, economic and health impact studies.

The forecasts discussed in this chapter have been used to establish:

- The nominal opening year for M3R (2026 for the purposes of this MDP see **Chapter A1: The Project - Introduction**)
- The benefits and impacts of M3R in: opening year, opening year plus five years, and opening year plus 20 years (i.e. to 2046).

A project on the scale of M3R has a lengthy development lead time. Melbourne Airport has determined that 2026 is the earliest possible opening year for M3R. This is based upon the time needed to secure Ministerial approval of the MDP (and related statutory permissions); complete the detailed design; then construct and commission the project.

Figure A2.21
COVID-19 impact on aircraft movement numbers



Source: APAM

Table A2.1
Summary of forecast passenger and aircraft movements at Melbourne Airport

Year ended 30 June	Passenger Movements	Aircraft Movements (RPT*)
2019 (Base year)	37.4 million	236,766
2026	47.3 million	276,800
2031	56.9 million	320,700
2046	83.8 million	449,000

**Regular Public Transport Source: APAM*

The timeframes for M3R's development also rely significantly upon demand and commercial agreements with customer airlines. Because these will be greatly influenced by the aviation industry's recovery from COVID-19 they may not align with the nominated 2026 opening year. Melbourne Airport is therefore seeking an extended period of approval in the Minister's decision for this MDP – from the usual five years to 10 years – to account for this short-term uncertainty and allow for delayed recovery and development scenarios.

A2.4.1.2
Growth drivers

As the impact of COVID-19 recedes, passenger numbers are expected to rebound and then grow, driven by economic growth in international markets; increasing demand in Victoria (driven by government-forecast population growth and a pent-up desire to travel); demand for domestic business travel; advances in aviation technology; and Melbourne's attractiveness to international carriers as a destination.

International

Australian demand for air travel is expected to continue to grow faster than GDP, mostly due to rising incomes and propensity to travel. The national population is also expected to continue to grow, as is Melbourne Airport's passenger base.

Australia's historically strong relationships with countries such as New Zealand, the UK and the US have underpinned Melbourne Airport's international business and leisure passenger numbers.

More recently, Australia's close proximity, accessibility and growing ties to Asian countries – including China and India – has seen strong growth in inbound passengers from those countries. China is now the largest source of international passengers at Melbourne Airport. In addition, direct routes to many Indian and Chinese cities are increasingly feasible given the increasing range of long-haul commercial aircraft.

For the financial year ended 30 June 2019, the top five inbound countries for Melbourne Airport were China, New Zealand, Singapore, United Arab Emirates and Indonesia. Melbourne Airport has secured additional new weekly services and the up-gauging (i.e. increased aircraft sizes) of existing services into Asia over the past three years. They include 19 across Asia (e.g. Narita, Phuket and Taipei) and six from India.

Over the past two decades Asia has experienced significant economic growth, represented by its increasing share of global GDP as shown in Figure A2.22 (Australian Trade and Investment Commission, 2016). Its expanding economies will continue to support greater international tourism, and business travel between many countries in the region. Melbourne, with Australia's fastest growing urban population, is a major attraction for investment and tourism.

Australia's growth in inbound visitors, driven by Asian economic growth, is expected to be stronger than outbound traffic. By 2027, one year after M3R's nominated opening, there will be more inbound visitors than Australian residents travelling outbound.

Emerging aircraft technology enabling longer flights will support new routes not requiring traditional hub airports (such as Singapore and Los Angeles). These new routes will likely support the entry of new airlines to Australia, in turn providing additional stimulus and market growth in the new services' home markets. A new direct route can stimulate passenger growth by 20 to 30 per cent as journey time and complexity reduces.

Qantas and other airlines have announced their intention to pursue ultra-long-haul flights connecting Melbourne directly to Europe and the east coast of America.

Concerns driven by COVID-19 may see passengers opt for direct services rather than transiting, which would benefit Melbourne given its geographical disposition for these ultra-long-haul routes.

Melbourne is one of Australia's most multicultural cities, with residents from more than 140 countries who will continue to significantly contribute to travel via Melbourne Airport.

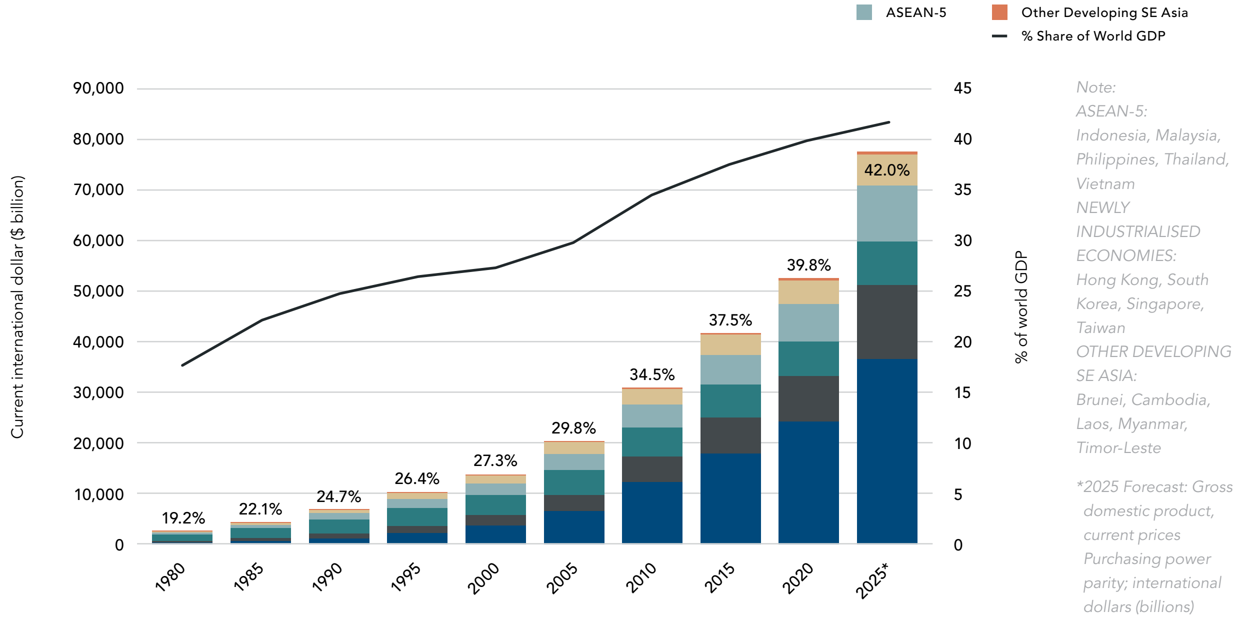
Domestic

The economy and population of Victoria have achieved solid growth over the past 10 years, consistent with the strong passenger growth experienced at Melbourne Airport. Peak periods for domestic demand are primarily driven by day-return travel patterns to capital city airports. Given the nature of this travel, passengers who value timing and punctuality are concentrated in the morning and afternoon peak periods.

The geography of Australia, particularly the vast distances between its population centres, often leaves passengers with no practical alternative to air travel. Additionally, low-cost carrier demand has increased in peak periods, particularly in the morning.

It is noted that after COVID-19 there is likely to be some impact on business travel due to changing working options (e.g. videoconferencing). However, demand for domestic travel – particularly in the peaks – is expected to continue to grow in line with existing trends.

Figure A2.22
Asia's increasing GDP as a proportion of world GDP (1980-2020)



Source: International Monetary Fund, World Economic Outlook Database, Oct 2015; Austrade

A2.4.1.3 Methodology

An econometric demand-based forecasting approach was adopted, in line with industry best practice. Econometric modelling uses the relationships between historic variables to forecast how changes in a given variable will affect passenger demand. It quantifies the long-term relationships between explanatory variables (the cause) and dependent variables (the effect).

Passengers

Passenger forecasts were built from models of 20 market segments, each chosen to capture a potential demand driver for various types of travel across markets. The 20 segments modelled were:

- Domestic passengers: all travel between Melbourne and all other airports in NSW, Victoria, Queensland, South Australia, Western Australia, Tasmania, the NT and ACT (a total of eight models)
- International Australian resident passengers: their international travel to and from Melbourne, to destinations in Oceania, Asia, the Americas, Europe and 'other regions' (five models)
- International visitor passengers: all international travel to and from Melbourne by international visitors from origins in Oceania, China, 'other Asia', the Americas, Europe and 'other regions' (six models). NB forecasts from the China and 'other Asia' models were combined to produce forecasts for the 'Asia visitors' segment
- Other passengers: international transit passengers (one model).

A number of explanatory (causal) variables were tested for their relationship to passenger numbers in the above markets. The econometric models were then evaluated to determine their suitability. The aim being to develop a set of relatively consistent models that generated accurate forecasts, and captured plausible relationships between the explanatory (causal) variables and passengers for each market. These models were refined by eliminating variables based on their significance.

Models were also evaluated by their ability to produce plausible short and long-term passenger forecasts such as by applying those factors that have driven earlier trends in individual markets. For example, because growth in some markets is known to have been driven by increases in capacity and competition on their routes, these models included a capacity variable.

Aircraft

Aircraft movement forecasts made assumptions on aircraft type and load factors based on an understanding of each airline's likely approach. The key assumptions are:

- For international aircraft movements:
  - The continued deployment of wide-body (i.e. dual aisle) aircraft (Code E and Code F)
  - New airlines beginning operations at Melbourne to use wide-body aircraft (Code E)
  - Predominantly narrow-body (i.e. single aisle) aircraft (Code C) to serve New Zealand and Oceania
  - Deployment of narrow-body aircraft to serve certain South-East Asian markets (particularly by low-cost carriers)
  - Load factors (the share of seats utilised per aircraft) to progressively increase
  - Improvements in aircraft technology, efficiency and range (e.g. Boeing 777X and 787, Airbus A320 Neo, A350).
- For domestic aircraft movements:
  - Regional destinations to be mainly served by narrow-body aircraft
  - Increasing use of wide-body aircraft on certain busy and constrained routes (e.g. Melbourne-Sydney)
  - Deployment of higher capacity narrow-body aircraft
  - New airlines to commence operations at Melbourne using narrow-body aircraft
  - Load factors to remain stable
  - Improvements in aircraft technology, efficiency and range (Boeing 737 Max and 787, Airbus A320 Neo, A350).
- That new-technology aircraft are smaller than traditional long-haul aircraft such as the Boeing 747 and Airbus A380 and will result in more aircraft movements to serve the same passenger numbers.

A2.4.1.4
MDP forecasts

Melbourne Airport developed passenger and aircraft movement forecasts, assuming the absence of any capacity constraints, based on the above approach. These passenger forecasts from the nominated M3R opening year of 2026 to 2046 are illustrated in **Figure A2.23**.

The forecast passenger and aircraft movements are detailed in **Table A2.2** (assuming additional capacity is provided by M3R to enable these aircraft movements).

A2.4.1.5
Busy day forecasts

Knowledge of an airport's daily traffic demand, especially in congested peak periods, is essential in understanding what its facility and infrastructure requirements are. For this, a representative 'busy day' forecast schedule is used.

Busy day forecasts are based on the detailed daily flight schedules (including aircraft type, origin/destination, assumed load factor and time of arrival/departure) that represent the 'equivalent day' for each forecast year.

Melbourne Airport's busy day forecasts have been developed from a 'representative day' (chosen from early October 2019). This allows the appropriate representation of passenger and aircraft volumes, and distribution of domestic and international traffic.

The daily profiles of the resulting busy day forecasts are illustrated in **Figure A2.24**.

A2.4.2
Timing of M3R

A2.4.2.1
Forecast impacts

The existing runway system was reaching practical capacity in 2019, resulting in delays and cancellations as OTP deteriorated. These are expected to significantly worsen as demand increases.

The impact of the forecast growth in movements over future years for the busy day schedule (compared to the existing two-runway system's capacity) is shown in **Figure A2.24**. The effective capacity of the parallel runway system is predicted based upon expected infrastructure enhancements and operational strategies (see **Chapter A4: Project Description** and **Chapter C2: Airspace Architecture and Capacity**).

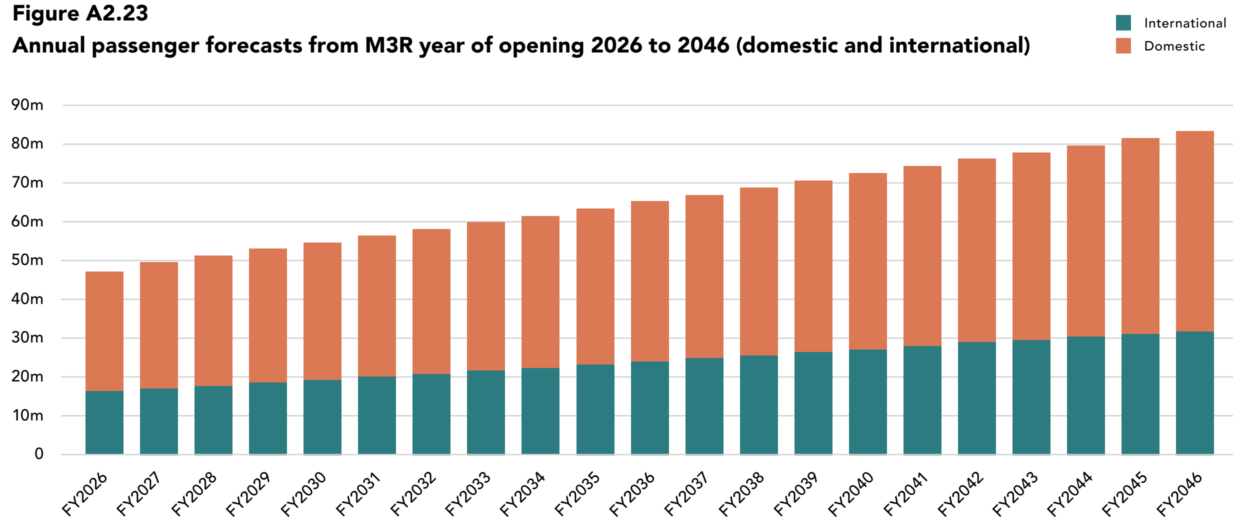
By the nominated M3R opening year of 2026, demand on the existing runway system will already meet or exceed capacity in the morning from 7am, a period in mid-afternoon and the evening peak. As years go by, the capacity-demand imbalance will worsen and by 2046 busy day demand will exceed capacity between 6am and 9pm – almost the whole day

Capacity constraints on the existing runway system will further displace flights from their scheduled times into adjacent shoulder periods, worsening the trend that is already being experienced now. **Figure A2.25** shows how flights could be displaced, based on the 2026 busy-day schedule.

A RDMS would have a similar effect – although in reality, many displaced flights would either be cancelled or removed entirely from airline schedules.

As explained in **Chapter A3: Options and Alternatives**, based on 2026 forecast aircraft-movement numbers, a RDMS would not be viable because it could not provide sufficient additional capacity for the constrained runway system.

Figure A2.23
Annual passenger forecasts from M3R year of opening 2026 to 2046 (domestic and international)

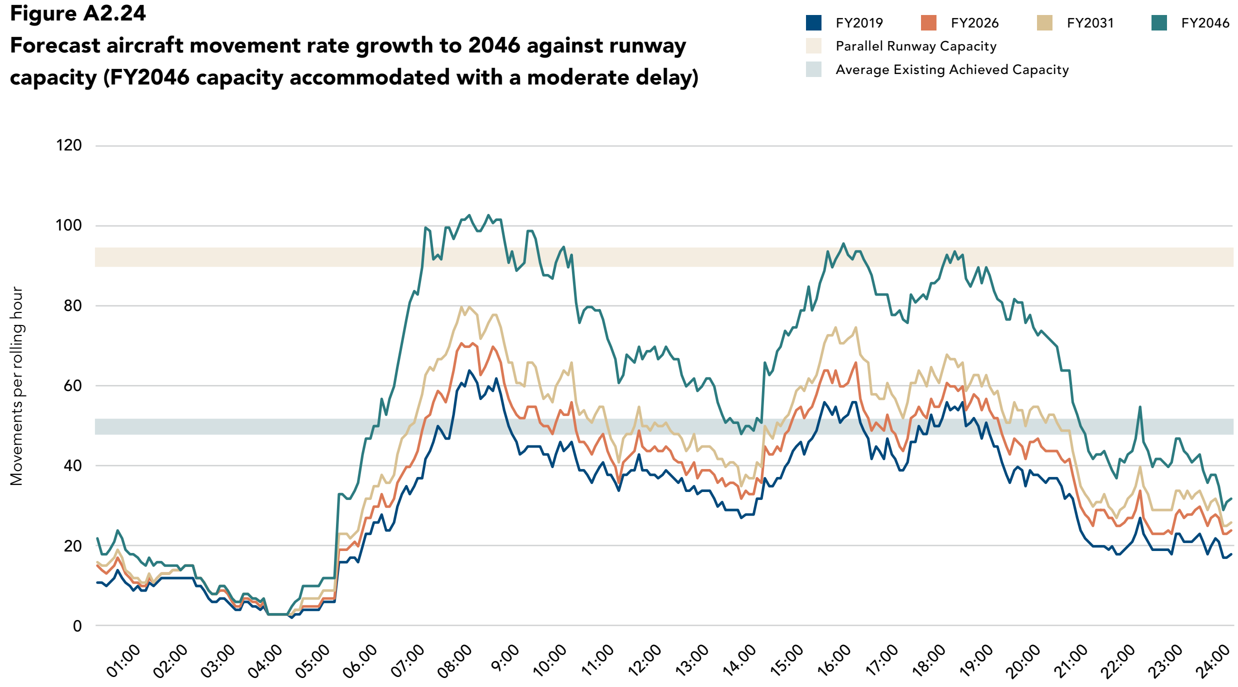


Source: APAM

On a busy day in 2026, the existing runway system would be saturated for the day, and the firebreak periods in the middle of the day exhausted, eliminating any ability to recover from delays. The ability to introduce new services or the attractiveness for new services to come to Melbourne would also be extremely limited and impact Melbourne Airport's ability to provide access for all airline operators.

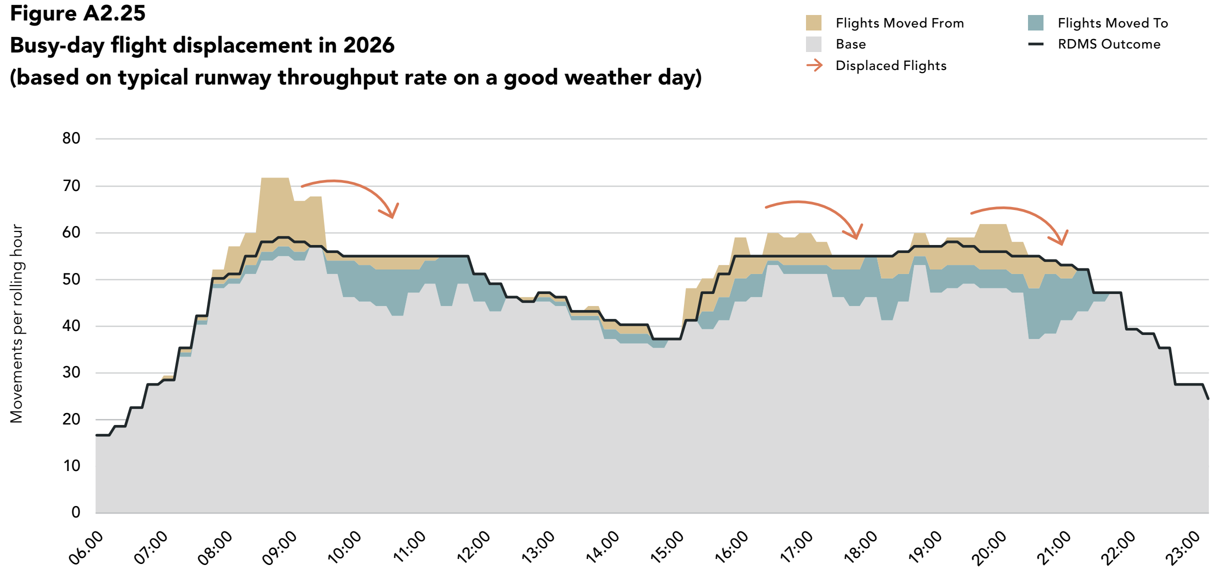
Delays would increase as the day progresses, causing unrecoverable aviation-network delays. Disruptions would be transmitted around the national network (given that 33 per cent of all jets operated by major domestic airlines cycle through Melbourne Airport by 10am on weekday mornings). Some of these off-schedule aircraft would then return to Melbourne later in the day, thereby compounding delays in the afternoon peak period.

Figure A2.24
Forecast aircraft movement rate growth to 2046 against runway capacity (FY2046 capacity accommodated with a moderate delay)



Source: Landrum & Brown
Note: 'bands' have been added based on capacity ranges:
Average existing achieved capacity: 48-52
Segregated Mode Parallel Runway Capacity: 60-70
Mixed Mode Parallel Runway Capacity: 90-95

Figure A2.25
Busy-day flight displacement in 2026
(based on typical runway throughput rate on a good weather day)



Source: APAM

International networks would also be affected, given approximately 60 per cent of aircraft on narrow-body short-haul international routes to and from Australia cycle through Melbourne Airport on a typical day.

On a bad weather day when single runway operations are in effect, runway capacity is limited to approximately 48 aircraft movements per hour and there is a significant disconnect between capacity and demand (as shown in **Figure A2.26**). On these days, cancellations will be needed to relieve the system and extensive network impacts will result.

A2.4.3
Runway-caused delays

The projected runway-caused delays based on the existing runway arrangement have been simulated for 2026 and illustrated in **Figure A2.27**. In 2026, the average (modelled) runway-caused delay across the day would be approximately 15 minutes. In a single-runway mode, the average delay increases to over 40 minutes per aircraft movement.

FAA guidance states that when average delays per aircraft operation reach four to six minutes, an airport is approaching practical capacity and generally considered congested. An average delay per operation of 10 minutes or more would therefore be considered severe congestion. By 2026 therefore, Melbourne Airport will be severely congested and in need of additional runway capacity.

A2.4.4
Cost benefits

APAM commissioned an economic-impact assessment of M3R from SGS Economics & Planning. The full analysis in **Chapter D2: Economic Impact Assessment** concluded M3R would achieve an overall cost-benefit ratio of 9.2 and wider benefits such as tourism and exports.

A2.4.5
Summary

Strong growth in passenger numbers is expected to return after COVID-19, driven by Australian and overseas passengers, and the opportunities created by new aircraft fleets. Over the next 25 years (i.e. to 2046) Melbourne Airport forecasts that daily demand will continue to continue grow across peak and off-peak periods, supporting domestic and international travel patterns.

- In 2019, the demand on the existing runway system was reaching practical capacity, leading to significant delays.
- By 2026, the demand on the existing runway system will exceed capacity for the entire morning, a period in the mid-afternoon, and for the evening periods for all weekdays throughout the year.
- By 2043, the demand over the whole busy day will exceed the capacity of the existing runway system.

By 2026 the average runway-caused delay of the existing runway system will be 15 minutes, compounded progressively through the day and without opportunity to recover performance. Melbourne Airport would be classified as 'severely congested' (according to FAA guidance) and operational continuity highly susceptible to severe disruptions, even reacting to relatively minor events.

Delays and cancellations will impact airline costs and quality of service to passengers. Airlines will therefore seek to deploy capacity growth elsewhere, leading to higher fares (due to demand exceeding supply) and economic-benefit losses for Victoria and Australia.

New services will neither be attracted to, nor able to come to, Melbourne Airport.

These combined assessments – of demand, capacity, delay, delivery timeframes and cost-benefit analysis – mean that in order to meet the accessibility, growth and reliability requirements of both Melbourne Airport and Australia's national aviation network, M3R is required by 2026.

A2.5
BENEFITS OF BUILD SCENARIO

Building M3R will stimulate growth and tackle current and forecast runway-congestion constraints – including delays and cancellations – thereby delivering the many benefits detailed in this section.

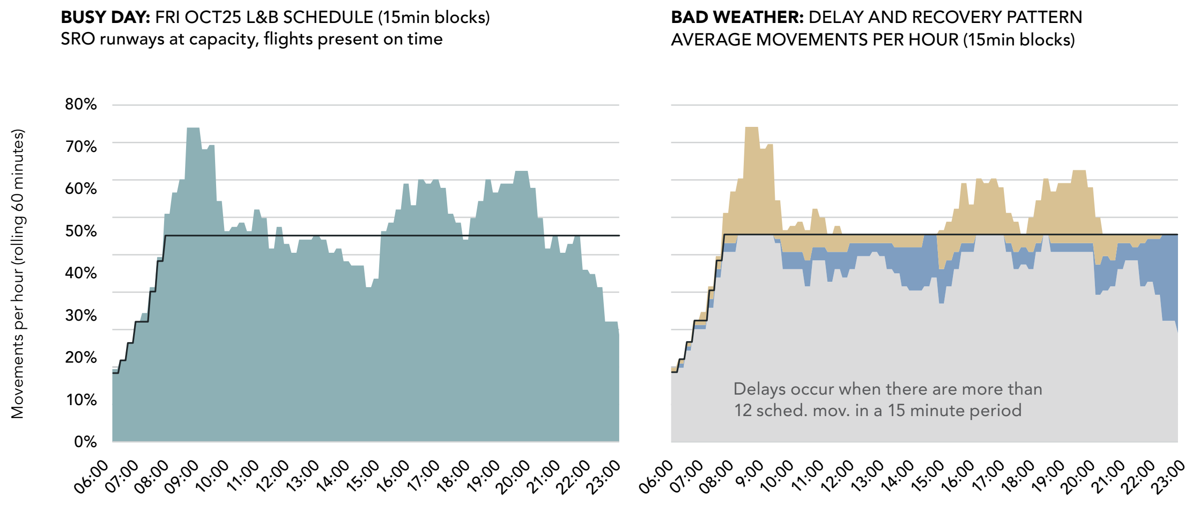
A2.5.1
Passengers and airlines

M3R will allow Melbourne Airport to meet the growing demand for air travel to and from Melbourne, Victoria and Australia; as well as supporting the Australian aviation network's efficient operation.

Benefits include:

- Increased capacity to meet demand without constraint that:
  - Strengthens the Australian aviation network and stimulates international passenger demand
  - Ensures parallel runway operations are available for at least 97 per cent of the year, including during unfavourable weather
- Open access for all services – allowing more destinations to be added and a greater frequency of services (including to and from ultra-long-haul destinations)
- Enhanced market opportunities – facilitating competition, customer choice and affordable air-travel options
- Better on-time performance, fewer cancellations, and significantly reduced runway delays
- Reduced airline costs caused by delays
- Reduced aircraft fuel-burn and emissions.

Figure A2.26
2026 busy-day flight displacement on a bad weather day



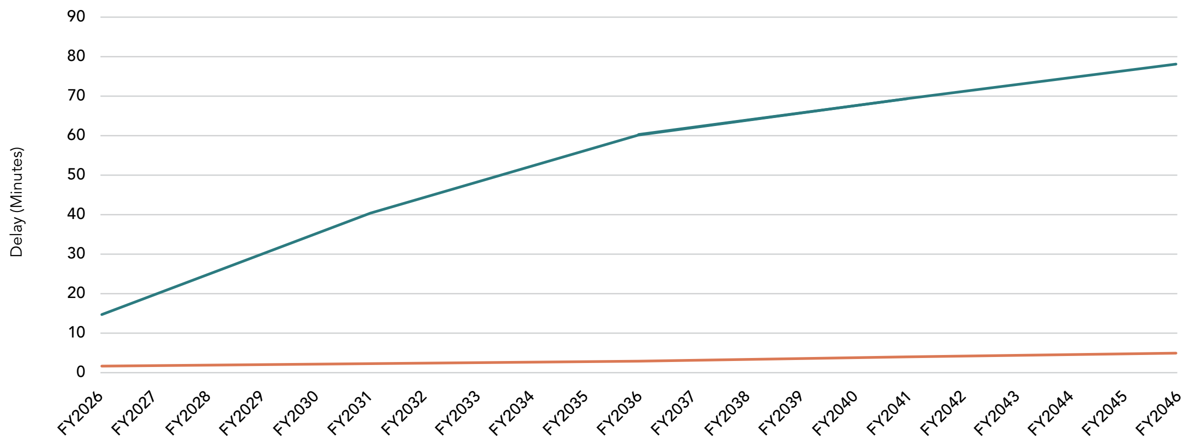
Source: APAM

Table A2.2
Forecast passenger and aircraft movements at Melbourne Airport

Year (ended 30/06)	Passenger Movements (millions)			Aircraft Movements (RPT*)		
	Domestic	International	Total	Domestic	International	Total
2026	30.8	16.5	47.3	205,000	71,800	276,800
2031	36.5	20.4	56.9	232,600	88,100	320,700
2036	41.3	24.3	65.6	257,200	105,400	362,600
2041	46.4	28.3	74.8	283,200	121,500	404,700
2046	51.6	32.3	83.8	311,200	137,800	449,000

*Regular Public Transport Source: APAM Annual passengers rounded to nearest 100,000

Figure A2.27
Average delays for forecast busy day from 2026 to 2046 with and without M3R



Source: To70

A2.5.2
The economy

M3R is expected to produce significant and wide-ranging economic benefits. Its construction will provide a temporary boost to local employment, much of it in the construction sector. Then, when the project is completed and operational, permanent employment opportunities (direct and indirect) will be created.

A detailed assessment of M3R's contribution to the economic development of Victoria and Australia is given in Chapter D2: Economic Impact Assessment. This assessment shows that the capacity and activity growth associated with M3R will:

- Create 37,000 jobs throughout Victoria by 2046
- Create 3,222 new jobs within the airport site by 2046
- Increase Victoria's gross state product by $4.6 billion by 2046
- Increase airline competition, resulting in more frequent flights at cheaper prices
- Increase tourism expenditure throughout Melbourne and Victoria
- Reduce delays – allowing travellers to benefit from reliability, time savings and flexibility.

From a cost-benefit perspective, for every dollar invested in the M3R there will be a return of $9.24 for Victoria over 20 years to 2046. The biggest benefits are expected to come from tourism, increased additional air travel (i.e. connecting flights) and increased freight exports.

A2.6
COSTS OF NO BUILD SCENARIO

There would be a significant opportunity cost to the Melburnian, Victorian and Australian economies if M3R did not proceed. Without M3R, the existing two-runway system would limit Melbourne Airport's ability to accommodate the forecast demand. Constrained-growth forecasts have been developed to model the impacts of not developing M3R.

The constrained and unconstrained annual aircraft-movement forecast is illustrated in Figure A2.28. Projections indicate that without M3R there will be 30 per cent fewer aircraft movements a year by 2046 than there would be with M3R's additional runway capacity.

The constrained and unconstrained annual passenger forecast is illustrated inFigure A2.29. The projections indicate that, if M3R is not built, passenger growth will be severely limited. By 2046, even with other throughput enhancements, the effect of capacity constraint could be approximately 29 per cent fewer passengers (than would be facilitated by M3R).

The constrained passenger and aircraft movement forecasts are compared to the unconstrained forecasts in Table A2.3.

A2.6.1.1
Passengers

Given the expected high growth in passenger numbers, if M3R does not proceed Melbourne Airport would be unable to accommodate demand – especially during peak times. Passengers would face the following consequences:

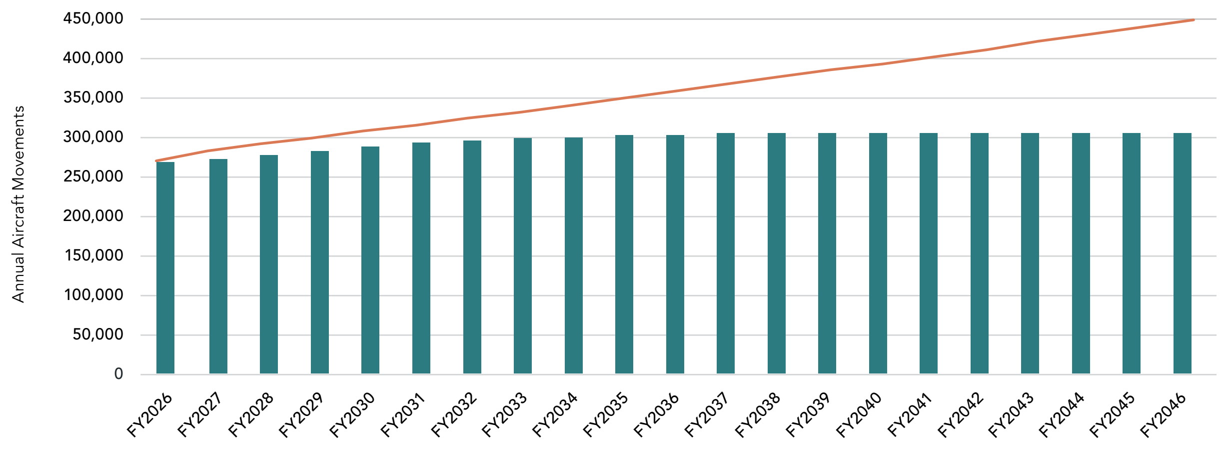
- Some would be required to travel at less convenient times
- Some who could not be accommodated at their preferred time because there are no available seats, or who aren't confident in arriving at their destination on time, will decide not to travel at all
- Increasing delays
- A likely increase in peak-period ticket prices, reducing the affordability of air travel from Melbourne Airport
- Reduced choice as airlines rescheduled and moved routes away from Melbourne and Victoria
- Economic impacts from lost growth.

A2.6.1.2
Airlines

Melbourne Airport's existing runway system will not be able to meet demand if M3R is not built. This will result in the following impacts to airlines:

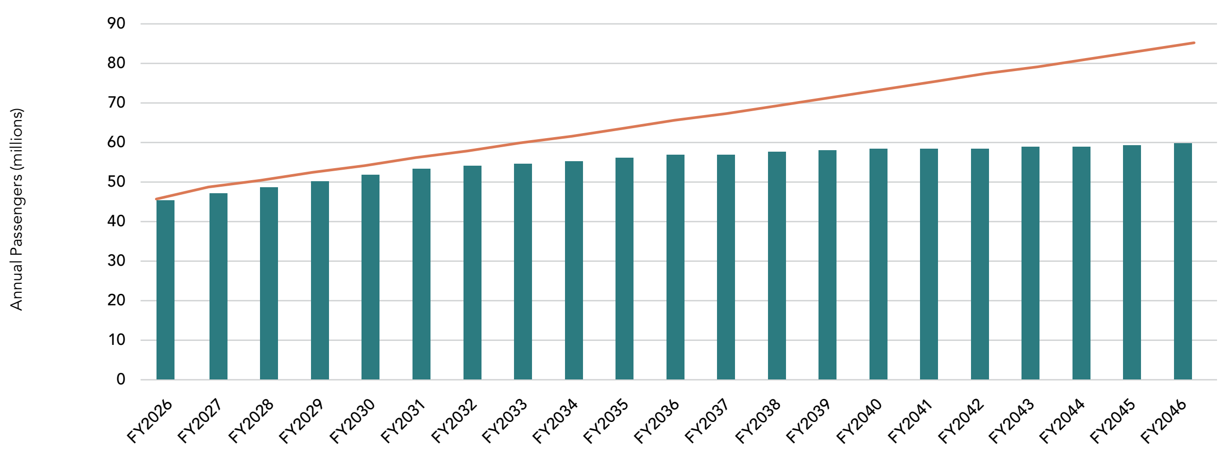
- By 2026, the ability of new airline operators to start services, or for existing operators to introduce more services to Melbourne, will be severely impacted due to restricted access to the airport
- Increasing scheduling uncertainty due to the unpredictable nature of the runway system's performance
- Increasing cancellations and deteriorating OTP will cause reputational damage …
- … And subsequent network effects will continue to worsen, requiring more redundancies to be built into schedules
- Growth and revenue will be constrained and the opportunity for an additional 23.9 million passengers a year lost by 2046.

Figure A2.28
Annual growth in flights with M3R (unconstrained) and without M3R (constrained) from nominated Build year 2026 to 2046



Source: APAM

Figure A2.29
Annual passenger growth with M3R (constrained) and without M3R (constrained)) from nominated Build year 2026 to 2046



Source: To70

Table A2.3
Constrained and unconstrained forecast domestic and international passenger and aircraft movements at Melbourne Airport (passengers rounded to nearest 100,000)

Year ended 30 June	Passenger Movements (millions)			Aircraft Movements (RPT)		
	Constrained	Unconstrained	Difference	Constrained	Unconstrained	Difference
2026	47.3	47.3	0	276,800	276,800	0
2031	54.4	56.9	2.4	302,200	320,700	18,500
2036	57.8	65.6	7.8	309,700	362,600	52,900
2041	58.9	74.8	15.9	311,100	404,700	93,600
2046	60.0	83.8	23.9	312,500	449,000	136,500

Source: Landrum & Brown 2019

A2.7 CONCLUSIONS

Melbourne Airport is a major hub for Australia's air traffic. It is an international gateway to Australia and Victoria's primary domestic airport. The airport supports six of the 10 busiest domestic flight routes (pre COVID-19 rankings). About 60 per cent of all aircraft operating domestic routes and narrow-body short-haul international routes cycle through Melbourne Airport every weekday.

Prior to COVID-19, Melbourne Airport was reaching the practical capacity of its intersecting runway system. As demand returns after COVID-19, the airport is expected to exceed capacity by 2026, with cancellations and delays impacting passengers and airlines. Forecast continued growth in demand for domestic and international travel will create unacceptable delays, cause severe disruption to passengers, and trigger disruption to the entire Australian aviation network.

On the other hand, building M3R will benefit both the Victorian and Australian economies by enabling an additional 23.9 million passengers a year to use the airport by 2046. This will contribute an additional 37,000 jobs in Victoria, by 2046 and an additional $4.6 billion a year to gross state product in 2046.

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Chapter A3 Options and Alternatives

Summary of key findings:

- Before recommending the construction of a parallel north-south runway system, Melbourne Airport considered a variety of alternatives
- As a result of this process it was decided that Melbourne Airport's Third Runway (M3R) is the most appropriate solution for managing the growing demand for air travel to and from Melbourne
- The case for M3R is further strengthened because implementation of operational efficiencies has already deferred the need for an additional runway by more than 10 years; and because any further opportunities for enhancing efficiency in operations are limited and short-term
- A parallel north-south runway system was identified as the preferred orientation for M3R following technical assessments and industry consultation
- This parallel north-south runway system will provide reliable capacity and maximise runway availability in all weather conditions
- Refinement of the M3R design and development footprint has reduced its expected impact on the environment and community.

CHAPTER A3 CONTENTS

CHAPTER A3 FIGURES

CHAPTER A3 TABLE

A3.1 INTRODUCTION

This chapter provides context to Melbourne Airport's Third Runway (M3R) project by focusing on the available options and alternatives. It outlines the reasons why M3R is the most appropriate option to supply the additional capacity required to meet forecast passenger growth and demand at Melbourne Airport.

The chapter comprises:

- Master Plan options and alternatives
- Runway options and alternatives
- M3R design development.

This chapter details the analysis undertaken to evaluate, compare and decide between potential alternatives, including their social and environmental impacts. It discusses the operational and environmental evaluation of the runway design options, and how the design evolved to take into account identified environmental values. The main reasons for selecting the new north-south runway plan are presented.

A3.2 MASTER PLANNING OPTIONS AND ALTERNATIVES

A3.2.1 Overview

Prior to recommending a north-south parallel runway system to deliver the much-needed additional airfield capacity, Melbourne Airport recognised there were other potential options and so evaluated them for suitability.

A3.2.2 No Build scenario

An airfield's capacity is generally described as the level of demand above which resulting delays exceed acceptable service levels. Melbourne Airport's capacity and its projected demand are modelled in the strategic development of the airport's Master Plan. **Chapter A2: Need for the Project** demonstrates a consistent and significant increase in airline demand for Melbourne Airport.

The strategic basis for M3R is to instill confidence that there will be sufficient runway capacity to support the expected growth in airline activity, and thereby meet the obligations of both the Master Plan and the airport lease agreement.

The No Build scenario considers implementing only the already-planned enhancements to the airport's existing two-runway configuration between 2019 and 2026 (i.e. to upgrade the airport as outlined in Master Plan 2018). The primary elements are completion of the Taxiway Victor and Taxiway Zulu projects, providing a dual-taxiway system in each direction around the terminal precinct.

However, this scenario does not meet future demand projections and Melbourne Airport would become constrained and unreliable, and unable to meet either its operational functions or its lease obligations. This outcome would in turn lead to adverse social and economic impacts for Melbourne and Victoria.

It should be noted that the runway requirement has already been deferred by more than 10 years from the 2010 date estimated in the Melbourne Airport Strategy (developed by the Federal Airports Corporation and Victorian Government in 1989-90). This deferral has been achieved through implementing increased efficiencies in concert with increased traffic growth.

A3.2.3 Expand use of other airports

There are three other airports in the Melbourne basin that could theoretically be leveraged to meet demand growth requirements: Essendon Fields Airport, Moorabbin Airport and Avalon Airport.

Essendon Fields Airport and Moorabbin Airport are domestic airports that play an important role in servicing regional point-to-point passengers, freight, general aviation and emergency-services aviation activities. They therefore complement Melbourne Airport's role as an international and domestic hub.

However, these airports lack the infrastructure, and therefore growth potential, of Melbourne Airport. In addition, Melbourne Airport can develop additional capacity (particularly for international services) to meet demand with comparative ease, and has an advantageous proximity to metropolitan Melbourne.

The vast majority (87 per cent) of Australia's Regular Public Transport (RPT - scheduled passenger flights) operate through primary capital-city airports such as Melbourne Airport, as noted by the Australian Airports Association's report on secondary airports in Australian cities (which includes Essendon Fields Airport and Moorabbin Airport) entitled *Securing the Future of Australia's Metropolitan Airports* (AAA, 2014). To transform secondary airports so that they could provide the additional capacity needed to handle projected demand would require extensive infrastructure works (at substantial expense) and cause major adverse community and environmental impacts.

Regarding Avalon Airport, the Bureau of Infrastructure, Transport and Regional Economics noted in 2012 that it accounted for 'less than 5 per cent of total passenger movements through Melbourne and Avalon airports' and that it has had 'no noticeable effect on total passenger numbers at Melbourne Airport' (BITRE, 2012).

The Productivity Commission recently reiterated this point in its *Economic Regulation of Airports Draft Report* (Productivity Commission, 2019). This report states that 'Melbourne Airport has strong market power in the provision of domestic aeronautical services. Like Sydney, as a business and tourism hub, passengers are less likely to substitute to another destination. There are no strong modal substitutes for the majority of its passengers and it faces little competitive constraint from Avalon Airport, even in the market to serve low-cost carriers'. (Productivity Commission, 2019)

Although Avalon Airport commenced its first international flights in December 2018 with a twice-daily Air Asia X flight to Kuala Lumpur, they equate to only some 0.5 per cent of Melbourne Airport's total daily movements. Because this falls within the tolerances of Melbourne Airport's forecast growth, relocation of these flights to Avalon has an immaterial impact on runway movement demand at Melbourne Airport and does not impact the timing of M3R.

Melbourne Airport believes Avalon Airport has a role to play in servicing the low-cost domestic and international market in Victoria, and acknowledges its forecasts to grow in these markets. However, Avalon does not have the growth potential or service offering to cater for Melbourne's or Victoria's growth in air transport. Despite its presence and capacity, Avalon's location and distance from Melbourne limits its appeal to both passengers and airlines. A lack of connectivity for transiting passengers further reduces its appeal, as evidenced by the stronger growth at Melbourne Airport in recent years.

The expanded use of other airports is also not considered an appropriate alternative because they are not positioned to meet airline industry expectations – particularly regarding domestic and international airline passenger access, service and experience offerings.

It should also be noted that the Tullamarine airport site was originally chosen because of the opportunity it provided for long-term growth. Melbourne Airport's long-term plans have consistently documented a dual parallel-runway system as the ultimate development concept for a four-runway airport.

Plan Melbourne 2017-2050 (DELWP, 2017) notes there is potential for a future airport in the south-east of Melbourne to secure adequate interstate terminal capacity beyond 2050. Given the timeframe for the development of a south-east airport, this is not considered a viable option to meet the imminent demand described in **Chapter A2: Need for the Project**.

A3.2.4 Demand management scenarios

Demand management scenarios consider the additional and alternative measures available to enhance operational efficiencies at Melbourne Airport. They can include technological, procedural, economic and fiscal actions taken to maximise runway efficiency, improve aircraft flow, and reduce aircraft delays on the airfield.

Melbourne Airport has historically implemented a range of demand management measures, including optimisation of runway-occupancy time and aircraft separations.

An additional demand management measure under consideration is implementing a Runway Demand Management System (RDMS). Based on the International Air Transport Association's *Worldwide Slot Guidelines*, a RDMS would require operators to secure an allocated 'slot' in order to operate to and from Melbourne Airport. During peak periods there would be a limited number of allocated slots therefore, to manage demand, airline operators would have to accept a reallocation of slots.

Melbourne Airport has assessed the effectiveness of a RDMS and determined that:

- Although its implementation would reduce the magnitude of congestion delays and improve on-time performance, it would also spread congestion across more hours, resulting in a limited ability to recover from issues or accommodate growth
- Demand for travel in the morning and afternoon would not be met because aircraft movements would be limited
- Delays would continue to increase over time
- New flights would not be accommodated at the desired times, resulting in longer layovers at Melbourne Airport for passengers connecting with flights during peak periods
- RDMS would restrict Melbourne Airport's ability to meet its regulatory requirement to provide fair and equitable access to all airline operators, as new flights are limited to a few hours in the day when other airlines do not want to fly
- High utilisation rates in peak periods would leave Melbourne Airport and airlines with a reduced ability to recover from a disrupted morning peak.

Melbourne Airport concludes that the effectiveness of the RDMS in managing demand would cease before commencement of M3R. A RDMS is therefore not considered a viable option to either replacing or delaying the opening of M3R.

In summary, demand-management measures, together with a RDMS, will not sufficiently address capacity constraints and meet projected demand. Even with implementation of demand-management measures and some associated airfield enhancements, the current runway configuration is expected to exceed capacity by 2026 (see **Chapter A1: The Project - Introduction**). The use of demand management measures will provide only short-term relief in the management of delays and is not considered a viable long-term solution or alternative to M3R.

A3.3
RUNWAY OPTIONS AND ALTERNATIVES

A3.3.1
Overview

This section describes the runway configuration options considered by Melbourne Airport to meet M3R objectives defined in **Chapter A1: The Project - Introduction**. Analysis is undertaken to evaluate, compare and select from alternatives. The major reasons for selecting the M3R option are detailed: accounting for operational and constructability considerations, as well as the economic, social and environmental impacts of each alternative.

A3.3.2
History of developing runway options: early planning documents to the 2008 Master Plan

A key step in the history of runway option development at Melbourne Airport was the preparation of the *Melbourne Airport Strategy* (MAS) of 1990.

Before the MAS, planning allowed for a north-south runway 1,860 metres east of the existing north-south runway, and a new east-west runway 2,225 metres south of the existing east-west runway between the proposed north-south runways (refer to **Figure A3.1**). The MAS recognised that the location of these proposed new runways was no longer acceptable on environmental grounds.

The MAS was jointly developed by the Federal Airports Corporation (FAC) and the Victorian Government during the 1980s as a long-term strategy for the airport's development and management. It was subject to an environmental assessment process under former Commonwealth environmental assessment legislation *The Environment Protection (Impact of Proposals) Act 1974* (Cth).

Under the requirements of this now superseded legislation, the *Melbourne Airport Strategy Draft Environmental Impact Statement* (draft EIS) was prepared by the Victorian Government and the FAC in 1989.

Following public comments, a *Supplement to the Melbourne Airport Strategy Draft Environmental Impact Statement* (supplementary report) was prepared in 1990. The supplementary report and the original draft EIS formed the final EIS. This final EIS for the MAS was approved by the Commonwealth on 12 November 1990.

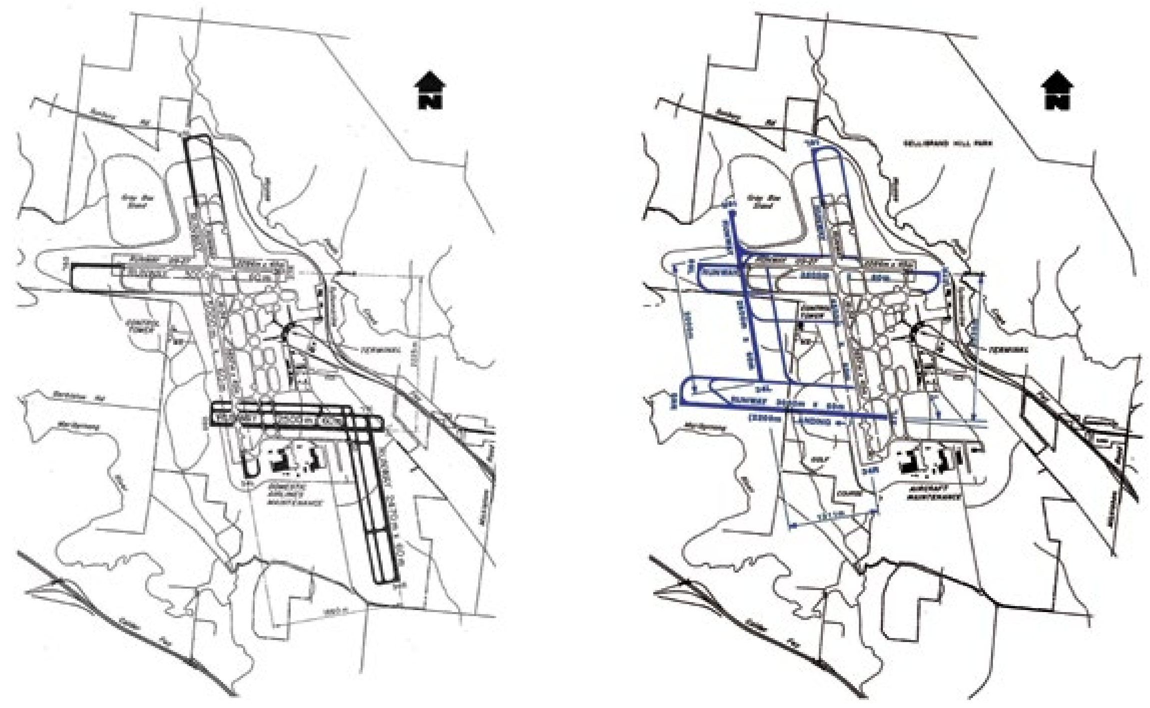
As stated in the draft EIS, the purpose of MAS was to 'determine and advise all interested parties where the future runways and terminals, freight, maintenance and other facilities will be developed'.

In doing so, the MAS sought to ensure that 'the growth of Melbourne Airport was not constrained by encroaching urbanisation limiting area for on-ground expansion of airport facilities' (the Victorian Government and FAC 1989). The approved runway layout from the final EIS is provided in **Figure A3.1**.

The MAS was based on the best available information at the time, and for nearly three decades was the basis for planning runway development at Melbourne Airport. In doing so, it provided a broad framework for orderly airport development, road and rail access, and external land-use controls to protect the airport's curfew-free operation. However, the MAS is no longer the relevant planning document for the airport, being superseded by subsequent Master Plans prepared under the Airports Act.

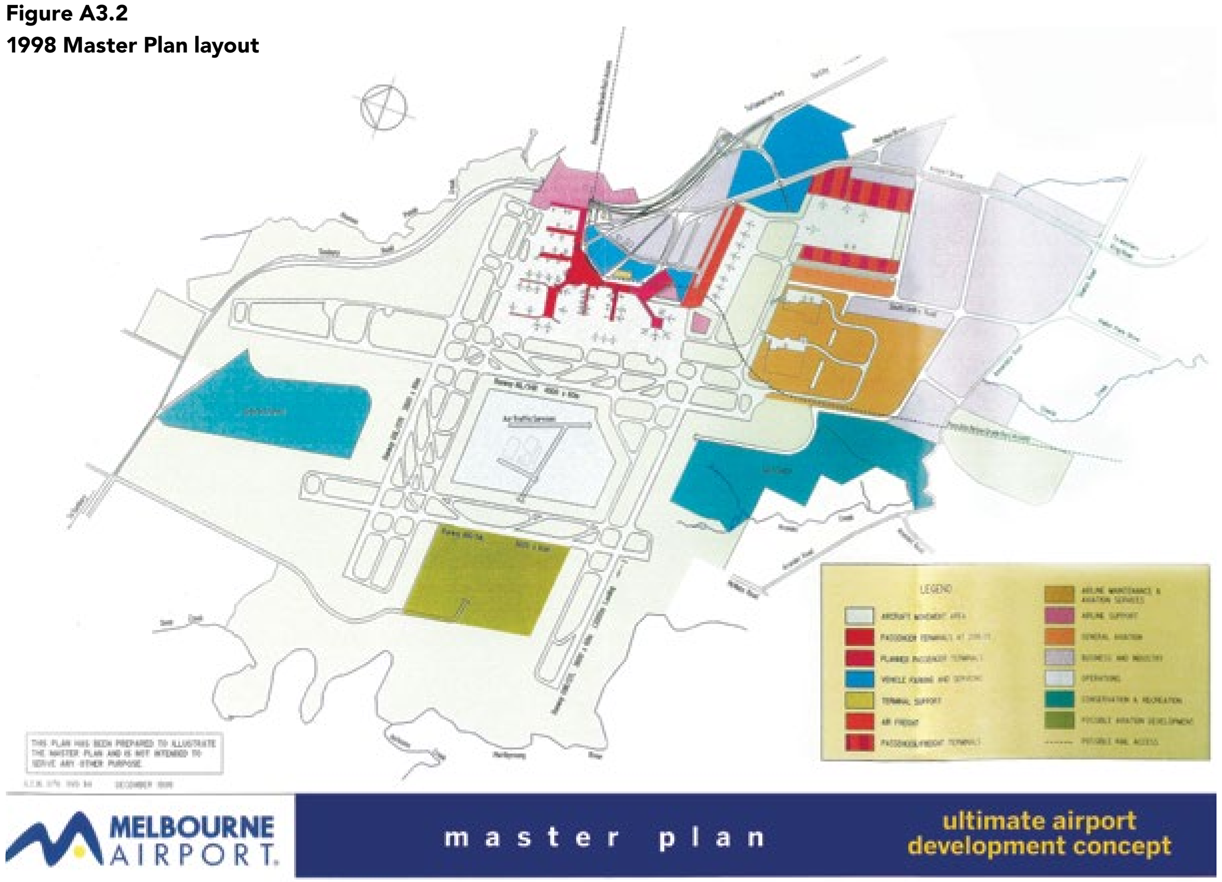
Following Melbourne Airport's privatisation, the first airport Master Plan was developed in 1998, taking the MAS into account. It outlined the lengthening of the MAS's future north-south runway by 500 metres to the south, creating a 3,000 metre runway (**Figure A3.2**). This was to provide greater operational flexibility and simplify air traffic control procedures, thereby enhancing safety and runway capacity.

Figure A3.1
1960s Airport layout and approved EIS layout



Source: APAM

Figure A3.2
1998 Master Plan layout



Source: APAM

This 1998 Master Plan estimated that development of the third runway would be necessary within a 10 to 20-year timeframe. As with the MAS, a final decision on which runway would be built next was not stated in this Master Plan. Subsequent Master Plans and Environmental Strategies have consistently documented the layout of a four-runway system as per the 1998 Master Plan.

The 2003 Melbourne Airport Master Plan anticipated the need for a third runway within 20 years (to be built by 2022) but made no proposal regarding which alignment should be built first. The Master Plan and MAS are referenced in the State Planning Policy for the airport and must be considered in relation to planning decisions affecting land in the vicinity of Melbourne Airport.

The 2008 Melbourne Airport Master Plan again anticipated the need for a third runway within the 20-year planning horizon (estimated to be operational in 2026) though again no decision was made on which runway alignment should be built first.

A3.3.3
2013 Master Plan

The 2013 Master plan concluded that the existing two-runway system would reach capacity between 2018 and 2022, meaning a new runway was needed within the next 10 years.

Melbourne Airport, in consultation with key aviation stakeholders, undertook a number of studies to investigate whether a parallel north-south or parallel east-west runway would be preferable for the airport's third runway. The Master Plan considered a number of factors including:

- Capacity: including safety, aircraft movements, and minimising aircraft delays both on the ground and in the air
- Community: including the impacts on surrounding residents, sustainability and economic effects
- Environment: including the impact on land, noise, emissions and water
- Financial: including the cost and duration of construction, as well as aircraft operating costs
- Growth: including providing capacity for future increase in demand.

An important metric used was the capacity of each of the runway systems, including the throughput of the runway (i.e. the rate of aircraft movements) and the availability of the runways (i.e. the percentage of time the runway can be used without constraint due to wind conditions).

The throughput of each parallel runway system was estimated and it was concluded that an east-west system would provide a higher rate. This was driven by the requirements of a north-south system to handle runway crossings by aircraft, thereby reducing throughput compared to an east-west system.

Assessments of wind records were analysed to compare runway orientation availabilities. The north-south system was found to have a higher availability.

By combining throughput and availability metrics, the 2013 Master Plan concluded that the east-west runway had a higher capacity and was thus the preferred nomination for Melbourne Airport's third runway.

A3.3.4
Runway Development Program and 2018 Master Plan

The Runway Development Program (RDP) project was established pursuant to the 2013 Master Plan to enable commencement of the feasibility and early design work, and preparation of a Major Development Plan (MDP) supporting the assessment and approvals process for the new runway.

The 2018 Master Plan included detailed content regarding the progress of RDP.

A3.3.5
Planning Review

In November 2018, Melbourne Airport announced a pause in preparing the RDP runway MDP in order to undertake a Planning Review of the project. It evaluated a range of changes (regulatory, technology, environmental etc) since 2013, and evaluated east-west and north-south runway configurations in consideration of this revised planning environment (as shown in **Figure A3.3**).

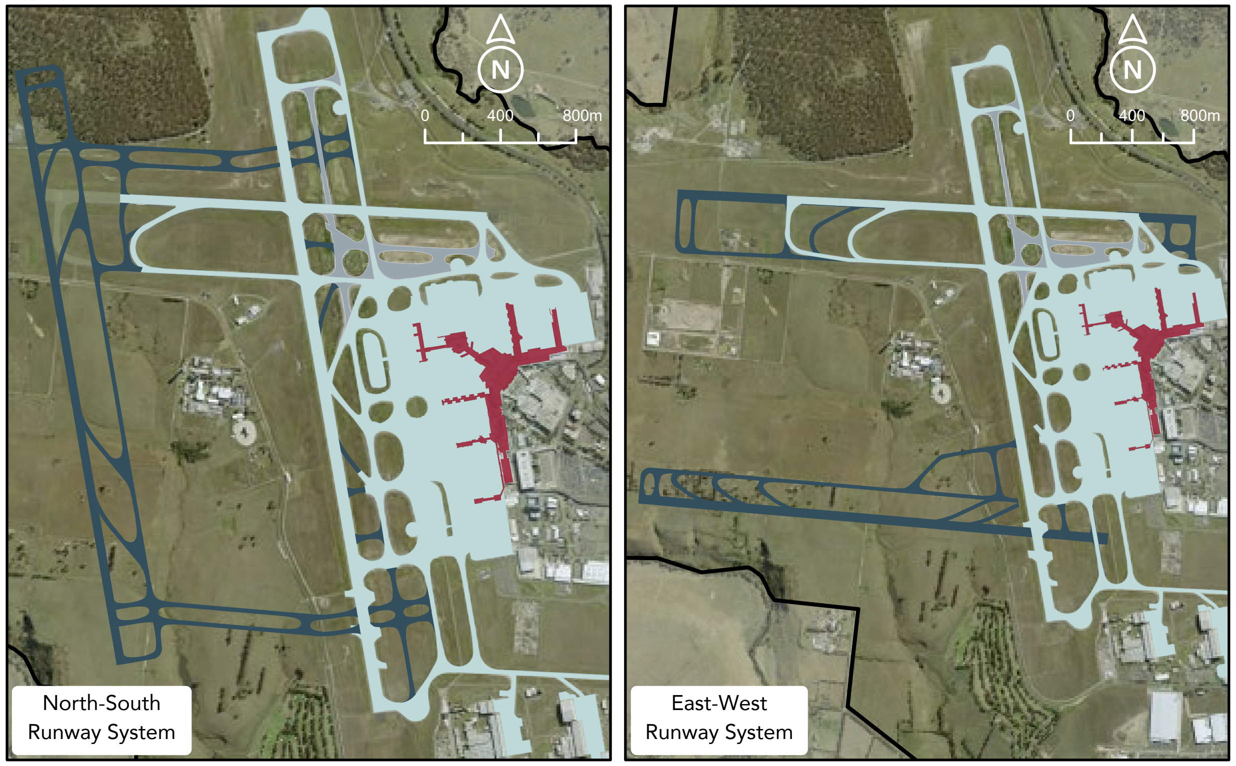
The Planning Review yielded strong evidence to suggest the north-south system had become the superior option in terms of availability, capacity, long-term investment profile and overall community impacts. Findings from the review are detailed in **Table A3.1**.

From June to November 2019, Melbourne Airport consulted government, regulators and airlines to validate the Planning Review. The airport also engaged with local communities regarding a potential change to the orientation of the next runway through in-person consultations, group workshops and online engagement.

A3.3.6
Preferred runway orientation

In November 2019, Melbourne Airport announced a revised preference for the third runway, to be oriented north-south. This was based on the Planning Review, and to optimise outcomes for the airport and its stakeholders.

Figure A3.3
Planning Review layouts



Source: APAM

Table A3.1
Planning Review findings

Consideration	Build north-south first	Build east-west first
Flight capacity maximum availability of the runway based on airport operations and aircraft taxiing	A north-south runway technically facilitates the greatest number of flights. Delays the construction of the east-west runway.	An east-west runway does provide additional capacity; however, the north-south runway would need to be constructed much sooner than anticipated to ensure operational resilience.
Operational availability time the runway is available for safe operation based on meteorological forecasts and associated wind	Minimal closures are expected based on cross-wind modelling.	Runway throughput would be frequently reduced on strong cross-wind days and the north-south runway would need to be completed within a decade for operational resilience.
Community impacts	Additional flights will be routed on flight paths above Keilor and Bulla.	Additional flights would be routed on flight paths above Gladstone Park, Jacana and hillside. However, Keilor and Bulla would experience additional flights within a decade.
Environmental impacts	Greater initial impact on Grey Box Woodland, including Swift Parrot habitat. Greater initial impact on Golden Sun Moth habitat. Marginally less impact on Natural Temperate Grassland of the Victorian Volcanic Plain. Comparable impact to Growling Grass Frog habitat.	Less initial impact on Grey Box Woodland, including Swift Parrot habitat. However, impact (extent as per north-south) would occur within a decade. Less initial impact on Golden Sun Moth habitat. However, impact (extend as per north-south) would occur within a decade. Greater impact on Natural Temperate Grassland of the Victorian Volcanic Plain. Comparable impact to Growling Grass Frog habitat.
Cultural heritage impacts	A formal management plan will be required to preserve any areas of Aboriginal heritage.	
Cost to Melbourne Airport	A north-south runway would attract a high initial cost, however, this would be offset by operational efficiencies and additional capacity.	The initial cost for an east-west runway is lower, however additional cost for a north-south runway occurs within a decade.
Future planning	A north-south runway would provide operational capacity beyond 2040.	A north-south runway would be required within a decade to meet demand.

Source: APAM

A3.3.7
Runway length and taxiway configuration

A3.3.7.1
New north-south runway length (16R/34L)

The following three runway-length design options were identified for delivery of the new north-south runway (16R/34L):

Option 1: 2,600 metre runway

This option is the development of a new north-south runway (16R/34L) that is 2,600 metres in length as illustrated in **Figure A3.4**.

It introduces a new, short parallel runway. However, this would create an unbalanced parallel system, with a large number of flights unable to utilise the short runway.

It would require all international departures to use the existing north-south runway (16L/34R) and move domestic operations to 16R/34L. This would create inefficiencies in the system, and significantly increase emissions and track miles for most aircraft movements due to the need to cross domestic and international flights in the air. (This is because the majority of domestic flights are traveling to destinations to the north-east, and the majority of international flights are travelling to destinations to the north-west.)

While the infrastructure footprint in this option is reduced compared to longer runway options, the development footprint of both would be similar. This is because of the need to clear the terrain and vegetation to the north (including the Grey Box Woodland) to protect the runway's Obstacle Limitation Surfaces (OLS) and facilitate safe aircraft operations.

Option 2: 3,300m runway

This option is the development of a new north-south runway (16R/34L) that is 3,300 metres in length as illustrated in **Figure A3.5**.

It introduces a new, long parallel runway and would create a balanced parallel-runway system, with nearly all aircraft being able to use 16R/34L.

It brings the runway's northern end closer to Sunbury Road and Bulla. Because the terrain rises to the north, the runway platform would need to be raised to ensure clearance of Sunbury Road and existing obstacles. This would create a significantly greater earthworks requirement compared to a shorter runway option. The additional earthworks would extend the construction period by a number of years, add cost to the program, and create additional construction ground-traffic and environmental impacts.

Option 3: 3,000 metre runway

This option is the development of a new north-south runway (16R/34L) that is 3,000 metres in length as illustrated in **Figure A3.6**.

It introduces a new, medium-length parallel runway creating a reasonably balanced parallel-runway system, with a large number of flights still being able to utilise 16R/34L.

However, the topography of the proposed site requires 16R/34L to slope up to the north at approximately one per cent. This reduces the effective runway length for aircraft departures to the north, and creates an imbalance between northerly and southerly operations. In order to compensate for the runway slope (without introducing the issues associated with Option 2) a ~200-metre starter extension (Option 3a) is provided at the southern end as illustrated in **Figure A3.7**. Because of this starter extension, the arrival threshold for aircraft on runway 34L would be displaced ~200 metres from the start of pavement.

Option 3a has been selected as the optimal layout for M3R, and is thus presented and evaluated throughout this MDP.

A3.3.7.2
Existing east-west runway length (09/27)

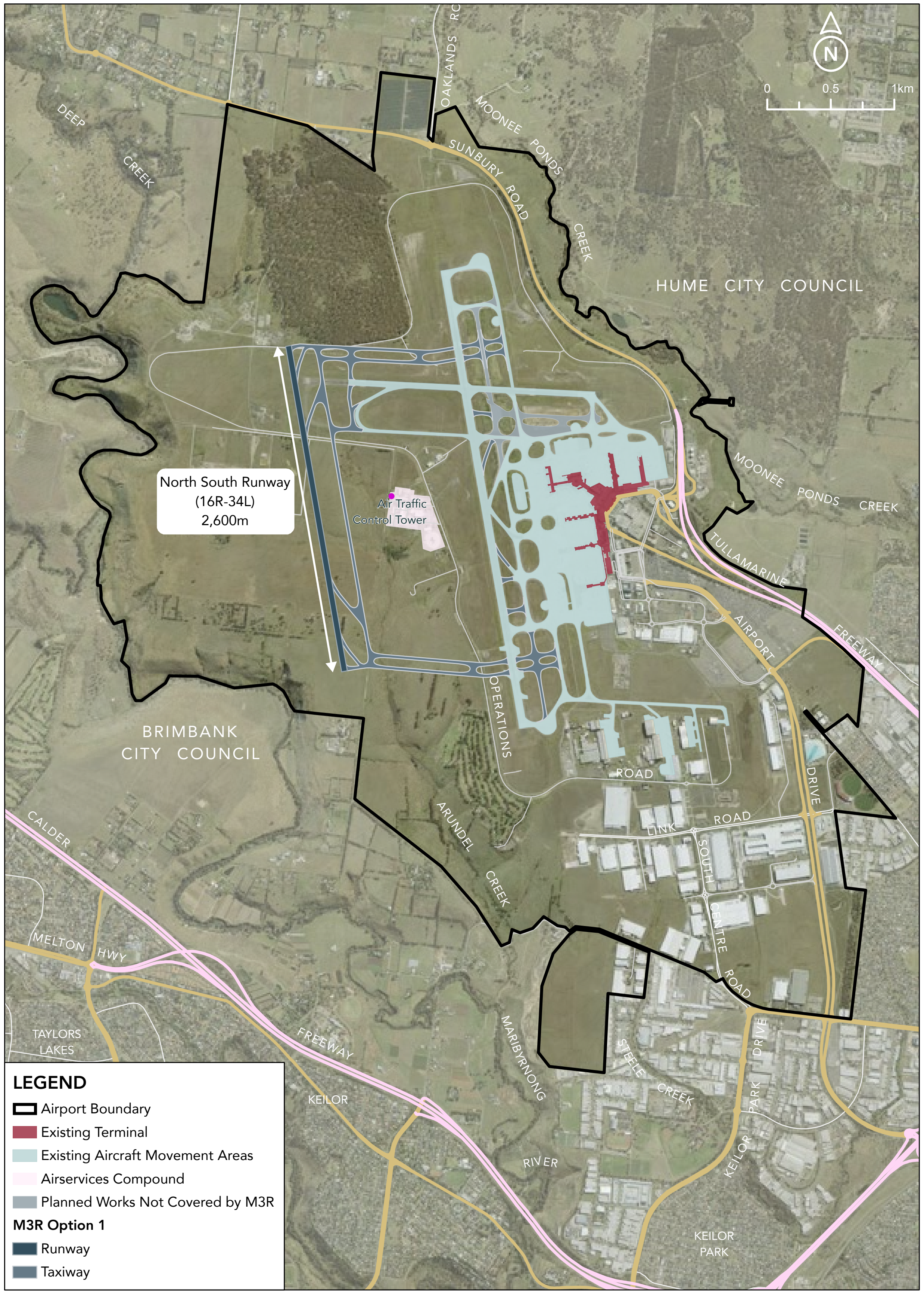
The western end of existing east-west runway (09/27) and existing Taxiway Mike (providing access/egress from western end of 09/27) is within the runway footprint for the new runway. It is airport-industry best practice to avoid this configuration in the interests of safety and operational efficiency.

The profile of the existing east-west runway also slopes down from east to west, being located approximately two metres below the proposed level of the new runway (which has been established to ensure obstacle clearance to the north).

Taking the above factors into account, Melbourne Airport concludes that for M3R the existing east-west runway should be shortened by approximately 346 metres at the western end. This would clear the western runway end and the associated Runway End Safety Area (RESA) area from the graded strip for the new runway. The proposed new runway length for the existing east-west runway (09/27) is 1,940 metres.

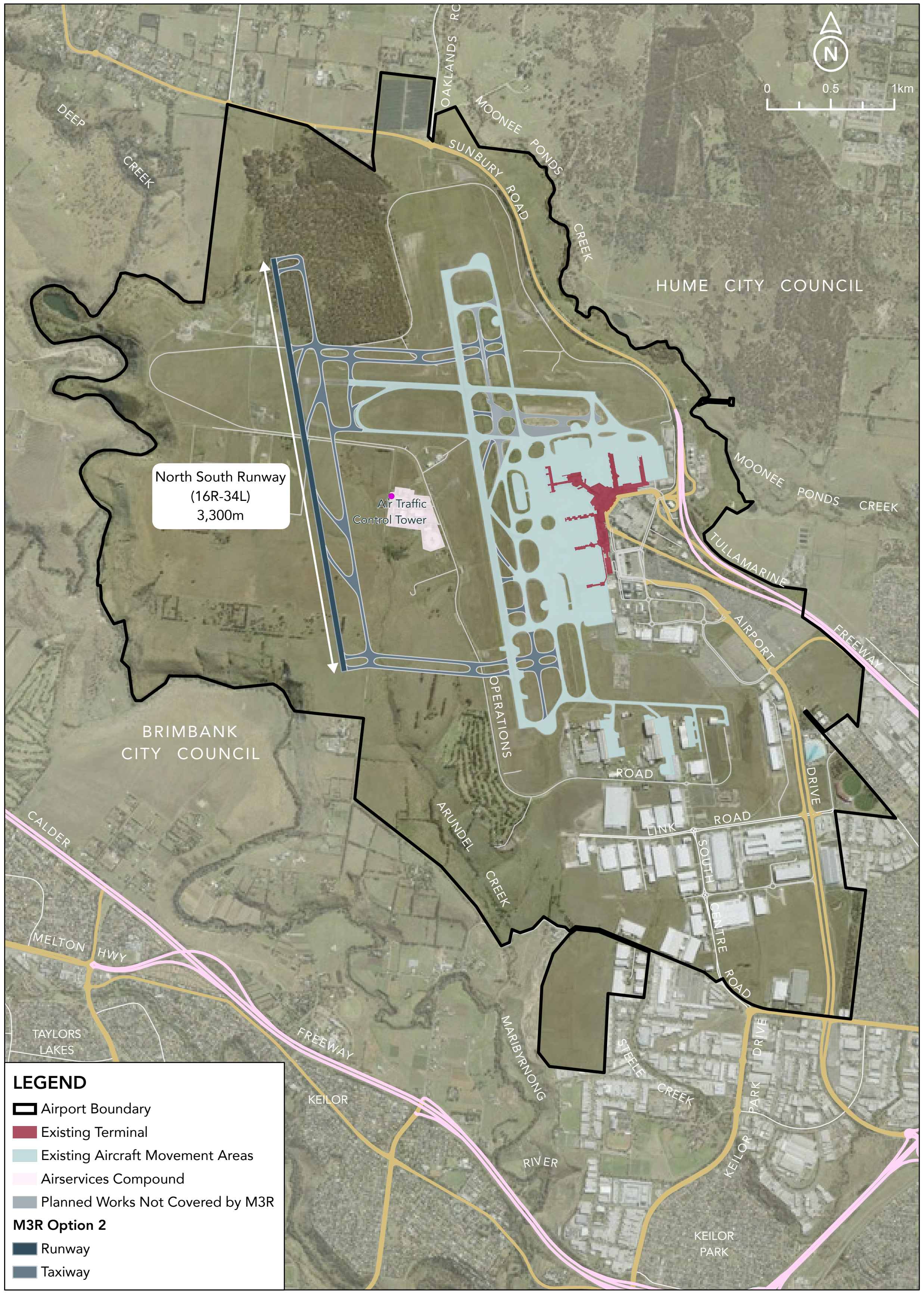
Alternative options to extend the existing east-west runway (09/27) to the west would require complete reconstruction of approximately half the existing east-west runway (09/27) to match the ground level of the new runway, and add significant additional cost to the program for a limited operational benefit.

Figure A3.4
Option 1 layout



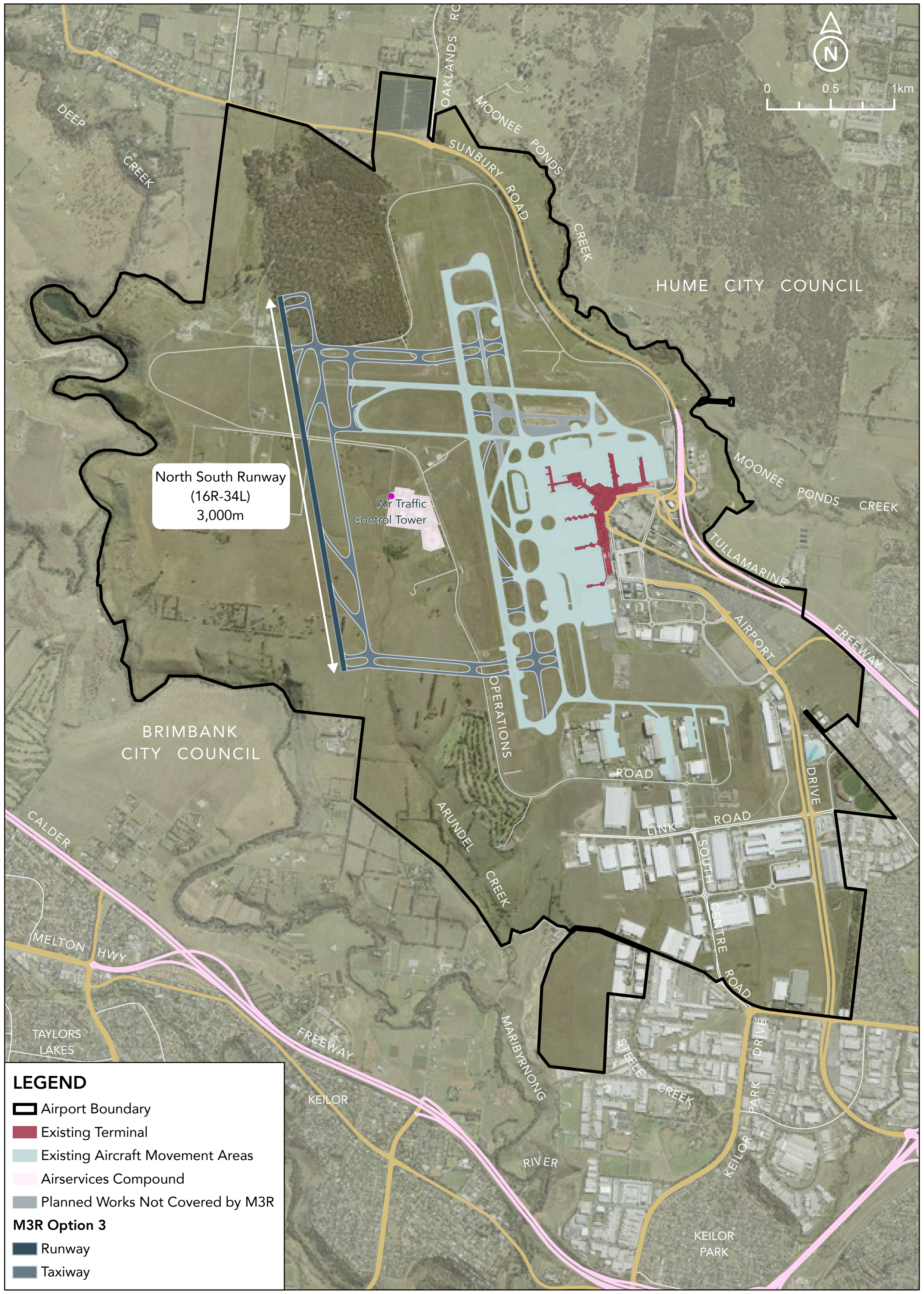
Source: Beca

Figure A3.5
Option 2 layout



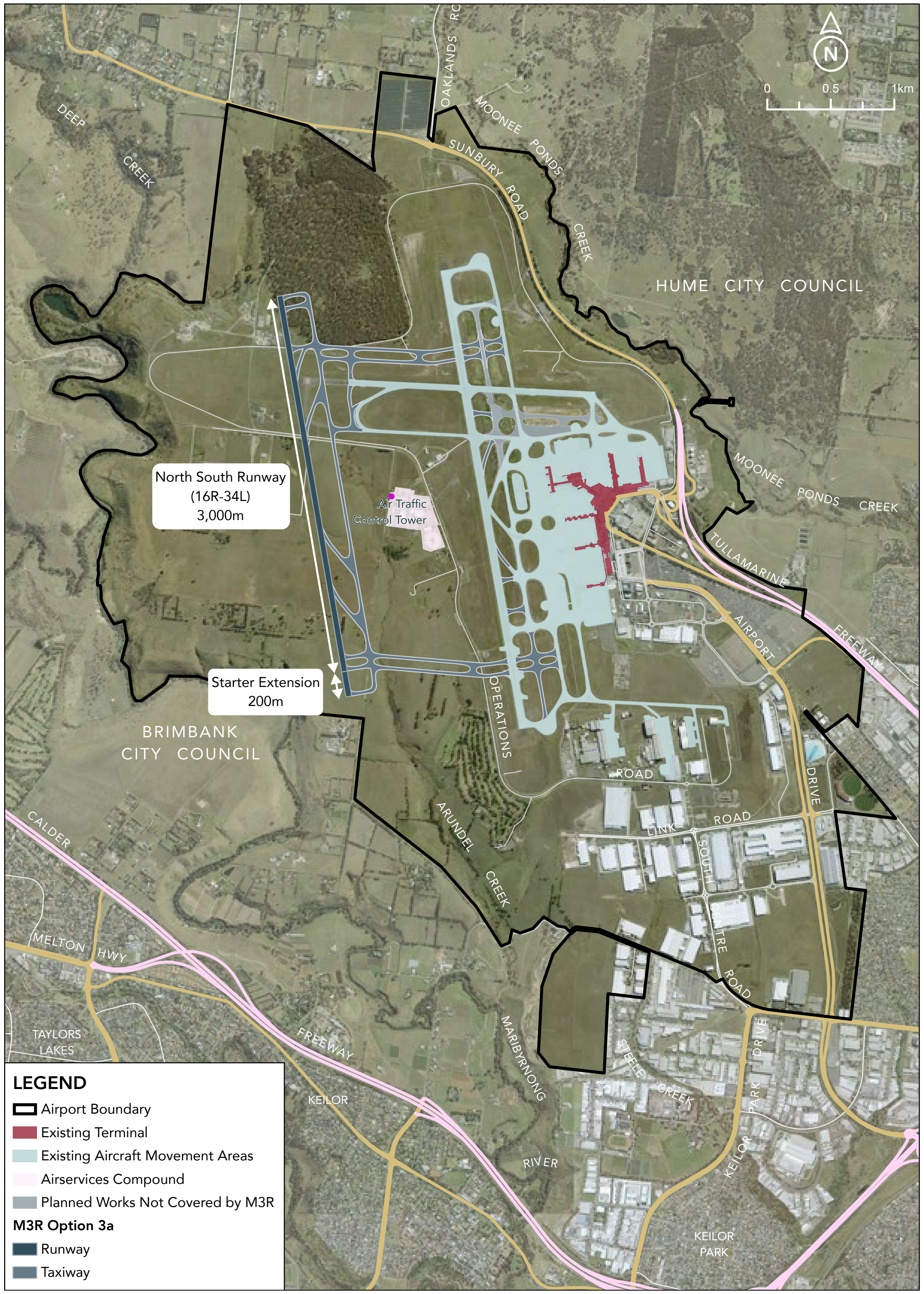
Source: Beca

Figure A3.6
Option 3 layout



Source: Beca

Figure A3.7
Option 3a layout (selected for M3R)



Source: Beca

A3.3.7.3
Taxiway configuration

The initial M3R design process considered a range of taxiway configurations. The following additional infrastructure was evaluated and subsequently excluded from the design. If required at a later date, these infrastructure developments would be subject to their own MDP.

End-around taxiways

End-around taxiways are an alternative means of managing runway crossings, and could provide aircraft taxi routes around the northern and/or southern end of the existing north-south runway (16L/34R) without interrupting operations of that runway. Typical end-around taxiway routes are illustrated in **Figure A3.8**.

End-around taxiway/s would require an increase in the disturbance footprint and have a significant impact on Gate 22 (including contractor compounds), the Qantas maintenance base and the existing golf course, as well as adding significant cost to the program.

As described in Chapter **E4: Draft Runway Operating Plan**, runway crossings can be safely managed without adversely compromising throughput by using crossing taxiways. End-around taxiways have therefore been discounted as an option.

Dual parallel taxiway

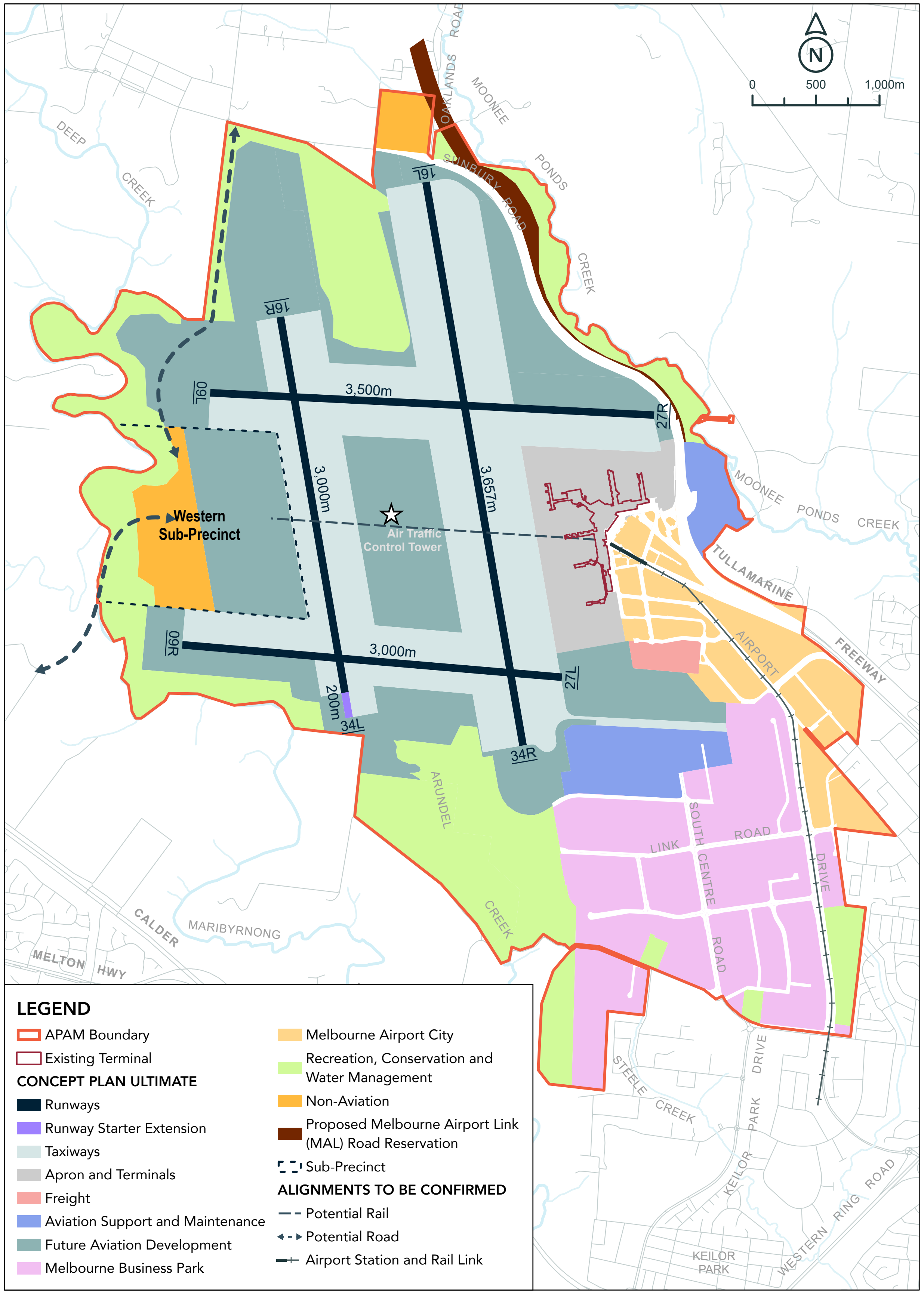
The long-term taxiway layout for Melbourne Airport includes dual parallel taxiways serving the new north-south runway (16R/34L) on the eastern side, and a single parallel taxiway on the western side, as illustrated in Figure A3.9 (*Long Long-term Development Concept plan for Melbourne Airport*, Master Plan 2018).

The proposed M3R taxiway layout includes a single parallel taxiway to serve the new north-south runway (16R/34L). This is sufficient to meet demand and provide adequate flexibility over the short and medium-term. Avoiding the development of additional parallel taxiways reduces impacts within the disturbance footprint for the program, and specifically, reducing the impact to Arundel Creek.

Figure A3.8
Typical end-around taxiway

Source: Beca

Figure A3.9
Long-term development concept for Melbourne Airport



Source: Melbourne Airport Masterplan 2018 Figure 8-3

A3.3.8
Future design refinement

A3.3.8.1
Development footprint

The M3R development footprint has been defined through an environmental impact assessment of early design. The current development footprint is as illustrated in **Figure A3.10**. More refinement and reduction to impacts will be achieved during the further design development process, when final construction impacts and design requirements are understood.

A3.3.8.2
Airspace design

Chapter C2: Airspace Architecture and Capacity describes the approach taken to the preliminary airspace design for M3R at Melbourne Airport.

It describes in detail the options available to Melbourne Airport to mitigate aviation-noise impacts, noting that the safety of flight operations is paramount and procedures are often dictated by standards ensuring the safe operation of airspace. The flight paths and procedures also have to permit efficient processing of the required volume of air traffic. As a consequence of these essential requirements, the opportunities to mitigate aircraft noise and other emissions through airspace design are limited.

However, several measures have been incorporated into the airspace architecture design in accordance with the current ruleset, with the specific aim of mitigating aircraft noise and vibration, greenhouse gas emissions, and social and health impacts.

The avoidance, mitigation and management measures of the preliminary airspace design are summarised in **Chapter C2: Airspace Architecture and Capacity**, in which the benefits relating to aircraft-noise impacts on communities are divided into four regions: north- east, north-west, south-east and south-west.

A3.4
CONCLUSION

The assessment of options and alternatives has considered alternative approaches to meeting the forecast passenger growth and demand at Melbourne Airport, and why the need for a parallel runway system – in the north-south orientation – is the most appropriate approach.

The inclusion of the four-runway development options in historic master plans and the rationale – including the environmental and community benefits – for the preferred north-south runway orientation are described.

Option 3a has been selected as the optimal layout for M3R, and is thus presented and evaluated throughout this MDP.

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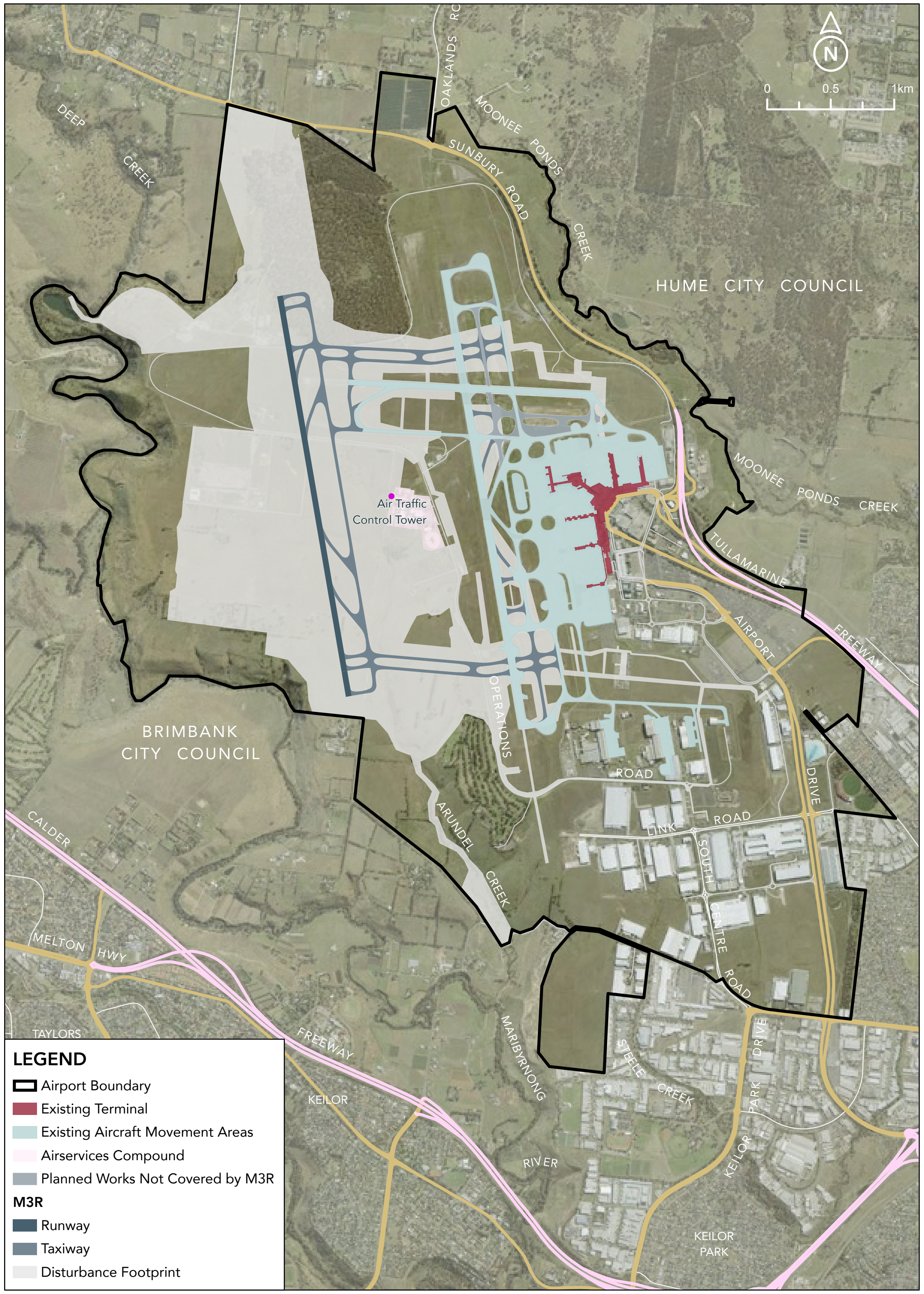
Figure A3.10
Preliminary Draft MDP development footprint



Source: APAM

Chapter A4
Project Description

Summary of key findings:

- Melbourne Airport's Third Runway (M3R) project will develop a north-south oriented parallel runway system.
- The major components of M3R are:
  - Construction of a new parallel north-south runway (16R/34L)
  - Modification of existing east-west runway (09/27)
  - Associated infrastructure including taxiways, navigational aids, security fencing and utilities.
- M3R has been planned and designed in accordance with the requirements of the Civil Aviation Safety Authority's Manual of Standards, International Civil Aviation Organisation standards and manuals, and US Federal Aviation Administration advisory circulars.
- Arundel Creek will be diverted under new cross-field taxiways. Additional stormwater management measures will be built to manage stormwater flows and water quality.
- A road underpass will be provided under cross-field taxiways to provide access to the midfield area.
- New Aviation Rescue Fire Fighting Service facilities and infrastructure may be necessary to comply with regulatory requirements for the new north-south runway (16R/34L).

CHAPTER A4 CONTENTS

CHAPTER A4 FIGURES

CHAPTER A4 TABLES

A4.1 INTRODUCTION

This chapter describes the design aspects of the M3R development (excluding construction which is described in **Chapter A5: Project Construction**). Specifically, it discusses the following:

- Site planning
- Preliminary design process
- Design requirements
- Airfield pavement
- Subsurface and geotechnical design
- Airport drainage
- Lighting design
- Perimeter and security design
- Landscape design
- Ancillary facilities and utilities.

A4.2 OVERVIEW

M3R is consistent with the Melbourne Airport 2022 Master Plan (proposed) and the principal objectives of the airside development plans of Australia Pacific Airports (Melbourne) Pty Ltd (APAM).

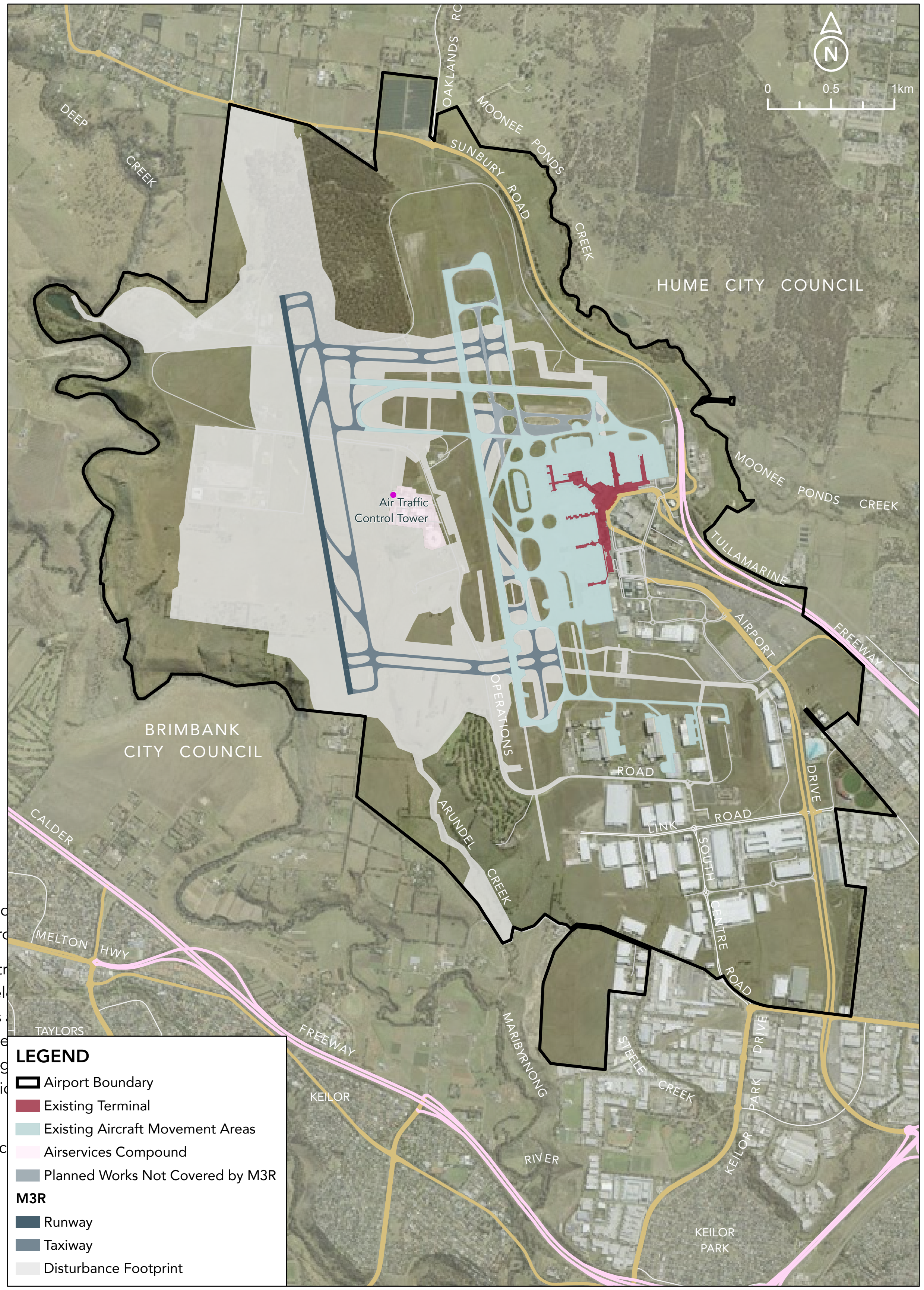
M3R will develop a north-south oriented parallel runway system to facilitate the forecast airline demand at Melbourne Airport. It includes construction of new parallel north-south runway 16R/34L, modification of existing east-west runway 09/27 and associated 'all of site' works.

During construction, there will be designated
support the works and construction access ro

The project's scope, design detail and constr
methodologies are subject to ongoing devel
and optimisation. However, these processes
expected to significantly change M3R's 'deve
footprint' (the maximum extent of potential g
disturbance during construction and operatio
proposed operation.

Figure A4.1 gives an overview of M3R's key c

Figure A4.1
M3R Overview



Source: APAM/BECA

A4.3
SITE PLANNING

A4.3.1
Airport design standards

M3R has been designed in accordance with the relevant national and international infrastructure design regulations, standards and guidelines. These include:

- Civil Aviation Safety Regulations 1998
- Civil Aviation Safety Authority (CASA) Manual of Standards (MoS) Part 139 – Aerodromes
- CASA Civil Aviation Advisory Publications (CAAPs) and Advisory Circulars (ACs)
- National Airports Safeguarding Framework guidelines
- Australian Standards
- Austroads and VicRoads guidance, standards and technical notes
- Melbourne Airport technical standards
- International Civil Aviation Organisation (ICAO) standards and manuals including ICAO Annex 14 and Aerodrome Design Manuals
- US Federal Aviation Authority (FAA) advisory circulars.

A4.4
PRELIMINARY DESIGN PROCESS

The preliminary design process for M3R commenced in 2014 with feasibility studies and consideration of approvals processes, based on the indicative third runway and runway extensions outlined in the 2013 Melbourne Airport Master Plan.

As described in **Chapter A3: Options and Alternatives**, the design initially promoted a parallel east-west system. Concept design for this system was progressed between 2015 and 2018.

Design and delivery activities were paused in late 2018 while a planning review was conducted to address emergent influences on the viability of an east-west parallel runway system. Refer to **Chapter A3: Options and Alternatives** for the rationale for the program hold, review and subsequent change of runway orientation.

In late 2019, following Melbourne Airport's announcement of the revision of the third runway project to align north-south (as the M3R development project) preliminary design works recommenced.

Initial investigations informing the preliminary design included geotechnical investigations, and preliminary heritage and ecological surveys. Design options were investigated to understand and where possible, quantify the impacts of design elements on the environment, airport security, aviation operations and constructability.

Analysis of current and forecast capacity constraints and the economics of M3R were also considered during this process.

Consequently, M3R evolved to optimise and balance the outcomes for Melbourne Airport, local communities and the environment.

A4.5
RUNWAY AND TAXIWAY DESIGN

A4.5.1
New north-south runway (16R/34L)

The new north-south runway (16R/34L) will be located approximately 1,311 metres to the west of, and parallel with, the existing north-south runway (16L/34R) as illustrated in **Figure A4.2**.

16R/34L has a planned length of 3,000 metres. Works have been designed to avoid encroachment into the escarpment of Maribyrnong River to the west, and Arundel Creek valley to the east.

The runway will be equipped with a ~200 metre runway starter extension at its southern end to serve operating requirements for aircraft departing to the north.

A4.5.2
Existing east-west runway (09/27)

The existing east-west runway (09/27) will be shortened by approximately 346 metres at its western end. This is necessary to deconflict the Runway End Safety Area (RESA) of 09/27 and the graded runway strip for 16R/34L (as illustrated in **Figure A4.2**).

A4.5.3
Design aircraft and traffic

The largest aircraft expected to use an airport determines an airfield's planning criteria, including infrastructure separation and design geometry specifications. Collectively these elements enable safe and efficient operations on runways, taxiways and aprons. M3R is designed to accommodate current and expected aircraft fleets, including the Boeing B777-9X (i.e. ICAO Code F aircraft), on runways and taxiways.

Long-term forecasts have been used to assess the demand that will be placed on the runways and taxiways at Melbourne Airport. M3R is being designed to increase and enhance the airport's capacity to efficiently and effectively meet this demand.

The predominant operations at Melbourne Airport are international, domestic and cargo aircraft movements. M3R is being designed to accommodate the projected traffic detailed in **Table A4.1**. These figures exclude movements not classified as regular public transport (RPT) as they are not critical aircraft for infrastructure design.

Refer to **Chapter A1: The Project - Introduction** for explanation of the 'opening year' concept.

Refer to **Chapter A2: Need for the Project** to see full aircraft movements and COVID-19 forecast.

Table A4.2 summarises the fleet mix analysed for design purposes.

Table A4.1
Projected annual RPT traffic movement

Operating year	International aircraft movements	Domestic aircraft movements	Total aircraft movements
Opening Year	71,800	205,000	276,800
+5 Years	88,100	231,600	320,700
+10 Years	105,400	257,200	362,600
+15 Years	121,500	283,200	404,700
+20 Years	137,800	311,200	449,000

Source: APAM

Table A4.2
Indicative design traffic fleet mix at opening year +20 years

Mode	Aircraft type	Percentage of movements
Cargo	B747-8F	0.1%
	B747-400F	0.2%
	B777-200F	0.1%
	A330F	0.1%
	A321P2F	0.4%
	B738BCF	1.4%
	B737-400F	0.3%
	B737-300F	0.3%
Passenger aircraft - International	B777-9	2.1%
	B777-8	0.0%
	A350-1000	3.2%
	A350-900	6.8%
	B787-10	1.7%
	B787-9	5.0%
	B787-8	2.2%
	A330neo	0.6%
	B797	0.8%
	A321XLR	0.6%
	A321neo	0.2%
	A320neo	2.0%
	B737 MAX10	0.1%
	B737 MAX9	0.8%
	B737 MAX8	3.0%
Passenger aircraft - domestic	B787-9	0.5%
	B787-8	0.8%
	B797	2.1%
	A321XLR	8.1%
	A320neo	13.6%
	B737 MAX10	13.0%
	B737 MAX8	26.8%
	Embraer 170	0.1%
	A220	0.9%
	ATR 72-500	0.2%
	ATR 42-600	2.0%

Source: APAM

A4.5.4
Geometric design

The geometric design of M3R will be in accordance with the CASA Manual of Standards - Part 139, with supplementary guidance from ICAO Annex 14. Airfield characteristics such as the dimensions and layout of runways, taxiways, RESA, navigation aids and access roads will be designed in accordance with the standards described in the following sections.

A4.5.5
Runway length

Runway-length requirements are broadly determined by the performance characteristics of expected aircraft, and associated specifications as defined by ICAO. Runway length may also be influenced by site-specific conditions such as elevation, temperature, topography and obstacle environment.

Runway 'declared distances' define the lengths of runway infrastructure provided for take-off, landing and aborted take-off movements. They may extend beyond the length of physical runway pavement. Additionally, a Runway End Safety Area (240 metres long and 150 metres wide) is provided at the end of each runway to improve protections for aircraft in the event of a runway over-run incident.

These characteristics are governed by a range of regulatory compliance requirements.

A4.5.5.1
New north-south runway (16R/34L)

The new north-south runway (16R/34L) is designed to accommodate ICAO Code F aircraft (e.g. A380) and will be 3,000 metres long.

The topography of the proposed site requires that 16R/34L rises from south to north at a gradient of approximately one per cent. This slope counteracts effective runway length for aircraft departures to the north. In order to compensate for the runway slope a ~200 metre starter extension is therefore provided at the southern end. Because of this, the arrival threshold for aircraft on runway 34L will be displaced ~200 metres from the start of pavement.

The planned runway declared distances for runway 16R are:

- Take-Off Run Available (TORA) ~3,000 metres
- Take-Off Distance Available (TODA) ~3,060 metres
- Accelerate Stop Distance Available (ASDA) ~3,000 metres
- Landing Distance Available (LDA) ~3,000 metres.

The planned runway declared distances for runway 34L are:

- Take-Off Run Available (TORA) ~3,200 metres (including starter extension)
- Take-Off Distance Available (TODA) ~3,260 metres (including starter extension)
- Accelerate Stop Distance Available (ASDA) ~3,200 metres (including starter extension)
- Landing Distance Available (LDA) ~3,000 metres.

A4.5.5.2
Existing east-west runway (09/27)

The existing east-west runway (09/27) will be shortened by approximately 346 metres at the western end.

The planned runway declared distances for runway 09 are:

- Take-Off Run Available (TORA) ~1,940 metres
- Take-Off Distance Available (TODA) ~2,090 metres
- Accelerate Stop Distance Available (ASDA) ~2,000 metres
- Landing Distance Available (LDA) ~1,940 metres.

The planned runway declared distances for runway 27 are:

- Take-Off Run Available (TORA) ~1940 metres
- Take-Off Distance Available (TODA) ~2,000 metres
- Accelerate Stop Distance Available (ASDA) ~1,940 metres
- Landing Distance Available (LDA) ~1,940 metres.

A4.5.6
Taxiways

Taxiways enable the ground movement of aircraft between runways, terminals and aprons.

Rapid-exit taxiways are angled and allow landing aircraft to leave a runway at higher speed than a right-angle exit. This increases runway availability. Melbourne Airport's taxiway configuration will be altered and expanded by M3R as shown in Figure A4.3.

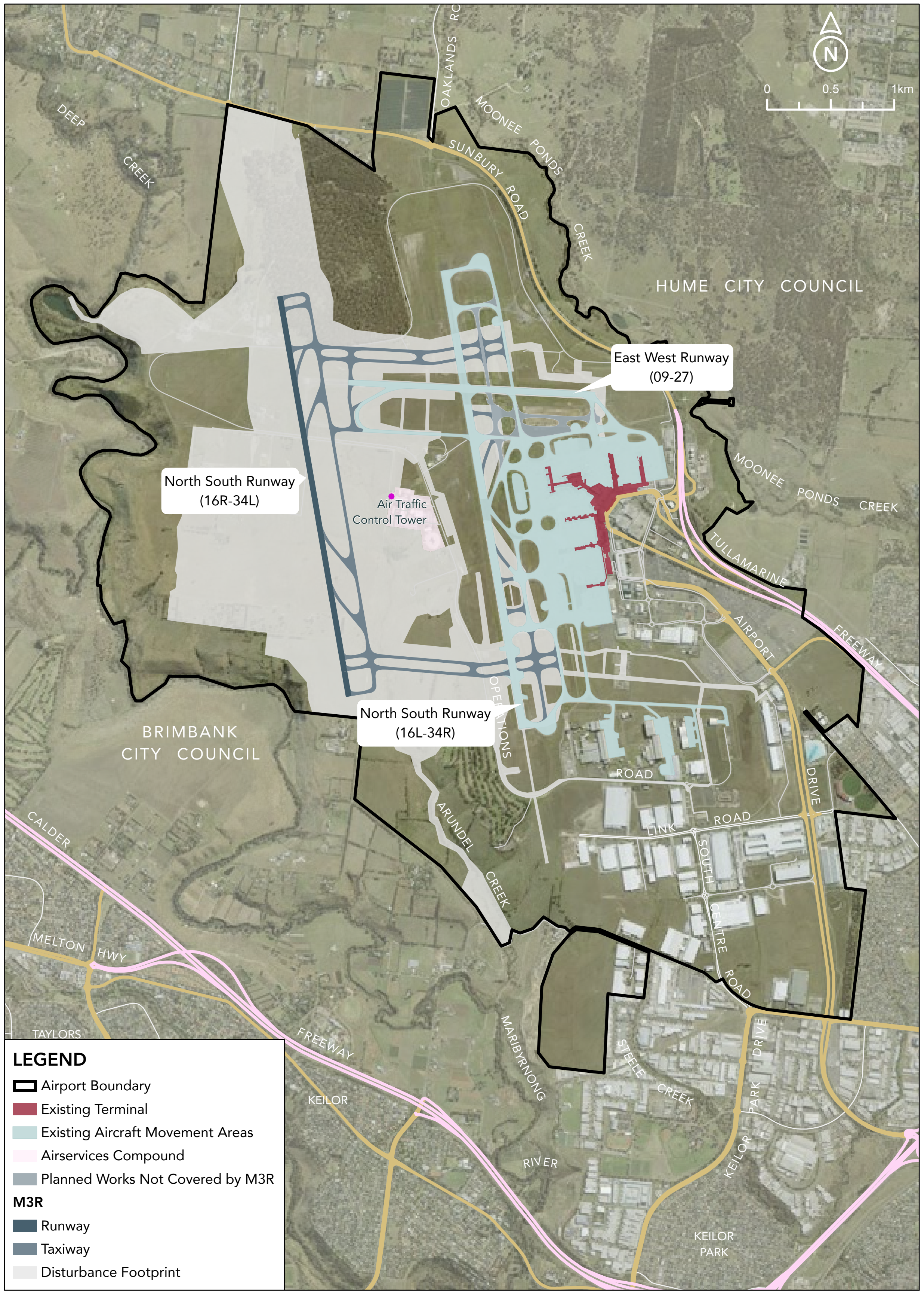
The new north-south runway (16R/34L) will be supported by:

- Rapid-exit taxiways: four are proposed. Two for aircraft landing from the south on Runway 34L, and two for aircraft landing from the north on Runway 16R. Their precise location will be agreed with stakeholders as part of detailed design.
- Entry taxiways: six are proposed. Three for aircraft departing to the north on Runway 34L, and three for aircraft departing to the south on Runway 16R.
- Parallel taxiway: a full-length parallel taxiway is proposed.

The existing north-south runway (16L/34R) will be provided with additional taxiway infrastructure to facilitate increased capacity and connectivity with 16R/34L (including safe runway crossings):

- Rapid Exit taxiways: two new rapid exit taxiways are proposed to serve the existing north-south runway. They will supplement the existing two rapid exit taxiways. Their precise locations will be agreed with stakeholders as part of detailed design.
- Entry taxiways: three are proposed as additional intersection departure locations.
- Crossing taxiways: four will be provided to facilitate safe crossing of the existing north-south runway (16L/34R) for aircraft arriving or departing from the new north-south runway (16R/34L). They are proposed to extend through 16L/34R and connect to the new parallel taxiway serving 16R/34L.

Figure A4.2
Location of the new north-south runway (16R/34L) and shortening of east-west runway (09/27)



Source: APAM/BECA

The existing east-west runway (09/27) will be provided with new entry/exit taxiways to facilitate use of the shortened runway.

In addition, the following modifications will be made to existing taxiways:

- Taxiway Victor will be extended south from the intersection with Taxiway Juliet to Taxiway Kilo.
- Taxiway Echo west of existing north-south runway (16L/34R) will be reconstructed and interface with the new parallel taxiway serving the new north-south runway (16R/34L).
- Taxiway Mike will be demolished.
- Taxiway Zulu will be extended through to the existing north-south runway (16L/34R).

A4.5.7
Aviation operations

M3R went through a design process to achieve the most effective layout for Melbourne Airport's projected operation.

The design must allow continuous operation of the existing aerodrome throughout construction. In final operation, it must enable safe and efficient runway crossings by aircraft, and rapid transfer of modes as necessary for effective capacity utilisation.

The new north-south runway (16R/34L) will be capable of supporting all commercial aircraft (noting that for some routes aircraft need use of the existing north-south runway's greater length). All arriving and departing aircraft movements will be managed by Airservices Australia in accordance with approved airspace and air traffic control measures.

New flight paths for approaches and departures to/from 16R/34L, and changes to existing flight paths, will be required. Flight paths for M3R have been developed by Melbourne Airport with assistance from Airservices Australia, considering the current design criteria that apply to airspace design and operation, as well as the updates to these rules expected by M3R opening. These flight paths reflect a careful optimisation of safety, efficiency, noise, environmental and social impact considerations. Changes to airspace associated with M3R are discussed further in **Chapter C2: Airspace Architecture and Capacity.**

A4.5.8
Staged development of runway and taxiway system

The M3R MDP details the full-build configuration as outlined in this chapter. However, there is flexibility for incremental development of the runway and taxiway network to meet commercial and operational requirements. **Figure A4.4** is provided as an example of a potential 'opening day' layout for which some of the taxiway infrastructure has been deferred. Taxiway stubs may be constructed so as to reduce future operational impacts from later construction activities. It is expected that all taxiway infrastructure shown in **Figure A4.1** will be constructed within 10 years of the new north-south runway (16R/34L) opening.

A4.6
AIRFIELD PAVEMENT

A4.6.1
Existing runway and taxiway pavements

Runway and taxiway pavements at Australian airports generally comprise flexible (asphalt) and rigid (concrete) structures designed to support the loads of those aircraft that are routinely expected to use the airfield.

Departing aircraft are generally heavier due to their fuel load. Pavement areas ordinarily utilised for slow and heavy departing aircraft are usually constructed of higher-cost, rigid pavement. Areas that are less frequently trafficked, or where lower loading is anticipated, may be adequately served by lower-cost, flexible pavements.

The existing pavements within the airfield include:

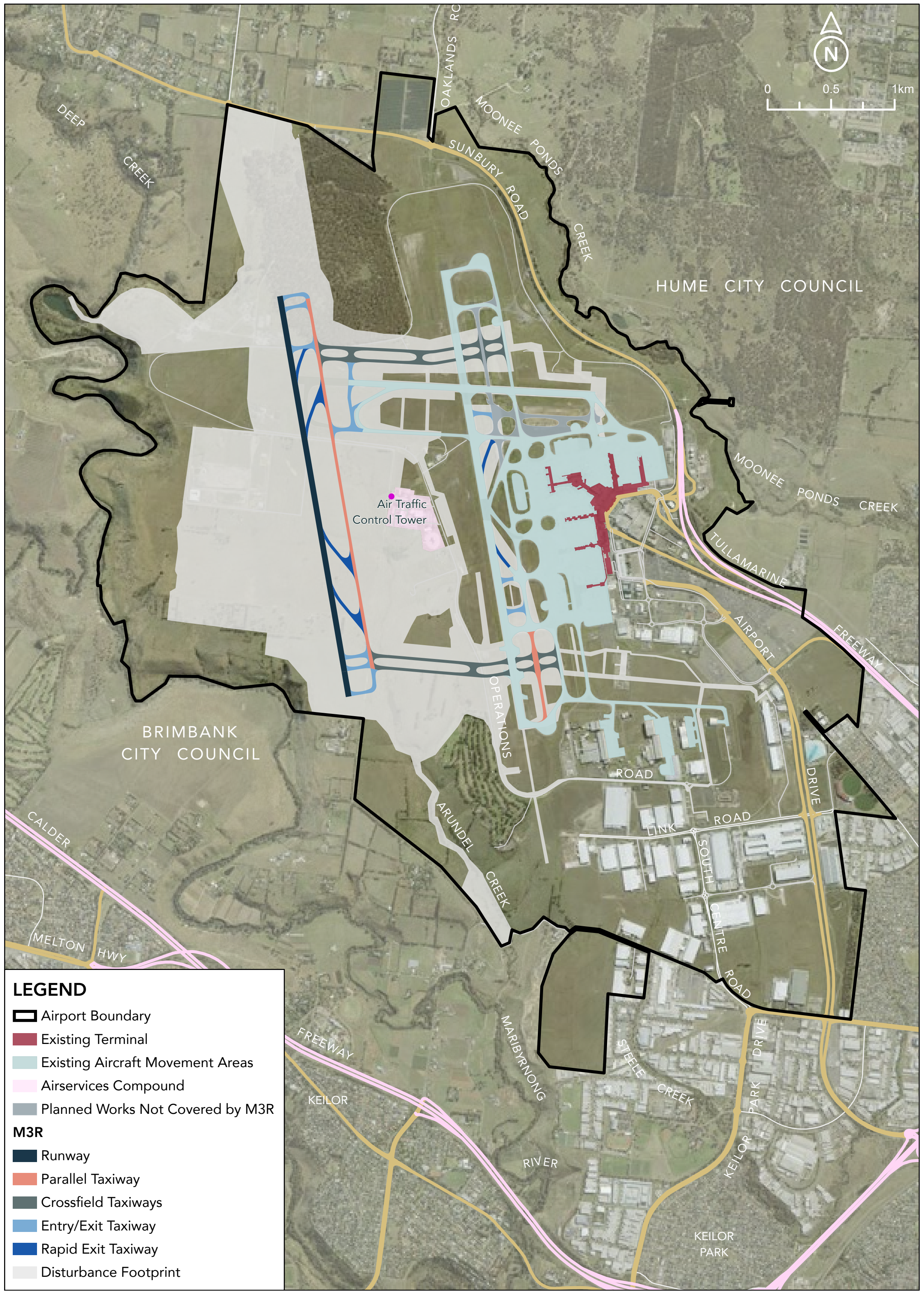
- Runway 16/34: rigid ends, remainder flexible
- Runway 09/27: rigid eastern end, remainder flexible
- Taxiways Echo, November and Mike: flexible
- Taxiways Foxtrot and Golf: flexible at runway connection, transitioning to rigid
- All other taxiways: rigid
- All aprons: rigid.

A4.6.2
Design considerations

The design of runway and taxiway pavements has been prepared taking into account factors including the design aircraft and traffic (as discussed in **Section A4.5.3**), geotechnical considerations and environmental conditions. The design life adopted for the structural design of the pavements included in M3R is 20 years for flexible pavements (for the asphalt surface) and 40 years for rigid pavements.

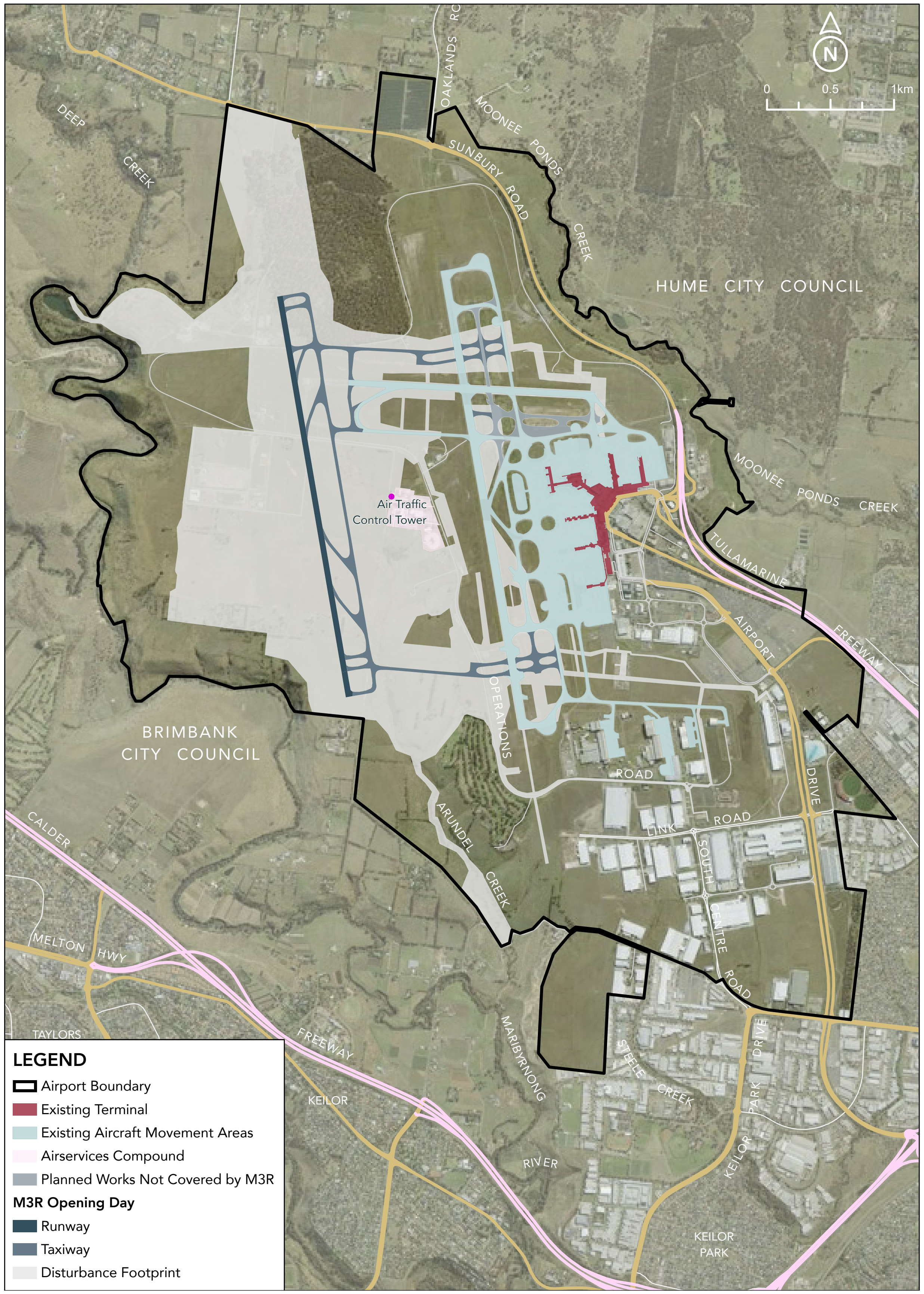
The concept-level pavement structures for M3R have been designed using FAARFIELD design software (the standard software for determining airfield pavement thickness) and validated by other pavement-design software. FAARFIELD accommodates aircraft up to Code F and incorporates guidance from the FAA (as outlined in Advisory Circular 150/5320-6F).

Figure A4.3
Overview of the proposed taxiway configuration



Sources: APAM/BECA

Figure A4.4
Potential opening day layout



Sources: APAM/BECA

A4.6.3
Aircraft and operational considerations

The selection of pavement type and thickness has been designed to accommodate the critical aircraft, fleet mix and forecasted traffic outlined in **Section A4.5.3**. Critical loadings within this fleet mix include those from Airbus A380, Airbus A340-600, Airbus A350-1000 Boeing 777-300 ER and Boeing 777-9X.

Operational activities on different parts of the airfield will influence different pavement characteristic requirements. Rigid pavements are more suitable for aprons as they can accommodate heavy static loads and fuel/oil leaks without damage. Flexible pavements are more appropriate for runways as their elasticity is beneficial for aircraft take-off and landing performance. Flexible pavements can also be used relatively quickly once constructed, and are therefore advantageous for use in areas of the airfield that must remain operational during construction. Some areas of the airfield will have relatively low usage and therefore low strength pavement will suffice.

It is anticipated that some rehabilitation works will be required for the flexible pavements before the end of their design life due to likely deterioration associated with ultra-violet rays and normal deformation. The rate of deterioration will vary based on location, degree of traffic loading and stress across the airfield.

A4.6.4
Pavement types

Lower-strength pavement will be provided in sections of the airfield with relatively low usage and aircraft traffic. Runway strips and runway end safety areas will comprise granular pavement surfaced with topsoil.

Expedient pavement is recommended for interface sections that must be constructed rapidly to minimise the operational disruption of the existing airfield (e.g. the taxiways connecting with 16L/34R). Expedient pavements will comprise rapid-set Portland cement concrete or rapid-set lean concrete surfaced with an asphaltic concrete wearing course, and include a geogrid material to help counter reflective cracking.

A4.6.5
Adopted pavement thicknesses

Flexible pavements generally consist of asphalt overlaying a pavement layer of fine crushed rock. In contrast, rigid pavements consist of a concrete layer over a stabilised base layer. The profile of the pavement varies depending on the underlying geological conditions, including the subgrade and mechanical strength of the ground determined by the California Bearing Ratio (CBR).

The indicative depth and profile of flexible and rigid pavements for the new north-south runway (16R/34L) and new taxiways is shown in **Table A4.3**.

Table A4.3
Pavement types for new north-south runway (16R/34L)

Pavement type	Material	Pavement on clay subgrade (millimetres)	Pavement on rock formation (millimetres)
Flexible pavement	Asphaltic concrete surfacing	125	125
	Fine crushed rock base	400	500
	Fine crushed rock subbase	1,120	-
	Total pavement thickness	1,645	625
	Subgrade CBR	5	15
Rigid pavement	Portland cement concrete	530	465
	Lean mix concrete upper subbase	150	150
	Fine crushed rock lower subbase	300	300
	Total pavement thickness	980	915
	Subgrade CBR	5	15

Source: BECA

A4.7 SUBSURFACE AND GEOTECHNICAL DESIGN

A4.7.1 Geotechnical investigations

Field and desk-based geotechnical investigations were undertaken as part of the concept design to determine the geological and engineering considerations that would influence the design of M3R. Field investigations in 2015, 2017 and 2019 included:

- Excavation of tests pits along the alignment of the new north-south runway (16R/34L)
- Drilled boreholes across the works site and in particular:
    - The northern end of new north-south runway (16R/34L) which is expected to be constructed in cut
    - Along the length of the southern cross-field taxiway, which crosses the Arundel Creek valley
    - Along the alignment of the Operations Road underpass
- Installation of standpipes into select boreholes to measure groundwater levels
- Drilled boreholes and excavation of test pits in locations identified as potential site-won fill sources.

Boreholes were drilled to depths ranging from 8.5 to 20.3 metres and test pits excavated to depths ranging from one to four metres. A desktop review of geological information relating to the site was undertaken, along with a walk-over survey of the site to assess surface exposures and surface conditions. These investigations were supplemented by existing geotechnical information of the airport held by Melbourne Airport including:

- *Geotechnical investigation for the southern precinct program* (Coffey Geotechnics, 2012)
- *Geotechnical investigation for Taxiway Victor south* (Aurecon, 2013)
- *Geotechnical investigation for Taxiway Zulu and T2T apron* (Jacobs, 2015).

The key findings of the geological investigations are summarised in the following sections.

A4.7.2 Ground conditions

Geotechnical investigations and laboratory testing found that ground conditions across the development footprint are generally consistent with the wider region and findings in existing geotechnical information at the airport.

The geology of the southern portion of the site broadly consists of a capping of basalt rock. The surface of the basalt rock has weathered to a residual clay which is encountered at the surface over the majority of the site. The basalt rock mass consists of seams of variable strength, weathering and fracturing. There is a general trend of increasing strength, reduced fracturing and reduced weathering with depth. However, this is not always the case, with zones of more highly weathered and weaker strength material often encountered beneath less weathered and higher strength material. The variability in the basalt layers is likely due to multiple overlying basalt flows creating layers of variable strength and weathered materials.

In some areas, particularly around the Arundel Creek valley, more sandy sediments of the Brighton Group formation, exposed areas of weathered Older Volcanics and colluvial and alluvial deposits were evident. Similarly, investigations near the Maribyrnong River found colluvial materials to depths of 14.5 metres, likely to have been formed as the Maribyrnong River eroded the area to form its current valley. Localised areas of instability were also evident in the banks and along the gullies of the Maribyrnong River and in the Arundel Creek valley.

The geology of the northern portion of the site comprises Newer Volcanics flows overlying Devonian aged Bulla Granodiorite. In some areas the Bulla Granodiorite outcrops at the surface. The granodiorite has weathered to residual sandy clay which is typically encountered at the surface where the granodiorite outcrops. The granodiorite is often extremely weathered close to the surface, with a reduction in weathering with depth. In some areas, high strength, slightly weathered granite rock is encountered. Towards the base of the hill an increasing depth of colluvium is expected. There is also a shallow gully located under north-west extents of the footprint which may comprise an increased thickness of residual or alluvial soils.

Groundwater is present 13 to 15 metres below the proposed level of Operations Road and is not expected to be disturbed by this project.

A4.8 AIRPORT DRAINAGE

A4.8.1 Surface-water features

Surface water is an integral part of the natural environment and there are several surface water features interacting with this development footprint and wider region. The airport sits within a number of catchments managed by Melbourne Water and the Port Phillip and Westernport Catchment Management Authority.

The airport occupies a north- to south-sloping site that is drained by several local creeks and rivers. The airport is bounded by the Maribyrnong River and Deep Creek to the west, and Steele Creek North and Moonee Ponds Creek to the east. The three main catchments of Melbourne Airport are the Maribyrnong River, Arundel Creek and Moonee Ponds Creek, which ultimately discharge into the Yarra River near the outlet to Port Phillip Bay.

The management of stormwater at the airport is the responsibility of Melbourne Airport, with the receiving catchments surrounding the airport being managed by Melbourne Water and the Environmental Protection Agency (EPA) as the statutory regulator. M3R design will have limited impacts to water quality and flows of the surface water, refer to **Chapter B4: Surface Water and Erosion** for details.

A4.8.1.1 Arundel Creek catchment

Arundel Creek is a sub-catchment of the Maribyrnong River (approximately 12 square kilometres) which lies within and external to the airport estate. Arundel Creek is the discharge point for the stormwater generated over approximately half of the airport.

Downstream of the airport infrastructure, Arundel Creek is located in a valley typically 25 metres deep and 250 metres wide. There are two existing dams located on Arundel Creek downstream of the airport.

In terms of land use within the airport estate, the catchment mostly comprises vegetated areas but also includes significant areas of runway, taxiways, aprons, terminal precinct buildings, fire training grounds, aircraft maintenance hangars and workshops, and part of a golf course. Arundel Creek discharges to the lower Maribyrnong River.

The majority of M3R infrastructure is expected to drain into the Arundel Creek catchment.

A4.8.1.2 Maribyrnong River catchment

Adjacent to the Melbourne Airport site, there is a major confluence of Deep Creek and Jacksons Creek. Downstream of this confluence, the waterway is known as the Maribyrnong River.

The majority of the Melbourne Airport site drains to the Maribyrnong River catchment to the west of the airport plateau. The Maribyrnong River has a catchment area of about 1,450 square kilometres at the Calder Freeway, five kilometres downstream of the Airport. The river meanders within in a deeply incised valley, running approximately 70 metres below the edge of the airport plateau. The valley floor is generally between 100 and 150 meters wide. The tree-lined river channel is approximately 20 metres wide.

Approximately 4.9 square kilometres (or 15 per cent) of Melbourne Airport land drains ultimately to the Maribyrnong River. A small portion of the western boundary drains directly to the Maribyrnong River, while further north the airport land drains to Deep Creek.

The majority of the proposed development sits within the Arundel Creek catchment, with the project footprint affecting 0.13 square kilometres or (1.5 per cent) of the catchment within airport land. The project will have minimal impact to the timing and flows of runoff ultimately contributing to the Maribyrnong River catchment.

A4.8.1.3 Moonee Ponds Creek catchment

Located along the eastern boundary of the airport estate, Moonee Ponds Creek is significantly urbanised, especially downstream of the airport. While the catchment upstream of the airport consists predominantly of pasture, this land is also being slowly urbanised with expanding residential development in the region. The Moonee Ponds Creek catchment is approximately 145 square kilometres. Only a small portion of this catchment resides within the airport estate lands (approximately 1.6 per cent of the catchment).

Within the airport boundary, land use is comprised of vegetated areas, taxiways, aprons, roads, car parks, terminal precinct buildings and a fuel storage facility. Moonee Ponds Creek is a tributary to the lower Yarra River.

A4.8.1.4 Steele Creek and Steele Creek North catchments

Steele Creek and Steele Creek North catchments receive discharges from the southern and eastern regions of Melbourne Airport. The proposed works and operation of M3R will have a negligible impact within the catchment and hence will not result in any changes to flows or flood behaviour.

A4.8.2 Stormwater drainage and detention storage

The proposed drainage system for M3R (illustrated in **Figure A4.5**) will integrate with the existing network to manage local stormwater, floodwater and run-off at the airport.

The overarching stormwater drainage design philosophy is to direct all catchments impacted by the proposed works to Arundel Creek, where flow and quality can be efficiently managed.

The drainage design for M3R incorporates a stormwater treatment train approach to achieve water quality objectives and will include:

- Buffer strips adjacent to the runways and taxiways
- Grass swales collecting and conveying stormwater
- Sedimentation basin
- Bio-retention systems
- Retardation basin.

Discharge rates will be controlled back to the existing conditions for the 100-year average recurrence interval events.

Suitable drainage crossing points will be established to facilitate the movement of vehicles on the airfield.

A4.8.3
Hydraulic structures

The key hydraulic structures proposed within M3R are:

- Arundel Creek culvert, to maintain flows under cross-field taxiways
- Attenuation storage at airport, to minimise impact downstream
- Water treatment features, to optimise water quality and flow rates.

The use of steep slopes in the hydraulic structures that discharge water has been avoided in order to reduce the likelihood of erosion and slippage at the airport and in surrounding surface water features. All grass swales will have a minimum grade of 0.5 per cent.

Concentrated flows will be discharged through a stilling basin and/or other energy dissipation arrangements to disperse the force of discharge and provide a safe working environment at the outfall locations. Appropriate treatments will also be provided at all outfall locations to dissipate energy and prevent erosion of the local waterways.

A4.8.4
Water quality during operations

Chapter B4: Surface Water and Erosion describes in detail the potential impacts of M3R on water quality, and the relevant water quality objectives and targets that need to be met. The design of M3R ensures appropriate treatment to maintain water quality (including that pollutant loads are not exceeded).

M3R will provide buffer strips, grass and biofiltration swales, sedimentation basins, bio-retention systems and retardation basins to treat water, as well as underlying filter zones beneath the final third of all swales to assist with draining dry.

A4.9
LIGHTING DESIGN

Approach and ground lighting systems are required to provide visual cues for pilots using the airfield. The M3R lighting system will be integrated with MEL's complex navigational control system, incorporating approach and ground lighting as well as navigational aids and instrumentation.

A4.9.1
Approach lighting

Approach lighting provides visual guidance to pilots in the final stages of flight, improving operational safety and efficiency (particularly in conditions of reduced visibility). Approach lighting is directed towards flight paths and is therefore not usually visible from the ground.

CASA standards for approach lighting stipulate minimum system requirements for defined operating conditions. M3R scope includes lighting systems that enable the use of the airport during inclement weather and low visibility conditions:

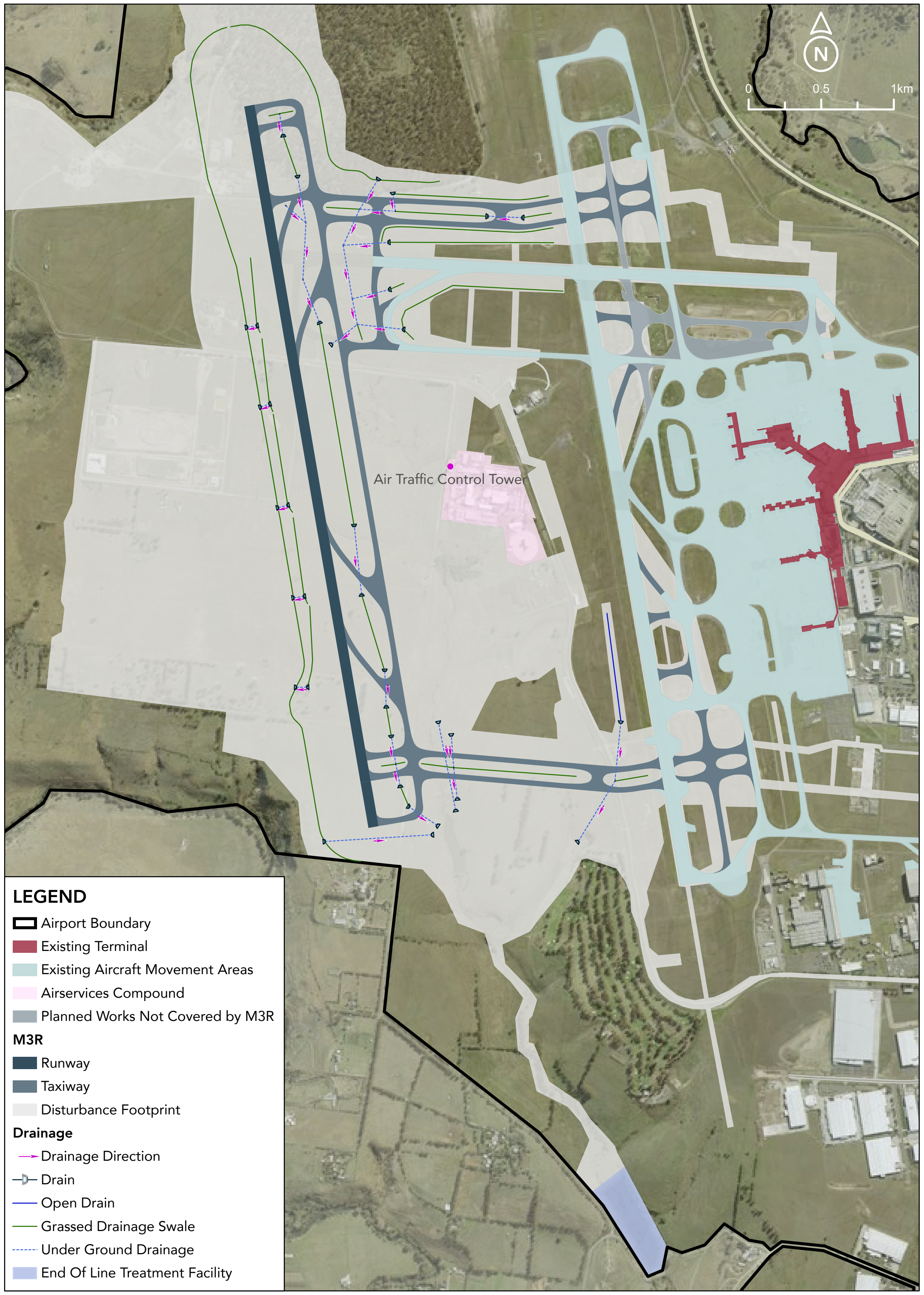
- The lighting for runway 16R will be designed as a Category II/III runway system with a 720-metre approach lighting system (see **Section A4.9.2**)
- The lighting for runway 34L will be designed as Category I Special Authorisation so will not require approach lights
- A new 720 metre approach lighting system for existing runway 34R may be provided (subject to further assessment)
- The existing approach lighting system for existing runway 16L will remain
- The existing approach lighting system for runway 27 will remain
- No approach lighting will be provided for runway 09 (none currently provided).

The light plane for each approach lighting system will be as close to horizontal as possible, with no object protruding within a distance of 120 metres from the centreline of the runway. Approach lighting will be supported by double-sided Precision Approach Path Indicator (PAPI) system and Instrument Landing Systems (ILS) (or other compliant precision approach systems (see **Section A4.12.1.2**) to facilitate navigation for each runway.

A4.9.2
Runway 16R approach lighting system

The approach lighting structure for 16R will extend to the north and be supplied power via 6.6A series circuits connected to the network with backup generators available for use. The backup generators will be used during low visibility operations and will achieve the requisite switchover performance to ensure that approach lighting has an operational power supply at all times.

Figure A4.5
Indicative M3R stormwater network



Source: APAM/BECA

A4.9.3
Ground lighting system

Ground lighting provides visual clarity for pilots navigating aircraft through the airfield. The ground lighting system is integrated with infrastructure and communications that, collectively, enable air traffic control to safely and efficiently direct ground traffic around the aerodrome (even when pilots are unfamiliar with the layout).

The ground lighting system includes:

- Runway centreline lighting
- Runway edge lighting
- Runway threshold lighting (including wing bar and identification lights)
- Runway end lighting
- Touchdown zone lighting
- Taxiway centre lighting (including entry/exit lighting)
- Taxiway stop bars, guard lights and intermediate holding position lights
- Precision Approach Path Indicator (PAPI).

Lighting will be provided in the pavement along the length of the centreline of 16R/34L (known as runway centreline lighting). All runway centreline lighting will be configured in accordance with the requirements of the relevant runway system definition. Runway 34L will be a Category I (SA) runway system while runway 16R will be a Category II/III runway system.

All runways will be supported by lighting identifying the boundary of the runway (known as runway edge lighting). Runway edge lighting will comprise high-intensity runway lights, which are required for precision approach runways.

Runway threshold lighting will be required (perpendicular to the centreline of the runways) to identify the beginning and end of the designated space for landing and take-off on the runway.

The runway threshold lights will extend 12 to 15 metres from the runway edge lights and threshold wing-bar lights will be provided at precision approach thresholds. The threshold wing-bar lights will comprise five lights spaced 2.5 metres apart extending from the runway edge lighting perpendicular to the runway centreline.

Lighting will be provided to identify the limit of each of the runway ends (known as runway end lighting).

The lighting for the exiting east-west runway (09/27) will be modified to suit the shortened runway length.

Category II and Category III runway systems require additional lighting (known as touchdown zone lighting) to support low visibility operations. Touchdown zone lighting will be required for runway 16R as it is a Category II/III runway system.

Lighting will be provided in the pavement along the length of the centreline of taxiways (known as taxiway centreline lighting) to assist pilots navigating towards runways and aircraft stands. All new taxiways will have lighting capable of supporting Category II/III low visibility routes. Lights will be provided along the centreline of all new taxiways with the exception of rigid pavements, which will require the taxiway centreline to be offset by 0.3 metres to avoid clashes with concrete joints and improve ease of repainting taxiway centreline markings. The alignment of taxiways entering a runway will require both curved and straight entries. At the extremity of the runway, straight entry will be provided via uni-directional green taxiway lights and exit taxiway lighting will be provided with alternating green/yellow unidirectional taxiway lighting along the curve to meet CASA requirements. All other entry/exit taxiways will have bi-directional lighting. Rapid exit taxiways will have unidirectional lighting.

Taxiway stop bars will be provided at the entrance to each runway to identify where aircraft are required to stop before entering the runway. Additionally, runway guard lights will be provided at all new intersections of a taxiway and a runway to warn pilots about to enter an active runway. Elevated runway guard lights will be provided on both sides of the taxiway at each stop bar position.

All intermediate holding positions at marking positions will be provided with three inset unidirectional hold position lights.

The ground lighting will be supported by additional infrastructure including movement area guidance signs, illuminated wind direction indicators and two additional Aerodrome Lighting Equipment Rooms (ALERs). The ALERs will contain the control equipment, power facilities and standby generators.

A4.10
PERIMETER AND SECURITY DESIGN

Effective perimeter and security design is critical in protecting the airfield and enabling regular inspections, emergency response and maintenance in order to maintain safe, reliable operations at the airport.

Perimeter roads are required to facilitate security inspections and maintenance. Security fencing (around the perimeter of the airport) delineates the secure airside areas and publicly accessible landside areas in the surrounding region. Protection will also be provided to key infrastructure including the Operations Road underpass, Arundel Creek culvert, utilities and services.

A4.10.1
Perimeter roads

Perimeter roads are required around the airfield to cater for vehicle traffic required to support regular maintenance, security patrols and emergency response.

The perimeter road is proposed to have a design life of 20 years and take guidance from VicRoads standards. The road will accommodate ordinary airport vehicle traffic, fire trucks and construction vehicles. All perimeter roads will be consistent with those currently at the airport and will be located within the secure airport boundary.

A4.10.2
Security fencing

Security is critical to maintain safe operations and provide a physical barrier for the airside precinct of the airport.

Fencing will be provided and integrated with the existing security fencing to maintain a continuous fence. Once M3R is complete, Melbourne Airport proposes to reset the airside boundary and perimeter fence so that the fence will trace the western, northern and southern extents of the new infrastructure.

The security fencing will have limited gates, will be securely monitored by CCTV (with infrared capability) and will be regularly inspected by airport security staff to ensure its integrity. Access beyond the security fencing (i.e. airside) will require approval in accordance with the airport's security procedures to secure the airfield and prevent unauthorised access to the airside precinct.

This approach will improve Melbourne Airport's security in areas of the airport precinct which are difficult to monitor. It will also limit response times to security breaches and emergencies and better utilise security technology.

A4.10.3
Infrastructure protection

Key infrastructure that is critical to airport operations will be securely protected to facilitate business continuity.

The Operations Road underpass will be protected by a range of security mitigation measures including a guardhouse, tunnel control room (if required) and CCTV. The guardhouse will serve as the access control point and be equipped with a drop-arm barrier on the approach, access control system and appropriate services to monitor movements.

The Arundel Creek culvert will also be equipped with security grilles and CCTV to ensure protection against forced entry.

A4.11
LANDSCAPE DESIGN

A4.11.1
Landscape context

The airside precinct is generally comprised of open fallow land (mostly grasses) and operational infrastructure. Planting and vegetated landscape features have generally been avoided to reduce the risk of wildlife collisions with aircraft. Buildings in the landside precinct are appropriately orientated and positioned to avoid inducing wind shear, interface operational zones and allow daylight access. Natural vegetation and vegetated strips are provided to improve visual amenity, however, all planting is in accordance with the *Melbourne Airport Planting Guidelines* (Ecology and Heritage Partners, 2014) to ensure that landscaping features and flora species are appropriately selected to minimise the risk of attracting wildlife. Further detail on the landscape and visual conditions is described in **Chapter B11: Landscape and Visual**.

A4.11.2
Proposed landscape features

The soft and hard landscaping of M3R will be designed to harmonize with the existing airport. All features and flora species incorporated in the soft landscaping will be selected to minimise the risk of attracting wildlife, and the density of planting will be aligned with the *Melbourne Airport Planting Guidelines*.

Hard landscaping will include pavements, minor concrete paving, kerbs, gutters, crossings and edge strips. All like surfaces will have a uniform texture and be free from depressions in which water can lie. The built form will be designed to optimise amenity and protect aviation operations.

A4.12
ANCILLARY FACILITIES

A range of ancillary facilities and utilities will be required to support the operation of M3R. This will include the relocation and permanent installation of ancillary facilities and utilities around the airport. The existing infrastructure, operational considerations and likely demands have been considered in the development of the design.

A4.12.1
Airservices Australia interfaces and infrastructure

The new runway and associated infrastructure will interface with new and existing infrastructure owned and/or operated by Airservices Australia.

The installation of new Airservices Australia infrastructure will either be completed by Airservices Australia or by the main M3R contractor. Siting and design of Airservices Australia infrastructure may influence the design of surrounding M3R infrastructure to avoid interference and/or achieve compliance.

A4.12.1.1
Aviation Rescue Fire Fighting Service facilities and infrastructure

Aviation Rescue Fire Fighting Service (ARFFS) service facilities and infrastructure are proposed to be developed within M3R.

Options to achieve regulatory response times to an emergency on new and existing runways are currently under assessment. The requisite response times can be achieved using a number of proposed solutions, including the construction of a new fire station (to either supplement the existing fire station or replace the existing fire station), or through the use of the proposed taxiway and upgraded road network supported from the existing fire station.

A potential new fire station location has been identified, based on land availability and theoretical response times to relevant runway thresholds, as illustrated in **Figure A4.6**. Alternative fire station locations within the disturbance footprint may be considered and will be subject to further detailed analysis and design.

ARFFS stations, at minimum, include covered drive-through tender parking bays, wash-down and replenishment bays, vehicle maintenance facilities, recreational facilities and administration offices. Depending on ARFFS service provided, sleeping accommodation may also be required.

ARFFS training facilities located within the development footprint will also need to be relocated to accommodate M3R infrastructure.

A4.12.1.2
Communications, navigation, and surveillance system

M3R will be supported by new communications, navigation and surveillance infrastructure, including:

- Instrument Landing System (ILS)
  - ILS consists of a localiser and a glide path, which together provide vertical and horizontal guidance for arriving aircraft. The localiser will be located approximately 300 metres after the end of the runway. The glide path will be located approximately 400 metres from the start of the runway and offset to the west by approximately 140 metres. The exact location of the equipment is subject to further evaluation, and agreement with Airservices Australia.
- Ground Based Augmentation Systems (GBAS)
  - GBAS is a satellite-based precision landing system. GBAS supports the existing runways at Melbourne Airport and will be updated for use on the new north-south runway. GBAS is currently unable to replicate the full functionality of ILS but may do in the future thereby negating the need for ILS on 16R/34L. A decision on the technology to be used will be finalised during the detailed design phase, and in consultation with Airservices Australia and the wider aviation community.
- Additional infrastructure for Advanced Surface Movement Guidance and Control Systems (A-SMGCS)
  - A-SMGCS provides real-time surveillance information to air traffic control to assist with the management of operations by aircraft and support vehicles on the airfield. It typically consists of a Surface Movement Radar (SMR) and various remote units supporting multilateration.
  - M3R will require the existing A-SMGCS to be expanded to encompass the new north-south runway (16R/34L) and associated taxiways.
- Anemometers
  - Anemometers measure wind speed and will be provided to serve 16R/34L. Locations will be agreed with Airservices Australia and the Bureau of Meteorology (BoM) in detailed design.
  - Existing anemometers on runway 09/27 will be relocated to serve the shortened runway.
- Runway Visual Range (RVR) sensors
  - RVR sensors provide visibility readings to air traffic control. Three new RVR sensors will be installed for runway 16R/34L: at each end and the midpoint of the runway.
  - The existing RVR on runway 09/27 will be relocated to serve the shortened runway.

A4.12.2
Midfield access road (Operations Road)

Operations Road currently provides access west of the existing north-south runway (16L/34R) to the existing Airservices Australia compound, ARFFS and BoM offices. It includes a public aircraft-viewing area and minor connections to unsealed tracks and airside vehicle access gates. M3R will require the diversion of Operations Road.

Operations Road will be closed to the general public to the north of the Melbourne Airport Golf Club access road and reconfigured to pass underneath the proposed southern cross-field taxiways via an underpass structure. A guardhouse and associated security measures will be used to control access to the midfield area including to Airservices Australia, ARFFS and BoM through a controlled landside access corridor. The reconfigured road may require minor modification to the Melbourne Airport Golf Club, subject to detailed design. The proposed alignment of Operations Road is illustrated in Figure A4.7

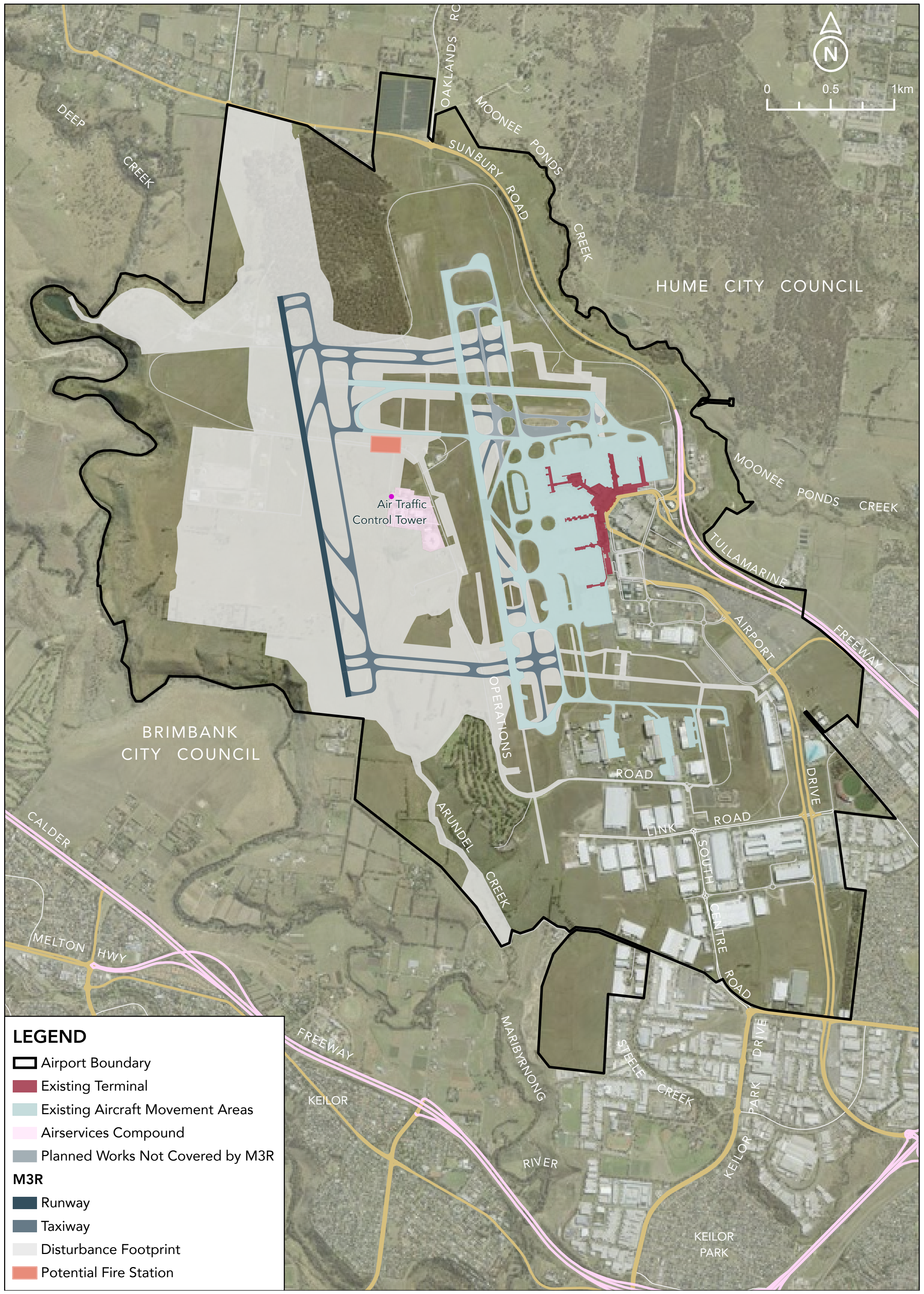
A4.13
UTILITIES

A4.13.1
Electrical

M3R will require the provision of High Voltage (HV) and Low Voltage (LV) supplies, and connections to the existing infrastructure to ensure reliable power supplies during operations. The load demands for HV and LV have been assessed against the existing network capacity, and the strategy for supply allows for key future infrastructure. The proposed HV network is illustrated in Figure A4.8.

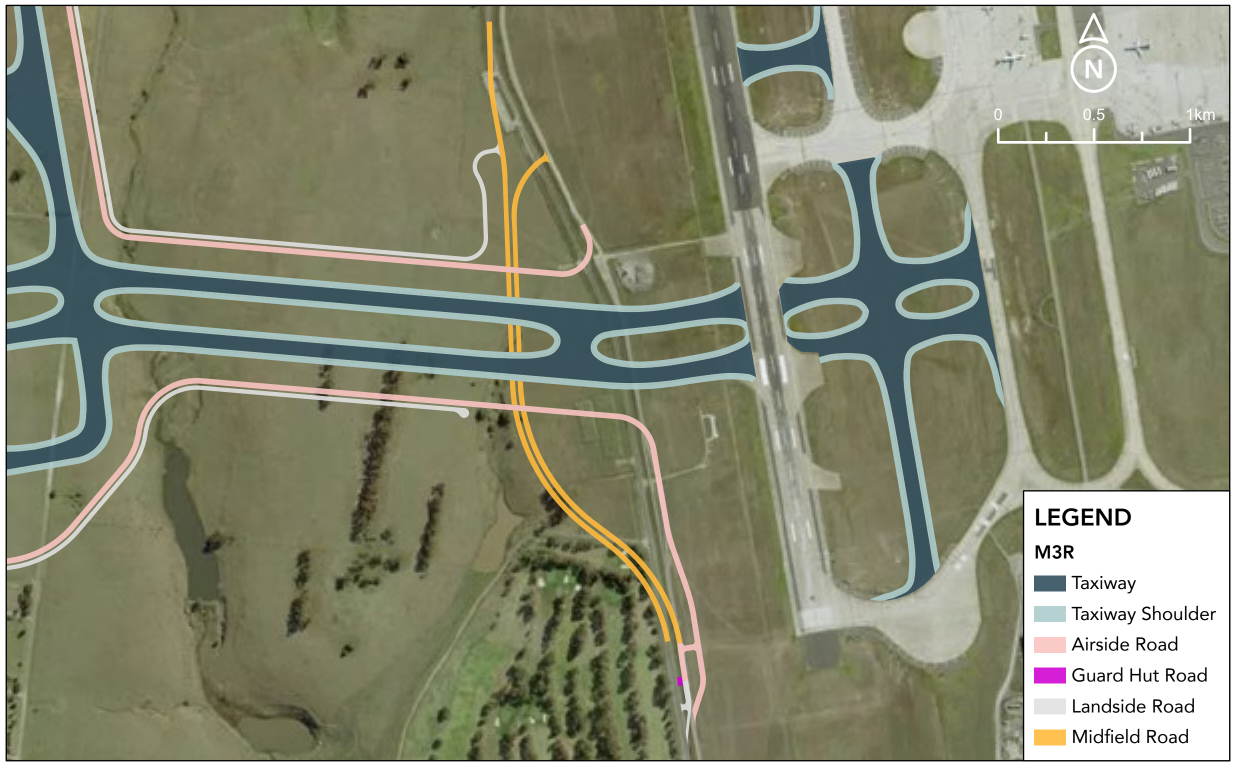
The HV network will comprise a 'ring main' starting at existing Ring Main Unit (RMU) 2, connecting the western side of the new runway to the substation located on South Centre Road. Separate substations will be provided at each load point. Other ancillary loads are anticipated to be reticulated from main distribution points at low voltage. The HV network will also be reconfigured and protection settings adjusted to accommodate the new loads required for M3R.

Figure A4.6
Potential ARFFS station location



Source: APAM

Figure A4.7
Midfield access road



Source: APAM/BECA

A4.13.2
Information and communications technology

The existing Information and Communications Technology (ICT) infrastructure comprises a dedicated fibre-optic network for Melbourne Airport to support airfield lighting controls and monitoring system, and a separate network for Airservices Australia to support navigational aids. M3R will require additional infrastructure to serve the new runway and Airservices Australia facilities in a way that integrates with the existing network.

The existing pit and duct system for fibre infrastructure serving the existing east-west runway (09/27) and existing north-south runway (16L/34R) will be extended; and connections and cables will be relocated (through the Operations Road underpass) where appropriate within the airport to support Airservices Australia' buildings and Melbourne Airport infrastructure.

A4.13.3
Sewer

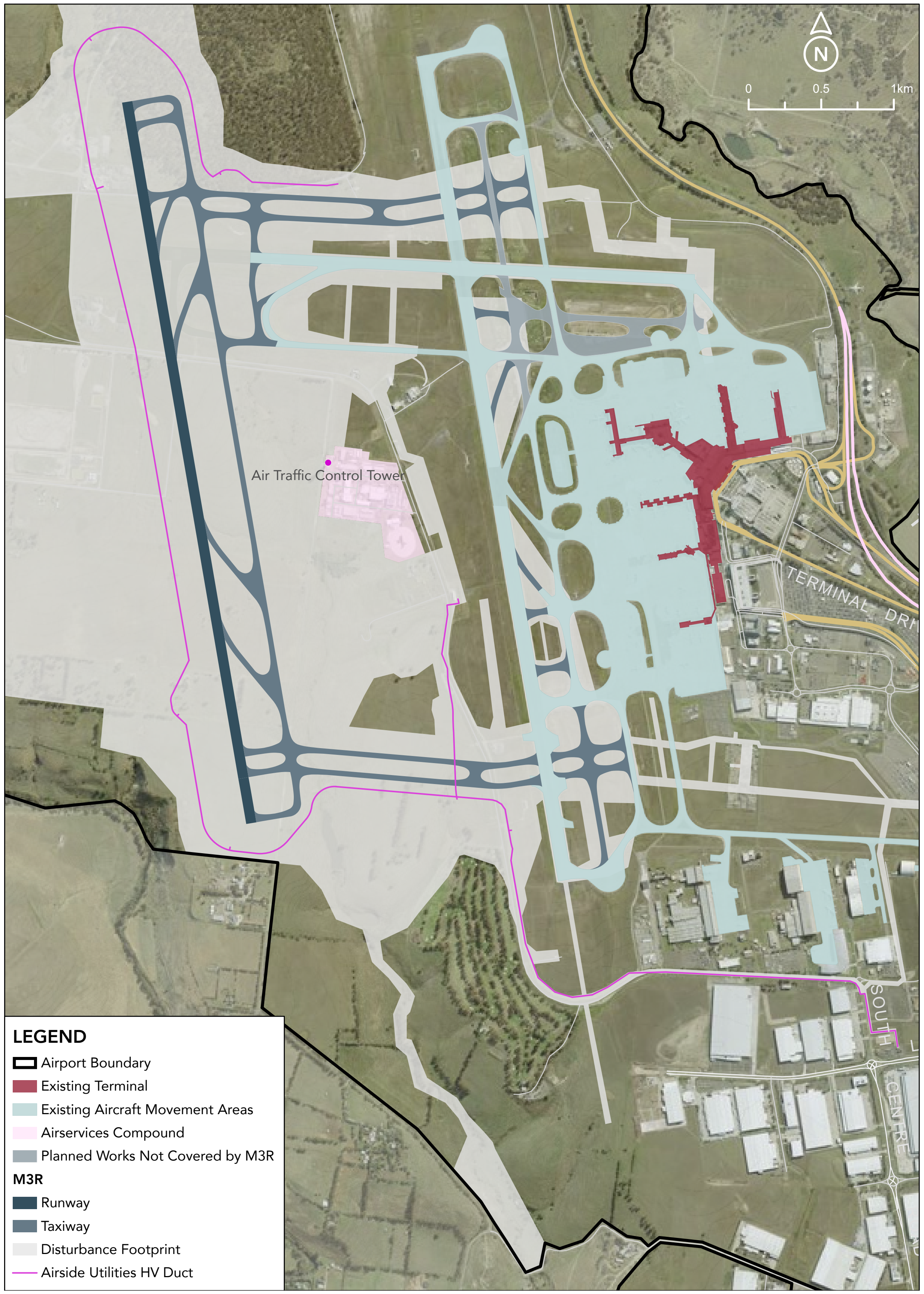
The existing sewer rising main currently runs north to south and has substantially lower flows than required to support M3R. Proposed ARFFS and ALER facilities will increase demand, and therefore a new sewer system will be required to service the new buildings.

Sewage flow from these buildings will be gravity fed into a new pump station that will discharge into the existing rising mains.

A4.13.4
Water

The existing water network will be upgraded to support the new infrastructure constructed as part of M3R, with increases in demand as a result of new ARFFS and ALER facilities.

Figure A4.8
Proposed HV network



Source: APAM/BECA

Chapter A5 Project Construction

Summary of key findings:

- Construction of Melbourne Airport's Third Runway (M3R) will take place over a four to five-year period
- Construction will be staged to limit the impact on active airport operations
- Construction will involve major earthworks, development of large areas of runway and taxiways, drainage works, and building supporting infrastructure
- Environmental risks during construction will be managed through implementation of a detailed Construction Environmental Management Plan.

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A5.1 INTRODUCTION

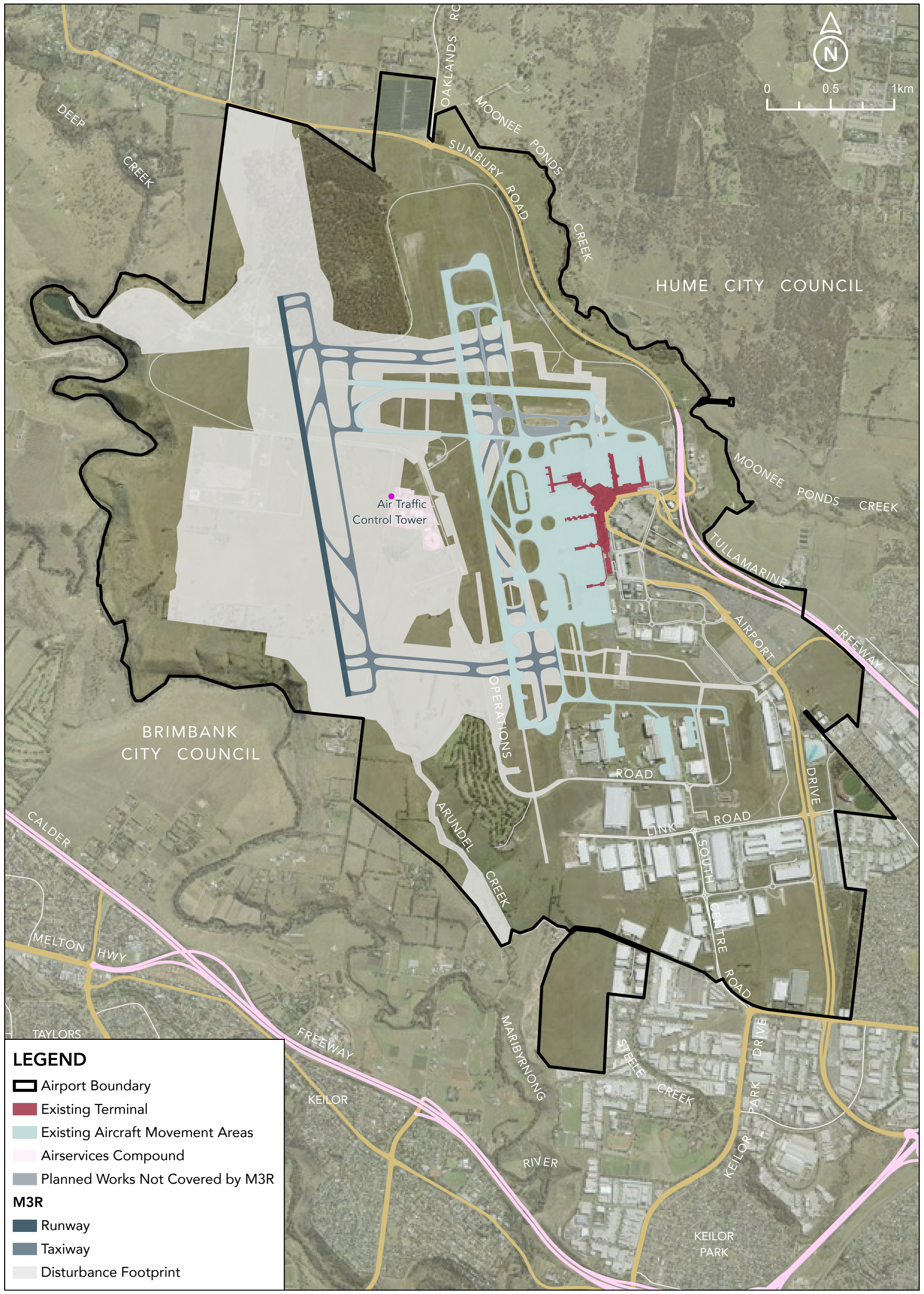
This chapter provides an overview of the construction methodology for Melbourne Airport's Third Runway (M3R) project. M3R is a large multidisciplinary engineering project to construct a new parallel north-south runway (16R/34L) at Melbourne Airport. It includes construction of a supporting taxiway network and the navigation aids required to operate the runway system. Project scope and associated construction methodologies are subject to ongoing development and optimisation.

The construction of M3R includes large-scale earthworks for the runway and taxiway strip platforms; construction of large areas of flexible (asphalt) and rigid (concrete) pavements; drainage works; and various services and supporting infrastructure. The construction phase will be completed over a four to five-year period and staged to minimise the impact on airport operations.

Figure A5.1 shows the M3R development footprint.

The construction activity area is equivalent to the development footprint, and will encompass all construction activities – including source material extraction, internal access routes, lay-down areas and compounds – as described in this chapter.

Figure A5.1
M3R overview



Source: APAM/BECA

A5.2
MAJOR WORKS PHASES

The construction of M3R is divided into seven phases. Although the phases are listed sequentially in their order of completion, some will be undertaken concurrently. In all phases, works will be managed and staged to ensure the safety of airport operations is not compromised. Details provided below in Figure A5.2.

A5.3
PRELIMINARY WORKS

A5.3.1
Introduction

Most preliminary works (Phase 1) will occur during the construction mobilisation phase of M3R. Some works, such as relocation of services, will occur later but before the commissioning phases (Phases 6 and 7).

A5.3.2
Construction compound and access roads

The midfield area between the parallel runways and the area to the west of the new north-south (16R/34L) runway will be utilised for the contractor compounds and staging area. These sites will also be used for stockpiling fill and pavement materials. (Refer to Figure A5.3 for indicative construction-site layout and Table A5.1 for details.)

These areas will be maintained landside throughout the construction program. The construction compound will comprise portable offices and buildings, connected where possible to available services. Portable toilets will be provided. If feasible, these will be connected to existing sewer services - alternatively, contracts established with licenced operators for disposal of sewage and grey water may be required.

Figure A5.2
Construction phases

Phase 1: Preliminary works
All the preparatory works required to commence construction of the project. Installation of access roads, mobilisation and set up of contractor compounds, relocation of airside perimeter fencing, installation of construction fencing, site clearance, establishment of stockpile locations and temporary facilities.

Phase 2: Major earthworks, civil works and master grading of runway 16R/34L
Major earthworks and civil engineering associated with the earthworks platform and supporting infrastructure for runway 16R/34L, includes the extraction of source material.

Phase 3: New entries and tie-in to existing runway 16L/34R
Construction of runway entry and crossing points, requiring some night-time closures of runway 16L/34R.

Phase 4: Modification to runway 09/27
Shortening of runway 09/27, including the construction of new entry/exit taxiway to serve the western end of the runway. These works will require a number of closures of runway 09/27.

Phase 5: Final earthworks, pavements and associated infrastructure runway 16R/34L
Complete earthworks for new north-south runway (16R/34L) and associated taxiways before completing construction of pavements, Aeronautical Ground Lighting (AGL), NAVAIDs and services.

Phase 6: Commissioning runway 16R/34L and associated taxiways
Transition to operation of runway 16R/34L and the associated NAVAIDs and taxiway networks.

Phase 7: Complete remaining taxiway works and works associated with runway 09/27
Construction and commissioning of remaining taxiway work and works on runway 09/27. This phase will require closures of runway 09/27 for nine to twelve months

Source: APAM/MLJV

Throughout construction, works will be coordinated with the Aviation Rescue Fire Fighting Service to ensure its operational access and response objectives are maintained.

A5.3.3
Fencing

The majority of construction for M3R will occur in a secure landside environment with no public access. This significantly reduces the time, cost and complexity of construction, and enhances safety. Fencing to prevent public access will be provided around all landside construction areas. Access to these areas will be controlled by a monitored security gate and managed by the contractor as part of their site management plan.

Once the works have been completed and the airfield infrastructure is ready to be commissioned, the permanent airside fencing will be established and the new infrastructure contained within the secure airfield boundary. The fencing will be installed to Melbourne Airport's standards and the airfield perimeter gazetted.

A5.3.4
Internal access roads

Access roads will be constructed around the contractors' compound and stockpile areas to provide access to all areas of the site required for construction. They will be designed based on their intended construction use, with haul roads required for fill transportation built to accommodate heavy vehicle traffic.

To limit the environmental impact across the site, existing roadways will be utilised where possible.

A5.3.5
Relocation of existing services

At some stages of M3R existing services will need to be demolished and either replaced or relocated. Key examples are:

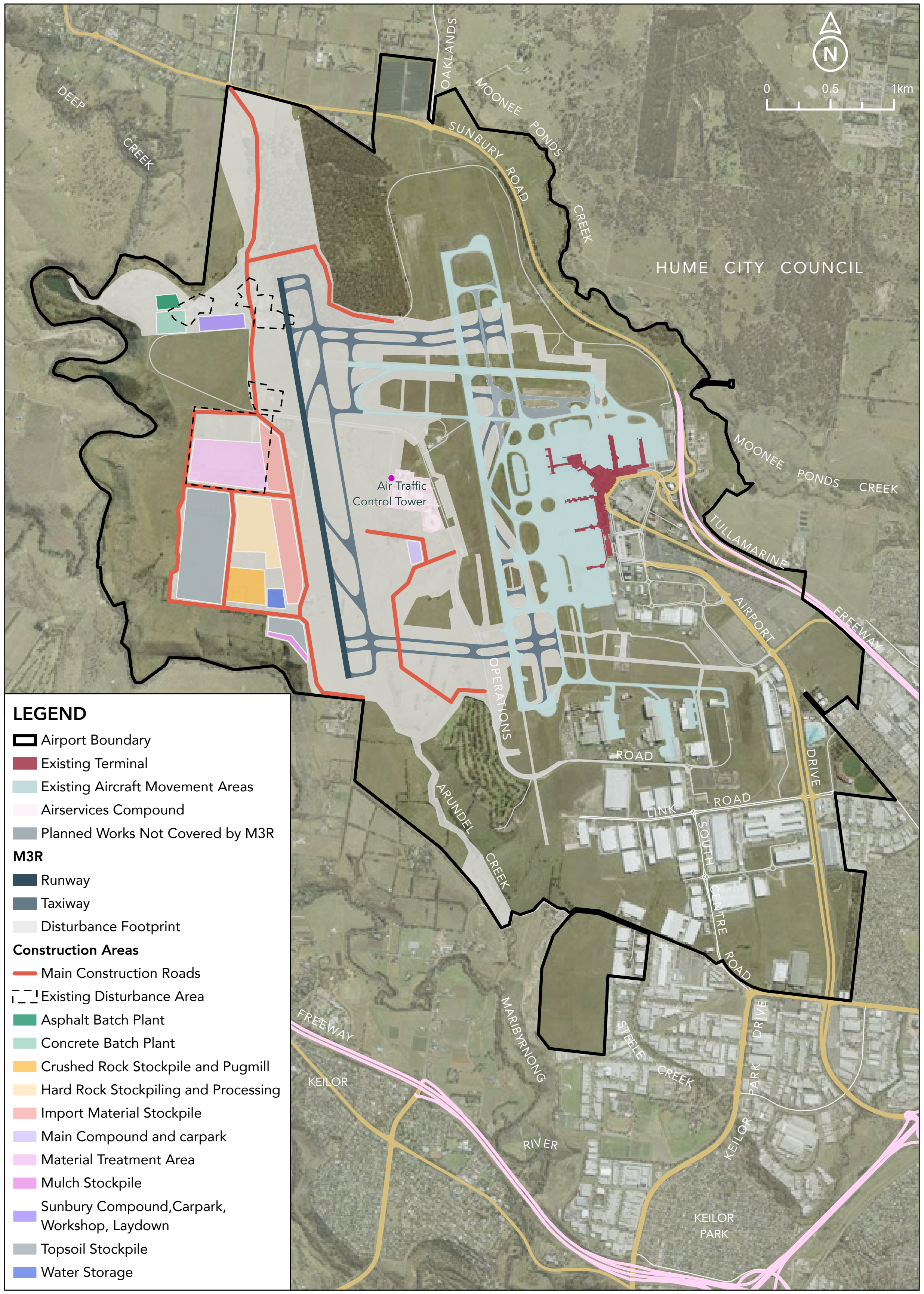
- Services along the existing Operations Road service corridor: relocated to new service tunnels or conduits as part of the Operations Road realignment
- Airfield lighting, and associated primary and secondary circuits affected by pavement construction: relocated to accommodate the new airfield layout.

Table A5.1
Description of construction compound areas

Area	Description
Contractors' compound	The contractors' office compound will consist of an area of approximately 100 x 150 metres. The area will be surfaced with gravel, have clearly defined parking areas for light vehicles and a range of portable office, ablution and amenities facilities.
Contractors' works compound (Sunbury Compound, Carpark, Workshop, Laydown in Figure A5.3)	The contractors' works compound will consist of an area of approximately 350 x 100 metres that will be used for laydown, equipment storage, workshops and plant storage.
Asphalt and concrete plant	Asphalt and concrete batching plants will be mobilised to the site. An area 200 x 300 metres has been allocated for the siting of these facilities, which will include batching plant, bitumen storage tanks, polymer modified binder blender, aggregate bins and concrete batching facilities.
Stockpile areas	Stockpile areas within the development footprint has been allocated to facilitate temporary storage of fill materials and topsoil, as well as for the storage and processing of hard rock.
Construction access	Construction access to the site will be via access roads connected to Sunbury Road (primary – north), Operations Road (primary – south) and McNabs Road (secondary – south).
Airside access	Airside access will be through existing facilities at the northern compound and Gate 22. Temporary gate facilities may be established to facilitate airside access for construction purposes at other locations depending on the specific stage of the program. These temporary facilities will be operational during construction and then decommissioned.

Source: APAM/MLJV

Figure A5.3
Indicative construction site plan



Sources: APAM/MLJV

A5.4 EARTHWORKS

A5.4.1 Introduction

Earthworks are required across many areas of M3R. The most substantial are construction of the earthworks platform for the new north-south runway (16R/34L) and cross-field taxiways to the south which cross Arundel Creek. This section provides an overview of the ground conditions and construction methodologies during M3R construction.

A5.4.2 Fill volumes

Based on the concept design, it is estimated that approximately six million cubic metres of general or high-quality fill will be required.

It is expected that between 70 and 90 per cent of this volume could be sourced on site, leaving between 0.6 and 2 million cubic metres to be imported from off site. In addition, a further 0.7 million cubic metres of pavement or engineered material will have to be imported from off site. The truck movements required to import this material are incorporated in the traffic impact assessment (see **Chapter B8: Surface Transport**).

A5.4.3 Master grading

The runway and taxiway master-grading proposal has been developed in accordance with the geometric constraints of CASA Manual of Standards Part 139 (MOS 139) and considers:

- Levels of existing runway and taxiways
- Longitudinal profile of a future east-west fourth runway
- Cross-sectional profiles developed through the runway and taxiway strips
- Obstacle environment
- Overall site topography and provision for future infrastructure development.

The new north-south runway (16R/34L) will be graded with a one per cent longitudinal grade sloping from north to south in order to make best use of the existing ground topography and minimise earthworks volumes. It will also be graded with a 1.5 per cent transverse gradient with a two-way cross fall or crowned pavement (i.e. a central peak so water drains in both directions).

A5.4.4 Bulk earthworks design

The requirements and extent of the project's earthworks were influenced by the soil characteristics, stability, and long-term performance needs of M3R.

Key aspects of the bulk earthworks design influencing the proposed construction methodology are:

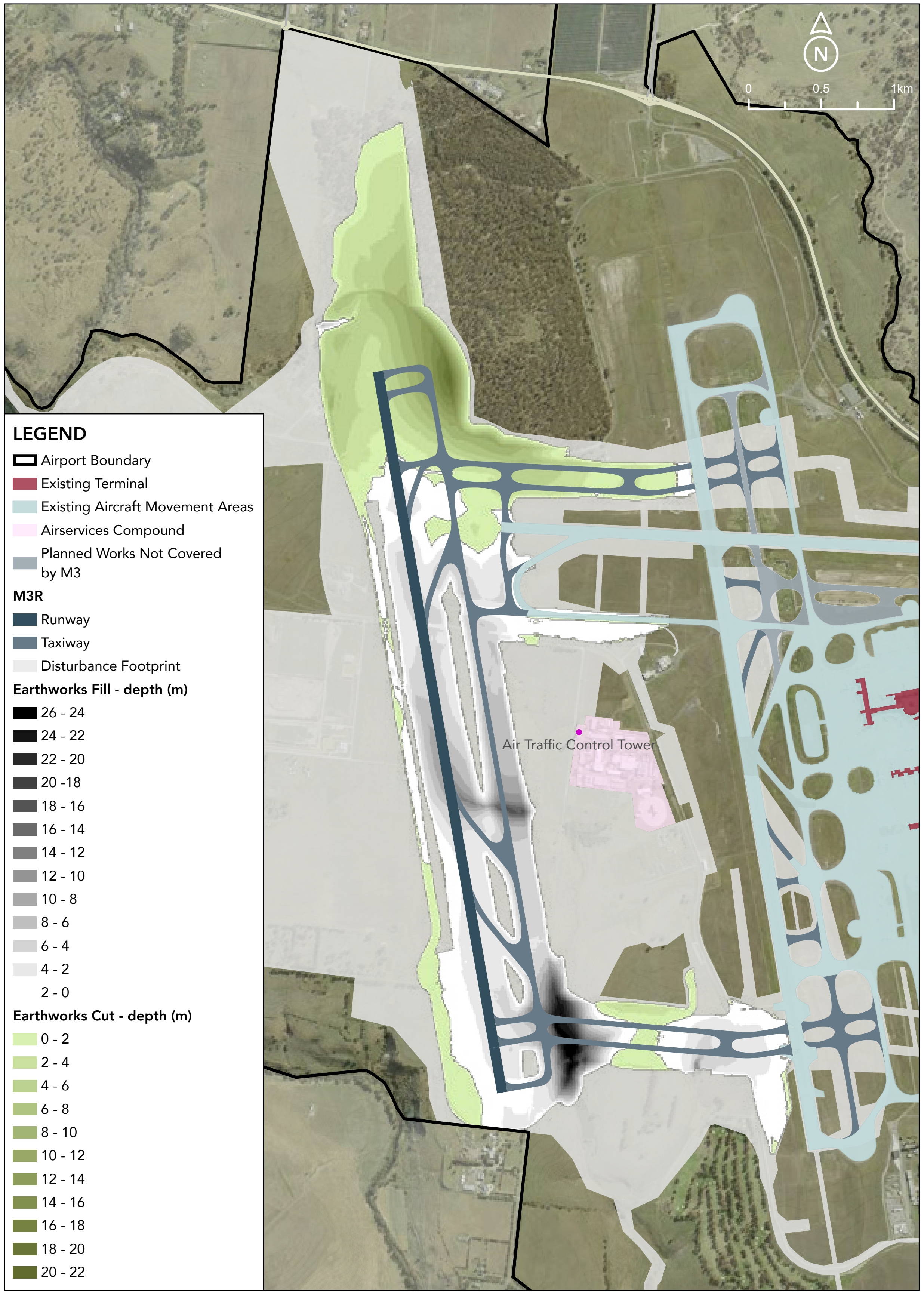
- Balance of cut and fill across the site, while achieving compliant levels aligned with long-term master planning requirements, which is an objective of the design process. Based on the current earthworks design, approximately 70 to 90 per cent of the general or high-quality fill will be sourced on site from within the extent of the runway footprint of in the region immediately west of the proposed runway (subject to confirmed suitability)
- A typical fill embankment batter slope of one-vertical to six-horizontal ratio has been adopted for the relatively low fill areas (i.e less than eight metres in height)
- Where the embankment crosses the Arundel Creek valley, a one-vertical to 2.5-horizontal ratio will be adopted, with benching expected where slopes exceed eight metres in height. Granular and higher permeability material will be incorporated at the front face of the embankment to improve stability and drainage characteristics
- The Operations Road underpass/tunnel will be founded on hard basalt rock or weaker clays. Zones of pile foundations may be constructed in these locations to mitigate the risk of settlement
- The Arundel Creek culvert will be founded on variable ground conditions. A support layer using material such as cement-treated crushed rock will be constructed below the culvert to mitigate differential settlement. Free-draining structural fill will be placed around the it to mitigate piping and fill instability from groundwater flows.
- **Figure A5.4** gives an overview of the earthworks required. Deep fill is required in Arundel Creek where the southern cross-field taxiways cross the waterway.

A5.4.5 Ground conditions

The geology across the majority of the M3R site comprises a capping of basalt rock (Newer Volcanics) overlying older Brighton Group sand, weathered Older Volcanics basalt and Silurian-age siltstone. At isolated locations around the site, the solid geology has been overlain by younger alluvial and/or colluvial deposits (e.g. at Arundel Creek).

The surface of the basalt rock has weathered to residual clay, encountered on the surface over the majority of the site. The basalt-rock mass comprises layers of highly variable strength, weathering and fracturing; albeit with a general trend of increasing strength and reduced weathering with depth. The clay is highly plastic, and highly reactive to changes in moisture content. Boulders or floaters of less weathered, hard basalt rock may be encountered in this unit and may affect excavation for trenches, subgrade surface preparations and in-situ lime stabilisation.

Figure A5.4
M3R earthwork isopach map showing level difference pre and post development



Sources: APAM/BECA

The geology of the northern portion of the site comprises Newer Volcanics flows overlying Devonian aged Bulla Granodiorite. In some areas, the Bulla Granodiorite outcrops at the surface. The granodiorite has weathered to residual sandy clay, which is typically encountered at the surface where the granodiorite outcrops. The granodiorite is often extremely weathered close to the surface, with a reduction in weathering with depth. In some areas, high-strength, slightly weathered granite rock is encountered. Towards the base of the hill, an increasing depth of colluvium is expected. There is also a shallow gully in the north-west of the footprint that may comprise an increased thickness of residual or alluvial soils.

Ground conditions have been considered in the pavement and earthworks construction methodologies.

A5.4.6
Earthworks methodology

A5.4.6.1
Site clearance

Existing features onsite – including dams, ponds, buildings, foundations and vegetation – will require clearance prior to earthworks.

Additionally, zones of weaker alluvial and/or colluvial deposits (i.e. in the base of Arundel Creek) will not be suitable directly below structures or pavements. They will be excavated and replaced prior to the main earthworks activities proceeding.

Where unsuitable materials are man-made (e.g. landfills) or very soft natural soils (e.g. in historic dams) and located in zones of cut, the excavated material is unlikely to be suitable for re-use in the earthworks. Where these zones are located below areas of fill, they will require local excavation and backfilling before the main earthworks commence.

Initially, work areas will need to be stripped of all vegetation, organic matter, deleterious material, uncontrolled fill or made ground, and other unsuitable material. Topsoil strip will be undertaken (using scrapers where possible, or loaded into trucks using excavators). Stripped topsoil will be stockpiled for reuse in landscaping. Stockpiles will be protected to avoid surface water run-off and erosion.

A5.4.6.2
Excavation

Excavation methodologies have been developed based on the ground conditions to be encountered, and to minimise the impact from dust noise and vibration on airfield users. Excavation will be dictated by the material composition and natural weathering profile. Based on existing ground-investigation information, the site is underlain by an organic topsoil horizon with an average depth of 0.25 metres but with deep pockets up to 0.9 metres thick in places.

The specific considerations for the varying ground conditions are:

- The residual basaltic clay, colluvium and Brighton Group materials are expected to be excavated using conventional earthworks equipment. The extremely weathered basalt will be excavated using conventional equipment – although it is expected to contain significant proportions of cobbles and boulders. This will make lime stabilisation difficult and result in over-excavation in trenches and footing excavations
- It is expected the majority of the clay soils will be approaching their equilibrium moisture content. These soils will become difficult to handle if they become over wet or are allowed to dry out. Therefore only limited areas will be opened up at a time, and stockpiles carefully managed to protect the material and limit changes in its moisture content. Because the clays are reactive, their use as fill will be restricted to below pavements and structures
- The basalt and granite rocks are expected to be more difficult to excavate and probably require hard ripping, rock breakers or blasting
- The less weathered and/or deeper basalt and granite rocks may require blasting for cost-effective removal. If blasting is proposed it will be a sequence of smaller, controlled charges to advance the excavation face. The timing of detonations will be coordinated with airport operations, CASA and Airservices Australia
- Excavated rock will require further processing to meet grading requirements and allow for compaction and stability in the earthworks fill placement. Any processing will be included in the construction planning and take place adjacent to the stockpile areas in the contractors' compound.

A5.4.6.3
Contaminated material

The key contamination issue requiring management in the M3R footprint is per- and poly-fluoroalkyl substances also known as PFAS (both source and diffuse impacts). A project-specific PFAS Management Strategy is therefore proposed.

Confirmation of the management and remediation options, including detailed feasibility, will be completed as part of detailed design works. A project-specific human health and ecological risk assessment will also be prepared to support the management and remediation options assessment and PFAS Management Strategy. Chapter B3: Soils, Groundwater and Waste provides additional details.

The project will use the on-site water treatment and stockpile facility established for the Taxiway Zulu construction project. This facility is identified as the material treatment area on Figure A5.3.

A5.4.6.4
Fill placement

A sound working platform is required to construct the earthworks for M3R. Depending on the quality of the in-situ material this may be formed by excavation and proof rolling, placed imported material, or the use of ground-improvement techniques such as lime stabilisation. Benching into the existing valley slopes will be done where existing slopes are steeper than a one-vertical to five-horizontal ratio.

The major fill-placement sites will be the southern portion of the new north-south runway (16R/34L) and associated parallel taxiway, and the southern cross-field taxiways that cross the Arundel Creek valley.

Earthworks production in the Arundel Creek valley is likely to be initially controlled by the rate at which the fill can be placed and compacted. As other parts of the site are cleared, additional placement faces can be opened below the wider earthworks. The number of different types of fill material in this area – such as drainage blankets and rockfill 'toes' – require careful staging of earthworks.

Seasonal constraints, particularly wet weather impacts, will need to be taken into account. Basaltic clay and weathered clay deposits will be challenging to work in the winter months (June, July and August).

Stabilisation of clay subgrade layers has therefore been incorporated within the earthworks' design to improve constructability. In addition to strengthening the subgrade material, this will provide a sound working platform for placement of the upper fill and pavement layers. This stabilised layer enables effective compaction of the upper material layers, which is critical to successful placement of fill within the runway and taxiway platforms.

Double-handling of material will be reduced wherever possible. Minimising the stockpiling of material and maximising direct transportation of fill to the placement site will therefore be prioritised in the detailed works staging.

A5.4.6.5
Stockpile management

Material stockpiles will be established in the contractor compound areas. As well as the main stockpile area, additional smaller stockpiles may be established to facilitate handling of earthworks during the various stages. These will be documented in the contractor's construction-management plan.

Mitigation measures to control surface water run-off will be implemented as part of the M3R construction specification and Construction Environmental Management Plan (CEMP).

Basaltic clay on the site is highly susceptible to changes in moisture content and can quickly degrade if exposed. The extremely weathered residual basalt rock and colluvium on site may also have similar issues. This material will therefore be placed and compacted in a controlled manner, shaped to shed stormwater, and protected from overland surface-water flows.

Stockpile management will consider Foreign Object Debris (FOD) and dust suppression, depending on the proximity to airport operations. (FOD is any loose material that may pose a risk to aircraft operations e.g. risk of ingestion into a jet engine.) To protect material, stockpiles may be topsoiled and vegetated depending on how long they will be in place.

The threat and management of sediment-laden runoff will be considered through all stages of the project including staging, works methodology and design to mitigate and manage risks.

A5.4.7
Batter access requirements

A slope ratio of one vertical to six horizontal, or one vertical to 2.5 horizontal (depending on height of embankment) has been selected to enable reasonable access and movement on the slope for maintenance and inspections.

Four-metre-wide access benches have been provided every eight metres vertically up the embankment. This is to provide vehicle access for maintenance, and control stormwater flow paths down the slope to mitigate erosion. Swales on the inside edge will divert surface water flows across the embankment to lined swales running down the edge of the embankment, which will discharge into Arundel Creek. It is proposed that the embankment be vegetated with grasses and medium-height shrubs.

A5.4.8
Operations Road underpass

A realigned Operations Road will provide access to the midfield area for general maintenance and security access, and to serve the Airservices Australia compound, ARFFS and Bureau of Meteorology (BoM) offices.

The reconfigured road will pass below the proposed southern cross-field taxiways via an underpass structure. Excavation for the underpass is anticipated to be limited to basaltic clay and fractured basalt rock (with the potential to encounter areas of intact rock) thereby likely avoiding hard excavation. Fill will be used to build the ground surrounding the underpass up to the required level for taxiway construction.

The reconfigured road may require minor modification to the Melbourne Airport Golf Club, subject to detailed design.

A5.5
PAVEMENT CONSTRUCTION

A5.5.1
Introduction

M3R will be constructed using a variety of pavement types and profiles.

The pavement profiles have been developed based on the varying geotechnical conditions across the site, the differing pavement types and materials to be used, and the varying aircraft-traffic design loading required. This section gives an overview of the key airfield pavements to be constructed and their associated construction methodologies.

A5.5.2
Pavement design life

The intended design life of M3R infrastructure is for a minimum of 100 years.

However, asphalt wearing courses typically have a life of only 10 to 12 years. Full rehabilitation works will be required for the flexible pavements before the end of their design life due to ultra-violet rays and normal deformation. The deterioration rate varies depending on location, traffic loading and stress. Likewise, the concrete slabs on rigid pavement are expected to be replaced after 40 years, according to traffic and environmental conditions.

A5.5.2.1
Design subgrades

Various design subgrade strengths have been adopted across M3R, based on geotechnical test information and proposed pavement use. These then informed the pavement design process and construction methodology.

Natural subgrade conditions at Melbourne Airport generally have a low subgrade California Bearing Ratio (CBR) of around two per cent when tested in the soaked condition.

Historically, flexible pavements at Melbourne Airport have been designed using CBR of four to five per cent and are performing well. These existing pavements incorporate a lime-stabilised clay working platform underneath, along with waterproofing layers and subsoil drainage. This is considered to have helped the good pavement performance.

Based on geotechnical investigation, the following subgrade strengths have been adopted for M3R pavement design:

- CBR of 15 per cent subgrade for pavements founded on rock
- CBR of five per cent subgrade for pavements with surcharge loading (pavement thickness) greater than 1,200 millimetres
- CBR of four per cent subgrade for pavements with surcharge loading between 600 millimetres and 1,200 millimetres
- CBR of two per cent subgrade for pavements with surcharge loading less than 600 millimetres.

A5.5.3
Pavement profiles

This section summarises the M3R pavement profiles that are expected to be constructed.

A5.5.3.1
Flexible unbound granular pavement with thin asphalt

The flexible unbound granular pavement designs are generally a 125-millimetre asphaltic concrete wearing course over a 400-millimetre Fine Crushed Rock (FCR) base course, over a designed FCR sub-base course.

A 300-millimetre-thick in situ lime-stabilised clay working platform is included in the pavement profile when the pavement is founded on a clay material; and a nominal 200-millimetre-thick blinding concrete layer when founded on a rock subgrade.

A5.5.3.2
Rigid pavement

Rigid pavements utilise five megapascal (mpa) flexural-strength Portland cement concrete over a 150-millimetre wet lean-mix concrete base course over a 300-millimetre layer of high-quality FCR. A 300-millimetre in situ lime-stabilised clay working platform has been included in the rigid pavement profile when the pavement is founded on a clay material, and a 200-millimetre nominal blinding concrete layer when founded on a rock subgrade.

A5.5.3.3
Shoulder pavement

The shoulder pavement design comprises a 50-millimetre asphaltic concrete wearing course over a FCR base course and a FCR subbase. Where sited on clay, this pavement structure will be constructed on a 300-millimetre lime-stabilised working platform.

A5.5.3.4
Expedient pavement

Pavement areas required to remain operational during M3R construction will be completed using an expedient pavement design.

Examples of these areas are those that tie into the existing north-south runway (16L/34R). These pavements are typically constructed in six to nine-hour shifts. Expedient pavement typically utilises rapid-set concrete and rapid-set lean concrete surfaced with an asphaltic concrete wearing course. To control reflective cracking on the asphalt wearing course, a geogrid reinforcing layer will be incorporated.

A5.5.4
Pavement preparation

This section provides an overview of the approach to pavement preparation.

A5.5.4.1
Basaltic clay management during construction

The in-situ clay at Melbourne Airport is subject to swell and changes in strength depending on its moisture condition.

Careful management of the clay is therefore required during construction in order to maintain its moisture content and density. Materials intended to remain in-situ will be kept near the equilibrium moisture content and in-situ density.

Construction will be staged so that clay subgrades are only exposed when the weather forecast is favourable, and the clay can be quickly covered and protected. Overburden will remain on top when rain is forecast, and only limited areas of subgrade will be exposed at any time.

Materials intended to be excavated and reused immediately will be maintained at the in-situ moisture condition and compacted back to their in-situ density. Any significant changes in moisture content or density will cause the clay to change volume once it returns to its equilibrium state.

Materials to be excavated and reused at a later time are expected to be compacted into a stockpile embankment, at the in-situ moisture content and density, and appropriately protected from changes in moisture content. Once incorporated into the works they will again be maintained at their in-situ moisture content and compacted back to in-situ density.

To help manage moisture conditions in the clay subgrade during construction of the upper pavement layers, the following have been incorporated into the construction methodology:

- Application of a waterproofing/curing membrane (prime) on the lime-stabilised working platform
- Application of a sprayed seal on the bottom-most layer of fine crushed rock subbase. This is to provide waterproofing protection from top-down or side moisture ingress to the existing subgrade
- Installation of subsoil drainage at the interface between the runway structural pavement and shoulders. The invert level of the subsoil drainage will remain above the lime-stabilised working platform to prevent moisture ingress into the subgrade level.

A5.5.4.2
Stabilised clay working platform

Where pavements are constructed on expansive basaltic clay soils, a stabilised clay platform will be constructed to act as a working platform to facilitate the construction and minimise damage to the prepared subgrade. The top 300 millimetres of existing subgrade will be stabilised with three per cent lime. This will be undertaken by in-situ stabilisation using equipment purpose-built for lime stabilisation.

In addition to adding strength and reducing risk, the lime-stabilised clay layer will serve as a construction platform for construction of the upper pavement layers. This construction platform is important, not only to support construction vehicles, but also to provide a firm base enabling adequate compaction of granular pavement materials in the upper pavement layers.

A5.5.4.3
Proof rolling

Proof rolling of airfield pavement aggregate layers and non-cohesive subgrade will be done to demonstrate that subgrade and pavement layers have reached the minimum required strength specified in the design.

Proof rolling has two primary objectives:

- To identify soft spots in the underlying pavement structure, allowing areas to be repaired and avoiding costly repairs when the pavements are operational
- To increase the compacted density of the aggregate subbase and base layers close to those produced by aircraft operating on the finished pavement. In some cases this might be above 100 per cent of laboratory density.

Proof rolling for lower pavement layers may be undertaken using pneumatic-tyred rollers or a water cart. Proof rolling of upper pavement layers will be undertaken utilising a purpose-built 'Marco' roller. This roller simulates the stress impact of aircraft-wheel loading and significantly reduces risk of operational pavement failure.

A5.5.5
Pavement construction methodology

This section provides an overview of the pavement preparation approach and the intended construction methodology for M3R's main pavement types:

- Flexible unbound granular pavement with thin asphalt
- Rigid pavement
- Shoulder pavement
- Flexible composite pavement
- Expedient pavement.

A5.5.5.1
Flexible pavements

Crushed rock sub-base and base course layers will be placed and compacted on top of the prepared subgrade.

Base materials will be placed by paver wherever possible, to reduce segregation and allow a greater level of control. When not possible, base material will be spread by grader and trimmed to level. Subbase and base layers will be compacted using steel drum and pneumatic rollers at or near optimum moisture content. Each layer will be tested and proof rolled to confirm the specified level of compaction has been achieved. A bituminous prime coat will be placed on the surface of the base course.

Asphalt will be placed using asphalt pavers at varying layer thicknesses. Asphalt will be manufactured at the onsite batching plant with minimal transport time to the site, thereby reducing the risk of cooling before placement.

Asphalt shuttle buggies will be utilised where possible to ensure a continuous supply of asphalt to the paving machine. This allows longer paving runs and improves level control with fewer cold joints.

The asphalt surface is compacted by steel drum and pneumatic-tyred rollers to achieve the density required in the project specification. Asphalt on runway pavements will be grooved prior to entering service. A typical asphalt pavement profile is shown in **Figure A5.5**.

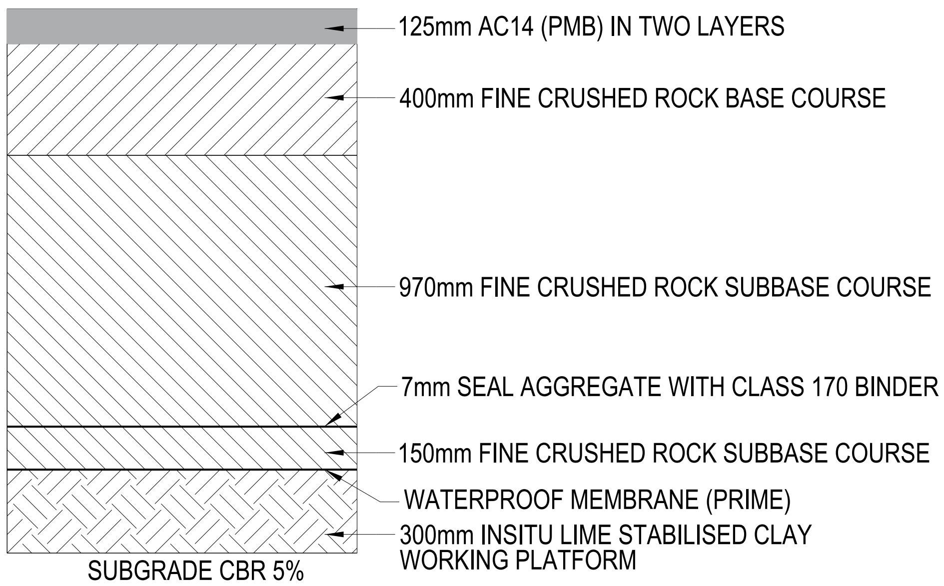
A5.5.5.2
Rigid pavements

A fine crushed-rock subbase layer will be placed on top of the prepared subgrade using a paver or grader.

The subbase material will be rolled and compacted to the required density by steel-wheeled and pneumatic rollers. A wet lean-mix concrete layer will be placed on top of the granular subbase. The lean mix will be placed by mixer truck and may be placed in widths that cover a wide area across multiple runs of form work.

A seven-millimetre seal aggregate with Class 170 bituminous binder will be constructed on top of the lean mix base. This acts as a bond breaker and waterproof membrane between the pavement layers. Form work will be constructed in paving run widths of five to eight metres, and paving run lengths of up to 150 metres. Airfield Portland cement concrete will be placed from trucks and levelled, vibrated and screeded by a finishing train running on rails on top of the form work or from the top of the adjacent slabs during infill runs. All concrete surfaces will be broom finished to provide adequate surface texture.

Figure A5.5
Typical flexible pavement profile



Source: BECA

Curing compounds and wet hessian curing will be utilised through the curing process, and saw cutting will occur some two to eight hours after placement, depending on environmental conditions and the rate of curing. These joints will be sealed after the concrete is fully cured using a silicon-based joint sealant material. Dowel bars will be drilled into vertical faces between formwork runs, and bond breaker applied to dowel bars. Infill runs, will be constructed between the formed runs, with concrete placed by trucks trafficking the adjacent finished concrete pavement. Concrete pavement on runways will be grooved to improve frictional characteristics and water dispersion under aircraft tyres.

Alternative placement methods such as slip-form paving and placement by concrete paver may be trialled, and utilised if they have the potential to enhance quality and efficiency. A typical rigid pavement profile is shown in Figure A5.6.

A5.5.5.3
Construction of expedient pavements

Expedient pavement construction will be required inside operational areas, based on the construction staging program. This is likely to be within the existing north-south runway (16L/34R) graded strip.

Short work windows are expected, and pavements need to be reinstated to an operational condition at the end of the work shift. Rapid-set concrete pavements surfaced with asphalt and incorporating Asphalt Reinforced Geogrid (ARG) and Stress Alleviating Membrane Interlayer (SAMI) have been developed for these time-critical areas.

ARG will be used between the asphalt layers of the expedient pavements to control reflective cracking migrated from the surface of the rapid-set Lean Mix Concrete (LMC). Due to high early strength gain within the short night-time working window, shrinkage cracks on rapid-set LMC are unavoidable.

Rapid-set concrete will be transported to site in volumetric mixers. These store concrete ingredients separately due to the rapid setting nature of the material. The material is mixed when it enters the chute prior to placement. Once placed, the concrete will achieve trafficable strength within four hours.

Due to the rapid setting nature of the material, logistics and the continual supply of material to the work site are vital in preventing cold joints within the concrete pours. A typical expedient pavement profile is shown in Figure A5.7.

A5.6 DRAINAGE

Provision of adequate drainage is critical to the airfield's safe operation and serviceability. Construction of drainage throughout M3R will involve the development of new drainage systems and outfalls, and integrating areas into the existing drainage network. For a summary of the impacts and mitigations of M3R on surface-water quality and hydraulics refer to **Chapter B4: Surface Water and Erosion**.

A5.6.1
Discharge attenuation and water quality

The key features of M3R's drainage system regarding discharge attenuation and water quality are:

- Discharge rates from the development are controlled back to existing conditions for the 100-year Average Recurrence Interval (ARI) events
- The overarching stormwater-drainage design philosophy is to direct all catchments impacted by the proposed works to Arundel Creek, where flow and quality can efficiently managed
- Attenuation has been provided in the open areas between the taxiways and runways, as well as a detention and treatment facility at the southern edge of the airport boundary
- Surface run-off is conveyed to collection structures (pits and headwalls) by grass-lined swales (these swales are part of M3R's attenuation and treatment strategy)
- The minimum grade of all grass swales is 0.5 per cent - where the slope is less than 0.5 per cent, channels will be concrete lined
- The design typically involves treatment by buffer strips, grass swales and biofiltration swales
- The final third of all swales will be constructed with an underlying filter zone to help drain the area dry.

A5.6.2
Swales

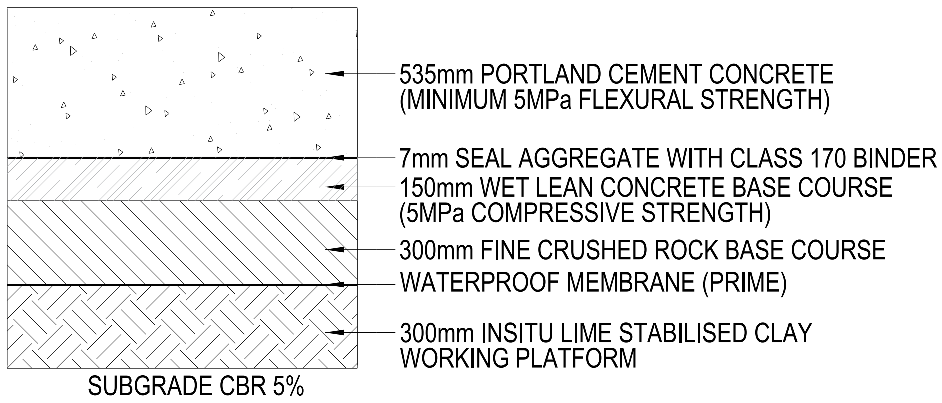
Swale drains will be constructed at completion of the earthworks platform. Swales will be of variable depth depending on grade and catchment area, and constructed by excavators and graders as part of the final trim of the earthworks platform. Any material excavated during drainage construction will be transported to the material stockpile site for use as general fill.

At the invert of the drain-course, aggregate filter material will be placed surrounded by a geotextile filter fabric.

150 millimetres of topsoil and a jute mesh lining (erosion control mat) will be placed over the graded surface.

Approved grass seed and bitumen emulsion will be spread over the top soil to promote strong natural grass growth and reduce erosion. A typical swale profile is shown in Figure A5.8.

Figure A5.6
Typical rigid pavement profile

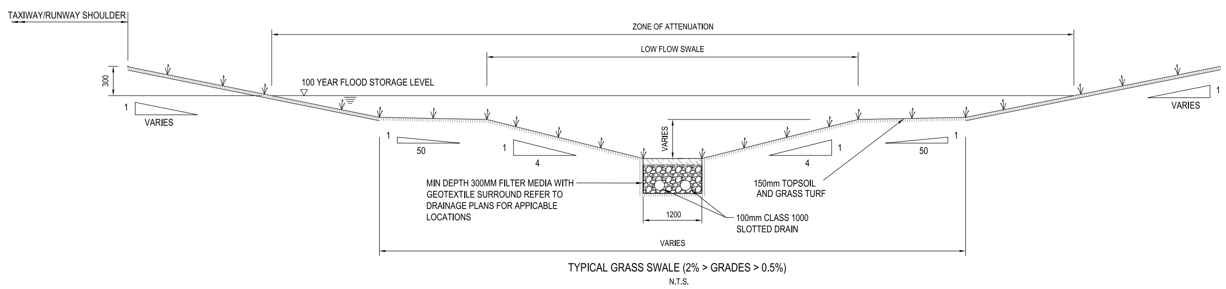


Source: BECA

Figure A5.7
Typical expedient pavement profile

Source: BECA

Figure A5.8
Typical swale profile



Source: BECA

Biofiltration swales will be constructed using a sandy-loam filter material over a coarse sand transition layer. This will be placed on top of the coarse aggregate material that includes wood chips and straw. Within the coarse aggregate, a 50-millimetre PVC slotted pipe will be placed at the base of the drain. The swale drain will be constructed using excavators. A typical biofiltration swale is shown in Figure A5.9.

A5.6.3 Headwalls

Headwalls will be largely cast in situ using structural formwork and plywood forms. Rock riprap and stilling basins will be placed downstream of major drainage points to dissipate energy and reduce erosion. These will be constructed by preparing levels to grade, placing Geofabric filter material and then placing large diameter rock riprap on top of the Geofabric. Excavators will be used to excavate and place riprap, with concrete placed by ready-mix trucks. A typical headwall profile is shown in Figure A5.10.

A5.6.4 Piped drainage

Areas of the drainage system utilising a pit and pipe system will be constructed with industry standard details. All pipes will be precast - pits will be a combination of precast and cast-in-situ structures.

All pit structures will be founded on a minimum depth of 100-millimetre blinding concrete. Swelling HydroStop material will be placed around the pipe pit interface to prevent leakage from the drainage system. Material surrounding pits within pavement areas will be backfilled with lean-mix concrete, while pits located in grassed areas will be backfilled with stabilised sand or general fill material.

Trenches will be excavated for the placement of drainage pipes using excavators. The trenches will be battered back to meet Victorian health and safety requirements, depending on the depth of the trench. Stabilised bedding material will be placed in the bottom of the trenches, and the concrete drainage pipes placed in the trenches using cranes and exactors. Trenches will be backfilled with general fill and granular material. Drainage pipes will be inspected by remote camera before being accepted into service to ensure all joints are aligned and that there are no defects that will affect the performance of the system. A typical pipe/pit profile is shown in Figure A5.11.

A5.6.5 Arundel Creek culvert

The runway platform embankment across Arundel Creek requires the creek's permanent diversion into a culvert approximately 500 metres long beneath the southern cross-field taxiways.

The design and alignment of the Arundel Creek culvert is primarily to give the tunnel flood immunity. The size and levels have been determined based on a Q10,000 flood event. The resulting design is a three-cell concrete culvert: the two proposed outer culverts are 3.6 metres wide by 2.1 metres high, and the single central culvert is 3.6 metres wide by 2.6 metres high. The central culvert will be formed at a lower level to allow for a low-flow condition. The levels of the culvert at each end tie in with existing terrain and creek levels.

The realigned Operations Road will cross a tributary of Arundel Creek adjacent to Melbourne Airport Golf Course. This will require a culvert to ensure conveyance of the tributary is maintained. The location and layout of the Arundel Creek culvert is illustrated in Figure A5.12

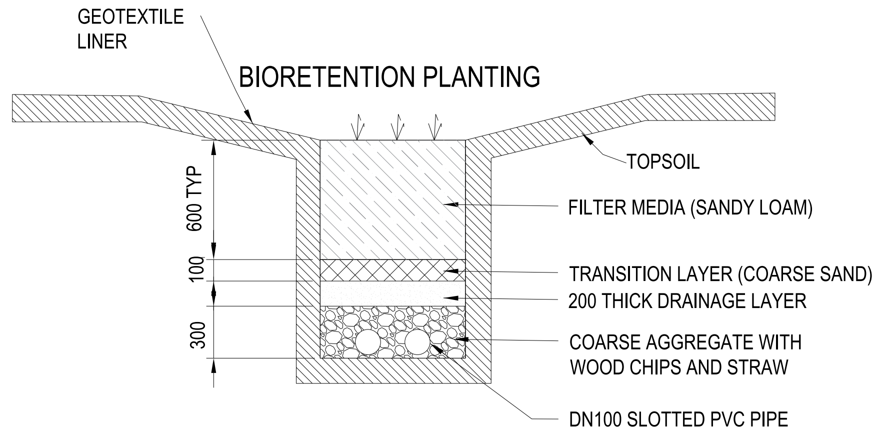
A5.6.5.1 Construction methodology

Construction methodology for the crossing of Arundel Creek has been developed to enable the creek's flow to be maintained at all times. During construction of the culvert, flow within the existing Arundel Creek will be maintained.

Tie-in works are expected to be required only within the immediate vicinity of the upstream and downstream headwalls. The installation of box culverts or large-diameter pipe will require widening of the creek bed both upstream and downstream of the culvert. All disturbed ground will be treated to prevent erosion during construction and in the developed condition. Treatment of the main channel will include rock beaching; disturbed ground within the floodplain will be replanted with local native species and grass.

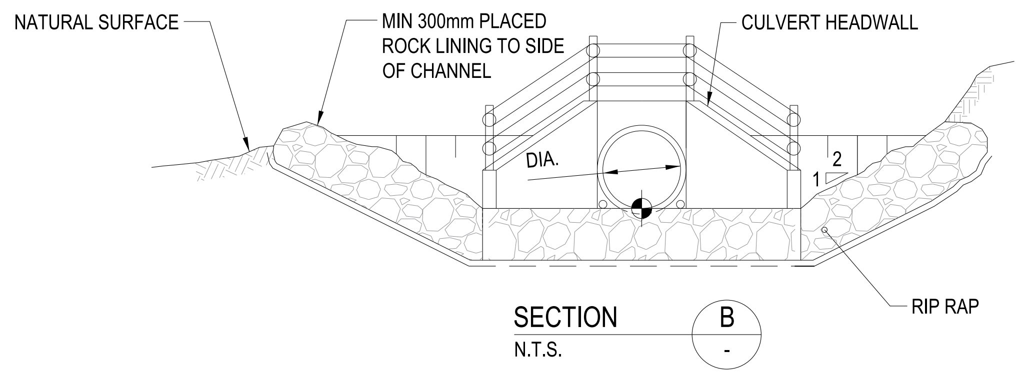
The alignment for the culverts will likely be to the east of the existing watercourse. This cuts through the valley side and, as a result, the foundation of the culverts will be in rock. Temporary cuts will be constructed and battered back at safe angles to provide working space for construction of the culverts. The culverts will be backfilled with a three-metre zone of structural fill material.

Figure A5.9
Typical biofiltration profile



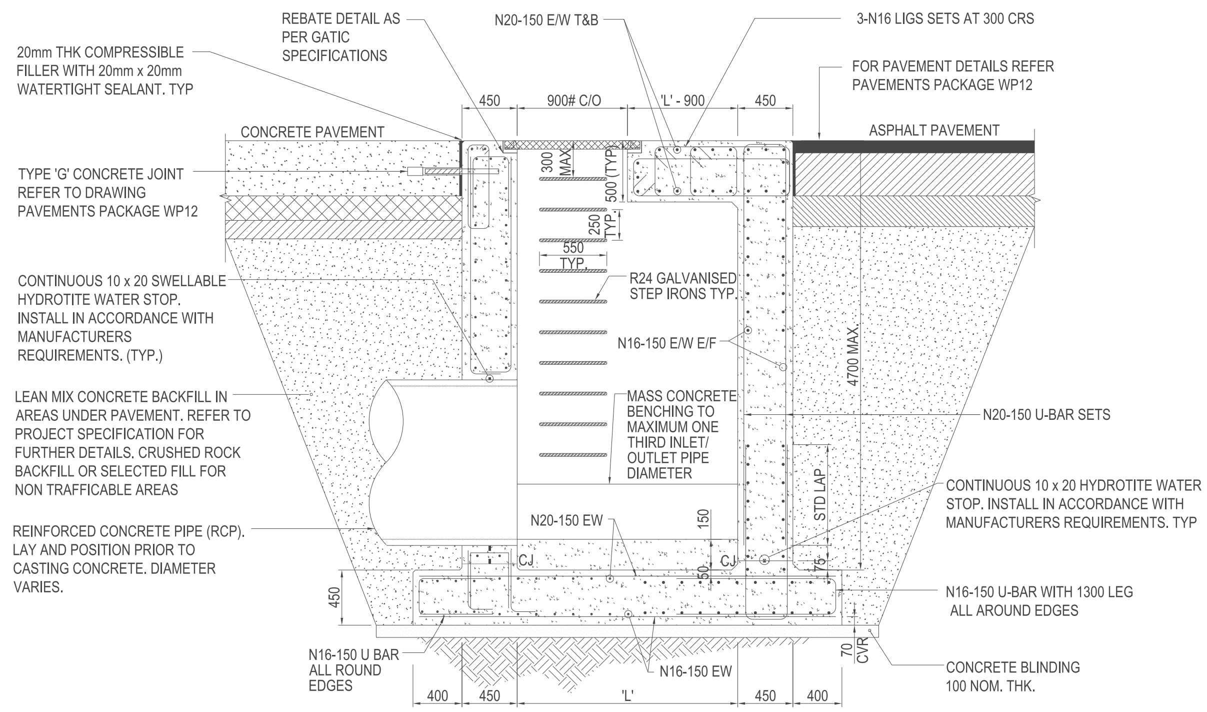
Source: BECA

Figure A5.10
Typical headwall profile



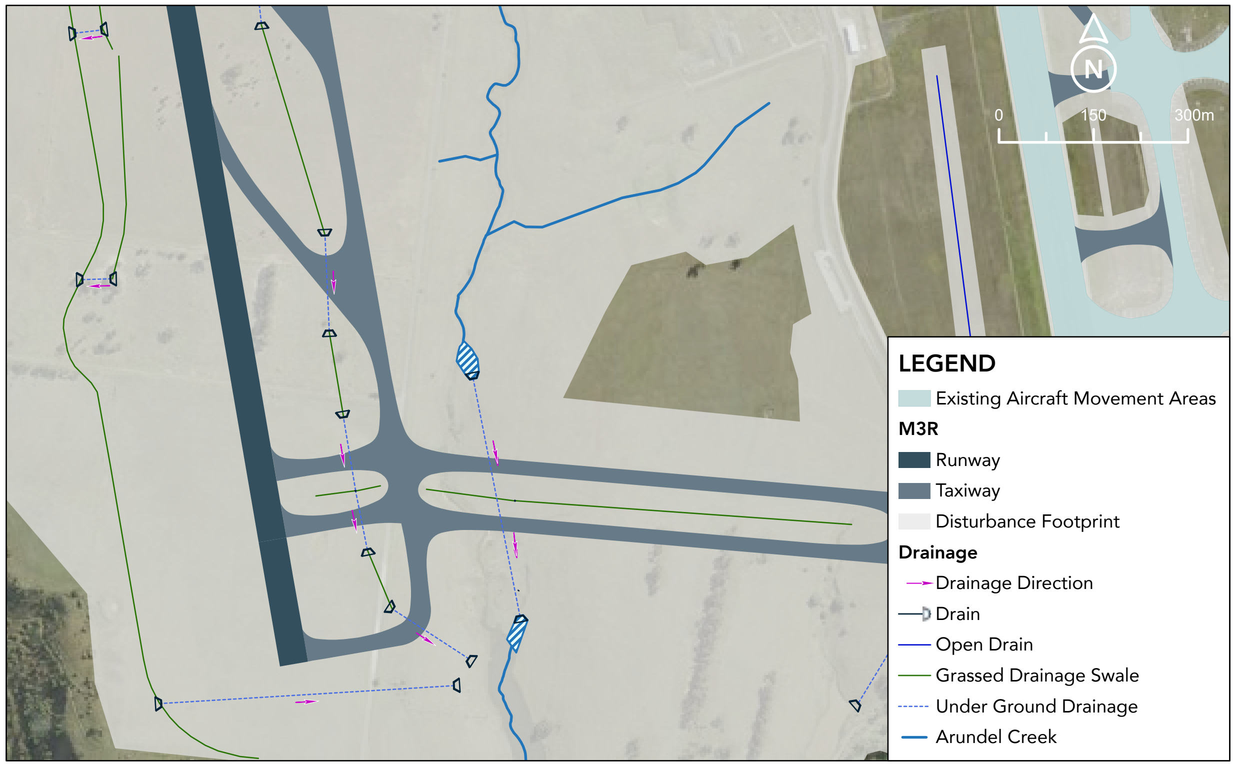
Source: BECA

Figure A5.11
Typical pipe/pit profile



Source: BECA

Figure A5.12
Diversion of Arundel Creek



Source: APAM

One or more collars of low-permeability clay fill will reduce seepage under the embankment and reduce the potential for piping erosion of the embankment fill. The general construction methodology outline for culvert construction is:

- Vegetation, topsoil strip and soft-spot removal conducted over the length of the culvert alignment using bulldozers, graders or box scrapers
- Ground-bearing capacity confirmed by three shallow trial pits along the line of the Arundel Creek culvert (outside the exiting stream) and standard penetration tests
- Any soft or unsuitable material in the bottom of the valley excavated and replaced with suitable fill before starting construction of the embankment and culverts
- A granular-basalt drainage layer constructed at the bottom of the valley, together with longitudinal pipes. These will collect the flows from the slope drains in the valley sides (springs and areas or zones of preferential seepage are likely along the sides of the Arundel Creek valley)
- At the northern end of the runway embankment, the existing creek diverted into a temporary lined diversion while the northern and central portion of the culvert is constructed
- The culvert constructed using precast sections where possible. Head walls cast in situ. Sections placed by crawler crane
- The southern section of the culvert will be similarly constructed with the creek again temporarily realigned
- Granular or rock-fill 'toes' will then be constructed around inlet and outlet. These have been incorporated into the upstream and downstream slopes of the embankment to protect against erosion damage in case of flood events
- Upon completion of the whole culvert structure, Arundel Creek will be diverted into the culvert. It is anticipated that construction of the culvert will take five months.

A5.7 NAVIGATIONAL AIDS

A5.7.1 New Instrument Landing System (ILS) installation

Precision landing guidance technology, in the form of Instrument Landing Systems (ILS) will be installed to meet regulatory and customer requirements for runways 16R and 34L.

The respective localiser and glide path footprints will be constructed as part of the earthworks platform grading. Each localiser platform will be approximately 200 metres in length and 45 metres in width. Each glide path platform will be approximately 400 metres in length and 40 metres in width. The localiser and glide path areas will be prepared to a maximum grade of one per cent longitudinally and two per cent laterally, done by bulldozers and graders.

Conduit systems for power and communication will be constructed to the localiser and glide path sites.

The ILS equipment will be installed at each site by Airservices Australia in accordance with the manufacturer's requirements. Extensive testing and commissioning is required prior to the equipment becoming operational.

A5.7.2 ILS critical and sensitive areas

Three types of critical, restricted areas exist around localisers and glide paths. These must be maintained throughout M3R works to maintain operational capability on the airfield. The areas needing protection during construction are:

- The vehicle critical area, which must be kept clear of vehicles, plant and similar up to four metres high, and will be marked by signs or bollards
- The aircraft critical areas (based on A380 aircraft and Category I operations) for the localiser and glide path
- The Building Restricted Area (BRA) that protect the glide path and localiser signal from interference by building development.

A5.7.3 Approach lights

A High Intensity Approach Lighting System (HIALS) will be constructed for runway 16R.

Where HIALS lights are inset within the pavement, they will be constructed similarly to airfield ground lighting. In other areas, they will be supported on prefabricated gantries of variable height (depending on the height of the lighting plane in relation to the natural surface). These lighting support structures are 'frangible', which means they will not damage an aircraft if struck. They will be erected by crane and constructed on concrete footings of variable depth.

A5.7.4 Visual approach slope indicator system (Precision Approach Path Indicator)

Double-sided Precision Approach Path Indicator (PAPI) systems will be provided for the new north-south runway (16R/34L). The existing PAPI for runway 09 will be relocated due to the shortening of the runway. A nominal location for the PAPI units is 400 metres from each threshold. Power and communication cable will be run to the site in ducted conduit. The PAPI systems will be installed based on the manufacturer's requirements. A commissioning process involving flight testing will occur before the units enter service.

A5.7.5 Movement area guidance signs

The locations of Movement Area Guidance Signs (MAGS) across the M3R site are based on MOS 139 requirements. New MAGS installed under M3R will be LED type and include adjacent Series Isolation Transformer (SIT) pits. MAGS are to be mounted on frangible couplings on concrete foundations.

Road-holding position lighting and illuminated signage is to be provided at each road-holding position serving the runway. The foundations will be prepared using excavators, and concrete placed using ready-mix trucks. The lights will be levelled and installed as per manufacturer's requirements.

A5.7.6 Illuminated Wind Direction Indicators

New Illuminated Wind Direction Indicators (IWDI) will be provided for the new north-south runway. The existing IWDI situated adjacent to the existing east-west runway (09/27) location will be repositioned as appropriate for the new threshold location for runway 09. All new IWDIs will be installed as per manufacturer's requirements.

A5.7.7 Obstacle lighting

Obstacle lighting will be placed on any structures deemed necessary under the obstacle obstruction survey.

A5.8 AIRFIELD GROUND LIGHTING

The Airfield Ground Lighting (AGL) and navigation aids for the new north-south runway will provide a Category III runway system for runway 16R and Category I Special Authorisation Approach for runway 34L.

In line with Melbourne Airport's strategy to update existing tungsten halogen lights to LED lights, all AGL will be LED. Taxiway light fittings will be LED smart-ready lights safeguarding for a future 'follow the green' system of individually addressable lights. This allows aircraft to be guided around the airfield by following paths of green lighting.

The construction process for installation of AGL inset fittings across M3R is:

- Set out the location and orientation of each light fitting via survey
- Core the pavement to install the outer can of the light fitting
- Drill a smaller diameter core through the base to locate the underlying AGL conduit
- Install secondary cable through conduit to the associated transformer
- Install the light-fitting can using a mortar bed and semi-rigid grout
- Install and align the light fitting as per manufacturer's guidance
- Seal unit as required to prevent water ingress
- Test and commission the fitting and control system.

Raised lights will have a similar installation process. However, they will not require large diameter cores to inset the fitting into the pavement. Coring may still be undertaken to connect the base of the fitting to the underlying AGL conduit but the fitting itself is bolted onto the pavement.

A5.8.1
Base cans and Series Isolation Transformers

The taxiway base cans provided are typically 12 inches (304.8 millimetres) in diameter, with depth base of 210 millimetres fitted with an eight-inch adaptor ring to allow space for the cable and conduit entry points. The Series Isolation Transformers (SITs) are located in a SIT pit outside the runway and taxiway strip, allowing access to the SITs without closing the runway and taxiway.

Secondary cables are installed in conduits within the pavement. SITs have been located in a new circular SIT pit. Reinforced concrete pits are utilised to house a maximum number of six SITs. Baskets are installed to house the SITs in the middle of the pit rather than sitting on the bottom.

A5.9
AIRFIELD LIGHTING EQUIPMENT ROOM AND CONTROL SYSTEMS

A5.9.1
Airfield lighting equipment rooms

Two additional Airfield Lighting Equipment Rooms (ALERs) – one in the south and one in the north – will be constructed. Supply to these is drawn from an extended HV ring main.

ALERs contain the standby generation, main switchboard, surge protection, control and monitoring station, communications rack, Constant Current Regulators (CCRs) and circuit selectors.

Construction of each ALER building will utilise standard building practices for light commercial buildings. Construction will involve the placement of concrete floor slabs, provision of services, erection of steel frame work by crane, and construction of brick and prefabricated cladding.

New CCRs will be provided, which are microprocessor controlled and compatible with LED-type airfield lighting fixtures. The CCRs will have a minimum of six intensity levels fully adjustable between zero and 100 per cent.

The CCRs will incorporate the following:

- Open-circuit protection device
- Over-current protection device
- Current monitoring and display
- Lamp failure detection
- Insulation resistance monitoring
- Output current limiter (limiting series current to 120 per cent of rated value)
- Surge protection.

CCR monitoring will be displayed on the CCR, accessible through the control and monitoring system to the remote mimic control panels in the maintenance base and in the ALERs. The CCRs will be installed in accordance with the manufacturer's requirements.

A5.9.2
Control and monitoring system

The Control and Monitoring System (CMS) is to provide the user interface allowing ATC and maintenance personnel to manage the AGL system. The control system is capable of allowing single lamp control throughout, safeguarding the works for a future 'follow the green' control system of individually addressable lights.

Local control will be provided in each ALER. M3R allows for modifications to the existing CMS workstation in the existing Air Traffic Control (ATC) tower to incorporate the new runway and allow for new workstations in the new ALERs, and software modifications to existing mimic panels. Integration of the CMS into the Airservices Australia control system will occur before commissioning the lighting system.

A5.9.3
Cables and pit/duct system

The primary series cabling will be installed in a new dedicated pit and duct system for the new north-south runway (16R/34L) and associated new taxiways.

The pits are located outside the graded strip for maintenance access. The duct system will have pits at a maximum of 100 metres spacing for the drawing of cables. In cases where circuits are interleaved, cables are run in separate ducts. Concrete-encased duct banks are provided at pavement crossings.

The cables provided are screened to allow for safeguarding a fully addressable control system in the future. This system allows lights to be individually turned on and off from a central position. The voltage and sizing of the cables are:

- Primary cables: minimum size five kilovolt, six millimetres squared
- Secondary cables: minimum size 600 volt, four millimetres squared.

Primary cables will be installed in pit and duct system, secondary cables will be installed in conduit.

A5.10
HV POWER SUPPLY STRATEGY

The HV network will comprise a 'ring main' starting at existing RMU 2, connecting the western side of the new runway all the way down to MAT substation located on South Centre Road.

Separate substations will be provided at each load point. Other ancillary loads are anticipated to be reticulated from these main distribution points at low voltage. The HV network will also be reconfigured and protection settings adjusted to accommodate the new loads required for M3R.

A5.11
REMEDIATION OF TEMPORARY WORKS

The M3R construction process will include a number of temporary works that will be remediated at completion of the relevant stage. These will include temporary haul roads, construction access tracks, site accommodation, construction laydown areas, and stockpile areas.

Remediation works will be undertaken at the completion of M3R, or relevant construction stage, to return areas affected by temporary works to the standard of their condition prior to M3R commencing.

Dilapidation surveys will be undertaken at each site prior to temporary works commencing. Their objective is to document site condition prior to construction.

As part of the temporary works, topsoil stripped from road and hardstand areas will be stockpiled for reinstatement post-construction. These topsoil stockpiles will be stored separately from general-fill stockpiles.

At the completion of M3R construction, or the relevant M3R stage, temporary works will be decommissioned and remediation work undertaken to restore affected areas to their condition pre-construction. This will typically involve the following tasks:

- At temporary compound and site accommodation areas, all plant, stockpiles and portable buildings will be decommissioned and removed from site
- Areas will be cleaned of any objects, debris and signage used during construction
- Repairs will be made to any defects in the peripheral environment such as damaged pavements, fences and drainage structures
- At temporary roads, access tracks and hardstand areas, all ground-improvement measures such as drainage and Geofabrics will be removed. Crushed rock and any asphalt, spray seal or concrete surfacing will be removed and, where possible, reused elsewhere in M3R
- Topsoil will be reinstated on areas where soil was stripped, and these areas will be treated with seed emulsion or seeded hydromulch using an approved grass species. A watering and maintenance regime will be established over a three-month period post-seeding to ensure healthy uptake of grass.

Remediation of temporary works will be inspected before acceptance by the airport. This inspection will occur at the completion of the required maintenance period for grassed and vegetated areas.

A5.12
CONSTRUCTION DELIVERY

A5.12.1
Workforce and plant requirements

During the M3R construction phase, it is estimated approximately 600 staff will be on site in construction and labour related activities. A further 50 staff will be employed in supervision and project-management-related functions.

Due to the nature of many work phases, it is anticipated that the resourcing level will fluctuate and therefore at times staff numbers will be less than these. Traffic impacts as a result of the construction works are presented in Chapter B8: Surface Transport.

A5.12.2
Hours of work

The hours of work will vary over the phases of M3R. The majority of works will be done between 5am and 6pm each day. Works associated with critical stages of the program may be undertaken on a 24-hour basis to reduce program duration and its impact on airport operations.

When works interface with active runways requiring closure of the runways during the construction period, they will be undertaken as night works and typically between 8pm and 6am.

There will generally be two shifts a day, with personnel arriving over a relatively wide time period due to their occupational requirements. For example, staff working on the asphalt plant and materials production will arrive some hours before those operating the construction plant.

A5.13 CONSTRUCTION PHASE RISK MANAGEMENT

During the construction phase many activities could be adversely affected by risks, having a negative impact on M3R regarding duration, cost, environment, quality and/or safety. Through the application of the Melbourne Airport risk-management methodology the M3R team has endeavoured to identify these risks, implement actions to reduce the likelihood of their occurrence, and reduce the impact on M3R should an adverse event occur.

For further details of the risk-management framework established for M3R refer to Chapter E5: Risk Management.

In most cases, risks cannot be eliminated through risk-management actions alone. The residual likelihood and consequence of each risk has therefore been assessed as part of the process for engaging the construction contractor. This is to determine whether management responsibility for the risk will be retained by Melbourne Airport or placed with the contractor. In general, the contractor will be responsible for those risks that they are best placed to manage due to their experience and expertise.

Together with Melbourne Airport, the successful construction contractor will be expected to implement risk management practices regarding:

- Design scope management and specification
- Construction scope and quality
- Airport operation interdependencies
- On-site occupational health and safety
- Environmental management
- Traffic management
- Airside works safety
- Security.

Table A5.2 identifies the most significant of these.

Table A5.2
Risks that could occur during the construction phase

Item	Risk	Impact	Mitigation
Revision of scope	Construction scope needs to be revised to accommodate an updated operational requirement by the airlines.	This could lead to delays in the commencement of construction, or approval of the design.	Regular communication with airline representatives to understand requirements and revisions on the scope of the design.
Foreign Object Debris (FOD) incident to aircraft	Construction activities such as carting of rock material and break out of concrete result in loose material on aircraft operating pavements.	Loose material is ingested into an aircraft engine creating a FOD incident.	Controlled and monitored construction sites and construction traffic routes. All work areas kept clean and an active sweeping regime implemented. All areas, including temporary works areas inspected by airfield safety officers prior to being accepted back into service. Lessons learnt on previous airside construction projects implemented on M3R.
Breach of Method of Work Plan (MOWP)	An aircraft does not comply with the MOWP requirements.	This could lead to a risk of damage to the aircraft and/or risk to construction personnel along with disruption to airfield operations.	All MOWP, Notice to Airmen (NOTAM) and staging requirements correctly published and clearly articulated. All signage and temporary lighting well maintained and correctly set out. Resourcing of airside safety officers and airfield works safety officers appropriate for the complexity of each stage.
Regulatory requirements	CASA introduces revised regulations at a late stage in the detailed design process.	This could lead to changes to the scope of work which result in a delay to the commencement of construction.	Regular communication with CASA during the design process to understand how the design complies with the current and proposed regulations.
Traffic	The number of heavy vehicle movements required during construction could adversely affect the surrounding road network.	This could lead to delays in the construction schedule and safety concerns from local residents.	The contractor to prepare a Construction Traffic Management Plan to minimise the potential safety and road damage impacts. Mitigation measures could potentially include road layout upgrades.
Airport operations	Construction works are carried out in such a way that they disrupt the operation of the airport in an unplanned manner.	This could lead to a breach/incident requiring response/investigation, which could delay the construction schedule.	Contractors' work methodology will be reviewed by Melbourne Airport's operations team for compliance with all airport works policies
Construction safety	An accident occurs that affects the contractors' personnel, the public or airport staff.	This could lead to delays in the construction schedule while the safety event is investigated.	Contractors' OH&S Management Plan will be reviewed by Melbourne Airport's safety and site management and superintendent teams for compliance with all airport work safety policies.

Item (cont.)	Risk (cont.)	Impact (cont.)	Mitigation (cont.)
Environmental incident	The contractor causes an environmental incident either within or external to the construction site, potentially requiring emergency response.	This could lead to delays in the construction schedule while the environmental incident is remediated and investigated and addressed.	Compliance by the contractor with its Environmental Management Framework and Plan will be monitored by Melbourne Airport's site management and superintendent team.
Soil remediation	Discovery of unexpected historically contaminated soil.	Soil needs to be treated before it can be used as fill or subbase.	Extensive site investigation to be undertaken during M3R design phase.
Cultural heritage salvage	Unmarked artefacts of cultural significance are exposed during the excavation works.	Undertake additional cultural heritage salvage.	Cultural Heritage Management Plan contains provisions for responding to unmarked artefacts and salvage activities to be undertaken well in advance of construction commencing.
Unknown utilities	Unknown major utilities are encountered during construction.	This could result in delays to construction.	Extensive service proving to be undertaken during the site investigation phase.
Asbestos	Utilities that need to be moved are unexpectedly found to be made from asbestos, or asbestos from old structures found on site.	This could result in delays to construction.	Engage asbestos consultant to advise on potential interaction with asbestos.
Adverse weather	Unexpected adverse weather conditions are encountered during construction.	This could result in delays to construction.	Seasonal conditions to be incorporated within construction program.
Significant soft spot	Additional unexpected ground soft spots are encountered during construction.	This could result in delays to construction.	A geotechnical engineer will be engaged to ensure the necessary survey is conducted to identify potential adverse ground conditions.
Construction equipment damages airport equipment	Construction works may damage Melbourne Airport or Airservices Australia equipment.	This could result in delays to M3R and/or disruption to aircraft operations.	Identify services and equipment that are vulnerable and/or sensitive. Section off areas around sensitive infrastructure as 'no go' zones. The Construction Management Plan prepared by the contractor must identify critical infrastructure and modify construction techniques in critical areas accordingly.
Safety incident	An operational safety incident occurs at the airport.	This could result in delays to the construction works while the incident is resolved.	The contractor will need to be prepared to efficiently close down and reopen the site or to transfer work to an unaffected area.
Security breach	M3R encounters a security incident.	This could result in delays while the security issue is resolved.	Construction methodology to be developed that ensures airside security is maintained at all times and adequate supervision undertaken to ensure Melbourne Airport security requirements are adhered to.
Late reinstatement of work areas	The work being undertaken by the contractor during a temporary airfield closure over-runs with a critical work area not able to be returned to service at the planned time.	This could cause delays to airport operations.	Construction carefully managed on an individual shift basis, with process for reinstatement including key timings closely monitored. Contingency plans are to be in place for incidents such as plant breakdown or disruption in material supply. Process for inspection and handover of work areas to be well documented and rehearsed with construction trials undertaken prior to works commencing in a critical time-limited area.
Dust disrupting operations or local community	Airport operations might be affected by dust created by works that cannot be adequately managed.	This may result in changes to aircraft operations.	Construction Environmental Management Plan to be developed to manage dust issues and a dust suppression program implemented where required.
Commencing operations	The timescales to complete the operational readiness tasks take longer than planned.	This would result in a delay to the commencement of operational services.	The operational readiness phase will be planned in detail jointly with CASA and Airservices Australia. The implementation of the plan will be coordinated with the airlines and the Melbourne Airport operations team.

A5.14
REFERENCES

Civil Aviation Safety Authority (CASA) Manual of Standards Part 139 (MOS 139).

BECA Consultants (BECA) 2020, M3R Concept Design, BECA Consultants Pty Ltd.

Chapter A6
Stakeholder Engagement

Summary of key findings:

- Melbourne Airport is actively engaging with a broad range of community, industry, and government, regulatory and other stakeholders on the M3R project.
- Engagement activities occurred prior to puiblic exhibition of this MDP, are continuing through the formal public exhibition period, and will (subject to approval of the MDP) extend to the construction and opening of the new runway.
- Consultation has occurred, and continues to occur, across a broad geographic area to increase awareness with affected communities.
- A dedicated engagement website (melbourneairport.com.au) has been established to encourage two-way communication between Melbourne Airport and the community. It is part of an engagement strategy employing multiple channels to make community participation easier and increase awareness of Melbourne Airport project developments. It complements traditional channels such as the community phone line and email.
- These multiple channels include project briefings, public displays, listening posts, community forums, and conversations with the community via a bespoke virtual engagement hub.
- Detailed community and stakeholder engagement on the final flight paths and airspace design will occur after MDP approval.
- The community can provide formal feedback during the MDP's public exhibition period.

CHAPTER A6 CONTENTS

CHAPTER A6 TABLES

A6.1 INTRODUCTION

Melbourne Airport is committed to comprehensive consultation and engagement with the community.

The airport's overarching objective is to foster community engagement; however, it is also about connecting with the community at a broader, grass-roots level and showing commitment to industry, social welfare, education and participation.

Engagement is critical for Melbourne Airport to continue to deliver an important connection for Melbourne and Victoria, while respecting the needs and desires of local communities to live in a safe and comfortable urban environment, and working effectively with a broad range of stakeholders to deliver safe and efficient airport operations.

Engagement enables Melbourne Airport to be responsive to the needs of our stakeholders and deliver better outcomes for all involved. Melbourne Airport must do this within a highly regulated and complex operating environment.

Engagement also drives improved:

- Business decision making
- Stronger levels of understanding and shared knowledge
- Levels of trust and reputation.

Melbourne Airport is required under the *Airports Act* (1996) (Cth) to consult with community and key stakeholders on the five-yearly Master Planning process, and as part of the Major Development Plan approval processes.

Melbourne Airport will commit to engaging:

- Early - we will engage with stakeholders and the community as we develop projects, ideas and solutions to harness the benefit of broad stakeholder inputs
- Regularly - we will ensure there are regular opportunities to engage with Melbourne Airport through a range of channels
- Ongoing - our engagement continues well beyond the closing of the consultation period, we commit to informing stakeholders of outcomes and how the engagement has influenced project planning and development. More detail about Melbourne Airport's commitment to engagement is enclosed as **Appendix A6.F**.

A wide variety of communication and engagement activities is undertaken by the airport to inform, consult and involve participants from across the community.

Melbourne Airport uses the International Association for Public Participation (IAP2) engagement spectrum (**Figure A6.1**) to assist in the design of engagement programs.

Figure A6.1
IAP2 engagement spectrum

Inform → Consult → Involve → Collaborate → Empower

A6.2 STATUTORY REQUIREMENTS

The statutory requirements for consultation and engagement for this MDP are prescribed in section 92 of the Airports Act 1996 (Airports Act).

In accordance with Section 92(1) of the Act, advertisements and will be placed in newspapers to publicise the public exhibition of the Preliminary Draft MDP, promote engagement activities and encourage conversation through the melbourneairport.com.au website.

The melbourneairport.com.au website includes the full MDP and summaries of all chapters. The website will promote engagement activities held in the lead up to, and during, the formal exhibition period such as locations and times of engagement events.

In accordance with Section 92(1A) of the Airports Act, the following stakeholders will be advised in writing about the preparation and consultation period of the Preliminary Draft MDP:

- Department of Infrastructure, Transport, Regional Development and Communications
- Civil Aviation Safety Authority
- Airservices Australia
- Victorian Department of Environment, Land, Water and Planning
- Hume City Council
- Brimbank City Council
- Melton City Council
- Moreland City Council
- Hobsons Bay City Council
- Moonee Valley City Council
- Maribyrnong City Council
- Whittlesea City Council.
- Macedon Ranges Shire Council
- Mitchell Shire Council
- Melbourne City Council
- Local Councillors and state and federal MPs.

It is during the statutory public exhibition period that stakeholders and communities can view the Preliminary Draft MDP and make a formal submission with their feedback.

Following the statutory public exhibition period for the Preliminary Draft MDP, Melbourne Airport will consider all written submissions, and the document will be revised as appropriate. This will then form the Draft MDP, which will be provided to the Commonwealth Minister for Infrastructure, Transport and Regional Development (The Minister) for a decision.

The Draft MDP will be accompanied by copies of written comments received during the public exhibition period, and a written statement demonstrating that the Draft MDP has been prepared with due regard for those comments. The Draft MDP will also list the names of organisations such as the Victorian Government and agencies, councils, airlines, other airport users, nearby communities and other interested parties who were consulted during the preparation of the document, along with a summary of their comments.

If the Draft MDP is approved by the Minister, advertisements will be placed in local newspapers and on the airport's website stating that the MDP has been approved and that copies of the MDP can be viewed online.

A6.3 MELBOURNE AIRPORT COMMUNITY ENGAGEMENT PROGRAM

High levels of involvement in community engagement are achieved by selecting activities that overcome barriers to participation. To facilitate this, Melbourne Airport undertakes a variety of engagement methods to enable the participation of people potentially affected by a decision, as well as others beyond those directly impacted who may hold an interest in the proposal.

Melbourne Airport uses a suite of activities for its engagement program. These include:

- Community forums - a "drop in" style format, designed to be informal and allow for community members to have direct discussions with Melbourne Airport staff and provide feedback
- Hot desks – staffed by the engagement team, at locations in the communities that surround the airport, provides opportunity for community members to drop-in and talk to staff about any questions, concerns or issues they have with the airport
- Community workshops – interactive sessions with groups of community members to find out information and provide feedback on projects/proposals

- 'Meet the Planner' – individual appointments with members of Melbourne Airport's planning and engagement team
- Community festivals – staffed information stall at community events
- Local and state government briefings – presentations made to local councils and local state MPs on airport projects and operations
- melbourneairport.com.au/community – Melbourne Airport's engagement hub providing participants with an avenue to ask questions, make comments and view project specific material.

A list of other activities the airport may undertake is included as Appendix A6.B.

Airport operations and projects attract media interest and coverage, and the airport has used these channels to disseminate information to a broader audience as required. This includes the publication of articles in print media, and has provided comments, interviews and media briefings throughout the approvals phase of M3R.

Engagement activities are supported by a robust communications strategy, which includes:

- State and local media coverage and advertising
- Direct mail-out and newsletters to APAM's database
- Social media posts on Melbourne Airport channels and other community channels.

A full list of the communications tools the airport might use is provided as **Appendix A6.C**.

Once community engagement activities have occurred, the feedback is consolidated and analysed. This information is then presented in a community engagement report, and made available to participants and online. Participant feedback is shared with the project team to influence the planning and development of the Draft MDP.

A6.4 COVID-19

During COVID-19, Melbourne Airport has continued with its community engagement program to support the important work required so that airport projects and operations can continue. COVID-19 has changed the way we do community engagement, but it has not altered our commitment to working with communities to inform and consult at the appropriate time.

Like many organisations, Melbourne Airport has had to adapt, and quickly, to an online based program so that the community can continue to be informed and stay-up-to-date with airport projects. Over the course of 2020 and for the foreseeable future, the airport's engagement program will continue to evolve online - while this provides us with some challenges, it also provides opportunities to extend our program beyond the communities that live around the airport and to increase local participation.

Melbourne Airport recognises that communities want to engage on projects in a variety of ways. And, while engagement during COVID-19 is challenging the airport continues to strive to have the engagement with the community be as full and meaningful as possible while also respecting current conditions and restrictions.

The airport will continue to offer the community and key stakeholders every opportunity to engage with project teams, whether that be in an online or in-person setting.

A6.5 ONLINE

Melbourne Airport's engagement activities undertaken during 2018 and 2019 were predominantly face-to-face with lower levels of engaged visitors online. With Melbourne Airport's commitment to continuous improvement and the pivot of our engagement strategy to mostly online due to COVID-19, a variety of online engagement tools has been rolled out to facilitate participation.

Melbourne Airport has also invested in other online tools to further enhance public participation and reduce barriers for those who may otherwise not attend traditional engagement activities.

A6.5.1 my.melbourne.airport.com

Melbourne Airport developed an online engagement platform, my.melbourneairport.com, as the hub that participation stems from. It provides a repository for information over the course of the proposal, making it convenient for anyone newer to the proposal to familiarise themselves with what has occurred in the development of the MDP.

The online platform gives people information about all of the airport's major projects, including M3R. It allows visitors to ask questions (which will be replied to by Melbourne Airport staff), provide feedback on the proposal, and make comments and submissions on the project. The site includes:

- An overview of the project and approval process
- Detailed information about areas the community has expressed interest in knowing more about
- Online events information and how to participate
- Frequently Asked Questions (FAQs)
- Drawings, maps and photos
- Other public information resources.

The objective of the online platform, and the diversified channels of communication, is to increase the reach of information and lower the barrier to public participation in the engagement program. It recognises that there are many people in the community that while interested, will not be prepared to attend traditional engagement forums.

In mid-2021, Melbourne Airport transferred this online engagement hub to the melbourneairport.com.au website.

The previous online platform had served our needs to communicate with communities about airport project and operations to a point, but as our engagement has evolved we have decided to combine airport information relevant to passengers, communities and stakeholder, into one convenient location.

This move was communicated with interested stakeholders via newsletters to our database, redirection links from the previous channel and updates to our project communications.

A6.5.2 Virtual 'engagement lounge'

A virtual engagement lounge has been developed, inspired by one of the airport's traditional engagement activities - a community forum. The online lounge hosts a variety of information; from videos featuring our experts, interactive maps, runway virtual experience and online engagement sessions to the M3R Major Development Plan and Master Plan 2022 (proposed). The lounge, which can be accessed via melbourneairport.com.au, helps to facilitate two-way conversation and allows participants to engage with the project at a time that suits them.

A6.5.3 Noise tool

An enhanced online noise/flight path software tool has also been provided as a transparent way in sharing with the community current and future noise impacts as well as current and future flight paths. The interactive tool allows participants to look at specific locations of interest to them (such as their home). The tool is supported by various explanatory resources.

A6.5.4 Online events

To bring all of the online tools together, Melbourne Airport has facilitated a series of online events to support the planning of the third runway (pre-exhibition) and during public exhibition. The online events allow participants to learn more about the project and connect with airport staff to hear about topics that matter to them. During engagement activities in 2018/19 the community identified a series of topics (environment, health/social, flight paths) that they wanted to know more about. We have used that information to guide the development of the online events.

A6.5.5 Social media

Melbourne Airport continues to use social media including Facebook, Instagram and Twitter to provide updates and direct visitors to the My Melbourne Airport site for further information.

A6.5.6 Email

Email updates have also been used to facilitate engagement. This included ad hoc 'project update' emails, which provided key messages about the third runway, the status of the project and any important points of relevance for stakeholders.

A6.6 M3R ENGAGEMENT OVERVIEW

A stakeholder engagement strategy was prepared that outlines engagement activities to be undertaken by Melbourne Airport during the planning and approvals phases of M3R.

The strategy has been reviewed and updated to reflect changes to the project since its initial development. It reflects the lessons learned from engagement on the 2018 Master Plan, and engagement in 2019 surrounding the re-opening of the orientation decision.

The strategy included a five-stage approach, reflecting the different planning and approval stages of the third runway as shown in **Figure A6.2**.

A6.7 M3R ENGAGEMENT PRINCIPLES

The following principles guide how engagement will be conducted over the first two phases of the project - they provide a reference point to ensure activities are being delivered in a way that supports the overall engagement objectives of M3R. The engagement principles are:

- Explain the engagement objectives and opportunities to influence decisions
- Respect the views and opinions of all community members
- Share information about project activities
- Provide feedback about the outcomes of community engagement and how the engagement has influenced project planning and development.
- Ensure engagement activities are inclusive and equitable
- Provide technical information in clear, concise and accessible language
- Engage with impacted and interested community members
- Conduct engagement in a timely manner
- Make every effort to properly understand the community and stakeholders you are engaging with
- Measure the outcomes of engagement to support continual improvement.

Figure A6.2
Stages of planning and approval

Phase 1: Investigations

- November 2019 – mid-2021 - Investigations will commence on the MDP. Engagement to provide early opportunity for community to learn about the project.

We Are Here

Phase 2: Formal exhibition and approval

- 2022 - Melbourne Airport release the Preliminary Draft MDP and MP22 for comment and submit Drafts for Ministerial approval.

Phase 3: Design

- To be confirmed - Melbourne Airport will progress concept designs for M3R, indicative flight paths and plan for construction.

Phase 4: Construction

- To be confirmed - Construction for the project will occur over a 4-5 year timeframe. During this period Airservices Australia will conduct detailed airspace and flight path design and change programs. Airservices Australia will provide community engagement opportunities to help inform the detailed airspace design.

Phase 5: Operation

- To be confirmed - The new North-South runway (16R/34L) will be commissioned for operation.

A6.8 M3R ENGAGEMENT OBJECTIVES

The overarching project engagement objectives are to:

- Inform the development of the final MDP and raise awareness of airport planning
- Build the capacity of stakeholders and communities to make informed submissions
- Broaden engagement participation to extend beyond near neighbours
- Build the support of community and stakeholders to understand the need for Melbourne Airport's Third Runway
- Acknowledge and respect the diversity of views about the future of Melbourne Airport.

A6.8.1 Engagement objectives by phase

The specific engagement objectives, outcomes, and engagement and communications activities for each of the project development stages are outlined in Table A6.1.

A6.9 GOVERNMENT ENGAGEMENT

Melbourne Airport maintains extensive engagement with the relevant Commonwealth and State departments that are critical to the endorsement of the MDP.

Melbourne Airport has facilitated several key Government briefings on particular topics of relevance and interest to the departments during the drafting phase of the MDP. These briefings covered topics such as environmental impacts, ground transport use, health and social impacts of runway construction and community engagement during the MDP process. The briefings ensured that clear timing and expectations around the MDP were received by Government. Several departments and agencies were included in the briefings:

State

- Department of Jobs, Regions and Precincts
- Department of Transport
- Department of Health and Human Services
- Department of Premier and Cabinet
- Department of Treasury and Finance

Commonwealth

- Department of Infrastructure, Transport, Regional Development and Communications
- Department of Agriculture, Water and the Environment
- Department of Health
- Department of Home Affairs
- Department of Foreign Affairs and Trade
- Department of Prime Minister and Cabinet
- Department of the Treasury

Table A6.1
Engagement objectives per project phase

Phase	Objectives	Outcomes	Engagement activities	Communications
Phase 1 Investigation	Inform general public and key stakeholders of the project and how to get involved Provide meaningful opportunities for stakeholders to inform planning and decision making Build capacity of stakeholders and communities to understand technical requirements Broaden engagement participation to extend beyond near neighbours - including improving geographical reach, and also to engage with communities that have otherwise not participated so far Undertaking statutory, regulators, related agencies and associated industry forums and briefings	The ability to demonstrate to decision-makers the breadth and depth of engagement Community and stakeholder understanding built about the need for a third runway and the design considerations A comprehensive understanding of community and stakeholder concerns in relation to the new runway	Listening posts Focus groups with hard-to-reach communities Online engagement Community facilities engagement Meeting with strategic networks Meet the Planner Council briefings One-on-one briefings Community talks Project presentations Melbourne Airport Community Aviation Consultation Group (CACG) Melbourne Airport Planning Coordination Forum (PCF) Aviation Advisory Group (AAG) Parallel Runway Steering Implementation Group (PROSIG)	Key messages FAQs Online hub Letterbox drop Static displays Print media Social media Briefings pack Fact sheets Email distribution
Phase 2 Formal exhibition and approval	Inform general public and key audiences during the statutory exhibition process of the MDP Build capacity, broaden the range of voices and secure additional supporters of the MDP Present mitigation measures taken to reduce impacts Encourage and facilitate well informed written submissions in accessible formats Support stakeholders to make submissions Demonstrate how feedback has been incorporated in design Undertaking statutory, regulators, related agencies and associated industry forums and briefings	Successful approval of the MDP Community concerns are acknowledged and where possible responded to Mitigation options understood and accepted by community and stakeholders Relationships built with partners and stakeholders for the design and construction of the runway Community and stakeholder understanding of how their feedback has influenced the design	Listening posts Focus groups with hard-to-reach communities Meetings with strategic networks Project presentations Online engagement Meet the Planner Noise tool Virtual engagement lounge Melbourne Airport Community Aviation Consultation Group (CACG) Melbourne Airport Planning Coordination Forum (PCF) Aviation Advisory Group (AAG) Parallel Runway Steering Implementation Group (PROSIG)	Key messages FAQs Online hub Letterbox drop Static displays Print media Social media Briefings pack Fact sheets Email distribution
Phase 3 Design	Work with key stakeholders to understand their design needs Inform community of project construction and operational timeframes Inform community about detailed airspace design and flight path development Identify opportunities to mitigate and reduce construction impacts on affected stakeholders Undertaking statutory, regulators, related agencies and associated industry forums and briefings	Adoption of the final design Stakeholders on board and confident in the design Community and stakeholder understanding of how their feedback has influenced the design Community and stakeholder understanding of airspace design and flight paths and the associated impacts	Listening posts Melbourne Airport community talks One-on-one briefings Council briefings Meet the Planner Online engagement Project presentations Meetings with strategic networks Community facilities engagement Melbourne Airport Community Aviation Consultation Group (CACG) Melbourne Airport Planning Coordination Forum (PCF) Aviation Advisory Group (AAG) Parallel Runway Steering Implementation Group (PROSIG)	Key messages FAQs Online hub Static displays Print media Social media Briefings pack Fact sheets Email distribution

Phase (cont.)	Objectives (cont.)	Outcomes (cont.)	Engagement activities (cont.)	Communications (cont.)
Phase 4 Construction	Inform public of construction process and expected impacts Provide channels for feedback/complaint to support timely resolution of issues Continue to identify opportunities to mitigate and reduce construction impacts on affected stakeholders Manage relationships with affected stakeholders and community Identify and mitigate newly identified operational impacts Airservices Australia will conduct detailed airspace and flight path design and change programs. Airservices Australia will provide community engagement opportunities to help inform the detailed airspace design. Undertaking statutory, regulators, related agencies and associated industry forums and briefings	Achieve a smooth construction process not interrupted by community and stakeholder concerns Trust is built that Melbourne Airport wants to manage and reduce impacts of construction and the runway Refining operational mitigation measures in response to community and stakeholder feedback	Listening posts One-on-one briefings Council briefings Meet the Planner Project presentations Focus groups with hard-to-reach communities Online engagement Community facilities engagement Hotline phone and email Noise tool Virtual engagement lounge Melbourne Airport Community Aviation Consultation Group (CACG) Melbourne Airport Planning Coordination Forum (PCF) Aviation Advisory Group (AAG) Parallel Runway Steering Implementation Group (PROSIG)	Key messages FAQs Online hub Letterbox drop (at key milestones) Static displays Print media Social media Briefings pack Fact sheets Email distribution
Phase 5 Operation	Maintain relationships developed with participants during the MDP Inform stakeholders and community about the process, technical work and changes as they emerge 'Close the loop' on the engagement process with community and stakeholders Undertaking statutory, regulators, related agencies and associated industry forums and briefings	Leading practice engagement approach to support major airport approvals and development projects Maintained and strengthened social licence to operate and develop airport site Melbourne Airport continues to operate with limited conditions	Listening posts Council briefings Online engagement Hotline phone and email Noise tool Melbourne Airport Community Aviation Consultation Group (CACG) Melbourne Airport Planning Coordination Forum (PCF) Aviation Advisory Group (AAG) Parallel Runway Steering Implementation Group (PROSIG)	Key messages FAQs Online hub Letterbox drop Static displays Print media Social media Fact sheets

Agencies

- Airservices Australia
- Civil Aviation Safety Authority
- Environmental Protection Authority

The Government and stakeholder engagement team readily engage with local elected members of the Victorian and Commonwealth government during the MDP process. This enables members of parliament to represent the needs of their communities directly to the airport and in return advocate to their communities the immense opportunities that arise with the construction of the third runway. Members of parliament are kept up to date with the process of the MDP and are engaged early to discuss potential impacts that may affect their constituents.

Melbourne Airport will also continue to undertake normal engagement forums throughout the approval, design, delivery and implementation phases of the project, including:

- Melbourne Airport Community Aviation Consultation Group (CACG)
- Melbourne Airport Planning Coordination Forum (PCF)
- Aviation Advisory Group (AAG)
- Parallel Runway Steering Implementation Group (PROSIG)

A6.10 CULTURALLY AND LINGUISTICALLY DIVERSE (CALD) ENGAGEMENT

Melbourne Airport is committed to ensuring that the needs of all individuals within our diverse community are met in an appropriate and respectful manner.

Engagement participation across the 2018 Master Plan (119 in-person participants), and 2019 Community Workshops (226 participants) showed:

- Higher levels of participation by men than women
- Low representation of people younger than 34 years old when compared to the Greater Melbourne population
- High representation of participants who lived near the airport, particularly in Keilor and Gladstone Park
- Low levels of 'engaged visitors' online (those who made a comment, or completed a survey) as compared with the numbers of people who participated face-to-face
- Empirical observation of a lack of representation from people with CALD backgrounds.

This engagement reach highlights gaps in populations who may be interested in the impacts that a third runway could create, but have not yet engaged in the process.

In an effort to address the gap in representation from people particularly with CALD backgrounds, relationships have been built with multicultural officers from local government offices, CALD community leaders and state multicultural agencies.

After consulting multicultural officers from local governments, several key themes and recommendations emerged:

- Build relationships - The key ingredient to working with CALD communities is to build strong relationships in order to gain trust
- Translations - Communication should be in simple and clear language for ease of translation in both written and video format, and via Google Translate
- Council events - Depending on the type of consultation, it may be appropriate to add face-to-face events to existing general or multicultural council events
- Social media - A social media campaign using short videos in different languages to promote consultation
- Advertising – on 3CR community radio
- Council's quarterly newsletters - To advertise consultation to the broader community as well as CALD
- SBS TV or radio advertising - a trusted source for CALD communities
- Languages Other Than English (LOTE) newspapers - Turkish, Chinese, Arabic, Italian, Vietnamese and Greek newspapers in particular are widely circulated, with a high readership in their communities.

Melbourne Airport has created an online translations hub. It tapped into its diverse workforce and focused on key languages spoken in communities that surround the airport. Our staff have helped to translate clear messages in both written and video format.

A6.11 PUBLIC EXHIBITION ENGAGEMENT

The public exhibition period is the time during which the community and key stakeholders can view the airport's M3R plan.

It is also during this period that the community can make a submission detailing their feedback on the plan.

The community will be supported during this time with a range of engagement activities (refer to **Appendix A6.B**) so that they can access the Preliminary Draft MDP and share their feedback with airport staff.

A range of engagement events both online and in person (subject to Victorian Government COVID-19 restrictions) will be held to ensure communities can access the information they require to make informed submissions.

Following the public exhibition period for the Preliminary Draft MDP, Melbourne Airport will consider all written submissions, and the document will be revised as appropriate. This will then form the Draft MDP, which will be provided to the Minister for Infrastructure, Transport, Regional Development and Communications for a decision.

The Draft MDP will be accompanied by copies of written comments received during the public exhibition period and a written statement demonstrating that the Draft MDP has been prepared with due regard for those comments. The Draft MDP will also list the names of other organisations such as the Victorian Government and agencies, councils, airlines, other airport users, nearby communities and other interested parties who were consulted during the preparation of the document, along with a summary of their comments.

A6.11.1 Post approval engagement

Community engagement will continue throughout the life cycle of the project. Following Ministerial approval, detailed design works will commence. The airport will use a variety of engagement activities to support various phases of the project.

During this phase of the project there will be an opportunity to engage with the community to:

- Inform them of project construction and operational timeframes
- Inform about detailed airspace design and flight path development
- Identify opportunities to mitigate and reduce construction impacts on affected stakeholders.

Once the project moves into its construction phase, there will be further opportunities to engage with the community.

It is during the construction phase that Airservices Australia will begin its detailed design of the airspace based on the approved MDP.

Airservices Australia will undertake a community engagement program to gather feedback from the community, which will be used to inform the detailed airspace design. Once the final flight paths are designed, Airservices Australia will commence a site feasibility assessment for Noise Monitoring Terminals (NMTs) and follow this up with consultation on community suggested locations. To learn more about Airservices Australia and the role they play go to: https://engage.airservicesaustralia.com/about-us

During the construction phase the airport will:

- Keep the community informed of construction planning, processes and expected impacts
- Provide channels for feedback/complaint to support timely resolution of issues
- Continue to identify opportunities to mitigate and reduce construction impacts on affected stakeholders
- Identify and mitigate newly identified operational impacts.

A6.12 M3R AND PLANNING REVIEW ENGAGEMENT

A6.12.1 2020

Despite the COVID related challenges of 2020, Melbourne Airport moved forward with its engagement ahead of the Preliminary Draft MDP. The airport's message at the end of 2019 was that a Preliminary Draft MDP would be on public exhibition in 2020.

As COVID-19 impacted airport operations, the airport communicated with the community that 2020 public exhibition would no longer occur. This message was distributed to media, communities, and key stakeholders.

However, Melbourne Airport deemed it necessary to continue with some form of engagement during the height of the COVID-19 pandemic and restrictions in Victoria. While an entirely online engagement program did not suit everyone it was the only way in which we could continue to engage the community on M3R.

In late 2020, Melbourne Airport held three online community sessions to continue to inform the community regarding the third runway project. We also provided extensive project information on the my.melbourneairport.com website.

Across the three sessions, more than 200 people attended and asked more than 150 questions via the my.melbourneairport.com website or during the sessions. The engagement website received 14,900 visits and 3,600 document downloads during the period from June-December 2020 – the period correlated to the timing of the online sessions.

Each session was recorded. That recording, the Q&As from each session and the presentation was uploaded to my.melbourneairport.com following the event. Participants were also sent emails asking for feedback, with that feedback used to plan following sessions.

Melbourne Airport continues to strive to have the engagement with the community be as full and meaningful as possible while also respecting current conditions and restrictions. We recognise that an online engagement program will not satisfy all members of the community. We will endeavour to provide as many opportunities both online and face-to-face as we can going forward.

A6.12.2 Planning review 2019

In mid-2019 Melbourne Airport announced to the community that it was reconsidering its decision to construct the third runway (of four planned) in an east-west direction.

The engagement plan was designed to support the planning review undertaken into the third runway and the subsequent announcement of a change in orientation.

This engagement approach included:

- Two direct mail outs to approx. 330,000 households to advise of the review, engagement workshops and final decision
- Media coverage on TV, radio, daily and local newspapers
- Information on my.melbourneairport.com
- Alerts sent to approximately 3,000 people in our database
- 20 community workshops held in 14 locations
- Four 'Meet the Planner' sessions
- Federal, state and local government briefings
- Community group presentations
- CACG and PCF briefings

Following this, in November 2019, Melbourne Airport announced that following a detailed review and consultation with industry and regulatory bodies, the third runway (of four planned) would be a north-south parallel.

A6.12.3 Planning review workshops

A total of 226 people participated in both face-to-face and online engagement program, through workshop attendance or by providing feedback online.

Twenty community workshops were held across 14 locations, with 175 people attending. There were a further 2,790 online visits to the dedicated project online engagement site my.melbourneairport.com/third-runway between 27 June and 23 August 2019, with 51 visitors providing feedback.

The six most frequently raised issues related to participants' discussion of:

- Noise and vibration, including the impacts of noise, night-noise, the potential for a curfew, and impacts of noise and vibration upon vulnerable communities. Noise and vibration was the most commonly cited issue across the engagement program, and was the top issue discussed at all but two workshop locations.
- Health and social impacts, in relation to vulnerable communities such as the elderly and children, air quality and overall physical and mental health impacts.
- Transport, including impacts of increased road traffic from increased operations at Melbourne Airport and, active and public transport links.
- Consultation and information needs, relating to the information provided by Melbourne Airport, comments on past consultation, event promotion, and engagement with Airservices Australia.
- Environmental concerns, including pollution, habitat loss and environmental degradation because of the construction and operation of a third runway.
- Planning and decision-making processes, including the impact of re-opening the decision of the third runway orientation. People's expectations of future amenity (noise levels, property prices) in their area, and planning approvals processes for developments and housing.

The most frequently raised opportunities related to:

- Infrastructure and services, in particular the opportunity for improved infrastructure and services in the areas and communities surrounding Melbourne Airport.
- Noise and flight path mitigations, such as runway alignment to achieve noise reduction, sharing noise impacts across nearby communities and over industrial areas.
- Economic and jobs opportunities created through developing a third runway.

Feedback provided by participants was used to inform the development of the Preliminary Draft MDP.

To read a summary of the planning review workshops see Appendix A6.G.

A6.13 RUNWAY DEVELOPMENT PROJECT ENGAGEMENT PRE-2019

Between July 2014 and late 2018, consultation between Melbourne Airport and key stakeholders, such as Airservices Australia, Commonwealth and state government departments and agencies, airlines, Essendon Fields Airport and others, ensured that views from a range of key organisations were taken into account as studies were prepared for the MDP.

Key findings were distributed to key stakeholders and local community members about the third runway, who were provided an opportunity to address emerging issues.

The information from the key study findings was issued to stakeholders and the community in an easy-to-read fact sheet format and made available on the Melbourne Airport corporate and community engagement websites.

Discussion opportunities were made available through listening posts, targeted stakeholder meetings, the Community Aviation Consultation Group (CACG), the Planning Coordination Forum (PCF) and other events where the information was presented.

Some areas of technical work were undertaken through working groups with interested government agencies and officers. This supported the process of scoping and establishing methodologies for some of the key reports.

During this period, a number of one-on-one briefings also occurred with stakeholders to provide updates on project timings and processes.

A6.13.1 2018

In 2018 Melbourne Airport undertook community and stakeholder engagement as part of the public exhibition of the 2018 Master Plan. The 2018 Master Plan indicated planning would commence on a third runway, in an east-west orientation, through the preparation and anticipated approval of a Major Development Plan (MDP).

The 2018 Master Plan engagement included a series of face to face engagements, including five community forums and five 'pop-up' booths in local areas, in addition to online engagement via my.melbourneairport.com. Community members could also provide formal submissions to the Federal government through the formal Master Plan approval process under the Airports Act.

In late 2018, Melbourne Airport paused works on the MDP for an east-west runway to consider new information and guidelines released.

A6.13.2 2017

Community and stakeholder briefings and presentations continued throughout 2017. This included additional schools, community groups, and the provision of follow-up briefings to key stakeholders.

While continuing to engage with Melbourne Airport's local communities, the scope of community engagement activities expanded beyond the immediate surrounds of the airport to include communities across Melbourne and those who use the airport most.

Events such as listening posts, meet and greets at train stations and coffee cart discussions were held in Melbourne's various regions. Many of these took place outside of normal business hours, including early in the morning and on weekends, to maximise the opportunity for community members to attend, gain information and ask questions relating to the third runway.

A6.13.3 2016

From September to December 2016, the information display program was expanded to libraries and community centres. This included an additional five venues; Banksia Gardens Community Centre, Hume Global Learning Centre, Broadmeadows Community Hub, Niddrie Library and Taylors Lakes Shopping Centre.

The goal was to maintain the focus on the third runway throughout the planning phase while also highlighting new airport developments such as the URBNSURF project and international terminal improvements.

Display venues were chosen based on flight path locations, modelled noise exposure and diverse audience reach - informed by local knowledge and personal observation. Venues were staffed Monday to Friday (at different times depending on location). They were advertised on the Melbourne Airport website, via monthly advertisements in three local newspapers and in The Gateway community newsletter.

Melbourne Airport also undertook a series of stakeholder briefings and presentations, engaging with local councils, community groups and local schools. Briefings were typically provided to school principals or vice-principals, and presentations offered to community groups.

Introductory briefings and presentations were provided to the following:

- Eight schools and one school council
- Catholic Education Melbourne, Northern Region; and Department of Education, Hume and Moreland Area
- Two community groups.

No responses or declined invitations for a presentation were received from four schools, a local school network (Hume Principals Network) and five community groups.

Meetings were also held with council staff from the Planning, Economic Development and Community Development departments of the City of Hume, City of Melton, City of Brimbank and City of Moonee Valley to update them on the project and to seek advice on the best local facilities for engagement. Melbourne Airport also provided a briefing on the third runway to the Hume City Council strategy and policy meeting in September 2016.

A6.13.4
2015

From June to September 2015, an information display was installed for one month at three local shopping centres (Broadmeadows Shopping Centre, Gladstone Park Shopping Centre and Westfield Airport West). The stand was staffed most weekdays and weekends. Venues were chosen based on their location relative to the flight paths, modelled noise exposure and anticipated audience reach. This ensured a relevant cross-section of people were able to view information, speak to staff or contact the airport for information via the community email address and phone number.

The goal was to raise community awareness of the Runway Development Project (RDP) in the early stages of the project while also taking the opportunity to promote new and completed projects such as Airport Drive and Terminal 4.

A6.14
CONSULTATION GROUPS

Melbourne Airport operates two ongoing standing consultation groups and establishes others on specific projects when required. The two main consultation groups are the Melbourne Airport Community Aviation Consultation Group (CACG) and the Planning Coordination Forum (PCF).

A6.14.1
Melbourne Airport Community Aviation Consultation Group (CACG)

The CACG was established in 2010, following the 2009 White Paper into Aviation, which made a range of recommendations designed to drive improved engagement and discussions between communities, local governments and airports.

The CACG includes representation from local government, airlines and local community representatives. The CACG is chaired by an independent chair and facilitated by Melbourne Airport.

In 2019 a review was undertaken into the operation of CACG, which resulted in a number of recommendations designed to broaden the membership of the group, and to ensure that the group engaged in a wide range of airport activities which impacted local communities.

The CACG meets four times a year and holds additional working group sessions on topics of specific interest.

The CACG has received extensive briefings on the runway development at Melbourne Airport during the RDP period (2016 – 2019). The CACG was engaged during the process of the planning review and has been provided with access to Melbourne Airport and external technical experts and consultants who are supporting the M3R project.

Table A6.2
CACG M3R activity

Date	Topic	Presenter/s
June 2019	Planning review announcement	Jai McDermott
August 2019	Planning review and engagement update	Tony Brun/ Paige Ricci
November 2019	Orientation announcement	Kathryn Hodges
November 2019	Third Runway MDP	Rosie Offord/ Tony Brun
February 2020	Third runway flight path design/health and social studies	Rosie Offord/ Phil Owen/ Ron Brent
April 2020	Third runway engagement	Paige Ricci
June 2020	Third runway MDP	Tony Brun/ Paige Ricci
August 2020	Third Runway MDP	Tony Brun/ Paige Ricci
November 2020	Third Runway MDP	Tony Brun/ Paige Ricci
February 2021	Third Runway MDP	Rosie Offord/ Paige Ricci
May 2021	Third Runway MDP	Rosie Offord/ Paige Ricci
August 2021	Third Runway MDP	Rosie Offord/ Paige Ricci

Appendix A6.D includes a list of current CACG members.

A6.14.2
Planning Coordination Forum (PCF)

The PCF was also established following the 2009 Aviation White Paper. The purpose of the PCF is to ensure effective communication and engagement relating to planning matters on and around the airport estate. The membership of the PCF includes local government, Victorian Departments of Planning, Transport and the Environmental Protection Authority, and from Commonwealth DITRDC.

The PCF has received extensive briefings on the third runway program and Melbourne Airport, in addition to the Planning Review and subsequent development of the MDP.

Table A6.3
PCF M3R activity

Date	Topic	Presenter/s
August 2019	Planning review announcement	Michael Jarvis
November 2019	Orientation announcement	Tony Brun
February 2020	Third runway planning	Tony Brun
May 2020	Third runway planning	Tony Brun
August 2020	Third runway MDP	Tony Brun

Appendix A6.E includes list of current PCF members.

A6.15
ENGAGEMENT REPORTING

Melbourne Airport is committed to continuous improvement throughout the life of this engagement program. Evaluation and learning is part of our community engagement practice.

Engagement outcomes (including the results of monitoring and evaluation) should be shared among those involved in the engagement process.

This enables validation of the approach and increases motivation for further engagement and action. Often only successes are communicated, however failures should also be highlighted – within a culture of transparency and trust – so as to avoid future ineffective or inappropriate investments of time and resources.

Monitoring and evaluation should include assessment of on-ground outcomes, management effectiveness and engagement effectiveness, through:

- Selecting an appropriate monitoring and evaluation approach
- Measuring the engagement process from the beginning
- Understanding and evaluating the depth and breadth of participation to inform future engagement
- Capturing and sharing the learning from the engagement.

Melbourne Airport is committed to sharing its engagement findings and reports with stakeholders throughout the life of the third runway project.

APPENDIX A6.A STAKEHOLDERS

Area or group	Description
Local Government Areas (LGAs)	The community for M3R project includes the communities of the following 15 LGAs: Whittlesea, Hume, Banyule, Brimbank, Darebin, Hobsons Bay, Maribyrnong, Melton, Moonee Valley, Moreland, Melbourne, Wyndham, Nillumbik, Macedon Ranges and Yarra Ranges.
Disadvantaged communities	According to the Index of Relative Socio-Economic Disadvantage, the following LGAs have suburbs with high levels of disadvantage: Brimbank, Hume, Whittlesea, Melton, Hobsons Bay, Maribyrnong, Banyule, Moonee Valley, Moreland, and Wyndham. Of these, Brimbank and Hume have the highest levels of disadvantage.
Culturally and Linguistically diverse (CALD) community members	Over one third of 15 LGAs' residents were born overseas, with the exception of Nillumbik, Macedon Ranges, Yarra Ranges and Banyule. The most common languages spoken across the 15 LGAs include Italian, Greek, Arabic, Vietnamese and Mandarin.
Young workers, families and elderly	According to the 2016 census, young workforce, parents and homebuilders (people aged 25 to 49 years) make up a large percentage of the population for all the LGAs. Higher levels of community members aged 75 years and above are present in Banyule, Darebin, Moonee Valley and Moreland.
Aboriginal Groups	Aboriginal people make up .05% of Greater Melbourne's population. Aboriginal people are identified as a group that will be difficult to reach in the engagement on the M3R project. It is important that engagement activities are inclusive and accessible to Aboriginal communities.
People with a disability (and their supports)	According to the State Government of Victoria, people with a disability form 18.4% of the population and this number is increasing.
Priority schools, early learning centres and childcare services	Previous engagements for Melbourne Airport showed significant community concern for schools, early learning centres and childcare centres.

APPENDIX A6.B ENGAGEMENT ACTIVITIES

Engagement activity	Description	Targeted stakeholder groups
Information Sessions	The Melbourne Airport Information Sessions will be large-scale facilitated drop-in sessions where the public will be invited to speak to technical experts and the project team. At the sessions they will be able to explore the MDP in more detail and provide feedback on the negotiable elements. There will be space to sit and write a submission (paper survey, or at a computer), and for a short-form submission using a tool such as a postcard. Staff will be on-hand to assist with submissions. These sessions will be held on a regular basis and distributed across geographical locations to ensure equitable access to stakeholders and community. Each session will be approximately four hours long and be staffed by a combination of technical and engagement staff.	Consultative Groups Near neighbours Residents within the N70 and N60 contour General Melbourne community
Listening post roadshow	Listening posts will be held in high pedestrian areas, community events, festivals and in the airport terminals. The objective is to visit the community in places they already visit and congregate. Listening posts could also include partnering with relevant engagement sessions, such as Melbourne Airport Rail engagement. The focus of the listening post stations will be informing people about the M3R project, how they can provide input and other engagement opportunities. There will not typically be technical experts present but there will be access to fact sheets, online engagement, and Frequently Asked Questions. If people want to know more technical information they will be encouraged to attend an information session or get in contact with Melbourne Airport through the hotline, phone number or through the Q&A. Each listening post will run for two hours and be staffed by engagement staff members.	Near neighbours Residents within the N70 and N60 contour Melbourne Airport customers
Hard-to-reach Focus Groups	Small group (10-12 people) focus groups will be targeted at groups or cohorts identified as hard-to-reach and/or highly impacted by the project. These will be used to increase project understanding, likely impacts and how to make an informed submission. Focus groups will be recruited for by using existing networks and groups such as Municipal Youth Services and representative groups, service providers such as disability advocacy organisations and providers, aged care, and also organisations already working with CALD groups. Incentives will be given, appropriate to the participation level to reduce and remove barriers to participation. Each focus group will be approximately two hours long and facilitated by engagement staff members.	Hard-to-reach community members (young people, people with disabilities, CALD communities, regional communities and elderly citizens)

Engagement activity (cont.)	Description (cont.)	Targeted stakeholder groups (cont.)
Melbourne Airport Community Talks	Community talks are based on giving communities information about the things we have heard they are concerned about. These proactive informative talks could include a panel with experts and allow time for question and answer at the end. The talks should: • Be based online and in community and library locations with capacity for 20-30 participants • Invite guest speakers to deliver sessions alongside Melbourne Airport • Be designed to give community the opportunity to learn information as it becomes available, and to build capacity to understand MDP and Master Plan • Cover emerging areas of community such as noise and vibration, health and social impacts and environmental impacts • Be recorded and available online • Include fact sheets with relevant content (A4, single-page), that are also made available online	Near neighbours Residents within the N70 and N60 contour Interested community members
One-on-one Briefings	Stakeholders within the N70 contour will be notified of the changed impact to them from M3R project via letter or email. In this communication they will be offered the opportunity to request a one-on-one briefing with Melbourne Airport staff. At this briefing they will have M3R and its impact explained to them further, be able to explore mitigation opportunities and establish interest in ongoing communication and engagement. Each briefing will be approximately one hour long and facilitated by technical and engagement staff members.	Local Governments and Councillors Schools and early years centres, health and community centres, and businesses within the N70 and N60 noise contour
Project Presentation	Interested community groups, Council advisory groups and MPs/Councillors will be able to request a project presentation. The project presentation will present the case for M3R, the planned construction and engagement process, and opportunities to provide input and stay involved. Presentation lengths will vary, depending on stakeholder need/availability.	Local government stakeholders Consultative Groups Interested community groups
Online engagement	Online engagement will be available throughout the project on my.melbourneairport.com There will be one consolidated Melbourne Airport website that also includes community engagement. Information will be updated through the phases as it becomes available. Engagement activities such as surveys and forums will also be made available during each engagement phase. Online engagement should be supported through online communications including paid advertising on Facebook, Instagram and local groups and networks, WiFi sign-in (in terminal) to link to relevant engagement, regular email updates to subscribers, and networking to have airport events and materials shared online. Online engagement to include interactive tools such as; video presentations, interactive maps, quick-polls and Q&A boards. Links to the online engagement is included in all project collateral. All materials and presentations that are provided face-to-face is available online. Online engagement is provided in multiple languages.	All
Noise tool	An interactive online tool will be made available to the community for them to understand the noise impact and current and future flight paths relevant to where they live. The easy to use tool will allow the user to explore the noise contours (through video and written explanation) and find out how and when airport operations might impact their residence.	Near neighbours Residents within the N70 and N60 contour Interested community members
Virtual Engagement Lounge	A virtual lounge will be established through different phases of the project as a central hub for project specific information. The lounge will guide users through video, fact sheets, exhibition and approval documents, interactive maps and engagement events.	Near neighbours Residents within the N70 and N60 contour Interested community members Broader Victorian community
Community facilities/ engagement: schools visits	A list of priority, or higher impact, stakeholders that includes schools and early years, health and community centres and businesses will identify areas for meetings and visits. Relationships with these key stakeholders will inform how each stakeholder is engaged with. These community facilities should also be used to recruit for focus groups, and to disseminate information. The list of community facility stakeholders should include schools, early learning centres, and disability and aged-care service providers. Engagement with community facility stakeholders should; be early in the engagement process (and ongoing), be tailored to suit the needs of the stakeholder (informed by asking them how they want to be involved), and a vehicle to provide consistent messaging to the community through a number of channels.	Schools and early years centres; health and community centres; and businesses within the N70 and N60 noise contour

Engagement activity (cont.)	Description (cont.)	Targeted stakeholder groups (cont.)
Meet the Planner	Meet the planner sessions are 1:1 or small group discussions with technical specialists from Melbourne Airport to help answer specific questions. The sessions are by appointment, and are attended by one technical specialist and one engagement staff member, and will last 30 minutes.	Near neighbours Residents within the N70 and N60 contour Interested community members
Regular council forum	Regular bi-monthly forums with local government representatives across all impacted 15 municipal areas will be held to keep Councils and Councillors updated with the project progress. Representatives will be provided with a briefing pack to assist them when talking about the project and responding to enquiries.	Local Governments and Councillors
Walk-through	Walk-throughs are designed to enable people to view complex policy documents in large-print, visual and as summarised information. They usually have 8-15 feedback posters that summarise key Master Plan/MDP information and provide a space on the poster for 'level of support' or 'comments'. That information will be used alongside postcards as short-form submissions for the Master Plan and MDP. Walk-throughs are set up in already used and open community spaces such as libraries, galleries or at Council offices so that they can be supervised and also browsed at leisure. Participants can write their simple submissions as they walk through the set-up. Walk-throughs are supplementary to Community Information sessions, as the information format is written. They are set up in community spaces for three days to one week with scheduled times where they are staffed. The people who can guide participants through the walk could include young people, people from CALD communities or 'community champions' who have been engaged by Melbourne Airport and trained to assist people.	Near neighbours Residents within the N70 and N60 contour Interested community members Hard-to-reach communities

APPENDIX A6.C COMMUNICATION TOOLS

Communication tool	Description
Key messages	A consistent and holistic set of key messages is provided below that can be used by all project partners to update their websites, project information and other communications.
FAQs	A regularly updated list of FAQs to be developed and posted online to help understanding of M3R, the MDP and Master Plan processes.
Static displays	Static display posters that direct people to find out more online will be an important promotional tool. Types of static displays could include: at the Airport (billboards, in bus station and car-parking areas, at terminals etc.), and in busy locations (shopping mall displays, bus stations, train stations). These should be provided in multiple languages in areas with CALD communities.
Print media	Print media should be used to advertise engagement activities and provide project updates: including postcards (distributed within the N70 contour), newspaper advertisements and regular updates in Gateway Magazine.
Fact Sheets	Fact sheets that explain key parts of M3R such as noise, health and social impacts, environmental impacts and the planning and approvals process should be developed, made available at engagement activities and online.
Online Hub	An online engagement hub is part of the larger Melbourne Airport website. This will be regularly updated with project information. It will include materials such as fact sheets, Q&A, and have the ability for people to submit submissions (long and short-form). The Free Melbourne Airport WiFi will promote engagement by showing links to the engagement as internet-users are requested to login.
Social Media	A social media schedule (including paid advertising) will be developed to outline the proposed posts that will be rolled out in advance of key engagement activities, to create interest within the broader community. Photos and videos of engagement events can be posted, and creating posts may involve seeking photos or videos from engagement activities. Posts will be shared on Melbourne Airport's social media pages (Facebook, Instagram, and LinkedIn) - project partners and key stakeholders will be encouraged to share these posts. Posts could be translated, and targeted advertising used to capture particular demographics and groups of people who are as yet under-represented in engagement.

Communication tool (cont.)	Description (cont.)
Email distribution newsletter	Project newsletters will be aligned with the commencement of each engagement phase and key engagement events. Each newsletter will include engagement event details, links to the online engagement platform and other relevant information. Newsletters will be distributed online via electronic direct mail to the Melbourne Airport stakeholder database and may be printed for face-to-face events, or used by project partners.
Letterbox drop	Letterbox drops will be undertaken throughout the N70 and N60 contour line and to communities beyond, such as those in the Macedon Ranges and Mitchell shires, to promote engagement activities and events at each phase of the project. Participant feedback from previous engagement showed that postal delivery was a common way to learn about engagement events, and Australia Post is used to ensure widespread receipt of materials.
Hotline and email	A phone and email hotline is available throughout the project. This will be important to identify key concerns and proactively manage any outrage with construction and operational impacts.
Briefings pack	Briefing packs should be made available to state and local governments, peak bodies and other key stakeholders such as schools. Briefing packs will be tailored to each engagement stage and, in some cases, key stakeholders. They will include project collateral, FAQs, key engagement questions and survey toolkit, project information and timelines.
Videos	Regular video updates from the airport should be posted on social media and online. These could focus on building the story of the history of the airport and the narrative behind the need for growth and a third runway, providing information from community talks (with closed-captions for accessibility), and other important updates.

APPENDIX A6.D COMMUNITY AVIATION CONSULTATION GROUP MEMBERSHIP

Name	Position	Organisation
Kim Jordan	Chair	
Fred Ackerman	Community member	
Peter Hurst	Community member	
David O'Connor	Community member – resigned June 2020	
David Cleland	Community member	
Susan Jennison	Community member	
Petrus Barry		Moonee Valley City Council
Michael Sharp		Australian Mayoral Aviation Council/Hume City Council
Liz Beattie		Victorian Trades Hall Council
Jack Medcraft		Australian Mayoral Aviation Council/Hume City Council
Steve Finlay		Melton City Council
Tony Clarke		Virgin Airlines – on extended leave
Blair Henderson		Airservices Australia
David Kirkland		DELWP
Catherine Hunichen		Brimbank Council

APPENDIX A6.E
PLANNING COORDINATION FORUM MEMBERSHIP

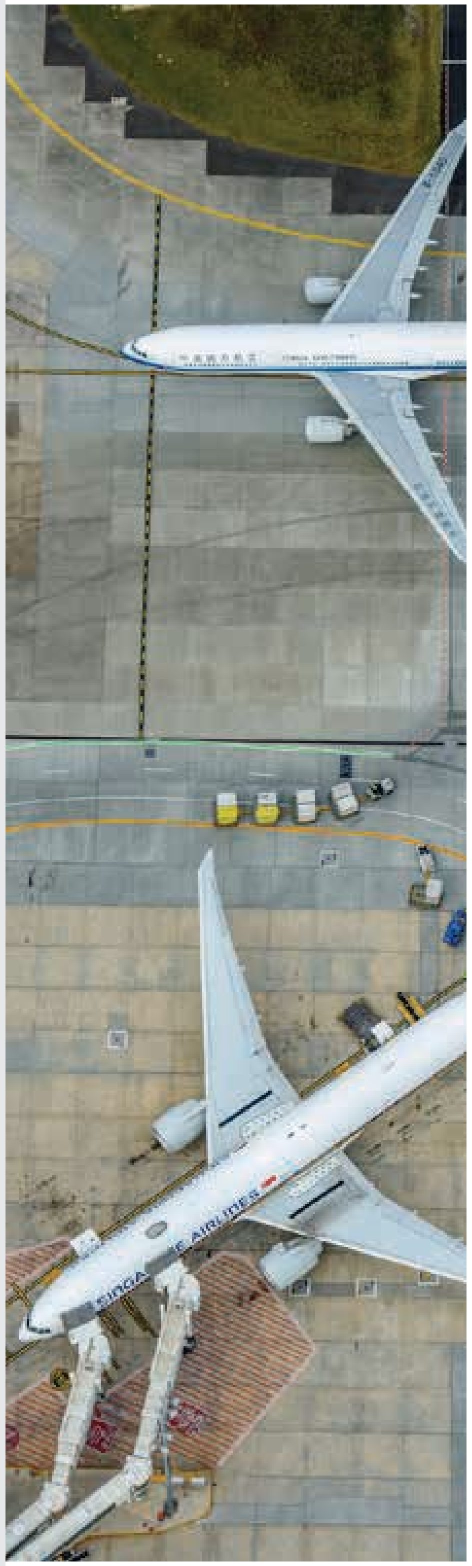
Name	Organisation
Cindy McTaggart	DITRDC
Martina Johnson	VPA
Mark Knudsen	VPA
Paul Cassidy	VPA
James Paul	VPA
Tony Marks	VPA
Nigel Smith	DoT
Daniel Heley	DoT
Jessie Keating	DoT
Lisa Kogios	DoT
Joanna Kormos	DELWP
Yan Gaoulil	DELWP
Bartholomew Gane	DELWP
George Panagiotakakos	DELWP
Andrew Grear	DELWP
Cathy Crooks	DJPR
Sohrab Motiwalla	DJPR
Rohini Sood	DJPR
Colin Harris	MVCC
Leanne Deans	Brimbank
Richard Tolliday	Moreland
Kim Giaquinta	Moreland
Gilbert Richardson	MVCC
Michael Sharp	Hume
Kelvin Walsh	Brimbank
Peter Kartsidimas	RACV

APPENDIX A6.F
STAKEHOLDER ENGAGEMENT FRAMEWORK

MELBOURNE AIRPORT

Engagement Framework

2019



Objective

This Framework intends to:

- establish the foundations for engagement across our business;
- provide transparency for stakeholders and communities on how we will approach engagement; and
- establish an approach for reporting on our engagement.

We will review this framework regularly to continually improve our approach to stakeholder engagement.

Our Stakeholders

When we use the term "community" we also do so in a broad way. A community might be:

A community of place – a group connected through geography of where they live, work or play; or

A community of interest – a group who has a particular area of interest or passion, such as an environmental group.

When we will engage

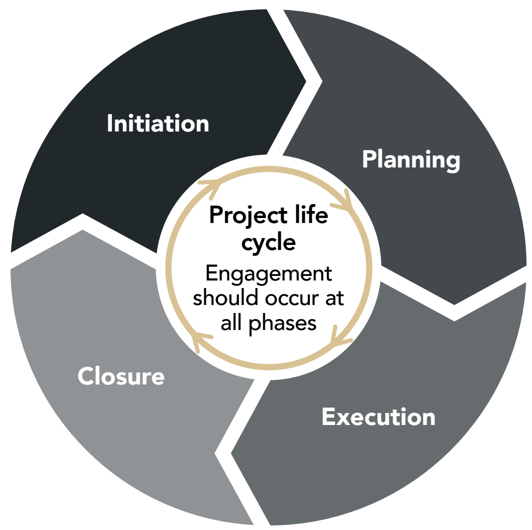
This Engagement Framework covers a wide range of engagement activities including:

- Consultation on major projects or master plans
- Discussions around Melbourne Airport's ongoing operations
- Changes to how we do business which might impact stakeholders

Melbourne Airport is required under the Airports Act (1996) Cth to consult with community and key stakeholders on the five yearly Master Planning process, and as part of the Major Development Plan approval processes. Melbourne Airport will focus on the right engagement for each issue or project, and will look beyond compliance.

Melbourne Airport will commit to engaging:

- Early: we will engage with stakeholders and the community as we develop projects, ideas and solutions in order to harness the benefit of broad stakeholder inputs
- Regularly: we will ensure there are regular opportunities to engage with Melbourne Airport, through a range of channels.
- Ongoing: engagement does not end with the closing of a consultation period, we will commit to informing stakeholders of outcomes and "closing the loop"



Why engagement matters

Engagement is critical for Melbourne Airport to continue to deliver an important connection for Melbourne and Victoria, while respecting the needs and desires of local communities to live in a safe and comfortable urban environment and working effectively with a broad range of stakeholders to deliver safe and effective airport operations.

Engagement enables Melbourne Airport to be responsive to the needs of our stakeholders and deliver better outcomes for all involved. Melbourne Airport must do this within a highly regulated and complex operating environment.

Engagement expectations of stakeholders and communities have evolved significantly in recent years.

Engagement drives improved:

- business decision making;
- stronger levels of understanding and shared knowledge;
- levels of trust and reputation.

Melbourne Airport is a member of IAP2 and in developing this Framework and undertaking engagement we follow IAP2 principles and approaches.

Our engagement principles

We have a set of principles which guide all of our engagement activities.

- Purposeful – we are clear on what the purpose of the engagement is.
- Respectful – we are respectful of the views of all stakeholders.
- Transparent – we share information about our activities and decisions, we adopt decision making processes which are open.
- Inclusive and accessible – we ensure that our engagement is as inclusive as possible, encompassing a broad range of groups and that we engage in a manner which is accessible and understandable to stakeholders.
- Responsive – we provide information and feedback about the outcomes engagement and 'close the loop' on our processes.

Our engagement approach

For Melbourne Airport, engagement activities can relate to a specific project or issue, or, they can be ongoing engagement activities for operations and processes. Depending on a range of factors, including the project or stakeholders involved, our engagement approach can look different, however, our commitment is to always apply a consistent approach to designing our engagement and to ensure that all engagement follows the Engagement Principles.

We utilise the IAP2 Stakeholder Engagement Spectrum when designing engagement programs or activities.

INFORM

To inform or educate stakeholders in a one-way communication.

"we will keep you informed"

Examples of engagement:
- Fact sheets
- Websites
- Letters
- Media releases
- Corporate documents (annual reports)
- Speeches, conferences and public presentations

CONSULT

To gain information and feedback from stakeholders to inform decisions made internally.

"we will keep you informed, listen to your concerns, consider your insights and provide feedback on our decisions"

Examples of engagement:
- Focus groups
- One on one meetings
- Drop in sessions
- Online feedback and discussions

INVOLVE

To work directly with stakeholders throughout the process to ensure that issues and concerns are understood and considered. Two way conversation where learning takes place on both sides.

"we will work with you so that your concerns and issues are directly reflected in alternatives developed and provide feedback on how input influenced the outcome"

Examples of engagement:
- Forums
- Consultative committees
- Workshops

EMPOWER

To place the final decision making in the hands of the public

"we will implement what you decide"

Examples of engagement:
- Delegated decisions

COLLABORATE

To partner with stakeholder/s for the development of mutually agreed solutions and a joint pan of action. Two way/multi way communication, where learning, negotiation and decision making on both sides. Stakeholders work together to take action.

"we will work together to agree on what we will implement and incorporate your advice and recommendations into the outcomes to the maximum possible extent".

Examples of engagement:
- Forums
- Consultative committees
- Workshops

Measuring and reporting on engagement

We will continually review this Framework to ensure it continues to remain relevant and to identify areas for further improvement and growth.

We will commit to publishing reports on our website and made available to stakeholders and the community which:

- Report on the engagement activities undertaken
- Transparently reports on feedback received
- Evaluation on our engagement methods and approach.

Join the conversation
my.melbourneairport.com

Contact
community@melair.com.au
03 9412 0412

APPENDIX A6.G
PLANNING REVIEW ENGAGEMENT

MELBOURNE AIRPORT

Melbourne's Third Runway Community workshops summary

Melbourne Airport is a vital piece of transport infrastructure and Victoria's gateway to the rest of the world. The development of a third runway is critical to cater for forecast growth.

In 2013 Melbourne Airport announced that the east west runway would be the next runway constructed as part of a future four runway system.

Melbourne Airport has been undertaking a review of that decision and the findings of that work suggests it needs to be reconsidered. Capire Consulting Group was engaged by Melbourne Airport to support planning and delivery of a series of community engagement activities regarding the potential changes in planning for Melbourne's third runway.

Who did we talk to?

226 people participated in face-to-face and online engagement program

175 people attended the community workshops

2,790 online visits to dedicated engagement website

A total of 226 people participated in both face-to-face and online engagement program, through workshop attendance or by providing feedback online.

Twenty community workshops were held across 14 locations, with 175 people attending. There were a further 2,790 online visits to the dedicated project online engagement site my.melbourneairport/third-runway between 27 June and 23 August 2019, with 51 visitors providing feedback.

20 Workshop

14 Locations

When did it happen?

Twenty workshops were held in July and August across 14 locations where participants had the opportunity to hear about the project, ask questions of technical staff and give feedback.

What did we hear people say?

1. *Planes flying so low causing stress and anxiety* – **Footscray workshop**
2. *Revegetate along waterways to offset impact to Greybox forest with local environmental groups* – **Gisborne workshop**
3. *Frustration at the changed plans. [We] made decisions based on the east-west [runway] and where to live* – **Taylors Lakes workshop**
4. *Concerned about] devaluation of property as people become aware of the increase in aircraft movements* – **Altona workshop**
5. *More jobs at airport, opportunity for greater transport connection to west* – **Keilor workshop**
6. *There are multiple schools and childcare facilities within the noise contour –impact of learning and cognitive function* – **Keilor workshop**

Timeline

Jul-Dec 2019
Consultation with airlines, Federal Government, regulators and community regarding a potential change in the orientation of the third runway.

Dec 2019
Melbourne Airport to determine the orientation of the third runway and commence planning for the project.

2020
Melbourne Airport to undertake detailed work on the third runway and prepare a Preliminary Draft Major Development Plan.

Early 2021
Preliminary Draft Major Development Plan for the third runway project expected to be on public exhibition.

Early 2022
If approved, construction on the third runway to commence.

2025
If approved, operation of the third runway to begin.

Key findings

Participants were asked to share issues or opportunities that may be associated with the third runway project and identify places or matters of importance to them in their community.

The six most frequently raised issues related to participants discussion of:

Noise and Vibration
Noise and vibration was the most commonly cited issue across the engagement program, and was the top issue discussed at all but two workshop locations

Health and social impacts
In relation to vulnerable communities such as the elderly and children; air quality; and overall physical and mental health impacts

Transport
Impacts of increased road traffic from increased operations at Melbourne Airport and, active and public transport links

Consultation and information needs
Relating to the information provided by Melbourne Airport, comments on past consultation, event promotion, and engagement with Airservices Australia

Environmental concerns
Pollution, habitat loss and environmental degradation because of the construction and operation of a third runway

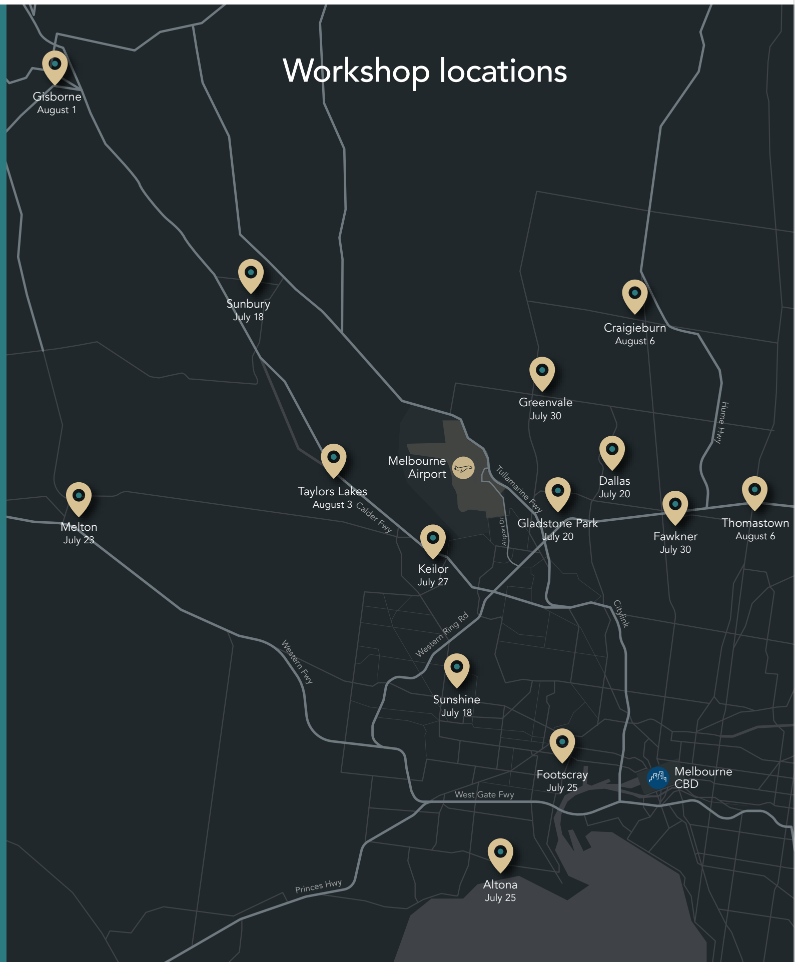
Planning and decision-making processes
The impact of re-opening the decision of the third runway orientation. People's expectations of future amenity (noise levels, housing prices) in their area, and planning approvals processes for developments and housing.

The most frequently raised opportunities

Infrastructure and services:
in particular the opportunity for improved infrastructure and services in the areas and communities surrounding Melbourne Airport.

Noise and flight path mitigations:
such as runway alignment to achieve noise reduction, sharing noise impacts across nearby communities and over industrial areas.

Economic and jobs opportunities:
created through developing a third runway.



Join the conversation
my.melbourneairport.com

Contact
Phone: (03) 9297 1597
Email: community@melair.com.au

Chapter A7 Sustainability Framework

Summary of key findings:

- Melbourne Airport has set sustainability objectives for the design and delivery of Melbourne Airport's Third Runway (M3R).
- To realise these objectives, Melbourne Airport has developed a Sustainability Management Framework (SMF). This is the basis by which sustainability issues will be managed for the design, construction and operation of M3R.
- The process of identifying risks and opportunities considered four areas of sustainability:
  - Climate change, carbon and energy
  - Resource consumption and waste
  - Local environmental impacts and opportunities
  - Responsible procurement and local sourcing of labour and materials.
- Appropriate management strategies have been defined for each sustainability area with regard to both the construction phase and the ongoing operation of M3R.
- The SMF is designed to be compatible with the Infrastructure Sustainability Rating Scheme to achieve best practice in infrastructure sustainability.

CHAPTER A7 CONTENTS

CHAPTER A7 FIGURES

CHAPTER A7 TABLES

A7.1
INTRODUCTION

Melbourne Airport recognises its responsibility for contributing to a resilient, connected and sustainable Victoria. The 2018 Master Plan defines a series of actions aimed at ensuring that planning and design decisions are focused on building long-term sustainability and resilience (as does the proposed Master Plan 2022). Central to these actions is the integration of Ecologically Sustainable Development (ESD) principles into new developments.

Melbourne Airport has defined the following sustainability objectives for the delivery and operation of M3R:

- Strengthen Melbourne Airport's relationship with the community, commerce and government
- Responsibly manage M3R's impacts on land, noise, emissions and water
- Fulfil regulatory obligations relating to airfield development
- Maximise economic benefits and support the competitiveness of the Victorian economy.

To achieve these objectives, a comprehensive approach is required that addresses all the environmental, social and economic aspects of M3R. Melbourne Airport has developed this Sustainability Management Framework (SMF) to provide the basis for management of sustainability issues during design, construction and operation of M3R.

A7.2
SUSTAINABILITY MANAGEMENT FRAMEWORK

The SMF is an overarching management framework governing sustainability issues relating to the construction and operation of M3R. It includes the Environmental Management Framework (EMF), risks and opportunities register, and related policies and processes (e.g. Melbourne Airport Environment Policy).

A7.2.1
Risks and opportunities

The process of identifying sustainability risks and opportunities considered the following areas:

- Climate change, carbon and energy
- Minimisation of resource consumption and waste
- Local impacts and opportunities (noise, environment, health and wellbeing)
- Responsible procurement and local sourcing of labour and materials.

These areas provide holistic coverage of sustainability issues, addressing the environmental, social and economic aspects of M3R. The following were considered in the identification of the focus areas:

- The Infrastructure Sustainability (IS) rating scheme
- The UN Sustainable Development Goals (SDG)
- M3R stakeholder engagement
- Melbourne Airport Master Plan.

All environment and heritage related risks and opportunities are addressed within the Environmental Management Framework (EMF).

Figure A7.1 provides an overview of how the SMF relates to the EMF, and the broader structure of the Major Development Plan (MDP) process and documentation.

A7.3
ROLES AND RESPONSIBILITIES

The Melbourne Airport Environment and Sustainability Team and other parties involved in the design, construction and operation of M3R have a responsibility to contribute to its sustainability performance. Achieving sustainable outcomes requires a collaborative and integrated approach. This is coordinated by the Environment and Sustainability Team to drive performance and monitor success. Key responsibilities of roles in relation to SMF are outlined in **Figure A7.2**.

Figure A7.1
Sustainability management framework within the context of the MDP

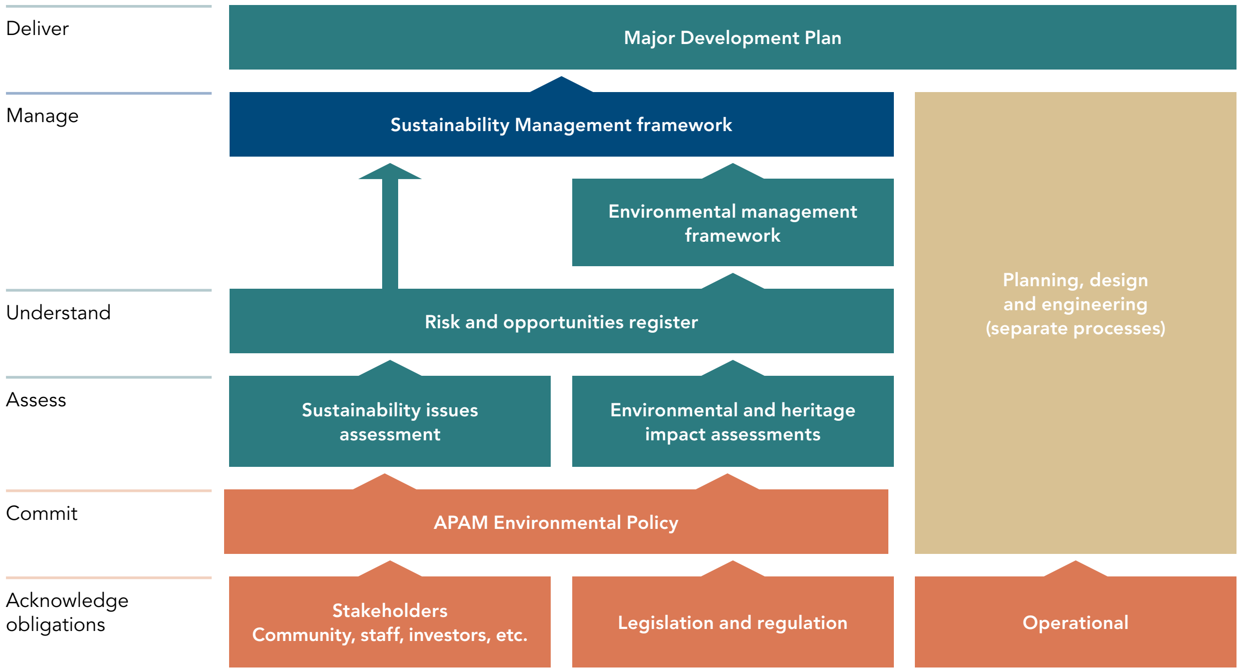
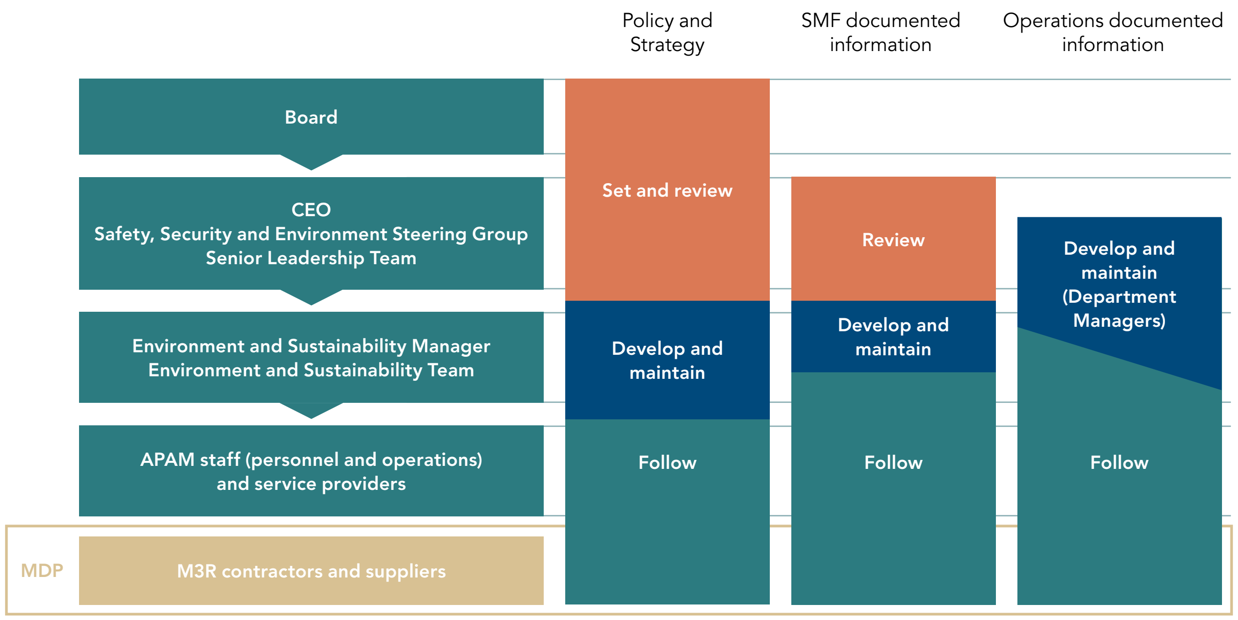


Figure A7.2
Roles and responsibility for Melbourne Airport's Sustainability Management Framework



A7.4
APPROACH, REGULATIONS AND EXPECTATIONS

The purpose of this chapter is to detail the approach of the SMF.

This chapter:

- Identifies the legislative and policy context and expectations for sustainability as applicable to M3R
- Presents a high-level assessment of the key sustainability issues and actions related to M3R based on studies to date
- Outlines the process for monitoring, reviewing and reporting on sustainability throughout M3R construction and operation.

The SMF ensures that planning and design decisions are focused on building long-term sustainability and resilience.

The M3R SMF was developed in the context of existing Commonwealth and Victorian legislation and policy.

A7.4.1
Commonwealth legislative and policy requirements

A7.4.1.1
EPBC Act

The Commonwealth Department of Agriculture, Water and Environment (DAWE) administers the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and undertakes assessments under this Act.

Section 3 (1)(b) of the EPBC Act states that an object of the Act is 'to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources'.

Section 3A of the EPBC Act sets out the principles of ESD:

- Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
- If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making
- Improved valuation, pricing and incentive mechanisms should be promoted.

Approval of the MDP

Under section 160 of the EPBC Act, before the Minster for Infrastructure, Transport and Regional Development approves the MDP under the Airports Act they will obtain and consider advice from the Minister for the Environment. The Minister for the Environment will, in giving the advice, advise on whether the MDP should be approved and recommend conditions (if any) to be attached to the MDP approval to protect the environment.

APAM, in its capacity as the airport-lessee, shall be designated the proponent for the project. This approach is consistent with the governance of the Airports Act and facilitated by the MDP process defined therein.

CASA and Airservices, in their respective capacities as authorities governing the use and change of airspace, have jointly referred the M3R MDP to DAWE (nominating the M3R MDP as the assessment mechanism). DAWE's decision regarding this referral is discussed in Chapter A8: Assessment and Approvals Process.

Section 136(2)(a) of the EPBC Act requires the Minister for the Environment to take into account the principles of ESD when deciding whether to approve an action and what conditions, if any, to attach to the approval. Consistent with these requirements for approval, the Minister is also likely to consider the principles of ESD when providing advice under section 160 of the EPBC Act.

A7.4.1.2
Paris Agreement

Australia is party to the *2016 Paris Agreement*, which builds on ongoing international efforts to address climate change under the *United Nations Framework Convention on Climate Change* (UNFCCC) and the *Kyoto Protocol*.

The Paris Agreement aims to strengthen the global response to the threat of climate change by holding the increase in the global average temperature to well below 2°C above pre-industrial levels, and pursuing efforts to limit temperature increases to 1.5°C.

The Australian government is facilitating a number of measures to meet Australia's Paris Agreement commitments. These measures are not directly related to the M3R MDP.

A7.4.1.3
National Strategy for Ecologically Sustainable Development (NSESD)

The *National Strategy for Ecologically Sustainable Development 1992* (NSESD) (ESDSC, 1992) sets out the broad strategic and policy framework that has informed government decision-making to include ESD requirements in Australia.

The goal of the NSESD is: 'Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends' (ESDSC, 1992). The guiding principles of the strategy are:

- Decision-making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations
- Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- The global dimension of environmental impacts of actions and policies should be recognised and considered
- The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised
- The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised
- Cost-effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms
- Decisions and actions should provide for broad community involvement on issues that affect them.

Transforming Our World: 2030 Agenda for Sustainable Development

Transforming Our World: 2030 Agenda for Sustainable Development (2030 Agenda) (United Nations, 2015) consists of 17 Sustainable Development Goals (SDGs) with 169 associated targets that form an international roadmap for global development efforts to 2030.

On 25 September 2015, Australia (together with the other 192 members of the United Nations General Assembly) endorsed the *2030 Agenda*. The 2030 Agenda is non-binding but, through the SDGs, is increasingly influential in structuring efforts toward embedding sustainable development considerations across government, not-for-profit and private sectors. The Infrastructure Sustainability Council of Australia (ISCA) which manages the IS rating scheme has aligned V2.0 of the scheme with the direction set by the SDGs.

A7.4.2
Victorian legislative and policy requirements

A7.4.2.1
Application of Victorian Legislation

Although Victorian legislation outlined below does not specifically apply to the M3R MDP, it does help to inform the sustainability context for the project.

A7.4.2.2
Climate Change Act 2017

In November 2017, the *Climate Change Act 2017* (Vic) (CC Act 2017) commenced. The CC Act 2017 repealed the former *Climate Change Act 2010* (Vic).

The CC Act 2017 provides the state with an updated legislative foundation to manage the risks that climate change poses, embed a long-term emissions reduction target, and drive Victoria's transition to a climate resilient community and economy.

The CC Act 2017 sets a long-term emissions reduction target of net zero greenhouse gas emissions by 2050 and five-yearly interim emissions reduction targets to meet and track progress.

The policy objectives of the CC Act 2017 which are of particular relevance to Melbourne Airport and M3R are:

- To build the resilience of Victoria's infrastructure through effective adaptation and disaster preparedness
- To promote and support Victoria's regions, industries and communities to adjust to the changes involved in the transition to a net zero greenhouse gas emissions economy.

A7.4.2.3
Victoria's Climate Change Framework

Victoria's Climate Change Framework (VCCF) articulates the Victorian Government's long-term vision and approach to climate change. The VCCF also describes the transition required across different sectors of the economy and the challenges to be addressed (the relevant sectors are energy, urban transport, built environment, health and wellbeing, agriculture, water and natural environment). It is recognised that progressive change and long-term planning is required to ensure that the transition to a net zero economy is positive, orderly and just.

A7.4.2.4
Victorian Climate Change Adaptation Plan 2017-2020

Victoria's Climate Change Adaptation Plan 2017-2020 (VCCAP) is a whole-of-Victorian-Government commitment to adaptation. It addresses a number of areas including existing adaptation responses, roles and responsibilities, key strategies and priorities, and partnerships (DELWP, 2017).

The VCCAP recognises that government policies can influence and support private sector adaptation, particularly by removing barriers and providing access to information that supports risk allocation and promotes business innovation.

The Victorian Government is committed to ensuring that critical regulatory settings provide a foundation for risk management and promote effective adaptation by private parties.

A7.4.2.5
Environment Protection Act 2017 and Environment Protection Amendment Act 2018

In 2017, the Victorian Parliament passed the *Environment Protection Act 2017* (EP Act 2017). *The Environment Protection Amendment Act 2018* (EPA Act 2018) was then passed. From 1 July 2021, the EP Act 2017 is the principal environmental legislation in Victoria and the EP Act 1970 has been repealed.

The EP Act 2017 and EPA Act 2018 include a new proactive approach to environment issues and enhance protection of Victoria's environment and human health through a proportionate, risk-based environment protection framework.

The cornerstone is a General Environmental Duty (GED). This requires businesses to undertake reasonably practicable steps to eliminate, or otherwise reduce, risks of harm to human health and the environment from pollution and waste.

Unlike similar laws in other states and territories, a breach of Victoria's GED could lead to criminal or civil penalties.

A7.4.3
Expectations

While Melbourne Airport is not subject to definitive statutory or policy obligations in relation to the management of sustainability, it does recognise that its stakeholders expect sustainability issues to be actively monitored, managed and reported. The identification and recognition of these expectations is made necessary under Melbourne Airport's ISO14001:2015 certified Environmental Management System.

ISCA rating scheme is seen by stakeholders as the benchmark for measuring sustainability performance across the planning, design, construction and operations of infrastructure projects within Australia and New Zealand.

Similarly, the UN's SDGs are broadly seen as a basis with which organisations should align their sustainability goals in order to demonstrate economic growth, social inclusion and environmental protection. Other reporting frameworks that stakeholders often expect alignment with are:

- The Global Real Estate Sustainability Benchmark (GRESB) for environmental social governance performance
- The recommendations of the Financial Stability Board's (FSB) Taskforce for Climate-Related Financial Disclosures (TCFD) to inform investors and capital markets on climate-related social and financial risks (the FSB was established after the G20 London summit in April 2009).

A7.4.4
Key issues and actions

Table A7.1 outlines the key sustainability issues identified in the development of the SMF and their associated management actions. Reference was given to previous studies carried out by Melbourne Airport and operational data, particularly in identifying sustainability risks and opportunities. Importantly, this table shows which actions are specific to the construction of M3R, and which will continue to be undertaken during business as usual operations of Melbourne Airport. The approach to each of these key sustainability issues is discussed in greater detail in the following sections of this chapter.

A7.4.4.1
Responsible procurement and local sourcing of labour and materials

Melbourne Airport will contribute to the local economy and community through a range of initiatives during the construction and operation of M3R.

Ensuring that the local community and businesses are actively engaged throughout the project cycle is critical both for Melbourne Airport's success and its long-term sustainability. Supporting local businesses through procurement of labour and materials helps to create a healthy, expanding local economy and fosters employment opportunities and growth.

Management during construction and operations

Melbourne Airport will adopt a principles-based approach combined with coordinated engagement with local suppliers, guided by an understanding of risks and opportunities.

Melbourne Airport has implemented sustainable procurement principles and responsible procurement with the aim to prioritise local suppliers, maximise spend in the local economy, and augment social-issues awareness across supply chains.

Melbourne Airport will also engage with suppliers to limit natural resource extraction by preferencing recycled materials where possible.

A7.4.4.2
Climate change, carbon and energy

Melbourne Airport, as part of its M3R development, has carried out assessments for climate risks and greenhouse gas emissions. These assessments have allowed Melbourne Airport to identify the material risks to be mitigated during M3R's construction and operation.

Table A7.1
Key sustainability issues for Melbourne Airport, showing current actions undertaken

Sustainability issue	Why this matters	Management approach	Actions	Construction	Operations
Responsible procurement and local sourcing of labour and materials (including issues of social equality)	Supporting local businesses through procurement of labour and materials helps to create a healthy, growing local economy and furthers employment opportunities and growth.	Adopt a principles-based approach combined with coordinated engagement with local suppliers, guided by an understanding of risks and opportunities	Supply chain management and engagement	X	X
			Develop sustainable and responsible procurement principles	X	X
			Embed sustainable and responsible procurement principles within the procurement process	X	X
Climate change, carbon and energy	Reducing carbon emissions, and the responsible, innovative use of energy, are two ways in which we can play our part in mitigating the cause of climate change. These actions also help ensure the resilience of assets to the effects of a changing climate over the long-term.	Adopt the carbon hierarchy controls (reduce, renewable, offset), and the energy hierarchy controls (be lean (less energy), be clean (energy efficiency), be green (renewable engergy)), and proactively manage climate-related risks and opportunities.	Consider investing in waste to energy projects		X
			Invest in renewable energy projects		X
			Implement carbon management plan with science-based reduction targets		X
			Implement energy efficiency program	X	X
			Undertake and periodically update climate change risk assessment	X	X
			Undertake an electric vehicle trial		X
			Develop a construction logistics strategy	X	
			Implement Airport collaborative decision making (A-CDM)		X
			Implement the Ground Delay Program (GDP)		X
Local impacts and opportunities (flora, fauna, noise, air, soil, water, heritage and community health and wellbeing)	Continually minimising impacts on, or enhancing ecological value of, the surrounding environment will ensure long-term social and environmental benefits.	Implementation of the Environmental Management Framework and Construction Environment Management Plan. Continuous improvement will be ensured by our certified Environmental Management System.	Continually implement and improve Environmental Management System	X	X
			Continue to monitor and comply with environmental obligations	X	X
			Continue to respond to and report on environmental incidents promptly and appropriately.	X	X
			Continue to administer Permissions to Commence Works (PerCOWs) and Construction Environment Management Plans (CEMPs)	X	X
			Maintain EMS certification	X	X
			Continue to convene the noise abatement committee	X	X
			Continue to conduct ecological assessments	X	X
			Implement the PFAS management strategy and framework	X	X
			Implement sewage and water management practices	X	X
			Implement erosion and sediment control measures recommended by the International Erosion Control Association	X	X
			Adhere to tree and vegetation removal procedures	X	X

Sustainability issue (cont.)	Why this matters (cont.)	Management approach (cont.)	Actions (cont.)	Construction (cont.)	Operations (cont.)
Local impacts and opportunities (flora, fauna, noise, air, soil, water, heritage and community health and wellbeing)	Continually minimising impacts on, or enhancing ecological value of, the surrounding environment will ensure long-term social and environmental benefits.	Implementation of the Environmental Management Framework and Construction Environment Management Plan. Continuous improvement will be ensured by our certified Environmental Management System.	Implement ecological community offsetting programs	X	X
			Implement the air quality management plan	X	X
			Continue to conduct cultural and historical heritage assessments	X	X
			Implement the scholarship and community grant programme		X
			Maintain the Community Aviation Consultation Group (CACG)		X
			Continue stakeholder consultation	X	X
Minimisation of resource consumption and waste	Effective resource management will reduce the stress on waste management systems and reduce demand for raw materials over time.	Adopt the whole-of-life management approach to waste and align with the waste hierarchy controls (reduce, reuse, recycle, recover) and circular economy principles.	Rainwater harvesting and water recycling (e.g. toilets, dust suppression)	X	X
			Reuse of key construction materials	X	
			Site waste management plan	X	
			Inclusion of recycled materials wherever technically and economically viable.	X	

Management during construction

Climate risks

There are a number of climate risks that draw an inherent rating of medium during M3R construction. Four relate to physical drivers and impacts:

- Localised surface water flooding
- Surface water flooding leading to mobilisation of contaminants from the construction area affecting flora and fauna
- Bushfires resulting in smoke and diminishing air quality for workers
- High east-west winds during periods that the existing east-west runway is closed, resulting in cross-winds on the existing north-south runway.

One climate risk relates to society's response to climate change (transition risks):

- Abrupt/unexpected shifts in energy costs.

More information on the controls can be found in **Chapter B13: Climate Change and Natural Hazard Risk**.

Carbon and Energy

The greenhouse gas assessment identified emissions from the manufacture of construction materials (particularly concrete) and fuel use by construction vehicles as the major sources. Opportunities to reduce these will be implemented where practical. These include using recycled materials in construction (e.g. low-embodied carbon concrete) and requiring the use of hybrid and/or electric construction vehicles. More details on mitigation opportunities are covered in **Chapter B11: Greenhouse Gas Emissions**.

Management during operations

Climate risks

Several climate risks draw an inherent 2020 rating of medium for the operation of the airport as a whole. In aggregation, these relate to:

- Changes in soil conditions driven by heating and drying cycles
- High winds leading to damage, dust, visibility issues and flight delays
- Drought impacting sensitive vegetation on site
- Extreme rainfall leading to accidental release of stored contaminated material/soil
- High temperatures leading to pavement damage, health and safety issues, or take-off weight restrictions (due to lower air density and aerodynamic lift)
- Bushfires leading to smoke and health impacts for staff and passengers, flight delays, and staffing challenges if staff are directly impacted.

Of these medium risks, most are expected to be reduced to a low rating following the application of planned controls.

Those expected to remain at a medium rating following the application of planned controls relate to:

- High winds leading to dust, visibility issues and flight delays
- Bushfires leading to smoke and health impacts for staff and passengers, flight delays, and staffing challenges if staff are directly impacted.

These risks are external to the airport and out of its management control. Refer to Chapter B13: Climate Change and Natural Hazard Risk for more information on climate risks and management options during the operation
of M3R.

In the longer term, three key risks are anticipated to become more significant:

- Emissions reporting obligations – net zero/carbon neutrality targets and/or a price on carbon
- Increased risk of regulation
- Changing customer behaviour.

These too are discussed in more detail in **Chapter B13: Climate Change and Natural Hazard Risk**.

Carbon and Energy

The biggest source of emissions during operations is from aircraft during the landing and take-off cycle, and surface access (i.e. employees and passengers accessing the airport using the current road network). Both these emission sources are not within direct control of the airport. However, Melbourne Airport works with airlines and transport authorities to identify opportunities to reduce emissions where feasible.

Melbourne Airport will also implement a range of initiatives to reduce other sources of emissions. These include energy efficiency projects, installing 12MW of solar panels, and trialling electric vehicles.

More details on this can be found in the **Chapter B11: Greenhouse Gas Emissions**.

A7.4.4.3 Local impacts and opportunities

This issue focuses on actions related to localised environmental and social impacts such as ecological values, water and air quality, noise, local employment opportunities, and cultural and heritage values.

Management during construction and operations

Melbourne Airport will focus on minimising impacts on and enhancing the ecological value of the local environment to ensure long-term social and environmental benefits. This will be achieved through the implementation of the Environmental Management Framework and Construction Environment Management Plan. Continuous improvement will be ensured by its certified Environmental Management System. Social issues such as local employment will be covered under responsible procurement and local employment.

A7.4.4.4 Minimisation of resource consumption and waste

Melbourne Airport aims to reduce resource consumption and waste production to reduce demand for raw materials and the volume of waste sent to landfill.

Management during construction

During the M3R construction period, Melbourne Airport will adopt the whole-of-life management approach to waste and align with the waste hierarchy controls (reduce, reuse, recycle, recover) and circular economy principles. Key initiatives include maintaining an onsite waste management plan and uptake of opportunities where practical to use recycled materials in construction.

Management during operations

The waste management plan will continue to be used during operation of the third runway. Opportunities to implement water recycling for dust suppression and toilet flushing will also be explored.

A7.4.5 IS rating scheme

Melbourne Airport has developed this SMF to be compatible with V2.0 of the IS rating scheme. In doing so, Melbourne Airport ensures it is following leading practice in infrastructure project sustainability in Australia. **Appendix A7.A** demonstrates that, through preparation of M3R, Melbourne Airport is actively addressing the key sustainability issues of relevant infrastructure projects. This commitment will be continued through the design and construction process, and then into operation.

A7.4.6 National Strategy for ESD Assessment

The Minister for the Environment is required to take ESD principles into account when deciding whether to approve an action and what conditions, if any, to attach to the approval. The principles of ESD are defined in Section 3A of the EPBC Act. **Appendix A7.A** replicates each of these principles and describes how the M3R MDP addresses them.

A7.4.7 Monitoring and reporting

The M3R team will periodically review issues, risks and opportunities related to sustainability throughout the construction and operation of M3R.

Ongoing monitoring and reporting throughout the construction of M3R will take place via reports to the Senior Leadership Team as part of standard EMS function.

A7.5 CONCLUSION

Melbourne Airport has provided a management framework for identifying and managing sustainability impacts created by M3R during construction and operation. This document outlines the specific key actions to be undertaken during construction and operation of M3R.

REFERENCES

Department of Environment, Land, Water and Planning (DELWP) 2017, Victorian Climate Change Adaptation Plan 2017- 2020, Melbourne, Victorian Govt. Public Service.

Ecologically Sustainable Development Steering Committee (ESDSC) 1992, The National Strategy for Ecologically Sustainable Development, Canberra, Australian Govt. Public Service.

United Nations 2015, Transforming Our World: The 2030 Agenda for Sustainable Development, A/RES/70/1, accessed 2017, https://sustainabledevelopment.un.org/ content/documents/21252030%20 Agenda%20for%20 Sustainable%20Development%20web.pdf

APPENDIX A7.A: NATIONAL STRATEGY FOR ESD ASSESSMENT

The IS rating scheme represents leading practice in infrastructure sustainability in Australia. Table A7.2 demonstrates that for most IS categories there is an existing comprehensive assessment undertaken by Melbourne Airport for M3R. Where a category is not addressed here, it will be through the M3R detailed design and construction process.

Table A7.2
National Strategy for ESD assessment

Principle	M3R MDP response
Decision-making processes should effectively integrate both long and short-term economic, environmental, social and equitable considerations.	The assessment and decision-making processes for M3R have evaluated both the short-term impacts during M3R construction, and long-term operational economic, environmental, social and equitable considerations. Construction considerations generally relate to impacts to identified ecology and heritage values and construction emissions to water, soil and air, as well as the generation of vehicle traffic. **Chapter A3: Options and Alternatives** describes how the ecological and heritage values have influenced decisions on the extent of the development footprint. Impacts associated with M3R construction and the approaches to managing are described in **Chapter E2: Environmental Management Framework**. **Chapter B8: Surface Transport** defines the approach to managing construction traffic. To determine the long-term operational impact the assessment methodology considers impacts on opening day, five years from opening and 20 years from opening. These impacts are primarily derived from future passenger and aircraft movement forecasts and underpin the operational traffic, ground-based noise, air quality and airspace noise assessments. The outputs from these assessments have formed key inputs to the social and health impact assessments, which consider the social and equity aspects of M3R. The significance assessment frameworks for the health and social impact assessment define for 'major' and 'high' impact categories that an impact defined at this level is either 'critical' or 'important' to decision-making. Related to these assessments, the aircraft movement forecasts are one of the primary inputs to the determining future runway mode usage. **Chapter C2: Airspace Architecture and Capacity** details how these assessments have informed key decisions regarding the airspace design and informed the integration of mitigation measures to reduce the airspace noise impact.
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	Threat of serious or irreversible environmental damage is identified in **Chapters B5: Ecology, B6: Indigenous Cultural Heritage** and **B7: European Heritage**. Lack of full scientific certainty has not been used as a reason for postponing measures to prevent or minimise environmental degradation. To increase the level of scientific certainty field surveys were undertaken for all of the below studies. **Chapter B5: Ecology** The chapter identifies potential serious impacts from M3R on the following EPBC Act listed species: • Natural Temperate Grassland of the Victorian Volcanic Plain • Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia ecological community • Growling Grass Frog habitat within development footprint • Removal of foraging habitat for Swift Parrot and Grey-headed Flying-fox. **Chapter B6: Indigenous Cultural Heritage** The chapter identifies potential serious impacts from M3R on: • Maribyrnong Valley alluvial terrace (VAHR 7822-3866) • Upper Maribyrnong escarpment (VAHR 7822-3871). **Chapter B7: European Heritage** The chapter identifies potential serious impacts from M3R on Victoria Bank Homestead. **Chapter A3: Options and Alternatives** The chapter describes how the development of the preferred option for M3R has sought to minimise impacts to these ecological and heritage values. Where impact is unavoidable appropriate offsets or archaeological salvage have been committed.
The principle of intergenerational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	The assessment framework assesses impacts on opening day, five years from opening and 20 years from opening, representing an assessment of the short, medium and long-term impacts. There will be ecological and heritage impacts, and where impact is unavoidable, appropriate offsets or archaeological salvage have been committed to maintain these values for future generations. Emissions to the air, land and water environments are assessed in **Chapters B3: Soils, Groundwater and Waste**, **B4: Surface Water and Erosion**, **B9: Ground-Based Noise and Vibration** and **C3: Aircraft Noise Modelling Methodology**. For impacts associated with construction of M3R, the measures to ensure the health of the receiving environment are described in each chapter and summarised within **Chapter E2: Environmental Management Framework**. The measures incorporated in the M3R design and airspace design to maintain the environment are described in the relevant chapter. For the airspace impacts, additional measures are described in **Chapter D4: Social Impact**. The framework for assessing the significance of M3R impacts in the health and social impact assessments (**Chapter D3: Health Impact** and **Chapter D4: Social Impact**) have specific criteria considering the permanence or otherwise of an impact, which in turn considers the issue of intergenerational equity.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making	The potential impacts on biological diversity and ecological integrity have been assessed in **Chapter B5: Ecology**. A description of the key historic stages of M3R and the inclusion of ecological impact as part of the decision-making is provided in **Chapter A3: Options and Alternatives**.
Improved valuation, pricing and incentive mechanisms should be promoted.	**Chapter D2: Economic Impact Assessment** assesses the economic impact of the M3R. Two forms of economic analysis were undertaken; an economic impact assessment and a cost benefit analysis. The economic impact assessment provides for a wider consideration by identifying the availability of labour and other resources in local regions and tests whether there are sufficient unemployed resources in an area to meet the needs of each project, or whether prices or wages will need to increase to attract resources to the area.

Chapter A8
Assessment and Approvals Process

Summary of key findings:

- Melbourne Airport is required to seek Commonwealth Government approval for any major airport development by preparing a Major Development Plan (MDP) in accordance with the *Airports Act 1996* (Cth).
- The Melbourne Airport's Third Runway (M3R) project must also comply with the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).
- The Department of Agriculture, Water and the Environment has determined that M3R will be assessed under the EPBC Act via an accredited assessment process, being the MDP process as defined under the Airports Act.
- The MDP process requires Melbourne Airport to undertake extensive community and stakeholder consultation. This includes making a Preliminary Draft MDP available for 60 business days to facilitate public comment.
- Although Victorian planning and environmental legislation is not directly applicable to M3R (because Melbourne Airport is on Commonwealth land) Victorian law has been considered where relevant (e.g. where there is the potential for impacts beyond airport land).
- The assessment framework has incorporated the requirements of the Airports Act and the 'whole of environment' as defined in the *Actions on, or impacting upon Commonwealth land, and actions by Commonwealth agencies, Significant impact guidelines 1.2* (pursuant to the EPBC Act).

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A8.1
INTRODUCTION

This chapter describes:

- The statutory mechanisms applicable to the M3R approval process
- The process for assessing environmental impacts
- The consistency of M3R with relevant legislation.

As Melbourne Airport occupies Commonwealth land, Victorian state planning and environmental legislation does not directly apply. M3R is also exempt from local planning scheme requirements. *The Airports Act 1996* (Cth) (subsequently referred to as the Airports Act) does, however, require that any master plan prepared for the airport reflect due consideration of the provisions of planning schemes under the law of the state in which the airport is located. The assessment process covered in this chapter is in line with the relevant requirements of the Airports Act.

A8.2
APPROVALS FRAMEWORK

A8.2.1
Commonwealth Legislation

The Airports Act, and its subordinate regulations, is the primary legislation applicable to Melbourne Airport.

The Airports (Environment Protection) Regulations 1997 cover the full range of airport environmental management matters. While an approval is not required for M3R under these regulations they do impose general obligations relating to the management of the environment across the airport site and support the Airports Act provisions.

The *Environment Protection and Biodiversity Conservation Act 1999* (referred to as the EPBC Act) is further Commonwealth Government environmental legislation relating to the environmental impact of developments. Provisions of the EPBC Act apply to M3R and so will be incorporated in the decision process of the Airports Act. This requires MDPs and plans for aviation airspace management (e.g. flight path or procedure changes) to be referred to the Minister for the Environment for advice. However, the Airports Act is the primary legislation under which M3R will be assessed, as outlined below.

A8.2.1.1
The Airports Act (1996) and Airports Regulations (1997)

__Overview__

The Airports Act, administered by the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC), represented by its Minister, the Minister for Infrastructure, Transport and Regional Development (hereafter referred to as 'Minister for Infrastructure'), is the primary Commonwealth legislation applicable to Melbourne Airport.

The *Airports Regulations (1997)* (Cth) designate the Commonwealth land occupied by Melbourne Airport as an 'airport site'. The owner of the land is the Commonwealth Government and, pursuant to a lease, Australia Pacific Airports (Melbourne) Pty Ltd (APAM) operates the site as Melbourne Airport.

__Major Airport Developments__

The Airports Act (section 89(1)) classifies certain types of airport development as 'major airport developments' for which an airport lessee company is required to seek approval through a Major Development Plan (MDP). These developments include:

a. *Constructing a new runway; or*

b. *Extending the length of a runway; or*

ba. *Altering a runway (other than in the course of maintenance works) in any way that significantly changes:*

  i. *Flight paths; or*

  ii. *The patterns of levels of aircraft noise; or*

…

f. *Constructing a new taxiway, where:*

  a. *The construction significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft; and*

b. *The cost of construction exceeds the threshold amount… [currently $25 million]; or*

g. *Extending a taxiway, where:*

  a. *The construction significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft; and*

  b. *The cost of construction exceeds the threshold amount… [currently $25 million]; or*

…

m. *A development of a kind that is likely to have significant environmental or ecological impact; or*

n. *A development which affects an area identified as environmentally significant in the environment strategy; or*

na. *A development of a kind that is likely to have a significant impact on the local or regional community.*

The full scope of M3R meets several criteria of major airport development classification.

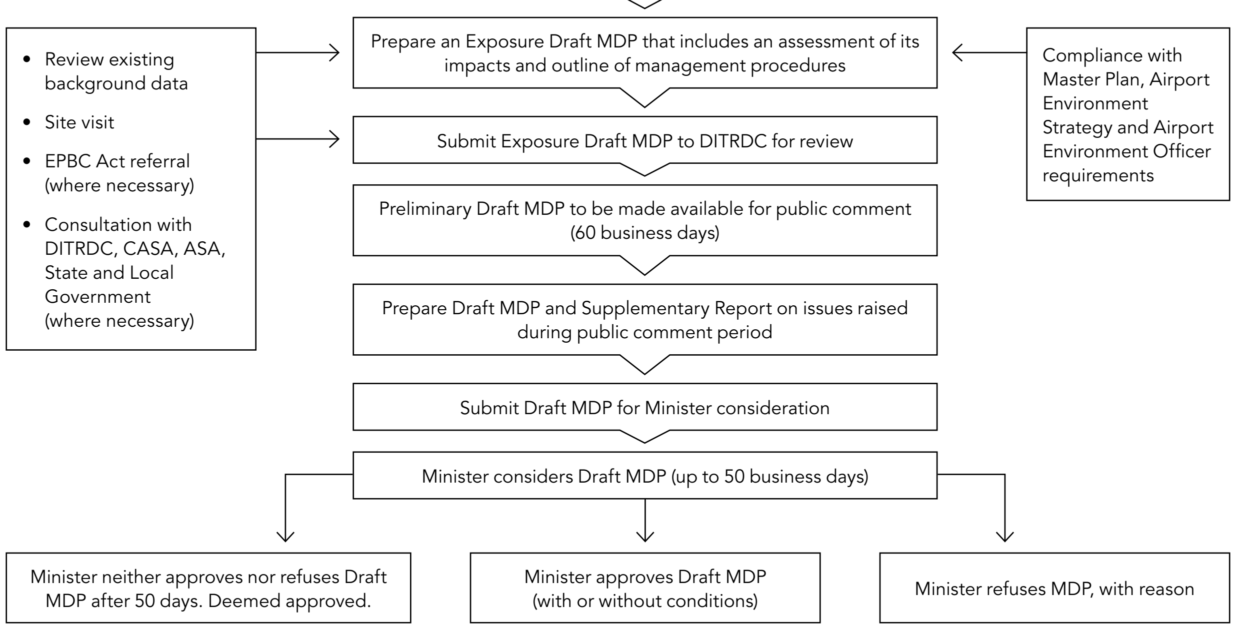
Section 90 of the Airports Act prohibits an entity from carrying out a major development relating to an airport unless the development is in accordance with an MDP approved under the Airports Act. Given that M3R constitutes the development types noted above, Melbourne Airport is prohibited from commencing works on M3R unless it has prepared, submitted and obtained approval for this MDP.

__MDP approvals process__

APAM, as the airport-lessee company for the airport, is required to follow the statutory process for requesting approval for this MDP, which is set out in the Airports Act. Section 91(1) of the Act lists the content requirements to be addressed in a MDP (described in **Chapter A1: The Project - Introduction**).

As a matter of practice, the statutory approvals process for MDPs involves multiple draft MDP submissions to DITRDC. The Airports Act requires that the MDP is exhibited to the public and, as a matter of practice, airport lessee companies (including APAM) undertake extensive public and stakeholder consultation about the content and proposed development in an MDP (explained in **Chapter A6: Stakeholder Engagement**).

Figure A8.1
MDP approval process



The key practical steps in the approval process for an MDP under the Airports Act are shown in Figure A8.1. While not a legislated requirement, it is standard practice to prepare and submit an Exposure Draft MDP to DITRDC for review. The intent of the Exposure Draft MDP process is for Commonwealth agencies to provide initial feedback on compliance and consistency with relevant legislation and guidelines.

DITRDC refer the Exposure Draft MDP to DAWE, the Civil Aviation Safety Authority (CASA) and Airservices Australia for review. Based on comments received following review by DITRDC, DAWE, CASA and Airservices Australia, a Preliminary Draft MDP is then produced and made available for public comment for at least 60 business days.

A Draft MDP is finally prepared, incorporating appropriate amendments arising from the public consultation period together with a 'Supplementary Report' (detailing amendments incorporated). The Draft MDP and Supplementary Report are submitted to the Minister for Infrastructure for consideration.

A8.2.1.2
Airports (Environment Protection) Regulations (1997)

The *Airports (Environment Protection) Regulations 1997* (Cth) (referred to as the AEP Regulations) 'cover the field' in relation to airport environmental management. While an approval is not required for M3R under the AEP Regulations, they impose obligations relating to the management of the environment across the airport site and require assessment, monitoring and reporting in relation to biodiversity, heritage, air, water and soil pollution, and noise levels. As such, Melbourne Airport has a duty to take all reasonable and practicable measures to:

- Prevent the generation of air, water and soil pollution, as well as to assess and report on existing pollution (e.g. soil contamination)
- Ensure that works do not result in adverse consequences for local biota and their associated ecosystems and habits
- Ensure that works do not result in adverse consequences for existing aesthetic, cultural, historical, social and scientific (including archaeological and anthropological) values of the local area
- Prevent the generation of offensive noise (excluding noise generated by an aircraft in flight or when landing, taking off or taxiing at the airport).

A8.2.1.3
The Environment Protection and Biodiversity Conservation Act (1999)

Overview

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth), (referred to as the EPBC Act), is administered by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) and represented by its Minister (hereafter referred to as 'Minister for the Environment'. The EPBC Act serves as Commonwealth environmental legislation relating to the environmental impacts of developments.

The EPBC Act details 'triggers' for formal assessment associated with impacts to Matters of National Environmental Significance (MNES) and actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies. It applies to the M3R project because the 'proposed action' will occur on Commonwealth land, requires changes to airspace volume and flight paths, and affects MNES.

As well as formal assessment requirements, the EPBC Act requires a Commonwealth agency or employee to consider advice from the Minister for the Environment on protection of the environment, before authorising:

- A plan for aviation airspace management involving aircraft operations that have, will have or are likely to have a significant impact on the environment
- The adoption or implementation of a Major Development Plan (as defined in the Airports Act).

Matters of National Environmental Significance

The EPBC Act requires actions that have, or are likely to have, a significant impact on any of the following MNES, to be considered by the Minister for the Environment:

- Listed threatened species and communities
- Listed migratory species
- Ramsar wetlands of international importance
- Commonwealth marine environment
- World Heritage properties
- National Heritage places
- The Great Barrier Reef Marine Park
- Nuclear actions
- A water resource, in relation to coal-seam gas development and large coalmining development.

As described in Chapter B5: Ecology, listed threatened species and communities are present on the M3R site and will be impacted by the project.

Actions on, or impacting upon, Commonwealth land and actions by Commonwealth agencies

Actions on, or impacting upon, Commonwealth land or actions by Commonwealth agencies may require formal assessment under the EPBC Act. Guidance on whether an action requires advice to be sought from the Minister (i.e. a referral) for assessment under this part of the EPBC Act is contained in *Actions on, or impacting upon Commonwealth land, and actions by Commonwealth agencies, Significant impact guidelines 1.2 Environment Protection and Biodiversity Conservation Act 1999* (Significant impact guidelines 1.2) (DSEWPC, 2013).

Appendix D of the previously mentioned publication provides specific guidance on the interaction between the Airports Act, MDP approval process and the requirements of the EPBC Act in relation to actions on Commonwealth leased airports, such as Melbourne Airport.

Requirement to take account of Minister's advice (section 160)

The EPBC Act requires that, before a Commonwealth agency or employee gives an authorisation of certain 'actions', that agency or employee must obtain and consider advice from the Minister for the Environment. In relation to M3R, the Minister for Infrastructure (who will make the approval decision regarding the MDP) must obtain and consider advice from the Minister for the Environment for the following actions (s160 EPBC Act, 1999):

(2)…

(b) the adoption or implementation of a plan for aviation airspace management involving aircraft operations that have, will have or are likely to have a significant impact on the environment; and

(c) the adoption or implementation of a major development plan (as defined in the Airports Act 1996); and

To formalise this process and the approach to the assessment of the action, a referral is submitted to the Minister for the Environment specifying the authorisation the Commonwealth agency or employee is intending to consider. The Minister then confirms the assessment approach to be adopted under the EPBC Act.

For major airport developments, the referral process must take place prior to the required public consultation period. APAM submitted the Exposure Draft of the M3R MDP to DITRDC (as set out in Figure A8.1) and DITRDC subsequently referred it to DAWE for consideration under section 160 of the EPBC Act.

In March 2021, DAWE formally advised that the Environment Minister's advice is required to be obtained and considered before the MDP is approved by the Minister for Infrastructure and adopted or implemented. DAWE also decided that the proposal requires further assessment under the EPBC Act by an accredited process, being the MDP process as defined under the Airports Act.

In relation to provision (2)(c) of EPBC Act s160 (regarding the adoption or implementation of a Plan for Aviation Airspace Management (PAAM)), Airservices and CASA submitted a joint referral to DAWE. In November 2021, DAWE subsequently determined that the Environment Minister's advice is required before the PAAM is authorised by CASA or Airservices. DAWE also decided that the airspace proposal requires further assessment under an accredited process, being the M3R MDP.

Significant impact criteria and guidelines

The *Significant Impact Guidelines 1.2* consider the 'whole of environment' impacts to be the 'total adverse impact of the action in the entire context of the environment which will be impacted' by the proposed action (particularly those elements of the environment which are sensitive or valuable). This applies to:

- Any person who proposes to take an action which is either situated on Commonwealth land or which may impact on Commonwealth land, and/or
- Representatives of Commonwealth agencies who propose to take an action that may impact on the environment anywhere in the world.

The guidelines identify a series of criteria to determine whether an action is considered 'significant':

- Landscapes and soils
- Coastal landscapes and processes
- Ocean forms, ocean processes and ocean life
- Water resources
- Pollutants, chemicals and toxic substances
- Plants
- Animals
- People and communities
- Heritage.

A checklist with the specific significance criteria and the correlating M3R MDP chapter/s that provide assessment information is provided in Appendix A8.A. A summary assessment against each of the significance criteria is provided in Appendix E6.A to **Chapter E6: Summary Commitments and Conclusion.**

Part 13 EPBC Permit

M3R will impact listed species and communities. As outlined in Chapter B5: Ecology, this includes disturbance and/or removal of a range of flora and fauna species, including some threatened species (e.g. Golden Sun Moth, Grey-headed Flying Fox, Swift Parrot, Growling Grass Frog).

Under Part 13 of the EPBC Act, actions including an action that damages or will significantly damage critical habitat for a listed threatened species or a listed threatened ecological community are prohibited (and constitute offences) unless a permit is issued under section 201 of the EPBC Act.

Melbourne Airport will apply to DAWE for a permit under Part 13 of the EPBC Act prior to the commencement of any action and in parallel with the completion of the offset management plan. This will occur either immediately prior to finalisation of the MDP, or following approval of the MDP (depending on the level of detailed design completed by that time).

A8.2.1.4
Other approvals

There are further Commonwealth and Victorian legislation and guidelines of relevance, some of which have additional approval requirements. These are described in Section A8.2.3 and **Chapter B2: Land Use and Planning.**

A8.2.1.5
Approvals pathway

The M3R MDP is the expected approval pathway for the project, addressing both the Airports Act and EPBC Act requirements. The overall approvals process for M3R pursuant to the requirements of the Airports Act and EPBC Act is provided in Figure A8.2. The figure documents the initial referrals and decisions on the approvals pathway, followed by the process to prepare, exhibit and submit the MDP.

Upon submission of the draft MDP, the Minister for the Environment will provide advice to DITRDC, CASA and Airservices Australia on the draft MDP. This advice shall be considered by the Minister for Infrastructure in deciding whether to approve the MDP.

Figure A8.2
M3R approvals process flow

1. Exposure draft MDP submitted
APAM prepares and submits the Exposure Draft MDP to DITRDC. DITRDC refer Exposure Draft MDP to DAWE under Section 161 of the EPBC Act. DITRDC also seeks comments from CASA and Airservices Australia. DITRDC, DAWE, CASA and Airservices Australia comments are provided to APAM.

2. Assessment approach decision
DAWE determines the proposed action is to be assessed by an assessment process accredited under section 160 of the EPBC Act through an MDP under the Airports Act.

3. Preparation of preliminary draft MDP
APAM addresses comments received on Exposure Draft MDP and prepares Preliminary Draft MDP.

4. Preliminary draft MDP on public exhibition
Preliminary Draft MDP public exhibition (under Section 92 of the Airports Act). APAM considers respondents' comments and amends Draft MDP where appropriate.

5. Draft MDP and Supplementary Report prepared and submitted
Draft MDP and Supplementary Report prepared and submitted to DITRDC. DITRDC requests advice from the Minister for the Environment on Draft MDP.

6. Environment Minister's advice
Minister for the Environment advises DITRDC, CASA and Airservices Australia within 30 business days of receiving the DITRDC report (in accordance with Section 163 of the EPBC Act).

7. MDP approval decision
Minister for Infrastructure decides whether to approve the MDP (within 50 business days in accordance with Section 94 of the Airports Act).

8. Other consents and operational approvals
There are a number of other consents, approvals and management plans required beyond the MDP to support the construction and operational phases of M3R. This includes the Part 13 permit. This also includes approvals issued by APAM, CASA, Airservices Australia, Airport Building Controller (ABC), Melbourne Water and other utilities, Hume City Council, VicRoads and Department of Land, Environment, Water and Planning (DELWP).

A8.2.2
Victorian legislation

The development area of M3R (as proposed in this MDP) is contained entirely within the Melbourne Airport 'airport site' (as defined in the Airports Regulations 1997 (Cth)) and therefore on Commonwealth land.

As previously noted, planning and development at Melbourne Airport is primarily regulated by the Airports Act. Part 5 of the Airports Act is particularly relevant as it relates to land use and planning, the airport's Master Plan and this MDP. Section 112 sets out the Commonwealth's intention that Part 5 of the Airports Act applies to the exclusion of the law of a state, and specifically laws of the state relating to land use and planning.

Notwithstanding section 112, section 91(1)(ga) requires the MDP to detail:

- Effects on traffic flows at and surrounding the airport
- Employment influences at the airport, and in the local and regional community
- Analysis of how the proposed development fits within the community and local planning schemes for commercial and retail development.

Additionally, section 91(4) requires that, in specifying a particular objective or proposal in section 91(1)(ga), the MDP will address the extent (if any) of consistency with planning schemes in force in Victoria and, if this MDP is not consistent with those planning schemes, the justification for the inconsistencies.

Therefore, while it is not necessary that M3R comply with relevant local and state planning provisions on the airport site, Melbourne Airport has considered the requirements of Victorian legislation as they are relevant to M3R, and recognises that certain M3R impacts interact with the surrounding environment.

A8.2.3
Other consents and operational approvals

There are a range of other approvals or secondary consents required for M3R implementation.

A8.2.3.1
Airspace changes

Proposed airspace changes will not be formally approved until a time closer to the opening of the changed infrastructure, and hence details of the airspace procedures in this MDP are indicative and conceptual at this stage.

On the basis the MDP is approved, Melbourne Airport will support the subsequent processes for the proposed changes to the airspace (including flight paths, procedures and management) which will be undertaken by Airservices Australia and CASA.

As previously stated, an EPBC Act referral was submitted by Airservices Australia and CASA for the airspace aspects of M3R. DAWE will consider this MDP as having described and addressed the environmental impacts associated with M3R airspace changes.

A8.2.3.2
Building approvals

New development at the airport is subject to airport lessee consent from APAM and a building approval from the appointed Airport Building Controller (ABC) as required under the *Airports (Building Control) Regulations 1996* (Cth).

The Building Approval cannot be issued by the ABC without written consent from Melbourne Airport, confirming that M3R is consistent with:

- The Master Plan
- Airport Environment Strategy
- Planning objectives for the airport
- An approved MDP.

A8.2.3.3
Secondary consents

In addition to the approvals outlined in previous sections, a number of secondary consents are required for the development of M3R. Although the Melbourne Airport site is a Commonwealth place, Victorian legislation applies to M3R where the development footprint, associated activities or significant impact occur outside of the Commonwealth-lease boundary.

Approvals under the *Planning and Environment Act 1987* (Vic), the *Water Act 1989* (Vic) and the *Flora and Fauna Guarantee Act 1988* (Vic) may be triggered where impacts associated with M3R occur outside of the Commonwealth-lease boundary. Activities requiring secondary consents may include:

- Creating or altering access to certain roads serving construction vehicle access
- Removal or lopping of native vegetation as a result of road alterations serving construction vehicle access, or to enable stormwater outlet construction
- Future changes to the Melbourne Airport Environs Overlay (MAEO) resulting from the impact of the new Australian Noise Exposure Forecast (ANEF). M3R has produced a new three-runway Australian Noise Exposure Concept (ANEC), which was used to inform the preparation of the new ANEF in the 2022 Master Plan (proposed)
- Works on, or proximal to, Melbourne Water assets and the establishment of stormwater structures and connections
- Impacts to protected flora or fauna species on public land as a result of road alterations serving construction vehicle access, or to enable stormwater outlet construction.

A8.2.3.4
Other approvals

Supplementary to the MDP approval process, there are further authorisations required for M3R. These include endorsements of airport-specific plans, operational conditions and consents (where compliance is required to operate M3R infrastructure).

Approval requirements include specific elements of design for the aerodrome's infrastructure (e.g. runway, taxiway, lighting, navigational aids, signage) and Obstacle Limitation Surface (OLS) protection. Airport manuals and the Safety Management System (SMS) will also require modification and regulatory approval to incorporate M3R in operation.

A8.3 IMPACT ASSESSMENT METHOD

A8.3.1
Overview

This MDP presents the findings of impact assessments covering a wide range of environmental, social and aviation effects associated with M3R. The assessments have sought opportunities to prevent or minimise significant adverse effects and, where possible, enhance benefits.

A consistent process has been generally applied to the assessment of impacts associated with each technical study:

1. Describe the existing baseline conditions relevant to the technical study
2. Assess the anticipated impacts of M3R, incorporating standard mitigation (e.g. statutory compliance and measures incorporated in the design)
3. Assess the significance of each impact - by considering the severity and likelihood of the impact in accordance with the framework described in **Section A8.3.2**.
4. Where an extreme or high adverse impact is identified, consider additional mitigation measures to reduce the severity and/or likelihood of the impact.
5. Revised assessment of impact significance, incorporating the additional mitigation measures to determine the residual impact.

Chapter B13: Climate Change and Natural Hazard Risk is the exception, for which APAM's 'risk assessment' methodology has been applied (because it evaluates hazards *to* the project - rather than caused *by* the project).

The M3R assessment process incorporates relevant guidance (DSEWPC, 2013). Further, any disturbance or impact that M3R has on the whole of the environment has been considered in line with DAWE guidance.

A8.3.2
Significance assessment

As defined in the *Significant Impact Guidelines 1.2*, a 'significant impact' is:

> *"an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. These factors need to be considered when determining if an action has a significant impact on the environment."*

Table A8.1
Severity assessment criteria

Magnitude	Description
Major adverse	Only adverse effects are assigned this level of importance as they represent key factors in the decision-making process. These effects are generally, but not exclusively associated with sites and features of national importance. A change in a national or state scale site or feature may also enter this category, as well as a very high intensity impact. They tend to be permanent, or irreversible, or otherwise long term. Typically, mitigation measures are unlikely to remove such effects.
High	These effects are likely to be important considerations at a state scale but, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision-making process. They tend to be permanent, or otherwise long to medium term of high intensity. Effects can be beneficial as well as adverse.
Moderate	These effects, if adverse, while important at a regional scale, are not likely to be key decision-making issues. Impacts tender to range from long term to short term of medium intensity. Nevertheless, the cumulative effects of such issues may lead to an increase in the overall effects upon a particular area or particular resource. Effects can be beneficial as well as adverse.
Minor	Effects are at a local scale and are unlikely to require amelioration unless identified by a specific stakeholder group. Impacts tend to be short term, or temporary in scale of low intensity. Effects can be beneficial as well as adverse.
Negligible	No effects or those which are beneath levels of perception, within normal bounds of variation within the margin of forecasting error. Impacts tend to be short term or temporary.
Beneficial	Effects are likely to benefit the attribute of the environment under consideration.

To inform the assessment of each impact, the *Significant Impact Guidelines 1.2* direct that the severity be determined, according to four factors; intensity, scale, duration and timing/frequency.

To assess the relative level of severity for M3R impacts, a generic description was developed for the differing levels (**Table A8.1**), taking into account each of the above factors. These descriptions built on previous assessment frameworks for runway approvals, such as the Sunshine Coast Airport Expansion Project Environmental Impact Assessment (Sunshine Coast Airport, 2014). Each specialist then defined for each level, study-specific criteria of relevance to their impact assessment (which are detailed in each respective MDP chapter). The intent of these definitions is for impacts with a residual severity of major or high to represent a 'significant' impact as defined in the *Significant Impact Guidelines 1.2*.

To inform the definition of the duration of an impact within the severity assessment, temporal scale has been defined as shown in Table A8.2. Likelihood assessment criteria are also defined, as shown in Table A8.3."

Once the severity and likelihood of an impact was determined, its significance level was defined by considering the intersection in accordance with **Table A8.4**.

A8.3.3
Indirect and off-site impacts

Consideration has also been given to 'indirect' and 'off-site' impacts, in order to ensure a holistic impact assessment of the whole environment, including:

- 'Downstream' or 'downwind' impacts - such as impacts on wetlands or ocean reefs from sediment, fertilisers or chemicals which are washed or discharged into river systems
- 'Upstream impacts' - such as impacts associated with the extraction of raw materials and other inputs which are used to undertake the project
- 'Facilitated impacts' - which result from further actions (including actions by third parties) which are made possible or facilitated by the project (e.g. the construction of a dam for irrigation water facilitates the use of that water by irrigators with associated impacts)

Consideration shall be given to all adverse impacts that could reasonably be predicted to follow from the project, whether these impacts are within the control of M3R or not.

Table A8.2
Temporal description

Term	Duration
Temporary	Up to 1 year
Short-term	From 1 to 5 years
Medium-term	From 5 to 20 years
Long-term	From 20 to 50 years
Permanent	Period in excess of 50 years

Table A8.3
Likelihood assessment criteria

Frequency	Description
Almost certain	Very likely to occur as a result of the proposed project construction and/or operations; could occur multiple times during relevant impacting period (probability >90%)
Likely	Event likely to occur once or more during period of the project (probability 70-90%)
Possible	Event could occur during period of the project (probability 30-70%)
Unlikely	Event is unlikely to occur, but is possible during period of the project (probability 10-30%)
Rare	May occur only in exceptional circumstances – can be assumed event will not occur during period of the project (probability <10%)

Table A8.4
M3R impact assessment matrix

Likelihood	Severity: Major adverse	High adverse	Moderate adverse	Minor adverse	Negligible	Beneficial
Almost certain	Extreme	Extreme	High	Medium	Low	Beneficial
Likely	Extreme	High	Medium	Medium	Negligible	Beneficial
Possible	High	Medium	Medium	Low	Negligible	Beneficial
Unlikely	High	Medium	Low	Low	Negligible	Beneficial
Rare	High	Medium	Low	Negligible	Negligible	Negligible

A8.3.4
Assessment scenarios

A8.3.4.1
Baseline year

The foundation data for M3R analysis was generated in late 2019, which is therefore the 'baseline year' for M3R studies and assessments. Future impact scenarios and evaluations are compared to the 2019 baseline (where applicable).

A8.3.4.2
Forecast years

To ensure analytical consistency, forecasts have been prepared for defined, specific assessment timeframes:

Table A8.5
M3R MDP representative assessment years

Timeframe	Description	Reference year
Current	Existing runway configuration.	2019
Opening year	Existing runway configuration with M3R in operation (incorporating the timing of construction of the new parallel north-south runway and modifications to the existing east-west runway) and the time required for commissioning of the new runway system. M3R in operation is the day when parallel north-south runway operations commence.	2026
+5 years	Impact assessment scenario five years from M3R operational date.	2031
+10 years	Impact assessment scenario ten years from M3R operational date (noise and community impacts).	2036
+20 years	Impact assessment scenario twenty years from M3R operational date.	2046

The forecast schedules include future aircraft type, operation type (arrival or departure), time of operation and port of origin or destination for each operation for a typical busy week. The development of these schedules is described in further detail in Chapter C3: Aircraft Noise Modelling Methodology.

A8.3.4.3
'No Build' scenario

For those studies where impacts are derived from future passenger and aircraft movement forecasts, there is a need to determine the additional contribution that M3R provides, beyond that which would occur if the project was not to proceed. To quantify this, the traffic, air quality and airspace/ground noise assessments include an assessment of the impact of both M3R Build and No Build scenarios for the future years identified in Table A8.5.

Under the No Build scenario, the number of passenger and aircraft movements becomes constrained as the current runway system reaches capacity, as described in Chapter A2: Need for the Project. The relative contribution of M3R is determined by the differential between the impacts associated with the Build and No Build scenarios.

To ensure consistency across the assessments, the No Build scenario assumes:

- The two-runway configuration is maintained as currently exists, incorporating only planned enhancements between 2019 and 2026
- Five and 20 years from opening – no further enhancements are undertaken to the two-runway configuration past 2026. Growth on the existing runway configuration is restricted and occurs in shoulder and non-peak periods and through larger aircraft operating. All relevant landside planned projects, including those external to Melbourne Airport, are undertaken over the period from opening date to the forecast year/s.

A8.3.5
MDP chapter interactions

A8.3.5.1
Interactive assessments

Much of the MDP's content is inter-related and based on fundamental input data which is used across multiple studies. The interaction of these studies is important when understanding the impact assessment method.

A number of chapters / assessments rely on the findings of other assessments and the data in those assessments. This is demonstrated in Table A8.6 and Figure A8.3. For example, the social impact assessment relies heavily on the outputs of the ground-based noise, air quality, aircraft noise and health impact assessment chapters, which evaluate specific community and environment influences relevant to social impacts.

A8.3.6
Cumulative and facilitated impacts

The purpose of assessing cumulative and facilitated impacts is to identify whether other developments, on and off airport, may lead to an elevated effect on the environment during the construction or operation of M3R. The assessment of cumulative impacts of relevant on and off airport developments is described in Chapter E6: Summary Commitments and Conclusion.

Table A8.6
Inter-relationship of M3R assessments

Chapter	Relevant input assessment	Relevant data from input assessment*
A2. Need for the Project	D2. Economic Impact Assessment	Employment numbers Economic impacts
B8. Surface Transport	D2. Economic Impact Assessment	Employment numbers
B9. Ground-based Noise and Vibration	B8. Surface Transport	Operational traffic volumes
B10. Air Quality	B8. Surface Transport	Operational traffic volumes
	C2. Airspace Architecture and Capacity	M3R Build and No Build flight paths
	C3. Aircraft Noise Modelling Methodology	M3R Build and No Build flight schedules
B11. Greenhouse Gas Emissions	B8. Surface Transport	Operational traffic volumes
	C3. Aircraft Noise Modelling Methodology	M3R Build and No Build flight schedules
C4. Aircraft Noise and Vibration	C2. Airspace Architecture and Capacity	M3R Build and No Build flight paths
	C3. Aircraft Noise Modelling Methodology	M3R Build and No Build flight schedules
D3. Health Impact	B3. Soils, Groundwater and Waste	Contaminated land assessment results
	B10. Air Quality	M3R Build and No Build air quality contours
	C4. Aircraft Noise and Vibration	M3R Build and No Build noise contours
D4. Social Impact	B9. Ground-based Noise and Vibration	M3R Build and No Build ground based contours
	B10. Air Quality	M3R Build and No Build air quality contours
	C4. Aircraft Noise and Vibration	M3R Build and No Build noise contours
	D3. Health Impact	M3R Build and No Build health impact assessment results

**Refer relevant input assessment chapter for further details of input data.*

A8.4
RELATIONSHIP TO OTHER PROJECTS

In addition to M3R, Melbourne Airport is in the process of designing and constructing a range of landside and airside projects to support its growth over the coming decades. The key projects under development, approval and construction at the airport are outlined in the Airport Master Plan (2018 current and 2022 proposed), as are strategies and plans for managing the overall impacts of Melbourne Airport's development program, such as the Environment Strategy and Ground Transport Plan.

It is important to note that the approval processes for these projects are separate to the approval process for M3R and will not be assessed as part of the M3R MDP.

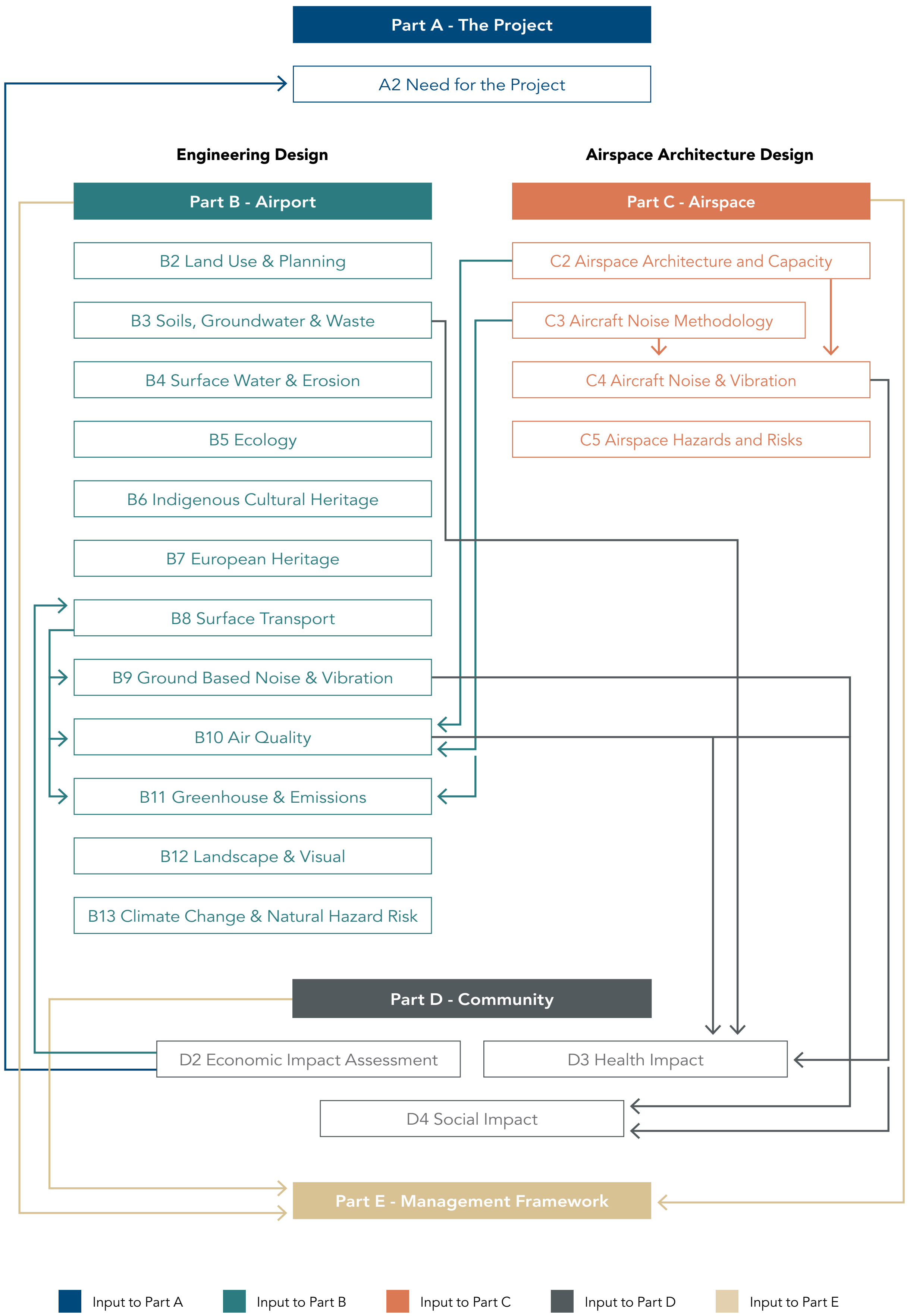
The Victorian Government is also undertaking a range of projects of relevance to M3R. The interaction and description of how relevant Melbourne Airport and Victorian Government projects have been considered in the assessment of M3R is explained in Chapter E6: Summary Commitments and Conclusion.

REFERENCES

Department of Sustainability, Environment, Water, Population and Communities 2013, Actions on, or impacting upon Commonwealth land, and actions by Commonwealth agencies, Significant impact guidelines 1.2 Environment Protection and Biodiversity Conservation Act 1999.

Sunshine Coast Airport 2014, Sunshine Coast Airport Expansion Project Environmental Impact Statement, accessed 2017, https://www.statedevelopment.qld.gov.au/ assessments-and-approvals/sca-expansion-project-eis- documents.html

Figure A8.3
MDP chapter relationships



APPENDIX A8.A
WHOLE-OF-ENVIRONMENT CHECKLIST

Environmental element	Relevant MDP chapters
Impacts on landscape and soils	
Is there a real chance or possibility that the action will:	
• substantially alter natural landscape features;	B12: Landscape and Visual
• cause subsidence, instability or substantial erosion; or	B12: Landscape and Visual
• involve medium or large-scale excavation of soil or minerals?	B3: Soils, Groundwater and Waste
Impacts on coastal landscapes and processes	
Is there a real chance or possibility that the action will:	Not applicable as M3R is approximately 25 kilometres from the coast
• alter coastal processes, including wave action, sediment movement or accretion, or water circulation patterns;	
• permanently alter tidal patterns, water flows or water quality in estuaries;	
• reduce biological diversity or change species composition in estuaries; or	
• extract large volumes of sand or substantially destabilise sand dunes?	
Impacts on ocean forms, ocean processes and ocean life	
Is there a real chance or possibility that the action will:	Not applicable as M3R is approximately 25 kilometres from the coast
• reduce biological diversity or change species composition on reefs, seamounts or in other sensitive marine environments;	
• alter water circulation patterns by modification of existing landforms or the addition of artificial reefs or other large structures;	
• substantially damage or modify large areas of the seafloor or ocean habitat, such as sea grass;	
• release oil, fuel or other toxic substances into the marine environment in sufficient quantity to kill larger marine animals or alter ecosystem processes;	
• release large quantities of sewage or other waste into the marine environment?	
Impacts on water resources	
Is there a real chance or possibility that the action will:	
• measurably reduce the quantity, quality or availability of surface or ground water;	B3: Soils, Groundwater and Waste/ B4: Surface Water and Erosion
• channelise, divert or impound rivers or creeks or substantially alter drainage patterns; or	A4: Project Description/A5: Project Construction/B4: Surface Water and Erosion
• measurably alter water table levels?	B3: Soils, Groundwater and Waste
Pollutants, chemicals, and toxic substances	
Is there a real chance or possibility that the action will:	
• generate smoke, fumes, chemicals, nutrients, or other pollutants which will substantially reduce local air quality or water quality;	B10: Air Quality/B4: Surface Water and Erosion
• result in the release, leakage, spillage, or explosion of flammable, explosive, toxic, radioactive, carcinogenic, or mutagenic substances, through use, storage, transport, or disposal;	A5: Project Construction/B4: Surface Water and Erosion/B3: Soils, Groundwater and Waste/B8: Surface Transport/ D3: Health Impact
• increase atmospheric concentrations of gases which will contribute to the greenhouse effect or ozone damage; or	B11: Greenhouse Gas Emissions
• substantially disturb contaminated or acid-sulphate soils?	B3: Soils, Groundwater and Waste
Impacts on plants	
Is there a real chance or possibility that the action will:	
• involve medium or large-scale native vegetation clearance;	B5: Ecology
• involve any clearance of any vegetation containing a listed threatened species which is likely to result in a long-term decline in a population or which threatens the viability of the species;	B5: Ecology
• introduce potentially invasive species;	B5: Ecology
• involve the use of chemicals which substantially stunt the growth of native vegetation;	A4: Project Description/ A5: Project Construction
• involve large-scale controlled burning or any controlled burning in sensitive areas, including areas which contain listed threatened species?	B5: Ecology

Environmental element (cont.)	Relevant MDP chapters (cont.)
Impacts on animals	
Is there a real chance or possibility that the action will:	
• cause a long-term decrease in, or threaten the viability of, a native animal population or populations, through death, injury or other harm to individuals	B5: Ecology
• displace or substantially limit the movement or dispersal of native animal populations	B5: Ecology
• substantially reduce or fragment available habitat for native species	B5: Ecology
• reduce or fragment available habitat for listed threatened species which is likely to displace a population, result in a long-term decline in a population, or threaten the viability of the species	B5: Ecology
• introduce exotic species which will substantially reduce habitat or resources for native species	B5: Ecology
• undertake large-scale controlled burning or any controlled burning in areas containing listed threatened species	B5: Ecology
Impact on people and communities	
Is there a real chance or possibility that the action will:	
• substantially increase demand for, or reduce the availability of, community services or infrastructure which have direct or indirect impacts on the environment, including water supply, power supply, roads, waste disposal, and housing	A4: Project Description/ A5: Project Construction/ B8: Surface Transport/ D4: Social Impact
• affect the health, safety, welfare or quality of life of the members of a community, through factors such as noise, odours, fumes, smoke, or other pollutants	B3: Soils, Groundwater and Waste/ B9: Ground-based Noise and Vibration/ C4: Aircraft Noise and Vibration/ B10: Air Quality/ D3: Health Impact/ D4: Social Impact
• cause physical dislocation of individuals or communities; or	A4: Project Description/ B2; Land use and Planning
• substantially change or diminish cultural identity, social organisation or community resources	B6: Indigenous Cultural Heritage/ B7: European Heritage/ D4: Social Impact
Impacts on heritage	
Is there a real chance or possibility that the action will:	
• permanently destroy, remove or substantially alter the fabric (physical material including structural elements and other components, fixtures, contents, and objects) of a heritage place	B6: Indigenous Cultural Heritage/ B7: European Heritage
• involve extension, renovation, or substantial alteration of a heritage place in a manner which is inconsistent with the heritage values of the place	B6: Indigenous Cultural Heritage/ B7: European Heritage
• involve the erection of buildings or other structures adjacent to, or within important sight lines of, a heritage place which is inconsistent with the heritage values of the place	B6: Indigenous Cultural Heritage/ B7: European Heritage
• substantially diminish the heritage value of a heritage place for a community or group for which it is significant	B6: Indigenous Cultural Heritage/ B7: European Heritage
• substantially alter the setting of a heritage place in a manner which is inconsistent with the heritage values of the place	B6: Indigenous Cultural Heritage/ B7: European Heritage
• substantially restrict or inhibit the existing use of a heritage place as a cultural or ceremonial site?	B6: Indigenous Cultural Heritage/ B7: European Heritage

MELBOURNE AIRPORT

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