27. Cumulative impact assessment

Cumulative impacts may arise as a result of the development of the proposed airport concurrently or sequentially with other major projects in the region. To identify the likelihood of airport related cumulative impacts, other significant projects and/or initiatives were reviewed including:

- Western Sydney Infrastructure Plan
- Broader Western Sydney Employment Area
- South West Priority Growth Area
- other major projects identified in the region

Cumulative impacts associated with the long term development of the proposed airport are considered separately as part of the strategic environmental assessment presented in Volume 3.

There is considered to be minimal potential for cumulative noise impacts upon sensitive receivers as a result of the distance from other major projects. The relocation and upgrade of The Northern Road, construction of the M12 motorway and potential realignment works on Elizabeth Drive in the vicinity of the airport site have the highest potential for cumulative noise impacts. The majority of the roads on the anticipated construction haulage routes carry relatively high volumes of existing traffic and the increase in noise from construction traffic is unlikely to be perceptible. Further, aspects of likely noise impacts from additional road projects, such as the M12, have been considered on a preliminary basis in the noise assessment as part of this draft EIS.

Existing background air quality monitoring data in conjunction with the modelled emissions from the surrounding road network were used in the local air quality assessment. Consideration of the potential for increases in ozone in Sydney's regional airshed was also undertaken as part of the assessment. Predicted emissions would typically be below the respective air quality assessment criteria during construction and operation for both incremental impacts of the airport alone and when considered cumulatively with other surrounding land use and development.

The traffic assessment utilised land use forecasts to model anticipated future traffic generation in the region together with expected traffic from the proposed airport. Additional vehicle movements associated with the construction and operation of the proposed airport are not likely to significantly affect the operation of the surrounding road network. Substantial road improvement works are proposed as part of the Western Sydney Infrastructure Plan and other planned developments in Western Sydney. These are expected to provide sufficient capacity to cater for the expected passenger and employee traffic demand associated with the operation of the proposed airport in 2030.

The progressive development and urbanisation of Western Sydney has placed increased pressure on biodiversity, Aboriginal and European heritage values of the region. Development of a biodiversity offsets strategy, consideration of a Keeping Place and additional archaeological and archival recording would assist in mitigating cumulative impacts.

27.1. Introduction

This chapter provides an assessment of the potential cumulative impacts that may arise as a result of the construction and operation of the proposed airport concurrently or sequentially with other projects in the region.

Cumulative impacts are incremental environmental impacts that are caused by past, present or reasonably foreseeable future activities that, when combined, may have a cumulative effect. When considered in isolation, the environmental impacts of any single project upon a receiver or resource may not be significant. However, the potential impacts may increase when individual effects are considered in combination, either within the same project or together with other projects.

The proposed airport may result in both adverse and beneficial cumulative effects as a result of:

- concurrent or co-located projects under construction;
- regional land use changes;
- off-site infrastructure needed to support the operation of the airport;
- landside transport access to the airport; and
- incremental increases in the capacity of the airport including both the Stage 1 and long term development.

Another type of cumulative impact is known as construction fatigue. This concept relates to sensitive receivers that experience construction impacts from a variety of projects over a long period of time with few or no breaks between construction periods. Construction fatigue typically relates to amenity impacts from projects that are constructed consecutively or 'back to back'.

27.1.1. Assessment approach

The assessment of cumulative impacts builds upon the detailed assessment of environmental aspects presented in Chapters 10 through to 26 in this volume.

To identify the likelihood of airport related cumulative impacts, potential construction and operational phase interfaces with other significant projects and/or initiatives were reviewed, specifically:

- relevant projects under construction;
- projects and/or initiatives that have publicly declared financial commitments;
- projects for which approval has been sought or that have been approved under relevant NSW legislation; and
- projects that are committed to in planning strategies for the region.

In determining which other projects/initiatives are relevant to the cumulative impacts assessment, the following criteria were taken in account:

- **location**: the projects are located in proximity to the airport;
- **project timeframe**: projects likely to be under construction concurrent with the airport (or which would otherwise have a noteworthy operational interaction) were considered; and
- **project size**: projects were listed on either the NSW Department of Planning and Environment Major Projects Register or local government websites.

Consideration of cumulative impacts was inherently addressed as part of the detailed modelling approach for a number of environmental aspects assessed as part of specialist investigations presented in Volume 4 of this draft EIS. For example the traffic assessment considered the impacts of the proposed airport within the context of the modelled urban growth predictions for Western Sydney. The air quality assessment included modelling of the incremental impacts of the proposed airport together with background monitoring data and the modelled pollutant sources from surrounding projects.

The long term impact assessment presented in Volume 3 of this draft EIS considers the cumulative impacts associated with the possible progressive expansion of the proposed airport beyond the scope of the proposed Stage 1 development.

27.2. Relevant plans and projects

There are a number of initiatives and projects in progress or proposed for Western Sydney, which have the potential to generate cumulative impacts/interactions with the proposed Stage 1 development. These initiatives and projects are summarised below.

27.2.1. Western Sydney Infrastructure Plan

The Western Sydney Infrastructure Plan involves the Australian and New South Wales Governments investing $3.6 billion over 10 years in major Western Sydney road infrastructure upgrades. The plan aims to relieve pressure on existing infrastructure and unlock the economic capacity of the region by easing congestion, reducing travel times and creating local jobs. The plan includes:

- upgrade of The Northern Road to a minimum of four lanes from Narellan to Jamison Road;
- construction of a new east-west four-lane M12 Motorway to provide access and traffic capacity for the proposed airport between the M7 Motorway and The Northern Road, with the retention of Elizabeth Drive for local traffic;
- upgrade of Bringelly Road to a minimum of four lanes between The Northern Road and Camden Valley Way;
- upgrade of the intersection of Ross Street and the Great Western Highway;
- construction of the Werrington Arterial road; and
- a $200 million package for local roads upgrades.

27.2.2. Broader Western Sydney Employment Area

The Broader Western Sydney Employment Area comprises a land area of approximately 10,690 hectares and encompasses portions of the local government areas of Blacktown, Fairfield, Liverpool and Penrith.

The *Broader Western Sydney Employment Area Draft Structure Plan* was released in June 2013 by the NSW Government (now referred to as the Western Sydney Employment Area Extension). It outlines a broad framework for the area including the location of future employment land and centres, a road network, potential freight and transport corridors and staging scenarios. The Draft Structure Plan is currently being revised to recognise the Western Sydney Airport and a revised structure plan is expected by the end of 2015.

The Draft Structure Plan shows approximately 8,100 hectares of employment land, comprising 1,750 hectares of currently zoned employment land and 6,350 hectares of future employment land. The Western Sydney Employment Area Extension has the potential to generate 57,000 jobs to 2046, of which 36,000 would be industrial jobs and 21,000 office based jobs.

The Draft Structure Plan also identifies opportunities for two specialised centres and one local centre as follows:

- one specialised centre proposed to be located on the airport site south of Elizabeth Drive;
- a second specialised centre proposed to be located at the proposed intersection of Aldington Road and the Erskine Park Southern Link Road; and
- a local centre planned along the potential passenger rail corridor close to the intersection of the potential Outer Sydney Orbital corridor and Luddenham Road.

27.2.3. South West Priority Growth Area

The South West Priority Growth Area is approximately 17,000 hectares in size and includes parts of the Liverpool, Camden and Campbelltown LGAs. It is divided into 18 Precincts that are being progressively released for planning and rezoned for sustainable urban development.

The South West Priority Growth Area will be supported by a Major Centre at Leppington and serviced by the new South West Rail Link. It is presently estimated that this Area will contain about 110,000 new dwellings for some 300,000 residents.

To date, seven South West Growth Centre precincts including Oran Park, Turner Road, Edmondson Park, Austral, Leppington North, Catherine Field (part) and East Leppington have been rezoned to allow urban development. Collectively, these precincts have potential for 42,560 homes to accommodate approximately 130,200 residents and capacity for 22,120 jobs.

The Leppington Precinct is currently undergoing precinct planning and upon rezoning is expected to provide land for approximately 9,000 additional homes.

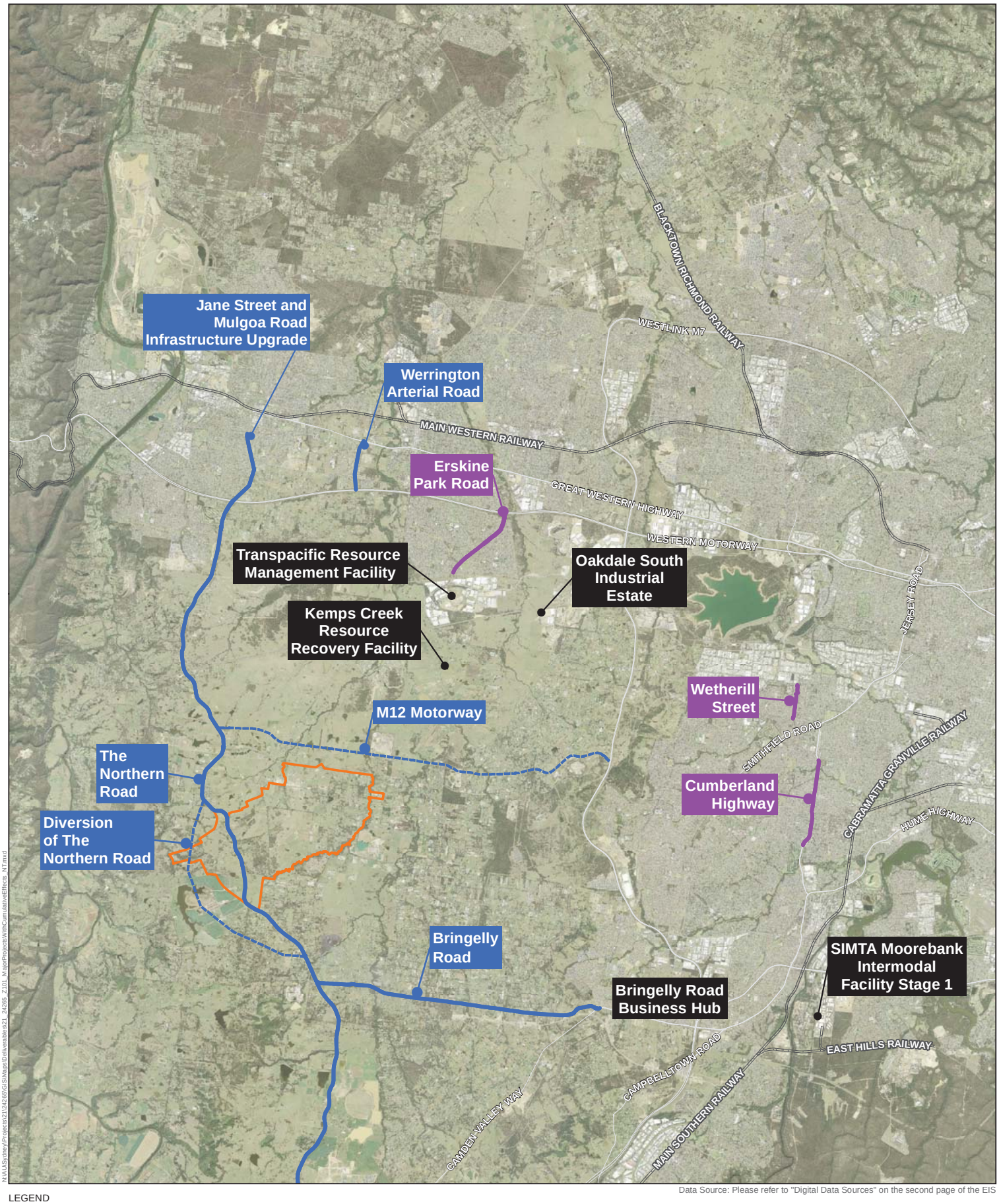
27.2.4. Major projects

In addition to the broad transformational plans identified above, five major projects which are currently undergoing project assessment or have been approved recently were identified as relevant for the assessment of construction and operational phase cumulative effects based on the criteria explained in Section 27.1. The projects are described in Table 27–1 and their locations are shown in Figure 27–1.

Table 27–1 – Major projects with potential cumulative effects

Project and location	Description	Status
SIMTA Moorebank Intermodal Facility Stage 1, Moorebank Avenue, Moorebank	Construction and operation of Stage 1 of the facility comprises the following components: • intermodal terminal facility operating 24 hours per day, seven days per week with a capacity to handle up to 250,000 twenty foot equivalent units including: truck processing and loading areas; rail loading and container storage areas; and an administration facility and associated car parking; • a rail link connecting the southern end of the site to the Southern Sydney Freight Line; and • associated works including: rail sidings; vegetation clearing, remediation and levelling works; and drainage and utilities installation.	State Significant Development Concept Plan Approved Stage 1 EIS exhibition
Bringelly Road Business Hub, Bringelly Road, Leppington	The proposed Bringelly Road Business Hub would accommodate large format retail, bulky goods and light industrial premises and may include the sale of home wares, electrical appliances, home building materials and/or office supplies. The proposal involves: • demolition of existing structures; • subdivision of the site into eight developable lots; • bulk earthworks to regrade the land and provide generally level developable lots; • construction of new internal roads accessed from the realigned Bringelly Road; • construction and delivery of utilities, services and stormwater management infrastructure; and • public domain and landscaping works.	State Significant Development Proponent reviewing submissions on EIS
Kemps Creek Resource Recovery Facility, 788 – 804 Mamre Road, Kemps Creek	The facility is intended to process general solid waste associated with the construction and property development industries. In particular, it seeks to screen, crush and sort building and demolition materials, excavated natural materials, and the like. It is expected that the site would process between 200,000 to 250,000 tonnes of such material annually. Recovered materials would be distributed throughout the Sydney metropolitan area, as required.	EIS requirements issued
Transpacific Resource Management Facility, 50 Quarry Road, Erskine Park	Erskine Park Resource Management Facility would include: • Stage 1: Erskine Park Waste Transfer Station with a design capacity of 300,000 tonnes per year of waste (putrescible and non-putrescible) for sorting and transfer; and • Stage 2: Erskine Park Resource Recovery Facility designed to receive up to 150,000 tonnes per annum of selected recyclable material from the transfer station for processing into a number of saleable commodities.	EIS requirements issued

Project and location	Description	Status
Oakdale South Industrial Estate, Erskine Park	Oakdale South Industrial Estate is a 117 ha site located within the Western Sydney Employment Area and is the second of four stages of the broader Oakdale Industrial Estate (421 hectares). Land uses permitted at Oakdale South Industrial Estate include those associated with warehouse, distribution and manufacturing. Staged development of the Oakdale South Industrial Estate would comprise: • a Master Plan for the entire site establishing key development parameters; • subdivision of the entire Oakdale South site into six sub-precincts to allow for the staged development of the site.; • bulk earthworks across the entire Oakdale South site, staged to align with infrastructure delivery and market demand; • staged infrastructure/civil works; and • development of selected precincts for warehousing and distribution.	EIS requirements issued



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Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

LEGEND

- Airport site
- Rail
- Roads

Western Sydney Infrastructure Plan

- Local roads package
- Major road projects
- Route to be decided

Figure 27-1 - Location of major projects with potential cumulative effects

0 1 2 4
Kilometres

N

27.2.5. Long term development of the proposed airport

It is expected that the proposed airport would be progressively developed as demand increases beyond 10 million annual passengers. Additional aviation infrastructure and support services such as taxiways, aprons, terminals and support facilities would be required to service the growing demand.

The need for a second runway would be triggered when operational demand approaches 37 million annual passengers, which is forecast to occur around 2050. Conceptual layouts have been developed for an airport with the capacity to service approximately 82 million annual passengers. This level of patronage is forecast to occur by around 2063.

A strategic level environmental assessment of this possible long term development is provided in Volume 3 to provide an indication of the impacts associated with the progressive expansion of operations beyond the scope of the proposed Stage 1 development. The strategic level assessment therefore provides consideration of the cumulative impacts arising from long term development stages of the proposed airport.

27.2.6. Airspace operations

The operation of the proposed airport would interact with the operations of Sydney Airport, Camden Airport, Bankstown Airport, RAAF Base Richmond and several other minor aviation facilities in the region. A preliminary assessment of airspace implications for the Sydney region associated with an introduction of flights at the proposed airport was undertaken by Airservices Australia to develop indicative air traffic management designs. The indicative designs demonstrate that Stage 1 of the proposed airport and Sydney Airport could safely operate independently as high capacity airports. Further detail is available in Chapter 7.

The cumulative environmental impacts (noise, air quality and public safety) of additional aircraft movements over the Sydney metropolitan area would be considered as part of future airspace planning. A separate regulated airspace design process to develop operational flight paths would be required closer to the commencement of operations at the proposed airport. The design process would require extensive consultation with airlines, the community, Sydney Basin airspace users and other stakeholders as part of a separate regulatory approvals process.

27.3. Cumulative impacts

The cumulative impacts that may arise during construction and operation of Stage 1 of the proposed airport development are outlined below.

27.3.1. Noise

There is considered to be limited potential for cumulative noise impacts as a result of construction activities at the airport site. Noise emissions arising from construction activities would be predominantly limited to the airport site and immediate surrounds. The geographic separation from other major developments in Western Sydney would limit the potential for cumulative effect of noise upon any individual sensitive receivers.

The relocation of The Northern Road and other site infrastructure is proposed to be undertaken concurrently with site preparation activities at the airport site. Site preparation activities would generally proceed from east to west within the airport site to facilitate relocation of the existing infrastructure. The distance between concurrent construction activities would limit the potential for cumulative impacts to receivers in close proximity to the airport site

Cumulative noise impacts may be experienced along haulage routes associated with construction vehicles accessing the airport site and surrounding developments. The majority of the roads on the anticipated haulage routes carry relatively high volumes of existing traffic and the increase in noise from construction traffic is predicted to be less than two dBA, which is unlikely to be perceptible.

During operation, aircraft operating concurrently with those from other Sydney region airports have the potential to increase noise exposure to the surrounding community. While the proposed airport would result in additional aircraft movements, the indicative flight paths are designed to facilitate safe, efficient and independent airspace operations for each airport. As a result, there are not expected to be any significant cumulative noise impacts upon any individual receivers. Noise abatement opportunities are expected to be considered in conjunction with future airspace design processes.

There is also anticipated to be a general increase in background noise levels associated with the ongoing urbanisation and development of Western Sydney. For example, certain proposed road projects, such as the proposed relocation and upgrade of The Northern Road, would contribute to changed background noise levels in the vicinity of the airport site. An increase in background noise would effectively limit the incremental increase associated with noise generated by the airport operations.

27.3.2. Air quality

Emissions from existing local sources were reflected in the ambient air quality data obtained from monitoring stations in the vicinity of the airport site. The inclusion of this background data in the impact assessment of the proposed airport, coupled with a generally conservative approach to impact assessment, means that the potential impacts identified would account for any potential cumulative air quality impacts associated with existing sources. To address the potential cumulative impacts of the airport in combination with the major roadways, emissions from both sources have been characterised within the modelling. The potential for increases in ozone in Sydney's regional airshed was also considered as part of the assessment process.

Consideration of cumulative impacts is therefore inherently captured in the overall modelling approach for the assessment of air quality impacts associated with the proposed airport.

The results of the air dispersion modelling indicate that predicted emissions would typically be below the respective air quality assessment criteria during construction and operation for both incremental impacts of the airport alone and when considered cumulatively with other surrounding land use and development. Predicted exceedances were generally associated with external sources such as regional dust storms and emissions generated by traffic on the surrounding road network. The assessment of regional air quality impacts has found that operation of the proposed airport would have only a marginal impact on regional ozone levels.

27.3.3. Traffic and transport

The traffic impact assessment was undertaken using the Sydney Strategic Travel Model which is a tool developed by the Transport for NSW Bureau of Transport Statistics to project travel patterns in the Sydney Greater Metropolitan Area. The model uses land use forecasts in the form of population and employment projections by travel zone combined with a detailed representation of the road and public transport networks to assess the impact of growth and trip making behaviour on transport infrastructure. Cumulative impacts associated with the proposed airport in conjunction with other major developments in Western Sydney are therefore inherently captured in the modelling approach.

Additional vehicle movements associated with the construction and operation of the proposed airport are not likely to significantly affect the operation of the surrounding road network. A plan would be developed in consultation with relevant stakeholders to control and manage traffic during the construction phase of the proposed airport development. Development of the plan would seek to ensure coordination of measures with any concurrent road works projects.

A large amount of road improvement works is proposed as part of the Western Sydney Infrastructure Plan and other planned developments in Western Sydney. These works are expected to provide sufficient capacity to cater for the expected passenger and employee traffic demand associated with the operation of the proposed airport in 2030 and beyond.

The NSW Government has also started planning to extend the South West Rail Link. The rail link will be considered as part of the planning for the wider transport network for Western Sydney.

27.3.4. Biodiversity

The progressive development and urbanisation of Western Sydney has placed increased pressure on the biodiversity values of the region including the endangered Cumberland Plain Woodland and a range of threatened flora and fauna. The cumulative impacts of the proposed airport development combined with surrounding major projects and other development would include further loss and fragmentation of habitat, and creation of edge effects in retained remnant native vegetation.

The biodiversity offset package detailed in Chapter 16 and Appendix K in Volume 4 would help address unavoidable impacts of the proposed airport on Cumberland Plain Woodland and other threatened species, including the likely cumulative impacts outlined above. The biodiversity offset package would include the conservation and management of offset sites that support the biodiversity values affected by development of the proposed airport. The quantum of biodiversity offsets required has been calculated in accordance with the EPBC Act Offset Policy (DSEWPaC 2012).

Offset sites would be conserved in the locality and surrounding region and would be managed by relevant land owners within the NSW Biobanking framework. Much of the offset package may be delivered, and biodiversity gains achieved, prior to many of the impacts of Stage 1 of the airport and the majority of the potential cumulative impacts occurring. Offsets with equivalent ecological communities and species would be acquired in the local bioregion.

Long term development at the airport site would require separate calculation of any additional biodiversity offsets with reference to the prevailing airport master plan(s) and the EPBC Act Offsets Policy. Other major projects and the development of the Western Sydney Infrastructure Plan, Western Sydney Employment Area and the South West Priority Growth Area would need to deliver biodiversity offsets (as required) in accordance with the Framework for Biodiversity Assessment (OEH 2014b), the EPBC Act Offset Policy (DSEWPaC 2012) and/or the outcomes of the strategic assessment of the Western Sydney growth centres conducted under the EPBC Act.

27.3.5. Water Resources

Existing water quality in waterways in the vicinity of proposed airport site are generally poor. Hydrologic and hydraulic modelling of the airport site for construction and operation indicates that the proposed drainage system would be generally effective at mitigating watercourse and flooding impacts. It is also anticipated that the quality of water discharged from the site would be improved compared to existing conditions. Accordingly, whilst the extent of future development surrounding the airport may increase the cumulative surface water quality impacts, it is not expected that the proposed airport would significantly contribute to this risk.

27.3.6. Aboriginal and European heritage

The progressive development and urbanisation of Western Sydney has placed pressure on the Aboriginal and European heritage values of the locality. Further development such as the proposed airport and other major projects and growth initiatives would result in an increasing rarity for Aboriginal sites and historic structures to be retained in their original location and landscape setting.

To facilitate preservation of artefacts and cultural values consideration could be given to the establishment of an Aboriginal ‘Keeping Place’ for the archival storage, conservation management and interpretation of salvaged Aboriginal cultural material.

27.3.7. Planning and land use

The cumulative effects of the development of the Western Sydney Employment Area and the South West Priority Growth Area would transform existing rural land uses to urban land uses, particularly over the long term. Land use planning across all levels of government has been designed to reduce land use conflict between the airport and surrounding land uses. For example, lands adjoining the north-west and south-east sides of the airport site have been earmarked for commercial and industrial purposes.

The draft EIS provides ANEC contours and identified other potential noise impact areas which can be used to guide appropriate future land use planning and compatible development.

27.3.8. Landscape and visual amenity

The rural character that has existed for many decades in Western Sydney is changing due to the development of the South West Priority Growth Area, the commitment by the Australian Government to the Western Sydney Infrastructure Plan and the establishment of the Broader Western Sydney Employment Area. These projects will lead to increased urbanisation of the area over time and corresponding visual effects. The increased urbanisation of the area will generally reduce the impact of the airport development, including night sky glow, as it becomes a part of the developing urban visual character of the area.

27.3.9. Social

The cumulative effect of developing the proposed airport and surrounding lands would increase the demand on existing social infrastructure and recreational assets. The development of surrounding land uses and major projects may also increase the availability of social infrastructure as the region transitions from rural to residential and industrial lands which would likely offset a cumulative increase in social infrastructure demand.

27.3.10. Economic

The proposed airport and surrounding land use changes associated with the development of the Western Sydney Employment Area and the South West Priority Growth Area would further increase population and employment growth in Western Sydney. These projects are likely to result in a cumulative economic benefit in terms of economic activity, employment and population growth.

27.3.11. Resources and waste

The generation of waste during construction and operation of the proposed airport would be reduced through the implementation of a waste management plan. Waste requiring disposal would be sent to an appropriately licensed facility. The waste management market in Western Sydney is mature and handles significant volumes of waste from various domestic, commercial and industrial sources across Sydney.

Waste facilities in Western Sydney have sufficient capacity to handle wastes of the type and volume expected to be generated at the airport site in conjunction with the broader development of Western Sydney.

27.3.12. Greater Blue Mountains World Heritage Area

The proposed airport would have no direct impact on the Greater Blue Mountains Area. The contributory factors influencing potential cumulative impacts on the Greater Blue Mountains World Heritage Area (GBMWHA) are potential direct impacts from other projects and indirect impacts of the proposed airport on noise, air quality and amenity. Indirect impacts associated with operation of the airport are unlikely to have a significant impact on World Heritage values or the integrity of the listed property.

While the proposed airport would provide progressively increasing aviation capacity in the Sydney region, which could also parallel a growth in tourism and visitation for the GBMWHA, it is very unlikely that an airport would directly contribute to inappropriate development or uncontrolled visitor access, particularly within the context of strong management plans which are in place for the GBMWHA. Other factors such as Sydney's expanding population are considered more likely to influence the need for any new management responses to threats posed by increased visitations.

The predicted increase in aircraft overflights over the GBMWHA is considered in Chapter 26. Large areas of the World Heritage area would not experience aircraft overflights, or would do so infrequently. In those areas directly under flight paths, potential indirect impacts on noise and visual amenity are not considered to be significant due to the high altitude of operating aircraft.

27.4. Conclusion

This assessment considers the potential cumulative impacts that may arise as a result of the construction and operation of the proposed airport and other major projects that are planned to occur in the vicinity of the airport site. The chapter identifies key major projects to consider in project planning and key cumulative risks.

As part of its Stakeholder and Community Engagement Plan, the Department of Infrastructure and Regional Development would liaise with the proponents for the major projects identified and key stakeholders (such as Roads and Maritime Services, Transport for NSW, and the Department of Planning and Environment) to reduce the potential for cumulative impact to arise during construction.

The highest risk for cumulative impact is the concurrent upgrade and relocation of The Northern Road and the construction of the M12 motorway between the M7 and The Northern Road which could contribute to construction fatigue for surrounding communities. To manage this risk a high level of coordination would be required between the Department of Infrastructure and Regional Development, Roads and Maritime and relevant construction contractors.

Prior to and during operations, the ALC and the Department of Infrastructure and Regional Development would liaise with Airservices Australia, the Civil Aviation Safety Authority, other Sydney basin airport operators, NSW Government agencies and other key stakeholders to identify measures to reduce operational cumulative impacts.

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