

7.0 Environmental assessment

7.18 Cumulative impacts

This chapter provides an assessment of the potential cumulative impacts resulting from construction and operation of the proposed modification in combination with impacts from other projects. It outlines the methodology used for the assessment, identifies potential cumulative impacts, and identifies mitigation measures to address these impacts.

7.18.1 Introduction

Table 7-121 sets out the SEARs relevant to the cumulative impact assessment and identifies where the requirements have been addressed in this section.

Table 7-121 SEARs – Cumulative impacts

Desired Performance Outcome	SEAR	Where addressed within the Modification Report
<p>1. Modification Report The modification is described in sufficient detail to enable clear understanding that the modification has been developed through an iterative process of impact identification and assessment and project refinement to avoid, minimise or offset impacts so that the project, on balance, has the least adverse environmental, social and economic impact, including cumulative impacts.</p>	<p>1. The Modification Report must include, but not necessarily be limited to, the following:</p> <p>(o) an assessment of the relevant cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed</p>	<p>Section 7.18.4 to Section 7.18.5</p>
<p>2. Assessment of Key Issues Key issue impacts are assessed objectively and thoroughly to provide confidence that the project will be constructed and operated within acceptable levels of impact or with appropriate offsets.</p>	<p>2. For each key issue the Proponent must:</p> <p>(d) identify, describe, and quantify (if possible) the impacts associated with the issue, including... cumulative impacts (parallel and sequential) with other projects.</p>	<p>Section 7.18.3, Section 7.18.4, Section 7.18.5</p>
<p>2. Noise and Vibration – Amenity Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity, and adverse impacts on the structural integrity of buildings and items including Aboriginal places and environmental heritage. Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are</p>	<p>1. The assessment of construction noise and vibration must be undertaken in accordance with the Interim Construction Noise Guideline (DECC 2009) (ICNG) relevant guidelines, and must:</p> <p>(g) include a cumulative noise and vibration assessment inclusive of impacts from the project (including concurrent project construction activities) and the construction of other relevant development in the vicinity of the project.</p>	<p>Section 7.18.4 to Section 7.18.5 Appendix E (Noise and vibration assessment)</p>

Desired Performance Outcome	SEAR	Where addressed within the Modification Report
<p>effectively managed to protect the amenity and well-being of the community.</p> <p>Increases in noise emissions and vibration affecting environmental heritage as defined in the <i>Heritage Act 1977</i> during operation of the project are effectively managed.</p>		
<p>8. Other Issues</p>	<p>An assessment of the following issues must be undertaken in accordance with the commitments in Attachment 2 of the M7 Motorway (SSI 663) – Project Modification letter submitted 9 May 2022 (via Major Projects Portal):</p>	
	<p>Air Quality</p> <p>1. Air quality impact assessment (AQIA) for construction and operation of the proposed modification in accordance with the current guidelines. This will include:</p> <p>(c) dispersion modelling for operational impacts. This will compare existing motorway pollutant concentrations (2017 or 2018); do-nothing (two lane carriageway plus M12/M7 intersection) (year of opening and design year) and the cumulative do-something (motorway widening plus M12/M7 intersection) (year of opening and design year) scenarios.</p> <p>(d) qualitative cumulative impact assessment with the Elizabeth Drive project.</p>	<p>Section 7.18.4 to Section 7.18.5</p> <p>Appendix F (Air quality impact assessment)</p>
	<p>Non-Aboriginal heritage</p> <p>1. Identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of:</p> <p>(a) environmental heritage, as defined under the NSW <i>Heritage Act 1977</i></p> <p>(b) items listed on the National and World Heritage lists.</p>	<p>Section 7.18.4 to Section 7.18.5</p> <p>Appendix J (Non-Aboriginal heritage assessment report)</p>

7.18.2 Overview of cumulative impacts

Cumulative impacts have the potential to occur when one project interacts or overlaps with other project(s) and can potentially result in a larger combined effect (positive or negative) on the environment or local communities. Cumulative impacts may occur when projects are constructed or operated concurrently or consecutively.

The extent to which another project could interact with the construction and/ or operation of the proposed modification would depend on its location, scale and/ or timing of construction. Generally, cumulative impacts would be expected to occur where a project's construction is undertaken close to, and over a similar timescale to, construction activities for the proposed modification, or where consecutive construction occurs in the same area. Construction fatigue can occur when sensitive receivers (e.g. residents) experience construction impacts from multiple and/or sequential projects over a prolonged period with few or no breaks between construction activities.

Once the proposed modification is operational, other projects which interrelate may enhance the proposed modification to create cumulative beneficial or adverse impacts.

7.18.3 Method of assessment

Legislative and policy context

The cumulative impact assessment for the proposed modification has been prepared generally in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE, 2021).

Assessment steps

The assessment of cumulative impacts included the following steps, which are described further below:

1. Development and application of screening criteria to use in determining which projects should be included in the cumulative impact assessment
2. Identification of relevant projects that could contribute to cumulative impacts with the proposed modification, through review of the DPE 'Major Projects' website and local council websites, and application of the screening criteria
3. Assessment of the potential cumulative impacts of the proposed modification with the other projects screened in to the assessment. The assessment of cumulative impacts has been undertaken separately for each environmental issue and documented in the technical reports appended to this report and summarised in this chapter. The assessment assumes that the mitigation measures proposed as part of the proposed modification are implemented (refer to **Chapter 9** (Synthesis of the modification report and conclusion))
4. Identification of suitable mitigation measures to address the potential cumulative impacts identified.

Identification of relevant projects

Projects identified for consideration as part of the cumulative impact assessment included:

- Major transport infrastructure projects, including road projects and public transport projects
- Large-scale urban development projects and other infrastructure projects.

The following criteria were used to screen the projects initially identified:

- **Spatial relevance:** Where a project would overlap with or occur in close proximity to the proposed modification
- **Timing:** Where timing of a project would overlap with or occur consecutively to construction of the proposed modification (**Chapter 4** (Proposed modification) details the indicative construction programme, and timing for operation of the proposed modification)
- **Scale:** Where a project:
 - Is designated as state significant development or state significant infrastructure
 - Is classified as designated development and requires an Environmental Impact Statement

- Requires assessment under Division 5.1 of the NSW *Environmental Planning and Assessment Act 1979* and is likely to significantly affect the environment and require an Environmental Impact Statement
- Other major development (as identified through consultation with stakeholders and government agencies)
- **Status:** Where a project:
 - Has been approved but where construction has not commenced
 - Has commenced construction
 - Has recently been completed
 - Has sufficient publicly available information available to inform a cumulative impact assessment (such as timing of construction and operation and assessment of key issues or impacts).

All the above criteria need to be met for a project to be included in the cumulative impact assessment.

Projects included in the cumulative impact assessment

Analysis of the projects that met the screening criteria and were therefore included in the cumulative impact assessment is provided in Table 7-122 and shown on Figure 7-130. Projects include those recently approved and under construction; no further recently completed projects have been identified (noting also that older, previously completed projects are accounted for in the baseline data/information used for each assessment).

Depending on the potential key issue, the type of cumulative impact assessment may be quantitative (such as predictive through modelling), qualitative, or a combination of both. For most key issues, a high level qualitative assessment has been undertaken to identify potential cumulative impacts.

The Elizabeth Drive upgrade project was considered in the Air Quality cumulative assessment, as requested in the SEARs. However this project is not yet approved, and an environmental assessment of this project is also not yet available. It was therefore screened out.

Table 7-122 Projects considered in the cumulative impact assessment

Name and brief description of the project	Project status	Spatial relevance	Expected construction period (if available)	Approval pathway
The Sydney Zoo Modification: Construction of a new zoological facility with a total area of 16.5 ha, and modification to existing opening hours	Approved (June 2021)	Located 1 km east within the Western Sydney Parklands	N/A	State Significant Development (SSD)
Light Horse Interchange Business Hub Eastern Creek: Construction of a 165,000 m ² of gross floor area (GFA) business hub for general and light industrial, warehouse and distribution and ancillary offices	Approved (August 2020)	Located direct adjacent to the south-east of the interchange between the proposed modification and M4	Construction period between 2022 and 2023 (TBC)	SSD
Saint Peter and Paul Assyrian Primary School: Construction and operation of a new school for a maximum of 630 students from Kindergarten to Year 6	Approved (February 2021)	Located 460 m west at 17-19 Kosovich Place, Cecil Park, 2178	N/A	SSD
Gazorp Industrial Estate: Construction of a new industrial estate including 16 warehouse building envelopes, landscaping, and associated infrastructure	Approved (November 2019)	Located 490 m west at 813-913 Wallgrove Road, Horsley Park	Currently under construction	SSD Modification
M12 Motorway project: Dual carriage motorway proposed to directly connect the M7 Motorway with the Western Sydney Airport and The Northern Road. Includes an interchange with the Westlink M7.	Approved (April 2021). Early works commenced.	Intersects the proposed modification at the interchange between the Westlink M7 and Elizabeth Drive	Construction period between Q1 2022 and 2025. Operation by 2025	State Significant Infrastructure (SSI)
Mamre Road Upgrade: Upgrade of a 10 km section of Mamre Road between the M4 Motorway and Kerrs Road to support economic and residential growth in the area	Approved	Located approximately 7 km west	Construction period between 2022 and 2025	Road upgrade project / Review of Environmental Factors (REF)

Name and brief description of the project	Project status	Spatial relevance	Expected construction period (if available)	Approval pathway
<p>Sydney Metro – Western Sydney Airport: Construction and operation of a metro railway line around 23 kilometres in length between St Marys in the north and the Aerotropolis Core precinct in the south</p>	Approved	Located approximately 5 km west	Construction period between 2021 and 2026	SSI
<p>Western Sydney Airport: The construction of an airport to cater for ongoing growth in demand for air travel in the rapidly expanding Western Sydney Region</p>	Approved	Located approximately 9.7 km west	Currently under construction. Operation to begin in 2026	SSI
<p>The Northern Road Upgrade: Upgrade of 35 km of The Northern Road, a key north–south arterial link, as part of the Western Sydney Infrastructure Plan road investment program</p>	Approved	Located approximately 10 km west	Expected to be completed late 2021, before proposed modification work commences	SSI
<p>Horsley Drive Business Park: Modification of the existing business park to upgrade location and size of buildings and location and configuration of access</p>	Approved (August 2020)	Located 2 km east at the corner of Cowpasture Road and Trivet Street	Operation expected to commence in 2022/2023	SSD Modification
<p>Moorebank Intermodal Precinct West – Stage 2: The development of intermodal freight terminal facilities (IMT), linked to Port Botany, the interstate, and intrastate freight rail network</p>	Approved	Located approximately 3.7 km east on Moorebank Avenue	Construction commenced in April 2022	SSD
<p>Sydney International Speedway: Construction and operation of a new speedway (including a new clay-based racetrack) as a part of the Eastern Creek Motor Sports Precinct</p>	Approved (December 2020)	Located 1.2 km east of the M7 near Prospect Reservoir	Anticipated to be completed by September 2021	SSI

Name and brief description of the project	Project status	Spatial relevance	Expected construction period (if available)	Approval pathway
Elizabeth Drive Subdivision: Construction of a mixed-use subdivision (composed of 11 allotments and associated stormwater detention), including demolition of existing structures	Approved (June 2021)	Located approximately 270 m north west	N/A	SSD

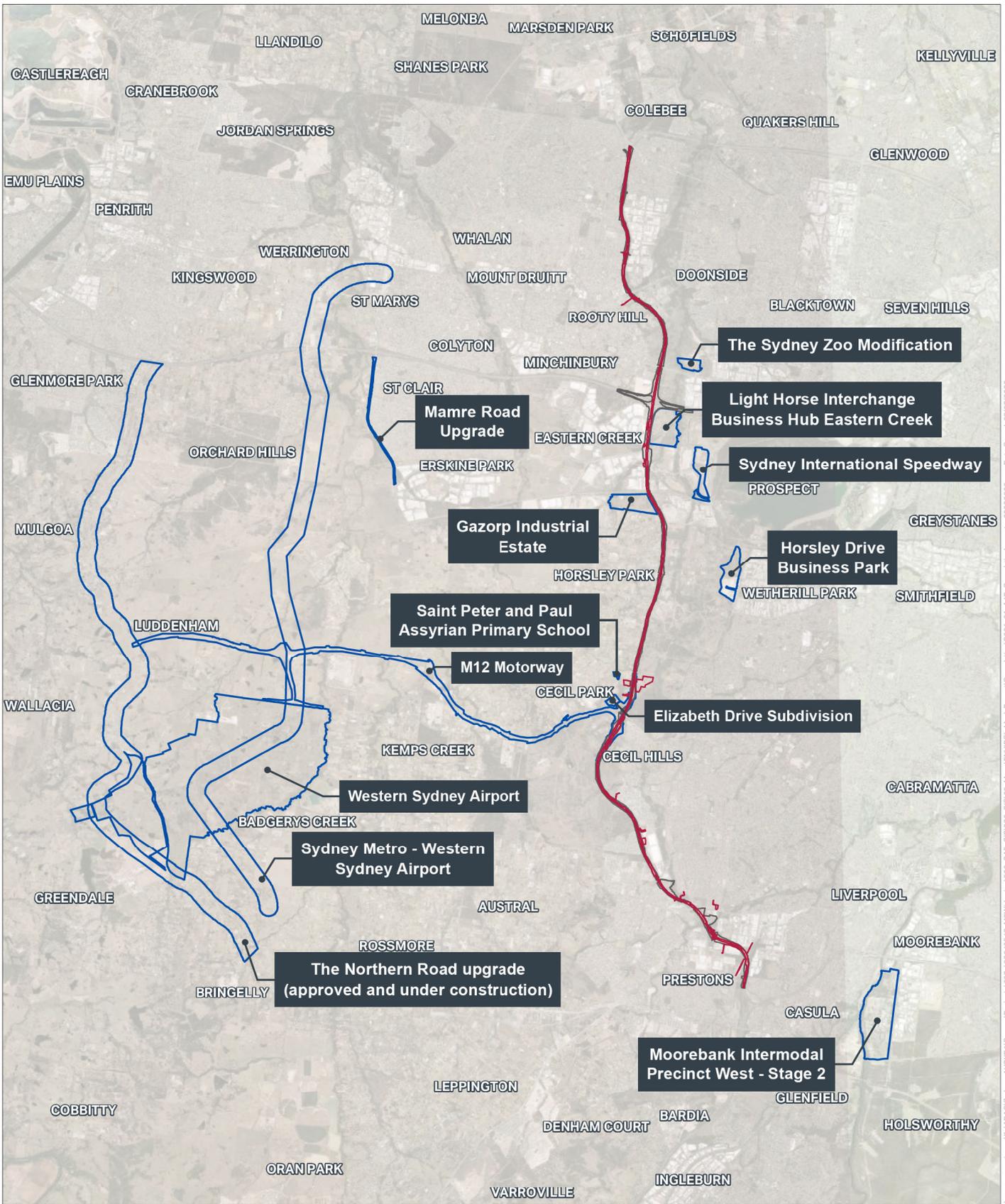


FIGURE 7-130: PROJECTS INCLUDED IN THE CUMULATIVE IMPACT ASSESSMENT



Legend

- Construction footprint
- Operational footprint (maintenance boundary)
- Project

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7.18.4 Construction impact assessment

Potential cumulative impacts during construction of the proposed modification are related to, but not limited to:

- Construction activities occurring in temporal and spatial proximity, resulting in increased noise, vibration and dust, and/ or construction fatigue associated with ongoing noise levels, and a decline in amenity
- Temporary road lane closures, detours, or changes to road speeds causing traffic disruption
- Construction vehicles present on the road at the same time, resulting in increased traffic volumes in the area, noise emissions and air pollution from vehicle exhausts
- Removal of the same type of vegetation communities and habitat within the region
- Increased throughput/ inundation at local waste management facilities.

These impacts are discussed in the following sections. Further details on the potential cumulative impacts during construction of the proposed modification are presented in the relevant technical appendices.

Traffic and transport

A cumulative traffic and transport impact assessment is provided in **Appendix D** (Traffic and transport assessment). During construction, impacts upon traffic and transport would be caused by temporary lane closures, diversions/ detours, reduced speed limits, and an increase in light and heavy construction vehicle movements on the road. Congestion on roads could be amplified where construction travel routes or detours between different projects conflict.

The concurrent construction of the M12 Motorway project is likely to cause cumulative traffic impacts. The potential number of heavy vehicles associated with the proposed modification and the M12 Motorway interchange works is presented in Table 7-123. If both works occurred simultaneously without coordination to minimise impacts, up to 910 heavy vehicles per day or up to 112 heavy vehicles per hour could be expected on the surrounding road network, distributed across Wallgrove Road and Elizabeth Drive. The cumulative impacts of these projects would likely include localised increased congestion, poor intersection performance and reduced travel times resulting from the combined construction traffic generation of these projects.

Table 7-123 Cumulative heavy vehicle volumes between the proposed modification and M12 Motorway interchange works at shared construction ancillary facilities

Shared ancillary facility	Daily heavy vehicle estimates			Work hour heavy vehicle estimates		
	Proposed modification	M12 Motorway ¹	Combined	Proposed modification	M12 Motorway ¹	Combined
AF8	50	100	150	2	10	12
AF17	120	160	280	20	16	36
AF18	120	120	240	20	12	32
Zone B (AF9)	120	120	240	20	12	32

¹ (Source: Transport for NSW, 2020)

² No light vehicle information currently available for the M12 Motorway project

³ No evening traffic generation information currently available for the M12 Motorway project

It is planned that the proposed modification would be undertaken concurrently with the interchange component of the M12 Motorway project, with a single contractor. This would provide significant advantages compared to delivering these works separately; for example, by sharing construction ancillary facilities, it would minimise the need for additional temporary land use, additional construction activities associated with establishing new facilities, and environmental impacts associated with these facilities. It would also allow construction planning and scheduling to take into account both projects and

minimise the combined traffic impacts of the M12 Motorway interchange and the proposed modification e.g. avoid conflicting requirements for access, traffic lane closures, and nightworks. The combined construction footprint of the M12 Motorway works and the proposed modification would also provide more construction flexibility and space during construction. The M12 Motorway interchange works also require extensive fill areas, potentially allowing material excavated from the proposed modification to be reused on the M12 Motorway project rather than exported off site for disposal or long term stockpiling (subject to further investigation, construction planning and approval). Incident response could also be more efficiently managed.

The timing of construction of other nearby projects (e.g. Elizabeth Drive Subdivision, Light Horse Interchange Business Hub and Gazcorp Industrial Estate) may overlap with the construction period of the proposed modification, which would likely result in cumulative impacts including localised increased congestion, poor intersection performance and reduced travel times resulting from the combined construction traffic generation of these projects. Transport would coordinate these construction activities to minimise the extent of localised cumulative impacts.

Other mitigation measures are presented in **Section 7.1** (Traffic and transport) and include measures to minimise cumulative impacts with other projects, such as avoiding conflicting requirements for access, traffic lane closures, and nightworks.

Noise and vibration

A cumulative noise impact assessment is provided in **Appendix E** (Noise and vibration assessment). It is possible that noisy construction activities for the proposed modification may occur at the same time as construction activities from other nearby projects, particularly those adjacent to the proposed modification, including the M12 Motorway project. In these cases, it is possible that the predicted noise levels for the proposed modification (described in **Section 7.2** (Noise and vibration)) may increase by up to 3 dB(A) (a discernible level); there is potential that this would increase the number of receivers where noise levels would be greater than 20 dB above the applicable Noise Management Levels (NMLs) (i.e. the noise level considered moderately intrusive and requiring additional management measures). There is also the potential for some sensitive receivers to experience construction fatigue where these receivers are exposed to noise from multiple projects sequentially, or over an extended period of time. Coordination between project proponents and relevant contractors on each project would be undertaken where relevant to avoid ongoing noise generation causing construction fatigue, and to confirm that mitigation measures such as respite periods are effective. It is proposed to undertake the M12 Motorway project and the proposed modification over similar timeframes and by the same contractor, which would facilitate the coordination of activities and mitigation measures between these two projects.

Construction road traffic noise and vibration would be generated by vehicles associated with construction of the proposed modification. As described in '*Traffic and transport*' above, there is potential for construction vehicles (including heavy and light vehicles) to be on the road network at the same time. Construction vehicles associated with the proposed modification alone will cause an increase of less than 1 dB(A) during the most affected hour in the day and up to 1 dB(A) during the most affected hour in the night. When considered in cumulation with other projects, this is likely to increase at a discernible level.

Construction of the proposed modification would require temporary lane closures on the Westlink M7 and traffic detours. These traffic detours would only occur at night-time to allow critical construction activities that cannot otherwise be practically carried out without road or lane closures. Additional traffic on the detour routes have potential to cause relative noise level increases along these routes of 2 dB(A) to 8 dB(A) in comparison with background levels (considered to be noticeable). When considered in cumulation with noise from any other projects, this is likely to increase at a discernible level.

The cumulative impact of noise and vibration would be managed by the contractor by the mitigation measures outlined in **Section 7.2** (Noise and vibration) to minimise potential adverse impacts at sensitive receivers. Consultation would be undertaken with other relevant projects to minimise potential cumulative impacts where feasible and reasonable.

Air quality

A cumulative air quality impact assessment is provided in **Appendix F** (Air quality impact assessment). There is potential for cumulative air quality impacts to occur where construction activities (such as demolition, earthworks, use of construction vehicles and equipment, and waste management) for the proposed modification occur in temporal and spatial proximity to that of another project. Based on receiver sensitivity, the risk of dust impacts from the proposed modification has been rated between low and high:

- Dust spoiling: Generally medium risks identified within 20 metres of the works, dropping to medium to low within 50 metres
- Human health: Some high risks identified within 20 metres of the works, with low risks identified within 350 metres
- Ecological receiver: Medium to low risks identified within 20 metres of the works, and low risks identified between 20 and 50 metres.

Whilst there is unlikely to be significant impacts on local air quality due to combustion and odour emissions from the proposed modification alone, these effects have potential to become substantial if construction works for the different projects occur in tandem.

Most projects are considered to be of such a scale or at such a distance from the proposed modification, that there would be little to no potential for cumulative air quality impacts. Due to its proximity to the proposed modification, there are potential cumulative impacts associated with combustion from construction vehicles and plant equipment as well as dust generating activities at the intersection with the M12 Motorway project.

Subject to the implementation of mitigation measures identified in **Section 7.3** (Air quality) of this report, the cumulative air quality impacts during construction of the proposed modification would be minimal.

Hydrology and flooding

A cumulative hydrology and flooding impact assessment is provided in **Appendix G** (Surface water and flooding assessment). With construction of different projects, including road upgrades and new development on greenfield land, there is potential for runoff volumes and runoff rates to increase due to increase in paved surfaces. In addition, construction works could include various earthworks which would change drainage and overflow paths.

Most projects are considered to be at such a distance from the proposed modification that there would be little to no potential for cumulative flooding impacts. The M12 Motorway project, Gazcorp Industrial Estate, Light Horse Interchange Business Hub, and Elizabeth Drive Subdivision have been approved with conditions of approval, including requirements to manage the impact of each project on the quality and quantity of stormwater runoff discharging to receiving drainage lines during construction. Therefore, it is considered that impacts associated with hydrology and flooding would be mitigated to an appropriate level for these projects.

Subject to the implementation of the mitigation measures identified in **Section 7.4** (Hydrology and flooding), any cumulative effects on hydrology and flooding during construction of the proposed modification would be minimal.

Surface water and groundwater

A cumulative surface water and ground water impact assessment is provided in **Appendix G** (Surface water and flooding assessment). Cumulative impacts on surface water and ground water have potential to be caused by multiple construction works being undertaken within the same catchment. Construction activities could cause erosion and mobilisation of sediments and associated nutrients, heavy metals, and toxicants into waterways, accidental spillages of pollutants into the waterbodies and the presence of contaminants in wash down water from plant and concrete slurries.

With the implementation of appropriate mitigation measures identified in **Section 7.5** (Surface water and groundwater), the potential impacts attributed to the proposed modification are considered to be minor and manageable, and therefore have a minimal potential for contributing to cumulative impacts with surrounding projects.

Biodiversity

The proposed modification would result in removal of 7.48 ha of modified vegetation within the construction footprint of the proposed modification which corresponds to six threatened ecological communities, as well as removal of 2.31 ha of foraging habitat for the Southern Myotis. Several of these TECs would also be impacted by the M12 Motorway project, as well as habitat for the Southern Myotis, resulting in an overall cumulative impact to these biodiversity values. Both projects would be subject to biodiversity offsets for these values which would assist in addressing these impacts.

There is potential for indirect impacts upon vegetation and individuals associated with dust, noise, contamination, and additional traffic, though this is considered unlikely with mitigation measures in place.

The proposed modification would also temporarily impact waterways from temporary crossings/platforms, realignments or diversions. Other similar impacts elsewhere in the catchment could contribute to an overall cumulative impact to the aquatic biodiversity in individual waterways. Mitigation measures detailed in **Section 7.6** (Biodiversity) will assist in avoiding and mitigating these impacts, which will also reduce the potential for cumulative impacts.

Aboriginal heritage

The proposed modification is not expected to impact on any Aboriginal heritage values (refer to **Section 7.7** (Aboriginal heritage)), as there are no identified Aboriginal heritage sites or places within the construction footprint. Therefore, there is also not expected to be any cumulative impacts to Aboriginal heritage.

Non-Aboriginal heritage

A cumulative non-Aboriginal heritage impact assessment is provided in **Appendix J** (Non-Aboriginal heritage assessment report). The proposed modification is not expected to result in any direct impacts to identified heritage items, with only potential indirect impacts to the heritage-listed Upper Canal System at Cecil Hills identified from vibration during construction. With the application of mitigation measures, this heritage item is not expected to be impacted, and therefore the proposed modification is also not expected to contribute to cumulative impacts.

Subject to the implementation of management measures identified in this chapter and in **Section 7.8** (Non-Aboriginal heritage), any cumulative impacts on non-Aboriginal heritage during construction of the proposed modification would be minimal.

Land use and property

Impacts to land use and property outside of the existing Westlink M7 operational footprint would result from the temporary establishment of construction ancillary facilities, construction access routes and haulage routes.

Cumulative impacts would occur in areas where multiple projects would require the use of private land in close proximity, potentially affecting access to surrounding land uses. Land required to be leased for construction ancillary facilities would only be required temporarily for construction. Due to the proximity of the proposed modification and the M12 Motorway project construction footprint, four parcels of land already approved as construction ancillary facilities for the M12 Motorway project will also be used for construction of the proposed modification, which will minimise temporary land take.

In areas where the proposed modification is located in close proximity to the M12 Motorway project and/or other projects, consultation will be undertaken with relevant utility providers, landowners, and the project proponent/s to confirm the potential utility adjustments/protection measures required, and account for this in construction planning.

Subject to the implementation of mitigation measures identified in this chapter and in **Section 7.9** (Land use and property), any cumulative impacts on land use and property during construction of the proposed modification would be minimal.

Landscape and visual

A cumulative landscape and visual impact assessment is provided in **Appendix K** (Urban design, landscape character and visual impact assessment). Any cumulative impacts would be caused by the construction activities of different projects occurring in tandem with one another, in proximity to visually sensitive receiver. The most visually prominent elements of the proposed modification includes clearing of vegetation and earthworks within the construction footprint (including under the bridges), the construction ancillary facilities and access tracks, construction equipment and activity (e.g. for widening the median and bridges) and construction of noise walls. These changes would be seen predominantly within the Westlink M7 road corridor, with views to most of the construction activity from surrounding areas screened by vegetation, existing noise walls, and batters on either side of the construction footprint.

Subject to the implementation of mitigation measures identified in this chapter and in **Section 7.10** (Landscape character, visual amenity and urban design), any cumulative impacts on landscape and visual receiver during construction of the proposed modification would be minimal.

Soils and contamination

A cumulative soils and contamination impact assessment is provided in **Appendix L** (Contamination assessment report). Potential cumulative impacts are related primarily to soil disturbance and management of existing contamination and the discharge of treated stormwater, construction wastewater and/or groundwater. The impact assessments found that:

- Contamination, including Polycyclic aromatic hydrocarbons (PAHs) and heavy metals, has been identified within the footprint of the M12 Motorway, but not within the region of the proposed modification
- Contamination, including bonded asbestos and heavy metals within stockpiled soil and subsurface soils, has been identified within the study area for the proposed modification and within the construction footprint of the Light Horse Interchange Business Hub
- The proposed modification, Light Horse Interchange Business Hub, Gazorp Industrial Estate, and the M12 Motorway are located in areas where the potential for soil erosion and salinity are considered to be moderate to high
- The projects listed in Table 7-122 are not expected to generate substantial land contamination during construction; however, they may encounter and disturb existing contamination from past land uses that would require further investigation, management, or remediation.

Impacts from the proposed modification and other major projects are expected to be managed with the implementation of mitigation measures for each project, and therefore any cumulative impacts are expected to be avoided or minor. Management measures to be implemented would be included in the Construction Environmental Management Plan (CEMP) and Soil and Water Management Plan (SWMP) for the proposed modification.

Social

A cumulative social impact assessment is provided in **Appendix M** (Social impact assessment). Potential cumulative socio-economic impacts during construction could include: safety risks arising from increased traffic; increased amenity impacts as a result of noise, visual change, and dust emissions; and health and wellbeing impacts from construction fatigue. Construction fatigue and indirect social impacts may be caused by the combined impacts of different projects (e.g. traffic impacts from one project and noise impacts from another), or from the concurrent or consecutive nature of disruptions in the area. Cumulative traffic and access impacts leading to delays in travel time or difficulties accessing public transport during construction could also lead to indirect social impacts such as anxiety and concern during the construction period.

The proposed construction timeframes for each project and its proximity would have a social impact on residents and businesses in Horsley Park, Cecil Hills, Eastern Creek and Badgerys Creek. Transport for NSW would seek to address construction fatigue through the following means:

- *Coordination of construction:* Communication between other project proponents, operators and/or contractors to understand specific project timeframes and to avoid concurrent or immediately consecutive construction activities in close proximity, where possible
- *Communication:* Clear and frequent communication with the community as required, coordinated with other projects to ensure that similar projects retain consistent messaging and complaint mechanisms.

Subject to the implementation of mitigation measures identified in this chapter and in **Section 7.12** (Social), any cumulative impacts on social receiver during construction of the proposed modification would be minimal.

Greenhouse gas and climate change

A cumulative greenhouse gas and climate change impact assessment is provided in **Appendix N** (Climate change risk and greenhouse gas assessment).

Construction of the proposed modification would produce greenhouse gases, in combination with those produced from construction of other projects, notably the M12 Motorway project. The Environmental Impact Statement (EIS) for the M12 Motorway project predicts a total of 271,607 tCO₂e emissions resulting from construction. The cumulative impact from construction of both the M12 Motorway project and the proposed modification is 402,308 tCO₂e. This is equivalent to 0.29 per cent of total NSW annual emissions in 2019.

Cumulative impacts related to climate change would be associated with an increase in extreme climate events and delays to construction programs, resulting in a cumulative increase in the duration of construction periods. For example, an extreme climate event may affect both the construction of the proposed modification and the M12 Motorway project, which are proposed to have overlapping construction timeframes over several years.

The mitigation measures described in **Section 7.18.6**, as well as **Section 7.14** (Climate change) and **Section 7.15** (Greenhouse gas), would minimise potential cumulative impacts.

Waste

The waste likely to be generated from construction of the proposed modification is described in **Section 7.16** (Waste), and includes excavated material/spoil, demolition waste, packaging materials, construction material waste, liquid waste, green waste, and general waste.

Cumulative waste impacts could occur if large volumes of waste are produced from the proposed modification in tandem with other projects in the area, causing an influx of waste at nearby waste management facilities that may not be able to process the waste effectively, or that may otherwise contribute to excessive landfill waste.

However, as per the mitigation measures outlined in **Section 7.16** (Waste), the proposed modification will adhere to a Construction Waste and Resource Management Plan (CWRMP) to reduce waste impact. As part of the CWRMP, waste management facilities would be identified and consulted with regards to waste management requirements of the proposed modification.

Concurrent construction of the proposed modification with the M12 Motorway project would result in opportunities for waste minimisation. For example, the interchange works for the M12 Motorway project requires extensive fill areas, which may allow material excavated from the proposed modification to be re-used rather than stockpiled long-term or disposed of. Opportunities for waste avoidance and re-use and co-management of resources between the two projects would be identified during detailed design, construction planning and construction.

Subject to the implementation of mitigation measures identified in this chapter and **Section 7.16** (Waste), any cumulative waste impacts with other projects are expected to be minimal.

Hazard and risk

Potential hazards and risks to the proposed modification or caused by the proposed modification during construction include contributing to public safety risk on surrounding roads, risk associated with storage, handling and transportation of dangerous goods and hazardous substances, and risk of being affected

by bushfire. These risks could be exacerbated due to the concurrent construction of other projects in close proximity, such as the M12 Motorway project.

Subject to the implementation of mitigation measures identified in **Section 7.17** (Hazard and risk), any cumulative impacts on hazards and risk during construction of the proposed modification would be minimal.

7.18.5 Operation impact assessment

Potential cumulative impacts during operation for the proposed modification are primarily related to:

- Improved traffic conditions, although slower vehicle speeds may be experienced at the northern and southern extents outside the proposed modification footprint
- Air quality/ greenhouse gas emissions (e.g. from vehicles)
- Beneficial social impacts associated with improved connectivity and access

These impacts are discussed below. Further details on the potential cumulative impacts during operation of the proposed modification are presented in the relevant technical appendices.

Traffic and transport

A cumulative traffic and transport impact assessment is provided in **Appendix D** (Traffic and transport assessment). Overall, operational impacts related to the proposed modification would be beneficial, but the increased traffic volumes along the Westlink M7 during operation of the proposed modification could result in slower vehicle speeds at the northern and southern extents outside the proposed widening areas. Links between the proposed modification and projects listed in Table 7-122 are generally expected to have increased capacity, though some intersections (such as those between the Westlink M7 and Horsley Drive) are expected to experience increased delays.

Mitigation measures presented in **Section 7.1** (Traffic and transport) include investigation into intersection improvements to cater for a combination of forecast traffic volumes associated with regional population and employment growth, and the proposed modification with other planned projects.

Noise and vibration

A cumulative noise impact assessment is provided in **Appendix E** (Noise and vibration assessment). Due to the existing noise levels along the Westlink M7 and the incorporation of measures that would be implemented to reduce noise levels (such as noise walls and at-property acoustic treatments), the noise impacts associated with the proposed modification are expected to be adequately mitigated. Therefore the proposed modification is not expected to contribute to cumulative noise impacts during operation.

Air quality

A cumulative air quality impact assessment is provided in **Appendix F** (Air quality impact assessment). Most of the projects assessed for cumulative impacts are located at a distance far enough away from the proposed modification that there will not be material difference in cumulative ground level concentrations. Larger traffic generating developments, including approved road upgrades which would influence future traffic numbers on the Westlink M7, such as the M12 Motorway project, have been accounted for within traffic growth factors assumptions for the 2026 and 2036 modelled scenarios used in the air quality assessment (refer to **Section 7.3** (Air quality) and **Appendix F** (Air quality impact assessment for results)).

Hydrology and flooding

A cumulative hydrology and flooding impact assessment is provided in **Appendix G** (Surface water and flooding assessment). During operation, the proposed modification will experience a similar risk of flooding to that of the existing Westlink M7, with only a minor increase in the risk of flooding in adjacent land.

Projects, such as Elizabeth Drive Subdivision, have proposed stormwater drainage infrastructure as part of their design to reduce the risk of flooding on their site and adjacent properties. This, in turn, will reduce the risk of cumulative flooding between the proposed modification and Elizabeth Drive Subdivision.

Subject to the implementation of mitigation measures identified in **Section 7.4** (Hydrology and flooding), any cumulative impacts on hydrology and flooding during operation of the proposed modification would also be minimal.

Surface water and groundwater

A cumulative surface water and ground water impact assessment is provided in **Appendix G** (Surface water and flooding assessment). Operation of the proposed modification has the potential to lead to an increase in the volume of runoff and quantity of contaminants from the motorway due to an increase in paved surfaces and increase in vehicle movements (and associated leaks and spills). This would be combined with the increased paved areas associated with the development of other projects in the same catchments.

Drainage infrastructure and pollution controls would be further investigated during detailed design to confirm that surface water runoff from the proposed modification can be adequately treated and controlled, including to meet applicable water quality objectives.

Subject to the implementation of mitigation measures identified in **Section 7.5** (Surface water and groundwater), any cumulative impacts on surface water and groundwater during operation of the proposed modification would be minimal.

Biodiversity

It is unlikely that the operation of the proposed modification would contribute to cumulative biodiversity impacts with other projects. Operation of the proposed modification is not expected to further impact on threatened ecological communities at risk of serious and irreversibly impacts (SAII), and the vegetation within the operational footprint is already subject to direct and indirect impacts from the existing Westlink M7 and associated maintenance activities. There is a low likelihood of impacts associated with shading, changes to shelter or exposure, changes in lighting and noise, deleterious hydrological changes, and weed invasion caused by the operation of the proposed modification; in combination with other projects in close proximity, such as the M12 Motorway project, the likelihood of these impacts may increase by a minor amount.

Subject to the implementation of mitigation measures identified in **Section 7.6** (Biodiversity), including continuation of existing Westlink M7 management plans, any cumulative effects on biodiversity during operation of the proposed modification would be minimal.

Landscape and visual

A cumulative landscape and visual impact assessment is provided in **Appendix K** (Urban Design, Landscape Character and Visual Impact Assessment). At operation, the largest overall change would be the widening of the Westlink M7 carriageways from four lanes to six lanes, a narrowing of the central median, and the vegetation cleared. These changes would be predominantly visually contained within the Westlink M7 corridor and would not be seen from the surrounding landscape; therefore, there is limited potential to interact with other plans and projects.

The design of the proposed modification has considered the interface with the approved M12 Motorway/Elizabeth Drive Interchange. In combination with the urban design plan, the proposed modification would have an overall beneficial visual impact on the landscape character of the local area.

Subject to the implementation of mitigation measures identified in **Section 7.10** (Landscape character, visual amenity and urban design), any cumulative impacts on landscape and visual receiver during operation of the proposed modification would be beneficial.

Social

A cumulative social impact assessment is provided in **Appendix M** (Socio-economic impact assessment report). The cumulative benefit of the proposed modification with other projects during operation is expected to result in a substantial net benefit for the community. Considered together with these other projects, the proposed modification would provide:

- Improved accessibility and connectivity within the social locality
- Improved access to employment areas
- An increase in economic activity, businesses, and employment opportunities

- In combination with the urban design plan, the proposed modification would have an overall beneficial visual effect on the local area.

Whilst the majority of operational impacts related to the proposed modification would be beneficial, the increased traffic volumes along the Westlink M7 could result in slower vehicle speeds at the northern and southern extents of the motorway outside the proposed widening areas. In addition, there is potential for increased vehicle emissions causing a decline in air quality and a visual change, caused by more paving in the area. These have been considered in the assessments for each of these issues.

Subject to the implementation of mitigation measures identified in **Section 7.12** (Social), any cumulative effects on social receiver during operation of the proposed modification would be beneficial.

Greenhouse gas and climate change

A cumulative greenhouse gas and climate change impact assessment is provided in **Appendix N** (Climate change risk and greenhouse gas assessment). The cumulative greenhouse gas impact from operation of both the M12 Motorway project and the proposed modification, excluding tailpipe emissions, is 21,021 tCO₂e per annum on average. This is equivalent to 0.02 per cent of total NSW annual emissions in 2019.

Cumulative impacts associated with climate change risk would primarily occur as a result of interdependencies between projects and the local environment. These impacts may occur where the introduction of the proposed modification and another project exacerbates climate change risks for receiving environments. For example:

- The proposed modification would interact with surrounding motorways and the local road network. Climate-related impacts, such as flooding on those roads, may impede accessibility to the Westlink M7 and could also lead to restrictions in traffic flow for the proposed modification. Key roads within the local road network including the M12 Motorway, Elizabeth Drive, the M4 Motorway, and the Great Western Highway may independently be disrupted by climate-related hazards which could lead to impacts on traffic flows for the widened Westlink M7.
- Introduction of additional infrastructure as part of the proposed modification, contributing to the 'urban heat island effect' and an increase in local average temperatures. This would have implications for the urban heat island profile of the study area, surrounding suburbs, and new residential growth corridors. Residential and economic growth is likely to increase traffic flows and in the event of an extreme weather event may heighten the safety risks for road users.

Adaptation measures identified in **Appendix N** (Climate change risk and greenhouse gas assessment) will improve the resilience of the proposed modification to climate change and reduce potential interdependencies and cumulative climate change risks. The implementation of adaptation measures for the proposed modification to address climate change risks provides opportunities to improve the resilience of the road network within the Sydney region as a whole.

Other issues

Based on the outcomes of the assessments undertaken in this modification report, operation of the proposed modification is not expected to contribute to cumulative impacts for the following issues, subject to the implementation of the mitigation measures identified in this chapter and in **Section 7.1** to **Section 7.17**:

- Aboriginal heritage
- Non-Aboriginal heritage
- Land use and property
- Soils and contamination
- Waste
- Hazard and risk.

7.18.6 Management and mitigation

Mitigation measures to address potential cumulative impacts are provided in Table 7-124.

Table 7-124 Cumulative impact mitigation measures

Impact	ID	Mitigation measure	Responsibility	Timing
Cumulative impacts during construction (e.g. traffic, noise, amenity)	Cu1	<p>Consultation will be undertaken with other project proponents, operators, and/ or contractors to understand construction programmes and ensure that conflicting requirements for access, traffic lane closures, high noise and vibration generating activities, and nightworks are avoided or minimised as much as reasonably practical, in order to prevent construction fatigue for local sensitive receivers.</p> <p>Communication with other project proponents, operators, and/ or contractors will be an undertaken throughout the construction phase.</p> <p>Any management measures to prevent construction fatigue will be captured in the Construction Environment Management Plan (CEMP). The CEMP will include specific environmental management plans, such as Construction Traffic and Access Management Plans (see Mitigation Measure T1) and Construction Noise and Vibration Management Plan (CNVMP) (see Mitigation Measure NV1).</p>	Transport for NSW Construction Contractor	Prior to construction Construction
Cumulative impacts during construction (e.g. traffic, noise, amenity)	Cu2	Clear communication would be undertaken with the community as required, which is coordinated with other projects so that similar projects retain consistent messaging and complaint mechanisms.	Transport for NSW Construction Contractor	Prior to construction Construction