



CBD AND SOUTH EAST LIGHT RAIL PROJECT ENVIRONMENTAL IMPACT STATEMENT

NOVEMBER 2013



VOLUME 1A - MAIN VOLUME Parts A to C







Transport for NSW

CBD AND SOUTH EAST LIGHT RAIL PROJECT **ENVIRONMENTAL IMPACT STATEMENT** - VOLUME 1A Main Volume, Parts A to C

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Declaration in accordance with Schedule 2, Part 3 of the Environmental Planning and Assessment Regulation 2000

Submission of Environmental Impact Statement prepared under Part 5.1 of the (NSW) *Environmental Planning and Assessment Act 1979*

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In respect of	Sydney CBD and South East Light Rail	Project Environmental Impact Statement
Applicant name:	Transport for NSW	
Applicant Address:	Level 5, Tower A, Zenith Centre 821 Pacific Highway Chatswood NSW 2067	
Proposed development:	Construction and operation of a new lig approximately 13 kilometres of new ligh Kingsford and Randwick via Surry Hills vehicle stabling and maintenance facilit zone on George Street in the Sydney C Full details of the proposed developme Environmental Impact Statement.	ght rail service in Sydney, including nt rail track from Circular Quay to Central, and Moore Park (including track for light rail ties). The proposal also includes a pedestrian IBD between Hunter and Bathurst streets. ent are included in chapters 5 and 6 of the
Land to be developed:	Generally along existing roadways. Readjacent areas. Please refer section 5.3	quires some acquisition of private land in of the Environmental Impact Statement.
Environmental Impact Statement:	An Environmental Impact Statement is the Director-General's Requirements da of the (NSW) Environmental Planning a legislation.	attached that assesses all matters specified in ated 5 August 2013, in accordance with Part 5.1 and Assessment Act 1979 and other relevant
Declaration:	I certify that I have prepared the conten- in accordance with Schedule 2 of the E Regulation 2000 and the Director-Gen- that, to the best of my knowledge the i Impact Statement is not false or mislea	nts of the Environmental Impact Statement invironmental Planning and Assessment erals Requirements dated 5 August 2013, and information contained in the Environmental iding.
Signatures:	Jun 1:	02/s
Name:	Hugh Swinbourne	Alex McDonald
Date:	11 November 2013	11 November 2013

Environmental Impact Statement prepared by:

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Noise and Vibration Impact Assessment

CBD AND SOUTH EAST LIGHT RAIL PROJECT ENVIRONMENTAL IMPACT STATEMENT

VOLUME 1A

GLOSSARY AND ABBREVIATIONS

Glossary and abbreviations

AARNET	Australia's Academic and Research Network
AAP	Area of archaeological potential
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AHIMS	Aboriginal Heritage Information Management System
ATC	Australian Turf Club
AFL	Australian Football League
ANZAC	Australian New Zealand Army Corp
ANZECC	Australian and New Zealand Environment and Conservation Council
APDG Site	Alfred, Pitt, Dalley and George Streets site
ARI	Average recurrence interval
ASS	Acid sulfate soils
BCR	Benefit-cost ratio
BDA	Barangaroo Development Authority
BITRE	Bureau of Infrastructure, Transport and Regional Economics
BRT	Bus rapid transit
BTS	Bureau of Transport Statistics
CAMBA	China Australia Migratory Bird Agreement
CBD	Central business district
CCTV	Closed circuit television
CEMP	Construction environmental management plan
CF ₄	Tetrafluoromethane
CH ₄	Methane
СМА	Catchment management authority
СО	Carbon monoxide
CO ₂	Carbon dioxide
CO ₂ -e	Carbon dioxide equivalent
CPTED	Crime Prevention Through Environmental Design
CSELR	CBD and South East Light Rail (the proposal)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSR	Combined services route
CSTTC	Central Sydney Traffic and Transport Committee
dB	Unit of measurement of Sound Pressure Level
dBA	A-weighted decibels
DBYD	Dial-before-you-dig
DC	Direct current
DCP	Development control plan
DDA	Disability Discrimination Act 1992
DEC	(NSW) Department of Environment and Conservation (now the Office of Environment and Heritage)
DECC	(NSW) Department of Climate Change (now the Office of Environment and Heritage)
DECCW	(NSW) Department of Climate Change and Water (now the Office of Environment and Heritage)

DEWHA	(Commonwealth) Department of the Environment Water Heritage and the Arts (now Department of Environment)
DGRs	Director General's requirements
DoS	Degree of saturation - ratio of demand flow to capacity
DP&I	NSW Department of Planning & Infrastructure
DSAPT	Disability Standards for Accessible Public Transport 2000
DSEWPaC	Department of Sustainability, Environment, Water, Populations and Communities (now Department of Environment)
EIS	Environmental Impact Statement
EMF	Electromagnetic field
EPA	NSW Environment Protection Authority
EP&A Act	NSW Environmental Planning & Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Act 1999
ESA	Environmental site assessment
ESBS	Eastern Suburbs Banksia Scrub
ESD	Ecologically sustainable development
ESR	Eastern suburbs rail
FM Act	Fisheries Management Act 1994
FSR	Floor space ratio
GPO	General Post Office, Martin Place, Sydney CBD
GSP	Gross state product
HAMU	Historical Archaeological Management Units
HFCs	hydrofluorocarbons
ICNG	Interim Construction Noise Guideline (DECC 2009)
INP	NSW Industrial Noise Policy (EPA 2000)
IPCC	Intergovernmental Panel on Climate Change
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
JAMBA	Japan Australia Migratory Bird Agreement
KG	kilogram
kL	kilolitre
KPIs	Key performance indicators
kWh	Kilowatt hour
LAeq	The 'energy average noise level' evaluated over a defined time period. The LAeq can be likened to a noise dose representing the cumulative effects of all the noise events occurring in the relevant time period.
L _{Amax}	The maximum noise level occurring during a noise event
L _{AE}	The Sound Exposure Level, which is used to indicate the total acoustic energy of an individual noise event. The sound exposure levels are applied in the calculation of LAeq noise levels from light rail operations.
	The subscript "A" indicates that the noise levels are filtered to match normal human hearing characteristics (i.e. A-weighted).
LED	Light-emitting diode
LEP	Local environmental plan
LGA	Local government area
LNG	Liquefied natural gas
LoS	Level of service – performance parameter used to describe the operation of an intersection



LPG	Liquefied petroleum gas
LRVs	Light rail vehicles
mAHD	Metres above Australian Height Datum
Master Plan	The NSW Long Term Transport Master Plan (December 2012)
MCA	Multi-criteria analysis or Museum of Contemporary Art
MyZone	Sydney's integrated transport zoning system
N ₂ O	Nitrous oxide
NBN	National Broadband Network
NCA	Noise catchment area
NE	North-east
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NES	Matters of national environmental significance
NIDA	National Institute of Dramatic Art
NO _x	Oxides of nitrogen
NO ₂	Nitrogen dioxide
NSW	New South Wales
NW	North-west
O ₃	ozone
OEH	NSW Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OHW	Overhead wiring
Opal card	Sydney integrated electronic ticketing system, currently in trial
PA	Public address
PAD	Potential archaeological deposit
PAH	Polycyclic aromatic hydrocarbon
PCBs	Polychlorinated biphenyls
PM _{2.5}	Particulate matter with a diameter less than 2.5 micrometres
PM ₁₀	Particulate matter with a diameter less than 10 micrometres
PoEO	(NSW) Protection of the Environment Operations Act 1997
PIDS	Passenger information display systems
PIR	Preferred Infrastructure Report
Porte cochere	A porch at the main or secondary entrance to a building where vehicles stop for passengers to depart or alight
PPP	Public private partnership
PTPM	Public Transport Project Model
PVC	Polyvinyl chloride
QVB	Queen Victoria Building
Randwick LEP	Randwick Local Environmental Plan 2012
RBL	Rating background level
REA	Rapid economic appraisal
RING	Rail Infrastructure Noise Guideline (EPA 2013)
RMS	NSW Roads and Maritime Services
RNP	NSW Road Noise Policy
ROKAMBA	Republic of Korea Australia Migratory Bird Agreement
ROL	Road occupancy licence

Round Table	The Sydney Light Rail Round Table. A forum of executive representatives from key stakeholders
SCATS	Sydney Coordinated Adaptive Traffic System
SCCAS	Sydney City Centre Access Strategy
SCG	Sydney Cricket Ground
SE	South-east
SEPP	State environmental planning policy
SEPP 55	State Environmental Planning Policy No. 55 - Remediation of Land
SF ₆	Sulfur hexafluoride
SFS	Sydney Football Stadium (also called Allianz Stadium)
SHFA	Sydney Harbour Foreshore Authority
SHR	State Heritage Register
SIA	Social impact assessment
SICEEP	Sydney International Convention, Exhibition and Entertainment Precinct
Skyglow	The illumination of the night sky or parts of it, typically as a result of artificial light
SO ₂	Sulfur dioxide
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2011
SREP SHC	Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005
SRZ	Structural root zone
SSI	State significant infrastructure
SULE	Safe useful life expectancy
Sydney LEP	Sydney Local Environmental Plan 2012
SW	South-west
tCO _{2-e}	Tonnes of carbon dioxide equivalent
TAFE	Technical and Further Education
ТМС	Traffic Management Centre
TPZ	Tree protection zone
Tree study area	The area that would be directly affected by the CSELR proposal for the purpose of the preliminary tree assessment in Technical Paper 9.
TSC Act	Threatened Species Conservation Act 1995
UAP	Urban Activation Precinct
UNSW	University of New South Wales
UTS	University of Technology, Sydney
VDV	Vibration dose value
VMS	Variable message signs
WHS	Work health and safety
YHA	Youth Hostel Australia

CBD AND SOUTH EAST LIGHT RAIL PROJECT ENVIRONMENTAL IMPACT STATEMENT

VOLUME 1A



Executive summary

The proposal

The Central Business District (CBD) and South East Light Rail Project ('the CSELR proposal' or 'the CSELR') comprises the construction and operation of a new light rail service in Sydney, including approximately 12 kilometres of new light rail track from Circular Quay to Central, Kingsford and Randwick via Surry Hills and Moore Park.

What are the key features of the proposal?

The key infrastructure elements of the CSELR are detailed on in Figure E.1. The proposal includes 20 light rail stops, a pedestrian zone on George Street (between Hunter and Bathurst streets), approximately 12 substations to provide power for the light rail vehicles (LRVs), an LRV stabling facility in Randwick and a maintenance depot in Rozelle. The CSELR requires a total of 13 kilometres of track including track required for proposed maintenance and stabling facilities. Key operational features of the proposal include:

- high frequency, 'turn up and go' services every two to three minutes during peak periods within the CBD; with services operating every five to six minutes between Moore Park and the Randwick and Kingsford branches
- additional special event services between Central Railway Station and the Moore Park and Royal Randwick racecourse stops
- interchange with heavy rail at major rail stations (Circular Quay, Wynyard, Town Hall and Central), ferry interchange at Circular Quay, and bus interchanges at the Town Hall, Queen Victoria Building, Rawson Place, Central Station, Randwick and Kingsford stops
- a fleet of 30 electric-powered LRVs (including spare LRVs), approximately 45 metres long, featuring air conditioning and accessible low-floor design
- a highly reliable service with the capability to carry up to 9,000 passengers per hour in each direction
- capacity for approximately 80 seated and 220 standing passengers in each LRV
- public domain improvements including concepts for paving, street trees, lighting and furniture.

The proposal also includes changes to property and utilities access, and traffic management changes as a result of the CSELR and within the direct corridor of the proposal.

The proposal is also integrated with, but does not include, a redesign of the Sydney bus network, which is proposed as part of a suite of projects under the (draft) *Sydney City Centre Access Strategy* (NSW Government 2013a).

Transport for NSW is the proponent for the CSELR, and will deliver the planning and concept design phases of the proposal, and the early works. The detailed design, construction, maintenance and operation of the proposal would most likely be delivered through a public private partnership (PPP) arrangement. It is anticipated that it would take approximately five to six years to build the CSELR, with work beginning at multiple sites from mid-2014 (subject to planning approval).



Figure E.1 CSELR proposal - key infrastructure elements

Why is the proposal needed?

The CSELR would transform the transport system within inner Sydney and provide a step change in transport capability, reliability and capacity. The CSELR proposal is designed to address three key challenges facing the Sydney CBD and inner south-eastern suburbs, as summarised below and in Figure E.2:

- Customer travel experience is currently degraded by unreliable journey times and a confusing bus network — In response the CSELR would improve the reliability of travel and provide an efficient connection between the CBD and major trip generators in the south-eastern suburbs such as the Moore Park sports and entertainment complex, Royal Randwick racecourse, the University of NSW (UNSW) and the Randwick health precinct. Light rail stops are proposed at Moore Park, Royal Randwick racecourse, UNSW, and adjacent to the Prince of Wales and Sydney Children's hospitals.
- Congestion is reducing Sydney's productivity and urban amenity which has created transport congestion, unreliability, significant economic and social impacts and a degraded environment (particularly along the George Street corridor). In response the CSELR would free up road capacity, transferring CBD trips from existing buses and private vehicles onto the light rail and along the proposed George Street pedestrian zone. In tandem with other Sydney bus network changes as part of the Sydney City Centre Access Strategy (SCCAS), the CSELR proposal would lead to approximately 220 fewer bus trips during the morning peak periods within the CBD.
- The transport system does not have the capacity to support growth In response the CSELR would support future economic growth by improving public transport capacity, quality and reliability.

Figure E.2 Problem, objectives and benefits alignment



As well as meeting the challenges discussed above, the CSELR proposal is expected to lead to a number of significant benefits for users, the community and the wider economy. As well as meeting the challenges discussed above, the CSELR proposal is expected to lead to a number of significant benefits for users, the community and the wider economy. The total economic benefits arising from the CSELR proposal are estimated to be \$4 billion, including customer, operating, community and wider economic benefits. The anticipated benefits of the proposal are described in detail in Chapter 3 of this Environmental Impact Statement (EIS). The anticipated benefits of the proposal are described in detail in Chapter 3 of this Environmental Impact Statement (EIS).

The planning, design and decision-making process

How was the proposal developed?

The development of the CSELR proposal has been an iterative process that has taken into account issues arising from community and stakeholder involvement and the environmental investigations undertaken as part of the preparation of the EIS. The proposal was developed as part of a comprehensive options identification and assessment process in three key stages (refer Figure E.3 below). This process involved developing and assessing the feasibility of alternative options to deliver the necessary transport system capacity within inner Sydney and the CBD.

The planning and design process is ongoing and the proposal may be subject to further refinement as a result of submissions received in response to the public exhibition of this EIS and further consultation during detailed design (should project approval be granted).

Figure E.3 CSELR options assessment process



What is the planning approval process?

The CSELR proposal was declared a critical 'State significant infrastructure' project by the NSW Minister for Planning and Infrastructure on 20 May 2013. Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes an assessment and approval regime for 'State significant infrastructure' (SSI). Under Part 5.1 of the EP&A Act, the planning and approvals process includes the following key steps:

- Submission of an SSI application with an accompanying supporting document to the Director-General of the NSW Department of Planning and Infrastructure (DP&I) to seek Director-General's requirements (DGRs) for the proposal — An SSI application was submitted to the Director-General of DP&I on 25 June 2013.
- Preparation and submission of an EIS (this report), addressing the matters outlined in the DGRs

 The Director-General of DP&I issued the DGRs for the CSELR proposal on 5 August 2013 (refer to Appendix A).
- 3. Public exhibition of the EIS for a minimum of 30 days. During the exhibition period, government agencies, interested groups and the community will be invited to make written submissions to the DP&I on the CSELR proposal.
- 4. Preparation of a submissions report and if required, a preferred infrastructure report, to address community and stakeholder comments and any potential design changes.
- 5. Assessment of the application by the DP&I and preparation of the Director-General's environmental assessment report.
- 6. Determination by the Minister for Planning and Infrastructure, including if approved, any conditions of approval.

Approval from the Minister for Planning and Infrastructure is required before Transport for NSW can proceed with the CSELR proposal.

How have the community and stakeholders been involved?

Consultation with stakeholders and the community has occurred progressively through the development of the CSELR proposal and has been supported by a public information campaign. Place managers have been appointed to act as the 'face' of the proposal in the communities along the proposed route. The consultation strategy has been designed to inform the community and key stakeholders about the proposal and encourage participation to allow the development of the CSELR to benefit from stakeholder knowledge and understanding of specific needs. Consultation activities will continue as the project progresses to detailed design and construction.

The Environmental Impact Statement (EIS)

What is the purpose of the EIS?

This EIS has been prepared to assess and document the potential environmental impacts of the construction and operation of the CSELR proposal. It also documents the key features of the proposal, including the likely construction method and operation. The CSELR proposal would be constructed and operated in accordance with the mitigation measures proposed in this EIS and any submissions report or preferred infrastructure report, and the Minister's conditions of approval.

The EIS has been prepared in accordance with the DGRs for the proposal, which incorporate the requirements of Part 3 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (refer Appendix A).

How were the impacts assessed?

The EIS was prepared through community and stakeholder consultation and detailed specialist assessment of key environmental issues, including surveys, data analysis and predictive modelling where appropriate. The EIS process included a detailed environmental risk analysis to scope the level of assessment required, identify key risks and confirm those issues that require the most focus in terms of management and mitigation.

This main EIS (Volumes 1A and 1B, with appendices in 1B) takes a regional and local (or precinctbased) approach to assessment of potential environmental impacts. Regional impacts include regional planning, transport and socio-economic issues, and are described in Chapter 9 of Volume 1A. Local impacts are described in individual chapters for the various precincts/localities through which the CSELR would pass (refer Chapters 12-17 in Volume 1B). This approach was taken in recognition of the relatively distinctive character of the local precincts, and to make it easier and clearer for the local communities to determine how they might be affected by the proposal.

What are the key findings of the EIS?

Key regional and local impacts (positive and negative impacts) during operation and construction of the CSELR proposal are summarised in the following tables.

How would the impacts be managed?

A large suite of management and mitigation measures is proposed to be implemented to reduce the potential adverse impacts of the proposal (refer Chapter 18 and Appendix I of the EIS). These measures would be incorporated into the construction environmental management plan (CEMP) and sub-plans for the proposal and subsequently (if necessary), the future operator's environmental management system.

ISSUE	IMPACTS DURING OPERATION - POSITIVE (+VE) AND NEGATIVE (-VE)	IMPACTS DURING CONSTRUCTION - POSITIVE (+VE) AND NEGATIVE (-VE)
Regional traffic, transport and access (Note: Local impacts such as parking and access are described in the next table)	• <i>Transport and access benefits (+ve):</i> Substantial regional transport benefits, including a notable increase in public transport carrying capacity and reliability along the CSELR corridor, and pedestrian capacity in the George Street pedestrian zone. Significantly enhanced access to major event precincts and community/education facilities within the corridor such as Moore Park, Royal Randwick racecourse and UNSW, leading to an increased public transport mode share and reduced congestion around these facilities.	 Road network performance (-ve): Road network is expected to function satisfactorily during the morning peak period; however, the afternoon peak period conditions may present problems for the CBD. In particular, the afternoon peak period forecasts indicate that implementation of adequate management measures would be critical to ensure priority bus corridors are protected against increased levels of congestion. In the South East corridor, challenges would relate to maintaining acceptable operations on Anzac Parade and Alison Road during construction.
	 Traffic and access changes in tandem with the SCCAS and redesign of the South East bus network (+ve and -ve): Significant adjustments to the road hierarchy, traffic operating patterns and uses in the CBD, and along the key regional corridors of Anzac Parade and Alison Road. Consolidation of right-turn movements along the CSELR corridor. South East bus network changes would not be implemented until after the CSELR is operating. 	 Road network changes during construction (+ve and -ve): Functional changes to the road network proposed for the operational phase of the CSELR proposal would be implemented during construction, where appropriate and compatible with construction requirements.
	 Road network performance (+ve and -ve): Displacement of existing traffic from the light rail corridor is not predicted to significantly impact the performance and functionality of the wider network, and would reduce the level of traffic growth forecast without the CSELR, due to a shift to public transport. Predicted four per cent improvement in general travel speeds in the wider CBD and South East road network in the afternoon peak. Very minor reduction in travel speeds or general traffic in the morning peak (from CSELR only), and a significant improvement in bus speeds on the 	 Buses (+ve and -ve): Redesign of the city centre bus network would be implemented prior to construction of the CSELR. The redesign would improve reliability of bus travel times and in some cases, improve bus speeds. Some diversions of the new routes would be required in the CBD during construction. Impacts on the amended network would be managed through a mixture of local route diversions and construction staging.

network in conjunction with wider bus network changes resulting from the

redesign of the city centre bus network.

from the George Street corridor. Increases in intersection delays predicted in the alternative north-south corridors such as College, Elizabeth and York streets. Potential increases in east-west traffic movements.

Intersection performance (+ve and -ve): Intersection delays predicted to shift to the southern section of the CBD (with some exceptions) and away

Key regional impacts and benefits of the CSELR



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ISSUE	IMPACTS DURING OPERATION - POSITIVE (+VE) AND NEGATIVE (-VE)	IMPACTS DURING CONSTRUCTION - POSITIVE (+VE) AND NEGATIVE (-VE)
Regional land use and community outcomes	 Regional planning and land use implications (mainly +ve): Planning and land use changes could occur to take advantage of predicted improvements in amenity and/or accessibility, and/or changes to planning and land use controls by local councils where factors like improved access have the potential to create pressure for development. Pressure for development is likely to be focused around stops, the George Street pedestrian zone, retail strips along Anzac Parade, and the retail/medical precinct in High Street and Belmore Road (including supporting the development of the proposed Randwick Urban Activation Precinct). 	 Impacts on community values (-ve): Some disruption expected to amenity, character, human health and well-being, access to community facilities and public spaces, and urban connectivity during construction.
	 Impacts on community values (+ve): Significant benefits expected in relation to amenity, character and human health/well-being, enhanced regional access to public spaces and community facilities, enhanced urban connectivity, and improvements to social sustainability and communities by linking communities across the CBD and South East suburbs. 	
Regional economic development	 Macro-economic benefits (+ve): Including providing support for the anticipated growth across the CBD and South East suburbs; reducing the economic costs of road congestion, which would also improve the attraction of Sydney as a place to invest in and operate businesses; likely increases in land values along the alignment (benefits for owners); enhanced workforce accessibility; and generation of over 200 permanent jobs per annum with flow-on benefits for the wider economy (including supporting the development of the proposed Randwick Urban Activation Precinct). 	 Macro-economic benefits (4ve): Creation of approximately 4,500 direct jobs between 2014 and 2020, and approximately 6,100 indirect (offsite) jobs.
	 Other economic benefits (+ve): Including (in some locations) improved customer access and enhanced passing trade; stimulation and support of capacity and floor space density increases and activities close to the CSELR; increases in commercial rents (benefits for property owners); and benefits for business viability. 	 Other economic benefits (+ve): Including (in some locations) increase in passing trade, especially for businesses at pedestrian crossing points; trade increases for businesses close to construction sites that sell goods to construction workers; and significant growth in demand for construction- related businesses.
	 Adverse economic impacts (-ve): Including (in some locations) impacts on access, and delivery and servicing constraints; and some impacts on passing trade due to restrictions in parking and access. 	 Adverse economic impacts (-ve): Including (in some locations) disruptions to deliveries, distribution and customer access; reduced trade due to amenity impacts, especially for outdoor dining areas; reduced passing trade due to changes in vehicle and pedestrian flows; travel time impacts on workplace productivity and vehicle operating costs; and utility shutdowns.

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ISSUE	IMPACTS DURING OPERATION – POSITIVE (+VE) AND NEGATIVE (-VE)	IMPACTS DURING CONSTRUCTION – POSITIVE (+VE) AND NEGATIVE (-VE)
Local traffic, transport and access (Note: Regional	• Transport and access benefits (+ve): Many of the regional transport/ access benefits would also be felt locally, such as improved transport and pedestrian capacity in the City Centre Precinct.	 Disruption to pedestrians/cyclists (-ve): Diversions of pedestrian and cyclist routes and restrictions in pedestrian crossings in some locations to allow for safe construction.
in previous table).	 Permanent removal of parking spaces along the CSELR alignment (-ve): Permanent removal of a significant number of on-street parking spaces is required to allow space for the CSELR. Changes to private property access (-ve): Access to private property would be maintained; however, some access arrangements would be changed, including 'no entry' controls to the George Street pedestrian zone (other than emergency and service vehicles), and limiting access to left-in left-out arrangements at other locations along the alignment. Disruptions to special events within the CBD (-ve): Potential need to relocate/reroute some special events that typically utilise George Street and Circular Quay - to be further assessed and managed in consultation with the City of Sydney, Sydney Harbour Foreshore Authority and other stakeholders. 	 Changes to property access (-ve): Impacts similar to operational impacts. Disruptions to existing bus services within the south-eastern suburbs (ve): Some diversions of routes required. Potential minor increase in travel times and distances for some bus services. Disruptions to emergency access (-ve): Access would be maintained within all precincts. No significant disruptions anticipated with the application of adequate traffic management measures. Disruptions to special events at Moore Park and Royal Randwick racecourse (-ve): Temporary relocation of possenger set-down and pick-up areas for special event buses. Construction footprint to be configured so as to avoid impacts to special event within the CBD (-ve): Impacts similar to operational impacts. Disruptions (-ve): Some diversions necessary; however, existing pedestrian movements parallel to the CSELR alignment would also be maintained along footpaths for most construction works. Movements crossing the light rail route would be maintained at existing pedestrian costing facilities. Cyclists (-ve): Some diversions necessary; however, existing pedestrian would be maintained at existing cycle routes would be occupied by construction worksites (e.g. Devonshire, Wansey Road and Alison Road), with proposed diversions identified in the EIS. Emergency vehicles (-ve): Some diversion of emergency vehicle access routes likely during short periods of major construction and loading/unloading activities.
Local property and land use impacts	 Permanent impacts on land use and property (-ve): Permanent loss of some recreation and open space land uses (e.g. for substation and stop locations in parks, such as Moore Park, Ward Park, High Cross Park). Some permanent impacts on private properties, including in Surry Hills (between Bourke Street and South Dowling Street), Moore Park (land owned by the Centennial and Moore Park Trust) and at Royal Randwick racecourse. Private property to be acquired in accordance with the <i>Land Acquisition (Just Terms Compensation) Act 1991.</i> Revitalisation of the public domain and creation of open space (+ve): Potential to create open space area within/adjacent to the existing Olivia Gardens apartment complex in Surry Hills. Opportunities to revitalise the public domain in areas such as Such as George Street, Circular Quay, Devonshire Street, Wimbo Park and Ward Park 	 Temporary impacts on land use and property: Some temporary disruption to land uses affected by the construction footprint, such as open space and recreation uses in parks (e.g. Moore Park, Belmore Park, Prince Alfred Park, Ward Park, High Cross Park and Robertson Road sportsfields).

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ISSUE	IMPACTS DURING OPERATION – POSITIVE (+VE) AND NEGATIVE (-VE)	IMPACTS DURING CONSTRUCTION - POSITIVE (+VE) AND NEGATIVE (-VE)
Noise and vibration impacts	 <i>Airborne noise impacts from LRV passbys (-ve and +ve)</i>: Minor noise guideline exceedances predicted along Devonshire Street, Surry Hills (with mitigation) and at some locations in the City Centre, Kensington/Kingsford and Randwick precincts. Reduction in background noise predicted at a number of locations such as within the Sydney CBD. Noise impacts from stabling and maintenance facility operations (-ve): With proposed mitigation, noise levels are predicted to comply with applicable criteria. Operational noise from substations (-ve): Noise expected to comply with applicable criteria. Operational noise from substations (-ve): Noise expected to comply with applicable criteria. Operational noise from LRV passbys (-ve): Potential impacts at a small number of particularly sensitive locations along the route (subject to further assessment during detailed design). Operational road traffic noise impacts (-ve and +ve): Changes in road traffic flows predicted to cause potential increase in noise levels at some locations in the CBD in the morning and evening peak traffic times (up to 3.9 dB). Receptors affected are mixed use but mainly commercial or office spaces. Operational noise (+ve): Removal of traffic along George Street between Hunter Street and Bathurst Street would reduce noise impacts from existing traffic within this area. Other areas would also experience a benefit from reduced car and bus levels. 	 Construction airborne noise impacts (-ve): Exceedances of adopted noise management levels expected for short periods at the closest sensitive receptors in all precincts, particularly during road pavement, demolition, rock breaking and night works. Construction groundborne noise impacts (-ve): Generally less prominent than airborne noise impacts (-ve): Generally less prominent than breaking works. Construction studies along the alignment may also be affected during rock breaking works. Construction road traffic noise impacts (-ve): Noise levels not expected to exceed guidelines in daytime. Possible exceedances at night if night-time truck movements required. Construction vibration impacts (-ve): Expected to be below cosmetic damage criterion with implementation of proposed vibration monitoring. Potential for ground vibration levels to exceed human comfort criteria for short durations at some locations.
Impacts on planted trees	 Benefits (+ve): Potential opportunities to enhance tree planting in many areas (such as along George Street, Devonshire Street and Wimbo Park) through implementation of a landscape strategy for the proposed CSELR corridor. Removal of planted trees along the CSELR route (-ve): Construction impacts (refer right) would also be permanent impacts, where not able to be mitigated. 	 Removal of planted street trees along the CSELR route (-ve): A large number of planted trees would be removed along and adjacent to the proposed CSELR route, including a number of significant trees along Anzac Parade, Alison Road and Wansey Road. The most significant impacts are predicted within the Randwick, Moore Park and Surry Hills precincts (particularly along Alison Road, Wansey Road and Devonshire Street, as well as within High Cross Park). Where the loss of trees is unable to be mitigated, trees would be replaced at a ratio of between 2:1 and 8:1, depending on the size of the tree affected.
Visual and landscape character impacts	 Visual and landscape benefits (+ve): Substantial improvements anticipated in areas such as the George Street pedestrian zone, the plaza on Alfred Street (Circular Quay), and the potential new open space within/adjacent to the existing Olivia Gardens apartment complex. Visual and landscape impacts (-ve): Impacts anticipated in some areas due to tree removal and introduction of infrastructure such as catenary overhead wiring. The most affected areas include Elizabeth Street Gardens (at the corner of Elizabeth and Foveaux streets), George Street (view north of World Square), Devonshire Street (removal of street trees), Moore Park (removal of fig trees), Royal Randwick racecourse (Alison and Wansey Roads), High Cross Park and parts of Anzac Parade. Some night-time visual impacts associated with lights from the LRVs themselves, and lighting at stops, Randwick stabling facility and the Rozelle maintenance depot. 	 Visual and landscape impacts (-ve): Temporary impacts anticipated at construction worksites, particularly at First Fleet Park, Martin Place and Belmore Park. Also impacts from construction hoardings and light spill from construction vehicles and plant.

	IVE (+VE) AND IMPACTS DURING CONSTRUCTION - POSITIVE (+VE) AND NEGATIVE (-VE)	 mpact to and permanent <i>Impacts on listed heritage items (-ve):</i> Disturbance to and temporary changes grown of various heritage items and heritage items and heritage items in the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting, context and appreciation of various heritage items and heritage to the setting first. Fleet Park (Circular Quay) and Moore Park. <i>Impacts on areas of potential archaeological significance (-ve):</i> Disturbance to and temporary impacts predicted at some locations along the alignment. Potential impacts predicted in the City Centre Precinct (e.g. First Fleet Park, Town Hall), and at High Cross <i>ignificance (-ve):</i> Impacts into the would be <i>ignificance (-ve):</i> Impacts into the city Centre Precinct and Tay Reserve (Kensington/Kingsford Precinct). 	 <i>Local social impacts predicted during</i> <i>Local social impacts (-ve):</i> Significantly adverse social impacts predicted during City Centre, Moore Park, and Kensington/Kingsford precincts due to construction impacts such as noise, dust, potential loss of business trade and increased traffic and access impacts and Kensington/Kingsford Precinct. Additionally, adverse economic impacts such as noise, dust, potential loss of business trade and increased traffic and access impacts in pacts in pacts in pacts such as noise, dust, potential loss of business trade and increased traffic and access impacts and kensington/Kingsford Precinct. Additionally, adverse economic impacts in predicted in relation to loss of street car parking during construction in the Kensington/Kingsford Precinct. Additionally, adverse economic impacts areas impacts in pacts at High Cross community and cultural workerse impacts in Alison <i>Local economic impacts (-ve)</i>: Significantly adverse economic impacts in pacts in pacts in pacts in pacts in pacts at high Cross community and cultural workerse impacts in pacts at high Cross contraction.
penefits of the CSELR cont.	IMPACTS DURING OPERATION - POSITI NEGATIVE (-VE)	 Impacts on listed heritage items (-ve): Direct in changes to the setting context and appreciatic and heritage conservation areas along the alig impacts predicted at the Palace Hotel complex impacts predicted at the Palace Hotel complex Devonshire Street significant trees, the Racecourse Conservation Area, Royal Randwick racecourse Cross Reserve and significant trees (Randwick and UNSW significant trees (Kensington/King, and UNSW significant trees (Kensington/King, would occur during construction (refer right constructio	 Local social benefits (+ve): Significantly positivin some areas, including in some parts of the C Randwick and Kensington/Kingsford precincts accessibility to local shops and services, in addrisibility and accessibility along the George Structures impacts from the Kingsford stop, local amenity and Wansey roads, and community and culture Park. Local economic benefits (+ve): Significantly popredicted in some areas, including in the City C Randwick precincts. Local economic impacts (-ve): No significantly post predicted in some areas, including in the City C Randwick precincts. Local economic impacts (-ve): No significantly poter and wick precincts. Local economic impacts (-ve): No significantly curing operation due to improved accessibly not bredicted in the Kensington/Kingsford precinction car parking.
Key local impacts and b	ISSUE	Built and non- Indigenous heritage impacts	Socio-economic impacts

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Key local impacts and benefits of the CSELR cont.

ISSUE	IMPACTS DURING OPERATION – POSITIVE (+VE) AND NEGATIVE (-VE)	IMPACTS DURING CONSTRUCTION - POSITIVE (+VE) AND NEGATIVE (-VE)
Cumulative impacts	 Cumulative benefits associated with simultaneous operation of CSELR and other major proposed developments along the alignment (+ve): Most major developments would be integrated with the CSELR and mutually beneficial in regard to transport, access and amenity. Cumulative impacts associated with simultaneous operation of CSELR and other major proposed developments along the alignment (-ve): Potential cumulative impacts (land use change, noise and visual impacts) expected in tandem with the wider redesign of the Sydney bus network around those light rail stops with bus interchange facilities. Potential cumulative inpacts at the Rozelle maintenance depot locality with the linner West Light Rail Extension project. Potential traffic and associated amenity impacts on CBD streets along which buses and road traffic are proposed to be diverted as part of the SCCAS and the CSELR. 	 Cumulative impacts associated with simultaneous construction of CSELR and other major proposed developments along the alignment (-ve): Potential impacts predicted where adjacent projects are likely to overlap in timing. Most potential for impacts in the City Centre and Randwick precincts due to concentration of major projects there.
Surface water hydrology/drainage	• Local stormwater flooding and drainage impacts (-ve): Not considered likely to be significant overall, but may result in localised adverse impacts in existing problem areas such as George Street (near King Street), Hay Street and Anzac Parade/Alison Road. Proposal would be designed with the objective of not worsening existing stormwater drainage issues.	 Local stormwater flooding and drainage impacts, increased risk of contamination (-ve): Not considered to have potentially significant impacts - recognising proposed application of design, and construction management and mitigation measures.
Other environmental issues	 Assessed in EIS (refer Chapter 10) including issues such as Aboriginal heritage, biodiversity, air quality, utilities, contamination, and greenhouse gases; however, not considered to have potentially significant impacts - recognising proposed application of design, and operational management and mitigation measures. 	 Assessed in EIS (refer Chapter 10); however, not considered to have potentially significant impacts - recognising proposed application of construction management and mitigation measures.

Justification and conclusions

There is strong justification for the CSELR proposal in relation to its need, the anticipated benefits and costs/impacts, the objectives of the EP&A Act and matters of ecologically sustainable development (refer Chapter 19 of the EIS).

Provided the measures and commitments specified in the EIS are applied and effectively implemented during the design, construction and operational phases, the identified environmental impacts are considered to be acceptable and manageable.

How to make a submission on the CSELR proposal

The EIS will be placed on public exhibition by DP&I. During the exhibition period, government agencies, interested groups and the community will be invited to make written submissions to the DP&I on the CSELR proposal. Further community consultation will be undertaken by Transport for NSW during the exhibition period to enable the community to comment and Transport for NSW to answer questions about the proposal. Written submissions should be sent to DP&I before the end of the exhibition period and should be addressed to:

Department of Planning and Infrastructure

CBD and South East Light Rail Project – SSI 6042 23–33 Bridge Street,

Sydney NSW 2000 GPO Box 39, Sydney NSW 2001

Copies of all submissions received by the Director-General will be provided to the proponent, the Department responsible to the Minister of the Environment and relevant public agencies. Submissions would also be made available on the DP&I's website. Submitters can request that personal details be withheld from publication; however, the content of the submission will still be made publicly available.