

Table of Contents

Contents

	Page number	
Part A – Project development and description		
1	Introduction.....	1
1.1	North–South Corridor (Torrens Road to River Torrens)	1
1.2	Key project elements	4
1.3	Project area.....	4
1.4	Modifications to the concept design	4
1.5	Project phases and schedule.....	11
1.6	Environmental impact assessment process	12
1.6.1	Overview of the process.....	12
1.6.2	Objectives, structure and content of this <i>Project Assessment Report</i>	12
1.6.3	Supplement report.....	13
1.6.4	Australian Government environmental approvals	13
1.6.5	South Australian Government environmental approvals	14
2	Community and stakeholder engagement.....	15
2.1	Approach.....	15
2.2	South Road Planning Study key findings and issues raised	16
2.2.1	Key findings of the South Road Planning Study – general community and local businesses	16
2.2.2	Approach to and key findings of the South Road Planning Study – Government.....	17
2.2.3	Torrens Road to River Torrens project key findings and issues raised – community and stakeholder input	18
2.2.4	Community open days	19
2.3	Community Liaison Groups	19
2.3.1	Key issues raised	19
2.4	Community liaison groups – progress on issues raised.....	22
2.4.1	Access.....	22
2.4.2	Use of remaining land	24
2.4.3	Outer Harbor rail line overpass	24
3	Project need and context	25
3.1	National strategic policy context	25
3.1.1	Infrastructure Australia	25
3.1.2	National Land Transport Network	26
3.1.3	Infrastructure Investment Program.....	28
3.1.4	Our cities – building a productive, sustainable and liveable future ...	28
3.1.5	COAG Reform Council Capital City Strategic Planning Systems	29
3.1.6	National Road Safety Strategy (2011–2020)	29
3.2	State strategic policy context	30
3.2.1	South Australia's Strategic Plan.....	31
3.2.2	Integrated Transport and Land Use Plan	32
3.2.3	South Australian Planning Strategy	34
3.2.4	Strategic Infrastructure Plan for South Australia.....	35

3.2.5	Tackling Climate Change: South Australia's Greenhouse Strategy ..	35
3.3	Existing and projected need for the project	36
3.3.1	Problem identification and assessment.....	36
3.3.2	Population growth.....	44
3.4	Objectives to address strategic context and need for the project	45
4	Economic assessment.....	47
4.1	Background.....	47
4.2	Economic rationale	47
4.3	Benefit cost analysis (monetised).....	48
4.4	Benefit cost analysis (non-monetised).....	49
4.5	Economic activity impacts.....	50
4.5.1	Direct economic effects	50
4.5.2	Employment effects.....	50
5	Development of the Torrens Road to River Torrens project	51
5.1	Previous projects and studies.....	51
5.2	The concept development process.....	51
5.2.1	Preliminary concept planning	53
5.2.2	Concept planning and concept design	55
5.2.3	Torrens Road to River Torrens project – concept design	56
6	Project design and description	57
6.1	Key project features	57
6.2	Road design standards and principles	62
6.2.1	Design speeds.....	62
6.2.2	Vertical design parameters.....	62
6.2.3	Design of intersections	62
6.2.4	Road pavement design	62
6.3	Road alignment – North–South Corridor and local road access	62
6.3.1	South Road from Sunbeam Road to Cedar Avenue	62
6.3.2	South Road from Cedar Avenue to Hindmarsh Avenue	65
6.3.3	South Road from Hindmarsh Avenue to Ashwin Parade	70
6.4	Outer Harbor rail line grade separation	71
6.4.1	Rail design standards.....	71
6.4.2	Rail overpass concept design	71
6.5	Improved pedestrian and cycling facilities	76
6.6	Bridge structures.....	76
6.7	Services	77
6.8	Advanced traffic management systems.....	77
6.9	Lighting.....	78
6.10	Stormwater and drainage	78
6.11	Landscape and urban design	78
6.11.1	Urban design principles.....	78
6.11.2	Landscape and urban design objectives	79
6.11.3	Outer harbor rail overpass design principles.....	79
6.11.4	Design elements.....	80
7	Construction and operation	85

7.1	Construction	85
7.1.1	Construction activities	85
7.1.2	Construction methods	86
7.1.3	Early/enabling works	86
7.1.4	Equipment, resources and labour	87
7.1.5	Ancillary construction facilities	90
7.1.6	Construction environmental management plan	90
7.1.7	Landscape works	91
7.2	Operation	92
7.2.1	Traffic management	92
7.2.2	Surveillance and incident management	92
7.2.3	General maintenance methods and programming.....	92
7.2.4	Operational environmental management plan	93
Part B - Effects of the project		
8	Landscape, visual amenity and urban design	95
8.1	Visual impact assessment approach	95
8.1.1	Visual impact assessment methodology.....	95
8.1.2	Visual impact assessment terminology.....	96
8.1.3	Policy and legislative requirements.....	98
8.2	Existing conditions	99
8.2.1	Broad landscape description.....	99
8.2.2	Pre-European plant associations	99
8.2.3	Topography and landform	100
8.2.4	Landscape soil and geology.....	101
8.2.5	Landscape character modules	101
8.3	Potential effects	112
8.3.1	Construction	112
8.3.2	Operation.....	112
8.4	Management and mitigation	116
8.4.1	Planning and design.....	116
8.4.2	Construction	118
8.4.3	Operation.....	118
9	Noise and vibration	119
9.1	Assessment approach	119
9.1.1	Policy and legislative requirements.....	119
9.2	Existing noise and vibration conditions.....	123
9.2.1	Existing road and background noise	123
9.2.2	Existing road vibration	127
9.2.3	Existing rail noise levels	127
9.2.4	Existing rail vibration	128
9.3	Potential effects on existing conditions.....	128
9.3.1	Predicted future road traffic noise conditions	128
9.3.2	Predicted future road traffic vibration	131
9.3.3	Predicted future rail noise levels	131
9.3.4	Construction effects	132
9.4	Management and mitigation	133
9.4.1	Planning and design – Operational noise control considerations	133

9.4.2	Operational noise control	135
9.4.3	Construction phase	136
10	Non-Aboriginal heritage	139
10.1	Assessment approach	139
10.2	Policy and legislative requirements	139
10.2.1	Australian Government legislation	139
10.2.2	South Australian Government legislation	140
10.3	Existing conditions	141
10.3.1	Historical context	141
10.3.2	Current statutory heritage listings	142
10.3.3	Other heritage assessments	145
10.3.4	Existing conditions analysis.....	145
10.4	Potential project effects on existing conditions.....	148
10.4.1	Planning and design-related considerations	148
10.4.2	Construction-related effects	149
10.5	Management and mitigation	149
10.5.1	Planning and design phase	149
10.5.2	Construction phase	149
11	Aboriginal heritage and Native Title	151
11.1	Policy and legislative requirements	151
11.1.1	Aboriginal Heritage Act 1988	151
11.1.2	Native Title Act 1993	151
11.1.3	Aboriginal and Torres Strait Islander Heritage Protection Act 1984	151
11.1.4	Environment Protection and Biodiversity Conservation Act 1999....	152
11.2	Existing conditions	152
11.2.1	Archaeological and anthropological background	152
11.2.2	Native Title	152
11.2.3	Previously recorded/registered sites	153
11.3	Potential effects of the project on the existing conditions	153
11.4	Management and mitigation	153
11.4.1	Planning and design.....	153
11.4.2	Construction	153
12	Socioeconomic effects	155
12.1	Assessment methodology.....	155
12.2	Policy and legislative requirements	155
12.2.1	State planning strategies.....	155
12.3	Existing conditions	158
12.3.1	History	158
12.3.2	Regional context.....	158
12.3.3	Population growth context.....	159
12.3.4	Community profile	163
12.3.5	Community cohesion.....	166
12.3.6	Key economic drivers	167
12.3.7	Walking and cycling.....	168
12.4	Potential effects of the project on existing conditions	168
12.4.1	Potential effects on the local community.....	168
12.5	Management and mitigation	171

12.5.1	Planning and design considerations for operation	171
12.5.2	Construction	173
12.5.3	Operation.....	173
13	Planning, zoning and landuse	175
13.1	Planning strategies	175
13.1.1	South Australian Government	176
13.1.2	Local planning strategies	179
13.1.3	Relevant legislation	180
13.2	Existing conditions	186
13.2.1	Existing land use	186
13.2.2	Key land uses and development projects in the region	190
13.2.3	Regional destinations from South Road	191
13.3	Potential effects on existing conditions.....	192
13.3.1	Planning and design-related effects	192
13.3.2	Construction-related impacts.....	194
13.3.3	Operation and maintenance related effects	194
13.4	Management and mitigation	194
14	Traffic and transportation	197
14.1	Legislative and policy requirements	197
14.2	Existing conditions	197
14.2.1	South Road	197
14.2.2	Arterial road network	198
14.2.3	Local road network	199
14.2.4	Freight network	199
14.2.5	Existing traffic volumes.....	200
14.2.6	Current performance of South Road.....	200
14.2.7	Public transport network.....	200
14.2.8	Pedestrian and cycle networks	201
14.3	Potential effects	202
14.3.1	Potential effects during construction	202
14.3.2	Potential effects during operation	203
14.4	Management and mitigation	208
14.4.1	Construction-phase measures.....	208
14.4.2	Operation	208
15	Flora and fauna.....	209
15.1	Assessment approach	209
15.1.1	Literature review.....	209
15.1.2	Desktop study	209
15.1.3	Stakeholder consultation.....	209
15.2	Policy and legislative requirements	209
15.2.1	National legislation	209
15.2.2	State legislation	210
15.2.3	State Policy	211
15.2.4	DPTI policy.....	211
15.2.5	Council policy	211

15.3	Existing conditions	212
15.3.1	Biodiversity overview	212
15.3.2	Existing conditions – Flora and fauna	213
15.3.3	Threatened communities and fauna species of conservation significance.....	215
15.3.4	Threatened communities and flora species of conservation significance.....	216
15.3.5	Introduced plant species.....	217
15.4	Potential effects	219
15.4.1	Planning and design.....	219
15.4.2	Construction effects	220
15.4.3	Operation and maintenance related effects.....	221
15.5	Management and mitigation measures	221
15.5.1	Planning and design phase considerations	221
15.5.2	Construction phase	222
15.5.3	Operation and maintenance	223
16	Air quality	225
16.1	Policy and legislative requirements	225
16.1.1	Commonwealth.....	225
16.1.2	South Australian.....	225
16.2	Adopted air quality assessment criteria.....	226
16.3	Existing conditions	226
16.3.1	Existing air quality	226
16.3.2	Weather	228
16.4	Potential effects	228
16.4.1	Air dispersion modelling (operational effects)	228
16.4.2	Construction.....	230
16.5	Management and mitigation	230
16.5.1	Construction.....	230
16.5.2	Operation	232
17	Water quality, drainage and flooding.....	233
17.1	Assessment approach	233
17.2	Policy and legislative requirements	233
17.2.1	National.....	233
17.2.2	State	233
17.2.3	DPTI policies	235
17.3	Existing conditions	236
17.3.1	Major stormwater drainage systems	236
17.3.2	Minor stormwater drainage systems	238
17.3.3	Groundwater	240
17.3.4	Existing water quality	242
17.4	Potential effects	244
17.4.1	Effects on the existing stormwater systems	244
17.4.2	Water quality effects.....	245
17.4.3	Effects on groundwater	246
17.4.4	Construction effects	246

17.4.5	Operational effects.....	246
17.5	Management and mitigation	247
17.5.1	Planning and design phase	247
17.5.2	Construction.....	249
17.5.3	Operations and maintenance.....	249
18	Geology, soils and contamination.....	251
18.1	Assessment approach	251
18.1.1	Geology and soils assessment approach	251
18.1.2	Site contamination assessment approach	251
18.2	Policy and legislative requirements	251
18.2.1	Commonwealth.....	251
18.2.2	South Australia.....	252
18.2.3	DPTI policies	252
18.3	Existing conditions	253
18.3.1	Geology and soils.....	253
18.3.2	Site contamination.....	255
18.4	Potential effects, management and mitigation	257
18.4.1	Planning and design-related effects.....	257
18.4.2	Construction-related effects.....	258
18.4.3	Operational and maintenance effects.....	259
18.5	Management and mitigation	260
18.5.1	Soils and geology.....	260
18.5.2	Planning and design.....	260
18.5.3	Construction.....	261
19	Greenhouse gas, sustainability and climate change	263
19.1	Policy and Legislation	263
19.1.1	Commonwealth.....	263
19.1.2	State	263
19.1.3	Local	265
19.2	Existing conditions	265
19.2.1	Sustainability.....	265
19.2.2	Greenhouse gas emissions.....	266
19.2.3	Climate	266
19.3	Potential effects	267
19.3.1	Sustainability.....	267
19.3.2	Greenhouse gas emissions assessment	268
19.3.3	Climate change	271
19.4	Management and mitigation	271
19.4.1	Planning and design phase considerations	272
19.4.2	Construction phase	273
20	Environmental management, mitigation and monitoring framework....	275
20.1	DPTI's approach to environmental management	275
20.1.1	Environmental management system	275
20.1.2	Environmental management documentation.....	276

20.1.3	Legislative approvals.....	276
20.1.4	Community and stakeholder engagement.....	276
20.1.5	Environmental management during construction	276
20.1.6	Environmental management during operation	278
20.2	Summary of environmental management requirements	278

Part C - Justification and conclusion

21	Conclusion	289
21.1	Project need.....	289
21.2	Strategic importance.....	289
21.3	Achievement of project objectives	290
21.4	Project benefits	291
21.5	Key project effects and management measures	292
21.6	Next steps	293

Glossary, Abbreviations, References and Appendices

Abbreviations

Glossary

References

Appendix A – Project team

Appendix B – Extracts from urban design presentation to Croydon Station
Community Liaison Group – Long rail overpass option

Appendix C – Concept designs of the non-selected long rail overpass option and
at-grade rail level crossing option

Figures

	Page number
Figure 1.1. Adelaide's North–South Corridor and project location.....	3
Figure 1.2. Torrens Road to River Torrens project area and key project features	5
Figure 1.3. Torrens Road to River Torrens initial concept design (May 2013)	9
Figure 1.4. Torrens Road to River Torrens project current concept design (June 2014)	10
Figure 3.1 Adelaide's National Land Transport Network	27
Figure 3.2. South Australia's strategic planning framework (DPTI 2013)	31
Figure 3.3. Crash location and number in Adelaide's western sector, 2008–20113 (total crashes).....	43
Figure 3.4. Adelaide's key industry and employment areas reliant on the North–South Corridor.....	46
Figure 5.1. Development and delivery of the Torrens Road to River Torrens project	52
Figure 6.1a. Torrens Road to River Torrens project concept design.....	58
Figure 6.1b. Torrens Road to River Torrens project concept design.....	59
Figure 6.1c. Torrens Road to River Torrens project concept design	60
Figure 6.1d. Torrens Road to River Torrens project concept design	61
Figure 6.2. Graphical representation of the upgraded South Road/Torrens Road intersection (looking south along South Road)	63
Figure 6.3. Graphical representation of the upgraded Hawker Street and Hurtle Street intersections with South Road	64
Figure 6.4. Graphical representation of the upgraded South Road/Grange Road-Manton Street intersection above the non-stop lowered road.....	66
Figure 6.5. Graphical representation of the upgraded South Road/Port Road intersection above the non-stop lowered road	67
Figure 6.6 Typical symmetrical cross-section	68
Figure 6.7. Short rail overpass (plan view (bottom); long section (top))	73
Figure 6.8a. Graphical representation of the Outer Harbor rail line (short) overpass of the North–South Corridor, looking south.	74
Figure 6.8b. Graphical representation of rail overpass along Day Terrace looking towards South Road.....	75
Figure 6.8c. Graphical representation of rail overpass along Day terrace looking towards Elizabeth Street	75
Figure 6.8d. Graphical representation of rail overpass along Euston Terrace looking towards Queen Street.....	76
Figure 6.9.Typical landscape concept plan and section for 10m wide verge areas	82
Figure 6.10. Typical landscape concept plan and section for 5 metre verge areas	83

Figure 6.11. Typical landscape concept plan and section for wide median areas (between Torrens Road south to the lowered road).....	84
Figure 8.1. Landscape character module A	102
Figure 8.2. Landscape character module B	105
Figure 8.3. Landscape character module C	109
Figure 9.1. Noise and vibration monitoring locations in the project area	125
Figure 9.2. Existing traffic noise contour plans	126
Figure 9.3. Predicted daytime road noise contour plan (without mitigation) 2021	130
Figure 9.4. Control at source – quieter vehicles	133
Figure 9.5. Control along transmission path	134
Figure 9.6. Control at the receiver.....	135
Figure 10.1 The locations of non-Aboriginal heritage listings in the project area	144
Figure 10.2. Graves adjacent to South Road, Hindmarsh Cemetery	146
Figure 10.3. Brickworks.....	146
Figure 10.4. West Thebarton Hotel, abutting South Road	147
Figure12.1. Project area precincts	157
Figure 12.2. Hindmarsh–Brompton statistical area level 2	162
Figure13.1. Land use in the project area	187
Figure 14.1. Bus services using and crossing South Road (DPTI 2014).....	201
Figure 17.1. Minor and major drainage systems in the project area.....	239
Figure 18.1. Distribution of soil profiles (Extract from Soil Association Map of the Adelaide Region)	254
Figure 19.1. Summary of GHG emissions over a 30-year time frame.....	270

Tables

	Page number
Table 1.1. Modifications to the concept design	6
Table 1.2. Indicative time frames for the Torrens Road to River Torrens project.....	11
Table 1.3. Possible South Australian legislative environmental approvals.....	14
Table 3.1. Infrastructure Australia's themes addressed by a non-stop North–South Corridor	25
Table 3.2. Project contribution to achieving SASP targets	31
Table 3.3. Contribution of the project to ITLUP goals and objectives.....	33
Table 3.4. Links to The 30-Year Plan for Greater Adelaide	34
Table 3.5. Summary of problems identified on South Road	37
Table 3.6. North–South Corridor forecast traffic volumes both with and without the project..	39
Table 3.7 South Road average speed vs. 2012 Austroads NPI	39
Table 3.8. East–west road segments average speed vs 2012 Austroads NPI.....	40
Table 3.9. South Road (Regency Road to Anzac Highway) incidents in 2011.....	41
Table 4.1. Monetised benefits and costs	48
Table 4.2. Non-monetised benefits and costs.....	49
Table 5.1. South Road Planning Study project objectives	53
Table 5.2. Triple bottom line based screening criteria	54
Table 7.1. Proposed program of work for Torrens Road to River Torrens project	85
Table 7.2. Plant and equipment for road construction activities	87
Table 7.3. Plant and equipment for rail construction activities.....	88
Table 9.1. Outdoor target noise levels for noise sensitive land use	120
Table 9.2. Rail noise criteria for new and upgraded railways for residential receivers.....	121
Table 9.3. Construction noise target levels.....	122
Table 9.4. Adopted road and rail vibration criteria for residential locations	123
Table 9.5. Adopted construction vibration criteria.....	123
Table 9.6. Measured noise levels	124
Table 9.7. Measured road traffic vibration levels	127
Table 9.8. Measured rail noise levels	128
Table 9.9. Measured rail vibration levels	128
Table 9.10. Road traffic vibration representing the expected project conditions	131
Table 10.1. Summary of heritage impacts	148
Table 10.2. Construction phase management and mitigation measures	149
Table12.1. Population targets for the western region in the 30-Year Plan	160

Table 12.2. HELSP estimated dwelling target	160
Table 12.3. SLA population projections	161
Table 12.4. 2011 ABS data fields by precinct	163
Table 13.1. Western Adelaide key growth targets	178
Table 13.2. Port Adelaide Enfield (City) Development Plan (consolidated 13 June 2013)..	182
Table 13.3. Charles Sturt (City) Development Plan (consolidated 12 December 2013)	183
Table 13.4. West Torrens Council Development Plan (consolidated 31 October 2013)	185
Table 13.5. Major land owners	190
Table 13.6. Potential planning and design related effects for the project	192
Table 13.7. Potential construction related effects	194
Table 13.8. Potential operation and maintenance related effects.....	194
Table 14.1. Arterial roads in the project area.....	198
Table 14.2. Key local roads in the project area that intersect South Road (DPTI 2012)	199
Table 14.3. Potential construction related effects	202
Table 14.5. 2021 South Road corridor travel time analysis	204
Table 14.6. Proposed access changes and effect.....	205
Table 14.7. Construction-phase management and mitigation measures	208
Table 15.1. Introduced pest plant species of environmental concern in the project area....	217
Table 15.2. Potential design-related effects.....	219
Table 15.3. Potential construction-related impacts	220
Table 15.4. Potential operation and maintenance-related impacts.....	221
Table 15.5. Design phase management and mitigation measures.....	222
Table 15.6. Construction phase management and mitigation measures.....	222
Table 15.7. Operation and maintenance phase management and mitigation measures	223
Table 16.1. Adopted project air quality goals	226
Table 16.2. Background air pollutant concentrations used in this assessment	227
Table 16.3. Ambient air pollutant concentrations measured.....	227
Table 16.4. Summary of construction phase mitigation measures	231
Table 17.1. Downstream water quality, River Torrens at Holbrooks Road (AMLR NRM Board).....	243
Table 17.2. Upstream water quality, Torrens Lake (EPA)	243
Table 18.1. Determination of contamination risk ranking.....	256
Table 18.2. Project area risk ranking summary in the land acquisition area	257
Table 18.3. Planning and design-related effects.....	257
Table 18.4. Soils and geology potential operational/maintenance impacts	259
Table 18.5. Planning and design-related consideration.....	260
Table 19.1. Climate change projections for Adelaide (CSIRO 2007)	267

Table 19.2. Sustainability issues for construction and operation of the project.....	267
Table 19.3. Summary of GHG emissions for the project design over a 30-year period	269
Table 19.4. Possible effects of climate change.....	271
Table 19.5. Measures for incorporating principles of sustainability at the planning and design phase	272
Table 19.6. Measures for addressing the principles of sustainability into the construction phase.....	273
Table 20.1. Summary of indicative environmental management, mitigation and monitoring activities.....	279
Table 21.1. Performance against project objectives	290

This page has intentionally been left blank