RESPONSE DOCUMENT TO THE RIVERLEA MAJOR DEVELOPMENT

DEVELOPMENT APPLICATION / AMENDMENT TO THE EIS

Principally – Alteration to the Precinct 2 Subdivision:

Altered stormwater and floodwater mitigation strategy Altered road network pattern and subdivision layout Altered Precinct Staging Plan

RIVERLEA, RIVERLEA PARK

DECEMBER 2024

walker

vision to reality

We acknowledge the Traditional Owners of the many lands on which we live and work. We pay respect to First Nations Elders past and present and thank them for their continuing care of Country, culture and community.

This document has been prepared by:			
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Abbreviations

TERM	MEANING	
AAR	Aboriginal Affairs and Reconciliation	
ACHM	Australian Cultural Heritage Management	
AEIS	Amended Environmental Impact Statement	
AEP	Annual Exceedance Probability	
АНА	Aboriginal Heritage Act 1988	
AHD	Australian Height Datum	
ALS	ALS Global	
ARTC	Australian Rail Track Corporation Ltd	
BDC	Buckland Dry Creek Pty Ltd	
BMT	BMT Global	
CDS	Continuous Deflective Separation	
СНМР	Cultural Heritage Management Plan	
СНО	Cultural Heritage Officers	
The Committee	State Aboriginal Heritage Committee	
The Council	City of Playford	
COOE	Care of Our Environment (COOE Pty Ltd)	
DEW	Department for Environment and Water	
DMP	Dewatering Management Plan	
EPA	Environment Protection Authority	
ETA	Empirical Traffic Advisory	
EVs	Environmental Values	
FFMP	Flora Fauna Management Plan	
Geotest	Geotest Pty Ltd	
GPT	Gross Pollutant Trap	
GRFMA	Gawler River Flood Management Authority	
HCL	Hydrogeology Consulting Ltd	
KYAC	Kaurna Yerta Aboriginal Corporation RNTBC	
LBWco	LBWco Pty Ltd	
Lidar	Light Detection and Ranging	
LMA	Land Management Agreement	
LMP	Lakes Management Plan	
LOMP	Lakes Operations Management Plan	

Mockinya	Mockinya Consulting (Paul Lightbody)		
MUSIC	Model for Urban Stormwater Improvement Conceptualisation		
ND&A	Neale Draper and Associates Pty Ltd		
NVA	Native Vegetation Act 1991		
NVB	Native Vegetation Branch		
NVC	Native Vegetation Council		
PDI Act	Planning, Development and Infrastructure Act 2016		
PLUS	Planning and Land Use Services Division, Department for Housing and Urban Development (DHUD)		
S&B	Simmonds and Bristow Pty Ltd		
SEMP	Soil & Erosion Management Plan		
SGMP	Surface and Groundwater Monitoring Plan		
SIDRA	Signalised Intersection Design and Research Aid (traffic engineering software)		
SMP	Stormwater Management Plan		
SWL	Saltwater Lakes		
TDS	Total Dissolved Solids		
The Document	The Response Document		
TIA	Traffic Impact Assessment		
VMP	Vegetation Management Plan		
WEP	Water Engineering Plus Pty Ltd		
WGA	Walter Gilbert Aztec Pty Ltd		
WSUD	Water Sensitive Urban Design		
WTP	Water Treatment Plant		

Executive Summary

This Response Document (the Document) responds to the submissions received during notification of the Precinct 2 amended EIS (Environmental Impact Statement) for the Riverlea major development (the Riverlea development) at Riverlea Park. The Document also responds to supplementary comments from State agencies and the City of Playford (Council) following a Planning and Land Use Services (PLUS) facilitated Workshop on 28 August 2024 on the Draft Response Document, including several technical meetings that occurred post-Workshop between Walker, the EPA and DEW.

The amended EIS (AEIS), notified from 14 June 2023 until 26 July 2023, related to changes to the previously approved Precinct 2 subdivision application, including the introduction of Saltwater Lakes (SWL) to enhance the Riverlea development's urban amenities and accommodate a revised stormwater mitigation strategy.

A secondary effect of introducing the SWL to the development is an altered Precinct 2 subdivision layout. The modified design will not alter the material nature of the subdivision, as it does not significantly change the Precinct 2 total land area, the number of residential allotments or the road hierarchy from that previously approved. The subdivision layout adjustments specifically address the introduction of the SWL within the Riverlea development.

The Document details the "*What We Heard – During AEIS Notification*" section, which summarises 15 topics that emerged from State Government agencies, the Council, the Gawler River Flood Management Authority and members of the public during the AEIS notification process. Overall, the topics varied somewhat, from Aboriginal heritage, affordable housing, traffic management, stormwater and floodwaters management, water quality, flora and fauna, and issues related to the construction and management of the SWL.

The Document then summarises the "*What We Heard – Draft Response Document & Workshop*" section, which summarises six main themes that emerged from the Council and key State agencies, including the Environment Protection Authority (EPA) and the Department for Environment and Water (DEW). The main themes that emerged included construction issues and operational considerations, water quality management, longer-term traffic management, and security of access to infrastructure on Crown land.

The *Summary of Submissions* section briefly details Walker's response and actions regarding how it has or will address the substance of the topic/s, where relevant, given some responses were beyond the scope of the AEIS or resolved. Some topics required further clarification or minor adjustments, and some needed acceptance (or otherwise) concerning the imposition of suggested Conditions.

From the analysis of *What We Heard,* several "*Key Issues*" appeared that necessitated a comprehensive response or more detailed explanation. These *Key Issues* include:

- 1. The significance of Aboriginal Heritage at Riverlea and the importance of providing updates on Aboriginal heritage matters, given they warrant careful management considerations as Riverlea develops.
- 2. SWL construction methodologies include suitable long-lasting containment barriers between seawater and groundwater management and surface and groundwater monitoring during construction activities. In addition, there are operational matters concerning lake water quality management measures.

3. The Council's proposed Reserved Matters covering stormwater management, flooding, the intake seawater source location, additional traffic modelling, and the SWL Phase 2 Report close-out comments.

Accordingly, Walker has sought to address these matters to prevent the project from stalling.

Also of importance is the *Riverlea Development Lakes and Lakes Infrastructure - Vesting Principles / Framework Deed* (the Deed), which is the culmination of ongoing negotiations between Walker and the Council on the terms of the Deed, which is a formal Agreement to design, construct, maintain and operate the SWL before vesting these community assets to the Council.

- 1. The Deed will govern the obligations and parameters that Walker must accomplish before the Council accepts the vesting and operational requirements of the SWL system.
- 2. Subject to approval, Walker will commit to preparing and undertaking various Mechanisms, including design, construction, operational and maintenance, handover and financial security Mechanisms for the infrastructure forming the SWL as outlined in the Deed.
- 3. Walker and the Council will seek to have the Deed executed, but some of the required mechanisms (within the Deed) will need to follow, pending approval of the AEIS.
- 4. The Deed will outline Walker's pre-determined obligations and benchmarks to be satisfied. Once satisfied, the Deed outlines how the Council will, at the appropriate time, accept the vesting and operational requirements of the SWL as each Lake reaches Practical Completion.

The Deed confirms that Walker and the Council are collaboratively pursuing a vesting framework that should give PLUS, the State Planning Commission, and the Planning Minister the comfort to approve the AEIS.

Amendments post-notification of AEIS have occurred, albeit the amendments are considered relatively minor and do not result in any material changes to the altered Precinct 2 proposal. For example, the implementation of wetland areas within the northern reaches of Precinct 2, adjacent to the Gawler River, was removed from the proposal to avoid doubt about constructing and operating the wetlands for stormwater capture, treatment and disposal within the overall development.

Minor amendments to Stages 14, 37, 38 & 39 (including the proposed school site and Riverlea Boulevard) post-notification were updated in the Response Document (including the revised Plan of Division, Affordable Housing Plan, Residential Allotment Mix Plan and the Overall Concept Plan) as agreed by the Council and PLUS.

The Document also summarises various **secondary approvals or licence requirements** (mandated by other legislative processes), such as the *Aboriginal Heritage Act 1988*, Dewatering licencing via the necessary water take and/or management authorisation(s) under the *Landscape South Australia Act 2019*, vegetation clearance under the *Native Vegetation Act 1991*, etc. Walker must comply with other approval processes regardless of whether it acts on the original approval or the AEIS.

The Statement and Table of Commitments details Walker's assurances to undertake these secondary approval processes and other actions (as necessary). Walker understands that numerous matters will be satisfied via conditions or as part of submitting technical details, plans, calculations, etc., for assessment. However, there are some instances where processes and authorities fall beyond a planning process, and this section seeks to capture those matters or reaffirm Walker's awareness of those affiliated processes.

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- Appendix B The Minister for Aboriginal Affairs authorisation instrument (including Mapping)
- Appendix C WGA Stormwater Management Water, Wastewater and Recycled Water (December 2023)
- Appendix D Water Technology Riverlea Development Flood Assessment 2020 Addendum
- Appendix D1 Water Technology October 2022 Memorandum Modelling of Riverlea development
- Appendix E COOE Assessment of the Impact on the Saltwater Lakes Ecology
- Appendix F WEP The Water Quality Monitoring Program Results to 02 July 2024
- Appendix G Updated Riverlea Lake Concept Design Report
- Appendix H COOE Assessment of the Impact on Flora and Fauna
- Appendix I EBS Ecology Review Flora and Fauna Management Plan Precinct 2.
- Appendix J LBWco's Dewatering Investigation and Risk Assessment Report October 2024
- Appendix K Geotest Construction Methodology Report
- Appendix L Geotest Proposed Options and Associated Costs Report
- Appendix M WEP Chapman Creek Cumulative Saltwater Extraction Riverlea and Buckland Dry Creek (BDC)
- Appendix N WGA Precinct 1 and 2 Interim and Ultimate Development Stormwater Management Plan - 2024
- Appendix O Simmonds & Bristow Technical Memorandum Stormwater Treatment Performance Modelling
- Appendix P HDPE Liner Lake Edge Concept Plans
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- Appendix R Council's Suggested Conditions
- Appendix S ETA Riverlea Precinct 2 Land Division Masterplan Traffic Impact Assessment (September 2024)
- Appendix T Riverlea Precinct 2 Plan of Division, Affordable Housing Plan, Residential Allotment Mix Plan - September 2024
- Appendix U Riverlea Overall Concept Plan September 2024
- Appendix V LBWco Proposed Saltwater Lakes Saltwater Seepage Risk Assessment (October 2024)
- Appendix W LBWC-HCL Response letter (ref. 231445-01 L01). Dated 13 December 2024.

1. Background

- 1.1 In 2023, an application was made to the Minster for Planning for amendments to the previously approved Precinct 2 subdivision for the Riverlea major development (Riverlea) at Riverlea Park.
- 1.2 The primary change to the Precinct 2 subdivision is the incorporation of the Saltwater Lakes (SWL) into the development to enhance Riverlea urban amenities and accommodate a revised stormwater and floodwater mitigation strategy.
- 1.3 A secondary effect of the SWL integrating into the development will be an amended Precinct 2 subdivision layout. The modified design will not materially alter the nature of the subdivision or significantly change the Precinct 2 total land area, the number of residential allotments, or the road hierarchy from that previously approved.
- 1.4 The amended Precinct 2 subdivision, supported by an amended Environmental Impact Statement (AEIS), was placed on public notification from 14 June 2023 until 26 July 2023. During that time, submissions were received from five State Government agencies, the City of Playford (the Council), the Gawler River Flood Management Authority (GRFMA) and four members of the public. An overview of the submissions received is shown in Table 1 below.

Submission From	Name	Abbreviation	Topic Raised
State Agency	Aboriginal Affairs and Reconciliation	AAR	Aboriginal Heritage
State Agency	Department for Environment and Water	DEW	Environmental
State Agency	Department for Infrastructure and Transport	DIT	Transport
State Agency	Environment Protection Authority	EPA	Environmental
State Agency	South Australian Housing Authority	SAHA	Affordable Housing
Local Government	City of Playford	Council	Various
Regional Subsidiary	Gawler River Flood Management Authority	GRFMA	Gawler River
Member of the public	Riverlea Adjoining Property Owner	AO	Environmental
Member of the public	Riverlea Property Owner	РО	Support Masterplan
Member of the public	Two Private Citizens	PC	Transport

Table 1: Summary of who provided a submission

- 1.5 On 11 June 2024, a Draft Response Document was distributed to the State Government agencies and the Council for review, which elicited additional submissions from those parties.
- 1.6 On 28 August 2024, PLUS held a workshop with Walker (and its technical consultants), the EPA, DEW and Council representatives to discuss Walker's response to the submissions received from State agencies and the Council on the draft response.
- 1.7 A further round of feedback was provided to Walker by the Council, the EPA and DEW in response to the PLUS workshop discussions.
- 1.8 This final Response Document (the Document) provides a comprehensive response to the matters raised in the submissions received during the mandatory notification period, feedback received on the Draft Response Document, and comments following the PLUS Workshop.
- 1.9 The information detailed in the table below assists with understanding the evolution of documents since the initial AEIS application went on public notification.

Change instigated by:	Detailed in AEIS – April 2023	Detailed in Response Document (October 2024)
AAR	N/A	The Minister for Aboriginal Affairs authorisation
		instrument
AAR	N/A	Mapping: The Burial Location 1 exclusion zone
		and the overall area subject to the authorisation
Council / DEW	WGA - Stormwater - Water,	WGA - Stormwater - Water, Wastewater and
	Wastewater & Recycled Water April 23	Recycled Water – December 2023
Council	Stantec - Riverlea – Precinct 2 Land	ETA - Riverlea – Precinct 2 Land Division
	Division Masterplan - Traffic	Masterplan - Traffic Impact Assessment – 30
	Assessment – 12 April 2024	September 2024
Council	N/A	WGA - SMP (October 2024) - Precinct 1 & 2
		Interim and Ultimate Development
EPA	BMT – SK 147 Revision D	Burchills – Drawing SK 147 - Saltwater Lakes
		Outlet Plan
Council	COOE – Riverlea Salt Water Lakes -	COOE – Riverlea Salt Water Lakes Assessment of
	Assessment of the Impact on Flora and	the Impact on Flora and Fauna V1.2 -
	Fauna V1.2	Replacement Mapping (Figures 2 & 4)
DEW	Riverlea Park Flora and Fauna	Riverlea Park Flora and Fauna Management Plan:
	Management Plan: Precinct 2 - 08.12.22	Precinct 2 - 05 October 2023
EPA/DEW/the Council	N/A	LBWco's - Dewatering Investigation and Risk
		Assessment Report - October 2024
EPA/DEW/the Council	N/A	Geotest - Proposed Options and Associated Costs
		Report – June 24
EPA/DEW/the Council	N/A	Geotest - Construction Methodology Report –
		June 24
EPA & the Council	N/A	WEP - Updated Lakes Concept Design – October
		2024
PLUS / Council / SAHA	Affordable Housing Plan – Issue J -	Affordable Housing Plan - Rev M - dated 24
	dated 31.03.2023	September 2024
PLUS / Council	Residential Allotment Mix Plan – Rev J -	Residential Allotment Mix Plan - Rev L dated 24
	dated 31 March 202	September 2024
PLUS / Council / SAHA	Precinct 2 Proposal Plan – Issue L -	Precinct 2 Proposal Plan - Rev R - dated 24
	dated 29.03.2023	September 2024
PLUS/ Council	Overall Concept Plan – Rev Q – Dated	Overall Concept Plan - Rev R - Dated 24
	03 April 2023	September 2024
Council	N/A	WEP - Chapman Creek - Cumulative Saltwater
		Extraction - Riverlea and Buckland Dry Creek
Council	N/A	S&B - Technical Memorandum Stormwater
		Treatment Performance Modelling
Council	N/A	HDPE Liner - Lake Edge Concept Plans
Walker	N/A	Burchills - Drawing SK113 - Conceptual Seawater
		Circulation Strategy Layout Plan
Walker	N/A	Burchills - Drawing SK138 - Conceptual Seawater
		Circulation System Phasing Plans
Walker	N/A	Riverlea SWL Presentation 28 August 2024
Walker	N/A	Water Technology - Memorandum - Modelling of
		Riverlea development - October 2022
Walker	N/A	Water Technology - Riverlea Development Flood
		Assessment - 2020 Addendum
Walker	N/A	LBWco – Proposed Saltwater Lakes - Saltwater
		Seepage Risk Assessment - October 2024
Walker	N/A	LBWC-HCL – Response letter (ref. 231445-01
		L01). Dated 13 December 2024.

2. What We Heard

2.1 AEIS Public Notification

- 2.1.1 The AEIS was placed on public exhibition from 14 June 2023 to 26 July 2023, with eleven submissions received five from State agencies, one each from Council and GFRMA, and four from members of the public. Chart 1 highlights the 15 main topics raised in the submissions and the number of submissions that touch on each topic.
- 2.1.2 The Draft Response Document (the Draft Document) prepared by Walker provided a summary of the respective submissions and topics raised, along with commentary on how it intends to deal with each matter for further review and comment by State agencies and the Council (where relevant).



Chart 1: Topics Raised During Notification (Including No. of instances raised).

2.2 Draft Response Document and Workshop

- 2.2.1 Walker's Draft Document was provided to the EPA, DEW and the Council for comment on 11 June 2024. The Draft Document included several (previously outstanding) technical reports. Still, Walker did not submit the *Updated Lake Concept Design Report* prepared by Water Engineering Partners (WEP) and Simmonds and Bristow (S&B) until 12 July 2024 (the last outstanding technical report), which details the water quality management measures proposed for the SWLs.
- 2.2.2 On 28 August 2024, PLUS held a workshop attended by Walker, its technical consultants, the EPA, DEW and Council representatives to discuss the Draft Document and feedback provided.

- 2.2.3 Walker prepared a presentation (essentially a talking piece) on the critical issues the parties involved in the PLUS Workshop raised and how Walker intended to respond to those matters. Those documents were subsequently made available for internal distribution to work teams within the respective organisations. The presentation is in <u>Appendix A</u> for information.
- 2.2.4 The PLUS workshop participants were requested to provide additional comments and feedback on the Workshop presentation by 05 September 2024.
- 2.2.5 The responses received cover six main themes:
 - construction issues;
 - operational considerations;
 - stormwater quality management;
 - longer-term traffic management;
 - Crown land and infrastructure access; and
 - capital and operation costs considerations.
- 2.2.6 The Construction and Operational themes are broken down further into several important issues, including the entity with the interest, as follows:



Chart 2: Issues Raised - Construction Themes



Chart 3: Issues Raised - Operational Considerations

2.2.7 Section 3 - Summary of Submission groups each theme under its respective heading, including Environmental Matters, Transport Matters, Infrastructure Matters, Management Measures and Operational Matters, with specific technical issues focussed more under sub-headings to provide a more logical flow. This method collectively responds to each theme and matter covered in Sections 2.1 and 2.2.

3. Summary of Submissions

Under the headings for each issue raised, the submission is summarised, including when it was raised (i.e., during the formal notification process or following notification as a result of comments received on the Draft Response Document and the PLUS workshop) and Walker's response.

3.1 Aboriginal Heritage

- 3.1.1 The Council and the Attorney-General's Department Aboriginal Affairs and Reconciliation (AAR) commented on this topic during the notification of the AEIS.
 - 1. In the AEIS, the Council recognises the Aboriginal significance of the Gawler River (Kadlitparri), including adjoining lands and the likelihood of archaeological remnants throughout the area. The Council realises the importance of the protocols detailed in Walker's Cultural Heritage Management Plan (CHMP) for the broader development of Riverlea and how it is essential in supporting and guiding Aboriginal heritage matters when implementing stormwater outfalls, channels and other development-related civil works.

- 2. On 08 February 2023, Walker provided AAR with a copy of the Aboriginal Heritage sub-section of the AEIS for consideration (based on AAR feedback on the December 2022 version of the AEIS). On 14 February 2023, AAR confirmed it was "happy to see the AEIS updated with these changes and released for public comment".
- 3. AAR also referenced the AEIS's lack of the State Planning Commission's EIS minimum assessment requirements.
- 3.1.2 **Response:** PLUS confirmed that the State Planning Commission's EIS minimum assessment requirements came into effect after the lodgement of the AEIS and are, therefore, not applicable. Nonetheless, Walker is committed to complying with any direction from the Minister for Aboriginal Affairs and any endorsed CHMP prepared for the Riverlea development.
 - 4. In November and December 2024, following the release of the Response Document (dated October 2024), AAR requested further changes to:
 - Include details of the AHA authorisation and conditions granted on 9 October 2024;
 - Delete some content within the Response Document, and update the commentary in Section 4.1.
 Aboriginal Heritage to reflect the current situation.
 - Update mapping that identifies the Burial Location 1 exclusion zone and the overall area subject to the authorisation.
- 3.1.3 <u>Response:</u> An updated summary of the matters that transpired post-notification is in **Section 4.1** of this document, and a copy of the authorisation instrument is in <u>Appendix B</u>. Maps have also been produced in <u>Appendix B</u> that identifies the Burial Location 1 exclusion zone and the overall area subject to the authorisation.

3.2 Environmental Matters

3.2.1 Northern Wetlands and the Gawler River

- 3.2.1.1 Walker received three submissions from the DEW, the GRFMA and the Council relating to the proposed northern wetland and the Gawler River during notification of the AEIS.
 - 1. DEW queried the bio-retention wetland proposed in the northwest area of Precinct 2, where a patch of River Red Gums is present, and requested information concerning possible impacts or benefits of the proposed wetland system on the trees, either directly or indirectly from any earthworks required to construct the wetland or via changed inundation frequencies and durations.
 - 2. GRFMA noted the AEIS consistency with previous stormwater management statements, except for the discharge to the northern outlet of the Gawler River northwest of the site. Specifically, the Walbridge Gilbert Aztec (WGA) Stormwater Management report (Appendix F) states that wetlands in the northwest portion of the site in the MUSIC modelling will treat stormwater before discharge to the Gawler River.
 - 3. The Council had concerns about the Gawler River and the provision of an Ephemeral Wetland within an area proposed in the Landscape Masterplan for retained vegetation and conservation. The Council requests additional detail on the functionality of a wetland within an area of retained vegetation.
- 3.2.1.2 **<u>Response</u>**: Walker removed the northern wetland concept from the proposal to avoid doubt about the challenges of excavating near the woodland area and creating and operating these areas for stormwater capture, treatment and disposal within the overall development. There are no ephemeral wetlands on the development's north edge or any stormwater connection to the Gawler River. In extreme weather events, flows will divert to Thompson's Outfall channel directly from the channel system via the wetland detention area at the southern end of the development.

- 3.2.1.3 Walker will raise development areas, approximately 0.7m-1m above natural ground levels, to protect development from potential flooding, and the woodland area will remain at natural levels. The 'minor' 20% AEP drainage system will collect and pipe stormwater around the woodland areas. Gap flows in the 1% AEP will be allowed to overflow into that area, with an outfall into a drainage channel provided at the downstream end.
- 3.2.1.4 The WGA *Stormwater Management Water, Wastewater and Recycled Water* (December 2023), enclosed in <u>Appendix C</u>, has removed the northern wetlands from the proposal.
 - 4. At the PLUS Workshop, Walker confirmed to participants that no flood waters would enter Lake 1 from the north, as bunds would restrict floodwater to follow the western floodway strategy (which the Council considered a significant late amendment to the AEIS).
 - 5. Similarly, DEW requested plan/s showing the 'built up' landform as described and referred to as a 'bund' by Walker Corporation during the PLUS Workshop on the 28th of August and a plan showing the perimeter channel on the western boundary of Riverlea (as referenced in the draft Response Document).
- 3.2.1.5 Walker does not share the Council's view that this is a substantial change, as the Burchills General Site Earth Works Pre-Design and Conceptual Plan reflects this design philosophy (refer to Figures 1 & 2). The bunds provide a more straightforward and cost-effective floodwater management solution for the SWL.
- 3.2.1.6 Detailed engineering design plans (for Stage 20) will capture the additional land form requirements to cut off (via bulk earthworks at this location) the open channel design in subdivision documents submitted to the Council for engineering design approval.
- 3.2.1.7 Nonetheless, represented in the following Burchills General Site Earth Works Pre-Design and Conceptual Plan and Gawler River Section extract is the 'earth bund' described by Walker during the PLUS Workshop (refer to Figures 1 & 2).



Figure 1 - Burchills – General Site Earth Works Pre-Design and Conceptual Plan



Figure 2 - Burchills – General Site Earth Works Pre-Design and Conceptual – Gawler River Section

3.2.1.8 In addition, the following extract shows the perimeter channel on the western boundary of Riverlea (detailed in the WGA – *Stormwater Management* – *Water, Wastewater and Recycled Water (December 2023),* enclosed in <u>Appendix C</u>).



Figure 3 – WGA (December 2023) - Western Perimeter Channel

- 6. A request from DEW after the PLUS Workshop was for "a plan/s showing the flow paths of floodwater breakouts from Gawler River in the 1% AEP event, and a discussion or plan of incremental flood impacts, if any, of this proposal on properties in the vicinity of Riverlea".
- 3.2.1.9 <u>Response:</u> A discussion on the Developed Conditions 1% AEP Depth (referred to in Figure 4 below) (and difference plot) of flood impacts (along with further mapping) of the proposal on properties near Riverlea is in the Water Technology 2020 Report *Riverlea Development Flood Assessment Addendum* in <u>Appendix D</u> and the Water Technology October 2022 *Memorandum Modelling of Riverlea development* in <u>Appendix D1</u>.



Figure 4 – Water Technology (2022) – Developed Conditions 1% AEP Depth - Riverlea Site

3.2.2 Water Quality

- 3.2.2.1 During notification of the AEIS, the EPA commented on the ecology of the SWL.
 - 1. The EPA recognises that part of the site's stormwater will discharge into the Saltwater Lakes, meaning that in times of high rainfall and during flood events, the lakes will have a mix of seawater and stormwater. At other times, the lakes will principally be saltwater. The mixing of water will potentially impact the lake's ecology. The EPA wants an indication of how the ecology of the saltwater lakes will change, as conditions vary throughout the year, and how potential impacts (within the Lakes and externally) will be managed (such as the die-off of species leading to odour and waste).
 - 2. The EPA believes that potential issues and concerns regarding the water quality and management of the SWLs should be thoroughly documented and modelled before establishing the SWLs to ensure the SWLs are a viable option.

- 3.2.2.2 <u>**Response:**</u> Walker engaged COOE to assess potential impacts on the SWL ecology. The baseline assessment identifies potential ecological impacts, explores stressors affecting plant and animal receptors in the SWL, and highlights the importance of managing water quality to safeguard the SWL ecology, considering both natural and anthropogenic factors. COOE highlights several potential water quality challenges and active approaches to the project's overarching design and management systems to mitigate ecological risks and promote ecologically responsive development. Much of the response detailing the mixing of seawater and stormwater and the influences relating to aquatic Fauna is mentioned in **Section 3.2.3 Flora and Fauna**.
- 3.2.2.3 To ensure ongoing monitoring of source water and in-lake water quality, COOE recommended that a water quality treatment expert advise on appropriate treatment-train strategies and design systems to enable real-time adaptive management. A copy of the COOE, *Assessment of the Impact on the Saltwater Lakes Ecology*, is in <u>Appendix E</u>.
- 3.2.2.4 In November 2023, WEP produced a Water Quality Monitoring Program Results 13 September 2023 report concerning the Riverlea project. WEP issued a report update on 20 September 2024, titled Water Quality Monitoring Program Results to 02 July 2024 (refer to Appendix F). WEPs summarised findings of water quality monitoring based on over 24 months of sampling of Chapman Creek (the proposed intake site) are as follows:
 - Consistent and acceptable pH values;
 - Typically, highly saline water except for short periods following local rainfall events;
 - Very low suspended solids and turbidity levels;
 - *Relatively high Total Nitrogen concentrations, predominantly associated with organic Nitrogen;*
 - Relatively high Total Phosphorus concentrations;
 - Very low chlorophyll 'a' values;
 - Variable but typically high dissolved oxygen levels; and
 - Low heavy metal concentrations (well below guideline limits for recreational waters);
- 3.2.2.5 Contrastingly, the sampling points in Thompson Creek and the outfall channel indicated very high Total Nitrogen, Total Phosphorus and chlorophyll 'a' concentrations. Due to ocean mixing, these concentrations fell progressively at the Inshore Bolivar Outlet and Offshore monitoring points.
- 3.2.2.6 Water quality control is paramount, so over the last two years, Walker sought the expertise of water quality specialists. During this time, the conceptual design of the proposed SWL system has been progressively refined with two main strategies progressed:
 - External saltwater exchange water pumping for lake turnover and flushing; and
 - In-lake treatment with dedicated water treatment plant and devices.
- 3.2.2.7 WEP has carried out considerable water quality monitoring and assessment of the receiving environment and the proposed exchange water source to inform the lake design. This work culminated in a refined, updated hybrid lake water management method and concept design, combining critical elements of the above strategies to provide an extremely robust and flexible management system to achieve lake water quality objectives. Notably, the *Updated Lake Concept Design* in <u>Appendix G</u> proposes a full-scale trial of turnover and treatment measures for SWL1 to allow further refinement of the lake water quality management and better inform the final detailed design, discussed more below.
- 3.2.2.8 Nonetheless, as elaborated further in **Section 3.2.3** concerning lake mixing and salinity levels, WEP notes that a significant storm event (Q100 local event) would not drop salinity levels below 25 ppt and most estuarine aquatic fauna is tolerant of such salinity levels. Further, full lake salinity will

likely return within two weeks following the event without undue effect on aquatic fauna. WEP also noted that based on aquatic fauna studies on other saline lake systems, implementing suitable design management measures by creating appropriate environments for aquatic fauna can avoid significant aquatic fauna mortality. Such measures will be modelled, trialled and monitored as part of the updated hybrid lake water management method and concept design.

Water Quality Management

- 3.2.2.9 As previously discussed, WEP and S&B described two alternate water quality management measures. WEP relies on a high lake water volumetric turnover rate, with inflow waters pumped from Chapman Creek, in-lake mixing, and additional lake water quality treatment if needed. WEP also details many existing saline lake systems that have historically managed lake water quality to an acceptable level through high volumetric turnover rates alone, without extensive additional inlake treatment.
- 3.2.2.10 S&B examined various seawater quality management scenarios for the SWL, concluding that one option would likely provide the best solution for controlling lake water quality concerning nutrients, turbidity, and algae. This option proposed a reduced lake turnover rate to reduce nutrient input to the lakes and reduce treatment requirements through reduced flow rates and turnover volumes.
- 3.2.2.11 S&B concludes that the reduced turnover flow with in-lake treatment and pre-treatment will likely produce the best outcome, particularly regarding nutrient and algal management. The proposed solution is robust in managing lake water quality, controlling algal growth to an acceptable level if excessive algal growth occurs, and removing the high level of nutrients in turnover waters.
- 3.2.2.12 The WEP Water Quality Monitoring Report indicates that, on testing results to date, there is little evidence of significant algal growth (and low chlorophyll 'a' results) in the waters of Chapman Creek adjacent to the intake site (despite the high nutrient levels), which may be related to the high salinity levels. However, more seasonal and complete tide-ranging testing is needed to validate this preliminary finding. Water quality monitoring is ongoing, with complete seasonality testing being the aim across various tidal conditions.
- 3.2.2.13 Accordingly, the intent is to adopt a 'hybrid' approach to lake water management, with the provision of a system that is capable of high lake turnover volumes if required, as well as the ability to progressively add in-lake and online water quality treatment measures as the staging of the development progresses, and as needed. The initial design can incorporate in-lake mixers to ensure a well-mixed lake with no dead spots. A pumping system from Chapman Creek will be required to maintain and replenish water levels within the lakes due to losses from evaporation.
- 3.2.2.14 Extensive monitoring of SWL1 performance will commence immediately following the filling of the SWL1. Circulation rates and the required in-lake treatment devices will consider sensitivity pumping rates and water quality results over the maintenance period for the lake.
- 3.2.2.15 Incorporating treatment contingencies as necessary might include:
 - Nutrient removal through a dedicated treatment plant
 - Algaecide dosing
 - Algal disruption, including mixing and ultrasonic systems
 - Suspended solids removal
- 3.2.2.16 A further option for treating algae is injecting a high salt dose into the lake as an emergency measure, with locally sourced raw salt likely suitable for the task.

- 3.2.2.17 Conducting a full-scale trial for SWL1 over 12-18 months ensures full seasonality is well-thoughtout while continuing with background water quality monitoring. The model will trial a range of lake turnover rates and undertake detailed lake monitoring on a maximum monthly basis, with daily observations for algal growth. If indicators for potential algal growth are present, contingency measures, including chemical dosing, will be applied. Other in-lake treatment measures and stage 1 of a dedicated treatment plant will be incorporated if necessary.
- 3.2.2.18 Following the conclusion of the trial, a staged, single wastewater treatment plant to treat all three lakes may ultimately be necessary. The treatment plant's design would allow for expansion in stages to align with the development staging of the three lakes. As the Updated Riverlea Lake Concept Design Report states (refer to Section 4.4), Walker will prepare a detailed SWL1 Management Plan before the trial.

Water Quality Modelling

- 3.2.2.19 At the PLUS Workshop, the participants were advised that detailed modelling and a Lake Management Plan preparation are proposed as part of the detailed design for Phase 1 before any construction commences.
- 3.2.2.20 Walker tabled a two-staged approach to demonstrate that the Updated Lake Concept Design can deliver an appropriate water quality outcome for the SWL and receiving waters downstream. Stage 1 proposed utilising a deterministic concept (black box) model, and Stage 2 proposed detailed hydrodynamic and water quality modelling. Stage 1 work was to immediately verify that the proposed lake circulation system and in-lake treatment measures are robust and can deal with all contingencies, as described below.

Stage 1 - Concept (Black Box) Modelling

3.2.2.21 This modelling assumes a thoroughly mixed water body, as the design intends to have well-mixed lakes through circulation and diffuse inflows and, as a contingency, use mechanical mixers and aerators. Validation will be by subsequent Stage 2 detailed modelling work. Stage 2 modelling requires several months to complete, following the Stage 1 work.

Key inputs to the black box model were:

- Lake stage volume
- > Inflow turnover supply rate, including suspended solids concentrations
- Evaporation
- > Developed site freshwater runoff
- Salinity level in the lake after initial filling
- > Total nitrogen and total phosphorus levels in the lake after filling
- Chlorophyll 'a' initial lake concentrations
- 3.2.2.22 Modelling was to assess lake salinity, nutrient levels and chlorophyll 'a' under a range of scenarios, including high salinity levels in supply water, under a sizeable local runoff event, and during the hot, dry summer period. The assessment would consider the potential for hyper-salinity, eutrophication, and low salinity after flooding and for sediment and algal deposition in the lake. The modelling intent was to inform the Lake 1 Optimisation / Progressive Adaptive Strategy and demonstrate that the proposed system can deliver the desired water quality objectives.
 - 3. In response to the AEIS and following the PLUS Workshop, the EPA requested comprehensive water quality modelling of the SWL be undertaken and thoroughly documented to address potential issues and concerns regarding the management of the SWL.

- 3.2.2.23 <u>**Response:**</u> While the Stage 1 work would inform the responses to EPA's request for further information, this appeared to be dismissed in favour of undertaking an entire comprehensive modelling exercise from the outset.
- 3.2.2.24 The SWL1 Operational Management Plan for the first 12 months involves fine-tuning treatment requirements, which have been allowed for in the preliminary design. Sufficient contingencies, including dedicated water treatment plants, are proposed to ensure suitable lake water quality results. Water quality modelling before lake construction will further direct which contingencies should be applied upfront; however, the SWL1 monitoring proposed is part of an adaptive design approach to ensure the best outcome for the lakes.

Stage 2 - Detailed Hydrodynamic and Water Quality Modelling

- 3.2.2.25 Hydrodynamic and water quality modelling of the lakes is proposed utilising the Tuflow modelling system. Modelling will consider the range of pumping rates and times over an entire tidal cycle and for the proposed hours of pumping each day. The assessment will feature both winter and summer months. Modelled scenarios will include extended dry periods and significant rainfall-runoff events, with a MUSIC model developed for the local site catchment runoff.
- 3.2.2.26 Based on current monitoring results, water quality modelling will consider a range of supply water qualities. Tested parameters include nutrients, suspended solids, residuals from in-lake treatment, salinity, temperature and chlorophyll 'a'.
- 3.2.2.27 The hydrodynamic model will initially be a fine-scale model of Lake 1 and will be expanded to model all three lakes after additional Lake 1 Optimisation / Progressive Adaptive Management Strategy monitoring. The model design will assess lake mixing and circulation, including the effect of the proposed circulation measures. Wind mixing will also inform this stage of work.
- 3.2.2.28 This modelling will inform the detailed design of the lakes and management system. It will be available as an ongoing tool for managing the system, with refined calibration as more long-term monitoring data becomes available.
- 3.2.2.29 Accordingly, Walker has received a detailed Scope of Work and Fee Proposal to undertake the detailed Lake Water Quality Modelling (as shared with PLUS), but given the lead times to deliver the comprehensive outputs of the modelling as well as stakeholder agreement concerning the most appropriate type of modelling and software platforms utilised over the life of the development, Walker is requesting this matter be conditioned or held as a Reserved Matter (i.e. before lake construction occurs) pending resolution of this issue with the EPA.

Water treatment continencies

- 3.2.2.30 The EPA's recent advice appeared favourable to the low flow option for the SWL, confirming that the treatment contingencies proposed (including nutrient removal through various mechanisms mentioned below) are all valid treatment methods.
- 3.2.2.31 Algaecide dosing treatment (at very low rates) is included as a contingency treatment. The algaecide Earthtec is proposed at very low dosage rates (i.e. between 60-240ugCu/L), and its formulation allows the copper to disperse in the water column quickly and not precipitate quickly. This method significantly reduces dosage and treatment frequency compared to the traditional use of copper sulphate at 2000-5000ugCu/L, precipitating within 1-3 days. Whilst the copper will ultimately precipitate into sediments, mass loads are not likely to result in significant copper concentrations in sediments.

- 3.2.2.32 The trialling of mixing and ultrasonic systems for SWL1 uses solar power. Contingency backup arrangements of additional horizontal and vertical mixing systems are proposed and can be fine-tuned, if needed, in the Phase 1 (SWL1) stage of development.
- 3.2.2.33 Suspended solid and sediment removal is a preferred option for lake aesthetics and quality, and it ensures that lake dredging in the future is not required. The proposed nutrient and algal management measures are extensive, with multiple contingencies. The water filtration will remove algae, organic (non-soluble) nutrients, and insoluble inert solids that would otherwise cycle in the lake water, adding to soluble nutrients as they break down under reductive decomposition in otherwise deposited sediments. Lake dredging is unlikely to be required over the project's life, given low sediment concentrations in the seawater supply and the pre-treatment from site runoff.
- 3.2.2.34 Cheap raw salt is available in the adjacent area. Initial assessments indicate a one-off dose for an emergency is feasible.

Water Treatment Plant

3.2.2.35 If required, the treatment plant location would be at the western aspect of SWL 2 & 3, as shown below on Burchills Drawing SK113 Rev G in the S&B - *Riverlea Development Lake Water Treatment Concept Progressive Adaptive Water Quality Management October 2024* component of the *Updated Lake Concept Design Report* (Appendix G).



Figure 5 - Burchills - Drawing SK113 Conceptual Seawater Circulation Strategy Layout Plan

- 3.2.2.36 Still, the EPA noted that particular treatment contingencies could generate potential waste streams that need capture and disposal or be entrained within the water column and discharged into the marine environment.
- 3.2.2.37 Waste streams from the SWL will pass through the water treatment system. The filters from the water treatment system generate the waste (this includes planned maintenance scouring of the packing, with the filters capturing any material removed via the air scour system), with an estimated 10% of the design flow discharged as backwash (the actual volume is likely lower, 10% is likely to be a conservative backwash estimate).
- 3.2.2.38 Included as part of the design is a thickening circuit that includes a lamella plate clarifier and a press for thickening captured solids to create a solid sludge cake instead of discharging liquid waste. Liquid from the press and clarifier would return to the system for re-processing (the units dropped back into the CMDF feed), so no liquid waste would discharge into the environment. The output is a sludge cake.
- 3.2.2.39 Sludge cake produced by the system is estimated to be between 2 m³/day and 10 m³/day depending on the solids loading in the treated water (and assumes polymer thickened sludge cake at around 17% solids).
- 3.2.2.40 The design plans no liquid discharge to the environment, only sludge cake to landfill.
- 3.2.2.41 The treatment plant must be operated and maintained by a competent operator. The plant treatment processes are typical of fixed film and filtration treatment technology used in the water industry to treat water and wastewater. The likely construction and operations/maintenance costs have been estimated and provided in Updated Lake Concept Design reports. These will be developed further through detailed design and testing (SWL1). The ultimate operator would be well-informed before handover.
- 3.2.2.42 The Council will be responsible for the operation, ongoing treatment, and disposal costs after a predetermined defect and liability period as covered in the Deed, as explained in **Section 3.6.4**.

Receiving Waters of Thompson Creek

- 3.2.2.43 The proposed outlet receiving waters of Thompson Creek have poor water quality with high nutrient and chlorophyll 'a' levels that are likely to experience significant algal growth and blooms.
- 3.2.2.44 Significant discharge flow rates from the lake system using Chapman Creek waters can improve the water quality in Thompson Creek by reducing nutrients and the potential for algal growth. The initial trial proposes a lake turnover rate of approximately 150 L/s over a 12-hour per day pumping period.
- 3.2.2.45 Without additional lake treatment, discharge waters are expected to be similar to those of the intake waters in Chapman Creek, with high salinity levels and low chlorophyll 'a' counts, resulting in an improvement in the quality of water in Thompson Creek and downstream waterways. If additional dedicated treatment plant and in-lake treatment measures come online, nutrient levels will also reduce, leading to further improvements in the water quality in Thompson Creek.

3.2.3 Flora and Fauna

- 3.2.3.1 During notification of the AEIS, a submission from DEW commented on flora and fauna impacts.
 - 1. DEW queried the potential impacts associated with the intake to and outflows from the saltwater lakes, noting the Chapman Creek (intake) and Thompson Creek (outflow) locations contain populations of fish, mangroves and shorebird feeding habitat. Impacts from construction and operation infrastructure elements on local ecosystems, including the quality and volume of outfall brackish water (following flood events), should be known.
 - 2 DEW also suggested minor amendments to the Riverlea Park Flora and Fauna Management Plan: Precinct 2 (Precinct 2: FFMP) dated 08 December 2022.

Aquatic Fauna

- 3.2.3.2 <u>Response:</u> Water quality monitoring at Chapman Creek intake and the Thompson Creek outflow locations (amongst others) has occurred for over 24 months. The *Water Quality Monitoring Program Results to 02 July 2024* (Water Quality Report), as prepared by Water Engineering Plus (WEP), noted: (1) *recorded values for many water quality parameters are considered to be acceptable for the purposes of drawing water from Chapman Creek for the future lakes;* (2) *the quality of water discharged from the lakes to Thompson Creek will be significantly better than the current quality of water due to the relatively higher quality of water that will be drawn from Chapman Creek into the lakes.* The WEP Water Quality Report is in <u>Appendix F.</u>
- 3.2.3.3 COOE noted that removing a small area of mangrove habitat is not anticipated to significantly impact birds, mammals or reptiles listed in the NatureMap database search. However, seawater extraction to maintain the SWL could affect fish and crustaceans by removing eggs and propagules from their habitat. While the impact is minor, COOE considered the extraction exacerbated by seawater abstraction for the Buckland Dry Creek salt fields [Author's note: the BDC salt fields mainly get seawater from 9km further north refer to **Section 3.2.5**].
- 3.2.3.4 COOE's detailed assessment of the possible impacts on flora and fauna from the construction and operation of the associated SWL infrastructure is provided in <u>Appendix H</u>.
 - 1. After the PLUS workshop, the Council was unclear about what happened to aquatic fauna health during the recovery period following a major stormwater event.
- 3.2.3.5 <u>**Response:**</u> A healthy lake system will promote aquatic fauna. Based on WEPs' experience with other saline lake systems, benthic fauna (prawns, fish, crabs, and other marine creatures) will likely be established in the lakes. Avoiding low oxygen levels, high sediment loads, algal blooms, total freshwater turnover, and hyper-salinity is essential for aquatic fauna survival. While screening on intake and pumping will limit the size of fauna entering, larvae will still enter the lake system.
- 3.2.3.6 Concerning lake mixing and salinity levels, WEP notes a significant storm event (Q100 local event) would equate to 100mm of rainfall over the catchment footprint of a typical lake. Given the catchment area to lake area, the ratio is approximately 10:1 or 10 x the rainfall volume would equate to 1.0m of rainfall lake volume fill. Assuming the depth of the lakes is 3.0m, the volume of rainfall water vs lake saltwater is 1/4 or equivalent to 25%. The lake will surcharge and drain through to the next lake via the interconnecting spillways to outlet towards Thompsons Creek in a single day. Under such an event, a near bed more saline layer will persist (which will be confirmed by the monitoring program). Even assuming complete lake mixing, salinity levels will not drop

below 25 ppt. Most estuarine aquatic fauna are tolerant of such salinity levels, with research showing no mortality in aquaculture, including oysters and fish, for salinity in the range of 25 to 38 ppt.

- 3.2.3.7 WEP noted that based on aquatic fauna studies on other saline lake systems (e.g. Emerald Lakes on the Gold Coast by SLR Consulting (previously FRC Environmental Pty Ltd), implementing suitable design management measures such as local bed depressions can avoid significant aquatic fauna mortality and appropriate environments for aquatic fauna can be achieved. Local depression in the lake floor 1.0m deep by, say, 30 x 30m in area at the Lake Circulation inlets will provide havens/retreats (areas of denser saltwater) for the aquatic fauna to congregate, i.e., immediately downstream of the feed lines servicing the lakes. With a shallow lake system as proposed, localised deeper pools within the lakes remain saline as a refuge for fish and other aquatic fauna sensitive to salinity change, even in an extreme local freshwater runoff event. Fish will also move progressively downstream following the saline plume during freshwater runoff events.
- 3.2.3.8 WEP (<u>Appendix G</u>) advised that full lake salinity will return within two weeks following a significant storm event without undue anticipated effect on aquatic fauna. Monitoring Lake 1 during the lake Optimisation / Progressive Adaptive Strategy will include surveys by an aquatic ecologist, and their advice on management strategies for aquatic fauna will form part of the Strategy. Accordingly, a proposed specialist aquatic fauna consultant is to monitor aquatic fauna health in the lakes.

Native Vegetation Clearance

- 3.2.3.9 COOE reviewed the WEP September 2023 Water Quality Report and the intake and outfall locations. COOE noted that the seawater disposal method comprised an underground pipe for most of the route and an open drainage channel for the remaining corridor. The channel is in low-lying coastal flats with saline water courses, poorly drained soils and shallow saline water tables.
- 3.2.3.10 COOE further noted the distinguishable land salinisation, either as saline subsoils or surface seepage, with salt-tolerant vegetation and the abutting unlined Buckland Dry Creek (BDC) outfall channel, establishing that this area is already quite a saline environment. Therefore, the long-term impact of discharging saline water via the open drain will likely have marginal consequences for the surrounding current habitat or long-term change of vegetation and animals supported by these corridors.
- 3.2.3.11 COOE also note that some vegetation removal, including some River Red gums and mangroves, will be required to accommodate the Intake and pipeline for the SWL. COOE noted that EBS identified 22 native plant species but none on the threatened species list. EBS prepared two Sustainable Environmental Benefit assessments for Precinct 2 (including the SWL) and the intake and discharge infrastructure. This SEB is to offset the removal of some areas of native vegetation. The Native Vegetation Council approved the SEB offsets to remove vegetation.
- 3.2.3.12 Walker requested that EBS Ecology review the suggested amendments and update Precinct 2: FFMP based on DEW's advice. The revised Precinct 2: FFMP (version dated 05 October 2023) is in <u>Appendix I.</u>

3.2.4 Groundwater Impacts

Dewatering

3.2.4.1 DEW and the EPA commented on dewatering activities needed for lake construction during notification of the AEIS.

- 1. The SWL sits below the water table (groundwater), and excavation will require dewatering. DEW considers it reasonable to take groundwater during construction dewatering, subject to undertaking appropriate hydrogeological investigations and having the relevant licensing approvals in place.
- 2. The EPA commented that to assess the potential environmental impacts of dewatering activities, it requires information about the volume of dewatering required and how the initial water dewatered for construction will be managed before it is 'reused' for conditioning and wetting the clay material (presumably not occurring until later in the construction schedule).

The EPA also noted potential groundwater contamination with elevated molybdenum, selenium, fluoride and nitrate levels... Any discharge of water removed during dewatering should, therefore, be subject to water quality testing and option considerations before using wastewater for 'conditioning'... until the conclusion of a risk assessment and all management options are considered (following the waste management hierarchy).

- 3.2.4.2 <u>Response:</u> The following provides an overview of how Walker intends to manage groundwater and dewatering activities. Walker engaged LBWco to undertake detailed environmental and hydrogeological investigations to manage and support the approval of the groundwater dewatering processes that Walker will require to construct the SWL and compile the Dewatering Management Plan (DMP) documents for licence application/s. Additional matters raised by DEW after the PLUS Workshop, including the need for Walker to develop a surface and groundwater monitoring plan, are discussed in Section 4.2.
- 3.2.4.3 Multiple phases of investigation have occurred at the site, as detailed in LBWco's *Dewatering Investigation and Risk Assessment Report* (Appendix J), which provides information on the soil, groundwater, and surface water investigations undertaken and the management of the estimated volume of dewatering/flow rates.
- 3.2.4.4 LBWco findings of the Environmental Values of groundwater (following the EPA Guidelines) in the shallow saturated zones within the SWL 1 excavation depth range indicate that concentrations of nutrients and dissolved metals represent ambient background conditions typical for the shallow groundwater within the region.
- 3.2.4.5 Walker outlined a preliminary proposal for lake excavation and dewatering sequencing, in which the excavation of SWL1 will be in stages via a series of compartments separated by coffer dams. Dewatering flow modelling was undertaken by Hydrogeology Consulting Ltd (HCL) for LBWco, based on the proposed sequencing, to determine dewatering flow rates and volumes reasonably expected during excavation and construction works at SWL 1. The full report detailing the modelling work undertaken is provided and attached to the LBWco Report in <u>Appendix J</u>.
- 3.2.4.6 LBWco will finalise its detailed DMP when the ultimate scope of the SWL lining system is known and follows a detailed engineering design. LBWco will complete any remaining soil, groundwater, and surface investigations to finalise its technical assessment and inform an all-inclusive DMP. LBWco, Geotest and Mockinya will work collaboratively to progress the construction methodology, including flow rates and volumes to be managed over the construction period, referencing the preferred containment lining system for each SWL.
- 3.2.4.7 LBWco has yet to finalise the DMP. Still, the information in their Technical Memo, *Riverlea Saltwater Lakes Dewatering Investigation* (Appendix J), indicates how Walker will manage dewatering. The DMP will be prepared in consultation with the EPA and DEW to follow the EPA's Water quality Guideline, *Environmental management of dewatering during construction activities* (updated June 2021). The DMP will be provided to the EPA and DEW for approval/licencing before any dewatering works commence. Walker expects a suitable condition of consent to satisfy this matter, given the DMP requires secondary approval and licencing following affiliated Acts.

Lake Liner Construction

- 3.2.4.8 DEW and the EPA expressed interest in the SWL clay liner regarding its permeability, construction methodology, life cycle, and monitoring methods.
 - 1. DEW sought assurances from a suitably qualified professional to verify that the lakes would not be permeable and that there would be no ongoing groundwater take, including any monitoring methods to check the quality of the clay liner in the future.
 - 2. The EPA notes that the Saltwater Lakes proposes a 500 mm thick clay liner using medium to high plasticity clay sourced from the Riverlea site. The EPA considers "an engineering deliverable that the clay liner is certified as impermeable" to be insufficient information to determine the following:
 - Will the proposed compacted clay liner effectively contain the saline water to prevent infiltration to groundwater (and infiltration of groundwater into the lakes)?
 - For what length of time can it be 'certified' to remain impermeable?
 - What is intended to prevent the clay liner from cracking during warmer months during the lake's construction?

The AEIS report suggests 'the pressure head between the filled Saltwater Lakes and the shallow groundwater will be approximately equal on either side of the liner, indicating no or limited pressure driver for water movement across the liner in either direction'. It is unclear to the EPA how this 'limited pressure driver' will be maintained or how changes in pressure will be identified. It is also unclear what consideration (if any) has been given to the impacts of climate change on the maintenance of this 'limited pressure driver' in the future.

- 3.2.4.9 **<u>Response</u>**: While more detailed commentary on these matters is in **Section 4.2**, the following provides a brief update on the issues raised.
- 3.2.4.10 Walker engaged various experts concerning different types of liners to ensure they act as a suitable barrier between the proposed SWL and the groundwater. Walker initially focused on implementing a 500mm compacted clay liner because abundant clay material was available across the site, and clay is better suited to the active recreational uses proposed for the SWL.
- 3.2.4.11 The consultants clarified that saltwater would likely increase the solute suction in the clay liner, increasing strength and corresponding shrinkage of the clay (but not enough shrinkage to cause cracking), and exposing and compacting the clay liner with brackish water could limit the long-term differential moisture condition of the liner. There would also be no ongoing take of groundwater as the saltwater level inside the lake will be higher than the natural groundwater level, providing a positive pressure head on the clay liner, whereby the water retained within the lake will tend to create outwards pressure.
- 3.2.4.12 Walker sought further advice regarding the waterproof nature of the clay liner from various qualified engineering firms. Neither firm would verify a clay liner to be more impermeable than 1x10⁻⁹ m/s, estimating a potential for some minor permeability after approximately five years of operation.
- 3.2.4.13 Notwithstanding the focus on a compacted clay liner, Walker engaged Geotest to work collaboratively with LBWco to explore the positives and negatives of implementing a geomembrane liner. Geotest's high-level *Construction Methodology* report in <u>Appendix K</u> and *Proposed Options and Associated Costs* reported on three geomembrane containment solutions, advancing all could achieve a permeability range of 1x10⁻¹² to 1x10⁻¹⁵ m/s is in <u>Appendix L</u>.

- 3.2.4.14 Liner design development progressed, and based on the advice of Paul Lightbody from Mockinya Consulting (Mockinya), an HDPE liner with a 300 mm (min) layer of sand above the liner to provide mechanical protection was the preferred synthetic solution achieving a minimum permeability of 1×10^{-12} m/s, and capable of being engineered to have a design life of at least 100 years.
- 3.2.4.15 However, Mockinya advised there are challenges concerning geomembrane containment systems, which can also have potential issues concerning construction practicalities and operational flaws, given they are applied (typically) to more passive land use practices that are not vulnerable to active or frequent public recreational exposure.
- 3.2.4.16 Mockinya and Jarrod Bishop from LBWco are collaborating to develop the best containment system, finalise the construction methodology, and manage groundwater and dewatering flows. In collaboration with its consultants and regulatory agencies, Walker will ensure that the ultimate lake liner solution mitigates acceptable containment risks between the proposed SWL and the groundwater so that it will be long-lasting, easily managed, and maintained.

Dewatering Well Points & Post-Construction Monitoring

3.2.4.17 Well points will likely be maintained (capped), and possibly new monitoring wells will be installed to monitor groundwater conditions around the periphery of the lakes. Given these well points comprise an approximate diameter of 200-300mm and will be capped, there is unlikely to be any issue with retaining potential well points in situ within the outskirts of the SWL edges (in terms of safety, amenity, cost, infrastructure, etc.). The ultimate location and the finished form of capped wells will form part of an LMP or LOMP and an agreed landscaping package, as appropriate.

3.2.5 Water Intake and Extraction Impacts

1. The Council and the EPA requested clarity regarding the cumulative impacts of water extraction to serve the Riverlea saltwater lakes and the BDC salt fields, advising there was little information regarding cumulative pumping volumes, rates or periods/seasonal requirements.

The Council referenced the NearMaps time series, where it appears that BDC regularly pumps salt water from Chapman Creek. The intake pumps in Chapman Creek into the BDC Cheetham Salt Fields have been in operation consistently since at least 2014

Further, concerning the potential worsening of the environmental quality of the extraction seawater site in Chapman Creek, the Council noted that the 2 pump station locations in Chapman Creek are only 160 metres apart.

- 3.2.5.1 **Response:** An assessment by WEP regarding cumulative pumping volumes is in <u>Appendix M</u>. Nonetheless, at the PLUS Workshop, Walker's consultants confirmed that BDC appears to be taking seawater from Chapman Creek for environmental flows at modest rates (2.2GL/annum of a total 65GL/annum licence). Riverlea will take approximately 7GL annually, representing 10% of the total inflow capacity into Chapman Creek from the Gulf St Vincent.
- 3.2.5.2 Some portions of the Dry Creek Salt Field are presently in a holding pattern. However, water being drawn into, mixed with, and transported through many ponds is still required for operational reasons (to entrain seawater from Section 4 to Section 1 in the Dry Creek Salt Field system). Middle Beach superseded Chapman Creek as the primary operational entrainment location, where continuation of the historic operational seawater entrainment now occurs.

Photo 1 - BDC - Chapman Creek Intake

Photo 2 – BDC - Middle Beach Intake



- 3.2.5.3 Photo 1 above shows the absence of an intake line (one of two) from the intake system at Chapman Creek, and Photo 2 details the Middle Beach Intake (the primary salt fields intake).
- 3.2.5.4 Nonetheless, there are environmental reasons why some pumping from Chapman Creek occurs (as with the Pond at Chapman Creek Pond XB3). Sustaining water quality and levels within several inundated Ponds (using managed entrainment, rebuilding infrastructure to flow brine through to Section 2 and maintaining continued pumping at Middle Beach through the 'salinas') also requires Pump 9 at Chapman Creek to remain operational. There is also a connection between Ponds XB3 and XD1, which can supply additional water if needed.
- 3.2.5.5 Accordingly, operational requirements for salt production primarily use the Middle Creek pumps to entrain seawater from Section 4 to Section 1 of the Dry Creek Salt Field system. To a lesser extent, there are requirements where Pond levels must be maintained for environmental purposes from Section 3 to portions of Section 2, using a combination of seawater entrainment from Middle Creek and Chapman Creek. Refer to <u>Appendix M</u> for the pond layout, holding pattern, and water flow path schematic.

3.2.6 Flood Management

- 3.2.6.1 DEW, the Council, and a property owner adjoining Precinct 3 of Riverlea comment on matters associated with flood events stemming from the Gawler River system during AEIS notification.
 - 1. The Gawler River is a perched river system subject to floodwater breakouts. Given this, DEW sought clarity about whether Walker considered potential flood levels on roads and transport routes to ensure there would be no possible flood island effects, isolation and access issues.

DEW also sought clarity (via a clear statement) that no additional diversions (directly or indirectly) would result in the 'take' of water from the Gawler River.

Gawler River

- 3.2.6.2 **<u>Response</u>**: Walker's engineering consultants, WGA, determine finished ground and pavement levels to ensure roads and other necessary infrastructure are above-predicted flood levels, which are in the engineering plans and documentation supplied to the Council for verification and approval before construction.
- 3.2.6.3 Only natural flood flow breakouts from the Gawler River are diverted via channels to the Thompson Creek outfall, which then flows to the ocean. The development will not cause the taking of any water from the Gawler River, either directly or indirectly.
 - 2. The Council raised concern about outbreaks identified in previous flood modelling that require consideration within the flood report. Several modelling iterations have represented the 2016 flood event, including outbreaks along the northern portion of Precinct 2.

The Council states that the up-to-date flood modelling utilises the latest digital terrain modelling. It has formed the basis of the Gawler River Stormwater Management Plan (showing a degree of flood water in the Riverlea development). The flood report should align with this modelling to ensure consistency with the latest information.

The Council raised concern about the reliance on potential external works to the site to mitigate flooding events that have not been implemented or a funding pathway identified.

- 3.2.6.4 <u>**Response</u>**: As previously communicated to the Council, Walker understands (from DEW) that the Northern Floodway is not proceeding and, therefore, has no consequence on the AEIS. All floodwater modelling undertaken by WaterTech does not consider the Northern Floodway, nor will it until there is a formal commitment by the State Government. As no known funding mechanism exists for these works, Walker is implementing its on-site solutions to mitigate flooding risk based on the existing conditions and has not relied on third-party works to alleviate flooding.</u>
- 3.2.6.5 All the previous inconsistencies the Council referred to were breakouts from the Gawler River through the middle of the site (roughly the Precinct 2 area). All flood modelling scenarios have since used the GRFMA-validated model (which reflects the recent LiDAR information).
- 3.2.6.6 Should a breach of the Gawler River within the Riverlea property boundary extent eventuate, floodwaters will naturally divert west as the Riverlea landform will be built up by ~750mm – 1,000mm above existing ground levels and discharge back into Gawler River. Further, a perimeter channel (similar to the channel adjacent to Stages 10, 11 and 12) on the far western boundary of Riverlea will capture any internal floodwaters stemming from the Gawler River to minimise any negative impact on properties west of Riverlea (i.e. Windemere).
 - 3. One submission (from an existing resident adjoining Precinct 3) suggests no evidence of assessing the environmental assets on their property that depend on floodwater and groundwater flows and how they are at risk of the proposed Stormwater and Food Mitigation Strategy.
- 3.2.6.7 **<u>Response</u>**: Walker does not propose to alter the natural flows to or from the Gawler River but manage breakout floodwaters that would potentially impact Riverlea by directing these flows to several channels (notably the eastern perimeter and the western perimeter channels) that guide the floodwater flows out to the ocean via the Thompson Creek outflow channel.
- 3.2.6.8 As shown in Figure 6 below, the respondent's property is about 2 km to the western point of the Precinct 2 boundary. Flood flows presently through Precinct 2 do not flow westerly but in a southerly direction via the Thompson Creek tributaries, leading to the Thompson Creek outflow. The breakouts from the Gawler River that potentially inundate the resident's property appear to be from the north, mainly via Windemere, as opposed to the closest breakout point, which is about 3.3 km northeast of their property.

3.2.6.9 The altered Stormwater and Food Mitigation Strategy does not change the situation from the previously proposed and approved channel diversion system.



Figure 6 - Respondent's Property and Direction of Flood Flows

Source: SAPPA - Planning & Property Atlas (October 2023) – Hazards (Flooding General) Overlay

Bunding

- 4. At the Workshop, Walker confirmed to participants that no flood waters would enter Lake 1 from the north as bunds would restrict floodwater following the Western Floodway strategy (which the Council considered a significant late amendment to the AEIS)
- 3.2.6.10 **<u>Response</u>**: Walker disagrees this is a substantial change, as the Burchills design philosophy reflects this, as discussed in **Section 3.2.1** above. The bunds provide a more straightforward and cost-effective flood protection system for the SWL as the additional land form cuts off and redirects possible riverine flood waters west. Detailed engineering design plans will capture the bulk earthworks at this location with the documents submitted to the Council for engineering approval.

3.2.7 Stormwater

3.2.7.1 DEW, the Council and the EPA commented on the AEIS concerning stormwater management.

Stormwater Quality

 DEW references Appendix A – WGA Walker Corporation Riverlea Park: 2009 Technical Paper Update – Stormwater Quality Modelling dated 14 April 2023 – and Appendix F: Stormwater Quality Modelling – Section 1.2.1 Treatment Assets: DEW supports the WGA best practice treatment train approach to stormwater management and the forward-looking process for future development stages.

DEW identified WGA's awareness of the highest-performing gross pollutant traps (GPT) continuous deflective separation (CDS) technology for sediment removal, which was adopted throughout the development and achieved high pollutant trapping performance. While DEW raises concern over GPT numbers (recommending a re-run of the MUSIC model using detailed design parameters for all the intervention measures), it strongly supports WGA's aim to optimise or reduce GPT numbers during detailed design.

- 3.2.7.2 **<u>Response</u>:** DEW/Green Adelaide:
 - supports the WGA treatment train approach to stormwater management strategy as the bestpractice approach.
 - acknowledges WGA's awareness of the highest-performing GPT technology in sediment removal. The high-performing GPT using CDS technology has been adopted throughout the development, achieving high pollutant trapping performance.
 - acknowledges WGA's aim to optimise or reduce the number of GPTs where possible during detailed design is 'strongly supported' to ensure satisfying water quality targets.
- 3.2.7.3 WGA also provides a detailed design report and modelling to the Council for approval for each release Stage, based on the design, with all water-sensitive urban design (WSUD) pollutant reduction targets met for each land release.
- 3.2.7.4 The updated WGA *Stormwater Management Water, Wastewater and Recycled Water* (*December 2023*) report in <u>Appendix C</u> and the WGA - *Precinct 1 and 2 Interim and Ultimate Development* - *Stormwater Management Plan* – 2024 in <u>Appendix N</u> has re-run the MUSIC model.
 - 2. The Council acknowledged the stormwater details provided, which reflect the work between the Council and Walker in evolving the stormwater strategy and drainage philosophy for Riverlea. Broadly, the Council understands and supports the proposed solution, subject to the reserved matters relating to stormwater and the lake component.

As part of the detailed technical documentation review, the Council noted some inconsistencies but expects an updated Stormwater Management Plan (SMP) to address these and is comfortable with a condition relating to the SMP to resolve these matters.

The Council further acknowledges the intricacies of site-wide stormwater management and believes it would benefit from a workshop held between stakeholders.

- 3.2.7.5 <u>**Response:**</u> Walker has presented the updated SMP to the Council and is committed to collaborating with the Council to deliver a comprehensive stormwater strategy for Riverlea. Further discussion on this and the suggested Reserve Matter is in **Section 4.3**.
 - 3. The EPA recognises that creating urban areas on predominantly permeable surfaces (often with related vegetation clearance and more impervious surfaces) increases run-off and pollutants in stormwater. Urban stormwater is subject to multiple pollution sources, and the impacts of poorly managed stormwater are well documented.

Using the principles of WSUD will offset the impacts of urban development (improving stormwater management) and is considered best practice stormwater management (and demonstrates compliance with the General Environmental Duty (defined in Section 25 of the Environment Protection Act 1993)).

The EPA considers it critical to treat all stormwater adequately before discharge into the proposed saltwater lakes. The SMP outlines a strategy for WSUD and reducing stormwater pollution (treatments via wetlands, vegetated swales in open linear channels, gross pollutant traps (GPT) and bioretention systems). The concept outlined in the SMP aims to achieve stormwater treatment before being released into the Saltwater Lakes and the outfall offsite, which is acceptable to the EPA.

The EPA comments that the wetland treats very little stormwater, and treatment targets are achieved mainly via the swales in the major drainage channels. The EPA raises concern that during high-flow events, the swales may be damaged and, therefore, unable to perform their treatment function in subsequent events (requiring further consideration in the detailed design phase).

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) is widely accepted, and the MUSIC model for this proposal demonstrates that stormwater will achieve the run-off pollution reduction targets and water quality improvements. Whilst the strategy is conceptual, the detailed design must accomplish the outcomes outlined.

3.2.7.6 **Response:** Walker has no issue with the EPA's suggested condition that "detailed design of the stormwater management system must meet the outcomes and water quality objectives as those modelled in the concept design outlined in Stormwater Management – Water, Wastewater and Recycled Water report, prepared by WGA and dated April 2023".

Stormwater Detention

4. The EPA advised that discharge rates from the development should not exceed pre-developed ones and that on-site detention is required. The EPA believes the SWL will provide stormwater detention (for catchments draining to the lakes) approximately 0.5 metres above the lake's proposed water level. For other parts of the development, a detention basin will be constructed in the southwestern portion of the site to capture stormwater before discharging to the Thompson Creek outfall channel. Not indicated in the AEIS is the detention basin's type of lining and construction methodology.

Further, the EPA is unclear on the intent for the detention basin to receive discharges from the SWL (having the potential to introduce uncertainties). Several potential problems may result, including:

- Infiltration of saline seawater into the underlying groundwater through the base of the basin.
- The detention area will potentially have highly variable salinity, ranging from 'fresh', stormwater freshwater, various mixtures of seawater and freshwater (quasi-estuarine) to predominantly seawater conditions in times of low rainfall, potentially impacting the basin's ecology, associated with plants, algae, macroinvertebrates and other species.
- 4. Major biological impacts could exacerbate odours and nuisance insect problems and reduce the capacity of the detention basin as seawater discharges into it.

The EPA sought clarification and further information on this particular issue.

3.2.7.7 **<u>Response</u>**: Walker does not propose directing seawater from the SWL to the southwest wetland detention area of the Riverlea development. As shown in the Burchills *Saltwater Lakes Outlet Plan* in Figure 7 and <u>Appendix Q</u>, the water from the SWL will be discharged via a separate channel system traversing the western property boundary (abutting the BDC channel) and disperse directly into the Thompson Creek outfall channel and, therefore, not impact the ecology of the wetland due to changing salinity/freshwater conditions throughout the year.

Figure 7 – Burchills – Drawing SK 147 - Saltwater Lakes Outlet Plan



3.2.7.8 Investigations by WEP, LBWco and COOE indicate the groundwater in this area is very saline; any seepage is unlikely to cause environmental harm (that is not trivial) in the receiving environment (refer to COOE's assessment in **Section 3.2.3**).

Urban Runoff Management (stormwater)

- 4. At the PLUS Workshop, the Council noted that the Hybrid Strategy relies on GPTs (number & locations unknown) and Atlan Flow Filter Units (number & locations unknown) to pre-treat urban runoff before entering Lake 1 for the other Hybrid Strategy components to be successful in achieving and sustaining secondary contact standard water quality.
- 5. Development of contingency plans should the water in the SWLs not be of suitable quality to discharge to the Thompson Creek outfall channel and marine environment.
- 3.2.7.9 **Response**: The GPTs align with the previous approvals and stormwater design philosophy (management & water quality). The Concept Plans for the SWL 1 show approximately 5 GPTs and 5 Atlan Flow Filter Units, as shown to the Council. As discussed with the Council, Walker will continue rationalising the number of GPTs across stages to maximise the pipe/pit network and stormwater catchments. However, the project is battling several constraints, including the flat topography and excessive fill requirements, minimum grades of pipes, groundwater, size and depth of open channel drains and vacuum sewer/SA Water requirements. Walker must balance these factors to ensure the project is feasible for all stakeholders.
- 3.2.7.10 Walker engaged S&B to provide an updated MUSIC model for the catchment area SWL1 for the Riverlea development to support the lake design and approval process (refer to Figure 8). S&B's Technical Memorandum, Stormwater Treatment Performance Modelling (<u>Appendix O</u>), provides an
overview of the modelling procedure, the results of the modelling, and indications of the potential effects that nutrient input from stormwater may have on the lake system.



Figure 8 - Catchment Area of Saltwater Lake 1 (SWL1)

- 3.2.7.11 S&B reviewed two stormwater treatment trains in the MUSIC modelling. Specifically, constructed wetlands are used compared to proprietary membrane filtration technology (specifically the Atlan Flowfilter product). S&B concluded that the GPT + wetland-based stormwater treatment process and the GPT + membrane filter-based treatment processes resulted in acceptable load reductions, meeting the required load reduction targets. A copy of the S&B's technical memorandum is in <u>Appendix O.</u>
- 3.2.7.12 The Lakes Management Plan and Lakes Operational Management Plan will consider contingency plans for the lake operator to suspend lake turnover and discharge until appropriate in-lake treatment achieves suitable water quality standards.

The EPA also sought confirmation that the ephemeral wetland pools are unlikely to have much value in terms of treatment of stormwater other than sediment removal due to short inundation times. However, the short inundation times will help with mosquito control.

3.2.7.12 **Response:** The interim wetland pools may have reduced value for stormwater treatment other than sediment removal due to short inundation times. However, vegetated swales would treat stormwater, and the interim wetlands solution will inform the design capacity for the final wetland. Nonetheless, short inundation times within the interim wetlands will help control mosquitoes.

3.3 Transport Matters

3.3.1 Public Transport

- 3.3.1.1 Concerning public transport-related topics, one submission from the Council and two submissions from members of the public were received during notification of the AEIS.
 - 1. The Council is aware of public transport's key role in providing a sustainable transport network and notes the limited options available for the site. The Council seeks the developer and the relevant authority to consider the scope for the future provision of public transport infrastructure within the current development site and the wider network, given the location of the development and expected movement patterns as the community develops.
 - 2. The two submissions from the public opposed the development, raising concerns regarding the lack of public transport options, specifically an efficient rail service (spur line from the Gawler line) and rail reserve corridor for future rail provision within the development.
- 3.3.1.2 **<u>Response:</u>** A new Adelaide Metro bus service commenced at Riverlea in July 2023 to cater to residents. The bus service operates between Riverlea Park and the Salisbury and Elizabeth Interchanges via Virginia Monday to Friday (refer to the 402 and 450 service routes, respectively). Adelaide Metro will monitor these services and consider any network alterations as demand around the Riverlea services evolves.
- 3.3.1.3 Implementing an efficient regional rail service is complex. The Australian Rail Track Corporation Ltd (ARTC), an Australian Government-owned statutory corporation, owns and manages the standard gauge interstate track in South Australia (being the closest rail infrastructure to Riverlea). If future regional demand warrants a rail service, appropriate governance arrangements between ARTC and the State Government would need to occur.
- 3.3.1.4 Additionally, alternate modes of mass public transport are emerging, including trackless trams/mass rapid bus transit (as an alternative to fixed heavy rail services), that operate within more flexible transit corridors and might be more practical than upgrading existing fixed rail infrastructure. Nevertheless, it is the responsibility of the State government, in line with the recently announced Adelaide North Transport Study, to inform future planning and funding options for regional mass public transport infrastructure for Adelaide's northern suburbs.

3.3.2 Traffic Management & Parking

- 3.3.2.1 Two submissions concerning traffic management matters were received, one from DIT and one from the Council.
 - 1. DIT confirmed that it 'reviewed the proposal and is generally comfortable with it [the AEIS]'. DIT identified that an additional note might be required [on approval] to ensure that new signalised intersections are coordinated and managed appropriately.
 - 2. The Council identifies the lakes as traffic and trip-generation drivers in the local and broader catchment. The Council desires an updated parking plan detailing additional parking facilities at key nodes around the lakes to cater to the expected parking pressures (including ramp access (catering to the largest envisaged watercraft)) and trailer parking.

The Council sought additional pedestrian crossings across lake bodies and swales to encourage walkable and connected communities, including but not limited to the lakes and footpath connections across swales near the Emerging Activity Centre, Sport and Recreation Facilities and Education Centre. Cycling and walking play a role in the transport network of the emerging community, and the Council has considered how this network can best serve residents. The Council requests (amongst other matters) a bridge or crossing point over/through the lake, which is vital for residents to cross (rather than commuting the lake's circumference). An updated Pedestrian and Cycling Network Plan (to ensure that the network is fit for purpose in the future) should address this matter.

3.3.2.2 **<u>Response</u>**: The DIT comments are acknowledged. The Council has suggested numerous conditions regarding the above, and Walker (together with the Council) is preparing an updated parking plan detailing additional parking facilities around the lakes. While Walker does not intend to build a bridge over the lakes (nor does it form part of the proposal), it will review the Pedestrian and Cycling Network Plan.

3.4 Infrastructure Matters

3.4.1 Affordable Housing

- 3.4.1.1 Two submissions, one from the South Australian Housing Authority (SAHA) and the other from the Council, raised the importance of providing Affordable Housing across the Riverlea development.
 - 1. SAHA assessed the proposal and determined that delivery of Affordable Housing will be secured by:
 - A. An Affordable Housing Land Management Agreement (LMA) between Walker and the Minister for Planning is registered on the Certificates of Title.
 - B. Walker's documentation (dated 30/6/2023) states that the Project will deliver 15 per cent of the total number of dwellings as affordable housing, being 430 out of 2867 total allotments (Table 1 Land Division Statistics (2023).
 - C. The Master Plan provided by Walker (Appendix N (2 pages), Drawing No. 21A3185AH Rev J, dated 31 March 2023) outlines that the proposal will deliver 15 per cent of the total number of dwellings as affordable housing and therefore meets the minimum 15 per cent requirement.

SAHA concludes that the delivery of appropriate, affordable housing is likely to be achieved provided the development follows the LMA, the submitted AEIS documentation and the <u>directed</u> condition below:

<u>SAHA Directed Condition</u>: The applicant must provide a minimum of 15% as affordable housing' of all dwellings following the criteria determined by the Government Gazette on 8 September 2022 under regulation 4 of the South Australian Housing Trust Regulations 2010 (or any updates) as per the LMA registered on the respective Certificates of Title.

- 2. The Council raised the importance of providing affordable and high-needs housing catering to a diverse community's evolving needs and would encourage consideration of a formal Affordable Housing Agreement.
- 3.4.1.2 <u>Response</u>: An LMA (between Walker and the delegate for the Minister for Planning) to provide a minimum of 15% of affordable housing across the development is registered on the Certificates of Title for land in Precinct 2 that is in the ownership of Walker (Registered Dealing No. AG 14140180). LMA title registrations will continue to occur as land transfers to Walker.
- 3.4.1.3 In addition to Walker's commitment to provide at least 15% of affordable housing across the development, Walker will continue to review and update its Affordable Housing Plan in collaboration with SAHA. **Table 2** details the Approved Affordable housing delivery compared to that conceptually identified in the AEIS.

Allotments (Lots)	Precinct 2 - approved	Precinct 2 - proposed		
Total lots	2664	2749		
Total affordable housing lots	400	435		
Total % affordable housing lots	15.01	15.8		

Table 2 - Approved Affordable Housing and Conceptually Identified in the Proposed AEIS

3.4.2 Social Infrastructure

3.4.2.1 The Council made several comments on Social Infrastructure during AEIS notification.

The Council considers the Social Impact Statement for Precinct 2 to address a broader range of principles rather than purchaser preferences to understand the social impacts. A reliance on purchaser preferences presents challenges in appropriately catering for the community's future needs. The study's design limits its usefulness as a tool to understand the likely social impacts on the local and broader communities.

The provision of the community development framework would also be a useful addition to the information on the community profile and community needs.

Due to changes in human service organisation and delivery since the original EIS, there is an argument for reviewing and updating this information, as it will provide a complete understanding of how the service delivery needs will be met for the community. It is noted in the guidelines that high-needs housing should be included as a category of service provision in the EIS, and its inclusion is vital.

The Council continues to work with Walker Corporation on further social infrastructure outcomes through a partnership approach.

- 3.4.2.2 <u>**Response:**</u> Concerning Social Infrastructure, Walker commits to providing a Social Impact Statement for Precinct 2 to the Council's satisfaction and a Community Development Framework for Riverlea (as included in Walker's Statement of Commitments). In this regard, Walker has had a comprehensive Community Engagement Strategy prepared by Stan Salagaras in 2023 (as provided to the Council), and Walker upholds a live Community Business Plan, which is disclosed and discussed during regular monthly meetings with the Council.
- 3.4.2.3 As stated in the Affordable Housing Section, Walker commits to deliver at least 15% 'affordable housing' over the Precincts 1 & 2 area and has explicitly entered into an LMA with SAHA over Walker-owned land to demonstrate this commitment.

3.4.3 Council Infrastructure

3.4.3.1 The Council commented on the Council Infrastructure during AEIS notification.

The Council advised typical external infrastructure work requirements (i.e., works at the applicant's expense and to the Council's satisfaction) and requested additional detail as to the impact of the lake on the adjoining road networks.

3.4.3.2 <u>**Response:**</u> Walker acknowledges the Council's Infrastructure comments and the requested information that Walker will progress with the detailed design for the associated works.

3.4.4 Open Space & Gawler River

3.4.4.1 The Council made several interrelated comments on the Landscaping Master Plan, open space, and the Gawler River corridor during AEIS notification.

Open Space

1. The Council supports the landscape masterplan vision for providing high-quality open space reflecting the community's future enjoyment needs. Several points of clarification are required but do not represent fundamental challenges to the proposal (and are dealt with via an updated landscaping plan). Cycling and walking play a role in the transport network of the emerging community, and the Council has considered how this network can best serve residents. The Council requests (amongst other matters) a bridge or crossing point over/through the lake, which is vital for residents to cross (rather than commuting the lake's circumference). An updated Pedestrian and Cycling Network Plan (to ensure that the network is fit for purpose in the future) should address this matter.

The Council also requests that any review of the open space hierarchy rationalise 'pocket parks' or small parks to provide residents with a more usable form of open space.

3.4.4.2 **<u>Response</u>**: Walker has been reviewing the points of clarity concerning the Landscaping Master Plan and updating the document, including a review of open space. Similarly, Walker is reviewing the Pedestrian and Cycling Network Plan. However, as previously stated (in the Traffic Management & Parking Section), Walker does not intend to build a bridge over the lakes, nor does it form part of the proposal. Walker encourages alternative uses of open space to provide facilities for events such as local concerts, outdoor cinema, pop-up markets and other activities that contribute to a strong and vibrant community.

Shared Use Trail

The Council asserts the proposal fails to incorporate a shared-use trail along the Gawler River from Buckland Park to Old Port Wakefield Road, in addition to a 50-100m wide linear reserve (part of the State Government's Gawler River Open Space Strategy report).

3.4.4.3 <u>Response</u>: The AEIS changes little concerning the Gawler River corridor. Walker's Precinct 2 proposal incorporates a shared-use path along the entire length of the Gawler River within Precinct 2 and a minimum 50m wide future open space reserve area (as shown previously in the Riverlea Landscape Master Plan).

Gawler River

The Council also commented on how the proposal lacks revegetation works details adjacent to the Gawler River and considers a Revegetation Management Plan (RMP) for this area is required and should include delineation of approach for riverbank, riparian and woodland zones. The RMP should combine into a wider Masterplan identifying how the Gawler River will be managed and landscaped.

3.4.4.4 **<u>Response</u>**: While high-level guidance is in the Flora and Fauna Management Plan for (amongst other matters) the revegetation of Precinct 2, Walker will incorporate the Gawler River Open Space Zoned area into the Riverlea Landscape Master Plan for targeted revegetation management methods for riverbank, riparian and woodland areas.

3.5 Management Matters

3.5.1 Lakes Liner and Lakes Edge

- 1. Council staff now understand the management requirements relevant to a lake system; however, detailed consideration of lake management requirements, including operational management considerations, is still required.
- 3.5.1.1 Following AEIS notification and the PLUS Workshop, the Council and the EPA commented on SWL edge treatments and long-term maintenance.
 - 2. The Landscape Masterplan highlights a series of varied lake edge treatments; however, in understanding the impacts of various lake treatments, the Council seeks a hard edge approach to the entirety of the lake, ensuring water quality outcomes, reduced weed and maintenance impacts and appropriate interface.

A Workshop outcome was that council staff sought confirmation of the type of geomembrane lining system proposed for the SWLs and its longevity and permeability. Greater detail on the liner lake edge design was also requested, including lake edge design finishes, penetrations, and liner armouring and anchoring structures (in concept form) in the final submission. The Council also asked for further details on sedimentation and siltation and the likelihood and frequency of dredging requirements.

3. EPA notes, 'After five years from the date of the SWL construction contract Practical Completion, and upon rectification of known system defects (except for normal wear and tear), Council assume the operation and maintenance of the system from Walker, relieving Walker of any further liabilities'. An indication of the Council's willingness and capacity to operate and maintain the SWL system would be useful.

Lake Edge Treatment Concept Design

- 3.5.1.2 <u>Response</u>: Further detail and comments concerning the liner types are in Section 4.2. If Walker prefers the HDPE geomembrane containment solution, an appropriate anchoring system must also be employed. Any additional structural penetrations will likely be discouraged from being used within the SWLs because the geomembrane containment systems do not generally perform an active recreational function (but rather a passive usual industrial application function).
- 3.5.1.3 Accordingly, Walker prefers that there be no (or minimal) penetrations through an HDPE liner and that lake edge infrastructure is designed and installed accordingly. Nonetheless, the lake edge finish, design, treatment, and liner anchoring structures were reviewed for inclusion in the final submission at the Concept Design level, as shown below in <u>Appendix P</u> HDPE Liner Lake Edge Concept Plans.

3.5.2 Stormwater Runoff

3.5.2.1 All configured subdivisional piped stormwater outlets (discharges) are to contain GPTs (silt/gravel/rubbish) and Atlan WQ (nutrient removal) cleansing units, and all open space areas will discharge into the lakes via grassed open swales. Implementing GPTs aligns with the previous approvals and stormwater design philosophy (management and water quality). The Concept Plans for the SWL 1 and surrounding stages that feed into it illustrate approximately 5 GPTs and 5 Atlan Flow Filter Units, as shown to the Council. As discussed with the Council, Walker will continue rationalising the number of GPTs across stages to maximise the pipe/pit network and stormwater catchments. In addition, Gawler River flooding will not enter the lake system (up to the 1% AEP event). The developed areas of the site, open space areas and road reserves will be vegetated and landscaped to manage local site sediment runoff.

- 3.5.2.2 However, as previously advised, the project is battling several constraints, including the flat topography and excessive fill requirements, minimum grades of pipes, groundwater, size and depth of open channel drains and vacuum sewer/SA Water requirements. Walker must balance these factors to ensure the project is feasible for all stakeholders.
- 3.5.2.3 The proposed stormwater outlet controls will ensure no significant local settlement plumes in the SWL, as the design intent is that there will be no requirement to manage stormwater siltation in the SWL within the project's life. Monitoring suspended solids discharge into the lakes during local runoff events is proposed to demonstrate compliance. Any non-conformances can be dealt with through additional treatment train measures if required (e.g. flocculant dosing). However, based on WEP's experience with many other projects, such contingency measures will not be necessary.

Pumped Lake Water Supply to the lakes

- 3.5.2.4 The quantity of remnant fine siltation entering the SWL from the pumped lake supply water is estimated to be less than 1.0mm/year per the footprint area of each lake or less than 10cm over 100 years. Monitoring to date indicates that average suspended solids levels in Chapman Creek are less than 20 mg/L, with continuous turbidity monitoring indicating less than 5 NTU for most of the time, indicating quite clear water with low suspended solids. Some elevation of suspended solids was detected for short periods, possibly following local runoff events. Even conservatively assuming 20 mg/L at all times in the lake intake waters and assuming all suspended solids settle in the lake system, this equates to less than 1 mm/ year siltation. Based on the continuous turbidity measurements, siltation from the lake supply waters will be significantly less than this.
- 3.5.2.5 Sediment removal is a preferred option regarding lake aesthetics and quality, and it ensures that lake dredging in the future is not required. The proposed nutrient and algal management measures are extensive, with multiple contingencies. The water filtration will remove algae, organic (non-soluble) nutrients, and insoluble inert solids that would otherwise cycle in the lake water, adding to soluble nutrients as they break down under reductive decomposition in otherwise deposited sediments.

3.5.3 Sediment Removal

- 3.5.3.1 Walker's consultant, S&B, advised that the Progressive Adaptive Hybrid Lake Water Management & Treatment Strategy results in minimal sedimentation and siltation within the SWL. Therefore, lake dredging will not be required over the system's design life.
- 3.5.3.2 In their advice dated 08 November 2024, the EPA appeared favourable to the low flow option for the SWL, confirming the treatment contingencies proposed (including nutrient removal through various mechanisms) are all valid treatment methods. Still, the EPA noted that particular treatment contingencies could generate potential waste streams that need capture and disposal.
- 3.5.3.3 As mentioned in Section 3.2.2, waste streams from the SWL will pass through the water treatment system. The filters from the water treatment system extract the waste, including planned maintenance scouring, and capture any material removed via the scour system.
- 3.5.3.4 A thickening circuit that includes a lamella plate clarifier and a press for thickening captured solids to create a solid sludge cake instead of discharging liquid waste. Liquid from the press and clarifier are returned to the system for re-processing (the units dropped back into the CMDF feed) so there is no liquid waste discharge to the environment. The output will be a sludge cake disposed of in a landfill.
- 3.5.3.5 Sludge cake produced by the system is estimated to be between 2 m^3/day and 10 m^3/day , depending on the solid loadings treated in the water.

3.5.4 Outflow Channels

SWL Outlet Channel

- 3.5.4.1 At the Workshop, the Council requested further information and clarification concerning the SWL Outfall Channel, including:
 - 1. The volumes of water that will be gravity-fed along the channel;
 - 2. How will erosion and scouring be managed;
 - 3. Whether the channel will be planted out (i.e. what will be the amenity outcome);
 - 4. What will the longevity/serviceability of the channel be in the context of its exposure to seasonal weather variations (not permanently underwater or permanently wet); and
 - 5. What are the maintenance costs of necessary repairs/replacement of the open channel?
- 3.5.4.2 <u>**Response</u>**: Most of the alignment of the SWL Outfall Channel will pass through areas of highly elevated groundwater salinity immediately adjacent to the Buckland Dry Creek (BDC) Salt Production Lakes with TDS levels between 40,000 and 80,000 (mg/L). The Thompson Creek outfall channel is similar.</u>
- 3.5.4.3 The longevity and serviceability of the outlet channel will not differ from any other planted channels in a saltwater setting. Accordingly, there will be minimal maintenance requirements or necessary repairs/replacements of the outfall channel as it will be largely unmaintained and not dissimilar to the existing Thompsons Creek outfall channel downstream.
- 3.5.4.4 Accordingly, the proposed location of the SWL Outfall Channel does not require a clay liner.
- 3.5.4.5 The photos (3 & 4) below detail the type of salt-tolerant vegetation immediately along the BDC Salt Lakes (unlined) channel feeding into the Thompson Creek outfall channel and within the farmlands adjacent to the BDC Salt Lakes and Thompson Creek outfall.

Photo 3 – Channel adjacent to BDC Salt Lakes feeding into Thompson Creek outfall channel



- 3.5.4.6 The channel will have negligible longevity/serviceability issues in the context of its exposure to seasonal weather variations, as the base (and sides) will be permanently underwater (grading up from Thompsons Creek outfall channel), and the vegetation will generally look after itself akin to a natural environment.
- 3.5.4.7 The longevity and serviceability of the outlet channel will not differ from any other planted channels in a saltwater setting. Accordingly, there will be minimal maintenance requirements or necessary repairs/replacements of the outfall channel as it will be largely unmaintained and not dissimilar to the existing Thompsons Creek outfall channel downstream.
- 3.5.4.8 The volumes of water draining along these channels (based on an 80-day SWL pumped circulation) show an outflow of 160 l/s (from the 3 saltwater lakes or 0.16 m3/s average).
 Based on a critical 30-hour storm event, an outflow of approximately 0.5 m3/s (average) with a peak of 1.0 m3/s.
- 3.5.4.9 The outlet channels' approximate profile would be 10.0 m wide base (min) x 1.0 m depth with 1 on 4 batters (essentially a wide shallow flat-graded outfall). The average peak storm velocity would be < 0.2 m/s (subject to further validation of design storm discharges and modelling of lake detention effects). Given the wide, shallow, flat-graded outfall, the channel is a very low-velocity discharge environment.



Photo 4 – Vegetation adjacent to BDC Salt Lakes and Thompson Creek outfall channel

- 3.5.4.10 Given the abovementioned outfall design parameters that create a low-velocity discharge environment, outfall channel erosion and scour are not expected. In addition, the SWL 3 spillway will have a length of scour protection, receiving the local drop through the spillway before the discharge steadies to the open channel flow to a very flat outlet channel.
- 3.5.4.11 The following provides a brief overview of the construction methodology.

- During construction (excavation of channel):
- Topsoil placement immediately following excavation
- Berm/windrow placed on the top of batters to prevent land runoff from entering the channel
- Haybale/sandbag/ sediment fence/ rock check placed along the length of the channel every 100 – 200m
- Post Construction (post-excavation):
- Plant out/revegetation with salinity-tolerant grasses and high levels of native species
- Reed bed or similar placed through channel invert and the floor of the channel
- Additional planting of batters will follow using salt-tolerant species.
- 3.5.4.12 The channel will be so flat and flow velocities so low that simple excavation, trimming and grading, then replacing topsoil and post-planting with more saline-tolerant grasses, will be adequate to reinstate, if not create a better amenity outcome. Many channels are naturally revegetating, and further planting along and within the banks will also occur. Walker will encourage subsequent natural regeneration of native flora species such as samphire and *Sueda australis,* particularly further down the channel, where regeneration will further assist erosion sediment control and enhance coastal amenity.



Photo 5 - Channels naturally revegetating

- 3.5.4.13 As stated in Section 3.2.3, the outlet receiving waters of Thompson Creek have poor water quality with high nutrient and chlorophyll 'a' levels that are likely to experience significant algal growth and blooms.
- 3.5.4.14 However, discharge flows from the SWL using Chapman Creek waters can improve the water quality in Thompson Creek by reducing nutrients and the potential for algal growth, given the discharge waters will be similar to those of the intake waters in Chapman Creek (with high salinity levels and low chlorophyll 'a' counts), an improvement in the quality of water in Thompson Creek and downstream waterways will result.

Stormwater Outlet Channel

- 2. Similarly, after the PLUS workshop, the Council and DEW raised concerns about the lack of capacity of the Smith Creek/Thompson Creek channel through SA Water land downstream of the development. The original 2008 AWE Buckland Park flood modelling assumed a much larger channel being built there than currently exists. The flood mitigation will not be effective until this channel is larger.
- 3.5.4.15 <u>**Response**</u>: As previously advised to PLUS and DEW, Walker has not found any reference to '*the* original 2008 AWE Buckland Park flood modelling', as referenced above. Walker has taken this matter up with WGA (involved in the project since 2008/2009), and they are unaware of any commitment or need to upgrade the existing channel (as long as post-development flows do not exceed pre-development flows).
- 3.5.4.16 In this regard, the WGA December 2023 and January 2024 (Stormwater Management Plan) SMP reports (and the W&G Buckland Park Proposal Technical Paper, March 2009, in the original EIS) explain the current discharge to the Thompson Creek outfall channel cannot exceed the predevelopment flow rate of 10m³/s. WGA calculated the pre-development peak flow rate to be approximately 10m³/s, whereas the post-development peak 1%AEP flow rate was 92m³/s based on the allowance for Climate Change. WGA analysis determined that the maximum capacity of the outfall channel is approximately 28 to 30m³/s.
- 3.5.4.17 As such, a detention basin is proposed in the site's southwestern corner to reduce the peak flows from the site to a maximum of 6.1m^3 /s, significantly lower than the pre-development flows of 10m^3 /s.
- 3.5.4.18 Based on further design evolution and the recently submitted WGA *Precinct 1 & 2 Interim and Ultimate Development SMP (October 24)* in Appendix N, the detention basin's location is due to the significant size of the stormwater attenuation required. For Precincts 1 & 2, a 125,000m³ detention basin is required in the interim and before Saltwater Lake 1 comes online. WGA adopted a TUFLOW model to determine that a detention basin of 250,000m³ would be necessary to attenuate the ultimate design and the 1 in 100-year ARI peak flows to a maximum outflow of 10 m³/s.
- 3.5.4.19 The peak outflow from the three saltwater lakes is 0.16m³/s, based on a critical 30-hour storm event. The SWL outlet arrangement is separate from the stormwater detention/channel discharge point.
- 3.5.4.20 The channel network design, parallel with the detention basin and culvert, allows the development flows to be controlled substantially less than pre-development flows. Accordingly, the SWL outlet arrangement and the stormwater detention/channel discharge point post-development will not result in flow rates exceeding pre-development flow rates and, therefore, not trigger any upgrade works to the Thompson Creek outfall channel or levees on account of the implementation of the SMP for Riverlea.
- 3.5.4.21 Walker contacted SA Water and DEW concerning implementing culverts from the Riverlea outfall channels to the Thompson Creek outfall channel. Walker became aware of Water Technology's *'Draft' Smith Creek Catchment Stormwater Management Plan* (the Draft Smith Creek SMP) prepared for others in October 2020. The Draft Smith Creek SMP stops at the SA Water wastewater ponds and fails to assess upgrade requirements for the downstream Thompson Creek outfall channel (leaving the channel across SA water land exposed and funding of upgrades uncertain).
- 3.5.4.22 The Draft Smith Creek SMP identified the potential channel upgrades of Smith Creek from the NEXY basin outlet to Beagle Hole Road. The upgrades will impose an increase in the capacity of the

Thompson Creek outfall channel and involve channel widening and laying back the banks from the current typically near-vertical configuration.

- 3.5.4.23 As stated above, Riverlea flow rates will not exceed pre-development flow rates and will not impact the Thompson Creek outfall channel or levees because of the Riverlea SMP implementation. The pressure on the Thompson Creek outfall channel stems from the Draft Smith Creek SMP outputs that create the additional volume input allowance from the channel upgrades of Smith Creek from NEXY basin outlet to Beagle Hole Road and at Beagle Hole Road from the adjoining catchment to the south.
- 3.5.4.24 Nonetheless, Walker will consider 'future' design requirements concerning the upgrade and widening of the Smith Creek and Thompson Creek outfall channels (undertaken by the Stormwater Management Authority and others) and any potential land take requirements into Riverlea's southern boundary needed for channel widening (subject to accountable cost recovery and deliverable negotiations). In addition, in collaboration with its consultants, Walker will consider sharing any information (surveys, models and base data) used to guide its previous investigations.



Photo 6 – Intersection of the Smith Creek channel and the Thompson Creek outfall channel

3.6 Operational Matters

3.6.1. Costings

- 1. At the PLUS Workshop, the Council advised that the revised spreadsheet (presented at the 28 August 2024 Workshop) showing separated costs for Lakes 1, 2 & 3 (Capex & Opex) and the cumulative costs were much easier to understand and review.
- 3.6.1.1 <u>Response</u>: The summary estimates presented in the SWL Circulation OPEX Costs (MW) and the Simmonds and Bristow Water Treatment Plant (WTP) OPEX Costs provide reasonable cost coverage for the Progressive Adaptive Lake Water Quality Management Scheme as proposed. Refer to Table 3 Lakes Circulation and Treatment (Capex & Opex Estimates).

- 3.6.1.2 To quantify this issue, if the SWL + WTP Combined OPEX Costs were, say, \$1,000,000 (the actual estimates are about \$870,000 max. in Table 3), the OPEX Cost per equivalent tenancies (ET) = \$1,000,000/10,000 ET = \$100/ET/per annum (at Project Completion).
 - 2. The Council still consider that other costs need to be added, including the number of circulation / recirculation systems, and questioned whether there are 8 pumps in total proposed.
- 3.6.1.3 <u>**Response:**</u> Described below is the 'Architecture' of the Proposed SWL Adaptive Lakes Management Strategy and Associated Works:

RIVERLEA MASTERPLANNED RESIDENTIAL DEVELOPMENT - Propose Saltwater Lakes Circulation and Treatment Management										
PRELIMINARY COST ESTIMATES FOR BOTH THE CAPITAL AND OPERATIONAL EXPENDITURE (based on average costs)										
						Cumulat	ive Costs			
		SWL	Costs	SWL 1 Costs (Phase 1)		SWL 1 + 2 (Phase 2) 5		SWL 1 + 2 + 3 (Phase 3)		Comment
		Capex Costs	Opex Costs							
SWL 1	Primary Circulation	\$ 9,797,680	\$ 136,763	\$ 9,797,680	\$ 136,763					
	WTP	\$ 7,390,000 \$ 17,187,680	\$ 220,000 \$ 356,763	\$ 7,390,000 \$ 17,187,680	\$ 220,000 \$ 356,763					
SWL 2	Primary Circulation	\$ 545,060	\$ 53,525			\$ 10,342,740	\$ 190,288			
	WTP	\$ 160,000 \$ 705,060	\$ 221,000 \$ 274,525			\$ 7,550,000 \$ 17,892,740	\$ 441,000 \$ 631,288			
SWL 3	Primary Circulation	\$ 346,500	\$ 27,562					\$ 10,689,240	\$ 217,850	
	WTP	\$ 160,000 \$ 506,500	\$ 210,000 \$ 237,562					\$ 7,710,000 \$ 18,399,240	\$ 651,000 \$ 868,850	Possible Savings Dependent upon WTP 1 delivering spare circulation water for SWL 3 Circulation, with limited
		\$ 18,399,240	\$ 868,850					-\$ 160,000	-\$ 210,000	treatment.
_										

Table 3 – Lakes Circulation and Treatment (Capex & Opex Estimates)

3.6.2. Circulation and Water Quality Systems

3.6.2.1 Walker revisited the location of the proposed WTP, which changed the pipework alignments to support newly preferred primary circulation services corridors because of restricted space allocation in some areas. The new location and revised circulation reticulation system are shown below in Figures 9 and 10, as detailed in Burchills Sketch SK 113 and SK 138 (Appendix Q).



Figure 9 - Burchills - Drawing SK113 - Conceptual Seawater Circulation Strategy Layout Plan

- 3.6.2.2 The SWL Circulation and Water Quality System has been rationalised to restrict the piped circulation requirements to the primary lines only and now comprises the following components: -
 - 1. The Primary Circulation System requires a dual pump system (1 No. duty and a standby) at the Chapman Creek Intake to lift and pump the water supply to the Riverlea Site.
 - 2. The WTP (Contingency) Pumping requirements will include dual pump systems associated with each treatment train within the WTP (servicing SWL 1 and 2 (2 No. duty and a standby)).
- 3.6.2.3 Therefore, depending on the general Lake System Water Quality needs, either the primary piped supply line (part thereof) or piped discharge line (part thereof), waters can divert to the WTP (under pumped head (from Chapman Ck) or Gravity for discharge line). Treated water can be pumped (injected) into the primary circulation line (re-circulation of treated water).
 - 3. If the WTP is required, it will be restricted to the two treatment trains, and the spare circulation capacity available in the primary supply line will be used to provide increased SWL 3 circulation to deliver a 40-day volumetric turnover. This will have primary line (and, for that matter, all lines) increased discharge pipe cleansing advantages.
- 3.6.2.4 Walker will install the primary SWL supply and discharge lines to have the capacity to deliver full system circulation based on an 80-day lake volumetric turnover from the Chapman Creek intake through to the location of the contingent WTP.
- 3.6.2.5 The linework from this WTP location to SWL 1 (and perimeter extensions) will be sized to facilitate a 40-day lake volumetric turnover to enable the SWL 1 circulation to be maintained at a higher flow rate if <u>'the circulation only'</u> lake management strategy struggles with the lower circulation rate in

delivering the required Water Quality Standards, and the WTP Contingency Plan needs to be activated (and the facility constructed).



Figure 10 – Burchills - Drawing SK138 - Conceptual Seawater Circulation System Phasing Plans

- 3.6.2.6 The SWL Circulation System Options are as follows: -
 - 1. 80-day Circulation Trials deliver adequate lake water quality no WTP Contingency requirement.
 - 2. 80-day Circulation Trials are unsuccessful:
 - a) WTP Contingency activated.
 - b) SWL 1 has a 40-day contingent circulation capacity during construction of the WTP.
 - *c) SWL 1 System commissioned. The primary intake volumetric circulation requirements can be reduced.*
 - *d)* SWL 2 System will require a second treatment train to be added to the WTP facility to service the additional lake system.
 - *e)* SWL 3 *if the WTP is constructed with treatment trains to service SWL 1 and SWL 2, spare circulation capacity will be in the primary supply line. Therefore, the following options remain for SWL 3:*
 - i. Increased SWL 3 circulation to deliver 40-day volumetric turnover,
 - *ii.* Or the inclusion of a third WTP treatment train.

3.6.3. Water Treatment Plant Contingency

3.6.3.1 A further review of the circulation system has been done. Walker's consultants believe that the primary circulation system can provide the dual function of lake water supply circulation and treated water circulation.

- 3.6.3.2 The WTP has been relocated to align with the primary SWL supply and discharge lines west of the SWLs 2 and 3 junction. This location allows for the staged inclusion of WTP Infrastructure with short connections to both primary supply and discharge lines 'to and from' the WTP. There will be additional WTP Train augmentation to supply and discharge circulation pipework linkages, valves and pumping requirements. However, this proposed system layout minimises excessive separate/additional system linkages and costs.
- 3.6.3.3 Water will divert into the WTP from the supply line (under Chapman Creek Pumping) or the SWL 1 discharge line (via gravity). Therefore, depending on the general SWL Water Quality needs, supply (or part thereof) or discharge piped water (or part thereof) can be diverted to the WTP.
- 3.6.3.4 A dual pump system (duty and standby) will be available to inject treated water from the WTP into the primary supply line for recirculation. The workings of WTP should be mechanically self-sufficient, with cost coverage provided by Simmonds and Bristow.
- 3.6.3.5 The WTP location is at the high end of the system, and the delivery lengths and pump sizing are minimal.
- 3.6.3.6 Note that the intake supply line intake/discharge only operates for approximately 50% of each day (10 to 12 hrs in any 24 hours). Subject to requirements, the WTP recirculation pumps can be engaged 'off-cycle' for discharge water diversion through WTP treatment and recirculation (treated water injected into the main supply line).
- 3.6.3.7 Detailed design will confirm the final SWL system requirements. Walker believes sufficient monies have been allocated in the CAPEX and OPEX estimates to deliver the systems as described.
- 3.6.3.8 The circulation trials should prove Walker can deliver the desired Lake Water Quality Standards; therefore, supplementary WTP measures may or may not be necessary. However, they still have that planned contingency.
- 3.6.3.9 WEP know the water supply is not perfect. Yet, neither is that of the Nerang River from where the 35 Ha Waterfront Emerald Lakes Development at the heart of the Gold Coast (Qld) draws and circulates tidal river water, and that system has generally performed well. WEP is confident that sufficient cost has been allocated to the Combined Circulation and WTP System (Contingency) described.
 - 1. Following the PLUS Workshop, the Council queried the sizes and costs and the accuracy of details in the submitted plans (i.e. Drawings LAY-403 & LAY-404) that also impact costings (refer below) and final Hybrid Strategy costs and other SWL operational and maintenance costs, i.e. lake dredging, aquatic fauna monitoring/management & lakes, GPT & Atlan unit cleaning/maintenance.
- 3.6.3.10 <u>**Response</u>**: Walker revised the Lake Circulation System Architecture as detailed above, and the Simmonds and Bristow Drawings LAY-403 and 404 have been superseded (refer to Burchills revised Sketch SK 113 and SK 138, above (and in <u>Appendix Q</u>).</u>
 - 2 Following the PLUS Workshop, the Council queried whether the Capex and Opex for the Solar PV option for the SWL was to be provided if Walker is still proposing it.
- 3.6.3.11 **<u>Response</u>**: Walker is committed to operating and maintaining the SWL system (until transferred to the Council) and, therefore, will pursue the most cost-efficient solutions for SWL's long-term operations. During the project's detailed design, Walker will continue to explore Solar Photovoltaics and other energy-efficient solution options for the SWL operations.

3.6.4. Vesting Principles / Framework Deed

- 3.6.4.1 Several Council staff took a tour of four saltwater lake developments in South-East Queensland, resulting in several matters emerging that are a high priority for the Council, including;
 - a. The drafting and implementation of a Lakes Management Plan (LMP)
 - b. The establishment of detailed lake water quality and monitoring standards and protocols
 - c. The design, construction and commissioning of the pump station and associated infrastructure
 - d. The establishment of appropriate and agreed maintenance, transfer and ownership handover protocols and timeframes
 - e. The identification of appropriate financial arrangements and governance frameworks concerning ownership, operating, maintenance and renewal costs, and the statutory mechanism for the enforcement of such arrangements, including financial security
- 3.6.4.2 The Council further advised that Items d. and e. are vital to support the long-term vesting of the SWL to the Council, and these matters will require ongoing discussions with suitable parties.
- 3.6.4.3 Walker, in conjunction with the Council, has been negotiating an overarching Deed for (amongst other matters) transferring the SWL infrastructure and assets (SWL, peripheral treatments and intake and outfall infrastructure) to the Council. The draft Deed, provided by the Council to Walker, ensures that both parties thoroughly understand each other's commitments before the Council accepts the vesting of this critical infrastructure and valued community asset.
- 3.6.4.4 These negotiations culminated in the preparation of the "*Riverlea Development Lakes and Lakes Infrastructure - Vesting Principles/Framework Deed*" (the Deed) by the Council solicitors. While the negotiations to finalise and execute the Deed are ongoing, the Deed is a formal Agreement outlining the protocols and parameters of each party in the design, construction, operation, maintenance, and vesting of the Lakes as a Council asset.
 - I. The Deed is the primary Agreement between Walker and the Council to govern the obligations and parameters Walker must achieve before the Council accepts the vesting and operational requirements of the Lakes system.
 - II. Walker and the Council will have the Deed executed, but some of the required mechanisms (within the Deed) will need to follow, pending finalisation and approval of the AEIS.
 - III. Subject to approval, Walker has committed to preparing and undertaking the various mechanisms, including the design, construction, operational and maintenance, handover and financial security mechanisms for each of the lakes forming the Riverlea Lakes as outlined in the Deed between Walker and the Council.
 - IV. The formal Agreement outlines Walker's pre-determined obligations and benchmarks to be satisfied. Once satisfied, the Deed outlines how the Council will, at the appropriate time (i.e. after Practical Completion and the liability and maintenance period), accept the vesting and operational requirements of the Lakes system as each Lake reaches Practical Completion.
- 3.6.4.5 The Deed also acknowledges this process between the parties to give PLUS, their executives and ultimately the Planning Minister the comfort that Walker and the Council are collaboratively pursuing a vesting framework so they can proceed with assessing and processing the AEIS.
- 3.6.4.6 Walker will provide a draft outline for the Council's input and approval, which sets out a regime for reaching an agreement on six Mechanisms (which underpins the Deed), including the preparation

of a first draft of each Mechanism document and a program to reach an agreement on those Mechanisms. Figure 11 below details the six vital Mechanisms included in the Deed:



Figure 11 – The Six Vital Mechanisms in the Deed

- 3.6.4.7 The Standard Mechanisms will determine all relevant standards for the design, construction, operation, maintenance and handover of lakes of the nature of the Riverlea Lakes. In addition, the Standard Mechanisms determine all water quality standards and performance indicators for the Riverlea Lakes that are comparable with secondary contact recreation standards.
- 3.6.4.8 Design Mechanisms will satisfy the following criteria to both parties' satisfaction:

a. Walker will design the Riverlea Lakes to:

- i. incorporate a Hard Edge to the extent and manner indicated in the Lakes Concept Plan;
- ii. incorporate adequate space around the lake edge for water quality treatment trains, systems and infrastructure, concerning potential future expansion of existing or proposed roads and infrastructure in proximity to the lakes;
- iii. maximise opportunities for use, activation and passive surveillance of the lake and curtilage;
- iv. incorporate design levels, earthworks, infrastructure and technologies to promote access to the lake and curtilage for users of all ages and abilities;
- v. avoid the use of construction or stormwater methodologies which may restrict or limit activation and useability of the lakes;
- vi. satisfy Council's requirements in respect of the proposed energy supply for the SWL; and
- vii. contain contingencies to minimise the risks associated with extreme weather events;

b. prepare a detailed emergency response and recovery plan;

3.6.4.9 Walker's design will follow the Standards Mechanism and conditions of the Major development approval, Intake infrastructure approval, and other relevant approvals;

3.6.4.10 The Construction Mechanism will satisfy the following criteria:

- a. Walker will construct the SWL to incorporate the extent and manner indicated in the Lakes Concept Plan;
- Walker's construction of the Lakes will follow the Standards Mechanism, the Design Mechanism, and conditions of the Major development approval, Intake infrastructure approval, and other relevant approvals; and
- c. Walker will provide a proposed construction timetable for the SWL, including a proposed completion date as generally outlined in the Development Program;

3.6.4.11 The Operation and Maintenance Mechanism will satisfy the following criteria:

- a. Walker will undertake regular testing, monitoring and reporting of water quality indicators for comparison against the relevant approved water quality standards (as detailed in the Standards Mechanism) until the vesting of each Lake to the Council;
- b. Walker will undertake regular testing, monitoring and reporting of Riverlea Lakes in any emergency and recovery event and will provide all such data to Council staff and consultants promptly until the vesting of each Lake to the Council;
- c. maintenance requirements for the SWL and all associated infrastructure (including edge and revetment walls, weirs, culverts, water intake and outlet infrastructure, pumps, pipes, treatment works, access points, monitoring stations and safety equipment) costs are to be clearly defined;
- d. Each phase of the Lakes must perform to the relevant approved water quality standards (as detailed in the Standards Mechanism) for a minimum period (as agreed between the parties, which period cannot be not less than two continuous years from Practical Completion and commissioning of that Phase of the Lakes) before any request or action of the Developer to effect the Riverlea Lakes Vesting; and

[Timing and consequences of vesting to be discussed further with the Council]

3.6.4.12 The Intake Tenure and Handover Mechanism, in respect of a Phase, will satisfy the following:

- a. provides the documentation for the Intake Tenure, which evidences the appropriate arrangements for the subdivision, conveyance and transfer to the Council (for no consideration) to support the Lakes to function adequately;
- b. protocols for the handover of each Phase of the Riverlea Lakes and the associated Riverlea Lakes Vesting of that Phase;
- c. adequate training and instruction of Council staff and consultants as to operation and maintenance of the Riverlea Lakes, including emergency response and recovery protocols;
- 3.6.4.13 The regime for Council securing all available approvals (at Walker's cost) as required for the Council's security, operation, and maintenance of the Lakes;
- 3.6.4.14 The Financial Security Mechanism will satisfy the following criteria:
 - a. Walker will provide an amount of financial security to the Council for each Phase of the Lakes for a period up to the Lakes vesting;
 - b. the security is to be in the form of an insurance bond;

the quantum of financial security will be [further negotiated between the Council and Walker].

3.7 Crown Land and Infrastructure Assets

- 3.7.1 At the PLUS Workshop, the Council raised concerns regarding seawater intake tenure and considerations for supply security. The Council believed that licencing tenure over Crown Land under the *Crown Land Management Act 2009* provides a maximum of 10-year licenses. The security of tenure across a maximum of 10-year terms with no guarantee for renewal is of concern, and it would be appropriate for Walker to share any other tenure arrangements that the Council may consider.
- 3.7.2 **<u>Response</u>**: Crown Lands advised that subject to Walker obtaining all necessary approvals, Walker will need the following from the Minister for the Department for Environment and Water:
 - 1) A construction licence to permit works associated with the installation of infrastructure
 - 2) The subsequent issue of an easement (over the relevant Crown land) to protect access to the infrastructure in perpetuity.
- 3.7.3 Given the many interests in the land and the necessity to obtain other approvals, the licencing and creation of an easement will logically follow said approvals, as explained below.
- 3.7.4 A briefing document was circulated to the relevant government agencies to inform them of potential conditions for the in-principle approval of an easement. The approval of the easement will be subject to the consent of the custodians of the land, other interest parties, associated regulatory and statutory approvals and the Council's willingness to hold the easement. The *Crown Land Management Act 2009* (S.28(4)) states consent cannot be unreasonably withheld.
- 3.7.5 The relevant provisions for licencing over Crown Land under the *Crown Land Management Act* 2009 provide a maximum of 10-year licenses. The license is required to undertake the upfront works, whereas the issue of an easement allows access to said infrastructure and is in perpetuity.
- 3.7.6 Walker is unaware of any *Crown Land Management Act 2009* licence requirements restricting pumping from Chapman Creek.

3.8 City of Playford & State Agencies – Recommended Conditions

- 3.8.1 The Council has indicated its support for the altered proposal comprising the SWL system, subject to recommended conditions of approval. The EPA also recommended a condition of approval concerning stormwater management.
- 3.8.2 The Council recommended conditions fall under the following "themes", which have formed the basis for much of the commentary in this Section so far.
 - Form of Land Division
 - Infrastructure
 - Lake and Lake Edge
 - Landscaping and Open Space
 - ➢ Flooding

- Stormwater
- Traffic & Parking
- Environment
- Land Division Condition
- 3.8.3 While the Council has provided a rationale for recommended Conditions, it is open to discussions, as required, before finalising any conditions of approval. While generally accepting the Council's suggested conditions, Walker suggests further review and refinement with a breakdown of comments on the Council's suggested Conditions in <u>Appendix R</u>.

4. Key Issues Raised

4.1 Aboriginal Heritage

- 4.1.1 Numerous Aboriginal heritage surveys of the surface conditions within the AEIS area identified Aboriginal cultural heritage sites. Accordingly, subdivision plans have kept stands of River red gums (outside of Open Space Zoned areas) intact, including retaining culturally modified (scarred) trees within and situated them within designated open space reserves.
- 4.1.2 Underground areas might contain items of Aboriginal cultural heritage, but unknown underground sites are complex to avoid. Accordingly, all topsoil stripping and excavations only proceed in the presence of Kaurna cultural heritage officers (CHOs) operating under the procedures and protocols of an approved CHMP.
- 4.1.3 Accordingly, in March 2023, Walker applied for authorisations following sections 21, 23 and 29(1)(b) of the Aboriginal Heritage Act 1988 (AHA) to the Minister of Aboriginal Affairs to manage Aboriginal cultural heritage within the AEIS area.
- 4.1.4 The ensuing sub-sections summarise the events post-submission of the AEIS for consultation, the AHA Section 13 Consultation process and Walker's future intent for managing Aboriginal heritage.

The sequence of actions and events

- 4.1.5 An unexpected discovery of a shallow Aboriginal burial site within Precinct 2 in late April and May 2023 revealed that additional unrecorded Aboriginal heritage existed in the area. The discovery, by Kaurna cultural heritage officers (CHOs) operating under an approved CHMP, occurred within the Precinct 2 area south of the Gawler River while undertaking subdivision works (stripping topsoil).
- 4.1.6 After the discoveries, Walker immediately ceased works, established an exclusion zone around the discovery area, and notified AAR (per the AHA requirements and the provisions of the CHMP).
- 4.1.7 On 6 June 2023, the Minister directed Walker under section 20(3) of the AHA to immediately protect and preserve the remains. The Minister's direction:
 - required Walker to give KYAC and others access to the exclusion zone for the sole purpose of excavating the land under KYAC's leadership for the preservation, protection and reburial of the remains
 - allowed the remains to be removed and relocated to a location acceptable to KYAC for their protection and preservation
 - permitted Project works to resume within the exclusion area only once the remains have been removed appropriately
- 4.1.8 As Attorney-General, the Minister also approved the excavation of the remains, following the Burials and Cremation Act 2013 (SA).
- 4.1.09 The covering letter to Walker (enclosing the direction) advised that the Minister could not make further Section 20(3) directions to excavate heritage, and any other discoveries must be cordoned off and avoided unless granted authorisations under sections 21 and 23 of the AHA.

- 4.1.10 Before granting authorisation under the AHA, Section 13 requires the Minister to consult with Traditional Owners, the State Aboriginal Heritage Committee and any other Aboriginal persons or bodies that may be interested in the matter.
- 4.1.11 Due to the number of Aboriginal ancestral remains discovered within the exclusion zone and the potential for additional discoveries, the Minister revoked his earlier direction on 23 August 2023.
- 4.1.12 On 5 July 2023, the KYAC Board advised that it had reviewed "and endorses the report titled 'Riverlea Development: Kaurna Cultural Heritage Management Plan CHMP#2 Area. (Version 1.4)' by Neale Draper dated 29 June 2023".
- 4.1.13 On 20 July 2023, the Minister, by notice in the Advertiser, advised that he had received an application for authorisations under sections 21, 23 and 29(1)(b) of the AHA from Walker.

The notice read: "The Applicant seeks the authorisations to impact Aboriginal sites, objects and ancestral remains (Aboriginal heritage) during the construction of a large residential, retail, commercial and recreational development at Riverlea Park".

- 4.1.14 Traditional Owners, interested Aboriginal parties and the State Aboriginal Heritage Committee were extensively consulted from August 2023 until January 2024.
- 4.1.15 AAR collated all submissions, Walker's responses to them, the State Aboriginal Heritage Committee's advice, and its recommendations to assist the Minister in considering the applications.
- 4.1.16 The Minister's authorisation was granted with conditions on 9 October 2024. A copy of this is contained in <u>Appendix B</u>.
- 4.1.17 The Minister's authorisation (including associated conditions) will guide Walker in reburying the discoveries and managing areas containing Aboriginal sites, objects and ancestral remains within the Riverlea development.
- 4.1.18 Maps have been produced to identify the Burial Location 1 exclusion zone and overall area subject to the authorisation in <u>Appendix B</u>.
- 4.1.19 Walker understands that land outside the authorised areas retains a high cultural heritage sensitivity, where there is no authority to damage, disturb, or interfere with Aboriginal heritage (subject to further authorisation).

4.2 Groundwater Management

- 4.2.1 During notification of the AEIS, DEW and the EPA commented on dewatering activities needed for lake construction. Their comment primarily focused on two main topics surrounding:
 - 1) The management and licencing of dewatering activities; and
 - 2) The clay liner and its effectiveness as a barrier between groundwater and seawater.

Dewatering and Licencing

- 1. The SWL sits below the water table (groundwater), and excavation will require dewatering. DEW considers it reasonable to take groundwater during construction dewatering, subject to undertaking appropriate hydrogeological investigations and having the relevant licensing approvals in place.
- 2. The EPA commented that to assess the potential environmental impacts of dewatering activities, it requires information about the volume of dewatering required and how the initial water dewatered for construction will be managed before it is 'reused' for conditioning and wetting the clay material (presumably not occurring until later in the construction schedule).

The EPA noted that part of the Precinct 2 area was subject to a site contamination audit (identifying groundwater contamination characterised by elevated molybdenum, selenium, fluoride and nitrate levels). A portion of Phase 1 of the Saltwater Lake systems is on the audit land. The auditor considered no management measures for the contaminated groundwater were necessary at that time, as groundwater use for any purpose on the site was low.

As there is no updated groundwater quality information, any discharge of water removed during dewatering should be subject to water quality testing and option considerations per the EPA's Environmental management of dewatering during construction activities and the Environment Protection (Water Quality) Policy 2015.

Using wastewater for 'conditioning' clay material before compaction and maintaining clay liners in a 'wet state' following compartment completion shouldn't occur until the conclusion of a risk assessment and all management options are considered (following the waste management hierarchy).

The EPA further noted how the AEIS report suggests 'the pressure head between the filled Saltwater Lakes and the shallow groundwater will be approximately equal on either side of the liner, indicating no or limited pressure driver for water movement across the liner in either direction'. It is unclear to the EPA how this 'limited pressure driver' will be maintained or how changes in pressure will be identified. It is also unclear what consideration (if any) has been given to the impacts of climate change on the maintenance of this 'limited pressure driver' in the future.

- 4.2.2 <u>**Response</u>**: As briefly discussed in **Section 3.2.4**, Walker engaged LBWco to undertake the environmental and hydrogeological investigations to support managing the groundwater dewatering process required to construct the SWL. LBWco will compile the dewatering methodology and necessary information for the DMP approvals (and the pending secondary licence/approval applications) as required by the EPA and DEW.</u>
- 4.2.3 LBWco has undertaken geotechnical engineering fieldwork assessments to complete its hydrogeological investigations and ascertain flow rates, water volume, and groundwater quality. LBWco has considered the scope for both SWL containment systems and appreciates managing the flow rates and volumes over the construction period for either scenario. LBWco will finalise its detailed DMP to demonstrate compliance with the EPA's *Water quality* Guideline, *Environmental management of dewatering during construction activities* (updated June 2021) and the *Environment Protection (Water Quality) Policy 2015* upon completing the detailed design phase.
- 4.2.4 LBWco's investigations include an assessment of the environmental values (EVs) of groundwater, following the EPA's *Guidelines for the assessment and remediation of site contamination* (Revised November 2019) and the *Environment Protection (Water Quality) Policy 2015*. LBWco considers that the range of nutrients and dissolved metal concentrations in the shallow groundwater onsite represent ambient conditions typical for the shallow groundwater within the region (relevant to

groundwater in the shallow saturated zones within the Saltwater Lake 1 excavation depth range only).

- 4.2.5 Further, LBWco concluded that if dewatering wastewater required discharging to Thompson Creek via the stormwater system, the discharge would unlikely cause environmental harm (that is not trivial) in the receiving environment via impacts from chemical substances.
- 4.2.6 Nevertheless, the total storage capacity on site will enable the total volume of dewatering wastewater to be managed on-site. Dewatering wastewater will discharge into the partially excavated SWL2, other channels within Precinct 2, completed SWL1 compartments, and coffer dams (and not directly or indirectly to surface waters, including stormwater systems and inland or marine waters). If construction dewatering encounters higher than expected flows, contingency measures for alternate dewatering wastewater management may be considered, including discharge to the surface water environment, where appropriately managed following the general environmental duty under the *Environment Protection Act 1993*.
- 4.2.7 More details on determining the minimal risk (that is, no likelihood of occurrence or impacts to the aquatic environment) will be in the detailed DMP following the EPA guidelines.
- 4.2.8 While the Dewatering Management Plan (DMP) is likely to be finalised during detailed design, LBWco's - *Riverlea Development - Proposed Saltwater Lakes Dewatering Investigation and Risk Assessment Report* (Appendix J) provides detailed information on groundwater quality, contamination risk assessment, managing dewatering flow rates and volumes, storage and reuse of wastewater, and managing dewatering activities. LBWco will, in collaboration with the EPA and DEW as the relevant regulatory bodies to evaluate and approve the pending DMP, provide a DMP to the EPA and DEW for approval before dewatering works commence. The DMP will follow the EPA's Water quality Guidelines, *Environmental management of dewatering during construction activities* (June 2021).
- 4.2.9 Notwithstanding the above, on 15 November 2024 (following the PLUS meeting), DEW provided a Technical Memo to PLUS that raised four significant comments that require addressing before it would support approval outlined below:
 - 1. The potential for groundwater extraction associated with the dewatering effort to affect other groundwater users in the region has not been addressed adequately either by modelling or the provision of data such as a well audit of groundwater users within a nominal distance of the project.
 - 2. The current model indicates that significant groundwater discharge needs to occur into Gawler River and Thompson Creek for model calibration before extraction is initiated. If the model is correct, such a significant discharge may represent an adverse environmental impact to ecosystems and other dependencies on these surface water systems. This needs to be verified and investigated from a groundwater-surface water perspective as it may have significant ramifications if large amounts of water are extracted in the process of dewatering the site.
 - 3. Confirmation that there is no connection between surface and groundwater. Water samples from well number 6628-23298 (which is close to the Gawler River) and surface water from Gawler River Channel, Thompson Creek and Riverlea stormwater shows low value of pH ranging from 4.75 to 5.08 suggesting a potential connectivity between the groundwater and surface water. For example, water quality data from the Gawler River next to the well 6628-23298 should be obtained to confirm connection or otherwise.
 - 4. Confirmation on the type of liner is required as well as confirmation of its leakage. In Appendix V, a permeability value of 1x10-9 was used for the calculation of leakage (using Darcy's law) from the base of the saltwater lake. In the LBW co's Technical Memo that was sent previously for comments, it was mentioned that using a synthetic geomembrane will achieve a permeability in the range of 1x10-12 to 1x10-15 m/d. This poses two questions what is the actual permeability value of the liner and what is the

volume and distribution (temporally and spatially) of this leakage? Also, a detailed 'Risk Management and Monitoring Plan' (RMMP) is required that identifies the hazards and risks related to lake liner leakage and/or liner failure and outlines how risks to existing groundwater users, groundwater-dependent ecosystems and the groundwater resource itself will be managed. The RMMP will detail a fit-for-purpose groundwater monitoring network that includes, but is not limited to, a plan outlining (1) the groundwater parameters that will be monitored, (2) the groundwater well locations where those parameters will be measured and the frequency of monitoring, (3) the measurement thresholds that will invoke a management response, (4) details of the type of management response and (4) the conditions under which the management response will be revoked (i.e., a return to the status quo).

- 4.2.10 DEW also provided one significant comment about the modelling that can be a condition of approval and 40 specific comments surrounding the modelling reporting that would improve the submission and aid in DEW assessment.
- 4.2.11 LBW and HCL carefully considered the comments from DEW, undertook some additional review and investigation of available groundwater data, and prepared a detailed response to each of DEW's remarks. Attached in <u>Appendix W</u> is a copy of the LBWco-HCL response letter (ref. 231445-01 L01) dated 13 December 2024.
- 4.2.12 In addition, following a meeting between DEW, Walker and its consultants (LBW and HCL) on 27 November 2024 and several email communications since that time, Walker concurs that a suitable condition that requires the development of a surface and groundwater monitoring plan (SGMP) in conjunction with DEW for implementation during dewatering of SWL1, is an appropriate pathway towards an approach that builds progressive certainty for the construction of the SWL1.
- 4.2.13 Walker is acutely aware that it must comply with other statutory measures and approval processes (as outlined in this Document's Secondary Approvals or Licensing Requirement Section) concerning any on-site dewatering activities, as noted in the DEW comment.
- 4.2.14 Accordingly, Walker trusts that suitable conditions of approval will ensure a DMP and an SGMP are delivered and authorised by relevant licensing authorities before SWL dewatering works commence.

Liner

- 4.2.12 DEW and the EPA expressed interest in the SWL clay liner regarding its ongoing impermeability, construction methodology, life cycle, and monitoring methods.
 - 1. DEW sought assurances from a suitably qualified professional to verify that the lakes would not be permeable and that there would be no ongoing groundwater take, including any monitoring methods to check the quality of the clay liner in the future.
 - 2. The Saltwater Lakes proposes a 500 mm thick clay liner using medium to high plasticity clay sourced from the Riverlea site. The EPA considers "an engineering deliverable that the clay liner is certified as impermeable" to be insufficient information to determine the following:
 - Will the proposed compacted clay liner effectively contain the saline water to prevent infiltration to groundwater (and infiltration of groundwater into the lakes)?
 - For what length of time can it be 'certified' to remain impermeable?
 - What is intended to prevent the clay liner from cracking during warmer months during the lake's construction?
- 4.2.13 **<u>Response</u>**: Walker focused on constructing a 500mm compacted clay liner for the SWL because of the abundant clay material available across the site and its non-porous nature. Reusing site-won

materials results in significant energy and cost savings by reducing the amount of raw and manufactured materials imported to the site, thereby maximising on-site resources while minimising off-site resources, waste and haulage fees.

- 4.2.14 Walker initially engaged a Soil Survey Engineering consultancy firm specialising in applied geotechnics to advise on the suitability of a clay liner to prevent groundwater ingress into the lakes and saltwater egress into the groundwater regime. The consultancy firm considered (based on investigations and laboratory testing) that the clay layers on-site are typically of low permeability and that these clays, on suitable compaction, would be impermeable.
- 4.2.15 At the request of the EPA and DEW, Walker sought further advice that the SWL clay liner would not be permeable and that there would be no ongoing groundwater take (i.e. seepage of groundwater through the clay liner). Their assessments factored in potential changes in containment properties of the compacted liner over time, soil type and properties variables, salt concentration, compaction method, moisture-conditioning, the liner contact time with saline water, pore water pressure, temperature and pH.
- 4.2.16 However, after reviewing the clay liner and construction methodology, no firms approached would verify that the clay liner would be completely impermeable, conservatively advising an estimated porosity rate (i.e. seepage of seawater through the clay liner on account of the pressure head the seawater would create) of approximately $2 \times 10^{-9} \text{m}^3/\text{s/m}^2$.
- 4.2.17 Regarding the clay liner construction methodology and performance, seawater would likely increase the solute suction in the clay liner, increasing strength and corresponding shrinkage of the clay (but not enough to cause shrinkage to cause cracking). Furthermore, exposing and compacting the clay liner with brackish water during construction could limit the long-term differential moisture condition of the liner.
- 4.2.18 Walker engaged LBWco, Geotechnical and Hydrogeological experts, to better understand the clay liner's permeability. Based on the same parameters, LBWco indicated the clay liner would deliver a permeability of around 1 x 10⁻⁹ m/s for Salt Lake 1, with a permanent driving head of approximately 0.5-1m of seawater standing above the groundwater level. Based on an area of 12.3 Ha, a total flow rate of 0.4 l/s is estimated for the entire lake. Further, seawater seepage through the clay liner was estimated to occur approximately five years after the operation of the SWL.
- 4.2.19 Recognising that any seepage through the clay liner design must demonstrate no or negligible risk of environmental harm regarding the likelihood and consequence of the seawater seeping from the SWL and raising the salinity of the surrounding groundwater, then performance monitoring of the clay liner will require monitoring salinity levels in the groundwater and monitoring wells outside the lake would need to be installed.
- 4.2.20 Accordingly, Walker requested LBWco to investigate the long-term effects of saltwater leakage through the liner on the shallow groundwater system concerning the likely volumes of seawater, the saline nature and directional flows of the local groundwater system, and the contextual environment of Lake 1. Based on the findings of the plume modelling (factoring the impacts with and without the clay liner over 250 years), the effect on the groundwater appeared confined to a small portion just beyond Lake 1 under both scenarios (i.e. with and without the clay liner).
- 4.2.21 In addition, LBWco's assessment revealed no current or realistic potential future use of the shallow groundwater onsite. LBWco considered the potential for harm to groundwater trivial because of the absence of any hydraulically connected aquatic ecosystems within the predicted plume migration extent.

- 4.2.22 Notwithstanding the previous focus on a compacted clay liner, Walker explored using a geomembrane liner as a more efficient containment solution. Working with Geotest (in collaboration with LBWco), Geotest investigated the following geomembrane liners:
 - High-Density Polyethylene (HDPE);
 - Linear Low-Density Polyethylene (LLDPE), or;
 - Polyvinyl Chloride (PVC);
- 4.2.23 Geotest advised the geomembrane liner options (HDPE, LLDPE and PVC) would deliver a permeability range from 1x10-12 to 1x10-15 m/s and with a 200mm 300mm layer of sand placed over the membrane for mechanical protection, should ensure no permeability between the proposed SWL and the groundwater. Further, a geomembrane liner's engineering design life could be over 100 years, and the dewatering methodology would not be too dissimilar to the scenario previously explored (i.e. with the clay liner configuration).
- 4.2.24 Geotest's proposed Construction Methodology for SWL1 (in <u>Appendix K</u>) outlines the approach and procedures for designing and installing the lining system. Integral to the construction methodology is integrating the lake dewatering strategy and the proposed construction sequencing, which LBWco would assist with via work similar to that detailed in LBWco's *Riverlea Development Proposed Saltwater Lakes Dewatering Investigation and Risk Assessment Report* (in <u>Appendix J</u>). In addition, Geotest's proposed options and associated costs report (in <u>Appendix L</u>) provides an initial assessment of the viability of HDPE, LLDPE and PVC geomembrane liners from a pricing perspective, outlining their respective benefits, limitations, and estimated costs for both supply and installation.
- 4.2.25 Mockinya (an industry expert with considerable experience with a range of lining and containment systems) advised that an HDPE liner with a 300 mm (minimum) layer of sand above the liner to provide mechanical protection was the preferred synthetic membrane solution, achieving a minimum permeability of 1x10⁻¹² m/s. Mockinya further confirmed that the HDPE liner is an effective salt diffusion barrier, can be manufactured to have a 100 years of design life to nominal failure subject to the liner being covered (above & below the water line) and correctly installed with appropriate subgrade and under liner water/soil gas controls.
- 4.2.26 While the HDPE liner appears to be the most fit for purpose, being virtually impermeable and having the least chance of failure (compared to other types of synthetic containment solutions) where containment of saltwater is required and within the environment proposed, Mockinya advised there are challenges concerning geomembrane solutions, because in many scenarios synthetic liners could be ineffective containment barriers.
- 4.2.27 For instance, there are potential challenges concerning construction practicalities and operational issues with synthetic membranes, given they are applied (typically) to more passive practices. The realities of construction practices and installation management over such vast areas would prove challenging, with punctures and tears resulting in containment defects often correlating to the level of construction quality assurance. In addition, jetties, landings' and other penetrations (piers, piling, etc.) are not always compatible with synthetic lining solutions as they create a potential leakage point and are typically discouraged due to their susceptibility to cause containment failure.
- 4.2.28 Similarly, geomembrane containment solutions are also susceptible to stress, the risk of movement and uplift and are better suited to passive environments such as ponds and dams, landfills, mining tailing applications and CSG brine ponds, which are often physically protected from potential human interference (i.e. geomembrane containment systems do not generally perform an active recreational function, but rather a passive (usually) industrial application function.

- 4.2.29 Accordingly, while the geomembrane solution appears feasible, the experts are telling Walker that due to the risks of even the best geomembrane lining solution, the impact on groundwater could be similar to a clay liner and to think about mitigating any potential risks on potential sensitive receivers, adjoining land owners, users of shallow groundwater, established deep-rooted trees, etc. rather than to entertain potentially unattainable containment performance expectations.
- 4.2.30 Accordingly, LBWco is tasked with developing the necessary models to evaluate the impact of seawater leakage on shallow groundwater for all three SWLs using both containment systems (an HDPE geomembrane and clay liner) and an unlined scenario. The report by LBWco titled *Proposed Saltwater Lakes Saltwater Seepage Risk Assessment* dated October 2024, detailing the modelling findings, is in **Appendix V**).
- 4.2.31 LBWco and Mockinya will then adopt the best containment system to explore any necessary measures to mitigate risks on potential sensitive receivers, adjoining land use practices, users of shallow groundwater, established deep-rooted trees, etc.
- 4.2.32 LBWco and Mockinya will collaborate with regulatory agencies to develop the best practicable containment system, finalise the construction methodology, and manage groundwater and dewatering flows. In collaboration with its consultants and regulatory agencies, Walker will ensure that the ultimate lake liner solution mitigates acceptable containment risks between the proposed SWL and the groundwater so that it will be long-lasting, easily managed, and maintained.

4.3 City of Playford – Recommended Reserved Matters

The Council recommends imposing five Reserved Matters, following Section 102(3) of the *Planning, Development and Infrastructure Act 2016*.

The Reserved Matters relate to the following;

- 1) Stormwater and Floodwater Inflow Treatment
- 2) Stormwater and Flood Water Management and Modelling
- 3) Salt Water Lake Intake
- 4) Traffic Generation, Intersection Analysis and Modelling
- 5) Salt Water Lakes Phase 2 Comments Close Out

4.3.1 Stormwater and Floodwater Inflow Treatment

- **a.** The saltwater lake system receives significant pumped saltwater, stormwater and floodwater inflows of highly variable volumes and quality at several locations, many of which have not been specified. There is a concern that the current proposals do not identify appropriate upstream treatment design or capacity to treat stormwater and floodwater inflows, nor the potentially large number of inflow points around the perimeter of the saltwater lakes. Such treatment infrastructure may occupy a substantial land area (as in South-East Queensland), need different treatment strategies for stormwater vs floodwater, and comprise substantial hard-built elements. Such infrastructure should not be left for later determination and resolution.
- **b.** The current intention is that the SWL water be maintained at a standard suitable for secondary human contact. However, if there are not adequately located and designed upstream and inflow

catchment treatments, the lake's water quality may never achieve the parameters to allow secondary human contact. If there is insufficient treatment capacity in the system, a lake that starts as secondary contact may not always be able to be secondary contact if treatment is inadequate and/or below acceptable capacity.

Reserved Matter – Stormwater and Floodwater Inflow Treatment

- (i) A detailed surface on-ground (peripheral) passive stormwater and floodwater treatment design and layout that adequately accommodates all stormwater and floodwater inflow volumes and at all inflow locations adjacent to and in the upstream vicinity of the saltwater lakes shall be prepared and submitted.
- 4.3.1.1 <u>**Response**</u>: As discussed with the Council, Walker engaged several expert consultants to look at water quality issues associated with the intake water quality, including saltwater from Chapman Creek and peripheral sources, including stormwater from the several subdivision Stages and amended plans to ensure occasional floodwaters from the Gawler River resulting from extreme weather events would not enter the SWL.
- 4.3.1.2 As discussed in Section 3.2.1 Northern Wetlands and the Gawler River, Section 3.2.2 Water Quality and Section 3.2.7 under Urban Runoff management as well as the design philosophy covered by S&B's Technical Memorandum Stormwater Treatment Performance Modelling in <u>Appendix O</u>. The ultimate stormwater treatment performance solution is subject to a detailed design (once granted planning approval). S&B has confirmed that various treatment system options are available to achieve secondary contact recreation standards. In collaboration with the Council, Walker will consider the feasibility of the possibilities presented by S&B.
- 4.3.1.3 As a Council-suggested condition (Condition No. 26), WGA has progressively worked toward the next revision of the detailed SMP to incorporate the above considerations. Walker provided a markup of the revised SMP to the Council Engineer to review and confirm catchment extents for interim modelling. The revised WGA *Precinct 1 & 2 Interim and Ultimate Development SMP (October 24)* is in <u>Appendix N</u>, and by including water quality inflow treatment within the Deed's Operation and Maintenance Mechanism section, we trust the deliverables to satisfy the Council's required information request and resolve the need for a Reserved Matter.

4.3.2 Stormwater and Flood Water Management and Modelling

- a. The submitted Stormwater Management Plan, Gawler River outbreak flood modelling, flood modelling, and hazard assessment present a confusing and inconsistent outcome for the Riverlea development, particularly Precinct 2. The combination of Gawler River Floodplain Management Authority (GRFMA) Gawler Stormwater Management Plan modelling, the current PLUS–sponsored Code Amendment Enhanced Flood Hazard Mapping, submitted LiDAR information and submitted "wet" and "dry" modelling raises several inconsistencies and uncertainties as to the actual impacts upon Precinct 2 and properties external to Riverlea to the west, i.e., "Windamere".
- b. The GRFMA is currently assessing several mitigation strategies to reduce the extent of flooding from the Gawler River. One of these strategies is the proposed Northern Floodway project, which includes new mitigation infrastructure west of Port Wakefield Road. It is unclear as to the extent to which the Riverlea Precinct 2 modelling has or has not considered and/or relies upon the Northern Floodway or other proposed mitigation strategies, and therefore, it is unclear as to the impacts that may require alternative flood mitigation design outcomes across Riverlea.

Reserved Matter – Stormwater Water and Floodwater Management and Modelling

- (ii) An appropriate reconciliation of all relevant current & historical data and new modelling shall be undertaken and combined into a single Stormwater Management and Flood Management Plan and Model. It shall include a clear summary of impacts upon Precinct 2, including downstream discharges, discharge levels, channels and basins (in particular the southern "detention" basin), external land and properties, and shall, in particular, consider the impact upon the Saltwater Lake system which has now been proposed as part of the proposed flood mitigation strategy. Further, the plan should demonstrate how stormwater from Precinct 2 catchments is appropriately managed through Precinct 2 and defined discharge points outside the Precinct. The management plan is to ensure that the stormwater discharge from Precinct 2 is managed to not have an adverse impact on the existing downstream system. Further modelling should clarify the contribution that the Northern Floodway Project has to Riverlea, if any.
- 4.3.2.1 <u>Response</u>: The Council has not explicitly identified the 'inconsistencies and uncertainties' in the comparable information to enable an informed response. Previous inconsistencies the Council raised in February 2022 concerned breakouts from the Gawler River through the middle of the site (roughly the Precinct 2 area). All flood modelling scenarios have since run/used the GRFMA-validated model (which reflects the recent LiDAR information used before February 2022).
- 4.3.2.2 Should a breach of the Gawler River occur within the Riverlea property boundary (but excluding the Riverlea urban development), floodwaters will naturally divert west due to the built-up landform within Riverlea (estimated to be ~750mm 1,000mm above natural ground level) and discharge back into Gawler River or via a perimeter channel to the Thompson Creek outfall.
- 4.3.2.3 In this regard, a perimeter channel (similar to the channel adjacent to Stages 10, 11 and 12) on the far western boundary of Riverlea captures and directs internal stormwater and floodwater to the Thompson Creek outfall via the stormwater channels to ensure minimal impact to properties west of Riverlea (i.e. Windemere).
- 4.3.2.4 As was expressed in the PLUS Workshop and previously communicated to the Council, all floodwater modelling undertaken by Water Technology does not consider the Northern Floodway, nor will it, until there is a formal commitment by the State Government. Walker has a firm understanding (from DEW) that the Northern Floodway is not proceeding and, therefore, has no consequence on the AEIS.
- 4.3.2.5 Walker's consultants, WGA, have provided the next revision of the detailed *Precinct 1 & 2 Interim and Ultimate Development SMP (October 24)* to address the above considerations.
- 4.3.2.6 Given the above circumstances, the need for a Reserved Matter is not warranted based on the information provided to date and the matters progressing via the delivery of a detailed SMP.

4.3.3 Saltwater Lake Intake

a. A detailed consideration of the Riverlea Saltwater Lakes Phase 3 Report (January 2023 – Walker) and the Water Quality Water Monitoring Program Results (16 Nov 2022 – BMT) reveals that within the current proposal, the difference between a healthy saltwater lake system and a marginal lake condition is small. The concern is that even a relatively minor adverse event will affect the quality of saltwater intake, particularly turbidity levels and dissolved oxygen levels, resulting in very high salinity levels. These narrow marginals will significantly limit the opportunities to maintain a healthy lake suitable for secondary human contact and limit the capacity to recover the lake from adverse events and restore an appropriate healthy balance.

The current intake location and its catchment has some vulnerabilities, namely,

- (a) The location upstream in a narrow, shallow creek channel (Chapman Creek)
- (b) The potential for upstream inflows from nearby salt pans consisting of highly turbid stormwater overland flows with high nutrient loads
- (c) The potential impact of combined pumping operations from the Cheetham Salt Pans intake pump in Chapman Creek and the Riverlea Saltwater Lakes intake pump also in Chapman Creek. These intake pumping locations are only 162 metres apart.
- (d) The vulnerability of a narrow, shallow creek environment to extreme weather and tidal events.

Reserved Matter - Saltwater Lake Intake

- (iii) An assessment should be undertaken to identify alternative saltwater intake locations outside the Chapman Creek channel. It shall quantify the extent and characteristics of improved saltwater quality available at those alternative locations.
- 4.3.3.1 <u>**Response**</u>: The intake facility requires a location that provides a reliable supply of quality seawater while minimising impacts on sensitive environments (including native vegetation) and other natural features as far as reasonably practical. The site chosen for the infrastructure had to be in a relatively sheltered environment, protected from exposure to severe storm events, wave action, etc., and from the public. The site and pipeline route selection also had to have a negligible impact on adjoining land uses and general public amenities. Ultimately, the chosen site followed a hierarchy of necessities Primary and Secondary Considerations as detailed below.

Primary Considerations:

Water quality and quantity

4.3.3.2 Fundamental is the need to access a reliable supply of quality seawater. Chapman Creek, subject to the ebb and flow of the tide from St Vincent Gulf, is constantly being flushed and replenished, providing a reliable source of fresh seawater. Bathymetry mapping and the Water Quality Monitoring Results indicate the site has a good water column, providing a suitable depth for reliable constant extraction.

Sheltered site location

4.3.3.3 The location is such that there are limited landward flows to Chapman Creek from rainfall events. Chapman Creek has limited tributaries, restricted by extensive salt lake waterbodies to the south, east and north. Notwithstanding the unlikely event that there is a breach of a saltwater levee, the confined catchment area results in limited long-term impact on water quality, and the sheltered area minimises exposure to extreme weather events, including potential damage from wave action. An added benefit the project brings is the upgrade of the current levee during pipework placement, further reinforcing the strength and performance of the levee to withhold saltwater and prevent seepage into the immediate environment.

Minimise impact on Buckland Dry Creek Pty Ltd (BDC)

4.3.3.4 The intake location has a negligible impact on adjoining land uses and the general public, particularly on the BDC operations, which have mining tenements extending along the coastline from north to south (primarily over Crown Land). Walker has a temporary licence to use Crown land. The conditions of Walker's licence (for water quality monitoring and sampling) require that said activities not interfere with BDC's operations. Discussions with the Crown Lands Branch suggest that further licencing for constructing the intake facility and associated pipe network over the Crown Land will have similar requirements.

4.3.3.5 The selected location balances the need to avoid BDC operations as much as reasonably practicable whilst gaining access to a reliable supply of quality seawater in a sheltered and relatively private location that is unnoticed by the general public.

Chapman Creek prescribed watercourse area

4.3.3.6 Avoiding the prescribed watercourse area and being sited as far as possible from the BDC intake facility to prevent any impact is essential. Accordingly, locating the intake facility and pipe network a further 160m northeast of the existing BDC suitably addresses these issues.

Avoidance of significant areas and minimising native vegetation clearance

- 4.3.3.7 The intake area and route were chosen following a Native Vegetation Council's (NVC) Accredited Consultant's survey and applied advice to minimise native flora and fauna impacts. Achieving the NVC mitigation hierarchy must be demonstrated in the NVC regulation assessment requirements.
- 4.3.3.8 Balancing the primary and secondary considerations, most notably the necessity to obtain a reliable supply of good quality seawater and managing complex land tenure issues while ensuring the most negligible impact on native vegetation and coastal processes, demonstrated to the NVC due to consideration of their mitigation hierarchy.

Secondary Considerations

The most direct and shortest route from a feasibility perspective

4.3.3.9 The most direct route usually has the most negligible impact on sensitive areas and is more economical to implement and maintain over the long term. The planned route is the most direct and completely avoids infrastructure on private landholdings, being on Crown Land for approximately 1km and about 3km of Council-owned road reserve.

Public access and exposure

4.3.3.10 The chosen infrastructure route (largely underground) avoids public interference and does not impact visual amenities. Putting the pipework underground also provides added UV protection and minimises heating effects on the seawater, thereby reducing long-term maintenance costs.

Existing land use activities

4.3.3.11 The other benefit of the planned route is that the pipeline traverses existing land use activities that have previously compromised the natural environment. Most notably, the salt lakes operations (levees) and rural activities account for nearly three-quarters of the pipeline route. More sensitive areas are, unfortunately, unavoidable.

Other Areas Investigated

Downstream of Chapman Creek

4.3.3.12 The site sits within the Adelaide Dolphin Sanctuary defined area. However, if the intake facility and pipe network were further downstream of Chapman Creek, it could further exacerbate vegetation clearance and interfere with BDC interests.

- 4.3.3.13 The site would also fall further within other sensitive areas, including:
 - Prescribed Watercourse
- Adelaide International Bird Sanctuary
- State Significant Vegetation
- National Park Areas

BDC's existing intake facility and saltwater lake

- 4.3.3.14 Walker previously pursued the potential to source seawater from the existing BDC intake facility, including sourcing seawater from the BDC-maintained salt lake immediately adjoining. It was evident that mutually beneficial commercial arrangements would not eventuate.
- 4.3.3.15 The intake infrastructure and the necessary access will inevitably transfer to the Council. Accordingly, Walker will manage the facility's construction, transfer of ownership and longterm land tenure arrangements with the Council and the Crown and its various government interests, including the Department of Primary Industries and Regions SA, Department of Energy and Mining and multiple departments within DEW.

Areas investigated further south

4.3.3.16 Areas further south of Chapman Creek, including near the outfall of Thompson Creek (roughly two kilometres southwest), were also investigated. This option proved attractive because it potentially resolved long-term land tenure and operational issues. However, the route would be considerably longer, require more significant vegetation disturbance, and be substantially more expensive to implement and maintain. There were also no inland tributaries to shelter the infrastructure from exposure to, and risk of, damage from wave effects during significant storm events. However, the main concern with this area was its proximity to the Thomson Creek and Bolivar outfall locations, potentially compromising seawater quality.

Areas investigated further north

- 4.3.3.17 Other areas further north were dismissed (including a location near the Port Gawler Pontoon and Recreation area), as they would disturb a greater extent of native vegetation and other environmentally sensitive areas, have the same land tenure obstacles, and be subject to frequent inundation. The location (by its very nature) has greater public patronisation, potentially compromising amenity, public safety and the facility's security.
- 4.3.3.18 Accordingly, balancing the primary considerations, most notably the necessity to obtain a reliable supply of good quality seawater and balancing complicated land tenure issues, revealed that the site has the most negligible impact on native vegetation and coastal processes. The primary and secondary considerations (along with the pitfalls of the other areas investigated) addressed the NVC mitigation hierarchy and proved the most viable option to progress.
- 4.3.3.19 Based on the water quality monitoring data collected over nearly two years and its locational advantages, Chapman Creek is the most attractive option to supply quality water to the lakes.

4.3.4 Traffic Generation, Intersection Analysis and Modelling

- 4.3.4.1 During notification of the AEIS, the Council provided the following advice. It highlighted a potential reserve matter for consideration concerning a revised Traffic Impact Assessment, additional modelling considering further Precinct 3 traffic volumes for the wider area and considerations of ultimate intersection scenarios.
 - a. The submitted Traffic Impact Assessment still presents limitations in its modelling and underestimated volumes, limited incorporation of future heavy vehicle movements and no less, the lack of appropriate modelling of future traffic volumes generated by a fully developed Precinct 3 and by the adjacent Riverlea non – residential zoned lands. Additional mesoscopic level and microsimulation level modelling (MASTEM or similar & TAM_AIMSUN & SIDRA) is required to provide the level of confidence necessary to manage the significant constraint created by the single entry in/exit out serving Riverlea via Riverlea Boulevard and the multiple intersections along the length of Riverlea Boulevard.
 - b. Further to the above, and concomitant with the need for further modelling, is the uncertainty evident in regards to proposed "initial", "interim", and "ultimate" scenarios. Unless there is appropriate confidence as to each "ultimate" scenario (based on adequate modelling per (i) above), there is a concern that intersection expansion and augmentation requirements will not be fully understood and be able to be implemented without, for example, additional land purchases through compulsory acquisition being left to Council.

Reserved Matter – Traffic Generation, Intersection Analysis and Modelling

- (iv) A Traffic Impact Assessment (TIA) shall be prepared and submitted that includes additional MASTEM or similar modelling in addition to TAM_AIMSUN & SIDRA modelling, taking into account Precinct 3 volumes, heavy vehicle volumes, the traffic volumes generated by the adjacent Riverlea non – residential zoned lands and more detailed consideration of each "ultimate" intersection scenario (supported by appropriate SIDRA modelling). The TIA should consider the worst-case scenario for Riverlea Boulevard and its intersections based upon Precincts 1, 2 and 3 and non-residentially zoned lands being fully developed.
- 4.3.4.2 **<u>Response</u>**: Walker was mindful of the response requesting a full review and remodelling of previously accepted information, incorporating areas beyond the extent of Precinct 2, including Precinct 3 and areas of land not in Walker's control did not explicitly focus on the primary purpose of the AEIS, being the introduction of SWL within the Riverlea development.
- 4.3.4 3 Walker engaged Empirical Traffic Advisory (ETA) to provide expert advice on the TIA for Precinct 2, as the altered subdivision design and introduction of the SWL are unlikely to generate additional recreation demand on the network that would exceed the current am & pm peak demands – which the existing road network caters for based on sound modelling for various uses.
- 4.3.4.4 ETA confirmed that the approach was consistent with the original TIA for Riverlea (PB, 2013), where secondary access considerations were required when capacity thresholds of Riverlea Boulevard were known and accommodated within the Precinct 2 TIA, where the ultimate intersection arrangements specified in the Precinct 2 will cater for Precincts 1, 2 and part of 3.
- 4.3.4.5 While Precincts 3 and 4 traffic management and access arrangements were considered part of further traffic assessment, Walker acknowledges the wider area will ultimately require

secondary access. Accordingly, Walker is undertaking the necessary investigations (in conjunction with relevant stakeholders) to determine where that access might be. The updated Precinct 2 TIA provides more details about the Precinct 3 considerations (i.e. ~60%) of volumes and their distribution on the local road network.

- 4.3.4.6 Given the single corridor dual access possibilities for Riverlea, the development of an appropriate traffic model with SIDRA intersection analysis will be suitable for consideration for future access strategies. The SIDRA modelling is now underway to provide the anticipated associated traffic impacts for less time, cost and overall benefit.
- 4.3.4.7 Walker advanced a Reserved Matter was not warranted based on the current AEIS (a variation to the previous Precinct 2 consent) not being a significant departure from the prior approval (in the quantum of land uses or layout). ETA's advice confirmed the above.
- 4.3.4.8 Nonetheless, Walker requested ETA to commence additional modelling to assist the Council with progressing its assessment of Riverlea Boulevard and demonstrate Walker's commitment to actively pursue the issue in line with Walker's Statement of Commitments previously highlighted.
 - 1. After a review of the Draft Response Document and the PLUS Workshop, the Council considered that waiting for the results of the traffic model for Precinct 3 would be too late to properly assess the impacts on Precinct 2 and Precinct 1 in terms of traffic volumes, pavement design standards, etc. The Council requested further information/confirmation on:
 - Wider network modelling with DIT
 - The type of modelling i.e. Mastem or Aimsun/Tam or similar,
 - The trigger for a second access/egress point
 - The scope of the modelling and lead for the modelling work (Walker, DIT or a 3rd party)
 - Riverlea Boulevard augmentation
- 4.3.4.9 Walker is undertaking a Riverlea Precinct Access Strategy involving DIT traffic specialists and private consultants, including Pentelic Advisory Integrated transport planning services, WGA Civil and Transport and URPS Town Planners.
- 4.3.4.10 Walker has commissioned Pentelic Advisory (Pentelic) to lead updated traffic modelling that informs a high-level strategic Access Strategy for the Riverlea Precinct. WGA – Civil and Transport will undertake corridor constraints analysis, corridor design basis and requirements and explore access options. URPS – Town Planners will formulate the scenario concepts and present the findings in a structure plan format to all stakeholders in early 2025.
- 4.3.4.11 The Riverlea Precinct Access Strategy will assess the Riverlea Precinct's interface with the surrounding network, considering changes to the Riverlea Masterplan, future urban land releases in Buckland Park to the south, and the critical need for efficient and safe access to Port Wakefield Highway. The Riverlea Precinct Study Area is in the figure below from the Traffic Model Scoping Document and endorsed by DIT.



Figure 12 - Riverlea Precinct Study Area

- 4.3.4.12 Pentelic will develop a microsimulation sub-area model using the Tactical Adelaide Model (TAM) to evaluate access options and guide the strategic development of connections to Port Wakefield Highway within and around the Riverlea Precinct. The microsimulation models will be calibrated by Pentelic, base and future years (i.e. investigating 2031, 2036, and 2041 horizons for AM and PM peak periods) to DIT's TAM guidelines and the future scenario options issued to DIT for final consideration and comment.
- 4.3.4.13 While largely reliant on DIT review processes, Pentelic's timing is forecasted to be within the next six months. Walker has submitted the Traffic Model Scoping Document (TMSD) to DIT/NMS for acceptance, and DIT should provide their TAM model imminently.
- 4.3.4.14 The optimised second entry/exit point trigger is likely to be determined following the development of the microsimulation model and the SIDRA work that is currently progressing, as Walker is hopeful there will be further efficiencies identified, resulting in optimised SIDRA outputs for the ultimate scenarios.
- 4.3.4.15 Concerning the Riverlea Boulevard augmentation from 4 lanes to 6 lanes triggers, this work is part of the microsimulation model development to find further efficiencies and optimisation. As part of the microsimulation model process, Walker attempts to avoid augmentation of Riverlea Boulevard mid-block lanes and limits future works to only local widening at the intersections.
- 4.3.4.16 ETA has updated the Precinct 2 TIA report in <u>Appendix S</u>. The updates incorporate changes discussed with the Council to inform the engineering design of related stages within Precinct 2 that primarily involve pavement detail, road cross sections and the revised trigger for intersection 4.
- 4.3.4.17 The Riverlea Boulevard design and intersection capacities, the currently documented report and modelling reflect 60% of Precinct 3 volumes. Therefore, Walker considers there is no intention or need to update previous SIDRA modelling. ETA will provide further prescriptive wording and figures to identify the Precinct 3 allowances considered for the Precinct 2 TIA.
- 4.3.4.18 Accordingly, a Reserved Matter is not warranted, given Pentelic will develop a microsimulation sub-area model using the Tactical Adelaide Model (TAM) in conjunction with DIT that evaluates access options and guides the strategic development of connections to Port Wakefield Highway within and around the Riverlea Precinct.
- 4.3.4.18 Given the work Walker is undertaking with DIT and others to evaluate and identify a second entry/exit scenario for the Riverlea Park and Buckland Park areas, it is premature to speculate the location of any second entry/exit options or considerations.
- 4.3.4.19 ETA has updated the Precinct 2 TIA report to incorporate changes discussed with the Council to inform the engineering design of relevant stages within Precinct 2 that primarily involve pavement detail, road cross sections and the revised trigger for intersection 4. The Riverlea Boulevard design and intersection capacities, the currently documented report and modelling reflect 60% of Precinct 3 volumes. ETA provides further prescriptive wording and figures to identify the Precinct 3 allowances considered for the Precinct 2 TIA.

4.3.5 Saltwater Lakes Phase 2 Comments Close Out

- On 22 August 2022, the Council provided a letter to Walker Corporation confirming that the assessment and review of the Riverlea Saltwater Lakes Phase 2.0 had been closed out subject to Walkers addressing those SWL 2.0 review matters transferred to a future SWL 3.0 review and assessment. There were 73 outstanding items transferred to the SWL Phase 3.0 assessment stage.
- 2. The AEIS has submitted the Saltwater Lakes Phase 3.0 proposal to PLUS for assessment, and it is considered appropriate that if a determination is to proceed, there should be the confidence and certainty that the 73 outstanding items have been appropriately addressed in the AEIS.

Reserved Matter – Saltwater Lakes Phase 2 Comments Close Out

(v) A schedule shall be prepared and submitted by Walker Corporation confirming that the 73 outstanding SWL Phase 2.0 matters have been satisfactorily addressed in accordance with the Council's correspondence. The schedule shall identify how the matters have been addressed and within which document or report of the AEIS the addressed matters are located.

- 4.3.5.1 **Comment:** Walker has reviewed the outstanding SWL Phase 2.0 matters and updated that Schedule, as delivered to the Council in early December 2023.
- 4.3.5.2 Given the complexity of that Schedule and its indiscernible elements, it is not disclosed in this Document. However, after reviewing the outstanding Phase 2 Comments Close-out Schedule, Walker considers the following breakdown best encapsulates Walker's understanding of the addressed items and otherwise:
 - 27 items in the Schedule can be closed (either being satisfied or no longer relevant);
 - 42 items were apportioned, as per Council suggested conditions (20 Lakes Operational Management Plan (LOMP), 12 Stormwater Management Plan (SMP), eight Lakes Management Plan (LMP), etc., and four items related to Detailed Design issues and thus deemed closed)
 - Five items remain open. The open items are all matters relating to the Liner and are still under Walker's investigation.
- 4.3.5.3 It is worth noting that several conditioned items overlap or partially overlap with Mechanisms in the Deed presently being formulated (i.e. LMP and LOMP) or are awaiting feedback (such as the SMP).
- 4.2.5.4 However, there has been no comment from the Council since Walker forwarded its advice on 05 December 2023.

5. Changes or Amendments to the proposal

5.1 Material and Minor Changes

- 5.1.1 There are no material changes to the AEIS. However, several minor changes to the proposal resulted from further detailed review, and there were changes to some Stages within the overall plan of division. Still, the changes did not result in material changes to the altered Precinct 2 proposal.
- 5.1.2 For instance, the implementation of wetland areas within the northern reaches of Precinct 2, adjacent to the Gawler River, was removed from the proposal to avoid any doubt about the construction and operation of the wetlands for stormwater capture, treatment and disposal within the overall development. WGA has since updated its Stormwater Management Plans to reflect this change.
- 5.1.3 Alterations to Stages 14, 37, 38 & 39 (including the proposed school site and Riverlea Boulevard) occurred post-notification and have been updated in the Response Document as agreed by the PLUS team and the Council. **Appendix T** include the most up-to-date plans for these amended stages (including a revised Plan of Division, Affordable Housing Plan and Residential Allotment Mix Plan). An updated Overall Concept Plan is in **Appendix U**.

5.2 Statement of Commitments

5.2.1 Upon reviewing the submissions, Walker understands that numerous topics will be dealt with as part of submitting technical details, plans and calculations, etc., requested by the Council.

- 5.2.2 In addition, there are other secondary approval processes and licencing requirements from different agencies for associated works and other particular items when implementing the altered Precinct 2 subdivision (as mandated by other associated legislation (including the *Aboriginal Heritage Act 1988, Dewatering licencing via Green Adelaide and the Landscape South Australia Act 2019,* vegetation clearance via the Native Vegetation Council under the *Native Vegetation Act 1991,* etc.).
- 5.2.3 Walker has enclosed a Table of Commitments below, where it commits to undertake these secondary approvals processes and other actions.

TOPIC	COMMITMENT
Aboriginal Heritage	The development will comply with any direction from the Minister for Aboriginal Affairs.
Aboriginal Heritage	The development will comply with the endorsed Cultural Heritage Management Plan prepared for the Riverlea development.
The Environment	The stormwater management system will comply with the outcomes and water quality objectives as modelled in the concept design outlined in the Stormwater Management - Water, Wastewater and Recycled Water report, prepared by WGA and dated April 2023.
Gawler River	The proposal will not cause, either directly or indirectly, the taking of water from the Gawler River.
Flora & Fauna Management	The development of Precinct 2 will comply with the Riverlea Park - Flora and Fauna Management Plan: Precinct 2 (05/10/2023).
Affordable Housing	Walker will deliver at least 15% 'affordable housing' of all dwellings (following the criteria determined by the Government Gazette on 8 September 2022 under regulation 4 of the <i>South Australian Housing Trust Regulations 2010</i> (or any updates).
Water Licensing	Walker will undertake suitable hydrogeological investigations and have the relevant licensing approvals before dewatering works commence.
Liner	In collaboration with its consultants and regulatory agencies, Walker will ensure that the ultimate lake liner solution mitigates acceptable containment risks and will be long-lasting, easily managed, and maintained.
Social Infrastructure	Walker will provide an updated Social Infrastructure Statement and associate Social Infrastructure Strategy to the Council's reasonable satisfaction.
Social Infrastructure	Walker will provide a Community Development Framework document to the Council.
Water Quality Control	Water quality treatments and flows within the lakes will maintain water quality comparable to secondary contact recreation standards.
Water Quality Monitoring	Walker will undertake the detailed Lake Water Quality Modelling of the Lakes to the reasonable satisfaction of the EPA before filling the lakes.
Discharged water quality	Discharge waters to comply with the Environment Protection (Water Quality) Policy 2015 requirements

TABLE OF COMMITMENTS

6. Secondary Approvals or Licensing Requirements

- 6.1 Walker knows that legislative requirements for the altered proposal are still relevant, including (but not limited to) compliance with the *Aboriginal Heritage Act 1988* and the *Native Vegetation Act 1991* (akin to the previous Precinct 2 approval).
- 6.2 Similarly, adding the SWL will require a bulk earthworks operation, necessitating dewatering exercises. Erosion and sediment management are necessary to ensure no impacts on

downstream environments. Walker knows that authorisation from Green Adelaide/the Minister for Environment and Water under the *Landscape South Australia Act 2019* is essential for dewatering activities. Walker must ensure compliance with relevant *Environment Protection Act 1993* requirements, including compliance with the Environment Protection (Water Quality) Policy 2015 and applicable Environment Protection Authority Water Quality Guidelines, such as *Environmental management of dewatering during construction activities*. Further saltwater and freshwater discharge may also trigger EPA licencing (depending on release volumes, water temperatures and whether any additives are applied).

- 6.3 Many subsequent construction activities (staged subdivision works, housing, buildings, bridges, ancillary playground structures and signage) will require approval under the PDI Act via the Council's Planning and Engineering Departments. Similarly, street naming, property numbering and works within Council road reserves will require authorisation by the Council under the *Local Government Act 1999*.
- 6.4 Walker has already secured approval from the Native Vegetation Council (under the *Native Vegetation Regulations 2017*) to undertake the necessary vegetation clearance to locate the intake pump station and associated pipework and power supply components. It has also received approval under the *Native Vegetation Regulations 2017* to remove some native vegetation within the altered Precinct 2 subdivision proposal. Accordingly, Walker knows its obligations under the *Native Vegetation Act 1991* and the requirements for achieving a Significant Environmental Benefit Offset (should approval for native vegetation clearance be granted).
- 6.5 Legoe Road was partially closed via the original application/EIS process and the *Roads* (*Opening and Closing*) *Act 1991*. The partial closure of an unmade portion of Buckland Road (within the Precinct 2 boundary area) followed a similar approach as part of the initial Precinct 2 EIS amendment application. Whilst outside the Precinct 2 boundary area, Walker is facilitating the closure of portions of Tippets Bridge and Legoe Roads as well as Beagle Hole Road and an Un-named Road under the *Roads* (*Opening and Closing*) *Act 1991* for stormwater management (in conjunction with the Council).
- 6.6 Walker has extensively engaged with various State Government agencies concerning the 'essential infrastructure' requirements for the SWL system beyond the Riverlea project area. Walker has applied for the necessary planning approvals for the essential intake and pipework infrastructure (following Section 131(2)(c) of the PDI Act). While this application was on hold, PLUS advised that this application will be submitted to the Minister for consideration and determination, as a favourable determination will enable Walker to begin other affiliated (or secondary) processes with this matter.
- 6.7 While discussed in the Crown Application Seawater Intake System and Pipe Network, Walker knows it must apply for a license to undertake the seawater intake construction activities under Section 46 of the *Crown Land Management Act 2009*. Ultimately, Walker will need to secure longer-term tenure by easement (in favour of the Council) following Section 28 of the *Crown Land Management Act 2009* after construction commences.
- 6.8 As highlighted, Walker realises authorisations must be secured from Green Adelaide/the Minister for Environment and Water following the *Landscape South Australia Act 2019* to undertake any dewatering activities associated with Intake infrastructure construction and seawater extraction.

6.9 Accordingly, Walker is aware that there are many secondary legislative requirements and approval processes that it must comply with to undertake many associated activities.

7. Conclusion/s

- 7.1 The *What We Heard* section highlighted the various topics raised during the notification phase of the Precinct 2 AEIS for Riverlea and issues the Council, DEW, and the EPA raised on the Draft Response Document and following the PLUS Workshop on 28 August 2024.
- 7.2 The *Summary of Submission* section consolidates the matters raised during these processes. It details Walker's response and actions regarding how it has or will address the substance of the topic/s, where relevant.
- 7.3 From the analysis of *What We Heard,* several pivotal "*Key Issues*" appeared that necessitated a more detailed explanation and comprehensive response. While discussing the key issues in greater detail, in terms of how specific topics are being addressed or resolved, some are nearing resolution or warrant a condition of approval, as detailed below:

Aboriginal heritage

- A. The significance of **Aboriginal heritage** at Riverlea and the importance of providing updates on Aboriginal heritage matters, given they warrant careful management considerations as Riverlea develops.
- 7.4 Walker acknowledges the authorisations of the applications made under sections 21 and 23 under the AHA and will comply with any direction from the Minister for Aboriginal Affairs.

Construction methodologies and Operational matters

- B. Lake **construction methodologies** include the containment systems explored as suitable barriers between seawater and groundwater and the surface groundwater management and monitoring during construction. The **operational matters** concern the hybrid approach to managing seawater quality within the lake system and delivering comprehensive Lake Water Quality Modelling to validate the proposed approach.
- 7.5 The experts are telling Walker that the risks of even the best geomembrane lining solution could be similar to that of a clay liner and to think about mitigating any potential risks on potential sensitive receivers, adjoining land owners, users of shallow groundwater, established deep-rooted trees, etc. rather than to entertain potentially unattainable containment performance expectations.
- 7.6 Walkers technical experts (LBWco and Mockinya) are completing the necessary modelling to evaluate the impact of seawater leakage on shallow groundwater for all three SWLs using both containment systems (an HDPE geomembrane and clay liner). LBWco and Mockinya will then work collaboratively with the regulatory authorities to develop the best containment solution that mitigates acceptable containment risks between the proposed SWL and the groundwater and to ensure it will be long-lasting, easily managed, and maintained.
- 7.7 Once the seawater containment system is fully appreciated, a Dewatering Management Plan (DMP) and groundwater management methodology can be finalised (acknowledging LBWco's - *Riverlea Development - Proposed Saltwater Lakes Dewatering Investigation and*

Risk Assessment Report responds to the relevant matters). Despite this, a suitable condition of approval can ensure the appropriate approving authorities approve a DMP on application.

- 7.8 Similarly, a suitable condition that requires developing a surface and groundwater monitoring plan (SGMP) in conjunction with DEW for implementation during the dewatering of SWL1 is appropriate and builds progressive certainty for the construction of the SWL1.
- 7.9 There is considerable lead time to deliver the Scope of Works as detailed in the Fee Proposal for the comprehensive Lake Water Quality Modelling outputs. There also needs to be an agreement between the stakeholders regarding the type of modelling and the required software platforms (their suitability and longevity). Accordingly, Walker is requesting this matter also be conditioned or held as a Reserved Matter (i.e. before lake construction occurs) pending resolution of this issue with the EPA and other stakeholders.

Council's suggested five Reserved Matters

- C. The Council suggested five **Reserved Matters** covering stormwater, flooding, the location of the seawater intake source, additional traffic modelling, and the SWL Phase 2 Report close-out comments.
- 7.10 Walker believes it has effectively dealt with and responded to the Council's suggested five Reserved Matters, which had potential ramifications for the efficient rollout of the Riverlea development, effectively stalling implementation of the project while addressing the substance of particular matters.
- 7.11 While not identified as a key issue, the *Riverlea Development Lakes and Lakes Infrastructure -Vesting Principles / Framework Deed* is significant given that it culminates the ongoing negotiations between Walker and the Council on the terms of a formal Agreement to design, construct, maintain and operate the SWL before vesting these community assets to the Council. The Deed establishes the manner, parameters and protocols concerning the ongoing monitoring and management of the Saltwater Lakes infrastructure assets and their transfer to the Council (the how and when).
- 7.12 Walker and the Council are furthering the Deed for execution. In this regard, Walker has provided its comment on the draft Deed and is waiting on the Council's further feedback. Despite this, some of the required mechanisms (within the Deed) will need to follow, pending finalisation and approval of the AEIS.
- 7.13 Nevertheless, the Deed confirms that Walker and the Council are collaboratively pursuing a vesting framework that should give PLUS, the Commission, and ultimately the Planning Minister the comfort of progressing the AEIS.
- 7.14 While there have been some **amendments to the AEIS** since it went on notification, the amendments are considered relatively minor and do not result in any material changes to the altered Precinct 2 proposal.
- 7.15 Also highlighted are the **secondary approvals and licencing requirements** mandated by other affiliated legislation and Walker's commitment to address those matters when implementing the AEIS for Precinct 2 of the Riverlea development.
- 7.16 Walker (and its technical consultants) have undertaken considerable planning and design work to 'prove up' the SWL urban design concept to enhance the Riverlea development's urban amenities and accommodate a revised stormwater mitigation strategy.

- 7.17 There are significant resource and fiscal implications to progress to more detailed investigations. Therefore, a favourable determination will support Walker in proceeding to the detailed engineering design phase for various scopes of work and validate preliminary findings (that the SWL will be a long-lasting, easily managed, and maintained community asset).
- 7.18 Accordingly, Walker requests the relevant stakeholders to have confidence in Walker to deliver an exemplary development showcasing the SWL as its centrepiece in SA's fastest-selling master-planned community and to support the Minister in determining the AEIS favourably.

Appendices

Appendix A - Riverlea SWL Presentation 28 August 2024

Appendix B - The Minister for Aboriginal Affairs authorisation instrument (including Mapping)

- Appendix C WGA Stormwater Management Water, Wastewater and Recycled Water (December 2023)
- Appendix D Water Technology Riverlea Development Flood Assessment 2020 Addendum
- Appendix D1 Water Technology October 2022 Memorandum Modelling of Riverlea development
- Appendix E COOE Assessment of the Impact on the Saltwater Lakes Ecology
- Appendix F WEP The Water Quality Monitoring Program Results to 02 July 2024
- Appendix G Updated Riverlea Lake Concept Design Report
- Appendix H COOE Assessment of the Impact on Flora and Fauna
- Appendix I EBS Ecology Review Flora and Fauna Management Plan Precinct 2.
- Appendix J LBWco's Dewatering Investigation and Risk Assessment Report October 2024
- Appendix K Geotest Construction Methodology Report
- Appendix L Geotest Proposed Options and Associated Costs Report
- Appendix M WEP Chapman Creek Cumulative Saltwater Extraction Riverlea and Buckland Dry Creek (BDC)
- Appendix N WGA Precinct 1 and 2 Interim and Ultimate Development Stormwater Management Plan - 2024
- Appendix O Simmonds & Bristow Technical Memorandum Stormwater Treatment Performance Modelling
- Appendix P HDPE Liner Lake Edge Concept Plans
- Appendix Q Burchills Drawings SK113, SK138 and SK147 General Site Earthworks Pre-Design and Conceptual Plans
- Appendix R Council's Suggested Conditions
- Appendix S ETA Riverlea Precinct 2 Land Division Masterplan Traffic Impact Assessment (September 2024)
- Appendix T Riverlea Precinct 2 Plan of Division, Affordable Housing Plan, Residential Allotment Mix Plan - September 2024
- Appendix U Riverlea Overall Concept Plan September 2024
- Appendix V LBWco Proposed Saltwater Lakes Saltwater Seepage Risk Assessment (October 2024)
- Appendix W LBWC-HCL Response letter (ref. 231445-01 L01). Dated 13 December 2024.