

# Brown Hill Keswick Creek Stormwater Project Business Case

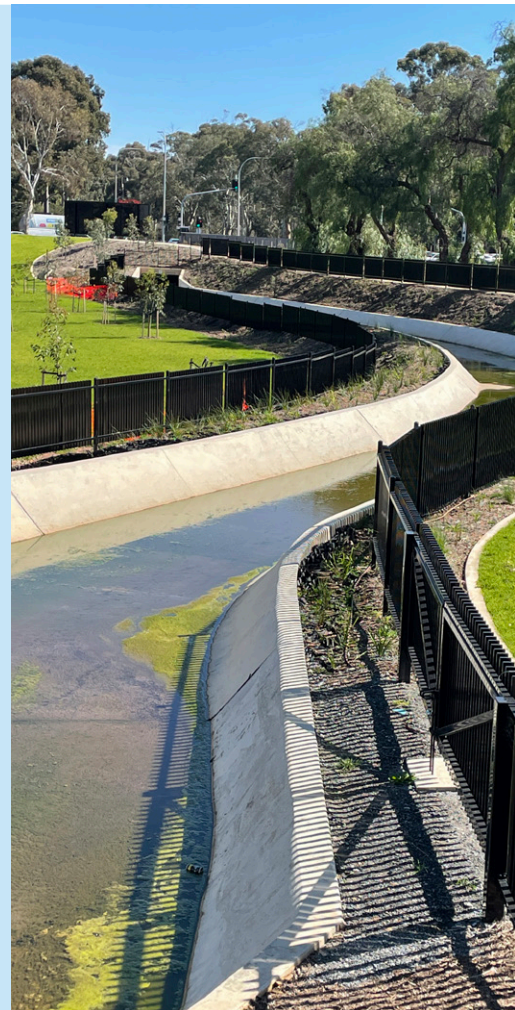
*January 2022*

*For the Cities of Adelaide, Burnside, Mitcham, Unley and West Torrens*



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# 1.0 Project Overview

The Brown Hill Keswick Creek Stormwater Project is seeking a \$70 million contribution from the Federal Government to supplement \$140 million provided by the South Australian Government (\$70 million) and constituent Councils including the Cities of Adelaide, Burnside, Mitcham, Unley and West Torrens (\$70 million) to mitigate significant flood risks arising from four major watercourses in metropolitan Adelaide; the Brown Hill, Keswick, Glen Osmond and Park Lands Creeks. A balance of \$18 million will be sought from other grant programs on an individual sub-project basis making up the total funding requirement of \$228 million.

Economic modelling for this project indicates that total damage estimates associated with a significant (100 year average recurrence interval) flood event is \$418.5 million and completing the proposed project will reduce that damage estimate to \$7.5 million, a net benefit of \$411 million. 57% of the damage estimates are direct property damage, but indirect benefits (business interruption, traffic disruption, social and environmental impacts) add significantly to the total.

Climate change, and the increasing intensity and frequency of storm events globally, are increasing the probability of another significant flood event in the near future with devastating socio-economic consequences for Adelaide. This project will protect critical transport infrastructure including roads, rail and air including significant Federal Government assets and investments such as Adelaide Airport (leased to Adelaide Airport Limited), Keswick Army Barracks (Department of Defence), the ARTC rail network and Keswick Terminal interstate rail hub, the North South Corridor project (Federal Government Investment).

Through its infrastructure spend, the project will support \$145.5 million in Gross State Product and an average of 112 jobs per annum over the remaining construction period 2022-2032. This includes local Tier 2 and Tier 3 contractors who do not typically benefit from major road infrastructure projects.

According to a study published in the Australian and New Zealand Institute of Insurance and Finance Journal, the Brown Hill Creek catchment is the sixth most likely region in Australia to experience a major flood event, placing the Brown Hill Keswick Creek Stormwater Project among the highest priority flood mitigation works across the nation.



\$418.5m

total damage estimates associated with a significant flood event today



\$7.5m

total damage estimates associated with a significant flood event after proposed mitigation

\$411m net benefit

Under the Current Funding Model (\$140 million from the South Australian Government and Constituent Councils) \$34.5 million has been used since 2017 to fund the first of 4 project stages, to be completed in early 2022. The \$70 million Federal Government funding will assist the implementation of a lower cost Accelerated Delivery

Schedule (\$228.1 million from 2017 to 2032) compared with the Current Delivery Schedule (\$244.9 million from 2017 to 2037). The Accelerated Delivery Schedule will also have a higher Benefit Cost Ratio (BCR) and Net Present Value than the Current Delivery Schedule.

**Current Funding Model**

Committed funding from the Stormwater Management Authority (SMA) and the Constituent Councils of \$140 million, for partial delivery of the BHKC Stormwater Project over a 20-year timeframe concluding in 2037.

**Current Delivery Schedule**

Committed funding from the Stormwater Management Authority (SMA) and the Constituent Councils of **\$140 million plus uncommitted funding of \$104.9 million** required from other sources making total funding of **\$244.9 million** for completion of the BHKC Stormwater Project over a **20-year timeframe concluding in 2037**.

**Accelerated Delivery Schedule**

Committed funding from the Stormwater Management Authority (SMA) and the Constituent Councils of **\$140 million plus uncommitted funding of \$88 million** required from other sources making total funding of **\$228 million** for completion of the BHKC Stormwater Project over a **15-year timeframe concluding in 2032**.

	BCA	NPV (\$m)	Funding (\$m)		Completion Date by Stage	
Current funding model	1.28	\$15.9	SMA	\$70.0	Stage 1: Flood Detention	2022
			Constituent Councils	\$70.0	Stage 2: Lower BHC	2027
			Other	\$0	Stage 3: Flow Diversions	Not completed
			Total	\$102.7	Stage 4: Upper BHC and Glen Osmond	Not completed
Current delivery schedule	1.86	\$120.0	SMA	\$70.0	Stage 1: Flood Detention	2022
			Constituent Councils	\$70.0	Stage 2: Lower BHC	2027
			Other	\$104.9	Stage 3: Flow Diversions	2032
			Total	\$244.9	Stage 4: Upper BHC and Glen Osmond	2037
Accelerated delivery schedule	1.94	\$132.5	SMA	\$70.0	Stage 1: Flood Detention	2022
			Constituent Councils	\$70.0	Stage 2: Lower BHC	2027
			Other	\$88.0	Stage 3: Flow Diversions	2029
			Total	\$228.0	Stage 4: Upper BHC and Glen Osmond	2032

Infrastructure Australia (IA), an independent statutory body that is the key source of research and advice for governments, industry and the community on nationally significant infrastructure needs, recently (August 2021) noted that the events of recent years (global pandemic, bushfires, droughts, floods, other extreme weather events and cyber threats) have highlighted Australia's vulnerability to natural and non-natural threats and their social, environmental and economic impacts. It estimates that by 2050, the annual economic cost of natural disasters in Australia could more than double – from an average of \$18 billion per year to more than \$39 billion per year<sup>1</sup>.

*Failure of a single asset can amplify impacts for people, economies and the natural environment and increase the risk of cascading, systemic failures. There is opportunity to improve infrastructure investment decision-making by developing agreed methodologies and guidance on how to better value resilience through the infrastructure lifecycle.*

Infrastructure Australia

In 2005 the State Government and the Local Government Association (LGA) released the Urban Stormwater Management Policy for South Australia. In 2006 they entered into the Stormwater Management Agreement which sets out the roles and responsibilities of state and local government and provides governance arrangements for stormwater management on a catchment basis throughout the state.

A key element of strategies described in the Urban Stormwater Management Policy is the development of Stormwater Management Plans (SMP) for catchments to ensure that stormwater management is addressed on a total catchment basis with Green Adelaide and the 8 Regional Landscape Boards, local government authorities and relevant state government agencies working together. **The Brown Hill Keswick Creek Stormwater Project focusses on building the collaboration and organisational structure sought by IA to deliver infrastructure for resilience.**

Most importantly and in the context of IA Guidelines, the project is a package of related interventions designed to address a common flood problem that will be delivered in a coordinated manner by the Constituent Councils to obtain benefits that could not be achieved by delivering the interventions individually.

This Business Case for the acceleration of the Brown Hill Keswick Creek Stormwater Project has been prepared with the cooperation of the project's Constituent Councils and major stakeholders likely to be impacted by a significant flood event. Professional advice has also been sought on the project costs, property valuations and flood damage estimates to private property which have all been incorporated into the Economic Impact Assessment (EIA) and Benefit Cost Analysis (BCA).

In the **Accelerated Delivery Schedule**, the project will proceed in 4 stages over the next 11 years (completion 2032) at an escalated cost of \$228.1 million:

1. The first stage of the project (Detention Storages - cost of \$34.5 million) is almost completed. Once completed 20% of the flood protection benefits are achieved.
2. The second stage of the project (Lower Brown Hill Creek Upgrades - cost of \$58.4 million) is targeted for completion in 2027. Once completed 40% of the flood protection benefits are achieved.
3. The third stage of the project (Keswick Creek Flow Diversions - cost of \$89.4 million) is targeted for completion in 2029. Once completed 80% of the flood protection benefits are achieved.
4. The fourth stage of the project (Upper Brown Hill and Glen Osmond Creek Upgrades - cost of \$45.8 million) is targeted for completion in 2032. Once completed 100% of the flood protection benefits are achieved.

The BHKC Stormwater Project and associated works have the strong support of key stakeholders including Adelaide Airport Limited, the South Australian Government's Stormwater Management Authority, the South Australian Government's Department for Infrastructure and Transport and the North South Corridor project, the Local Government Association Mutual Liability Scheme and Members of Parliament.

## Support Sought

*The Brown Hill Keswick Creek Stormwater Project is seeking a \$70 million contribution from the Federal Government, ideally to be provided in seven equal instalments over a 7 year period commencing in 2022, to guarantee the completion of the overall project and accelerate the delivery of Stages 2 and 3 of the project which will provide flood protection for Federal Government land holdings (Adelaide Airport and Keswick Army Barracks) and critical transport routes including the North South Corridor and ARTC's interstate rail lines. A balance of \$18 million will be sought from other grant programs on an individual sub-project basis making up the total funding requirement of \$228 million for the Accelerated Delivery Schedule.*

<sup>1</sup> Infrastructure Australia, A Pathway to Infrastructure Resilience, Advisory Paper 1: Opportunities for Systemic Change



## 2.0 Project Catchment Area

### 2.1 Brown Hill Creek Catchment

Brown Hill Creek flows through the suburbs of Crafrers West, Brown Hill Creek, Mitcham, Torrens Park, Hawthorn, Unley Park, Millswood, Goodwood, Forestville, Everard Park, Ashford, Kurralta Park, Plympton, North Plympton, Netley and Adelaide Airport before flowing into the Patawalonga. It can be conveniently divided into two sections:

- **Lower Brown Hill Creek** – which is downstream from Anzac Highway to its confluence with Keswick Creek at Adelaide Airport (which is also the western extent of the catchment study area); and
- **Upper Brown Hill Creek** – being the section upstream of Anzac Highway to its source in the rural area of the Mitcham hills.



Brown Hill Creek has a catchment area of 32.0 km<sup>2</sup> (upstream from Adelaide Airport) of which about 18 km<sup>2</sup> is rural land.

### 2.2 Keswick Creek Catchment

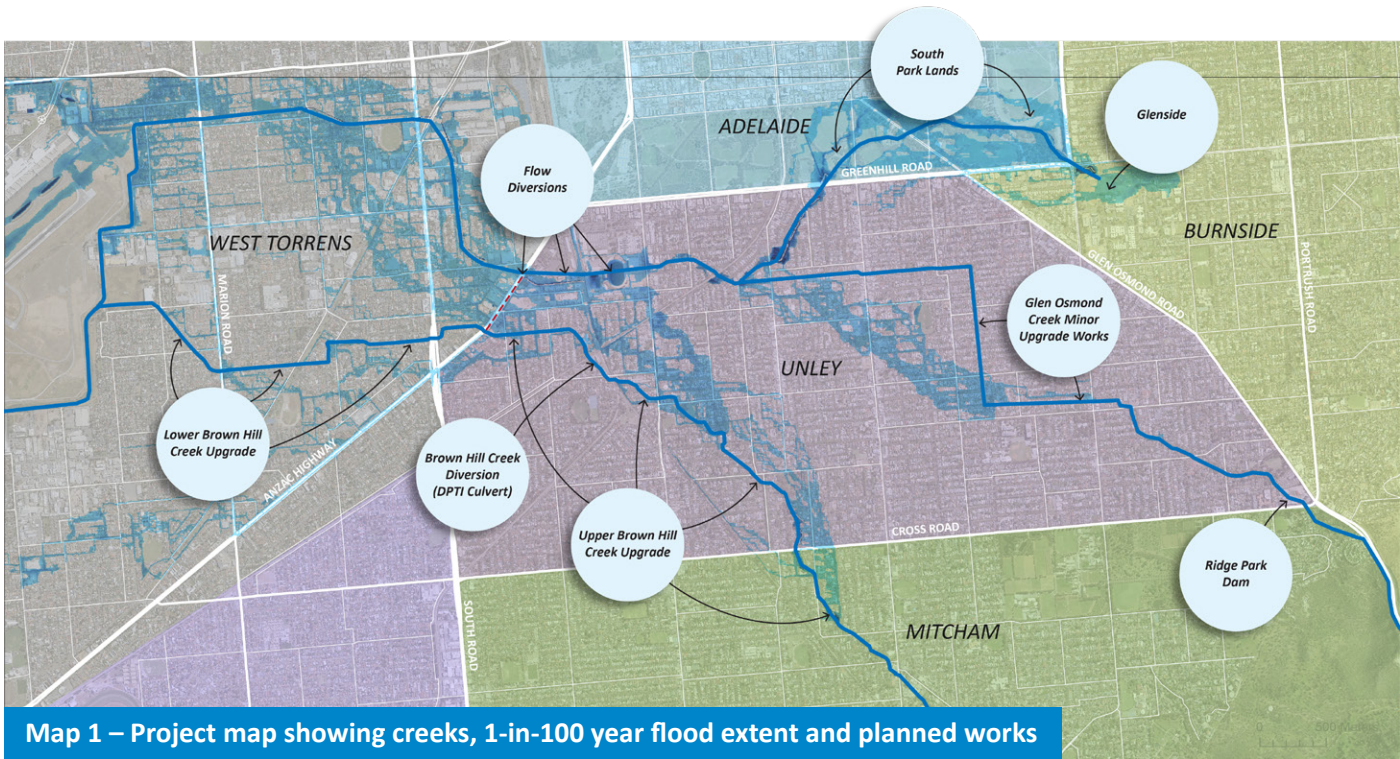
Keswick Creek is fed by:

- **Glen Osmond Creek** – which originates in the valley in which the South Eastern Freeway is located from the Heysen Tunnels to the Old Toll Gate and then passes through the suburbs of Leawood Gardens, Mount Osmond, Urrbrae, Myrtle Bank, Fullarton, Parkside, Unley and Wayville.
- **Park Lands Creek** – which originates as several minor watercourses that flow off the hills face in the suburbs of Glen Osmond and Beaumont. These watercourses enter the minor (underground) drainage system and continue as underground drains on several routes down through the suburbs of Hazelwood Park, Linden Park, St Georges, Glenunga and Glenside. These drains come together at Conyngham Street, Glenside prior to becoming Park Lands Creek as the drain enters the South Park Lands via a culvert under the Greenhill Road / Fullarton Road intersection. Park Lands Creek leaves the South Park Lands near Peacock Road and flows through Unley before joining with Glen Osmond Creek to form Keswick Creek just downstream of Simpson Parade, Wayville.

Keswick Creek then flows through the suburbs of Wayville, Keswick, Mile End South, Richmond, Cowandilla, Brooklyn Park and Adelaide Airport prior to joining with Brown Hill Creek. The Keswick Creek catchment area is 36.7 km<sup>2</sup>.

Map 1 shows the creeks and planned project works, overlaid on the Council areas.

## 3.0 Stormwater Management Plan



The **Brown Hill Keswick Creek Catchment Stormwater Management Plan 2016 (the SMP)** highlights the devastating impact that a major flood event would have on the inner southern and south-western suburbs of Adelaide. The SMP outlines a comprehensive program of flood mitigation works that will protect the community and businesses from the effects of flooding while also delivering social and environmental benefits such as urban greening, improving the quality of stormwater discharges to coastal waters, and the beneficial use of stormwater.

The SMP has been endorsed by all of the Constituent Councils and has the acceptance of the community. The SMP was approved by the Stormwater Management Authority (the SMA) and gazetted in February 2017. The Councils then established the Brown Hill and Keswick Creeks Stormwater Board (the Board) as a regional subsidiary under the Local Government Act 1999 to coordinate implementation of the SMP.

The six broad objectives of the SMP are:

1. Protection from flooding.
2. Quality of runoff and effect on receiving waters.
3. Beneficial reuse of stormwater runoff.
4. Protection of watercourses and riparian ecosystems.
5. Effective planning outcomes.
6. Management of stormwater infrastructure.

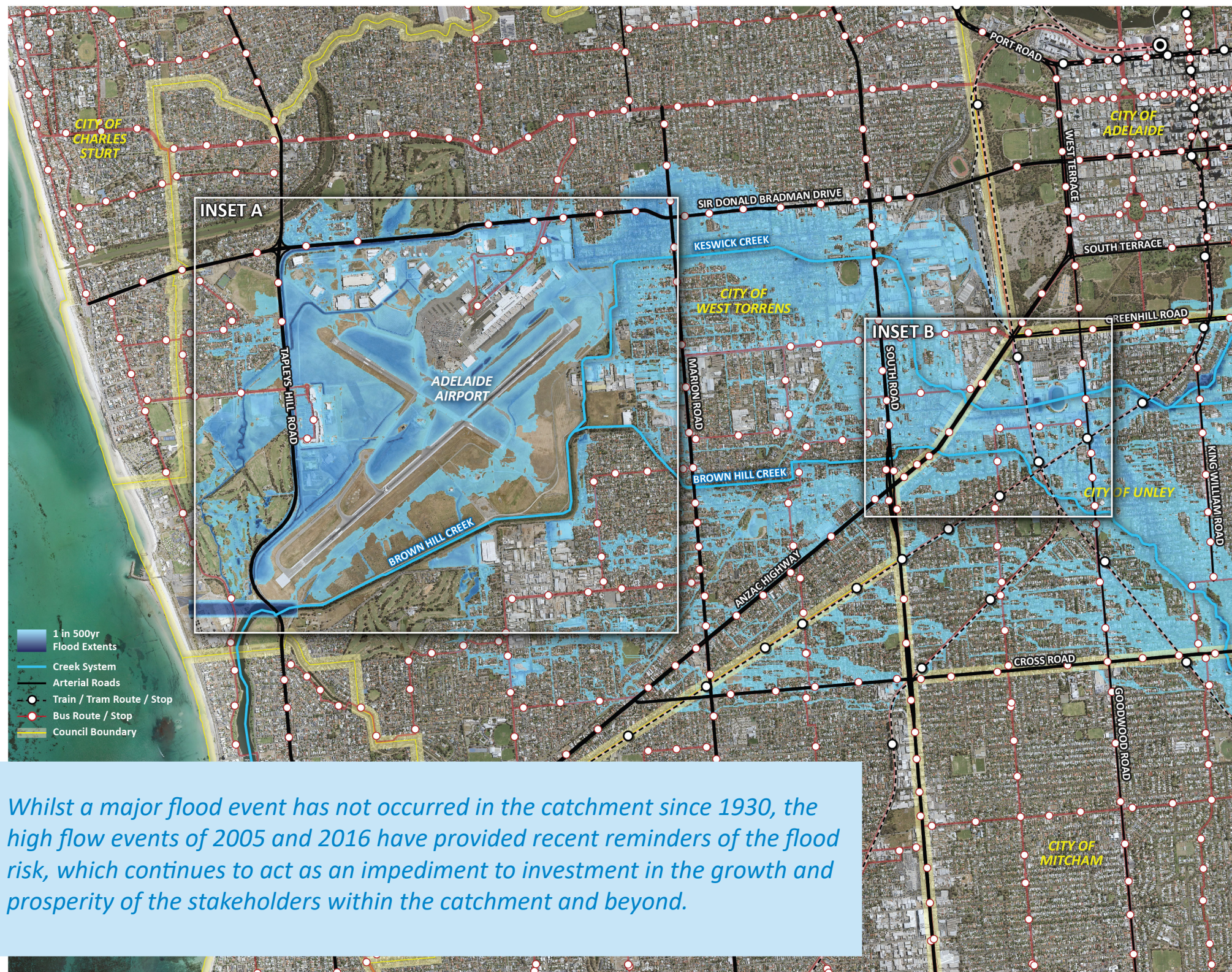
With respect to flood protection, the key objectives of the SMP are to substantially reduce the number of properties within the catchment that would be affected by very large flood events and to minimise damage to critical infrastructure. Currently a significant flood event in the catchment would affect over 3,900 properties and cause potential damages currently estimated to be \$418.5m.

**3,935**  
properties would be  
flood-affected if a significant  
flood event occurred today

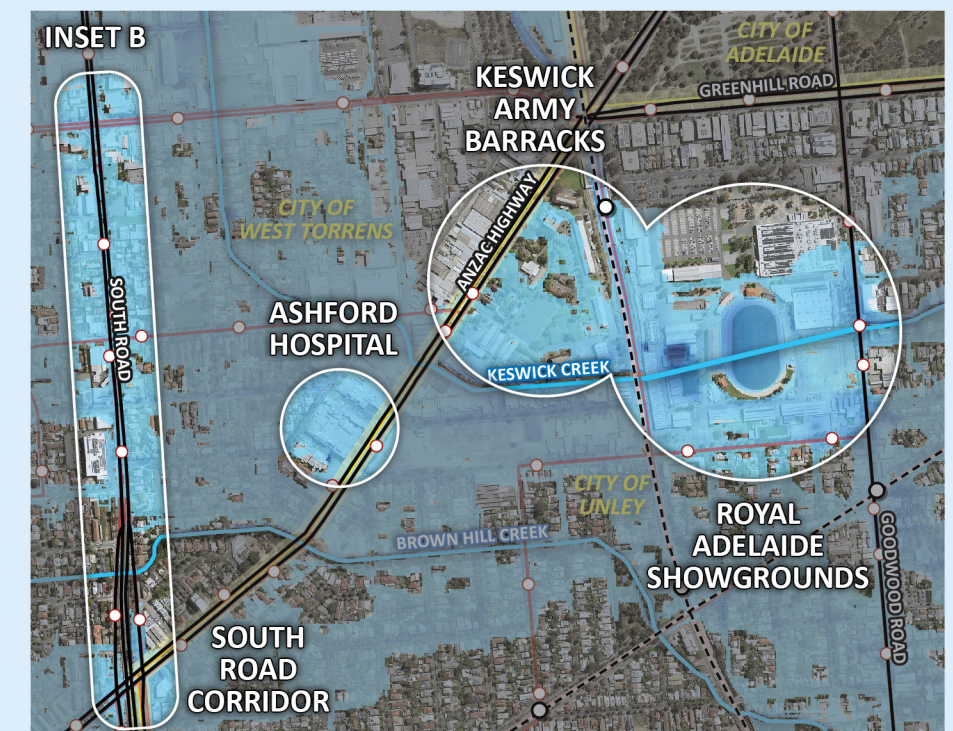
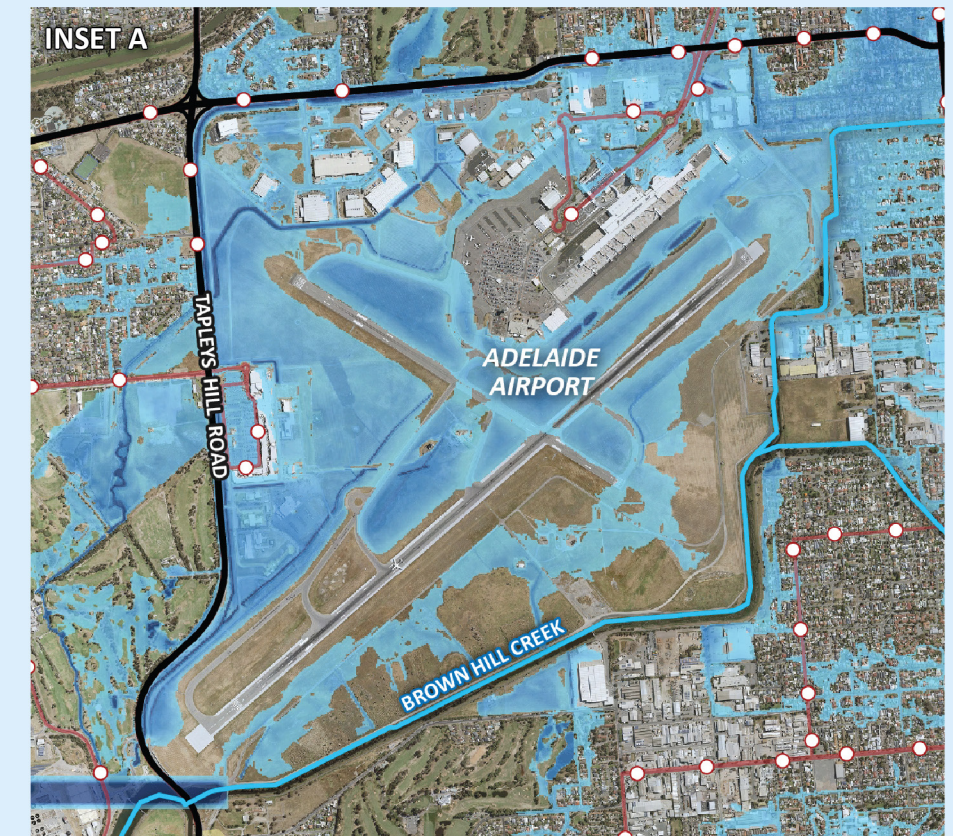
**63**  
properties would be flood-affected  
if a significant flood event  
occurred after proposed mitigation



## Map 2



*Whilst a major flood event has not occurred in the catchment since 1930, the high flow events of 2005 and 2016 have provided recent reminders of the flood risk, which continues to act as an impediment to investment in the growth and prosperity of the stakeholders within the catchment and beyond.*





## 4.0 Program of Works

The flood mitigation works outlined in the SMP comprise detention storages in the upper reaches of the catchment, diversion of high flows away from flooding hotspots, and upgrades to the flow capacity of the channels. Fundamental to the successful delivery of this program of flood mitigation works is the principle of ‘working progressively in an upstream direction’ to ensure that the downstream reaches of the creek system are ready to cater for the ultimate design flow before the works in the upper catchment are undertaken.

The program of works can be delineated into four stages (also referred to as sub-projects):

- 1. Flood Detention;** this involves the construction of detention storages in the upper catchment (Ridge Park, Glenside, South Park Lands) that will reduce the downstream flow rates.
- 2. Lower Brown Hill Creek Upgrades;** this will involve doubling the flow capacity of a 3.3 kilometre long section of channel beginning at the south-eastern corner of the Adelaide Airport and ending at Anzac Highway. The channel is primarily situated within a 12-metre wide reserve owned by City of West Torrens and comprises sections of earthen and concrete lining. In its current form the channel does not offer any environmental value or opportunity for community use.
- 3. Keswick Creek Flow Diversions;** this will involve construction of a large underground drain to divert flows from Keswick Creek to the upgraded section of Lower Brown Hill Creek, before these flows have the opportunity to ‘break-out’ of the channel (upstream of the Royal Adelaide Showgrounds) and continue overland through the south-western suburbs.
- 4. Upper Brown Hill and Glen Osmond Creek Upgrades;** this will involve upgrading the flow capacity of the creek channel and road crossings to prevent ‘break-outs’ and flooding of private property and the road network.

The program of works is depicted in the following diagram.



*An article from the Insurance Council of Australia identifies that if quality flood data was made available by the State Government the federal electorates of Hindmarsh, Sturt and Adelaide would be included in the top 20 flood exposed federal electorates in the nation.*

The Brown Hill Keswick Creek Catchment Stormwater Management Plan 2016 proposed a funding model that includes a 1/3 funding contribution from each tier of Government. The current commitment from the South Australian Government’s Stormwater Management Authority is for a total of \$70 million over a 20-year timeframe. The Constituent Councils are matching the contributions made by the Stormwater Management Authority, which brings the total funding commitment to \$140 million over 20 years. There is currently no funding commitment from the Federal Government, and there is a current funding shortfall of \$105 million under the Current Delivery Schedule, which would be reduced to \$88 million by accelerating the delivery schedule.

The catchments of both Brown Hill and Keswick Creeks arise on the western slopes of the Mount Lofty Ranges and flow westwards across inner south-eastern and western suburbs of Adelaide before discharging to the sea in the vicinity of the Adelaide Airport. The lower portion of the catchment, across the south-western suburbs of Adelaide, is at the greatest risk of flooding with Adelaide Airport and Ashford Hospital being the dominant land holdings in the catchment.

The underlying flood risk would be exacerbated if the Torrens to Darlington section of the North South Corridor Project proceeds significantly ahead of the BHKC Stormwater Project’s flood mitigation works, as the design for the lowered Motorway is required to incorporate a physical barrier on its upstream (eastern) side to prevent floodwater ingress.

The Brown Hill Keswick Creek system spans the Federal electorates of Sturt, Adelaide, Boothby and Hindmarsh, and the BHKC Stormwater Project includes flood mitigation works throughout the Cities of Adelaide, Burnside, Mitcham, Unley and West Torrens.

In relation to modelling the economic impacts of a significant flood, the modelling variations have included:

- A range of scenarios and sensitivities.
- Additional regional scenarios to be modelled including impacts on the North South Corridor Project and Adelaide Airport.
- An alternative scenario to consider the impacts of climate change. The major impact of climate change on flooding in the catchment area will be to increase the probability of more severe floods occurring on a more frequent basis. For example, the 1-in-100 year flood becoming a 1-in-50 year flood. The methodology agreed to undertaking this analysis included:
  - » Undertaking desktop research of the modelling of climate change on flood severity.
  - » Conducting interviews with climate change experts to fill in gaps and expand the evidence about possibilities and probabilities.
  - » Adjusting the modelling to allow for the changed probabilities, and undertaking sensitivity analysis for forecasting uncertainty.

## 5.0 Stakeholder Consultation and Case Studies

Detailed consultation with all key stakeholder organisations has been undertaken including:

- Adelaide Airport Limited
- Ashford Hospital
- Australian Rail Track Corporation (ARTC)
- City of Adelaide – Constituent Council
- City of Burnside – Constituent Council
- City of Mitcham – Constituent Council
- City of Unley – Constituent Council
- City of West Torrens – Constituent Council
- Department of Defence - Keswick Army Barracks
- Department of Infrastructure & Transport - North South Corridor Project
- FM Global – Insurer for Ashford Hospital
- LGASA Mutual Pty Ltd
- Metropolitan Fire Service (MFS)
- SA Ambulance Service
- State Emergency Service (SES)
- Stormwater Management Authority

The consultation findings from the five Constituent Councils are summarised below. It is noted that these findings focus on flood impacts/damages that are not otherwise covered by estimates of direct damages to private property.

Councils identified the following impacts from flooding:

- Damage to infrastructure and assets including government, transport and communication infrastructure.
- Damage to community assets including property.

- Increased demand or impact to facilities including health services, aged care and schools.
- Impacts to business and economic loss.
- Loss of life or injury to people.

The following 4 case studies are indicative of the impact that a significant flood will have on the stakeholders. The outcomes of all consultations, including flood impacts, costs and mitigation benefits, are incorporated into the Economic Impact Assessment and Benefit Cost Analysis.

### Ashford Hospital

*Ashford Hospital is located between the Brown Hill and Keswick Creeks. It is estimated that a significant flood event would shut Ashford Hospital down for six months.*

The entire hospital would be closed as it is dependent on the ground floor and the chillers which are located in the hospital basement. Under this scenario revenue loss is estimated at \$60 million plus with equipment / infrastructure an expected minimum of \$10 million. For example, one of the hospital's Angio labs is \$1 million alone.

Importantly, there is a significant social impact if the hospital is closed as it handles 350 theatre cases per week and also handles public hospital overflow work. The hospital also has an emergency department which would be closed. The current pandemic has demonstrated the importance of maintaining an effective health system and Ashford Hospital plays a key role in this.

In summary, a significant flood event would not only severely impact on Ashford Hospital's operations, but would also impact on South Australia's overall hospital capacity to deal with major medical events such as the current pandemic.

### South Australian Ambulance Service (SAAS)

SAAS has two owned properties and four leased properties which would be impacted by a significant flood event. SAAS headquarters in Eastwood house the Emergency Operations Centre which receives 000 emergency calls and dispatches appropriate resources to them. SAAS also has a rescue retrieval centre at Adelaide Airport. The headquarters replacement value is \$100 million with the rescue retrieval centre replacement value being \$13 million. The four leased properties are some of SAAS's Ambulance Stations which accommodate ambulances and crews ready for deployment. Leasehold improvements are estimated at \$2.2 million.

One of the most significant impacts would be on personal injury/loss with over 1,000 cases per day being managed by SAAS. A significant flood would generate a substantial workload with evacuations from hospitals and aged care facilities. Those injured by the flood would generate work for SAAS over and above the usual levels of activity.

Another impact is the inability to access an emergency case, including potential injury and loss of life. The length of time for a person to receive definitive medical care has a major impact on patient outcomes. There would potentially be a loss of transport legs and routes if the flood restricted transport routes completely. This means that one hospital could be cut off from another hospital leading to the accessible hospital being overwhelmed. This aligns with information provided by Ashford Hospital.

Within the Emergency Operations Centre there is a Clinical Telephone Assessment team whose function is to match lower acuity callers with alternative pathways to receiving their required care. This includes directing people to their own GP or to a Priority Care Centre. A significant flood could impact on the team itself and/or reduce the available alternative pathways. This would also lead to patients defaulting to an Emergency Department presentation which would also overwhelm available hospital resources.

SAAS has an Emergency Operations Centre contingency plan but it's a short term solution. A protracted event would compromise SAAS's ability to handle call volumes. Also, if critical infrastructure is knocked out, then ambulance despatch which relies on 4G network, could be impacted.

A flood of Adelaide Airport would also impact on the ability of SAAS' MedSTAR Retrieval Service to conduct retrievals from regional areas into the major city hospitals. This would result in high acuity cases not being able to receive appropriate clinical care leading to adverse outcomes including death.

It could also restrict SAAS's engagement of the Royal Flying Doctor Service to undertake Inter-Hospital Transfers of Patients. This would result in regional patients not being able to access the needed level of care and to patients being held in hospital beds throughout the State. This bed blockage then causes access issues for other patients trying to get treatment and causes ramping issues for ambulances delivering patients to hospitals.

*In summary, a significant flood event could severely impact on SAAS's operational ability in terms of its 000 emergency calls, its ability to access hospitals and aged care facilities, and its ability to respond to distress calls in a timely manner potentially resulting in loss of life.*



## Adelaide Airport Limited

Analysis has considered the types of impact expected for a significant flood event on Adelaide Airport's aviation operations in conjunction with the flood mapping data provided in the Stormwater Management Plan 2016.

Adelaide Airport Limited's critical infrastructure has been designed and constructed to withstand a 1-in-100 year flood event, however, some operations may be impacted for a short period of time:

- The flooding could make both runways unavailable apart from one section due to runway seal and strip inundation. This length would not be suitable for domestic or international traffic.
- The loss of precision approach capability due to flooding of the glide path and approach lights. This would likely be needed with the expected poor weather conditions associated with heavy rainfall.
- Loss of the helipad, however helicopters could operate from other areas if not flooded. The helipad is lit so this capability would be lost without temporary lighting.
- Adelaide Airport Limited should still have an Aviation Rescue Fire Fighting service although there would be some flooding surrounding the fire station.
- Taxiing aircraft would be difficult but aircraft could potentially be towed through impacted areas. This would not entirely stop movements but would severely slow them.

In summary, a significant flood event could have a major but short term impact on Adelaide Airport Limited's aviation operations for both domestic and international traffic.

## Australian Rail Track Corporation (ARTC)

ARTC has not undertaken previous studies to determine the impact of a significant flood event.

The worst case scenario is a freight train derailment. In this scenario the ballast supporting the track is washed



1-in-100 year event - base case



1-in-100 year event - with mitigation

away and the train is derailed. The track would be closed for a minimum of 4 to 5 days with this freight corridor handling all Melbourne to Adelaide to Perth rail freight (there are also two passenger trains to Melbourne each week that would potentially be impacted). There would



1-in-500 year event - base case



1-in-500 year event - with mitigation

be significant delays in freight movements under this scenario. For example access to rail transport for grain and general commodities would be cut off. There would be a service delay and lost revenue for freight that is time critical.

The rail operator that runs the trains would also suffer a force majeure. The estimated ARTC financial impact is a minimum of \$1m to \$1.5m based on a 4.5 day repair effort and is very much dependent on the specific location of the derailment and the extent of damage. In addition there would be losses associated with the locomotive and rollingstock of \$1m to \$1.5m. The track is adjacent to the passenger train network with a derailment expected to foul the passenger train network which would therefore need to be closed.

The mid-level case would be a track closure due to a loss of ballast and sleepers causing the track to subside (no derailment). It is estimated this would cost around \$100,000 to repair with no significant operational impact (short term impact only).

The best case would be that the flood event resulted in water pooling around the track with trains needing to operate at slower speeds until the water subsides.

There are two other potential impacts:

- Environmental impacts as a result of trains carrying hazardous freight or a diesel spill in the event of locomotive derailment.
- The potential for train drivers to be injured during a derailment.

The proposed flood mitigation infrastructure, when implemented, would potentially result in a reduction of insurance premiums.

*In summary, a significant flood event would not only impact on ARTC's operations but also presents a risk for injury or death, a risk of significant environmental damage and potential disruption to supply-chains and the passenger rail network.*



### Torrens to Darlington (T2D)

The T2D Project is the final 10.5 km piece of the North South Corridor and the most significant road infrastructure project ever undertaken in South Australia. Using a combination of tunnels, lowered and ground-level motorways, as well as overpasses and underpasses at key intersections, T2D will bypass 21 sets of traffic lights between the River Torrens and Darlington.

Set to unlock Adelaide's traffic network, T2D will stimulate economic activity, supporting up to 4,900 jobs and help ensure people, produce and products arrive where they need to be safer and sooner.

The design for T2D consists of two tunnel sections joined by a lowered motorway. The Southern Tunnel will connect Darlington to Anzac Highway, while the Northern Tunnel will be located north of Anzac Highway and connect to Torrensville. The Southern Tunnel and Northern Tunnel will be joined by the Tunnel Connector lowered motorway.



Artist Impression - north of Anzac Highway overpass

*“ We understand that significant upgrades are proposed for both Keswick Creek and Brown Hill Creek, which will ultimately benefit this project, but which may present considerable interim risk if the construction of the motorway were to proceed significantly ahead of the flood protection works. It is expected that there would be considerable benefits to both projects if their development and delivery through reference design, detailed design, then construction was coordinated in the same or similar timeframe. An integrated solution would potentially deliver costs savings to both projects and a reduction in flood risks to the community that would need to be considered. ”*

**Malcolm Short**

*Director, Engineering North South Corridor Project.*



ARTIST'S IMPRESSION

photos: [https://dit.sa.gov.au/nsc/torrens\\_to\\_darlington](https://dit.sa.gov.au/nsc/torrens_to_darlington)



# 6.0 Economic Impact Assessment

An Economic Impact Assessment (EIA) has been undertaken to estimate the Gross State Product and employment impacts of the construction phase of the project. Econometric modelling for the **EIA** results in the following outcomes:

Present value of the **Accelerated** Delivery Schedule Economic Impact:

**\$145.5 million**

The construction process will generate an average of:

**112 jobs/annum**

over the period 2022-2032.

*The above Gross State Product and employment outcomes are important in the context of current pandemic impacts on businesses and State unemployment levels with the Accelerated Delivery Schedule bringing these benefits forward. The scale of the work packages is tailored to maximise participation from local Tier 2 and Tier 3 contractors who do not typically benefit from major road infrastructure projects.*



<sup>2</sup> Uses discount rate of 3.8% real, + assumption of 2.5% general inflation

# 7.0 Deliverability

Governance of the BHKC Stormwater Project is exercised through an Owners Executive Committee (OEC) which includes the Chief Executives of the five Constituent Councils or their delegates. A Memorandum of Agreement dated December 2008 provides terms of reference for the conduct of the project. Meetings of the OEC take place quarterly.

The five Constituent Councils established the Brown Hill and Keswick Creeks Stormwater Board in February 2018 as a regional subsidiary under the Local Government Act 1999, to coordinate implementation of the flood mitigation works outlined in the Brown Hill Keswick Creek Catchment Stormwater Management Plan 2016 that was approved and gazetted in February 2017. The Board meets eight times each year.

In accordance with the requirements of the Local Government Act 1999, the Brown Hill and Keswick Creeks Stormwater Board has established an Audit and Risk Committee. The objective of the Audit and Risk Committee is to ensure the Board acts in compliance with its Charter and meets its legislative and probity requirements as required by the Local Government Act 1999 and other relevant legislation. Meetings of the Audit and Risk Committee take place quarterly.

Most importantly and in the context of IA Guidelines the project is a package of related interventions designed to address a common flood problem that will be delivered in a coordinated manner by the Constituent Councils to obtain benefits that could not be achieved by delivering the interventions individually. In addition, the Board has a proven track record of working with the Kaurna People, the traditional owners of the Adelaide Plains.



Board and SMA tour of the South Park Lands Construction Site

