SPECIAL COUNCIL AGENDA

Special Council Meeting

Notice is hereby given pursuant to the provisions of the Local Government Act, 1999, that a Special Meeting of Unley City Council will be held in the Council Chambers, 181 Unley Road Unley on

Monday 14 September 2015 at 7.00pm

for the purpose of considering the items included on the Agenda.

Peter Tsokas
Chief Executive Officer

OUR VISION 2033

Our City is recognised for its vibrant community spirit, quality lifestyle choices, diversity, business strength and innovative leadership.

COUNCIL IS COMMITTED TO

- Ethical, open honest behaviours
- Efficient and effective practices
- Building partnerships
- Fostering an empowered, productive culture – “A Culture of Delivery”
- Encouraging innovation – “A Willingness to Experiment and Learn”

ACKNOWLEDGEMENT

We would like to acknowledge this land that we meet on today is the traditional lands for the Kaurna people and that we respect their spiritual relationship with their country.

We also acknowledge the Kaurna people as the custodians of the Adelaide region and that their cultural and heritage beliefs are still as important to the living Kaurna people today.

PRAYER AND SERVICE ACKNOWLEDGEMENT

Almighty God, we humbly beseech Thee to bestow Thy blessing upon this Council. Direct and prosper our deliberations for the advancement of Thy Kingdom and true welfare of the people of this city.

Members will stand in silence in memory of those who have made the Supreme Sacrifice in the service of their country, at sea, on land and in the air.

Lest We Forget.

WELCOME

ORDER OF BUSINESS

ITEM NO		PAGE NO
	Mr Ron Bellchambers	
	REPORTS OF OFFICERS	
	GENERAL MANAGER ASSETS AND ENVIRONMENT – Mr John Devine	
246	Brown Hill Keswick Creek Stormwater Management Plan Part B – Recommended Option	3 – 15
	QUESTIONS OF WHICH NOTICE HAS BEEN GIVEN	
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NEXT MEETING

Monday 28 September 2015 – 7.00pm

CONFIRMATION OF MINUTES

TITLE:	CONFIRMATION OF MINUTES FOR COUNCIL MEETING HELD ON 24 AUGUST 2015
ITEM NUMBER:	244
DATE OF MEETING:	14 SEPTEMBER 2015
ATTACHMENTS:	NIL

RECOMMENDATION

MOVED:
SECONDED:

That:

1. The minutes of the Council Meeting held on Monday 24 August 2015, as printed and circulated, be taken as read and signed as a correct record, with the following amendment:

   "Item 221**
   LGA Annual General Meeting – Call for Nominations

   A Division was called and the previous decision set aside.

   Those voting in the affirmative:

   Councillors, Smolucha, Hudson, Hughes, Lapidge, Sangster and Rabbitt.

   Those voting in the negative:

   Councillors Schnell, Palmer, Boisvert, Salaman, Hewitson, Koumi and Mayor Clyne.

   The MOTION was declared **LOST"**

DEPUTATION

TITLE:	DEPUTATIONS
ITEM NUMBER:	245
DATE OF MEETING:	14 SEPTEMBER 2015
ATTACHMENTS:	NIL

Mr Tom Pearce

Mr David Schultz – presentation – resident

Mr Neil Lowrie – presentation – resident

Professor Wayne Meyer, Chairperson of Brown Hill Creek Association – talking about the benefits of Option D for all stakeholders and the environment.

Mr Jeffrey Newchurch, Chairperson of the Kaurna Nation Cultural Heritage Association – talking about the impacts of Part B works on Kaurna Culture and Heritage.

Mr Ron Bellchambers

DECISION REPORT

REPORT TITLE:	BROWN HILL KESWICK CREEK STORMWATER MANAGEMENT PLAN PART B RECOMMENDED OPTION
ITEM NUMBER:	246
DATE OF MEETING:	14 SEPTEMBER 2015
AUTHOR:	JOHN DEVINE
JOB TITLE:	GENERAL MANAGER ASSETS & ENVIRONMENT
RESPONSIBLE OFFICER:	PETER TSOKAS
JOB TITLE:	CHIEF EXECUTIVE OFFICER

1. EXECUTIVE SUMMARY

The five catchment councils of the Brown Hill Keswick Creek catchment have been directed by the Stormwater Management Authority to produce a revised stormwater management plan catering for the 1 in 100 year storm.

The 2012 Stormwater Management Plan, which was gazetted in March 2013, produced by the 5 Catchment Councils outlines a solution for Part A works, while committing the councils to determine the flood mitigation works for the upper Brown Hill Creek catchment within 12 months of the gazettal date.

After further investigation, the project Steering Group has recommended that Option D be endorsed by each Council as the Part B solution.

Engagement with affected land owners commenced in April 2014 and broader community consultation was conducted in May/ June 2015. Council received a report summarising the findings of this consultation in August 2015. This consultation did not affect the Steering Group's recommendation that Option D be the endorsed solution for Part B works.

A 'do nothing' outcome would consign the creek to continuing deterioration and increase the risk of flooding to hundreds of properties in Mitcham, Unley and West Torrens.

2. RECOMMENDATION

That:

1. The report be received.

2. Having regard to the Notice issued by the Stormwater Management Authority dated 19 May 2015 which requires the Cities of Adelaide,

Burnside, Unley, Mitcham, and West Torrens to prepare a revised Stormwater Management Plan (SMP) in respect of the Brown Hill Keswick Creek Catchment by 30 September 2015; the Part B report; and community consultation and feedback, that Council hereby determines that Option D - Creek Capacity Upgrade is the recommended solution for Part B Works under the Stormwater Management Plan (SMP 2012) given:

(a) There is broad community support for Option D from respondents to the community consultation process undertaken on behalf of the Project during May and June 2015;

(b) Option D has the lowest capital cost, the lowest annual maintenance cost and the lowest present value whole of life cost when compared against the other available options;

(c) Option D provides the required level (100year ARI) of flood protection;

(d) For shorter duration storms, Option D provides a higher than 100 year ARI level of flood protection;

(e) Option D satisfies the project councils' endorsed position to give preference to a 'no dam' solution;

(f) Option D does not require bypass culverts in suburban streets;

(g) Option D preserves sites of cultural and heritage significance; and

(h) Option D is within the budgeted cost for Part B Works estimated in the 2012 SMP.

3. The Chief Executive Officer is delegated authority to do all things necessary to prepare a revised Stormwater Management Plan in respect of the Brown Hill and Keswick Creek Catchment for submission to the Stormwater Management Authority for approval.

4. In respect of funding for implementation of the finalised and gazetted Stormwater Management Plan, Council reaffirms the cost sharing proposal between the three spheres of government as described in the Stormwater Management Plan 2012.

5. The project councils continue to investigate a Regional Subsidiary as the vehicle for project delivery and ongoing care and management of the Brown Hill Keswick Creek flood mitigation scheme.

6. In the event that the cost sharing proposal involving the other levels of Government as referred to in (3) above is not materialised, the catchment Councils reserve their rights to review the scope of work,

delivery timelines and funding model under the Stormwater Management Plan 2012 to enable some flood mitigation works to be undertaken which are affordable for Local Government and which mitigate and reduce impacts of flooding on selected properties within the Brown Hill Keswick Creek catchment.

7. That in the event that all five (5) catchment Councils are not able to agree on Option D, the Chief Executive Officer is authorised to write to the Stormwater Management Authority and advise the Presiding Member that Council, as part of the Project, has done all it possibly can to find a community wide acceptable solution to the Part B Works and despite those best endeavours, does not believe further work by the project Councils will result in a common solution for the Part B Works being agreed and therefore, requests the Stormwater Management Authority to utilise its powers pursuant to clause 15 and 16 of Schedule 1A of the Local Government Act 1999 to finalise and approve the Stormwater Management Plan for the Brown Hill Keswick Creek Catchment.

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3. RELEVANT CORE STRATEGIES/POLICIES

Since 2010, the five catchment councils have been acting in response to Notices and Orders issued by the Stormwater Management Authority and subject to its direction from time to time with respect to the Brown Hill Keswick Creek Catchment. On 19 May 2015, the Stormwater Management Authority issued the Mayors of each of the five councils, a Notice pursuant to Clause 14(1) of Schedule 1A of the Local Government Act 1999 to prepare a revised Stormwater Management Plan for the Brown Hill Keswick Creek catchment by 30 September 2015.

4. DISCUSSION

The 2012 Stormwater Management Plan (SMP) was approved by the five catchment councils in August 2012, and subsequently gazetted in March 2013. The SMP includes Part A flood mitigation works representing about 80% of overall project cost, and commitment by the councils to determine the flood mitigation works for the upper Brown Hill Creek catchment within 12 months of the gazettal date.

In September 2014, Council resolved to receive the Part B Report which summarises investigations into eight options for flood mitigation works along upper Brown Hill Creek (Attachment 1 to Item 246/15) and identified a ‘creek capacity upgrade’ (Option D) as the preferred option.

Attachment 1

Option D was selected as the preferred option because:

- It is effective in providing the required level of flood protection;
- It satisfies the catchment councils' endorsed position to give preference to a feasible 'no dam' solution;
- It does not require bypass culverts in suburban streets;
- It helps preserve existing sites of heritage significance;
- It represents the lowest capital cost ($35.2 million) compared to the other seven options; and
- It is within the budgeted cost for Part B works as estimated in the Stormwater Management Plan ($27.3 million compared with $28.5 million).

Community engagement commenced in late 2013 with community special interest groups and extended into meetings with creek owners in March 2014.

In April 2015 Council resolved to carry out community consultation on the Part B Report.

In August 2015 Council resolved to receive the community consultation report ('Consultation Findings on the Brown Hill Keswick Creek Stormwater Project: Part B Report', Natalie Fuller & Associates and URPS) which was publicly released on 13 August 2015.

The community consultation report summarises findings and the feedback collected through the consultation process held over six weeks between May and June 2015.

Key conclusions from the process:-

- There is a high level of support for Option D amongst the wider community who responded to the survey while the support was relatively balanced amongst creek owners.

- Since March 2014, the project has provided comprehensive information and other assistance to creek owners, with less than half (41%) subsequently providing feedback forms during the consultation process.

There are a number of key factors which need to be considered in making a decision on which option provides the best solution for Part B works. Below is a summary of these factors.

Impact of rehabilitation

The intention of creek rehabilitation along upper Brown Hill Creek is to remove invasive and unsuitable vegetation from within the creek channel and replace it with local native species of vegetation on top of the creek banks. This work will restore the creek to a more natural environment and improve the creek as a valuable natural biodiversity corridor and habitat for native fauna. This work is recommended to be undertaken irrespective of what option is chosen for Part B works.

Impact of an Urban Storm
A major storm (eg one in 100 year frequency) could manifest itself either as a very intense short duration event (producing peak urban runoff) or as a less intense but long duration event (producing peak rural runoff), or as something in between.

An intense short duration event may produce peak stormwater runoff from the urban area and very little runoff from the rural area – hence a dam would have little or no mitigation effect at all, even if the storm covered the urban and rural areas at the same time.

Over most of the creek's length (down to Anzac Highway) the rural peak flow is greater than the urban peak flow. Also, estimating the urban peak flow is more difficult than estimating the rural peak flow because the urban landscape is more prone to change due to on-going development.

Therefore, an advantage of upgrading creek capacity to cater for both the urban and rural peak flows is that there is scope for greater increases in future urban runoff, particularly stemming from infill development and associated increase in the impervious area of the catchment.

How are the key water flows for 1:100 ARI determined
Modelling shows the worst case impact – as an envelope over the flood affected area of the catchment – for both the short and long duration events over all of the catchment (one in 100 year frequency). That is, the worst case water flows are used at each location along the creek rather than selecting any one particular storm event as the design flow.

Increase in water velocity for the Option D scenario compared to a dam solution
Brown Hill Creek is a watercourse which drains stormwater runoff from the rural as well as the urban areas of the catchment. It will continue to provide a stormwater management function no matter what outcome is determined for the Part B works.

The peak rate at which stormwater flows in the creek is potentially about the same for all options (ie whether the creek capacity is upgraded as for Option D or there is a detention dam (Option B1 or B2) and the extent of upgrading is less.

As discussed in the Part B Report in Section 4.9.4, the average and maximum velocities of flow for each of the three main options generally occur in the 36 hour storm (100 year ARI), as follows:

Option	Ave. velocity (m/s)	Max'm velocity (m/s)
D	3.6	3.9
B1	3.3	3.8
B2	3.2	3.2

In general, any flow of velocity greater than about 2 m/s has the potential to cause erosion in a creek. For creek flows in the one in 100 year event, the difference in velocity between Options B2 and D is considered to be only marginal in terms of any damaging impacts on the bed and banks of the creek.

However, with Option D, for the sections of creek subject to capacity upgrade works, stabilised creek banks are likely to be better protected against erosion than 'natural' banks. Irregularities in the creek geometry are more likely to result in turbulence induced erosion than places where the creek is modified to an appropriate design.

Extent of water capture & why this will not hold back all/ high % of the water in the 1:100 storm event

The 2012 SMP outlines the extent of stormwater harvesting across the catchment in terms of its overall potential and projects being considered. Currently, estimates are that about 16% of flows in Brown Hill Creek will be harvested for reuse purposes.

While it is clear that stormwater harvesting opportunities are available, they will not significantly affect the need for, or size of, flood management options.

Attachment 2 to Item 246/15 provides more details on the stormwater harvesting investigations which form the basis of the 2012 Stormwater Management Plan.

Attachment 2

Under the Part B process, no additional stormwater harvesting initiatives were identified in respect of upper Brown Hill Creek flood mitigation options.

During the Part B process, the project gave in-principle support for a private proposal put to the Goyder Institute to research the potential for stormwater harvesting from a detention dam in upper Brown Hill Creek. However, the proposal was not approved for funding.

In 2013 a CSIRO researcher in water sustainability made an application to the Goyder Institute for financial support to investigate utilising a detention dam in Ellisons Gully for water sustainability and quality improvement purposes. The research project, given in-principle support by the BHKC project, was estimated

to cost in the order of $900,000. However, the application was unsuccessful and the project has not gone ahead at this stage.

It is expected that the opportunities available for stormwater harvesting will be explored further during the design phase of the project once an option has been endorsed by the Councils.

How the Cost estimates have been determined

The Part B Report at Section 3.5 outlines that construction cost estimates and constructability factors were sought as follows:

- Estimates required for component works of the main options, including:
  - Detention dams in the rural section of upper Brown Hill Creek
  - Culverts along the high flow bypass culvert routes (Malcolm Street, Route 3 and Route 3A)
  - Creek capacity upgrade works
  - Extraordinary maintenance to restore the creek towards achieving good condition
- Costs to be compared on an equal basis and using consistent methodology (eg timing, risks and overheads)
- Estimates by others to be peer reviewed

The Part B Report at Section 7.1 states that 'Costplan' was engaged to review and if necessary update cost estimates in the 2012 SMP. Costplan provides a civil engineering based cost planning, estimating, project management and planning service to government agencies, consultants and construction contractors. The objectives sought for all cost estimates include consistency of risk and overheads, greater rigour and transparency, local knowledge, and common dollar values (nominally 2013/14). In respect of the cost estimation of the Brown Hill Creek dams, further reference is made to Costplan's role at Section 5.3.1.

With respect to the contingency that has been factored into the cost estimates, Costplan has commented (6/8/15):

> "The amount of contingent risk that we apply to concept estimates varies usually between 20% and 40%. This is generally driven by how well the project's objectives have been documented, how well the scope is understood, how advanced the design and documentation is, the nature of ground conditions, constructability, market volatility and so on. Unlike building projects where the scope can be measured reasonably accurately fairly early on in the design development phase civil engineering projects (particularly dams upstream of built up urban environments) cannot.
> We prepare a large portion of the Department of Planning, Transport and Infrastructure's civil engineering related estimates and work within specific DPTI requirements and associated national guidelines when preparing these estimates. For the Brown Hill Keswick Creek Storm water project, we have adopted a similar approach. Our view is that the Dam estimates a contingent risk allocation of 40% is appropriate given the level of

documentation available to us. We have also endeavoured to provide a consistent view of the risk profile between the various options."

The project steering group consider that the costing estimates for Option D have built in sufficient contingencies to deal with any reasonable uncertainties that have been identified.

Extent of works in individual properties

The Part B Report at Section 5.5 gives approximate details of creek widening and other works required at sections along the creek for Option D. Whilst the details are not available for individual properties (this would be done in the detailed design phase of the project), general descriptions are provided for sections comprising up to 14 contiguous properties. This detail (taken from the Part B Report) was displayed on posters at three of the four open days during recent community consultation.

The project has not yet commissioned site specific detailed designs for creek capacity upgrade works. This is because it is expensive to complete and not considered to be required until there is agreement that Option D is the endorsed option for the Part B works by the Catchment Councils and approved by the Stormwater Management Authority.

The detailed creek capacity upgrade works will also involve extensive liaison between the project and individual property owners, some of which may engage their own design professionals (eg landscape architects). This would involve significant financial and other resources and be a wasteful exercise if Option D is not adopted.

Nevertheless, the Part B Report outlines creek upgrade design treatments and reasonably approximate dimensions to indicate the extent of creek widening for the relevant sections along its length. In general, the creek would be widened across its base and not increased at the top width, thereby not reducing usable land area on either side of the creek.

As part of the construction process, some areas may require an additional excavation of approximately 1 metre either side of the creek to allow installation of required structures (eg gabions). These areas will then be backfilled.

Comparison of impact on trees

The extent of tree removal and revegetation would be the same under all eight options presented in the Part B Report, including options B1 and B2 which involve a dam. Tree removal and revegetation along the creek under Option D would have the same remedial impacts as for the other seven options.

The intention of creek rehabilitation along upper Brown Hill Creek is to remove invasive and unsuitable vegetation from within the creek channel and replace it with local native species of vegetation on top of the creek banks. This will restore the creek to a more natural environment and improve the creek as a valuable natural biodiversity corridor and habitat for native fauna.

Replacement vegetation species would include South Australian Blue Gums, River Red Gums, grasses, sedges and rushes. Selection of plants for individual properties would be decided in consultation with the property owner.

Easements

Estimated costs in the Part B Report to create easements in privately owned sections of creek for capacity upgrade works have been prepared by an independent expert valuer in accordance with the principles of compensation pursuant to the Land Acquisition Act.

The easement cost estimates for each flood mitigation option are preliminary estimates for project feasibility and planning purposes only, and are considered to be a reasonable approximation based on various assumptions as set out in the easement acquisition report (Appendix 19 of the Part B Report). In terms of compensation, more detailed individual property assessments would be undertaken should creek capacity upgrade works proceed.

Compensation associated with easement creation is based on any potential property related losses, disturbance and reasonable costs, including professional fees, incurred by the property owner.

In respect of Option D it is intended to secure easements for creek capacity upgrade works by negotiation rather than by compulsory acquisition. Property owners may also choose to be responsible for maintaining the constructed works themselves and thus avoid the requirement for an easement. Consequently, the risk of litigation is believed to be low and there is no allowance for litigation in the cost estimates for any option, including the risk of litigation in relation to compulsory property acquisitions required for a dam in Ellisons Gully (Option B2).

Heritage/ Environmental value/ impact of the options

In respect of Brown Hill Creek through the Recreation Park and its tributary watercourse in Ellisons Gully, heritage, cultural and environmental features of value to the community are identified in the Part B Report.

Through suburban areas, Brown Hill Creek is highly modified. All of the creek downstream of Mitchell Street, Millswood (comprising 30% of its length) has concrete lining or base, together with retaining walls in places. Over the rest of the creek, there are many sections which include privately installed retaining walls, full concrete lining or artificial landscaping.

These works probably do not detract from the ambience of the creek as far as their private owners are concerned. Similarly, creek capacity upgrade works of Option D, if designed to be in sympathy with the properties involved, should have little or no adverse effect on the ambience of the creek in its existing modified condition.

Next Steps

Completion of a revised SMP is subject to all five councils agreeing on a solution for the Part B Works, which realistically at this stage would have to be

one of the three main options – Options D, B1 or B2. No other option received any support at all in the community consultation feedback.

Even if the five catchment councils reach common agreement this month, the project will be unable to complete preparation of a revised SMP by the required date of 30 September. However, if the SMA was to be advised this month that all five councils had reached agreement on the solution for Part B Works, it would give the SMA confidence that the revised SMP could be completed later this year.

If there is a satisfactory outcome in terms of the Part B works and the Final SMP is produced and subsequently approved, the onus will then be on the State Government to provide the necessary funding assistance to the councils to enable the project to be fully implemented. An approved Final SMP would also provide the councils with leverage to press for a favourable funding solution. Without an approved Final SMP, the councils' position is tenuous in terms of being able to argue that responsibility for inaction lies elsewhere.

In the event that the cost sharing proposal involving the other levels of government does not occur, the catchment councils reserve their rights to review the scope of work, delivery timelines and funding model to enable some flood mitigation works to be undertaken. These would be selected on the basis of mitigating and reducing the impacts of flooding on selected properties within the Brown Hill Keswick Creek Catchment.

If the five catchment councils do not reach common agreement on a viable solution for the Part B Works at this opportunity and, as a consequence, approval of a Final SMP is delayed indefinitely, there is a risk that the community may consider the councils to be liable for property damages resulting from flooding from Brown Hill Creek if such an event were to occur. Production of an approved Final SMP is not a discretionary matter for the councils. It is a requirement imposed under legislative power exercised by the SMA.

Any action on the ground in respect of Part B works is still a number of years away. Construction works for the Brown Hill Keswick Creek stormwater project are currently planned to be rolled out over a 10 year timeframe with the Part B works programmed after the Part A works are largely completed. Commencement of the ten year program is subject to agreement on overall project funding arrangements.

As indicated in the August 2015 Council report, the following key milestones represent the next steps in the project, assuming all five Councils can agree on the option to endorse:

September 2015	Recommended option for Part B works submitted to councils for decision
October 2015	Prepare Final Stormwater Management Plan (revision of the 2012 SMP to incorporate Part B investigations and outcome)
November 2015	Councils endorse Final SMP for submission to SMA by the end of the month

5. POLICY IMPLICATIONS

5.1 Financial/budget

The costs of the BHKC project have been included in the budget and Long Term Financial Plan

5.2 Legislative/Risk Management

Council is operating under a Notice from the Stormwater Management Authority to prepare an SMP, including an agreed position to Part B works, by the end September 2015

5.3 Environmental/Social/Economic

A major part of the SMP will provide solutions to the degraded state of the BHKC channel

5.5 Stakeholder Engagement

The community has been engaged extensively on this project as advised the Council report in August 2015.

6. REPORT CONSULTATION

Internal consultation with Chief Executive Officer, Project Director and Steering Committee.

7. ANALYSIS OF OPTIONS

Option 1 -

(1) Having regard to the Notice issued by the Stormwater Management Authority dated 19 May 2015 which requires the Cities of Adelaide, Burnside, Unley, Mitcham, and West Torrens to prepare a revised Stormwater Management Plan (SMP) in respect of the Brown Hill Keswick Creek Catchment by 30 September 2015; the Part B report; and

community consultation and feedback, that Council hereby determines that Option D - Creek Capacity Upgrade is the recommended solution for Part B Works under the Stormwater Management Plan (SMP 2012) given:

(a) There is an 85% level of wider community support for Option D from respondents to the community consultation process undertaken on behalf of the Project during May and June 2015;

(b) Option D has the lowest capital cost, the lowest annual maintenance cost and the lowest present value whole of life cost when compared against the other available options;

(c) Option D provides the required level (100year ARI) of flood protection;

(d) For shorter duration storms, Option D provides a higher than 100 year ARI level of flood protection;

(e) Option D satisfies the project councils' endorsed position to give preference to a 'no dam' solution;

(f) Option D does not require bypass culverts in suburban streets;

(g) Option D preserves sites of cultural and heritage significance; and

(h) Option D is within the budgeted cost for Part B Works estimated in the 2012 SMP.

(2) The Chief Executive Officer is delegated authority to do all things necessary to prepare a revised Stormwater Management Plan in respect of the Brown Hill and Keswick Creek Catchment for submission to the Stormwater Management Authority for approval.

(3) In respect of funding for implementation of the finalised and gazetted Stormwater Management Plan, Council reaffirms the cost sharing proposal between the three spheres of government as described in the Stormwater Management Plan 2012.

(4) The project councils continue to investigate a Regional Subsidiary as the vehicle for project delivery and ongoing care and management of the Brown Hill Keswick Creek flood mitigation scheme.

(5) In the event that the cost sharing proposal involving the other levels of Government as referred to in (3) above is not materialised, the catchment Councils reserve their rights to review the scope of work, delivery timelines and funding model under the Stormwater Management Plan 2012 to enable some flood mitigation works to be undertaken which are affordable for Local Government and which mitigate and reduce impacts of flooding on selected properties within the Brown Hill Keswick Creek catchment.

(6) That in the event that all five (5) catchment Councils are not able to agree on Option D, the Chief Executive Officer is authorised to write to the Stormwater Management Authority and advise the Presiding Member

that Council, as part of the Project, has done all it possibly can to find a community wide acceptable solution to the Part B Works and despite those best endeavours, does not believe further work by the project Councils will result in a common solution for the Part B Works being agreed and therefore, requests the Stormwater Management Authority to utilise its powers pursuant to clause 15 and 16 of Schedule 1A of the Local Government Act 1999 to finalise and approve the Stormwater Management Plan for the Brown Hill Keswick Creek Catchment.

Option 2 –

Unley could provide an alternative motion which could result in no common agreement across the Catchment Councils, thereby not enabling the Order from the SMA to be met.

8. RECOMMENDED OPTION

Option 1 is the recommended option.

9. ATTACHMENTS

- Attachment 1 – BHKC Part B Options
- Attachment 2 – Stormwater Harvesting opportunities

ATTACHMENT 1

BHKC PART B OPTIONS

Option	Detention dam	High flow bypass culvert	Creek capacity upgrade
A1	Site 1: Brown Hill Creek Recreation Park	Malcolm Street to Victoria Street	Anzac Highway to Leah Street; Cross Road to Hampton Street
A2	Site 2: Ellisons Gully	Malcolm Street to Victoria Street	Anzac Highway to Leah Street; Cross Road to Hampton Street
B1	Site 1: Brown Hill Creek Recreation Park		Anzac Highway to Leah Street; sections between Mitchell and Malcolm Streets; Cross Road to Hampton Street; Fife Avenue
B2	Site 2: Ellisons Gully		Anzac Highway to Leah Street; sections between Mitchell and Malcolm Streets; Cross Road to Hampton Street; Fife Avenue
C1		Hampton Street to Victoria Street via the railway corridor with Malcolm Street leg (Route 3A)	Anzac Highway to Forestville Reserve; sections upstream of Hampton Street
C2		Hampton Street to Victoria Street via suburban streets (Route 3)	Anzac Highway to Forestville Reserve; sections upstream of Hampton Street
C3		Hampton Street to Victoria Street via the railway corridor without Malcolm Street leg	Anzac Highway to Forestville Reserve; sections between Douglas and Malcolm Streets; sections upstream of Hampton Street
D			Anzac Highway to Forestville Reserve; sections between Victoria and Mitchell Streets; Orphanage Park; Douglas to Malcolm Streets; Cross Road to Hampton Street; sections upstream of Hampton Street to Muggs Hill Road

Notes:

1. The above options all include works to upgrade Brown Hill Creek between Anzac Highway and Forestville Reserve. This section of the creek, technically, is an item of the Part A Works. However, in comparing options it has been included in the assessment of the Part B works as the extent of works in this section varies between the eight options and its cost therefore impacts on the overall cost of the Part A Work
2. All of the above options include undertaking maintenance works along the full length of upper Brown Hill Creek in order to rehabilitate the creek towards achieving a state of good condition. Under the NRM Act creek owners have the responsibility to maintain the creek in 'good condition'.
3. Under all options, some bridges and culverts at road crossings of the creek would be upgraded to give increased flow capacity as required.

STORMWATER HARVESTING – BROWN HILL AND KESWICK CREEK CATCHMENT

The following summary is based on information in the 2012 stormwater management plan and related reference reports.

KEY STUDIES

Stormwater harvesting opportunities in the Brown Hill Keswick Creek catchment have been assessed over recent years.

The **Urban Stormwater Harvesting Options Study** (Wallbridge and Gilbert, 2009) (USHOS report) investigated all the opportunities for stormwater harvesting in the Adelaide area.

- The study looked at the technical feasibility of stormwater harvesting, rather than the broader viability of schemes.
- The opportunities identified in the USHOS represent the upper limit of stormwater harvesting opportunities.

The **Stormwater Harvesting Plan for the BHKC Stormwater Project** report (Adelaide and Mount Lofty Ranges Natural Resources Management Board, 2010) (AMLRNRMB report) drew on the USHOS and other investigations to develop recommendations about which stormwater harvesting components should be included in the stormwater management plan (SMP).

The report outlined the critical success factors in the development of any successful stormwater harvesting scheme, being:

- the availability and reliability of stormwater supply;
- demand for recycled stormwater;
- storage (such as suitable aquifers);
- space for collection and treatment;
- risk management;
- identification of owners/operators; and
- the availability of funding.

The report also took into account technical viability, demand for water, the impact that the availability of recycled effluent from the Glenelg to Adelaide pipeline has on demand for harvested stormwater and the other practical issues.

A further study, specific to a detention dam in upper Brown Hill Creek, is discussed in the following section.

STORMWATER HARVESTING OPPORTUNITIES

A number of stormwater harvesting schemes are already operational or under development/consideration within the catchment, including:

- Glenelg Golf Club wetland and aquifer storage and recovery (ASR*) scheme
- Adelaide Airport stormwater harvesting scheme
- City of Unley stormwater ASR reuse projects (Ridge Park, Heywood Park and Orphanage Park)
- Scotch College stormwater harvesting facility

- South Park Lands and Glenside ASR (subject to further assessment)

(*ASR is also referred to as managed aquifer recovery – MAR)

The total stormwater harvesting and reuse from existing schemes, along with those under development, total 800 ML/y, or 16% of the total average annual stormwater runoff volume. Most of this water is or would be harvested from Brown Hill Creek.

In terms of further opportunities, the USHOS noted that:

- Areas to the east of the city have limited aquifer storage and recovery (ASR) potential as the target aquifers are in bedrock, which typically have limited injection rates and low recovery efficiency.
- The aquifers further to the west are generally more favourable for ASR, providing greater storage and yield characteristics.
- Additional demands identified within the upper catchment at Waite and Urrbrae could be served by more economical harvesting from local catchments.
- The opportunity for harvesting up to 1500 ML/annum from Brown Hill Creek at Plympton and transfer to the disused railway corridor at Plympton for treatment and aquifer injection.

Plympton railway corridor

Further assessment by the AMLRNRMB dismissed this site as a feasible opportunity partly because of a lack of demand – the operational Glenelg to Adelaide recycled effluent pipeline has spare capacity and can provide recycled water suitable for irrigation.

In December 2011 the BHKC stormwater project submitted a funding application to the Australian Government (Nation Urban Water and Desalination Plan) for the proposed scheme in the railway corridor.

- The application acknowledged that users for the water had not been secured and that that was a major challenge for the project.
- The overall project cost at the time of the funding submission was estimated at approximately $22 million.
- The funding application was not successful.

Detention storage

Stormwater harvesting arising out of detention storage in the rural area of Brown Hill Creek was further investigated for the AMLRNRMB in the report **Brown Hill Creek Stormwater Harvesting Assessment – Utilising Proposed Flood Mitigation Dams in the Upper Catchment** (W&G, 2011).

This report identified:

- opportunities to integrate stormwater harvesting as part of the flood mitigation project;
- possible impacts these projects may have on the stormwater harvesting potential within the broader catchment;

- challenges associated with any reuse proposals within the upper catchment, including uncertain ASR potential, high costs of establishment, and the lack of identified demands close to the source; and
- that the cost of a stormwater harvesting scheme in the upper catchment would likely be around double the cost of an equivalent scheme in the lower catchment.

The proposal would also require reconfiguration of the dams requiring an enlarged dam wall and associated footprint such that its primary flood detention capability (its 'active storage') would not be compromised.

Both the W&G and AMLRNRMB reports concluded that there was insufficient justification for any reuse associated with the detention storages proposed for the rural areas of Brown Hill Creek.

STORMWATER HARVESTING VERSUS FLOOD MANAGEMENT

The AMLRNRMB report highlighted the fact that stormwater harvesting opportunities are sized to use the regular stormwater flows that occur throughout the winter period.

- Flood management options need to address the very rare, large and potentially catastrophic events.
- Harvesting schemes and flood mitigation schemes are therefore optimised for two extremes of the spectrum of stormwater flows.
- Whilst there may be opportunities to co-locate flood mitigation and harvesting schemes the objectives and outcomes of both remain distinct and independent.

Example – Plympton railway corridor

Assuming that this scheme was in place, USHOS demonstrated that even with this ambitious harvest target that it would have minimal impact on flood flows.

- To achieve an annual harvest volume of 1,500 ML/annum would require a flow diversion rate of 300 L/s. This can be compared to the estimated flow in this part of the creek during a 100 year event is 25 m3/s, that is 25,000 L/s and so the diversion rate represents only around 1% of the peak stormwater flow in the creek.
- There are also reasons to suspect that during a major flow, mobilisation of sediment in the catchment and erosion in the creek would increase turbidity to the point that online water quality monitoring of the harvesting scheme would shut down the diversion to protect the scheme from excessive sediment loads.
- It would be for these reasons that in relation to a scheme on the railway corridor the AMLRNRMB report concluded "*The scheme has no synergy with the flood mitigation objectives particularly in terms of the greater watercourse capacity required in this section of Brown Hill Creek.*"

Example - Detention dam in upper Brown Hill Creek

In order to perform its flood mitigation role, the dam is designed to empty as soon as possible by releasing water at a controlled rate (such that flooding is reduced downstream).

Any water held within the dam for an extended period, for example to enable harvesting of stormwater at a much slower rate (consistent with treatment and aquifer injection rates) would compromise the flood storage capacity unless the dam is enlarged.

Preliminary calculations completed by W&G in their 2011 study concluded that the dam wall may need to be raised by around 1 m to provide an additional 30 ML capacity for water collection. However, the collection capacity would have to be assessed for optimisation of water transfer into a suitable storage (notionally in a downstream aquifer).

In 2013 a CSIRO researcher in water sustainability made an application to the Goyder Institute for financial support to investigate utilising a detention dam in Ellisons Gully for water sustainability and quality improvement purposes. The research project was estimated to cost in the order of $900,000. However, the application was unsuccessful and the project has not gone ahead at this stage.

SUMMARY

The detailed review carried out as part of the AMLRNRMB report did not reveal any stormwater harvesting options that would significantly change, improve or enhance the key components of flood management.

Whilst many stormwater harvesting schemes have merit in their own right the conflicting factors of managing stormwater for flood control compared with harvesting winter storms means that synergy between the two objectives does not readily exist within this catchment.

Efforts have been made over the years to look at opportunities for the BHKC project to include stormwater reuse in flood management plans and a number of schemes have been identified that are complementary to flood mitigation, although their role is minimal.

It should be noted that should circumstances change in the future and a harvesting scheme become practicable and viable there is no reason why it could not proceed since there would be nothing done as part of the flood mitigation works that would affect its cost and/or viability.

Overall:

- Currently, estimates are that 16% of flows in Brown Hill Creek will be harvested for reuse applications.
- Harvesting has been examined at a preliminary level for other potential applications when there is demand.
- Harvesting would play a minimal role in any flood mitigation scheme whether based on a detention solution or creek capacity upgrade.

ITEM 247
QUESTIONS ON NOTICE FROM COUNCILLOR HEWITSON RE BROWN HILL KESWICK CREEK

The following Questions on Notice have been received from Councillor Hewitson and the answers will be provided at the Council meeting on 28 September 2015.

COMMENT FROM COUNCILLOR HEWITSON
My questions relate to the amount of water retained on an average year of rainfall. Option D is designed to allow the maximum amount of water to flow out to sea in the quickest time in a 1 in a 100 year rain event.

Questions

1. What percentage and quantity of water will be harvested with option D in an average year?

Answer

2. What amount of water was harvested in the Ridge Park scheme water recycling scheme

    A. Before the retention dam?
    B. After the dam?

Answer

3. What work has been done to design a flood solution for BHC which maximisers the recycling of water in an average year?

Answer

4. If yes, what was the value of the water retained?

Answer

5. Should the Dam options B2 and B1 be redesigned like Ridge Park dam to both harvest water and prevent flooding:

    a) how many Megalitres of extra water could be available to harvest along Brown Hill Creek between the hills and the sea compared to option D in an average year?

    b) What would be the reduction of flow to the sea would occur in an average year?