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10 February 2017

The Honourable Jackie Trad MP
Deputy Premier, Minister for Infrastructure, Local Government and Planning and Minister for Trade and Investment
c/- State Interest Feedback
Planning Group
Department of Infrastructure, Local Government and Planning
PO Box 15009
CITY EAST QLD 4002

Dear Minister Trad,

RE: Stormwater Queensland Submission on the Draft State Planning Policy

I write to you on behalf of the members of Stormwater Queensland - the peak industry association for stormwater in Queensland. Stormwater Queensland has reviewed the draft *State Planning Policy* (SPP or 'the policy') and the proposed draft amendments to the policy. This letter outlines our submission on both the policy and the proposed draft amendments.

In general, we support the policy and the proposed draft amendments although have provided some discussion and recommendations for improving the policy. The intention of this submission is to support the State in providing strong and workable regulation which contributes to the achievement of the State interests outlined in the policy.

It is noted that Stormwater Queensland recently facilitated a forum on the draft SPP (31 January 2017 with 70 delegates). Our submission takes into account the information presented by the speakers as well as discussions which occurred during the forum and subsequent contributions by Stormwater Queensland members.

Summary of Recommendations

We provide below a succinct summary of our recommended changes to the SPP. Each recommendation is elaborated thereafter, with explanation and justification for these changes.

State Interest - Water Quality

1. It is recommended that Total Water Cycle Management planning requirements are reinstated into the *Environmental Protection (Water) Policy* or other regulatory instrument as appropriate, to ensure the state achieves the water quality state interest.
2. It is recommended that the following wording be added to the 'state interest - water quality' and the associated 'development assessment requirements – water quality' or other location of the SPP deemed appropriate:

   Part E State interest – water quality recommended wording (p41)

   (6) Water Sensitive Urban Design (WSUD) principles[1] are applied to developments to ensure that stormwater management measures are well-integrated with surrounding land uses.

   'Development assessment requirements – water quality' recommended wording (p42)

[1] WSUD principles are provided in the *Urban Stormwater Quality Planning Guidelines* (DERM 2010)

The following requirements are assessment benchmarks for the development:

Development is located and designed to ensure that stormwater management measures are well-integrated with surrounding land uses including by:

(a) applying Water Sensitive Urban Design (WSUD) principles; and

(b) integrating stormwater management with other open space uses; and

(c) minimising or avoiding retaining structures, steep batters and exclusion fencing.

3. If the DILGP are going to accept offsets as a means to achieve the water quality state interest, the SPP:
   - Should specifically state this as an acceptable compliance pathway.
   - Provide some guidance on the types of development for which offsets may be appropriate (please refer to our offsets position statement in Appendix A).
   - Provide some guidance on the appropriate acquittal of offsets contributions (please refer to our offsets position statement in Appendix A).
   - Outline minimum planning requirements.
4. Either remove the Best Practice Environmental Management compliance option or clearly state its intended application. If the intent is compliance with 'Living Waterways' (Water by Design 2014) this should be clearly stated in the SPP.
5. Remove the development thresholds from the SPP <u>and</u> require assessment authorities to undertake the appropriate level of stormwater offset planning; <u>or</u> apply a lower threshold, as follows (note also changes to wording in below):
   1) for a material change of use, or reconfiguring a lot for an urban purpose that involves land area greater than 850 m^2 that:
   (a) will result in an impervious area greater than 25 per cent of the net developable area; or
   (b) will result in three or more dwellings or lots.
   (2) operational works for an urban purpose that involves disturbing a land area greater than 850 m^2.
6. The wording of the deemed to comply modelling target be changed to:
   In lieu of modelling, the default bio-retention treatment area to comply with load reduction targets for all Queensland regions is 1.5 per cent of the contributing catchment area. This applies only to development *that involves land area less than 2500 m^2 that:*
   (a) will result in an impervious area greater than 25 per cent of the net developable area; or
   (b) will result in six or more dwellings or lots.
7. Reconsider the need for including the defining bank in the SPP and SDAP. If the need is justified, consider utilising the 'outer bank' as defined by the Water Act instead of another new definition.
8. It is recommended that the following provisions be added to the development assessment requirements – water quality (p42).
   The following requirements are assessment benchmarks for the development:
   (3) Development is located in areas that avoid or minimise the disturbance to natural drainage, high risk soils, aquatic ecosystems (including high ecological value and slightly disturbed waters), groundwater and landform features.
9. Reword Table B (d) Waterway stability objective (p76) to:
   Waterway stability objective applies only if development drains to an un-lined waterway within or downstream of the site; or to a lined waterway where the local Council has identified, as part of catchment planning, future waterway remediation intent.

Construction Phase

1. Amend wording of the objective to:
   Capture at least 80% of the average annual runoff volume that flows through or from exposed site areas and treat to 50mg/L TSS or less and pH in the range 6.5–8.5.
2. Consider adopting the recommendations of the Cavendish and Witheridge (2014) paper particularly the regional zone mapping and the erosion and sediment control elements suggested for each zone. The erosion and sediment control elements could be adopted in the water quality guidelines to replace the single solution there currently.
3. Amend wording of the design objectives table as follows:

Issue	Design Objectives
Erosion Control	• Stage clearing and construction works to minimise the area of soil exposed to rain or strong winds at any one time • Effectively stabilise[1] cleared areas prior to rainfall if works are delayed or works are not intended to occur immediately • Effectively stabilisie[1] areas at finished level as soon as practicable and prior to rainfall • Prior to completion of works (i.e. plan sealing or on-maintenance) for the development and prior to removal of sediment controls, all site surfaces must be effectively stabilised1 using methods which have achieved effective short-term stabilisation and which will continue to achieve effective stabilisation in the medium to long-term
Drainage Control	• Manage clean stormwater around or through areas of exposed soil in order to avoid contamination • Manage sheet flows and avoid or minimise rill and gully erosion • Provide concentrated flow paths to avoid rill or gully erosion and which have the required capacity and are stable as per Table A1 • Provide emergency spillways for sediment basins as per Table A2
Sediment Control	• Runoff from exposed site soils must be directed to sediment controls which are appropriate to the extent of disturbance and level of erosion risk • As a minimum, all exposed areas in excess of 2500m^2 must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated to 50mg/L TSS or less and pH in the range 6.5-8.5 (i.e. 80% hydrologic effectiveness) [2].
Waterway stability and flood flow management	• Where measures are required to meet post-construction waterway stability objectives (specified in Table B), these are either installed prior to land disturbance and are integrated with erosion and sediment controls or equivalent alternative measures are implemented during construction • Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1%AEP)

[1] An effectively stabilised surface is defined as one that does not, or is not likely to result in visible evidence of soil loss caused by sheet, rill or gully erosion or lead to sedimentation, or lead to water contamination

[2] The SPP Guideline has advice on measures which are deemed to comply with the 80% hydrologic effectiveness requirement for sediment controls

Other

1. It is recommended that that the DILGP consult with Stormwater Queensland on amendments to the 'water quality guideline' prior to the release of the draft and prior to official public consultation.
2. Make the studies upon which the water quality state interest is based publically accessible. If this is not possible, Stormwater Queensland would like to request copies of these document to enable more valuable feedback in the future.
3. Frequent flow objectives are reinstated in conjunction with planning (i.e. mapping) by assessment authorities (councils) identifying where these objectives apply and where they don't. Clearly articulate compliance pathways for achieving the frequent flow objective to assist implementation.
4. Investigate the adequacy of the Q1 Waterway Stability objective and encourage Councils to undertake monitoring and catchment planning to identity with greater resolution where the waterway stability objective applies, doesn't apply or where an alternative may apply.
5. Rainwater tanks are considered mandatory on all new developments unless an alternative stormwater harvesting scheme has been identified.
6. Revisit the load based objectives and their appropriateness. Consider what is actually required to achieve or move closer to achieving the 'protection and enhancement' of Queensland waters. Incentivised treatment above minimum standards is one potential mechanism of achieving improved outcomes for our waterways
7. The SPP should acknowledge and identify the need for maintenance of stormwater treatment systems both vegetated and proprietary. Council's should be required to identify, as part of their TWCM planning, the mechanisms through which adequate maintenance provisions will be attained.

Explanation of Recommendations

1. State Interest - Water Quality

The Draft SPP retains 'Water Quality' as a State interest in planning and development. Stormwater Queensland strongly supports the retention of water quality as a State interest and the wording of the overarching state interest statement. As noted by James Coutts at the Stormwater Queensland Forum, the draft SPP proposes to achieve this state interest by focusing on '*ensuring development facilitates achievement of water quality objectives for Queensland waters*'.

The draft SPP suggests that this can be achieved through:

- Achieving the stormwater management design objectives in Table A and B (construction and post construction); or
  - Facilitating an equivalent or improved water quality outcome through locally appropriate solutions; or
  - Demonstrating best practice environmental management is applied.

However, each of these options will at best only deliver a reduction in stormwater pollutant loads generated by development and cannot therefore be expected to provide for the protection or enhancement of environmental values. These solutions therefore only provide for part of the solution.

In order to ensure the State interest is achieved, local governments must undertake catchment planning and Total Water Cycle Management (TWCM) planning. It is suggested that to ensure the state achieves the water quality state interest, the mandatory TWCM planning requirements be reinstated into the *Environmental Protection (Water) Policy* or other regulatory instrument as appropriate.

While it is acknowledged that in some jurisdictions water agencies are separate to local governments, this has not prevented Moreton Bay Regional Council or Redland City Council from successfully leading the development of their local TWCM plans. As such, reinstating the mandatory TWCM requirements is recommended.

Recommendation:

2. It is recommended that TWCM planning requirements are reinstated into the *Environmental Protection (Water) Policy* or other regulatory instrument as appropriate.

2. Facilitating Good Urban Design

Facilitating good urban design is noted as a key priority of the draft SPP. The 'liveable communities' provisions of the Draft SPP includes some valuable statements aimed at facilitating good urban design outcomes (page 23) however, there is little direction regarding the integration of land and water planning.

For example, it could be argued that the example shown in Figure 1 below complies with both the 'liveable communities' and 'water quality' state interest policies yet still delivers both poor urban design outcomes and likely poor water quality outcomes. In this example, neither state interest has been achieved. The proliferation of such examples demonstrates that stronger wording specific to stormwater management is required.

Figure 1 Example of a poorly designed bioretention basin with high retaining walls and steep batters

Given that Water Sensitive Urban Design (WSUD) is a design philosophy which seeks to integrate land and water planning, there is value in making WSUD part of the water quality and liveable communities state interest and associated development assessment requirements. This would also assist in overcoming the problem of local government planning schemes focusing on the water quality objectives rather than more integrated urban design outcomes.

Further information on the values of integrating land and water planning and how to achieve integration is also available in *The Framework for the Integration of Flooding and Stormwater Management into Open Space* (Water by Design 2011). This document also provides a framework which can easily be integrated directly into local government planning schemes in response to the recommended amendment making planning scheme compliance straightforward. Please refer to Appendix A for a copy of the Stormwater Queensland submission on the *Multiple Use Public Open Space Consultation Report* commissioned by the Department of Infrastructure, Local Government and Planning. Importantly, Stormwater Queensland believes that the successful integration of stormwater and open space will only be achieved with a head of power through the SPP.

Recommendation:

It is recommended that the following wording be added to the 'state interest - water quality' and the associated 'development assessment requirements – water quality' or other location of the SPP deemed appropriate:

Part E State interest – water quality recommended wording (p41)

> *(6) Water Sensitive Urban Design (WSUD) principles[2] are applied to developments to ensure that stormwater management measures are well-integrated with surrounding land uses.*

'Development assessment requirements – water quality' recommended wording (p42)

> The following requirements are assessment benchmarks for the development:
>
> *(3) Development is located and designed to ensure that stormwater management measures are well-integrated with surrounding land uses including by:*
>
> *(a) applying Water Sensitive Urban Design (WSUD) principles; and*
>
> *(b) integrating stormwater management with other open space uses; and*
>
> *(c) minimising or avoiding retaining structures, steep batters and exclusion fencing.*

3. Stormwater Quality Offsets

Local authorities are increasingly relying on stormwater quality offsets as a flexible solution to meeting the water quality state interest. As documented in the Stormwater Queensland *Stormwater Quality Offsets Position Statement* (refer to Appendix B), we support the adoption of stormwater quality offsets when undertaken following the appropriate level of planning.

Planning does not always guarantee that offsets will be applied responsibly however. Some Councils for example, have undertaken comprehensive planning and are expected to be spending collected offset contributions responsibly but they still accept offsets from most development applications, including in greenfield areas where integration of stormwater management measures can be readily achieved. This is not considered appropriate for the reasons outlined in the offsets position statement (Appendix A).

It would be appropriate for the state to require, as part of its state interest checks, that any local government collecting voluntary contributions from development for the provision of off-site stormwater quality solutions, must have regional stormwater quality planning in place for this purpose. It would also be appropriate that the state check what type of applications are being accepted for offsets and how offset contributions are intended to be spent.

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[2] WSUD principles are provided in the *Urban Stormwater Quality Planning Guidelines* (DERM 2010)

Recommendation:

We would recommend that if the DILGP are going to accept offsets as a means to achieve the water quality state interest, the SPP:

- Should specifically state this as an acceptable compliance pathway.
- Provide some guidance on the types of development for which offsets may be appropriate (please refer to our offsets position statement in Appendix A).
- Provide some guidance on the appropriate acquittal of offsets contributions (please refer to our offsets position statement in Appendix A).
- Outline minimum planning requirements.

4. Best Practice Environmental Management

The draft policy accepts that the water quality state interest can be achieved by '*demonstrating current best practice environmental management*'. Precisely what constitutes current best practice environmental management (BPEM), is however widely open for interpretation and the definition provided in the Environmental Protection Act 1994, section 21 does little to clarify the intent.

The definition states that BPEM includes 'minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity'. How this varies from achieving the water management objectives stated in the SPP remains unclear and the term 'minimisation' used in the definition does not provide any regulatory certainty.

This has led to a lot of confusion in the industry as to the intent of this policy statement including between leading practitioners in stormwater management. If the intent is compliance with 'Living Waterways' (Water by Design 2014) this should be clearly stated in the SPP. Stormwater Queensland has previously provided feedback on this document to Healthy Waterways which is provided in Appendix C.

Recommendation:

Either remove the BPEM compliance option or clearly state its intended application.

5. Development Threshold

The development thresholds is an area which the DILGP was specifically seeking comments. It is noted that the development thresholds listed in the draft SPP include the following:

(1) for a material change of use, or reconfiguring a lot for an urban purpose that involves premises greater than 2500 m^2 and that will result in six or more dwellings or lots with an impervious area greater than 25 per cent of the net developable area; or
(2) operational works for an urban purpose that involves disturbing a land area greater than 2500 m^2.

Our response includes analysis of both the wording and relevance of the thresholds.

5.1 Development Threshold Wording

Firstly, it is noted that the first of these thresholds could be interpreted to mean that any lots with an impervious area greater than 25 per cent of the net developable area are triggered regardless of their size i.e. the relationship to the 2500 m^2 trigger is not clear in this wording. Based on advice from James Coutts and Brad Dines at the forum, the thresholds were not intended to have changed so the wording would need to be revised to reflect the intended meaning i.e. 2500m^2 **and** meeting the impervious trigger.

Secondly, the revised wording combining the triggers for MCU and ROL applications has the consequence of not applying the development assessment requirements for water quality to any commercial or industrial development because it only applies to MCU developments greater than 2500m^2 **and** six or more dwellings. This is also assumed to be an unintended consequence of trying to simplifying the wording of the triggers.

Thirdly, changing the wording of the trigger from 'land area' to 'premises' is confusing. This could be interpreted as gross floor area of a building which would further reduce the application of the policy for industrial developments.

Lastly, the wording is also different to that on page 76, Table B, item (a). This text is also unclear as to whether the impervious area criteria is subject to the 2500 m^2 trigger.

Recommendation (Wording):

If the thresholds are to remain without any fundamental change to the actual intent, the following wording is recommended:

1) for a material change of use, or reconfiguring a lot for an urban purpose that involves land area greater than 2500 m^2 that:

(a) will result in an impervious area greater than 25 per cent of the net developable area; or

(b) will result in six or more dwellings or lots.

It should be noted that Stormwater Queensland does not support the retention of the current thresholds and further information on suggested improvements is provided below.

5.2 Development Threshold Relevance

Having a threshold for stormwater quality management in previous state policies has been beneficial to avoid the need for management systems on very small lots and highly constrained sites. This was beneficial as meeting the SPP targets on highly constrained sites often leads to poor outcomes and is not cost effective. It is important to consider however, that in a number of the larger Council's such as Brisbane and the Gold Coast, small scale developments makes up the majority of development applications and therefore have the greatest impact on water quality and hydrology.

Even in local government areas where greenfield development still dominates as the primary type of development, the impact to water quality from small, infill development still has a disproportionately high impact due to the higher imperviousness of such development. An integrated design for the quantity and treatment option needs to be considered for these small scale developments as the cookie cutter approach of a small treatment system in the back corner of the development is not a good WSUD outcome and can lead to ongoing maintenance issues.

The impact of small scale development on water quality and catchment hydrology therefore needs to be managed. Acknowledging the physical constraints of small scale development to achieve water quality and catchment hydrology targets, it is considered that such development provides the perfect opportunity for the application of stormwater quality offsets. The funds from such offsets could then be invested in regional stormwater management strategies. This is only a workable solution however, if assessment authorities (local governments, ports, airports etc.), undertake the appropriate level of offset planning as outlined in point 3 above.

It is acknowledged that not all Council's will have the desire to adopt an offsets scheme in which case a reduced trigger could be adopted. Such a trigger should lower the thresholds for both land area and scale of development. Note that the recommended thresholds noted below are based upon:

1. Minimising the infrastructure requirements for very minor applications but applying the SPP to the bulk of applications with high imperviousness (heavily polluting uses) including high density residential, commercial and industrial uses.
2. The work undertaken by Gold Coast City Council in determining appropriate targets in its planning scheme.

Recommendation (Relevance):

It is recommended that:

- The development thresholds are removed from the SPP; and
- Assessment authorities are required to undertake the appropriate level of offset planning as outlined in point 3 above.

OR

A lower threshold is retained, as follows:

1) for a material change of use, or reconfiguring a lot for an urban purpose that involves land area greater than 850 m^2 that:
(a) will result in an impervious area greater than 25 per cent of the net developable area; or
(b) will result in three or more dwellings or lots.
(2) operational works for an urban purpose that involves disturbing a land area greater than 850 m^2.

6. <u>Deemed to Comply Trigger</u>

The draft SPP suggests that:

> In lieu of modelling, the default bio-retention treatment area to comply with load reduction targets for all Queensland regions in 1.5 per cent of the contributing catchment area.

During the forum, Brad Dines advised that the intent was for this to apply to small scale development however, it is currently being applied for all scales of development. This is an inappropriate application of a deemed to comply trigger such as the one suggested in the policy. The *Deemed to Comply Solutions* (Water by Design 2010) for example, capped such solutions to an upper limit of either 20 allotments or 12,500m^2 in land area. According to this document, these upper limits were set to:

- *Ensure the solutions address the bulk of applications received by authorities (consisting of small scale applications within the ranges defined)*
- *Ensure that develop applications which justify full scale stormwater quality modelling and reporting are excluded from the solutions. These include large scale and more complex application which do not lend themselves to generic deemed to comply solutions.*

Since the publication of that guideline, our understanding of what makes up a complex application in terms of stormwater quality management has changed. For example, most applications where stormwater runoff flows into separate catchments is sufficiently complex to justify modelling in order to understand the appropriate design responses required to meet the state interest.

In this regard, the threshold targets suggested in point 7.2 above may appropriate technically but may also trigger more modelling than is intended. The current thresholds however, would likely strike the right balance.

Recommendation:

The wording of the deemed to comply modelling target be changed to:

> In lieu of modelling, the default bio-retention treatment area to comply with load reduction targets for all Queensland regions is 1.5 per cent of the contributing catchment area. This applies only to development *that involves land area less than 2500 m^2 that:*
>
> *(a) will result in an impervious area greater than 25 per cent of the net developable area; or*
>
> *(b) will result in six or more dwellings or lots.*

7. Watercourse Definition

The draft SPP includes a definition of a 'defining bank' as it relates to a 'watercourse', which is defined by the Water Act 2000. This is the same definition provided in the State Development Assessment Provisions (SDAP). The existing definition of a watercourse under the Water Act 2000 is influenced by definitions of the 'lateral limits', 'outer bank', and 'drainage feature' which are also defined by the Water Act 2000. The definition of a watercourse remains however, quite ambiguous to the extent that numerous court cases are brought before the Planning and Environment Court to resolve.

To add another definition in the SPP and SDAP further confuses the definition of a watercourse and will likely lead to further court actions.

Recommendation:

Reconsider the need for including the defining bank in the SPP and SDAP. If the need is justified, consider utilising the 'outer bank' as defined by the Water Act instead of another new definition.

8. Protection of Natural Drainage

The water quality state interests suggest that:

> (2) Land zoned for urban or future purposes is located in areas that avoid or minimise the disturbance to natural drainage, high risk soils, aquatic ecosystems (including high ecological value and slightly disturbed waters), groundwater and landform features.

This is an important and highly valuable provision of the draft SPP. Avoiding or minimisation of disturbance to these values should however extend development applications as well as land use planning/zoning.

Additionally, the provision of buffers would be beneficial in avoiding impacts to natural drainage and would facilitate opportunities for water quality improvement, floodplain management, disconnection of impervious surfaces etc.

Recommendation:

It is recommended that the following provisions be added to the development assessment requirements – water quality (p42).

The following requirements are assessment benchmarks for the development:

(3) *Development is located in areas that avoid or minimise the disturbance to natural drainage, high risk soils, aquatic ecosystems (including high ecological value and slightly disturbed waters), groundwater and landform features.*

9. <u>Waterway Stability Objective - Wording</u>

The existing wording is confusing and doesn't recognise the potential of lined urban waterways (e.g. concrete channels) to be remediated into unlined vegetated ecological systems. This is becoming more and more common as the economic, environmental and social value of vegetated waterways, particularly with urban densification, is becoming better understood.

Recommendation:

Waterway stability objective applies only if development drains to an un-lined waterway within or downstream of the site; or to a lined waterway where the local Council has identified, as part of catchment planning, future waterway remediation intent.

CONSTRUCTION PHASE

1. <u>Erosion and Sediment Control Design Objectives</u>

The wording of the current erosion and sediment control objective (Part 6 Appendix 2 Table A Page 74 Sediment Control (2)) appears to be confused. 80% hydrologic effectiveness is the same as treating 80% of the average annual runoff volume. It is understood that work has been completed which shows that 80% of the annual runoff volume can be treated using current best practice technologies.

Moreover, the wording on the design objectives seems to be equally confused from an engineering and scientific perspective.

Recommendation:

Amend wording of the objective to:

2. Capture at least 80% of the average annual runoff volume that flows through or from exposed site areas and treat to 50mg/L TSS or less and pH in the range 6.5–8.5.

Amend wording of the design objectives table as follows:

Issue	Design Objectives
Erosion Control	• Stage clearing and construction works to minimise the area of soil exposed to rain or strong winds at any one time • Effectively stabilise[1] cleared areas prior to rainfall if works are delayed or works are not intended to occur immediately • Effectively stabilisie[1] areas at finished level as soon as practicable and prior to rainfall • Prior to completion of works (i.e. plan sealing or on-maintenance) for the development and prior to removal of sediment controls, all site surfaces must be effectively stabilised1 using methods which have achieved effective short-term stabilisation and which will continue to achieve effective stabilisation in the medium to long-term
Drainage Control	• Manage clean stormwater around or through areas of exposed soil in order to avoid contamination • Manage sheet flows and avoid or minimise rill and gully erosion • Provide concentrated flow paths to avoid rill or gully erosion and which have the required capacity and are stable as per Table A1 • Provide emergency spillways for sediment basins as per Table A2
Sediment Control	• Runoff from exposed site soils must be directed to sediment controls which are appropriate to the extent of disturbance and level of erosion risk • As a minimum, all exposed areas in excess of 2500m^2 must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated to 50mg/L TSS or less and pH in the range 6.5-8.5 (i.e. 80% hydrologic effectiveness) [2].
Waterway stability and flood flow management	• Where measures are required to meet post-construction waterway stability objectives (specified in Table B), these are either installed prior to land disturbance and are integrated with erosion and sediment controls or equivalent alternative measures are implemented during construction • Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1%AEP)

[1] An effectively stabilised surface is defined as one that does not, or is not likely to result in visible evidence of soil loss caused by sheet, rill or gully erosion or lead to sedimentation, or lead to water contamination

[2] The SPP Guideline has advice on measures which are deemed to comply with the 80% hydrologic effectiveness requirement for sediment controls

2. Erosion and Sediment Control Mapping

Cavendish and Witheridge (2014) proposed that erosion and sediment control on civil construction sites should be based on several regional zones based on local climatic conditions and waterway type. This paper included a map of Queensland showing the proposed regional zones.

Recommendation:

Consider adopting the recommendations of the Cavendish and Witheridge (2014) paper particularly the regional zone mapping and the erosion and sediment control elements suggested for each zone. The erosion and sediment control elements could be adopted in the water quality guidelines to replace the single solution there currently.

OTHER RECOMMENDATIONS

1. Stormwater Quality Guidelines

A revised water quality state interest guideline was not available at the time of review and it appears that there is no commitment for this guideline to be made available for consultation prior to the SPP being finalised or the Act commencing. As such, neither the existing nor amended version of this guideline were reviewed for this submission, which makes commenting on the policy difficult. It is expected that when the guideline becomes available, consultation on the guideline will be undertaken and there will be opportunity for comment. Stormwater Queensland would however like to request that it is consulted prior to the release of a draft so that we can provide meaningful input.

Recommendation:

> It is recommended that the DILGP consult with Stormwater Queensland on amendments to the 'water quality guideline' prior to the release of the draft and prior to official public consultation.

2. Data Availability

The water quality state interest is based upon a number of studies commissioned by the DILGP. It is understood that this included analysis of the erosion and sediment control requirements/business case and alternatives to meeting water quality objectives (BPEM). There is value in making these studies publically available so that a better understanding of the policy can be developed by the industry. Such an understanding is expected to lead to better planning outcomes.

Recommendation:

> Make the studies upon which the water quality state interest is based publically accessible. If this is not possible, Stormwater Queensland would like to request copies of these document to enable more valuable feedback in the future.

3. Frequent Flow Objective

Reinstatement of frequent flow or specifying new targets to control hydrology alteration. This should primarily aim at encouraging stormwater infiltration, through bio filter or others, stormwater harvesting (tanks/ponds) and groundwater recharge to maintain baseflows, particularly in ephemeral systems.

Councils should identify, through appropriate catchment planning, where additional (i.e. frequent flow objectives) apply to help protect waterway values.

Recommendation:

Frequent flow objectives are reinstated in conjunction with planning (i.e. mapping) by assessment authorities (councils) identifying where these objectives apply and where they don't. Clearly articulate compliance pathways for achieving the frequent flow objective to assist implementation.

4. Flow Criteria

Flow control as a key criteria – consideration of expansion of waterway stability objective above Q1 events may be warranted as some developments are lacking detention altogether and this can result in hugely elevated stream power, doing rapid damage to some waterways. Additionally, there is also some merit in investigating achieving this control for flows below Q1 as certain streams maybe damaged at these lower thresholds. It should be customised based on the evidence downstream through site inspection, flow monitoring and modelling (potentially), this is becoming easier to identify with new technology in 2D modelling.

Bank full flows are the critical flows for bank stability (i.e. when highest velocities are typically experienced). The Q1 is often indicative of bank full flows but actual modelling and/or onsite inspection and /or flow monitoring may prove otherwise. The vulnerability of a waterway is also influenced by soils and existing condition of the receiving waterway particularly the cover of vegetation and shade. We agree that in most circumstances the management of the Q1 flows is beneficial in waterway stability. However, Councils may undertake monitoring and catchment planning to identity with greater resolution where the Waterway Stability Objective applies, doesn't apply or where an alternative may apply.

Recommendation:

Investigate the adequacy of the Q1 Waterway Stability objective and encourage Councils to undertake monitoring and catchment planning to identity with greater resolution where the waterway stability objective applies, doesn't apply or where an alternative may apply.

5. Rainwater Tanks

We understand rainwater tanks were previously removed from state policy due to pressure from the development industry claiming it was increasing the cost of development. However, after the rainwater tanks were removed, the cost of housing did not decrease. In addition, previous studies into the cost-benefit of rainwater tanks (which also influenced the removal of these from legislation) was found to have incorrect assumptions applied (refer to Appendix D). More recent and rigorous studies have identified a positive cost-benefit.

Recent research on rainwater tanks has demonstrated a strong cost-benefit outcome to property developers, home owners and the environment. Successful outcomes to flood mitigation, water quality management and potable water reductions are demonstrated in the Aquarevo development.
https://watersensitivecities.org.au/content/aquarevo-launch-heralds-new-standard-sustainable-living/

The reuse of rainwater has a positive benefit on receiving waters and on potable water use reduction. Achieving targets for potable water use reduction is mandatory in other jurisdictions e.g. NSW - BASIX and **https://www.basix.nsw.gov.au/iframe/about-basix.html** **"BASIX reduces water and energy consumption in homes across NSW. These environmental outcomes also provide a long term financial saving for the homeowner – and a valuable contribu**tion to the sustainable future of our communities."

and Victoria Clause 56 – Residential subdivision "Integrated water management provisions"
http://www.dpcd.vic.gov.au/__data/assets/pdf_file/0007/135754/VPP_Clause_56_4-Intwaterman.pdf

Recommendation

Rainwater tanks are considered mandatory on all new developments unless an alternative stormwater harvesting scheme has been identified.

6. Load Based Objectives

The current load based pollutant reduction objectives are simple to apply, readily understood and have served well to date. However, the shortfalls of this singular method, including the lack of good integrated design are apparent and it is acknowledged by industry that these load based objectives don't achieve the "protection and enhancement" of waterways that the policy intent clearly states. Further investigation is necessary to understand what is required to achieve the policy outcome of 'protected and enhanced waterways'. This ill require revisiting of the load based objectives and their appropriateness. Incentivised treatment above minimum standards is one potential mechanism of achieving improved outcomes for our waterways.

Recommendation:

Revisit the load based objectives and their appropriateness. Consider what is actually required to achieve or move closer to achieving the 'protection and enhancement' of Queensland waters. Incentivised treatment above minimum standards is one potential mechanism of achieving improved outcomes for our waterways

7. Maintenance

Maintenance for stormwater treatment systems, both vegetated and proprietary, is critical to their continued functionality. Mechanisms are required to ensure adequate funding and capacity is available for the ongoing maintenance of stormwater treatment systems.

Recommendation:

The SPP should acknowledge and identify the need for maintenance of stormwater treatment systems both vegetated and proprietary. Council's should be required to identify, as part of their TWCM planning, the mechanisms through which adequate maintenance provisions will be attained.

I trust that this submission will assist in providing a more robust and workable policy for the State of Queensland and lead to better planning outcomes.

Should you have any questions or would like to discuss the SPP in general or our submission specifically, please contact Paul Dubowski (p: 3831 6744 e: paul.dubowski@bmtwbm.com.au).

Kind regards

Brad Dalrymple
President, Stormwater Queensland

Appendix A: Stormwater Queensland submission on the *Multiple Use Public Open Space Consultation Report*

STORMWATER QUEENSLAND

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12 January 2016

Adam Jones
Principal Planner
Department of Infrastructure, Local Government and Planning
Level 6, 63 George St Brisbane QLD 4000

Dear Adam

Re: Stormwater Queensland Submission - Multiple Use Public Open Space Consultation Report

Stormwater Queensland commends the Department of Infrastructure, Local Government and Planning for commissioning the "*Multiple Use Public Open Space Consultation Report"* (hereafter referred to as the report). We believe that the report achieves its stated aim of analysing how better and more cost effective infrastructure provision can be achieved through multiple use of land for parks and stormwater.

The purpose of Stormwater Queensland is to promote the efficient management of stormwater including the delivery of cost effective stormwater infrastructure achieved through the integration of stormwater assets into urban areas. As such, Stormwater Queensland strongly supports the notion of multiple use open space.

Further to our review of the report, we believe it to present a technically sound approach towards the achievement of multiple use open spaces and support the outcomes of the report. Some more specific comments are provided below for your consideration.

General comments

- With the increasing density of urban development being encouraged by government, it is more important than ever that the available land bank be efficiently used. This includes maximising the value provided by green space in developed/developing areas.
- In balancing the sometimes conflicting needs of developable land and green space, it is vital that a win-win result is achieved. This should include encouraging or even rewarding developers for giving up larger than minimum tracts of land and achieving good urban design outcomes which balance the community's needs. The win for the local and broader community is the priceless green space secured in perpetuity.
- Once green space is lost, it is lost forever. Effective planning, as demonstrated by the case studies in the report, is therefore critical to ensure adequate green space which achieves multiple benefits is retained.
- Linear parks containing a waterway, in particular, offer a high degree of visual amenity and a substantial improvement to the overall urban scape. When using such corridors, the community does not typically distinguish between arbitrary separation of 'open space' and 'drainage corridor'. The value of these spaces and the way they are used/viewed by the community needs to be recognised in planning frameworks. Where such corridors are rehabilitated (or already in good condition) and embellished with recreational assets (such as pathways), the developer should receive credit for such works/land dedication.

- If a developer is required to dedicate drainage reserve without any recompense, the minimum possible area will be dedicated. Minimum areas typically result in hydraulically efficient channels with little other benefit. They are designed to be high velocity, hard surfaced, unsafe and visually unappealing - a drain.
- If a developer is credited the full value of green space, financial barriers to providing all the space necessary to achieve a high value urban result area greatly minimised. With space, a waterway or overland flow path can be broader, shallower, lower velocity, vegetated, sinuous and visually appealing - a linear park with both high amenity and a stormwater function.
- Typical urban ephemeral waterways carry flows only during and shortly after rain events. In any year for example, there are approximately 4,410 daylight hours in South East Queensland. Adopting a “typical” flow event duration of 4 hours, the 20% AEP (one in five year) event occupies approximately 0.02% of daylight hours, the 10% AEP occupies 0.009% and the 1% AEP event occupies 0.001%.

  The catchment drainage purpose of a multi-use linear park, whilst important, occupies only a very small component of available time. For the vast majority of the time, the space is available for a full range of urban community recreation and amenity purposes.

  The design of open spaces should therefore reflect the normal condition of the park rather than exceptional storm event condition, while accounting for the safety and functional considerations during and after rainfall.

Barriers to implementation

The most significant barriers to implementation of multiple use open spaces are Local Authority planning scheme codes, policies and infrastructure charges offset arrangements. Effective implementation of multiple use open space is unlikely to occur without alterations to these regulatory instruments.

Council officers are also often reluctant to accept multiple uses in creditable open space. There are many reasons for this reluctance including poor attempts at integration which have led to aversion to the broader principles of integration and perceptions that providing credits to offset development charges would result in overall loss in infrastructure charges for Councils.

Overcoming this barrier will require a range of solutions including, for example, regulatory reforms (as noted above) and promotion to Councils of the benefits of integration (including financial benefit) outlined in the report.

These and other solutions are discussed further below (refer to “Next Steps’).

Specific comments on the desired standards of service proposals in the report

Road frontage

Proposed minimums will not be achievable in all topographies. This is particularly so in linear parks where a waterway might, for example, traverse around the base of a steeper sided hill.

Batter slopes

Maximum batter slopes should allow a reasonable degree of local variation to suit specific topographic constraints or landscape design purposes. For example, in a 1:6 batter area, local steepening, or even a small wall, for a landscape function or to enhance a local topographic feature can be entirely appropriate. Equally, it is counter-productive to flatten a batter in a natural/semi-natural waterway simply to comply with an arbitrary guideline.

Depth and flow characteristic limits`

Specific depth limits appear arbitrary and unnecessary. Public safety risk can be adequately managed by nominating appropriate depth velocity (DV) values. Whilst DV limits should apply to the more accessible public spaces, no specific limits should apply to the waterway areas as these are a function of the existing natural environment and topography.

Linear park width limitations

We disagree strongly with the suggestion that the part of the park outside of the 15 m zone is not “parkland”. The entirety of linear open space, including the waterway area, has high visual amenity and adds substantially to the urban scape.

Linear park typical section

The zoning in Figure 7 is too restrictive. An essential component of urban design in a linear park is activation of the waterway area. Pedestrian paths should generally meander through the whole area and not be limited to the high side.

With that in mind, the requirement that paths be set above ARI 5 (Figure 3, Tables 10, 11, 12 and Figure 6) or ARI 100 (Figure 7) is too limiting. Figure 7 is probably wrong.

Some relaxation is needed to allow paths to closely approach the waterway where appropriate.

Table 13: Stormwater management in waterway and wetland buffers DSS

The limitation of half the overall waterway buffer width and the 10 metre setback are overly restrictive and unnecessary.

The prohibition of walls in the buffer is overly restrictive and unnecessary. Low walls can be entirely appropriate in particular circumstances.

Broader problems

Many smaller urban developments do not involve the creation of public open space, and provide no opportunities to integrate stormwater management measures in a meaningful way as outlined in the document.

Stormwater management in these developments becomes disproportionately expensive and tends to lead to the poorest urban design outcomes. A broader review of stormwater quality measures for smaller subdivisions is warranted.

Next Steps

The following points outline our recommended strategy for the widespread adoption of the framework. The points have been based on the assumption that the issues identified above have been suitably addressed.

- Integrate the framework with the State Planning Policy and SPP guideline currently in development. Wherever site constraints allow, multiple use open space should be identified as either a 'performance outcome' or as an 'acceptable outcome' for both 'liveable communities' and 'water quality' state interests.
- Translate the outcomes of the report into a short fact sheet which promotes the business case for multiple use open spaces and which refers back to the report for further detail.
- Work with the Council of Mayors and Local Government Association of Queensland to have the framework formally endorsed and reflected in local regulatory instruments.

  Although the changes to the SPP would provide the regulatory impetus for change, working with these groups is a more participatory and inclusive approach which complements the regulatory changes and is therefore recommended. Ensuring political buy-in early would likely result in faster and more effective support for the framework.
- Promote the framework, case studies and fact sheet through the various industry associations (Institute of Public Works Engineering Australasia, Stormwater Queensland, Planning Institute of Australia, Engineers Australia, Urban Development Institute of Australia, Australia Institute of Landscape Architects, Floodplain Management Association, Queensland Environmental Law Association and the Environmental Institute of Australia and New Zealand).
- Undertake a tour of all the major regions in Queensland to promote the report, fact sheet and new SPP provisions.

We would like to thank you for the opportunity to provide a submission on the report and offer our support in promoting the widespread adoption of an appropriate framework for the integration of land and water planning in multiple uses open spaces. Should you have any questions or would like to discuss our submission further, please contact Tony Loveday of the Stormwater Queensland Advocacy and Engagement Sub-Committee (4659 611 or 0448 035 303 or tony.loveday@rmaeng.com.au).

Kind regards

Brad Dalrymple
President
Stormwater Queensland

Appendix B: Stormwater Queensland Stormwater Quality Offsets Position Statement

Stormwater Queensland
Stormwater Quality Offsets Position Statement

Stormwater Queensland is committed to providing industry leadership on flexible and innovative pathways for stormwater quality management. These pathways include but are not limited to stormwater quality offsets. This Position Statement sets out Stormwater Queensland's stance on stormwater quality compliance pathways particularly stormwater quality offsets.

This Position Statement has been informed by feedback received from Stormwater Queensland members and the broader industry. Feedback included both written feedback in response to an earlier published draft Position Statement and oral feedback received during the 'Stormwater Quality Offsets Forum' held in November 2015.

This Position Statement will be used as a platform to represent Stormwater Queensland members and the broader industry in collaboratively working with state and local governments and other industry stakeholders towards the development of an appropriate regulatory framework and guidelines.

Stormwater Queensland understands that other initiatives are required to address the reasons why many site-based solutions have not met expectations. Stormwater Queensland will be progressing such initiatives separately.

General

1. Stormwater Queensland agrees that offsets could form part of sustainable stormwater management if adequately planned for and applied in the right context as outlined in this Position Statement.
2. Stormwater quality should always be attempted to be managed at source first. Stormwater Queensland however also supports the need for flexible and locally appropriate solutions for managing stormwater where on-site treatment is not feasible, partially feasible or where catchment planning has identified a suitable downstream treatment measure that will deliver equivalent or greater benefit.
3. Proponents of offsets schemes (e.g. local authorities) should assess the reasons why offsets are being pursued locally, the feasibility of achieving local objectives and the costs of various flexible and locally appropriate solutions for addressing the local objectives. This assessment should be made prior to collecting offsets and used to inform the local offsets scheme.
4. Capacity building to improve design, construction and maintenance is considered a more appropriate response than offsets for addressing poorly functioning stormwater assets. Such capacity building should be undertaken in conjunction with stormwater asset rectification and offsets where appropriate.
5. Management of stormwater pollutants should be based on a hierarchy of avoidance and mitigation prior to offsetting (in order of preference). Offsets are generally more complex and more costly.
6. Offsets should be limited to developments where on-site stormwater management is highly constrained. In principle, offsets should not be accepted on greenfield sites including within the urban footprint. Exceptions may apply where appropriate total water cycle and catchment planning has deemed otherwise.

7. Offset schemes do not remove other stormwater management regulatory responsibilities such as flooding, hydrologic objectives and erosion and sediment control.

Planning

8. Offsets schemes should be underpinned by appropriate total water cycle and catchment planning and local authorities should undertake such planning in order to achieve the optimal outcomes.
9. Due consideration must be given to both the current and predicted future condition (including rehabilitation potential) of waterways as part of catchment planning and before an offset is agreed. Hydrology, water quality (including sediments, nutrients, heavy metals, hydrocarbons and gross pollutants) and ecology should all be considered because uncontrolled stormwater can have significant impacts on waterway health.
10. In principle, offset solutions should occur in the same catchment as the concession to avoid impacts on local waterways. Total water cycle and catchment management planning may however, identify appropriate scenarios for cross-catchment trading e.g. where offset solutions in another catchment provide greater benefits. In such instances, the risks to the waterways receiving reduced or no stormwater mitigation in the source catchment and the benefits to the receiving catchment waterways need to be assessed and communicated to the community.
11. Offset schemes should include consideration of how stormwater quality offsets relate to other stormwater management requirements including flow objectives and erosion and sediment control.
12. Offset schemes should include the assessment of spatial, temporal and environmental equivalence. In principle, offset schemes should seek to achieve equivalence when compared to well-designed, constructed and established site-based stormwater treatment solutions. A factor applied to offsets charge may be appropriate where equivalence cannot be achieved. In some instances, it may be appropriate to require a net gain rather than equivalency.

Pricing

13. Proponents of offset schemes (e.g. local authorities) should be required to develop strategies for the collection and acquittal of offset funds prior to their collection.
14. Offset charge pricing should be reflective of appropriate costs including land costs (regardless of current land availability), planning, design, construction, establishment and administration (e.g. for planning and resourcing). Costs should be based on the long-term offset supply including potential future constrained sites. Planning of offset solutions is required to appropriately price offset charges.
15. Offsets schemes should not shift the burden of responsibility for the maintenance of stormwater quality treatment assets onto local authorities without adequate recompense. For example, on sites where the stormwater management systems will remain in private ownership, offsets charges would also need to account for the maintenance, renewal and decommissioning costs in addition to the costs outlined in the above point.
16. The total value of potential offsets and the individual offsets charge should be determined prior to collecting offset funds. The offsets charge should include a contingency factor to account for inflation, risks, equivalency and uncertainties.
17. Offsets collected should not be permitted to exceed the forecast supply of offsite solutions available. In principle, where offset solutions are limited to the same catchment, offset schemes should be based on the equitable distribution of offsets.

18. Offset funds should not be allocated to general revenue.

Implementation

19. Any local authority which is currently or historically collecting offsets funds and which has not yet developed a scheme for the acquittal of stormwater offset funds should cease collecting offsets until a scheme which reflects this Position Statement has been developed. Similarly, any existing offsets schemes which do not reflect this Position Statement should be updated to reflect this Position Statement.
20. Stormwater offset frameworks should be transparent and independently evaluated. The use of offset funds should be reported publically on an annual basis.
21. Evaluation and monitoring of offset frameworks and treatment systems should only be funded through an administration charge portion of the regular offsets charge.

Appendix C: Stormwater Queensland Submission on ‘Living Waterways’ (Water by Design 2014)

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27 January 2015

Andrew O'Neill
Healthy Waterways
PO Box 13086
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Brisbane QLD 4003

Dear Andrew

Re: Living Waterways

Stormwater Queensland commends Healthy Waterways for the development of the Living Waterways document as it provides a practical means of encouraging best practice stormwater management with achievable objectives that will make a positive impact to waterways.

The presentation of examples allows an easy grasp of the intent of the guideline and the flexible scoring system allows site specific solutions to be adopted. The adoption of the presented outcomes through the suggested scoring system is something that Stormwater Queensland supports and looks forward to its adoption within the development industry.

The following points are provided for your consideration of future updates of amendments of the document.

General comments:

1. The booklet states that, "*Living waterways is a best practice environmental management approach to deliver enduring, engaging and affordable places*." It is interpreted that the intent of the document is therefore to provide some guidance on how to design sites which do not necessarily meet the SPP load-based pollutant objectives, but rather meet the alternative accepted solution of 'best practice environmental management'.
2. If this indeed the intent, the link should be made more explicit. If this not the intent, alternative working should be considered. Without further clarification regarding this statement, the reader is left with uncertainty as to how the document is to be used and therefore of its value.
3. What are the incentives for developers of using Living Waterways? It is understood that Living Waterways is to be applied to sites larger than 2500m^2 and that in reality, it may be difficult to achieve many of the desired outcomes to sites smaller than say 10,000m^2 without compromising affordability. Compliance with load-based targets is relatively straightforward on larger sites and therefore developers may question the value of the additional work associated with both design and assessment utilising this pathway. A clearly articulated business case for the Living Waterways approach would likely increase uptake.
4. Who approves or allocates the drop rating? Will it be self-determined or evaluated by Councils or an independent body such as Healthy Waterways?

Comments related to the scoring system:

5. The scoring system applies a 0 score for actions that are mandatory which makes sense. However should it go further and allocate a negative score if the mandatory elements are overlooked or not implemented well? It is noted that the scoring scheme must cover a wide range of variables but be simple enough to allow a transparent assessment. Adding additional complexity to the scoring would make it difficult to document and calculate ratings.
6. Similarly, if the mandatory elements are implemented in a way that provides a better than “business as usual” outcome, should additional credits be available?
7. The text on the first page suggests that 20 credits are required for 1 Drop Rating but further down a 1 Drop Rating is stated to equal 36-40 credits.
8. While the principle and intent of the Living Water theme mention ‘enhancement’/’rehabilitation’, this is not reflected in any of the desired outcomes.
9. Some outcomes of the Living Places and the Living Communities themes appear to be very similar. Additional explanation highlighting the difference between the two would make the distinction easier to understand.
10. LW2 – it is considered that development which complies with the stated desired outcomes could still result in diminished waters and catchment/ecological processes. The words ‘does not diminish ’should be reconsidered e.g. ‘minimises impacts’.
11. LW5 Living Water desired outcomes related to ensuring that ‘muddy waters’ don’t leave the site is impractical. While the desired outcomes and provisions clarify the intent, the desired outcome could still be misleading.
12. One of the drivers for the document is to promote affordable places however there are no credits allocated to developing cost effective management systems. Developing systems that consider whole of life costs and maintenance requirements should be mandatory as documented however adopting an innovative or substantially more cost effective system should be acknowledged?
13. Reference LW1.2 allocates 8 credits if the stormwater pollutant targets from the State Planning Policy are met, however it allocates 2 credit points if the discharged pollutant loads are 50% above the required target reduction. Although this acknowledges that it may be difficult or not possible to meet the SPP requirements, does it send a message that a positive outcome is achieved by not meeting the current legislative requirements?
14. Reference LW2 indicates that it is mandatory to meet all legislative requirements and that no credits are available for this mandatory requirement which is in conflict with LW1.2. Should a negative value be awarded if the documentation is insufficient to confirm legislative requirements are met?
15. Reference LW5 should include an Erosion and Sediment Control Plan as an appropriate reporting mechanism in addition to a Stormwater Management Plan.
16. Reference LP1.1 and LP1.2 are similar in that the stormwater system and landscape design encourages the touch and interaction with water systems. Can they be combined? Safety aspects must be considered especially during periods during or after rainfall and must be well documented.

17. Reference LP2.2 encourages the use of interactive art with water features. During the recent drought most fountains and water art were turned off to prevent waste of water. Can these systems be drought-proofed and can this be assessed?
18. Reference LC5 promotes the connection to water in a way that mitigates the danger associated with water through viewing platforms, shallow water depths and lower velocities. The best safety measure would be to prevent access to overland flow paths, adoption of high flow bypass around pedestrian and viewing areas. This will require larger footprint areas which will increase costs.

We wish Healthy Waterways success with the Living Waterways approach and offer our support in promoting the document to our members. Should you have any questions or would like to discuss our submission further, please contact Bill Johnson of the Stormwater Queensland Advocacy and Engagement Sub-Committee (p: (07) 3854 6287 or bjohnson@pb.com.au).

Kind regards

Brad Dalrymple
President
Stormwater Queensland

Appendix D: Expert Review of Rainwater Tanks Business Case

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Our Ref: RainwaterTankReportPeerReview

14 October 2012

SIA Queensland
(via email)

Attention: Nicole Ramilo

RE: REVIEW OF REPORT - DOMESTIC RAINWATER TANKS IN QUEENSLAND: COST EFFECTIVENESS AND IMPACTS ON HOUSING COSTS

Thank you for your recent request to prepare a review of the report prepared by Mainstream Economics and Policy entitled "Domestic Rainwater Tanks in Queensland: Cost Effectiveness and Impacts on Housing Costs". I have conducted this review independently and offer the comments below as an analysis of this report in a peer review capacity. It should be noted that some work undertaken by BMT WBM was quoted as being used in the report, however I was not involved in this work directly.

In conducting the review, I have attempted to identify inconsistencies and unsubstantiated opinions wherever they were noted, however it should be recognised that the audience this report was prepared for would not be fully aware of the purpose and function of rainwater tanks. It is therefore a curious mix between a technical document and one which simply notes opinions of the author. The comments below outline the findings of my review considering this document as one with a technical basis. It may be that some simplification of the technical details was attempted by the author given the likely audience.

1. The report attempts to suggest that it is considering the overall cost-effectiveness of rainwater tanks, however it simply focuses on the use of tanks in supplying an alternate source of water to a reticulated potable supply and does not consider all elements of cost-effectiveness of rainwater tanks (this is detailed further below). It should therefore only be considered as an examination of the costs and cost imposts of using a rainwater tank for an alternative water source in a domestic housing situation, not a full cost-effectiveness analysis, simply because it fails to examine a comprehensive range of externalities and benefits of a broad scale implementation of rainwater tanks as part of an overall integrated water cycle management strategy for developed and developing areas in Queensland.
2. Fundamentally, minimal or no consideration or detailed costings have been assessed regarding the multiple economic benefits of rainwater tanks including:
    a) Reducing downstream hydrologic impacts by minimising the occurrence of frequent stormwater flows
    b) Deferring costs of augmenting water supply infrastructure, such as new storage reservoirs, larger trunk water supply infrastructure, smaller reticulation systems and the like (this is discussed, though no cost savings are attributed). Analysis of the impacts of this is provided in Bonacci Water (2011).

c) Improvements in overall water supply scheme resilience, to climate variability and climate change (this is discussed, though no cost savings are attributed). Again, further analysis of the impacts of climate change and how they may be mitigated are shown in Bonacci Water (2011)

d) Considerations of economies of scale. The costs used appear to be those associated with single installations of a rainwater tank on an individual home. There is no consideration of cost savings associated with broad scale rainwater tank adoption, either across development projects, or across whole regions. An example of the types of impacts on costs was well illustrated when Brisbane City Council were undertaking their rebate scheme for rainwater tanks. Anecdotal evidence provided through newspaper advertisements and other media suggested that competition between rainwater tank suppliers was significant resulting in major reductions in costs to supply and install rainwater tanks.

e) Reductions in the size of downstream water quality improvement infrastructure to meet regulatory requirements. The use of rainwater tanks can significantly reduce the overall volumes of stormwater requiring treatment in smaller, frequent flow runoff events where the majority of pollutant loads are transported. By also removing the "cleaner" roof water from the stormwater flows, pollutant treatment systems work more effectively as they are able to treat more concentrated flows at reduced hydraulic loads.

3. The end use data used in the report does not reflect the latest information as published by the Urban Water Security Research Alliance (see Beal and Stewart 2011) and as such underestimates the impacts of rainwater tanks on the potential reductions in water demand as a result of rainwater tanks.

4. The unit costs ($/kL) quoted are consistent with those derived in Stewart 2011, however the report reviewed did not raise the conclusions of that study, that rainwater tanks had the second cheapest unit costs of alternative water supply options.

5. The costs used in the report are not directly attributed to any one source and given that they are so strongly relied on for the arguments developed in the report, it is difficult to assess their overall suitability to the contexts used (e.g. Cairns and Brisbane).

6. Within the report, it is stated that "In effect, RWTs are typically understood to offset about one third of water use from reticulated sources." and references the Stewart 2011 study. The latter study states that a 70kL per household per year (kL/hh/yr) saving is possible with a 5,000L rainwater tank consistent with the Queensland Development Code 4.2 requirements. Give that Beal and Stewart 2011 documents that the average water use in South East Queensland was 135 kL/hh/yr, this would equate to a more than 50% offset of potable water supply by rainwater tanks.

7. Table 3 in the report quotes yields based on "available literature", however the extent to which that literature is relied upon to provide the yields is not detailed and it is therefore difficult to determine whether the yields are appropriate for the context used. This can be a significant issue in the different climatic regions and was well reported in Coombes and Barry 2008.

8. Under key findings on page 11 of the report, it is stated that the cost of rainwater tanks would be higher where smaller roof catchments further reduce yields however this statement is not supported by evidence. It is highly likely that smaller developments on smaller lots would have smaller demands as they would typically be occupied by smaller numbers of "equivalent persons" or EPs. Smaller lots would also mean a greater number of rainwater tanks, albeit typically lower in volume, as smaller lots would result in higher overall lot numbers. Without conducting detailed modelling, it would be very difficult to justify that smaller lots and smaller roofs would themselves reduce overall water yield.

9. The second key finding listed on page 11 is that the cost to households of water supplied by rainwater tanks is significantly higher than accessing reticulated mains water. This is not argued, the cost of providing an alternate source of water with equivalent costs to reticulated mains water does not benefit from the large economies of scale from delivering centralised infrastructure. However, as obvious from the millennium drought, such systems are susceptible to reduced reliability due to climatic variability and alternate water sources provide a greater degree of resilience for whole of system delivery of water, and ensure that water which is fit for purpose is delivered where required. There are also likely to be reduction in water treatment costs if lower water demands are required with alternate water sources in place, and therefore overall potable water costs would reduce. That, coupled with savings in water bills from less water consumption per household are likely to result in more savings that have not been included in the analysis. Such analysis would need to be undertaken as a whole of system

exercise in order to reduce the possibility of spurious results from assuming "average" yields for individual tanks are applicable to the regional scale. This is further discussed in Bonacci Water (2011).

10. Under section 2.2.2 on the benefits of rainwater tanks outlines potential savings in household water bills. There is no supporting information to support the costs in Table 5, as such, it is very difficult to understand how the cost savings were determined. A simple analysis would suggest that if rainwater tanks were able to provide approximately 70kL/hh/yr of supplementary water, and this resulted in a direct reduction in potable demand of an equivalent amount, then cost savings could be at least as high as $115/hh/yr, assuming a potable water cost of $1.65/kL. If higher rainwater tank yields were possible (and the report suggests they are from the information in Table 3), then cost savings would likely be even higher.

11. In the same section on benefits, the statements regarding drought contingency appear to indicate that rainwater tanks would only be beneficial where potable use restrictions would preclude the use of the reticulated supply, however it also correctly states that during drought conditions, rainwater tanks are likely to yield water even during small rain events due to the efficiency of the collection system, that is a roof will produce runoff after only minor amounts of rain, estimated at around 0.5-1mm before runoff occurs (Coombes and Barry 2007). As such, the ability of a rainwater tank to supplement potable supplies would be significantly greater during drought conditions and reduce the stress on the reticulated potable system. The benefit of rainwater tanks in drought conditions would therefore not be confined to houses which would water gardens, but be more generally beneficial where they were plumbed internally.

12. No assessment has been made within this document of the positive impacts of rainwater tanks on modifying consumer behaviour with regards to water (Gardiner 2010).

13. It is of concern that the language used in the benefits section is typically negative. For example, under the dot point concerning delaying major water supply augmentations, it is stated that rainwater tanks would "marginally" reduce growth in demand from reticulated systems, however no support is given for the supposed "marginal" benefits. It would appear that this report has therefore not been prepared objectively and was always intended to provide a negative assessment on the use of rainwater tanks.

14. With regards to point 12 above, it is also stated at the end of the benefits section that other than reduced water bills and drought/water restriction benefits, the other identified benefits are likely to be relatively negligible at the individual rainwater tank level. Again, no evidence is provided to support such a claim and it is concerning that no further assessment was undertaken to quantify the savings associated with the multiple benefits of rainwater tanks.

15. Under section 2.3, on benchmarked water supply options, there are some significant omissions and unsupported statements. For example, in Table 6: Typical water supply options – Queensland, it is stated that for dams, they are generally at the lower end of the cost of supply, however no current costings (e.g. those for Wyaralong Dam) are presented to justify this position, and no consideration has been given to the other social, economic and environmental issues associated with new dam construction such as those exemplified by the attempted construction of the Mary River Dam. No consideration is also made regarding the loss of productive land or the cost of such land where dams are constructed. Given this, it would not appear that the cost comparisons between other water sources have been conducted on a "level playing field" and it raises significant questions regarding the validity of the conclusions drawn.

16. Also under section 2.3, it is stated that many groundwater aquifers are already highly allocated, but again this is not supported by any evidence and would not appear consistent with groundwater supplies in urban areas.

17. Where recycled water is discussed under section 2.3 that several benefits of the use of recycled water are documented, and these are consistent with other studies, however there is a statement that recycled water competes directly for the same demands as rainwater tanks. While this can be true, an integrated water supply scheme considers which water supplies are fit for purpose, and as such, rainwater tanks and recycled water are often considered as complimentary, rather than competing, in order to better manage perceived health risks from each alternate water source.

18. Of key concern is the graph presented in Figure 1 on p14. The values given for rainwater tanks are not consistent with the values given in Table 4 and have suggested that rainwater tanks have even higher unit costs than those given in the literature and earlier in the report. It should also be noted that the figures illustrated in that graph are not consistent with the work in Stewart 2011 which indicated that

on average, rainwater tanks had the second lowest unit rates for alternative water supply options. Because of this, the key findings and associated dot points in this section are not justified by either the data presented (because it is not consistent with figures earlier in the report), and also not consistent with the literature previously referenced in the literature (i.e. Stewart 2011).

19. In section 3, the report documents the impacts on housing costs, however it is of concern that the report does not attempt to quantify economies of scale in widespread introduction of rainwater tanks, especially where delivered as part of greenfield developments. It is also curious to note that the figures discuss that a rainwater tank requires a reduction of $3m^2$ of house area, or an approximate 1% increase in the construction price of a residential home. This would appear to be a relatively insignificant impact when considered with the benefits that a rainwater tank provides and would also realise benefits regarding smaller homes in terms of managing urban heat island effects, reduced raw materials consumption, reduced energy costs to construct and run smaller homes and reductions in urban sprawl as a result of smaller house sizes. Therefore what is suggested as a negative impact may actually be considered beneficial. It also does not consider rainwater tanks in conjunction with other environmental initiatives such as solar panels, demand reduction devices etc. and is therefore difficult to place in any context.

20. It is stated that rainwater tanks “should” positively contribute to the market value of homes however again, no quantification of this is given, but a note is made (again with no justification) that anecdotal evidence suggests that installation costs are higher than any attributable price premium. It is very difficult to understand why this statement would be made other than to again attempt to paint rainwater tanks in a poor light and the lack of objectivity in this report is highly concerning.

21. For net financial impacts presented in Section 3.2, no justification, methodology or data is presented to support the figures given in Table 8, however some key findings rely solely on these values. It also states under key findings that there may not be net annual costs where rainwater tanks have efficient yields for outdoor uses on large lots, but again, no references are given and no data is provided to support such a statement.

22. Within Section 4.2, there are numerous unsupported statements which the author has used to attempt to justify abandoning the current policies. Firstly, it is stated under rigid regulatory requirements for installing rainwater tanks (presumably the Queensland Development Code 4.2 requirements), that climate conditions are less likely to deliver efficient yields from rainwater tanks, however the actual climatic conditions where inefficient yields are documented are not provided. Furthermore, such analysis would need to be undertaken across the whole system, rather than to simply extrapolate the results of a single rainwater tank (Bonacci Water 2011). It is also stated that households are less likely to fully utilise rainwater tank water, but again, there is no discussion of this in the body of the report. It is simply a statement of opinion by the author with no justification given.

23. The author also appears to consider that rainwater tanks are only beneficial where large outdoor demands are present. This is not consistent with analyses that demonstrate that regular demands on rainwater tanks can result in far higher yield efficiencies than sporadic irrigation uses (Coombes and Barry 2008).

24. Finally, under “The bottom line” it is stated that an “independent economic analysis” has been undertaken and shows that rainwater tanks are a high cost water supply option. From the points noted above, it would appear that this and the other conclusions and recommendations are not supported by either the literature, data or analyses undertaken and the report is littered with inconsistencies, unsupported statements and opinions that are all designed to give a negative impression on the use of rainwater tanks as part of an integrated water supply option.

Conclusions

The report "Domestic Rainwater Tanks in Queensland: Cost Effectiveness and Impacts on Housing Costs" prepared by Mainstream Economics and Policy for the Queensland Master Builders Association is not an independent economic analysis of the cost-effectiveness of rainwater tanks and contains many inconsistencies and unsupported statements and opinions. It should not be relied upon for any consideration of the role of rainwater tanks in an integrated water management strategy at any scale (lot, development or regional scale) and it would be far better to review the primary sources of literature quoted to obtain a more independent assessment.

I trust that the above is satisfactory for your current purposes. Please feel free to contact me if any of the above requires further discussion or if I can assist further.

Yours Faithfully
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