EPA's stormwater work: the current context

EPA VICTORIA | Environment Protection Authority Victoria

VICTORIA State Government

Overview

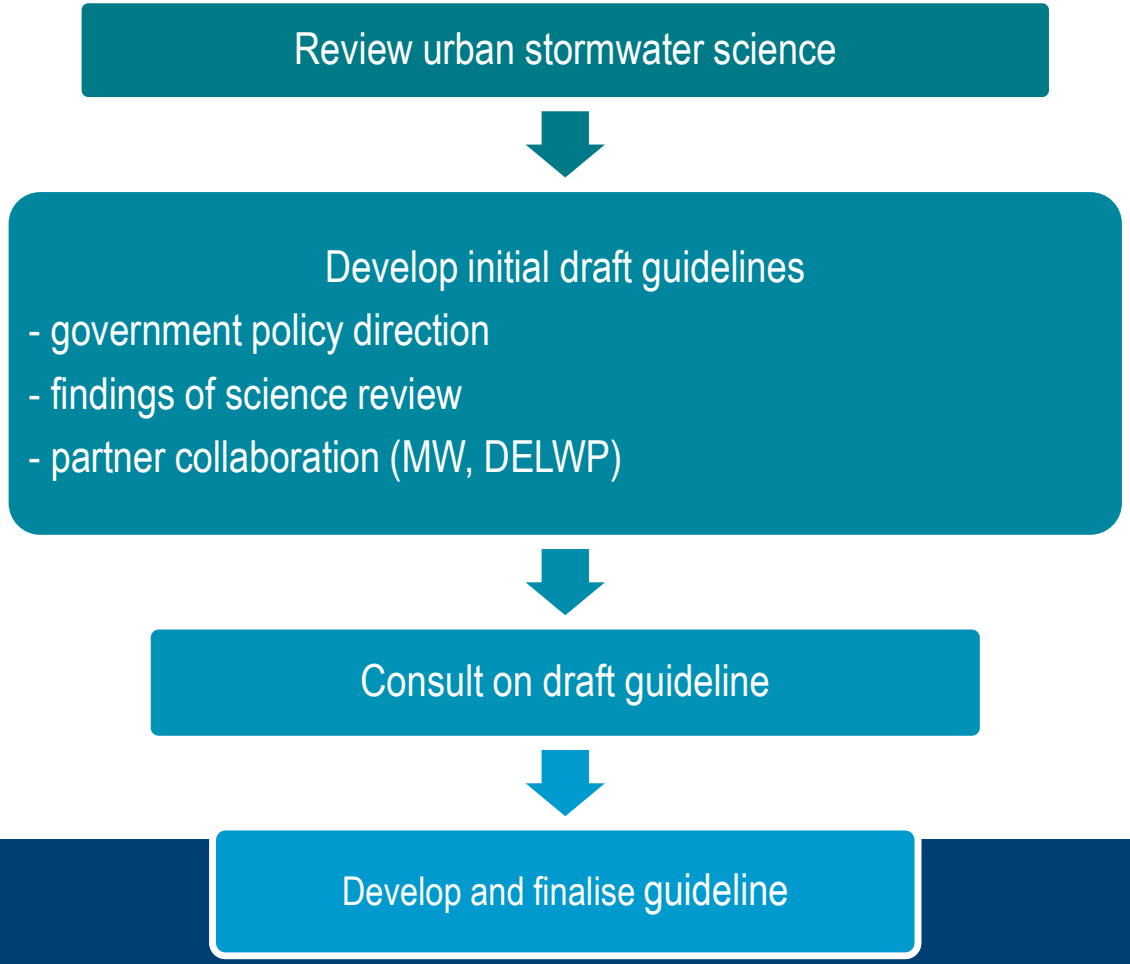
Overview

- Review of stormwater science
- Stormwater Guidance development
- EPA's new legislation

Need to review science and guidance

- Urban stormwater BPEM published in 1999
- Knowledge of the harmful effects of stormwater, including stormwater flow regimes, has greatly expanded in recent years
- Stormwater treatment technology and practice have also changed since 1999

Review process



Changes to flow regime due to urbanisation

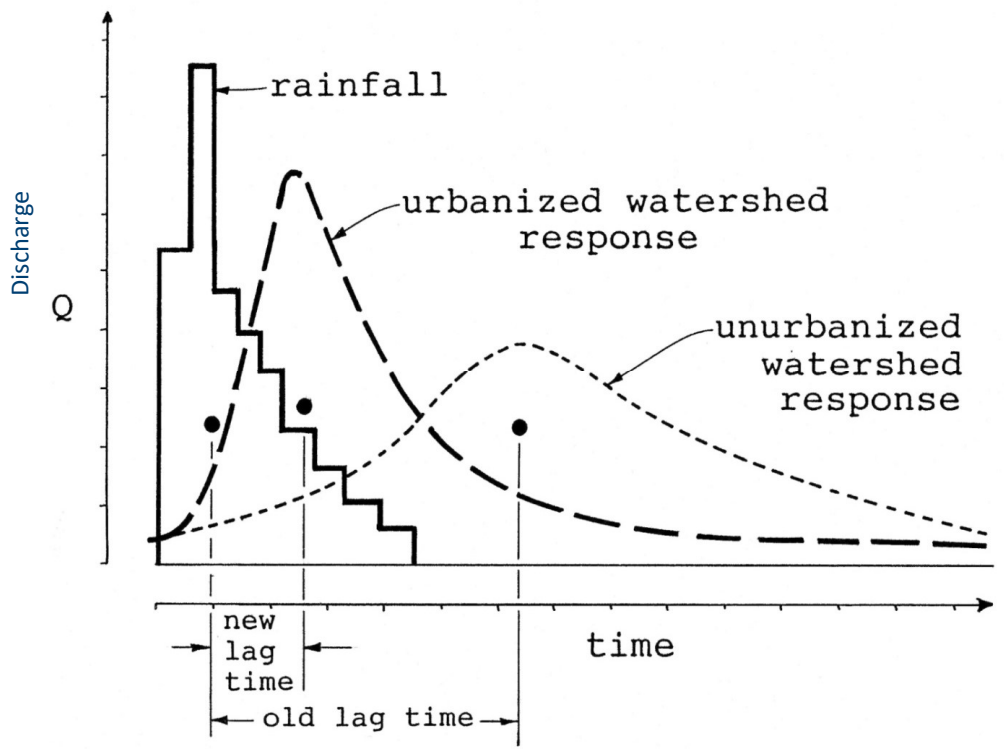
The creation of impervious surfaces – roads, roofs – greatly increases water runoff, resulting in less infiltration into local soils and loss of water by transpiration.

Increased flows:

→ higher energy streams

→ greater erosion

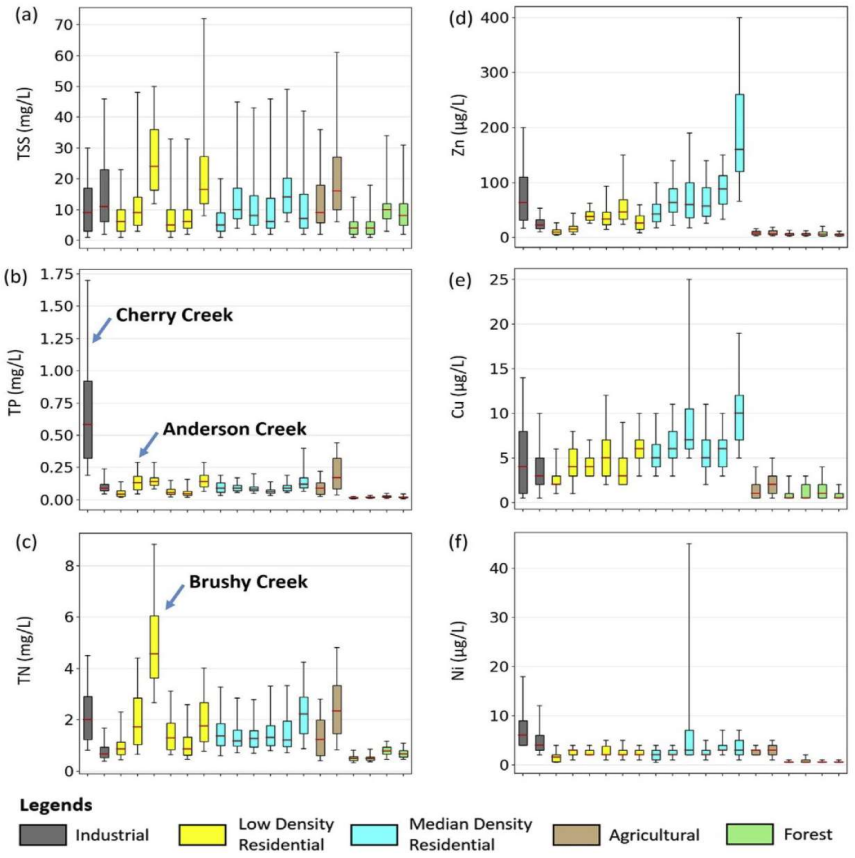
→ increased management



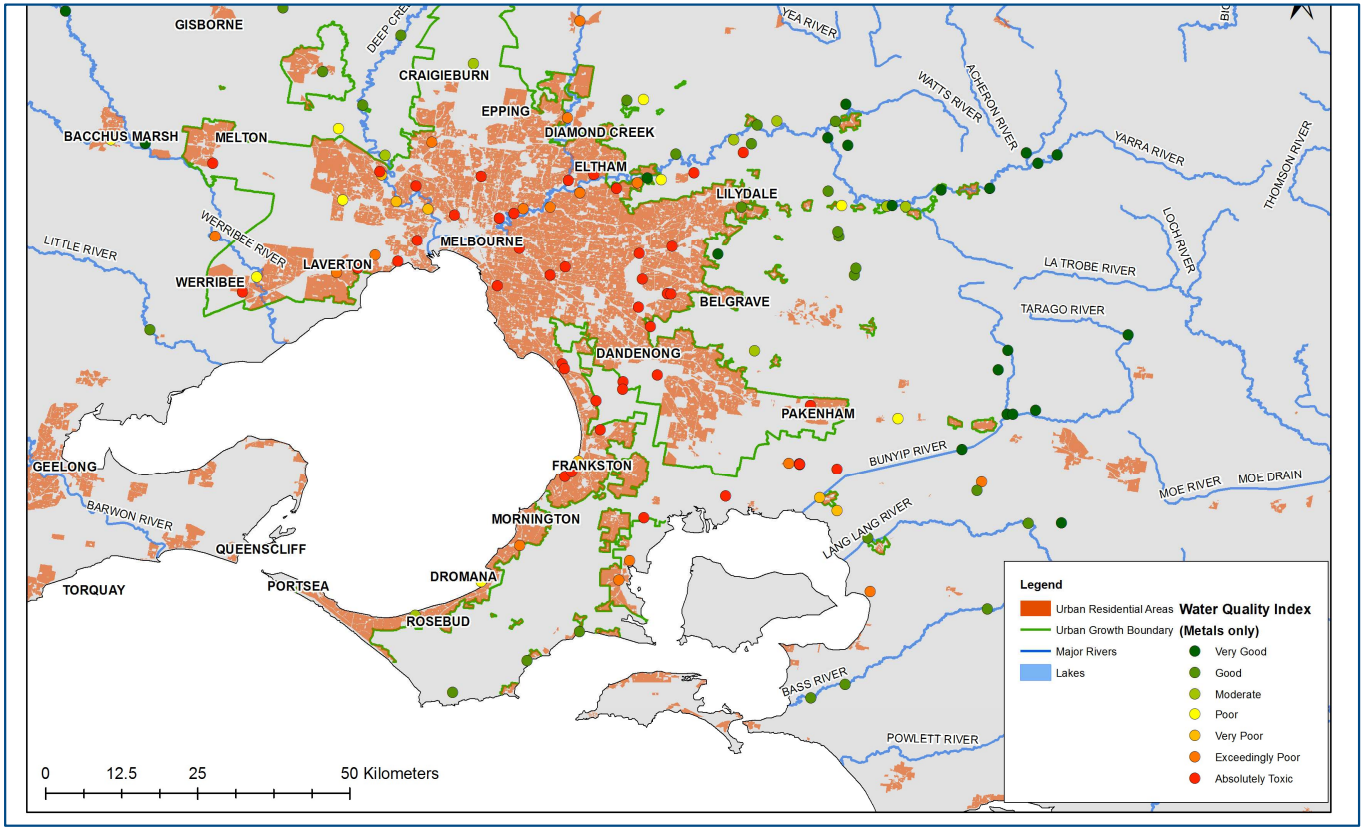
The urban stormwater problem

Key points:

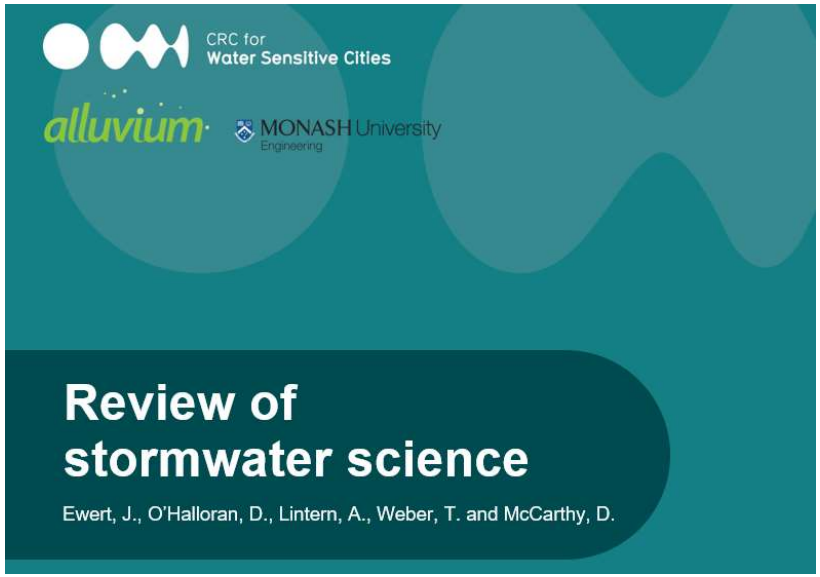
- Generally low pollutant levels in agriculture and forested areas, especially for toxicants (e.g. zinc and copper)
- High variability in urban settings and usually much higher than undeveloped areas
- Even low density residential can greatly alter water quality



Metals in streams – consequence of development



Science Review: Key findings



- ❑ Increased recognition of social values of urban waterways
- ❑ Support for place-based targets
- ❑ No change to pollutant load targets (TN, TP, TSS, litter) and no additional targets such as E. coli or metals
- ❑ Performance of treatment measures are variable and integration of approaches is important

Science Review: Key Findings

- **Flows are a critical threat to urban waterways**
- Metrics: many potential flow indicators, but ‘mean annual runoff volume’ is effective indicator that correlates with stream health and is easily calculated
- 25% in most urban areas
- Protecting/restoring values in urbanised catchments: 50 – 90% reduction in annual runoff

Draft general objectives

- Maintain pollutant removal objectives
- Include flow reduction objectives
  - **50 - 90%** reduction for high ecological value waterway areas
  - **25%** reduction for other areas
  - **10%** minimum contribution to baseflow

This:

- Addresses the **key gap** identified in the science review
- Provides for a **place-based** approach

Stormwater Treatment Scenario: 25% Flow Reduction

Development type: townhouse infill multi-dwelling

Objectives

25% flow reduction achieved with treatment

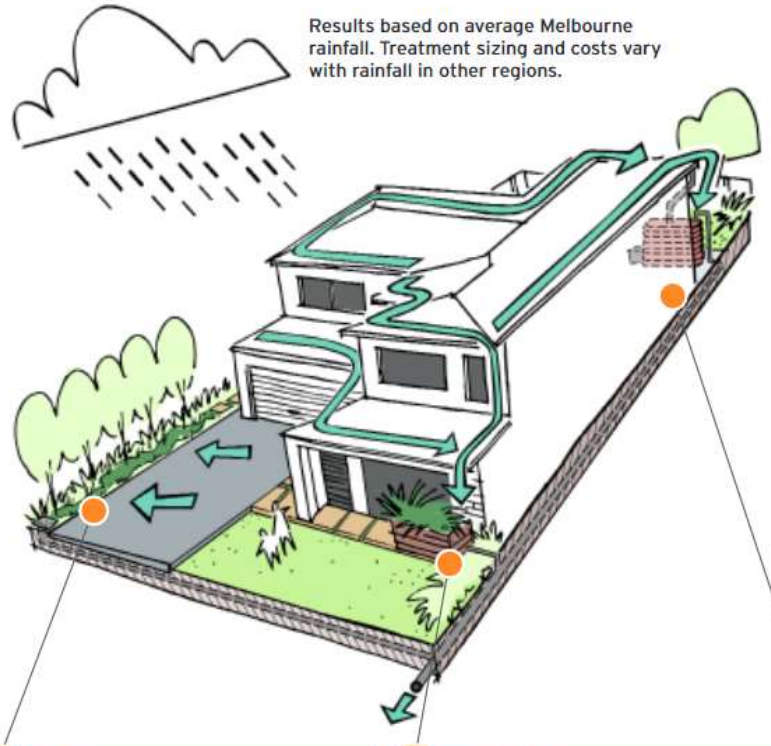
Stormwater pollutant load reductions achieved with treatment

What needs to be done?

- 60% of the roof area is connected to a 2 kL rainwater tank for non-drinking water uses.
- 40% of the roof is connected to a raised raingarden of 1 m². Driveway slopes to a swale of 1 m². All other paved surfaces slope to other permeable areas.

Rainfall

Results based on average Melbourne rainfall. Treatment sizing and costs vary with rainfall in other regions.



Urban form

A townhouse is constructed as part of a infill development in an inner urban suburb.

Water context

The new infill development generates increased stormwater flows that can damage local waterways. Capturing and using stormwater will protect your local waterway and enhance the blue and green elements of your development.

Property owners

New property owners would like to live in an attractive low maintenance environment. Owners reduce water bills with the rainwater tank.

Did you know..

At least 20% of the site should have surfaces that can absorb water – such as garden beds, lawn and other unsealed surfaces (Clause 55.03-4).

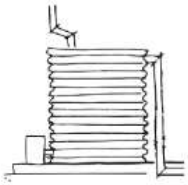
1 Swale

Rainwater falling on the driveway drains to a vegetated swale. This treats stormwater runoff and allows it to soak into the ground. Any excess water is collected by an overflow drain and is released to the local waterway via drains in the street.

2 Raingarden

Rainwater from the roof drains to a raised raingarden which is designed to temporarily hold and filter stormwater. Some water is used by the plants and the rest is collected by an underdrain and is released to the local waterway via the drains in the street.

3 Rainwater Tank



Rainwater from the roof of each lot is stored in a rainwater tank and used for toilet flushing, laundry washing, and watering the garden.

Stormwater Treatment Scenario: 25% Flow Reduction

Development type:
residential development
greenfield subdivision

Objectives

25% flow reduction achieved with treatment

Stormwater pollutant load reductions achieved with treatment

What needs to be done?

- 60% of every lot's roof area is connected to a 2.5 kL rainwater tank for non-drinking water uses.
- All of the precinct's runoff is treated by a constructed wetland sized at 3.8% of the development area.

Urban form

A residential development is constructed as part of a greenfield subdivision.

Water context

The new greenfield subdivision generates increased stormwater flows that can damage local waterways. Capturing and using stormwater will protect your local waterway and enhance the blue and green elements of your development.

Property owners

New property owners would like to live in an attractive low maintenance environment. Owners reduce water bills with the rainwater tank.

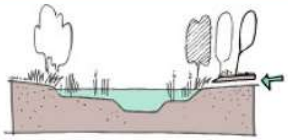
Did you know..

Constructed wetlands are usually used close to a catchment outlet or within a reserve where there is plenty of space. They are best built in land subject to flooding, but outside the main waterway channel. Many developers and councils prefer wetlands because they are reliable and provide amenity for the community.

Rainfall

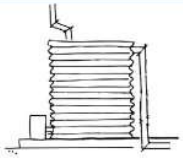
Results based on average Melbourne rainfall. Treatment sizing and costs vary with rainfall in other regions.

1 Wetland



All of the precinct's stormwater runoff is treated with a constructed wetland. The stormwater is filtered by physical and biological processes through a series of shallow, densely-planted areas. The treated water is released to the local waterway.

2 Rainwater Tank



Rainwater from each lot's roof area is stored in a rainwater tank. This rainwater is used for toilet flushing, laundry washing, and watering the garden.

Stormwater Treatment Scenario: 25% Flow Reduction

Development type:
residential development
greenfield subdivision

Objectives

25% flow reduction achieved with treatment

Stormwater pollutant load reductions achieved with treatment

What needs to be done?

For 30% of total lots, 30% of the lot roof area is connected to a 2.5 kL rainwater tank for non-drinking water uses. All of the precinct's runoff is treated by a constructed wetland and sponge, sized at 3.8% and 0.8% of the development area respectively. 22.5 ML/yr of treated stormwater is harvested for oval and green space irrigation.

Urban form

A residential development is constructed as part of a greenfield subdivision.

Water context

The new greenfield subdivision generates increased stormwater flows that can damage local waterways. Capturing and using stormwater will protect your local waterway and enhance the blue and green elements of your development.

Property owners

New property owners would like to live in an attractive low maintenance environment. Owners reduce water bills with the rainwater tank.

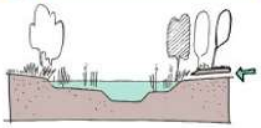
Did you know..

Harvesting large volumes of urban stormwater protects local waterways as well as providing a valuable resource for irrigating ovals and green spaces within the community.

Rainfall

Results based on average Melbourne rainfall. Treatment sizing and costs vary with rainfall in other regions.

1 Wetland

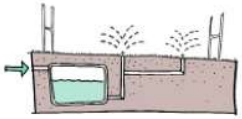


All of the precinct's stormwater runoff is treated with a constructed wetland. The stormwater is filtered by physical and biological processes through a series of shallow, densely-planted areas.

2 Sponge

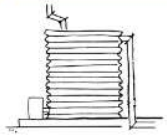
A low lying sponge in the floodplain collects the treated stormwater from the wetland and allows it to slowly soak into the soil and evaporate into the air. Any excess water flows to the local waterway.

3 Harvesting



Treated stormwater from the wetland is temporarily held in storage tanks and used to irrigate large sporting facilities.

4 Rainwater Tank



Rainwater from lot roof areas is stored in a rainwater tank. This rainwater is used for toilet flushing, laundry washing, and watering the garden.

Stormwater Treatment Scenario: 60% Flow Reduction

Development type: residential development greenfield subdivision

Objectives

60% flow reduction achieved with treatment

Stormwater pollutant load reductions achieved with treatment

What needs to be done?

- All of the precinct's runoff is treated by a constructed wetland sized at 4% of the development area.
- Treated stormwater is further cleaned to supply 760 kL/day of Class A standard water for external use.

Urban form

A residential development is constructed as part of a greenfield subdivision.

Water context

The new greenfield subdivision generates increased stormwater flows that can damage local waterways. Capturing and using stormwater will protect your local waterway and enhance the blue and green elements of your development.

Property owners

New property owners would like to live in an attractive low maintenance environment. Owners reduce water bills with the rainwater tank.

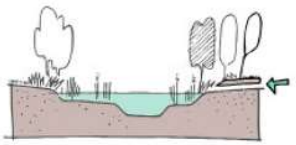
Did you know..

Harvesting large volumes of urban stormwater protects local waterways as well as providing a valuable resource for irrigation of agricultural lands in areas near the development.

Rainfall

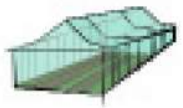
Results based on average Melbourne rainfall. Treatment sizing and costs vary with rainfall in other regions.

1 Wetland



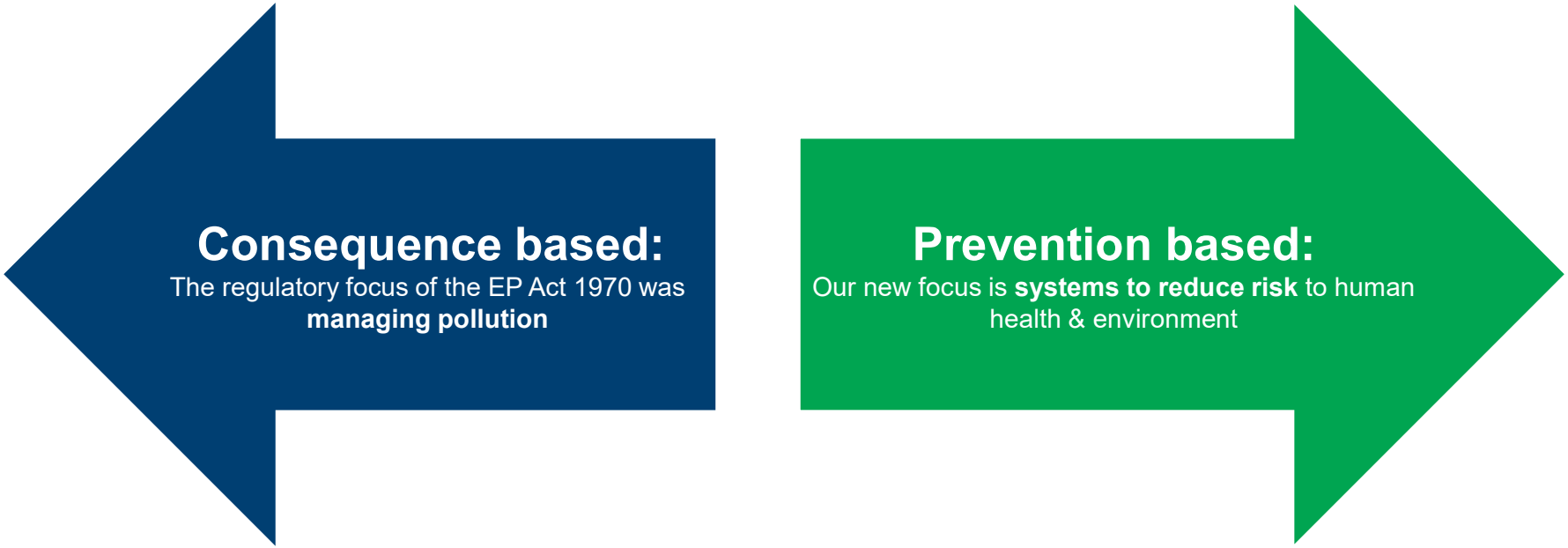
All of the precinct's stormwater runoff is treated with a constructed wetland. The stormwater is filtered by physical and biological processes through a series of shallow, densely-planted areas. The treated water is released to the local waterway.

2 Class A treatment and use



Treated stormwater from the wetland is polished to Class A standard via a new treatment facility. This highly treated water supply is pumped to neighbouring commercial and agricultural operations for use.

Environment Protection Amendment Act 2018



General Environmental Duty (GED)

"A person who is **engaging in an activity** that may give rise to risks of harm to human health or the environment from *pollution* or *waste* must **minimise** those risks, so far as reasonably practicable."

- Modelled on the OHS Act (established in Victoria since 1985)
- **Minimise** means to eliminate the risks (as far as reasonably practicable) and if not, reduce the risks.

Section 6 (EP Amendment Act 2018)

- *"so far as is reasonably practicable"*

5 factors to weigh up:

- Likelihood
- Degree of harm

Risk

- What the duty holder: **knew** or ought **reasonably have known** about the risk and means of its control
- Means of control were *available* and *suitable*

State of knowledge

- Cost of control measures not disproportionate to risk

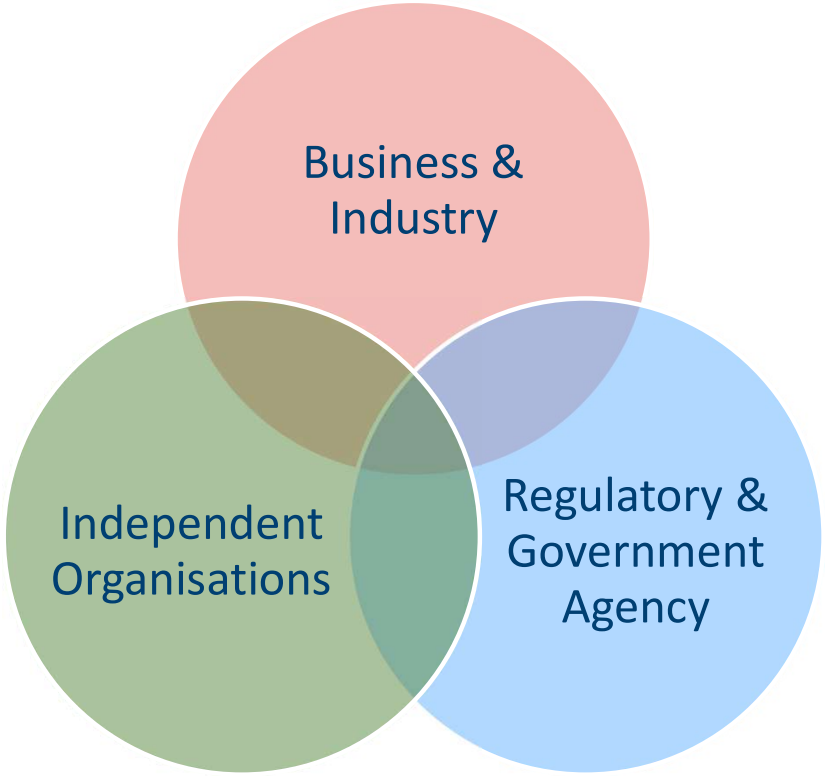
Relative to **risk**

State of Knowledge

- What is **known** (or ought reasonably be known) **about the risks** of harm to human health and the environment; and/or
- What is **known** (or ought reasonably be known) **about the means of eliminating or otherwise reducing** those risks.
- GED requires reasonable knowledge of your risks

What contributes to knowledge

- Draw upon reliable, reputable sources
- Existing knowledge may include information from industry, government and organisations
- State of knowledge will develop over time



Other work

- Subordinate legislation development under the new Act

https://engage.vic.gov.au/new-environmental-laws/subordinate-legislation

- Scoping work on Orders for managers of land or infrastructure (OMLIs)

https://www.epa.vic.gov.au/about-epa/laws/epa-tools-and-powers

Summary

- GED intended to take effect July 2021
- Guidance being developed – new guidance supports ‘State of knowledge’ – under EP Act
- VPPs 1999 BPEM reference is static – EPA publishing new guidelines does not automatically change this reference and compliance req’s under the VPPs
- DELWP will consider further investigation into developing appropriate minimum compliance requirements (with further consultation)

Summary

- Key gap in current guidelines appears to be lack of objectives for stormwater flows
- Next step = further targeted consultation with stakeholders and publishing draft with supporting materials for comment
- To receive key updates on the review, such as when a draft is ready for comment, please contact: urbanstormwaterbpem@epa.vic.gov.au