GOVERNMENT OF WESTERN AUSTRALIA
Department of Biodiversity, Conservation and Attractions
PARKS AND WILDLIFE SERVICE

Saint Leonards Creek Catchment Local Water Quality Improvement Plan Review Summary

December 2021

2021_690

Acknowledgements

Thank you to the City of Swan for its contribution to the review of the Saint Leonards Creek Catchment Water Quality Improvement Plan (WQIP).

Purpose and use of this document

The Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service, with the support of the City of Swan, has reviewed the implementation of the Saint Leonards Creek Catchment WQIP. The purpose of this document is to summarise that review and inform future updates of the Saint Leonards Creek Catchment WQIP. The Swan Canning WQIP review and the updated catchment modelling will be used to inform updates of the local WQIPs. It is intended that these documents will be used by partner organisations that will continue to have a role in implementation of the WQIPs.

Front cover photos: Wetland adjoining Saint Leonards Creek in Brabham, March 2019; Pacific Black Ducks in a highly modified channel of Saint Leonards Creek; Revegetation on private property along Saint Leonards Creek. Photos - DBCA

Local Water Quality Improvement Plans

The Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service works with stakeholders to reduce nutrients and other contaminants entering the Swan and Canning rivers.

DBCA (and previously the Swan River Trust) developed and invests in the implementation of local Water Quality Improvement Plans (WQIPs). The WQIPs were designed to provide stakeholders with a mechanism to prioritise recommendations and resources and seek funding to improve water quality in catchments contributing the greatest amount of nutrients and contaminants.

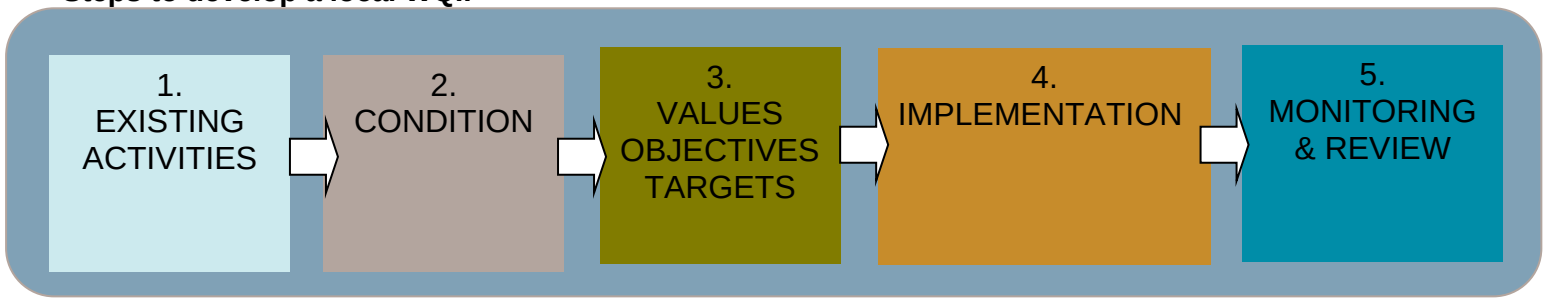
WQIP implementation takes a treatment train approach with actions falling into each of the following stages in the pathway of nutrients and non-nutrients from the source to the discharge point:

1. Prevention (Land use planning)
2. Minimisation (Ecoefficiency)
3. Reduction (Source control)
4. Amelioration (Conveyance and transmission)
5. Treatment – Reuse – Disposal

Water Quality Improvement Plans:

- identify water quality issues and hot spots;
- identify environmental values of water bodies and water quality objectives required to protect the values; and
- identify and commit to a set of cost-effective management measures to achieve and maintain those values and objectives.

Steps to develop a local WQIP

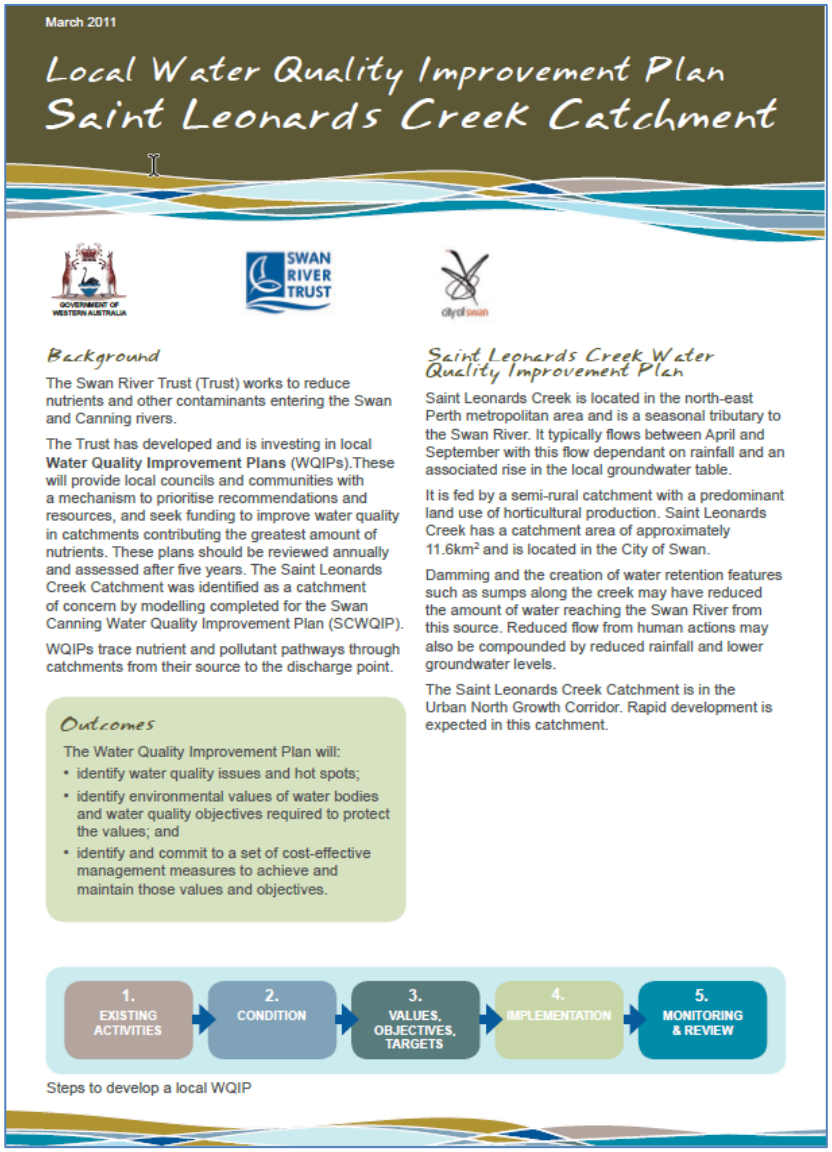


Local WQIP Review

Ten local WQIPs were developed between 2008 and 2012 with strong involvement of key stakeholders. Implementation of the WQIPs is ongoing, however, many of the actions are complete or require review. There are also actions that are still underway and others that will require an ongoing commitment and additional resources to maintain and improve water quality. This review of the Saint Leonards Creek Catchment WQIP is based on achievements and stakeholder participation.

The monitoring associated with on-ground projects in the Swan Canning Catchment provides evidence that these types of projects are improving water quality. Monitoring the effects of non-structural WQIP actions, such as community education and behaviour change programs, and changes to local government policies and procedures, on catchment water quality is more complicated. Therefore, statistically linking WQIP actions to changes in overall catchment water quality is not attempted at this stage. Variations in annual flow, changes in catchment land uses, and the long timeframes required for some catchment management practices to affect water quality at the catchment discharge point are other factors that can contribute to discharge water quality.

The Swan Canning River Protection Strategy supports the development and implementation of the Swan Canning and local WQIPs as an action to achieve nutrient load reduction targets and provides the framework for DBCA to update local WQIPs. This review will determine the local WQIPs to be updated based on the level of support from key stakeholders and the need for further water quality improvement. Modelling of water quality improvement targets is proposed as part of an update of the Swan Canning WQIP, currently underway.


March 2011

Local Water Quality Improvement Plan
Saint Leonards Creek Catchment

GOVERNMENT OF WESTERN AUSTRALIA
SWAN RIVER TRUST
city of swan

Background

The Swan River Trust (Trust) works to reduce nutrients and other contaminants entering the Swan and Canning rivers.

The Trust has developed and is investing in local **Water Quality Improvement Plans** (WQIPs).These will provide local councils and communities with a mechanism to prioritise recommendations and resources, and seek funding to improve water quality in catchments contributing the greatest amount of nutrients. These plans should be reviewed annually and assessed after five years. The Saint Leonards Creek Catchment was identified as a catchment of concern by modelling completed for the Swan Canning Water Quality Improvement Plan (SCWQIP).

WQIPs trace nutrient and pollutant pathways through catchments from their source to the discharge point.

Outcomes

The Water Quality Improvement Plan will:

- identify water quality issues and hot spots;
- identify environmental values of water bodies and water quality objectives required to protect the values; and
- identify and commit to a set of cost-effective management measures to achieve and maintain those values and objectives.

Saint Leonards Creek Water Quality Improvement Plan

Saint Leonards Creek is located in the north-east Perth metropolitan area and is a seasonal tributary to the Swan River. It typically flows between April and September with this flow dependant on rainfall and an associated rise in the local groundwater table.

It is fed by a semi-rural catchment with a predominant land use of horticultural production. Saint Leonards Creek has a catchment area of approximately 11.6km² and is located in the City of Swan.

Damming and the creation of water retention features such as sumps along the creek may have reduced the amount of water reaching the Swan River from this source. Reduced flow from human actions may also be compounded by reduced rainfall and lower groundwater levels.

The Saint Leonards Creek Catchment is in the Urban North Growth Corridor. Rapid development is expected in this catchment.

1. EXISTING ACTIVITIES → 2. CONDITION → 3. VALUES, OBJECTIVES, TARGETS → 4. IMPLEMENTATION → 5. MONITORING & REVIEW

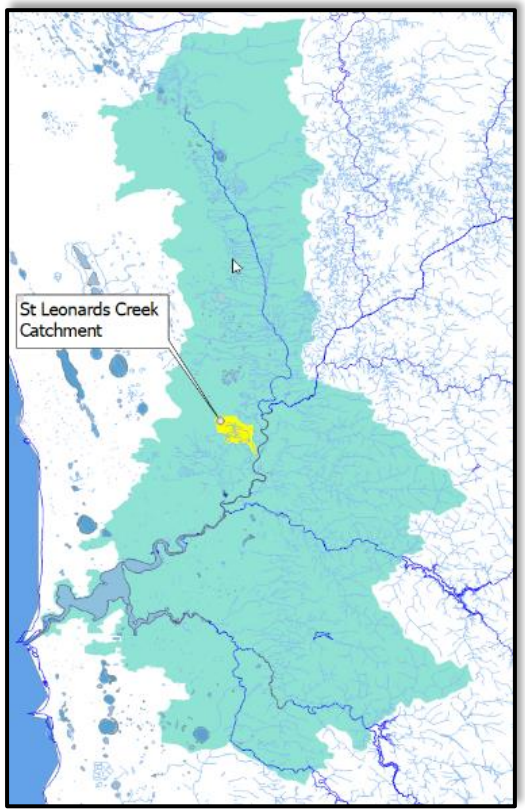
Steps to develop a local WQIP

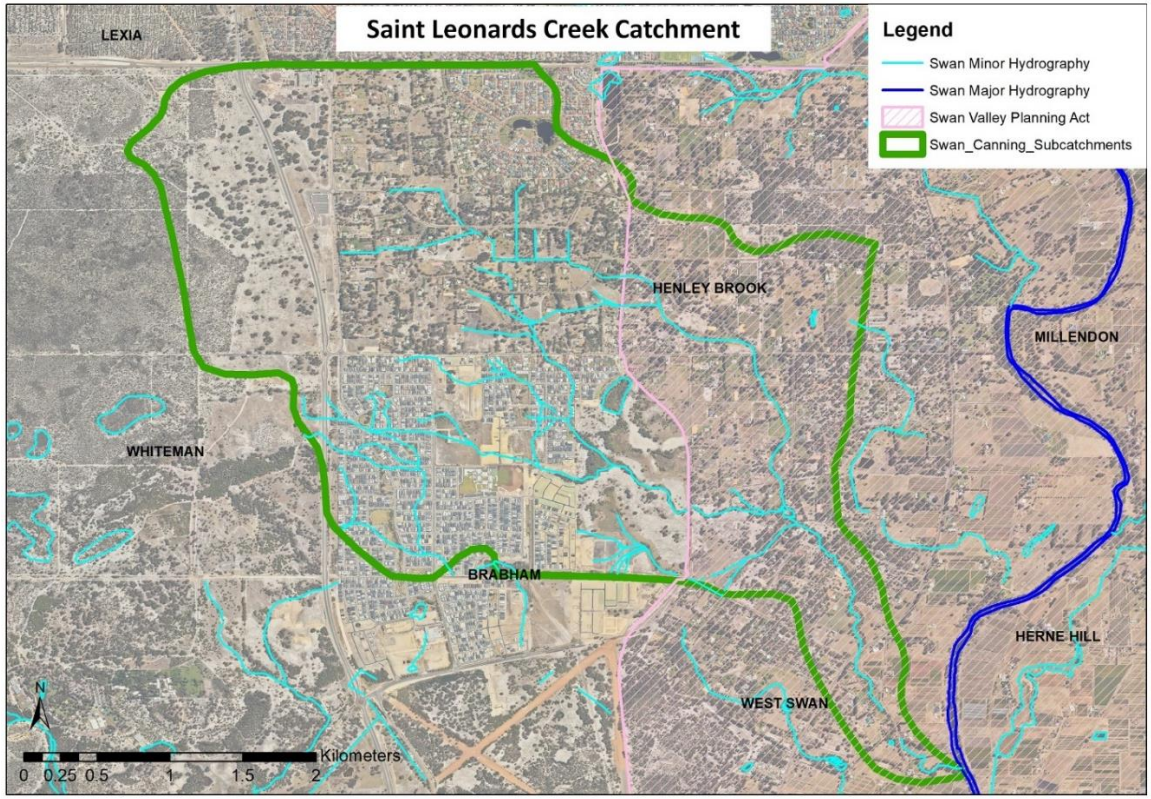
Local WQIP front cover for illustration purposes only

Saint Leonards Creek Catchment

Saint Leonards Creek is a seasonal tributary of the Swan River and flow is dependent on rainfall and an associated rise in the groundwater table. In 2011 when the WQIP was produced, much of the catchment was semi-rural, and predominant landuses were lifestyle blocks and natural areas. However, the catchment is within the City of Swan's Urban Growth Corridor and substantial urbanisation has occurred in Brabham, with more planned in both Brabham and Henley Brook. The section of Saint Leonards in West Swan and the eastern part of Henley Brook is not proposed for further development under the *Swan Valley Planning Act 1995*. The catchment area is approximately 11.6km^2.

Much of the creek's alignment is on private property or adjacent to private property on a narrow easement vested in the City of Swan. The western branches of the creek are located in residential estates in Brabham and the alignment has been highly modified. The northern alignment through the suburb of Henley Brook is also highly modified. The creation of water retention features such as lakes, sumps and bores along the creek may have reduced the amount of water reaching the Swan River. Reduced flow from human actions may also be compounded by reduced rainfall and lower groundwater levels. The soils in most of the catchment are Southern River, with Swan complex to the south east.





Saint Leonards Creek WQIP Review Summary

The Saint Leonards Creek WQIP had a total of 12 actions. Only one of those actions has been completed; while ten are implemented but will require ongoing commitment or further investment for catchment-wide implementation. One action has had little or no progress (see Appendix 1 for details).

Major projects:

- Foreshore condition assessment from November 2018 to April 2019 (DBCA and the City of Swan).
- Recent developments in Dayton and Caversham have included revegetation of compensation basins and installation of rain gardens.
- Saint Leonards Restoration Program was initiated by DBCA in 2019 with private landholders in the *Swan Valley Planning Act* area.
- City of Swan has developed a rehabilitation plan for part of Pannage Wetlands to lead to improved onground outcomes.
- DBCA funded a Great Gardens workshop in Henley Brook in 2016 to encourage fertiliser and river-friendly gardening.

The City of Swan plans to retain rural landuses in West Swan and part of Henley Brook for heritage and tourism under the *Swan Valley Planning Act 1995*. The remainder of the catchment is within the City of Swan's Urban Growth Corridor and has undergone substantial urbanisation with more planned.

Much of the western part of Brabham has been developed into residential estates. In these areas, palusplain wetlands have been modified into constructed drainage lines disconnected to the creek system.

In the eastern part of Brabham, several land lots are vested in the Department of Communities and are planned for a high-density residential estate. This area contains the highest condition vegetation on Saint Leonards Creek and requires protection during and post development. A workshop was hosted by the estate's developer Peet, the Department of Communities and the Cooperative Research Centre for Water Sensitive Cities in June 2018 to compile ideas about how the development 'can become a practical example of Perth's commitment to become Australia's most water sensitive city', and more specifically how water management and urban design can create 'sustainable and liveable communities' in areas with high groundwater tables.

A number of other major infrastructure projects are planned or occurring in and adjacent to the catchment which are likely to have an impact on surface water, groundwater hydrology and native vegetation. These include Metronet's Morley-Ellenbrook Line, Drumpellier Drive (formerly New Lord Street), and NorthLinkWA, an extension of Tonkin Highway major highway linking Morley with Muchea.

DBCA and the City of Swan assessed Saint Leonards Creek from November 2018 to April 2019 to determine the current condition of the riparian zone using recognised foreshore condition methods. Permission was sought from landholders to access their properties and landholder anecdotes including changes in the creek's condition and wildlife observations were also recorded.

Much of Saint Leonards Catchment has been used for rural and semi-rural purposes, such as grazing or equine smallholdings. Riparian vegetation has been disturbed along most of Saint Leonards Creek as a result of land practices. Most of the riparian vegetation across Saint Leonards Creek is in poor condition. The few areas with good condition vegetation are all in private ownership in the suburb of Brabham and proposed for residential development, so it is essential that riparian values are retained during development.

Landholders in the *Swan Valley Planning Act* area were offered the opportunity to undertake restoration work with funding from DBCA. Six landholders took up this offer and have become engaged in revegetation and weed control activities on their properties.

Providing further information and education is critical to engaging landholders in more active management and protection of the creek. There is an opportunity for the City of Swan to provide information to new landholders when properties are purchased.

DBCA produced a comprehensive report from the condition assessment: *Saint Leonards Creek foreshore condition assessment, November 2020* which included overall recommendations for the creek system and prioritised restoration activities in each river reach.

Two workshops were held in 2016 for residents of Henley Brook, Brabham and surrounding suburbs. The Great Gardens workshop (presented by The Forever Project) focussed on fertiliser wise and river-friendly gardening and the horse management workshop (presented by the WA Horse Council) included sessions on planning a property for horse use and land management responsibilities.

WQIP Review Summary

WQIP catchment	Release date	Total number of actions	Actions fully achieved or on track	Actions implemented but ongoing commitment required	Actions with little or no progress	% of actions being implemented
St Leonards Creek	March 2011	12	1	10	1	**91.6%**

Summary of investment in WQIP (from commencement of WQIP to December 2021)

	DBCA investment	Local Government investment	Community investment	**Total Investment (approximate)**
Investment in Saint Leonards Creek WQIP projects	$86,500	$22,000	$71,500	**$180,000**

Future priorities and actions – Saint Leonards Creek Catchment

- Relevant government and non-government organisations work collaboratively to implement the actions of the Swan Canning River Protection Strategy.
- Increase community awareness, education and involvement in catchment management to reduce nutrient and contaminant outputs in residential and rural areas.
- Ensure all new development and infill/retrofit proposals are in line with Perth's transition to a water sensitive city.
- Ensure that all local government planning schemes and policies support the transition to a water sensitive city.
- Ensure State Planning Policy 2.10 (Swan-Canning River System) requirement for developers to maintain or improve water quality is upheld during land-use planning decisions. Note that at the time of publication of this review, the Department of Planning, Lands and Heritage is reviewing this policy and intends to replace it with the Draft State Planning Policy 2.9 Planning for Water.
- Engage with district and local structure planning processes to ensure that adequate buffers are applied to Saint Leonards Creek and remnant vegetation is retained.
- Ensure all new developments are connected to sewer and aim for infill sewer to all existing urban areas.
- Continue to take opportunities to retrofit existing drainage systems in line with Water Sensitive Urban Design (WSUD) principles. Current proposals include: Pannage Wetlands and Saint Leonards Creek on Department of Communities land in Brabham.
- Continue to look for, and take opportunities to improve water quality, habitat, and community benefit of wetlands and vegetated areas in the catchment.
- Reduce local government's nutrient outputs through local management practices by providing up-to-date training to all staff involved in fertiliser application, grounds keeping and maintenance of drainage infrastructure, including WSUD features.
- Discourage the planting of deciduous trees near drainage infrastructure to reduce organic loads and excessive nutrients entering waterways.
- Develop a revised WQIP for this catchment as it undergoes rapid urbanisation for improved catchment management. Future actions should be specific, costed and measurable.

Saint Leonards Creek Case Study: Saint Leonards Creek Restoration Project

The restoration project is an outcome of the foreshore condition assessment conducted by DBCA and the City of Swan in 2018-19.

As most of the creek is located on private property or a narrow easement vested in the City of Swan, 66 landholders were contacted to seek permission to access their land. Of the 35 landholders we spoke directly with through phone calls or meeting on site, 23 provided observations about the creek, including changes over time and wildlife observations.

Many landholders were interested in the creek and wanted to protect its wildlife but were not aware what a naturally vegetated creek would look like. However, many were concerned about a decline in turtle, waterbird and freshwater crayfish populations, a lack of water, sediment or brown sludge occasionally flowing down the creek, and the impacts from nearby development.

After the assessment, information sheets were provided for landholders in the *Swan Valley Planning Act* area, which included major observations from the assessment, actions they could undertake to protect the creek and where to access further information.

Private landholders planting on their property along Saint Leonards Creek after solarisation with black plastic, June 2020

Eighteen landholders in the *Swan Valley Planning Act* area with no easement over the creek were offered the opportunity to undertake restoration activities with funding from DBCA. Six landholders took up this offer and have been working with DBCA and the City of Swan since June 2019 to conduct weed control and revegetation activities on their properties. These landholders have put in a significant amount of their own time to hand weed, plant, water seedlings through summer and carry out general maintenance of the site. One landholder has also erected fencing to exclude horses from the creek.

Weed control has been conducted by a licensed contractor with several follow up treatments. On two properties herbicide has not been used and other methods have been trialled, including steam weeding and solarisation using UV stabilised black plastic. On the whole, solarisation has so far proved very effective and the thick layer of hummus from dead Kikuyu and other weeds forms a protective mulch layer to plant into.

The landholders have developed a strong sense of ownership of the restoration of ‘their patch’ of the creek and are noticing native plants emerging from the native seed bank now they have been given a chance to recruit. The vision is that other nearby landholders will be inspired to revegetate their properties and restrict horse access to the creek to have long-term water quality benefits.

Saint Leonards Creek Restoration Project

Before restoration, Henley Brook property, November 2018

Post weed control and revegetation, Henley Brook property, October 2021

Number of landholders offered the chance to participate:	18
Number of landholders who participated:	6
Total area of project sites:	2.5 ha
Number of seedlings planted:	6,440 (local wetland and dryland species)
Project partners:	DBCA and the City of Swan
Cost of project investment:	$67,000
Estimated volunteer input by landholders:	$63,000

Appendix 1: Saint Leonards Creek Catchment WQIP - Action Review

Tally and explanation of WQIP actions review categories – Saint Leonards Creek			
Total number of actions	**12**	**Percentage**	**Explanation**
Action achieved	1	8.3%	The action has been completely fulfilled.
Action on track	0	0%	Significant progress has been made and the action is likely to be completed in the near future.
Ongoing action	3	25%	This action will require ongoing commitment or maintenance.
Projects/Programs implemented	7	58.3%	There are projects and programs in place that address this action, however significantly more investment is required to enable catchment wide implementation.
Little or no progress	1	8.3%	Little or no progress has been made on this action. This can be for various reasons.
No longer relevant or viable	0	0%	Can be for various reasons.
Summary categories			
Total number of actions	**12**	**Percentage**	**Explanation**
Action fully achieved or on track to being achieved	1	8.3%	First two categories above combined.
Action implemented but ongoing commitment required	10	83.3%	Second two categories above combined.
Little or no progress	1	8.3%	Last two categories above combined.

Saint Leonards Creek Catchment WQIP – Action Review

Treatment train approach	Management strategies	Implementation actions	Lead organisations	Supporting partners	Timing	Status comments	Review category
1. Prevention Land use and planning	1.1 Application of Water Sensitive Urban Design (WSUD)	1.1.1 Ensure WSUD is incorporated into all relevant planning proposals consistent with the requirements of Better Urban Water Management, State Planning Policy 2.9 Water Resources and local environmental conditions	Department of Planning, Lands and Heritage (DPLH), City of Swan (CoS)	Department of Water and Environment Regulation (DWER)	Commencing 2010-11	• The Stormwater Management Manual has been developed and is updated by DWER. This provides information on the implementation of WSUD in open drains with the aim to implement living streams where appropriate. • CoS receives funding from the Department of Biodiversity, Conservation and Attractions (DBCA) for a part-time water quality officer to support the community and local government (LG) in projects to improve water quality and management. •The catchment is under pressure from rapid urbanisation and very few areas of high condition riparian vegetation remain. Protection of these remnant areas is critical to improving water quality and habitat values. • On many development proposals there is limited space to implement a buffer. Not having a set buffer distance in policy or legislation makes it difficult to justify. Fire breaks, paths and other features should be in addition to the revegetation buffer. • Recent Dayton and Caversham developments have included WSUD, with revegetation of compensation basins and installation of rain gardens. These are	

						improvements, but do require increased maintenance for LG. • Implementation of WSUD on a subdivision scale is challenging. The pressure for a high number of dwellings can lead to infilling of wetlands, public open space and parks. Structure plans and water management plans drafted many years ago that are still current have outdated or no WSUD. The *Swan Urban Growth Corridor: Sub-Regional Structure Plan (2009)* does not provide WSUD guidance. • There is a growing understanding within CoS that WSUD is beneficial but is not near its full potential yet. There is some risk aversion. •In a 2018-19 DBCA condition assessment of Saint Leonards Creek, no good condition vegetation was found where urban development has taken place. Palusplain wetlands that are now mostly redeveloped into residential estates have been modified into constructed drainage lines disconnected to the creek system. • A workshop was hosted by Department of Communities (DoC) and the Cooperative Research Centre for Water Sensitive Cities and land developer Peet in June 2018 on ways in which water management and urban design can create 'sustainable and liveable communities' in areas with high groundwater tables. DBCA have been liaising with DoC regarding protection of riparian values on land in Brabham vested in DoC and proposed for urban development.	

						• A planning decision register would be useful, to understand the circumstances at the time that meant a particular decision was made.	
		1.1.2 Ensure the planning process for retrofitting incorporates WSUD principles as stated in the Stormwater Management Manual for Western Australia	CoS	DWER, Perth NRM	Commencing 2010-11	• POS in subdivisions sometimes need to be retrofitted to fix design issues. However, some areas are not considered for retrofitting as they are not considered holistically. A drain may be functioning in terms of water movement but is not functioning ecologically. Waiting until the end of life of infrastructure for retrofitting or redesign may take 20-30 years. • An example of where improved WSUD will be implemented is at Pannage Wetlands in Brabham, where a rehabilitation plan has been developed by CoS. • Some CoS staff are advocating for a condition that asks for evidence that weed control in a new development has been conducted a minimum of biennially. At the point of handover, an area may have been recently controlled for weeds, but if it has not been conducted regularly, the weed seed bank is likely to be very high and leads to ongoing maintenance issues for the LG. • CoS's engineering maintenance team manage compensation basins. An effective contractor is currently on board; and the onground team are passing maintenance requests directly to the contractor.	
	1.2. Assess and enhance tributary condition	1.2.1 Complete an assessment (consistent with the Swan River Trust Tributaries Foreshore	CoS	Department of Biodiversity, Conservation and	Commencing 2010	• DBCA and CoS assessed the Saint Leonards creek system from November 2018 to April 2019. Where the creek's alignment had been modified in housing estates, open drainage lines and compensation basins were also	

		Assessment Project) of Saint Leonards Creek to assess condition, identify issues and prioritise areas for revegetation		Attractions (DBCA)		assessed. Methods were based on a previous DWER/DBCA tributary assessment project. • Two reports have been produced from the assessment: *Saint Leonards Creek foreshore condition assessment* for the overall creek system and *Saint Leonards Creek foreshore condition assessment: Summary report for Department of Communities land* for land vested in Department of Communities in Brabham. • Data and knowledge during the assessment have contributed to several improvements in planning outcomes in proposed Brabham subdivisions. • Anecdotal information from landowners was recorded during DBCA and CoS's condition assessment. Most common concerns included a decline in populations of waterbirds, turtles and freshwater crayfish, sediment and sludge occasionally flowing down the creek, a lack of water, and nearby development. • Landowner information sheets were produced for 35 private properties in the *Swan Valley Planning Act* area, which are not earmarked for urban development. Info sheets included major observations from the assessment, actions landowners could undertake to protect the creek and where to access further information.	
		1.2.2 Develop a policy to revegetate and fence creek line in partnership with	CoS	Landowners, developers	Commencing 2010-11	• CoS advises that a Guideline for landowners, rather than a policy, would be more appropriate. • Department of Primary Industries and Regional Development (DPIRD) has published *Stocking rate*	

		landowners and developers				*guidelines for rural small holdings*, which CoS refers to when assessing development applications. • As an outcome from the Saint Leonards Creek foreshore condition assessment, landowner information sheets were provided to 35 private properties along Saint Leonards Creek in *the Swan Valley Planning Act* area. The info sheets outlined ways that landowners could protect the creek and take actions to improve water quality and habitat on their properties. • Some landowners in the catchment have fenced their section of creekline to exclude stock at their own initiative and cost. • DBCA and CoS have implemented weed control and revegetation with six private landowners in the catchment, from 2019 to 2021.	
	1.3 Monitor water quality in the catchment	1.3.1 Design and implement a water quality monitoring program to establish baseline data	DBCA	DWER, CoS	Commencing 2010-11	• Water quality is monitored fortnightly at a site located at the base of the catchment, about 500m before the creek flows into the Upper Swan Estuary in West Swan. This site is positioned to indicate what nutrients are leaving the catchment and flowing into the Upper Swan Estuary, so the data may not represent nutrient concentrations in upstream areas. • The 2018 Saint Leonards Catchment Nutrient Report Card showed that the site on the lower reaches of the creek was failing both the short- and long-term nutrient targets for total nitrogen and failing the long-term targets for total phosphorus.	

		1.3.2 Seek funding to expand, review and continue the water quality monitoring program	DBCA, Perth NRM	DWER, CoS	Ongoing	• In 2019, students from North Metropolitan TAFE monitored eight sites in Saint Leonards Catchment. Physical parameters, presence of bacteria and algal species were recorded. Sediment analysis for heavy metal contamination was also conducted. Results are included in the *Saint Leonards Creek foreshore condition assessment* report. The data provide an indicative snapshot of water quality in the catchment and further monitoring would be required to validate the results.	
2. Minimisation Efficiency in nutrient use	2.1 Reduce community output	2.1.1 Implement fertiliser management in urban and rural areas	DWER	DBCA, Department of Primary Industries and Regional Development (DPIRD)	Ongoing	• The Fertiliser Action Plan (2007) was replaced by the Fertiliser Partnership (2012-16). DBCA worked with DPIRD and other partners to deliver the Fertiliser Partnership objectives. • The *Environmental Protection (Packaged Fertiliser) Regulations 2010* puts limits on the phosphorus (P) content and nitrogen (N) ratio for fertiliser in 50kg or less bags sold in WA to target urban users. However, agricultural users are not affected. • CoS provides information to the South East Regional Centre for Urban Landcare (SERCUL), which produces an Annual Nutrient Survey for Local Government Authorities. Best Practice Management Scores have been collated since 2002. CoS was one of few LGs to have adopted all Best Management Practices in 2019 and 2020. • According to information provided to SERCUL, from 2015-2020 the CoS excelled in nutrient monitoring. It is recommended that it continues to implement current	

						practices, however, should undertake moisture testing of sports fields and irrigated parks and soil and leaf testing of all irrigated parks. CoS was not using fertiliser on foreshore reserves and parks and it was recommended that this practice continue. • However, as much of Saint Leonards Creek foreshore is under private landownership, there is limited opportunity for CoS to direct fertiliser management in these areas. • Moisture, soil and leaf testing in sports fields and irrigated parks will become more relevant to Saint Leonards Creek Catchment as public open space is developed in Brabham residential estates and handed over to CoS for ongoing management.	
		2.1.2 Develop and implement an education program to promote fertiliser efficiency and environmental best management practice for landowners and specific industries	Perth NRM	CoS, landowners	Ongoing	• DBCA continues to support the Phosphorus Awareness Program delivered by SERCUL across the Swan Canning Catchment. From 2011 – 2017, DBCA provided funding for the Fertiliser Wise Fertiliser Training offered through SERCUL. • Fertilise Wise brochures have been developed and are available for distribution by the CoS or other interested parties. • Since 2018, CoS has provided advice on reducing fertiliser use on its website. • CoS runs an annual Rural Revegetation Program which offers free native plants to eligible residents. Residents whose property is 4,000m^2 or greater are eligible. Over the 15 years the program has been running, the scheme has distributed around 150,000 plants to CoS residents	

						(note that this is broader than rural properties in Saint Leonards Creek catchment). • A Great Gardens workshop was run in Henley Brook in 2016 to encourage fertiliser and river-friendly gardening. Although the workshop clashed with another event and wasn't well attended, people who did attend found the workshop very informative. • The Healthy Soils Healthy Rivers Program assisted landowners and community groups implement on-ground activities that will improve soil health and water quality in the Swan and Avon rivers. These activities include 1. Broad Acre Cropping/Grazing Soil Nutrient Management, and 2. Irrigated Agriculture Nutrient Management Advisory Services. The program was a joint initiative of Perth NRM, Wheatbelt NRM and DBCA (initially Swan River Trust) with funding from the Australian and WA State governments. However, very little of this program has been targeted to the Saint Leonards Creek Catchment, and it is more closely related to the Swan Canning WQIP. • A previous program, Waterwise on the Farm, run by Perth NRM in partnership with DWER, targeted wine-grape producers working on water efficiencies which as a by-product can also help with nutrient efficiencies. • CoS presents a series of free community, sustainable living workshops calling Thinking Green. Future workshops could be held in the Brabham area.	
		2.1.3 Implement an education program	Perth NRM, CoS	Landowners	Ongoing	• A horse management workshop was held in 2016 in the catchment to encourage improved property	

		for horse owners to promote environmental best management practice				management for horse health and to prevent nutrient losses. There were 12 participants, and good feedback was received with most participants saying they were likely or very likely to change their practices in soil/pasture type, nutrient and manure management. • DPIRD has published *Stocking rate guidelines for rural small holdings*. CoS planners calculate stocking rates and inform landowners. There is an opportunity during this process to encourage fencing and revegetation.	
3. Reduction Source control	3.1 Maintain natural hydrological flow	3.1.1 Manage unauthorised modifications and riparian extraction of Saint Leonards Creek	CoS	DWER, landowners, developers	Ongoing	• Records from the CoS indicate that drainage issues were reported in relation to some properties along Saint Leonards Creek and appropriate compliance action was taken.	
4. Amelioration Conveyance and transmission	4.1 Nutrient intervention and improved drainage	4.1.1 Develop a Saint Leonards Creek protection and enhancement program to: ▪ identify and prioritise sections for revegetation and fencing ▪ develop partnerships with stakeholders ▪ seek funding	CoS	Landowners, developers, DBCA	Ongoing	• The Saint Leonards Restoration project is an outcome of DBCA and the CoS's condition assessment. Landowner information sheets and letters of offer were provided to 18 private properties which did not have an easement over the creek, offering them to partner with DBCA to restore their area of creekline. • Six landowners took up this offer and have been working with DBCA and CoS to remove invasive weed species and plant local native species for water quality and habitat benefits. Property plans were developed for each property, outlining management actions that would be undertaken, and how to maintain the restoration work into the future. Landowners signed an agreement with DBCA which requested that landowners do not remove or intentionally damage revegetation, hand	

						weed revegetation regularly and water plants during their establishment phase. • The CoS has expressed an intent to restore parts of its easement in priority locations. The prioritisation process undertaken as part of the condition assessment will assist in selecting priority areas and tasks. • It is noted that seedling deaths are common in compensation basins associated with roadways, as these are often dry. Infill planting with suitable drought- and flooding tolerant species is required.	
5. Treatment-Reuse-Disposal	5.1 Monitoring new treatment systems	5.1.1 Develop and implement a monitoring program to determine the effectiveness of aerobic treatment units	CoS	DBCA, DWER	Ongoing	• Several aerobic treatment unit (ATU) designs are approved for use in single houses in Western Australia. Under Department of Health legislation, ATUs are required to be serviced at least every three months by an approved service person. https://ww2.health.wa.gov.au/Articles/A_E/Aerobic-treatment-units • CoS and DBCA are not aware of a monitoring plan being completed or implemented.	