Claisebrook was first named in 1827 (as Clause’s Brook) after the naval surgeon, Frederick Clause who was present on Captain James Stirling’s expedition of the Swan River. It was a seasonal waterway, typically dry in summer and flowing in winter with numerous interconnected freshwater lakes which drained to the Swan River. During the 1800s land was reclaimed from the feeder lakes, enabling the development of East Perth. The drain now consists almost exclusively of closed pipes with the Hyde Park lakes being the largest area of open water.

During the late 1880s to early 1900s the brook was used as the main effluent outlet of Perth. Historical landuses in the area include the East Perth Gasworks, East Perth Power Station and East Perth railway yards and workshops', these have all since ceased. In the 1990s it was determined that the East Perth Gasworks site and adjacent waterways were extensively contaminated. Large scale remediation was undertaken in 1994–95.

The predominant soil types in Claisebrook Main Drain are brown sands (Spearwood Zone) with a small area of leached sands in the north-western corner (Bassendean zone) and neutral red and yellow earths near the Swan Estuary. Most of the soils in the catchment have poor nutrient retention capacities.

Water quality samples are collected near the discharge point of the drain into the Swan Estuary. This site gives an indication of the nutrient concentrations leaving the catchment and entering the estuary. It does not represent nutrient concentrations in upstream areas.

### Claisebrook – facts and figures

<table>
<thead>
<tr>
<th>Average rainfall (2010–14)</th>
<th>~ 686 mm per year (Perth metro)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catchment area</td>
<td>16.4 km²</td>
</tr>
<tr>
<td>Per cent cleared area</td>
<td>98%</td>
</tr>
<tr>
<td>(2005)</td>
<td></td>
</tr>
<tr>
<td>River flow</td>
<td>Dries intermittently throughout the year</td>
</tr>
<tr>
<td>Main land uses (2005)</td>
<td>Residential and transport (roads)</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Nutrient Summary: concentrations, rainfall and targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>TN median (mg/L)</td>
</tr>
</tbody>
</table>

- TN short term target = 2.0 mg/L
- TN long term target = 1.0 mg/L
- TP short term target = 0.2 mg/L
- TP long term target = 0.1 mg/L

* best estimate using available data. * Statistical tests that account for the number of samples and large data variability are used for testing against targets on three years of winter data. Thus the annual median value can be above the target even when the site passes the target (or below the target when the site fails).
Changes in nutrient concentrations over time in Claisebrook

**Trend:**
Total nitrogen concentrations were relatively stable over the reporting period. The occasional high concentrations consist mostly of dissolved forms of N and may indicate the presence of a point source in the catchment.

**Target:**
Claisebrook is currently passing the short- but failing the long-term TN target.

There were insufficient data available at Claisebrook with which to calculate a trend.

**Trend:**
Total phosphorus concentrations appear to have increased over the reporting period.

**Target:**
Claisebrook is currently passing both the short- and long-term TP targets.

There were insufficient data available at Claisebrook with which to calculate a trend.

Nutrient fractions in Claisebrook

**Nitrogen**
Almost three quarters of the N is present as dissolved inorganic N (DIN, consisting of ammonium - \(\text{NH}_4^+\) and N oxides - \(\text{NO}_x\)). This form of N is derived from fertilisers used on home gardens and parks, industrial discharges and animal wastes and is readily available for plant and algal uptake. The remaining N is present as organic N which consists of both dissolved (DON) and particulate (PON) fractions. DON largely comprises organic compounds leached from peaty subsoils and degrading plant and animal matter and is available for uptake by plants, algae and bacteria. PON is composed of plant and animal debris and needs to be further broken down to become available to plants and algae.

**Phosphorus**
Over three-quarters of the phosphorus (P) is present in the form of particulate P which is derived from organic material and sediment-bound forms of P. This form of P is not readily available for use by plants or algae, but may be broken down to available forms over time. The remainder of the P is present as soluble reactive phosphorus (SRP) which is readily available for plant and algal uptake. Likely sources of this form of P are fertilisers used on home gardens and parklands, animal waste and industrial discharge.
Seasonal variation in nutrient concentrations in Claisebrook

**Nitrogen**

TN and NO₃ increased slightly from March to October indicating that there may be a very weak seasonal response with concentrations increasing slightly with increased flow following the onset of winter rainfall.

The other forms of N did not show a seasonal response.

It is likely that N is entering the drain from land use in the catchment (such as fertilisers and industrial discharges) year round.

**Phosphorus**

SRP concentrations showed a slight seasonal pattern, increasing over winter when rainfall and flow were at their highest. This suggests that SRP is entering the drain via surface and sub-surface flows.

Particulate P and TP showed a reverse seasonal response, being higher in summer and lower in winter. It is likely that the concentrations of these forms of phosphorus are being diluted by the increased flows during winter.

Algae probably makes up a large portion of the particulate P.

Photographs of Claisebrook: (Top left) Taking water quality samples in Claisebrook, April 2011. (Bottom left) Urban wetland in Dog Swamp, August 2010. (Right) Lake with fountain at the lower end of the catchment in East Perth, April 2015.
Local nutrient reduction strategies for Claisebrook

Nutrient reduction strategies being undertaken or recently completed in the Claisebrook catchment include:

- The Claise Brook Catchment Group (CBCG) has worked to restore wetlands and improve the quality of water flowing into the Swan River from Perth city and inner city. The CBCG holds monthly working bees and community plantings in winter to provide habitat and improve water quality in local wetlands and the Swan River. In the past few years, the CBCG have been working on rehabilitating Hamilton Lakes and Robertson Park.
- The City of Vincent obtained Waterwise Council status.
- The City of Vincent local plant day. The City provides free local native plants to residents in the Claisebrook catchment.
- The City of Vincent's Adopt a Verge program funds residents to create gardens out of their verges. This program has many benefits to the local catchment including the greening of local streets, increasing local infiltration of stormwater, increasing and fostering local biodiversity and establishing biodiversity corridors.
- The Healthy Catchments Program aims to protect the environmental health and community benefit of the Swan Canning river system by improving water quality in the catchments. This is achieved through a ‘catchment to coast’ approach and by engaging in partnerships that focus the effort of local governments, sub-regional groups, the community and other organisations in water quality improvement activities.
- The Phosphorus Awareness Project aims to assist the community in reducing their nutrient outputs through education, promotion and behaviour change programs.

Swan Canning water quality improvement plan

The Swan Canning water quality improvement plan (SCWQIP) complements the delivery of other major programs and presents a roadmap for reducing nutrient inputs into the river system. It uses sophisticated modelling to identify nutrient sources and provides nutrient-reduction targets for each of the subcatchments.

<table>
<thead>
<tr>
<th>SCWQIP load and concentration targets for Claisebrook</th>
<th>Max. acceptable load (t/yr)</th>
<th>Concentration target (mg/L)</th>
<th>% reduction required</th>
</tr>
</thead>
<tbody>
<tr>
<td>TN</td>
<td>1.3</td>
<td>0.5</td>
<td>72%</td>
</tr>
<tr>
<td>TP</td>
<td>0.3</td>
<td>0.05</td>
<td>0%</td>
</tr>
</tbody>
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For further information on the SCWQIP contact: rivers.info@dpaw.wa.gov.au

The treatment train in Hyde Park, installed as part of the restoration works to reduce nutrient concentrations in drain water entering the lakes. July 2015.

Summary: Claisebrook

- Claisebrook is passing the short-term TN target as well as the short- and long-term TP targets.
- Claisebrook had the highest percentage of N present as bioavailable DIN of the 12 catchments in this series of nutrient reports.
- It had the equal lowest percentage of P present as bioavailable SRP of the 12 catchments in this series of nutrient reports.
- Claisebrook requires the highest percentage reduction in TN to achieve the SCWQIP load reduction targets of the 12 catchments in this series of nutrient reports.
- P loads are currently considered acceptable by the SCWQIP and no reduction is required.