

Cardiff Council

Roath Park Dam

Scour & Bypass Valves Management Plan

Reference: 270911_ARP-00-XX-RP-OX-10039

3.0 | 13 January 2023



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			Prepared by	Checked by	Approved by
		Name	Abby Downing	Darren Shaw	Jon Maidment
		Signature			
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		Signature			
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			Prepared by	Checked by	Approved by
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		Signature			

Issue Document Verification with Document

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1. Introduction

Roath Lake is classified as a Category A large raised reservoir under the Reservoirs Act (1975) and is owned & operated by Cardiff Council. There is the requirement for it to have operational draw-down facilities in the case of an emergency.

This document details the management of the reservoir scour and bypass valves for both routine operation and emergency operation.

2. Reservoir Details

2.1 Reservoir Location

Roath Park Lake is situated in the suburbs of Cardiff approximately 5km north of Cardiff City Centre, at the following address:

Roath Park Lake
Lake Road West (opposite house no 69)
Cardiff
CF23 5PH

The National Grid Reference for the reservoir is ST 185 793.

2.2 Access Routes

2.2.1 Access to the reservoir site

Access into the grounds of Roath Park can be made from the following entrances:

- The east side of the reservoir can be accessed from gates on Lake Road East at National Grid References ST 186 793.
- The west side of the reservoir site can be accessed from the gates on Lake Road West at National Grid References ST 184 793.
- The upstream sides of the reservoir are open with good access available the east and west banks from Lake Road East & Lake Road West.

2.2.2 Access onto the embankment crest

Access onto the eastern and western ends of the embankment can be made directly from the two gates detailed above on Lake Road East and Lake Road West.

2.3 Reservoir Owner & Undertaker

The reservoir Owner & Undertaker is:

Cardiff Council
Queen Alexandra House
Cargo Road
Cardiff
CF10 4LY

Contact: Mr Adam Beach
Office : 02920 684000
Mobile : 07976 011850
Email: A.Beach@cardiff.gov.uk

2.4 Reservoir Supervising Engineer

The reservoir Supervising Engineer is:

Nathan Walding

Stillwater Associates Limited
Chapter House
33 London Road
Reigate
Surrey
RH2 9HZ

Office: 01737 768237
Mobile: 07807 217862
Email: nathan.walding@stillwater-associates.co.uk

Alternative Supervising Engineer contact:

Mr David Littlemore

Stillwater Associates Limited
Office: 01737 768237
Home: 01737 270301
Mobile: 07740 432292
Email: david.littlemore@stillwater-associates.co.uk

2.5 Reservoir Use

Amenity and recreation.

2.6 Reservoir Type

Earth fill embankment.

3. Reservoir Scour & Bypass Valves

The dam running along the south side of the lake comprises of an earth fill embankment. The scour and bypass valves are [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

4. Routine Valve Operation

4.1 Timing of operation

The scour and bypass valves will be tested at least once every 6 months to ensure ongoing operability. Any ongoing maintenance such as greasing of spindles would be undertaken at the same time.

It is anticipated that the scour valve will take approximately 30 minutes to open and close, and the bypass valve will take approximately 20 minutes.

4.2 Procedure

1. Advise NRW at least 48 hours in advance, using the following e-mail address: reservoirs@cyfoethnaturiolcymru.gov.uk
2. Responsible Person to approve and monitor valve operation.
3. Fence off the access to the valve chamber cover to prevent public and non-authorised access. Open the chamber cover to allow view of the valves. Do not enter the chamber, as it is considered a confined space.
4. Competent person to fully open and close the scour valve using a 'T key' [REDACTED]. The valve opens clockwise with approximately 40 turns. It is anticipated that the valve will take approximately 30 minutes to open and close.
5. Competent person to fully open and close the bypass valve by entering the valve chamber as part of a managed confined space entry. It is anticipated that the valve will take approximately 20 minutes to open and close.
6. Record valve operation on the site Prescribed Form of Record.

5. Emergency Valve Operation

5.1 Timing of operation

During an emergency draw-down of the reservoir, the scour valve will be opened fully.

The normal acceptable rate of draw-down is 300mm per 24 hours. In an emergency this may be increased to 1000mm (or more) per day following authorisation from the Inspecting Engineer.

The duration of the draw-down is dependent on what water level needs to be reached to ensure the safety of the dam.

5.2 Procedure

1. Advise NRW as soon as possible of the emergency drawdown, using the following e-mail address: reservoirs@cyfoethnaturiolcymru.gov.uk
2. Inspecting Engineer to approve drawdown; Incident Controller to monitor valve operation. If Inspecting Engineer is unavailable, Incident Controller to approve drawdown.
3. Fence off the access to the valve chamber cover to prevent public and non-authorised access. Open the chamber cover to allow view of the valves. Do not enter the chamber, as it is considered a confined space.
4. Competent person to fully open the scour valve using a 'T key' [REDACTED]. The valve opens clockwise with approximately 40 turns. Close the valve once the required water level is reached. It is anticipated that the valve will take approximately 30 minutes to open and close.
5. Record valve operation on the site Prescribed Form of Record.

6. Environmental Impact and Mitigation Plan

The potential impact on the environment due to the routine or emergency operation of the valves is reviewed in Table 1.

Table 1: Environmental Impact Plan

Description of Risk or Hazard	Comment & Mitigation Measure(s)
Discharge of silt into downstream watercourse	<p>Due to the upfront silt management which will be undertaken during the 2023 valve repair works to move the silt away from the tunnel entrance (see Appendix A for details), it is expected that any sediment transfer during the valve operations will be negligible quantity and temporary (scour testing is expected to take 30 minutes); therefore, no significant environmental impact is anticipated.</p> <p>However, a watch person will be located at the tunnel outlet during the valve operations and in the case of any significant silt discharge (observed through visual observation), the valve will be closed and silt curtain/hay dam will be installed within the tunnel outlet to capture any silt release.</p>
Release of stratified water into the downstream watercourse	<p>There is potential in deep lakes for water of poor water quality (i.e. water that that is excessively cold or depleted in dissolved oxygen) to be discharged into the downstream watercourse. Roath Park lake is ~4.5m at its deepest point and as such the risk of significant stratification causing a reduction in water quality in the Roath Brook is considered to be negligible.</p>
Release of fish into the downstream watercourse	<p>The lake is populated with carp, pike, roach and various other coarse fish (eDNA survey results that will provide a full species list are pending). Some coarse fish species from the lake are considered likely to be present downstream. There is a low risk of fish being released downstream, but given the temporary nature of the scour releases and the fact there is no change in the operational practice of the valves that has taken place since the dam was built, significant impacts to the Roath Brook are not anticipated.</p>
Release of invasive species into the downstream watercourse	<p>Although there may be invasive species are present in the lake (eDNA survey results are pending), there is no change in the operational practice of the valves that has taken place since the dam was built. The lake is known to support invasive elodea pond weed (suspected Nuttall's waterweed <i>Elodea nuttallii</i>). All species of elodea are non-native to the UK and listed on Schedule 9 of the Wildlife and Countryside Act. This species is considered likely to already be present downstream of the lake and risk of transfer during scour testing is considered low, given that this species is considered unlikely to grow at the depth of the scour valve inlet due to insufficient light levels.</p>
Flooding of the park downstream	<p>The maximum discharge of the scour valve is within the capacity of the downstream watercourse and so flooding is not anticipated due to the valve operation. Valve tests will only be undertaken when there's low flow in the downstream channel and not during storm events.</p>
Noise of the valve operation affecting surrounding environment	<p>The valves are both located at the bottom of a chamber within the dam and the water will discharge from a tunnel into the downstream watercourse. Neither structure can be easily accessed by members of the public or wildlife, and so noise pollution will be low.</p>

Appendix A

Scour Valve Repair Works 2023

The valves are currently inoperable and works to repair them are being undertaken in January & February 2023. The valves can be repaired and tested without the discharge of reservoir water to the Roath Brook downstream.

The methodology for this repair will be in stages:

1. Preliminary works to allow access to the wet scour tunnel:
 - The end of the scour tunnel within the reservoir has a fence on it, which needs to be removed to allow a diver to access the tunnel to isolate the valve. There is silt built-up in front of this fence, and so this silt needs to be moved away.
 - Firstly, a silt management system will be installed. A hydraulic pump, with diver's attachment, will pump the silt into a bunded area within the reservoir but away from the spillway. The bunded area will consist of a silt curtain, encompassed by a hay dam to contain all silt within the bund to act as a settling tank for the silt. All pump effluent would be pumped into the bunded area and, on completion of the silt clearance works, be allowed to settle for a minimum of 24 hours prior to its removal.
 - In addition to the bunded area, a silt curtain/hay dam will be established around the spillway weir. This is to prevent the siltation of the watercourse downstream, in the event the diver disturbs the silt to an extent that will create a silt plume, which migrates to the spillway.
 - A watch person will be available during any silt clearance works. This person will monitor the siltation of the reservoir, if a silt plume appears and is migrating to the spillway, all de-silting works will cease for a minimum of 30 minutes (or until the silt has settled), prior to recommencing works. The recommencement of de-silting will only be permitted if there is no risk of contamination of the watercourse downstream of the spillway.
 - In addition to the siltation of the water, there is a direct danger to fish and eels in the vicinity of the hydraulic pump as they could be drawn through the pump system. To mitigate against this, there will be a 10mm mesh strainer on the diver's attachment. Prior to the commencement of pumping operations, the diver will knock two hollow steel tubes together for a duration of 30 seconds to scare away any fish and eels within the vicinity, prior to operating the pump.
 - Once the silt has been moved from the tunnel entrance, the divers will remove the fence.
 - This methodology has been discussed and agreed with NRW's Pollution Advisor, Martyn Davies, and Fisheries Officer, Rhys Davies-Herbert.
2. Isolation of the scour and bypass valves, by the installation of an inflatable bung within the upstream end of the scour pipe by divers.
3. Repair of the scour and bypass valves, from within the valve chamber.
4. Remote removal of the scour pipe isolation by the dive team.
5. Once the valves have been confirmed to be operable, the fence over the end of the scour tunnel within the reservoir will be replaced by divers, as this acts as a silt trap to limit silt discharge through the scour pipe during the valve operation.

The operation of the valves, resulting in reservoir water discharge to the Roath Brook, will not be undertaken until a discharge consent is obtained from NRW. This operation will follow the routine operation methodology outlined in Section 4.