NEATH PORT TALBOT COUNTY BOROUGH COUNCIL

ECONOMIC & COMMUNITY REGENERATION BOARD
4 December 2015

Joint Report of the Head of Engineering & Transport, Head of Streetcare and Head of Transformation

Matter for Decision

Wards Affected: Margam, Neath North & Neath South

Flood and Water Management Act 2010 Changes to the Reservoirs Act 1975

Purpose of Report

1 To advise Members of changes to the Reservoirs Act 1975 and to seek approval to implement relevant requirements to unregistered small bodies of water in the Council's ownership to comply with the Act.

Executive Summary

2 The Flood and Water Management Act 2010 was introduced following the PITT Review. Schedule 4 of the Act brings in changes to the Reservoirs Act 1975. The first phase of changes was implemented in July 2013 but a second phase is now imminent (likely to start in October 2015).

3 The main changes introduced under Schedule 4 are:

- The threshold for reservoirs covered by the Act will go down from 25,000m³ to 10,000m³ of water retained above the surrounding land
- Reservoirs will be risk assessed for potential damage and inspection regimes adjusted accordingly
- New rules calculating capacity
- NRW to charge owners for enforcement procedures

- Owners responsible for registration of new reservoirs under the new rules

4 Under the existing 1975 Act there are two registered reservoirs that the Council are currently responsible for; Moss House Wood and Fish Pond, both in Gnoll Park. The inspection regime for these will not change; there is a supervising inspection every year and major inspection every 10 years.

5 However, there are four smaller bodies of water that will potentially fall within the revised Act based on the criteria set out above.

Background

6 In August 2014, the Council appointed a specialist Consultant; H R Wallingford, to advise the Council on the changes to the Act and the implications on those reservoirs currently supervised on a non-statutory basis, i.e. NOT registered as reservoirs:

Fish Pond (Margam Park)
New Pond (Margam Park)
Furzemill Pond (Margam Park)
Bottom Pond (Gnoll Park)

7 This report sets out the summary findings and the likely costs and implications to the Council in complying with the revised Act (a copy of the Consultant's report will be available for Members).

Fish Pond (Margam Park)

8 Fish Pond is located within Margam Park and was constructed around 1841. It is an impounding reservoir with a dam height of 7.8m, a surface area of about 10,069m² and an original volume of around 27,000m³ (thus it was originally regulated as a large raised reservoir). However, following a survey in 2010, the volume of water was found to be 8,571m³ lying up to 43.63m Above Ordinance Data. However, at this level large areas of silt are exposed which spoil the visual amenity of the pond and the park management have kept the water higher than this and would prefer to continue to do so.

9 This reservoir is upstream of both the Orangery and a busy area of the country park. Whilst a Category C designation was given in 2009, it is

the opinion of the consultant that this reservoir would be given a '**High Risk**' designation by NRW if it was investigated.

Likely works required and budget costs (£60K)

10 If the water level is to be kept high and NRW classify it as a high risk reservoir, the following works (or similar) would be legally necessary:

Updated flood calculations to account for the new legislation = £5K

Improvements to either damn crest (raising) or spillway crest (lowering) = £50K

Miscellaneous small items = £5K

Discontinuance and budget costs (£5K)

11 An alternative to carrying out the above work would be for the Council to demonstrate that the dam is incapable of holding more than 10,000m³ above the level of the surrounding natural ground.

12 This would most easily be achieved by permanently removing the stop logs in the spillway channel, so that the retained volume reduces well below the 10,000m³ threshold. The impact of this is that the water level in the reservoir will drop noticeably and leave a muddy margin around some of the shoreline that would vegetate up over time.

13 To remove stop-logs and make good would cost £5K.

Current Proposals

14 Given the borderline nature of the body of water with respect to the Act, and taking account of the Council's Duty of Care with respect to the Orangery etc., it is recommended that the reservoir is declared to NRW and options reviewed when the outcome of their assessment is known. There may be some scope for reducing the cost of the required works by undertaking more detailed studies to accurately assess the design flood flow. Ultimately should the required work be cost prohibitive, the option to reduce the volume of the reservoir below 10,000m^3 would have to be reconsidered.

New Pond (Margam Park)

15 New Pond is retained by a low earth embankment, approximately 3m high and 125m long and is located to the south east of Fish Pond, on relatively flat ground. The surface area is approximately 19,363m² and the crest carries a miniature railway line across.

16 New Pond is used for various amenity and scenic purposes, such as boating and miniature railway trips around the park.

17 New Pond will definitely fall within the revised Act, with a volume well over 10,000m³. Following registration of this reservoir, the ponds risk-designation will be determined.

18 Downstream of the dam the outlet stream runs across approximately 225m of fairly flat park land before connecting to Furzemill Pond.

19 In the event of a structural failure, it is likely that the majority of the capacity of the reservoir would be spread out widely on the park land immediately downstream of the dam, with a smaller proportion of water finding its way into the railway cutting to the west of Furzemill Pond, and then flowing towards Margam Discovery Centre. Although it may appear to be relatively low risk, the only categories under the new act are likely to be 'high risk' and 'no risk', so a high risk rating is still quite likely.

20 The spillway is undersized for the design flood condition (according to the flood calculations carried out so far).

Drawdown Capacity

21 In 2014, a hidden chamber at the downstream right hand side of the spillway structure was exposed. This scour valve could be used to lower the reservoir in an emergency and if necessary, mobile pumps could be brought to the site in order to over-pump the dam.

22 With the scour valve facility and good access for mobile pumps, drawdown capacity is considered adequate and it is unlikely that an Inspecting Engineer would recommend major costly works in this area.

Likely works required and budget costs (£75K)

23 The design flood is modest, but even so, the spillway is much too small to cope.

24 If the dam were designated as 'high risk' by NRW it is likely that an Inspecting Engineer would require an increase in spillway capacity, plus an allowance for wave freeboard.

25 Lowering top water level would significantly reduce the size of the pond and will be unacceptable from an amenity and aesthetic point of view.

26 Widening the existing spillway at the same level is feasible, but expensive, as the crest length would need to be some 4.55m long and even then there would still be no allowance for wave free-board. The minimum height of wave wall is likely to be 0.4m.

27 Given the natural look of the lake, this 'hard' measure would be undesirable.

28 The alternative course of action would be to raise the existing dam crest by a modest amount (approx. 0.5m). This would give room for flood storage and increase the discharge over the weir but would also mean the railway line would also have to be raised, which is also undesirable.

29 Likely costs are therefore estimated as:-

Updated flood calculations to account for new legislation = £5K

Design and construct dam crest raising works = £50K (plus railway costs)

Design and construct spillway channel raising works = £20K

Discontinuance works and budget cost (£20K)

30 Given the low height of this dam and shallow nature of the reservoir, it would be impracticable to try to reduce the water level such that the volume of the reservoir fell just below the 10,000m³ threshold. It would be simpler to discontinue the reservoir completely by removing the spillway channel and replacing this with a precast concrete box culvert unit. The reservoir would revert to a small stream running through a wetland area.

31 Breakout spillway and replace with precast box culvert unit = £20K

Current Proposals

32 The preference of the park management is try to maintain the existing facility of the lake because of its importance to the park. In this case the reservoir must be declared. It then makes sense to await the decision from NRW as to whether it is classed as 'high risk'. If it is so classified, then there may be options to lower the risk level by constructing additional bunds downstream of the reservoir to contain flood waters. This could be less costly than carrying out improvements to the dam structure itself, but will need additional flood modelling work to prove its effectiveness. There is also a case to re-visit the flood calculations for this reservoir as the catchment area appears small and there are cut-off ditches on one side that may not have been taken into account.

33 The cost and scope of works could be reduced if the size of the design flood could be shown to be lower than currently assumed.

Furzemill Pond (Margam Park)

34 Furzemill Pond is located in the south east of Margam Park and has a surface area of 11,436m². It is retained by a dam some 50m long and approximately 3.2m high. Volume of water was estimated as 7565m^3 in Nov 2014.

35 Approximately 200m downstream of the spillway is Margam Discovery Centre, a residential training and education centre for school children visiting the Park. Any dam failure and flood from this reservoir is likely to flow down a watercourse which passes close to the Discovery Centre. However, as it has been built on stilts, it is unlikely to be affected.

36 Based on the current information available, the consultant advised that the design flood for such a 'non-statutory' reservoir is estimated as a '1 in 150' year event and as a result the spillway must be able to safely deal with a flow of 4.2m^3/s. If it were to become a statutory reservoir the design flood is estimated as 10.5m^3/s. However the existing capacity is only 0.28m^3/s.

37 The current spillway at Furzemill Pond is a very old stepped concrete and masonry structure, which is in poor condition. Furthermore, the leakage and undermining of the structure is of current concern.

Likely works required and budget costs

38 The standard of works legally required will depend on any designation and classification of the dam.

39 It is unlikely that this reservoir would become regulated unless it was significantly enlarged; however, additional spillway capacity is still likely to be required as well as maintenance of the existing spillway. It is believed that a new outlet can be made at the Coal Brook end of the reservoir relatively easily and the cost of this plus maintenance of the existing spillway is likely to amount to £20k.

40 If the reservoir were to be enlarged and become statutory then the works required would be much more extensive and costly – a wave wall and larger spillway are likely to be required.

Discontinuance

41 The Park Management, CADW, angling interests and our own Bio-diversity section are unlikely to support discontinuing this reservoir. If it were felt necessary to do this to reduce the authority's liability, then it would be relatively easy from an engineering viewpoint by breaching the perimeter at the Coal Brook end and lowering the existing spillway. Likely cost is around £10k.

Current Proposals

42 The recommended course of action is to keep the reservoir as present and not register it, but to revisit the flood calculations to check the size of additional spillway required and to undertake a low cost repair to the existing spillway. The additional spillway capacity could be provided at the Coal Brook end of the pond at relatively modest cost (this would also help to take flood waters from New Pond if that failed and may help the case to classify it as 'no risk'). One or two of the large trees growing on the embankment near the existing spillway will need felling.

Bottom Pond (Gnoll Park)

43 Bottom Pond is retained by a fairly high earth embankment; 10m high and 60m long and is located to the south east of Gnoll Park, downstream of the larger (statutory) Fishpond Reservoir. The surface area is approximately 5,853m².

44 Bottom Pond is used for fishing and aesthetic purposes. It has main and side spillways and a surfaced road and parking area on the dam crest. There are disabled fishing platforms on the left shore between main and auxiliary spillways.

45 The survey showed that the reservoir is heavily silted up and has an estimated volume of only 4734m^3. It is therefore unlikely that Bottom Pond will be considered to be of sufficient capacity to fall within the revised Act. (It should be noted that the HR Wallingford report has assumed that the reservoir is a 'high risk' category for calculating the design flood. This should be reviewed as it means that the existing spillway is theoretically well below the required flow capacity. Works are required to repair the spillway in any case, but to increase its capacity would be very difficult).

Likely works required and budget costs

46 Whilst is unlikely that this reservoir would become regulated, based on the consultant's initial observations from a site inspection on 22nd October 2014 the following works are recommended:-

Patch repair spillway cascade on left mitre = £10K

Clear all trees, vegetation and debris from downstream face = £5K

Collect, measure and safely remove all leakage flows on downstream face = £10K

Seal all leakage flows through embankment = £50K

Financial Impact

47 The following table summarises the work required:

	Reservoir	Register with NRW	Budget Requirement
1.	Margam Fish Pond	Yes	£60k but await NRW rating and review
2.	Margam New Pond	Yes	£75k but await NRW rating and review
3.	Margam Furzemill	No	£30k including repairs, further flood calculations and additional spillway
4.	Gnoll Bottom Pond	No	£75k

48 It can be seen therefore, there is a budgetary requirement of up to £240K (based on service management preferences and the likely outcome of registration of Margam Fish Pond and New Pond). DELLL officers will explore the potential of grant funding to undertake the necessary works.

49 Environment has identified a one-off budget for the works at Gnoll Bottom Pond to be undertaken during the current financial year, which are the subject of environmental approvals before any work can be undertaken. If the work is delayed, then the funding for the scheme will need to be revisited.

Miscellaneous Costs

50 If any of these reservoirs become 'regulated reservoirs', there will be on-going supervision and inspection costs. It should be noted that these are not onerous.

51 Typical costs per reservoir are:

52 Annual Supervising Engineer visit and statement under Section 12 = £1K
10 yearly Inspecting Engineer inspection and report under Section 10 = £3.5K

53 If the reservoirs are well maintained with items such as vegetation removal from structures undertaken frequently, then most costs can usually be planned and controlled.

54 The unscheduled costly issues arise when structures deteriorate due to neglect (lack of vegetation removal, lack of debris removal and lack of monitoring) or in extreme events (floods, landslips, etc).

Equality Impact Assessment

55 Screening Assessment has been undertaken to assist the Council in discharging its Public Sector Equality Duty under the Equality Act 2010. After completing the assessment, it has been determined that this function does not require an Equality Impact Assessment.

Workforce Impact

56 There are no impacts on the Council Workforce.

Legal Impact

57 Legal and Democratic Services have advised of possible prosecution if the Authority fails to register any reservoirs meeting the new requirements. All inspections and any works required to registered reservoirs are statutory requirements which cannot be avoided.

Risk Management

58 The physical risks posed by the reservoir remain the same but the new Act has the potential to increase financial liabilities particularly over the next few years.

59 The changes to the Reservoirs Act has been identified on Environment and DELLL Directorates' Risk Registers.

Consultation

60 There is no requirement under the Constitution for external consultation on this item.

61 Internal consultation has been undertaken with the Directorate Service Management teams, who are supportive of the proposals.

Recommendation(s)

62 It is recommended that:

63 Margam 'Fish Pond' and 'New Pond' are registered under the Reservoirs Act to establish their risk category designation. That a further report be presented on the necessary works required to comply

with the Act and DELLL explore potential sources of grant funding opportunities.

64 Furzemill Pond, Margam Park remains unregistered. That a feasibility study be carried out into an additional spillway into the Coal Brook and flood calculations revisited.

65 Gnoll Park (Bottom Pond) remains unregistered and that the works set out in the circulated report be carried out to comply with the Act as soon as practicable.

Reasons for Proposed Decisions

66 To comply with the Flood and Water Management Act 2010, incorporating changes in Schedule 4 to the Reservoirs Act 1975.

Implementation of Decisions

67 The decision is proposed for implementation after the three day call in period.

Appendix

68 'HR Wallingford's Changes to Reservoir Legislation (Advice on Implications for Margam Park and Bottom Pond Reservoirs)'

Officers' Contact

69 Hasan Hasan, Engineering Manager, Engineering & Transport
email: h.hasan@npt.gov.uk
Tel. No. 01639 686463

70 Glenn Watkins, Drainage Manager, Streetcare
email: g.l.a.watkins@npt.gov.uk
Tel. No. 01639 686038

71 Michael Wynne, Margam Park Manager
email: m.wynne@npt.gov.uk
Tel. No. 01639 881635