

BALDERTON LAKE

New Balderton,
Balderton,
Newark
NG24 3DF



SURVEY REPORT 2017



sac BINGHAM

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BINGHAM SUB AQUA CLUB
SURVEY REPORT OF BALDERTON LAKE
NEW BALDERTON, BALDERTON, NEWARK, NG24 3DF
18th February 2017

1. **Survey Team:** The survey team consisted of volunteers associated with Bingham Sub Aqua Club. A big thank you was provided to all who volunteered and gave their time to support this activity over the two days, without who's help we would not have been able to conduct this survey.

2. **Introduction;** Nottinghamshire YMCA with the support of Balderton Parish Council commissioned a survey report on Balderton lake. This was to identify the current water quality, current surface hazards and to identify actual depths of the lake including the identification of any hazards that may be hidden below the water and to ascertain the suitability of the lake for potential water sports activities. The lake had been previously surveyed by Newark sub aqua club in 1992, however this survey was left incomplete. At a meeting held in January 2014 with the parish council it had been stated that the lake had some parts that are very deep even though the original survey suggested the maximum depth was only 12 -16 feet. It appears that a sonar scan had been programmed but hadn't actually been carried out due to availability of an appropriate boat and equipment. The estimation was taken from the average depth of gravel pits within the area.

On 17th December 2016, an attempt was made to survey the lake, however due to some faulty equipment (fish finder and fuel line) the survey wasn't completed. However, at this point an assessment on the current rate of flow of the lake was conducted to establish an understanding of the speed of current flow for the lake, and a dive of the lake conducted to confirm the composition of the lake bed. Floating pontoons had been reported to be sunken due to vandalism in the lake and local fisherman had reported these to be a hazard, locations identified by the locals were surveyed and a dive was carried out but no positive identification of the location could be ascertained at this point. The start datum point for this exercise was taken from High point, pier 41.

On 18th February 2017, a comprehensive survey was carried out, including a depth assessment and a hazard search in a further attempt to locate the sunken floating islands. Depths were checked in a grid search across the lake and recorded in meters. These were recorded using a Garman sounder and a track was recorded to verify this work. Slope depths were measured at the steepest inclines only to ascertain the distance to depth ratio at the steepest inclines into the water. As an in-depth survey of this had already been carried out by Newark dive club, (Lake Survey, 1992) the results of this are at appendix 1.

3. **Location of the lake;** The coordinates for the lake are: Latitude 53.0598° N, Longitude 0.7949° W. The lake is most commonly explained by breaking it down into the following areas;

- a. High Bank – This is the area around the car park on the East to South East of the lake
- b. Catkin way end – This is at the Southerly to South East end of the lake
- c. Railway end - This runs from Catkin way to the South of the lake to the North of the lake
- d. The Pump pond - This is situated at the Northern end of the lake between the Railway end and Rowan way
- e. Rowan way – This runs from the North from the Pump pond to the South East where it joins the High Bank area

4. **History of the site;** The body of water had been developed as a fishery site since the redundant sand and gravel pit ceased being used as a landfill site in the mid-1970s. The lake was never designed as a fishery or had any other restoration plan developed for it. The ad-hoc nature of its abandonment resulting in the present form it is today. The present expanse of water being the remainder of a much larger void which has been filled by many years of waste deposition (1965-1974) and ensuing housing development site surrounding the lake. The majority of the water entering the lake comes directly from the Trent gravels ground water, though there are three small drains that discharge into the lake on the eastern edge. The major flow though enters through the base of the lake and has been described as 'fossil water'. The lake gravels were laid down at the time of the last ice

age when the River Trent's valley took on its present form; previously it had flowed through to the east discharging where now the River Witham meets the sea at Boston.

5. **Lake movement (flow rate);** The current rate of flow of the lake was measured to understand if the lake had a current and what speed it was flowing at. A lightweight buoy and line extended 1.5 - 2.0 metres with a 2kg weight attached was used to determine this rate. This was conducted at the centre point of the deepest part of the lake. The rate was assessed by timing the movement of the buoy over 1 minute using a stop watch. The buoy travelled slowly in a curve travelling a total distance of 0.4 metres over this time frame. This type of movement is to be expected of a lake of this type. The lake has two inlets to allow excessive surface water in to it at the North-eastern side of the lake (Picture 1 & 2). It also has an overflow sluice at the southerly side of the lake (Picture 3). This creates a small current that circles around the lake in a clock wise direction from the North early direction to a south westerly direction. The lake is also exposed to the wind and the surface flow can move dependant on the speed of the wind. However, this will vary dependant on the amount of surface water entering the lake and can be measured for safety by simply looking at the two entry points as shown in the picture.



Photo 1 – First water inlet for Balderton lake



Photo 2 – Second water inlet for Balderton lake



Photo 3 –Water overflow point for Balderton lake



Photo 4 – Contamination from 2nd Inlet

6. **Equipment used;** A Garman Echo map sonar GPS was used to conduct the depth and hazard survey, rigged to operate manually. All depth survey work was conducted from a motorised inflatable boat. Divers were used to ascertain specific points of interest and confirm the lake bed composite.

Pump Pond

0 100 m 200m

Railway

Rowan Way

N

Catkin Way

High Bank

2.4 m, 2.5 m, 2.4 m, 1.3 m, 2.7 m, 3.0 m, 2.2 m, 2.7 m, 2.3 m, 2.3 m, 2.6 m, 2.8 m, 2.3 m, 2.7 m, 2.5 m, 2.4 m, 2.6 m, 2.5 m, 2.5 m, 2.8 m, 2.3 m, 2.9 m, 3.1 m, 2.9 m, 3.3 m, 3.4 m, 3.0 m, 2.5 m, 2.6 m, 2.4 m, 2.0 m, 2.3 m, 1.8 m, 2.0 m, 2.5 m, 2.3 m, 2.6 m

7.1 The steepest drop off is located between fishing pier 39 and 38 to the southerly side of the lake. This was measured to understand the distance to depth ratio, as you can see from the chart below this area at the southerly side of the lake between fishing pier 39 & 38 has the severest drop off with it reaching 1.7metres in depth within the first 1.5 meters in distance from the shore. The remainder assessed have fairly shallow drop offs in comparison. A comprehensive brief on this is contained in the appendix 2 and in the Newark dive club brief at appendix 3. However, there is some discrepancy in the fishing pier numbers from the Newark dive club brief. I believe these may have changed numbers since 1992. However, the depths remain fairly consistent. If a further investigation of this is required, it can be done at a later date.

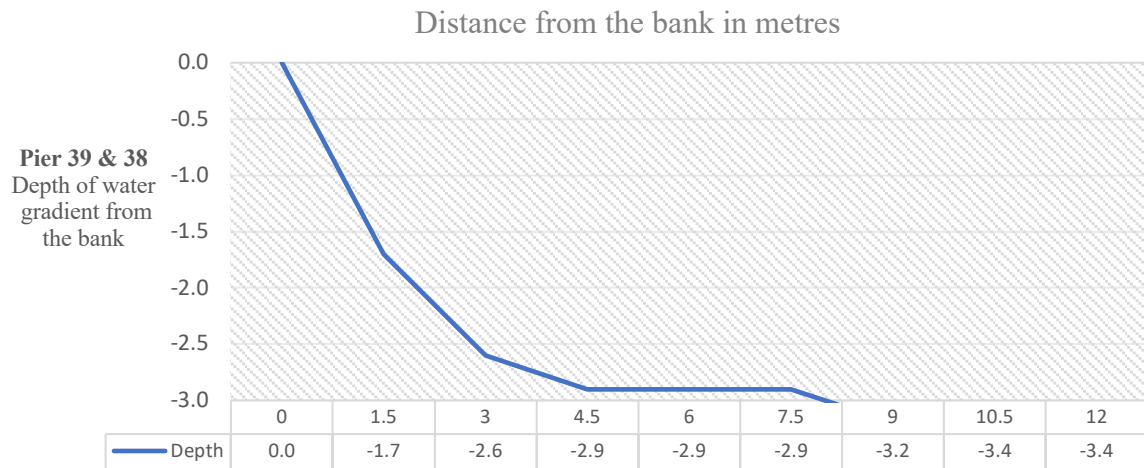


Chart 1 – Depth to distance ratio from shore

8. **Hazards;** A systematic search was carried out across the entire lake and no significant hazards were identified beneath the water surface using the sonar detector. The only detection was an area where we identified a rise in height from the lake bed of no more than 0.3 metre (1 ft.) these were deemed insignificant and a possible explanation of this is mention in point 9 below.

a. Overhanging trees were identified around the bank in a variety of places around the lake. These could cause entrapment if accessed from the water, but could also be avoided if required, as they are easily seen.

b. Evidence of reef construction can be seen alongside the shore line; these areas are identified by stakes with mess protecting a reed bed. These should be avoided to protect them. There is one identified without mesh (Picture 10 below) on the western side of the lake close to the shore line. This provides a hazard as wooden spikes are protruding out of the water, these can be avoided by staying away from this part of the shore line or placing a seclusion zone around his area.

c. The Pump pond is a natural reserve protected from access lake by a man-made barrier and floating island. The majority of the bird life of the lake is congregated around this area and in our opinion should be avoided by all other users. This is due to the potential risks caused by bird faeces and the potential damage to the lake environmental ecological system.

d. The Inlets should be avoided in case of excessive flowing water (this was not evident on both visits). However, there is potential for this to also allow for contamination as was evident in photo 4 above.

e. There is easy access into the water from the fishing piers and no formal protection to stop someone slipping into the water. The fishing piers are made of wood and care should be taken if wet as you could easily slip into the water.



Photo 6–Overhanging tree Balderton lake



Photo 7–Reef Construction Balderton lake



Photo 8–Pump Pond Balderton lake

- f. Rotten wooden piers, there are a few fishing piers identified that need to be repaired or isolated so that no one uses' them due to broken, missing, rotten or damaged slats.
- g. There were a number of fishing lines and lead weights discarded around the lake, which create hazards to the wildlife and fish. The majority were seen in and around the trees on the shore line.

9. **Reef Construction and Floating islands;** The Clean rivers trust report (2014) discusses the development of the site with the use of large blocks of concrete that may have been placed into the lake to create feeding sites and allow for algal growth and zoo plankton development. We believe some of these sites can be seen close to banks of the lake as they have been built up above the water level, and reeds and other wetland plants can be seen growing out of them. The floating islands believed to have been sunk by vandalism could not be found, however local fisherman believe one of them is 50-60 meters directly North of fishing pier 34. When we scanned this site with the sonar there was a small increase in height but no more than 0.1 metre, as shown in picture 11. However, on the sonar it did pick up a growth of reeds surrounding this sight. Suggesting it may well have created a small reef. This sight was dived on the first trip and due to the visibility, nothing was found. This could be due to the nature of the lake bed at this point being soft mud, so it is assumed that the floating island may well have partially sunk beneath the mud. To verify this a further survey would need out be carried out.



Photo 9 – Raised Reef/Reed beds



Photo 10 – Unprotected unused reef/ reed bed.

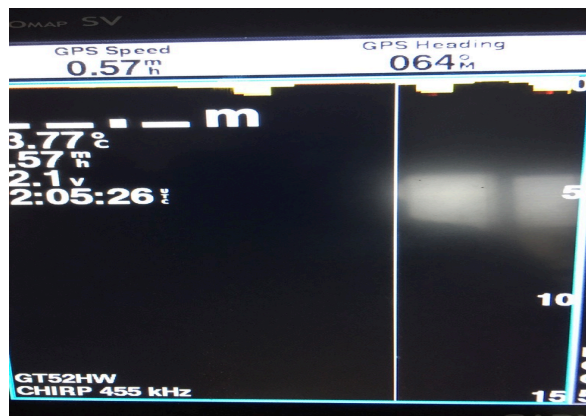


Photo 11–Sonar reading Balderton lake



Photo 12–Fishing Pier Balderton lake

10. **Water Quality;** Sterilizing services Ltd, based in Nottingham were requested to carry out a bathing water quality report to understand the quality of the water at Balderton lake. This was carried out on the 7th December 2016 and the results confirmed that the lake water quality results were significantly better than the mandatory and discretionary levels permitted for a lake of this type. There was only a requirement to take one sample due to quality of the water assessed, if further investigation is required (clearly not in this case) then further samples can be taken. The results can be seen at the bottom of the report attached at appendix 1.

References:

1. Clean rivers Trust (2014). Balderton Lake. [online] Available at:<
<http://www.cleanriverstrust.co.uk/balderton-lake/> > Accessed 15th December 2016.
2. Balderton Lake Survey (1992). Newark Sub Aqua Club. Newark Parish Council

Appendix 1. Balderton Lake water quality report



STERILIZING SERVICES LTD
WATER TANKS & SYSTEMS CLEANED & DISINFECTED

BATHING WATER QUALITY REPORT

Report Date: 13.12.16

Client: Nottinghamshire YMCA

Date Taken: 07.12.16

Site: Balderton Lake

Date Received: 08.12.16

Sample No.	Location	Total Coliforms Per 100mls	E. Coli Per 100mls	Faecal Streptococci Per 100mls
796575	Lake Water	24	8	12

Analysing Laboratory: NAMAS (UKAS) Accredited Laboratory No. 2450

Test Methods in accordance with The Bathing Water Regulations 2008.

Mandatory Guidelines

Coliforms 10000
E. Coli 2000
Faecal Streptococci No limit

Discretionary Guidelines

Coliforms 500
E. Coli 100
Faecal Streptococci 100

No. Samples Taken: 1

Authorised Signature:

Registered in England No. 7748328

24 Trent Business Centre
Canal Street
Long Eaton
Nottingham NG10 4HN

Tel: 0115 972 1667
Fax: 0115 946 2486
email: info@sterilizing-services.co.uk
www.sterilizing-services.co.uk

Appendix 2 – Lake depths from the bank out to 10 metres.

Location/ Pier No	Depth in Metres from lake bank							Remarks
	1.5m	3m	4.5m	6m	7.5m	9m	10.5m	
1	0.5	1.1	1.7	2.0	2.3	2.3	2.3	
2	0.5	1.1	1.7	2.0	2.3	2.3	2.3	
3	0.5	1.1	1.7	2.0	2.3	2.3	2.3	
4	0.8	1.1	1.7	1.7	2.3	2.3	2.3	
5	0.5	0.8	1.4	2.0	2.3	2.6	2.3	
Corner	0.5	0.5	0.8	1.4	2.0	2.3	2.9	
6	0.3	0.5	0.8	0.8	1.4	1.4	1.7	
7	0.5	0.5	0.6	0.8	0.9	1.1	2.0	
8	0.5	0.5	0.8	1.8	1.8	2.1	2.6	
9	0.5	0.5	0.8	1.1	1.5	2.0	2.4	
10	0.5	0.5	0.8	0.8	1.1	1.7	1.7	
Corner	0.3	0.3	0.5	0.5	0.5	0.5	0.5	
11	0.5	0.8	1.1	1.2	1.7	1.7	1.8	
12	0.5	1.1	1.7	2.0	2.0	2.0	2.0	
13	0.8	1.4	1.7	2.0	2.0	2.0	2.0	
Corner	0.8	1.1	1.7	2.0	2.0	2.0	2.0	
14	0.5	0.8	1.1	1.7	2.1	2.3	2.3	
15	0.5	0.8	1.1	1.7	1.8	2.0	2.3	
16	0.5	0.8	1.4	1.4	1.4	1.7	2.0	
17	0.5	1.1	1.4	1.7	1.7	2.0	2.0	
18	0.5	1.1	1.5	1.7	2.0	2.3	2.6	
19	0.5	1.1	1.7	2.0	2.3	2.3	2.6	
20	0.5	1.1	1.4	1.7	2.0	2.0	2.3	
21	0.8	1.4	1.7	2.0	2.3	2.3	2.3	
22	1.1	2.0	2.3	2.3	2.3	2.6	2.6	
23	2.0	2.3	2.0	2.3	2.3	2.3	2.3	
Corner	0.8	2.3	2.3	2.6	2.6	2.6	2.9	
24	1.1	2.0	2.6	2.6	2.6	3.2	2.9	
25	1.7	2.6	2.9	2.9	2.9	3.2	3.2	
26	1.4	2.6	2.6	2.9	3.2	3.2	3.2	
27	1.1	2.0	2.6	2.6	2.6	2.9	2.9	
28	0.8	2.0	2.6	2.6	2.6	2.6	2.7	
29	1.1	2.1	2.6	2.6	2.6	2.9	2.9	
30	0.5	1.7	2.3	2.6	2.6	2.6	2.6	
31	0.5	1.7	2.3	2.6	2.6	2.6	2.6	
32	0.8	1.7	2.6	2.6	2.6	2.6	2.6	
33	0.3	1.4	2.3	2.6	2.6	2.7	2.9	
34	0.8	2.0	2.3	2.6	2.9	2.9	2.9	
35	0.5	1.4	2.3	2.6	2.6	2.6	2.6	
36	0.5	1.4	2.3	2.3	2.6	2.6	2.6	Rubble
37	0.8	2.0	2.3	2.3	2.3	2.3	2.3	
38	0.5	1.7	2.3	2.3	2.6	2.6	2.6	
39	0.5	1.4	2.0	2.6	2.6	2.6	2.6	
Overflow	0.5	0.5	0.6	1.1	1.7	2.0	2.1	soft silt Sand & Rubble
40	0.5	1.4	2.0	2.3	2.0	2.1	2.3	
41	0.5	1.7	2.3	2.3	2.3	2.3	2.6	
42	0.6	1.7	2.3	2.3	2.6	2.6	2.6	
43	0.8	1.4	2.0	2.0	2.6	2.3	2.9	Drums Sand
44	0.8	2.0	2.3	2.6	2.9	2.9	2.9	
45	0.5	1.4	2.3	2.3	2.6	2.6	2.9	
46	0.5	1.7	2.6	2.9	3.2	3.2	3.2	
47	0.5	1.1	1.7	2.6	2.9	3.2	3.2	
48	1.1	1.7	2.3	2.9	2.9	3.2	3.2	
49	0.5	0.8	1.7	2.0	2.3	2.6	2.9	
50	0.5	1.1	1.7	2.0	2.0	2.3	2.6	
51	0.5	1.1	2.0	2.3	2.3	2.6	2.6	
52	0.5	1.1	2.0	2.3	2.6	2.9	2.9	
54	1.4	1.7	2.0	2.3	2.3	2.6	2.6	
55	1.1	1.7	2.0	2.0	2.3	2.6	2.3	
Corner	0.5	1.1	1.4	1.4	1.4	1.7	2.0	
56	0.5	1.1	1.7	2.0	2.0	2.0	2.0	

