D. Lake Survey;
by Miles Waterscapes

Wimbledon Park Lake

Considerations for Dealing with the Sediment Build Up

Our lake survey which included measuring the volumes of silts in the lake at Wimbledon Park recorded 72000m3 in December 2015. This equates to approximately 50% of the volume of material in the lake is silt and is a significant amount to deal with. To put it into perspective a tipper lorry has about a 14m3 capacity. It would be a significant project not only to dredge the silts but also to store or dispose of them.

There are typically three options when dealing with silts in this situation, often a combination of the three options is used. These are to remove all the silts from site, dispose of onsite i.e. to use in the landscaping or to store them with in the lake.

Some methods of dealing with the silt are extremely expensive and therefore options like removing the silt from site are ruled out immediately on a cost basis alone, it is highly likely that the dredging and disposal off site could be £100 plus per m3. Also there are of course other negative factors to consider with this option, firstly the disturbance caused by a high volume of lorries requiring access through the park and also the impact of these lorries on the local traffic using the same public roads. This solution would also require consents for planning permission and waste disposal which would be more controversial and therefore more difficult to achieve. Therefore the most viable silt disposal solution is to store it in the lake or park.

Storing the silt in the lake however, again highlights the issue of the sheer volume of silt. I.e. the amount of area potentially given up to silt storage as opposed to remaining as water could become high. By removing the silts from certain areas of the lake to achieve more depth of water at these points you would need to store the silt in other areas at a greater depth than it currently is. This therefore requires some way of retaining these silts so that they can be dredged from their current location and stored in these areas. Not only does the large volume of silt in question potentially result in taking up a great deal of the area of the lake but it could potentially require significant lengths of retaining walls if conventional techniques are employed.

Retaining walls which are capable of storing silts up to 2.5m deep would incur significant costs which ever technique was used to form that structure. Highlighting again how the large silt volume plays its part here, because to be able to retain these kinds of volumes of silt it would not be adequate to only have structures which are confined to within a few meters of the margin as they would not store enough material. This means that the retaining walls would have to go out into the deeper parts of the lakes requiring these retaining walls to be deeper and therefore more expensive.

An example of a retaining wall in the scenario described, built within the lake might traditionally be formed from a wall of steel sheet piles. This method of holding silts would offer adequate retaining properties but is aesthetically unappealing, offers poor habitat properties and can be damaging to the lake bed. An engineered solution like sheet piles would also be very expensive, you could expect to budget £2000 plus per linear meter.

Another alternative to sheet piles which can be used to retain the silts behind is to create bunds out of sub soils from the lake bed. Again this allows the silts to be retained in the lake and eventually for the area to become reed beds or similar. This method as seen in the photo below would be better value than sheet piles but it requires the water in the lake to be removed for the works, creates significant impact to the lake bed and does not allow for some of the silts to be left on the lake bed, they all would have to be removed to allow for the sub soil below to be excavated to create the bund walls.

Excavation of the lake bed subsoils in order to create bunds, behind which dredged silts are stored.

Having considered several options for retaining the silts with in the lake including the ones above we feel the most viable is to use dewatering bags to store the silt and to use them in the lake to form the revetment like structure that retains the silt in its new place, similar to what is seen below in the photo.

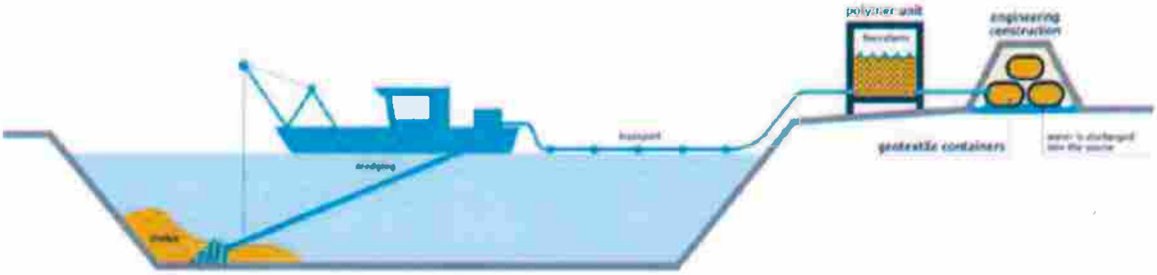
Dredged silts stored in the silt bags at a greater depth and density than when loose in the water body.

Having stored the silts in the silt bags or behind the revetments these silts bags form, the second stage would require further work above the water level, on the top of the bag to reinstate soils suitable for holding vegetation. The results of adding stable soils on top of the silt bags would mean that the area where the silts get stored could be reclaimed as land and would allow the opportunity for the area to be planted to create features like reed beds or other excellent habitat, see the photo below.

Soils being added on top of the silt bags to establish the bank edge further into the water.

The other significant advantage of creating these areas would be to allow access around the margin of the lake. Given the current lack of access this could benefit occasional access for maintenance or fishing or to be maximised as far as offering public access via a circular walkway, perhaps with or without the inclusion of a boardwalk or floating pontoon forming a bridge and connecting the new land forms up.

Our suggestion for the preferred methodology to move these silts would be to pump them. There are several reasons for this. Firstly if silt bags are to be used to retain the silts then pumping is the best way to fill them. Pumping also offers the benefit of not having to dewater the lake and possibly have to over pump the water entering the lake during the works therefore reducing costs and environmental impacts. It also means that there is no risk to the integrity of the lake bottom and because the equipment floats it would mean that if required some of the silt could be left in the bottom whilst only a percentage of the top layer was dredged. The diagram below shows the principal of how the silts would be pumped into the silt bags and how a polymer is added to aid the dewatering of the silt and to ensure it becomes denser in the silt bags than found in the rest of the lake.



Furthermore, if any of the silt was to be used on site, outside of the lake to reduce the loss of water volume in the lake or to allow the silts to be used in the landscaping plans, pumping it to the required location would reduce the impact to the surrounding area significantly compared to hauling it in mechanical plant. The photo below shows how silts can be pumped into bags for dewatering and how these bags allow silt to be stored in relatively small areas compared to the volume.

Silt bags being used to store silts until the material has dried and become more stable.

Dried silts being cut from the silt bags to be used in landscaping.

Although it is very difficult to give accurate costs without developing the project further and more details finalised, for now I would base budgets for dredging the silts and storing them behind silt bag revetments at £30 / m3. However, £10 /m3 is a sensible budget for just dredging and pumping the silts into a bund. The intention would be to use silt bags as a way of forming the revetment and therefore creating a bund behind into which the silts can be pumped. This solution if agreed in principal by the client needs further investigation by engineers to confirm how much loose silt can be sorted behind the silt bags without them moving. The desired location of the revetment / silt bays will also have an influence on the ratio of how much loose silt can be stored behind compared to that which is in the bags. The drawing that describes this process is MWE-WP-003-02-16a which helps clarify understand the intention to be able to store the silt in a combination of bags and loose behind the bags. Therefore, with this process it is possible to allow budgets which can feasibly include for some of the silts just being pumped i.e. at £10/m3 and some being stored in silt bags i.e. at £30 /m3.

If the decision is made to store the silts in such a way as to create new marginal lands around the lake, then the impact of where they should be go needs to be fully understood. With reference to our drawings MWE- WP-001-12-15, MWE -WP-003-002-16, MWE-WP-004-002-16 and MWE-WP-005-002-16, you will see 4 possible suggestions. You will see that each of the options has an impact on how much silt is stored, only option 1 allows for all the silt to be removed and stored in these bunds but that has a negative impact on the amount of surface are of the lake which is lost. To combat this one solution is to leave some silts in the base of the lake, you will see on each of the drawings how much silt that particular solution leaves in the base and how much extra depth of water that proposal gains compared to pre works. The other advantage of leaving some of the silt in the bottom is the savings in cost of not having to pay for so much to be removed, helping budgets.

Another point I would like to highlight from these options is that only options 1 and 2 would give rise to the benefit that there would be enough room between the bank and the silt bag revetment to store some silts loose and therefore benefit from the cheaper £10 / m3 dredging rate.

A further note is that only option 4 allows for an alternative solution to using silt bags as the revetment, this is because the design includes for the revetment to be positioned in a place to go no deeper into the lake than 1 m. This therefore allows for more cost effective silt retaining structures like Nico span. However, you can see how little volume of silt this solution will retain.

Another thing to consider is concentrating the dredging works in the areas where it is most important to achieve more depth of water for example where the sailing club use their boats, potentially reducing the volume of silt needed to be moved.

You can see from these examples above that there are several factors to consider and these decisions impact both the volume of silt stored, the reduction in the surface area of the lake and the cost.

Items to Further consider / investigate

If the principals of what we are suggesting is agreed, then the next steps can be taken.

For example, contacting the Environment Agency, they will need to be consulted for several reasons and permissions gained. It is important to know that the Environment Agency consider the case for silt movement and the associated licences on a case for case basis. Therefore they will want to know the proposed solution as this will impact their decisions especially given the test results showing some elevation of heavy metals. This again highlights the importance of agreeing in principal on the potential solution for dealing with the silt, be it the one I have outlined above or another. Please refer to the attached document **Environmental Management – Guidance,** this document briefly expands on the basics involved with apply for permissions to carry out dredging projects.

Pollution levels in the silts have been examined (please find attached the results). The results have indicated elevated levels of lead and zinc. As mentioned above these levels may have an impact on the dredging / storage method agreed by the Environment Agency and the license required, again highlighting the importance of including them in developing suitable solutions. On this point of heavy metals being present this again adds weight to using silts bags and storing the silt in the lake. If the silt is stored in the lake, then there is less risk of the works releasing the pollutants and contaminating other areas. Also storing the material in silt bags is an effective way of storing contaminated silts as they are effective at containing the material in the desired location and out of harm's way.

Engineers will also be needed to consider further the recommendations made in the last Reservoirs Act report and other items like the designing of new water control structures. This would be worth considering alongside any plans for future use of the over flow water being included in the plans being set out for the rest of the park. Engineers will also be needed to investigate the suitability of the silt bag retaining structures.

Raising the water levels is another possibility to achieve the desire of having extra depth of water in the lake. This could be done by lifting the level of the outfalls. This approach however would have other significant impacts on the hydrology of the surrounding area and therefore would require consent from the Environment Agency. I believe it is highly likely that this approach is not feasible without significant investigations, consultations and engineering works, although it may be worth pursuing with the mind to achieve a small rise in water level i.e. 50 mm.

Ecology and especially the fish stock will need considering, surveying and planning for.

Hydrology especially the flow of water entering the lake will be important when dredging both to control and mitigate any downstream risks but to ensure there is enough water to do the works. This I suggested should be monitored.

Other items to potentially consider are solutions to help water quality further other than just increasing the depth of water by dredging, and items to enhance the lake i.e. jetties, islands etc.

Giles Orford, Miles Water Engineering, March 2016

BA3

analysis report

TS0116/08
Test Date 01/02/2016
Sample received 18/01/2016

Client:
Miles waterscapes Ltd
School House Farm
Great Ashfield
Bury St. Edmunds
Suffolk IP313HJ

Sample from:
Sample 01
Silt
-
-
-

Determinand	Units	value	method
pH		8.91	potentiometrically (1:2.5) BS1377 - 3 section 9
Conductivity	µS cm^{-1}	1610	1:2.5 soil suspension determined using conductivity meter
Copper	mg kg^{-1}	167	ICP - OES on acid digest
Zinc	mg kg^{-1}	1274	ICP - OES on acid digest
Lead	mg kg^{-1}	1058	ICP - OES on acid digest
Arsenic	mg kg^{-1}	22.0	ICP - OES on acid digest
Cadmium	mg kg^{-1}	3.91	ICP - OES on acid digest
Nickel	mg kg^{-1}	47.2	ICP - OES on acid digest
Chromium	mg kg^{-1}	39.0	ICP - OES on acid digest
Mercury	mg kg^{-1}	6.17	hydride generation AFS on an acid digest of the sample
Selenium	mg kg^{-1}	1.41	hydride generation AFS on an acid digest of the sample
Water soluble Boron	mg kg^{-1}	2.3	extraction by soil boiled with water (1:2.5) then ICP - OES
Water soluble sulphate	g l^{-1}	1.64	extraction at 1:2.5 wt/ v then ICP - OES
Elemental Sulphur	mg kg^{-1}	1704	extracted into solvent then HPLC at 263 nm
Total Phenols index	mg kg^{-1}	13.7	Steam distilation then colourimetically
Total Cyanide	mg kg^{-1}	<1	Steam distilation then automated colourimetically
Benzene	mg kg^{-1}	<0.02	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
Toluene	mg kg^{-1}	<0.2	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
Etyhylbenzene	mg kg^{-1}	<0.04	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
m&p Xylene	mg kg^{-1}	<0.2	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
o Xylene	mg kg^{-1}	<0.1	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
EPH [C10 - C40]	mg kg^{-1}	7426	petroleum hydrocarbons [C10 - C40] extracted with iso-hexane then GC-FID
Total PAH [EPA - 16]	mg kg^{-1}	3912	extracted into solvent then GC-MS
Napthaline	mg kg^{-1}	0.3	extracted into solvent then GC-MS
Acenaphylene	mg kg^{-1}	12.3	extracted into solvent then GC-MS
Acenapthene	mg kg^{-1}	1.4	extracted into solvent then GC-MS
Fluorene	mg kg^{-1}	1.3	extracted into solvent then GC-MS
Phenanthrene	mg kg^{-1}	10.2	extracted into solvent then GC-MS
Anthracene	mg kg^{-1}	8.6	extracted into solvent then GC-MS
Fluoranthene	mg kg^{-1}	73.7	extracted into solvent then GC-MS
Pyrene	mg kg^{-1}	97.1	extracted into solvent then GC-MS
Benzo[a]anthracene	mg kg^{-1}	29.9	extracted into solvent then GC-MS
Chrysene	mg kg^{-1}	46.5	extracted into solvent then GC-MS
Benzo[b]fluoranthene	mg kg^{-1}	28.9	extracted into solvent then GC-MS
Benzo[k]fluoranthene	mg kg^{-1}	12.8	extracted into solvent then GC-MS
Benzo[a]pyrene	mg kg^{-1}	27.6	extracted into solvent then GC-MS
Indeno[1,2,3-cd]pyrene	mg kg^{-1}	17.7	extracted into solvent then GC-MS
Dibenz[a,h]anthracene	mg kg^{-1}	4.0	extracted into solvent then GC-MS
Benzo[g,h,I]perylene	mg kg^{-1}	19.1	extracted into solvent then GC-MS

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Nigel Fahey.
Laboratory manager

END OF DOCUMENT

BA3

analysis report

TS0116/09

Test Date 01/02/2016

Sample received 18/01/2016

Client:

Miles waterscapes Ltd
School House Farm
Great Ashfield
Bury St. Edmunds
Suffolk IP313HJ

Sample from:

Sample 02
Silt
-
-
-

Determinand	Units	value	method
pH		9	potentiometrically (1:2.5) BS1377 - 3 section 9
Conductivity	µS cm^{-1}	N/A	1:2.5 soil suspension determined using conductivity meter
Copper	mg kg^{-1}	572	ICP - OES on acid digest
Zinc	mg kg^{-1}	922	ICP - OES on acid digest
Lead	mg kg^{-1}	542	ICP - OES on acid digest
Arsenic	mg kg^{-1}	17.8	ICP - OES on acid digest
Cadmium	mg kg^{-1}	2.48	ICP - OES on acid digest
Nickel	mg kg^{-1}	64.0	ICP - OES on acid digest
Chromium	mg kg^{-1}	68.0	ICP - OES on acid digest
Mercury	mg kg^{-1}	1.47	hydride generation AFS on an acid digest of the sample
Selenium	mg kg^{-1}	1.73	hydride generation AFS on an acid digest of the sample
Water soluble Boron	mg kg^{-1}	1.6	extraction by soil boiled with water (1:2.5) then ICP - OES
Water soluble sulphate	g l^{-1}	1.62	extraction at 1:2.5 wt/ v then ICP - OES
Elemental Sulphur	mg kg^{-1}	376	extracted into solvent then HPLC at 263 nm
Total Phenols index	mg kg^{-1}	<1	Steam distilation then colourimetically
Total Cyanide	mg kg^{-1}	<1	Steam distilation then automated colourimetically
Benzene	mg kg^{-1}	<0.02	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
Toluene	mg kg^{-1}	<0.2	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
Etyhylbenzene	mg kg^{-1}	<0.04	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
m&p Xylene	mg kg^{-1}	<0.2	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
o Xylene	mg kg^{-1}	<0.1	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
EPH [C10 - C40]	mg kg^{-1}	1548	petroleum hydrocarbons [C10 - C40] extracted with iso-hexane then GC-FID
Total PAH [EPA - 16]	mg kg^{-1}	27.1	extracted into solvent then GC-MS
Napthaline	mg kg^{-1}	<0.05	extracted into solvent then GC-MS
Acenaphylene	mg kg^{-1}	0.7	extracted into solvent then GC-MS
Acenapthene	mg kg^{-1}	<0.05	extracted into solvent then GC-MS
Fluorene	mg kg^{-1}	<0.05	extracted into solvent then GC-MS
Phenanthrene	mg kg^{-1}	0.8	extracted into solvent then GC-MS
Anthracene	mg kg^{-1}	<0.05	extracted into solvent then GC-MS
Fluoranthene	mg kg^{-1}	3.5	extracted into solvent then GC-MS
Pyrene	mg kg^{-1}	3.6	extracted into solvent then GC-MS
Benzo[a]anthracene	mg kg^{-1}	1.6	extracted into solvent then GC-MS
Chrysene	mg kg^{-1}	2.9	extracted into solvent then GC-MS
Benzo[b]fluoranthene	mg kg^{-1}	3.5	extracted into solvent then GC-MS
Benzo[k]fluoranthene	mg kg^{-1}	1.3	extracted into solvent then GC-MS
Benzo[a]pyrene	mg kg^{-1}	2.8	extracted into solvent then GC-MS
Indeno[1,2,3-cd]pyrene	mg kg^{-1}	2.8	extracted into solvent then GC-MS
Dibenz[a,h]anthracene	mg kg^{-1}	0.7	extracted into solvent then GC-MS
Benzo[g,h,I]perylene	mg kg^{-1}	2.9	extracted into solvent then GC-MS

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These results refer specifically to the sample submitted for analysis and not the original site as a whole.

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END OF DOCUMENT

BA3

analysis report

TS0116/10

Test Date 01/02/2016

Sample received 18/01/2016

Client:

Miles waterscapes Ltd
School House Farm
Great Ashfield
Bury St. Edmunds
Suffolk IP313HJ

Sample from:

Sample 03
Silt
-
-
-

Determinand	Units	value	method
pH		8.6	potentiometrically (1:2.5) BS1377 - 3 section 9
Conductivity	$\mu S\ cm^{-1}$	1810	1:2.5 soil suspension determined using conductivity meter
Copper	$mg\ kg^{-1}$	475	ICP - OES on acid digest
Zinc	$mg\ kg^{-1}$	986	ICP - OES on acid digest
Lead	$mg\ kg^{-1}$	579	ICP - OES on acid digest
Arsenic	$mg\ kg^{-1}$	12.7	ICP - OES on acid digest
Cadmium	$mg\ kg^{-1}$	1.63	ICP - OES on acid digest
Nickel	$mg\ kg^{-1}$	53.0	ICP - OES on acid digest
Chromium	$mg\ kg^{-1}$	65.2	ICP - OES on acid digest
Mercury	$mg\ kg^{-1}$	0.59	hydride generation AFS on an acid digest of the sample
Selenium	$mg\ kg^{-1}$	1.36	hydride generation AFS on an acid digest of the sample
Water soluble Boron	$mg\ kg^{-1}$	2.2	extraction by soil boiled with water (1:2.5) then ICP - OES
Water soluble sulphate	$g\ l^{-1}$	1.91	extraction at 1:2.5 wt/ v then ICP - OES
Elemental Sulphur	$mg\ kg^{-1}$	804	extracted into solvent then HPLC at 263 nm
Total Phenols index	$mg\ kg^{-1}$	3.3	Steam distilation then colourimetically
Total Cyanide	$mg\ kg^{-1}$	<1	Steam distilation then automated colourimetically
Benzene	$mg\ kg^{-1}$	<0.02	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
Toluene	$mg\ kg^{-1}$	<0.2	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
Etyhylbenzene	$mg\ kg^{-1}$	<0.4	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
m&p Xylene	$mg\ kg^{-1}$	<0.2	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
o Xylene	$mg\ kg^{-1}$	<0.1	banded GRO [C5 - C10] methanol extraction then headspace GC - MS
EPH [C10 - C40]	$mg\ kg^{-1}$	3919	petroleum hydrocarbons [C10 - C40] extracted with iso-hexane then GC-FID
Total PAH [EPA - 16]	$mg\ kg^{-1}$	99.4	extracted into solvent then GC-MS
Napthaline	$mg\ kg^{-1}$	<0.05	extracted into solvent then GC-MS
Acenaphylene	$mg\ kg^{-1}$	0.5	extracted into solvent then GC-MS
Acenapthene	$mg\ kg^{-1}$	0.3	extracted into solvent then GC-MS
Fluorene	$mg\ kg^{-1}$	<0.05	extracted into solvent then GC-MS
Phenanthrene	$mg\ kg^{-1}$	3.5	extracted into solvent then GC-MS
Anthracene	$mg\ kg^{-1}$	1.3	extracted into solvent then GC-MS
Fluoranthene	$mg\ kg^{-1}$	17.9	extracted into solvent then GC-MS
Pyrene	$mg\ kg^{-1}$	15.2	extracted into solvent then GC-MS
Benzo[a]anthracene	$mg\ kg^{-1}$	9.1	extracted into solvent then GC-MS
Chrysene	$mg\ kg^{-1}$	12.4	extracted into solvent then GC-MS
Benzo[b]fluoranthene	$mg\ kg^{-1}$	10.4	extracted into solvent then GC-MS
Benzo[k]fluoranthene	$mg\ kg^{-1}$	4.7	extracted into solvent then GC-MS
Benzo[a]pyrene	$mg\ kg^{-1}$	9.1	extracted into solvent then GC-MS
Indeno[1,2,3-cd]pyrene	$mg\ kg^{-1}$	6.3	extracted into solvent then GC-MS
Dibenz[a,h]anthracene	$mg\ kg^{-1}$	2.3	extracted into solvent then GC-MS
Benzo[g,h,I]perylene	$mg\ kg^{-1}$	6.2	extracted into solvent then GC-MS

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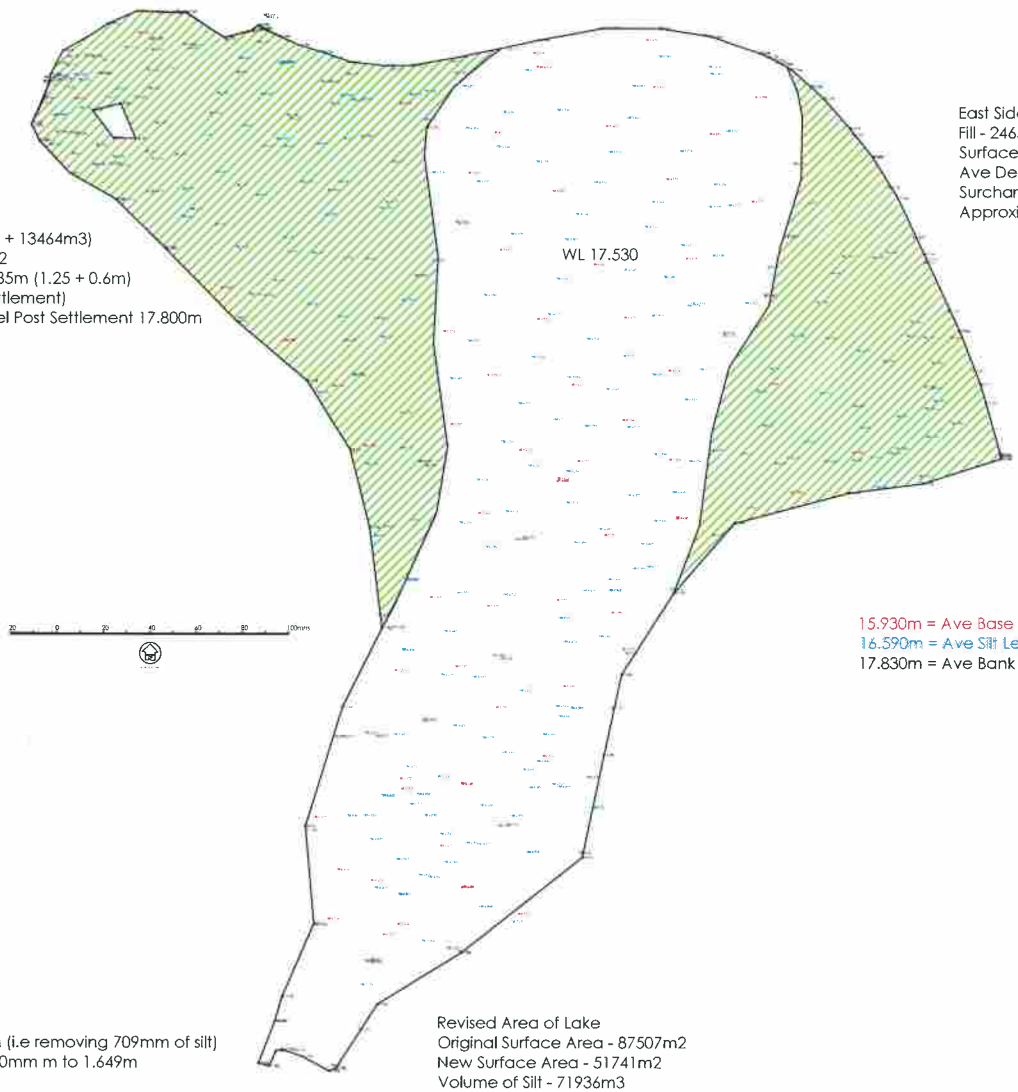
East Side
Fill - 24652 m3 (16657m3 + 7995m3)
Surface Area - 13326 m2
Ave Depth of Silt Fill - 1.85m (1.25 + 0.6m)
Surcharge - 600mm (settlement)
Approximate Finish Level Post Settlement 17.800m

West side
Fill - 41514 m3 (28050m3 + 13464m3)
Surface Area - 22440 m2
Ave Depth of Silt Fill - 1.85m (1.25 + 0.6m)
Surcharge - 600mm (settlement)
Approximate Finish Level Post Settlement 17.800m



15.930m = Ave Base level
16.590m = Ave Silt Level
17.830m = Ave Bank level

Volume of silt left in lake - 5770m3
Average depth of silt left in base - 111mm (i.e removing 709mm of silt)
Average increase in water depth from 940mm m to 1.649m

Revised Area of Lake
Original Surface Area - 87507m2
New Surface Area - 51741m2
Volume of Silt - 71936m3
Existing ave depth of Silt - 0.82m

MWE-WP-001-12-15
Wimbledon Park - Lake De-silting
Wimbledon Park
Wimbledon Park Lake Plan
1:1000 | JRM | Dec 2015

MILES WATER ENGINEERING LTD.

SCHOOL HOUSE FARM
GREAT ASHFIELD
BURY ST. EDMUNDS
SUFFOLK IP31 3HJ
PHONE 01359 242356
FAX 01359 241781

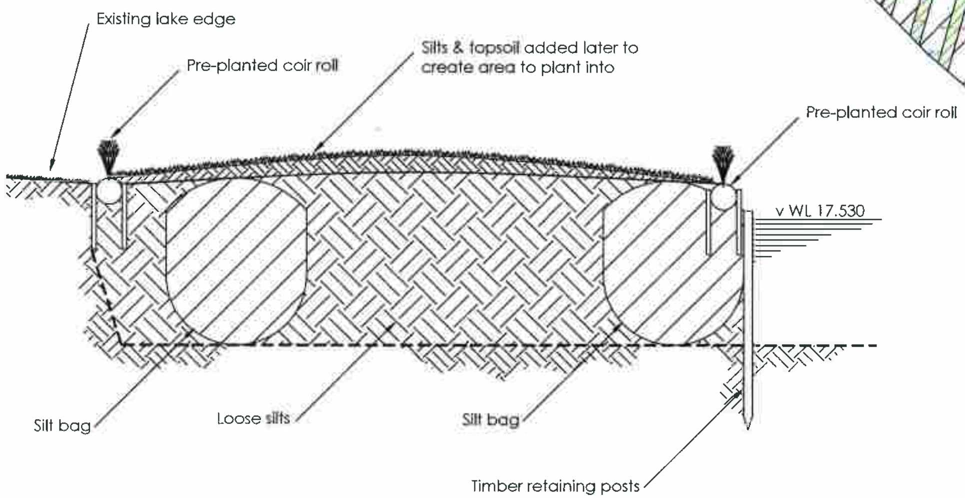
Loose silt

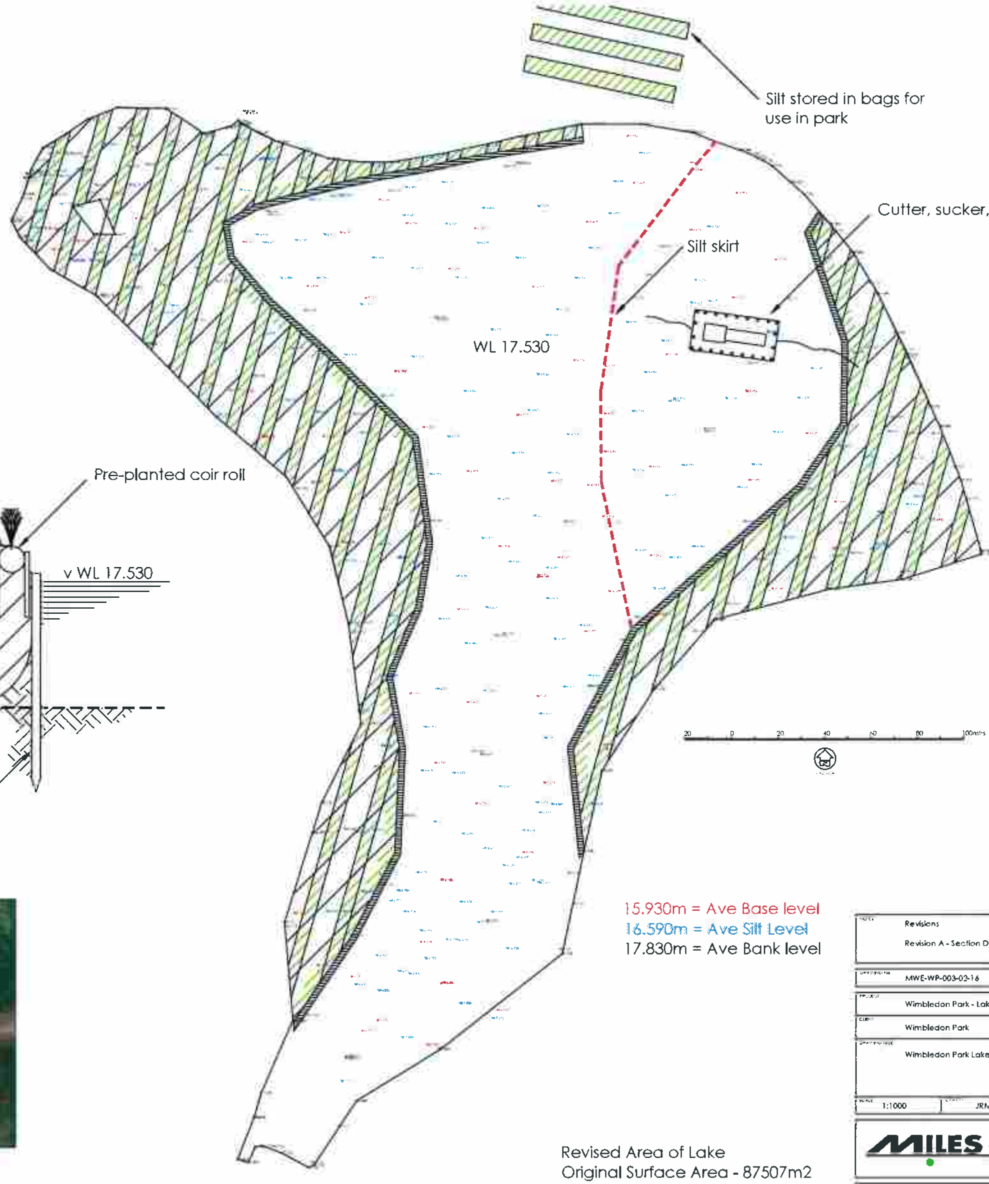
Silt bags

Timber retaining edge

West side
Fill - 37865 m3 (25585m3 + 12280m3)
Surface Area - 20468 m2
Ave Depth of Silt Fill - 1.85m (1.25 + 0.6m)
Surcharge - 600mm (settlement)
Approximate Finish Level Post Settlement 17.800m

East side
Fill - 18046 m3 (12193m3 + 5853m3)
Surface Area - 9755 m2
Ave Depth of Silt Fill - 1.85m (1.25 + 0.6m)
Surcharge - 600mm (settlement)
Approximate Finish Level Post Settlement 17.800m






Siltbags - Pre construction


Covered siltbags - Post construction

Volume of silt left in lake - 16025m3
Average depth of silt left in base - 270mm (i.e removing 550mm of silt)
Average increase in water depth from 940mm m to 1.490m

15.930m = Ave Base level
16.590m = Ave Silt Level
17.830m = Ave Bank level

Revised Area of Lake
Original Surface Area - 87507m2
New Surface Area - 57284m2
Volume of Silt - 71936m3
Existing ave depth of Silt - 0.82m

Revisions
Revision A - Section Details - JRM - 09.03.16

MWE-WP-003-02-16

Wimbledon Park - Lake De-silting

Wimbledon Park

Wimbledon Park Lake Plan

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MILES WATER ENGINEERING LTD.

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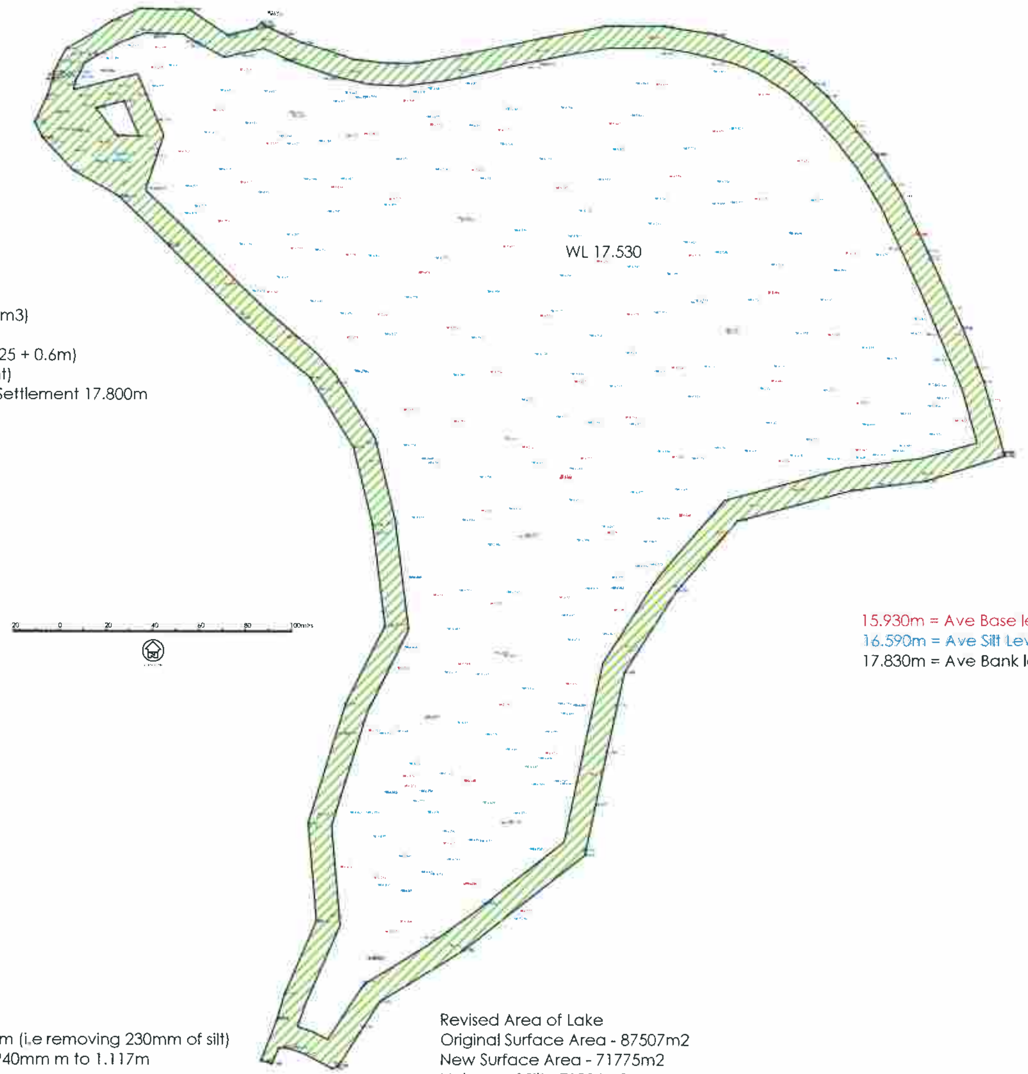
Lake Area
Fill - 29104 m3 (19665m3 + 9439m3)
Surface Area - 15732m2
Ave Depth of Silt Fill - 1.85m (1.25 + 0.6m)
Surcharge - 600mm (settlement)
Approximate Finish Level Post Settlement 17.800m



15.930m = Ave Base level
16.590m = Ave Silt Level
17.830m = Ave Bank level

Volume of silt left in lake - 42832m3
Average depth of silt left in base - 590mm (i.e removing 230mm of silt)
Average increase in water depth from 940mm m to 1.117m

Revised Area of Lake
Original Surface Area - 87507m2
New Surface Area - 71775m2
Volume of Silt - 71936m3
Existing ave depth of Silt - 0.82m

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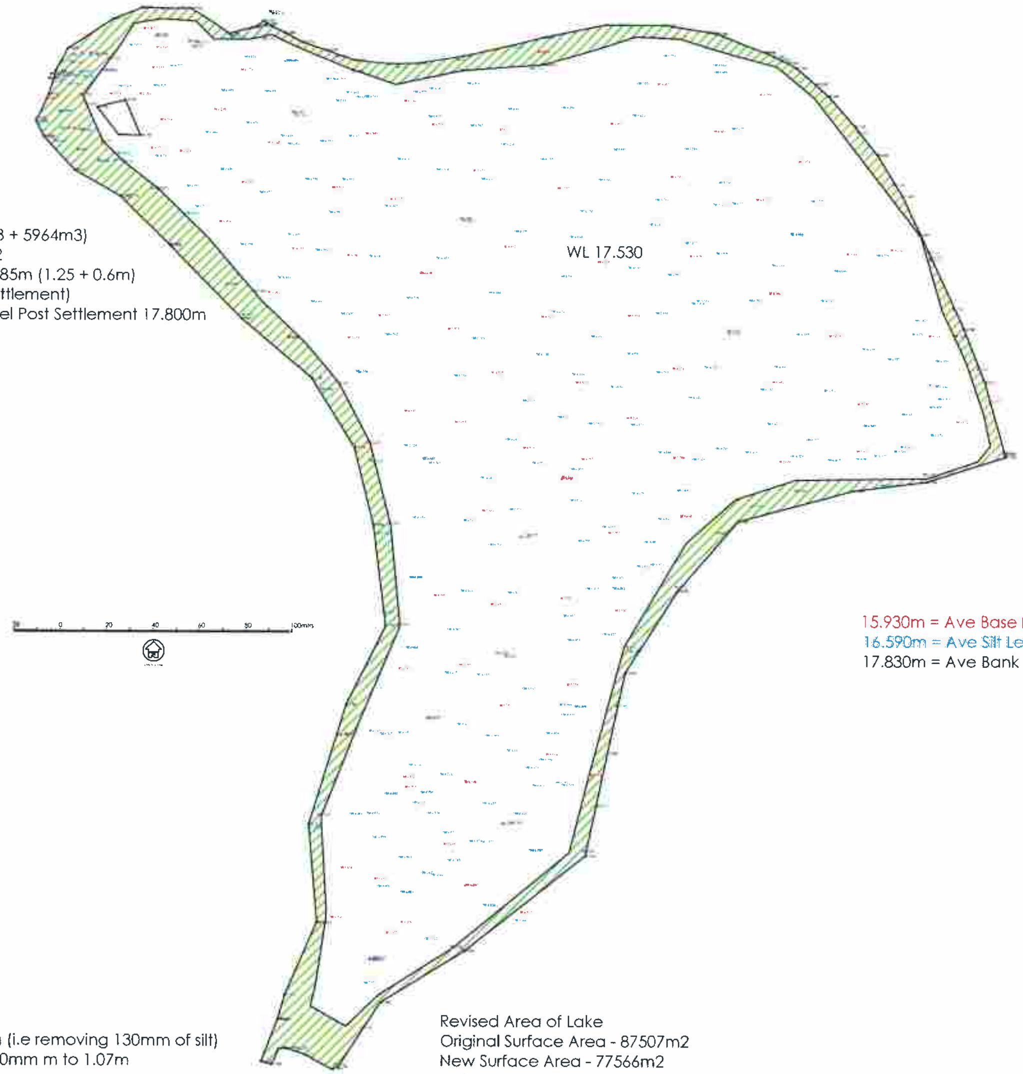
Lake Area
Fill - 18390 m3 (12426m3 + 5964m3)
Surface Area - 9941 m2
Ave Depth of Silt Fill - 1.85m (1.25 + 0.6m)
Surcharge - 600mm (settlement)
Approximate Finish Level Post Settlement 17.800m



15.930m = Ave Base level
16.590m = Ave Silt Level
17.830m = Ave Bank level

Volume of silt left in lake - 53546m3
Average depth of silt left in base - 690mm (i.e removing 130mm of silt)
Average increase in water depth from 940mm m to 1.07m

Revised Area of Lake
Original Surface Area - 87507m2
New Surface Area - 77566m2
Volume of Silt - 71936m3
Existing ave depth of Silt - 0.82m

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