# SHIPPING CONTAINER WITH OPEN FRONT SHELTER AND COVERED SEATING AREA FOR USE AS SHOP/CAFÉ AT BROWNS FARM, HENFIELD

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## WATER MANAGEMENT AND MAINTENANCE PLAN

**October 2024**

KERNON
COUNTRYSIDE CONSULTANTS LIMITED

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# WATER MANAGEMENT AND MAINTENANCE PLAN

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*Greenacres Barn, Stoke Common Lane, Purton Stoke, Swindon SN5 4LL*
*T: 01793 771333 Email: info@kernon.co.uk Website: www.kernon.co.uk*

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*Directors - **Tony Kernon** BSc(Hons), MRAC, MRICS, FBIAC **Sarah Kernon***
*Consultants – **Ellie Clark** BSc(Hons), **Amy Curtis** BSc(Hons)*

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# 1 INTRODUCTION

1.1 This water management and maintenance plan has been prepared to accompany application **DISC/24/0073** for the discharge of condition three under application **DC/22/0083**.

1.2 This report accompanies the Water Neutrality Statement to provide context on how the rainwater system will be managed.

1.3 As stated within the Guidelines for Drinking Water Quality: Small Water Supplies prepped by the World Health Organization a variety of supplies fall under the category of small water supplies. Where it states ***"These supplies may serve one household or a number of premises (e.g. households, businesses, schools and health care facilities) in rural areas, small towns.."***

1.4 Therefore this Water Management and Maintenance Plan has been prepared on the basis of the Site being treated as a small water supply.

1.5 The basis of managing and maintaining water supplies is set out in Section 4 of the Guidelines for Drinking Water Quality by the World Health Organisation which are:

- **Water supplier leadership.** Implemented directly by those who are responsible for operating and managing the water supply.
- **Prevention.** Identifying and addressing risks to prevent problems from occurring.
- **Multiple-barrier Protection.** Minimising contamination through source water protection, effective treatment (where applied) and safe distribution, storage and handling practices.
- **Progressive improvement.** Making stepwise and risk-based improvements to water safety that can be initiated with any level of available resources and continuously strengthened over time.
- **Ongoing monitoring.** Undertaking ongoing operations, maintenance and monitoring to keep water supplies safe.

1.6 Therefore this report will cover the management and maintenance information required in association with the rainwater harvesting unit at Browns Farm, Henfield.

## 2 SAMPLING AND INSPECTION

2.1 Sampling and Inspections will allow for the condition of the equipment and water to be continuously checked and monitored.

**Inspection**

2.2 The most important inspection that should take place frequently (once a week) is a sanitary inspection.

2.3 The sanitary inspection is an onsite inspection that evaluates the current risks on Site. Results from this can feed into a Risk Assessment or a Water Safety Plan (WSP). Once the risks have been identified, if there are any, then they can be controlled, managed and monitored. The inspection is carried out using a simple checklist format. The checklist is available to readily download with a full Sanitary Inspection Package from the World Health Organization from the link: https://www.who.int/publications/i/item/9789240089006

2.4 The checklists should then be retained and written copies kept as evidence if required.

2.5 When the equipment is initially installed a maintenance inspection will be carried out by the professional installing the equipment.

2.6 The equipment is designed in a way to ensure that the end user is able to carry out maintenance and inspections with no further assistance. Therefore, it is intended that the responsibility for maintenance, inspections and sampling will be of that Applicants. However, should the Applicant wish a fully trained and certified plumber could carry out the regular inspections and maintenance for them, if required.

**Sampling**

2.7 With regards to sampling it is important to note that every part of the rainwater harvesting process needs to be sampled, tested and monitored. This is because if you are solely testing the water that is directly ready for consumers to drink, by the time the contamination has been detected, consumers may have already drunk some of that water. Therefore, reliance cannot be had solely on the end product.

2.8 The priority with sampling needs to be for microbial contaminants as this is what leads to waterborne diseases.

2.9 The approach to take, as recommended by the World Health Organization is to carry out the testing of indicator organisms, with the preferred one being, *Escherichia Coli* (E. Coli).

2.10 A clear result should be that water is produced where E. Coli is not detectable within a 100mL sample.

2.11 Any sampling taken for the testing of E. Coli should also test turbidity, chlorine residual concentrate and the pH of the water.

2.12 The table below (taken from the Guidelines for drinking water quality by the World Health Organization) shows the priority parameters.

*Insert 1. Priority Parameters*

**Critical parameters related to microbial safety (all supplies)**

| Parameter[a] | Significance for microbial water quality | Occurrence in drinking-water |
|---|---|---|
| ***E. coli*** (or alternatively thermotolerant coliforms) | *E. coli* is excreted in large numbers in the faeces of humans and other warm-blooded animals. While most strains are non-pathogenic, certain strains can cause acute diarrhoea. *E. coli* is an important indicator of the presence of recent faecal contamination and associated pathogens (see Box 3.2). | Higher *E. coli* concentrations are expected in surface water and shallower groundwater sources (including those under the influence of surface water). Lower concentrations are typically found in deeper groundwater sources that are protected. |
| **Free chlorine residual** (if chlorinated) | Free chlorine residual provides an indication of microbial safety in terms of the efficacy of disinfection. Maintaining a residual throughout storage and distribution provides some protection against low-level microbial recontamination and growth, including as a result of user practices. | Added as a water treatment chemical for disinfection purposes. |
| **Turbidity** | Turbidity is caused by suspended or dissolved organic and inorganic materials. Where water treatment is applied, turbidity provides an indication of the effectiveness of particle removal processes and/or of conditions for effective disinfection (as high turbidity can interfere with disinfection processes, including chlorination). It also provides an indication of changes in source water quality and distribution network integrity, which can indicate vulnerability to microbial contamination.[b] (Acceptability issues are discussed at the end of this section.) | Higher turbidity levels are expected in surface water and shallower groundwater sources (including those under the influence of surface water), and turbidity levels tend to fluctuate with rainfall and snowmelt (e.g. seasonally). Lower levels of turbidity are typically found in deeper groundwater sources that are protected. |
| **pH** (if chlorinated) | pH is an important parameter in determining chlorination efficacy. | pH is naturally influenced by source water characteristics (including geology), and may be optimized by the addition of treatment chemicals. Contact with certain materials (e.g. cement-based storage tanks and pipes) may alter the pH. |

[a] See Tables 3.4 and 3.5 for guideline or target values.

[b] See *Water quality and health – review of turbidity (24)*.

*Sources:* adapted from WHO documents *Developing drinking-water quality regulations and standards (15)* and the GDWQ *(6)*.

2.13 The frequency of testing and sampling depends on the location and the risks that are assessed. Supplies that are serving more consumers may require more frequent testing than a singular household supply as it is exposing the risk to more people.

2.14 The frequency of the sampling will also be a reflection of the risks identified at the Site. The frequency of sampling is likely to change throughout the year as a reflection of the change in climate and how that can impact the water.

2.15 The samples should be taken from both the point of collection (i.e where the water begins to connect to the system (water tank) and the point of use (where the treated water comes out of).

2.16 Tables can be found in **Appendix KCC1**, which are from the Guidelines for drinking water quality by the World Health Organization which explain how frequently tests should be taken, the location the tests should be taken from, considerations to be had when testing and guidelines. This is the guidance that will be followed throughout the lifetime of the scheme.

2.17 Samples will be undertaken by laboratory's to ensure that the results are as accurate as possible, due to the nature of the water use.

2.18 Sampling will be undertaken by a DWI certified sampler and analysed by a UKAS accredited laboratory.

**Failed samples**

2.19 Should the samples contain too high of a quantity of the contaminant being tested for, then the water use must cease until it is dealt with accordingly. Water use will not continue at the Site until two clear samples have been provided.

## 3 DETAILS ON THE PLAN OR SCHEMATIC

3.1 The proposal seeks to put in place a rainwater harvesting system which will utilise the roof space of the existing café unit at the Site to collect the rainwater.

3.2 In order to ensure that there would be enough roof space available and the correct supply a Water Neutrality Report was undertaken by CGS Civils to calculate the requirements to ensure that the Site is not only water neutral, but also that the scheme being put forward is feasible. The Water Neutrality Report can be found in **Appendix KCC2**.

3.3 The Water Neutrality Statement concluded that the scheme is feasible, and the supply of water will be sufficient, as calculated through the general rainfall within the area and quantity of water used at the Site.

3.4 The water will then be collected and fed through a filter to remove any debris which has been collected from the roof, into a water storage tank. The tank which will be used on Site will hold up to 5000 litres of water.

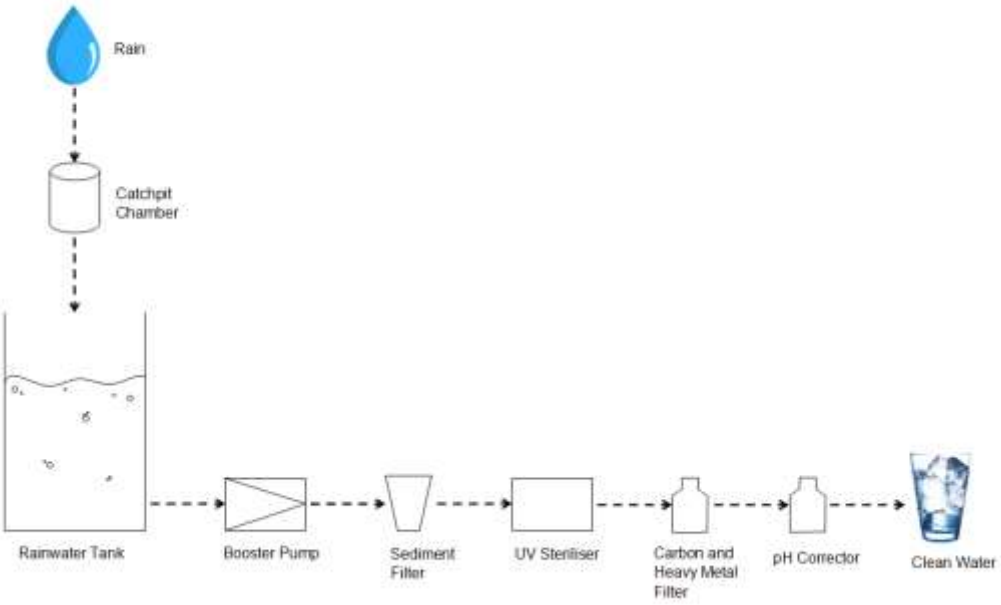
3.5 The water will go through a process for treatment, which is described in Section 4 of this document. The treatment process will ensure that the rainwater is safe for human consumption.

3.6 In order to ensure that the Applicant is able to monitor the use and consumption of water and record how much water is still remaining within the tank, a monitor can be installed on the tank. The monitor will allow the Applicant to view how much water remains in the tank as well as an average on how much water has been used from that tank during the day.

3.7 This will allow the Applicant to determine whether there will be a risk of the water availability running low to ensure if that is the case, there will be a contingency plan in place that will be actioned. The contingency plan is addressed in Section 7 of this document.

3.8 A diagram which shows how the system will work is shown below.

*Insert 2. Rainwater Harvesting Schematic Diagram*



# 4 DETAILS ON TREATMENT

4.1 The rainwater harvesting system proposed includes the collection of rainwater run off from the roof of the café. This will then feed into the water tank where it will be treated.

**Treatment of the Water and Equipment to be used**

4.2 Due to the water being collected from the roof, there is likely to be contaminants. The most common contaminants include:

- Silts;
- Dust;
- Bacteria;
- Nitrates;
- Organics; and
- Corrosive water.

4.3 Therefore a system needs to be installed that can overcome and treat each of those contaminants to ensure that it is safe for human consumption.

4.4 In order to do this initially the system will include a Catchpit Chamber. A Catchpit Chamber is designed to collect any dirt, silt or debris that could be initially within the water to prevent it going into the water tank or pipes. This will therefore remove the Silt contaminant.

4.5 The next piece of equipment will be a sediment filter. The sediment filter is designed to filter out any contaminants such as dust that may be within the water. This will therefore remove any dust contaminant from the water.

4.6 The treatment would also include the use of UV treatment, also known as the UV Steriliser. A UV steriliser enables untreated water supplies to become safe to drink by killing any bacteria or microorganisms. These are often also used for untreated water supplies such as wells, springs and boreholes. This then removes the bacteria contaminant.

4.7 There will also be a carbon and heavy metal filter put in place this will remove any metals such as nitrates from the water. This carbon element of the filter will then remove any organics. Therefore, these contaminants are removed.

4.8 Finally a PH corrector is installed this will ensure that any water going past this point is neutralised.

4.9 Each part of this process will then ensure that the water is not corrosive. Corrosive water is caused by a number of contaminants and a low PH value.

4.10 Therefore, each of the contaminants that could be an issue are treated.

4.11 In addition to the above further equipment will be installed. This includes an Aerator which will be within the rainwater tank. This will then introduce oxygen within the water tank and keeping air bubbles in the liquid much longer. By installing this it will prevent stagnation and in turn result in cleaner water.

4.12 From the water tank there will be a booster pump which will increase water pressure and ensure that the water travels through the rainwater harvesting system.

4.13 Generally any pipework chosen to be used will be substantial. The most common used pipework is the 25mm MDPE. However, the only pipework that would not be sufficient would be copper piping due to the corrosive nature of the water.

4.14 A breakdown on each piece of equipment including the specification of the equipment can be found at the back of this report in **Appendix KCC3**.

**Cleaning and Maintenance**

4.15 Cleaning and maintenance of the rainwater harvesting system will ensure the longevity of the lifespan of the system.

4.16 The key parts of the system that need to be checked and cleaned include:

- Pipework
- Filters
- Tank
- General overview

4.17 **Pipework.** The pipework will need to be checked. This means any pipework that the water is travelling through. Checking this will make sure there is nothing obstructing the water getting through the system. It is recommended that any pipework is cleaned thoroughly **every six months**.

4.18 **Filters.** The filters will need to be checked and all sediment emptied. Once emptied the filters will need to be cleaned to make sure all sediment is removed. The filters need to be **cleaned after every rainfall**.

4.19 **Tank.** A visual inspection of the tank is important to check for any stagnation (algae) that may be floating on the top of the tank. This will need to be removed if safely able to. This **will need to be completed weekly**.

4.20 **General Overview.** A general overview of the pipe work and the system needs to be carried out. This includes checking for any pooling or issues within the system where there are leeks or cracks. **This will need to be done weekly**.

4.21 Each of these checks and monitoring can be carried out by any member of staff. Training will be required for any new member of staff to ensure cleaning is carried out thoroughly. Training will be provided by the Applicant.

4.22 The maintenance throughout the lifetime of the development will be the responsibility of the Applicant. Should any issues arise during an inspection from a member of staff then this should be reported to the Applicant directly so that it can be dealt with accordingly.

4.23 Should at any time the system become deactivated due to lack of use or rainfall then it needs to be thoroughly cleaned before being completely emptied to ensure no bacteria or sediment is left in the equipment.

4.24 Depending on the length of time that the equipment has been left unused then prior to the equipment coming back into use and the water from the tank being used for human consumption, the equipment will be required to be thoroughly cleaned again.

# 5 RISK ASSESSMENT AND WATER SAFETY PLANS

5.1 A risk assessment is required to determine the potential risks with regards to the equipment used.

5.2 As stated within the Private Water Supply (England) Regulations (2016) a Regulation 6 Risk Assessment is required to be completed by a suitably competent person prior to the water supply being put into use.

5.3 The Risk Assessment and Water Safety Plans will be used following the guidance issued by the World Health Organization and will be prepared and completed by the water specialist who installs and monitors the equipment.

5.4 An example of the forms that will be used can be found in **Appendix KCC4.**

## 6 WATER SUPPLY

6.1 It must be considered where the water supply will come from should we find ourselves in a position where we have not had rain for 35 days continuously. As this would mean that no water is being collected to be harvested and used.

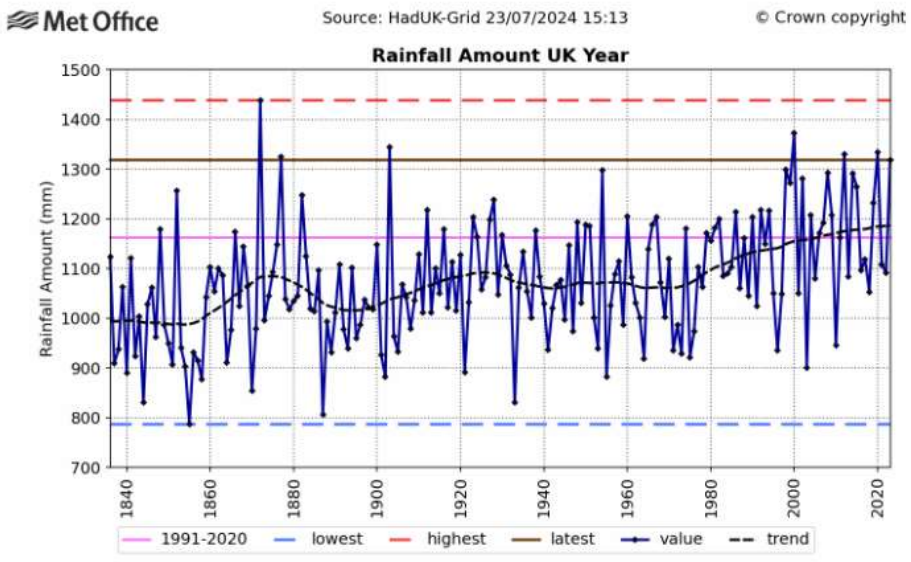
6.2 It has been explained previously in the Water Neutrality Report (which can be found in **Appendix KCC2**) that the estimate water usage of the development will be approximately 50 litres of water per day.

6.3 The water tank to be installed will be a 5000 litre rainwater harvesting tank. Initially for the installation the Applicant will import water from a region that falls outside the Sussex North Water Resource Zone. The proposed size of tank and equipment will allow for a 60 day drought period. Thus, providing a contingency for well in excess of a 35-day period without rain.

6.4 Rainfall has to be assessed to determine the risk that the contingency of a larger tank may not be acceptable. When looking at climatic data sets from the Met Office for the UK. It can be seen that we are seeing increases in the quantity of rainfall. With the lowest amount of rainfall recorded in the latest years being just under 1,100 mm which is dramatically different from the results from between 1850-1860, where the lowest results were approximately 800mm of rainfall. This can be seen on the graph below.

6.5 Thus, showing a larger contingency tank is not necessary.

*Insert 3. Average Rainfall per year for the UK*

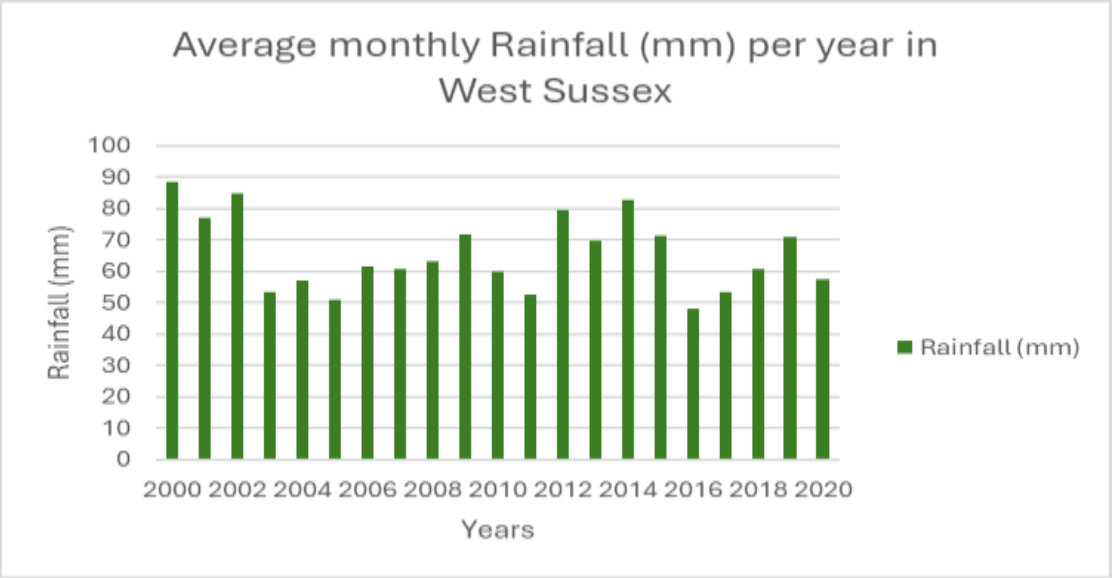


6.6 From this we can determine that we are seeing national increases in rainfall land lower risks of periods of drought.

6.7 It must be noted that these results are national. Therefore, an assessment has been made using the UK climate averages from the Met Office for West Sussex to determine the fluctuations in the rainfall levels each year over a 20 year period.

6.8 The results found that whilst the results have fluctated the lowest average recording was taken from 2016 when an average of 50mm of rainfall was measured per month. Therefore, we can determine that it is unlikley there would be a period where there would be concern for water levels.

*Insert 4. Average monthly rainfall per year in West Sussex*




6.9 Recognising that there does need to be a contingency in place an emergency connection to the mains water will be supplied and use monitored. This will not affect the rainwater neutrality issues as there is no expectation that the Applicant will be required use to the mains. However, should there be an unfortunate situation where it is that we are going more than 35 days without rain, then the Applicant will be required to supply water from off of the Site, which may have to come from a mains source (away from the Site itself).

## 7 CONTINGENCY PLANNING

7.1 A contingency plan will be in situ should there be an issue with the water supply at the Site.

7.2 Should a member of staff have any concerns with the water supply, this should be reported to the Applicant at any time. This will then trigger an investigation into the water system immediately.

7.3 Should the issues not be able to be remedied within a 24 hour period internally by the Applicant, then contact will be made to the most appropriate body for assistance. At this time, a timeframe will be provided for the rectification of the issue.

7.4 Should an investigation need to be undertaken and actions taken the Applicant will inform the LPA of such actions and timeframes for the restoration of the supply.

7.5 Should water be unavailable for a short period of time (24-48 hours) then bottled water, purchased from a wholesaler will be used to ensure no unnecessary use. However, if it is longer than the 24–48-hour window, then contact will be made to the Local Authority to discuss next steps.

7.6 As stated previously, a system will be in situ with a connection to water mains, if required in the case of an emergency. Therefore, it will be for the Council to confirm:

i) whether the use of the mains water would be sufficient; or

ii) whether it would be appropriate for the Applicant to continue to purchase and use bottled water from a wholesaler.

## 8 RECORDING

8.1 The use of the water equipment as well as the safety of the water being stored and used will be monitored and tested frequently.

8.2 All of the testing and checks will be recorded to ensure that in the case of any unforeseen circumstances or issues, there is a written record which includes the following:

(i) **Date**. The date when the testing/check had taken place

(ii) **Result.** The result of the testing/check

(iii) **Action.** Commentary on whether any further action is required.

(iv) **Identification.** The name and signature of the person who undertook the test/check of the equipment.

8.3 The following information will be recorded and available as evidence if required.

8.4 **General inspections.** This includes the regular inspections carried out by the Applicant or a member of staff to ensure that there are no issues with the equipment that has been installed or anything that needs to be noted such as a leak in the system or a low quantity of water available.

8.5 **Inspection of equipment by other professional bodies.** Any inspections of equipment by professional bodies will be recorded and details held on file. This will include events where the Applicant has asked for maintenance or other professional bodies to carry out works to the equipment.

8.6 **Sampling/Testing.** Any sampling or testing that has taken place will be recorded. This will be to assist the Applicant with ensuring that all sampling and testing is up to date and to be able to review when a test was previously done to see if it is due again. This information will also be of assistance in the case of an issue or an outbreak as evidence that the Applicant has had tests done. The date of a clear test to the date of the issue can pin point when the issue began or how long it has been ongoing.

8.7 **Results and Analysis.** Results and analysis of the sampling and testing will be held on file. The requirement for this is similar to that of the sampling and testing information.

8.8 **Concerns and Comments.** Any concerns and comments with the system will be recorded. This includes any slight differences in the running of the system. This means

that if there are a number of recordings of concerns that are of a similar nature, the Applicant will know that the system needs to be investigated further.

8.9 Overall, the recording will allow the Applicant to monitor the running of the system, as well as it providing evidence of the upkeep of the system and the general maintenance and testing of the water.

8.10 All of this recording will be retained for a minimum of seven years for review if required.

# 9 KEY ADDRESS

9.1 Overall, the key points to take away from the document are listed in turn.

9.2 **Sampling and Inspection**

(i) an inspection should take place once a week;

(ii) the frequency of the sampling will be dependent on the risk assessment;

(iii) sampling will be undertaken at a laboratory to ensure accurate results; and

(iv) any failed samples will mean water use is ceased until the issue is rectified.

9.3 **Treatment**

(i) the treatment of the water will ensure that it is safe for human consumption;

(ii) the cleaning of the system will ensure the longevity of the system;

(iii) the pipework will need to be cleaned every six months;

(iv) the filters will need to be cleaned after every rainfall; and

(v) a visual inspection of the equipment will need to be carried out weekly.

9.4 **Risk Assessment**

(i) a risk assessment will be carried out by the installer of the equipment on the date of which the equipment is installed; and

(ii) the risk assessment will provide details including when sampling and inspections should take place dependent on the risks on site.

9.5 **Recording**

(i) all information regarding the equipment, installation, testing and sampling will be held on file, including invoices, services and the risk assessment;

(ii) any sampling or testing undertaken on site will be recorded and information such as the date, result, action required and who undertook the work will be noted;

(iii) recorded data will include general inspections, inspection of equipment by other professional bodies, sampling/testing, results and analysis and any concerns or comments that need to be noted; and

(iv) all records will be retained for seven years.

## Appendix KCC1.
## Sampling Guidelines

Table 3.4 • *E. coli* monitoring: considerations, locations and minimum frequencies according to water supply type

| ***E. coli* (or alternatively, thermotolerant coliforms)** | |
|---|---|
| Guideline value | Not detectable in any 100 mL sample (see section 7.4 of the GDWQ *(6)*) |
| Guideline value considerations | Consider an appropriate grading scheme for non-complying water quality test results which links to prioritizing action for progressive improvement. See section 5.3.5 for guidance. |

| Minimum monitoring frequency[a] | | |
|---|---|---|
| **Household managed** | **Community managed** | **Professionally managed** |
| Once initially.[b]<br>Thereafter, periodically at a suitable frequency. | *Less management capacity:* 1–2 times per year, capturing seasonal variability.<br>*More management capacity:* once per month to once per 3 months. | Once per month. |
| **Frequency considerations** | | |
| *E. coli* should be routinely monitored in all water supplies if possible.<br>If microbial testing cannot be carried out at the recommended frequency, consider testing on a rotational basis in line with guidance in Box 3.4. Also, see Table 3.5 for guidance on complementary monitoring strategies to provide an indication of water quality between microbial monitoring events.<br>More frequent monitoring of surface water and shallow groundwater sources (including those under the influence of surface water) may be required as compared to deeper groundwater sources, given their greater vulnerability to microbial contamination, e.g. from surface run-off following rain. More frequent monitoring is also required in situations such as known or suspected outbreaks of waterborne disease, extreme weather events and natural disasters. | | |

| Minimum sample number (per sampling event) | | |
|---|---|---|
| **Household managed** | **Community managed** | **Professionally managed** |
| One sample from the monitoring location indicated. | *For non-piped supplies:* one sample from the monitoring location indicated.<br>*For piped supplies:* see professionally managed. | *<5000 population:* one sample from the monitoring locations indicated.<br>*>5000 population:* one sample per 5000 population from the monitoring locations indicated. |

Table 3.4 continued • *E. coli* monitoring: considerations, locations and minimum frequencies according to water supply type

| *E. coli* (or alternatively, thermotolerant coliforms) | | |
|---|---|---|
| **Monitoring locations**[c] | | |
| **Household managed** | **Community managed** | **Professionally managed** |
| Point of collection. | *For non-piped supplies:* point of collection.<br>*For piped supplies:* see professionally managed. | Point(s) of delivery,[d] which may include:<br>– consumer water meters or taps<br>– tapstands<br>– water kiosks<br>– water carters.<br>Additional locations may include:<br>– point of exit from treatment plant or entry point to the distribution network (e.g. if water treatment is not in place);<br>– point of exit from network water storages; and<br>– other accessible points throughout the distribution network for representation throughout the network. |
| **Monitoring location considerations** | | |
| Point of collection refers to the outlet of the abstraction device (e.g. outlet of a hand pump or a user tap where a private well is piped to premises).<br>Consider designated monitoring locations that account for denser population zones, vulnerable populations (e.g. schools, health care facilities, informal settlement areas) and known higher-risk zones (e.g. extremities and low-use areas of the network). For piped supplies, sampling from designated monitoring locations may be conducted on a rotational basis for optimal network coverage.<br>Flexibility may be needed to accommodate scenarios in which multiple water sources are used seasonally (e.g. changes between piped and non-piped sources of water used at different times of the year). | | |

[a] See Box 3.4 for more guidance on monitoring frequencies, including guidance related to the range of monitoring frequencies presented, and on testing sites on a rotational basis as needed.
[b] Once initially may include monitoring before commissioning of new supplies, or an initial sample for supplies that are already in operation but were not tested before commissioning.
[c] If the point of use is different from the point of collection (or point of delivery), see Table 3.3 for considerations related to additional sampling at the point of use (to understand the impact of user practices).
[d] Where there are multiple points of delivery within the one system, these should be tested on a rotational basis.

Table 3.5 • Turbidity, free chlorine residual and pH monitoring: considerations, locations and minimum frequencies according to water supply type

| Turbidity<br>Free chlorine residual and pH (if chlorinated) | |
|---|---|
| Target values | Turbidity: <1 NTU (nephelometric turbidity unit) for effective disinfection[a] (see section 10.2 of the GDWQ *(6)*)<br>Free chlorine residual: ≥0.2 mg/L (see section 7.3.2 of the GDWQ)<br>pH: 6.5–8.5 (noting that the optimum pH varies depending on the context; see section 10.2 of the GDWQ) |
| Target value considerations | **Turbidity:** High turbidity in drinking-water can harbour microbial pathogens and reduce the efficacy of disinfection (e.g. chlorination, ultraviolet light disinfection).<br>From a health perspective, if <1 NTU for effective disinfection is not achievable, the aim should be to keep turbidity below 5 NTU. In these cases, higher disinfection doses and/or contact times will be required to ensure that adequate disinfection is achieved. Above 5 NTU, disinfection should still be practised.<br>Consider the aesthetic impact in addition to the health impacts. Turbidity levels >4 NTU can be visible (i.e. give a cloudy appearance to the water), which may result in user rejection of the drinking-water for aesthetic reasons. Users may then search for more acceptable but potentially less safe water.<br>For more information, see *Water quality and health – review of turbidity (24)*.<br>**Free chlorine residual:** To ensure effective disinfection, sufficient contact time between free chlorine and the drinking-water must be ensured (e.g. 0.5 mg/L for at least 30 minutes at pH less than 8). Other factors also impact chlorine effectiveness, including turbidity and water temperature. Contact times and/or disinfection doses should be adjusted as necessary to ensure adequate disinfection.<br>Before disinfection, it is important to remove as much organic matter as possible (including keeping turbidities <1 NTU). This will not only improve disinfection efficacy (e.g. lower doses and/or contact times will be required), but also minimize formation of disinfection by-products.<br>To provide a degree of protection against low levels of microbial contamination during distribution and storage, including as a result of user practices, a minimum free chlorine residual of 0.2 mg/L is recommended at the point of delivery for piped supplies with household connections, or at the point of use for non-piped supplies.[b] User acceptability should also be considered when determining the optimal free chlorine residual concentration.<br>For points of delivery that require transportation by water users (e.g. tapstand or water kiosk), the free chlorine residual concentration should be higher (e.g. at least 0.5 mg/L) at the delivery point to allow for chlorine decay during user transport, and subsequent storage and handling at the household level. User acceptability should also be considered when determining the optimal free chlorine residual concentration.<br>**pH:** For effective chlorination, the pH of drinking-water should be less than 8. However, to balance other considerations, including corrosion control, the optimum pH for a water supply is generally considered to be between pH 6.5 and 8.5. |

Table 3.5 continued • Turbidity, free chlorine residual and pH monitoring: considerations, locations and minimum frequencies according to water supply type

**Turbidity**
**Free chlorine residual and pH (if chlorinated)**

**Minimum monitoring frequency**

As per *E. coli* (see Table 3.4).

**Frequency considerations**

Testing of turbidity and, where chlorination is practised, free chlorine residual and pH should be conducted in parallel to microbial testing.

For chlorinated systems where microbial testing cannot be carried out at the recommended frequency, free chlorine residual testing should still be carried out (ideally combined with testing for turbidity and pH to understand if conditions are optimal for effective chlorination) to provide an indication of water quality between microbial monitoring events.

More frequent monitoring may be required as the situation demands (e.g. following an outbreak of waterborne disease or extreme weather events).

**Minimum sample number (per sampling event)**

As per *E. coli* (see Table 3.4).

**Monitoring locations**

As per *E. coli* (see Table 3.4).

[a] For optimal disinfection, larger, well run, higher-capacity water supplies with filtration should aim to achieve turbidities of <0.5 NTU at all times, with average turbidities of ≤0.2 NTU.

[b] During outbreaks of waterborne disease, or when faecal contamination of a drinking-water supply is detected, the concentration of free chlorine should be increased to at least 0.5 mg/L throughout the system as a minimum immediate response.

Table 3.6 • Arsenic and fluoride monitoring: considerations, locations and minimum frequencies according to water supply type

| Arsenic and fluoride (where prioritized)[a] | | |
|---|---|---|
| Guideline values | Arsenic: 0.01 mg/L (provisional; see Chapter 12 of the GDWQ *(6)*)<br>Fluoride: 1.5 mg/L (see Chapter 12 of the GDWQ) | |
| Guideline value considerations | The guideline value for arsenic is provisional, and is based on the difficulties with removing arsenic to lower levels using conventional water treatment. | |
| **Minimum monitoring frequency** | | |
| Household managed | Community managed[b] | Professionally managed[b] |
| Once initially.[c]<br>Thereafter as the situation demands (see frequency considerations). | 1–2 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). | 2–4 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). |
| Frequency considerations | | |
| If elevated levels of arsenic or fluoride are detected, more frequent monitoring may be required.<br>Situations that may demand more frequent monitoring include the presence of polluting activities (e.g. mining or industry), changes in catchment land use and changes in environmental conditions.<br>More frequent monitoring of groundwater may be required compared to surface water, as groundwater sources are typically more vulnerable to arsenic and fluoride contamination. Shallower bores may be prone to greater variation than deeper bores.<br>If possible, sampling events should alternate between the wet and dry seasons to capture seasonal variability. | | |
| **Minimum sample number (per sampling event)** | | |
| Household managed | Community managed | Professionally managed |
| One sample from the monitoring location indicated. | One sample from the monitoring locations indicated. | |

**Table 3.6 continued** • Arsenic and fluoride monitoring: considerations, locations and minimum frequencies according to water supply type

| Arsenic and fluoride (where prioritized)[a] | | |
|---|---|---|
| **Monitoring locations** | | |
| **Household managed** | **Community managed** | **Professionally managed** |
| Point of collection. | *No water treatment plant*: point of collection.<br>*With water treatment plant*: point of exit from treatment plant. | |
| **Monitoring location considerations** | | |
| Point of collection refers to the outlet of the abstraction device (e.g. outlet of hand pump or a user tap where a private well is piped to premises). | | |

[a] A risk assessment should be conducted to determine if this parameter is likely to occur at concentrations of concern and, therefore, should be prioritized for compliance monitoring (see Table 3.2). Geostatistical modelling can help identify potential areas of concern (for example, see https://www.gapmaps.info), although it is not a substitute for water quality testing.

[b] See Box 3.4 for more guidance on monitoring frequencies, including guidance related to the range of monitoring frequencies presented, and on testing sites on a rotational basis as needed.

[c] Once initially may include monitoring before commissioning of new supplies, or an initial sample for supplies that are already in operation but were not tested before commissioning.

Table 3.7 • Lead monitoring: considerations, locations and minimum frequencies according to water supply type

| Lead (where prioritized)[a] | | |
|---|---|---|
| Guideline value | 0.01 mg/L (provisional; see Chapter 12 of the GDWQ *(6)*) | |
| Guideline value considerations | The guideline value for lead is provisional, and is based on the difficulty of removing lead to lower levels using conventional water treatment when lead-containing materials are in contact with drinking-water.[b] | |
| **Minimum monitoring frequency** | | |
| Household managed | Community managed[c] | Professionally managed[c] |
| Once initially.[d]<br>Thereafter as the situation demands (see frequency considerations). | *For non-piped supplies:* once every 2–3 years.<br>*For piped supplies:* 1–2 times per year from the monitoring locations indicated. | Once per month to once per year from the monitoring locations indicated. |
| **Frequency considerations** | | |
| If elevated levels of lead are detected, more frequent monitoring may be required.<br>Situations that may demand more frequent monitoring include the presence of polluting activities (e.g. mining or industry); changes in catchment land use; changes in water quality characteristics that may affect lead release or corrosion (e.g. related to pH; presence of iron or manganese oxides, which may be evidenced by discolouration of the water); and changes in water abstraction or plumbing materials/fittings. For piped supplies, additional lead monitoring should ideally be conducted after events that may affect lead release in the distribution network, including changes in water treatment processes and water sources.<br>When elevated lead is detected in drinking-water, a systematic investigation including additional sampling and analysis is usually needed to better understand exposure (including whether other properties or hand pumps are affected) and the contamination source, and to inform corrective actions. This could include taking a flushed sample from the tap or hand pump outlet where the elevated lead concentration was detected to better understand exposure from that site and to guide prioritization for more resource-intensive corrective action. | | |
| **Minimum sample number (per sampling event)** | | |
| Household managed | Community managed | Professionally managed |
| One to two samples from the monitoring locations indicated. | | |

Table 3.7 continued • Lead monitoring: considerations, locations and minimum frequencies according to water supply type

## Lead (where prioritized)[a]

### Sample number considerations

The sampling protocol to adopt, including sampling numbers (e.g. first draw requires one sample; random daytime sampling requires one sample; 30 minutes stagnation requires two samples) should depend on regulatory requirements and the objective of the analysis, recognizing that lead concentrations in water can be influenced by the sampling protocol.

### Monitoring locations

| Household managed | Community managed | Professionally managed |
|---|---|---|
| Point of collection. | *For non-piped supplies:* point of collection.<br>*For piped supplies:* point of delivery (e.g. tapstand, kiosk, consumer tap).[e] | |

### Monitoring location considerations

Point of collection refers to the outlet of the abstraction device (e.g. outlet of hand pump or a user tap where a private well is piped to premises).

Consideration should be given to facilities serving vulnerable groups (childcare centres, schools, etc.) or areas/supply types suspected of being at greatest risk of contamination (e.g. premises with lead service pipes or in low-use areas). More extensive areas or systems may need to be subdivided into zones for sampling purposes (e.g. divided based on geography, supply type or water quality).

As lead concentrations in drinking-water can vary significantly, the sampling protocol to adopt should depend on regulatory requirements and objectives of the analysis.

[a] A risk assessment should be conducted to determine if this parameter is likely to occur at concentrations of concern and, therefore, should be prioritized for compliance monitoring (see Table 3.2).

[b] In water supplies where lead does not originate from the source water, the most effective means of controlling lead levels is through the use of certified lead-free or low-lead materials and the proper installation of parts for new construction and repairs. Standards limiting the amount of lead that is permitted in products and materials used in drinking-water supplies should be included in regulations (see section 3.3.9), and water quality monitoring should be carried out to verify that compliant materials are being used. Where lead-containing materials have already been installed, the principal remedy is the removal of these materials. Given this takes time and resources, other practical measures to reduce lead concentrations in drinking-water should be implemented in the interim, including the use of corrosion inhibitors, flushing and point-of-use water treatment. For more information on developing monitoring strategies and corrective actions, see *Lead in drinking-water: health risks, monitoring and corrective actions (27)*.

[c] See Box 3.4 for more guidance on monitoring frequencies, including guidance related to the range of monitoring frequencies presented, and on testing sites on a rotational basis as needed.

[d] Once initially may include monitoring before commissioning of new supplies, or an initial sample for supplies that are already in operation but were not tested before commissioning.

[e] Where there are multiple points of delivery within the one system, these should be inspected on a rotational basis.

Table 3.8 • Manganese monitoring: considerations, locations and minimum frequencies according to water supply type

| Manganese (where prioritized)[a] | | | |
|---|---|---|---|
| Guideline value | 0.08 mg/L (provisional; see Chapter 12 of the GDWQ *(6)*) | | |
| Guideline value considerations | The guideline value for manganese is provisional because of the use of a high composite uncertainty factor (i.e. 1000) to calculate the guideline value. When manganese levels are approaching or exceed the guideline value, see Chapter 12 of the GDWQ for guidance on actions to consider.<br>Consider the aesthetic impact in addition to the health impacts. Concentrations >0.02 mg/L can cause discoloured water and staining of plumbing fixtures and laundry. Where manganese treatment is in place, aesthetic issues may indicate that treatment is not optimized or that the distribution system is not appropriately managed. | | |
| Minimum monitoring frequency | | | |
| Household managed | Community managed[a] | Professionally managed[b] | |
| Once initially.[c]<br>Thereafter as the situation demands (see frequency considerations). | 1–2 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). | 2–4 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). | |
| Frequency considerations | | | |
| If elevated levels of manganese are detected, more frequent monitoring may be required.<br>Situations that may demand more frequent monitoring include the presence of polluting activities (e.g. mining or industry), changes in catchment land use, discolouration of water, and reports of staining or release of deposits.<br>Surface water (or groundwater under the influence of surface water) may need to be monitored more frequently than deeper groundwater sources because surface water is typically more prone to high and variable concentrations of manganese. In general, manganese concentrations are stable between seasons in groundwater but may vary between wells near to each other.<br>For surface water and shallow groundwater sources, sampling events should ideally alternate between the wet and dry seasons to capture seasonal variability. | | | |

Table 3.8 • Manganese monitoring: considerations, locations and minimum frequencies according to water supply type

| Manganese (where prioritized)[a] | | | |
|---|---|---|---|
| Guideline value | 0.08 mg/L (provisional; see Chapter 12 of the GDWQ *(6)*) | | |
| Guideline value considerations | The guideline value for manganese is provisional because of the use of a high composite uncertainty factor (i.e. 1000) to calculate the guideline value. When manganese levels are approaching or exceed the guideline value, see Chapter 12 of the GDWQ for guidance on actions to consider.<br>Consider the aesthetic impact in addition to the health impacts. Concentrations >0.02 mg/L can cause discoloured water and staining of plumbing fixtures and laundry. Where manganese treatment is in place, aesthetic issues may indicate that treatment is not optimized or that the distribution system is not appropriately managed. | | |
| Minimum monitoring frequency | | | |
| Household managed | Community managed[a] | Professionally managed[b] | |
| Once initially.[c]<br>Thereafter as the situation demands (see frequency considerations). | 1–2 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). | 2–4 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). | |
| Frequency considerations | | | |
| If elevated levels of manganese are detected, more frequent monitoring may be required.<br>Situations that may demand more frequent monitoring include the presence of polluting activities (e.g. mining or industry), changes in catchment land use, discolouration of water, and reports of staining or release of deposits.<br>Surface water (or groundwater under the influence of surface water) may need to be monitored more frequently than deeper groundwater sources because surface water is typically more prone to high and variable concentrations of manganese. In general, manganese concentrations are stable between seasons in groundwater but may vary between wells near to each other.<br>For surface water and shallow groundwater sources, sampling events should ideally alternate between the wet and dry seasons to capture seasonal variability. | | | |

Table 3.8 continued • Manganese monitoring: considerations, locations and minimum frequencies according to water supply type

| Manganese (where prioritized)[a] | | |
|---|---|---|
| **Minimum sample number (per sampling event)** | | |
| Household managed | Community managed | Professionally managed |
| One sample from the monitoring location indicated. | One sample from the monitoring locations indicated. | |
| **Monitoring locations** | | |
| Household managed | Community managed | Professionally managed |
| Point of collection. | *No water treatment plant:* point of collection.<br>*With water treatment plant:* point of exit from the treatment plant. | |
| **Monitoring location considerations** | | |
| Point of collection refers to the outlet of the abstraction device (e.g. outlet of a hand pump or a user tap where a private well is piped to premises).<br>For piped supplies where there are dirty water problems, this could indicate that treatment for manganese removal is not optimized or that the distribution system is not appropriately managed. Where resources permit, monitoring within the distribution network and point of delivery (e.g. tapstand, consumer tap) may also be considered since manganese can accumulate within the distribution system and be released at the point of collection (which may not always result in dirty water problems). | | |

[a] A risk assessment should be conducted to determine if this parameter is likely to occur at concentrations of concern and, therefore, should be prioritized for compliance monitoring (see Table 3.2).

[b] See Box 3.4 for more guidance on monitoring frequencies, including guidance related to the range of monitoring frequencies presented, and on testing sites on a rotational basis as needed.

[c] Once initially may include monitoring before commissioning of new supplies, or an initial sample for supplies that are already in operation but were not tested before commissioning.

**Table 3.9 • Nitrate monitoring: considerations, locations and minimum frequencies according to water supply type**

| Nitrate (where prioritized)[a] | | | |
|---|---|---|---|
| Guideline value | 50 mg/L as nitrate ion ($NO_3^-$; see Chapter 12 of the GDWQ *(6)*) | | |
| Guideline value considerations | When nitrate levels are approaching or exceed the guideline value, see Chapter 12 of the GDWQ for guidance on actions to consider.[b] | | |
| **Minimum monitoring frequency** | | | |
| Household managed | Community managed[c] | Professionally managed[c] | |
| Once initially.[d]<br>Thereafter as the situation demands (see frequency considerations). | 1–2 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). | 2–4 times per year, capturing seasonal variability.<br>After a stable 3-year trend has been established that is consistently below the guideline value, this can be reduced, and should be increased as the situation demands (see frequency considerations). | |
| Frequency considerations | | | |
| If elevated levels of nitrate are detected, more frequent monitoring may be required.<br>Situations that may warrant more frequent monitoring include the presence of polluting activities (e.g. agriculture, human settlement and waste management, including in the event of known failures), changes in catchment land use, drought and over-abstraction locally.<br>Monitoring programmes should consider both groundwater and surface water sources. In particular, shallow wells located in agricultural areas or near sanitation facilities may require more frequent monitoring. More frequent monitoring of surface water supplies where elevated levels of nitrate are detected may also be required, since nitrate levels in surface water can change quickly. Piped supplies in areas where there are higher levels of naturally occurring ammonia may also require more frequent monitoring. In contrast, nitrate levels in groundwater not heavily influenced by surface water usually change very slowly, so less frequent monitoring of these supplies may be required.<br>Seasonal variability in relation to human activities should be captured (e.g. monitoring at times of the year when fertilizer application is known to occur). | | | |

**Table 3.9 continued · Nitrate monitoring: considerations, locations and minimum frequencies according to water supply type**

| Nitrate (where prioritized)[a] | | |
|---|---|---|
| **Minimum sample number (per sampling event)** | | |
| **Household managed** | **Community managed** | **Professionally managed** |
| One sample from the monitoring location indicated. | One sample from the monitoring locations indicated. | |
| **Monitoring locations** | | |
| **Household managed** | **Community managed** | **Professionally managed** |
| Point of collection. | *No water treatment plant:* point of collection.<br>*With water treatment plant:* point of exit from the treatment plant. | |
| **Monitoring location considerations** | | |
| Point of collection refers to the outlet of the abstraction device (e.g. outlet of a hand pump or a user tap where a private well is piped to premises). | | |

[a] A risk assessment should be conducted to determine if this parameter is likely to occur at concentrations of concern and, therefore, should be prioritized for compliance monitoring (see Table 3.2).

[b] Where nitrite is deemed to be a concern (see Table 3.2), the combined nitrate/nitrite guideline value should be considered (see the GDWQ *(6)*).

[c] See Box 3.4 for more guidance on monitoring frequencies, including guidance related to the range of monitoring frequencies presented, and on testing sites on a rotational basis as needed.

[d] Once initially may include monitoring before commissioning of new supplies, or an initial sample for supplies that are already in operation but were not tested before commissioning.

## Appendix KCC2.
## Water Neutrality Statement

cgs civils

Consulting Civil Engineers

# Water Neutrality Report

**The Café, Browns Field, Hollands Lane, Henfield, West Sussex BN5 9UX**

**For**

**Mr Kieran Berrett**

Rev – **P1**

Reference **C2212**

Date **23rd August 2022**

| Revision | Date of Issue | Comments | Prepared By | Checked By |
|---|---|---|---|---|
| P | 08.07.2022 | Initial Issue | LH | CS |
| **P1** | 23.08.2022 | Revised | LH | CS |
| | | | | |

Richard Cobden House, Lion Street, Chichester, West Sussex, PO19 1LW
Tel: 01243 933253 E: mail@cgscivils.co.uk W: www.cgscivils.co.uk

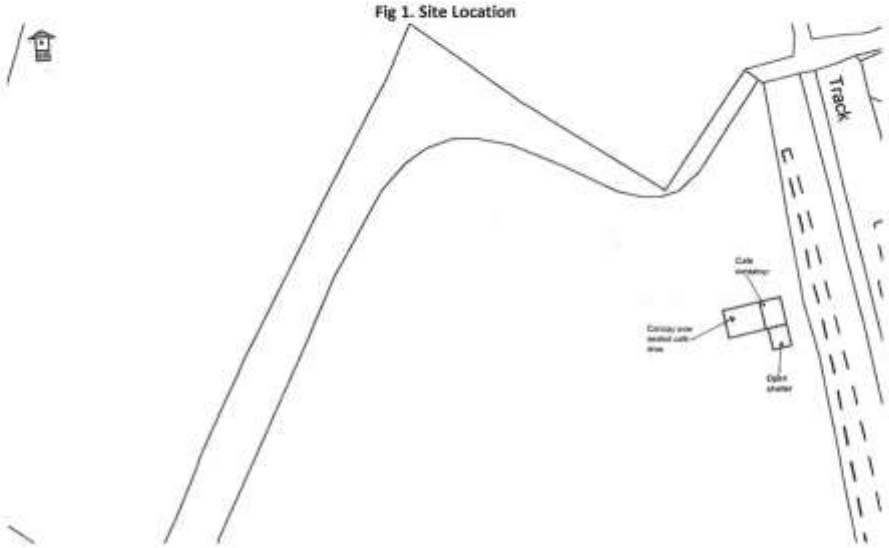
# 1 Introduction

1.1.1 CGS Civils Ltd has been appointed by Mr Kieran Berrett to undertake a Water Neutrality Report for a proposed development at The Cafe, Browns Farm in Henfield, West Sussex. A planning application has been submitted to Horsham District Council, under the ref DC/22/0083 for the retrospective application for the installation of a shipping container to form a café.

1.1.2 The purpose of this report is to therefore provide an overview on the potential water usage changes on the site as a result of the proposed development, and to confirm that the site is water neutral.

1.1.3 The proposed development is located at OS Grid Reference TQ 20700 15686 and has the post code BN5 9UX

**Fig 1. Site Location**




1.1.4 Waterwise defined Water Neutrality as:

*'For every new development, total water use in the region after the development must be equal to or less than the total water uses in the region before the new development.'*

1.1.5 Achieving water neutrality involves using a three-step approach. First, the demand for water from the new development must be reduced as far as is practicable, followed by the re-use of water; then the remaining demand should be offset within the region. Following this three-step approach allows the volume that requires offsetting to be reduced which ultimately reduces the cost of the overall scheme. This is noted within the Waterwise neutrality definition, which defines the three steps which should be undertaken in order to achieve water neutrality in their recent review dated January 2021.

- Reduce water demand in the new development through improvement in efficiency.
- Re-use water, wherever possible.
- Offset the remaining water demand from the new development if required.

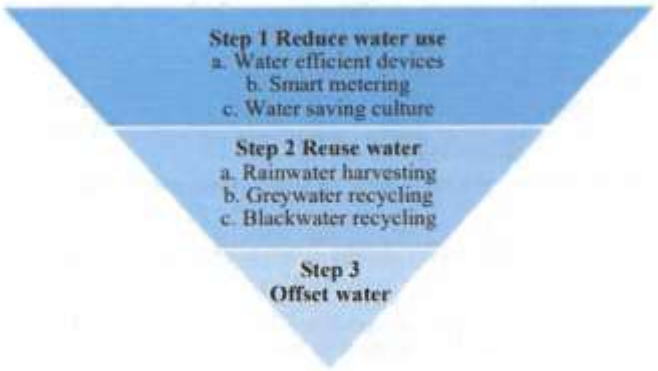
1.1.6 The report will be split into the following sections:

- A Review of Water Neutrality demand reduction
- A calculation of estimate water usage from proposed development
- Identification of measures that can be first used to reduce this demand
- Identification of measures that can be used to re-use water
- Establish solutions to offset that demand in order to achieve neutrality.

Richard Cobden House, Lion Street, Chichester, West Sussex, PO19 1LW
Tel: 01243 933253 E: mail@cgscivils.co.uk W: www.cgscivils.co.uk

1.1.7 This report will follow the methods documented within *'A Review of Water Neutrality in the UK'* carried out by Waterwise in January 2021. The document provides details on how developments can achieve water neutrality by utilising the 3-stage approach.

**Fig 2. 3-stage approach**




1.1.8 Some increase in water demand within the region from planned development during the local plan period is inevitable. However, it can be minimised by making the site as water efficient as possible.

1.1.9 Per Capita Consumption (PCC) is used as a measure of water use and is the volume of water that is used by one person in one day. It is usually measures in litres per person per day (l/p/d). The average PCC within Southern Water's 'Sussex North Water Resource Zones (WRZ)' is 135 l/p/d. Homes without a water meter consume on average 160 l/p/d and for homes with a water meter, consume on average 131 l/p/d.

1.1.10 Part G of the Building regulations currently states that new build housing should achieve a minimum of 125 l/p/d. A tighter target of 110 l/p/d can be requested if the local authority can establish a clear need based on available evidence.

1.1.11 The table below indicates different demand scenarios including Southern Water's Target 100 Ambition to achieve 100 l/p/d, as well as further scenarios where water demand is cut more dramatically.

**Table 1 PCC Demand Scenarios**

| Demand Scenario | Per Capita Consumption (l/p/d) |
|---|---|
| **British Flows and Loads** | 150 |
| **Building Regulations Standard** | 125 |
| **Building Regulations Optional** | 110 |
| **Target 100** | 100 |
| **Realistic Achievable** | 85 |
| **Ambitious** | 62 |

1.1.12 The benefits of water neutrality are wide ranging, from financial and reputational to environment and social. For a new domestic building, they could include:

- **Saving Water** – Over 100,000 litres of water can be saved per year for each water neutral home built
- **Saving Carbon** – A significant CO2 saving can be achieved by reducing the demand for hot water for baths, showers, basins, dishwashers and washing machines
- **Saving Money** – Both water and energy bills will reduce
- **Reducing environmental impact** – Decreasing water abstracted from rivers and groundwater sources
- **Improved Resilience** – For the future by minimising the additional pressure on water resources
- **Enabling future housing growth** – In water scarce areas by reducing the impact of new homes and buildings
- **Reducing discharge to sewage** – by using less water, collecting rainwater and recycling greywater, less water is discharged to the drainage network
- **Short pay-back time** – After approximately 5 years the saving of water neutrality will outweigh the costs of doing so.

# 2 Calculation of estimate water usage from the proposed development

2.1.1 Before any necessary steps to achieve water neutrality can be determined, the total water demand for the proposed development must first be calculated. The proposed scheme will consist of a conversion of a shipping container into a café with outdoor seating area. It has been estimated that the café will serve 100 people per day.

2.1.2 As the property will only make use of a tap in order to provide hot drinks to customers, and to wash up crockery. It has been confirmed that the café will use a 25l bucket for washing up and that all hot drinks are served in 8 Oz cups (Rounded up to 0.25l)

(100 x 0.25 l/p/d) + 25l
**= 50 l/day**

2.1.3 The following sections within this report will cover measures that can be undertaken in order to reduce the water consumption of the proposed property and aim for the 'Ambitious' PCC of 62/l/p/d.

# 3 Step 1 – Identifying measures that can be used to reduce this demand

3.1.1 Due to the nature of the site, it will not be appropriate to fit water efficient devices as the same volume of water will be used regardless.

Richard Cobden House, Lion Street, Chichester, West Sussex, PO19 1LW
Tel: 01243 933253 E: mail@cgscivils.co.uk W: www.cgscivils.co.uk

# 4 Step 2 – Identify measures that can be used to re-use water

4.1.1 Once the water demand has been reduced via the installation of water efficient products, water reuse should be considered. The term 'water reused' refers to the capture, treatment (if it is required) and the use of alternative water supplies for non-potable purposes. It includes:

- Rainwater and surface water harvesting
- Greywater recycling (typically the used water from baths, showers and hand basins)
- Wastewater recycling.

4.1.2 The installation of water reusing technology has the potential to save significant amounts of water; for example, 24% of water in the home is used for flushing the toilet and only 4% externally in the garden meaning a water reuse system could save at least a quarter of the demand if it was installed for these purposes. Depending on the quality and the system installed, it could also be possible to re-use water for a washing machine which accounts for 12% of total water usage.

**Table 7 Practical Summary of Step 2**

| Step 2: Reuse Water | | | |
|---|---|---|---|
| Rainwater Harvesting | Small scale water butt | Rainwater Harvesting system for individual homes and buildings | Large scale surface water harvesting |
| Greywater Recycling | | Small systems for individual homes | Largest scale systems for commercial and mixed-use sites |

4.1.3 The installation of water reusing technologies will further reduce the water demand on site, depending on the harvesting tank installed. The proposed roof area is sufficient to provide the required water to the property via an above ground rainwater harvesting tank as well as has sufficient capacity for a 60-day drought period. It is proposed that the rainwater harvesting will be fitted with a series of filters in order to treat the rainwater and make it suitable for human consumption.

4.1.4 The client is looking to install an Enduramax 5000l rainwater harvesting tank which is to be located just outside the Café which will allow the client to store, treat and use rainwater for the property. A data sheet for the tank can be found in **Appendix B.** – *For list of filters, see section 4.1.7.*

4.1.5 In order to initially fill the rainwater harvesting tank, the client is going to import the water from a region that falls outside the Sussex North Water Resource Zone. It is also recommended that the roof, rainwater goods and harvesting tank are to be installed early on in the scheme to allow for the tank to begin harvesting rainwater.

4.1.6 By installing the water efficient devices listed above as well as the rainwater harvesting system listed above, the total demand will be reduced to **0 l/day.**

4.1.7 The client is willing to install a 5,000l rainwater harvesting tank in order to achieve self-sufficiency within the property. The harvesting tank is to be fitted with the following equipment in order to get the rainwater to a level safe for human consumption.

- Aerator – This is to keep the water fresh
- Lowara 0.55 kW variable speed booster set
- PREFILT103/4 10" prefilter housing
- CRT10SW-05 5 micro sediment filter
- UV-CS165 ultraviolet steriliser (3 lamps to be replaced every year)
- WH1MH Whole house water filter (filter media to replaced every 2 years)
- 10" x 54" pH correction unit (media to be replaced every 1-2 years)

4.1.8 Due to the proposed rainwater harvesting tank and filtration system, there is no need to install a water main to the property – as such this means the proposed site will not require a Water Neutrality report (based on Natural England's definition below) and will also be water neutral.

"The water neutrality approach applies to all development that uses water from the Sussex North water supply zone and specifically the Pulborough abstractions it is not restricted to new residential dwellings and may include other forms of development that use the public water supply. Whether an application is included would depend on what water supply is chosen. **Only development that uses public water supply from Sussex North water supply zone is included in the Statement. Many of the types of development that use water that the County Council permit do not use public water supply and would therefore not be covered by the Statement.** It is for the local planning authorities including the County Council to identify which types of development they believe may be captured."

# 5 Conclusion

5.1.1 The overall water demand can be reduced by utilising methods listed in the sections above to reduce and re-used water for the proposed development. This results in the site being water neutral.

5.1.2 To summarise:

- The proposed development will use on average **50 l/day**.
- Re-using the water through rainwater harvesting tanks can further reduce the water demand down to **0l/day**
- The overall water demand will be reduced, and the site will become water neutral.

Richard Cobden House, Lion Street, Chichester, West Sussex, PO19 1LW
Tel: 01243 933253 E: mail@cgscivils.co.uk W: www.cgscivils.co.uk

# 6 Appendices

## 6.1 Appendix A:

**Rainwater Harvesting tank size calculator:**

### COLLECTABLE ROOF AREA (M²)

| | | | | | | |
|---|---|---|---|---|---|---|
| Main Building | Width: | | Length: | Rain Collection Area: | 0 | m² |
| Extension one | Width: | | Length: | Rain Collection Area: | 0 | m² |
| Extension Two | Width: | | Length: | Rain Collection Area: | 0 | m² |
| Extension Three | Width: | | Length: | Rain Collection Area: | 0 | m² |
| *Or the total roof area, if you already know it* | | 96 | | Total area of collectable roof space: | 96 | m² |
| Select Your Region | England SE & Central S | | | Average rainfall per year in your region: | 64 | L |
| **Collectable rainwater per annum in litres - discounted by 20% to account for water loss** | | | | | 49152 | L |

### USE OF RAINWATER IN THE BUILDING

| | | | |
|---|---|---|---|
| Number of people or bedrooms in the building - | 1 | 0 | |
| Number of clothes washing cycles per day (*50 litres each*) | 0.00 Cycles | 0.00 | L |
| Number of toilet flushes per day (*4.42 flushes per person, average 5 litres each*) | 0.00 Flushes | 0.00 | L |
| Outdoor use in litres, per person per day (*recommended 5 litres per person per day*) | 50 | 50.00 | L |
| Amount of water you require every day | | 50 | L |
| **Amount of water you require every year** | **DEMAND** | **18250** | **L** |

### FINAL FIGURES

| | | |
|---|---|---|
| How many days drought protection do you need? Typically 21 (18 minimum) | 60 | |
| Capacity of water storage in litres required for drought protection | 3000.00 | L |
| The lesser of YIELD (blue) or DEMAND (green) per annum | 18250 | L |
| **Therefore, volume of rainwater storage required** | **3000** | **L** |

### CONCLUSION

| | | |
|---|---|---|
| Is there sufficient roof water available: | | YES |
| Recommended tank size from our shallow dig range: | F-Line Range: | 3000 LITRE F-LINE TANK |

## 6.2 Appendix B:

**Enduramax 5000l rainwater harvesting tank data sheet:**

Richard Cobden House, Lion Street, Chichester, West Sussex, PO19 1LW
Tel: 01243 933253 E: mail@cgscivils.co.uk W: www.cgscivils.co.uk

# Think Tank.
# Think ENDURATANK

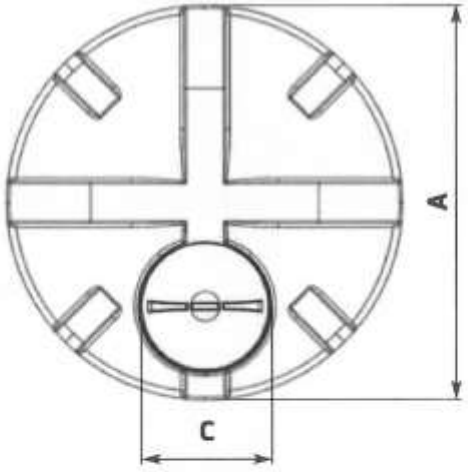
**NEED MORE HELP?**
**CALL US ON 01778 562810**

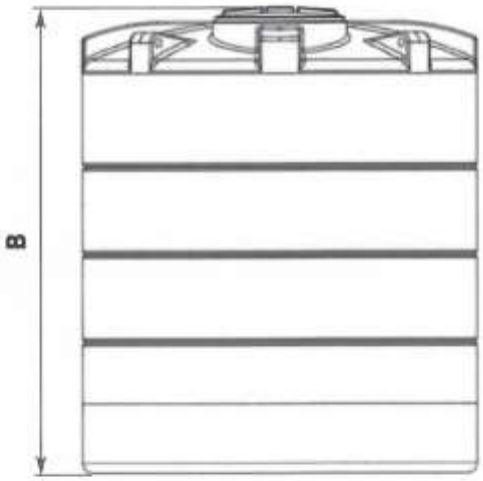


## VERTICAL TANK
## TECHNICAL SPECIFICATION

| | | | |
|---|---|---|---|
| POTABLE | 172215 | NON - POTABLE | 172115 |
| CAPACITY (Litres) | 5000 | CAPACITY (Gallons) | 1100 |

| | | | |
|---|---|---|---|
| A (mm) | 1900 | B (mm) | 2300 |
| C (mm) | 620 | Standard Outlet | 2" |




# ENDURATANK

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**01778 562810** **sales@enduratank.co.uk**

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## Appendix KCC3.
## Rainwater Harvesting Equipment

| Item | Description | Lifespan |
|---|---|---|
| Catchpit Chamber | | |
| Water Tank | Enduratank 5000 litre | |
| Booster Pump | Lowara 0.55kW variable speed booster | 20 year lifespan |
| Filter | PREFILT103/4 10” prefilter housing | 20 year lifespan |
| Sediment Fiter | CRT10SW-05 5 micro sediment filter | Needs to be replaced every year. |
| UV steriliser | UV-CS165 ultraviolet steriliser | 3 lamps to be replaced every year |
| Carbon & Heavy Metal Filter | WH1MH Whole house water filter | filter media to be replaced every 2 years |
| PH Corrector | 10” x 45” pH correction unit | media to be replaced every 1-2 years |
| Pipework | 25mm MDPE pipe | |

## Appendix KCC4.
## Example of Risk Assessment and Water Safety Plans

| | | | | Are existing controls effective? | | | | | Risk with controls in place | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Process step | Hazardous event | Hazard type | Existing control measure description | Validation notes | Yes | No | Somewhat | Likelihood | Severity | Risk score | Risk level |
| 5 | Distribution (storage tank) | Treated water storage tank is contaminated with faecal material from animals (X) due to the access hatch on the tank roof being open (Y) | M | Access hatch lock | Lock is robust and well fitting.<br>Weekly site inspection records confirm that the lock is in good condition and the hatch is locked securely.<br>No historical microbiological issues recorded for the tank. | ✓ | | | 2 | 5 | 10 | Medium |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

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*Greenacres Barn, Stoke Common Lane, Purton Stoke, Swindon, Wiltshire SN5 4LL*
*Telephone: 01793 771333 • Email: info@kernon.co.uk • Website: www.kernon.co.uk*