**Rainwater Harvesting Potential at Coca-Cola Factory Premises at Biyagama**

July 2018

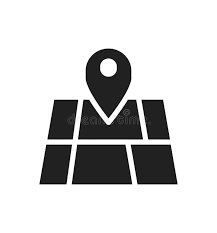


# Introduction



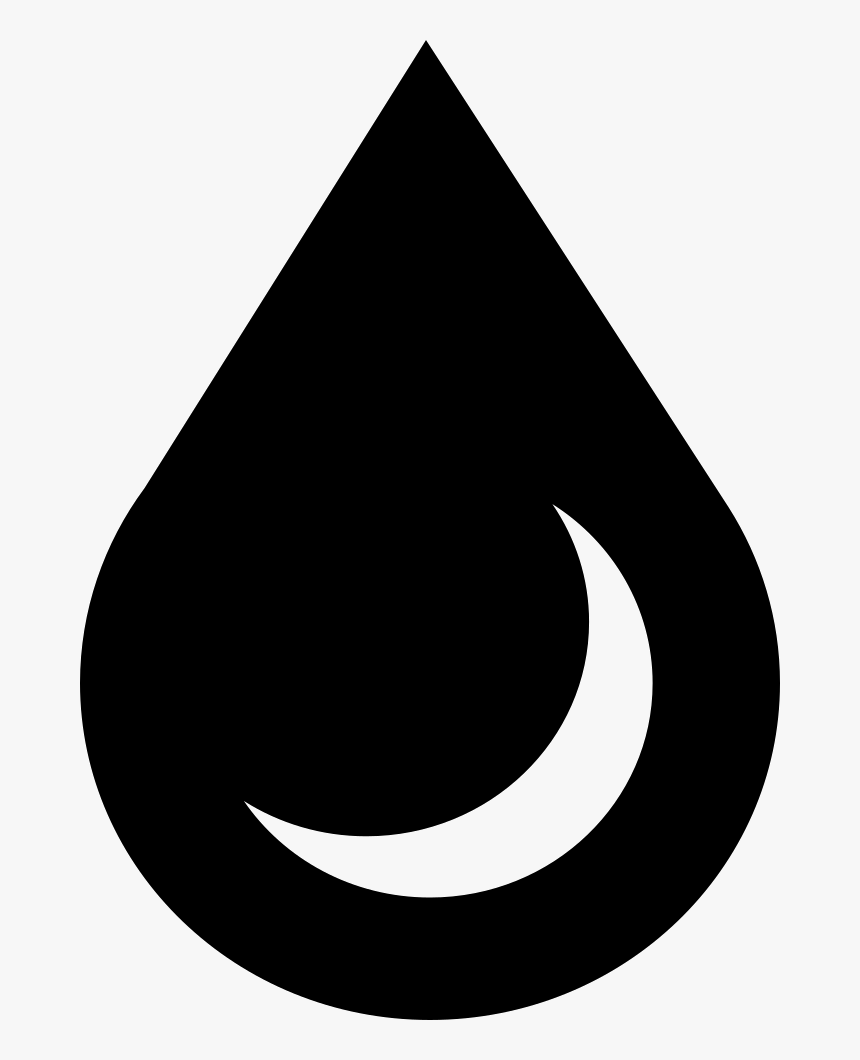
Further to previous 2 reports (21st December 2017 and 4th June 2018), after discussion with the team at Biyagama Coca-Cola on the 17th July 2018 a new calculation was made to assess the feasibility of collecting the run off rain water from 3 main roof areas.

**16,000 m2 (largest)**



**Roof Area of the 3 main buildings**

**120500 litres per day or 3,617 m3 per month**



**water demand for non-beverage production**



# Rain Water Harvesting Potential Calculation

# Rain fall for Biyagama (Gampaha)

Chart 1 Source: <https://en.climate-data.org/location/1012453/>

**Runoff Potential as Per Annual Rainfall**

|  |  |
| --- | --- |
| **Annual rainfall (mm)** | **Total RWH potential (m3) from 3 major Roofs** |
| 2,398 | 32,613 m3 |

Table 1

**Run off potential from Catchments and Demand Variation**

Chart 2



## Runoff Potential (Monthly) from Roofs (table 1)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Months** | **Monthly Rainfall (mm)** | **Monthly potential rainfall from 3 main roof ( m3)** | **Average Monthly Water demand for non-beverage production ( m3)** | **75%of Water demand for non-beverage production ( m3)** |
| **JAN** | 62 | 843 | 3,617 | 2,532 |
| **FEB** | 79 | 1,074 | 3,617 | 2,532 |
| **MAR** | 146 | 1,986 | 3,617 | 2,532 |
| **APR** | 255 | 3,468 | 3,617 | 2,532 |
| **MAY** | 353 | 4,801 | 3,617 | 2,532 |
| **JUN** | 216 | 2,938 | 3,617 | 2,532 |
| **JUL** | 134 | 1,822 | 3,617 | 2,532 |
| **AUG** | 123 | 1,673 | 3,617 | 2,532 |
| **SEP** | 202 | 2,747 | 3,617 | 2,532 |
| **OCT** | 365 | **4,964** | 3,617 | 2,532 |
| **NOV** | 311 | 4,230 | 3,617 | 2,532 |
| **DEC** | 152 | 2,067 | 3,617 | 2,532 |
| **Total** | **2,398.00** | **32,613** | **43,404** | **30,383** |

Table 3



## Feasibility Calculation

* Annual run off from all 3 main roofs = 32,613 m3
* Maximum collection during a month is 4964 m3
* Annual water demand for non-beverage production = 43,404 m3

Since annual run off exceed annual demand for non-beverage production, total demand for non-beverage production cannot be collected from main 3 building. However, 75% of the annual demand for non-beverage production of 30,383 m3 can be met through collecting the run off from the 3 main buildings.



## The calculation for Storage capacity

Rainwater Tank Performance Calculation

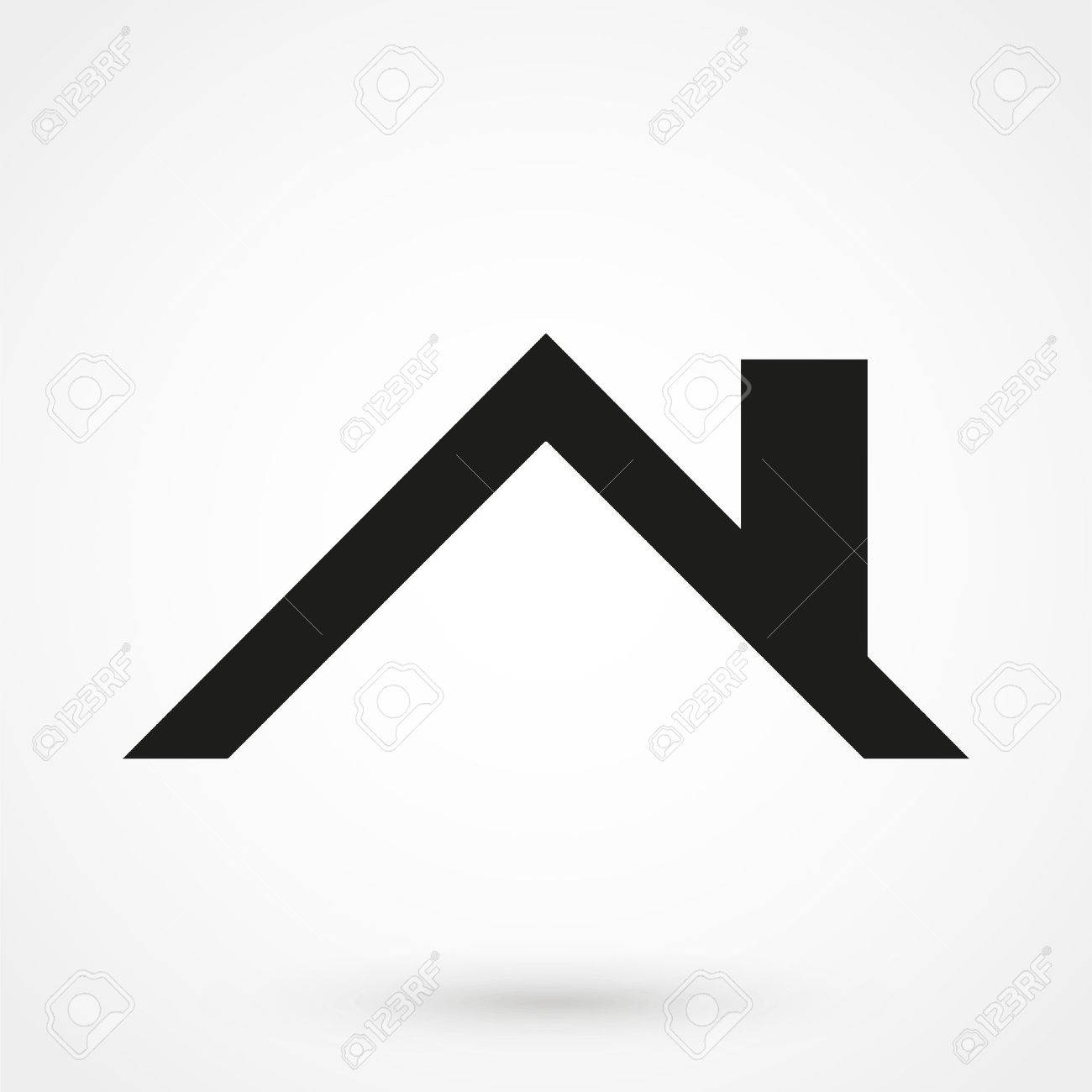
**Biyagama**

**Location**



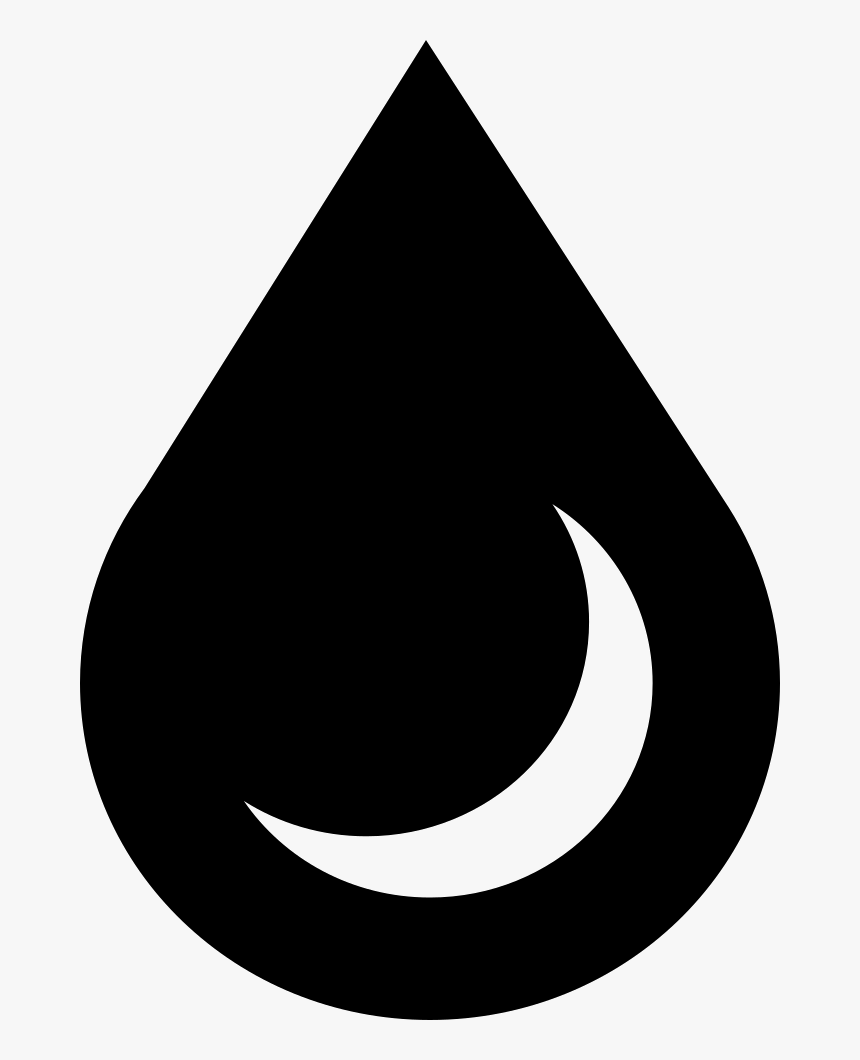
**16000 m2**

**Roof area**

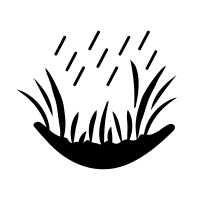


**120500 liters’**

**nominal demand**



**Mean daily runoff**



**90591 liter’s**

**water management strategy**

**Constant Demand**



**Using the nominal demand and tank size that you specified of 120500 litres per day:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Your Tank** | **Comparisons** | | |
| **Tank Volume (litres)** | **800000** | **4530004** | **18118004** | **72473004** |
| **Reliability1** | **44%** | **27%** | **59%** | **71%** |
| **Satisfaction2** | **55%** | **44%** | **66%** | **76%** |
| **Efficiency3** | **73%** | **59%** | **88%** | **100%** |

**Using a calculated5 nominal daily demand of 90591 litres per day:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Your Tank** | **Comparisons** | | |
| **Tank Volume (litres)** | **1000000** | **453000** | **1811800** | **7247300** |
| **Reliability** | **64%** | **42%** | **74%** | **92%** |
| **Satisfaction** | **71%** | **54%** | **78%** | **94%** |
| **Efficiency** | **71%** | **54%** | **78%** | **93%** |

Top of Form



Bottom of Form

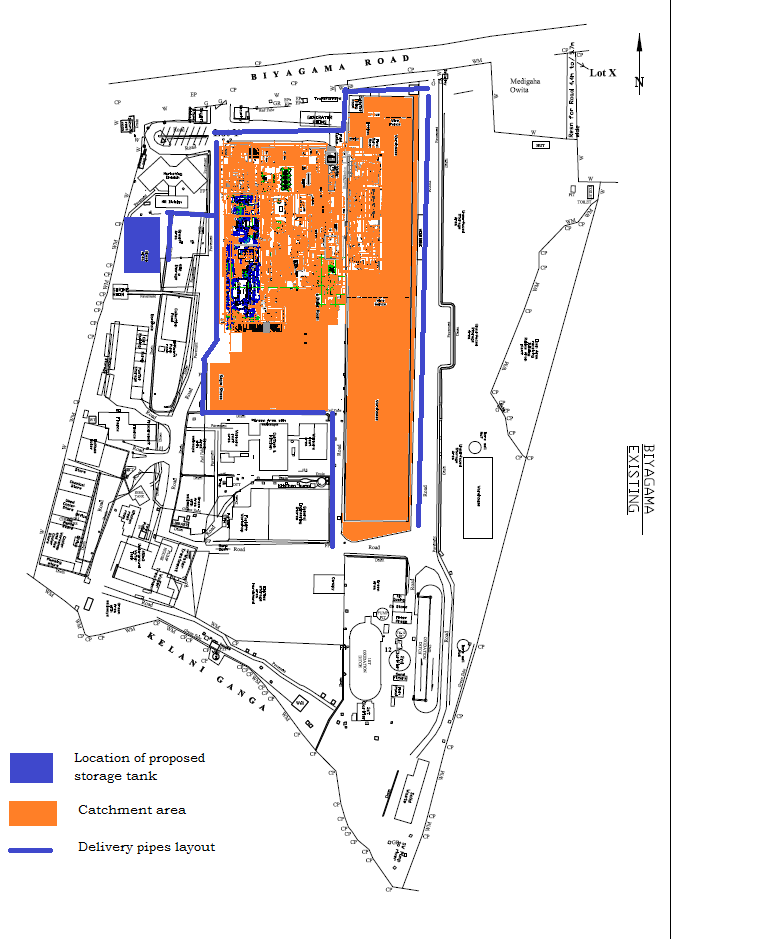
**Notes**

1. Reliability is the fraction of days the total demand will be met by the system
2. Satisfaction is the fraction of the total water demand that can be met by the system
3. Efficiency is the fraction of the runoff from the roof captured by the system
4. The comparison tank volumes are based on the average daily roof runoff multiplied by days, 20 days and 80 days respectively



## Recommendation

* 1000 m3 storage tank will give 75% of the demand (90591 litres per day) 71% of the times
* Delivery pipe can be laid inside the existing drainage system to minimize disruption to the site infrastructure
* Storage tanks can be placed above ground or/and underground. If it is above ground water will have to be pumped up continuously.
* Overflow should be directed to the storm water drains
* First flush system should be installed to reduce any contamination from the roof.



Underground tank

Roof drain direction

Underground drain

First flush tank