

Energy Savings Through Non Revenue Water

Andre Brown
National Water Commission
andre.brown@nwc.com.jm

Wilfredo Garin
Miya Water Jamaica
Wilfredo.garin@miya-water.com

Introduction

01

- ❖ Reducing NRW is one of the best ways to improve the financial viability of a water utility, sustain its operations and simultaneously contribute to combatting climate change.
- ❖ The National Water Commission along with MIYA Water Jamaica have partnered on a project to reduce NRW in Portmore, Jamaica.
- ❖ In the Audit stage of the Portmore Co-Management Program, between November 2020 and February 2021, data loggers were installed to gather information and assess the facilities of the Portmore Network.
- ❖ Portmore is fed from Wells within Portmore that provide thirty percent (30%) of the water while seventy percent (70%) is fed from the Eastern Head Works system located outside of Portmore.

AUDIT PHASE

02

- ❖ Auditing revealed that all six (6) operable reservoirs were overflowing, especially during off-peak hours, and one reservoir was inactive and could be rehabilitated.
- ❖ The co-management immediately agreed to implement the equipment changes to the facilities, such as Level Control Valves (control tank limits). Also to install the necessary Automation & Telemetry in Relief and Pump Wells to avoid continuously running (even if tanks are already full) and overflowing.
- ❖ The graphs below reflect the figures of the water level in the tank gathered from the level sensors installed during the audit phase. This clearly reveals that the tanks were overflowing for hours or even days.

The figure below shows the historical water level of Sandy Hills Vista, with a capacity of 250 m³, between January 21 – 29, 2021. During these eight days the tank overflowed for over 48 hours as highlighted in the graph.

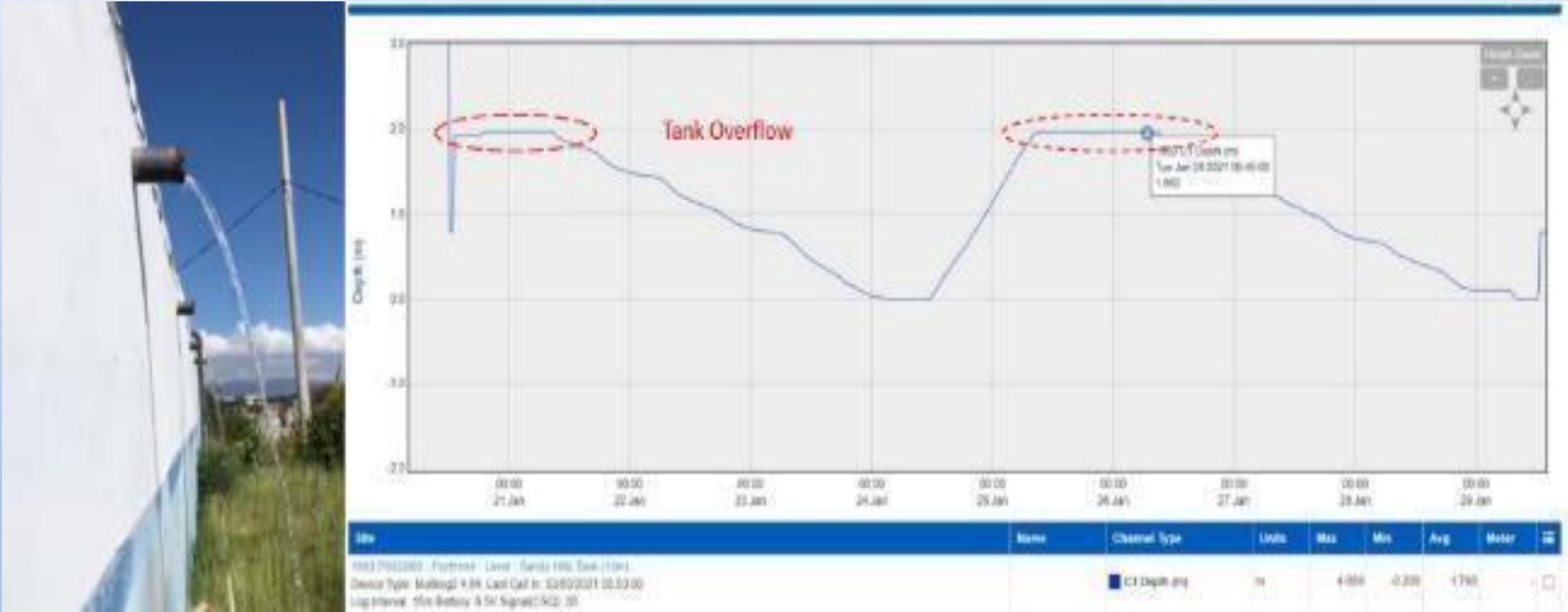


Figure 1 - Sandy Hills Vista Tank Historical Water Level.

The following figure shows the water level of the Marley Hill tank, the largest tank in Portmore with 11,000 m³ capacity. The graph shows that the tank overflowed consistently from February 6- 24, 2021, February 9 – 13 and February 16 – 20, 2021.

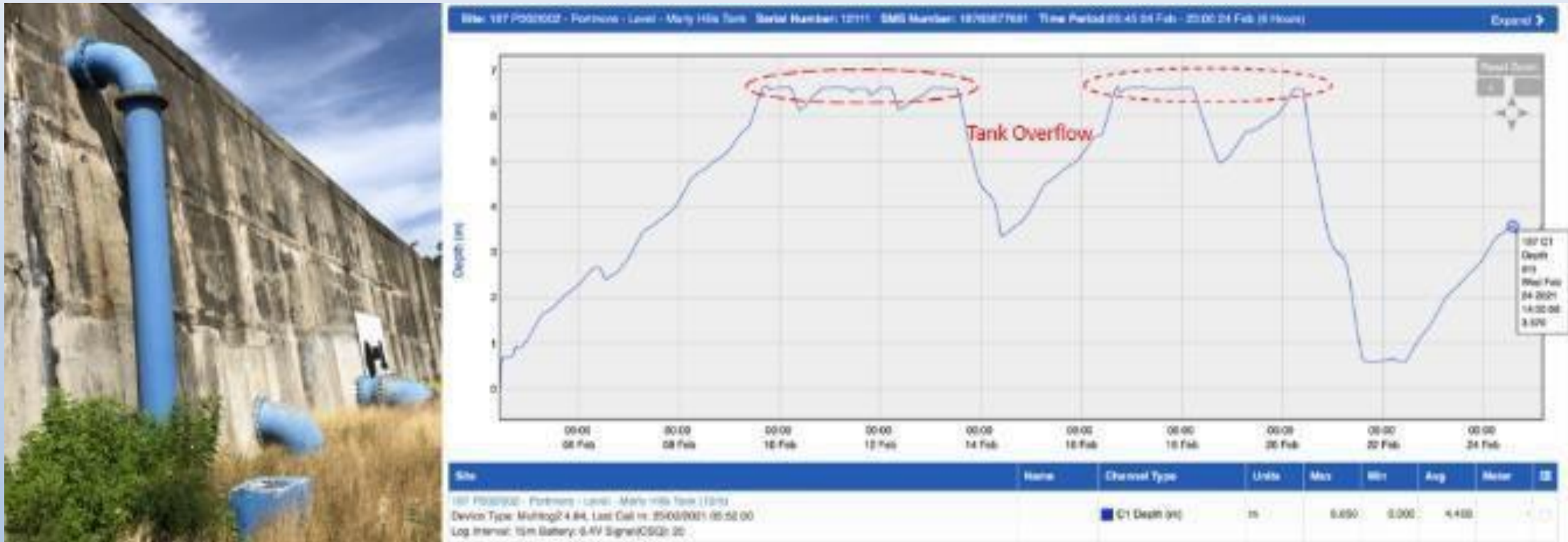


Figure 2 -Marley Hill Tank Historical Water level.

IMPLEMENTATION

03

- ❖ Seven (7) level control and float valves were in place within a year, along with pump optimization.
- ❖ Pumps were optimized by Soft-Starter/VFD installation instead of conventional and manual control.
- ❖ Pump controls were upgraded by installing pressure switches, level sensors, altitude valves, loggers, and timers.
- ❖ The figure below shows the table of water level of the Sandy Hills tank since July, when the control mechanisms were installed. Since then, the Sandy Hills tank has not been overflowing.



P005|009 - Portmore - South 3 - Sandy Hill Tank Level Phone: 18765524848 Site ID: 216 From: 02Jan2021 00:00 To: 01Feb2022 00:00 (1 Hour)

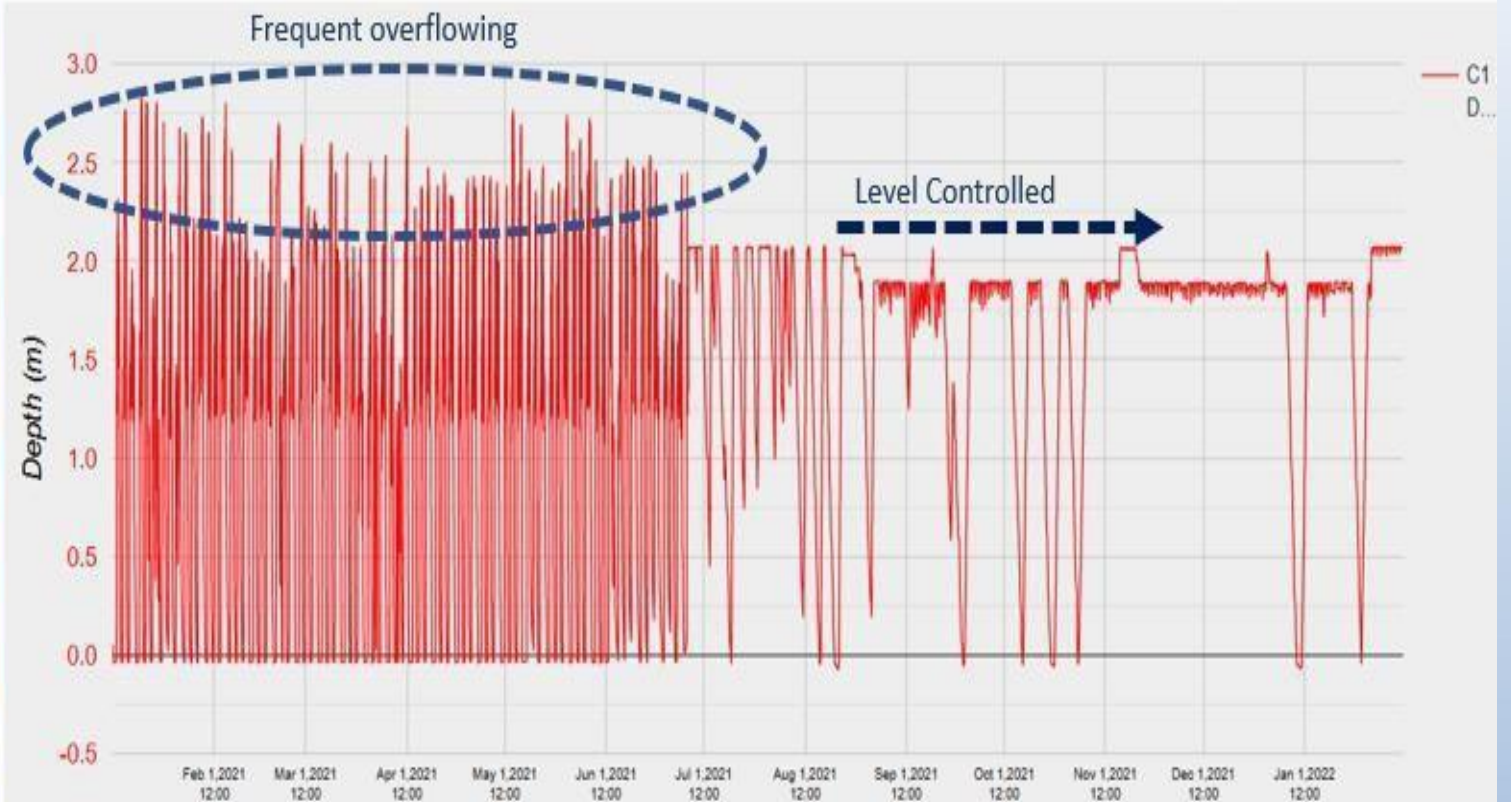


Figure 4 - Graph shows frequent overflowing and Level Controlled results after Control mechanism installations.

RESULTS

04

- ❖ After a series of activities conducted from Tank Level Control Automation and Pump Optimization the power consumption of wells and pump stations in Portmore has been reduced.
- ❖ From 146,300KWh to 97,700KWh, about 50,000KWh Monthly reduction or USD10,000.00.

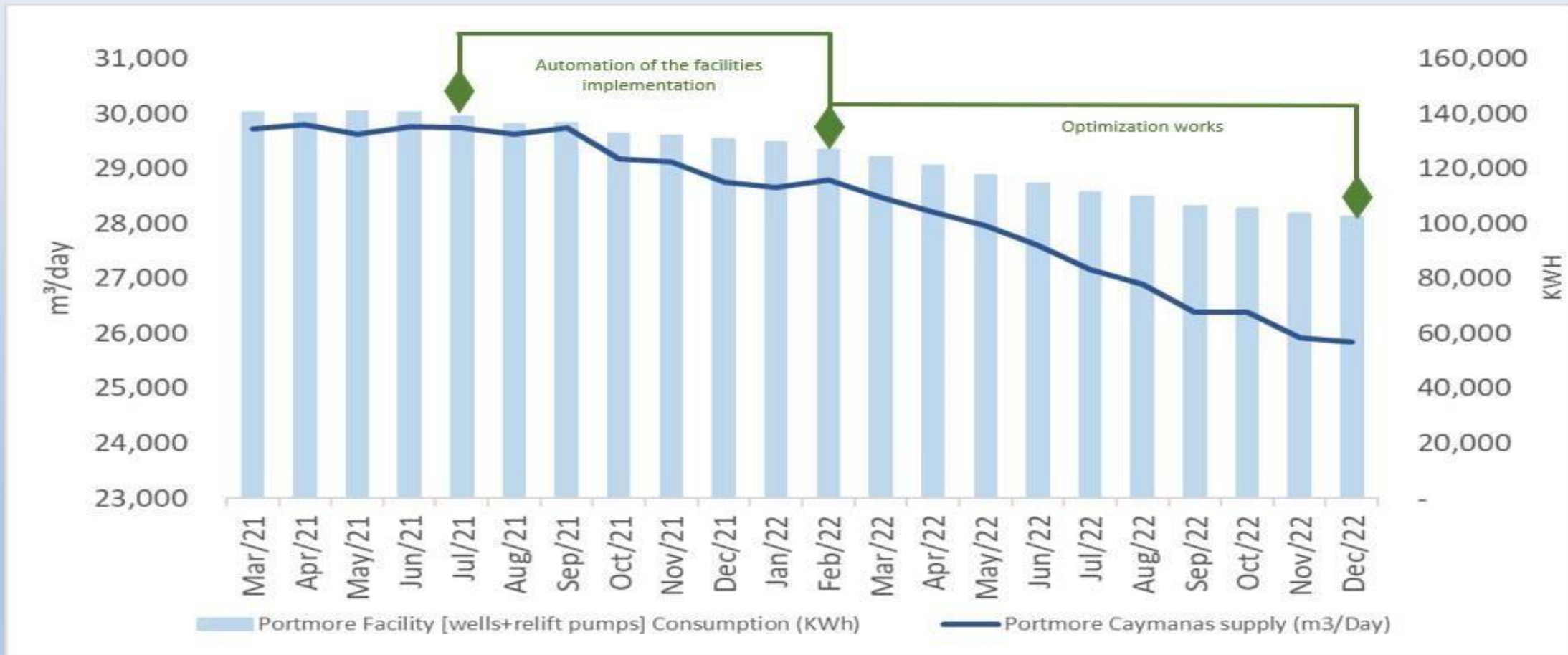


Figure 5 – Portmore Facilities [wells and re-lift pumps] Energy Saving results.

- ❖ The figure shows the monthly energy savings since the inception of the project in March 2021 until December 2022 and the cumulative savings of USD200,000.00
- ❖ The energy savings below are from the production wells and the re-lift pumps in Portmore that serve 30% of the population.

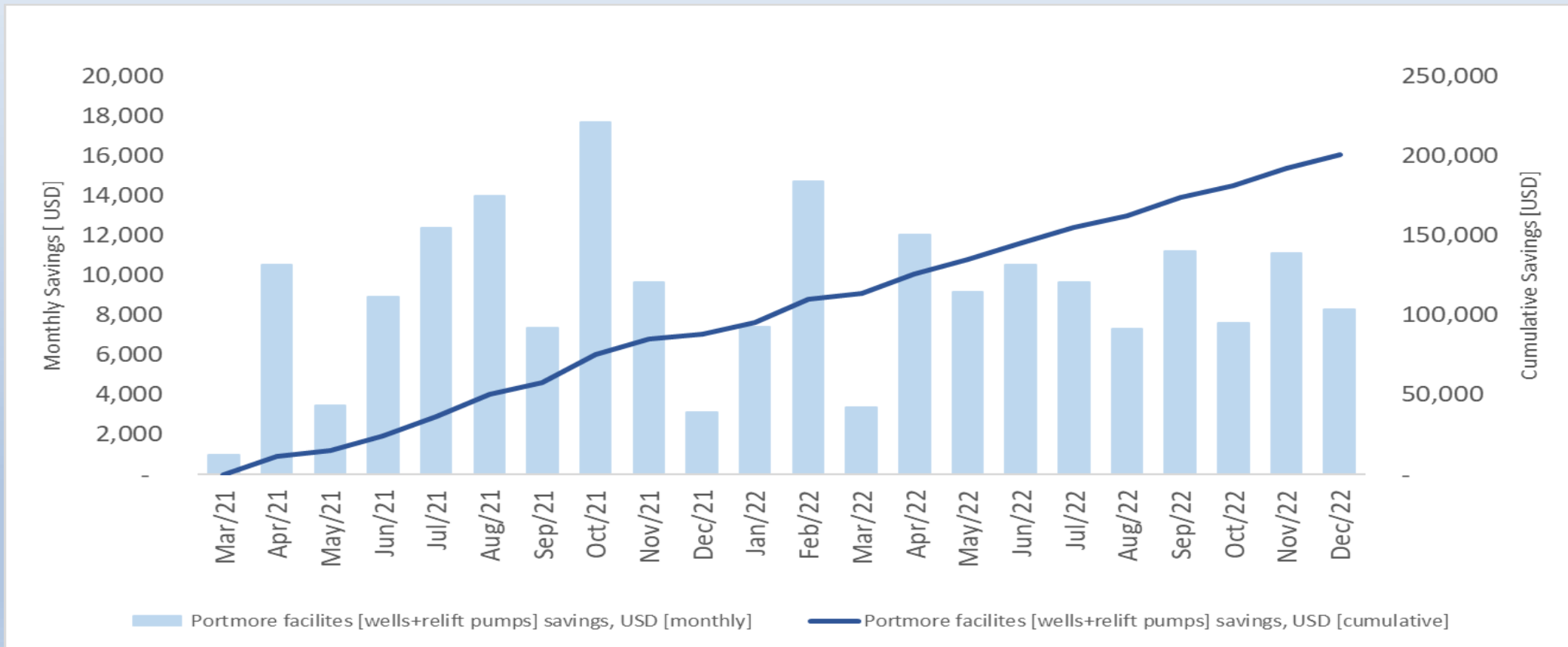


Figure 6 – Portmore Facilities [wells and re-lift pumps] USD savings

- ❖ In addition, the Caymanas pipeline (from Eastern Headworks Wells), feeds the remaining 70% of the Portmore population that has a production cost of USD 0.14 per cubic meter.
- ❖ From the inception of the project the SIV from Caymanas pipeline was 30,000 m³/day. Between the months June 2021 to February 2022, the automation of seven (7) reservoirs, four (4) wells, and five (5) Re-lift pumps were implemented and completed.
- ❖ As a result, the Caymanas SIV has reduced to 24,300 m³/day in December 2022 or 5,700 m³/day reduction.
- ❖ This is equivalent to USD24,000.00 per month in savings considering the USD 0.14 production cost.
- ❖ The graph below shows the monthly savings in the production of Caymanas system with a cumulative savings of USD 260,000.00 since the beginning of the project.

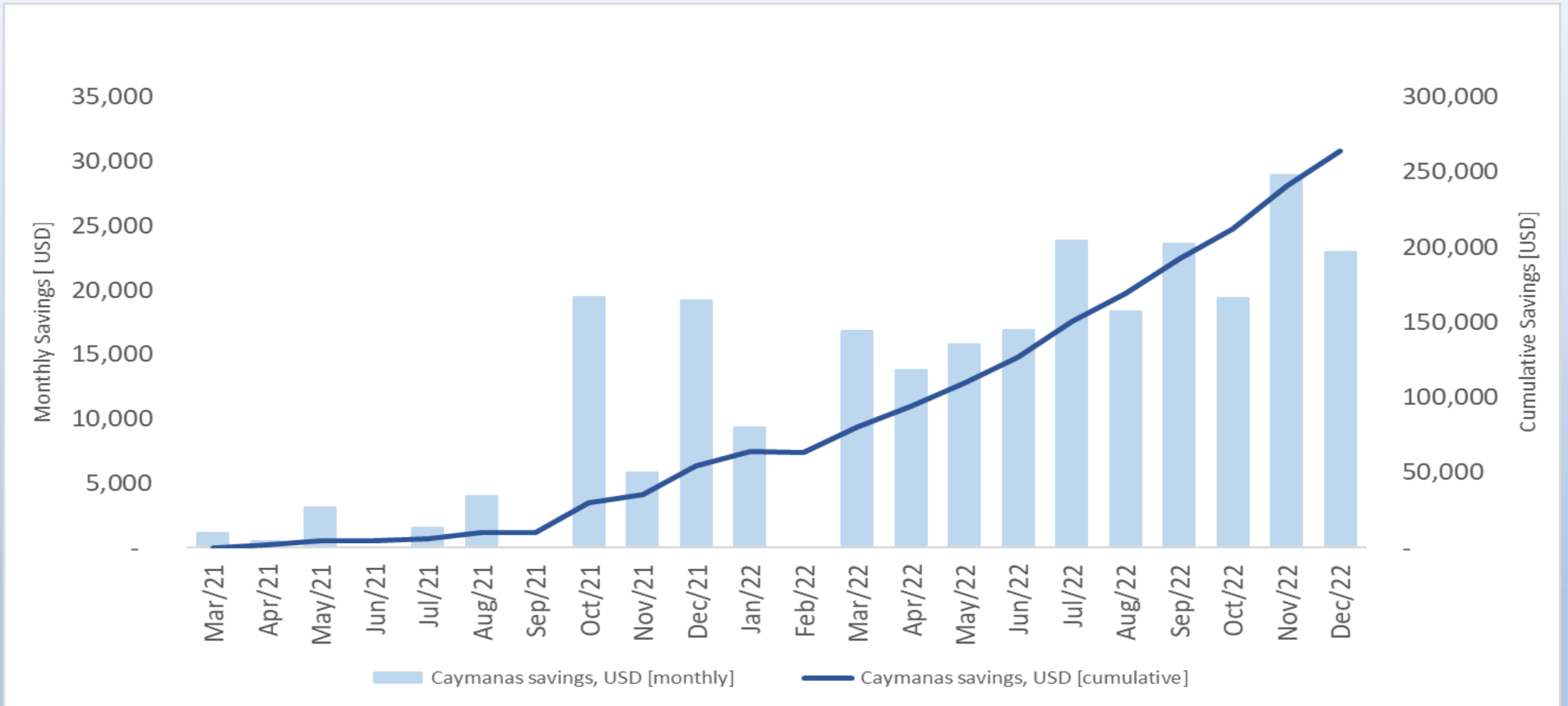
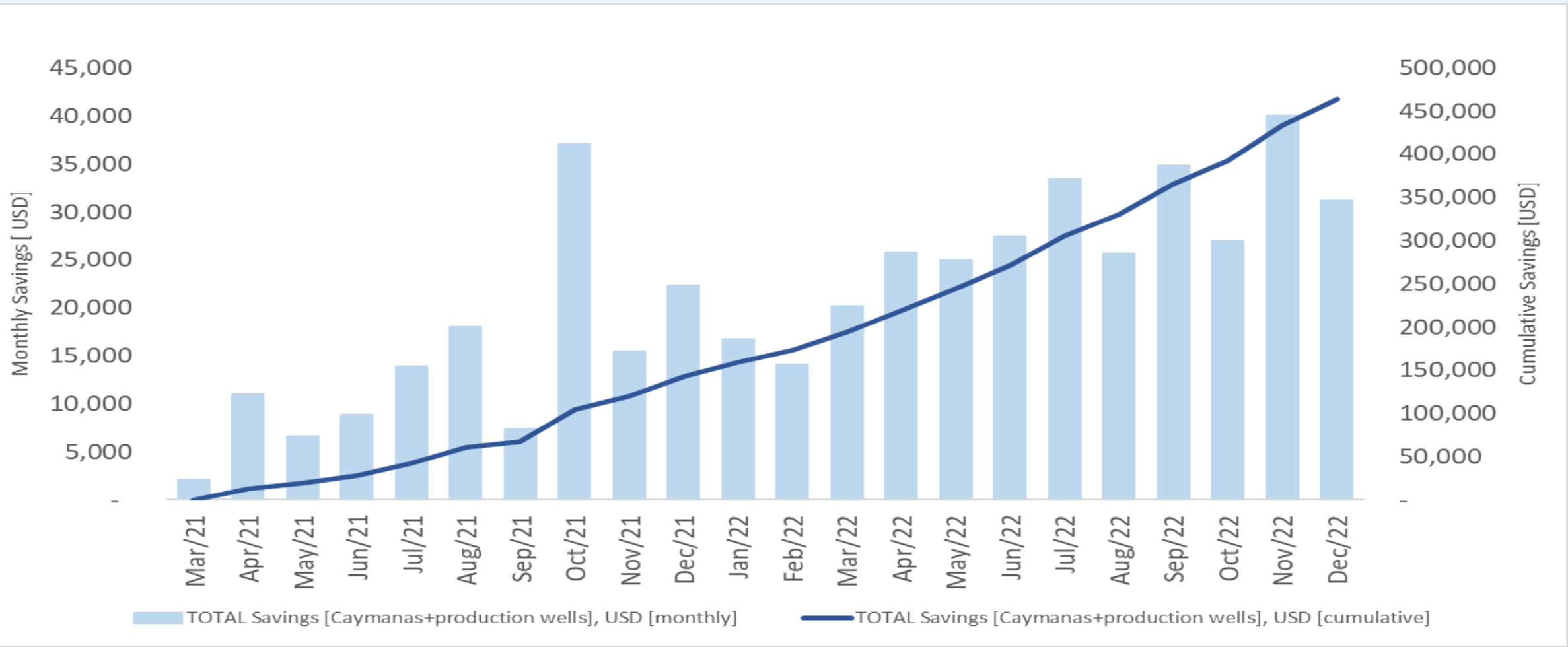


Figure 6 – Caymanas Production Savings

- ❖ During twenty (20) months of the implementation stage the project has shown vast improvement of USD460,000.00 cumulative savings.
- ❖ Due to automation and further optimization of the facilities, the supply needed from production wells and Caymanas system continues to decrease, thus saving energy consumption.



CONCLUSION

05

- ❖ Energy savings through NRW reduction is undoubtedly beneficial to NWC.
- ❖ NWC is already gaining results even though it is far from completion (40 more months to be completed).
- ❖ Based on the automation and optimization processes, the SIV will gradually decrease. Also, while leak detection, leak repair, pressure management, and metering are progressing, more energy savings are expected to be gained.

THANK YOU!

Andre Brown
Project Manager
andre.brown@nwc.com.jm