



**Review of the Environmental Impact Assessment (EIA) for
Proposed Dovecot Memorial Park Expansion at Part of Chisholm
called Bendon Pen, St. Johns Road, St. Catherine**

**EIA done by:
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July 2020

This document contains the professional opinion of the Jamaica Environment Trust (JET). In arriving at our opinion, we made every reasonable attempt to ensure that our resource persons are informed and reliable and experts in the area in which their comment and analysis is sought. JET encourages readers to apply their own critical analysis to the information provided in this document and by others, particularly where JET's opinion differs from those others.

Summary Statement

This review focuses on how the proposed cemetery expansion might impact water availability in wells of the area. We conclude that the Environmental Impact Assessment (EIA) is deficient because it does not assess how allowing an additional abstraction of 1334.4 m³/day would effect water levels for the Mango Walk wells (and possibly others) that have been declining over time because existing water usage.

We are also concerned about a facility with large lawn areas requiring irrigation, fertilization and possibly the use of agricultural chemicals, in the context of increasing levels of drought due to climate change and potential impacts to ground water.

Lastly, we note the EIA is dated 2014 – approximately six years ago. Where water resources are concerned, we recommend that EIAs be more recently updated as water trends, demand or supply, may have changed in six years.

Water Demand

With respect to water demand, pages 27-28 of the EIA contain the following information:

3.4.2 Water Supply and Sewage Disposal

The National Water Commission (NWC) supplies the existing site with potable water and sewage is presently managed with septic tanks and an absorption pit.

The proposed sewage treatment for the new expansion is by septic tank and evapotranspiration bed. Sewage will be collected from the three (3) restroom areas with initial treatment provided by septic tanks at each set of restrooms. The effluent from the two higher (in elevation) restrooms septic tanks will be conveyed by pipes down to the lowest restroom where it will connect into the outlet pipe from the septic tank there. The total effluent flow from the three (3) septic tanks will then enter the adjacent evaporation bed via a distribution box for final treatment and disposal. The effluent from the septic tank system will pass through a distribution network in a specially prepared mass of suitable sand and gravel layers. The effect of capillary action and shallow rooting perennial plants will result in the loss of effluent by evapotranspiration. The bed allows for storage of excess effluent during periods of low evapotranspiration, acting like a sponge, while the convex surface encourages the shedding of a proportion of the rainfall. The bed is lined at the bottom and sides with a synthetic liner which prevents any seepage of effluent into the soil below. A 15m x 15m (225 m²) evapotranspiration bed will be used.

It is anticipated that water demand will come from two main sources; these are the bathrooms/showers and the irrigation areas. The estimated water demand is based on a per capita usage by staff (30) and an estimated 1000 visitors per day as well as the irrigation requirements per acre for grass (California State Water Resources Control

board, 1984). The total required volume of water required per day is estimated at 1,334m³/d (\approx 352,405 us gal/day) on average when the full 12 phases are realized. Table 3-1 outlines the daily cumulative demands for phases 1, 3, 6, 9 and 12.

Table 3-1 Water Demand per day for workers and for irrigation shown across 5 of the 12 phases of the development

Water Use	Phase 1	Phase 3	Phase 6	Phase 9	Phase 12	Units
Irrigation						
Irrigation requirements	18.9	18.9	18.9	18.9	18.9	mm/acre/day
Irrigation Area	1.8	5.1	9.3	14.5	19.3	acres
Daily volume	120.5	347.2	626.5	984.6	1309.1	m ³ /day
Workers						
Water Demand	209	209	209	209	209	L/person/day
No. employees	30	30	30	30	30	
	6.27	6.27	6.27	6.27	6.27	m ³ /day
Visitors						
Water Demand	19	19	19	19	19	L/person/day
No. visitors	1000	1000	1000	1000	1000	
	19	19	19	19	19	m ³ /day
Total Demand	145.7	372.4	651.8	1009.8	1334.4	m³/day

It is clear that 98% of the water use $[(1309.1 \text{ m}^3/\text{day})/1334.4 \text{ m}^3/\text{day}]$ will be for irrigation of the cemetery.

Since the “National Water Commission (NWC) supplies the existing site with potable water” it is reasonable to conclude that the NWC would also supply the proposed cemetery expansion with water to meet its projected demand above.

The key question is where (at which source) would the NWC would obtain this supply of water and how would this additional abstraction of 1334.4 m³/day impact local supply.

Pages 139-140 of the EIA states the following:

5.3.2.1 Water Resources Authority

“The WRA prepared a Technical Note (September 23, 2014). This is included in Appendix 6. In this note the WRA indicated that:

“a) Groundwater: The estimated depth to groundwater where the proposed cemetery will be developed is fairly shallow (21.71m – 60.76m BGL). **The limestone aquifer is tapped by NWC and various business entities for public supply as well as irrigation purposes for the agricultural lands located south of the site. Additionally, the groundwater from this region is important for recharge to the springs and streams south of the site.**

“b) Due to the karst development and the fact that the soil overburden displays very rapid internal drainage there may be increased risk of contaminants reaching the water table. Contaminated surface run-off can be transported laterally to areas with lower hydraulic heads or vertically to the water table.

“The water quality of any wells down gradient of the site such as the Mango Walk wells would therefore be vulnerable, due to the direction of groundwater flow and the fact that these wells sit at a lower elevation than the site. The Mango Walk wells range in elevation from 27.19m to 28.30m amsl. This would have significant impacts on the supply of irrigation water for the sugar cane industries and horse farms within the agricultural plains to the south.”

The Technical Note of Appendix 6 begins at page 297 (of 307) of the PDF of the EIA and contains the following important information:

Technical Note
Hydrogeological Assessment
Dovecot Memorial Park Expansion, Chisholm Bendon Pen, St. Catherine

The results of a desk study of the area have been compiled in this technical note. The information relates to the estimated depth to groundwater, the extent and use of aquifers in the area, the probable direction of groundwater flow and gradient, location of any springs and surface water features and any potential impact on sources of local municipal water supply and location of registered private or industrial wells, including impacts on underground water quality.

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Water Supply from Groundwater Resources

There has been substantial groundwater exploration in the area. Generally the limestone aquifer has proven to produce a high yield due to faulting and the development of secondary porosity. Groundwater flows in a south and south easterly direction towards the coast. The proposed property sits within the Rio Cobre River Hydrological Basin which has a reliable groundwater yield of $337.7 \times 10^6 \text{m}^3/\text{yr}$ (337.7 million cubic meters per year - WRA Master Plan, 2005).

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Groundwater abstraction for the Dovecot Park and the Wynters Pen (BWC) pumping wells (2.98km east) are $141.12 \text{m}^3/\text{day}$ and $52.40 \text{m}^3/\text{day}$ in 2013 respectively. These wells both supply domestic water for the communities of Green Acres, Johnston Pen and Dovecot Park respectively.

This area represents a major ground water pumping depression within which groundwater levels were historically below sea level. These groundwater levels were theorised to be as a result of the general mining of the ground water resources in the basin. As such a moratorium has been enforced by WRA which restricts the development of new wells in the Lower Rio Cobre Basin.

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Water Supply from Surface Resources

The area is mostly devoid of surface drainage due to the karstic nature of the underlying white limestone, thus surface water is readily lost through sink holes to the groundwater system. Further south of the proposed cemetery development however, where the white limestone comes into contact with the alluvial deposits (clayey materials) of the alluvium aquiclude, groundwater is discharged to the surface via springs that give rise to numerous streams which flow south towards the coast.

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Conclusion

The estimated depth to groundwater where the proposed cemetery will be developed is fairly shallow (21.71m – 60.76m BGL). The limestone aquifer is tapped by NWC and various business entities for public supply as well as irrigation purposes for the agricultural lands located south of the site. Additionally, the groundwater from this region is important for recharge to the springs and streams south of the site.

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The water levels and water quality for the Mango Walk wells has been declining over time. There has been some improvement in these conditions in recent times due to the moratorium and reduction in pumping from the Lower Rio Cobre Basin.

If necessary the water levels within the depression associated with normal and extreme rainfall events should be determined. Based on this determination appropriate setbacks as well as an appropriate storm runoff drainage plan should be implemented which will adequately accommodate on site drainage and mitigate the impacts of site generated runoff.

Several things stand out in this Technical Note:

- The only practical source of water in the area is groundwater
- The proposed abstraction of 1334.4 m³/day for the cemetery expansion is far greater than the 141 m³/day and 52.4 m³/day for Dovecot Park and Wynters Pen pumping wells, respectively, in 2013.
- The existing use of water is causing problems as ***“water levels and water quality for the Mango Walk wells have been declining over time.”***
- The situation has resulted in a moratorium enforced by the Water Resources Authority (WRA) restricting the development of new wells in Lower Rio Cobre Basin

Considering these facts, the EIA for the proposed cemetery expansion is deficient because it does not assess how allowing an additional abstraction of 1334.4 m³/day would effect water levels for the Mango Walk wells (and possibly others) that have been declining over time because existing water usage.