Issue #20

ENVIROFOCUS

Magazine of the Environmental Protection Department

50

YEARS

of protecting our environment

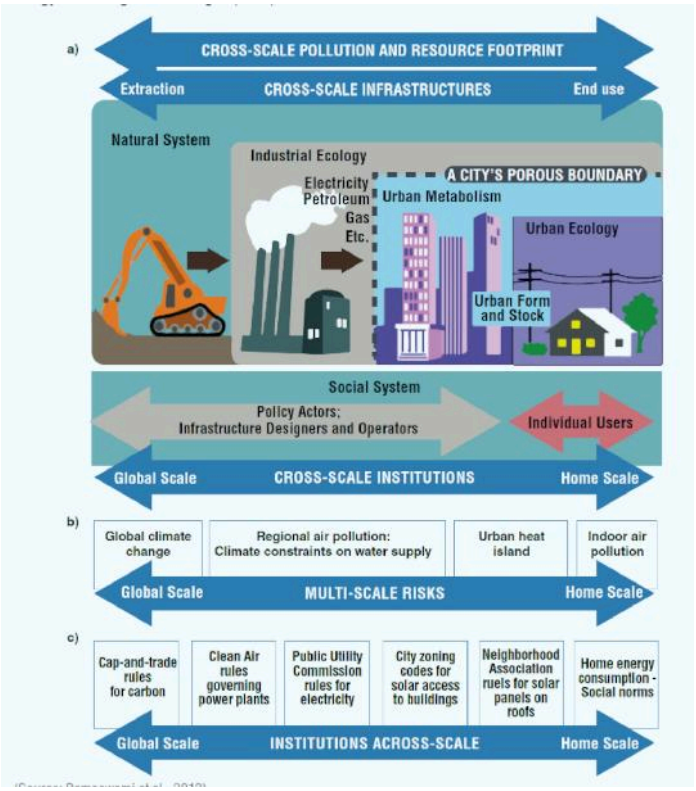
What's in this Issue?

Director's Message

The global political, economic, social, technological, environmental and legal landscape has evolved and is significantly different now, from when the Government of Barbados established the Public Health Engineering Unit of the Ministry of Health and Welfare (now Environmental Protection Department (EPD), Ministry of Environment and National Beautification) in March 1971. The primary focus was to ensure that, among other things, residential development complied with health standards and that wastewater was disposed of appropriately to minimize nearshore marine water and groundwater contamination in keeping with the policies and regulations at that time. The early work of the Department inspired improvements in solid waste disposal when evaluations showed leachate from dumps sites adversely impacted groundwater and could eventually contaminate the drinking water supply.

Also, evidence from recreational water quality monitoring of beaches in the 70s was a decisive factor that encouraged the construction of the Bridgetown Sewerage System, which stopped direct discharges from septic trucks into the Carlisle Bay area and generally improved sewage management in Bridgetown. Fifty years on, accumulated global knowledge of impacts from human development, particularly the damage to ecosystems and ecosystem services from pollution, advances in technology and new social perspectives have informed policy, legal reforms, technology and environmental activism. Simply put, environmental pollution is no longer viewed as separate localized events but an event integrated into the global interconnected ecological systems where simple acts are now understood to have larger consequences and must be managed within that regional and global context.

Taking this into consideration, the EPD is no longer solely focus on building development control and wastewater management. Its functions and responsibilities have expanded to include the following areas with varying levels of success in the regulation, monitoring and enforcement of air and noise pollution; marine pollution control; chemicals and hazardous waste; groundwater protection and sealed radiation sources within the context of national policies, laws and multilateral environmental agreements. Environmental Planning and Research forms a cross-cutting activity that links all the functions of the Department and is critical to implementation, which utilizes the four synergistic strategies of understanding your environment; environmental protection for a wholesome life; resource efficiency; and compliance through communication, education, partnerships, and shared responsibility. Over the years, the EPD has strived to

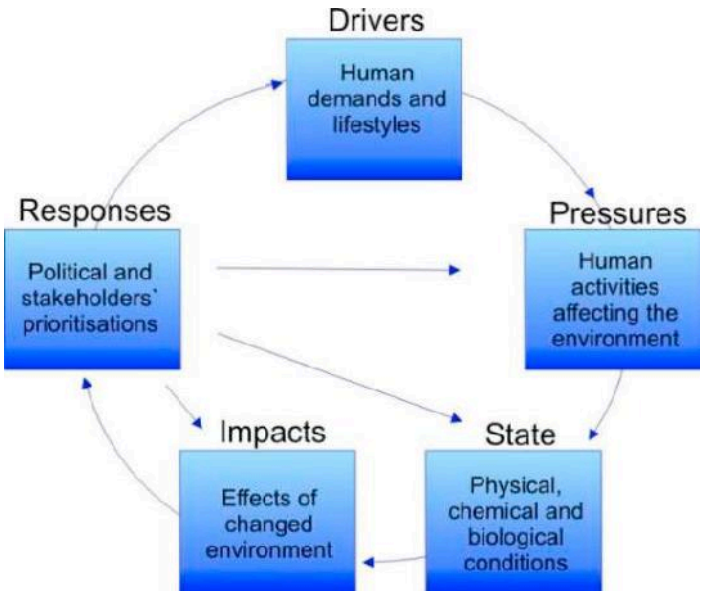


promote sustainable environmental practices based on these four strategies to prevent, control, and regulate pollution. To this end, the Department has contributed to the following work to safeguard the environment and human health from persistent organic pollutants, noise, chemicals and other harmful substances by:

- Preparing a National Implemention Plan (2004, 2021) designed to manage the handling and disposal of persistent organic pollutants in Barbados through cooperation with regional, international, private and public stakeholders;
- Conducting baseline assessments (2012-2015) of the ambient air quality of Barbados to determine pollutant levels and design future air quality monitoring initiatives;
- Coordinating and preparing a National Radiation Protection Policy (2020) to manage sealed radiation sources and ensure safeguards are in place;
- Coordinating and preparing National Noise Policy (2005)- that specifies acceptable noise levels in residential, commercial and industrial areas during day and night to protect human health and maintain a certain aspect of our quality of life;
- Coordinating and preparing National Wastewater Reuse Policy (2018) that suggest pathways for adaptation to climate changes and improvements in the management of water resources in Barbados;
- Conducting studies between 2012 and 2018 to characterize the environmental noise levels in Barbados across major urban centres;
- Preparing national inventories for cadmium, lead, mercury and persistent organic pollutants between 2017 to 2019 to improve the life cycle management of hazardous chemicals and minimize adverse environmental and health outcomes from improper disposal; and
- Maintaining national water quality monitoring for all potable water supply wells (1987-Present) and popular bathing beaches (1971-Present) to safeguard the public from pathogens, viruses, bacteria and harmful chemicals.

While it is good to look back on our achievements, we must operate based on the realities of the present informed by the lessons from the past, while maintaining an eye on the future and the desired national development aspirations and outcomes.

Going forward, the Environmental Protection Department needs to evolve to better utilize technology in its environmental monitoring programmes, particularly through the use of remote sensing and telemetry techniques for larger geographical analyses of pollutants in soil, air and water. The focus must also expand to include not just a better understanding of how environmental pollution impacts on ecosystems, but we must understand the social and economic driving forces behind pollution and their connections to national development objectives. We must be innovative in our efforts to promote decoupling economic development from environmental degradation and that starts by recognizing the socioeconomic interlinkages and must continue to engage stakeholders with approaches that respect our diverging views.

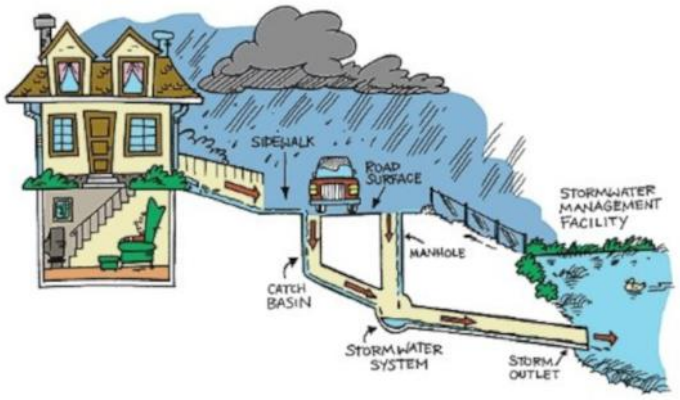


In that context, for possible new programmes looking forward, we must step out of our comfort zone and consider the establishment of National Youth Think Tanks on Environmental Pollution Control and Citizen Science Initiatives that can serve dual national purposes of awareness-raising in environmental matters while building the technical capacity of the future environmental stewards of the nation. Internally, the Department needs to be restructured to improve its responsiveness to environmental complaints through streamlining its organizational structure along with the following: Investigations and Complaints; Monitoring and Enforcement; and Research and Development.

Finally, the story of a Department is not the story of an individual or its leader, but the collective efforts, knowledge and shared experiences of all staff that form the fabric of our relationships and eventually our achievements. This story also is dependent on those persons we serve. So for the next fifty years, we at the EPD invite you our valuable partners, to crawl, walk, run, and soar with us on the next phase of our journey in the restoration of our ecosystems, improving our livelihoods, and protecting human health and the environment for our shared national development goals.

Stormwater and you!

Many may wonder when they see murky water pouring out of the storm drains onto the beach, what is it and why is it happening? When the rain falls it flows over roads, rooftops, driveways and other paved surfaces. This is what we call stormwater or rain runoff. Some of this rain is absorbed and replenishes groundwater but increased paved surfaces causes an increase in the amount of rain moving with gravity, downhill and towards the coast and eventually the sea. Stormwater is a natural process of replenishing rivers, lakes and other water bodies. However, this process may lead to flooding which is undesirable in areas where development has taken place. In order to minimize damage to property and infrastructure, artificial drainage measures were developed.



Stormwater also carries nutrients to coastal areas replenishing nutrients in coastal environments like mangroves and nearshore waters. Unfortunately, because of the different surfaces this rain water passes over, pollution can be collected too. Pesticides from gardens and lawns; metals from rooftops and roads; petroleum by-products from roads and vehicles; bacteria from human and animal waste; and litter can all be carried by stormwater.

Once this stormwater reaches the coast it can reduce light penetration and smother aquatic habitats like reefs and sea grass beds.

All of us need to help reduce our impact on stormwater and therefore reduce pollution of our environment by:

a) Creating green spaces in your yard and directing runoff to stormwater infiltration basins, the lawn or stormwater well;

b) planting hedgerows around green areas to retain soils;

c) not littering and not dumping hazardous chemicals down storm drains or in gutters;

d) using less fertilizers and pesticides;

e) checking cars for leaks and recycle motor oil;

f) use rain bins or collection tanks and using this to water your garden, this will conserve water usage and;

g) cleaning up your pet faeces.

Solid and Hazardous Waste-A Reflection

The Environmental Protection Department (EPD) is tasked with monitoring and regulating activities related to solid waste and hazardous materials management. Examples of hazardous material and solid waste dealt with by the section may include, pesticides, radioactive materials, asbestos, used oil, and scrap metals. The EPD aims to ensure that proper protocols are adhered to regarding the import and eventual disposal of these products. The EPD achieves its mandate by conducting site visits and inspections of the government-operated disposal site and landfill as well as of the companies which collect and process waste for recycling operations overseas. Over the years, as there were new developments in the management of solid waste and hazardous materials in the world, the responsibilities of the EPD have expanded. The responsibilities now include ensuring that Barbados meets its commitments under various international agreements related to the management of solid and hazardous materials.

The EPD now has responsibility for the following:

1. Basel Convention on the transboundary movements of hazardous wastes and their disposal;
2. The Chemical Weapons Convention;
3. The Rotterdam Convention on Prior Informed Consent and;
4. Relations with International Atomic Energy Agency – Responsible for ensuring the safety and security of radioactive sources and devices in Barbados.

An additional role of the EPD is to ensure that measures are in place to ensure the safety and security of the public and the environment from the use of chemicals and substances which can be dangerous, if not handled correctly.

As a part of this responsibility, the EPD reviews and makes recommendations for applications for the registration of pesticides in Barbados.

In recent times, the EPD has also become responsible for the execution of the Derelict Programme. This programme goal is to identify and remove derelict buildings and vehicles and thereby reduce their potential impacts by removing areas where mosquitoes and vermin may be harboured and remove the threats associated with hazards such as leaking engine fluids and batteries to the environment and human health of Barbados.

Apart from the recent functions, the removal of derelict buildings and vehicles remain a core activity, which has been conducted by the Department for over thirty years. This Programme clears sites that are likely to harbour disease-carrying vectors.

An example of one of many derelict structures and vehicles encountered by the EPD.

Recreational Water Quality and You: The Basics

Whether we go to the beach to relax or to exercise, we often jump into the sea without a second thought for water quality. After all, we live in the Caribbean with clean, calm, crystal-clear waters that others can only dream about. But is it good enough that the water looks clean?

The answer is 'not always'. Luckily, there are more rigorous ways to determine if that clear water is indeed safe. This is where the Environmental Protection Department (EPD) plays a critical role. The EPD collects nearshore water quality samples at 18 beaches weekly as part of our routine nearshore water quality monitoring programme. Samples are collected, stored and transported to the Best-dos Santos Public Health Laboratory to be tested for indicator bacteria.

Two indicator bacteria are used to assess the quality of recreational marine waters, these are faecal coliform and more importantly enterococci. Results are compared to recognised international water quality criteria to confirm suitability for recreation.

What are the Criteria Used?

The main criteria utilized are those developed by the United States Environmental Protection Agency (US EPA).

The criteria used by the EPD as part of routine nearshore monitoring are as follows:

• US EPA (1976)- Faecal Coliform – Geometric mean of a minimum 5 samples should not exceed 200 colonies/100ml in any 30-day period. No more than 10% of the samples should exceed 400 colonies/ 100ml.

• US EPA (1986)-Enterococci – Geometric mean of a minimum 5 samples should not exceed 35 colonies/ 100ml in any 30-day period.

• US EPA (2012)- Enterococci - Geometric mean of a minimum 5 samples should not exceed 35 colonies/ 100ml in any 30-day period. There should not be greater than a ten percent excursion frequency of the selected Statistical Threshold Value (STV) of 130 CFU/ 100ml Enterococci in the same 30-day interval associated with the geometric.

If the criteria are consistently not met, the EPD coordinates with relevant stakeholders to have that beach closed until water quality returns to normal and the source/cause of the failure is determined and addressed. This is paramount as we must ensure that our bathing waters are fit for use for locals and visitors alike and to protect our sensitive offshore ecosystems.

Did you know?

Activities far away on land can affect nearshore water quality. Contaminants may be transported overland in gullies and drains and underground via groundwater.

The EPD's nearshore water quality monitoring programme has been ongoing since 1971 with modifications in 2001.

The EPD monitors nearshore water quality at 33 sites from Heywoods in the north to Silver Sands in the south every week.

Ambient Air Quality Monitoring Programme

The Problem

When one thinks of poor ambient air quality, we usually envision smoke coming from industrial stacks or smog. However, poor air quality can occur without us even seeing it which makes it particularly insidious. For example, poor air quality can be characterized by the presence of high concentrations of the following chemical compounds which we cannot normally see but we may observe the impacts. Exposure to ambient air pollutants such as particulates as well as chemical compounds such as sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3) and volatile organic compounds (VOCs) may cause the development of diseases such as;

- lung cancers;
- heart disease; stroke and;
- chronic and acute respiratory diseases e.g. asthma, bronchitis and chronic obstructive pulmonary disease (COPD).

Environmental damage can occur to property, contaminate groundwater, damage crops and trigger deforestation due to acid rain and sulphurous deposits, and damage to electrical equipment by ground-level ozone.

According to the World Health Organisation (WHO), poor ambient air quality is considered a major impediment to preserving human health and the environment. In 2016, 91% of the world population primarily in developing countries were exposed to poor air quality. Also, it was estimated that poor ambient air quality may contribute to 4.2 million premature deaths worldwide. In light of the above, the Environmental Protection Department (EPD) has been tasked with monitoring the quality of the ambient air in Barbados.

How Did We Do It?

The EPD conducted three (3) ambient air quality passive monitoring projects between 2012 and 2015 which assessed ambient air quality levels one background site at Ragged Point, St. Philip and locations in and around the major commercial centres of Bridgetown, Speightstown, Oistins, Holetown and two rural areas (Farley Hill, National Park, St. Peter and Gun Hill Signal Station, St. George.

The goal of these projects was to characterize the concentrations of SO_2, NO_2, O_3 at all locations and VOCs (in select locations), and provide a baseline on pollutant levels in our air. The method by which this was done was the placement of specially treated passive airflow sorbent tubes, 1-3 m from the ground for 30 days (±5 days) over one year for each location. At the end of the 30 day sampling period the samplers were removed and shipped to the laboratory overseas for analysis.

Results

In the case of SO_2 and NO_2, the results across the island showed levels comparatively lower than the world averages, as shown in Figure 1 below. Across the urban corridors of Barbados, higher levels of NO_2 and SO_2 were observed compared to rural areas. This was expected, due to the presence of high vehicular traffic and human activity in those areas.

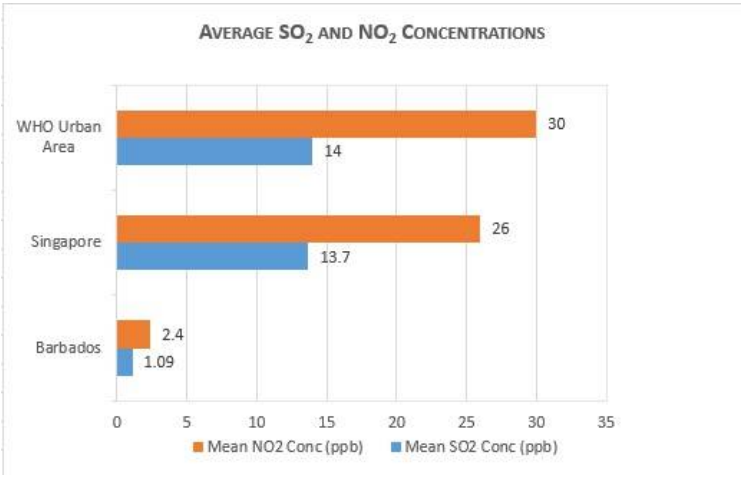


Figure 1: A comparison of sulphur dioxide and nitrogen dioxide passive sampler averages in Barbados compared to levels recordered in Urban Areas and Singapore.

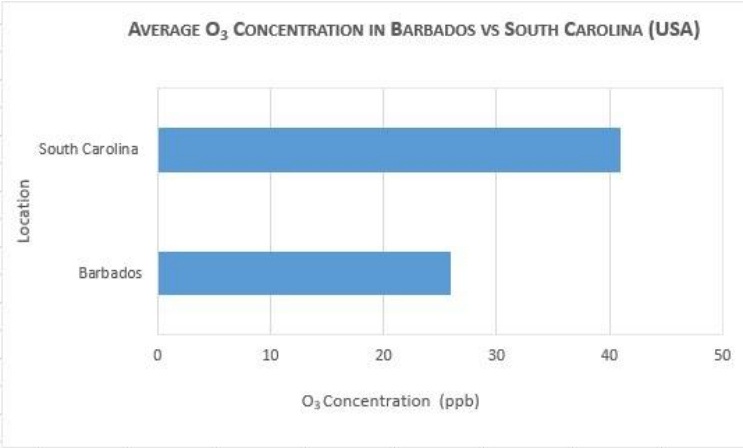


Figure 2: Show the average O_3 concentrations measured over 30-days using passive sampling in Barbados and South Carolina.

In the case of ozone, the average levels detected in Barbados of 26 ppb were below that of detected in similar passive sampling studies conducted in South Carolina, USA during 2002 as shown in Figure 2 below. The formation of ground levels ozone is an extremely complex reaction between sunlight, VOC concentration and nitrogen dioxide.

Going Forward

Despite the overall lower concentrations in Barbados, it does not mean that the role of the EPD is over concerning monitoring air quality. In actuality, the real work has just begun. The data collected during these studies have provided the EPD with baseline information to act as our starting point for our ambient air monitoring programme. In addition to the passive monitoring programme, the EPD will also be conducting monitoring using specialized real-time monitoring equipment at various stations across the island. This will allow us to identify any particular hotspots of ambient air pollution which would not be detected by passive sampling.

This data could then be used to assist the Government of Barbados in achieving the goals set out in the Draft National Health Plan 2017 through focused planning objectives and development processes in collaboration with various international organisations such as the United Nations Environment Programme (UNEP) and other developmental organisations to developing frameworks for tackling ambient air pollution.

Photo 1: Samplers at Gun Hill Signal Station.

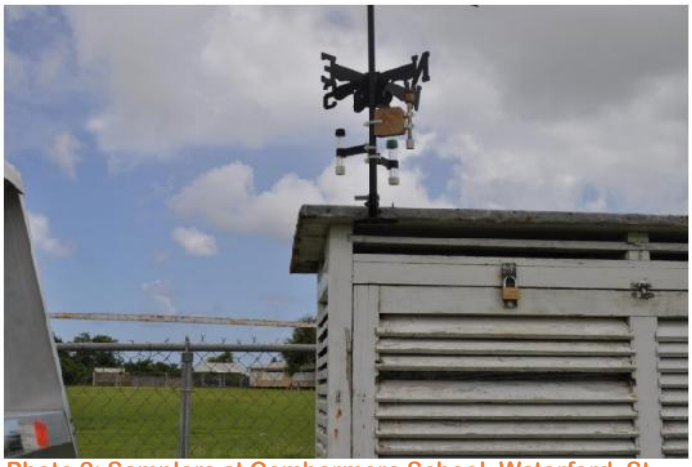


Photo 2: Samplers at Combermere School, Waterford, St. Michael during the Bridgetown Ambient Air Monitoring portion of the project.

Photo 3: An example of the VOC Passive Diffusion Tube used in the study.

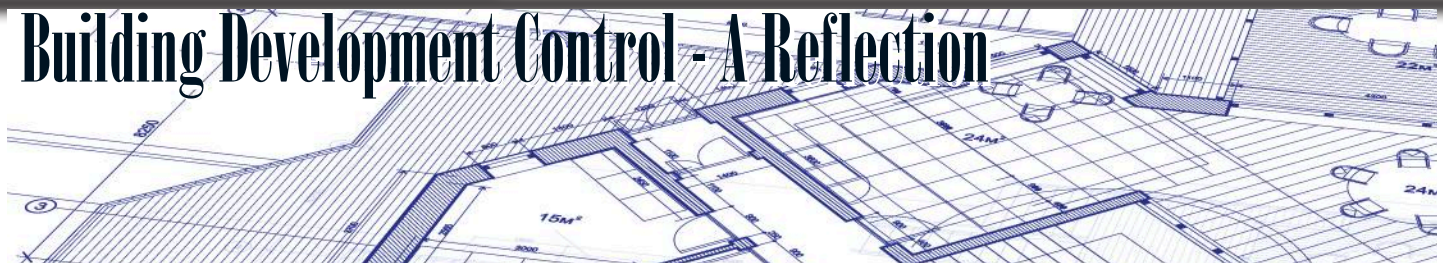
Photo 4: An example of the Passive Diffusion Tube used to monitor SO_2, O_3 and NO_2 in the study.

DID YOU KNOW THE DIFFERENCE?

Active sampling generally uses a pump to draw a specific volume of air over a surface/media that can be weighed or chemically analysed later or a sensor which can give a real time reading.

Passive air sampling relies on the diffusion of air over a specially treated surface (media), which can be chemically analyzed and is generally more economical than active sampling

Building Development Control - A Reflection



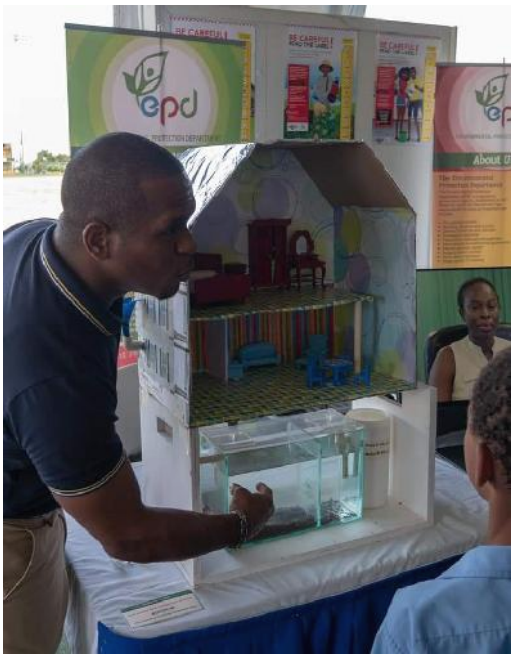
The EPD has played a pivotal role since its inception in 1971 in ensuring that the health and wellbeing of building occupants were not compromised by the building environment.

In that regard, the role of the EPD; has been to review building applications to ensure that the submitted applications meet the stipulations of the the Health Services Act and Health Services Building Regulations to promote healthy work environments in the following key areas:

- Ventilation: the promotion of good indoor air quality from the introduction of outdoor air into the building through adequately sized window and door openings.
- Sanitation: the promotion of the appropriate wastewater treatment and disposal systems and the control of solid waste disposal to protect the groundwater supply and the marine environment.
- Overcrowding: to control the spread of contagious diseases, and
- To ensure proper building layout to minimize exposure to radiation and noxious gases in occupational environments and reduce the potential for the contamination of food in resturants.

Over the years, applications for residential development in Barbados accounted for 83% of the applications seen by the EPD. This process usually takes approximately two months to complete but is hampered by the failure of building designers to comply with basic requirements of the Health Services (Building) Regulations 1969. Therefore, the process is delayed by a substantial number of requests for revised drawings/information. Though refusal of applications accounts for only 18% of the 7,620 applications processed over the last five years, the EPD has embarked on a pre-consultation strategy to further reduce this number.

Additionally, the EPD has embarked on several public service awareness programmes to reduce the high occurrence of the designer's error, these included the publishing of booklets, radio jingles, and science exhibitions.



Septic tank demonstration at UWI Science Exhibition 2019.

Through the EPD's website (www.epd.gov.bb) accessibility to relevant policy papers brochures and guidance documents to guide a more informed building designer which in turn will protect human health and the environment.

Ambient Noise Monitoring Programme

The average Barbadian is exposed to a wide range of sounds every day. You may awake to roosters crowing, birds chirping or the neighbour cutting grass with a lawnmower. And as you go through your busy day there will be the sounds of traffic and people, sometimes accompanied by noise from a construction site, industry or a siren from an emergency vehicle. And while some can end their day with the lovely sounds of crickets others may not be able to hear them or the television due to a karaoke bar nearby or the incessant buzzing of a noisy kite with a bull attached. The sound levels experienced by Barbadians varies greatly with some being severely affected by noise while others are blissfully unaware or not exposed to the annoyance associated with elevated sound levels.

Noise is often defined as “unwanted sound” and can have a wide range of negative effects including noise-induced hearing impairment, headaches, sleep disturbance, annoyance and negative impacts on a person’s mental health. Every citizen of Barbados should be able to enjoy their property and protect their hearing health. Yet, development or economic gain is sometimes associated with increased sound levels. It is therefore important to balance these sometimes opposing goals to have sustainable, civilised development of Barbados.

One of the tasks of the Environmental Protection Department (EPD) is to monitor sound levels within Barbados. The Department has conducted short term projects over the years that monitored the sound levels at various Crop Over Events as well as within Barbados’ four major towns- Bridgetown, Oistins, Speightstown and Holetown.

The knowledge and experience gained in the past have enabled the EPD in 2020 to embark upon a pilot project located at the Treasury Building in Bridgetown which seeks to monitor the decibel sound levels of the surrounding area in a comprehensive and systematic manner when compared to our previous studies.

The Department wishes to thank the Treasury Department for facilitating the project and as a department, we hope to form similar linkages with other entities which would allow for the development of a noise monitoring network in Barbados.

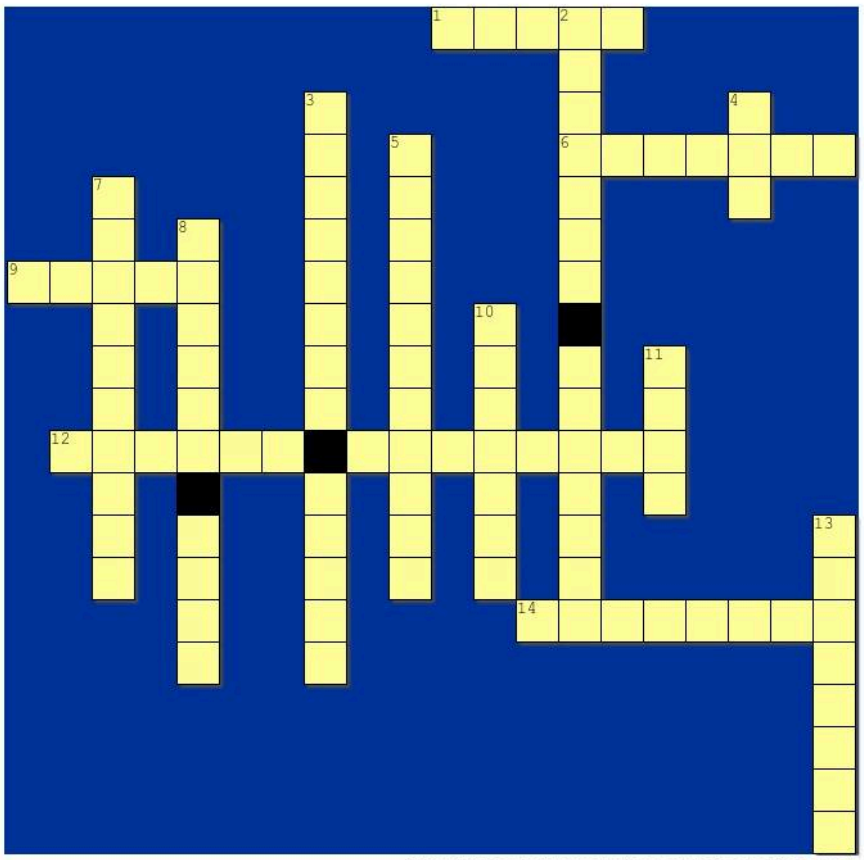
Following on from the establishment of a noise monitoring network. The EPD will utilise the data collected to formulate and update existing policies to assist in the development of comprehensive noise legislation that seeks to regulate noise sources in Barbados.

Photo 1: Noise monitoring station set up on the roof of the Treasury Building in Bridgetown

Crossword Puzzle

50 Years of EPD

Complete the crossword puzzle below



Created using the Crossword Maker on TheTeachersCorner.net

Across

1. An 'unwanted' sound
6. A method of air quality sampling
9. This gas can be harmful at ground level but helpful in the upper atmosphere
12. Another indicator bacteria used for water quality monitoring
14. The EPD collects samples of this weekly

Down

2. This gas can cause acid rain
3. The EPD reviews these documents before construction can start
4. It would be pretty difficult to breathe without clean ___
5. An indicator bacteria used for water quality monitoring
7. The runoff from rainfall over land into drains streams and gullies
8. The EPD gave a demonstration of this at the Science and Technology Festival
10. A measurement of a unit of sound
11. A machine used collect air samples
13. A structure or vehicle that can harbour rodents

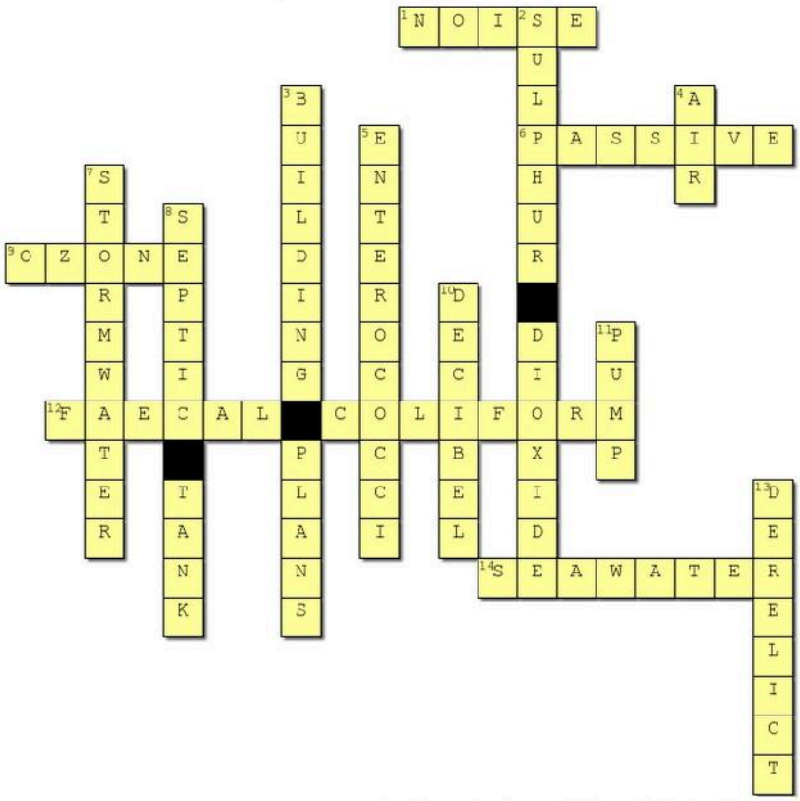
Puzzles and Games Corner-
Word Scramble

Find the words from the right column in the scramble! Enjoy!!

S	F	B	D	K	A	I	R	X	A	T	E	Y	N	U
I	I	O	Z	O	N	E	V	O	C	S	S	H	O	G
E	N	V	I	R	O	N	M	E	N	T	I	E	I	T
Y	O	D	H	U	A	T	E	N	M	O	O	L	T	D
U	I	E	R	H	C	W	D	T	S	R	N	Q	U	V
T	T	C	E	P	Z	A	O	E	E	M	O	O	L	D
C	C	I	T	L	P	T	Z	R	P	W	I	K	L	X
C	U	B	A	U	L	E	D	O	T	A	T	R	O	P
E	R	E	W	S	R	R	I	C	I	T	C	B	P	S
P	T	L	D	M	Y	E	O	O	C	E	E	L	I	N
N	S	R	N	K	Q	X	X	C	W	R	T	F	K	A
D	N	J	U	J	O	P	I	C	L	S	O	O	L	L
D	O	S	O	A	K	C	D	I	L	G	R	R	I	P
B	C	A	R	H	T	J	E	A	Z	I	P	E	J	L
S	C	V	G	J	H	Q	J	I	S	O	K	N	A	T

ENVIRONMENT
AIR
NOISE
WATER
POLLUTION
DECIBEL
ENTEROCOCCI
SEPTIC
TANK
OZONE
VOCS
SULPHUR
DIOXIDE
GROUNDWATER
STORMWATER
PLANS
CONSTRUCTION
OIL
PROTECTION

Crossword Puzzle Answers



ENVIRONMENTAL TIPS

- Do not burn anything! It is a nuisance and can make you and other people sick.

- Do not do bodywork or spray painting in the open. Activities like these should only be done in special booths and workshops in approved locations. Contact the Environmental Protection Department for more information.

- A derelict vehicle is any motor vehicle that has been abandoned, taken apart, is no longer roadworthy, or is in a condition that is harmful to the environment and public safety.

- A derelict building is any building that is run-down, unoccupied, structurally unsound and is in a condition that is harmful to the public safety.

- Turn your music down! Loud music can damage your hearing. Your neighbour should not be able to hear what you are listening to.

- Before constructing or renovating your home, office or any commercial or industrial building you must obtain permission from the Environmental Protection Department.

- Make sure that you comply with all regulations for your water zone. Contact the Environmental Protection Department (EPD) if you are unsure of what zone you are in, and for further information on any special requirements.

- Never dispose of wastewater (such as kitchen, bathroom and cleaning waste) or any other liquid to the sea, even small amounts over time may have a negative effect.

- Littering at the beach can harm wildlife! Litter can choke or maim fish, turtles, sea mammals and birds.

- Always store chemicals in their original containers and ensure that they are labeled, and always use chemicals for the purposes for which they were produced and in accordance with their label instructions. Read the labels before using.

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