July 5, 2019

Mr. Alex Baylor, Environmental Specialist via email: alex.baylor@pgcps.org
Environmental Safety Office
Prince Georges County Public Schools
Division of Supporting Services / Building Services
13306 Old Marlboro Pike
Upper Marlboro, MD 20772

RE: Indoor Air Quality (IAQ) and Mold Assessment Services
Hill Crest Elementary School
4305, 22nd Place, Temple Hills, MD 20748
Tidewater Project No.: 5419-014

Dear Mr. Baylor:

Tidewater, Inc. (Tidewater) is pleased to present this Indoor Air Quality (IAQ) and Mold Assessment Report describing the results of the IAQ assessment and mold survey conducted by Tidewater at Hill Crest Elementary School located at 4305, 22nd Place in Temple Hills, Maryland. The IAQ and Mold survey was conducted on May 22, 2019, by Tidewater's Project Manager and Certified Industrial Hygienist, Mr. Skanda Abeyesekere MS, CIH, CSP, CHMM.

The scope of work for the IAQ assessment and mold survey included:

- Visual inspections of the following representative areas of the school: Multipurpose Room, Media Center (M-16), Classroom B-21, Classroom R-3, Health Room, Music Room (E-54), Primary Classroom C-30, Intermediate Classroom C-39, 2nd Floor – Intermediate Classroom D-44 and 2nd Floor - Intermediate Classroom D-45 of Hill Crest Elementary School for evidence of potential indoor air quality problems (including suspect microbial growth, water damage, chemical use/storage, drain traps, sources of allergens/contaminants, etc.) that may contribute to indoor air quality problems.
- Comfort parameter air testing at the above areas utilizing a direct-reading IAQ monitor for temperature (T), relative humidity (RH), carbon monoxide (CO), and carbon dioxide (CO_2.) Measurements were taken for comparison with guidelines established by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62.1–2016, Ventilation for Acceptable Indoor Air Quality, and The United States Environmental Protection Agency (US EPA) National Ambient Air Quality Standards (NAAQS.)
- Measurement of particulate matter less than 10 microns (PM10) concentrations utilizing a direct-reading instrument at the above areas for comparison with guidelines established by the United States Environmental Protection Agency (US EPA.)
- Measurement of Total Volatile Organic Compounds (TVOCs) concentrations utilizing a direct-reading instrument at the above areas for comparison with relevant guidelines.
- Air sampling for total airborne fungal spore concentrations at the above areas using Allergenco-D cassettes affixed to a Buck BioAire™ Model B520 Bioaerosol Sampling Pump.

Visual Observations

Tidewater's assessment included a visual inspection of representative areas of the school including Multipurpose Room, Media Center (M-16), Classroom B-21, Classroom R-3, Health Room, Music Room (E-54), Primary Classroom C-30, Intermediate Classroom C-39, 2nd Floor – Intermediate Classroom D-44 and 2nd Floor - Intermediate Classroom D-45 of Hill Crest Elementary School. The results of Tidewater's visual inspection are as follows:

Multipurpose Room

The Multipurpose Room had over 30 students at the time of the inspection. All trash receptacles were being emptied at meal times. General housekeeping appeared to be good. All air diffusers on the ceiling appeared to be clean. Food odors were detected from the Multipurpose room during meal times. No signs of suspect mold growth, or prior or ongoing water-intrusion problems were observed.

Media Center (M-16)

Media Center had four (4) people at the time of the inspection. General housekeeping appeared to be satisfactory. Tidewater observed multiple water-stained ceiling tiles in the Media Book Room A-16A. Tidewater observed the return air grills located on the ceiling to be clean. No signs of suspect mold growth were observed in the Media Center (M16). Furthermore, no unusual odors were detected.

Classroom (B-21)

Classroom B-21 had 20 students at the time of the inspection. The air conditioning unit was in operation at the time of the inspection. General housekeeping appeared to be satisfactory. No signs of suspect mold growth or water-intrusion problems were observed in the classroom. No unusual odors were detected in the classroom.

Classroom (K-3)

Classroom K3 was vacant at the time of the inspection. The air conditioning system was in operation at the time of the inspection. General housekeeping appeared to be satisfactory. No signs of suspect mold growth, or prior or ongoing water-intrusion problems were observed in the classroom. No unusual odors were detected in the classroom.

Health Room (A-9)

Health Room (A-9) was vacant at the time of the inspection. The air conditioning unit was in operation at the time of the inspection. General housekeeping appeared to be satisfactory. The supply and return air grills located on the ceiling appeared to contain dust deposits. No signs of suspect mold growth or ongoing water-intrusion problems were observed in the Health Room. Mild food odors were detected in the Health Room (A-9.)

Music Room (E-54)

Music Room (E-54) was vacant at the time of the inspection. General housekeeping in Music Room E-54 appeared to be deficient. Tidewater observed numerous water-stained ceiling tiles in Music Room (E-54.) Books were stored on top of the supply grills of the fan coil unit hindering air flow. No signs of suspect mold growth or water-intrusion problems were observed in the Music Room. No unusual odors were detected in the Music Room (E-54).

Classroom C-30

Classroom C-30 was vacant at the time of the inspection. The air conditioning unit was in operation at the time of the inspection. General housekeeping appeared to be satisfactory. No signs of suspect mold growth or water-intrusion problems were observed in the classroom. No unusual odors were detected in the classroom.

Classroom C-39

Classroom C-39 had 30 students at the time of the inspection. The air conditioning unit was in operation at the time of the inspection. General housekeeping appeared to be satisfactory. No signs of suspect mold growth or water-intrusion problems were observed in the classroom. No unusual odors were detected in the classroom. Air supply grills located on the ceiling were clean.

2nd Floor – Intermediate Classroom D-44

The Intermediate Classroom D-44 was vacant at the time of the inspection. A wall-mounted fan coil unit was in operation at the time of the inspection. General housekeeping appeared to be satisfactory. No signs of suspect mold growth or water-intrusion problems were observed in the Laboratory. Furthermore, no unusual odors were detected.

2nd Floor – Intermediate Classroom D-45

The Intermediate Classroom D-45 was vacant at the time of the inspection. A wall-mounted fan coil unit was in operation at the time of the inspection. General housekeeping appeared to be satisfactory. No signs of suspect mold growth or water-intrusion problems were observed in the Laboratory. Furthermore, no unusual odors were detected.

Comfort Parameter Air Testing

During the assessment, Tidewater recorded temperature, relative humidity, carbon dioxide (CO_2), and carbon monoxide (CO) measurements in the above-mentioned locations of Hill Crest Elementary School using a TSI Q-Track Air Quality Meter (Model Number TSI Q-Track 7565, Serial Number 7565x0931002, Calibration Date: April 18, 2019.) Measurements were taken after allowing the instrument to become acclimated to the ambient temperature and relative humidity for approximately five (5) minutes. Measurements were taken over a 5-minute time period at each designated location and the average concentration was recorded. Samples were obtained for comparison with guidelines established by the American Society for Heating Refrigeration and Air Conditioning (ASHRAE) Standard 62.1 – 2016, Ventilation for Acceptable Indoor Air Quality.

A background sample was obtained in front of the main entrance to the school building for comparison to the interior readings. The results of the IAQ comfort parameter monitoring are provided in Table 1, in **Attachment A**.

According to the American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 62.1 – 2016, the temperature range in summer months should be maintained between 73.0°F and 79.0°F for maximum occupant comfort. The ASHRAE guideline for temperature for winter months is between 68.0°F and 74.5°F. The indoor temperature levels recorded in the assessed areas ranged between 70.3°F and 73.8°F, and the background temperature outside the building was 71.5°F.

The temperature levels recorded within all areas assessed were within the recommended range for the spring-summer transitional period.

Per the same guideline, a maximum recommended relative humidity level of 65.0% is recommended to reduce the likelihood of condensation on cold surfaces. Relative humidity levels recorded in the assessed areas ranged between 34.8% and 57.2%. The background relative humidity level outside the building was 31.5%. The relative humidity levels in all areas assessed were below the ASHRAE recommended maximum relative humidity guideline of 65.0%.

ASHRAE Standard 62.1 – 2016 recommends that indoor CO_2 concentrations not exceed 700 ppm above the outdoor background CO_2 level. The CO_2 levels recorded in all assessed areas ranged between 370 ppm to 2,827 ppm. The background CO_2 level outside the building was 277 ppm. The CO_2 levels in Classroom B-21, Music Room E-54, Classroom C-30, Intermediate Classroom C-39, and 2nd Floor Intermediate Classroom D-45 exceeded 700 ppm above the outdoor background CO_2 level of 277 ppm indicating inadequate air flow into these areas. These areas are highlighted in Table 1 in **Appendix A**.

The CO concentrations recorded in all of the assessed areas were below the maximum guideline of 9 ppm recommended by the Indoor Air Quality Association (IAQA) for CO in occupied indoor environments.

Particulate Matter Less than 10 Microns (PM 10)

Tidewater conducted air sampling for respirable dust particulates using a TSI® DUST TRAK DRX™ Aerosol Monitor (Serial Number 8534170101, Calibrated Date: March 1, 2019.) The TSI® DUST TRAK DRX™ Aerosol Monitor was equipped with a PM10 (10 µm) respirable impactor. Measurements were taken after allowing the device to become acclimated to the ambient temperature and relative humidity for five (5) minutes. Measurements were taken over a 5-minute time period at each designated location and the average concentration was recorded. Samples were taken for comparison with guidelines established by the EPA NAAQS. Tidewater also obtained a background sample from outside the main entrance of the school building for comparison to the interior readings. The results of the particulate matter sampling are provided in Table 2, in **Attachment A**.

Based on the EPA National Ambient Air Quality Standard (NAAQS) for Particulate Matter, Final Rule (January 15, 2013), the 24-hour primary and secondary exposure standard for particulate matter less than 10 microns (PM10) is 150.0 micrograms per cubic meter of air (µg/m^3) or 0.150 milligrams per cubic meter of air (mg/m^3.) The results of the PM10 analysis indicate that the average PM10 dust concentration recorded in all of the assessed areas ranged between 0.012 mg/m^3 and 0.026 mg/m^3. The average PM10 dust concentration in the background sample obtained in front of the main entrance was 0.015 mg/m^3.

The results of the PM10 monitoring indicate that the PM10 dust concentrations all areas assessed were below the EPA 24-hour primary and secondary NAAQS of 0.150 mg/m^3.

Total Volatile Organic Compound (TVOC) Air Testing

Tidewater obtained direct read measurements for Total Volatile Organic Compounds (TVOCs) using a Mini-RAE 2000 Hand Held VOC meter (Model Number MINIRAE 2000, Serial Number 110-010833, Calibration Date April 9, 2019.) Measurements were taken after allowing the device to become acclimated to the ambient temperature and relative humidity for five (5) minutes. Measurements were taken over a 5-minute time period at each sampling location and

the average concentration was recorded for comparison with threshold limits recommended for typical indoor occupied environments.

A background sample was also obtained outdoors in front of the main entrance of the school building for comparison to the indoor readings. The results of the particulate matter sampling are provided in Table 3, in **Attachment A**.

There are no OSHA published guidelines for TVOCs. However, in general, the indoor air quality TVOC threshold for typical indoor occupied environments should not exceed 1,000 ppb (1.0 ppm) isobutylene units. The TVOC concentrations recorded in all of the assessed areas were below the recommend threshold level of 1.0 ppm.

Spore Trap Bioaerosol Sampling

On May 22, 2019, Tidewater collected a total of ten (10) spore trap air samples using Allergenco-D cassettes to characterize potential airborne fungal spores within select areas of Hill Crest Elementary School. A background sample was also collected outside the main entrance to the school building for comparison purposes.

Tidewater obtained the spore trap samples using Allergenco-D cassettes affixed to a Buck BioAire™ Bioaerosol Sampling Pump (Pump Model Number B520 and Serial Number B153043, Calibration Date: February 6, 2019) calibrated to a flow rate of 15.0 Liters per minute. Each sample was run for a period of five (5) minutes at each sample location to collect a total sample volume of 75.0 liters of air.

Once collected, the samples were transported to EMSL Analytical Laboratory (EMSL) located in Beltsville, Maryland for analysis. The samples were transported following rigorous chain-of-custody guidelines to ensure proper handling and delivery of the samples. EMSL is accredited in the American Industrial Hygiene Association (AIHA) Environmental Microbiology Laboratory Accreditation Program (EMLAP) and is a successful participant in AIHA's Environmental Microbiology Proficiency Analytical Testing (EMPAT) program (Laboratory Number 102891.)

The samples were analyzed via light microscopy at the standardized magnification of 600X. This technique does not allow for the differentiation between *Aspergillus* and *Penicillium* spores because they are morphologically identical. Additionally, the technique does not allow for cultivation, or the identification of spores to the species level, except in a few cases.

There are no universally accepted federal or State of Maryland standards for acceptable airborne concentrations of bioaerosols in an indoor occupational environment. In general, airborne concentrations indoors should be less than that found in the outdoor air, with similar species composition. Indoor spore counts significantly greater than those detected outdoors, or the presence of large numbers of different types of spores indoors that are not found outdoors, may indicate contamination and potential indoor air quality problems.

The total mold spore counts for the interior samples ranged between 540 and 2,760 spores per cubic meter (spores/m^3.) The total mold spore concentration in the outdoors (background) sample was 7,270 spores/m^3. The total mold spore concentrations in all interior locations sampled were significantly below the outdoor (background) total mold spore concentration.

Additionally, the individual fungal species concentrations observed in the interior samples were generally consistent with those observed in the background reference sample with no significant concentrations of an individual fungal species identified in the interior samples.

The summary of the results for the spore trap sampling are provided in Table 4 in **Attachment A**. The laboratory analytical results, including speciation and chain of custody forms for the spore trap samples are included in **Attachment B**.

Conclusions

Based on this IAQ and mold assessment survey, Tidewater offers the following conclusions:

- Tidewater's visual inspection did not reveal any evidence of standing water, active water intrusion or suspect mold growth on accessible walls, floors and ceilings in the assessed areas; however, multiple water-stained ceiling tiles were observed in the Media Book Room (A-16A) and Music Room E-54.
- General housekeeping in all classrooms and common areas appeared to be satisfactory with the exception of the Music Room E-54.
- The supply and return air grills located on the ceiling of the Health Room A-9 appeared to contained excessive levels of dirt/dust.
- Temperature, relative humidity, CO, PM10, and TVOC readings recorded within the assessed areas were all within industry standards and guidelines.
- The CO_2 levels in Classroom B-21, Music Room E-54, Classroom C-30, Intermediate Classroom C-39, and 2nd Floor Intermediate Classroom D-45 exceeded 700 ppm above the outdoor background CO_2 level of 277 ppm indicating inadequate air exchanges within these classrooms.
- The total mold spore concentrations in all interior locations sampled were significantly below the outdoors (background) total mold spore concentration. Additionally, the individual fungal species concentrations observed in the interior samples were generally consistent with those observed in the background reference samples with no significant concentrations of an individual fungal species identified in the interior samples.

Recommendations

Based on the results of the assessment, Tidewater offers the following recommendations:

- Investigate above the water-stained ceiling tiles in the Media Book Room (A-16A) and Music Room E-54 for any ongoing water leaks and surface mold formations. If any leaks are detected, repair them immediately. If surface mold contamination is observed, appropriate steps should be taken to remediate and sanitize the affected areas;
- Abate the water-stained ceiling tiles in the Media Book Room (A-16A) and Music Room E-54. Ensure that the perimeters of the ceiling grids are cleaned with a 10% bleach solution to eliminate exiting fungal spores prior to installing new ceiling tiles;
- Clean air grills located in the Health Room A-9 with a 10% bleach solution to eliminate observed dust.
- Ensure that all cleaning activities are conducted after hours when the above areas are vacant to minimize exposure to occupants.
- Maintain good housekeeping practices in all common areas and classrooms. All common area and classrooms floors should be broom cleaned at the end of each day. Furthermore, all horizontal surfaces including desktops, furniture, window sills and

suspended light fixtures should be cleaned on a routine basis to prevent the accumulations of dust.

- Ensure HVAC System supplying is properly balanced per design requirements and current use/occupancy in order to ensure adequate ventilation throughout the classrooms.
- Ensure the ventilation systems are turned on in all classrooms and are operating at all times when the classrooms are occupied to provide sufficient air flow and ventilation to the classrooms**.**
- Increase the air exchange rates to Classroom B-21, Music Room E-54, Classroom C-30, Intermediate Classroom C-39, and 2nd Floor Intermediate Classroom D-45 in order to improve the air circulation within the classrooms. Consider running pedestal fans when the classrooms are fully occupied if the general air circulation is inadequate.
- Ensure the air supply vent of the fan coil unit in Music Room E-54 is left unobstructed to ensure adequate air supply into the classroom.

Qualifications

Tidewater has endeavored to investigate existing conditions in representative areas of Hill Crest Elementary School located at 4305, 22nd Place in Temple Hills, Maryland as they pertain to indoor air quality. Our conclusions and recommendations are based on the observations made on the day of our assessment, laboratory data from the time of the assessment, and information provided by both our Client and the area occupants. Actual conditions vary from day to day throughout the year.

Tidewater appreciates the opportunity to provide Industrial Hygiene consulting services for Prince Georges County Public Schools. Please contact us should any questions arise concerning this report or if we may be of further assistance.

Sincerely,

Tidewater, Inc.

Skanda Abeyesekere, MS, CIH, CSP, CHMM
Project Manager

Jonathan N. Schatz, MS
Manager, IH Services

SA/JNS

Attachments: **Attachment A – Summary of Comfort Parameters, Total (Nuisance) Dust, TVOC and Non-Viable Spore Trap Sampling**
Attachment B – Laboratory Reports for Non-Viable Spore Trap Sampling
Attachment C – Calibration Certificates
Attachment D – Qualifications
Attachment E – Floor Plan with Sampling Locations

Attachment A

Summary of Comfort Parameters, Total (Nuisance) Dust, TVOC and Non-Viable Spore Trap Sampling

Table 1: Indoor Air Quality Comfort Parameters Hill Crest Elementary School				
Location	**Temperature (°F)**	**Relative Humidity (%)**	**Carbon Dioxide (ppm)**	**Carbon Monoxide (ppm)**
May 22, 2019				
Multipurpose Room	72.4	39.9	548	0.0
Media Center M-16	71.6	42.6	830	0.0
Classroom B-21	72.0	47.6	**1,234**	0.0
Classroom K-3	71.7	41.6	481	0.0
Health Room A-9	71.7	34.8	370	0.0
Music Room E-54	71.8	50.0	**1,890**	0.0
Classroom C-30	70.3	51.6	**1,872**	0.0
Intermediate Classroom 39	72.7	57.2	**2,429**	0.0
2nd Floor Intermediate Classroom D-44	73.8	44.4	673	0.0
2nd Floor Intermediate Classroom D-45	73.7	53.6	**2,827**	0.0
Background	71.5	31.5	277	0.0

- Numbers highlighted in red indicates locations in which temperature, carbon dioxide or relative humidity levels were either above or below the guidelines recommended by the American Society for Heating Refrigeration and Air Conditioning (ASHRAE) Standard 62.1 – 2016.

Table 2: Particulate Matter Less than 10 Microns (PM10) Hill Crest Elementary School	
Location	**Particulate Matter (PM10)** **Concentration (mg/m^3)**
May 22, 2019	
Multipurpose Room	0.017
Media Center M-16	0.018
Classroom B-21	0.023
Classroom K-3	0.015
Health Room A-9	0.013
Music Room E-54	0.018
Classroom C-30	0.015
Intermediate Classroom 39	0.026
2nd Floor Intermediate Classroom D-44	0.012
2nd Floor Intermediate Classroom D-45	0.023
Background (Outdoors)	0.015

Table 3: Total Volatile Organic Compounds (TVOCs) Hill Crest Elementary School	
Location	**Concentration (ppm)**
May 22, 2019	
Multipurpose Room	0.0
Media Center M-16	0.0
Classroom B-21	0.0
Classroom K-3	0.0
Health Room A-9	0.0
Music Room E-54	0.0
Classroom C-30	0.0
Intermediate Classroom 39	0.0
2nd Floor Intermediate Classroom D-44	0.0
2nd Floor Intermediate Classroom D-45	0.0
Background (Outdoors)	0.0

Table 4: Spore Trap Sampling Results Hill Crest Elementary School			
May 22, 2019			
Sample Number	**Sample Location**	**Sample Volume (L)**	**Total Fungi Concentration (Counts/m^3)**
HHES-1	Multipurpose Room	75.0	2,470
HHES-2	Media Center M-16	75.0	820
HHES-3	Classroom B-21	75.0	1,300
HHES-4	Classroom K-3	75.0	2,760
HHES-5	Health Room A-9	75.0	2,040
HHES-6	Music Room E-54	75.0	800
HHES-7	Classroom C-30	75.0	1,250
HHES-8	Intermediate Classroom 39	75.0	600
HHES-9	2nd Floor Intermediate Classroom D-44	75.0	540
HHES-10	2nd Floor Intermediate Classroom D-45	75.0	930
BG-1	Background (Outdoors)	75.0	7,270

- Highlighted Area indicates location where the concentrations of the indoor sample exceeded the level detected in the background sample.

Attachment B

Laboratory Reports for Non-Viable Spore Trap Mold Sampling

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705
Phone/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com / beltsvillelab@emsl.com

Order ID: 191906036
Customer ID: TIDE50
Customer PO:
Project ID:

Attn: Skanda Abeyeskere
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Suite A
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Phone: (410) 540-8700
Fax: (410) 997-8713
Collected: 05/22/2019
Received: 05/24/2019
Analyzed: 05/29/2019

Proj: PGCPS HILLCREST HIEGHTS ES/5419-014

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191906036-0001			191906036-0002			191906036-0003		
Client Sample ID:	HHES-1			HHES-2			HHES-3		
Volume (L):	75			75			75		
Sample Location:	MULTIPURPOSE RM			MEDIA CENTER M-16			CLASSRM B-21		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria (Ulocladium)	-	-	-	1*	10*	1.2	-	-	-
Ascospores	13	530	21.5	6	200	24.4	2	80	6.2
Aspergillus/Penicillium	-	-	-	-	-	-	-	-	-
Basidiospores	35	1400	56.7	12	490	59.8	20	820	63.1
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	10	410	16.6	2	80	9.8	8	300	23.1
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	1	40	1.6	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	4*	50*	2	1	40	4.9	-	-	-
Pithomyces++	1	40	1.6	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Bispora	-	-	-	-	-	-	-	-	-
Botrytis	-	-	-	-	-	-	-	-	-
Gonatobotryum	-	-	-	-	-	-	-	-	-
Oidium	-	-	-	-	-	-	-	-	-
Paecilomyces-like	-	-	-	-	-	-	3	100	7.7
Pestalotia/Pestalotiopsis	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Total Fungi	**64**	**2470**	**100**	**22**	**820**	**100**	**33**	**1300**	**100**
Hyphal Fragment	1*	10*	-	-	-	-	2	80	-
Insect Fragment	2*	30*	-	1	40	-	7	300	-
Pollen	-	-	-	-	-	-	2*	30*	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	4	-	-	4	-	-	4	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	2	-	-	3	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.

Stefanie Schneider, Microbiology Lab Manager
or Other Approved Signatory

Initial report from: 05/30/2019 09:46:06

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.
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Order ID: 191906036
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Phone: (410) 540-8700
Fax: (410) 997-8713
Collected: 05/22/2019
Received: 05/24/2019
Analyzed: 05/29/2019

Proj: PGCPS HILLCREST HIEGHTS ES/5419-014

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191906036-0004			191906036-0005			191906036-0006		
Client Sample ID:	HHES-4			HHES-5			HHES-6		
Volume (L):	75			75			75		
Sample Location:	K-3			HEALTH RM A-9			MUSIC RM E-24		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria (Ulocladium)	1	40	1.4	-	-	-	-	-	-
Ascospores	7	300	10.9	8	300	14.7	3	100	12.5
Aspergillus/Penicillium	2	80	2.9	2	80	3.9	6	200	25
Basidiospores	52	2100	76.1	26	1100	53.9	4	200	25
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	1	40	2	-	-	-
Cladosporium	4	200	7.2	10	410	20.1	7	300	37.5
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	1	40	1.4	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Bispora	-	-	-	-	-	-	-	-	-
Botrytis	-	-	-	3	100	4.9	-	-	-
Gonatobotryum	-	-	-	-	-	-	-	-	-
Oidium	-	-	-	-	-	-	-	-	-
Paecilomyces-like	-	-	-	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	1*	10*	0.5	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Total Fungi	**67**	**2760**	**100**	**51**	**2040**	**100**	**20**	**800**	**100**
Hyphal Fragment	2	80	-	1	40	-	2	80	-
Insect Fragment	2	80	-	1	40	-	1	40	-
Pollen	1*	10*	-	1*	10*	-	1	40	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	3	-	-	4	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	2	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.

Stefanie Schneider, Microbiology Lab Manager
or Other Approved Signatory

Samples received in good condition unless otherwise noted. High levels of background particulate can obscure spores and other particulates, leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the result, it will be noted on the report.
Samples analyzed by EMSL Analytical, Inc. Beltsville, MD AIHA-LAP, LLC--EMLAP Lab 102891

Initial report from: 05/30/2019 09:46:06

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.
10768 Baltimore Avenue Beltsville, MD 20705
Phone/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com / beltsvillelab@emsl.com

Order ID: 191906036
Customer ID: TIDE50
Customer PO:
Project ID:

Attn: Skanda Abeyeskere
Tidewater, Inc.
6625 Selnick Drive
Suite A
Elkridge, MD 21075

Phone: (410) 540-8700
Fax: (410) 997-8713
Collected: 05/22/2019
Received: 05/24/2019
Analyzed: 05/29/2019

Proj: PGCPS HILLCREST HIEGHTS ES/5419-014

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191906036-0007			191906036-0008			191906036-0009		
Client Sample ID:	HHES-7			HHES-8			HHES-9		
Volume (L):	75			75			75		
Sample Location:	PRIMARY CLASSRM C-30			INTERMEDIATE CLASSRM C-39			INTERMEDIATE CLASSRM D-44		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria (Ulocladium)	1	40	3.2	2	80	13.3	-	-	-
Ascospores	1	40	3.2	1	40	6.7	3	100	18.5
Aspergillus/Penicillium	9	400	32	-	-	-	1	40	7.4
Basidiospores	4	200	16	5	200	33.3	7	300	55.6
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	13	530	42.4	4	200	33.3	3	100	18.5
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	2	80	13.3	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Bispora	-	-	-	-	-	-	-	-	-
Botrytis	-	-	-	-	-	-	-	-	-
Gonatobotryum	1	40	3.2	-	-	-	-	-	-
Oidium	-	-	-	-	-	-	-	-	-
Paecilomyces-like	-	-	-	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	-	-	-	-	-	-
Polythrincium	-	-	-	-	-	-	-	-	-
Total Fungi	**29**	**1250**	**100**	**14**	**600**	**100**	**14**	**540**	**100**
Hyphal Fragment	3	100	-	-	-	-	1*	10*	-
Insect Fragment	1*	10*	-	1*	10*	-	-	-	-
Pollen	1*	10*	-	3*	40*	-	-	-	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	3	-	-	4	-	-	4	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	3	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.

Stefanie Schneider, Microbiology Lab Manager
or Other Approved Signatory

Initial report from: 05/30/2019 09:46:06

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.
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Order ID: 191906036
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6625 Selnick Drive
Suite A
Elkridge, MD 21075

Phone: (410) 540-8700
Fax: (410) 997-8713
Collected: 05/22/2019
Received: 05/24/2019
Analyzed: 05/29/2019

Proj: PGCPS HILLCREST HIEGHTS ES/5419-014

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	191906036-0010			191906036-0011		
Client Sample ID:	HHES-10			BG-1		
Volume (L):	75			75		
Sample Location:	INTERMEDIATE CLASSRM D-45			BACKGROUND		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria (Ulocladium)	-	-	-	3	100	1.4
Ascospores	2	80	8.6	30	1200	16.5
Aspergillus/Penicillium	4	200	21.5	3	100	1.4
Basidiospores	4	200	21.5	106	4350	59.8
Bipolaris++	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-
Cladosporium	9	400	43	27	1100	15.1
Curvularia	-	-	-	1*	10*	0.1
Epicoccum	1*	10*	1.1	2	80	1.1
Fusarium	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-
Pithomyces++	1	40	4.3	-	-	-
Rust	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-
Bispora	-	-	-	5	200	2.8
Botrytis	-	-	-	-	-	-
Gonatobotryum	-	-	-	-	-	-
Oidium	-	-	-	2*	30*	0.4
Paecilomyces-like	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	-	-	-
Polythrincium	-	-	-	3	100	1.4
Total Fungi	**21**	**930**	**100**	**182**	**7270**	**100**
Hyphal Fragment	5*	70*	-	14	570	-
Insect Fragment	1	40	-	6	200	-
Pollen	1*	10*	-	5	200	-
Analyt. Sensitivity 600x	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	4	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-
Background (1-5)	-	3	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.

Stefanie Schneider

Stefanie Schneider, Microbiology Lab Manager
or Other Approved Signatory

Initial report from: 05/30/2019 09:46:06

For Information on the fungi listed in this report please visit the Resources section at www.emsl.com

OrderID: 191906036

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*).

191906036

PHONE:
FAX:

Company : Tidewater Inc.	**EMSL-Bill to:** ☐ Different ☐ Same If Bill to is Different note instructions in Comments**
Street: 6625 Slenick Drive, Suite A	*Third Party Billing requires written authorization from third party*
City: Elkridge **State/Province:** Maryland	**Zip/Postal Code:** **Country:**
Report To (Name): Skanda Abeyesekere	**Telephone #:**
Email Address: skanda@tideh2o.net	**Fax #:** **Purchase Order:**
Project Name/Number: PGCPS Hillcrest Heights ES	**Please Provide Results:** ☐ FAX ☐ E-mail ☐ Mail
U.S. State Samples Taken: MD 5419-014	**Connecticut Samples:** ☐ Commercial ☐ Residential

Turnaround Time (TAT) Options* - Please Check

☐ 3 Hour | ☐ 6 Hour | ~~☐ 24 Hour~~ | ☐ 48 Hour | ☑ 72 Hour | ☐ 96 Hour | ☐ 1 Week | ☐ 2 Week

**Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements*

Non Culturable Air Samples (Spore Traps) – Test Codes

• **M001** Air-O-Cell	• **M173** Allegro M2	• **M004** Allergenco	• **M032** Allergenco-D	• **M172** Versa Trap
• **M049** BioSIS	• **M003** Burkard	• **M043** Cyclex	• **M002** Cyclex-d	
• **M030** Micro 5	• **M174** MoldSnap	• **M176** Relle Smart	• **M130** Via-Cell	

Other Microbiology Test Codes

• **M041** Fungal Direct Examination	• **M014** Endotoxin Analysis	• **M029** *Enterococci*
• **M005** Viable Fungi ID and Count	• **M015** Heterotrophic Plate Count	• **M019** Fecal Coliform
• **M006** Viable Fungi ID and Count (Speciation)	• **M180** Real Time Q-PCR-ERMI 36	• **M133** MRSA Analysis
• **M007** Culturable Fungi	• Panel	• **M028** *Cryptococcus neoformans*
• **M008** Culturable Fungi (Speciation)	• **M018** Total Coliform	Detection
• **M009** Gram Stain Culturable Bacteria	(Membrane Filtration)	• **M120** *Histoplasma capsulatum*
• **M010** Bacterial Count and ID – 3 Most	• **M020** Fecal *Streptococcus*	Detection
Prominent	(Membrane Filtration)	• **M033-39** Allergen Testing
• **M011** Bacterial Count and ID – 5 Most	• **M210-215** *Legionella* Detection	• **M044** Group Allergen
Prominent	• **M026** Recreational Water Screen	(Cat, Dog, Cockroach, Dustmites)
• **M013** Sewage Contamination in Buildings	• **M027** Mycotoxin Analysis	• **Other** See Analytical Price Guide

Preservation Method (Water):

Name of Sampler: SKANDA ABEYESEKERE **Signature of Sampler:**

Sample #	Sample Location	Sample Type	Test Code	Volume/Area	Date/Time Collected
Example: A1	Kitchen	Air	M001	75L	1/1/12 4:00 PM
HHES-1	multipurpose room	Air	M032	75.0	05/22/19
-2	Media Center M-16				
-3	classroom B-21				
-4	K-3				
-5	Heath Room A-9				
-6	Music Room E-24				
-7	primary classroom C-30				
-8	Intermediate " C-39				
-9	Intermediate " D-44				

Client Sample # (s): **Total # of Samples:** 11

Relinquished (Client): **Date:** 05/22/19 **Time:** 12:00 pm

Received (Client): **Date:** 5/24/19 **Time:** 11:50 am

Comments:

* Skanda Ct. w/ 3 day TAT 5/24/19 *

Microbiology Chain of Custody

EMSL Order Number *(Lab Use Only)*:

PHONE:
FAX:

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Location	Sample Type	Test Code	Volume/Area	Date/Time Collected
HHES-10	Intermediate CR D-45	Air	M032	75.0	05/22/19
BG-1	Background	↓	↓	↓	↓

****Comments/Special Instructions:**

Page 2 of 2 pages

Attachment C

Calibration Certificates

FIELD ENVIRONMENTAL INSTRUMENTS, INC.
www.fieldenvironmental.com

301 Brushton Avenue
Suite A
Pittsburgh PA 15221
800-393-4009 Toll Free
(412) 436-2600 Local
(412) 436-2616 Fax

IAQ Meter Calibration Certificate

	Lot #	Expiration
Cal Standard	18-6508	4/18/2020

Carbon Monoxide Gas	**Reading ppm**	**Acceptable Range**
35 ppm	35.0	(32 - 38)

Carbon Dioxide Gas	**Reading ppm**	**Acceptable Range**
1000 ppm	1008.0	(950 - 1050)

Model	TSI Q-Trak 7565
S/N	7565x0931002
Barcode	u59038x
Order #	398188

Calibrated By: Bryce Spontak

Date of Calibration: 05/16/19

All calibrations performed by FEI conform to manufacturer's specifications. Please report any issues within 24 hours of receiving equipment.
All calibration gas used is traceable to NIST. Additional documentation is available upon request.

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

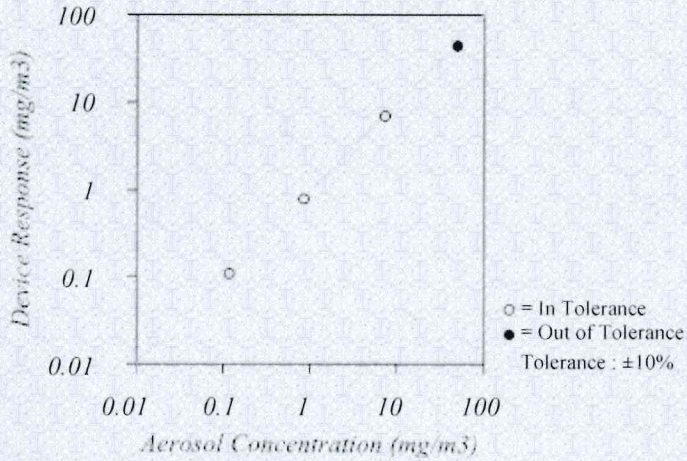
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	76.6 (24.8)	°F (°C)
Relative Humidity	24	%RH
Barometric Pressure	29.14 (986.8)	inHg (hPa)

Model	**8534**
Serial Number	**8534170101**

☐ As Left ☐ In Tolerance
☒ As Found ☒ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-02

FLOW AND PRESSURE VERIFICATION — **SYSTEM DTII01-02**

Parameter	Standard	Measured	Allowable Range	Parameter	Standard	Measured	Allowable Range
Flow lpm	3.0	3.0	2.85 ~ 3.15	Pressure kPa	98.6	98.6	93.71 ~ 103.57

Pump run time: 25 Hours, Pump voltage: 433 Bits

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005409	10-19-17	10-31-18
DC Voltage	E003314	05-03-17	05-31-18
Photometer	E003319	01-09-18	07-31-18
1 um PSL	679755	n/a	n/a
10 um PSL	167947	n/a	n/a
Flowmeter	E002471	04-20-17	04-30-18

Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005410	10-19-17	10-31-18
DC Voltage	E003315	05-03-17	05-31-18
Microbalance	M001324	11-02-16	11-30-18
3 um PSL	180387	n/a	n/a
Pressure	E003511	10-02-17	10-31-18

Verified

March 1, 2018
Date

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services, LLC.

Tidewater MD

Instrument ID 110-010833
Description MINIRAE 2000
Calibrated 4/9/2019

Manufacturer Rae Systems
Model Number MINIRAE 2000
Serial Number 110-010833
Location Maryland
Department CATHY MOORE

Frequency 6 Months
Status Pass
Temp 24
Humidity 39

Calibration Specifications

Group # 1
Group Name ISOBUTYLENE
Stated Accy Pct of Reading

Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	ppm	100.00	ppm	92.80	101.00	1.00%	Pass

Test Instruments Used During the Calibration (As Of Cal Entry Date)

Test Instrument ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date	Next Cal Date / Expiration Date
MD ISO 100PPM FBI-248-100-12	MD ISO 100PPM	Pine Environmental Services, Inc.	FBI-248-100-12	34LS-248-100	5/23/2022	
MD ZERO AIR FBI-1-25	ZERO AIR Oxygen 20.9%VOL, Nitrogen Balance	Pine Environmental Services, Inc.	31844	FBI-1-25		

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Ryan Armstrong

Pine Environmental Services, LLC. hereby certifies that this instrument is calibrated and functions to meet the manufacturer's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

Certificate of Conformance

(X) Buck BioAire™ ( ) Buck BioSlide™

Serial number: B153043 **Date Issued:** 2-6-19

Flow Calibration

The instrument listed above is in conformance with factory specifications and the flow is set to nominal using a BUCK Calibrator which is N.I.S.T. traceable to A. P. Buck, Inc. Calibration Procedure APB-1, Ver. 6.2.

QA APPROVAL BY: Thomas J. Gravenor

A.P. BUCK, INC.
7101 Presidents Drive, Suite 110
Orlando, FL 32809
Phone: 407-851-8602 • Fax: 407-851-8910

BUCK
A.P. BUCK, INC.

Attachment D

Qualifications

ABIH®

american board of industrial hygiene®

organized to improve the practice of industrial hygiene
proclaims that

Skandakumar Harshanath Abeyesekere

having met all requirements of
education, experience and examination, and
ongoing maintenance,
is hereby certified in the

COMPREHENSIVE PRACTICE
of
INDUSTRIAL HYGIENE

and has the right to use the designations

CERTIFIED INDUSTRIAL HYGIENIST

CIH®

Certificate Number	**9928 CP**
Awarded:	**May 11, 2011**
Expiration Date:	**December 1, 2021**

Susan Ripple
Chair, ABIH

Chief Executive Officer, ABIH

BOARD OF CERTIFIED SAFETY PROFESSIONALS

affirms that

Skandakumar Abeyesekere

Has applied for, met qualifications, and passed required examination(s) and is hereby authorized to use the designation

Certified Safety Professional®

in Comprehensive Practice

So long as this certificate is not suspended or revoked and the certificant renews this authorization annually and meets Continuance of Certification requirements.

Board of Examiners in witness whereof we have here unto set our hands and affixed the Seal of the Board this 7th Day of April, 2008

Paul S Adams — President

Linda Tapp — Secretary

20110 — CSP No.

INSTITUTE OF HAZARDOUS MATERIALS MANAGEMENT

THIS CERTIFIES THAT

Skandakumar Abeyeskere

HAS SUCCESSFULLY MET ALL THE REQUIREMENTS OF EDUCATION, EXPERIENCE AND EXAMINATION, AND IS HEREBY DESIGNATED A

CERTIFIED HAZARDOUS MATERIALS MANAGER
CHMM

INSTITUTE OF HAZARDOUS MATERIALS MANAGEMENT IHMM CORPORATE SEAL 1984 DISTRICT OF COLUMBIA

May 13, 2016
DATE OF CERTIFICATION

19053
CREDENTIAL NUMBER

May 31, 2021
CERTIFICATION EXPIRES

M. Patricia Buley
ACTING EXECUTIVE DIRECTOR

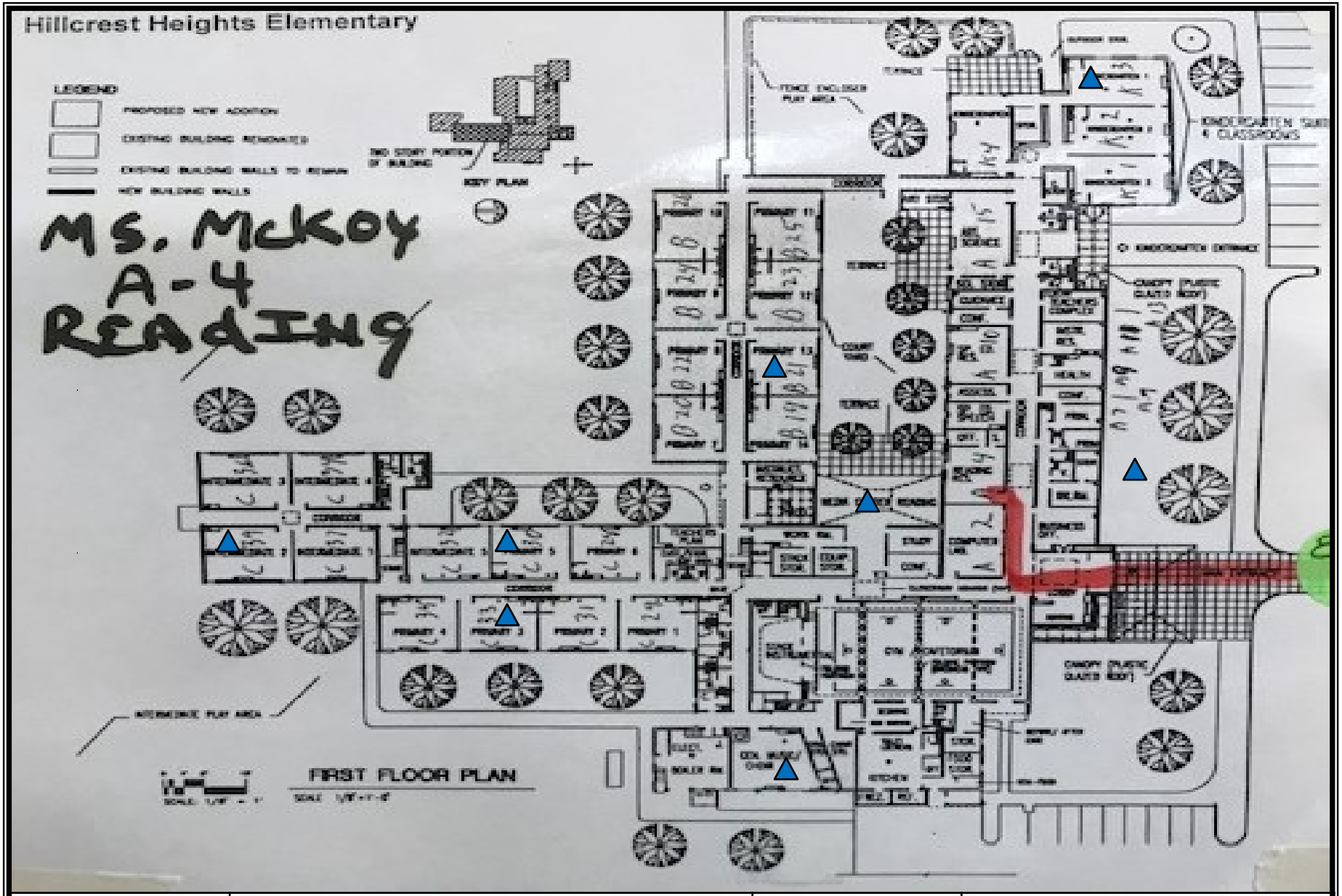
VALID SO LONG AS THIS CREDENTIAL IS RENEWED ACCORDING TO SCHEDULE AND IS NOT OTHERWISE REVOKED.

ANSI Accredited Program PERSONNEL CERTIFICATION

Accredited by the American National Standards Institute and the Council of Engineering and Scientific Specialty Boards

Attachment E

Floor Plan with Sampling Locations



TIDEWATER INC	**Attachment C** **Hill Crest Elementary School** **Floor Plan with Sampling Locations**	Scale: N/A Project #: 5419-014 Date: May 22, 2019	**General Notes** ▲ = Sample Location