Supplemental Moisture Intrusion and IAQ Report

Flagler County Sheriff's Operations Building
901 E. Moody Blvd.
Bunnell, FL

October 28, 2019
Terracon Project No. F9196079

Prepared for:
Flagler County Government
Bunnell, FL

Prepared by:
Terracon Consultants, Inc.
Winter Park, FL

October 28, 2019

Flagler County Government
1769 E. Moody Blvd.
Bunnell, FL 32110

Attn: Ms. Faith Alkhatib, P.E., County Engineer
P: (407) 302-7360
E. falkhatib@flaglercounty.org

Re: Supplemental Moisture Intrusion and IAQ Evaluation Report
Flagler County Sheriff's Operations Building
901 E. Moody Blvd.
Bunnell, Florida
Terracon Project Number: F9196079

Dear Ms. Alkhatib:

Terracon Consultants, Inc. (Terracon) has completed the authorized supplemental services on the above referenced property. This assessment was authorized by the Flagler County Government (client) via Proposal No. PF9196079 dated March 7, 2019, and Proposal No. PF9196079 (Revision 1), dated June 12, 2019. This report is based on recommendations provided in our Building Envelope & Indoor Air Evaluation Report (Terracon Project No. F9186371, dated February 28, 2019).

We appreciate the opportunity to provide service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

John L. O'Reilly
Florida-Licensed Mold Assessor, MRSA 212
Senior Scientist - Environmental Services

Brian J. DuChene, P.E.
Principal
Facilities Services

Attachments: Appendix A – Photographic Documentation
Appendix B – Mold Testing Results
Appendix C – Mold Testing Location Plan
Appendix D – Concrete Testing Results
Appendix E – Concrete Testing Location Plan

EXECUTIVE SUMMARY

Terracon Consultants, Inc. (Terracon) visited the Sheriff's Operations Building on June 28, 2019 and July 25, 26, 29 and 30, 2019 to perform the following items recommended in our Building Envelope & Indoor Air Evaluation Report (Terracon Project No. F9186371, dated February 28, 2019):

- Conduct additional observations below floor finishes in the building to further evaluate the extent of mold and/or moisture below carpet tiles, vinyl tiles, residual adhesive and plastic mats.
- Follow-up air testing for mold in the evidence cooler area where mold remediation has reportedly been recently performed.
- Further evaluate areas of old wood identified in the upper enclosed wall cavity behind the wall finishes along the south side of the building for treatment where high mold counts were identified on a surface sample. Perform four additional wall cuts at ceiling level to provide additional information regarding the extent of the old wood and provide additional sampling locations to distinguish viable versus non-viable mold spore types to be cleaned and sanitized.
- Further evaluate the extent of apparent bat droppings identified in the southeast upper enclosed wall cavity behind the wall finishes by performing six additional wall cuts (four upper and two lower wall cuts) and surface investigation with ultraviolet light.
- Conduct in-situ measurements of the moisture vapor emission rate (MVER) and relative humidity (RH) in the building's concrete floor slab.

Observations below represent areas of carpeting and vinyl floor tiles with varying degrees of moisture, musty odors, and/or visible mold growth at 18 of the 21 locations evaluated.

No elevated mold spores were identified in the follow-up air sample collected from the evidence cooler room after the mold removal activities were performed. No further evaluation is recommended in this area.

No old wood or old insulation was observed within the east and center south wall of the main evidence storage room or within the west end of the hallway with entrances to evidence rooms. Old wood was observed within the southwest corner of the main evidence room and along the south side of the narcotics evidence storage room.

Mold surface sampling revealed detectable counts of non-viable fungal spores from old wood in the main evidence room and Training Room 129, and from old wood in the narcotics evidence storage room. Mold surface sampling also revealed detectable counts of viable fungi in the narcotics evidence storage room and Training Room 129, and no fungi detected in the main evidence room.

No visible evidence of bat urine or guano was identified with the UV light on the ceiling, wall and floor in the south portion of Training Room 129. Bat droppings appeared localized to the top of the concrete wall from the southeast corner of Training Room 129 to approximately 12 feet to the west.

Fourteen of the 35 concrete moisture transmission measurement results exceeded generally accepted action levels, while eight of 35 results had the potential to exceed action level values and the remaining 13 results were below the recommended action level range. The relative humidity (RH) measured indicated elevated slab moisture conditions at 29 of the 35 locations tested.

We recommend the following corrective actions based on our findings:

- Contract with a Florida licensed mold abatement firm to clean and sanitize approximately 55 linear feet of old wood framing within the upper enclosed wall cavity behind the wall finishes from the southwest corner of the building and east to approximately 12 feet into the Main Evidence Storage room.
- Contract with a Florida licensed mold abatement firm to clean and sanitize approximately 30 linear feet of old wood framing within the upper enclosed wall cavity behind the wall finishes along the entire south side of the southeast corner of Training Room 129. Dried bat droppings within the south upper enclosed wall cavity behind the wall finishes in Training Room 129 should be properly abated and the areas cleaned. Approximately 12 linear feet of bat droppings from the southeast corner to the west along the south wall in Training Room 129 were identified.
- Remove rubber backed carpet tiles, vinyl tiles and residual adhesive in the areas with elevated moisture transmission measurement results. This will allow the slab to dry out. The slab RH can be rechecked periodically to see if levels begin to go down to the 95% acceptable level. If re-occupancy is necessary before the slab RH has been reduced to 95%, preparing and sealing of these elevated areas will be required.
- Retain a qualified acoustical leak detection firm to evaluate below-slab conditions at the building's restrooms and at concrete test locations 11, 22 and 24 for possible water leaks.

1.0 PROJECT INFORMATION

Building Use:	Offices and Evidence Storage
Areas Investigated:	Interior floors, evidence cooler room and wall cavities in the evidence storage room, narcotics evidence storage room and the southeast corner of Training Room 129.
Dates of Site Visits:	June 28, 2019 and July 25, 26, 29 and 30, 2019.

2.0 SCOPE OF SERVICES

Our scope of services for this report are as follows:

- Conduct additional observations below floor finishes in the building to further evaluate the extent of mold and/or moisture below carpet tiles, vinyl tiles, residual adhesive and plastic mats.
- Conduct follow-up air testing for mold in the evidence cooler area where mold remediation has reportedly been recently performed.
- Further evaluate areas of old wood identified in upper enclosed wall cavity behind the wall finishes along the south side of the building for treatment where high mold counts were identified on a surface sample. Perform four additional wall cuts at ceiling level to provide additional information regarding the extent of the old wood and provide additional sampling locations to distinguish viable versus non-viable mold spore types to be cleaned and sanitized.
- Further evaluate the extent of apparent bat droppings (guano) identified in the upper enclosed wall cavity behind the wall finishes by performing six additional wall cuts (four upper and two lower wall cuts anticipated) and surface investigation with ultraviolet light.
- Conduct in-situ measurements of the moisture vapor emission rate and relative humidity in the building's concrete floor slab.

Photographs illustrating our mold and IAQ related observations are presented in Appendix A to this report. Mold test results and test locations are presented in Appendices B and C, and concrete test results and test locations are presented in Appendices D and E.

3.0 OBSERVATIONS AND FINDINGS

3.1 Moisture and Mold Observations Beneath Floor Finishes

Observations beneath floor coverings at 21 locations (depicted in Appendix C to this report) revealed the following:

1. Sheriff's Office Room 178 – musty odor and suspect visible growth (SVG) below recently replaced dark carpet square.
2. Room 175 – No moisture, odors or SVG below older gray carpet square.
3. Room 168 – Moist glue, musty odor and SVG below carpet square.

4. Room 166 – Musty odor and SVG below carpet square.
5. Hall at Drinking Fountain by Restrooms – SVG below bottom vinyl floor tile layer.
6. Room 161 – Rust staining and slight musty odor below carpet square.
7. Room 165 – Wet glue, red staining and slight musty odor below carpet square.
8. Room 146 – Wet glue and musty odor below carpet square.
9. Hall by Room 156 – Mold staining and musty odor between vinyl floor tile layers.
10. Room 111 – Wet glue, musty odor and SVG below carpet square.
11. Room 118 – Wet glue, musty odor and SVG below carpet square.
12. Room 124 – No moisture, odors or SVG below older gray carpet.
13. Hall by Room 114 – Slight musty odor below vinyl floor tile layers.
14. Room 153 – Slightly moist glue and slight musty odor.
15. Break Room 128 – Musty odor and SVG below bottom vinyl floor tile layer.
16. Room 129A – No moisture, odors or SVG between carpet square and underlying ceramic floor tile.
17. Room 129 Training (SE Corner Room) – Musty odor and SVG below carpet square
18. Room 133A – No moisture, odor of SVG below newer black/white carpet square
19. Room 103 – Wet glue, musty odor and SVG below carpet square
20. Room 105A – Musty odor and SVG below carpet square.
21. Room 150 – Moist glue, musty odor and some SVG below newer carpet square with white glue.

Varying degrees of moisture, musty odors and or SVG were identified below 18 of the 21 areas evaluated (14 carpeted areas and 4 vinyl floor tile areas), including below newer carpeting in Room 150 and 178. No moisture, odors or SVG were identified in Rooms 175, 124 and 133A. No odors were noted prior to removal of floor coverings.

3.2 Mold Air Sampling

Total non-viable (non-culturable) fungal spore trap samples were collected using *Zefon Air-O-Cell*® sampling cassettes and a *Zefon Bio-Pump*®, Product Number ZBP-100, at a flow rate of 15 liters per minute for 10 minutes. Air-O-Cell® sampling cassettes were collected at one representative exterior location and at one location within the Evidence Cold Storage / Freezer room (Room 139). The purpose of this air sampling was to re-evaluate the air quality within Room 139 as recommended in our February 28, 2019 report. A slightly elevated spore count of Aspergillus/Penicillium (210 counts/m^3) was identified at that time. A localized area of drywall (approximately 1-foot by 1-foot) was observed to have been replaced below a condensate drain line that exhibited visible mold growth at the time of our February 28, 2019 evaluation. After air sample collection, the sample cassettes were submitted under chain-of-custody (COC) protocol to *EmLab P&K* (EmLab). EMLab is accredited by the *American Industrial Hygiene Association* (AHIA®) Laboratory Accreditation Programs, LLC under the *Environmental Microbiology Laboratory Accreditation Program* (EMLAP Accreditation Number 102297). The results are reported as total fungal counts per cubic meter of air (counts / m3).

A summary of the indoor and outdoor total airborne mold spore concentrations is provided in Table 1 below.

Table 1.0 Airborne Fungal Spore Sample Results [1,3]

Sample ID	Sample Location	Laboratory Result (total spore count/M³) [2,3]
E1	Building Exterior – West at Generator / Make-Up Air Intake	27,000
CA1	Building Interior - Evidence Cold Storage / Freezer Room 139	310

NOTES:
1. Samples obtained on June 28, 2019 using Zefon Air-O-Cell sampling cassettes and analyzed for fungal spore counts using light microscopy at 600X magnification.
2. Fungal spore count per cubic meter of air.
3. Reference Appendices B and C to this report for detailed laboratory analysis results and sample locations.

The analytical results, which include a total for fungal spores, have been used for relative comparison between indoor and outdoor airborne spore concentrations, as well as to identify the types of fungal spores present. It should be noted that there are currently no published standards for acceptable fungal or fungal spore exposure levels. There is no consensus on the number of fungal spores per cubic meter of air that may cause adverse health effects. It should also be noted that the presence of detectable concentrations of airborne mold spores within occupied spaces does not necessarily negatively impact indoor air quality.

Due to the lack of published standards referenced, and consistent with industry practices for airborne microbial sampling, we have compared the indoor and outdoor airborne fungal spore laboratory analysis results in an effort to evaluate the potential for microbial amplification within the structure. Indoor fungal amplification may be indicated when the total indoor airborne concentrations exceed those detected in the outdoor air. In addition, selective fungal amplification may exist when specific fungal taxa that are absent or in low numbers in the outdoor air are found in substantially higher numbers in the indoor air.

A comparison of the sampling results yielded the following general findings:

1. The total airborne mold spore concentration from Room 139 in Sample CA1 was 310 spores/m^3, and the Penicillium/Aspergillus mold types totaled 27 spores/m^3.
2. The total outdoor mold spore concentration in exterior samples E1 was 27,000 spores/m^3, and the Penicillium/Aspergillus mold types totaled 160 spores/m^3.
3. In general, the fungal genera identified from Room 139 was qualitatively consistent with the fungal genera encountered outdoors.

3.3 Old Wood Observations

With assistance from county maintenance personnel, we evaluated upper enclosed wall cavity behind the wall finishes at the following 6" to 8" square test cut locations:

- Main Evidence Storage Room – Four test cuts
- Narcotics Storage Room – One test cut

- SE Training Room 129 – Four test cuts. In addition, an approximate 4' x 1' test cut (2 cuts combined into one) was made at the bottom of the SE corner wall below the location of bat droppings observed in the upper enclosed wall cavity behind the wall finishes.

The locations of wall cavity observations are provided in Appendix C to this report.

No old wood or old insulation was observed at three of the test cuts within the east and south center wall of the Main Evidence Storage Room or within the west end of the hallway with entrances to evidence rooms.

Old wood was observed within an upper wall cut within the southwest corner of the Main Evidence Room and within and upper wall cut along the south side of the Narcotics Evidence Storage Room, which adjoins the Main Evidence Storage Room to the west.

Old yellow insulation was also observed within the Narcotics Evidence Storage Room test cut and in three upper enclosed wall cavities behind the wall finishes along the south wall in Training Room 129. Some staining was observed on the old wood (blocking between the top of the concrete perimeter wall and roof deck); however, the wood felt solid and dry with moisture meter pins and exhibited no obvious visible mold or musty odors. The lower wall test cut through drywall within the southeast corner of Training Room 129 was identified to be from a metal stud wall added in front of the south concrete wall.

3.4 Mold Surface Sampling

The following is a discussion of mold surface sampling on old appearing wood within upper enclosed wall cavity behind the wall finishes performed during this assessment.

3.4.1 Tape Lift Sampling Results

Terracon collected four tape lift samples (Samples CT1 through CT4) of old appearing wood within upper enclosed wall cavity behind the wall finishes in evidence storage areas and in the southeast corner Training Room 129. Each tape sample was collected by pressing a laboratory supplied slide against the old wood, placing the slide into a laboratory supplied cassette and submitting the samples with COC to EmLab P&K for optical microscopy.

A summary of the tape lift sampling results is provided in Table 2.0 below:

Table 2.0 Surface (Tape Lift) Fungal Spore Sample Results[1,3]

Sample ID	Sample Location	Laboratory Result (Spores/cm^2) [2,3]
CT1	Main Evidence Room – Old Wood in SW Corner upper enclosed wall cavity behind the wall finishes.	Cladosporium – 280 Nigrospora – 17 Penicillium – 12,000
CT2	Narcotics Storage Room – Old Wood in S Center Wall Cavity	Basidiospores – 67 Cladosporium – 83 Curvularia – 17 Penicillium/Aspergillus types – 50
CT3	SE Corner Training Room 129 – Old Wood in SW Corner upper enclosed wall cavity behind the wall finishes	Cladosporium – 930 Penicillium/Aspergillus types – 17
CT4	SE Corner Training Room 129 – Old Wood in SE Corner upper enclosed wall cavity behind the wall finishes	Cladosporium – 780 Smuts, Periconia, Myxomycetes - 170

Sample ID	Sample Location	Laboratory Result (Spores/cm^2) [2,3]

NOTES:
1. Samples obtained on June 28, 2019 using *Zefon Bio-Tape*™ sampling slides and analyzed for fungal spore counts using light microscopy at 600X magnification.
2. Fungal spore count per square centimeter of sample.
3. Reference Appendices B and C to this report for detailed laboratory analysis results and sample locations.

The analytical results have been used in an effort to evaluate the potential for indoor fungal amplification. It should be noted that there are currently no published standards for acceptable fungal or fungal spore exposure levels. There is no consensus on the number of fungal spores per unit of surface material that may cause adverse health effects. It should also be noted that the presence of detectable concentrations of surface mold spores within occupied spaces does not necessarily negatively impact indoor air quality.

The sampling results yielded the following general findings:

1. Detectable counts of non-viable fungal spores were identified in three of the four samples from old wood (samples CT1, CT3 and CT4).
2. Detectable counts of non-viable fungal spores were identified from old wood in the Narcotics Evidence Storage Room.

3.4.2 Swab Sampling Results

Terracon collected four surface samples for fungal culture analysis using laboratory supplied, HealthLink Transporter sterile swabs. These swabs were packaged in containers with 1 milliliter of phosphate buffer solution. Samples were collected in 2" x 2" areas adjoining the above tape sample locations to evaluate the presence of viable mold on old wood framing in upper enclosed wall cavity behind the wall finishes along the south walls in the evidence storage areas and SE training Room 129. The laboratory results are reported as colony forming unit (CFU) per square centimeter.

A summary of the swab sampling results is provided in Table 3.0 below:

Table 3.0 Surface (Swab) Fungal Sample Results [1,3]

Sample ID	Sample Location	Laboratory Result (CFU/cm^2) [2,3]
CS1	Main Evidence Room – Old Wood in SW Corner upper enclosed wall cavity behind the wall finishes.	No fungi detected
CS2	Narcotics Storage Room – Old Wood in S Center upper enclosed wall cavity behind the wall finishes.	Aspergillus sp. – 3.1 Aspergillus ustus – 3.1 Cladosporium – 0.78 Non-sporulating fungi – 3.9 Paecilomyces – 1.6 Penicillium – 2.3
CS3	SE Corner Training Rm 129 – Old Wood SW Corner upper enclosed wall cavity behind the wall finishes.	No fungi detected
CS4	SE Corner Training Rm 129 – Old Wood SE Corner upper enclosed wall cavity behind the wall finishes (near bat droppings).	Paecilomyces – 470

NOTES:
1. Samples obtained on June 28, 2019 using *HealthLink Transporter sterile swabs* and analyzed for fungi by culture analysis.
2. Colony forming units per square centimeter of sample area.
3. Reference Appendices B and C to this report for detailed laboratory analysis results and sample locations.

The analytical results have been used in an effort to evaluate the potential for indoor fungal amplification. It should be noted that there are currently no published standards for acceptable fungal or fungal spore exposure levels. There is no consensus on the number of colony forming units of fungal organisms per unit of surface material that may cause adverse health effects. It should also be noted that the presence of detectable concentrations of surface mold within occupied spaces does not necessarily negatively impact indoor air quality.

The sampling results yielded the following general findings:

1. Detectable concentrations of viable fungi were identified in two of the four samples from old wood (samples CS2 and CS4).
2. No detectable fungi were identified in the remaining two samples from old wood (samples CS1 and CS3).

3.5 Bat Guano Evaluation

Terracon further evaluated the south portion of Training Room 129 to identify the extent of previously identified bat guano in the southeast upper enclosed wall cavity behind the wall finishes. Per the scope of services, the evaluation consisted of the following:

- Scanning the ceiling, walls and floor in the south portion of Training Room 129 with an ultraviolet light (UV) for potential indication of bat related waste, and;
- Evaluate four upper enclosed wall cavities behind the wall finishes and two lower enclosed wall cavities behind the wall finishes within the south portion of Training Room 129.

No anomalies were identified with the UV light on the ceiling, wall and floor in the south portion of Training Room 129. Bat droppings appeared localized on the top of the concrete wall from the southeast corner of Training Room 129 to approximately 12 feet to the west.

3.6 Concrete Testing

Moisture vapor emission rate (MVER) and relative humidity (RH) measurements were conducted to evaluate the moisture vapor emission rate and the relative humidity of the concrete floor slab. On July 25, 2019, Terracon representative Brian DuChene visited the site to prepare each test location by removing the existing floor finishes and installing relative humidity probes on the concrete floor slab at 35 previously identified random locations. On July 26, 2019, Terracon representative Rolando Vargas visited the site to install the vapor emission test kits. On July 29, 2019 and July 30, 2019, Mr. Vargas returned to the site to collect the test kits and read the probes.

Testing was based on a slab thickness of 4" based on plans provided to Terracon. At test location 13, the slab was cored through to the subgrade. A polyethylene vapor barrier was observed at this location.

During our evaluation, Client representatives reported to Terracon:

- Portions of the flooring carpet tile from the original renovation were removed or replaced for aesthetic reasons by the tenants. No documentation including observations, test reports or

product data from this work was made available for our review. Documentation from that work should be reviewed to see if it has any bearing on the floor moisture issue.

- A water leak reportedly occurred at some point after occupancy by the tenant. The water leak was reportedly repaired. No documentation including exact location and extent, observations, test reports or descriptions of the leak were made available for our review. Any documentation from that work should be reviewed to see if it has any bearing on the floor moisture issue.

3.6.1 Moisture Vapor Transmission Measurements

Moisture vapor transmission measurements were conducted in general accordance with ASTM Test Method F1869-16a, "Standard Test Method of Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride". Test locations were selected based on conducting one test per 1,000 square feet (SF) of floor space, with three tests for the first 1,000 SF. A total of 35 test kits were installed at various locations throughout the building as indicated in Appendix E to this report.

Measurement results are reported as moisture vapor emission rates (lbs./1000 ft^2/24 hrs.) Acceptable maximum values of moisture vapor emission rates (MVER) for the installation of impermeable floor coverings are typically MVER between 3 and 5, or less. Certain wood floor products require lower MVER for acceptable installation. The measured MVER results are summarized as follows:

- Fourteen of the 35 measurement results indicate moisture emission rates exceeding generally accepted maximum values for floor covering installation (greater than 5.0 MVER).
- Eight of the 35 measurement results indicate moisture emission rates with the potential to exceed generally accepted maximum values for floor covering installation (between 3.0 and 5.0 MVER).
- Thirteen of the 35 measurement results indicate moisture emission rates below generally accepted maximum values for floor covering installation (less than 3.0 MVER).

Detailed analysis results and measurement locations are located in Appendix D and E to this report.

3.6.2 Concrete Relative Humidity Measurements

Concrete slab relative humidity measurements were conducted in general accordance with ASTM Standard F2170, "Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes". A total of 35 probes were installed adjacent to the vapor emission test kits.

Measurement results are reported as relative humidity (RH in percent). Acceptable maximum values of RH for the installation of impermeable floor coverings are typically 95 percent or less. Certain wood floor products require lower RH for acceptable installation. The RH measured generally indicates a saturated slab at depth, except at test locations 8, 14, 18, 19, 31 and 34. The concrete floor slab temperatures were consistent with ambient air temperature.

Detailed analysis results and measurement locations are located in Appendix D and E to this report.

4.0 CONCLUSIONS

4.1 Moisture Intrusion and IAQ

Our evaluation of the supplemental moisture intrusion and IAQ evaluation services provided in this report has led to conclusions as follows:

4.1.1 Flooring

Observations below random areas of carpeting and vinyl floor tiles identified varying degrees of moisture, musty odors, and/or visible mold growth at 18 of the 21 locations evaluated.

4.1.2 Air Sampling in Evidence Cold Storage / Freezer Room (Room 139)

A low total interior mold spore count and low count of Penicillium/Aspergillus mold types that were identified as slightly elevated in our February 2019 report were not identified during this assessment after mold removal activities were conducted.

4.1.3 Old Wood and Surface Mold Testing

Old wood that exhibited some staining was identified within the upper enclosed wall cavity behind the wall finishes along the south wall in the evidence rooms and southeast Training Room 129. Moderate to high counts of non-viable mold were identified in several tape samples from the old wood. Low viable fungal counts were identified in the Narcotics Evidence Storage room. An elevated fungal count was identified on old wood where bat droppings were identified in the southeast corner of Training Room 129. The old wood appeared solid and exhibited dry moisture measurements.

4.1.4 Bat Guano Evaluation

No anomalies suspected of being related to bat droppings were identified during an ultraviolet scan the ceiling, walls and floor in the south portion of Training Room 129. Bat droppings appeared localized on the top of the concrete wall from the southeast corner of Training Room 129 to approximately 12 feet to the west.

4.2 Concrete Evaluation

The test results indicate that an elevated moisture condition exists in certain areas of the concrete slab. Based on a comparison of our visual observations during our initial and follow-up IAQ evaluation and this floor slab moisture testing, it appears that the elevated moisture condition is improving, most likely due to the perimeter exterior drainage improvements recently performed. These drainage improvements appear to have addressed the source of the moisture saturating the slab. The floor slab will continue to dry to the interior, except where impermeable floor coverings inhibit the flow of water vapor to the interior conditioned space.

During our site visit, it was revealed that a water pipe leak occurred, apparently near the building's Mechanical Room 145 where the water service enters the building. Further investigation would be necessary to confirm the leak was repaired. We further conclude that this concrete slab investigation should include concrete test locations 11, 22 and 24 (areas with significantly elevated moisture contents) to verify existing conditions at those locations.

4.3 Building Re-occupancy

Based on our evaluation to date, if the recommendations included in the report are implemented and confirmed complete, the building should be ready for re-occupancy.

5.0 RECOMMENDATIONS

Based on the conclusions presented above, we recommend the following corrective actions:

5.1 Moisture Intrusion and IAQ

- No further evaluation of the localized area of removed mold or air testing is recommended in the Cold Storage/Freezer Evidence Room.
- Contract with a Florida licensed mold abatement firm to clean and sanitize approximately 55 linear feet of old wood framing within the upper enclosed wall cavity behind the wall finishes from the southwest corner of the building and east to approximately 12 feet into the Main Evidence Storage room. The work should be performed in accordance with the EPA guidance document "Mold Remediation in Schools and Commercial Buildings (EPA 402-K-01-001)".
- Contract with a Florida licensed mold abatement firm to properly clean and sanitize approximately 30 linear feet of old wood framing within the upper enclosed wall cavity behind the wall finishes along the entire south side of the southeast corner of Training Room 129. Dried bat droppings within the south upper enclosed wall cavity behind the wall finishes in Training Room 129 should be properly abated and the areas cleaned. Approximately 12 linear feet of bat droppings from the southeast corner to the west along the south wall in Training Room 129 were identified.

5.2 Concrete Evaluation

- Remove the rubber backed carpet tiles in the areas with MVER above 5. This will allow the slab to dry out. The slab RH can be rechecked periodically to see if levels begin to go down to the 95% acceptable level.

  If re-occupancy is necessary before the slab RH has been reduced to 95%, preparing and sealing the areas with MVER above 5 will be required. Each flooring manufacturer has specific recommendations and products for this purpose. The flooring manufacturer's written recommendation of the intended flooring material should be consulted to confirm the necessary preparation activities and coating/sealing materials to be used.

  Special preparation of the floor slab in the areas with MVER below 5 should not be necessary.

  Where mold growth is identified below the floor finishes to be removed (with MVER above 5), and the extent is less than 10 square feet, in-house personnel may properly clean and sanitize the surfaces prior to installation of the new adhesives and flooring. If the extent is larger than 10 square feet, a Florida Licensed Mold abatement firm must perform this work.
- Documentation from the partial flooring replacement efforts and water leak repair work should be obtained and reviewed to see if it has any bearing on the floor moisture issue.

- Retain a qualified leak detection firm to evaluate slab conditions at the building's restrooms and at concrete test locations 11, 22 and 24 to evaluate the possible source of the elevated slab moisture in these areas.

6.0 REPORT CONSIDERATIONS

The analysis and opinions presented in this report are based upon the information provided to us by our client, the Flagler County Government, and data collected at the project site at the time of our site visit. Information provided included but is not limited to building plans, previous test reports, and interviews with personnel knowledgeable about the moisture intrusion issue and history of the building. While additional conditions may exist that could alter our conclusions, we feel that reasonable means have been made available to us to fairly and accurately evaluate the existing conditions on this building.

This evaluation was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. The observations and measurement results contained within this report are considered to be a "snapshot-in-time" and may not be representative of other times when indoor environmental conditions, outdoor environmental conditions and/or heating, ventilation and air-conditioning (HVAC) system operations may be different. Many factors, such as weather conditions, building occupancy, ventilation patterns, and seasonal variations in HVAC equipment performance can affect the conditions observed.

Terracon has endeavored to install and monitor the concrete test kits using generally accepted procedures and in general conformance with ASTM F1869-16a and ASTM F2170. If additional areas of concern are identified, Terracon can investigate those areas upon notification and authorization.

This report has been prepared for the exclusive use of Flagler County Government for specific application to the project discussed and has been prepared in accordance with generally accepted engineering practices. No warranties, either expressed or implied, are intended or made. In the event that information described in this document which others provided is incorrect, or if additional information becomes available, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the information and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

PHOTOGRAPHIC DOCUMENTATION
MOISTURE INTRUSION AND IAQ EVALUATION

Photo #1 Air sampling in the evidence cooler room.

Photo #2 Typical view of new fiberglass and metal studs in upper wall cavity cuts in the southeast east portion of the evidence storage room.

Photo #3 Corrosion on metal roof deck within the southwest portion of the evidence storage room.

Photo #4 Dry moisture measurement in old wood framing blocking at top of concrete wall in southwest corner of the evidence storage room.

Photo #5 Swab testing on old wood in old wood in southwest upper wall cavity of Evidence Storage.

Photo #6 Dry moisture measurement in old wood in southwest upper wall cavity of Evidence Storage.

Photo #7 Old wood and insulation along upper south wall in Narcotics Storage.

Photo #8 Close up of old wood blocking on South upper wall in Narcotics Storage.

Photo #9 Dry moisture measurement on old wood on upper wall in Narcotics Storage

Photo #10 Entrance to southeast Investigations Room 129.

Photo #11 Upper wall cut at southwest corner of Room 129.

Photo #12 Old fiberglass on top of concrete upper wall in southwest corner of Room 129.

Photo #13 Dry moisture measurement in old wood on upper southwest wall in Room 129.

Photo #14 View of old wood on upper south center wall in Room 129.

Photo #15 No visible mold growth on back of drywall at cut locations in Room 129.

Photo #16 Dry moisture measurement in old wood by bat droppings at southwest corner of Room 129.

Photo #17 Bat guano at top of concrete wall in southeast corner of Room 129.

Photo #18 Concrete wall behind recently built-out gypsum wall at base of southeast wall in Room 129.

Photo #19 Visible mold below carpet square by entrance to the Sheriff's Office Room 178.

Photo #20 No moisture or mold issues identified below carpet square in Room 175.

Photo #21 Moisture and mold below carpet square in Room 168.

Photo #22 Visible mold below bottom floor tile layer by drinking fountain in west hallway by restrooms.

Photo #23 Wet glue, red staining and musty odor below carpet square in Room 165.

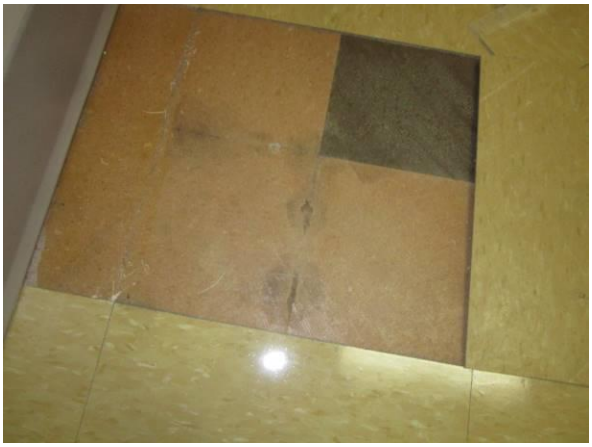


Photo #24 Visible mold and musty odor between floor tile layers in east hallway by Room 156.

Photo #25 Musty and moldy below carpet square in Victims Services Room 118.

Photo #26 Mold below floor tile in Room 127.

Photo #27 Wet carpet glue in Room 103.

Photo #28 Close up of wet carpet glue in Room 103.

Photo #29 Musty odor and mold below carpet square in Room 105A.

Photo #30 Wet carpet glue below carpet square in IT Room 150.

APPENDIX B
MOLD TESTING RESULTS

EMLab P&K
A TestAmerica Company

Report for:

Mr. John O'Reilly
Terracon - Orlando, FL
1675 Lee Road
Winter Park, FL 32789

Regarding: Project: Flagler Sheriff's Ops; Office Bldg
EML ID: 2195783

Approved by:

Operations Manager
Joshua Cox

Dates of Analysis:
Spore trap analysis: 07-02-2019

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #102297

EMLab P&K
1501 West Knudsen Drive, Phoenix, AZ 85027
(800) 651-4802 Fax (623) 780-7695 www.emlab.com

Client: Terracon - Orlando, FL
C/O: Mr. John O'Reilly
Re: Flagler Sheriff's Ops; Office Bldg

Date of Sampling: 06-28-2019
Date of Receipt: 07-01-2019
Date of Report: 07-02-2019

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	E1: Exterior W by Generator			CA1: Evidence Cooler Room		
Comments (see below)	None			None		
Lab ID-Version‡:	10432221-1			10432222-1		
Analysis Date:	07/02/2019			07/02/2019		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Ascospores	40	25	1,100	1	25	27
Basidiospores	186	5	25,000	3	25	80
Bipolaris/Drechslera group				3	100	20
Chaetomium						
Cladosporium	20	25	530	1	25	27
Curvularia	1	100	7	7	100	47
Epicoccum				12	100	80
Nigrospora	1	100	7			
Other brown	2	100	13			
Other colorless						
Penicillium/Aspergillus types†	6	25	160	1	25	27
Pithomyces						
Pyricularia	1	100	7			
Rusts						
Smuts, Periconia, Myxomycetes						
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	2+			3+		
Hyphal fragments/m3	40			33		
Pollen/m3	7			7		
Skin cells (1-4+)	< 1+			2+		
Sample volume (liters)	150			150		
§ TOTAL SPORES/m3			27,000			310

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.
† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium, Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
††Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m^3 divided by the raw count, expressed in spores/m^3. The limit of detection is the analytical sensitivity (in spores/m^3) multiplied by the sample volume (in liters) divided by 1000 liters.

For more information regarding analytical sensitivity, please contact QA by calling the laboratory.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

EMLab P&K
A TestAmerica Company

Report for:

Mr. John O'Reilly
Terracon - Orlando, FL
1675 Lee Road
Winter Park, FL 32789

Regarding: Project: Flagler Sheriff's Ops; Office Bldg
EML ID: 2195783

Approved by:

Operations Manager
Joshua Cox

Dates of Analysis:
Quantitative spore count direct exam: 07-02-2019

Service SOPs: Quantitative spore count direct exam (EM-MY-S-1041)
AIHA-LAP, LLC accredited service, Lab ID #102297

EMLab P&K
1501 West Knudsen Drive, Phoenix, AZ 85027
(800) 651-4802 Fax (623) 780-7695 www.emlab.com

Client: Terracon - Orlando, FL
C/O: Mr. John O'Reilly
Re: Flagler Sheriff's Ops; Office Bldg

Date of Sampling: 06-28-2019
Date of Receipt: 07-01-2019
Date of Report: 07-02-2019

QUANTITATIVE SPORE COUNT REPORT

Location:	CT1: Evidence Room SW Corner		CT2: Narcotics Rooms		CT3: SE Training Room SW		CT4: SE Training Room SE	
Comments (see below)	None		None		None		None	
Sample type	Tape sample		Tape sample		Tape sample		Tape sample	
Lab ID-Version‡:	10431331-1		10431332-1		10431333-1		10431334-1	
Analysis Date:	07/02/2019		07/02/2019		07/02/2019		07/02/2019	
	raw ct.	spores/unit	raw ct.	spores/unit	raw ct.	spores/unit	raw ct.	spores/unit
Aureobasidium								
Basidiospores			4	67				
Bipolaris/Drechslera group								
Botrytis								
Chaetomium								
Cladosporium	17	280	5	83	56	930	47	780
Curvularia			1	17				
Epicoccum								
Fusarium								
Myrothecium								
Nigrospora	1	17						
Other colorless								
Penicillium	127	12,000						
Penicillium/Aspergillus types†			3	50	1	17		
Pithomyces								
Rusts								
Smuts, Periconia, Myxomycetes							10	170
Stachybotrys								
Stemphylium								
Torula								
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	2+		2+		4+		2+	
Sample size	1		1		1		1	
Unit	1 cm2		1 cm2		1 cm2		1 cm2	
§ TOTAL SPORES/UNIT		12,000		220		950		950

Comments:

† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
†† Background debris is an indication of the amount of non-biological particulate matter present on the slide (dust in the air) and is graded from 1+ to 4+ with 4+ indicating the largest amounts. This background material is also an indication of visibility for the analyst and resultant difficulty reading the slide. For example, high background debris may obscure the small spores such as the *Penicillium/Aspergillus* group. Counts from areas with 4+ background debris should be regarded as minimal counts and may actually be higher than reported.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Spores/unit has been rounded to two significant figures to reflect analytical precision.
The limit of detection is 1 spore per area analyzed.
The analytical sensitivity is (1 Spore/Total Number of Fields Observed)*(Total Sample Area(cm2)/Field Area of the microscope objective (cm2))*(1/unit volume)*Dilution Factor.
For more information regarding analytical sensitivity, please contact QA by calling the laboratory.

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.

EMLab P&K
A TestAmerica Company

Report for:

Mr. John O'Reilly
Terracon - Orlando, FL
1675 Lee Road
Winter Park, FL 32789

Regarding: Project: Flagler Sheriff's Ops; Office Bldg
EML ID: 2195783

Approved by:

Operations Manager
Joshua Cox

Dates of Analysis:
1-Media fungi surface culture (Incl. Asp spp.): 07-09-2019

Service SOPs: 1-Media fungi surface culture (Incl. Asp spp.) (EM-PR-S-1040 & EM-MY-S-2584)
AIHA-LAP, LLC accredited service, Lab ID #102297

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received.

EMLab P&K's LabServe® reporting system includes automated fail-safes to ensure that all AIHA-LAP, LLC quality requirements are met and notifications are added to reports when any quality steps remain pending.

EMLab P&K
1501 West Knudsen Drive, Phoenix, AZ 85027
(800) 651-4802 Fax (623) 780-7695 www.emlab.com

Client: Terracon - Orlando, FL
C/O: Mr. John O'Reilly
Re: Flagler Sheriff's Ops; Office Bldg

Date of Sampling: 06-28-2019
Date of Receipt: 07-01-2019
Date of Report: 07-09-2019

FUNGAL CULTURE REPORT

Lab ID-Version‡ Location Analysis Date	Sample Size/ Report Unit	Medium	Dilution Factor	Fungal ID	Colony Counts	CFU/unit	%
10432217-1 CS1 Evidence Room SW Corner Analysis date: 07/09/2019	Size: 12.9 cm2 Unit: 1 cm2	MEA	10	No fungi detected		§ Total: < 0.78	100
Comments:							
10432218-1 CS2 Narcotics Rooms Analysis date: 07/09/2019	Size: 12.9 cm2 Unit: 1 cm2	MEA	10	Aspergillus sp. Aspergillus ustus Cladosporium Curvularia Non-sporulating fungi Paecilomyces Penicillium	4 4 1 1 5 2 3	3.1 3.1 0.78 0.78 3.9 1.6 2.3 § Total: 16	20 20 5 5 25 10 15 100
Comments:							
10432219-1 CS3 SE Training Room SW Analysis date: 07/09/2019	Size: 12.9 cm2 Unit: 1 cm2	MEA	10	No fungi detected		§ Total: < 0.78	100
Comments:							
10432220-1 CS4 SE Training Room SE Analysis date: 07/09/2019	Size: 12.9 cm2 Unit: 1 cm2	MEA	100	Paecilomyces	61	470 § Total: 470	100 100
Comments:							

The limit of detection is a raw count of 1 at the lowest dilution plated. The analytical sensitivity is equal to 1 raw count/reporting unit x the dilution factor.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total has been rounded to two significant figures to reflect analytical precision.

CHAIN OF CUSTODY
www.EMLabPK.com

EMLab P&K
A TestAmerica Company

New Jersey: 3000 Lincoln Drive East, Suite A, Marlton, NJ 08053 * (866) 871-1984
Phoenix, AZ: 1501 West Knudsen drive, Phoenix, AZ 85027 * (800) 651-4802
SSF, CA: 6000 Shoreline Court, Suite 205, South San Francisco, CA 94080 * (866) 888-6653

Weather		Fog	Rain	Snow	Wind	Clear
Level	None	☐	☐	☐	☐	☐
	Light	☐	☐	☐	☐	
	Moderate	☐	☐	☐	☐	
	Heavy	☐	☐	☐	☐	

REQ… (Us…

002195783

CONTACT INFORMATION

Company:	Terracon Consultants	Address:	1675 Lee Rd, Winter Park FL 32789
Contact:	John O'Reilly	Special Instructions:	email jlreilly@terracon.com
Phone:	321 438 5488		

PROJECT INFORMATION

Project ID:	Flagler Sheriff's OPS		
Project Description:	office Bldg		
Project Zip Code:		Sampling Date & Time:	5/28/19
PO Number:	F9196079	Sampled By:	John O'Reilly

TURN AROUND TIME CODES (TAT)

- STD – Standard (DEFAULT) (circled)
- ND – Next Business Day
- SD – Same Business Day Rush
- WH – Weekend / Holiday

Rushes received after 2 pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

Non-Culturable: Spore Trap; Tape Swab Bulk. BioCasset… Water, Bulk, …

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume / Area (as applicable)	Notes (Time of day, Temp, RH, etc.)	Fungi – Spore Trap Analysis	Spore Trap Analysis – Other particles	Direct Microscopic Exam (Qualitative)	Quantitative Spore Count Direct Exam	1-Media Surface Fungi (Genus ID + Asp. spp.)	2-Media Surface Fungi (Genus ID + Asp. spp.)	3-Media Surface Fungi (Genus ID + Asp. spp.)	Culturable Air Fungi (Genus ID + Asp. spp.)	Gram Stain & Counts (Culturable Air & Surface Bacteria)	Legionella culture	Total Coliform, E. coli (Presence/Absence)	Membrane Filtration (specify organism)	MPN Bacteria (specify organism)	QuantiTray – Sewage Screen	Asbestos Analysis – PCM Airborne Fiber Count (NIOSH 7400)	Asbestos Analysis – PLM (EPA method 600/R-93-116)	PCR (specify test)	
E1	Exterior W by generator	ST	STD	150 L	9:18 Am	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CA1	Evidence cooler room	ST	↓	150 L	10:10 AM	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CS1	Evidence Room SW corner	SW	↓	2"x2"	10:45 Am	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CT1	↓ ↓	T	↓	–	10:46 Am	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CS2	Narcotics Room S	SW	↓	2"x2"	11:13 Am	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CT2	↓ ↓	T	↓	–	11:14 Am	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CS3	SE Training Room SW	SW	↓	2"x2"	1:23 pm	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CT3	↓ ↓	T	↓	–	1:24 pm	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CS4	SE Training Room SE	SW	↓	2"x2"	2:32 pm	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CT4	↓ ↓	T	↓	–	2:33 pm	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES			
BC – BioCassette ™	ST – Spore Trap: Zefon, Allergenco, Burkard …	T – Tape	D – Dust
A1S – Anderson		SW – Swab	SO – Soil
SAS – Surface Air Sampler	P – Potable Water	B – Bulk	
CP – Contact Plate	NP – Non-Potable Water	O – Other:	

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
John O'Reilly	6/29/19 7:15 pm FedEx	[signature] FedEx 1025	7/1/19

APPENDIX C
MOLD TESTING LOCATION PLAN

A1.1	FLOOR PLAN
A1.7	FLOORING PLAN
A2.0	REFLECTED CEILING PLAN
A2.6	ROOF PLAN

A1.3	FLOOR PLAN
A1.7	FLOORING PLAN
A2.2	REFLECTED CEILING PLAN
A2.6	ROOF PLAN

A1.5	FLOOR PLAN
A1.7	FLOORING PLAN
A2.4	REFLECTED CEILING PLAN
A2.6	ROOF PLAN

A1.2	FLOOR PLAN
A1.7	FLOORING PLAN
A2.1	REFLECTED CEILING PLAN
A2.6	ROOF PLAN

A1.4	FLOOR PLAN
A1.7	FLOORING PLAN
A2.3	REFLECTED CEILING PLAN
A2.6	ROOF PLAN

A1.6	FLOOR PLAN
A1.7	FLOORING PLAN
A2.5	REFLECTED CEILING PLAN
A2.6	ROOF PLAN

N

Legend

- ☆ Air Sample
- ■ Tape and Swab Samples
- ● observed below floor covering
- O Additional upper wall cut areas
- X Clean and Sanitize upper Wall Cavity

1 SHERIFF'S OPERATIONS CENTER-OVERALL KEY PLAN
NTS

Record Documents 12.22.2015

This record drawing has been prepared, in part, based upon information furnished by others. While this information is believed to be reliable, the Architect assumes no responsibility for the accuracy of this record drawing or for any errors or omissions that may have been incorporated into it as a result of incorrect information provided to the Architect. Those relying on this record document are advised to obtain independent verification of its accuracy.

ttv architects, inc.
115 EAST FORSYTH ST
JACKSONVILLE, FLORIDA 32202

PROJECT ARCHITECT
CHRISTOPHER P. NOEL
LICENSE NO: AR-92560

NEW FLAGLER COUNTY SHERIFF'S OPERATIONS CENTER
901 East Moody Boulevard Bunnell, Florida

overall key plan

A1.0

APPENDIX D
CONCRETE TESTING RESULTS

Appendix D - Moisture Vapor Transmission and Concrete Relative Humidity Measurement Results
Flagler County Sherriff's Operations Building
901 East Moody Boulevard
Bunnell, Florida
Terracon Project No. F9196079

Test No. / Plan Location ID [1]	Duration				Weight (g)	Weight Gain (g)	pH	MVER (lbs./1,000 SF in 24 hours)	Ambient Conditions		Concrete Slab Conditions	
		Date [2]	Time	Hours					RH (%)	Temp. (°F)	RH (%)	Temp. (°F)
1	Start:	07/26/19	9:33 AM	72	32.5	4.9	9	8.02	52	72	99	73
	End:	07/29/19	10:05 AM		37.4							
2	Start:	07/26/19	9:27 AM	72	32.1	3.1	9	5.08	52	72	99	73
	End:	07/29/19	10:02 AM		35.2							
3	Start:	07/26/19	9:23 AM	72	32.8	4.1	9	6.71	51	73	99	72
	End:	07/29/19	9:59 AM		36.9							
4	Start:	07/26/19	9:38 AM	72	32.5	2.9	9	4.75	57	71	99	73
	End:	07/29/19	10:08 AM		35.4							
5	Start:	07/26/19	9:03 AM	72	32.7	10.8	9	17.69	52	72	99	71
	End:	07/29/19	9:46 AM		43.5							
7	Start:	07/26/19	11:58 AM	72	32.4	1.4	9	2.29	55	70	99	74
	End:	07/29/19	11:26 AM		33.8							
8	Start:	07/26/19	12:06 PM	72	32.3	2.4	9	3.93	54	70	81	71
	End:	07/29/19	11:30 AM		34.7							
9	Start:	07/26/19	11:44 AM	72	32.4	0.8	9	1.31	55	70	99	73
	End:	07/29/19	11:22 AM		33.2							
10	Start:	07/26/19	11:44 AM	72	32.3	1.2	9	1.97	56	69	99	70
	End:	07/29/19	11:19 AM		33.5							
11	Start:	07/26/19	12:22 PM	72	32.4	7.4	9	12.12	54	70	99	71
	End:	07/29/19	11:36 AM		39.8							
12	Start:	07/26/19	12:10 PM	72	32.3	2.0	9	3.28	55	70	99	70
	End:	07/29/19	11:32 AM		34.3							
13	Start:	07/26/19	9:10 AM	72	32.6	5.0	9	8.19	52	72	99	71
	End:	07/29/19	9:51 AM		37.6							
14	Start:	07/26/19	9:18 AM	72	32.8	3.2	9	5.24	51	73	95	72
	End:	07/29/19	9:56 AM		36.0							

Appendix D - Moisture Vapor Transmission and Concrete Relative Humidity Measurement Results
Flagler County Sherriff's Operations Building
901 East Moody Boulevard
Bunnell, Florida
Terracon Project No. F9196079

Test No. / Plan Location ID [1]	Duration				Weight (g)	Weight Gain (g)	pH	MVER (lbs./1,000 SF in 24 hours)	Ambient Conditions		Concrete Slab Conditions	
		Date [2]	Time	Hours					RH (%)	Temp. (°F)	RH (%)	Temp. (°F)
16	Start:	07/26/19	9:50 AM	72	32.5	1.8	9	2.95	57	72	99	74
	End:	07/29/19	10:14 AM		34.3							
17	Start:	07/26/19	9:45 AM	72	32.3	4.0	9	6.55	55	72	99	74
	End:	07/29/19	10:10 AM		36.3							
18	Start:	07/26/19	10:00 AM	72	32.4	1.7	9	2.78	56	71	82	71
	End:	07/29/19	10:17 AM		34.1							
19	Start:	07/26/19	9:56 AM	72	32.4	1.7	10	2.78	57	70	92	71
	End:	07/29/19	10:20 AM		34.1							
20	Start:	07/26/19	10:05 AM	72	32.3	1.5	9	2.46	60	72	99	71
	End:	07/29/19	10:23 AM		33.8							
21	Start:	07/26/19	12:29 PM	72	32.2	1.3	9	2.13	54	69	99	71
	End:	07/29/19	11:39 AM		33.5							
22	Start:	07/26/19	11:38 AM	72	32.4	5.8	9	9.50	55	70	99	71
	End:	07/29/19	11:03 AM		38.2							
23	Start:	07/26/19	12:17 PM	72	32.4	2.8	10	4.59	55	70	99	72
	End:	07/29/19	11:15 AM		35.2							
24	Start:	07/26/19	11:30 AM	96	32.4	9.0	10	11.05	54	70	99	75
	End:	07/30/19	9:30 AM		41.4							
25	Start:	07/26/19	11:22 AM	72	32.4	3.0	9	4.91	53	71	99	72
	End:	07/29/19	10:56 AM		35.4							
26	Start:	07/26/19	11:26 AM	72	32.4	1.3	9	2.13	53	70	99	72
	End:	07/29/19	11:12 AM		33.7							
27	Start:	07/26/19	10:50 AM	72	32.5	1.8	9	2.95	54	72	99	72
	End:	07/29/19	10:52 AM		34.3							
28	Start:	07/26/19	10:12 AM	72	32.4	1.8	9	2.95	55	71	98	71
	End:	07/29/19	10:26 AM		34.2							

Appendix D - Moisture Vapor Transmission and Concrete Relative Humidity Measurement Results
Flagler County Sherriff's Operations Building
901 East Moody Boulevard
Bunnell, Florida
Terracon Project No. F9196079

Test No. / Plan Location ID [1]	Duration				Weight (g)	Weight Gain (g)	pH	MVER (lbs./1,000 SF in 24 hours)	Ambient Conditions		Concrete Slab Conditions	
		Date [2]	Time	Hours					RH (%)	Temp. (°F)	RH (%)	Temp. (°F)
29	Start:	07/26/19	10:17 AM	72	32.4	13.3	10	21.78	55	72	98	71
	End:	07/29/19	10:28 AM		45.7							
30	Start:	07/26/19	10:32 AM	72	32.3	2.4	9	3.93	57	71	99	73
	End:	07/29/19	10:37 AM		34.7							
31	Start:	07/26/19	10:26 AM	72	32.4	2.8	9	4.59	56	71	92	72
	End:	07/29/19	10:33 AM		35.2							
34	Start:	07/26/19	11:18 AM	96	32.7	4.6	9	5.65	55	71	93	72
	End:	07/30/19	9:19 AM		37.3							
35	Start:	07/26/19	11:07 AM	96	32.6	2.2	9	2.70	57	71	99	72
	End:	07/30/19	9:21 AM		34.8							
36	Start:	07/26/19	11:03 AM	96	32.3	3.4	10	4.18	52	73	99	74
	End:	07/30/19	9:27 AM		35.7							
37	Start:	07/26/19	10:56 AM	72	32.3	1.6	10	2.62	52	73	99	71
	End:	07/29/19	11:00 AM		33.9							
38	Start:	07/26/19	10:37 AM	72	32.2	12.2	10	19.98	54	72	99	74
	End:	07/29/19	10:46 AM		44.4							
39	Start:	07/26/19	10:42 AM	72	32.3	3.6	10	5.90	53	73	99	74
	End:	07/29/19	10:43 AM		35.9							

LEGEND

[1] = Tests 6, 15, 32 and 33 were not conducted due to lack of access on July 26, 2019.

[2] = Devices for tests 24, 34, 35 and 36 were retrieved on July 30, 2019 due to lack of access on July 29, 2019.

g = grams

pH = measure of acidic / basic properties

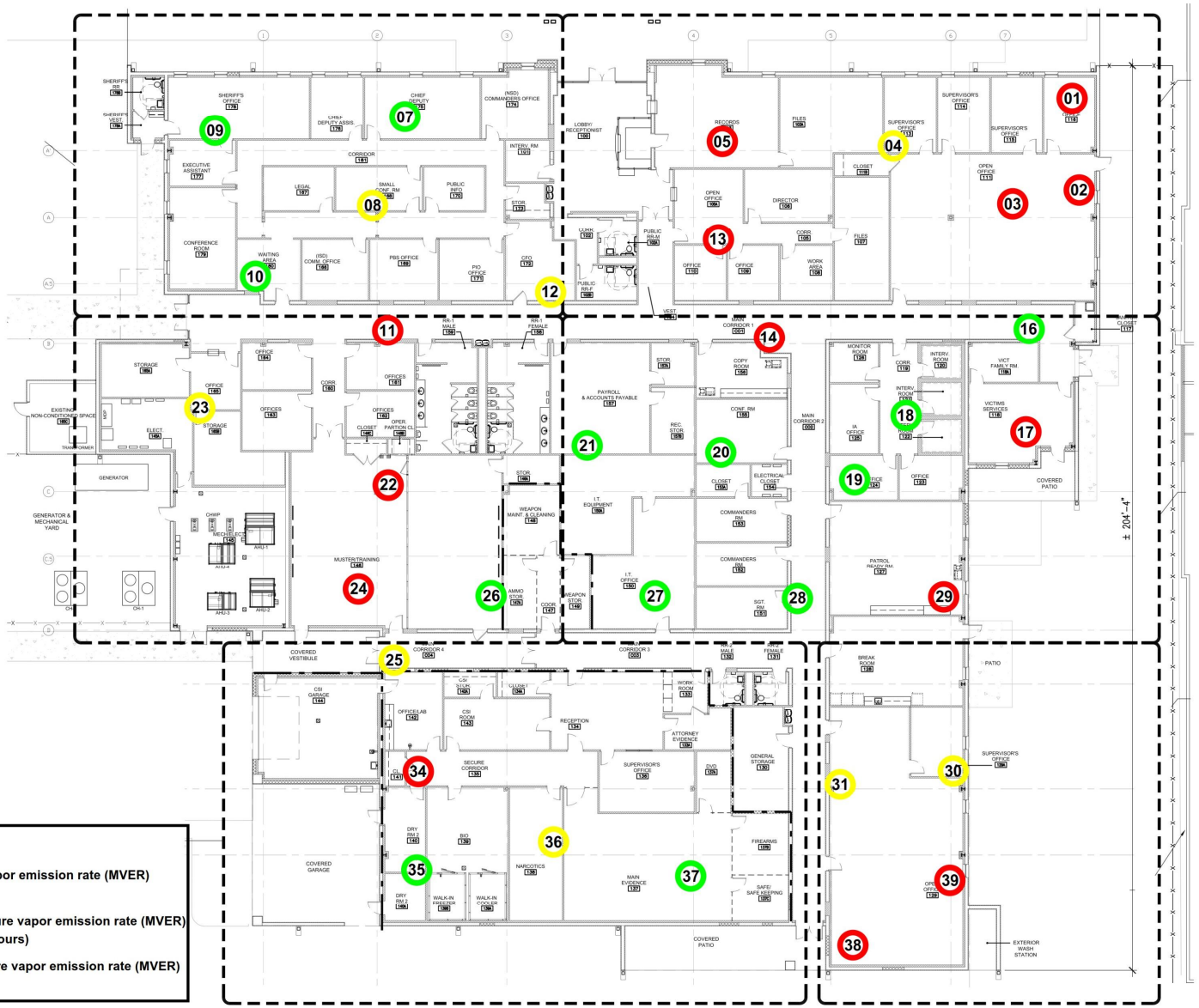
SF = square foot

lbs. = pounds

APPENDIX E

CONCRETE TESTING LOCATION PLAN

DRAFT



LEGEND

- ## = Test location with low moisture vapor emission rate (MVER) (<3.0 lbs. / 1,000 SF in 24 hours)
- ## = Test location with moderate moisture vapor emission rate (MVER) (3.0 lbs. - 5.0 lbs. / 1,000 SF in 24 hours)
- ## = Test location with elevated moisture vapor emission rate (MVER) (>5.0 lbs./1,000 SF in 24 hours)

SOURCE DOCUMENT: SHEET A1.0 ENTITLED "OVERALL KEY PLAN, NEW FLAGLER COUNTY SHERRIFF'S OPERATIONS CENTER", ISSUED BY TTV ARCHITECTS AND DATED 12/22/2015.

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

Project Manager:	BJD
Drawn by:	BBB
Checked by:	BJD
Approved by:	BJD

Project No.	F9196079
Scale:	NTS
File Name:	
Date:	08/5/2019

Terracon
Consulting Engineers & Scientists
1675 Lee Road Winter Park, Florida 32789
PH. (407) 740-6110 terracon.com

TESTING LOCATION PLAN

Moisture Vapor Transmission and Relative Humidity Measurements
Flagler County Sherriff's Operations Building
901 East Moody Boulevard
Bunnell, Florida

Appendix **E**