CHILDRESS
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HURRICANE IDA STORM DAMAGE ASSESSMENT

Upperline Condominiums

1114 Lyons Street
New Orleans, LA 70115

May 26, 2022

Client:
Property One
3500 N. Causeway Blvd, Suite 600
Metairie, LA 70002
Attn: Michele Casi

Introduction:

As requested, Childress Engineering Services, Inc. (CES) performed inspections of the referenced site to identify any damage which may have resulted from Hurricane Ida. CES team members Joe Murdter and Allen Kipp performed the site assessment of the building envelope, including the roof and windows, on May 4th, 2022. This assessment was limited to visual observations and photographic documentation of the building areas in scope. Follow-up drone Infrared (IR) imaging of the roofs was performed on May 9, 2022, by CES team members Randy Davis and Allen Kipp (*Reference #3*). Joe Murdter returned to the site on May 11th, 2022, to take core samples of the low slope roof in response to the IR imagining. The results of these site visits were shared with Tony H. Childress, P.E., S.E., principal, and owner of CES.

The building is orientated at a slight angle from a true north - south direction. For the purposes of this report, the front elevation and main entrance of the building at 1114 Lyons St will be referred as facing east (*Reference #1*). The original building (the south section) was reportedly completed in 1894 and the north addition was completed in 1925. The buildings originally served as a school that have been renovated into condos since. Both buildings are 3-story wood framed structures clad with (reportedly) four wythe masonry brick wall. The building contains a basement area for a gym and storage areas. The windows are reportedly original and are comprised of single hung wood frames in a wooden track assembly with a counter-weighted sash cord to assist with opening. Weather stripping was not observed at the window tracks, sills, or sashes.

The north addition has a low slope modified bitumen (MB) membrane roof that drains through external scuppers. The southern section has a steep-slope roof covered in composite asphalt shingles that drain to gutters along the eaves and below the rakes (in line with the eaves) (*Reference #2*). The scuppers and gutters feed into downspouts that empty at grade. A cupola that was once a bell tower extends from the peak of the southern section steep slope roofing system.

CES has been advised that the subject property is a nationally registered “Historical Place” under its original name McDonough School #6 and is within the Uptown New Orleans Historical District. This designation entails limitations and further permitting on exterior work at the property.

It is important to note that this building experienced another hurricane event in October of 2020 (Hurricane Zeta). CES was informed that the building experienced very little moisture infiltration through the roof and windows along with minimal damages from the storm event and that no damage claims were made resultant of Hurricane Zeta.

Hurricane Ida:

Hurricane Ida made landfall approximately 60 miles south of New Orleans, LA as a Category 4 hurricane with sustained wind speeds of 150 MPH near Port Fourchon, LA on August 29, 2021 (*Reference #4*). Only four hurricanes (all Category 5) have ever made landfall in the United States with stronger winds than Hurricane Ida and that Hurricane Ida is tied for the strongest winds at landfall in Louisiana. It reached southwest of the New Orleans area as a Category 3 hurricane with measured 62 MPH sustained winds and gusts up to 90 MPH in New Orleans as it approached. It should be noted that due to the power loss in New Orleans, measurements of wind speeds are not available for over the period during the peak of the storm and it reasonable to assume true peak sustained and gust wind speeds were greater than the available measured speeds. Hurricanes classified as Category 3 have sustained winds between 111-129 MPH. Louisiana Governor John Bel Edwards has stated that Hurricane Ida is the strongest Hurricane to hit New Orleans in 160 years.

The storms eye followed a path west of New Orleans, putting New Orleans on the "dirty side" of the storm. According to the NOAA, the "Dirty Side" of a hurricane in the northern hemisphere is always the right side in relation to the direction of the storm. Because storms in the northern hemisphere rotate counterclockwise, the strongest rain, wind, and storm surge occurs at the front right quadrant, where the moisture is being drawn to the shore (at landfall) and the wind speed combines with the speed of the storm (*References #5 & 6*).

Rainfall totals are estimated around 10" over the span of Hurricane Ida passing through the region. Rainfall readings are not available for large amounts of time as the storm approached and as the storm moved away from the region and for approximately 14 minutes while the storm passed west of New Orleans, totaling over two hours of lacking data. This lacking data greatly affects the "Maximum Short Duration Precipitation" figures for the storm, rendering them greatly underestimated (*Reference #7).*

The Hurricane Ida National Hurricane Center Tropical Cyclone Report states: "*Hurricane conditions occurred over much of the remainder of southeastern Louisiana south and east of Baton Rouge. Hurricane conditions occurred as far north as the north shore of Lake Pontchartrain, where WeatherFlow stations reported sustained winds at or near 65 kt along with a peak gust of 96 kt in Mandeville…As a tropical cyclone, Ida* *produced widespread heavy rains along portions of the northern Gulf coast states northward and eastward into the Tennessee Valley. Rainfall totals of more than 10 inches occurred over portions of southeastern Louisiana, southeastern Mississippi, and southwestern Alabama, with a maximum storm total of 15.04 inches at Ponchatoula, Louisiana… In southeastern Louisiana, thousands of buildings were damaged by Ida's wind and surge. The worst hit areas were the coastal portions of Lafourche and Jefferson Parishes, where almost every structure was damaged… wind damages to structures occurred as far inland as southwestern Mississippi."*

The Tropical Cyclone Report also makes note of the power outages: "*In addition to the damage, widespread electrical power failures occurred due to Ida's winds in southeastern Louisiana, including the New Orleans metropolitan area. All power was lost in Lafourche and Jefferson Parishes, with the failure in the latter parish aided by the collapse of a large transmission tower along the Mississippi River west of New Orleans."* Power outages in the region affected over one million customers including over 80 percent of the Orleans parish customers. Due to the power outages and the destructive force of the storm, much of the available wind speed and rain data is incomplete.

Hurricanes weaken as they move north inland (in the northern hemisphere), referred to as hurricane decay (*reference #8*). According to the research article: *Slower decay of landfalling hurricanes in a warming world* by Lin Li and Pinaki Chakraborty published November 11th, 2020, "*… in the late 1960s a typical hurricane lost about 75 per cent of its intensity in the first day past landfall, now the corresponding decay is only about 50 per cent. We also show, using computational simulations, that warmer sea surface temperatures induce a slower decay by increasing the stock of moisture that a hurricane carries as it hits land. This stored moisture constitutes a source of heat that is not considered in theoretical models of decay.*"

Mandeville had recorded winds of 65 kts (approximately 75 mph) with gusts of 96 kts (approximately 110.5 mph) and is approximately 25 miles north of New Orleans. The hurricane path passed west of New Orleans approximately eight hours after landfall and west of Mandeville approximately eleven hours after landfall. Though the hurricane decay is currently slower than in the past, some level of decay would be expected over these additional three hours. This suggests the strength of the hurricane was stronger as it passed west of New Orleans than it was when passing west of Mandeville, creating stronger storm conditions in New Orleans than in Mandeville. Mandeville is also 11 miles further east from the hurricane path than New Orleans, also suggesting stronger storm conditions in New Orleans than in Mandeville (*Reference #9*).

The Tropical Cyclone Report reports that the city of New Orleans experienced maximum sustained winds of 57 kts (approximately 66 mph) and gusts of 78 kts (approximately 90 mph), though the associated foot note states "*Incomplete record. Peak values may have exceeded the reported value.*" (*Reference #10*). The NOAA data from New Orleans International Airport display no readings between 17:53 CDT and 23:53 CDT on August 29th, 2021 (*Reference #11*). New Orleans news station 4WWL also reported a building less than three miles to the east (and subsequently further from the storm) of the subject property collapsed as Hurricane Ida passed to the west.

Executive Summary:

CES observed storm damages throughout the property and building envelope. These damages have led to subsequent damages to the interior finishes. The low slope and steep slope roofing systems display windborne debris impact and wind uplift damages. Windborne debris damage was observed at the cornice and parapet counterflashing and several broken windows had been reported. The aged condition of the MB membrane, windows, mortar, and sealants has also been exploited by the storm, worsening these conditions and leading to paths of water intrusion.

IR imagery displayed multiple areas of moisture trapped beneath the MB membrane at the low slope roof. Core sampling verified the IR imagery and exposed saturated insulation beneath. All moisture damaged insulation must be removed and replaced. The extent of moisture trapped beneath the MB membrane displayed in the IR scan suggests that replacement of the roofing system may be less expensive and time consuming than performing isolated repairs due to the quantity of damage and the damage to the insulation. All water damaged roofing framing and decking, as observed from the attic space below and any damages uncovered by the process of remediation, should be addressed prior to the installation of new insulation and roofing.

It is possible the damaged shingles at the steep slope roofing system may be remediated with isolated repairs. Any water damaged roofing framing and decking uncovered by the process of remediation should be addressed prior to the installation of new roofing. Damages observed to the rooftop equipment, scuppers, skylight, and cupola should be addressed accordingly. The displaced and damaged parapet counterflashing should be replaced.

All fencing around the property had been replaced at the time of CES observations. The reported damages to the fencing are consistent with hurricane damages. The racked entry door observed at the north elevation should be replaced. Grading should be performed to inhibit the intrusion of surface water at basement doorways.

The window systems present are reportedly original construction. These window systems predate water resistance testing and ratings and are likely not capable of resisting the conditions experienced in the storm event. Sash misalignment, broken panes, and loose glazing has been reported throughout the building. The aged sealants have been exploited by the storm worsening these conditions and leading to paths of water intrusion. All aged sealants should be removed and replaced and any window system deficiencies should be addressed. Water damaged interior finishes have been reported at most of the window openings and had been remediated prior to CES observations.

The aged condition of the masonry mortar and wall system sealants has been exploited by the wind pressure and rain of Hurricane Ida, worsening these conditions, and providing paths for water intrusion and subsequently damaging interior finishes. Some prior sealant repairs to the mortar were observed. CES does not recommend sealant as a viable remediation of degraded mortar. Sealant should be removed and all degraded mortar joints should be repointed. Sealant joints at window perimeters and other transitions should be removed and replaced. CES also recommends considering the application of a clear coating to the masonry walls once mortar remediation has been performed to further inhibit water intrusion.

Water damaged siding and disengaged fasteners at the stairwell penthouse should be replaced. Windborne debris damaged cornice should be repaired accordingly, and the perimeter sealant joints removed and replaced. The cracking and unadhered Direct-Applied Exterior Finish System (DEFS) coating at the basement and the east entry stoop has been exploited by the storm worsening these conditions. The DEFS coating should be ground back and replaced. Application of a negative-side waterproofing should be considered for the basement interior walls to further inhibit water intrusion.

All these damages are consistent with storm related windborne debris damage, wind pressure damage, and wind driven rain damage and should be addressed accordingly. These conditions did not reveal themselves in October of 2020 during Hurricane Zeta. These conditions only appeared after Hurricane Ida. The indicates the systems which were previously functioning have been impacted by Hurricane Ida and are no longer functional.

Observations:

CES observed windborne debris damage at the low slope MB membrane roof and parapet in the form of gouges and scratches that penetrate the membranes. Gouges were observed around the air conditioning (A/C) units that resemble the feet of the A/C units. CES also observed blisters in the membranes and unadhered membrane laps at the roof and parapets. Some prior repairs have been performed with elastomeric coating and/or granular-surfaced MB membrane.

CES observed storm damages at the rooftop equipment and metal flashing. An A/C unit remains displaced and disconnected near the stairwell penthouse. Windborne debris damages were observed at a scupper and skylight and a roofing line shack has been recently replaced. Sealant failure was noted at the base of many of the roof penetrations and scuppers. The wind gusts created by a hurricane exert intermittent forces onto the roofing systems, buffeting the components, and compromising the seals and flashings. Debris has damaged the parapet counterflashing and membrane near the southeast corner of the roof, displacing the counterflashing. The displaced counterflashing has further damaged the parapet membrane at the corner.

Non-destructive moisture readings indicated the presence of moisture beneath the MB membrane in multiple locations. Water seeping out from beneath the membrane was also observed. CES performed an IR scan with the use of a drone to further access the presence of water/moisture beneath the membrane, which displayed multiple areas of moisture. CES also performed a core sample of the roofing system to further confirm the IR scan. Water was present and a probe moisture reading detected 23.8% moisture between membrane layers. The insulation beneath the membranes was saturated and maxed-out the moisture meter to the "Wet" indicator and "Hi" percentage reading.

CES assessed the low slope roof framing and deck from within the attic space. CES observed water damage at the roof deck, subdeck, tapered edge shims, and roof joists. The water damaged roof deck and subdeck has deteriorated and fallen to the ceiling joists in multiple locations. CES also observed termite damage in at least one location. Some prior repairs have been performed. The passive attic vents on the east and west elevations do not appear to be storm-resistant.

The steep slope composite shingle roofing systems weathered the hurricane well with little appreciable damage. CES observed windborne debris damaged and displaced shingles at the south elevation. Windborne debris damage was observed at the cupola siding and louvers and the roof dormer vents. Sealant adhesion loss was also noted at the ridge tiles and roof flashings. The wind gusts created by a hurricane exert intermittent forces onto the roofing systems, buffeting the components, seals, and flashings.

Water penetration was reported at the majority of the window systems throughout the building, leading to damages to the interior finishes. Water intrusion was not reported during Hurricane Zeta a year prior. CES observed aged sealants and a lack of weatherstripping at the window frames and sashes. The existing window systems predate water resistance testing and ratings and are likely not capable of resisting the conditions experienced in the storm event. Sash misalignment, broken panes, and loose glazing has been reported throughout the building. The wind gusts created by a hurricane exerts intermittent forces onto the window systems and glazing, buffeting the glass and compromising the seals. These breaches allow the infiltration of hurricane wind pressure and rain. Prior observations, reports, and moisture mapping are consistent with wind driven rain intrusion at the window openings.

The brick masonry walls at both sections of the property are reportedly four-wythe thick. As with any historic building, the bricks and mortar of the masonry system are heavily aged. Though heavily aged, the masonry systems appear to be structurally sound. CES observed mortar cracking and some mortar displacement throughout the building. Cracked and displaced bricks were noted in a few isolated areas. Repointing of mortar appears to have been performed during the maintenance of the building, though much of this repointed mortar has also cracked and become displaced. CES also observed the use of sealant to remediate the aged mortar, which is a practice CES does not recommend.

CES observed disengaged fasteners and water damage at the penthouse siding. The DEFS coating at the basement and the east entry stoop is cracking, delaminating, and displaced. The wind pressure and rain have exploited these conditions making them worse. The north entry door appears to be racked and no longer sets flush in the door frame. CES also noted grade terminating directly to the basement door threshold on the west elevation, providing a path for surface water to penetrate into the basement.

Most of the interior finishes had been remediated prior to CES observations. Extensive water damages had been reported to the interior finishes around wall openings, roof penetrations, and roof to parapet transitions. Some instances of water damages to interior finishes resultant of water penetration through the masonry wall have also been reported. These reported damages are consistent with storm related wind driven rain. CES observed water staining and cracking of the interior coating at the basement and the roof access stairwell, which are also consistent with storm related wind driven rain.

Recommendations:

CES suggests an analysis be performed on the cost to repair versus the cost to replace the low slope roof. In addition, the observed damages to the rooftop equipment, scuppers, and flashing are consistent with hurricane damages. This remediation should be considered resultant of the hurricane. Damages to the adjacent materials should be addressed accordingly, including those observed from within the attic space, the insulation, and any other damages uncovered in the remediation process. All wet insulation must be removed and replaced. All trapped moisture must be evacuated and the materials dried prior to MB membrane installation.

Moisture readings, IR scans, and core samples confirm multiple areas of moisture beneath the roofing membranes. Extenuating conditions in heavy rainfall likely exceeded the performance capabilities of the roof drainage system leading to water penetration. The moisture trapped between the roof deck and the roofing membranes will degrade the composition of the decking and insulation and the adhesion of the membrane layers, increasing the risk of roofing system uplift damage and displacement in subsequent storms of lesser strength. Due to the observed presence of water between membrane layers and the extent of moisture beneath the membranes, CES recommends the removal of all existing low slope roof and parapet membranes and insulation and the installation of new MB membrane, as opposed to recovering the existing.

The attic vents and the voids in roof decking have allowed the storm wind pressure to exert uplift force onto the roof and parapet membranes, leading to some of the conditions observed. MB membrane is intended to be supported and adhered to the decking. Though some of the water and termite damages observed from the attic space likely predate the storm event, the remediation of these conditions is necessary in preparation of the installation of new MB membrane.

The disengaged fasteners at the stairwell penthouse siding should be replaced and the fastener holes abandoned, installing the new fastener in a new location bearing in mind fastener and material edge distance spacing. All fasteners and abandoned fastener holes should be sealed. The winds of Hurricane Ida are capable of buffeting the siding leading to fastener disengagement. Water damaged siding and failed sealants should be removed and replaced. The damaged parapet coping counterflashing should also be removed and replaced.

The displaced and damaged shingles at the steep slope roof should be replaced. It may be possible this remediation could be performed with isolated repairs. Windborne debris damage at the cupola should be repaired and the windborne debris damaged dormer vent should be replaced. Any water damaged adjacent materials uncovered by the process of remediation should be addressed. Remove and replace all failed sealant.

Hurricane wind gusts buffeting of the window systems and glazing has led to sealant failure at the glazing and window system perimeter. All broken glass has been removed and replaced. All failed sealant should be thoroughly removed and replaced. The loose/deglazed lites should be removed and re-installed. Adjustments should be performed to address misaligned sashes. CES also recommends weatherstripping be installed to further inhibit water intrusion. Though some of the observed conditions likely predate the storm event, the wind driven rain of the hurricane exploited these conditions, worsening them, and providing pathways for wind driven rain to damage the interior finishes.

As with any historic building, the bricks and mortar of the masonry wall system are heavily aged. Though heavily aged, the masonry systems appear to be structurally sound. Cracked and displaced bricks should be removed and replaced with like kind. The mortar should be repointed throughout the building, including areas of past repointing attempts. Though some of the observed mortar conditions predate the storm event, the wind driven rain of the hurricane exploited these conditions, worsening them, and providing pathways for wind driven rain to damage the interior finishes. CES does not recommend using sealant to remediate mortar joints and all prior uses of sealant for this purpose should be removed and repointed with mortar. CES also recommends considering the application of a clear coating to the masonry walls once mortar remediation has been completed to further inhibit water intrusion.

Mortars used in historical buildings are often more lime-rich and softer than current mortar mixtures. When remediating mortar on historic buildings, it is imperative to perform a mortar analysis to source a compatible mortar. The mortar must match in color, texture, and tooling and must be compatible with the softness and permeability of the existing mortar. It is likely that existing repointed areas of mortar are failing due to incompatibility.

Cracked, delaminated, and displaced DEFS should be ground back and replaced. Though some of the observed conditions likely predate the storm event, the wind driven rain of the hurricane exploited these conditions, worsening them. Flaking and water damaged interior paint in the basement should be removed and replaced. CES recommends the application of a negative-side waterproofing be considered for the basement interior walls to further inhibit water intrusion. The racked north entry door should be replaced. Grading should be performed to limit the intrusion water into the basement doorways.

The majority of interior finishes had been replaced at the time of CES observations. The prior observations, photographs, reports, and moisture maps of these damaged areas are consistent with the wind driven rain damages resultant of water intrusion from the above-mentioned roofing and exterior wall damages and conditions. All of the exterior fencing had been replaced at the time of CES observations and the reported damages are consistent with hurricane wind damage. These remediations should be considered resultant of the storm event.

The subject property is a nationally registered "Historical Place" under its original name McDonough School #6 and is within the Uptown New Orleans Historical District. The City of New Orleans requires that an applicant obtain a Certificate of Appropriateness (CofA) prior to beginning work on the exterior of a designated Landmark or within the bounds of a local Historic District (the subject property is both). The Historic District Landmarks Commission (HDLC) must review and approve all exterior work to obtain a CofA. This requirement may add time and cost to the proposed remediation. Beyond this, all remediation should be performed by contractors licensed in the State of Louisiana and in accordance with industry standards and Manufacturers' recommendations.

A follow up inspection should be scheduled to determine if the repairs and remediation have rectified all the damages/conditions related to Hurricane Ida. Further (possibly destructive) assessment may be necessary if the water penetration persists.

Conclusion:

The above observed damages are consistent with storm related windborne debris damage and wind pressure damage. These damages also allowed the penetration of wind driven rain causing subsequent damages to the interior finishes and furnishings. In some cases, as in the low slope roof, full replacement will likely be less expensive and time consuming than performing isolated repairs.

All remediation should be performed by contractors licensed in the State of Louisiana and in accordance with industry standards and Manufacturers' recommendations. If exterior work is proposed on a designated Landmark or within the bounds of a local Historic District (the subject property is both), the City of New Orleans requires that an applicant obtain a Certificate of Appropriateness (CofA) prior to beginning work. The Historic District Landmarks Commission (HDLC) must review and approve all exterior work to obtain a CofA. This requirement may add time and cost to the proposed remediation.

A follow up inspection should be scheduled to determine if the repairs and remediation have rectified all the damages/conditions related to Hurricane Ida. Further (possibly destructive) assessment may be necessary if water penetration persists.

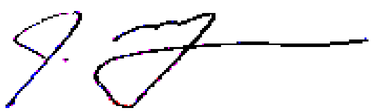
No calculations have been performed to determine the adequacy of the original construction. It is possible that other defects or deficiencies exist that were not accessible or visible during these assessments. Problems may develop with time, which are not readily evident at the time of the assessments. The opinions and recommendations in this report should not be construed in any way to constitute a warranty or guarantee regarding the current or future performance of any system identified. The report does not contain all the photographs taken during the observations and are not intended to quantify conditions. Photographs on the following photo pages are exemplary and are not intended to infer that they represent the only instances of a condition observed. The photographs in this report are used to point out various conditions observed and provide clarity for written descriptions; but they are not intended to quantify conditions.

This report is for the sole use of CES' client and not to be copied or distributed without CES' express written consent. The report should be read in its entirety. Any verbal comments made before, during or after the course of the investigation were made as a courtesy and are not to be considered a part of this report.

The observations, findings, and conclusions within this report are based on our professional judgment, information obtained during the course of this assessment, and subsequent documentation and photographs provided by the building management and are based on the scope of work authorized by the Client with respect to the location referenced above. CES reserves the right to adjust our opinions, accordingly, should new information be provided.

Should there be any questions, please do not hesitate to contact us.

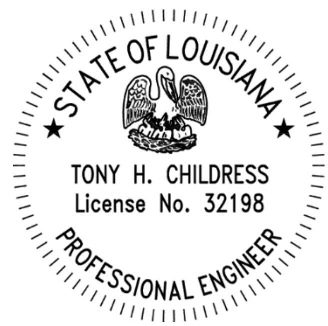
Respectfully,



Joe Murdter
Consultant

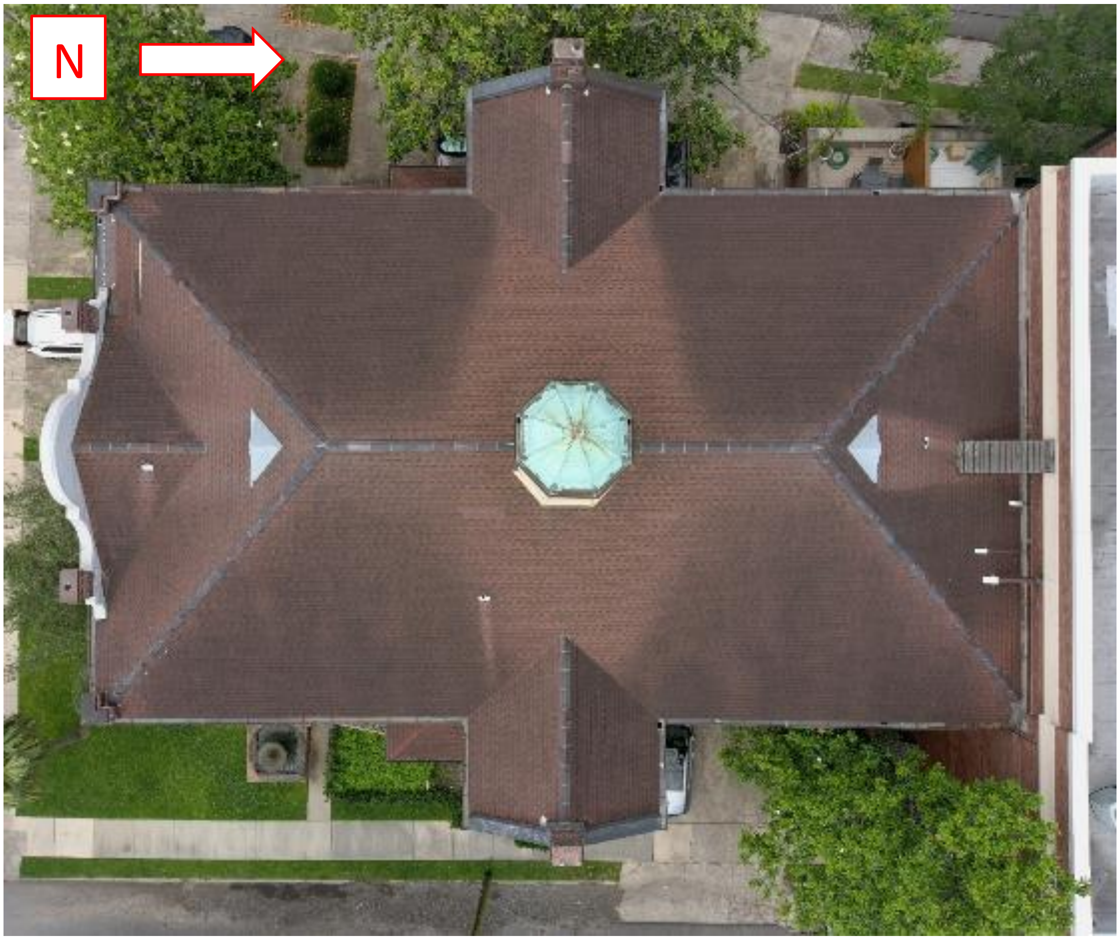
Reviewed by:

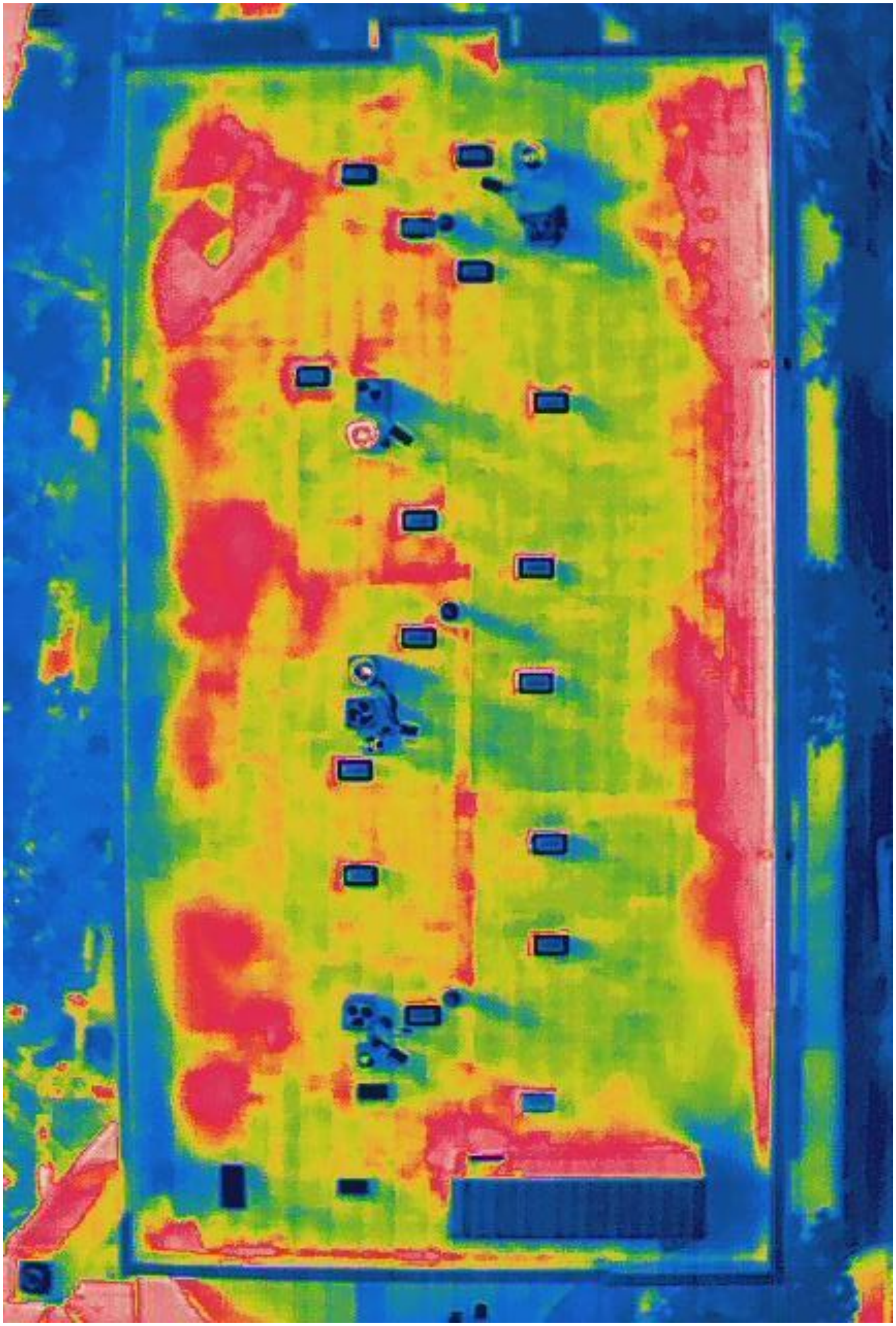
Tony Childress, P.E.
Owner / Principal



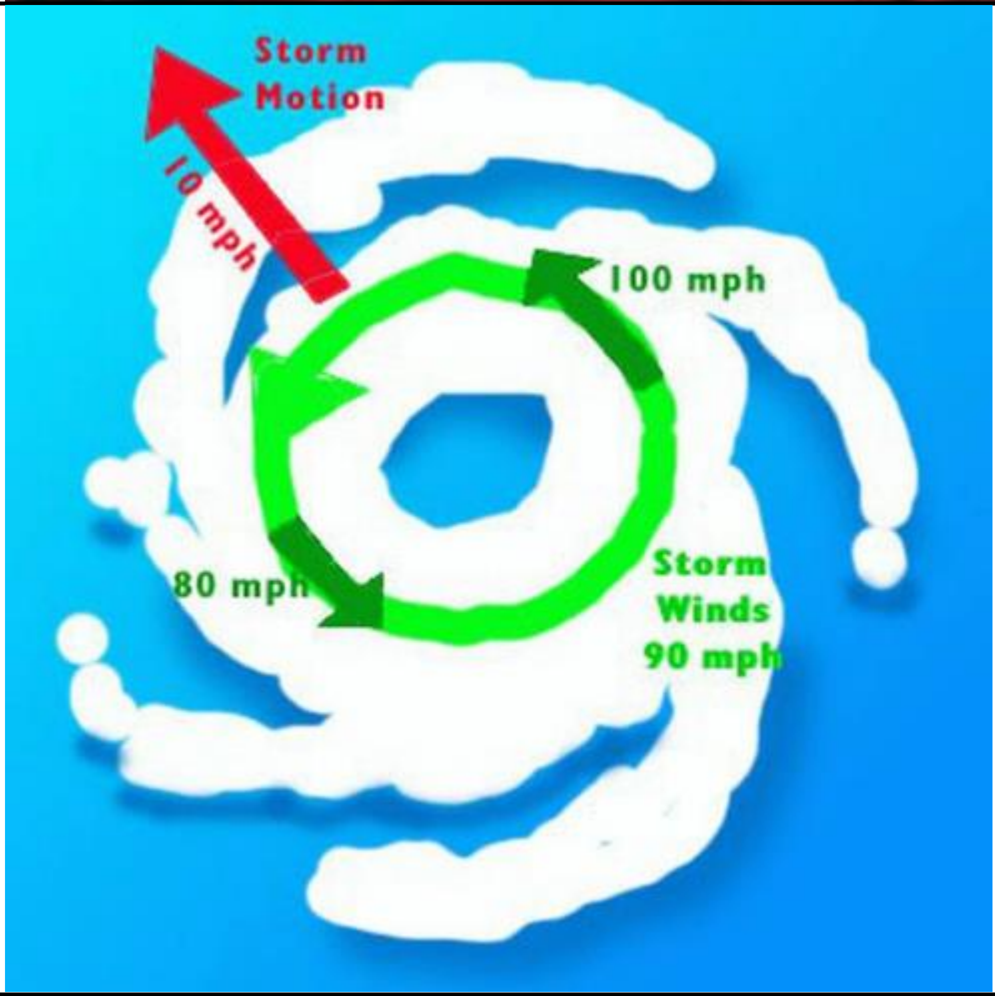
References:

Reference 1: Overview of the property labeling elevations and roof systems for use in this report.	

Reference 2: Overhead view of the low slope and steep slope roofs, respectively.	 

Reference 3: Imagery from CES drone IR scan of the low slope roof.	

Reference 4: NOAA Weather Prediction Center hurricane tracking map. Below is the landfall area with the subject property approximate location displayed (*red circle*).

Reference 5: The four quadrants of a hurricane in the northern hemisphere. The "Dirty Side" is the Front Right and Back Right (*Illustration by WFTV-ABC Orlando*).	
Reference 6: The Front Right quadrant on the "Dirty Side" combines the wind speed and the storm motion (*Illustration by Action News 5 – NBC Memphis*).	

Reference 7: Local Climatological Data Hourly Observations for KMSY, excerpts and Maximum Short Duration Precipitation figures.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Current Location: Elev: 4 ft. Lat: 29.9969° N Lon: -90.2775° W
Station: NEW ORLEANS AIRPORT, LA US WBAN: 72231012916 (KMSY)

Local Climatological Data
Hourly Observations
August 2021
Generated on 11/17/2021

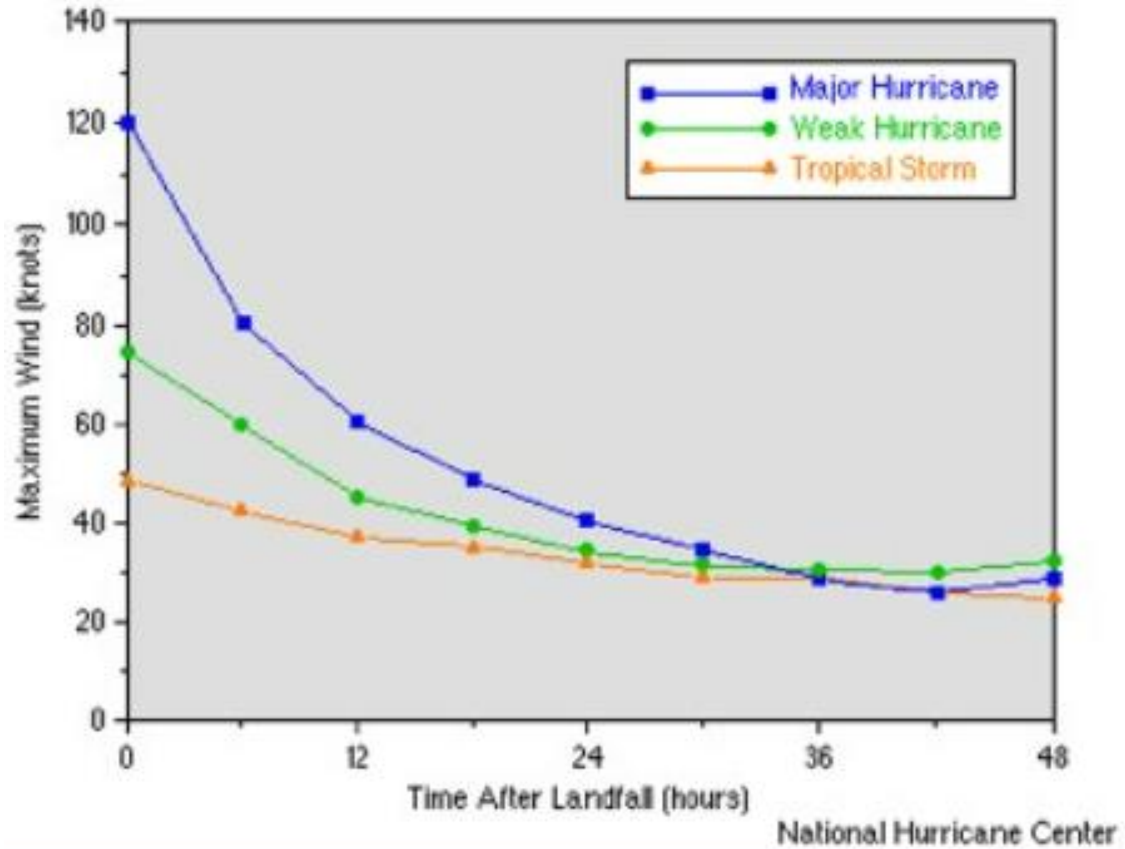
National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Date	Time (LST)	Station Type	Sky Conditions	Visibility	Weather Type (see documentation) AU | AW | MW	Dry Bulb Temp (F)	Dry Bulb Temp (C)	Wet Bulb Temp (F)	Wet Bulb Temp (C)	Dew Point Temp (F)	Dew Point Temp (C)	Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (InHg)	Press. Tend	Net 3-Hr Change (InHg)	Sea Level Press. (inHg)	Report Type	Precip Total (in)	Altimeter Setting (InHg)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
29	1653	7		0.25	|RA|	77	25.0						56	080	83				29.02	FM-15	0.26	29.01
29	1712	7	9	0.00	|RA|	75	23.9													FM-16	0.13	28.94s
29	1720	7	9	0.25	|RA|	75	23.9													FM-16	0.20	28.93s
29	1730	7		0.50	|RA|	75	23.9													FM-16	0.24	28.92s
29	1751	6		0.25																FM-16		
29	1753	7		0.25	|RA|	75	23.9										8	+0.31		FM-15	0.45	
29	1800	4	8	0.25	|RA|	75	23.9			32s	32ss	21	0	000			8	+0.31		FM-12		
29	1819	7	7	0.50	|RA|	75	23.9													FM-16	0.43	
29	1853	7		0.50	|RA|	75	23.9													FM-15	0.93	
29	1916	7		1.00	|RA|	75	23.9						56	140	85					FM-16	0.14	
29	1923	7		0.50	|RA|	75	23.9						62	140	86					FM-16	0.19	
29	1937	7		0.25	|RA|	75	23.9						62	150	90					FM-16	0.42	
29	1951	6		0.25									56	150	77					FM-16		
29	1953	6		0.25									57	150	77					FM-15	0.79	
29	2005	6		0.75									60	150	85					FM-16		
29	2012	6		1.00									60	150	86					FM-16		
29	2019	6		0.75									52	160	77					FM-16		
29	2026	6	FEW:02 8 BKN:07 15 OVC:08 20	1.50	+RA:02 |RA |RA	75	23.9						51	160	74	29.16				FM-16		29.18
29	2051	6	BKN:07 16 OVC:08 21	2.00	-RA:02 |RA |RA	75	23.9						44	160	70	29.24				FM-16		29.26
29	2053	6	BKN:07 16 OVC:08 21	1.75	-RA:02 |RA |RA	76	24.4						51	160	70	29.23	3	-0.40	29.26	FM-15	0.29	29.25
29	2139	6	FEW:02 14 OVC:08 20	2.50V	RA:02 |RA |RA	76	24.4						39	170	67	29.33				FM-16		29.35
29	2150	6	FEW:02 14 OVC:08 20	6.00	-RA:02 |RA |RA	77	25.0						43	170	56	29.36				FM-16		29.38
29	2153	6	BKN:07 20 OVC:08 27	4.00	-RA:02 |RA |RA	77	25.0						41	180	56	29.36			29.39	FM-15	0.30	29.38

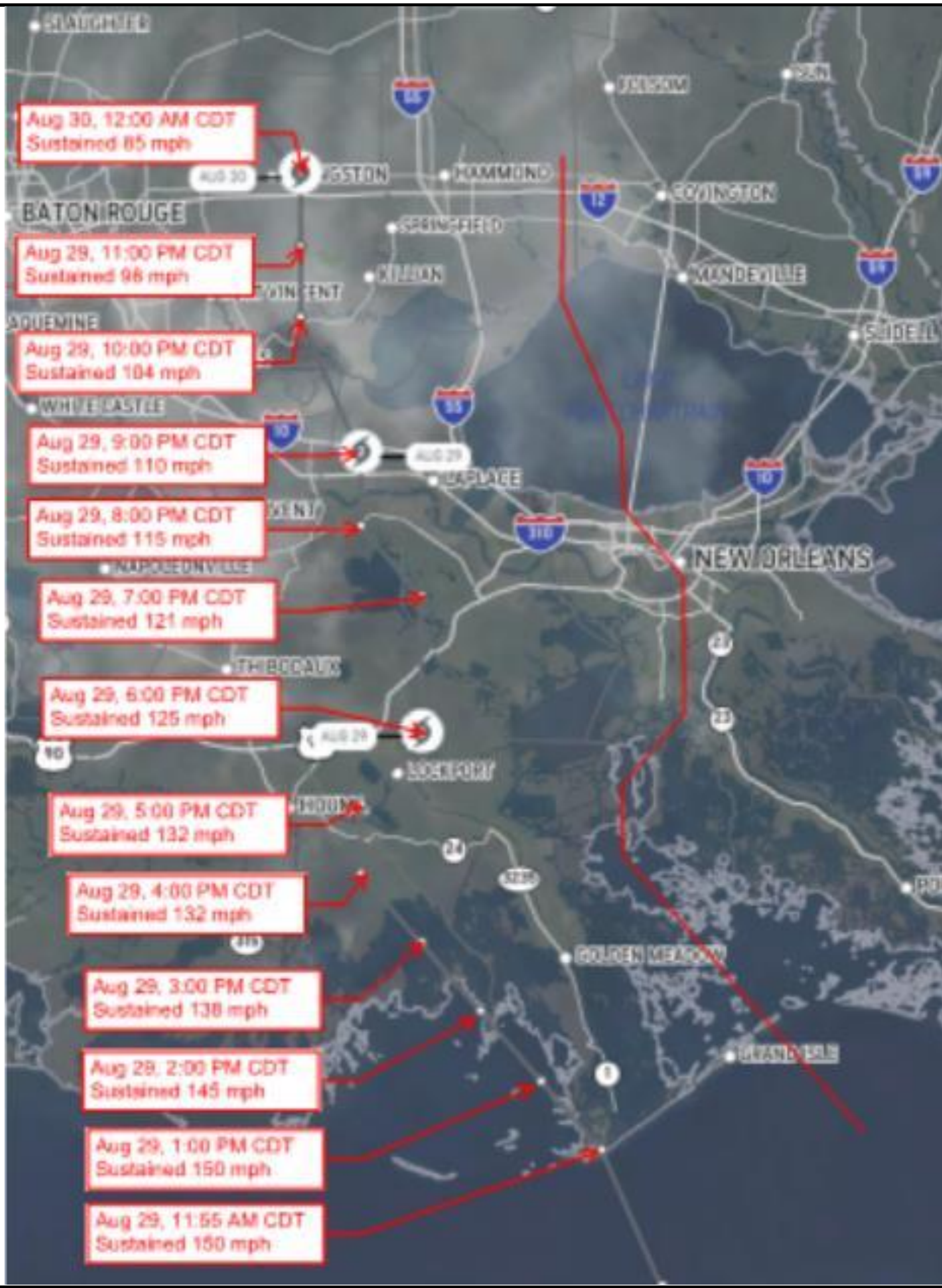
Maximum Short Duration Precipitation

Time Period (Minutes)	5	10	15	20	30	45	60	80	100	120	150	180
Precipitation (inches)	0.13	0.24	0.34	0.41	0.60	0.77	0.94	1.13	1.37	1.72	1.98	2.20
Ending Date Time (yyyy-mm-dd hh:mi)	2021-08-29 19:58	2021-08-29 19:59	2021-08-29 19:58	2021-08-29 20:03	2021-08-29 19:59	2021-08-29 20:04	2021-08-29 18:53	2021-08-29 19:03	2021-08-29 20:00	2021-08-29 19:59	2021-08-29 20:04	2021-08-29 20:04

Reference 8: National Hurricane Center graph of average decay of historical hurricanes.



Reference 9: Hurricane Ida path with approximately 26 miles to the ease (the distance between the hurricane path and New Orleans) labeled by a red line.



Reference 10: Selected meteorological data displayed in the National Hurricane Center Tropical Cyclone Report for Hurricane Ida, including the footnote.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm Tide (ft)[d]	Estimated Inundation (ft)[e]	Total rain (in)
	Date/time (UTC)	Press. (mb)	Date/time (UTC)[a]	Sustained (kt)[b]	Gust (kt)				
Green Canyon 338 (KGRY) (27.63N 90.44W) (18m)	29/1030	1002.7	29/0550	35	47				
Mississippi Canyon 311A (KMDJ) (28.64N 89.79W) (90m)			29/1150	83[i] (2-min)	102[i]				
Main Pass 140B (KMIS) (29.30N 88.44W) (85m)			29/0915	45 (2-min)	62				
Main Pass 289C (KVKY) (29.26N 88.44W) (115m)			29/0855	51 (2-min)	63				
LA Offshore Oil Port (LOPL1) (28.89N 90.02W) (58m)	29/1536	934.1[i]	29/1231	74[i] (2-min)					
United States									
Louisiana									
International Civil Aviation Organization (ICAO) Sites									
Vidalia (K0R4) (31.56N 91.51W)	30/0855	997.3	30/0855	24	37				0.10
New Orleans (K7N0) (29.95N 90.08W)	29/2303	988.5[i]	29/2300	27[i]	49[i]				
New Iberia (KARA) (30.03N 91.88W)	30/0253	1001.8	30/0053	24	39				0.59
Reserve (KAPS) (30.09N 90.58W)	30/0135	959.4	30/0315	51[i]	69[i]				8.87
Slidell (KASD) (30.35N 89.82W)	30/0048	998.7	30/0355	38[i]	60[i]				10.78
Baton Rouge (KBTR) (30.54N 91.15W)	30/0453	988.4	30/0050	34[i]	55[i]				1.33
Bogalusa (KBXA) (30.81N 89.86W)	30/0555	1002.7[i]	30/0515	31[i]	45[i]				
Galliano (KGAO) (29.44N 90.26W)	29/1915	959.4	29/2035	61[i]	85[i]				
Hammond (KHDC) (30.52N 90.42W)	30/0104	994.2[i]	30/0044	30[i]	49[i]				
New Roads (KHZR) (30.72N 91.48W)	30/0715	994.9	30/0335	28	38				
Lafayette (KLFT) (30.20N 91.99W)	30/0653	1001.8	291953	26	39				2.10
Boothville (KLNQ) (29.44N 90.26W)	30/0909	1006.1[i]	30/0909	21[i]	40[i]				
New Orleans (KMSY) (29.98N 90.25W)	29/2355	977.1	30/0105	56[i]	78[i]				4.73
New Orleans (KNBG) (29.84N 90.02W)			30/0155		51[i]				
New Orleans (KNEW) (30.04N 90.03W)	29/2253	990.4[i]	29/2216	57[i]	75[i]				

[a] Date/time is for sustained wind when both sustained and gust are listed.
[b] Except as noted, sustained wind averaging periods for C-MAN and land-based reports are 2 min; buoy averaging periods are 8 min.
[c] Storm surge is water height above normal astronomical tide level.
[d] Storm tide is water height above the North American Vertical Datum of 1988 (NAVD88).
[e] Estimated inundation is the maximum height of water above ground. For NOS tide gauges and USGS water level sensors, the height of the water above Mean Higher High Water (MHHW) is used as a proxy for inundation. Values marked with two asterisks (**) are from non-tidal stations, and the water level is referenced above Mean Sea Level (MSL).
[i] Incomplete record. Peak values may have exceeded the reported value.

Reference 11: The NOAA weather data for New Orleans International Airport.

8/30/2021 National Weather Service : Observed Weather for past 3 Days : New Orleans, New Orleans International Airport

weather.gov

Weather observations for the past three days

New Orleans, New Orleans International Airport

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metric

Date	Time (cdt)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (°F)				Relative Humidity	Wind Chill (°F)	Heat Index (°F)	Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour					altimeter (in)	sea level (mb)	1 hr	3 hr	6 hr
								Max.	Min.								
30	16:53	SW 18 G 30	10.00	Overcast	SCT031 BKN049 OVC080	84	NA			NA	NA	81	29.67	1005.1			

8/30/2021 National Weather Service : Observed Weather for past 3 Days : New Orleans, New Orleans International Airport

		G 41		and Breezy	OVC044												
30	00:53	S 35 G 45	9.00	Light Rain and Windy	FEW025 OVC042	79	NA	78	75	NA	NA	77	29.54	1000.7	0.03		2.52
29	23:53	S 40 G 55	8.00	Light Rain and Windy	OVC020	79	NA			NA	NA	77	29.47	998.4	0.13		
29	19:53	NA	0.50	Heavy Rain	OVC007	75	NA			NA	NA	NA	28.94	980.2	0.94		
29	18:53	NA	0.25	Heavy Rain	BKN008 OVC013	75	NA	79	75	NA	NA	NA	28.85	977.3	0.40		1.53
29	17:53	E 56 G 83	0.25	Heavy Rain and Windy	OVC010	77	NA			NA	NA	75	29.01	982.8	0.27		

Photographs

Photo 1: An example of windborne debris impact damage as observed at the low slope roof MB membrane (*red ellipse*).	
Photo 2: An example of windborne debris impact damage as observed at the low slope roof MB membrane (*red ellipse*).	

Photo 3: An example of windborne debris impact damage as observed at the low slope roof MB membrane (*red ellipse*). Note the proximity to an A/C unit and the resemblance of some of the damage and the foot of the A/C unit (*red arrows*) suggesting this damage was resultant of the A/C unit displacement.	
Photo 4: An example of windborne debris impact damage as observed at the low slope roof parapet MB membrane (*red ellipses*).	

Photo 5: An example of windborne debris impact damage as observed at the low slope roof parapet MB membrane (*red ellipses*).	
Photo 6: An example of the blisters observed at the low slope roof MB membrane (*red ellipse*).	

Photo 7: An example of the blisters observed at the low slope roof MB membrane (*red ellipse*).	
Photo 8: An example of the blisters observed at the low slope roof parapet MB membrane (*red ellipse*). Note windborne debris impact marks at the blister (*red arrows*).	

Photo 9: An example of the blisters observed at the low slope roof parapet MB membrane (*red ellipse*). Note windborne debris impact mark near the blistering (*red arrow*).	
Photo 10: An example of prior repairs observed at the low slope roof system (*red ellipse*).	

Photo 11: An example of unadhered laps at the low slope roof MB membrane (*red arrow*).	
Photo 12: An example of unadhered laps at the low slope roof parapet MB membrane (*red arrow*).	

Photo 13: A view of the displaced section of parapet counterflashing (*red arrow*). Note the displacement of the counterflashing has damaged the parapet MB membrane (*red ellipse*).	
Photo 14: A view of the impact damage observed within a few feet of the displaced counterflashing (*red ellipse*).	

<table>
<tr>
<td>Photo 15:
A displaced A/C unit (red arrow). It is unclear the location the displaced unit came to rest and whether it was placed in this location to be stored temporarily. Note the damaged and displaced counterflashing (red ellipse) in the background displaying the proximity of the damage to the displacement.</td>
<td></td>
</tr>
<tr>
<td>Photo 16:
An example of impact damage (red ellipse) observed at a scupper in close proximity to the surrounding trees.</td>
<td></td>
</tr>
</table>

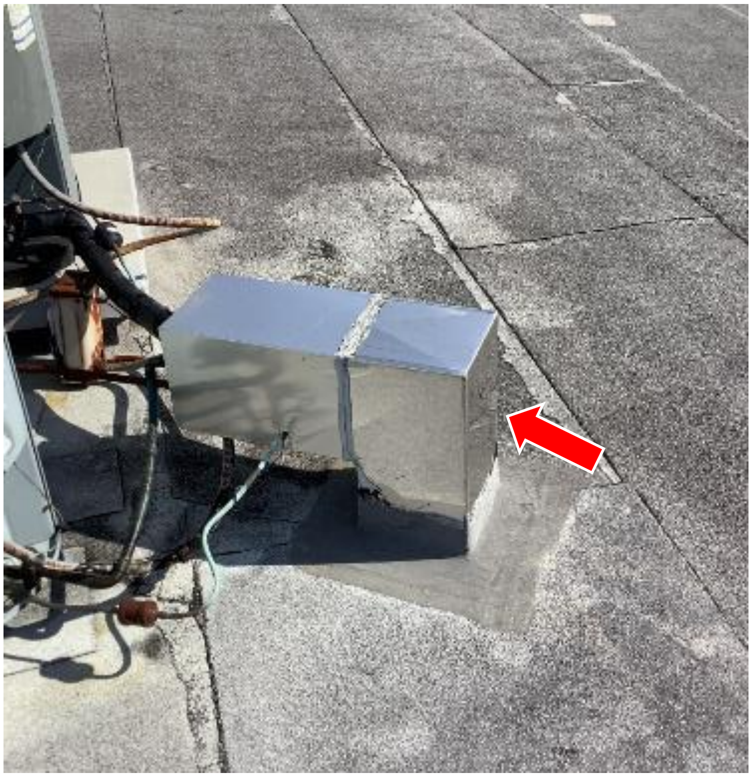
Photo 17: A view of the damaged skylight (*red ellipse*) that has been temporarily repaired with tape.	
Photo 18: A recently replaced roofing line shack (*red arrow*) observed at the low slope roof.	

Photo 19: An example of the wind buffeting of rooftop equipment that compromised the aging sealant (*red ellipse*).	
Photo 20: An example of a blister observed adjacent to the new roofing line shack (*red ellipse*). Note that water was visible (*red arrow*) when pressing on the blister.	

Photo 21:
A close-up view of moisture meter reading in the field of the low slope roof membrane.

Photo 22:
Elevated moisture was measured by the moisture meter at a prior repair.

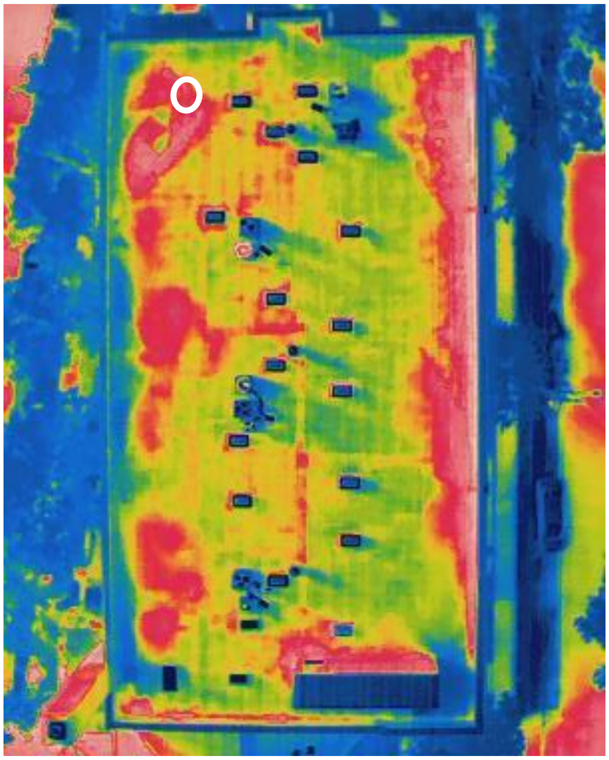
Photo 23: Elevated moisture was measured by the moisture meter adjacent to the east parapet.	
Photo 24: The drone IR scan performed by CES displayed multiple areas of moisture trapped beneath the MB membrane. The approximate area of the roof core sample is displayed (*white ellipse*).	

Photo 25:
The location of the core sample as viewed from the northwest corner of the low slope roof (*red ellipse*).

Photo 26:
Removal of the upper MB layers displayed water beneath the upper layers of membrane (*red arrows*).

Photo 27:
Removal of the upper MB layers displayed moisture on the underside of the upper layers (*red ellipses*).

Photo 28:
The moisture meter measured the insulation beneath the layers of membrane to be wet, its highest moisture reading.

Photo 29:
An example of the water damage and degradation of the low slope subdeck (*red ellipse*). Note the degradated subdeck hanging from the roof joists (*red arrows*).

Photo 30:
An example of displaced water damaged and degradated subdeck amassing on the ceiling joists.

Photo 31: An example of water damaged tapered edge shim beneath the subdeck (*red arrow*).	
Photo 32: An example of a damaged tapered edge shim that has become displaced beneath the subdeck (*red ellipse*).	

<table>
<tr><td>Photo 33:
An example of water damaged roof joists (red ellipses).</td><td></td></tr>
<tr><td>Photo 34:
An example of water damaged roof joists (red ellipses).</td><td></td></tr>
</table>

Photo 35: An example of termite damage observed to the low slope roof framing and subdeck(*red ellipse*).	
Photo 36: An example of prior repairs to the subdeck observed at the low slope roof (*red ellipse*). CES noted plywood (*red arrows*) and sheet metal (*blue arrow*) repairs.	

Photo 37: An example of prior repairs to the subdeck observed at the low slope roof using plywood (*red ellipse*).	
Photo 38: An example of an attic vent as observed at the east and west elevations of the north addition (*red ellipse*).	

Photo 39: An example of an attic vent as observed at the east and west elevations of the north addition, as viewed from the interior. Note that daylight was visible at all sides of the louver (*red ellipses*) and no flashing was observed to control water intrusion (*red arrow*).	
Photo 40: Storm damaged and displaced shingles observed at the south facing steep slope roof (*red ellipse*).	

Photo 41: Storm damaged shingles observed at the south facing steep slope roof (*red ellipse*).	
Photo 42: Storm damaged dormer vent at the south facing steep slope roof (*red ellipse*).	

Photo 43: The cupola at the steep slope roof displays windborne debris damages (*red ellipses*) at the louvers and base.	
Photo 44: An example of the sealant failure observed at the steep slope roof ridge tiles (*red arrow*)	

Photo 45: An overview of the typical windows at the original building (*red arrows*) at the south end of the property.	
Photo 46: An overview of the typical windows at the east and west elevations of the north addition (*red arrows*).	

Photo 47: An overview of the typical windows at the east and west elevations of the north addition (*red arrows*).	
Photo 48: Weather stripping was not observed at the window sashes, sills, or tracks (*red ellipse*).	

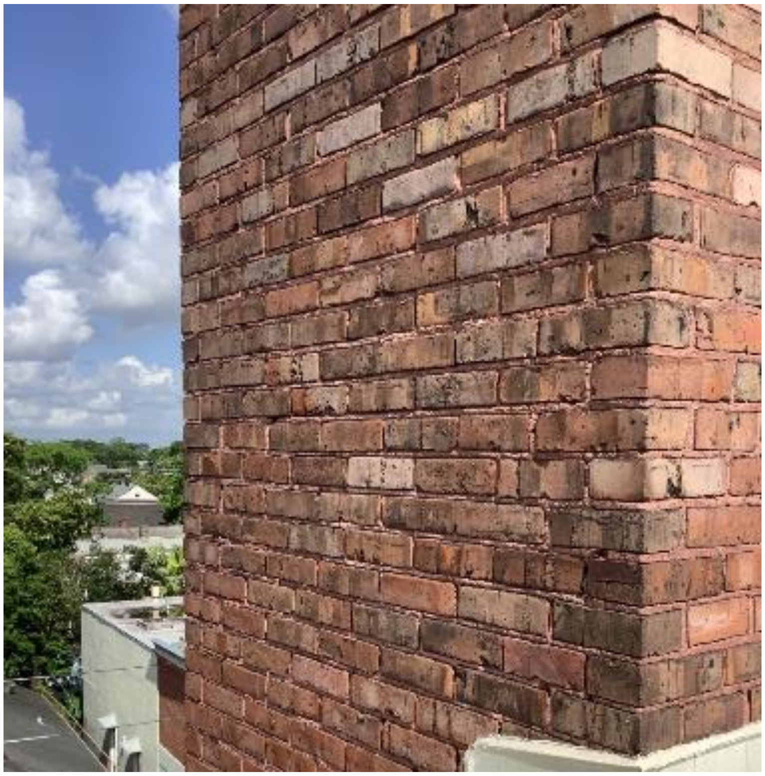
Photo 49: An example of mortar degradation observed at the chimney stack.	
Photo 50: An close-up view of mortar degradation observed at the chimney stack (*red ellipse*).	

Photo 51: An example of mortar degradation and brick cracking and deflection observed above a window (*red ellipse*).	
Photo 52: An example of degradation of re-pointed mortar (*red ellipse*).	

Photo 53: Displaced flashing at the building transition to the parapet (*red ellipse*).	
Photo 54: An example of a disengaged fastener at the stairwell penthouse siding (*red arrow*).	

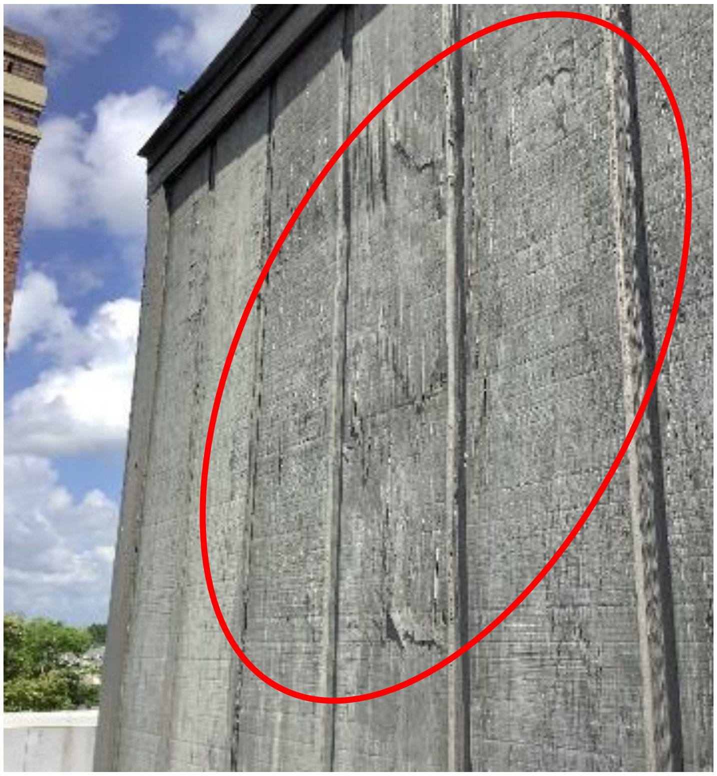
Photo 55: An example of water damage observed at the stairwell penthouse siding (*red ellipse*).	
Photo 56: An example of water damage observed at the stairwell penthouse siding (*red ellipse*).	

Photo 57: An example of cracked and delaminating DEFS coating (*red ellipse*).	
Photo 58: An example of displaced DEFS coating (*red ellipse*).	

Photo 59: An example of delaminating DEFS coating (*red ellipse*).	
Photo 60: An example of water damage to the interior wall finish at the basement gym (*red ellipses*).	

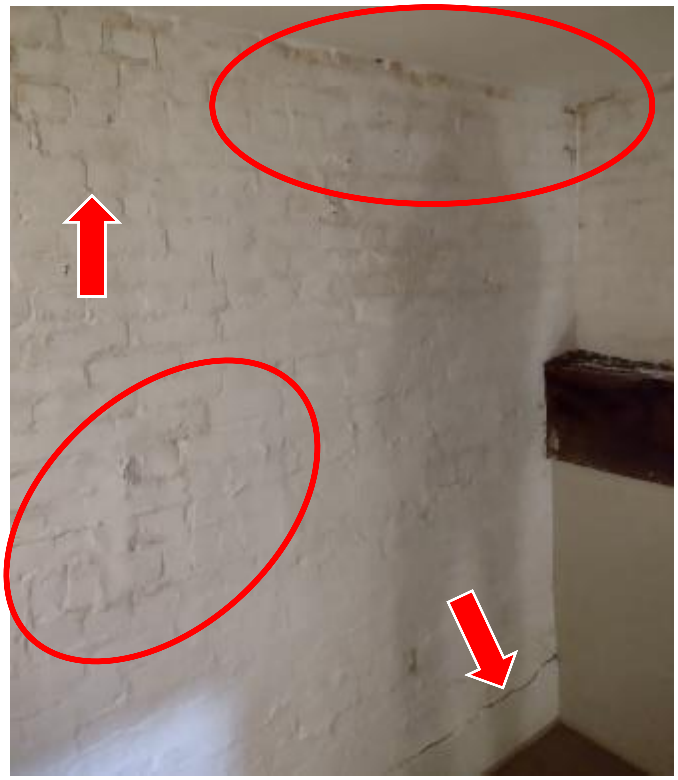
Photo 61: An example of water damage to the interior wall finish at the basement gym (*red ellipse*).	
Photo 62: An example of water damage (*red ellipses*) and cracking (*red arrows*) observed at the roof access stairwell interior wall finish.	

Photo 63: The north entry door has been racked and no longer sets flush within the door frame (*red ellipse*).	
Photo 64: The north entry door has been racked and no longer sets flush within the door frame (*red ellipse*).	

Photo 65: The threshold of the second door from the south on the west elevation abuts directly to grade (*red ellipse*).	
Photo 66: At the time of CES observations, the fencing had been replaced at the property (*red arrow*).