PALOS VERDES ENGINEERING
CIVIL AND STRUCTURAL CONSULTING

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March 4, 2025

F.N. 3-25-0110

[redacted]

Subject: Structural Inspection of Single-Family Residence Foundation
1212 Granvia Altamira, Palos Verdes Estates, CA 90274

## ASSIGNMENT

Pursuant to your request, we have personally inspected the subject single-family residence and detached garage to determine the structural integrity of the foundation. We base our conclusions on visual observations of accessible interior, exterior, attic, and underfloor areas. No destructive or subsurface testing was performed by our firm, that being outside the scope of this report. Our field investigation was conducted on March 4, 2025.

## HISTORY

LA County Assessor's website lists the single-family residence as being 3,001 sq feet, having 4 bedrooms, 4 bathrooms, and built in 1962. The house is conventionally framed with lumber, has a raised foundation at the house, a slab on grade foundation at the garage, and has exterior wall coverings of wood siding and stucco. The house was reported to have been vacant for the past three years.

## OBSERVATIONS & DISCUSSIONS

- Cracks are occurring on various interior surfaces. Most interior cracking occurs near the north side of the residence. The cracks appear in various ways (stair step cracks, vertical cracks, diagonal cracks, horizontal cracks, etc) at the interior drywall surfaces. Cracks were visible in the rooms with wallpaper, but more cracks will be revealed when the wallpaper and wood paneling on interior surfaces are removed.
    - Wall and ceiling surfaces are covered with drywall or plaster and both are a relatively brittle product. Minor stresses from wall/foundation movement/settlement will cause cracks in these brittle surfaces.

- Various roof rafters have separated from the ridge board in the attic.
    - The roof and foundation act as a system in a house. If the foundations move/settle, that will cause the roof to move/settle.

- Rodent dropping and wood destroying insect frass was observed in the attic.
    - Both of these pests should be removed from the property to prevent future damage.

- The wall separating the kitchen and dining room was indicated that it may be removed. This wall does not extend all the way to the roof diaphragm/sheathing, so it is not considered a part of the lateral resisting system. It does support the roof and ceiling and to remove that wall would require a new beam and posts to replace that wall.

- The front porch has begun to sink and slope towards the house. Digital level readings measured 1/8 inch per foot of slope towards the house.
    - The porch sloping back towards the house can cause water intrusion to occur at the house foundations.

- The house and garage roof has been patched and repaired in the past. There are still signs of wood rot and other damaged wood members in the eaves.
    - Palos Verdes Estates used to prefer the look of concealed roof gutters where the gutter was hidden behind the fascia board. This led to water damage issues from poor waterproofing and bad gutter connections.

- The front concrete path leading to the porch has cracked and separated significantly in various locations.
    - This hardscape will need to be replaced to prevent a tripping hazard.

- The driveway is separating from the house on the north side of the property.

- The stucco was found to be cracked in various location around the perimeter of the residence. These cracks occur due to similar reasons as the drywall/plaster.

- The concrete retaining wall at the south side of the property is failing and is tilting significantly.

- The railroad tie retaining wall at the south side of the property has failed and is on its side.

- The northern side of the garage opening has significant leaning at the base tilting north.

- Large cracks have occurred in the garage slab leaving large separations and height differences.

- The house's original concealed gutters are still installed at the garage. This design should be revised to prevent future damage.

- Various rafters in the garage have begun separating from the ridge board, similar to the house rafters.

- Cat litter was observed at the crawlspace entrance.
    - Cat litter is a common temporary fix when soil has a moisture problem.

- Efflorescence was observed around the entire crawlspace.
    - Efflorescence is a salt deposit left on the concrete. Water is a polar molecule and will attract the salts in the concrete as it traverses from the wet side to the dry side. Once the briny solution reaches the "dry" side, the water will evaporate and leave the salt on the face of the footing.
    - Efflorescence is a good indicator of water intrusion issues. Water intrusion at a house with expansive soil can cause differential settlement in the foundation system. Water can also damage the integrity of the concrete footing. Footings are strengthened using steel reinforcing bars. When water traverses through the concrete, it can come in contact with the steel rebar and cause the rebar to oxidize/rust. Steel expands in size when it oxidizes and this can cause the surrounding concrete to spall off. Once the steel rusts beyond a certain point, the footing will need to be removed and replaced.

- Desiccation cracks were observed in the soil in the crawlspace.
    - Desiccation cracks occur in expansive soils. Water gets into the soil and will cause the soil to expand. The soil will then dry out and cause these cracks due to the high clay content in the soil. These cracks are indicative of expansive soil and this type causes differential settlement in homes.

- Vertical cracks were observed at various locations throughout the crawlspace. These cracks occurred near the front door, the front hallway, and along the west side of the residence.
    - These vertical cracks are indicative of foundation settlement. The vertical cracks have weakened the foundation system and will cause the house to continue to move until the foundations can be strengthened.

## CONCLUSIONS AND RECOMMENDATIONS

The house and garage were built on a transition lot. This would require taking soil from the higher side (south side) and placing it on the lower side (north side) so the house could be built on a single floor. The soil used in this type of grading was generally the onsite soil which is expansive soil. Removing the soil on the south side would have placed the foundations closer to suitable soil/bedrock for solid construction while the north side had more expansive/fill soil added which is not a stable base for the foundation.

The proper method for this type of repair is to perform a manometer survey of the interior floor surfaces to determine the extent of unevenness around the residence. This manometer survey will help provide information as to how much of the house and garage needs to be underpinned. The next step in the repair process would be to contact a geotechnical engineer to provide a soils report for the repair of the foundations. This soils report will tell the structural engineer how to design the foundations and what type of foundation will work for this property. The two types of foundation repair would be either a caisson and grade beam system, or a deepened trench footing. The former is used when bedrock/good soil is much lower than grade. Deepened trench footings are used when bedrock/good soil is closer to grade. The south side of the residence exhibited minimal signs of foundation movement versus the north side so the assumption would be that trenched footings can be used (this will need to be verified with a soils report for permitting purposes). Assumed trenched footing information can be estimated to be 3-4 feet wide x 6 feet deep with 4-ton sacrificial jacks at 48 inches on center. The footing will require approximately 8 - #5 bars to adequately reinforce the footing. The deepened trench footings will also need to have dowels be epoxy injected into the existing footing for a positive connection. Underpinning the house will require removing the exterior hardscape/planters/porch around the house. The driveway, planters, and porch will need to be reinstalled after the repairs are performed. Below is a marked-up plan view of the property and the extent of underpinning assumed to be required.


The garage will also need to be underpinned. The interior slab can be removed, and the work performed from the interior. The repair methodology will be assumed to be the same as at the residence. Once the foundations are repaired at the garage, a structural reinforced slab should be installed to prevent future damage and to tie together the exterior footings. An 8 inch thick slab with #5 bars is assumed to work for this situation.

In addition to reinforcing the foundations, the drainage around the property should be improved. Once the roofs have been properly repaired, a new gutter and downspout system should be installed to collect all roof runoff. The downspouts should connect to a subgrade drainage system that discharges to the street. Hardscape around the house/garage needs to be sloped away from the structure at 2% slope minimum. Softscape needs to be slope away from the structure at 5% slope minimum. Area drains should be installed around the property to collect any surface water. This should connect with the downspout pipes and discharge to the street.

Framing hangers should be installed at the roof rafters in the house and garage. This will provide additional support to prevent damage from separating rafters. It may be advisable to perform this repair after the foundations have been strengthened/underpinned to prevent damage that needs to be repaired twice.

The concrete and railroad tie retaining walls at the south side will need to be replaced with new concrete or CMU walls. These walls need to be properly drained to prevent hydrostatic pressure.

Work done to the residence should be done by licensed people specializing in their field. This will provide the best outcome of results. City permits should be pulled where applicable. Our office can provide you with a manometer survey, foundation repair plan, and drainage improvement plan if requested.

This report is based solely on a visual inspection and is limited to the stated areas of concern. Other conditions affecting this or other properties that were not inspected, accessible or anticipated are beyond the scope of this report.

Palos Verdes Engineering Corporation does not inspect or test for mold or any other biologic or health hazards, which may be present at this site. Areas with limited ventilation, high humidity or evidence of moisture intrusion may contain such hazards. A professional inspection and test procedure can be done to obtain specific information about such conditions at this property.

Services performed by this firm, at the subject site, were conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. The contents of this report represent our professional opinions based on limited visual observation. This report has been prepared for the exclusive use of Steve Johnson and should not be considered transferable or relied upon for any other purpose. This report may not be construed as a guarantee or warranty of the performance of the structure under future adverse circumstances.

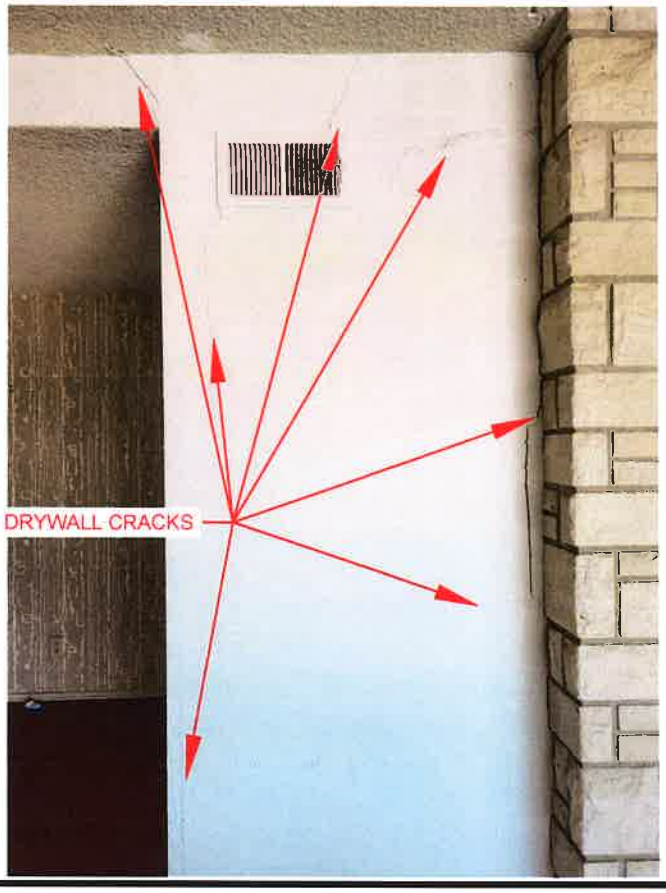
Please do not hesitate to call if you have any questions or require further information.

Very truly yours,

PALOS VERDES ENGINEERING CORPORATION


Bill Bell
Professional Engineer C88870

Exhibits and pictures attached

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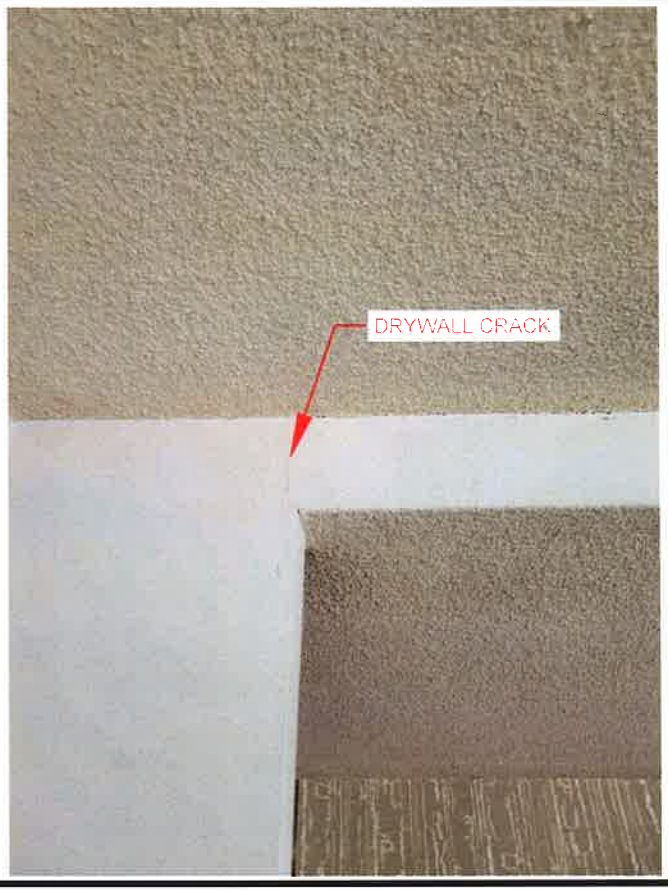


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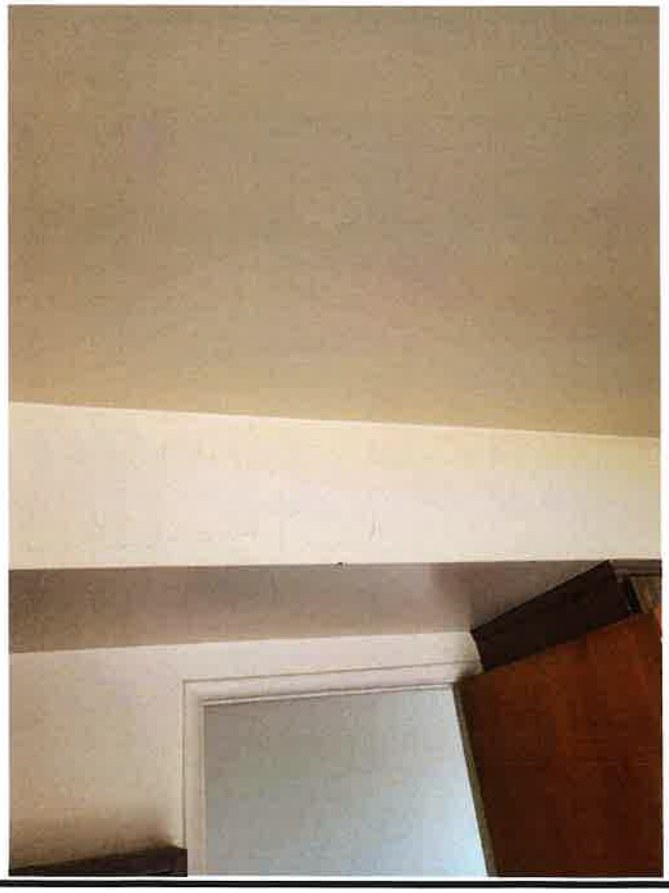

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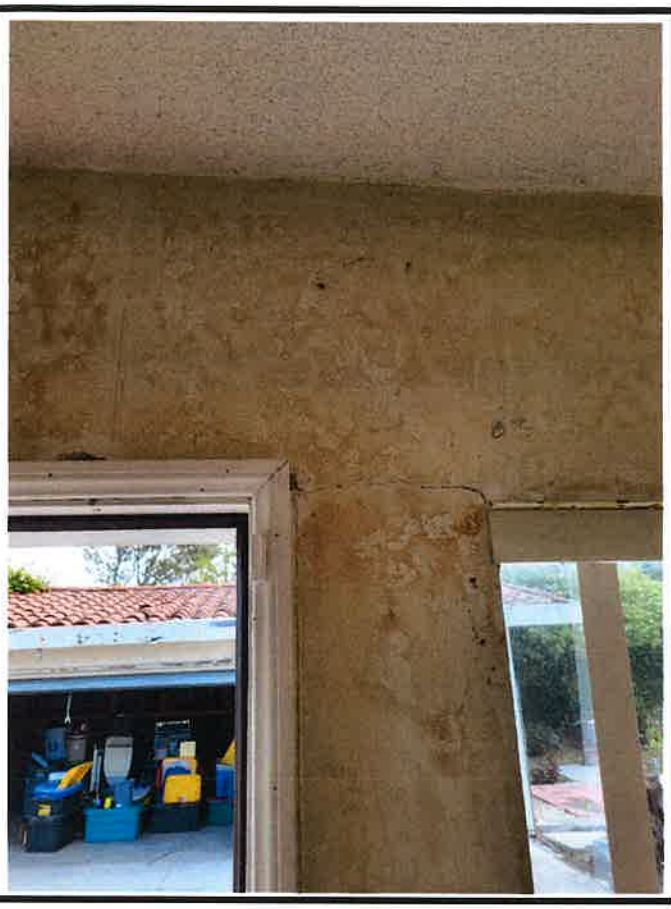

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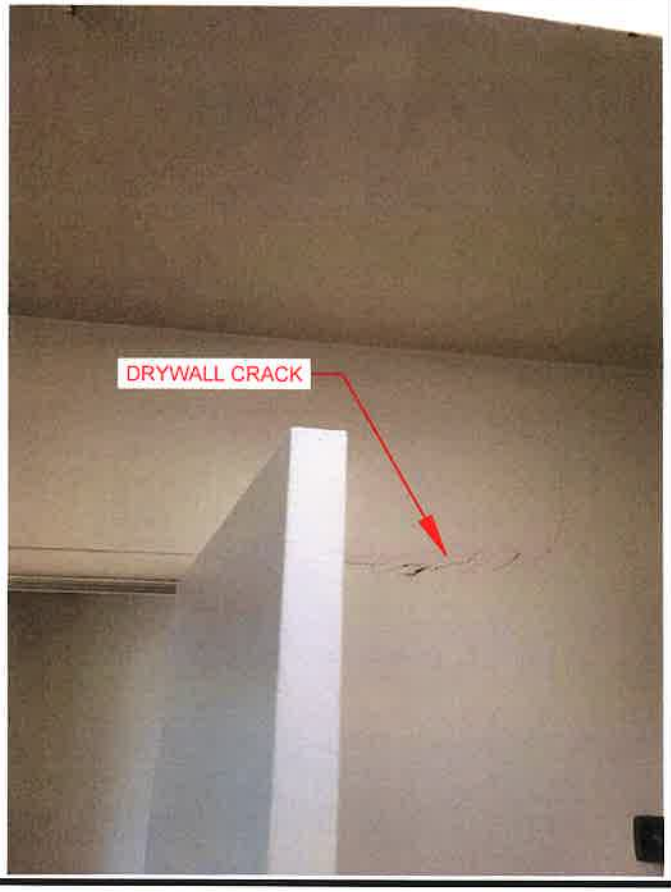


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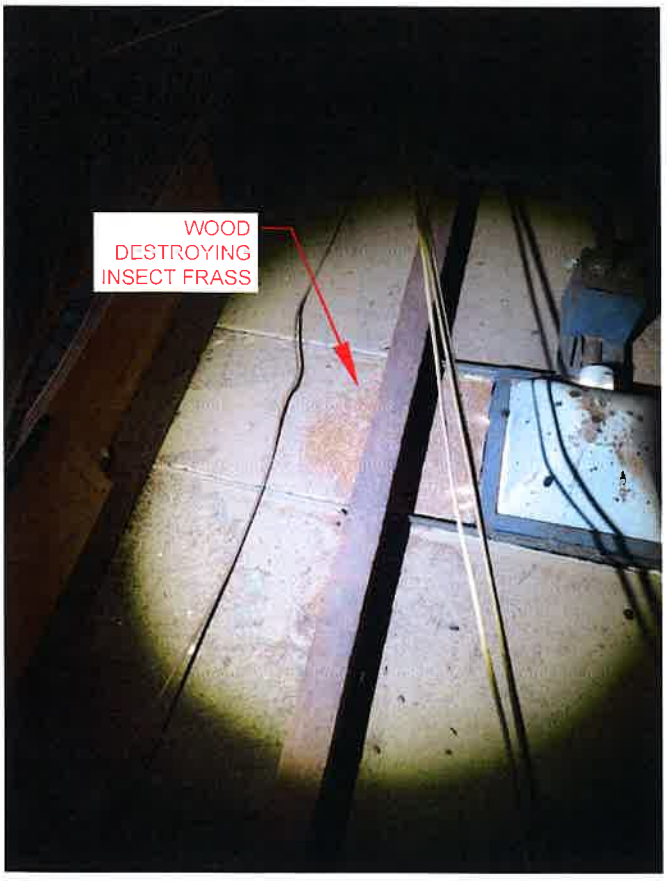


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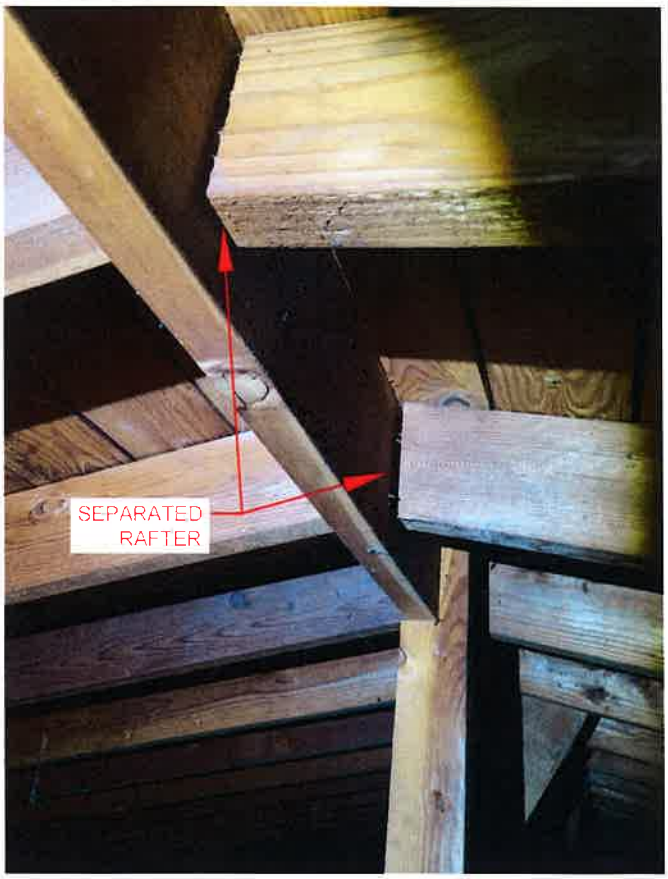


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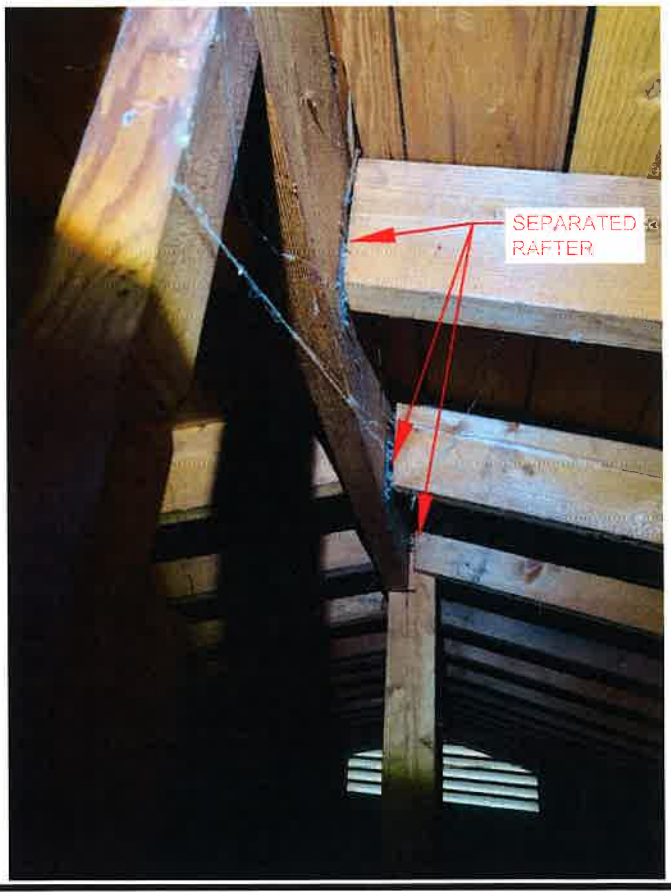


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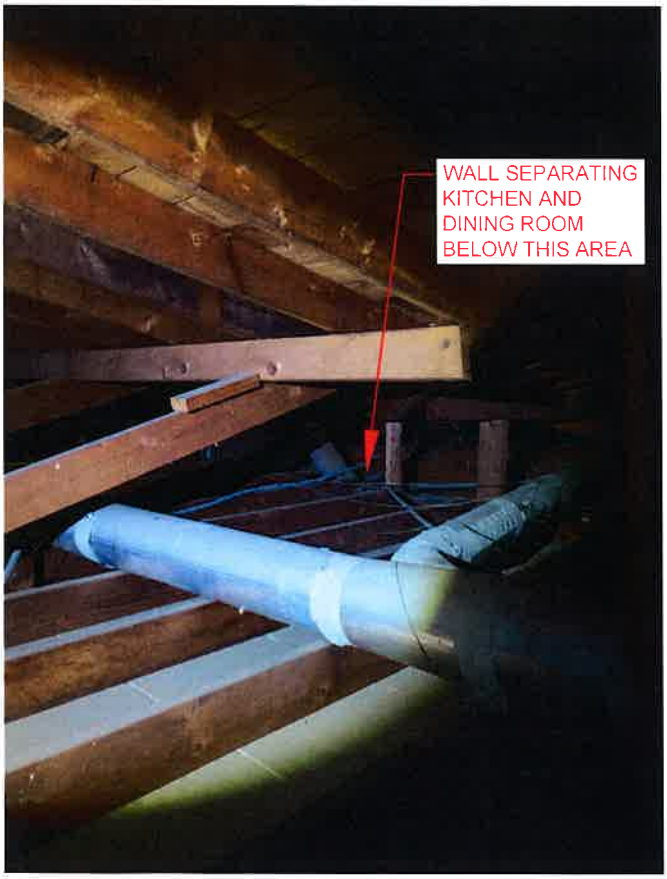


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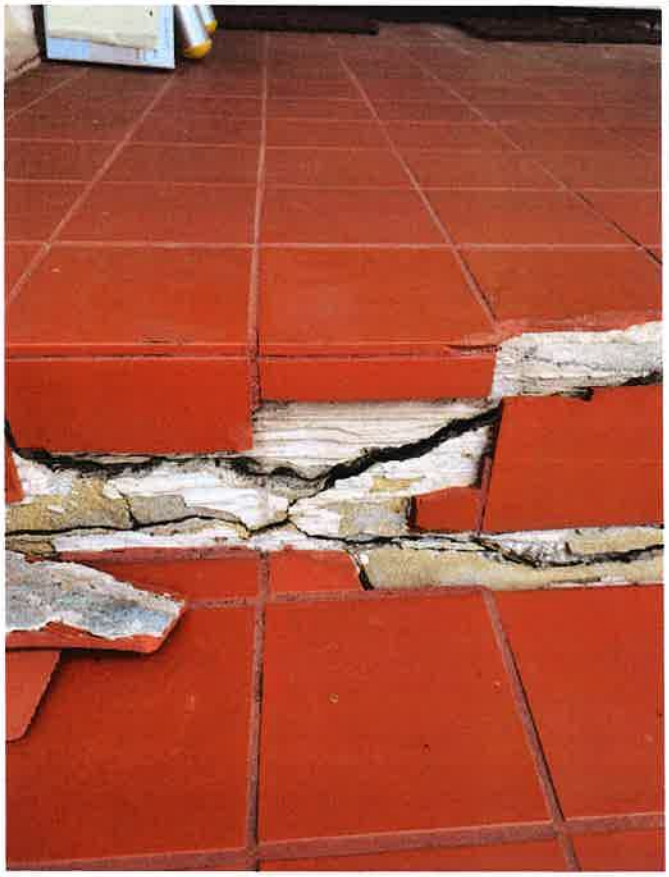

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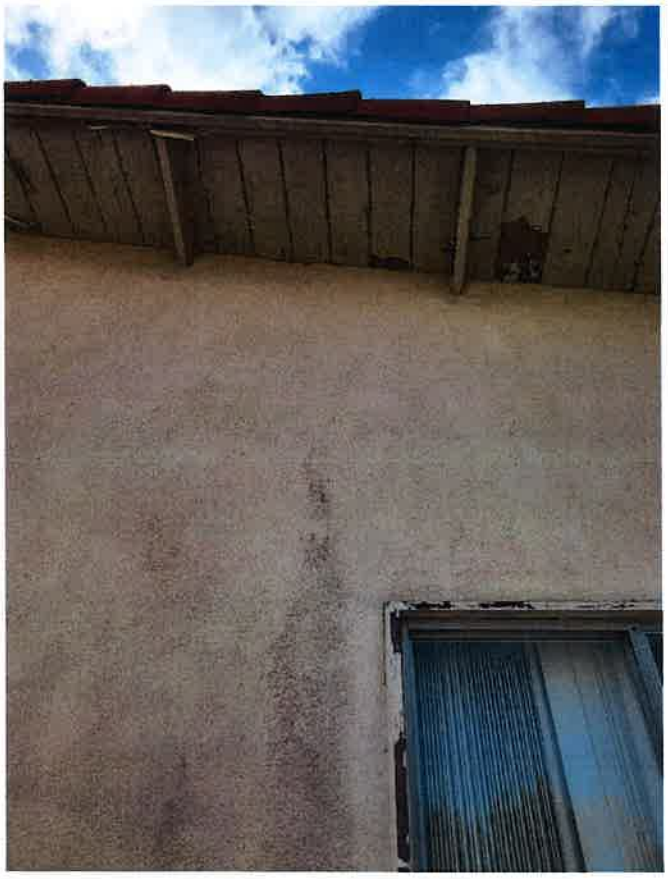

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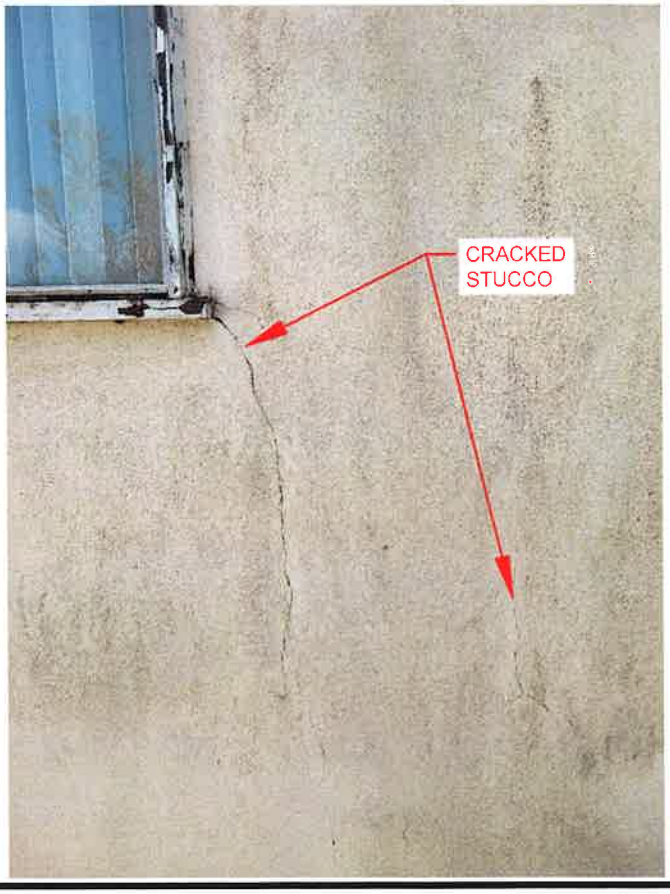


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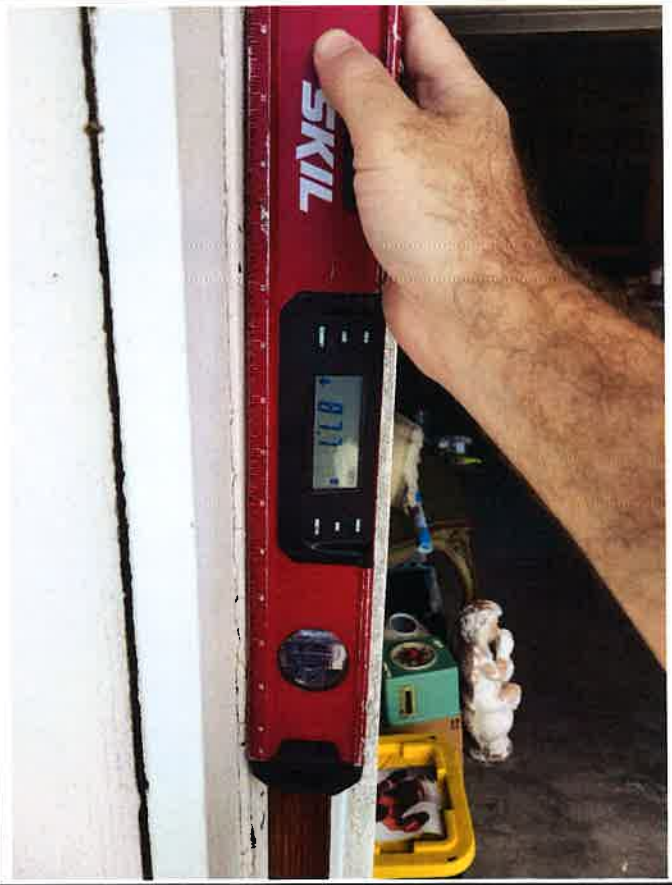


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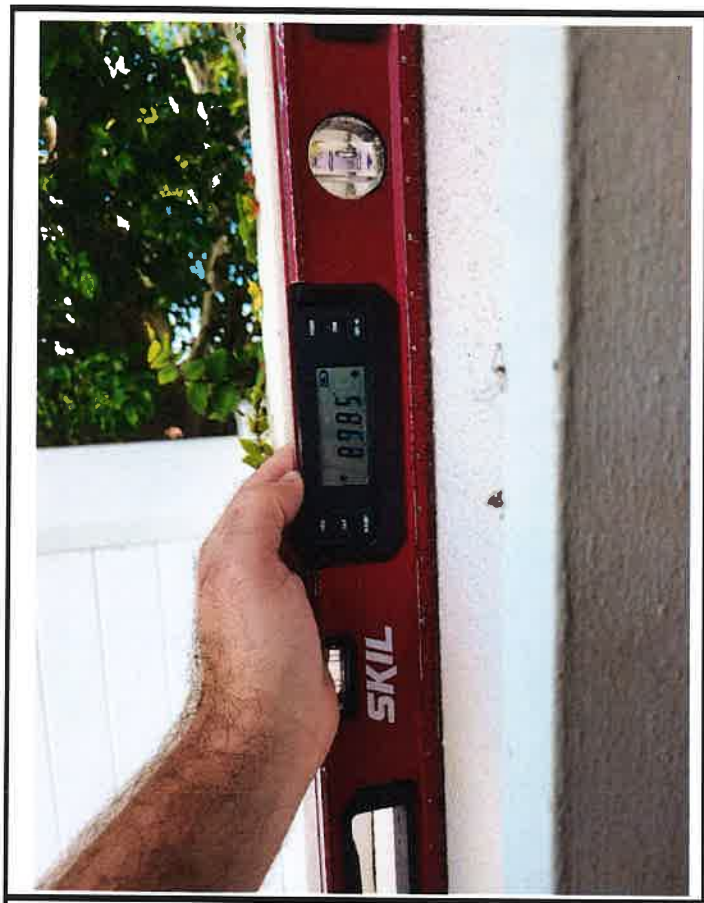


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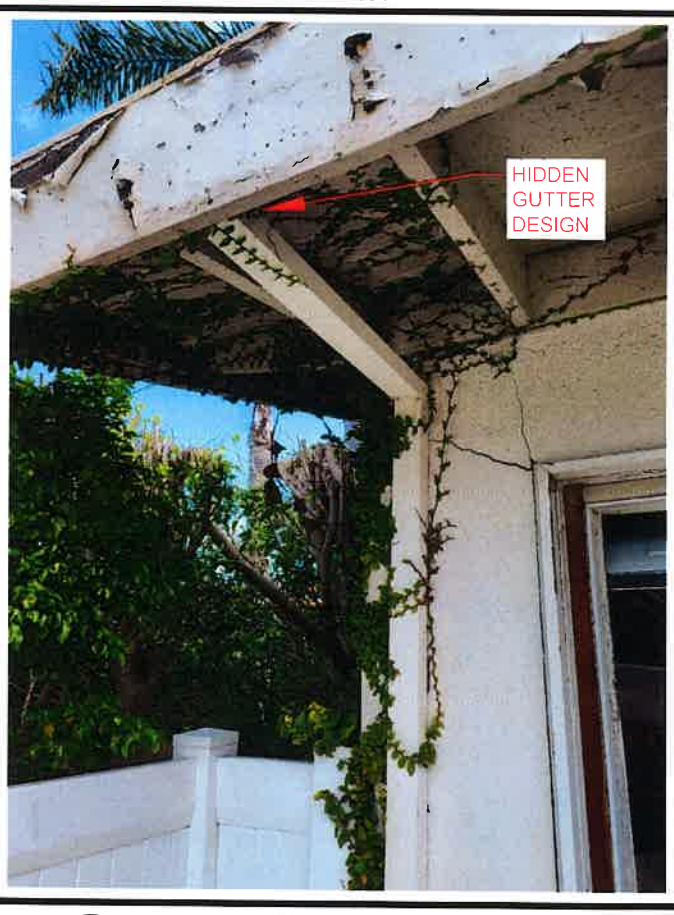


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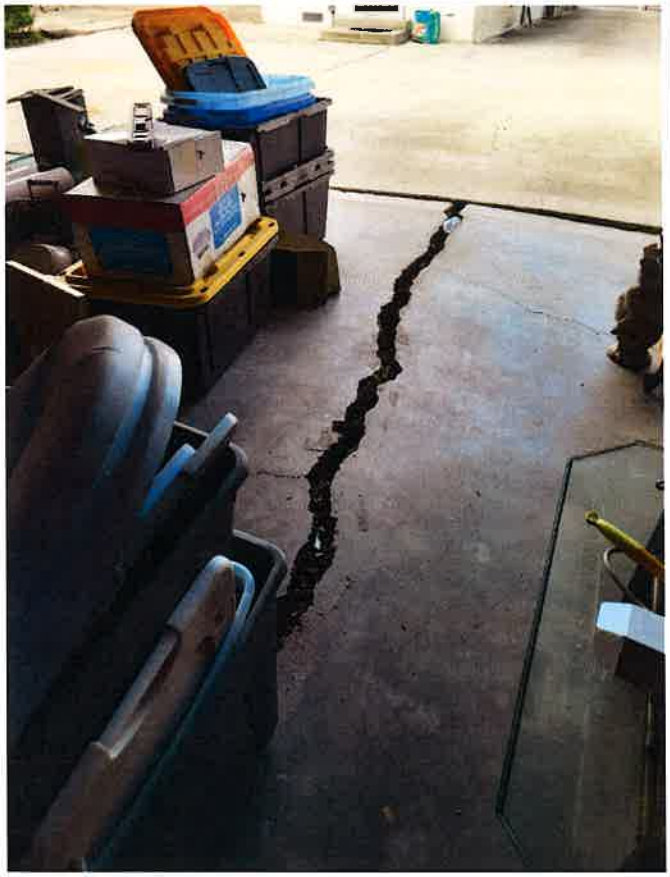

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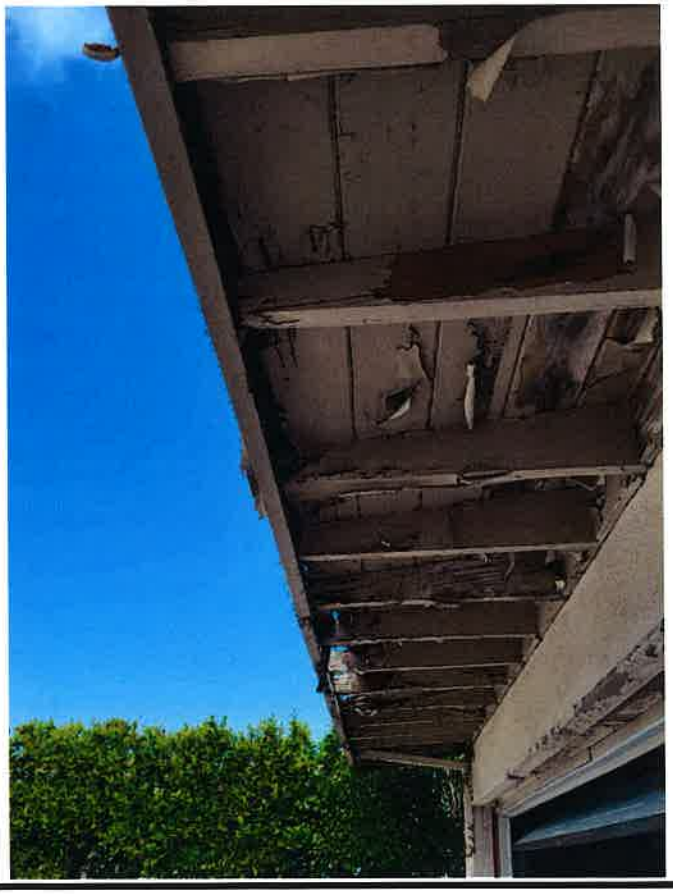

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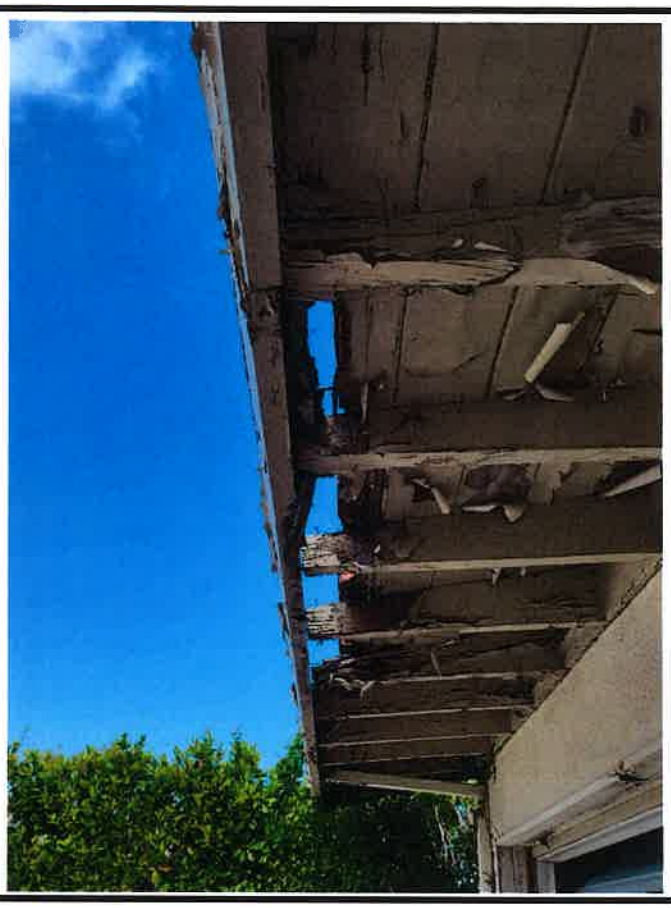

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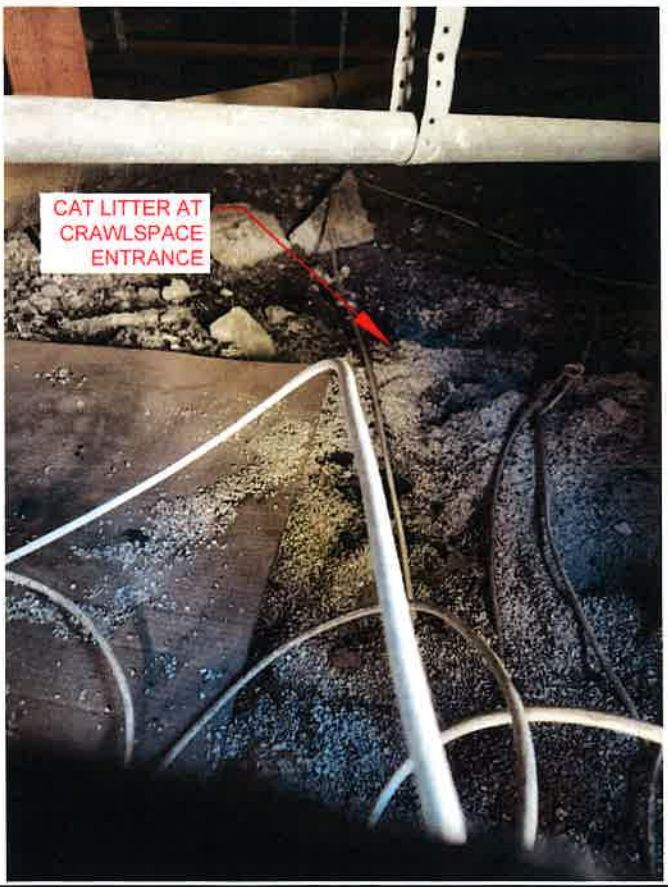


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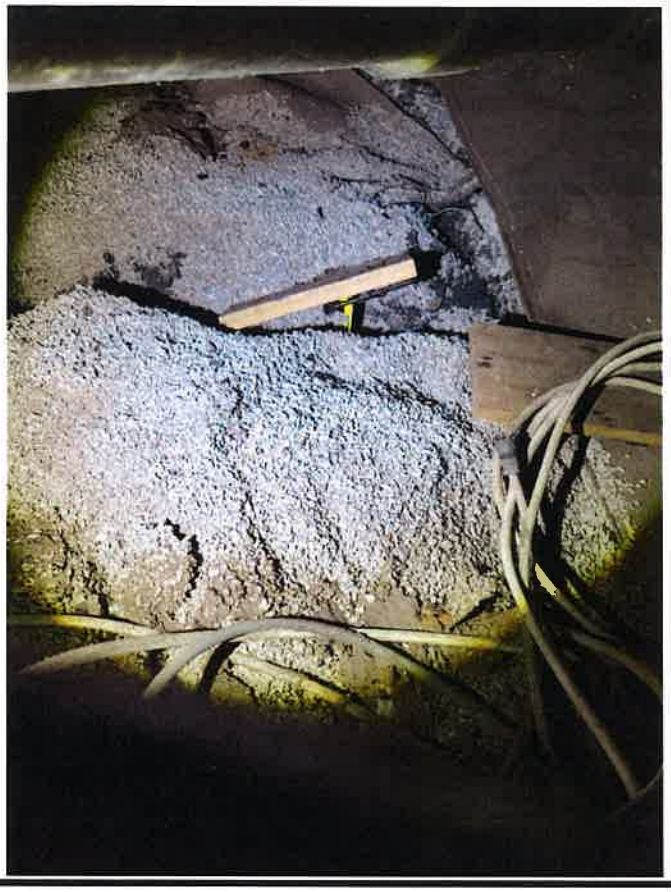

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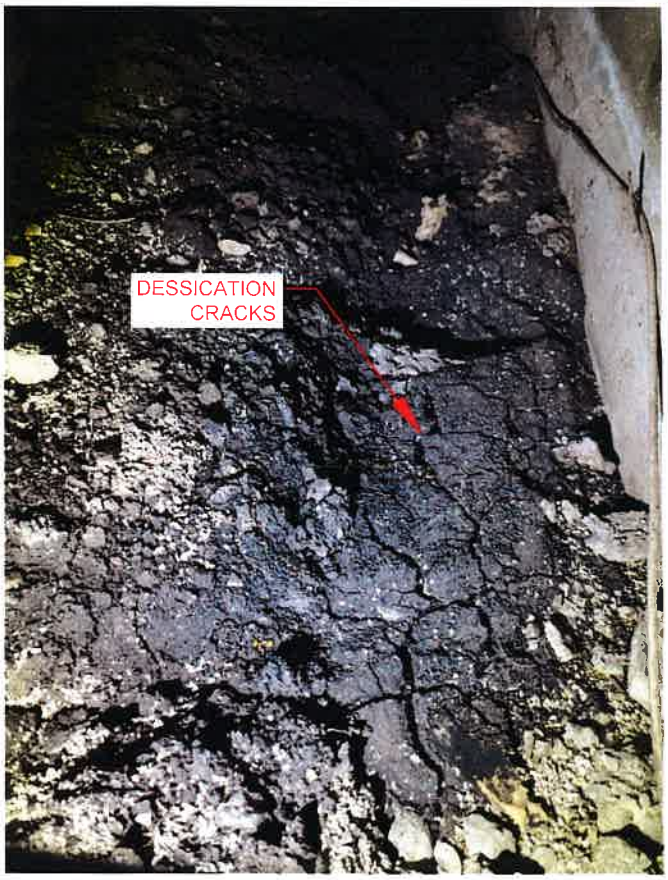


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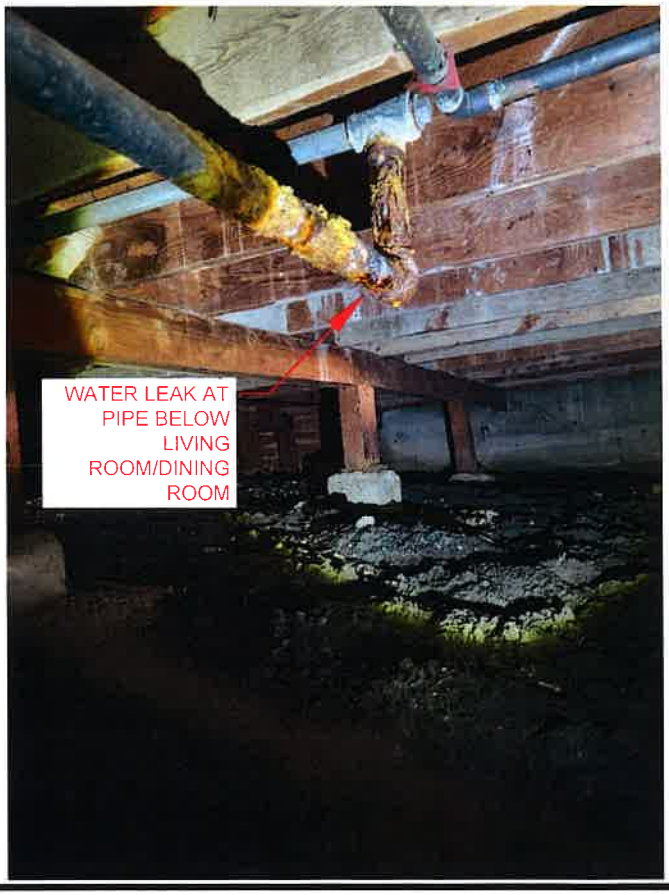


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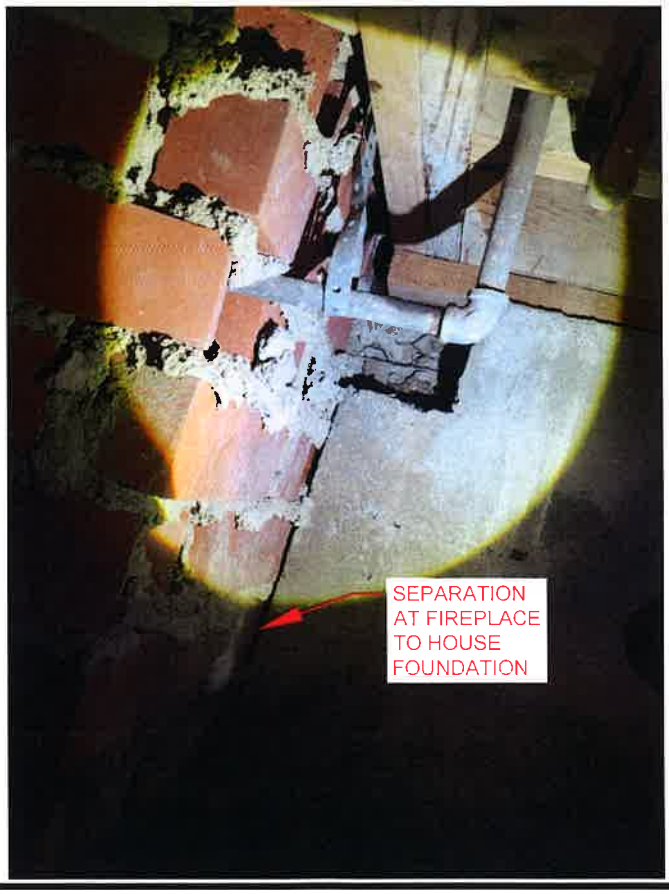


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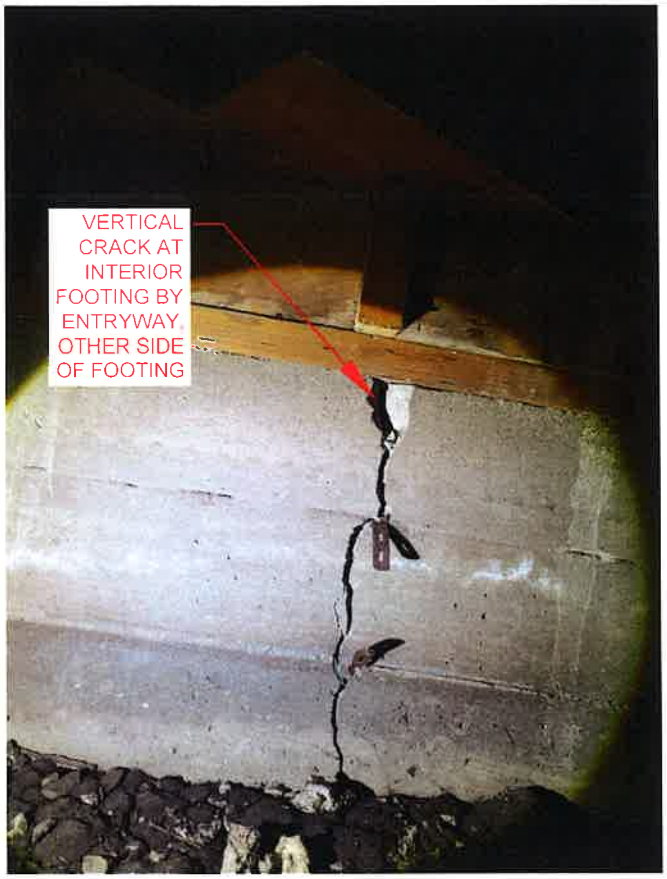


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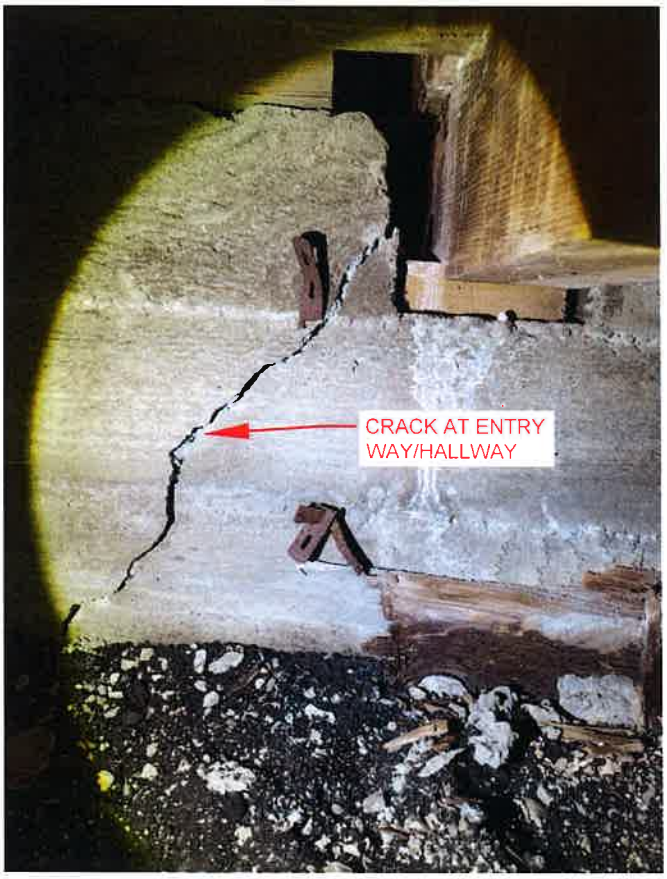


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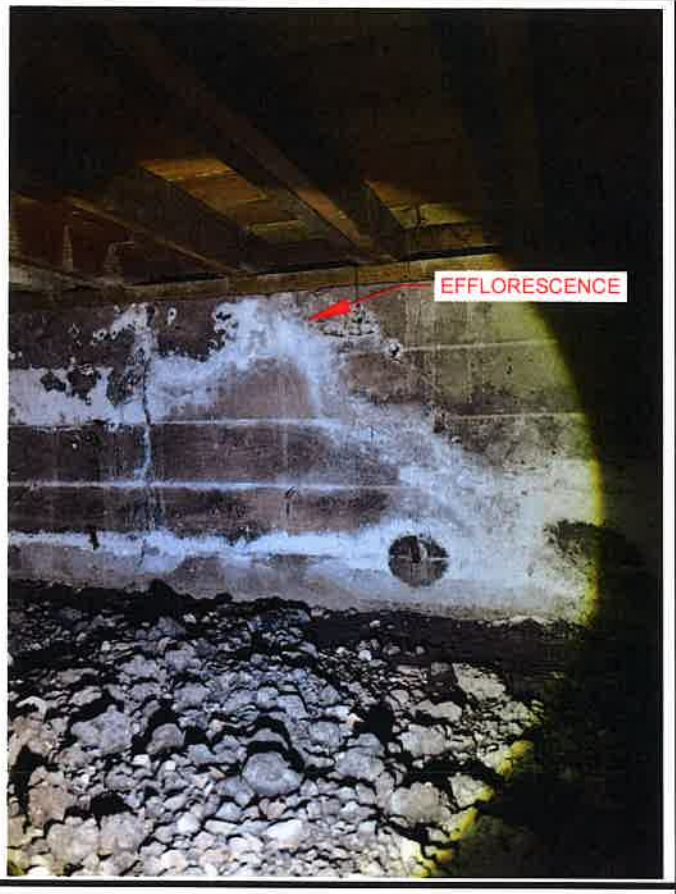


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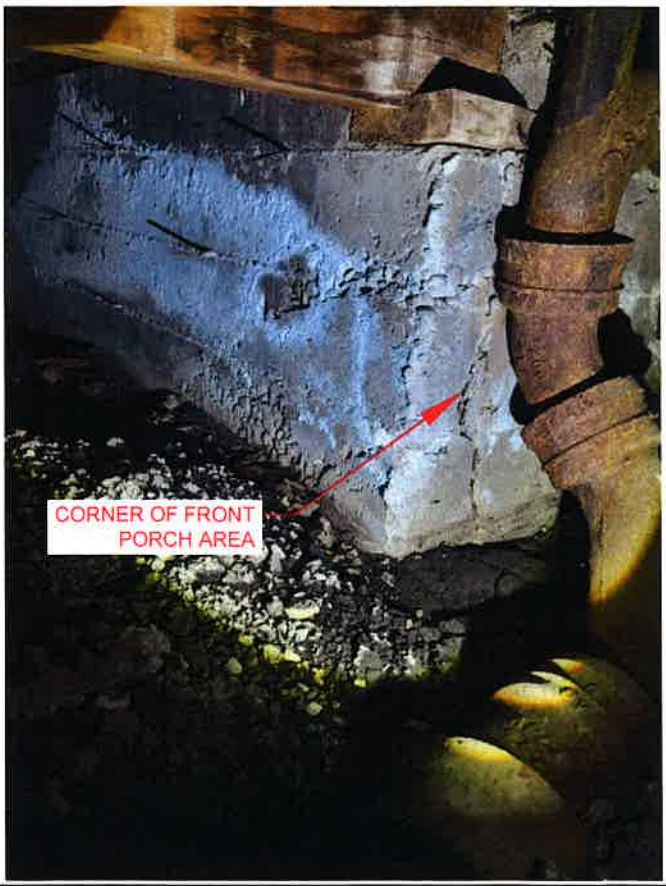


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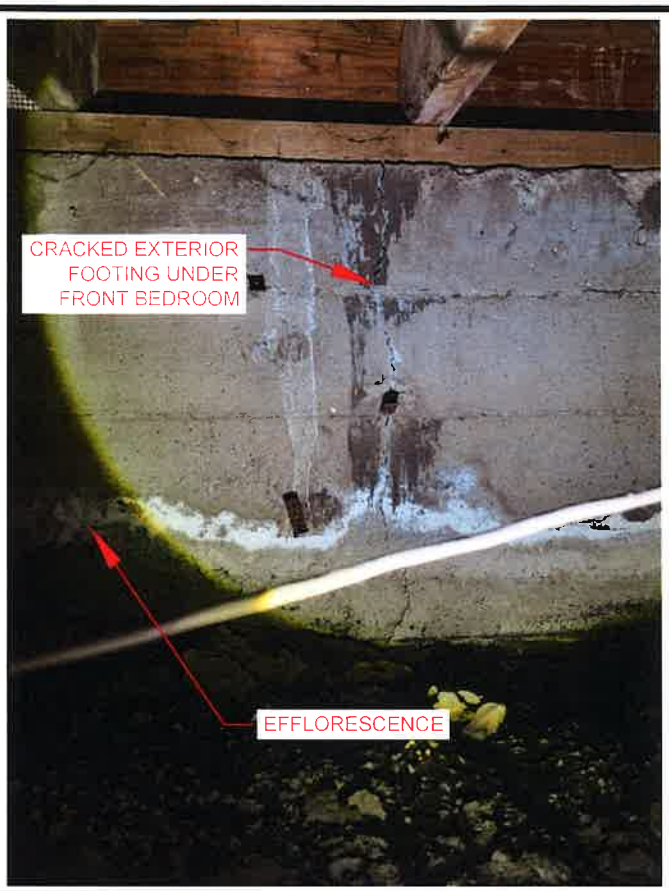


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