

**EXPERT REPORT**  
OF  
**Roger Greenwald, AIA**  
Re: [REDACTED] v. [REDACTED]  
February 18, 2021

Assignment

I have been engaged by [REDACTED], for case preparation, review of records, investigation, evaluation, assessment, analysis and preparation of an expert report. My rate is \$240/hour. This constitutes my expert report for my opinions relating to work performed by [Defendants] (the “Contractor”) and its employees and contractors at [REDACTED] (the “Premises”) and the cause of and liability for certain deficiencies described below. All statements contained herein represent my professional opinion made to a reasonable degree of certainty in the construction and architectural industry.

Summary of Experience

I am a registered and licensed Architect in the State of New York, and a national award-winning general contractor with over 40 years of experience in high-end residential design and construction. I founded Greenwald Cassell Associates, Inc., a licensed Class A General Contractor in the state of Virginia, in 1984, and was awarded the National Gold Medal for Full House Renovations Over \$500,000.00 in 2008 by the remodeling industry’s leading trade journal, Qualified Remodeler Magazine. I have designed and constructed over 800 high-end new homes and renovations. Based on my education, training, and experience, I am familiar with the relevant industry standards, practices and customs in the construction industry and architectural profession that exist now, and at the operative times at issue in this lawsuit. I am qualified to analyze and evaluate the project in question in terms of both the finished product and the construction process which produced it, and the defects discussed below.

Relevant Background

I have visited the Premises on 4 occasions since October 2020, and inspected the state and quality of the construction performed by Contractor at the Premises, studied the defects present in the work in question, and compared the work as built to the plans, specifications, and documents, and to the Residential Code 2015 of New York State, which is the governing building code for this project. I have studied and evaluated the contractual obligations, roles, and actions of the parties concerned, as expressed in the written record and in the work itself and have considered the following documents, attached as appendices to this report:

1. Contract Of Sale between Owner and Builder dated 8 November, 2019 (Appendix A)

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2. Plans by [REDACTED] Engineering, PC, date of last revision: 9.23.19 consisting of pages E1,E1,P1,P2,P3,W1 and W2. (Appendix B)
3. Report of [REDACTED] Design to [REDACTED] dated August 17, 2020 (Appendix C)
4. Subdivision Site Plan by [REDACTED] Design revised 11/2/18 (Appendix D)
5. Various emails and correspondence provided by the Owner. (Not attached as appendices).
6. Letter from [REDACTED] Engineering, P.C. dated December 9, 2019 (Appendix E)
7. Various photographic evidence (attached as exhibits P1-P24)

Based on my evaluation, I am able to provide the following observations and opinions:

**General Observations:** I observed and analyzed multiple material defects in the work which constitute clear violations of the building code, the contract, and accepted industry standards, resulting in significant adverse impacts on the safety, functionality, and value of the property. These observed defects, the forensic analysis of the origins of these defects, and the adverse impacts of and remedies for these defects are described below:

1. **Leaking Basement:** I observed water actively leaking in the basement in multiple locations, which I subjected to normal, non-invasive forensic investigation, standard for the architectural profession. (See photographs P1-A, P1-B, P1-C, attached as exhibits to this report). On multiple visits, I observed water at the joint between the floor and the wall at various points along the east wall. I observed standing water on the floor in the vicinity of the bulkhead enclosed by the Bilco door. The wood walls of the Bilco door areaway were dry, indicating water being forced in at floor level, consistent with hydrostatic pressure against the foundation wall. I observed standing water on the floor slab in the north-west corner of the basement. This water was also consistent with water being driven by hydrostatic pressure against the foundation. Water was also being forced through a crack in the left (driveway) side foundation wall, discussed separately in paragraph 2 below.
  - 1.1. **Adverse Impacts of Leaking Basement:** The leaking basement represents a material adverse impact on the use and enjoyment of the house, and on its market value.
    - 1.1.1. The observed water in the basement is sufficient to cause black mold and other health hazards.
    - 1.1.2. The value of the basement as storage space is severely degraded by the presence of water on the floors and walls.
    - 1.1.3. The wet basement effectively prevents normal use and enjoyment for activities such as recreation room activities and hobby activities.
    - 1.1.4. The value of the house is negatively impacted for resale.
    - 1.1.5. Wet basements are a source of stress and negatively impact normal use and enjoyment of the house generally.

1.2. Remedies for Leaking Basement:

1.2.1. Site Drainage: As discussed in paragraph 5 below, improper site drainage and improper grading is the primary cause of the leaking basement. Remedies for improper site grading and drainage are discussed in paragraph 5 below.

1.2.2. Defects in the waterproofing of the foundation must be logically inferred by the presence of water. During regrading as discussed below, the foundation must be excavated, inspected, and all waterproofing defects cured. See 2.2.3 below.

2. **Cracked and Leaking Left (Driveway) Side Foundation Wall:** I observed that the left (driveway) side poured concrete foundation wall has cracked vertically in the middle of the wall. The crack runs all the way through the wall from the bottom of the basement window to the basement floor. A cracked footing must be logically assumed. The most logical explanation for this crack is improper procedure during installation of the footings, contrary to code. I observed active water infiltration through this crack in the interior of the basement at various points along the crack, and at the floor-wall joint, indicating hydrostatic pressure actively forcing water through the cracked wall. (See photographs P2-A, P2-B and P2-C attached as exhibits to this report)

2.1. Adverse Impacts of Cracked and Leaking North Foundation Wall:

2.1.1. See 1.1 above

2.1.2. In addition to the adverse impacts of the water leaks resulting from this crack, the resale value of the house is diminished by this clear and obvious defect.

2.2. Remedies for Cracked and Leaking North Foundation Wall:

2.2.1. The foundation of the left side foundation wall must be excavated to the bottom of the footings. The crack must be injected with epoxy per industry standards. If the footing is cracked, it must be underpinned under the supervision of a licensed engineer or architect.

2.2.2. Existing improper drainage discussed in paragraph 5 below must be corrected to allow any water collecting against the foundation to drain properly away from the house as required by code and industry standards.

2.2.3. A flexible waterproofing membrane must be applied to the foundation. The cracked wall can be expected to continue to open over time, necessitating a flexible waterproof membrane to keep water from infiltrating the foundation. To be effective, a waterproof membrane must completely surround the foundation, so that no water can intrude from open edges of the membrane.

3. **Water Leaks in the Office and Office Bathroom:** I observed active water leaks in the office and office bathrooms at the joint between the wall and floor. These leaks are consistent with hydrostatic pressure from the surrounding drywells back feeding water against the foundation. (See photographs P3-A And P3-B attached as exhibits to this report)

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3.1. Adverse Impacts from Water Leaks in the Office and Office Bathroom:

- 3.1.1. Health hazards from mold, slip-fall risk, and excessive humidity.
- 3.1.2. Rot and mold in baseboards and drywall in office and office bathroom
- 3.1.3. Loss of use and enjoyment of the spaces involved
- 3.1.4. Loss of resale value of the home

3.2. Remedies:

- 3.2.1. Remove improperly placed drywells to the front and rear of the office foundation and replace with new drainage system per engineered site plan per code.
- 3.2.2. Excavate foundation of office/garage and install flexible waterproof membrane.
- 3.2.3. Pipe footing drains to storm sewer conveyance per professional site plan
- 3.2.4. Regrade per code and landscape

**4. Non-Compliant South (right side) Wall:**

General Observations: The south foundation wall was constructed in a manner materially inconsistent with the permit drawings and the contract, and without the knowledge or consent of the owner. The builder undertook this unilateral decision in a failed attempt to compensate for errors in site planning and drainage planning as discussed in paragraph 5 of this report, below. This unilateral action on the part of the contractor resulted in a cascade of material adverse impacts on the house, as discussed below. (See photographs P4-A, P4-B, P4-C, attached as exhibits to this report).

Non-compliance with plans: The plans, submitted to the City of [REDACTED] Building Department for building permit, designed by [REDACTED] Engineering, PC, on Sheet W1, “Typical Wall Section” (attached as an exhibit to this report) calls for a poured concrete foundation wall 8” wide, 8 feet high, with backfill not to exceed 7’ in height. However, the entire right (Union Street) side wall, and a portion of the rear (kitchen) wall was altered without the owner’s permission. The wall was changed from 8 feet high, 8” thick to 13 feet high, and 12” thick. This atypically tall, thick wall was clearly modified in the field by the builder to function as a retaining wall, to receive the pressure from additional backfilled dirt in a failed attempt to correct a critical siting and drainage issue discussed separately below. The builder’s intention to modify this wall was stated in the email of [REDACTED], assistant to the builder, dated August 12, 2019, to plaintiff’s real estate agent, [REDACTED], to wit “There is not going to be a retaining wall to the right (facing the home, *it will be the foundation higher [sic] to meet the grading needs’ ...[italics added]*). This email was sent three months before the contract was signed, during the negotiation period, indicating premeditation on the part of the builder. However, the contract documents do not show this alteration, nor do they show the material adverse design impacts detailed in 4.1 of this report, below. There is no record of any explanation of these adverse design impacts in the negotiations, and plaintiff understood at contract signing that she would be getting the house as shown on the contract document plans. In my professional opinion, to a high degree of architectural certainty, the builder had a clear obligation to modify the plans prior to contract signing, to clearly show

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the adverse design impacts of his premediated alteration of the foundation wall. This was not done. Plaintiff's shock and surprise when she discovered these impacts after the contract was signed, and she was fully committed to the move, in my professional opinion, meets the common definition of "bait and switch".

As a direct consequence of the builder's unilateral decision to field change these walls, the entire right side foundation wall was constructed to intrude 8.5 inches into the finished living area of the first floor. As noted below, this irregular wall condition also obtains in the rear wall of the kitchen. The right side foundation wall was then backfilled more than 3 feet above the level of the first floor, effectively turning the main living area of the first floor into a partial basement, all without the consent of the owner and presented to the owner as a fait accompli.

According to generally accepted industry standards, responsibility for the adverse impacts arising out of this unilateral action on the part of the builder rests exclusively on the builder. Despite this, the builder insisted that the owner pay \$4,000.00 toward the cost of these unilateral changes, as a condition for continuing the work.

4.1. Adverse Impacts of Non-Conforming South (living room) Wall, and East (kitchen sink) wall:

4.1.1. Loss of floor space: The intrusion of this non-conforming 12" thick concrete wall into the living space resulted in the loss of 8.5 inches of net usable floor space across the entire 44 ft length of the living room and kitchen, and an additional loss of 8.5 inches along the rear wall of the kitchen. Without consulting the owner, the builder proceeded to move the rear kitchen door in order not to compromise the kitchen. The end result was that the dining area, shown on the plan to be 9' in width from the wall to the kitchen door, now measures 6'6", drastically impacting the functionality, aesthetics, and value of this critical element of the house. The total loss of usable floor space on the first floor was 38.9 square feet, or about the size of a normal 5x8 bathroom. This significant loss of interior floor space resulted in an obvious adverse impact on the functionality, aesthetics, and value of the house.

4.1.2. Loss of functional windows: Because the concrete wall rises 5 feet above the first floor, the standard 3'X5' windows called for in the contract documents no longer fit. The builder unilaterally substituted the 5' tall windows called for in the contract documents with windows measuring 1'9" tall, depriving the owner of her view, and normal light, ventilation and esthetic enjoyment. The sill of the new windows stands 5' above the floor, giving the entire living room the effect of a partial basement, which it now technically has become. The owner's stipulation that she was presented with these changes as A fait accompli is supported by the lack of any written record in our possession discussing and/or agreeing to these changes.

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- 4.1.3. Loss of functional study: The plans called for a small study on the first floor, which the owner had intended to utilize as a guest room when needed. As a result of the loss of floor space and the loss of natural light and view in this room, the owner was forced to abandon this amenity. I opine with a high degree of architectural certainty that the loss of the approved 5' tall window in the study and the 8.5" reduction of the width of the room rendered the study dysfunctional, forced its abandonment, and constitutes a severe adverse impact on the functionality and value of the house. Further compromising the study, was the loss of emergency egress as required by code. This room, which was reasonably expected to function as guest room, was required by code to have an egress window. The sill of an egress window may extend no more than 44 inches from the floor. From the Residential Building Code of New York State: "**R310.2.2 Window Sill Height** Where a window is provided as the [emergency escape and rescue opening](#), it shall have a sill height of not more than 44 inches (1118 mm) above the floor". The intruding concrete wall at 60 inches above the floor blocked installation of a legal egress window, forcing the owner to abandon the anticipated amenity.
- 4.1.4. As a result of this unexpected and unannounced reduction of usable floor space, and the other issues discussed herein, the owner was forced to hire an interior designer for \$2,000.00 to assist with redesigning the smaller space, with basement-style windows, a compromised eating area, and no den.
- 4.2. Remedies for Adverse Impacts arising from Non-Compliant South Wall: No remedy exists short of demolition and rebuilding the house. Restitution for lost value is the industry standard remedy in such cases. Additionally, the \$4,000 extracted from the owner to pay for the change in the wall should be returned to the owner, along with an equitable adjustment for the significant loss of value of the house resulting directly from the above described adverse impacts.
5. **Improper Siting, Grading, and Drainage:** The entire site is improperly graded, and does not drain water away from the foundation as required by code and industry standards. This improper grading and drainage constitutes a major construction defect which resulted in a cascade of other major construction defects and adverse impacts discussed in this report, including, but not limited to the basement water problems discussed in paragraph 1 above and the improper decision by the builder to unilaterally field-change the right side foundation wall to the detriment of the owner as discussed above in paragraph 4 above. (See photographs P5-A, P5-B, P5-C, P5-D attached as exhibits to this report) **Section R401.3 of the Residential Code of New York State** states: "**Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection that does not create a hazard. Lots shall be graded to drain surface water away from foundation walls. The grade shall fall not fewer than 6 inches within the first 10 feet.**". The builder

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failed to meet this clear code requirement in two ways: 1) he graded in a manner which improperly directed water back toward the foundation walls both along the south foundation wall, and in the rear. 2) He relied on the installation of two drywells as collection points for surface and ground water which are failing to function as he intended, and do not in any case meet the standards of “*an approved point of collection which does not create a hazard*” as required by the code and by industry standards. The result is a wet basement with all of the hazards associated with wet basements. (See photographs P5-A, attached as exhibits to this report)

Improper Grading: In violation of 401.3 of the building code, the right (Union Street) side yard was improperly graded. The builder failed to establish a grade falling away from the house a minimum of 6” in the first 10 feet as required by code. (see photograph P6-1 attached as an appendix to this report). The water is instead directed along the house, enabling percolation through the loose backfill of the overdig area close to the house, where it can then improperly collect against the foundation. Of the surface runoff which does not percolate down against the foundation, approximately half of the volume is then directed toward the rear yard, close to the house, where it is trapped. The rear yard (see photograph P6-2) is essentially a basin with no proper outlet. It is a water trap. The only outlets for this trapped water created by this grading error are either downward percolation or into the basement. Clearly, when the volume of water overwhelms the percolation rate of the soil, some of the water finds its path of least resistance by forcing itself into the basement, driven by the hydrostatic pressure of the water collecting against the foundation. Proper grading would have drained the water away from the house toward either a storm sewer conveyance or “*an approved point of collection which does not create a hazard*”.

Improper Use of Drywells as Points of Collection: The builder relied on the installation of two drywells to collect and disburse the surface and groundwater before it could find its way into the basement. (See photograph P5-J, attached as AN exhibit to this report) This decision appears to have been taken to avoid the cost of piping the site water to the storm sewer, located a few hundred feet down the street. Use of drywells as a substitute for the more normal procedure of piping the site water to a storm sewer conveyance, while permitted in exceptional cases, is a highly technical method requiring precise engineering and precise implementation of the engineered plan. A builder undertaking this exceptional method of managing site water assumes an obligation to ensure that the site water is directed away from the foundation. The builder chose not to employ an engineer to design the drywell system for this lot. Instead, he loosely and inappropriately interpreted selected elements of a hypothetical drywell system shown on the subdivision plan by [REDACTED] Design Engineering, PC. It was, in my opinion, an unprofessional and improperly implemented improvisation, for which [REDACTED] Design abjured responsibility in their letter of August 17, 2020, (attached as an exhibit to this report). [REDACTED] Design states on page 6 of

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their report: “*The intent of the subdivision approval plan is only to prove the viability of the proposed lot lines in accordance with zoning regulations and generally accepted engineering practices. The building designer for the actual constructed house is responsible for foundation drainage design associated with the specific house being constructed*”. There is no evidence that the builder had these drywells, or any other aspect of the site drainage designed by [REDACTED] Design, and there is no evidence of the involvement of an engineer in the design of the drainage system. The builder improvised the drainage system on his own responsibility and to ill effect. The drywells don’t work. The basement is leaking. Properly engineered and installed, drywells may or may not have sufficed for the intended result. But if the drywells were functioning as intended, they would drain the water away from the foundation, and there would be no hydrostatic pressure building against the foundation walls, and then forcing itself into the basement. According to code, an “*approved point of collection*” cannot create a “*hazard*”. The wet basement created by the failure of the drywells is clearly a hazard, due to mold, slip and fall potential, and unacceptable risk of damage to personal property. Because the drywells in question have clearly created a hazard, they therefore fail to meet the standards for an approved point of collection as established by the R403.1 of the New York State Building Code. Furthermore, one of the two drywells installed was sited improperly, directly below the driveway, and adjacent to the detached garage/office foundation. This improper installation effectively blocks monitoring and maintenance of the drywell, and poses a risk of backing up into the garage and office foundation system. This improperly sited drywell must be removed and replaced as part of a functional system of drainage, as discussed in this report.

THIRD DRYWELL ON NEIGHBOR’S PROPERTY: The builder continued to compound the drainage errors with the installation of a third drywell located on the property of the owner’s neighbor to the rear. This drywell was installed just over the owner’s property line, five feet from the office foundation, and was intended to take additional runoff from the owner’s property. As a result, the office has large drywells within 5 feet of the office foundation on both front and rear. The active floor level leaks in the office and office bathroom are clearly the result of back feeding from these two improperly sited drywells.

Additionally, The builder graded the west (driveway) side of the house and the adjacent house so that a significant portion of the surface water runoff from that side of the house dumps onto the west neighbor’s lot, and is now visibly trapped during hard rains along the lot line with no way to escape. (See photograph P6-4, attached as an exhibit to this report.) When the builder disconnected the roof drain from the drywell, the roof water then dumped onto the driveway, exacerbating this problem during hard rains.



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FLOODING EVENT OF AUGUST, 2019. (See photographs P5-E through P5-I, attached as exhibits to this report) On information and belief, on or about August 8, 2019 the basement suffered a catastrophic flooding event, documented in the photograph P6-3 and attached as an appendix of this report. In their report of August 17<sup>th</sup> following this event, [REDACTED] Design states on page 1 of their report: *Surface runoff introduced into the drywell can back feed the footing drain and render them [the drywells] useless*". The report goes on to acknowledge that the builder, recognizing the failure of the drywells to accommodate the runoff as intended, disconnected half of the roof drains from the drywell. That helped. The basement leaks slowed down. But despite the theoretical ability of a properly engineered drywell system to serve the intended function of an approved point of collection, the fact is that they are failing, and thereby fail to meet the standards of the building code and must be replaced, as discussed below.

It is my professional opinion that the grading and drainage defects, and the resulting cascade of adverse impacts arising from these defects are rooted in the builder's failure to properly plan for the grading and drainage dangers of this low-lying lot. It was this failure of planning that led to the unilateral imposition of the non-compliant right side foundation wall discussed in paragraph 3 above: In setting the house too low, the builder failed to anticipate that that the top of the 8' south foundation wall called for in the plans would therefore end up too low to permit the surface water naturally flowing from the east to drain away from the house as required by code. When he realized during the construction of the foundation that he had created a fatal grading and drainage problem, he acted unilaterally to improperly construct the non-compliant south foundation wall and part of the north foundation walls. This act in turn precipitated a cascade of severe adverse impacts on the house as discussed in paragraph 4 above, all without obtaining a modification of the contract with the owner.

5.1 Adverse Impacts of Improper Siting, Grading, and Drainage: The clear result of the improper siting, grading, and drainage is a wet basement with active leaks in multiple locations, and a high risk of future catastrophic flooding during extreme weather events likely during the life of the house. This wet basement in turn creates the following adverse impacts:

5.1.1 Health hazards

5.1.1.1 Mold and other environmental health hazards

5.1.1.2 Loss of reliable basement storage

5.1.1.3 Slip and fall hazards on wet concrete floor

5.1.1.4 Loss of use and enjoyment of the basement for hobbies, child's play and activities.

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- 5.1.2 All adverse impacts arising out of non-compliant south foundation wall as discussed in paragraph 4 above.
- 5.1.3 Health hazards arising out of ponding water at the left (driveway) side lot line

5.2 Remedies for Adverse Impacts of Improper Siting, Grading, and Drainage:

- 5.1.4 Create a professionally engineered site, grading, and drainage plan per code and industry standards, which plan will include:
- 5.1.5 Remove ineffective and improperly placed drywells, and pipe site water to a storm sewer conveyance per code and industry standards.
- 5.1.6 Excavate to footings as noted in 2.2 above. Install proper waterproofing and footing drains.
- 5.1.7 Install interior drain tile system per industry standards
- 5.1.8 Regrade the yard per code and industry standards.
- 5.1.9 Landscape per industry standards.

**6. Areaway/Bilco Door Improperly Constructed:** The Basement areaway and covering Bilco Door was improperly constructed. The builder poured the areaway walls too wide and proceeded to infill the error with a wood wall. While the framing is now concealed, the plywood sides of the areaway, in contact with the concrete, are not pressure treated as required by code and industry standards. Despite a 92 inch vertical rise in the area way steps, no railings were provided as required by code. The landing at the base of the stairs is 29", which fails to meet industry standards for safe passage. (See photograph P6-A, Attached as exhibits to this report) appendix of this report.

6.1. Adverse Impacts: All wood which is not pressure treated must be replaced with pressure treated wood. Railings must be installed.

7. **Driveway Installed Too High.** See photograph P6-A, Attached as exhibits to this report)

The driveway was improperly constructed so that no room was left for the required top layer of asphalt and the required ½" water diversion lip where the driveway meets the garage entrance. The contract calls for the base coat, aka binder layer of the asphalt driveway to be installed. This is normal in order to allow a year of settlement before applying the typical 2" finish coat of asphalt over the base coat. The builder improperly installed the base coat so that the top of the base coat is even with the top of the garage slab, leaving no room for the required final coat without creating a dam in front of the garage, which is prohibited by code and by recognized industry standards. Furthermore, the top of the garage slab at the garage door was installed only 7" above the street, leaving barely .5% pitch to the street. Lowering the driveway 2.5" to allow for the finish layer of asphalt and the required ½" water diversion lip required by accepted industry standards would further lower the pitch of the driveway and effectively prevent water from draining to the street, forcing additional water to spill onto the neighbor's property, where

water is already being trapped, thus exacerbating an existing hazard caused by improper grading and drainage as discussed above.

- 7.1. Adverse Impacts: No proper topcoat can be applied to the driveway. Absent a top layer, the binder course will fail over time, creating a hazard and rendering the garage unusable.
- 7.2. Remedies: The driveway must be removed and lowered 2.5” to allow for the installation of the top layer of asphalt required by accepted industry standards, and a ½” water diversion lip. Water must be directed to a suitably located yard drain from which it must be piped to a storm sewer conveyance or an approved collection point per code.
  8. **Garage Slab Lacks Required Pitch**: The Garage slab is not properly pitched to the garage door as required by code. R309.1 of the governing code states: **R309.1 Floor Surface** “...*The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a [drain](#) or toward the [main](#) vehicle entry doorway.*” Application of a laser level to the garage floor shows that the garage floor was installed essentially level, without the necessary slope required to drain liquids to the garage door. No drain was installed to compensate for this defect. This violation of code has creates a life-safety hazard and must be fixed.
    - 8.1. Remedy: A top finish layer reasonably acceptable to the owner must be professionally installed in a good and workmanlike manner over the garage slab, with a slope of not less than 1% toward the garage door, in a manner which ensures a permanent bond between the finish layer and the slab, as approved by the owner.
  9. **Fujitsu HVAC System Improperly Installed**: The Fujitsu mini-split HVAC system for the house was improperly and unprofessionally installed, and is not compliant with code or the plans or accepted standards of the industry. Page W1 of the plans states that “*a whole-house ventilation system is to be installed for the new dwelling*”. The code and industry standards also require this. This requirement is based in the fact that houses today are constructed to drastically minimize air leakage. Fresh air must be introduced into the house to replace air exhausted by mechanical venting of kitchens and bathrooms, and also to ensure healthy air quality inside the home. This requirement of code, contract, and industry standards is typically met in a mini-split system by one of two methods: 1) by installing fresh air intakes in the air handlers of the system, or (2) by use of either a HRV (heat recovery ventilator) or ERV (energy recovery ventilator). The builder failed to install either system to provide fresh air to the house, and instead, instructed the owner to leave the bathroom exhaust fans running 24/7. Bathroom exhaust fans are an improper and unacceptable method of ensuring fresh air intake. Additionally, the Fujitsu system was improperly and unprofessionally installed, in violation of manufacturer’s recommendations and accepted industry standards: The

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unit was improperly operated during construction without normal and proper protections against construction dirt. As a result, the units became severely clogged with construction dirt and debris and were allowed to run in this condition during months of construction, and turned over to the owner without cleaning and without warnings of this condition. When the owner noticed that the units were not performing properly, she called in a Fujitsu factory representative who identified the problem and recommended professional cleaning. The owner, at her own expense, had certain of the units professionally and chemically cleaned, but other units still contain unacceptable levels of construction dirt. Construction dirt is known to shorten the life of these units considerably. In my professional opinion, the reasonably expected life of these units has been reduced substantially by what is clearly abuse by the builder during and after construction. In addition, the outside condenser units of the system were installed out of level and improperly secured to the house, indicating installation by unqualified and unsupervised workers. See photograph P6-A, Attached as exhibits to this report.

- 9.1. **Adverse Impacts:** The life of the units can be expected to have been significantly shortened by this abuse during construction.
- 9.2. **Remedy:** Owner should be provided with a 7 year extended warranty by a certified Fujitsu dealer with a minimum of 5 years of Fujitsu experience to cover the cost of premature burn-out typical of units subjected to abuse during construction.
10. **Radiant Heat System In Office Slab Inoperative:** The Hydronic radiant heat system in the office slab was installed without the required thermostat wire embedded in the polished concrete slab floor. The builder's workmen were apparently unaware of the requirement. The builder's suggested solution to this oversight was to install a wall thermostat. This suggestion was properly rejected by the owner. The office was designed to have a heated concrete slab floor driven by a boiler, with supplemental forced air heat and forced air conditioning provided by a Fujitsu mini-split system. If the radiant floor thermostat was triggered by air temperature (i.e. wall thermostat) rather than slab temperature (i.e. slab embedded thermostat), as suggested by the builder, the floor temperature would have lagged behind the air temperature, thus vitiating the purpose of the heated floor. Due to the large thermal mass, slab temperature must be constant. A wall thermostat would have caused the hydronic system to cycle off and on ineffectually rather than driving the heating of the room.
  - 10.1. **Adverse Impact:** The hydronic radiant system is currently inoperative.
  - 10.2. **Remedy:** a 12"X12" clean saw cut must be made in the slab at a location selected by the owner, close to the wall, and the concrete removed from this section. The cuts must be clean, without overcuts on the corners. The approved electrical lead for an approved slab temperature thermostat must be installed per manufacturer's

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recommendations, and the slab patched, leaving 1” from the top of slab for the insert of a decorative tile provided by the owner to make the patch appear deliberate. Tile to be installed professionally, flush with the finished slab grade.

**11. Water Accumulating in Entry Ceiling Light Fixture:** Water was reported collecting in the front hall light fixture. The cause of this hazardous condition is under investigation. A breach in the shower pan in the bathroom above the fixture is suspected.

**11.1. Adverse Impacts:** Although this defect manifests episodically, it indicates a serious and potentially fatal electrical hazard. All electrical fixtures must be protected against water at all times.

**11.2. Remedy:** Under Investigation

**13 Rear Exterior Steps Non-Compliant with Code:** The rear wood steps are not code compliant. The stairs lack the required landing per Section R311.3 of the code, to wit: “**R311.3 Floors and Landings at Exterior Doors. There shall be a landing or floor on each side of each exterior door. The width of each landing shall be not less than the door served.**” The stairs lack the required railing per code. The treads are not uniform in width as required by code, and not properly pitched to shed water. (See photograph P13-A, attached as an exhibit to this report).

**13.1 Adverse Impacts:** The rear steps constitute a slip-fall safety hazard due to both the irregularity of the tread widths, and due to pooling of water and ice on the treads.

**13.2 Remedy:** The steps must be removed and replaced per code and industry standards.

**14 Front Porch Roof Not Properly Secured Against Uplift:** The front porch posts are tacked to the porch roof with 8dd toe nails. This is totally inadequate to prevent the roof from being detached from the house in any strong wind event creating design force wind uplift on the porch roof. (See photograph P14-A, P14-B, And P14-C, attached as exhibits to this report).

**15** Section R802.11.1.1 states: “**R802.11.1.1 Truss Uplift Resistance** *Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the [truss design drawings](#) for the ultimate design wind speed as determined by [Figure R301.2\(5\)A](#) and listed in [Table R301.2\(1\)](#) or as shown on the [construction documents](#).*” Furthermore, the base of the posts improperly bear directly on the wood deck without a mediating metal post foot, thereby creating an inevitable rot condition.

**15.1 Adverse Impacts:** The porch roof is vulnerable to collapse with the next strong wind event creating uplift.

**15.2 Remedy:** Proper steel post connectors and post feet must be installed per code and visually disguised per accepted industry standards.

**16 Front Porch Steps Non-Compliant with Code:** The front porch steps are cupped and not properly pitched to shed water. (See photograph P14-B, attached as an exhibit to this report).

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16.1 Adverse Impacts: The steps constitute a slip-fall safety hazard due to both the irregularity of the tread widths, and due to pooling of water and ice on the treads.

16.2 Remedy: The steps must be removed and replaced per code and industry standards.

- 17 **Front Porch Railing Rotting, Structurally Defective Newel:** The rough-sawn front porch rough sawn lumber was constructed from inappropriately selected and water absorbent lumber, improperly sealed against weather, and improperly detailed to resist rot. Early stage rot is already apparent. The material selected by the builder, rough sawn non-resinous softwood, is particularly vulnerable to rot and inappropriate for exposed exterior use. The newel post has a large knot which renders the railing structurally unsound and unable to reliably resist the 200 lb lateral load required by code for railings. Once this large knot dries and loosens naturally, it is highly vulnerable to structural failure if someone slips against the railing. (See photograph P17-A, P17-b, attached as an exhibit to this report).

17.1 Adverse Impacts: Within two years, the rot will have progressed to the point that the railings will be unsafe and require replacement. The newel post is likely to fail once the large knot dries and loosens, with a high risk of serious injury and a lesser risk of death.

17.2 Remedy: The porch railings must be replaced with cedar, locust, or other rot resistant material and properly detailed and sealed against the weather to resist rot.

- 18 **Rear Kitchen Doors Improperly Installed:** The rear kitchen glass doors were installed improperly, out of plumb, and out of rack. Vertical margins unacceptable by industry standards, and prevent normal operation. (See photograph P18-A, attached as an exhibit to this report).

18.1 Adverse Impacts: As a result of this improper installation, the doors do not function properly. Screen door fell out and was damaged.

18.2 Remedy: The doors should be removed and professionally re-installed, and the damaged screen replaced.

- 19 **Basement Walls Un-Insulated:** (See photograph P19-A, attached as an exhibit to this report). The bare concrete walls of the basement are not insulated as required by code: “**N1102.2.9 (R402.2.9) Basement Walls** Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less.”

19.1 Adverse Impacts: The owner will suffer discomfort and increased energy bills, and reduced resale value on the home.

19.2 Remedy: Properly insulate the basement walls per code

- 20 **Non-Compliant Laundry Room Door:** (See photograph P20-A, attached as an exhibit to this report). The Laundry room door does not comply with the contract. Contract documents call for a pocket door, for clear and obvious functional reasons. The builder substituted a hinged door. No record of an agreed contract change has been presented.

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- 20.1 The hinged door reduces the functionality of the laundry room, reduces its effective usable floor space, and conflicts with the heating element when open.
- 20.2 Remedy: remove the non-compliant door and replace it with a pocket door per contract.
- 21 **Cracked Tile in Mater Bath:** (See photograph P21-A, P21-B, P21C attached as an exhibit to this report). A cracked tile is visible in the master bathroom wall. Defective installation.
- 21.1 **Adverse Impact:** The cracked tile is a significant defect in the master bathroom, lowering the value of the home.
- 22 **Improper Placement of Exterior Hose Bibs:** The builder installed two exterior hose bibs, concentrated within 15 feet of each other. Three hose bibs, spaced evenly around the house are required for effective watering of the yard with normal and manageable hose lengths, according to accepted industry standards.
- 22.1 **Adverse Impacts:** The unprofessional placement of the hose bibs makes normal yard watering and maintenance an undue burden.
- 22.2 **Remedy:** Add two hose bibs spaced evenly around the house at locations agreed by the owner.
- 23 **Construction Damage:** (See photograph P23-A, attached as an exhibit to this report). windows and door finishes were significantly damaged during construction, and [insert #] of gouges in the finish floors occurred and remain unrepaired, indicative of poor construction methods and management.
- 23.1 **Adverse Impacts:** Cumulatively, these defects significantly detract from a normal person's use and enjoyment of the house, and lower the resale value.
- 23.2 **Remedy:** The defects must be professionally repaired
- 24 **Paint Poor Quality and Incomplete** (See photograph P24-A, P24-B attached as an exhibit to this report). The ceilings were not properly covered by a finish coat. Colors were not as agreed [Hannah, we need to reconstruct the agreement to complete this section].
- 24.1 **Adverse Impacts:** The poor quality of the paint job would significantly impair a reasonable person's use and enjoyment of the house, and reduces resale value.
- 24.2 **Remedy:** A professional painter must complete the paint job to a reasonable level of quality appropriate to the price of the house..

## STATEMENT REGARDING NATURE OF REPORTS

Matters set forth herein are not final in nature. As additional information is obtained, the opinions and statements set forth herein could be supplemented or be refined.

Respectfully submitted,

Roger Greenwald, AIA