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STRUCTURAL ENGINEERING INSPECTION

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SUMMARY

1: GENERAL

Information

Project Information: GreenWorks Project Information: Inspection Project Information: Report Issue

Project Number

Date
2023-07-10

Date
2023-07-17

Building Information: Building Type
Three Story Multi-Family Residential w/ Below-Grade Parking Structure

Building Information: Framing Type
Wood-framed, Steel-framed, Concrete-framed

Building Information: Exterior Wall Type
Lap Siding, Stucco

Building Information: Foundation Type
Concrete Piers w/ Steel Beams

General: Purpose - Framing Review

As requested, personnel of GreenWorks Engineering and Consulting have completed a structural review of the address referenced above. The purpose of the observation was to collect information necessary to assess the condition and performance of the existing structure, including the below-grade garage, balconies, and facade. No inspection of the interior spaces was performed.

Some data collected in the form of photographs of the observed distress is presented in this report. These photographs are included for reference and are intended only to represent the distress generally found throughout the structure. They do not represent a comprehensive catalog of all of the distress present in the structure.

General Property Photos



























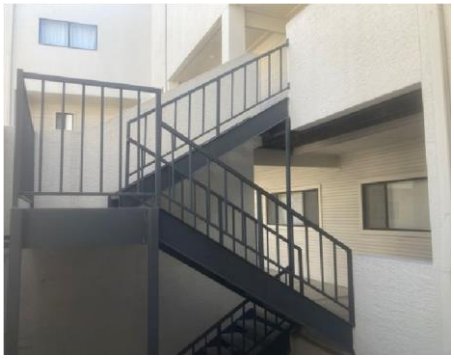





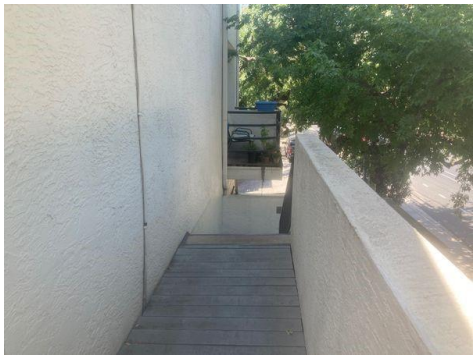


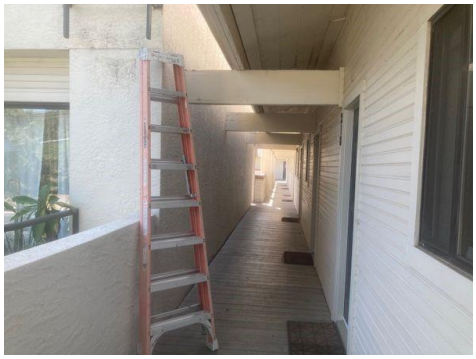

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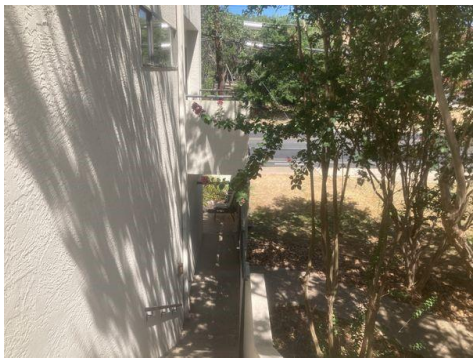



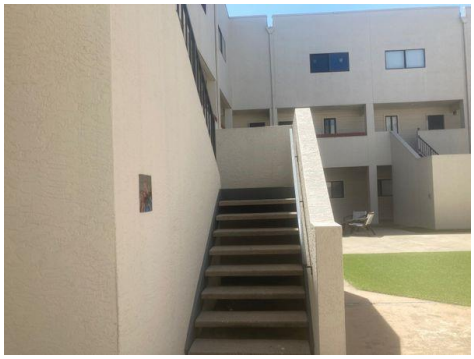






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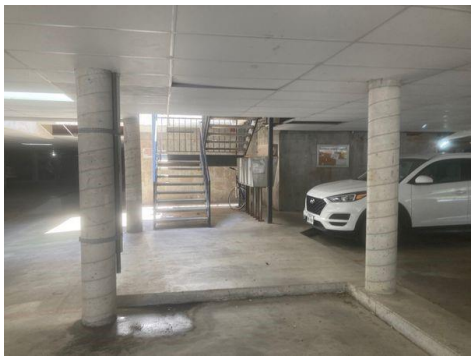
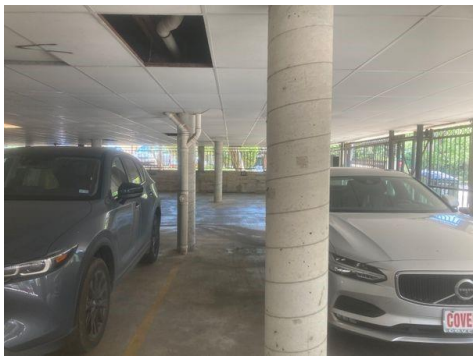
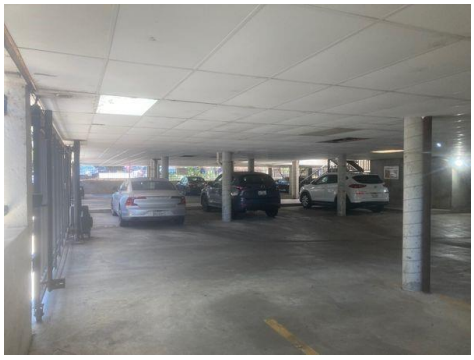










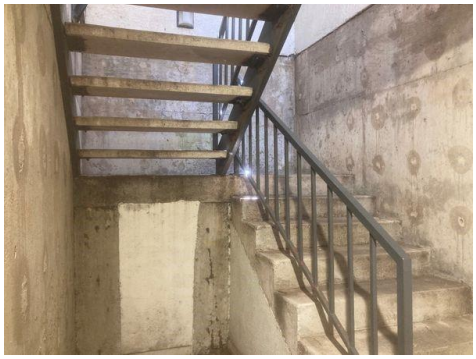
















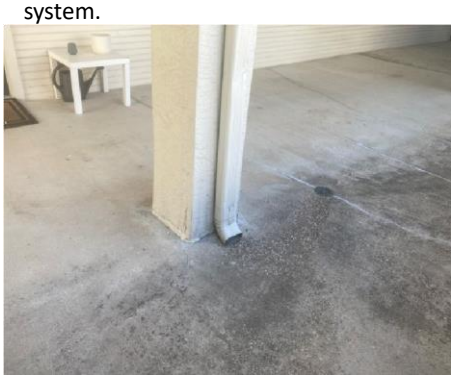

2: OBSERVATIONS - EXTERIOR

Information

Exterior Distress: Downspout Terminations

At foundation

A properly functioning gutter system will minimize ponding, soil loss and erosion, and can help control seasonal movement of the foundation. The gutter system should discharge the water a minimum of 5 feet from the foundation or into a below-grade drainage system.




Exterior Distress: Trim Separation



Exterior Distress: Patio Cracks







Exterior Distress: Stucco Cracks




Exterior Distress: Siding separation



2
1















Exterior Distress: Rotted siding

Unit 220, 224, 222, 2nd oor laundry, 102





Exterior Distress: Rotted Trim

Unit 207, 209, 210



Exterior Distress: Signi cant Corrosion to Stair Railing

East Stair

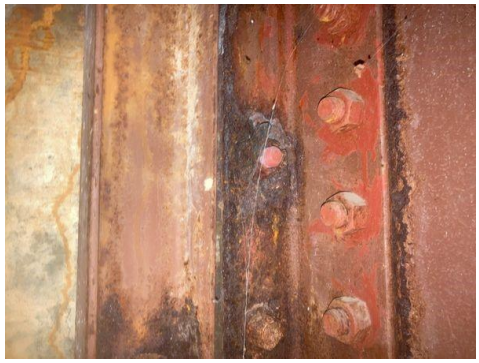

Structural concerns

2.1.1 Exterior Distress

Safety Hazard

SIGNIFICANT CORROSION TO STEEL CONNECTION






2.1.2 Exterior Distress

Safety Hazard

SIGNIFICANT CORROSION WITH SECTION LOSS

Signi cant corrosion was present with section loss to steel joists














2.1.3 Exterior Distress

Safety Hazard

SIGNIFICANT CORROSION TO STAIR STEP SUPPORT

WEST STAIRS 1ST FLIGHT

5 Angles need to be replaced





2.1.4 Exterior Distress

Safety Hazard

SIGNIFICANT CORROSION OF STEEL DECKING UNDER STAIR LANDING

UNIT 114


2.1.5 Exterior Distress

Safety Hazard

SIGNIFICANT CORROSION TO CORRUGATED DECKING

PARKING GARAGE, WEST & EAST STAIRS













2.1.6 Exterior Distress

SEPARATION OF GLULAM MEMBERS

UNIT 113

2.1.7 Exterior Distress

MODERATE CORROSION ON STEEL JOIST

CENTRAL AND NORTH CONCRETE WALLS


2.1.8 Exterior Distress

MODERATE CORROSION TO STEEL BEAM

EAST STAIRS, PARKING 205





2.1.9 Exterior Distress

MINOR CORROSION ON STEEL JOIST

NORTHEAST CORNER

2.1.10 Exterior Distress

BULGE AND CRACKS IN STUCCO

UNIT 202

Bulging Stucco is typically an indication of water intrusion in the wall.

2.1.11 Exterior Distress

MINOR CORROSION TO STEEL BEAM

PARKING 106

3: STRUCTURAL REVIEW

Information

Framing Review Conclusions: Structural Review - Inadequate

Based on our observations, there is signi cant structural damage due to extensive water intrusion, primarily at the balconies and the plaza above garage and the existing structure and is inadequate to support the current loads. It is our opinion that the structure will require extensive repairs to the concrete, steel, and wood framing to bring the structure to adequacy. We recommend performing the required repairs only according to structural repair plans that have been stamped and signed by a licensed professional engineer. If requested GreenWorks Engineering can provide the required structural plans.

Structural concerns

3.1.1 Framing Review Conclusions

Safety Hazard

BUILDING IS AT RISK OF COLLAPSE

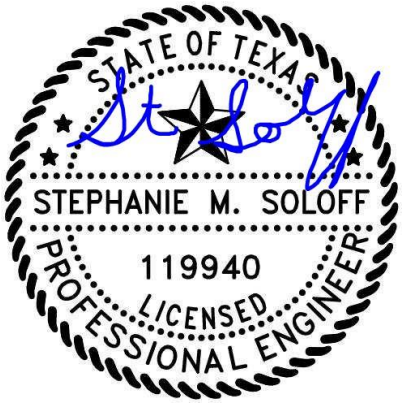
During the site visit, at least 7 steel oor trusses were observed to be completely corroded through with signi cant section loss, and several steel beam connections were compromised. Although it is impossible to predict when structural failure will occur, steel corrosion tends to accelerate quickly, and it is our opinion that temporary shoring should be placed in the locations marked as Safety Hazards throughout this report. If desired, a GreenWorks representative can meet on-site to indicate locations where temporary shoring should be placed.

4: PROFESSIONAL ENGINEER STAMP

Information

Report Prepared By: Prepared by Zain Maredia, E.I.T.

Professional Engineer Stamp: Reviewed by Stephanie Solo , P.E. GreenWorks Service Company



Vice President of Engineering

Texas Registered Engineering Firm 20170

Reviews enable us to continue providing the best experience possible for you and they also help homeowners like you to make con dent decisions about their engineering needs. Click here to leave a review.

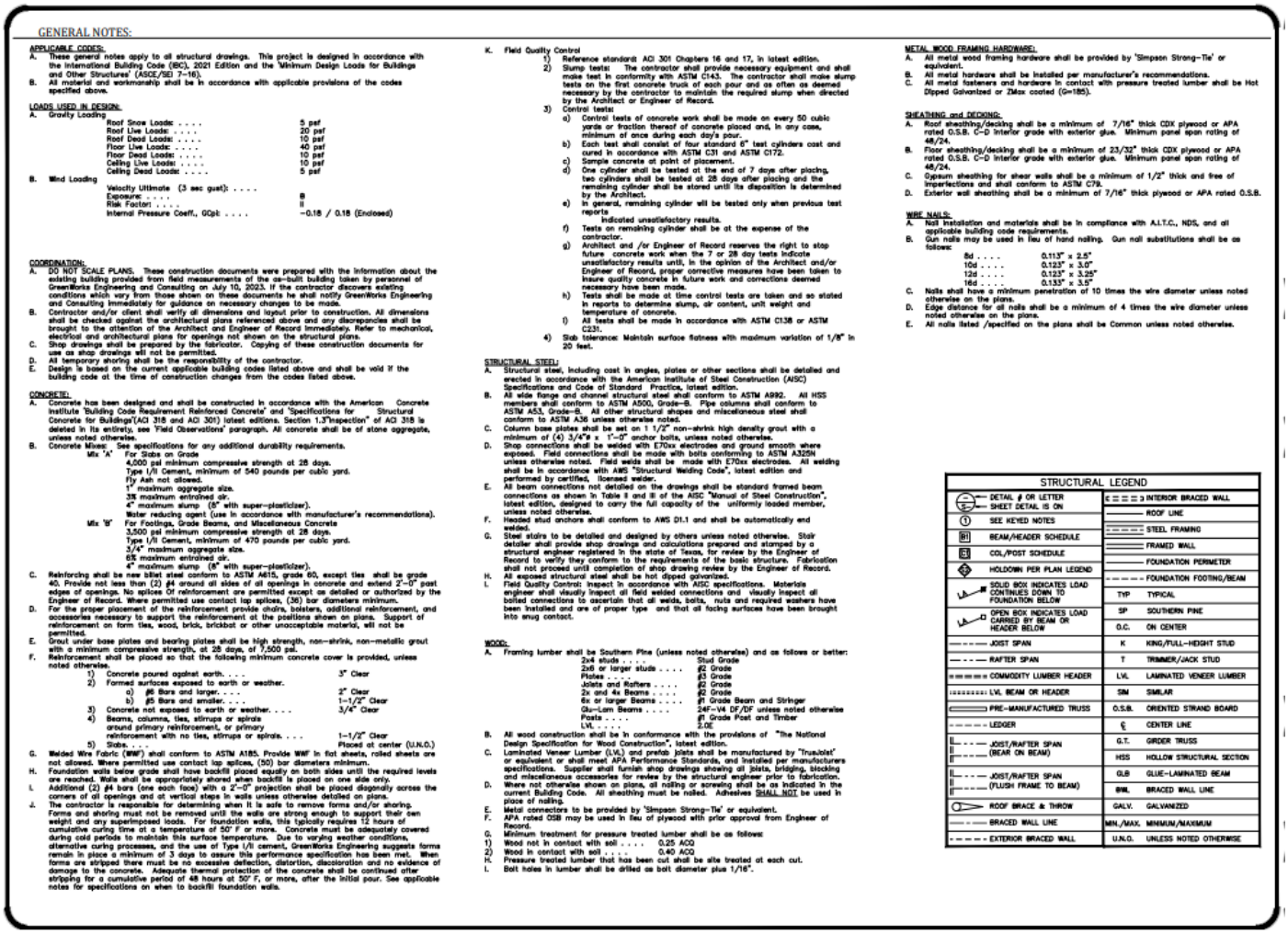
Limitations

GENERAL

The opinions and recommendations contained in this report are based on the visual observation of the then current conditions of the structure and the knowledge and experience of the engineer. The evaluation was limited to visual observations and areas not visible, accessible, or hidden behind furniture and appliances were not included in the evaluation. The evaluation did not include any soil sampling or testing.

The evaluation did not include any assessment of the existing foundation, plumbing, or soil and no implication is made on the compliance or non-compliance of the house with old or current building codes. No veri cation was made of the existing concrete strength, thickness, reinforcement nor capacity to support any load.

No guarantee or warranty as to the future performance or need for repair of the structure is intended or implied. Limits of liability for any claims with respect to this report is limited to the fees paid for services and anyone relying on the content of this report agrees to indemnify GreenWorks Service Company for all costs exceeding this fee.



GENERAL NOTES:

APPLICABLE CODES:
A. These general notes apply to all structural drawings. This project is designed in accordance with the International Building Code (IBC), 2021 Edition and the 'Minimum Design Loads for Buildings and Other Structures' (ASCE/SEI 7-16).
B. All material and workmanship shall be in accordance with applicable provisions of the codes specified above.

LOADS USED IN DESIGN:
A. Gravity Loading
Roof Snow Loads: . . . . 5 psf
Roof Live Loads: . . . . 20 psf
Roof Dead Loads: . . . . 10 psf
Floor Live Loads: . . . . 40 psf
Floor Dead Loads: . . . . 10 psf
Ceiling Live Loads: . . . . 10 psf
Ceiling Dead Loads: . . . . 5 psf
B. Wind Loading
Velocity Ultimate (3 sec gust): . . . .
Exposure: . . . . B
Risk Factor: II
Internal Pressure Coeff., GCpi: . . . . -0.18 / 0.18 (Enclosed)

COORDINATION:
A. DO NOT SCALE PLANS. These construction documents were prepared with the information about the existing building provided from field measurements of the as-built building taken by personnel of GreenWorks Engineering and Consulting on July 10, 2023. If the contractor discovers existing conditions which vary from those shown on these documents he shall notify GreenWorks Engineering and Consulting immediately for guidance on necessary changes to be made.
B. Contractor and/or client shall verify all dimensions and layout prior to construction. All dimensions shall be checked against the architectural plans referenced above and any discrepancies shall be brought to the attention of the Architect and Engineer of Record immediately. Refer to mechanical, electrical and architectural plans for openings not shown on the structural plans.
C. Shop drawings shall be prepared by the fabricator. Copying of these construction documents for use as shop drawings will not be permitted.
D. All temporary shoring shall be the responsibility of the contractor.
E. Design is based on the current applicable building codes listed above and shall be void if the building code at the time of construction changes from the codes listed above.

CONCRETE:
A. Concrete has been designed and shall be constructed in accordance with the American Concrete Institute 'Building Code Requirement Reinforced Concrete' and 'Specifications for Structural Concrete for Buildings'(ACI 318 and ACI 301) latest editions. Section 1.7'Inspection" of ACI 318 is deleted in its entirety, see 'Field Observations' paragraph. All concrete shall be of stone aggregate, unless noted otherwise.
B. Concrete Mixes: See specifications for any additional durability requirements.
Mix 'A' For Slabs on Grade
4,000 psi minimum compressive strength at 28 days.
Type I/II Cement, minimum of 540 pounds per cubic yard.
Fly Ash not allowed.
1" maximum aggregate size.
3% maximum entrained air.
4" maximum slump (8" with super-plasticizer).
Water reducing agent (use in accordance with manufacturer's recommendations).
Mix 'B' For Footings, Grade Beams, and Miscellaneous Concrete
3,500 psi minimum compressive strength at 28 days.
Type I/II Cement, minimum of 470 pounds per cubic yard.
3/4" maximum aggregate size.
6% maximum entrained air.
4" maximum slump (8" with super-plasticizer).
C. Reinforcing shall be new billet steel conform to ASTM A615, grade 60, except ties shall be grade 40. Provide not less than (2) #4 around all sides of all openings in concrete and extend 2'-0" past edges of openings. No splices Of reinforcement are permitted except as detailed or authorized by the Engineer of Record. Where permitted use contact lap splices, (36) bar diameters minimum.
D. For the proper placement of the reinforcement provide chairs, bolsters, additional reinforcement, and accessories necessary to support the reinforcement at the positions shown on plans. Support of reinforcement on form ties, wood, brick, brickbat or other unacceptable material, will not be permitted.
E. Grout under base plates and bearing plates shall be high strength, non-shrink, non-metallic grout with a minimum compressive strength, at 28 days, of 7,500 psi.
F. Reinforcement shall be placed so that the following minimum concrete cover is provided, unless noted otherwise.
1) Concrete poured against earth. . . . 3" Clear
2) Formed surfaces exposed to earth or weather.
a) #6 Bars and larger. . . . 2" Clear
b) #5 Bars and smaller. . . . 1-1/2" Clear
3) Concrete not exposed to earth or weather. . . . 3/4" Clear
4) Beams, columns, ties, stirrups or spirals around primary reinforcement, or primary reinforcement with no ties, stirrups or spirals. . . . 1-1/2" Clear
5) Slabs. . . . Placed at center (U.N.O.)
G. Welded Wire Fabric (WWF) shall conform to ASTM A185. Provide WWF in flat sheets, rolled sheets are not allowed. Where permitted use contact lap splices, (50) bar diameters minimum.
H. Foundation walls below grade shall have backfill placed equally on both sides until the required levels are reached. Walls shall be appropriately shored when backfill is placed on one side only.
I. Additional (2) #4 bars (one each face) with a 2'-0" projection shall be placed diagonally across the corners of all openings and at vertical steps in walls unless otherwise detailed on plans.
J. The contractor is responsible for determining when it is safe to remove forms and/or shoring. Forms and shoring must not be removed until the walls are strong enough to support their own weight and any superimposed loads. For foundation walls, this typically requires 12 hours of cumulative curing time at a temperature of 50° F or more. Concrete must be adequately covered during cold periods to maintain this surface temperature. Due to varying weather conditions, alternative curing processes, and the use of Type I/II cement, GreenWorks Engineering suggests forms remain in place a minimum of 3 days to assure this performance specification has been met. When forms are stripped there must be no excessive deflection, distortion, discoloration and no evidence of damage to the concrete. Adequate thermal protection of the concrete shall be continued after stripping for a cumulative period of 48 hours at 50° F, or more, after the initial pour. See applicable notes for specifications on when to backfill foundation walls.
K. Field Quality Control
1) Reference standards ACI 301 Chapters 16 and 17, in latest edition.
2) Slump tests: The contractor shall provide necessary equipment and shall make test in conformity with ASTM C143. The contractor shall make slump tests on the first concrete truck of each pour and as often as deemed necessary by the contractor to maintain the required slump when directed by the Architect or Engineer of Record.
3) Control tests:
a) Control tests of concrete work shall be made on every 50 cubic yards or fraction thereof of concrete placed and, in any case, minimum of once during each day's pour.
b) Each test shall consist of four standard 6" test cylinders cast and cured in accordance with ASTM C31 and ASTM C172.
c) Sample concrete at point of placement.
d) One cylinder shall be tested at the end of 7 days after placing, two cylinders shall be tested at 28 days after placing and the remaining cylinder shall be stored until its disposition is determined by the Architect.
e) In general, remaining cylinder will be tested only when previous test reports
indicated unsatisfactory results.
f) Tests on remaining cylinder shall be at the expense of the contractor.
g) Architect and /or Engineer of Record reserves the right to stop future concrete work when the 7 or 28 day tests indicate unsatisfactory results until, in the opinion of the Architect and/or Engineer of Record, proper corrective measures have been taken to insure quality concrete in future work and corrections deemed necessary have been made.
h) Tests shall be made at time control tests are taken and so stated in reports to determine slump, air content, unit weight and temperature of concrete.
i) All tests shall be made in accordance with ASTM C138 or ASTM C231.
4) Slab tolerance: Maintain surface flatness with maximum variation of 1/8" in 20 feet.

STRUCTURAL STEEL:
A. Structural steel, including cast in angles, plates or other sections shall be detailed and erected in accordance with the American Institute of Steel Construction (AISC) Specifications and Code of Standard Practice, latest edition.
B. All wide flange and channel structural steel shall conform to ASTM A992. All HSS members shall conform to ASTM A500, Grade-B. Pipe columns shall conform to ASTM A53, Grade-B. All other structural shapes and miscellaneous steel shall conform to ASTM A36 unless otherwise noted.
C. Column base plates shall be set on 1 1/2" non-shrink high density grout with a minimum of (4) 3/4"ø x 1'-0" anchor bolts, unless noted otherwise.
D. Shop connections shall be welded with E70xx electrodes and ground smooth where exposed. Field connections shall be made with bolts conforming to ASTM A325N unless otherwise noted. Field welds shall be made with E70xx electrodes. All welding shall be in accordance with AWS "Structural Welding Code", latest edition and performed by certified, licensed welder.
E. All beam connections not detailed on the drawings shall be standard framed beam connections as shown in Table II and III of the AISC "Manual of Steel Construction", latest edition, designed to carry the full capacity of the uniformly loaded member, unless noted otherwise.
F. Headed stud anchors shall conform to AWS D1.1 and shall be automatically end welded.
G. Steel stairs to be detailed and designed by others unless noted otherwise. Stair detailer shall provide shop drawings and calculations prepared and stamped by a structural engineer registered in the state of Texas, for review by the Engineer of Record to verify they conform to the requirements of the basic structure. Fabrication shall not proceed until completion of shop drawing review by the Engineer of Record.
H. All exposed structural steel shall be hot dipped galvanized.
I. Field Quality Control: Inspect in accordance with AISC specifications. Materials engineer shall visually inspect all field welded connections and visually inspect all bolted connections to ascertain that all welds, bolts, nuts and required washers have been installed and are of proper type and that all facing surfaces have been brought into snug contact.

WOOD:
A. Framing lumber shall be Southern Pine (unless noted otherwise) and as follows or better:
2x4 studs . . . . Stud Grade
2x6 or larger studs . . . . #2 Grade
Plates . . . . #3 Grade
Joists and Rafters . . . . #2 Grade
2x and 4x Beams . . . . #2 Grade
6x or larger Beams . . . . #1 Grade Beam and Stringer
Glu-Lam Beams . . . . 24F-V4 DF/DF unless noted otherwise
Posts . . . . #1 Grade Post and Timber
LVL 2.0E
B. All wood construction shall be in conformance with the provisions of "The National Design Specification for Wood Construction", latest edition.
C. Laminated Veneer Lumber (LVL) and prefab joists shall be manufactured by 'TrusJoist' or equivalent or shall meet APA Performance Standards, and installed per manufacturers specifications. Supplier shall furnish shop drawings showing all plats, bridging, blocking and miscellaneous accessories for review by the structural engineer prior to fabrication.
D. Where not otherwise shown on plans, all nailing or screwing shall be as indicated in the current Building Code. All sheathing must be nailed. Adhesives SHALL NOT be used in place of nailing.
E. Metal connectors to be provided by 'Simpson Strong-Tie' or equivalent.
F. APA rated OSB may be used in lieu of plywood with prior approval from Engineer of Record.
G. Minimum treatment for pressure treated lumber shall be as follows:
1) Wood not in contact with soil . . . . 0.25 ACQ
2) Wood in contact with soil . . . . 0.40 ACQ
H. Pressure treated lumber that has been cut shall be site treated at each cut.
I. Bolt holes in lumber shall be drilled as bolt diameter plus 1/16".

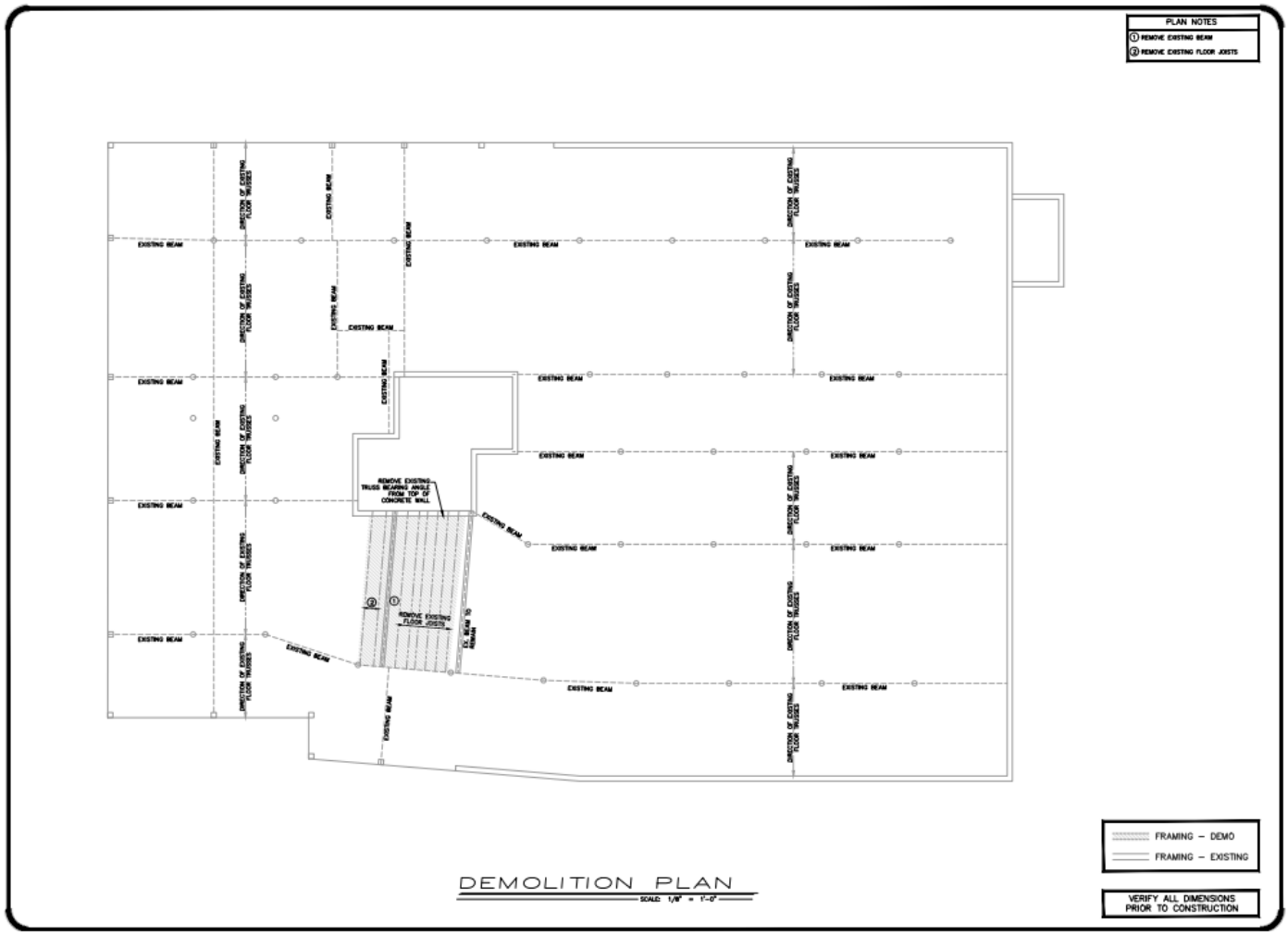
METAL WOOD FRAMING HARDWARE:
A. All metal wood framing hardware shall be provided by 'Simpson Strong-Tie' or equivalent.
B. All metal hardware shall be installed per manufacturer's recommendations.
C. All metal fasteners and hardware in contact with pressure treated lumber shall be Hot Dipped Galvanized or ZMax coated (G=185).

SHEATHING and DECKING:
A. Roof sheathing/decking shall be a minimum of 7/16" thick CDX plywood or APA rated O.S.B. C-D Interior grade with exterior glue. Minimum panel span rating of 48/24.
B. Floor sheathing/decking shall be a minimum of 23/32" thick CDX plywood or APA rated O.S.B. C-D Interior grade with exterior glue. Minimum panel span rating of 48/24.
C. Gypsum sheathing for shear walls shall be a minimum of 1/2" thick and free of imperfections and shall conform to ASTM C79.
D. Exterior wall sheathing shall be a minimum of 7/16" thick plywood or APA rated O.S.B.

WIRE NAILS:
A. Nail installation and materials shall be in compliance with A.I.T.C., NDS, and all applicable building code requirements.
B. Gun nails may be used in lieu of hand nailing. Gun nail substitutions shall be as follows:
8d . . . . 0.113" x 2.5"
10d . . . . 0.123" x 3.0"
12d . . . . 0.123" x 3.25"
16d . . . . 0.133" x 3.5"
C. Nails shall have a minimum penetration of 10 times the wire diameter unless noted otherwise on the plans.
D. Edge distance for all nails shall be a minimum of 4 times the wire diameter unless noted otherwise on the plans.
E. All nails listed /specified on the plans shall be Common unless noted otherwise.

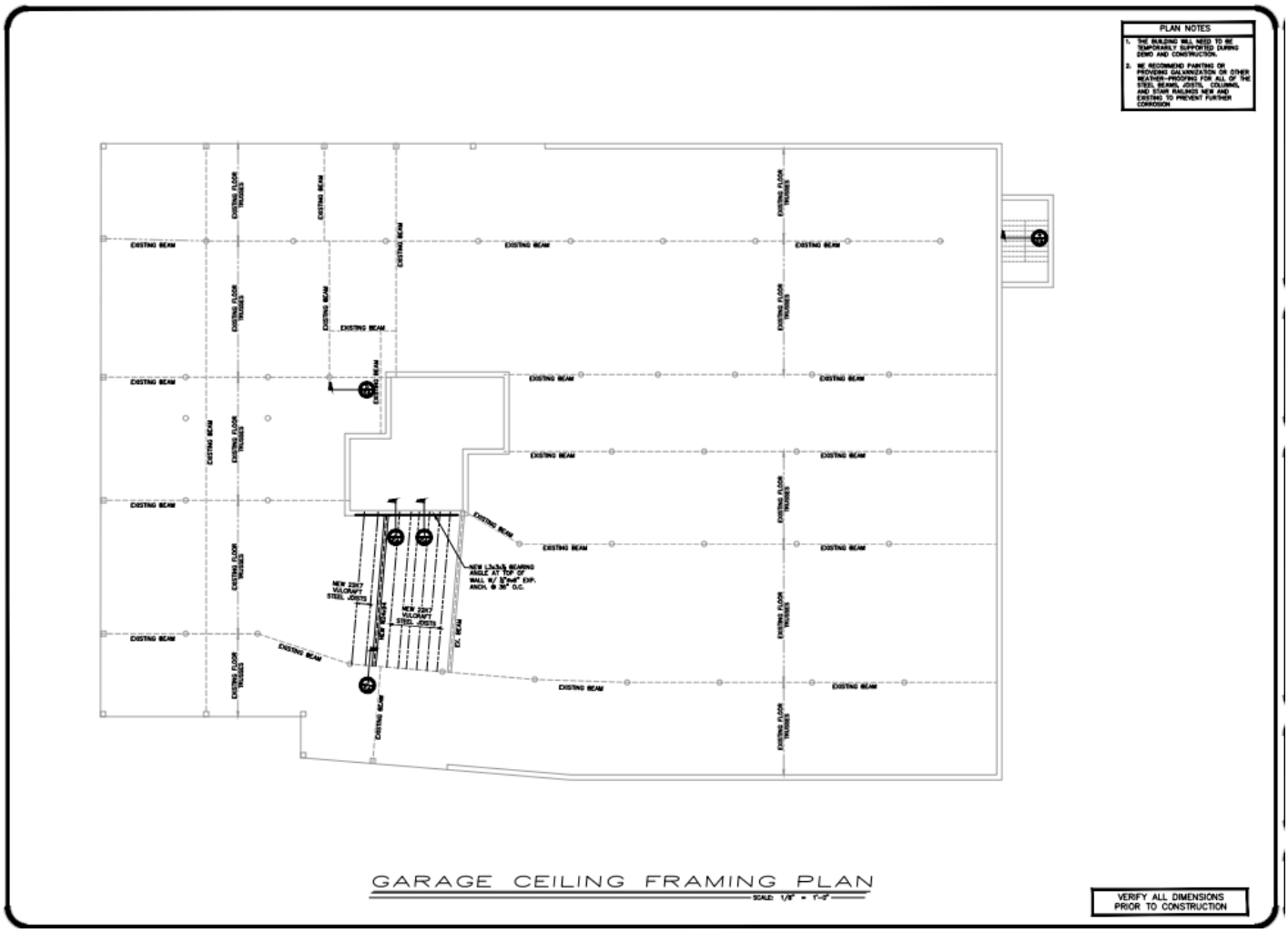
STRUCTURAL LEGEND

DETAIL # OR LETTER / SHEET DETAIL IS ON	INTERIOR BRACED WALL
SEE KEYED NOTES	ROOF LINE
BEAM/HEADER SCHEDULE	STEEL FRAMING
COL/POST SCHEDULE	FRAMED WALL
HOLDOWN PER PLAN LEGEND	FOUNDATION PERIMETER
	FOUNDATION FOOTING/BEAM
SOLID BOX INDICATES LOAD CONTINUES DOWN TO FOUNDATION BELOW	TYP TYPICAL
OPEN BOX INDICATES LOAD CARRIED BY BEAM OR HEADER BELOW	SP SOUTHERN PINE
	O.C. ON CENTER
JOIST SPAN	K KING/FULL-HEIGHT STUD
RAFTER SPAN	T TRIMMER/JACK STUD
COMMODITY LUMBER HEADER	LVL LAMINATED VENEER LUMBER
LVL BEAM OR HEADER	SIM SIMILAR
PRE-MANUFACTURED TRUSS	O.S.B. ORIENTED STRAND BOARD
LEDGER	℄ CENTER LINE
JOIST/RAFTER SPAN (BEAM OR BEAM)	G.T. GIRDER TRUSS
	HSS HOLLOW STRUCTURAL SECTION
JOIST/RAFTER SPAN (FLUSH FRAME TO BEAM)	GLB GLUE-LAMINATED BEAM
	BWL BRACED WALL LINE
ROOF BRACE & THROW	GALV. GALVANIZED
BRACED WALL LINE	MIN./MAX. MINIMUM/MAXIMUM
EXTERIOR BRACED WALL	U.N.O. UNLESS NOTED OTHERWISE



DEMOLITION PLAN

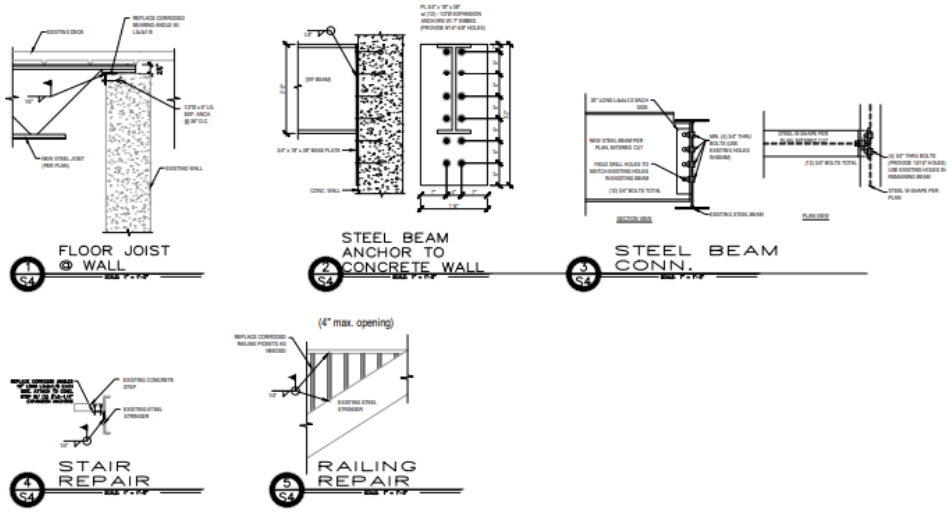
SCALE: 1/8" = 1'-0"


PLAN NOTES
1. THE BUILDING WILL NEED TO BE TEMPORARILY SUPPORTED DURING DEMO AND CONSTRUCTION.
2. WE RECOMMEND PAINTING OR PROVIDING GALVANIZATION OR OTHER WEATHER-PROOFING FOR ALL OF THE STEEL BEAMS, JOISTS, COLUMNS, AND STAIR RAILINGS NEW AND EXISTING TO PREVENT FURTHER CORROSION
EXISTING BEAM
EXISTING FLOOR TRUSSES
NEW 22K7 VULCRAFT STEEL JOISTS
DC BEAM
GARAGE CEILING FRAMING PLAN
SCALE: 1/8" = 1'-0"
VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION

1ST FLOOR FRAMING REPAIR PLAN

SCALE: 1/8" = 1'-0"

VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION


FLOOR JOIST @ WALL
1 S4
STEEL BEAM ANCHOR TO CONCRETE WALL
2 S4
STEEL BEAM CONN.
3 S4

STAIR REPAIR
4 S4
(4" max. opening)
RAILING REPAIR
5 S4