

Cody Johnston, PE  
Stonewall Structural Engineering, PLLC  
4800 Falls of Neuse Rd. #120  
Raleigh, NC 27609  
(919)407-8663



Paul Pepe  
14 W Landing  
Sanford, NC 27332

Re: Structural Observation—24 West Landing, Sanford, NC 27332

Mr. Pepe,

At your request, on May 29<sup>th</sup>, 2020 we performed a visual structural observation of various interior walls for proposed removal at the Sanford residence noted above. Renovation drawings by Robert Mikesell dated 12/2/2005 were provided on site. The structure is a conventionally framed, two-story, detached, single family residence with raised 1<sup>st</sup> floor framing over a pier/girder foundation system with perimeter masonry foundation walls (*see picture 1*).

Our observations and recommendations are listed below. Indicators such as “left,” “right,” “front,” and “back” are referenced as viewing the front of the home.

#### **BACK KITCHEN ROOM WALL REMOVAL**

- The 1<sup>st</sup> floor load bearing wall at the back of the kitchen is to be removed to create a total opening of approximately 18'-4" starting at the edge of the existing door opening that is at the right of the kitchen. The wall provides support for roof and attic loads. A beam that is installed so the bottom of the beam is flush with the bottom of the kitchen ceiling joists is to be added to support structural loads from above (*see picture 2*).
  - The beam should be a (2)1¾"x18" LVL (Boise Cascade VersaLam 3100, or better) beam with continuous span between end supports. The beam should be built-up using (3) rows of 16d sinkers at 12" o.c. spacing along the length of the member.
  - Fasten the kitchen ceiling joists to the front side of the new beam using Simpson face hangers.
  - Support each end of the beam with (3)2x4 #2 Spruce-Pine-Fir (SPF) studs.
  - Investigation into the crawlspace beneath the proposed bearing ends of the beam indicated that the left and right ends of the beam were located over CMU piers that are sufficient to support the new distribution of structural loads. No foundation modifications should be necessary to support the ends of the beam.
  - Install tight fit, full depth (3)2x blocking beneath each of the bearing points in the 1<sup>st</sup> floor framing system for direct transfer of vertical loads to the foundation elements below. The ends of the beam should be aligned over the centerline of the existing masonry piers.

**BACK DINING ROOM WALL REMOVAL**

- The 1<sup>st</sup> floor load bearing wall at the back of the dining room is to be removed to create a total opening of 29'-4". The wall provides support for 2<sup>nd</sup> story floor joists with front-to-back orientation, as well as roof, attic, and wall loads. A beam, installed flush to the underside of 2<sup>nd</sup> floor sheathing, is to be added to support structural loads from above (*see picture 3*).
  - The beam should be a W10x68 steel beam (Fy=50ksi) with continuous span between end supports. Install with tight fit 2x filler within the web on the back side of the beam for face hanger attachment. Fasten the web filler to the beam with ¾" diameter through-bolts with nut and washer at 12" o.c. for the length of the beam.
    - In order to facilitate the installation of the beam, the member may be shipped in sections and connected at the ends using a Complete Penetration Joint (CPJ) weld. All welds to be completed by a certified AWS welder.
    - Fasten 2<sup>nd</sup> story floor joists to the back side of the beam to the web-filler using Simpson face hangers.
    - Support each end of the beam with (8)2x4 #2 SPF studs. The stud pack should be strapped together at 1/3 points using Simpson CS-16 straps.
      - The end 3½ inches of the steel beam should have full bearing on the existing wall top plates. Fasten the bottom flange of the steel beam to the top of the wall plates using (2) ½" diameter x 4" long lag screws.
    - Investigation in the crawlspace beneath the proposed bearing ends of the beam indicated that the left and right ends of the beam were located over CMU piers that are sufficient to support the new distribution of structural loads. No foundation modifications should be necessary to support the ends of the beam.
    - Install tight fit, full depth (8)2x blocking beneath each of the bearing points in the 1<sup>st</sup> floor framing system for direct transfer of vertical loads to the foundation elements below.

**REMOVAL OF POSTS IN SUNROOM**

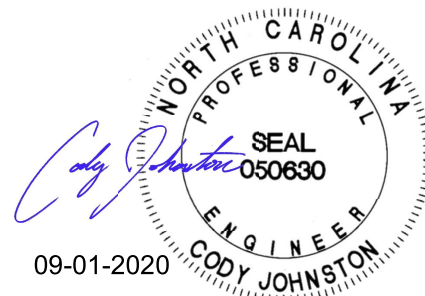
- The posts in the sunroom and the beam they support are to be removed to create a total opening of approximately 24'-0" starting at the right wall of the sunroom. The wall provides support for 2<sup>nd</sup> story floor joists with front-to-back orientation, as well as roof, attic, and wall loads. A beam, installed flush to the underside of the 2<sup>nd</sup> floor sheathing, is to be added to support structural loads from above (*see picture 4*).
  - The beam should be a W10x88 steel beam (Fy=50ksi) that is installed within the 2<sup>nd</sup> floor system and angled such that the left end bears on the back end of the header to the hallway that is at the left side of the stairs and the right end bears on the right wall of the sunroom over the back foundation wall of the master bedroom. Install with tight fit 2x filler within the web on both sides of the beam for face hanger attachment. Fasten the web filler at the beam with ¾" diameter through-bolts with nut and washer at 12" o.c. for the length of the beam.
    - In order to facilitate the installation of the beam, the member may be shipped in sections and connected at the ends using a Complete

Penetration Joint (CPJ) weld. All welds to be completed by a certified AWS welder.

- Fasten 2<sup>nd</sup> story floor joists on both sides of the beam to the web-filler using Simpson face hangers.
- Support the right end of the beam with a 3½"x7" PSL 1.8E ParaLam post with and additional (2)2x4 #2 SPF studs built-up against each face of the post. The stud pack should be strapped together at 1/3 points using Simpson CS-16 straps.
  - The end 3½ inches of the steel beam should have full bearing on the existing wall top plates. Fasten the bottom flange of the steel beam to the top of the wall plates using (2) ½" diameter x 4" long lag screws.
  - Install tight fit, full depth (8)2x blocking beneath this bearing point for direct transfer of vertical loads to the foundation element below.
  - Widen the foundation wall at the location of this point load by adding a 4"x16" solid CMU pilaster, that is built-up off the existing wall footing projection. Mortar and anchor new pilaster to the cleaned inside face of the foundation wall using (2) grouted stainless steel brick ties at each pilaster course.
- Support the left end of the beam with a (2)1¾"x9¼" Boise Cascade VersaLam 3100 header that should be span over the hallway opening.
  - Support the back end of this header with (6)2x4 #2 SPF jack studs and a 2x4 king stud.
  - Support the front end of the header with (3)2x4 #2 SPF jack studs and a 2x4 king stud.
- Investigation in the crawlspace beneath the proposed bearing ends of the beam and header indicated that the concrete footings that support the foundation at these areas are sufficient to support the new distribution of structural loads.
- Install tight fit, full depth 2x blocking beneath each of the bearing points in the 1<sup>st</sup> floor framing system for direct transfer of vertical loads to the foundation elements below.

The above-listed determinations were made in accordance with common engineering principles and the intent of the 2018 edition of the *North Carolina Residential Building Code*. Sequencing, and means and methods of construction are considered to be beyond the scope of this report. Contractor is to provide adequate temporary shoring prior to cutting or removing any structural load bearing elements. Please feel free to contact us, should you have any questions or concerns regarding this matter.

Sincerely,  
Cody Johnston, PE  
Stonewall Structural Engineering, PLLC  
Lic. #P-0951



**PICTURE ADDENDUM**



*Picture 1 – 24 West Landing,  
Sanford, NC*



*Picture 2 – Back kitchen wall*



*Picture 3 – Back dining room wall*



*Picture 4 – Posts and dropped beam*