



743 Powerline Road East, Lynden, Ontario, RR2 L0R1T0, Tel 905 521 9555, Fax 905 521 1613, [www.carmazanengineering.com](http://www.carmazanengineering.com)

To: Carrothers and Associates  
505 York Boulevard Unit 3, Hamilton, Ontario, L8R 3K4

Re. Structural and building engineering assessment at 324 Spruce Street, Oakville, Ontario

Date: March 5, 2024

Expert Report

All opinions and statements expressed are that of the duty of the Engineer retained in service.

### **Introduction :**

Carmazan Engineering Inc. has conducted an independent engineering inspection and assessment of the basement, main floor, second floor and third (attic) floor structure located at the above noted address. The inspection was based solely on visual and no testing.

### **Background :**

The subject structure was a 2 and a half storey single family home. We could not determine the age of the building, but we assume it is greater than 50 years old. (See plans attached)

### **Description of Structural Characteristics :**

The structure was observed as a typical wood frame building, with roof built in a lumber cut version.

The basement walls were observed as poured concrete on main area (old, original house) marked with "O" on plans attached, with a height of 7'8" and 2 rear areas that were observed as crawl space. We could not access the crawl space due to lack of accessibility. We could visualize the subfloor of crawl space through holes made in the rim boards at mechanical registers.

We observed a line of demarcation at the rear showing that an addition to the original building was made at some point in time in two stages. We marked the attached plans showing the additions with 2 and 3. Demarcation lines can be observed at the basement walls (crawl space) level and on the exterior walls. Brick veneer and additions 2 and 3 as wood shingles.

The addition 2 was made as an extension to the old kitchen, and over the old original rear porch. The addition 3 was made to extend family room at the rear and has a cathedral ceiling with a skylight.

We could not determine the timeline in the construction of the addition 2 and 3 but we know that the sequence was 2 followed by 3.

Main floor was observed as wood joints, wood beams and wood posts.

Exterior walls cladding was brick veneer and wood shingles.

## **Engineering Inspection :**

### **Basement and First floor**

Basement walls in area marked as “O” (original, old) were observed in a relatively good condition with minor cracks. We could not determine the strength of concrete used, but excavation was done to expose areas at connection of old, original home with additions. The additions do not have the required frost protection (the depth of underside of wall was observed at 32”). The additions do not have footings or a step down at the vicinity with the original home. The original basement wall, at that location, acts as a retaining wall and is not adequately reinforced to carry the loading.

The depth of the original basement walls are less than the OBC requirements of 48”, and observed at 40”.

The floor joist over the basement J1 (main floor joists) are 2”x8” spaced at 16” on center, supported by wood beams B1 and wood post marked as P1.

Wood beam B1 was observed as a timber cut 3.5”x8” with one piece of 2”x8” beside it.

No connection, nailing or bolting between the two. We observed a gap of an approximate 0.25” between the timber cut beam (3.5”x8”) and the 2”x8” added.

Floor joists were observed bearing on bare concrete and not on a typical wood plate. The lack of a wood plate indicates the probability of no anchorage to the foundation walls and no connection joist to concrete walls.

The floor joists are undersized based on today’s building code requirements, considering a live load of 1.9 Kpa the joist fail: moment (147%), live load deflection (200%), and total deflection (126%).

Some joists were observed cut, to allow mechanical installation (plumbing or heating).

Main supporting wood beam (B1) is supporting main floor and second floor so it is the structural core of the building. The beam is undersized and we consider it a possible structural hazard. After loading the beam according to latest building code requirements, with 1.9 Kpa life load the beam failed in all areas.

Failed shear (197%), failed moment (500%), and failed live load deflection (360%). We understand that standards at the time of construction of the original home were different than today, but the excess of maximum allowable is to be considered serious and hazardous.

Due to the above structural deficiencies the floor is sagging. We marked areas of depression in the floor with F1 and F2 at main floor. Values as indicated for F1 0.5” over 4’ and F2 1” over 4’ are both unacceptable. The direction of the depression is indicated on attached plans towards the main supporting beam below.

## **Second floor**

Second floor is also sagging. Values of depressions marked as F3 0.75" over 4' and F4 1.5" over 4' are both unacceptable. The direction of depression as marked on attached plans is towards the main supporting beam.

The largest depression in floor was observed in the stairs landing F5 2" over 4' which is also unacceptable and a hazard (structurally and as an eventual fire exit) due its steep angle.

## **Rear addition 2, 3**

Rear addition 2 and 3 as built, were observed as concrete walls and crawl space.

We could not determine the construction of the floor because there is no access in the crawl space.

We could see the underfloor through few holes made in the rim boards for mechanical installations and we observed the lack of insulation.

The crawls space has no venting.

We could not determine the as built construction of the wall and roof above the crawl space due the finishing and limited or no access.

## **Exterior, Front porch**

Original building exterior cladding is brick at main floor and wood siding at second and third floor (Attic level). The wood siding was observed to be in very bad shape with need of replacement. (see pictures attached)

Front porch deck was observed with significant settlement due the wood joist being damaged by water and possible rodents. The front porch deck will need a full replacement.

## **Conclusions :**

The original part of the home needs major structural adjustments that will trigger design, building permits and extensive work. The home cannot be occupied while construction will take place.

Additions 1 and 2 will also need major structural adjustments. Lowering the foundation wall to a min 48" below grade and add footings. This task will also require engineering and permitting and will be a very extensive and time consuming task, considering the limited space to the property lines.

Overall exterior cladding brick and siding will need repairs and replacement.

Based on the findings above and their structural deficiencies we consider the structure of the original and additions structurally unstable. The structure is not in an immediate danger to collapse, and repairs should be made in a very timely manner before another cold season and loading on main and second floor shall be limited.

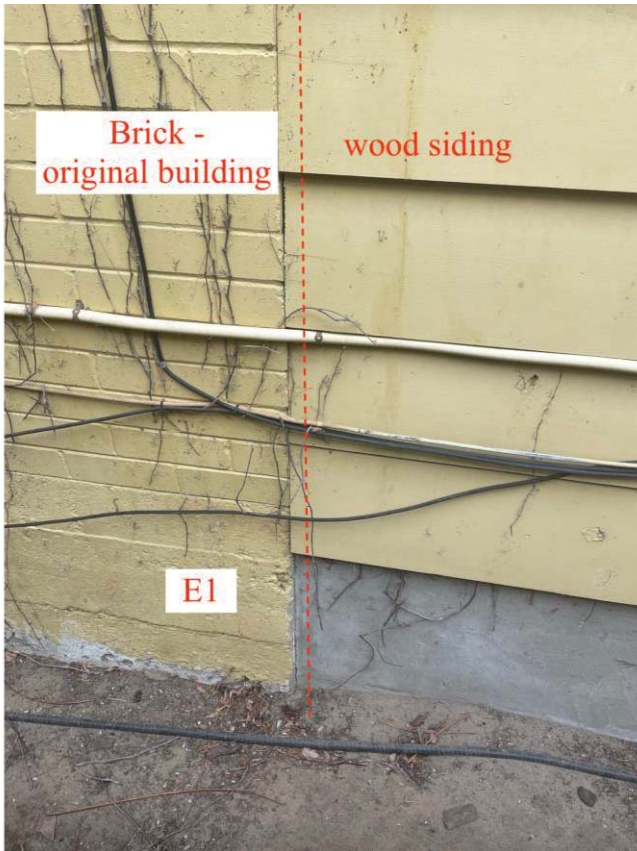
We cannot estimate the value of the repairs needed for structural issues without proper plans but based on our experience we expect the cost to be \$300,000 or more just for the structural components.

Sincerely

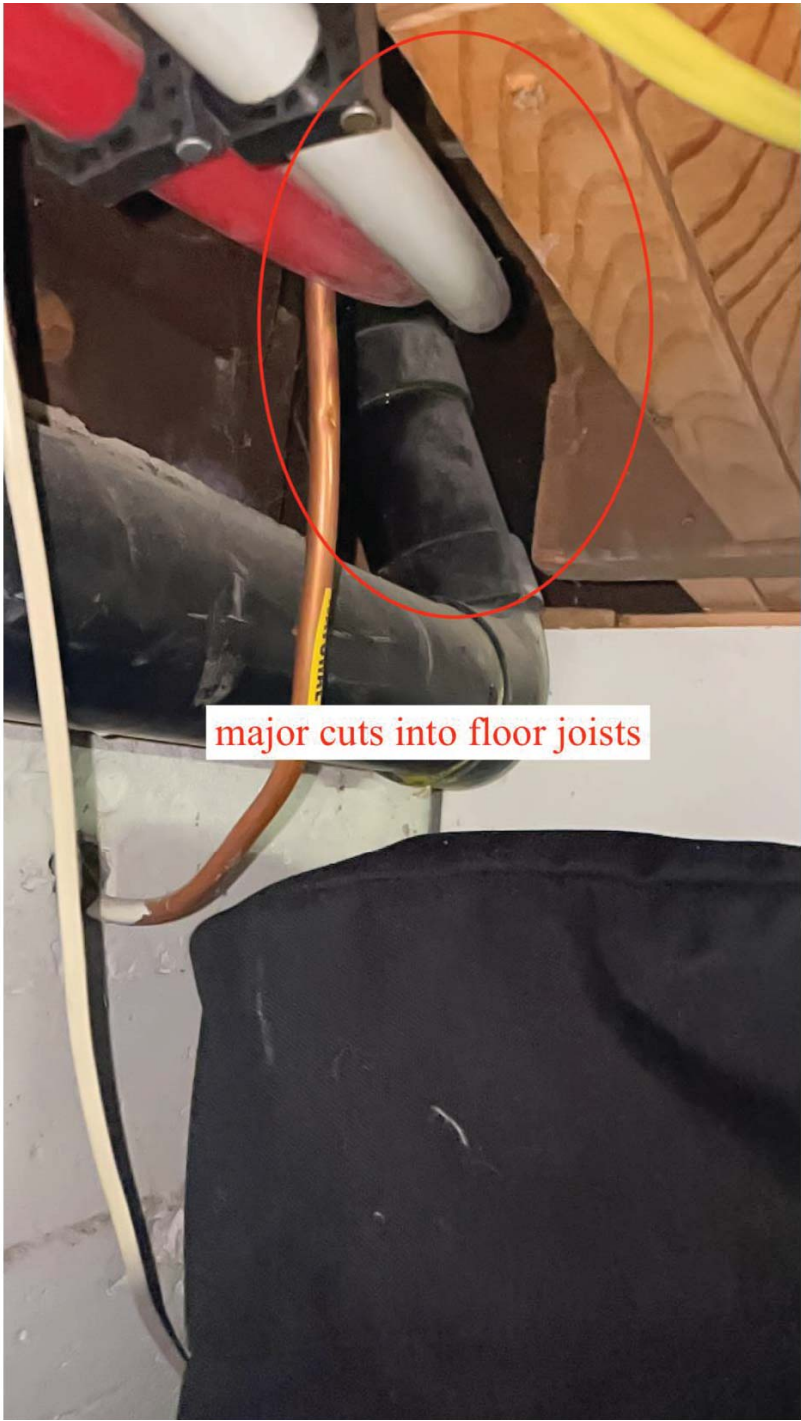
A handwritten signature in blue ink, appearing to read 'Carmazan', with a stylized flourish at the end.

Carmazan Engineering Inc.  
Calin Carmazan, M.Eng., P.Eng.  
Hamilton , March 5, 2024

Demarcation lines - original additions







major cuts into floor joists



No wood plate on top of foundation wall

major cuts in jost to accomodate plumbing

Crawl space beyond wall towards first addition





gap 1"

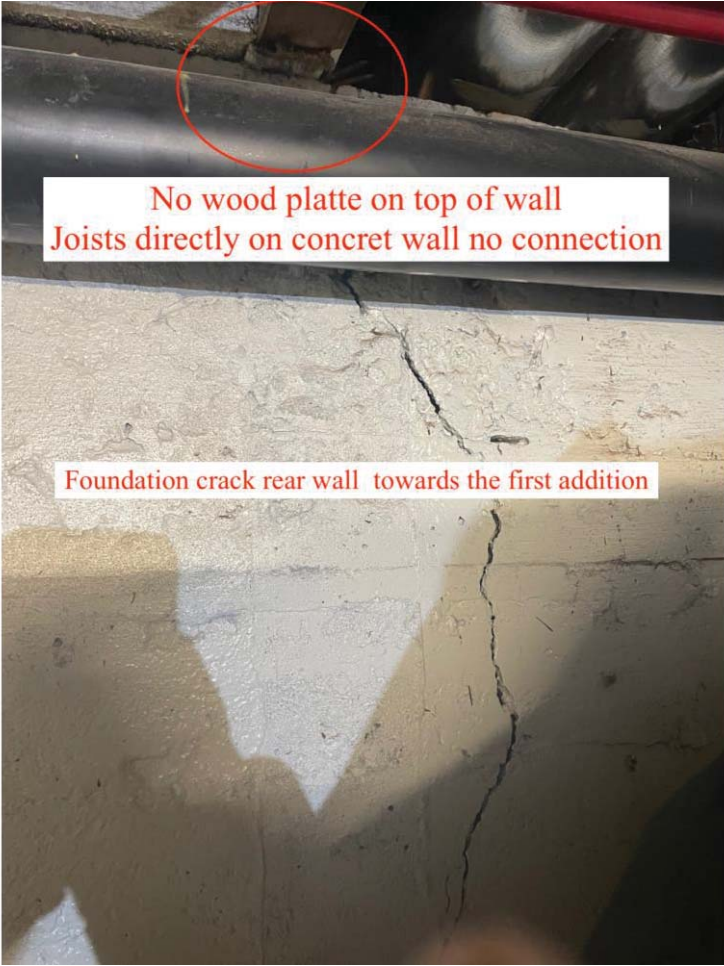
main supporting Beam B1



Damaged wood siding



second floor above mainsuuprting beam  
floor detaching



No wood platte on top of wall  
Joists directly on concret wall no connection

Foundation crack rear wall towards the first addition



lack of steel lintel for brick above  
arch with key to low support needed

craks in arch wood frame of window compressed



No.	Date	Issue/Revision	By
1	NOV 27/22	ISSUED FOR DC REVIEW	NK

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**Ministry of Municipal Affairs and Housing**  
 QUALIFICATION INFORMATION  
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 CARROTHERS AND ASSOCIATES INC.  
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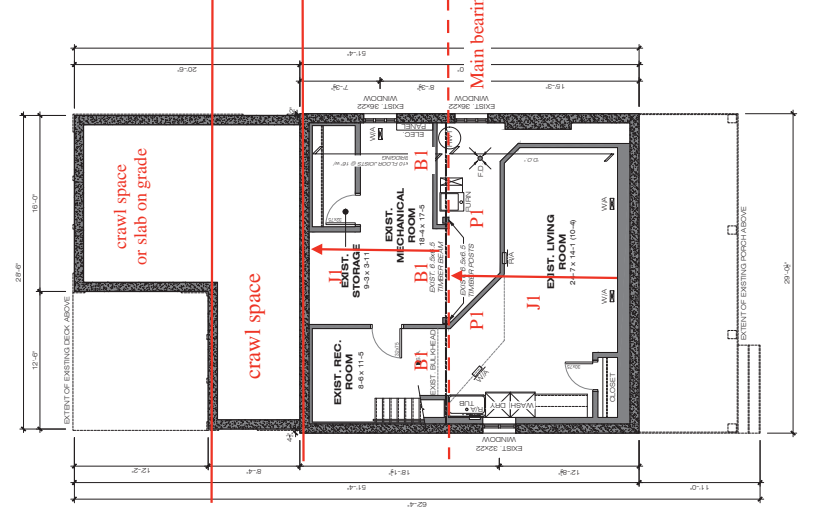
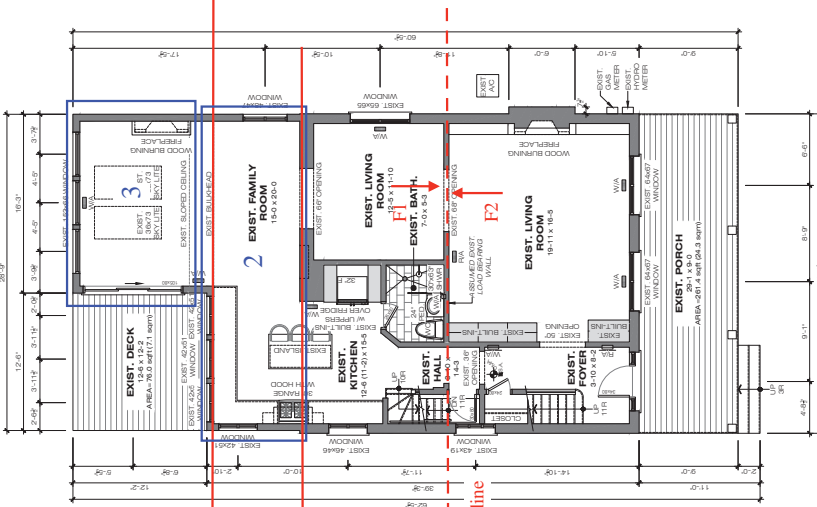
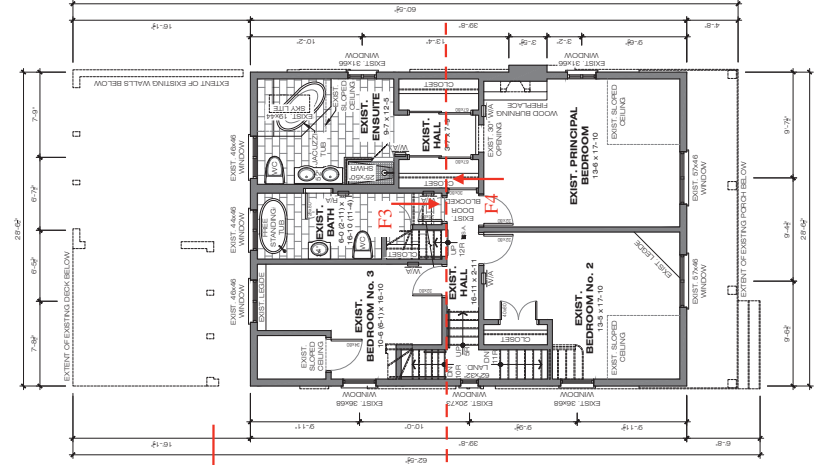
**CARROTHERS ASSOCIATES**  
 ARCHITECTURAL DESIGN + INTERIORS  
 505 YORK BOULEVARD - UNIT 3  
 HAMILTON ONTARIO L8R 3K4  
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**HAMMOND RESIDENCE**  
 ADDITION AND RENOVATION  
 324 SPRUCE STREET  
 OAKVILLE, ON. L6J 2H1

Project Name:  
 Sheet Title:  
**EXIST. FLOOR PLANS (FOR REF. ONLY)**

Drawn By: NK  
 Checked By: DC  
 Scale: 1/8" = 1'-0"  
 Date: NOV 2022  
 Project No: 2022-84

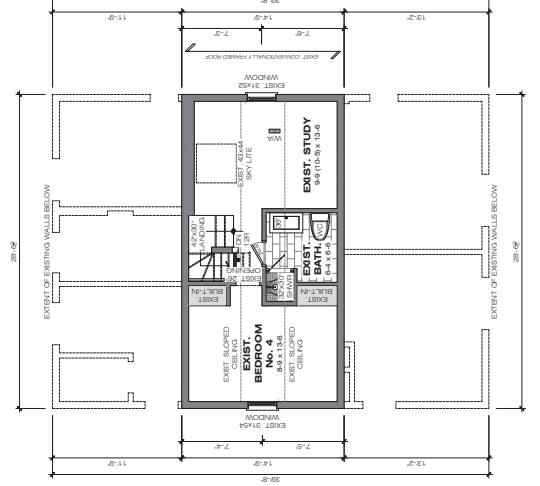
**A1**



EXISTING SECOND FLOOR PLAN  
 AREA = 1132.2 sqft (105.2 sqm)  
 CEILING HEIGHT = 7'-10"

EXISTING MAIN FLOOR PLAN  
 AREA = 1340.1 sqft (124.5 sqm)  
 CEILING HEIGHT = 8'-10"

EXISTING BASEMENT/FOUNDATION PLAN  
 AREA = 885.5 sqft (82.2 sqm)  
 CEILING HEIGHT = 6'-7"



EXISTING ATTIC FLOOR PLAN  
 AREA = 421 sqft (39.1 sqm)  
 CEILING HEIGHT = 6'-11"

EXISTING ATTIC FLOOR PLAN  
 AREA = 421 sqft (39.1 sqm)  
 CEILING HEIGHT = 6'-11"



CONSTRUCTION NORTH

No.	Date:	Issue/Revision	By:
6	MAR 04/23	ISSUED FOR STRUCT. REPORT	NK
5	FEB 14/23	ISSUED FOR STRUCT. REPORT	NK
4	NOV 28/23	ISSUED FOR COORDINATION	CD
3	NOV 14/23	ISSUED FOR DC REVIEW	CD
2	SEP 19/23	ISSUED FOR HERITAGE REVIEW	CD
1	SEP 15/23	ISSUED FOR DC REVIEW	CD

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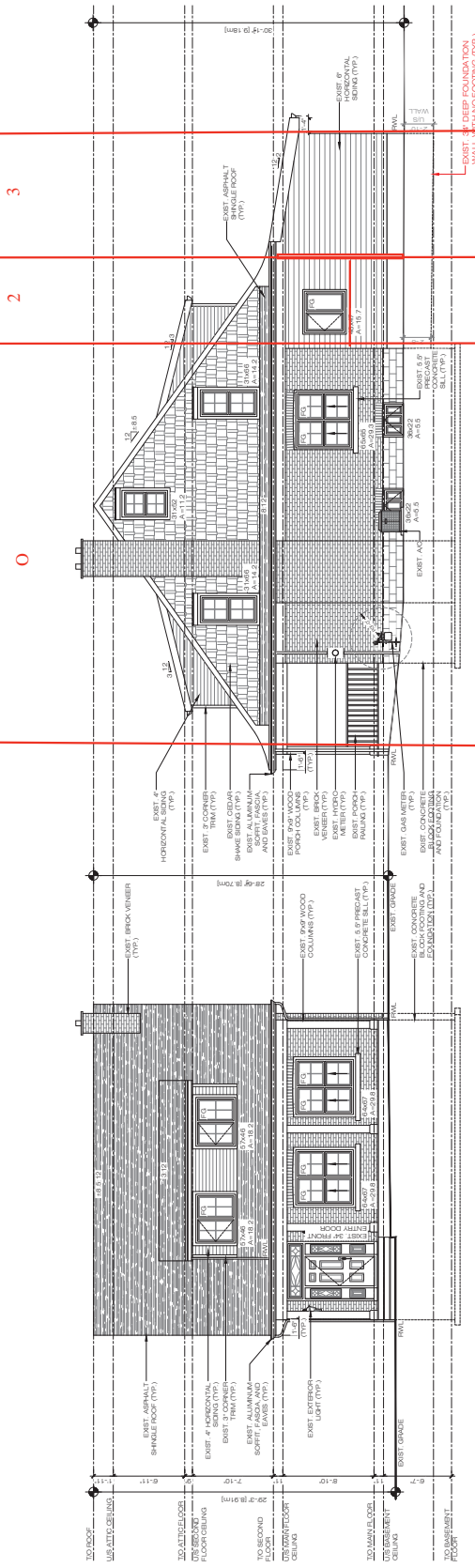
Project Name:  
**PRIVATE RESIDENCE**  
 NEW CUSTOM SINGLE FAMILY DWELLING  
 324 SPRUCE STREET,  
 OAKVILLE, ONTARIO L6J 2H1

Sheet Title:  
**EXISTING ELEVATIONS (FOR REF. ONLY)**

Drawn By:	MB/CD	Checked By:	DC
Scale:	1/8" = 1'-0"		
Date:	MAR 2024		
Project No.:	2023-18		

A1

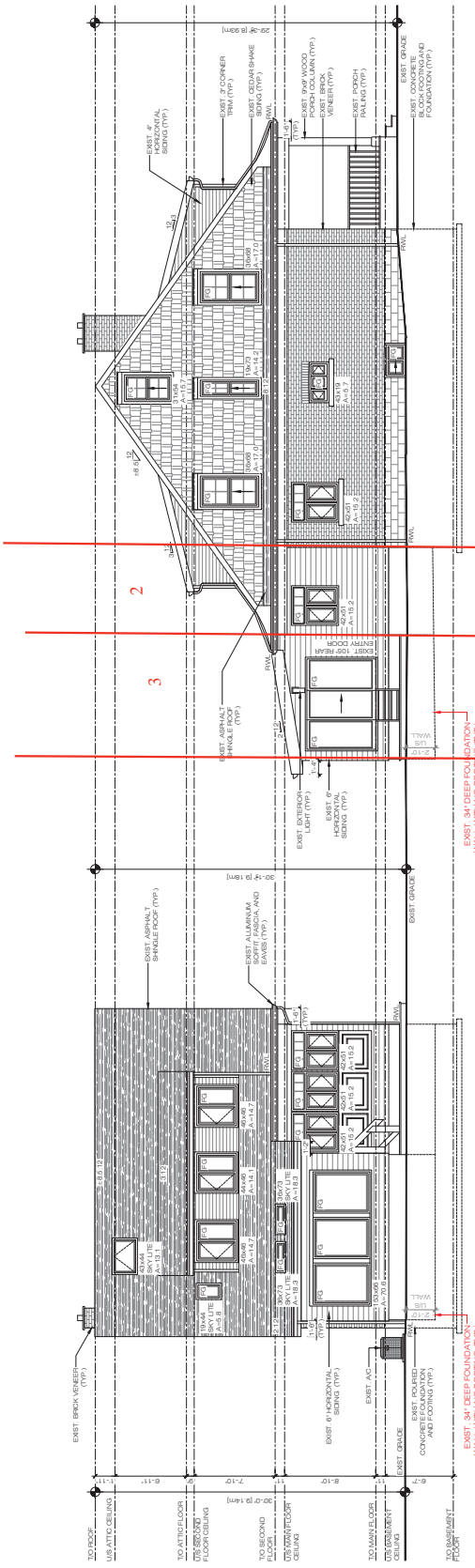
original Home  
 porch - front and rear  
 rear was changed with addition 1



EXISTING FRONT ELEVATION

EXISTING RIGHT SIDE ELEVATION

line of demarcation  
 addition 1  
 addition 2



EXISTING REAR ELEVATION

EXISTING LEFT SIDE ELEVATION

line of demarcation  
 addition 1  
 addition 2