

B2B Excellence Ltd. (Extension Buildings)

Purbapara Mirzapur, 8 No. Mirzapur Mouza, Mirzapur, Gazipur Sador, Gazipur
(24.08869, 90.35672)
15th November 2021



Buildings Information

1. 2-Storied RC Building (B+G+1)
2. CNG Vehicle & Finished Goods Shed (Single Storied Shed)
3. Compressor & Boiler Shed (Single Storied Shed)
4. Cutting Shed (Single Storied Shed)
5. Wastage Shed (Single Storied Shed)
6. Kitchen Shed (Single Storied Shed)
7. Guard Room (Single Storied Building)

Observations

Inconsistency in as-built drawing & engineering assessment report

5.3.3 Foundation Performance Check:

Allowable bearing capacity is 2.25 tsf at 10' depth in B.H-05 & Ultimate bearing capacity is 13.5 ksf.

Bearing capacity check:

Foundation Performance bearing check									
	BH-5	2.250	2.250	4.500		Ultimate BC =	13.500		
Node	DEAD Load Reaction (kip)	Floor live load reaction (kip)	Factored load (kip)	Total Reaction (kip)	Ultimate Bearing Capacity (ksf)	Footings Area(sq. ft)	Total Capacity (kip)	FoS gravity	Remark
1.00	36.25	3.90	57.37	40.15	13.50	176	2376.00	59.19	OK
2.00	42.45	6.81	71.00	49.26	13.50	288	3888.00	78.93	OK
3.00	54.26	7.38	88.51	61.64	13.50	288	3888.00	63.07	OK
4.00	50.90	7.37	83.78	58.27	13.50	288	3888.00	66.73	OK
5.00	61.22	16.55	113.84	77.77	13.50	288	3888.00	49.99	OK
6.00	66.64	11.26	112.44	77.90	13.50	176	2376.00	30.50	OK
7.00	51.84	9.33	88.44	61.17	13.50	168	2268.00	37.07	OK
8.00	155.59	26.12	262.22	181.71	13.50	168	2268.00	12.48	OK
9.00	125.28	20.67	210.53	145.95	13.50	168	2268.00	15.54	OK
10.00	123.31	17.14	201.77	140.45	13.50	465	6277.50	44.70	OK
11.00	161.55	24.33	267.53	185.88	13.50	441	5953.50	32.03	OK
17.00	12.10	2.25	20.76	14.35	13.50	441	5953.50	415.02	OK
18.00	13.22	2.57	22.87	15.79	13.50	441	5953.50	377.14	OK
19.00	23.57	3.88	39.60	27.45	13.50	441	5953.50	216.86	OK
41.00	9.88	0.97	15.48	10.85	13.50	441	5953.50	548.71	OK
42.00	11.38	1.00	17.62	12.37	13.50	441	5953.50	481.17	OK
43.00	17.52	2.75	29.20	20.27	13.50	441	5953.50	293.74	OK
44.00	22.06	3.37	36.60	25.42	13.50	441	5953.50	234.17	OK
45.00	5.35	0.77	8.80	6.12	13.50	441	5953.50	973.11	OK
46.00	28.77	4.45	47.83	33.21	13.50	441	5953.50	179.27	OK
47.00	28.48	4.62	47.73	33.11	13.50	441	5953.50	179.84	OK

Footings area mentioned in the engineering assessment report not matched with the as-built drawing. Building engineer is required to review the design of the footings.

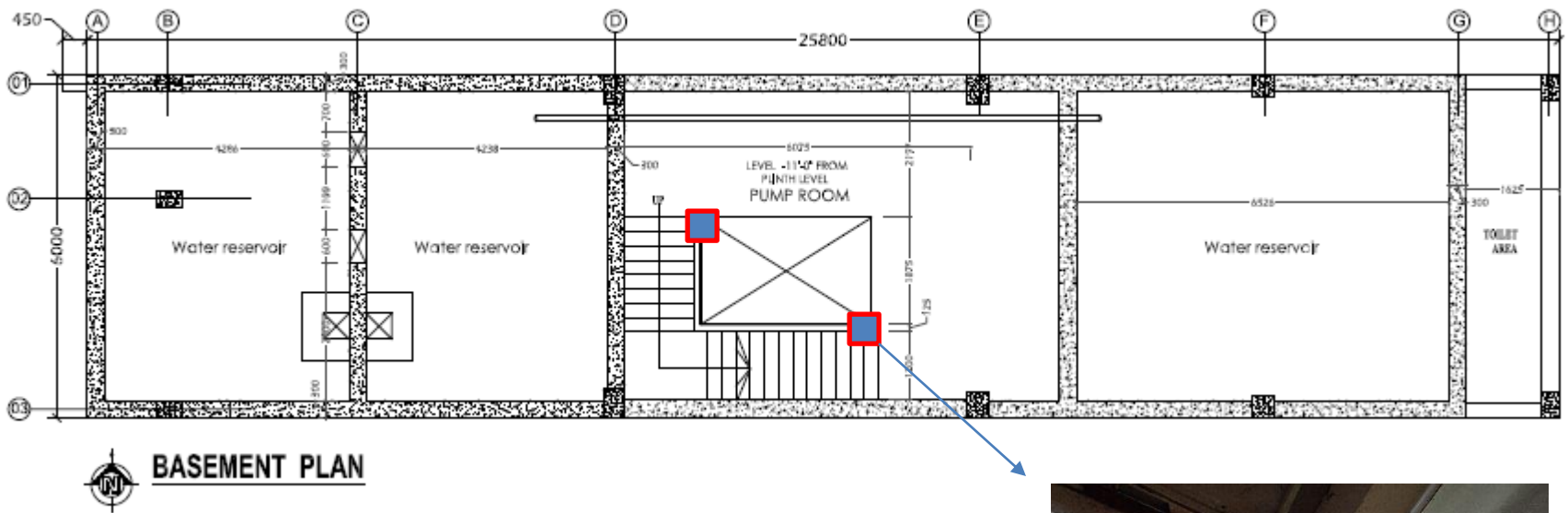
FOOTING SCHEDULE :

Note:-

f'c = 4,000 psi

Fy = 60,000 psi

Footings Mark	Nos	Footings size		Thickness (mm)			Re-bars	
		A	B	T	t1	t2	(Long) L	Short (S)
F1	2	2025	2025	450	300	150	12 Ø @ 100 c/c	12 Ø @ 100 c/c
F1a	1	2175	1900	450	300	150	12 Ø @ 100 c/c	12 Ø @ 100 c/c
F2	2	2100	2100	450	300	150	12 Ø @ 100 c/c	12 Ø @ 125 c/c
F3	2	2925	2925	600	450	150	16 Ø @ 150 c/c	16 Ø @ 150 c/c
F4	2	3000	3000	600	450	150	16 Ø @ 125 c/c	16 Ø @ 150 c/c
F5	2	3225	3225	625	450	175	16 Ø @ 125 c/c	16 Ø @ 140 c/c



Two additional column found on the basement floor but not shown in the drawing. Building engineer is required to update the as-built drawings



**Apparently lack of lateral stability system &
inadequate member size**



No compression strut provided at ridge position in the long direction. No roof bracings provided along the short direction. Apparently lack of lateral stability observed. The building engineer is required to check the lateral stability system of the shed.



Poor connection details

5.3.2 Column:

From the analysis, it is seen that almost no columns are in very good condition. All columns are found to be overstressed.

Before retrofitting:

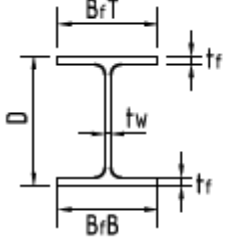
RCC Column Capacity Check						
B2B EXCELLENCE Ltd (EXTENSION BUILDINGS) (CNG Vehicle Room & Fabric Store Shed)						
NO	Grid no.	Column ID (As Built Drawing)	Column Size (As Built)	Provided rebar From As Built drawing	Required Rebar from AS-BUILT	Remarks (As Built)
BELOW GRADE						
1	1/G	C1	500X350	1896.7704	3353	NOT OK
2	1/F	C1	500X350	1896.7704	1988	NOT OK
3	1/E	C1	500X350	1896.7704	1988	NOT OK
4	1/D	C1	500X350	1896.7704	1988	NOT OK
5	1/C	C1	500X350	1896.7704	1988	NOT OK
6	1/B	C1	500X350	1896.7704	1988	NOT OK
7	1/A	C1	500X350	1896.7704	3353	NOT OK
8	2/G	C1	500X350	1896.7704	3353	NOT OK
9	2/F	C1	500X350	1896.7704	1988	NOT OK
10	2/E	C1	500X350	1896.7704	1988	NOT OK
11	2/D	C1	500X350	1896.7704	1988	NOT OK
12	2/C	C1	500X350	1896.7704	1988	NOT OK
13	2/B	C1	500X350	1896.7704	1988	NOT OK
14	2/A	C1	500X350	1896.7704	3353	NOT OK

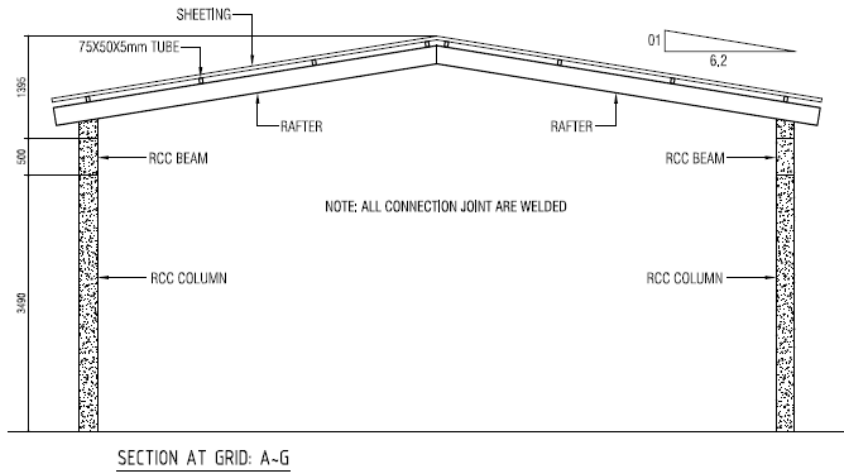
RCC Column Capacity Check						
B2B EXCELLENCE Ltd (EXTENSION BUILDINGS) (CNG Vehicle Room & Fabric Store Shed)						
NO	Grid no.	Column ID (As Built Drawing)	Column Size (As Built)	Provided rebar From As Built drawing	Required Rebar from AS-BUILT	Remarks (As Built)
BELOW GRADE						
1	1/G	C1	450X300	1896.7704	1639	OK
2	1/F	C1	450X300	1896.7704	2060	NOT OK
3	1/E	C1	450X300	1896.7704	2060	NOT OK
4	1/D	C1	450X300	1896.7704	2060	NOT OK
5	1/C	C1	450X300	1896.7704	2060	NOT OK
6	1/B	C1	450X300	1896.7704	2060	NOT OK
7	1/A	C1	450X300	1896.7704	1639	OK
8	2/G	C1	450X300	1896.7704	1639	OK
9	2/F	C1	450X300	1896.7704	2060	NOT OK
10	2/E	C1	450X300	1896.7704	2060	NOT OK
11	2/D	C1	450X300	1896.7704	2060	NOT OK
12	2/C	C1	450X300	1896.7704	2060	NOT OK
13	2/B	C1	450X300	1896.7704	2060	NOT OK
14	2/A	C1	450X300	1896.7704	1639	OK

As per Engineering Assessment report almost all the reinforced columns are inadequate. The building engineer is required to suggest remedial action.

Inconsistency in as-built drawing

LEGEND OF I-SECTION

TYPICAL I-SECTION	SECTION ID	D (mm)	t _w (mm)	B _f T (mm)	B _f B (mm)	t _f (mm)
	R01	250	4	100	100	6



Rafter depth shown 250 mm on as-built drawing, but depth measured 200 mm onsite. Building engineer is required to update the as-built drawings.

**Apparently lack of lateral stability system &
inadequate member size**



No roof bracing



Poor connection

No roof bracing provided to integrated the trusses. only truss action in the short direction. Load transfer media in long direction is missing. Also, poor connections are observed. The building engineer is required to check the lateral stability system of the structure and suggest proper remedial measures.

5.6 Conclusion:

The capacity of existing structure has been evaluated. Under the evaluation, standard procedure is step-by-step followed. Following things are found in present studies:

- a) *Building dimension & grid dimension are verified, in field dimension are found almost correct with a little variation. In analysis average dimension are taken. Those are also presented in as built drawing.*
- b) *All columns dimension is verified and the verified corrected column dimension are used in the analysis and presented in the as built drawing.*
- c) *Column reinforcement information was present in as-built document supplied by client.*
- d) *MAK CONSULTANTS Engineers checked a number of columns of the building from ground floor up to roof. Columns, which are the main vertical and load bearing component of a building has no sign distress or cracking anywhere in the building. The column faces are almost well.*
- e) *Considering the above things & from analysis it is seen that almost all steel columns are not good condition.*
- f) *Wall Footings are found in as-built condition, but it is not site verification.*
- g) *All brick columns are found..*
- h) *Most of steel members are not found to be good condition.*
- i) *Purlin size are not adequate for maximum column spacing.*

As per the Engineering Assessment (EA) report almost all steel members are inadequate. The building engineer is required to suggest remedial action.

**Apparently lack of lateral stability system &
Inadequate RC members**



No compression strut was at ridge position provided in the long direction.
No roof bracings provided along the short direction. Apparently lack of lateral stability observed.
The building engineer is required to check the lateral stability system of the shed.

5.6 Conclusion:

The capacity of existing structure has been evaluated. Under the evaluation, standard procedure is step-by-step followed. Following things are found in present studies:

- Building dimension & grid dimension are verified, in field dimension are found almost correct with a little variation. In analysis average dimension are taken. Those are also presented in as built drawing.
- All columns dimension is verified and the verified corrected column dimension are used in the analysis and presented in the as built drawing.
- Column reinforcement information was present in as-built document supplied by client.
- MAK CONSULTANTS Engineers checked a number of columns of the building from ground floor up to roof. Columns, which are the main vertical and load bearing component of a building has no sign distress or cracking anywhere in the building. The column faces are almost well.
- Considering the above things & from analysis it is seen that almost all steel columns are not good condition.
- All Footings are adequate in present condition.
- All RCC columns are not found to be good condition.
- All RCC beams are not found to be good condition.
- All steel members are found to be good condition.
- Purlin size are not adequate for maximum column spacing.

CAPACITY CHECK (GRADE BEAM) LEVEL + 0.00m

SI NO	GRADE BEAM ID (DRWING)	REBAR AREA, IN ² (DRAWING)		REBAR AREA, IN ² (MODEL)		REMARKS	
		TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
1	A/01-02	0.93	0.93	1.96	1.47	NOT OK	NOT OK
2	B/01-02	0.93	0.93	1.96	1.47	NOT OK	NOT OK
3	01/A-B	0.93	0.93	1.96	1.47	NOT OK	NOT OK
4	02/A-B	0.93	0.93	1.96	1.47	NOT OK	NOT OK

CAPACITY CHECK (FLOOR BEAM) LEVEL + 15.5 ft.

SI NO	GRADE BEAM ID (DRWING)	REBAR AREA, IN ² (DRAWING)		REBAR AREA, IN ² (MODEL)		REMARKS	
		TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
1	A/01-02	0.93	0.62	1.47	1.47	NOT OK	NOT OK
2	B/01-02	0.93	0.62	1.47	1.47	NOT OK	NOT OK
3	01/A-B	0.93	0.62	1.47	1.47	NOT OK	NOT OK
4	02/A-B	0.93	0.62	1.47	1.47	NOT OK	NOT OK

After analysis, all beams are found to be overstressed due to present condition.

5.3.2 Column:

From the analysis, it is seen that almost no columns are in very good condition. All columns are found to be overstressed.

Pedestal columns:

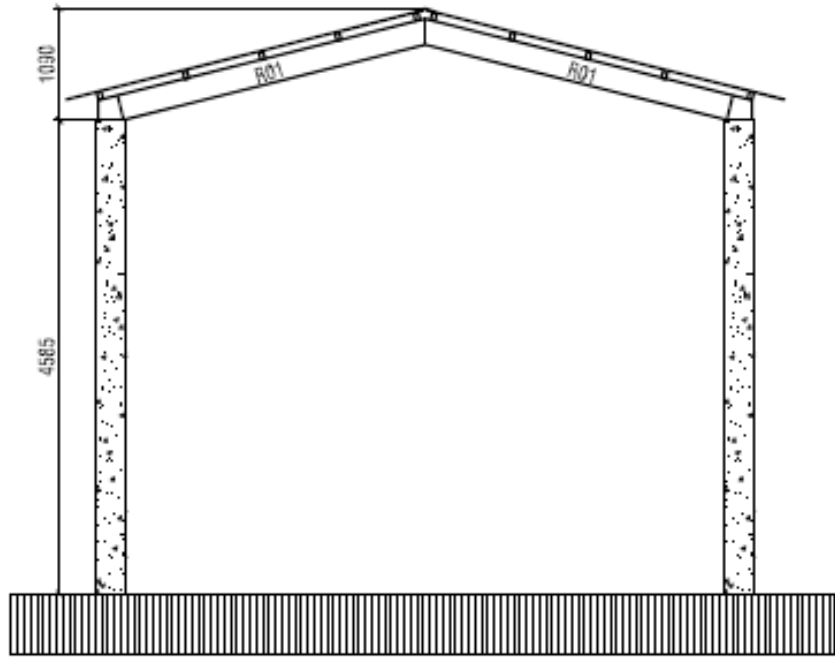
Before retrofitting:

RCC Column Capacity Check							
B2B EXCELLENCE Ltd (EXTENSION BUILDINGS) (BOILER & COMPRESSOR)							
NO	Grid no.	Column ID (Model)	Column ID (As Built Drawing)	Column Size (As Built)	Provided rebar From As Built drawing	Required Rebar from AS-BUILT	Remarks (As Built)
BELOW GRADE							
1	A/01	1	C1	14"x20"	1200	3080	NOT OK
2	A/02	2	C1	14"x20"	1200	3080	NOT OK
3	B/01	3	C1	14"x20"	1200	3080	NOT OK
4	B/02	4	C1	14"x20"	1200	3080	NOT OK

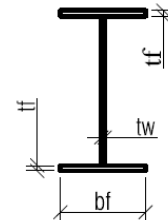
RCC Column Capacity Check						
B2B EXCELLENCE Ltd (EXTENSION BUILDINGS) (BOILER & COMPRESSOR)						
	Grid no.	Column ID (As Built Drawing)	Column Size (As Built)	Provided rebar From As Built drawing (sq.mm)	Required Rebar from AS-BUILT MODEL	Remarks (As Built)
ABOVE GRADE						
1	A/01	1	12"x18"	1200	2587	NOT OK
2	A/02	2	12"x18"	1200	2587	NOT OK
3	B/01	3	12"x18"	1200	2587	NOT OK
4	B/02	4	12"x18"	1200	2587	NOT OK

As per the Engineering Assessment report all reinforced column, grade beam & tie beams are inadequate. The building engineer is required to suggest remedial action.

Inconsistency in as-built drawing



SECTION



TYP. X-SEC

LEGEND:

d = DEPTH OF WEB
tw = WEB THICKNESS
bf = FLANGE WIDTH
tf = FLANGE THICKNESS.

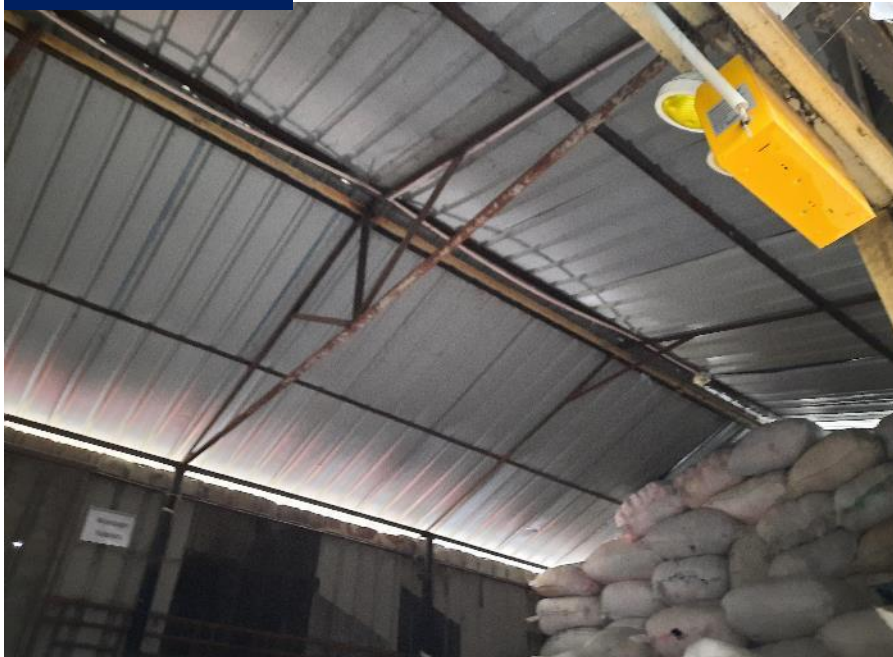
NO	WEB (mm)		FLANGE (mm)	
	DEPTH	THICK.	WIDTH	THICK.
R01	250	5	100	6



Rafter depth shown 250 mm on as-built drawing, but depth measured 200 mm onsite. Building engineer is required to update the as-built drawings.

Non-engineered shed

Wastage Shed



Inadequate member size, lack of lateral stability system and poor connection details observed. Building engineer is required to replace the structure.

Kitchen Shed



Inadequate member size, lack of lateral stability system and poor connection details observed. Building engineer is required to replace the structure.

Test Carried Out



Stone Chips (Compressor & Boiler)



Brick Chips (CNG Vehicle & Finished Goods Shed)



Ferro Scanning

Problems Observed

2-Storied RCC Building

Item 01: Inconsistency in as-built drawing & engineering assessment report.

CNG Vehicle & Finished Goods Shed

Item 02: Apparently lack of lateral stability system & inadequate member size

Item 03: Inconsistency in as-built drawing

Cutting Shed

Item 04: Apparently lack of lateral stability system & inadequate member size.

Compressor & Boiler

Item 05: Apparently lack of lateral stability system & Inadequate RC members.

Item 06: Inconsistency in as-built drawing.

Kitchen & Wastage Shed:

Item 07: Non-engineered shed.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Inconsistency in as-built drawing & engineering assessment report. (2-Storied RCC Building)	Building engineer is required to update the as-built drawings.	6-weeks
02	Inconsistency in as-built drawing & engineering assessment report. (2-Storied RCC Building)	Building engineer is required to review the adequacy of footings and comply with BNBC.	6-weeks
03	Inconsistency in as-built drawing & engineering assessment report. (2-Storied RCC Building)	Building Engineer to prepare design report as per BNBC (part-6; Article 1.9.1) by reviewing design, loads and capacity of structural members.	6-weeks
04	Inconsistency in as-built drawing & engineering assessment report. (2-Storied RCC Building)	Carryout repair works where necessary.	6-months
05	Apparently lack of lateral stability system & inadequate member size (CNG Vehicle & Finished Goods Shed)	The building engineer is required to check the lateral stability system of the shed.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
06	Apparently lack of lateral stability system & inadequate member size (CNG Vehicle & Finished Goods Shed)	Carryout remedial works where necessary.	6-months
07	Inconsistency in as-built drawing. (CNG Vehicle & Finished Goods Shed)	Building engineer is required to update the as-built drawings.	6-weeks
08	Apparently lack of lateral stability system & inadequate member size. (Cutting Shed)	The building engineer is required to check the lateral stability system of the shed.	6-weeks
09	Apparently lack of lateral stability system & inadequate member size. (Cutting Shed)	Carryout remedial works where necessary.	6-months
10	Apparently lack of lateral stability system & Inadequate RC members. (Compressor & Boiler)	The building engineer is required to check the lateral stability system of the shed.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
11	Apparently lack of lateral stability system & Inadequate RC members. (Compressor & Boiler)	Carryout remedial works where necessary.	6-months
12	Inconsistency in as-built drawing. (Compressor & Boiler)	Building engineer is required to update the as-built drawings.	6-weeks
13	Non-engineered shed. (Kitchen & Wastage Shed)	Building Engineer to prepare design report as per BNBC (part-6; Article 1.9.1) by reviewing design, loads and capacity of structural members.	6-weeks