

Union Sportswear Ltd. (Extension)

116, Pagar-Morkon Link Road, Pagar, Gazipur
Geographic Coordinates: 23.898500, 90.421014
17 October 2023



Executive Summary

New Production Building: Nine (G+M+8) storied building with a mezzanine floor.

Warehouse Shed: A single storied prefabricated steel shed with a mezzanine floor inside.

Utility Building: Two (G+1) storied RC building.

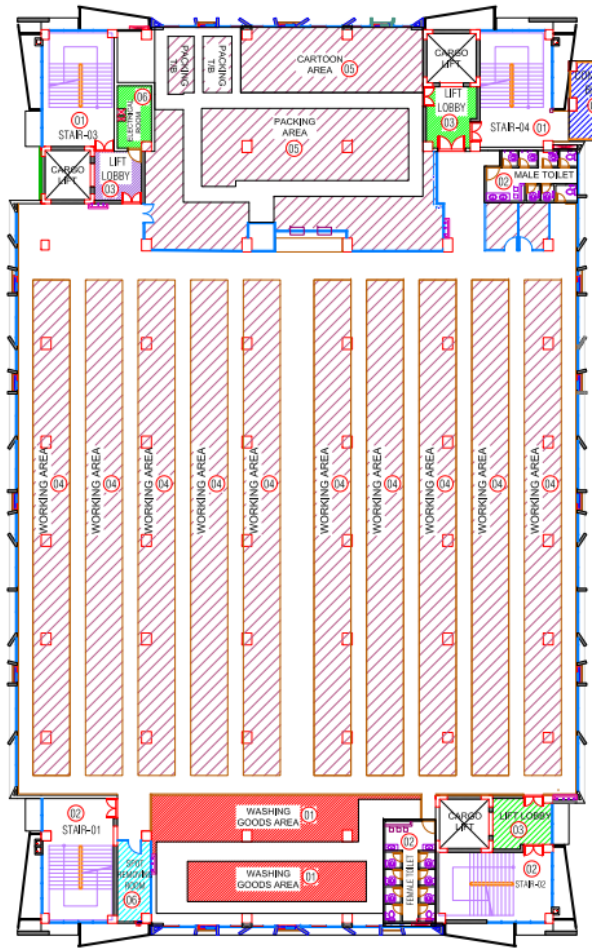
New Pump Room: An underground structure with a single storey RC portion on ground level.

Boiler & Generator Shed: A single storied prefabricated steel shed.

Wastage Shed: A single storied prefabricated steel shed.

Observations

Storage live load not comply with BNBC



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বাংলাদেশ গেজেট, অতিরিক্ত, ফেব্রুয়ারি ১১, ২০২১

Occupancy or Use	Uniform kN/m ²	Concentrated kN
Storage areas above ceilings	1.00	--
Storage warehouses (shall be designed for heavier loads if required for anticipated storage)		
Light	6.00	--
Heavy	12.00	--
Stores		
Retail		
First floor	4.80	4.50
Upper floors	3.60	4.50
Wholesale, all floors	6.00	4.50
Vehicle barriers	See Sec 2.3.11	
Walkways and elevated platforms (other than exit ways)	2.90	--
Yards and terraces, pedestrian	4.80	--

Live load table
(BNBC 2020)

Live load plan- 5 kPa (100 psf) for working area at 4th and 8th floor



Storage on 8th floor

Live load on 4th floor and 8th floor are considered as 5 kPa in prepared load plan. As per BNBC-2020, live load for light storage areas is required to be considered minimum 6 kPa. However, the building engineer is required to revise the live load plan as per BNBC requirement and check the design accordingly.

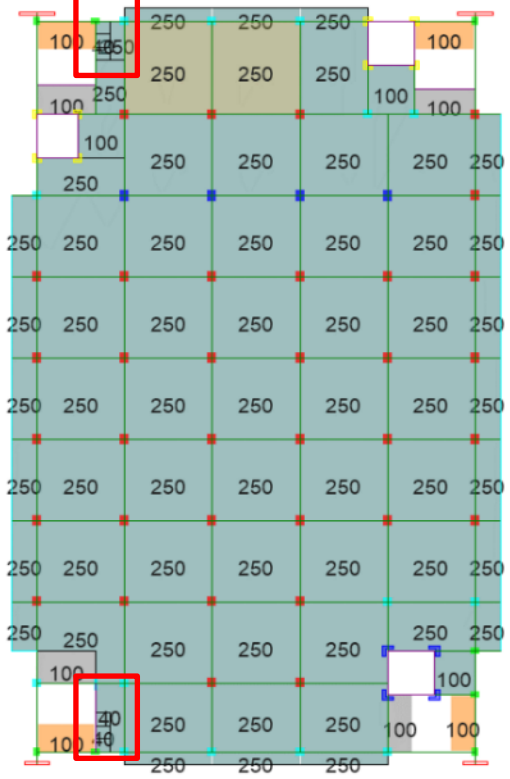
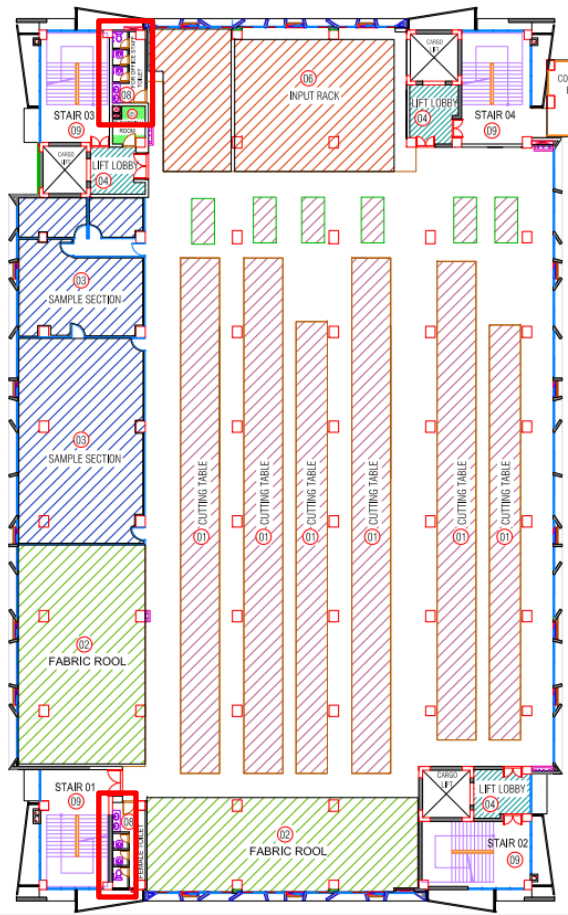


Figure 2.8.3: Applied Live Load on 2nd floor (psf)



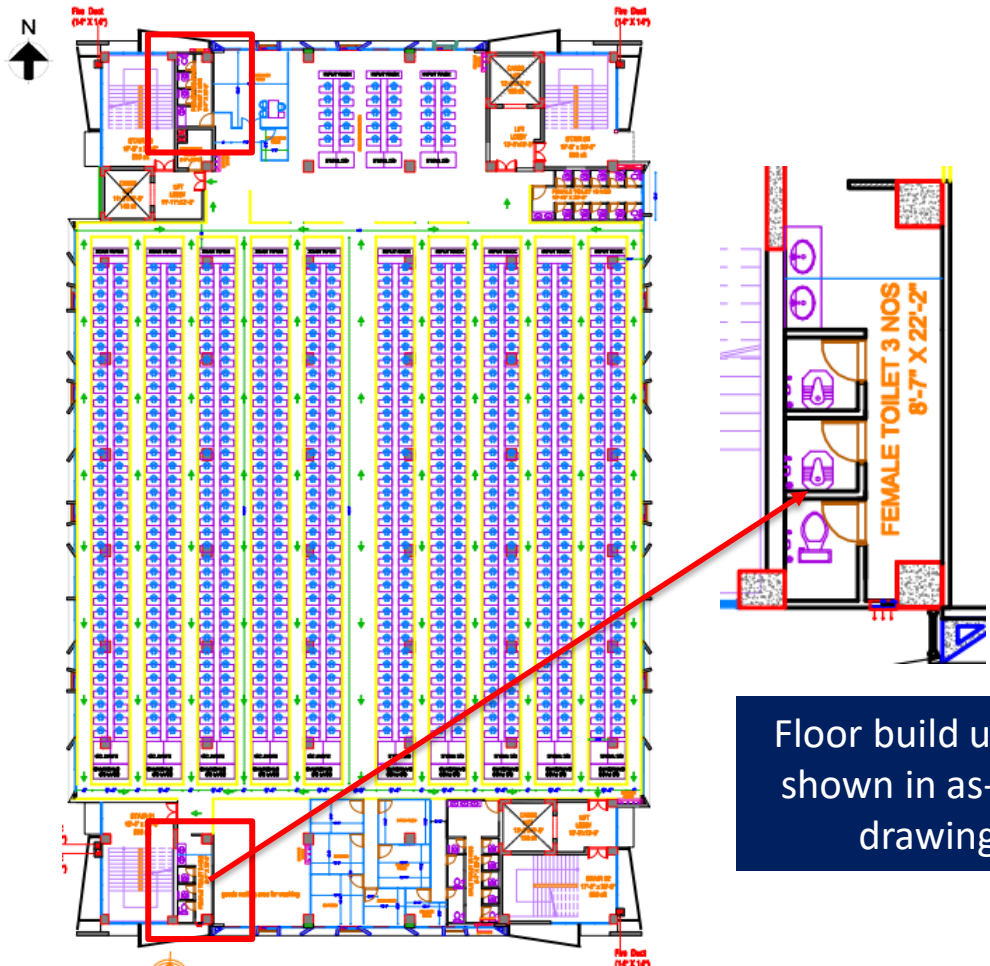
2ND FLOOR LOADING FOR THIS FLOOR				
NO.	TYPE	ITEM	MAX. LOAD IN PSF	DESCRIPTION
01	LIGHT	CUTTING TABLE	250	TYPICAL CUTTING TABLE
02	LIGHT	FABRIC ROOL	250	TYPICAL FABRIC ROOL
03	LIGHT	SAMPLE SECTION	250	TYPICAL SEWING MACHINE
04	LIGHT	LIFT LOBBY	100	TYPICAL LIFT LOBBY
05	LIGHT	ELECTRICAL ROOM	250	TYPICAL FURNITURE
06	LIGHT	INPUT RACK	250	TYPICAL STEEL RACK
08	LIGHT	TOILET	250	TYPICAL TOILET AREA
09	LIGHT	STAIR	250	TYPICAL STAIR

Live load: 2nd floor 2 kPa (40 psf) for toilet zone in FEA

Live load plan- 2nd floor 12.5 kPa (250 psf) for toilet zone

Live load on 2nd floor is considered as 12.5 kPa including toilet zone in prepared load plan. But in FEA, live load for toilet areas is considered 2 kPa. However, the building engineer is required to revise the load plan as per BNBC requirement and check the design accordingly.

Discrepancies in as-built drawings



Floor build up not shown in as-built drawing



Floor build up found 450 mm

Floor layout plan & blow up of toilet zone area.

In as-built architectural drawing, floor build up were not shown. However, floor build up was found 450 mm. Building engineer is required to survey the whole structure and update the as-built drawing accordingly.

Dampness on toilet zone wall



Dampness was found on toilet zone wall near staircase at 6th floor. The factory is required to repair the dampness as per the suggestion of building engineer.

Improper Vehicle Protection System



Barrier connected to column directly

Column adjacent of driveway of loading unloading area is susceptible to vehicle impact. The factory has provided light barrier touching the column surface. The building engineer is required to provide sufficient barrier just outside of exposed column to prevent the vehicle impact.

Trolley impact on column/walls

Observation: New Production Building

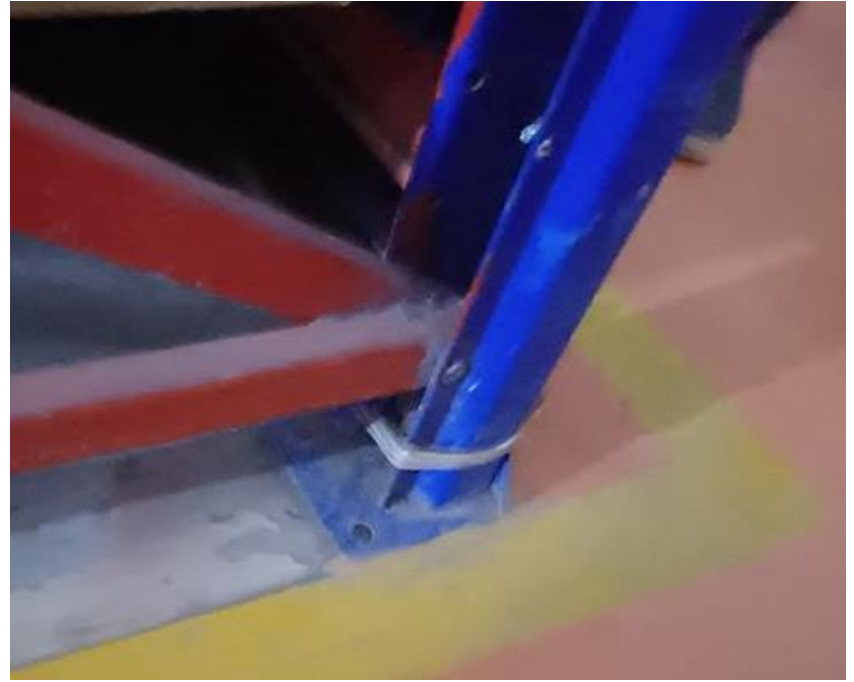


Signage of damage in wall due to trolley impact

The factory is required to provide necessary column/wall guards to resist possible trolley impact.

Observations: New Production Building

Non-structural elements found unbraced/not anchored



Storage rack found within the building without braced/anchored

All non-structural elements required to be braced/anchored

Improper information in design report

For BNBC-2020,

- 1 Zone co-efficient, $Z = 0.28$ (zone III, as per BNBC 2020)
- 2 Structure importance co-efficient, $I = 1.25$ (Occupancy Category III, Table 6.2.17, BNBC-20)
- 3 Response modification co-efficient for RCC, $R = 8.0$ (Table 6.2.19, BNBC-20)
- 4 Response modification co-efficient for Steel, $R = 3.0$ (Table 6.2.19, BNBC-20)**
- 5 System Overstrength factor, $\Omega_0 = 3.0$ (Table 6.2.19, BNBC-20)
- 6 Deflection amplification factor for RCC $C_d = 5.5$ (Table 6.2.19, BNBC-20)
- 7 Deflection amplification factor for Steel $C_d = 3$ (Table 6.2.19, BNBC-20)
- 8 Site class = SD (Table 6.2.13, BNBC-20) (Table 6.2.19, BNBC-20)
- 9 Vertical component of earthquake = $0.5 \times 2/3 \times Z \times S \times \text{Dead Load}$.

Seismic Force-Resisting System	Response Reduction Factor, R	System Overstrength Factor, Ω_0	Deflection Amplification Factor, C_d	Seismic Design Category B	Seismic Design Category C	Seismic Design Category D
				Height limit (m)		
C. MOMENT RESISTING FRAME SYSTEMS (no shear wall)						
1. Special steel moment frames	8	3	5.5	NL	NL	NL
2. Intermediate steel moment frames	4.5	3	4	NL	NL	35
3. Ordinary steel moment frames	3.5	3	3	NL	NL	NP
4. Special reinforced concrete moment frames	8	3	5.5	NL	NL	NL
5. Intermediate reinforced concrete moment frames	5	3	4.5	NL	NL	NP
5. Ordinary reinforced concrete moment frames	3	3	2.5	NL	NP	NP

Loading parameters in the design report

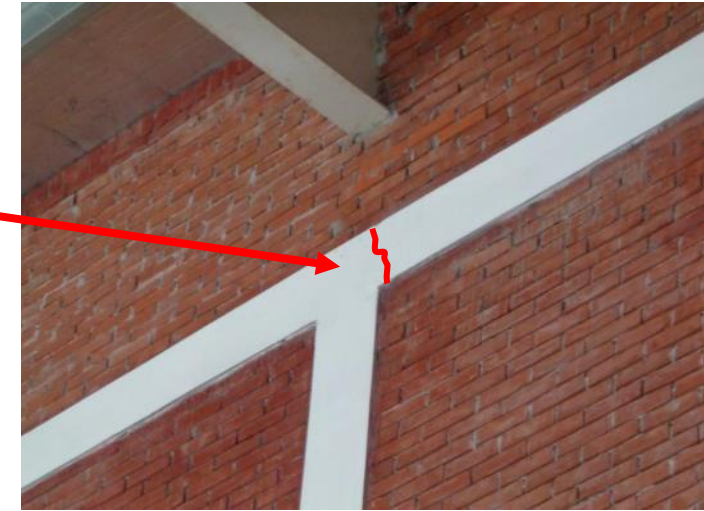
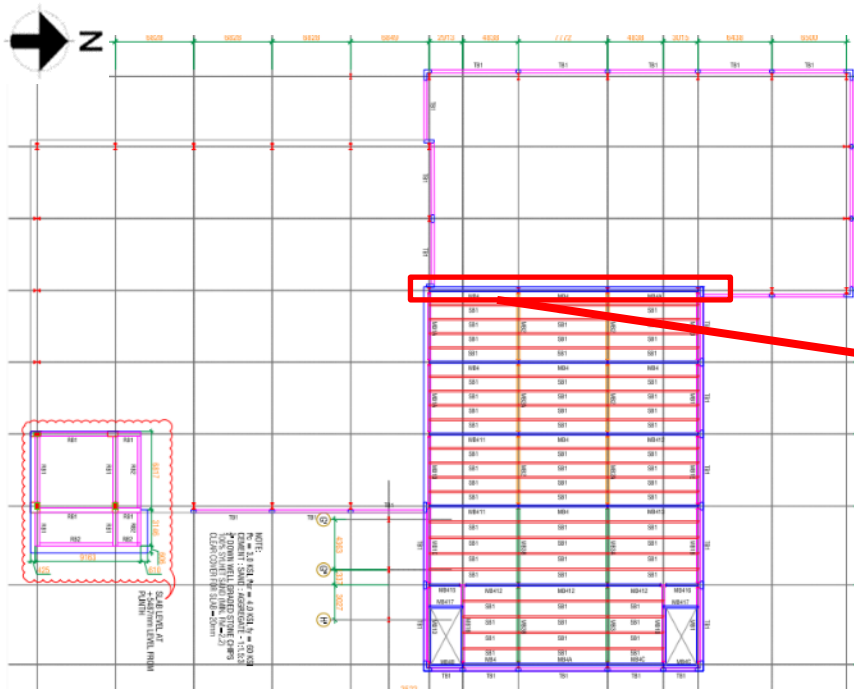
The design category of the building is SD-D which is not permitted as per BNBC-2020.

Seismic Design Category According to BNBC-2020

For seismic loads, only specifications & considerations are provided in design report. No detail calculations for seismic loads were available in the design report. Moreover $R=3$ is considered for steel moment frame which is 3.5 in BNBC-2020. Factory engineer is required to incorporate detail calculations for all lateral loads in the design Report in compliance with the BNBC (section 1.9.1 of part-6) and revise the design report and submit to RSC for further review.

Observation: Warehouse Shed

Cracks on tie beam



Cracks in beam (ground floor tie beam)

Cracks were observed on ground floor tie beams. The factory is required to repair the crack as per the suggestion of building engineer.

Non-structural elements found unbraced/not anchored



Storage rack found within the building without braced/anchored

All non-structural elements required to be braced/anchored.

Bolt missing in steel connection



Bolt missing in 1st floor dining Area

Bolt missing in several connection joint. Building engineer is required to identify all locations and install missing bolt accordingly.

Possible vehicle impact for column

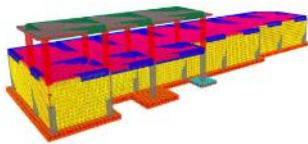


Steel Column susceptible to vehicle impact


Columns at ground floor are prone to vehicle impact. Factory is required to provide barrier for all exposed column at ground floor to avoid possible vehicle impact on column.

Lack of information in design report

DESIGN REPORT AS PER BNBC 2020
 FOR UNDERGROUND WATER RESERVOIR AND PUMP ROOM
 Location: 110, Pagar Markta Link Road, Tonge, Gostpur 1710
 CLIENT: UNION SPORTSWEAR LTD.



Assessed by-
 Engr. Kamal Ahmed
 Team Leader (Design)
 B.Sc. in Civil Engineering (PUCT)
 MRB: M-49942

Submitted by-


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Design Report



The top slab of underground water reservoir is used for driveway of heavy vehicles. The allowable design live load is not mentioned in the report. The building engineer is required to revise the design report for vehicle live load and submit to the RSC for review.

Hairline horizontal cracks on retaining wall



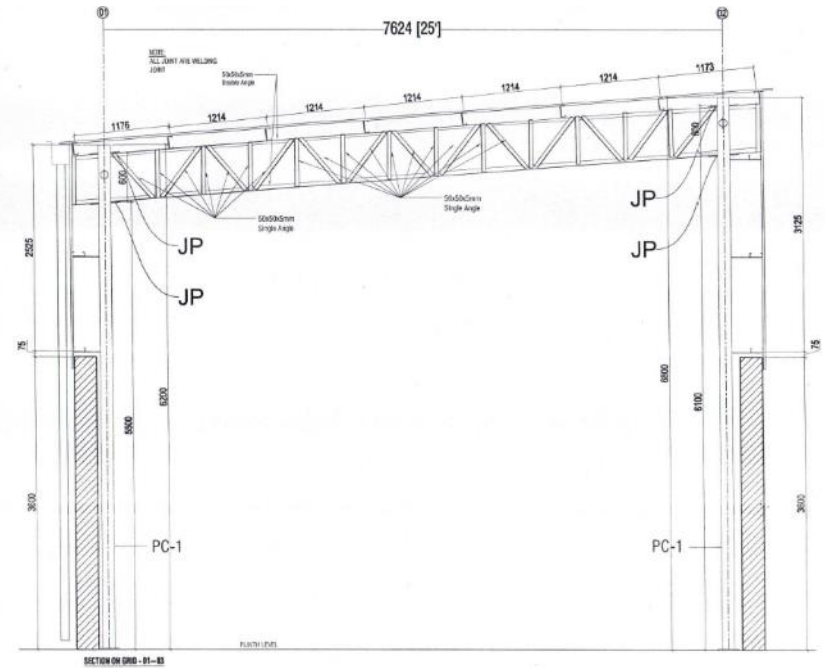
Cracks in retaining wall

Horizontal wavy cracks were observed on retaining wall along the construction joint. The building engineer is required to check the structural impact of the crack and suggest proper repair methodology.

Bracing connection apart from node



Vertical bracing at half-length of pipe column.



Frame section

The vertical bracings were connected apart from baseplate. Also, one extra vertical chord member was shown in the provided drawing. The building engineer is required to survey the whole structure and update the as-built drawing and revise the structural analysis & design accordingly.

Problems Observed

New Production Building:

Item 01: Storage live load not comply with BNBC.

Item 02: Discrepancies in as-built drawings.

Item 03: Dampness on toilet zone wall.

Item 04: Improper vehicle protection system.

Item 05: Trolley impact on column/walls.

Item 06: Non-structural elements found unbraced/not anchored

Warehouse Shed:

Item 07: Improper information in design report.

Item 08: Cracks on tie beam.

Item 09: Non-structural elements found unbraced/not anchored.

Item 10: Bolt missing in steel connection.

Item 11: Possible vehicle impact for column.

New Pump Room:

Item 12: Lack of information in design report.

Item 13: Hairline horizontal cracks on retaining wall.

Boiler & Generator Shed:

Item 14: Bracing connection apart from node.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Storage live load not comply with BNBC. (New Production Building)	The building engineer is required to revise the live load plan as per BNBC requirement and check the design accordingly.	6-weeks
02	Storage live load not comply with BNBC. (New Production Building)	Carry out suggested remedial work (if any).	6-months
03	Storage live load not comply with BNBC. (New Production Building)	Continue to implement floor load plan.	6-months
04	Discrepancies in as-built drawings. (New Production Building)	The building engineer is required to survey the structure and produce accurate as-built drawings.	6-weeks
05	Dampness on toilet zone wall. (New Production Building)	The factory engineer is required to investigate and repair the dampness with suitable method.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
06	Improper Vehicle Protection System.(New Production Building)	The building engineer is required to provide sufficient barrier just outside of exposed column to prevent the vehicle impact.	6-months
07	Trolley impact on column/walls. (New Production Building)	The factory is required to provide necessary column/wall guards to resist possible trolley impact.	6-months
08	Non-structural elements found unbraced/not anchored. (New Production Building)	All non-structural elements required to be braced/anchored .	6-months
09	Improper information in design report. (Warehouse Shed)	Factory engineer is required to incorporate detail calculations for all lateral loads in the design Report in compliance with the BNBC (section 1.9.1 of part-6) and revise the design report and submit to RSC for further review.	6-weeks
10	Improper information in design report. (Warehouse Shed)	Carry out remedial works (if any) after reviewed by the RSC.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
11	Cracks on tie beam. (Warehouse Shed)	The factory is required to repair the crack as per the suggestion of building engineer.	6-weeks
12	Non-structural elements found unbraced/not anchored. (Warehouse Shed)	All non-structural elements required to be braced/anchored .	6-months
13	Bolt missing in steel connection. (Warehouse Shed)	Building engineer is required to identify all locations and install missing bolt accordingly.	6-weeks
14	Possible vehicle impact for column. (Warehouse Shed)	Factory is required to provide barrier for all exposed column at ground floor to avoid possible vehicle impact on column.	6-weeks
15	Lack of information in design report. (New Pump Room)	The building engineer is required to revise the design report for vehicle live load and submit to the RSC for review.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
16	Lack of information in design report. (New Pump Room)	Carry out remedial works (if required).	6-months
17	Hairline horizontal cracks on retaining wall. (New Pump Room)	The building engineer is required to check the structural impact of the crack and suggest proper repair methodology.	6-weeks
18	Bracing connection apart from node. (Boiler & Generator Shed)	The building engineer is required to survey the whole structure and update the as-built drawing and revise the structural analysis & design accordingly.	6-weeks
19	Bracing connection apart from node. (Boiler & Generator Shed)	Carry out remedial works (if required).	6-months