

Ariyan Socks Industries Ltd

Mawna, Tengra , Sreepur, Gazipur, Bangladesh
(24.23112N,90.45715E)
29th March 2022



Building Information

Factory Building: two-storied (G+1) prefabricated steel building with a mezzanine floor. There are two reinforced concrete parts on the southeast and south side which is connected with steel part through the slab.

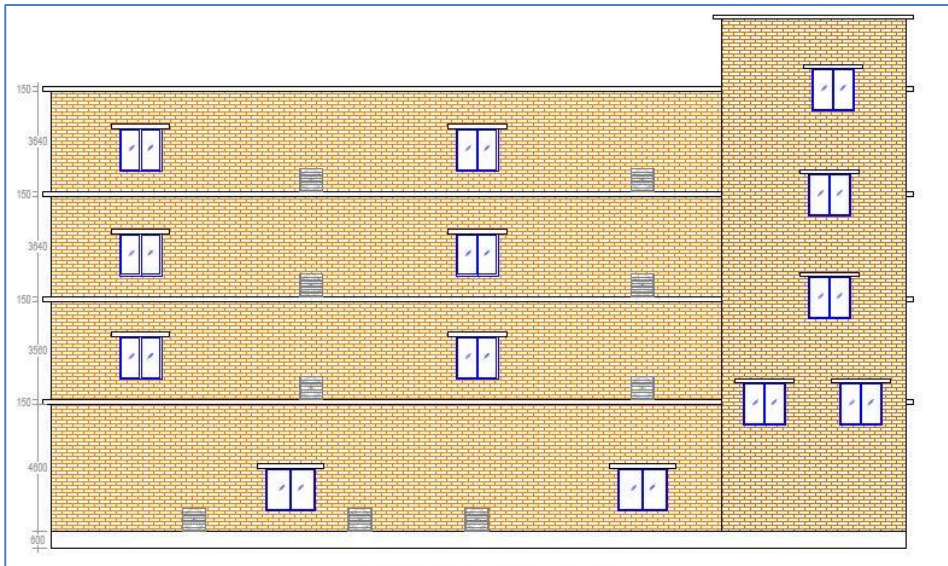
Office Building: partially three storied prefabricated steel building including a roof shed.

Shed-1 (Compressor Room): single storied steel shed

Shed-2 (Sub-Store & CT-PAT): single storied steel shed

Observations

**Ongoing vertical extension works required to
be ceased immediately**



Proposed elevation of 4 storied

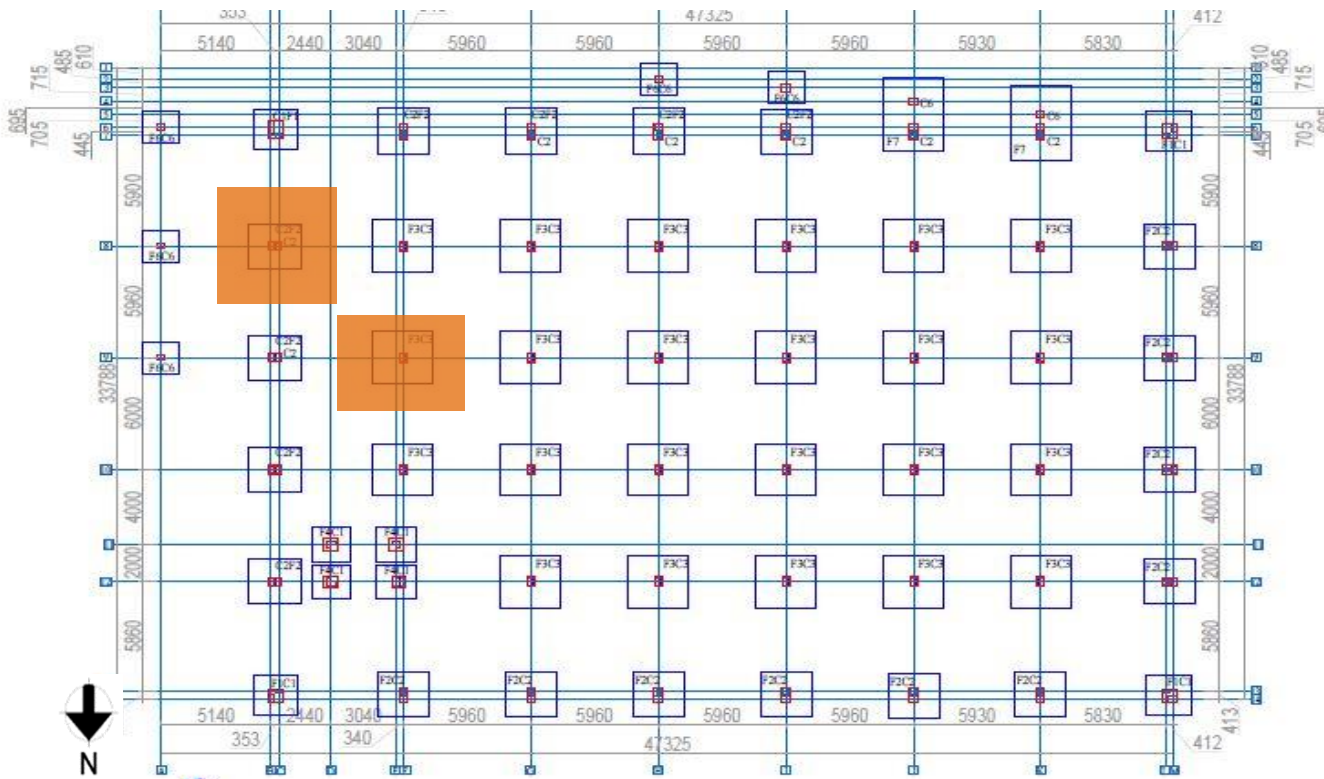
The factory has a plan to construct the building up to 4-storied.



Building is currently 2 storied

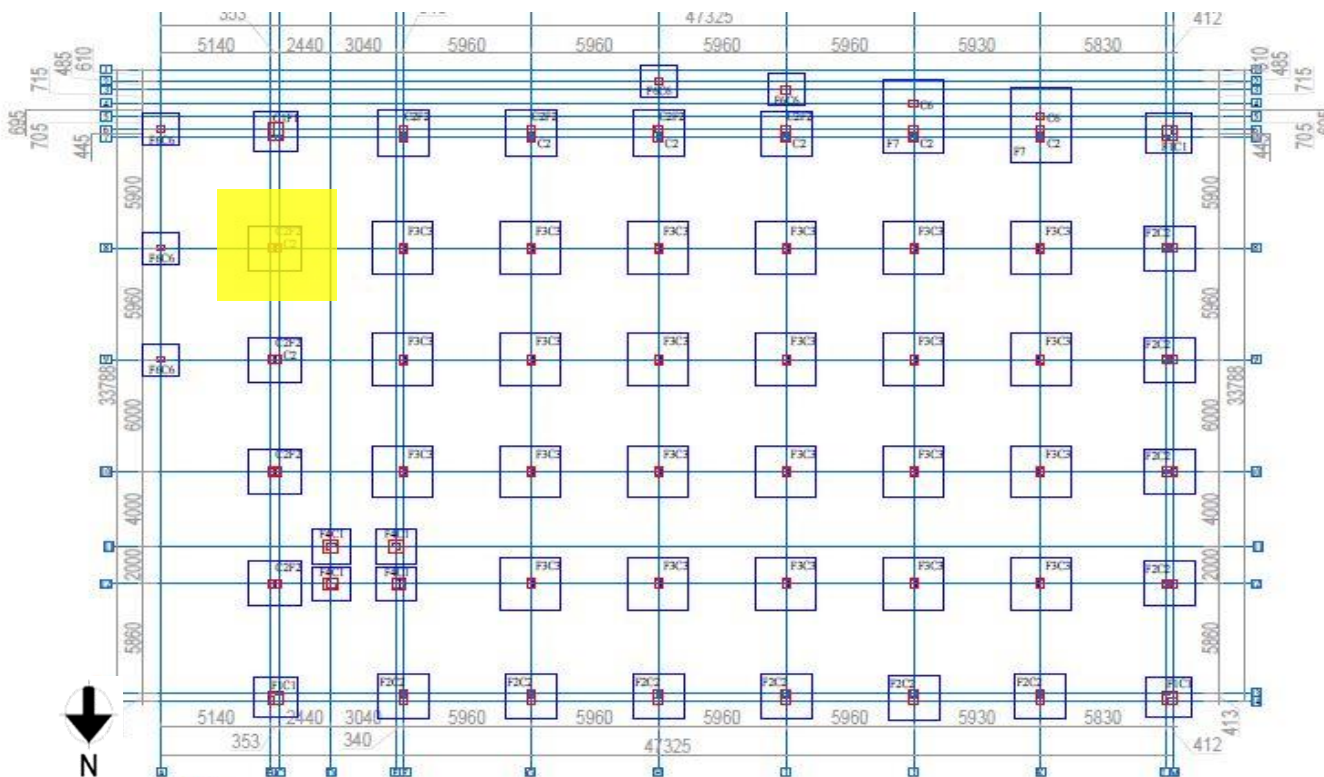


Ongoing construction on 2nd floor



Column/footing layout

Cursory calculation indicates the high stress level in highlighted columns (marked in the layout) for above of 2 storied building. Factory is required to cease all kind of extension work immediately. Factory engineer is required to review, design of column stress and prepare a Detail Engineering Assessment (DEA) report prior conducting any vertical extension.



Cursory calculation indicates that stress in foundation exceeds normal design limit in highlighted foundation (marked in the layout) for above of 2 storied. Factory engineer is required to review, design of foundation stress and prepare a Detail Engineering Assessment (DEA) report prior conducting any vertical extension.

Columns appear to be slender

Absence of design documents

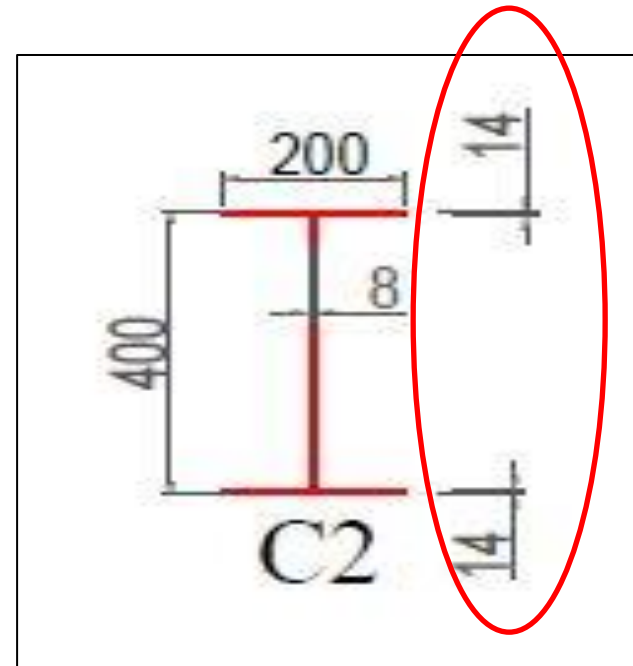


As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, design report was not available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

Discrepancy and missing information in as-built drawing

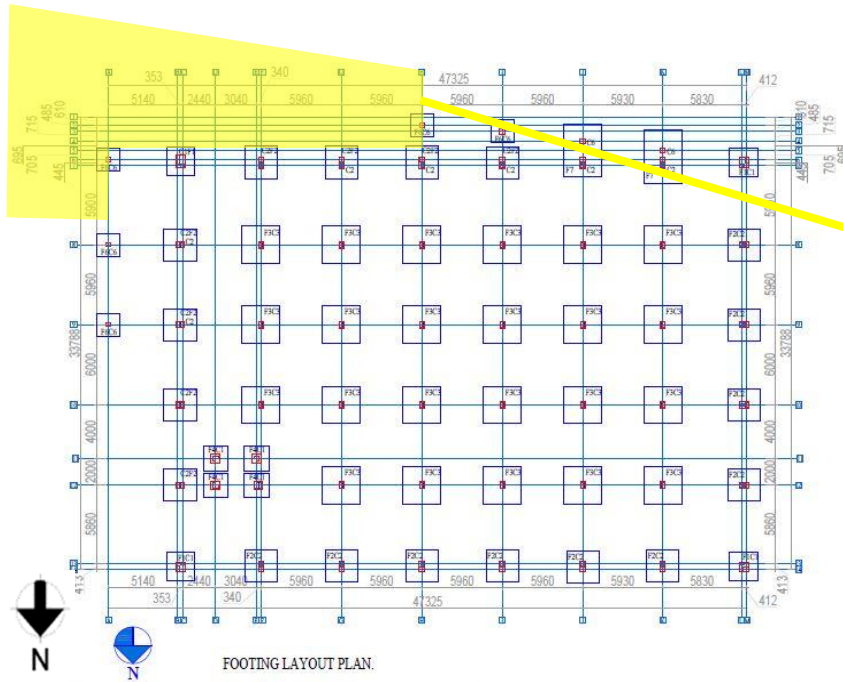


Flange thickness of column C-2 was measured as 10mm at ground floor



Flange thickness of column C-2 shown as 14mm

Flange thickness of column C-2 was measured as 10mm but shown in drawing as 14mm. Due to the change, the FoS of the columns significantly changes at ground floor level. Factory engineer is required to resurvey the whole structure and update as-built drawing accordingly.



Column and footing for the yellow marked area not shown in layout



Utility part at ground floor

Column and footing of Utility part at GF not shown in layout. Factory engineer is required to resurvey the whole structure and update as-built drawing accordingly.



Dimension or thickness of mezzanine floor slab not shown in drawing



Dimension of sub-beam not shown in drawing

Dimension or thickness of mezzanine floor slab, dimension of sub-beam are not shown in drawing. Factory engineer is required to update the as-built drawing including all missing information.



Dimension/layout of RC floor beam and slab not shown in drawing

Dimension/layout of RC floor beam and slab not shown in drawing. Factory engineer is required to update the as-built drawing including all missing information.



All internal steel columns are enclosed by RC casting

All internal steel columns were found enclosed by RC casting therefore the dimension/thickness of internal steel columns couldn't be verified. Factory engineer is required to confirm the dimension/thickness of all internal steel columns.

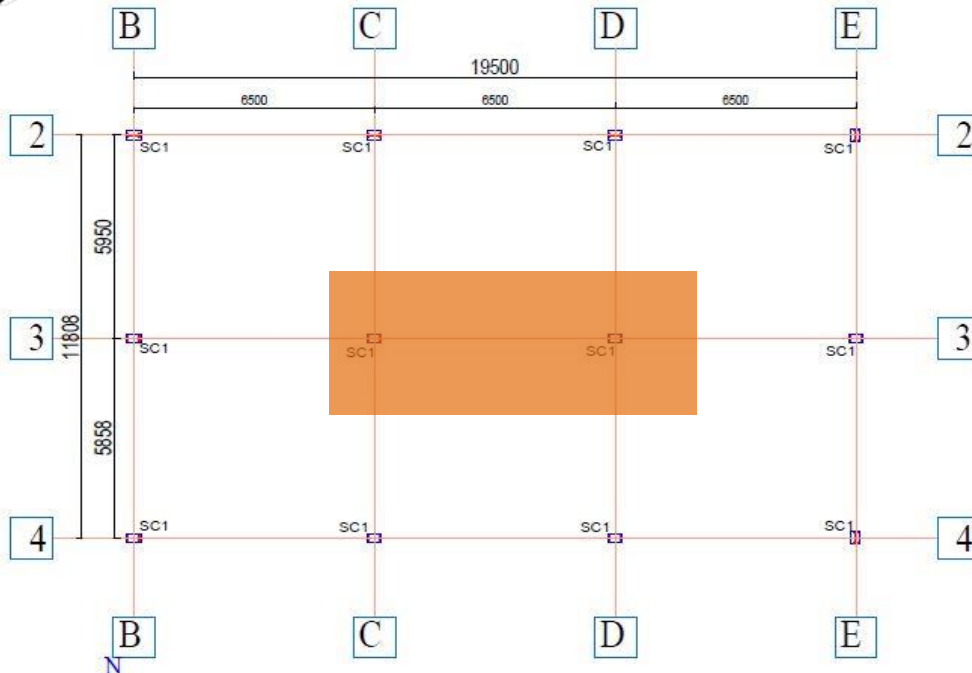
Water ingress through periphery wall and staircase



Water ingress was observed through periphery wall and staircase top

Water ingress was observed through periphery wall and staircase top. Factory is required to provide protection to prevent the water ingress.

High Stress level in ground floor column



Highly stressed columns in layout



Load from brick wall and dining at roof

Cursory calculation indicates the high stress level in ground floor (amber marked) considering the live load 3 kPa for typical floor, 2 kPa for roof open to sky (as per load plan), strength of steel 289 MPa from the available MS plate test report. Factory engineer is required to review the design, loads and column stresses for the marked columns and carry out a Detail Engineering Assessment (DEA). Maintain the floor live load 2 kPa at 1st floor and roof.

Lack of lateral stability



Moment resisting frame is only provided along long direction



No wall bracing is provided

Moment resisting frame is only provided along long direction and no wall bracing is provided therefore there is apparently lack of lateral stability along short direction. Factory engineer is required to check the lateral stability of the structure.

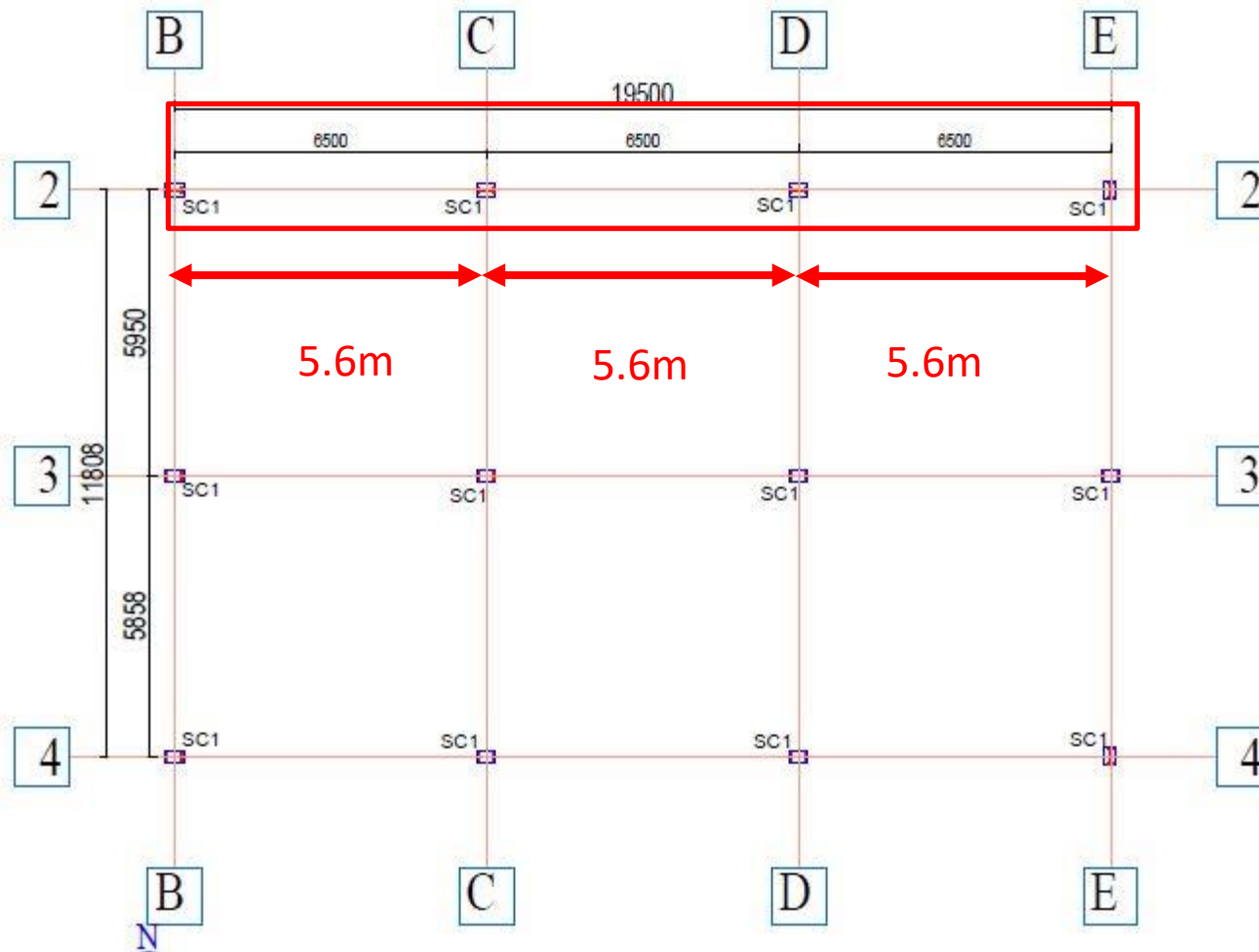
Absence of design documents



Office Building-front view

As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, no design report was available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

Discrepancy in as-built drawing



Grid dimension was measured 5.6m instead of 6.5m (marked)

Factory engineer is required to resurvey the whole structure and update as-built drawing accordingly.

Apparently inadequate connection

Observations: Roof Shed (Office Building)



Connection of truss to steel pipe and brick wall

Connection of steel members to pipe column and brick wall were appeared to be inadequate. Factory engineer is required to check the connection adequacy for uplift forces as part of EA.

Apparently non engineered shed

**Observations: Shed-1 (Compressor Room) Shed-2
(Sub-Store & CT-PAT)**



Shed-1



Shed-2

Both Shed-1 and Shed-2 were appeared to be non engineered due to lack of apparent load path, poor connection and apparently inadequate member size. Factory engineer is required to check the connection adequacy for uplift forces as part of EA otherwise replace with well designed structure.

Non-structural elements found unbraced/not anchored



Storage rack found within the building without braced/anchored

Factory is required to brace/anchor all non structural elements.

Problems Observed

Factory Building:

Item-1: Ongoing vertical extension works require to be ceased immediately.

Item-2: Columns appear to be slender.

Item-3: Absence of design documents.

Item-4: Discrepancy and missing information in as-built drawing.

Item-5: Water ingress through periphery wall and staircase.

Office Building:

Item-6: High Stress level in ground floor column.

Item-7: Lack of lateral stability.

Item-8: Absence of design documents.

Item-9: Discrepancy in as-built drawing.

Item-10: Apparently inadequate connection (Roof Shed).

Shed-1 (Compressor Room) and Shed-2 (Sub-Store & CT-PAT):

Item-11: Apparently non engineered shed.

Shed-2 (Sub-Store & CT-PAT):

Item-12: Non-structural elements found unbraced/not anchored.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Ongoing vertical extension works require to be ceased immediately (Factory Building)	Cease the ongoing vertical extension works immediately.	Immediate
02	Ongoing vertical extension works require to be ceased immediately (Factory Building)	Factory engineer is required to review, design of column stress and prepare a Detail Engineering Assessment (DEA) report with necessary remedial action prior conducting any vertical extension above two storied.	6-weeks
03	Ongoing vertical extension works require to be ceased immediately (Factory Building)	Verify in-situ material strength if required (steel part).	6-weeks
04	Ongoing vertical extension works require to be ceased immediately (Factory Building)	Implement required remediation works existing and prior to any extension.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
05	Columns appear to be slender (Factory Building)	Factory engineer is required to carryout adequacy check of the highlighted column considering slenderness effect.	6-weeks
06	Columns appear to be slender (Factory Building)	Carry out remedial works if required.	6-months
07	Absence of design documents (Factory Building)	Factory engineer is required to prepare the design report in compliance with section 1.9.1.1 (part-6, BNBC).	6-weeks
08	Absence of design documents (Factory Building)	Implement remediation work if required.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
09	Discrepancy and missing information in as-built drawing (Factory Building)	Factory engineer is required to update the as-built drawing.	6-weeks
10	Discrepancy and missing information in as-built drawing (Factory Building)	Factory engineer is required to confirm the dimension/thickness of all internal steel columns.	6-weeks
11	Water ingress through periphery wall and staircase (Factory Building)	Factory is required to provide protection to prevent the water ingress.	6-months
12	High Stress level in ground floor column (Office Building)	Maintain 2 kPa live load at all floor levels.	Immediate

Item No.	Observation	Recommended Action Plan	Recommended Timeline
13	High Stress level in ground floor column (Office Building)	Factory engineer is required to review the design, loads and column stresses for the marked columns.	6-weeks
14	High Stress level in ground floor column (Office Building)	Carry out a Detail Engineering Assessment (DEA).	6-weeks
15	High Stress level in ground floor column (Office Building)	Actively manage load plan.	6-weeks
16	High Stress level in ground floor column (Office Building)	Carry out remedial works as per DEA recommendations.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
17	High Stress level in ground floor column (Office Building)	Implement load plan.	6-months
18	Lack of lateral stability (Office Building)	Factory engineer is required to check the lateral stability of the structure.	6-weeks
19	Lack of lateral stability (Office Building)	Carry out remedial works from the analysis.	6-months
20	Absence of design documents (Office Building)	Factory engineer is required to prepare the design report in compliance with section 1.9.1.1 (part-6, BNBC).	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
21	Absence of design documents (Office Building)	Implement remediation work if required.	6-months
22	Discrepancy in as-built drawing (Office Building)	Factory engineer is required to update the as-built drawing.	6-weeks
23	Apparently inadequate connections (Roof Shed: Office Building)	Factory engineer is required to check the connection adequacy for uplift forces.	6-weeks
24	Apparently inadequate connections (Roof Shed: Office Building)	Implement remediation work where required.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
25	Apparently non engineered shed (Shed-1:Compressor Room; Shed-2: Sub-Store & CT-PAT)	Factory engineer is required to check the connection adequacy for uplift forces otherwise replace the sheds with well designed structure.	6-weeks
26	Apparently non engineered shed (Shed-1:Compressor Room; Shed-2: Sub-Store & CT-PAT)	Implement remediation work where required.	6-months
27	Non-structural elements found unbraced/not anchored (Shed-2: Sub-Store & CT-PAT)	Factory is required to brace/anchor all non-structural elements.	6-weeks

Survey Limitations and Assumptions

This report is for the private and confidential use of Accord for whom it was prepared together with their professional advisors as appropriate. It should not be reproduced in whole or in part or relied upon by third parties for any use without the express written permission of RSC.

This report can be used in discussion with the supplier or factory owner as a means to rectify or address any observations made. The report is not comprehensive and is limited to what could be observed during a visual inspection of the building.

This Report is not intended to be treated as a generalised inspection and does not cover the deterioration of structural members through dampness, fungal or insect attack, nor does it deal with problems and defects of a non-structural nature. Other non structural aspects of the building such as fire safety have not been assessed in this survey.

Except as otherwise noted, drains and other services were not viewed or tested during our inspection and are therefore similarly excluded from this Report. We have not inspected any parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

External inspection of the façade walls has generally been carried out from ground level only by visual sighting. No opening up works were carried out (except as noted) and we rely on the Architects and Engineers drawings provided to us for our views on concealed parts of the structure and in particular foundations. Strengths of materials and components are untested and we recommend that the factory owners Building Engineer carries out in situ testing over and above those suggested to satisfy themselves with the material strengths and component details.

Recommendations, where given, are for the purpose of providing indicative advice only, are not exhaustive, relate solely to identifying key and obvious structural defects as identified in this presentation, and do not take the form of or constitute a specification for works. We take no responsibility for the works as constructed. This report does not interfere with the factory owners Building Engineers responsibility for the structural performance of this building, The Building Engineer remains fully responsible for the structural adequacy of the building.

This report does not comment in detail on the future seismic performance of the building and only highlights the fact that the building may experience significant damage or collapse in a seismic event along with many others in the Dhaka region.

The observations in this report are based on the Engineering Judgement of the lead surveyor/engineer at the time of the survey. We assume in making these observations that no covering up of faults defects, filling or plastering over cracking or significant repair work has been carried out by the building owner. Any future alteration or additional work by the building owner will void this report.