MM Knitwear Ltd

Gazipur
(24.013868N, 90.321500E)

14 December 2013

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Building 1
Building Observations

Limit density of loading in storage areas

Uncontrolled loading

Plan and height restrictions to be introduced to prevent future overloading. (Loading plans in line with design loads from engineer)

Load Management

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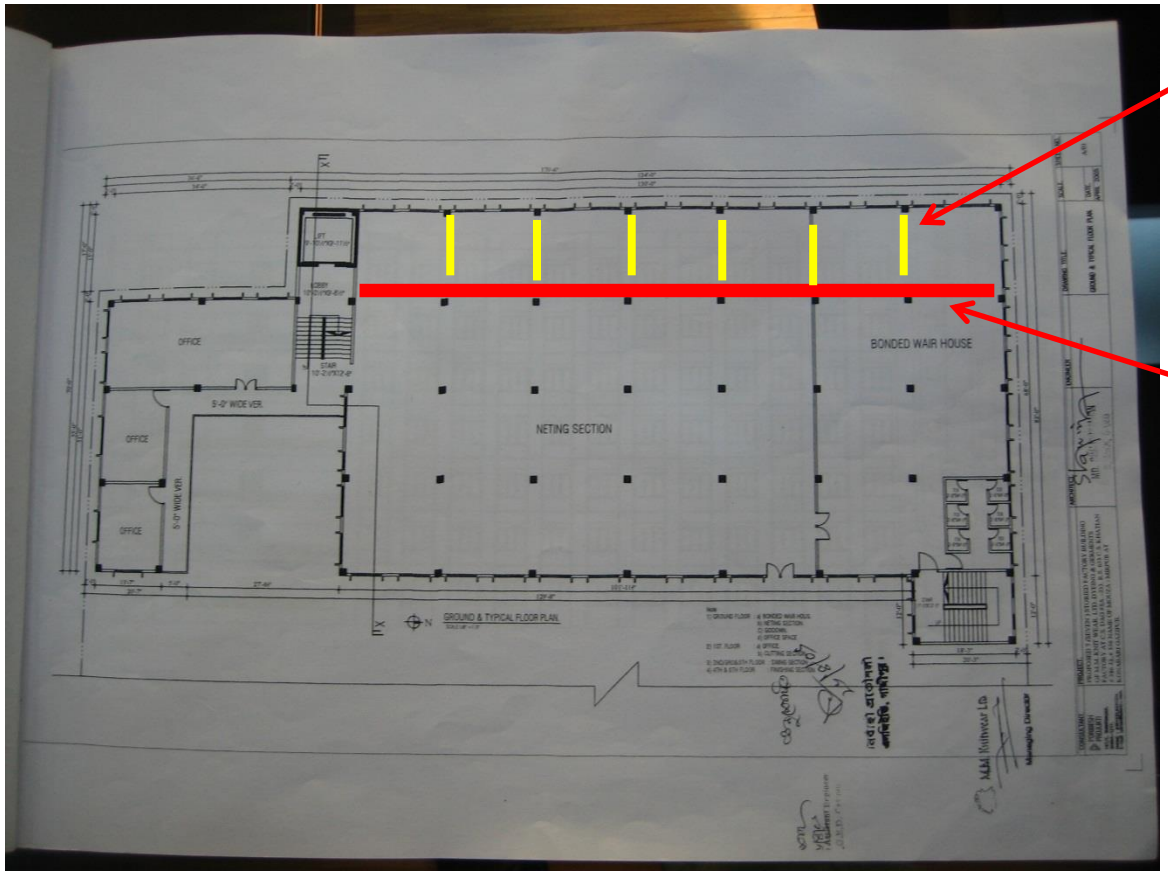
Drawings do not match constructed building



Beams here to underside of Level 1, 2 and 3

Beams here to all levels (original edge of building in Phase 1)

Structural engineering drawings do not match constructed building

Drawings do not match as built

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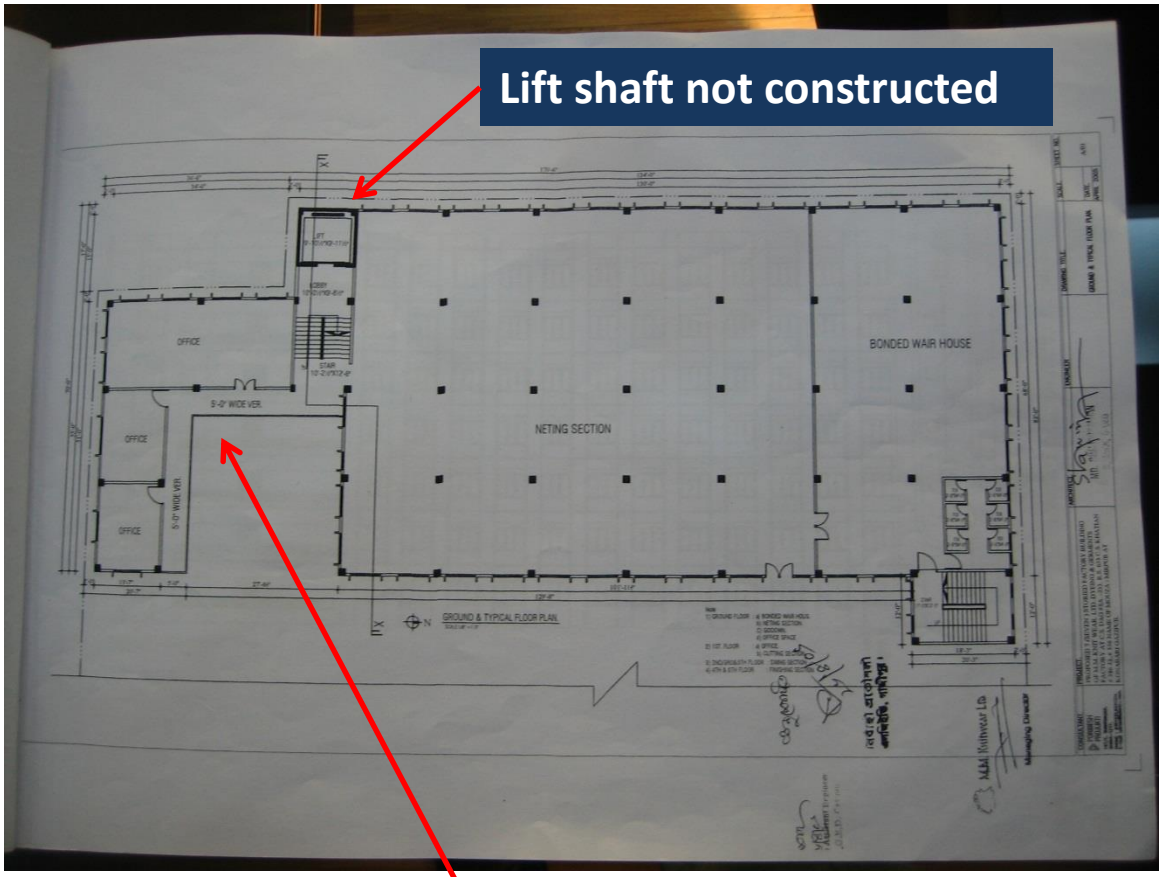

Drawings do not match as built

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Minor cracking to underside of Level 3 flat slab

Minor cracking to underside of Level 3 slab

Water causing damage and risk of corrosion

Water from now uncovered roof slab behind causing damage to wall

Water from toilet area behind causing damage to wall

Water causing damage and risk of corrosion

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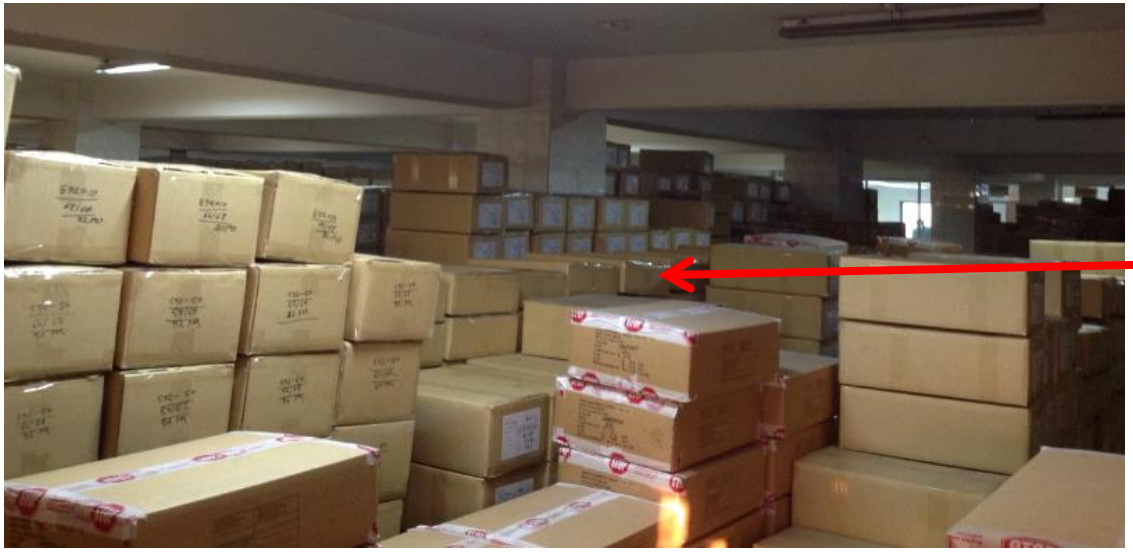
Building 2
Building Observations

Limit density of loading in storage areas

Uncontrolled loading on cantilever



Plan and height restrictions to be introduced to prevent future overloading. (Loading plans in line with design loads from engineer)

Load Management

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Plan and height restrictions to be introduced to prevent future overloading. (Loading plans in line with design loads from engineer)

Load Management

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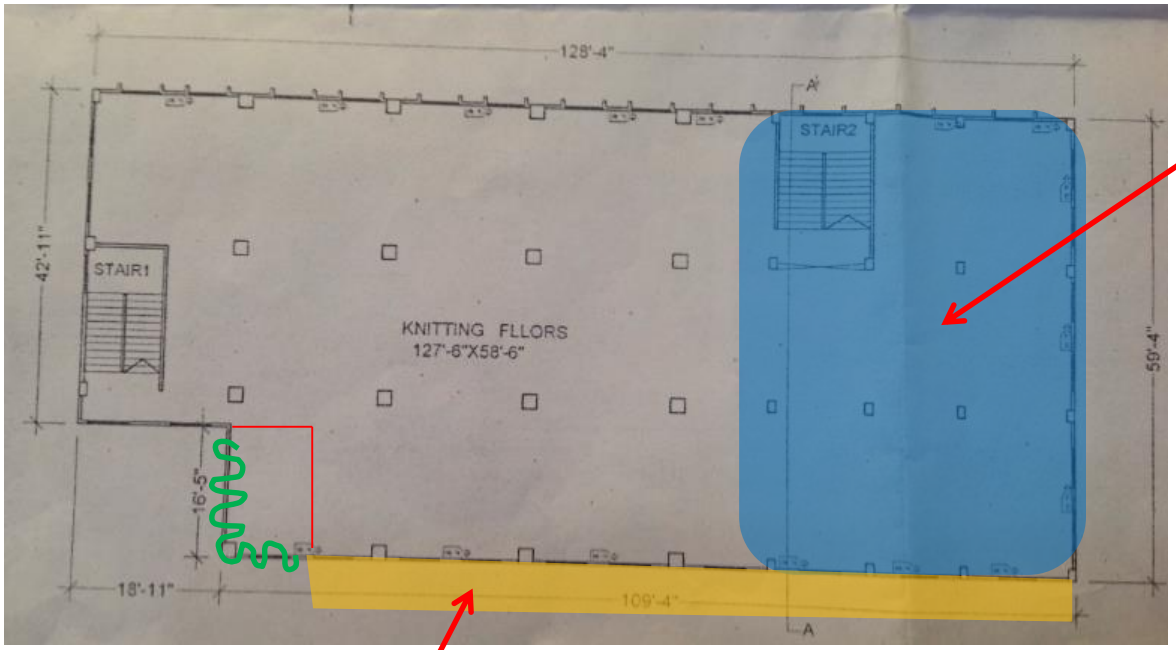
Building 3
Building Observations

Drawings do not match constructed building

Building 3 - Generally



Columns in this area do not correspond with drawings (location or size)

Cantilever along this edge (Level Roof to Level 3) does not correspond with drawing . Also extended building edge to additional row of columns at Level 2 not shown

No structural engineering drawings available

Drawings do not match as built

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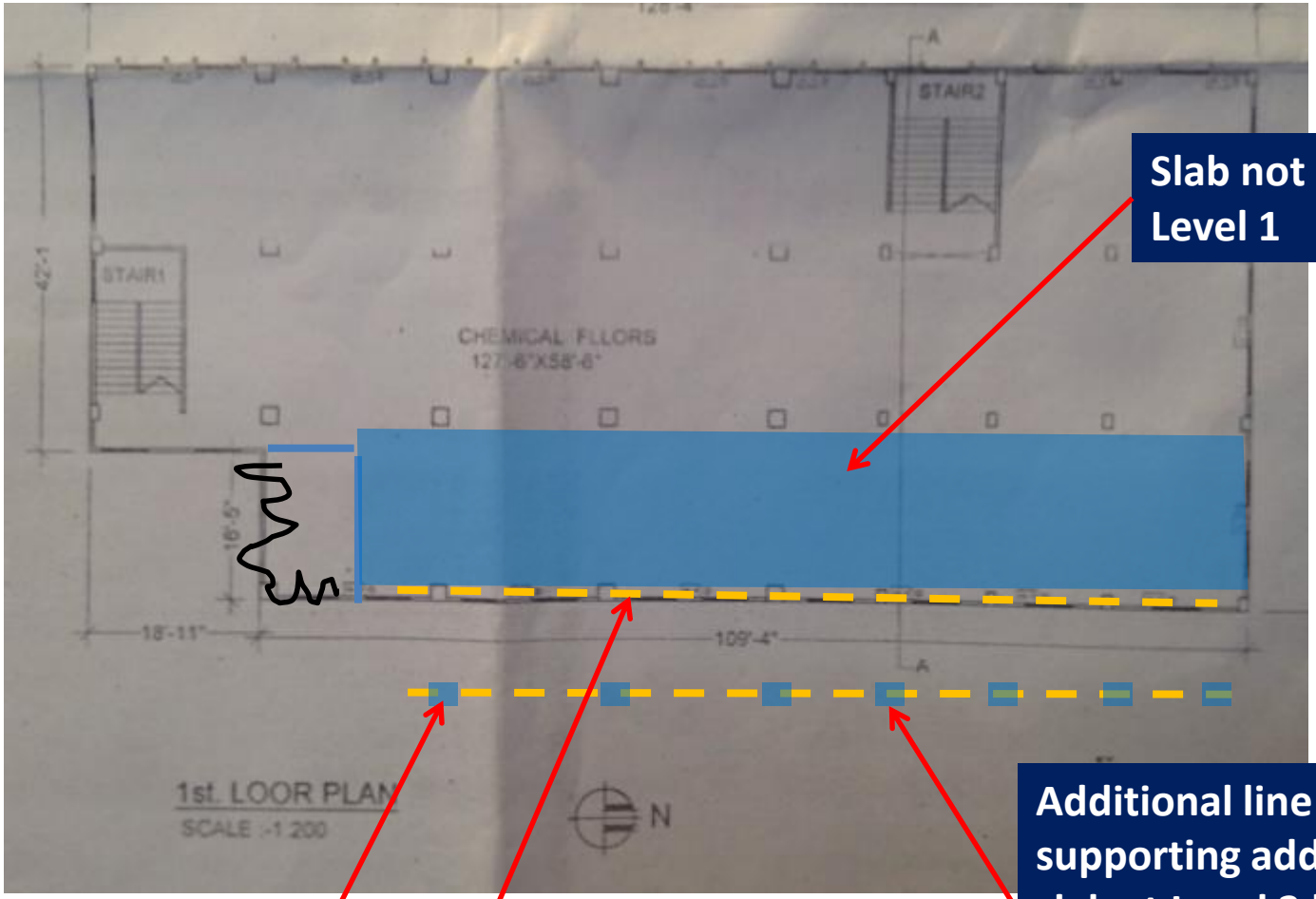
Building 3



Slab not present here at Level 1

Additional line of columns supporting additional area of slab at Level 2 beyond cantilever area shown generally

Concern with restraint of columns at Level 1 – engineering check required

Drawings do not match as built

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Limit density of loading in storage areas

Plan and height restrictions to be introduced to prevent future overloading. (Loading plans in line with design loads from engineer)

Uncontrolled loading

Load Management

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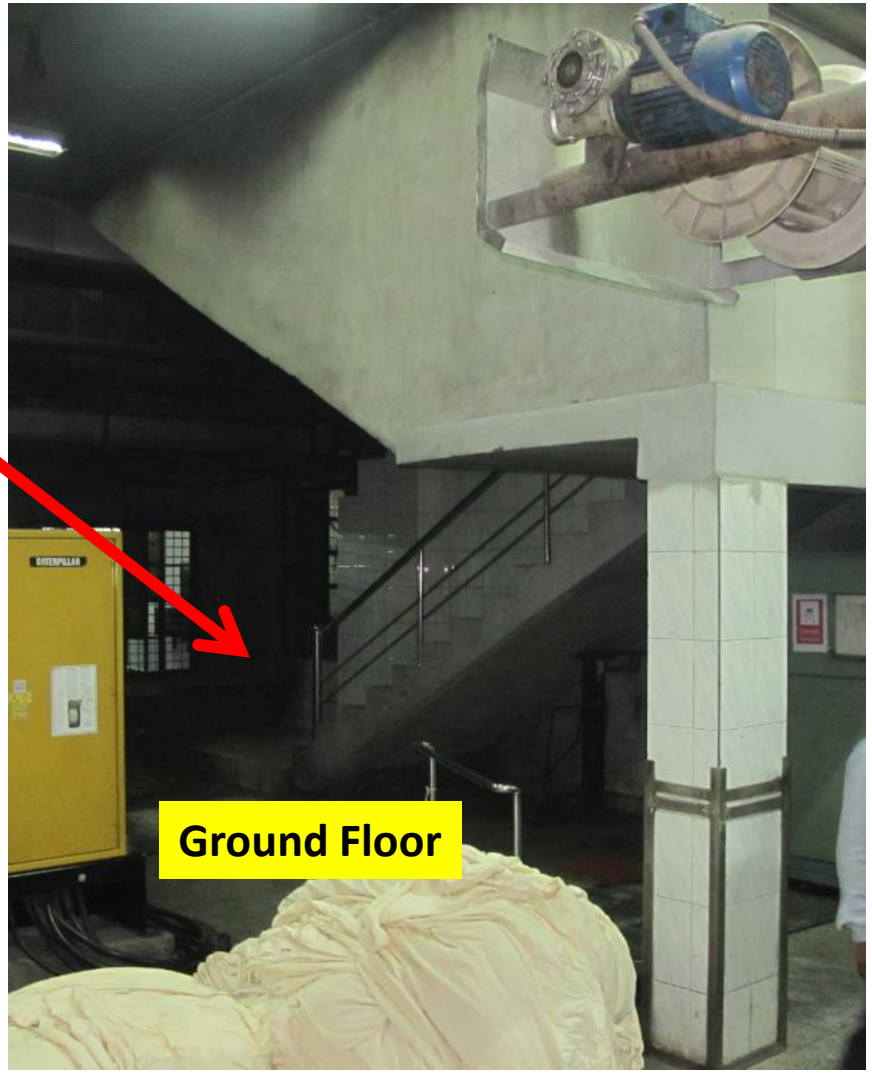
Non-Structural Issue
Escape stairs require exit through ground floor of Building 3 to outside

Escape stair discharges at ground level with long unprotected exit path to outside the building



Non-Structural – Escape stair

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Single storey drying, dyeing and generator steel sheds
Building Observations

Lateral stability of roof and modifications generally

Modified truss

Un-modified truss

Generally engineer to check lateral stability of shed roof structures to ground and acceptability of roof modifications throughout

Lateral stability of Sheds and Modifications

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Support to roof purlins on damaged RC beam

Support to steel roof with wall brackets

Generally engineer to check lateral stability of shed roof structures and acceptability of supports throughout

Stability of Shed roofs

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Priority Actions

Problems Observed

Building 1

1. Load management – design loads from engineer to be assessed and limits indicated. **We require the production of a Detailed Engineering Assessment, detail of this at the end of this report, for the internal columns indicated**.
2. Drawings do not match as built condition
3. Water penetration causing damage and possible future corrosion of reinforcing

Building 2

4. Load management – design loads from engineer to be assessed and limits indicated

Problems Observed

Building 3

5. Drawings do not match as built condition
6. Assess double storey height columns at ground floor for stability
7. Load management – design loads from engineer to be assessed and limits indicated. **We require the production of a Detailed Engineering Assessment, detail of this at the end of this report, for the internal columns indicated**

Single storey drying, dyeing and generator steel sheds

8. Check the structural capacity of modified roof elements and lateral stability of the roof to ground level

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Building 1: Verify concrete strengths for all internal columns which are 380 x 380 structural dimension (brick aggregate)	Storage areas (minor area) to be reduced in loading to 2 boxes high on any level (1.2metre max high)	**Immediate - Now**
2	Building 1: Verify concrete strengths for all internal columns which are 380 x 380 structural dimension (brick aggregate)	Factory Engineer to review design, loads and columns stresses in area identified above.	**Immediate - Now**
3	Building 1: Verify concrete strengths for all internal columns which are 380 x 380 structural dimension (brick aggregate)	Verify insitu concrete stresses either by cores or existing cylinder strength data for internal columns. Minimum Core size 100mm diameter	**Immediate - Now**
4	Building 1: Verify concrete strengths for all internal columns which are 380 x 380 structural dimension (brick aggregate)	A Detail Engineering Assessment of Factory to be commenced, see attached Scope	**Immediate - Now**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
5	Building 1: Verify concrete strengths for all internal columns which are 380 x 380 structural dimension (brick aggregate)	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-weeks**
6	Building 1: Verify concrete strengths for all internal columns which are 380 x 380 structural dimension (brick aggregate)	Detail Engineering Assessment to be completed	**6-weeks**
7	Building 1: Verify concrete strengths for all internal columns which are 380 x 380 structural dimension (brick aggregate)	Continue to implement load plan	**6-months**

Detail Engineering Assessment

This Schedule develops a minimum level of information, Analysis and testing expected as part of a Detail Engineering Assessment.
The Building(s) have been visually assessed and it is deemed necessary that a detailed engineering assessment be carried out by a competent Engineering Team employed by the factory Owner.
This Request should be read in conjunction with the BUET developed Tripartite Guideline document for Assessment of Structural Integrity of Existing RMG Factory Buildings in Bangladesh (Tripartite Document), the latest version of this document should be referenced. T his document also gives guidance on required competency of Engineering Team.

We expect that the following will be carried out:

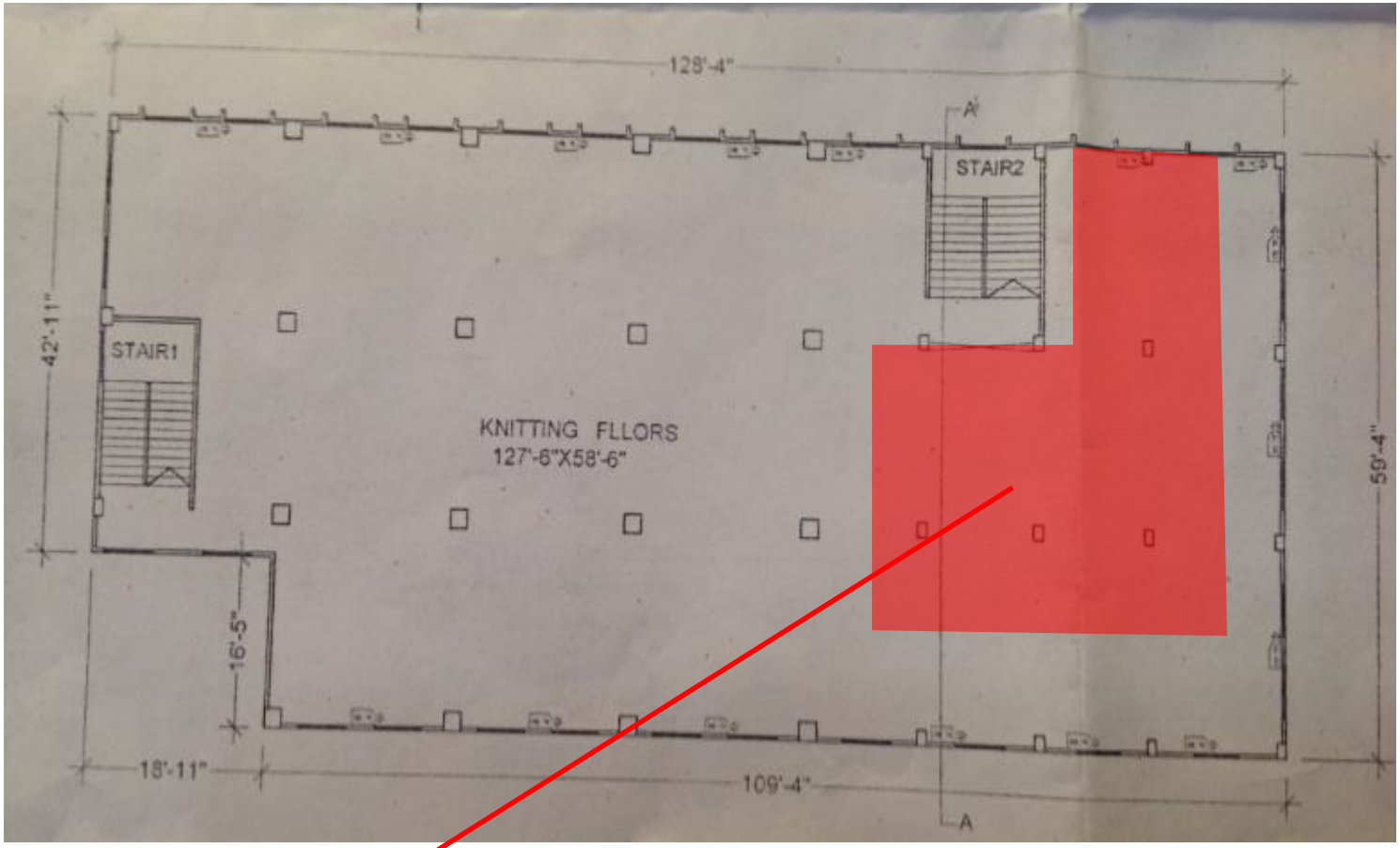
1. Development of Full Engineering As-Built Drawings showing Structure, loading, elements, dimensions , levels, foundations and framing on Plan, Section and Elevational drawings .
2. The Engineering team are to carry out supporting calculations with a model based design check to assess the safety and serviceability of the building against loading as set out in BNBC-2006, Lower rate provisions can be applied in accordance with the Tripartite Guidelines following international engineering practice, justification for these lower rate provisions must be made.
3. A geotechnical Report describing ground conditions and commenting on foundation systems used/proposed.
4. A report on Engineering tests carried out to justify material strengths and reinforcement content in all key elements studied.
5. Detailed load plans shall be prepared for each level showing current and potential future loading with all key equipment items shown with associated loads.
6. The Engineering team will prepare an assessment report that covers the following:
    - As-Built drawings including
        - Plans at each level calling up and dimensioning all structural components
        - Cross sectional drawings showing structural beams, slabs, floor to floor heights, roof build-ups and Basic design information of the structure
    - Highlight any variation between As-built compared to the designed structure
    - Results of testing for strength and materials
    - Results of geotechnical assessment and testing/investigation
    - Details of loading, inputs and results of computer modelling
    - Commentary on adequacy/inadequacy of elements of the structure
    - Schedule of any required retrofitting required for safety or performance of Structure

Any proposals for Retrofitting to follow guidance developed in the Tripartite Document

Item No.	Observation	Recommended Action Plan	Recommended Timeline
8	Building 1:Water damage and risk of corrosion from roof slab	Engineer to inspect water damaged structure including the exterior and propose a suitable repair. Roof drainage system/water proofing to be installed	**6-months**
9	Building 2: Load management – design loads from engineer	Design check all columns, beams and slabs. Create loading plans and heights to match actual structural code capacity.	**6-weeks**
10	Building 3:Drawings do not match the as built condition Assess double storey height columns at ground floor for stability	Design check all columns, beams and slabs. Produce As-Built drawings showing actual conditions.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
11	Building 3: Verify concrete strengths for small internal columns which are 320 x 470 structural dimension (brick aggregate)	Storage (minor area) on Level 2, 3 and 5 in area indicated on following page to be reduced in loading to 1.5m high.	**Immediate - Now**
12	Building 3: Verify concrete strengths for small internal columns which are 320 x 470 structural dimension (brick aggregate)	Factory Engineer to review design, loads and columns stresses in area identified above.	**Immediate - Now**
13	Building 3: Verify concrete strengths for small internal columns which are 320 x 470 structural dimension (brick aggregate)	Verify insitu concrete stresses either by cores or existing cylinder strength data for internal columns.Minimum Core sizes 100mm	**Immediate - Now**
14	Building 3: Verify concrete strengths for small internal columns which are 320 x 470 structural dimension (brick aggregate)	A Detail Engineering Assessment of Factory to be commenced, see attached Scope	**Immediate - Now**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
15	Building 3: Verify concrete strengths for small internal columns which are 320 x 470 structural dimension (brick aggregate)	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-weeks**
16	Building 3: Verify concrete strengths for small internal columns which are 320 x 470 structural dimension (brick aggregate)	Detail Engineering Assessment to be completed	**6-weeks**
17	Building 3: Verify concrete strengths for small internal columns which are 320 x 470 structural dimension (brick aggregate)	Continue to implement load plan	**6-months**



Storage in this area on any level (particularly level 2, 4 and 5) to be reduced to 1.5m high immediately

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Detail Engineering Assessment

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    - Schedule of any required retrofitting required for safety or performance of Structure

Any proposals for Retrofitting to follow guidance developed in the Tripartite Document

Item No.	Observation	Recommended Action Plan	Recommended Timeline
18	Sheds: Check the structural capacity of modified roof elements (trusses/purlins) and lateral stability of the roof to ground level	Design check modified trusses and purlins and check lateral stability of the roof down to ground level.	6-weeks