

# Modiste (CEPZ) Ltd.

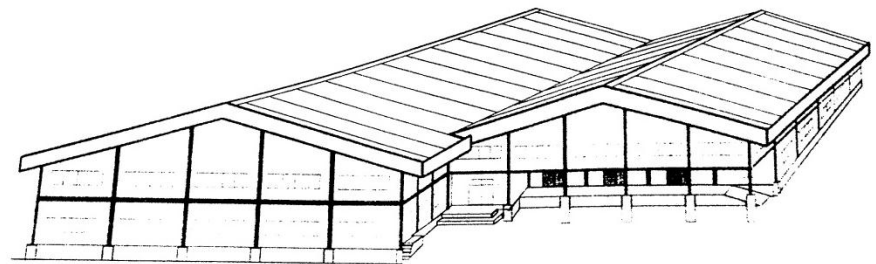
Plot 1-4, Sector #6, Export Processing Zone, Chittagong

(22.298388N, 91.775311E)

22 June 2014



FRONT VIEW

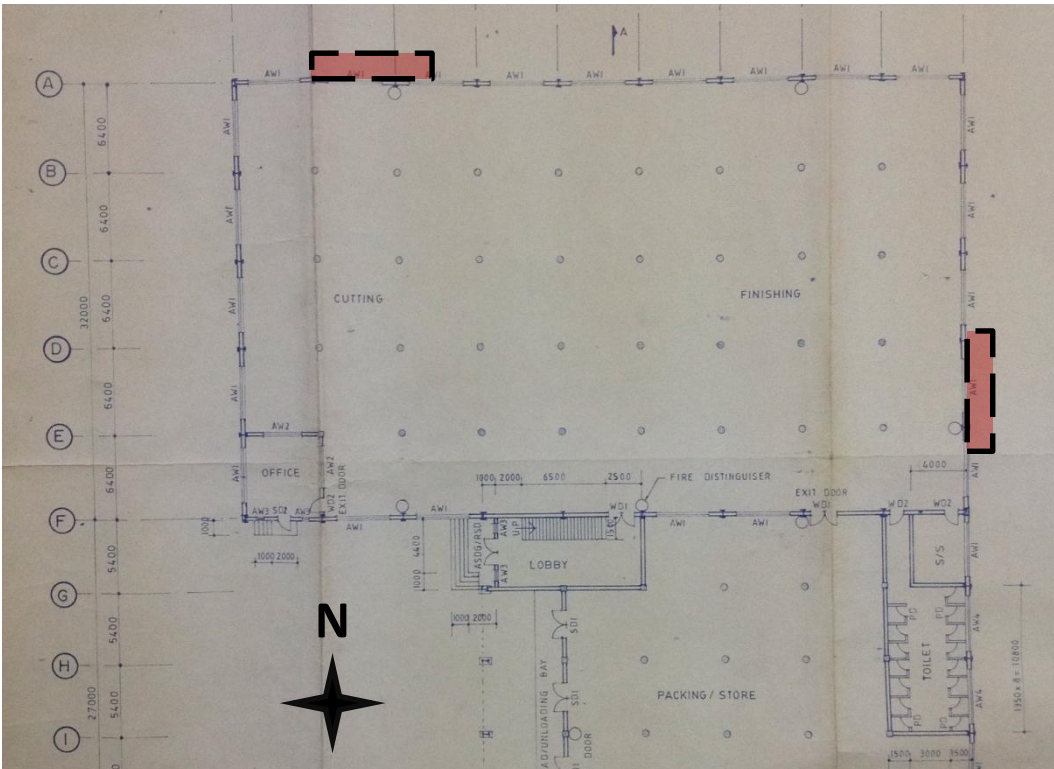


# Observations

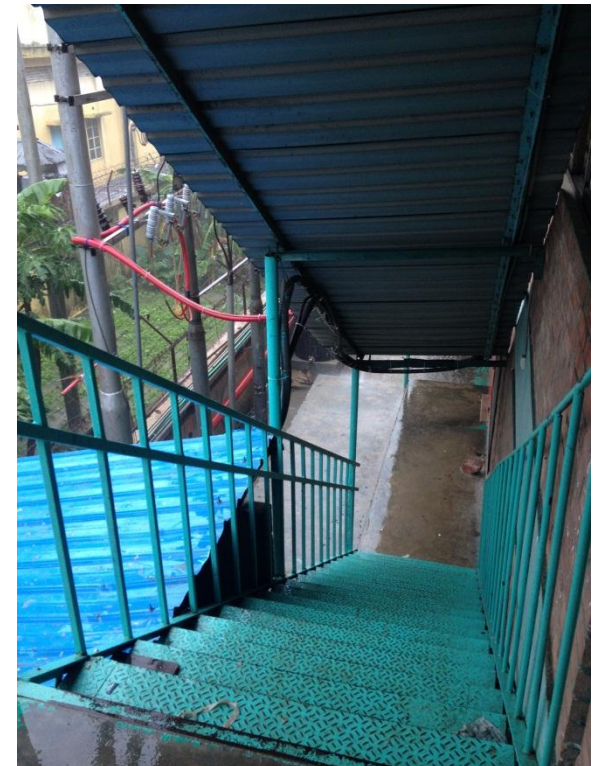
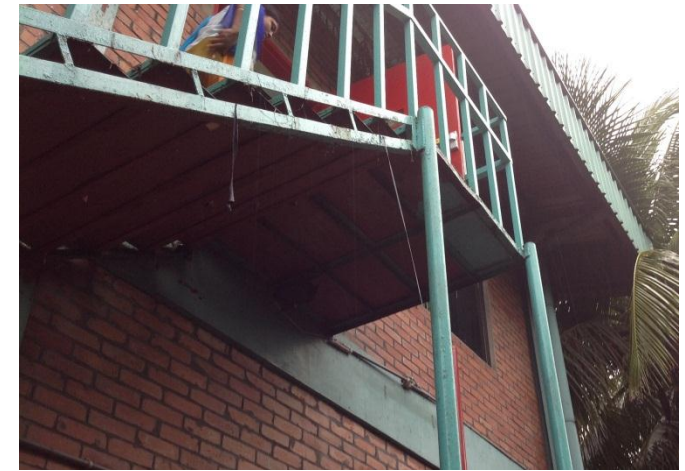
## Observations

**External steel escape stairs appear  
non-engineered**

# Observations



External staircases to First Floor of Building 1 intended as emergency exit routes appear non-engineered . Connections and treads appear weak and insubstantial – the stairs may not have been engineered to carry the full load during an evacuation event.



## Apparently Non-Engineered Escape Stairs

## Observations

# Localised areas of high loading observed in Building 2

# Observations



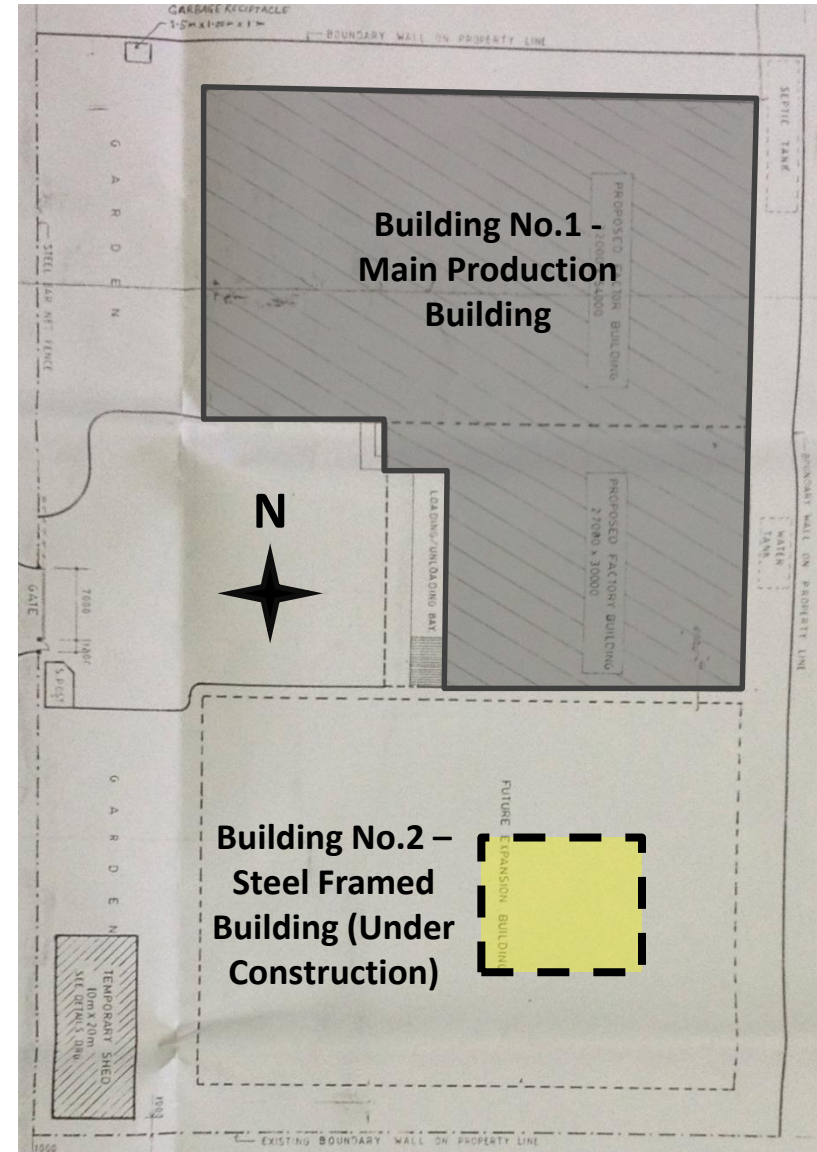
**Loading Observed  
Building No.2  
First Floor**

**2m High Rolled  
Unworked Fabric,  
Live Load  $7\text{kN/m}^2$**



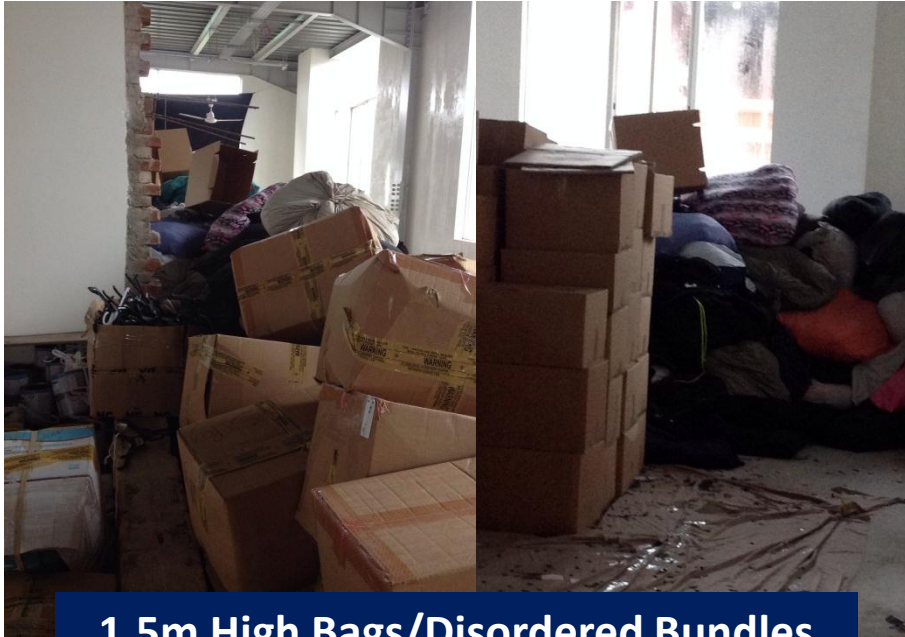
**1.8m High Rolled Unworked Fabric,  
Live Load  $6.3\text{kN/m}^2$**

**Localised areas of high loading observed in Building 2**

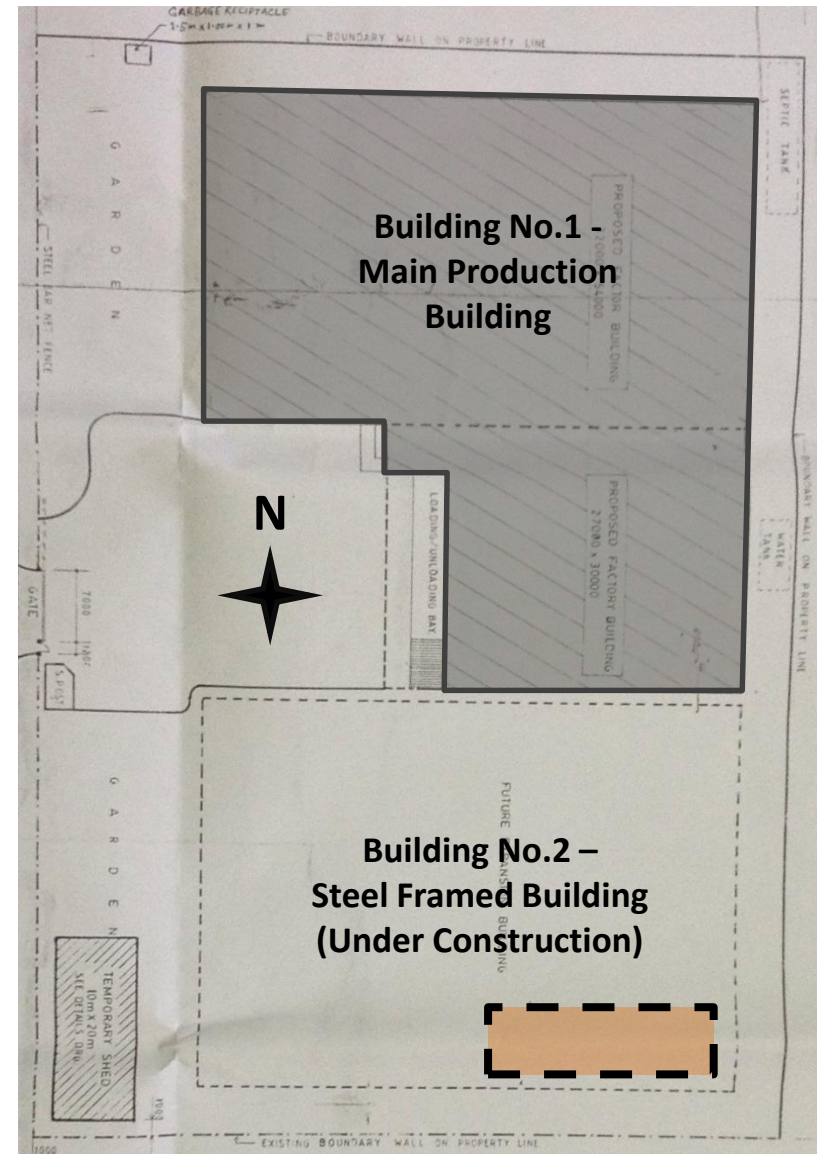


# Observations

## Loading Observed Building No.2 Second Floor



**1.5m High Bags/Disordered Bundles  
and Stacked Boxes of Clothes,  
Live Load up to  $4\text{kN/m}^2$**



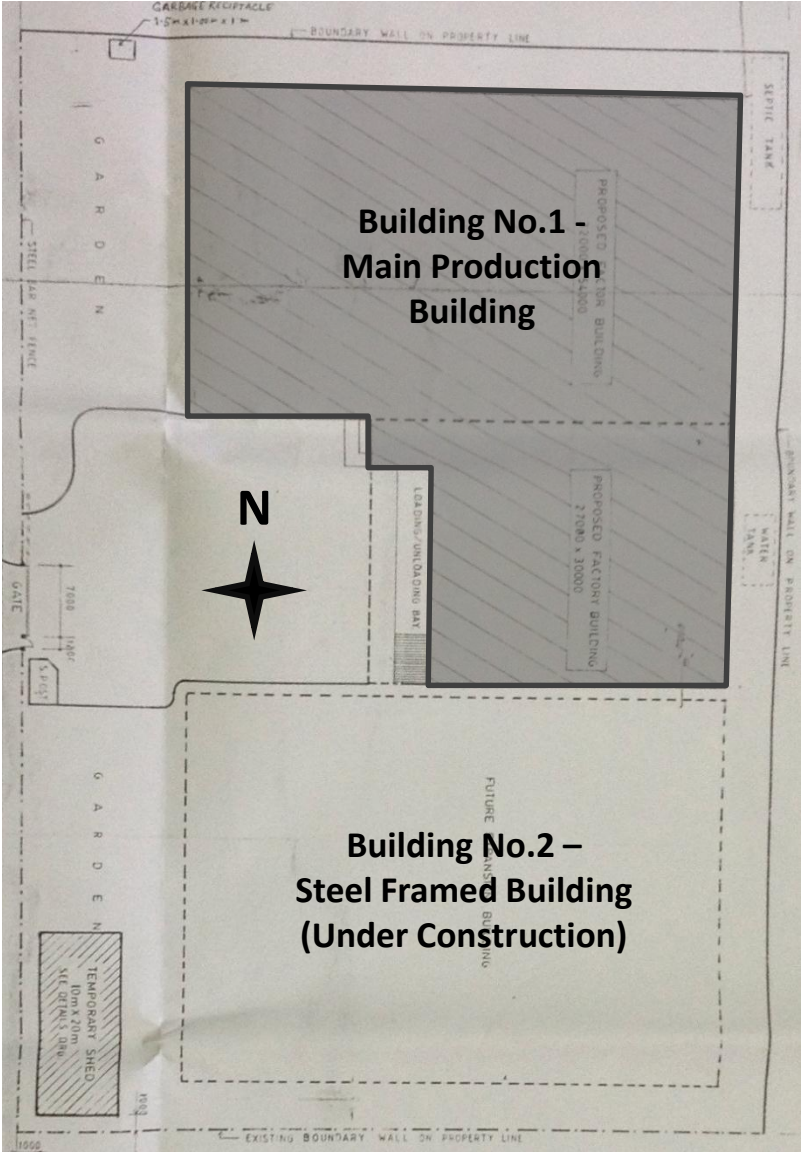
**Localised areas of high loading observed in Building 2**

# Observations

**Building No.2**  
**Design Live Load indicated to be 3.5kN/m<sup>2</sup>**

| Design Parameters                                         |                       |                                                                                                                                |
|-----------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Seismic Load Parameters (EX,EY) according to UBC and BNBC |                       |                                                                                                                                |
| Seismic Zone                                              | Z=0.3                 | UBC - Table 16.I - Seismic Zone Tabulation                                                                                     |
| Soil Profile Type                                         | SE - Soft Soil        | UBC - Table 16.J - Soil Profile Type                                                                                           |
| Seismic Coefficient., Ca                                  | 0.36                  | UBC - Table 16.Q - Seismic Coefficient., Ca                                                                                    |
| Seismic Coefficient., Cv                                  | 0.84                  | UBC - Table 16.R - Seismic Coefficient., Cv                                                                                    |
| Response Spec Func. Damp. Ratio                           | 0.05                  |                                                                                                                                |
| Response Modification Coefficient                         | 6                     |                                                                                                                                |
| Structure Importance Coefficient                          | 1                     | BNBC - Table 6.2.24 - c, 3i                                                                                                    |
| Dead Load (G)                                             |                       | BNBC - Table 6.2.23 - IV (standard occupancy structures)                                                                       |
| Slabs                                                     | 330 kg/m <sup>2</sup> | 15 cm thick concrete slab (incl. Concrete, corrug. steel sheet, steel mesh)                                                    |
| Live Load (P)                                             | 350 kg/m <sup>2</sup> | standard 5" brick wall with 12mm mortar                                                                                        |
| Wind Load                                                 | 160 kg/m <sup>2</sup> | exerted on the system for the area of wind coming from the left and right side of the building both in the X and Y directions. |

|               |                       |
|---------------|-----------------------|
| Live Load (P) |                       |
| Slabs         | 350 kg/m <sup>2</sup> |



**Localised areas of high loading observed in Building 2**

## Observations

# Undocumented and non-engineered Canteen Shed and Utilities Buildings

# Observations



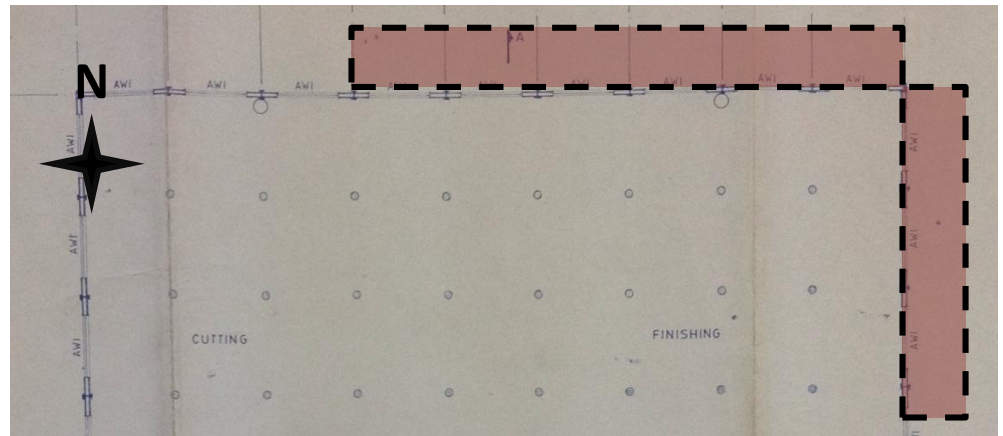
Large lightweight steel roofed canteen has been built on West face of Building 1. The structure appears non-engineered; no drawings or structural design information available. There is no obvious lateral stability system, columns appear slender. (Note – General Manager stated that canteen will be moved to third floor of Building 3 once fit-out of the new kitchens has been completed - est. July 2014)

## Apparently non-engineered Canteen Shed

# Observations



Additional Utility Buildings and production buildings along Northeast corner of Building 1 appear non-engineered.



**Apparently Non-Engineered Utility Buildings**

**ACCORD**  
on Fire and Building Safety in Bangladesh

**ARUP**

## Observations

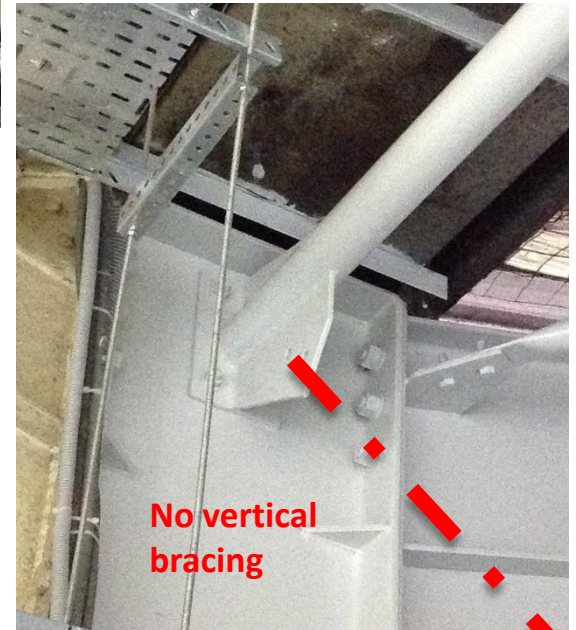
# Incomplete lateral stability system to Building 1

# Observations

Stability system designed as braced frame in east-west direction.



No bracing provided in the vertical direction to column base.

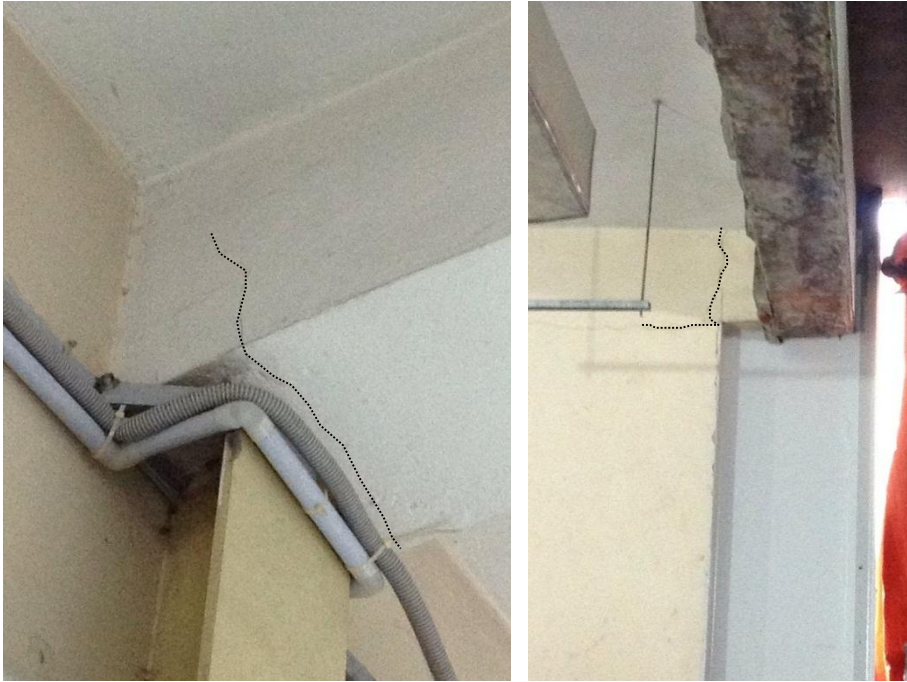


## Incomplete Lateral Stability System

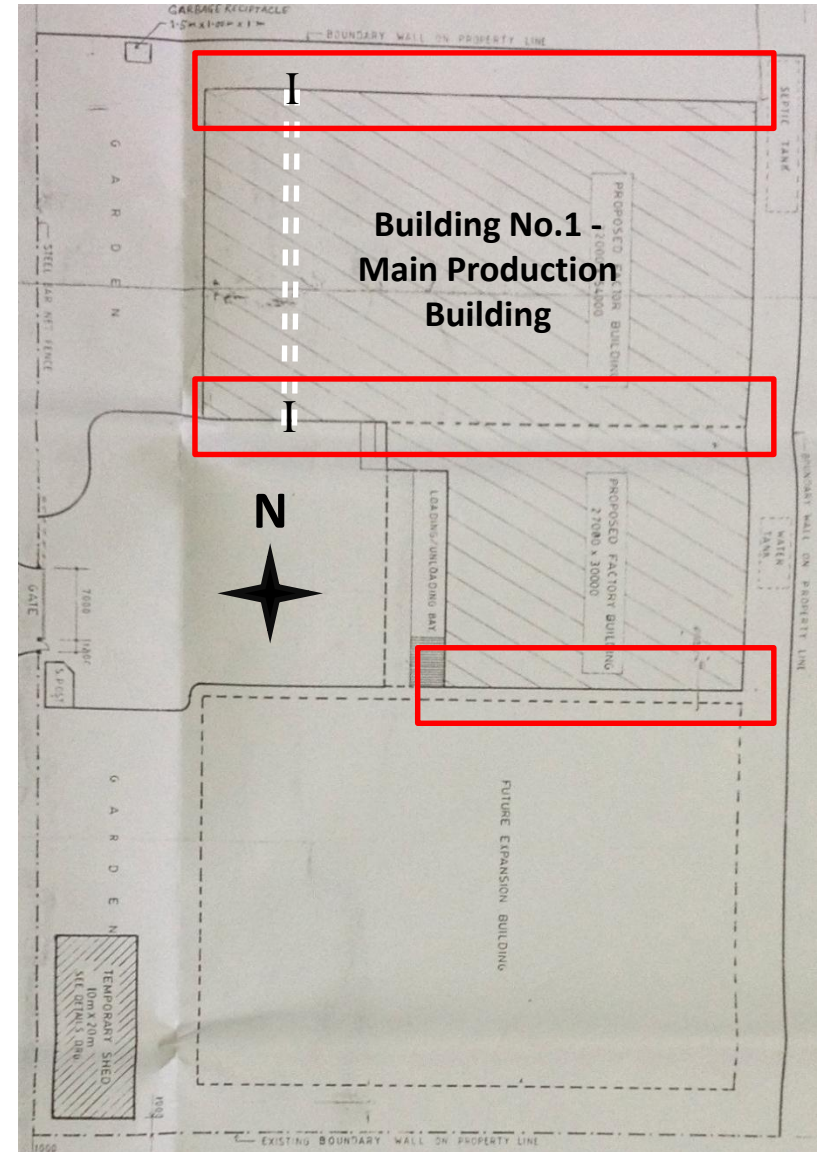
## Observations

**Cracking observed at connection between  
RC beam and steel column**

# Observations



Horizontal cracking observed at the RC Beam to Steel Column connection.  
Observed in a large number of connections.  
No standard drawing/detail provided showing connection type.



## Cracking at Beam – Column Connection

## Observations

**Movement joint between  
Building 1 and 3 is discontinuous**

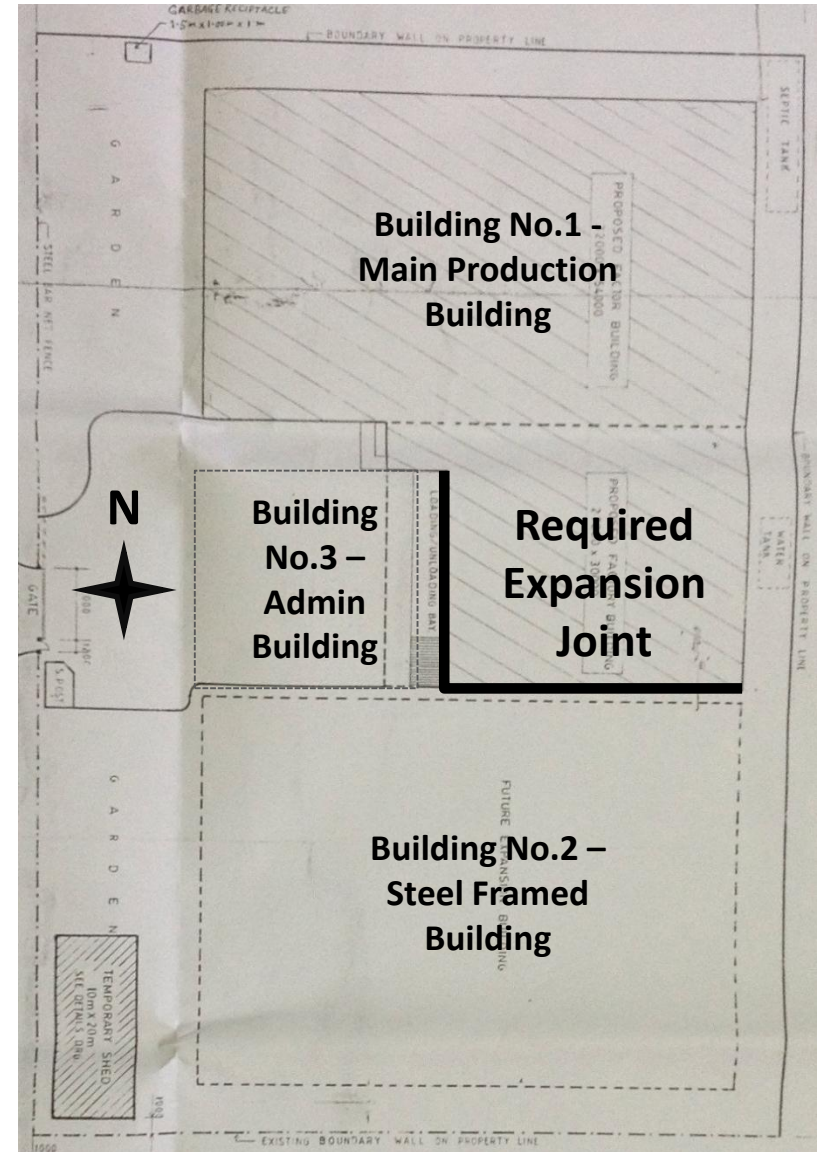
# Observations



Existing movement joint between Building No.1 and 2



Existing movement joint between Building No.1 and 3

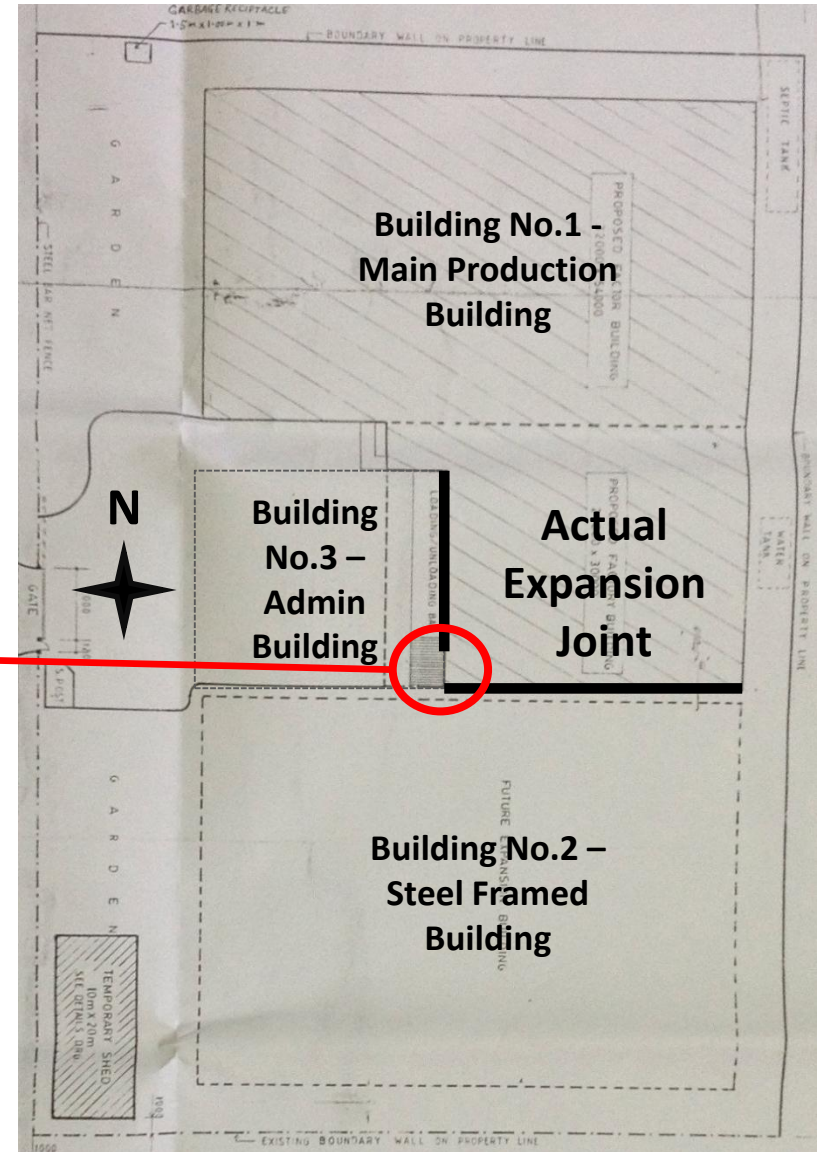


## Movement Joint

# Observations



**Movement joint does not extend the full length between Building No.1 and No.3**



## Movement Joint

# Priority Actions

# Problems Observed

- ITEM 1:** External steel escape stairs appear non-engineered
- ITEM 2:** Localised areas of high loading observed in Building 2
- ITEM 3:** Undocumented and non-engineered Canteen Shed & Utility Buildings
- ITEM 4:** Incomplete lateral stability system to Building 1
- ITEM 5:** Cracking observed at connection between RC beam and steel column
- ITEM 6:** Movement joint between Building 1 and Building 3 is discontinuous

| Item No. | Observation                                                        | Recommended Action Plan                                                                                                                                                                      | Recommended Timeline |
|----------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 1        | External steel escape stairs appear non-engineered                 | The stairs should be surveyed and assessed in detail by a structural engineer for adequacy to support the expected loading in an evacuation event and strengthened or replaced as necessary. | Immediate - Now      |
| 2        | Localised areas of high loading observed in Building 2             | Stored materials to be spread apart such that the total live load is limited to no more than 350kg/m <sup>2</sup> in accordance with the structural design.                                  | 6-weeks              |
| 3        | Localised areas of high loading observed in Building 2             | Loading plans for buildings to be correctly implemented throughout Buildings 1, 2 and 3.                                                                                                     | 6-months             |
| 4        | Undocumented and non-engineered canteen shed and utility buildings | Steel structures should be assessed to code vertical and wind loads by the Structural Engineer.                                                                                              | 6-months             |
| 5        | Undocumented and non-engineered canteen shed and utility buildings | Carry out any remedial actions as directed by the Structural Engineer.                                                                                                                       | 6-months             |
| 6        | Incomplete lateral stability system to Building 1                  | Structural Engineer to carry out a stability analysis of Building 1 and propose a suitable east-west lateral stability system                                                                | 6-months             |
| 7        | Incomplete lateral stability system to Building 1                  | Carry out any remedial actions as directed by the Structural Engineer.                                                                                                                       | 6-months             |

| Item No. | Observation                                                          | Recommended Action Plan                                                                                       | Recommended Timeline |
|----------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------|
| 8        | Cracking observed at the connection between RC beam and steel column | Structural Engineer to assess the as-built connection detail provided between concrete beam and steel column. | 6-months             |
| 9        | Cracking observed at the connection between RC beam and steel column | Retrofitting to be carried out as directed by the Structural Engineer.                                        | 6-months             |
| 10       | Movement joint between Buildings 1 and 3 is discontinuous            | Structural Engineer to determine the location of the interface between Building 1 and 3.                      | 6-months             |
| 11       | Movement joint between Buildings 1 and 3 is discontinuous            | Form a properly detailed expansion joint between both buildings as directed by the Structural Engineer.       | 6-months             |