Ocean Sweater Ltd.

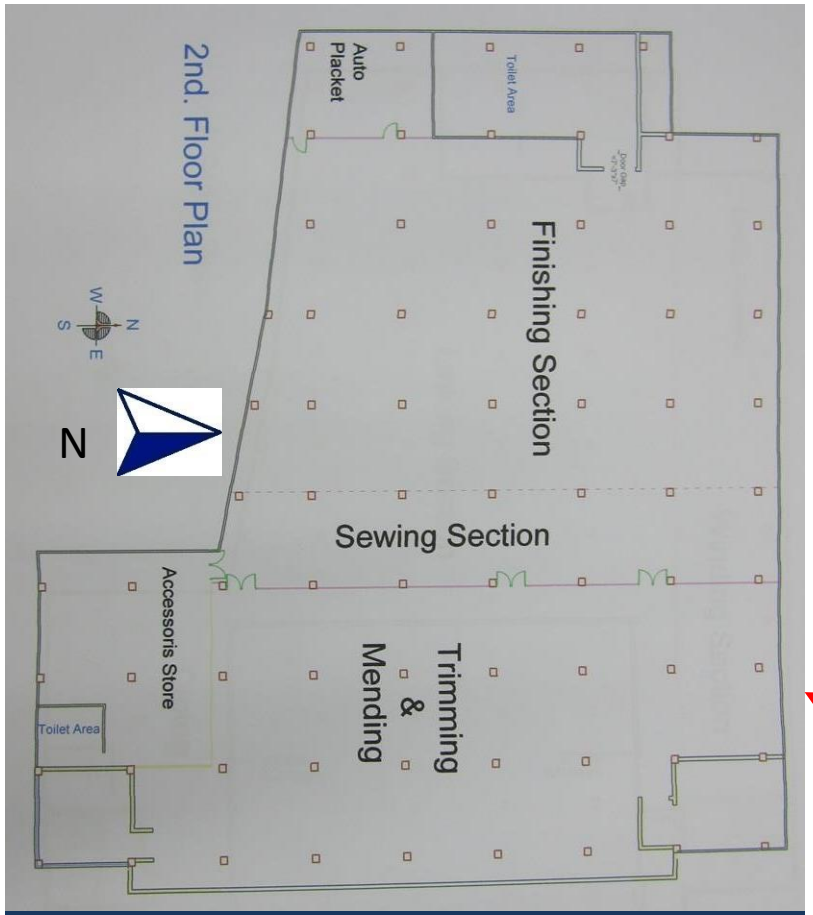
Islampur, Joydebpur, Gazipur
(23.980824N, 90.350873E)
22nd March 2015

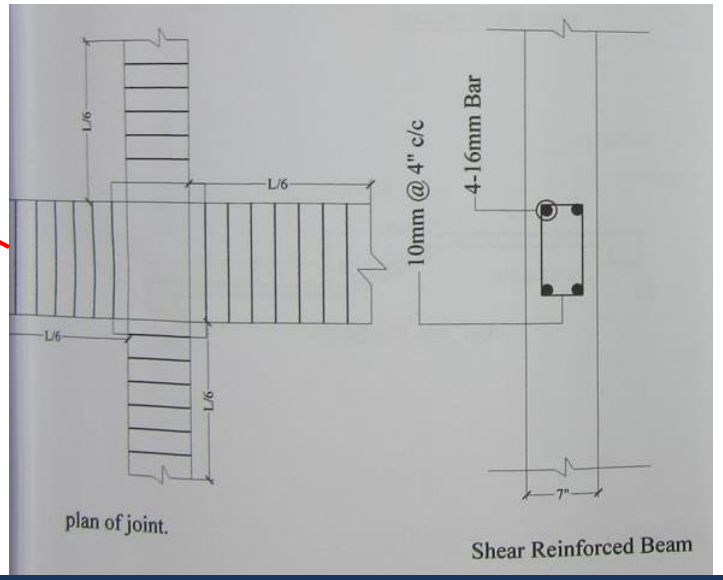
ACCORD on Fire and Building Safety in Bangladesh

ARUP

Observations

Punching shear in flat slabs





- Hidden beam within slab depth (as per structural drawings) need to be confirmed

Cursory calculations show punching shear stress in flat slabs to be in excess of normal design limits if shear links are not provided.

Observations – Production Building

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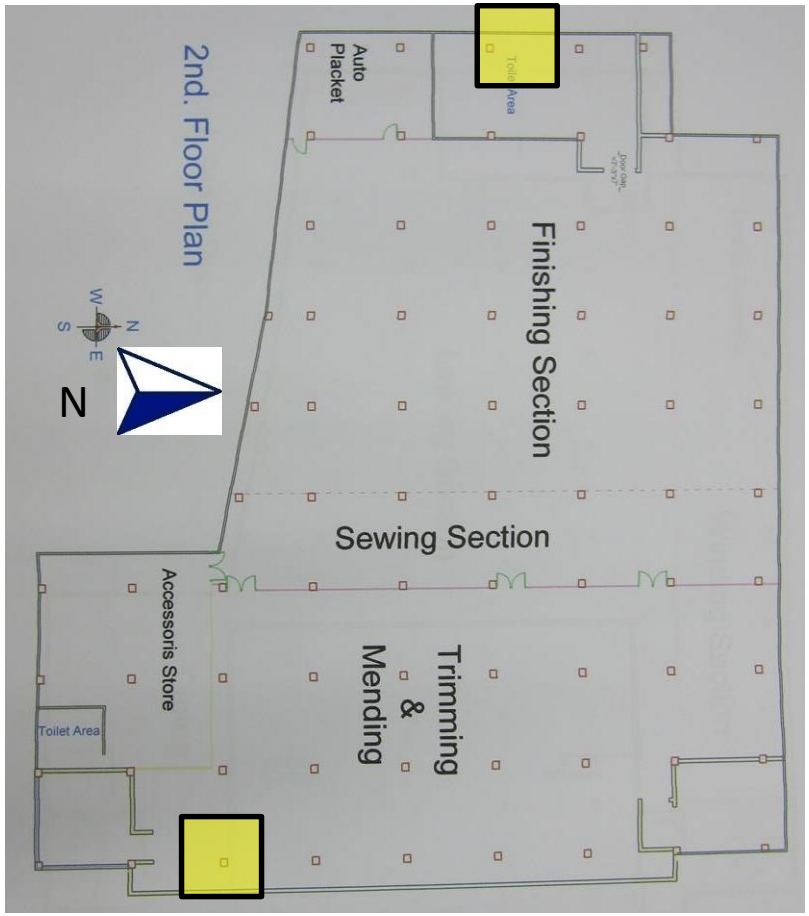
Highly-stressed perimeter columns



Cursory calculations show stress levels in excess of normal design limits for some perimeter columns.

Observations – Production Building

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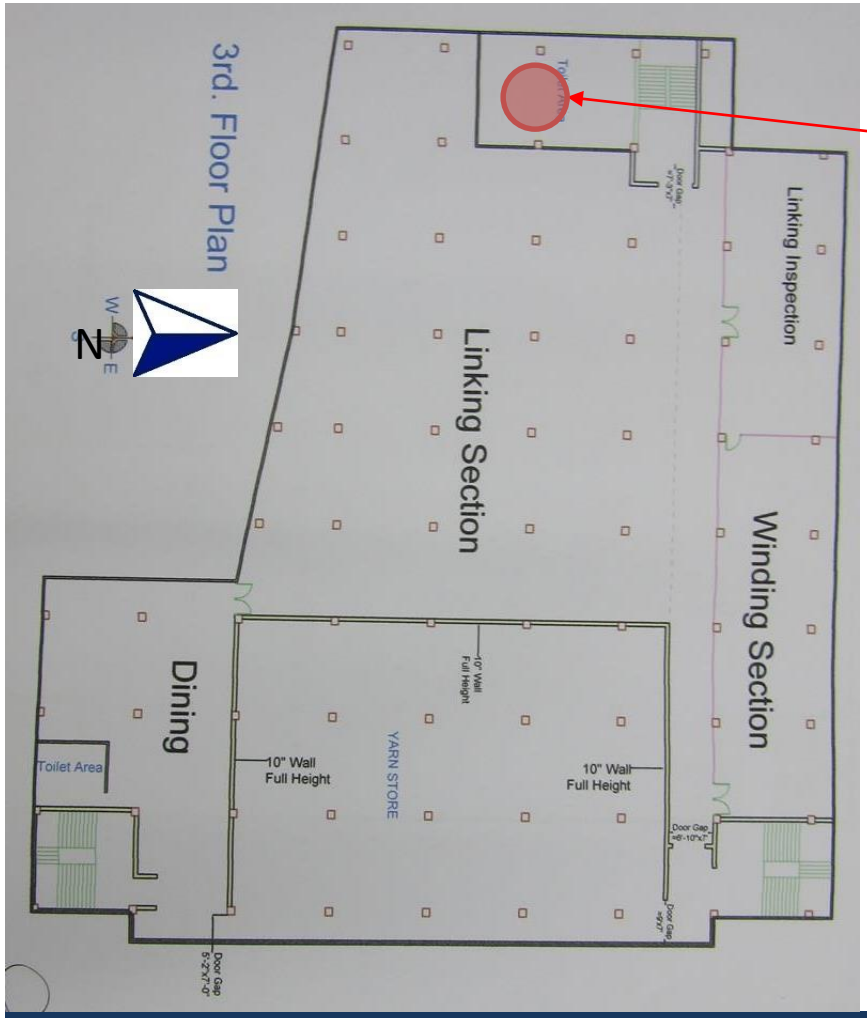
Heavy loading on 4th floor slab (current roof)



- 10,000 litre Gazi water tank

Heavy loading due to water tank on 4th floor/roof.

Observations – Production Building

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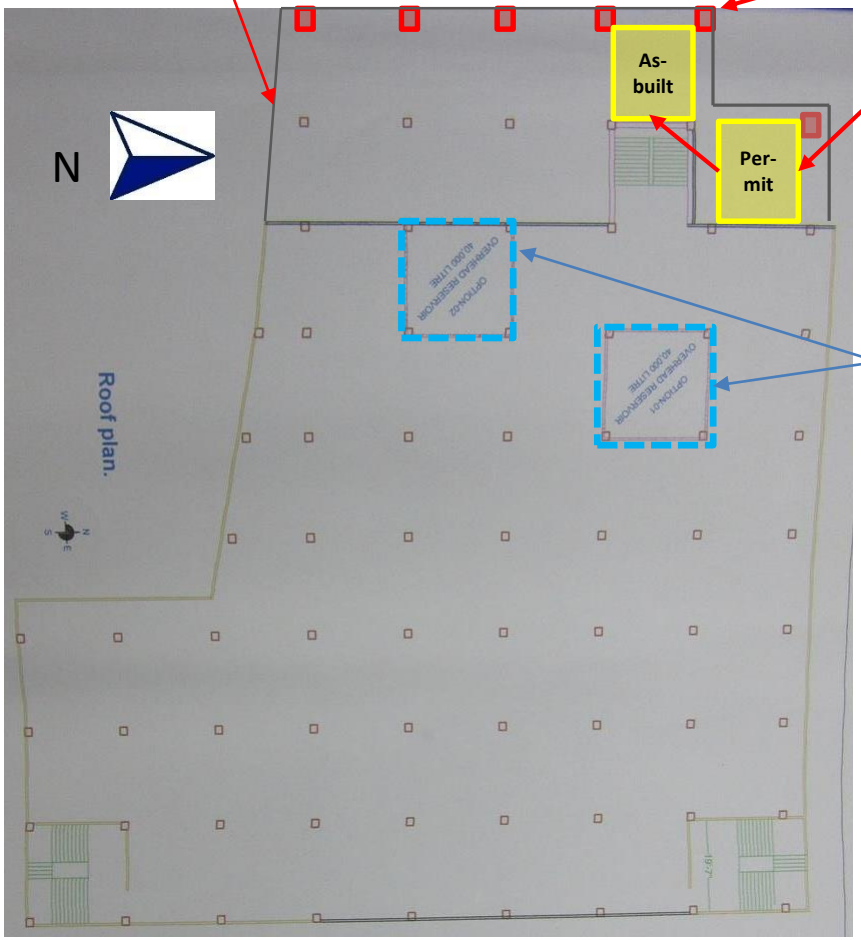
Discrepancies between permit drawings, structural “as-built” drawings and observed structure

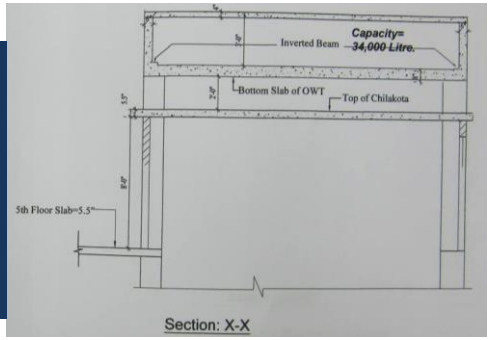
As-built perimeter



List of discrepancies:

- Missing existing column line on drawing of 4th floor (current roof)
- Existing staircore moved south-west compared to permit drawings
- Cantilever spans appear to be larger than in structural drawings (no dimensions given)
- Position of future RC water tanks is unclear (water tank shown on as-built drawings above 5th floor slab). Future position of water tanks needs to be confirmed

Drawing of future RC-water tank on roof



Column layout for 4th floor/roof.

Observations – Production Building

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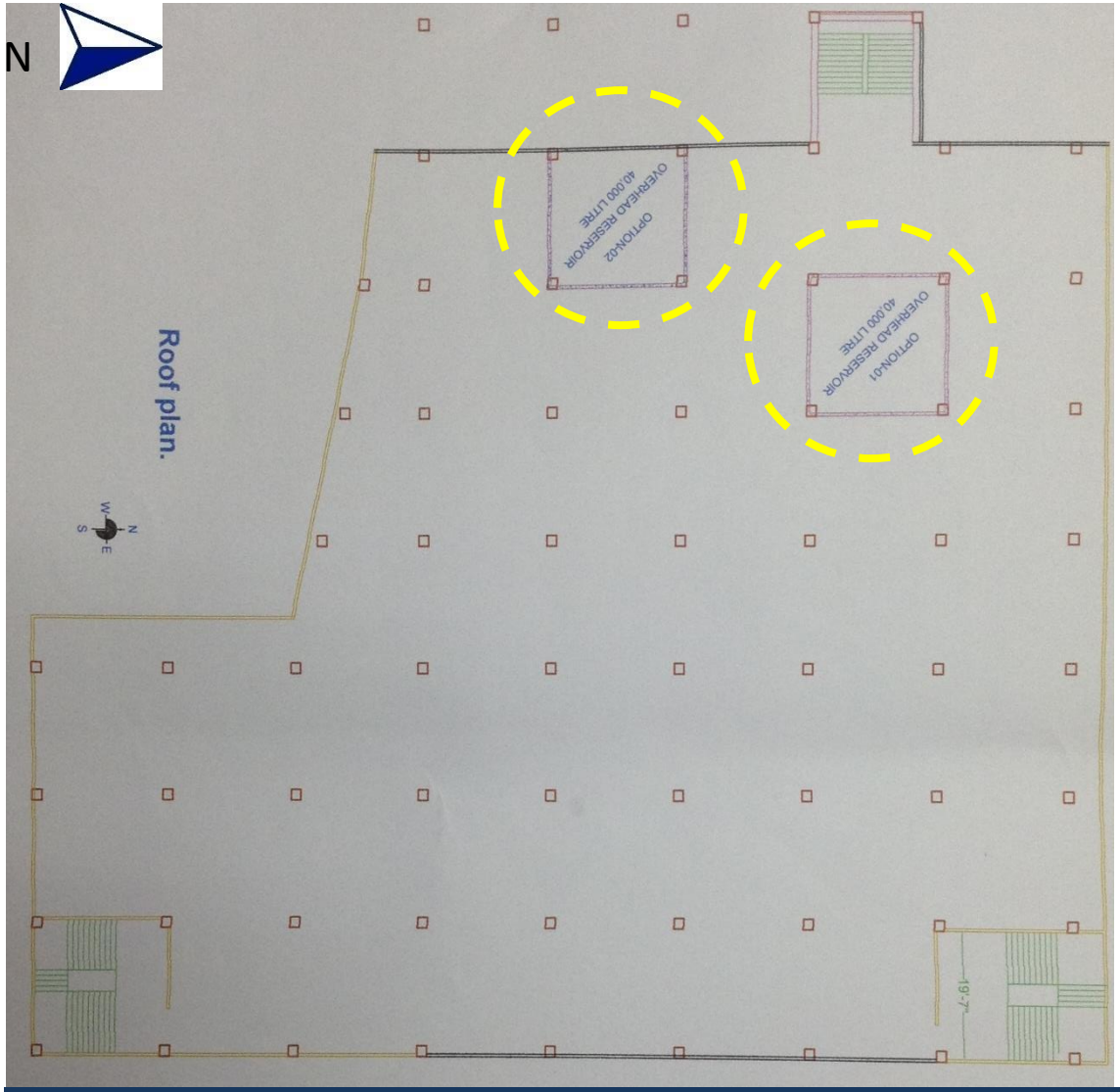

"As-built" drawings show two water tanks which are not yet constructed

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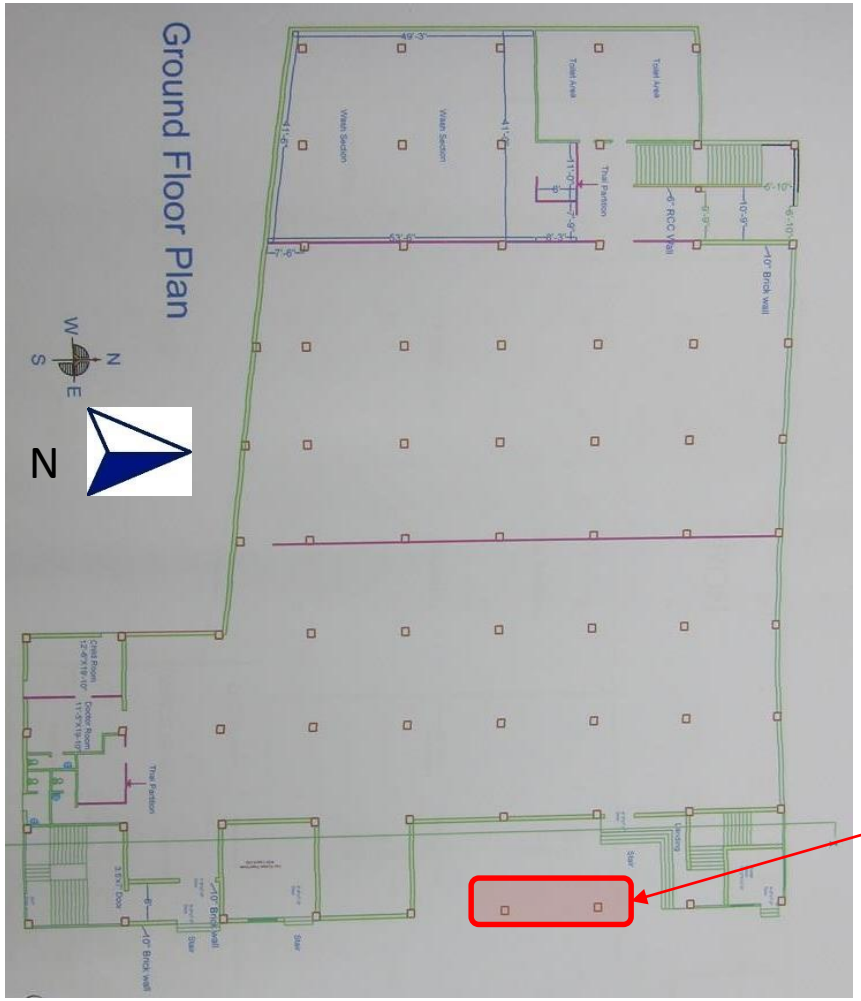
Ground floor columns in parking/delivery area vulnerable to vehicle impact



Possible vehicle impact to Ground floor columns in parking/delivery area

Observations – Production Building

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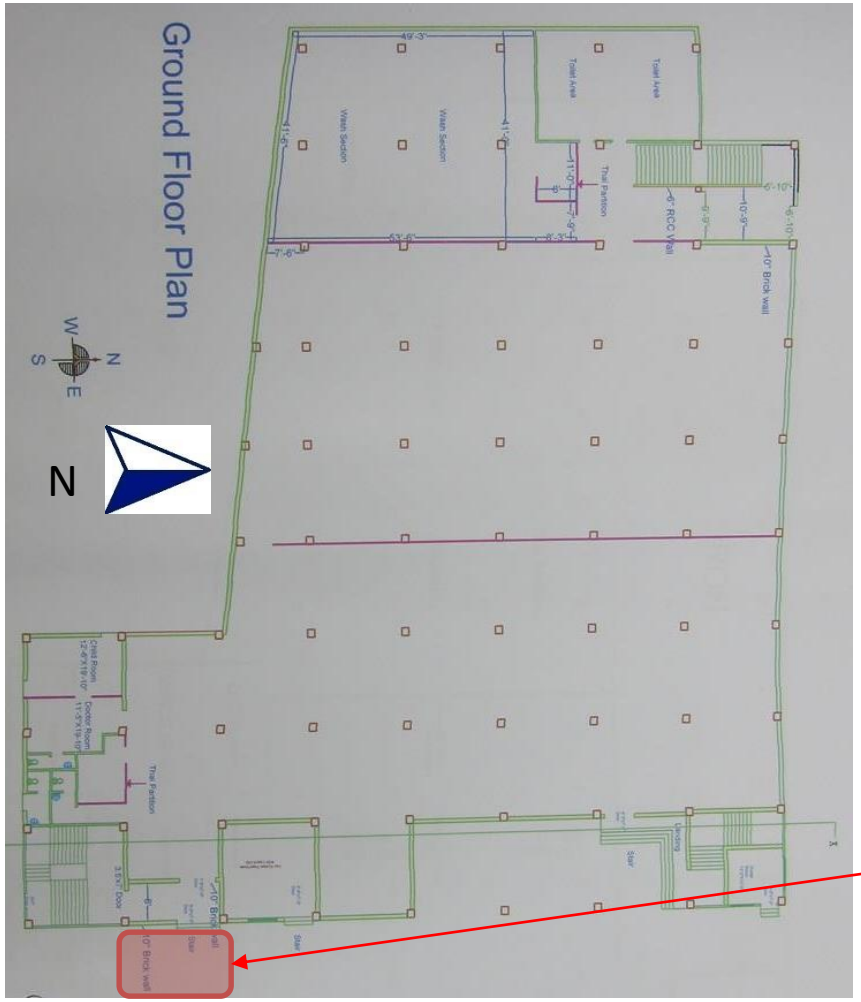
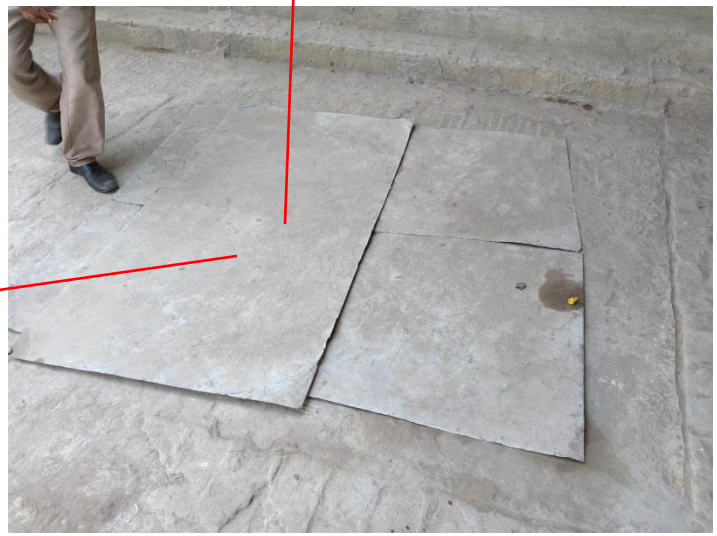
Insufficient cover on manhole in evacuation route





Insufficient cover on manhole in evacuation route. Falling hazard

Observations – Production Building

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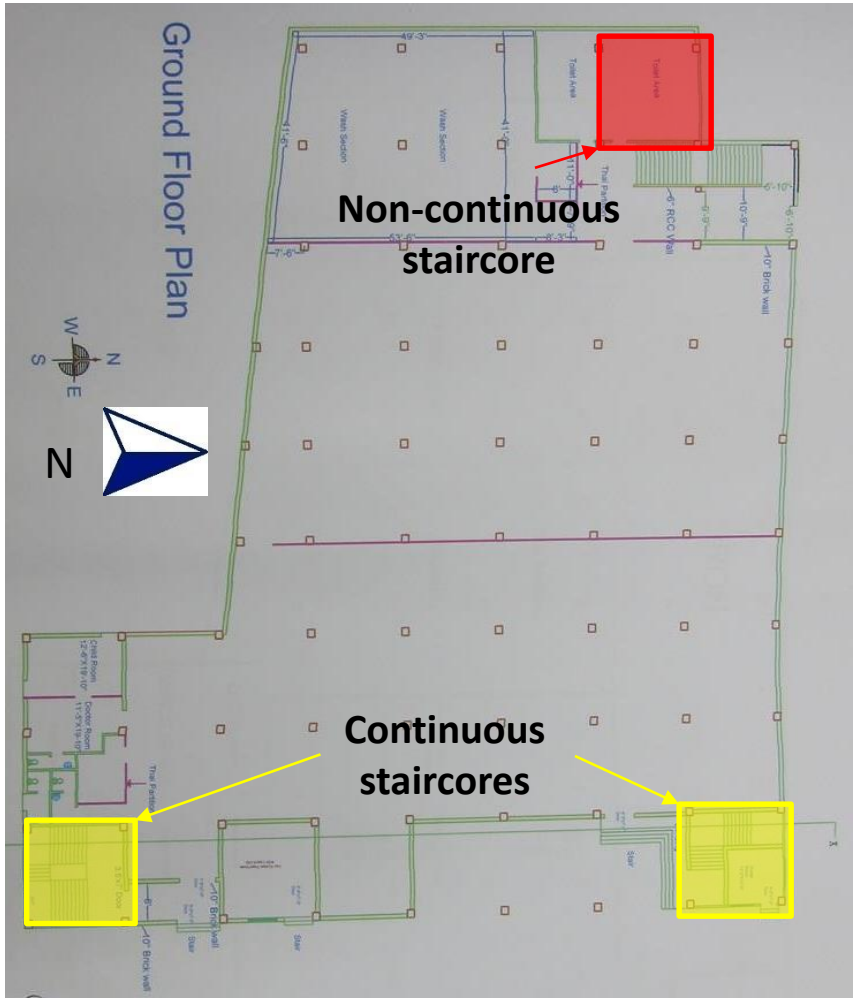
Lateral stability system is not apparent



Lateral stability concerns:

- Flat slabs on all floors
- 3 staircores, but only 2 of them continue down to ground floor

Lateral stability system is not apparent

Observations – Production Building

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Problems Observed

1. Punching shear in flat slabs
2. Highly-stressed perimeter columns
3. Heavy loading on 4th floor slab (current roof)
4. Discrepancies between permit drawings, structural “as-built” drawings and observed structure
5. Ground floor columns in parking/delivery area vulnerable to vehicle impact
6. Insufficient cover on manhole in evacuation route
7. Lateral stability system is not apparent

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Punching shear in flat slabs	Ascertain the presence of shear links in the slabs	**6-weeks**
2	Punching shear in flat slabs	Carry out any necessary strengthening or remedial measures to flat slabs arising from review.	**6-months**
3	Highly-stressed perimeter columns	Building Engineer to review design, loads and column stresses in the edge columns attracting loads from cantilevers and toilets.	**6-weeks**
4	Highly-stressed perimeter columns	Verify in-situ concrete stresses by 100mm dia. cores from min. 4 no. columns at ground floor level.	**6-weeks**
5	Highly-stressed perimeter columns	Produce and actively manage a loading plan for all floor plates within the Production Building, giving consideration to floor capacity and column capacity.	**6-months**
6	Heavy loading on 4th floor slab (current roof)	Building Engineer to check and verify the design capacity of the structural elements supporting the water tanks.	**6-weeks**
7	Heavy loading on 4th floor slab (current roof)	The location of the future water tanks to be confirmed.	**6-weeks**
8	Heavy loading on 4th floor slab (current roof)	If necessary, Building Engineer to take appropriate action by reducing or removing water tanks loads where required, and/or spread the load of the roof water tanks over a bigger and more appropriate area.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
9	Discrepancies between permit drawings, structural "as-built" drawings and observed structure	Building Engineer to survey the as-constructed building.	**6-weeks**
10	Discrepancies between permit drawings, structural "as-built" drawings and observed structure	Building engineer to produce accurate and complete as-built documentation showing as-built floor layouts, grids, column and slab dimensions.	**6-months**
11	Ground floor columns in parking/delivery area vulnerable to vehicle impact	Building Engineer to review and check the capacity of the columns in the parking/delivery area to resist possible vehicle impact.	**6-weeks**
12	Ground floor columns in parking/delivery area vulnerable to vehicle impact	Building Engineer to assign the required measures to ensure the columns are protected from vehicle impact following review, either by strengthening the columns or by cordoning them off to prevent impact.	**6-months**
13	Insufficient cover on manhole in evacuation route	Cordon off area around manhole.	**6-weeks**
14	Insufficient cover on manhole in evacuation route	Provide proper covers to the manhole to safely transmit vertical loads to the manhole walls.	**6-weeks**
15	Lateral stability system is not apparent	Building Engineer to investigate the lateral stability of the building, ensuring compliance with Code requirements.	**6-months**
16	Lateral stability system is not apparent	Implement any structural alterations arising from investigation.	**6-months**