



A-One Polar Ltd. (New Buildings)

Vulta, Rupgonj

(23.772240, 90.558224)

28th May and 3rd June 2018





Observations



Office Building

Observation :



Incomplete as-built documents

Observation : Office Building



As-built drawing was found up to 2nd floor. No drawing was observed for roof truss. Column schedule of 3rd floor was found missing in the given As-built drawing.



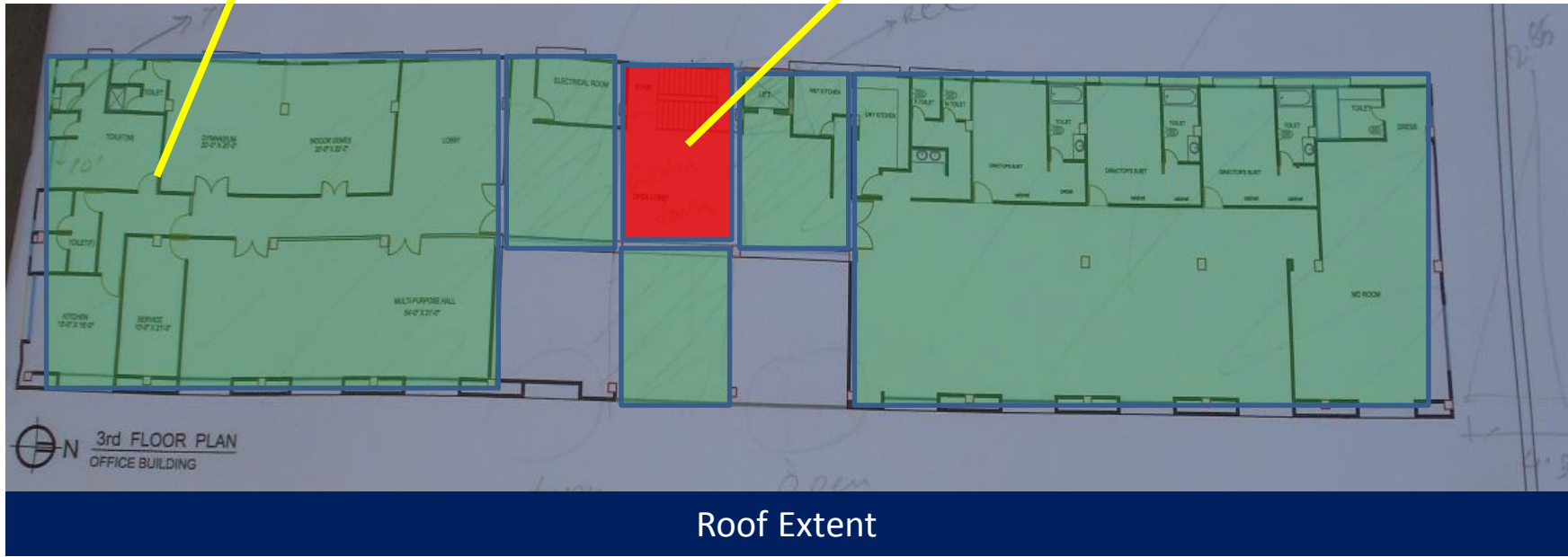
Observation : Office Building



Roof truss



Water tank



Roof Extent

Location and details drawing of water tank was not found in the As-built drawing. As-built drawing of roof truss was missing.

Observation : Office Building



Probable vehicle impact for ground floor columns

Observation : Office Building



Columns of ground floor are prone to vehicular impact. Factory is required to protect the columns from vehicular impact.

Observation : Office Building



Falling hazard in 3rd floor

Observation : Office Building



No safety guard or parapet was observed at the opening at roof top. This area is prone to falling hazard.

Observation : Office Building



Non-engineering connection roof shed

Observation : Office Building



Apparently non-engineered connection was observed in the truss at roof

Observation : Office Building



Inspection Building

Observations

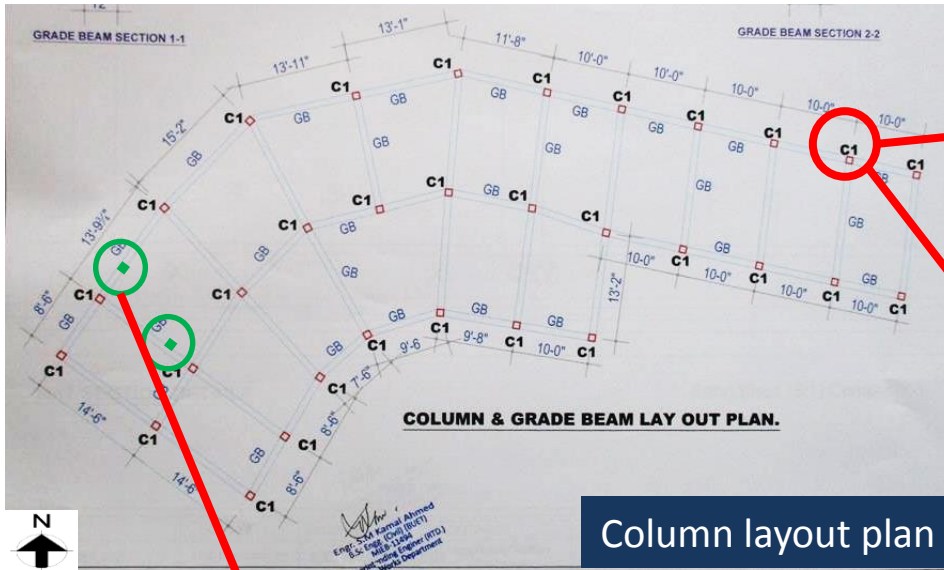


Discrepancies in structural drawings

Observations: Inspection Building



8 nos. rebars are shown in column schedule where 6 rebars were found onsite. Also, the column layout of the provided drawings did not match with on site arrangement. Additional columns were found during inspection which has been marked as green.



Column layout plan



6 Rebars in stair column



Additional column

Reinforcement	
1st Floor.	2nd Floor.
12"X12" 8 -16Ø.	12"X12" 8 -16Ø.



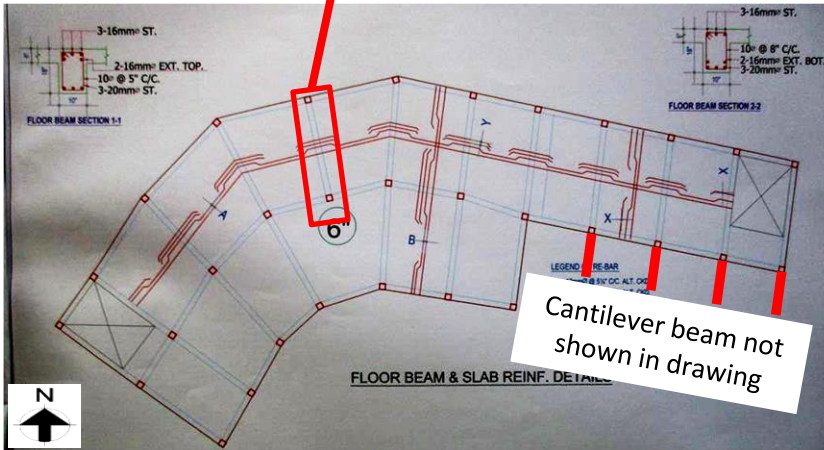
Beam missing in 1st & 2nd floor



Truss on 3rd floor



4x1000 ltr. Water Tank and a mast on 3rd floor



Cantilever beam not shown in drawing



3rd FLOOR PLAN

Floor beams were missing on marked location of 1st & 2nd floor. Undocumented roof truss was found on 3rd floor . Water tanks were observed on 2nd floor roof (4x1000 litre). Also, Cantilever beams were found in south direction of the building but not shown in as built drawing .

Observations: Inspection Building



Lateral stability

Observations: Inspection Building



The shape of the building is irregular. A portion of the building is consist of the single bay and another portion is two bays. However, there is no shear wall or other form of lateral load resisting systems in the building. Factory engineer to check the stability of the building against lateral forces following BNBC provisions.

Observations: Inspection Building



Dampness on brick façade

Observations: Inspection Building



Dampness due to water intrusions was observed in various locations.

Observations: Inspection Building



Discrepancies between as-built drawings and on site condition

Observation: ETP Building



1ST Floor & 2nd

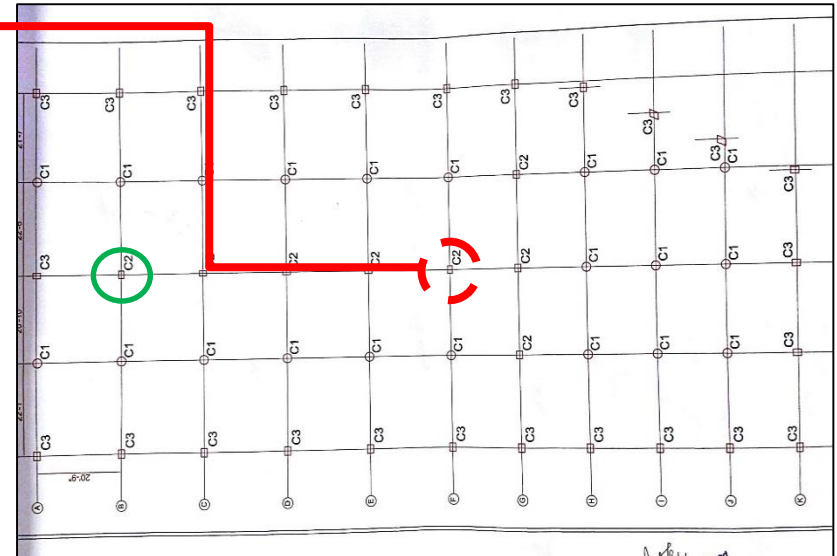
26" DIA
5-22Ø, 5-20Ø
SEC. OF C1

22"X15"
10-20Ø
SEC. OF C2

Column Schedule



C2 Column was measured 500mm instead of 550mm



Column Layout plan.



Diameter of C1 Column was measured 600mm instead of Diameter 650mm.

The dimension of all C1 and C2 type columns were found smaller than column schedule. Diameter of C1 column was measured 600mm instead of 650mm and C2 column dimension was found 600mm instead 550mm. Moreover, on B-3 grid (marked as green on layout) the orientation of C2 column didn't match with column layout plan.

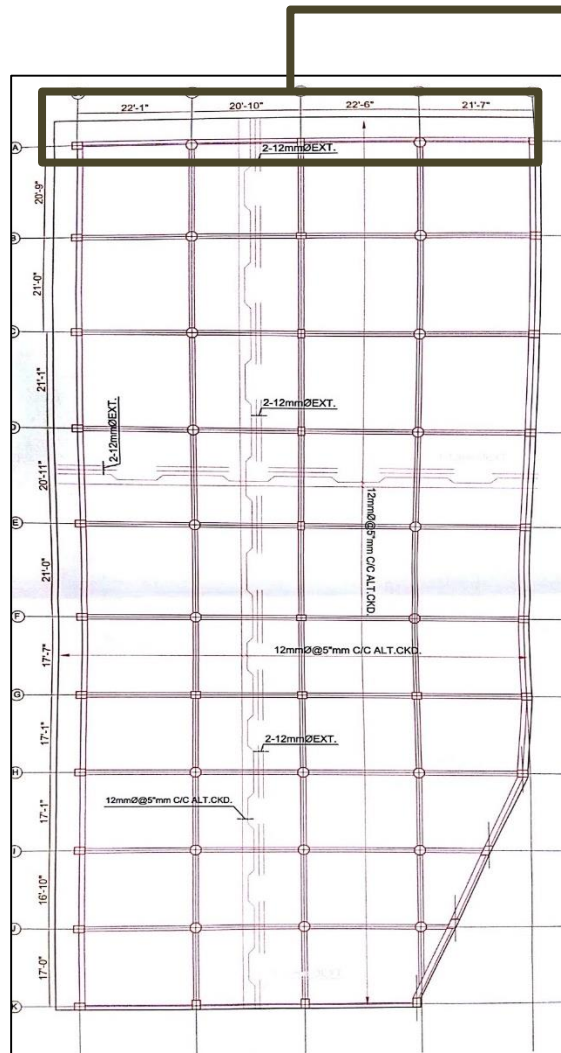


Floor beam layout Plan

Beam layout on site didn't match with as-built drawing. In 1st and 2nd floor beam wasn't found on the marked portion.



Location of the missing beam



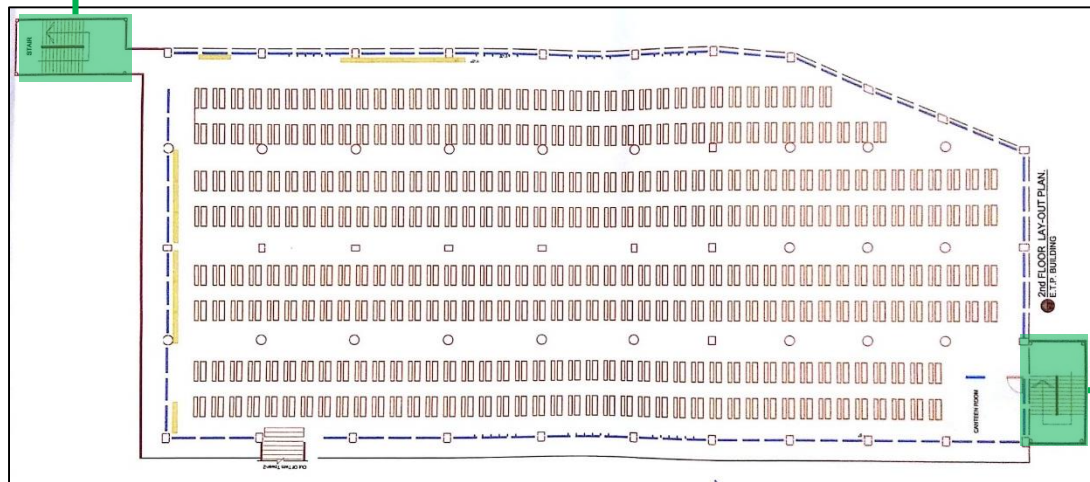
On north face, cantilever beams are present which aren't shown in as-built drawings.

Observation : ETP Building



Undocumented emergency steel stair

Observations: ETP Building



Floor layout plan



Emergency Steel stair on north face.



Emergency Steel stair on south face.

No document was found of emergency steel stair on north side and south side. Factory Engineer is required to prepare as-built drawing (structural and architectural) and carry out stability check against the lateral loads.

Observation : ETP Building



Twin Tower-1 & 2

Observations



Uncontrolled loading

Observations: Twin Tower-1 & 2



Uncontrolled loading



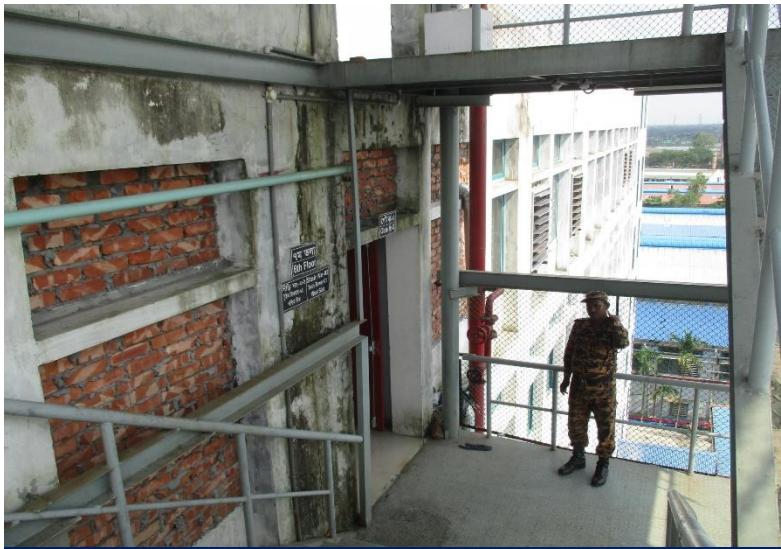
No load management program (i.e load restriction height marking, posting load plan, signage) was implemented. Factory engineer is required to implement floor load management.

Observations: Twin Tower-1 & 2



Undocumented steel stair, connecting bridge and roof frames

Observations: Twin Tower-1 & 2



Steel stair adjacent to Twin Tower-1



Steel stair in between Twin Tower-2 to ETP



Steel connecting bridge from Twin Tower

Some steel stair, roof frame and connecting bridges were found adjacent to the Twin Tower buildings having no structural details.



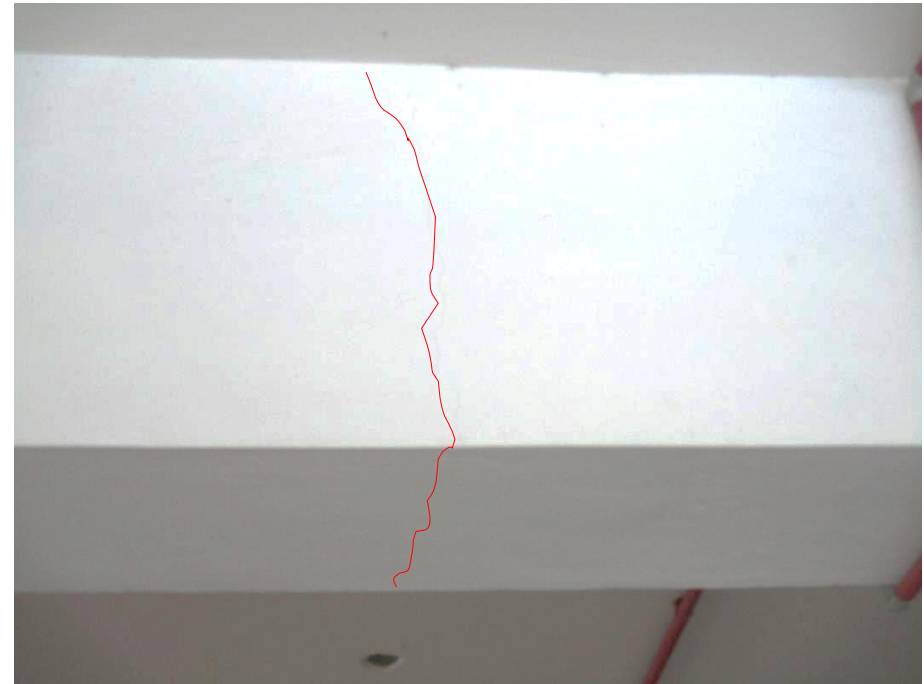
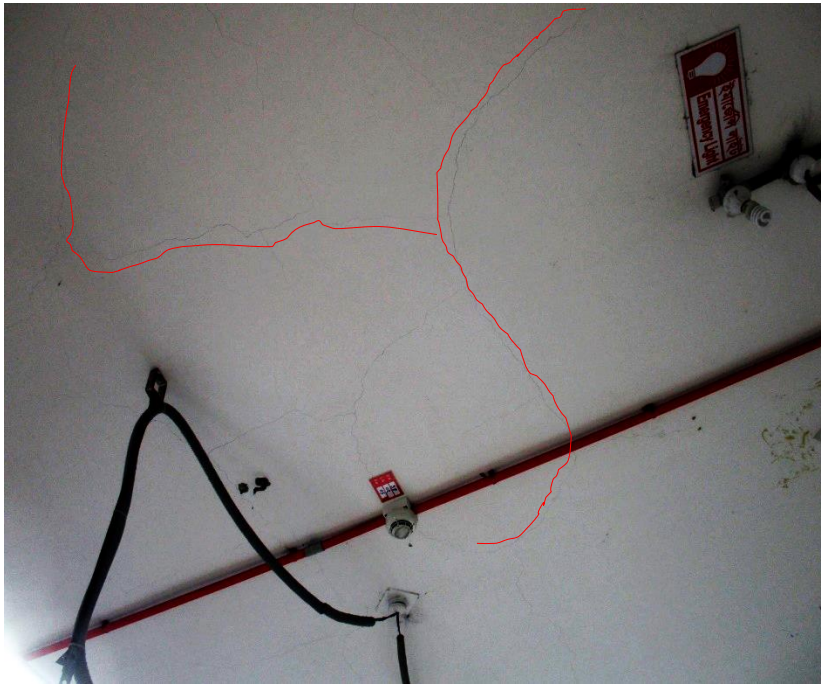
Steel Roof frame of Twin Tower-1 & 2

Observations: Twin Tower-1 & 2



Hairline crack on floor beam & slab

Observations: Twin Tower-1 & 2



Hairline crack was found soffit of 5th floor slab and 6th floor beam

Observations: Twin Tower-1 & 2



Water ponding on roof

Observations: Twin Tower-1 & 2



Water ponding was found in the roof. Also, poor water proofing layer was observed on roof slab. Building engineer to develop proper drainage system and provide proper water proofing layer on roof.



No water proofing layer



Poor water proofing layer

Observations: Twin Tower-1 & 2



Pond Building

Observations



Inaccurate as-built drawings

Observation : Pond Building



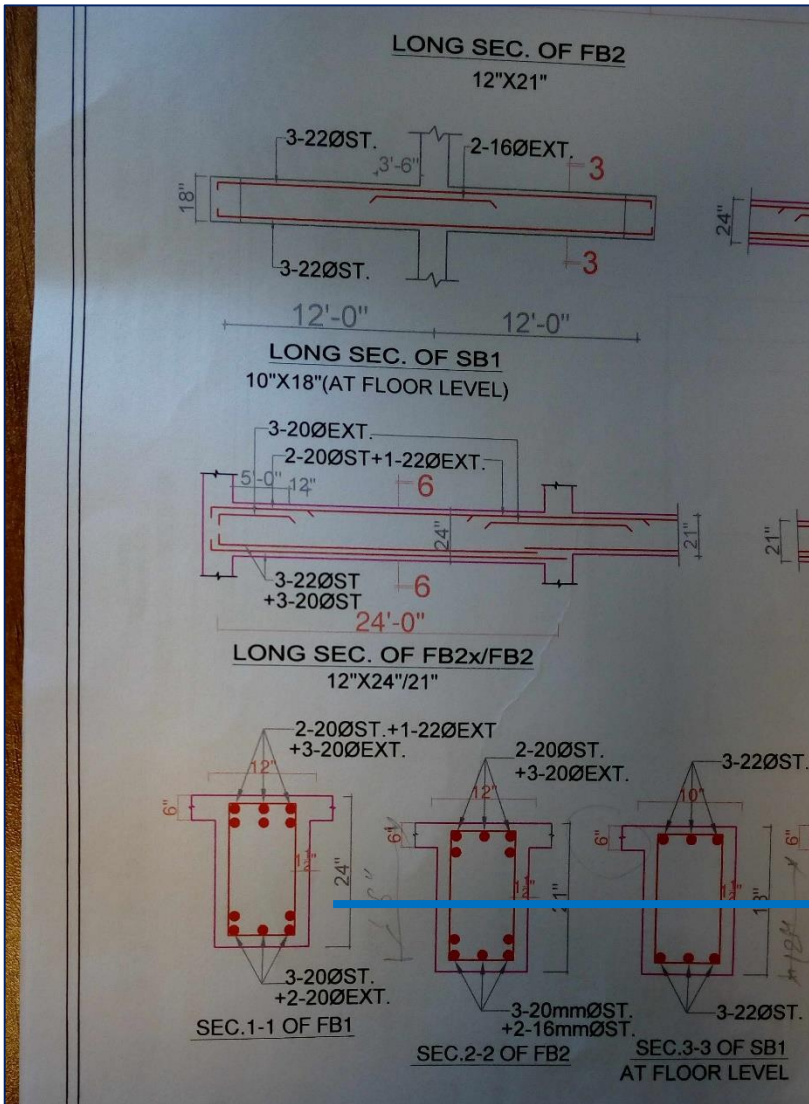
COLUMN MARK	Column size with main Reinforcement					TIE
	Below FGL/PL	Gr. & 1 ST Floor	2 ND & 3 RD Floor	4 TH & 5 TH Floor	6 TH & 7 TH Floor	
C1	 28'x28' 20-25Ø	 24'x24' 20-25Ø	 24'x24' 12-25Ø+8-20Ø	 24'x24' 4-25Ø+16-20Ø	 24'x24' 20-20Ø	
C2	 28'x28' 8-25Ø+8-20Ø	 24'x24' 8-25Ø+8-20Ø	 24'x24' 20-20Ø	 24'x24' 12-20Ø+8-16Ø	 24'x24' 20-16Ø	
C3	 28'x20' 8-25Ø+8-20Ø	 24'x18' 8-25Ø+8-20Ø	 24'x18' 16-20Ø	 24'x18' 8-20Ø+8-16Ø	 24'x18' 16-16Ø	
C4	 20'x20' 16-20Ø	 18'x18' 16-20Ø	 18'x18' 8-20Ø+8-16Ø	 18'x18' 16-16Ø	 18'x18' 16-16Ø	
C5	 28'x20' 4-25Ø+12-20Ø	 24'x18' 4-25Ø+12-20Ø	 24'x18' 16-20Ø	 24'x18' 8-20Ø+8-16Ø	 24'x18' 16-16Ø	
C6	 28'x17' 4-20Ø+12-16Ø	 21'x15' 4-20Ø+12-16Ø	 21'x15' 16-16Ø	 21'x15' 12-12Ø	 21'x15' 12-16Ø	

10 Ø @ 5" - 8" - 6" C/C

Column cross section within red shade area has 16 rebar up to 1st floor and column cross section of blue shaded area has 20 rebar up to roof. It is unusual in construction to have 20 rebar from 16 no rebar in the bottom. Factory is required to clarify about bond or anchorage of this rebar which has increased in number from above floors. Otherwise, Column rebar verification is required for C-2 and C-3 column.

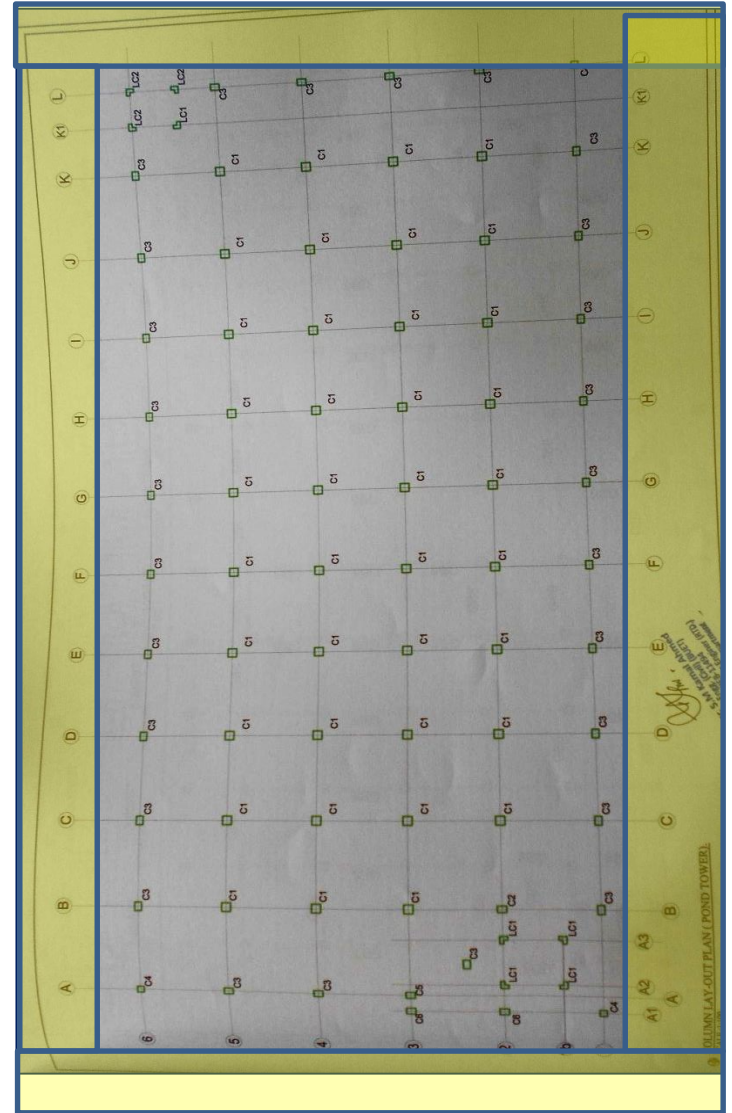
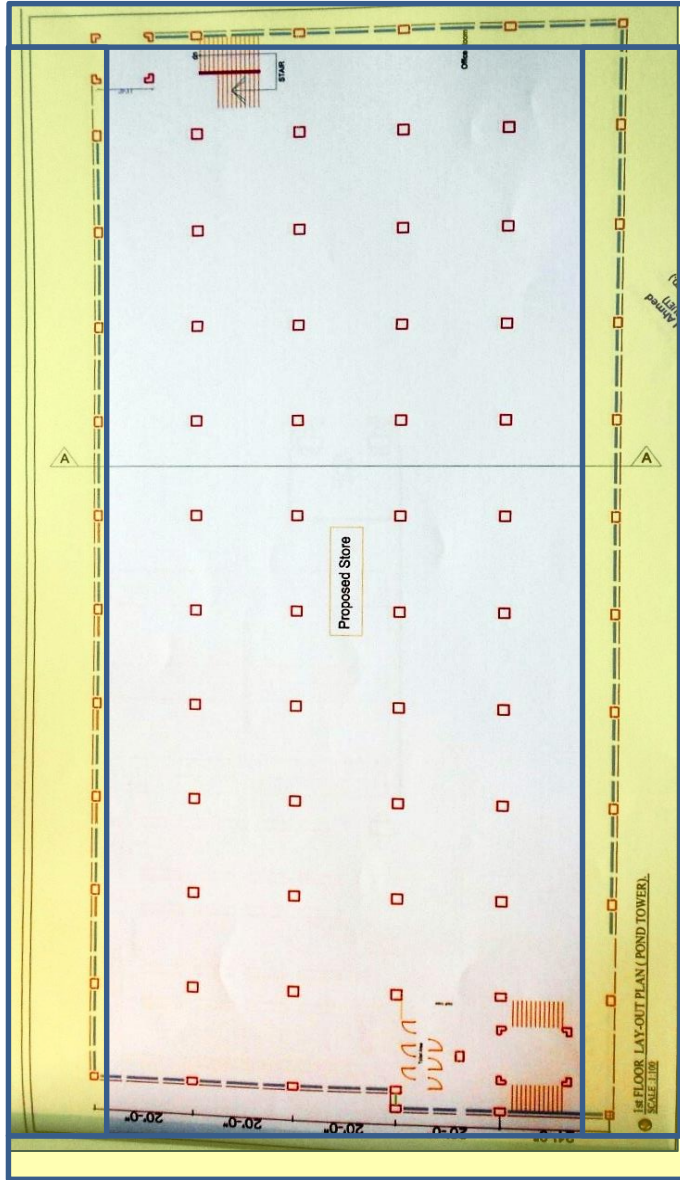
Observation : Pond Building

FB-1 d/s was found 375mm instead of 450 mm in the roof top.



Observation : Pond Building

Grid dimension missing in Architectural and structural drawing. Floor layout (PW, Build Up) need to update on architectural drawings.





Implement floor load management program

Observation : Pond Building



Loading in 3rd floor



Loading in 2nd floor



No load management program was found. Load was found around 83 psf. Load restriction height marking is required and load management plan is required to be followed.



Centre for Advisory and Testing Services (CATS-MIST)
Military Institute of Science and Technology

Compressive Strength of Concrete Drilled Cores

CATS Reference	: 2376/18636-37/01/18		Date	: 23.01.2018
Client	: A ONE POLAR LTD.		Project Name & Address	: Pond Tower Building, Bhulta, Rupongi, Narayanganj.
Sample Brought By	: Engr. Awolad Hossain		Date of Receiving	: 15.01.2018
Test Method	: ASTM C 42/C 42-M		Date of Test	: 22.01.2018
Sample	: Drilled Core		Sample Condition	: Unsoaked
Sample Location	: 3rd Floor Column at Grid: 36, 37		Quantity of Sample	: 2 Nos
Construction Year	: 2018		Aggregate Type	: Stone Chips
No. of Story	: 08-Storey			

Sl No.	Sample Identification Mark	Original Length mm	Sawed Length mm	Diameter mm	Crushing Load kN	Crushing Strength MPa	Crushing Strength psi	Failure Type	Fracture Type
1	44	160.0	134.0	68.0	122.2	33.6	4870	Combined	Columnar
2	45	170.0	120.0	68.0	93.4	25.7	3730	Combined	Columnar

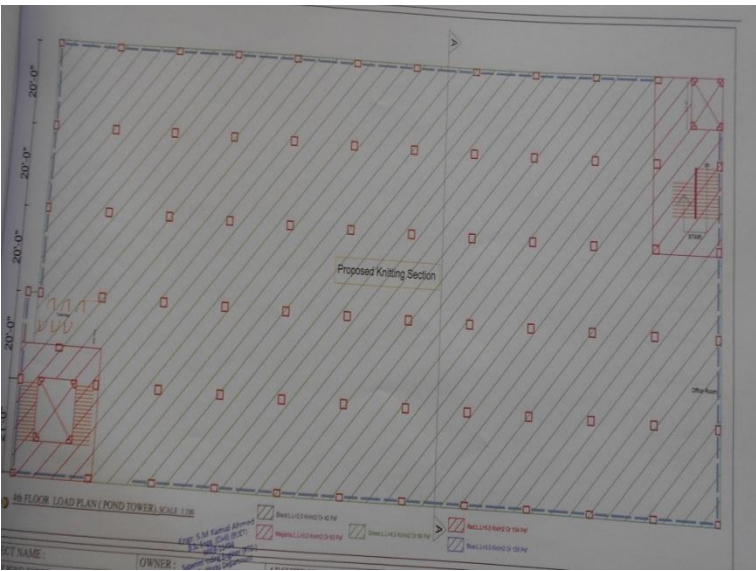
REMARKS:
1. All information displayed above the table are provided by the client. CATS-MIST did not verify any of those.
2. Sample is received in unsoaked condition without signature from the competent authority. Therefore, authenticity of the sample and its history could not be verified.

Test Supervised By: *[Signature]*
Countersigned By: *[Signature]*

SAKIPAKTER
Chief Engineer
MIST, Narayanganj Cantonment

Note: Samples as supplied to us have been tested in our laboratory. CATS-MIST does not have any responsibility as to the representation character of the samples required to be tested. It is recommended that samples to be sent in secure and sealed cover/packets/container under signature of the competent authority in order to preclude fabrication of test results. It is recommended to collect all test reports by duly authorized person and forward to contractor/supplier/owner.

Core test report of Pond building



Existing load plan (4 kPa)

2. CONCRETE : (UNLESS OTHER WISE MENTIONED)

a) TYPE : CONCRETE COMPRESSIVE STRENGTH CONSIDERED AS FOLLOWS :

- 1) COMPRESSIVE STRENGTH MINIMUM $f'_c = 3500$ psi (24 Mpa) IN 1:1½:3 USING STONE CHIPS.



Loading condition

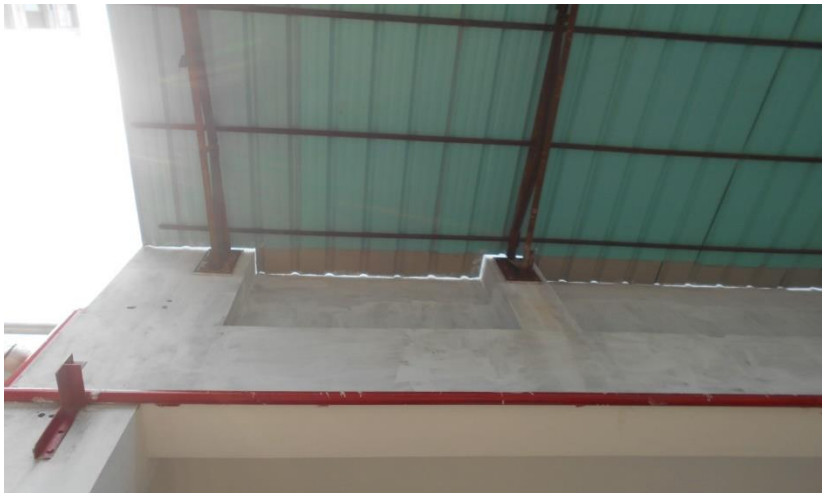
Design concrete strength was considered 3500 psi (24.13 MPa). Equivalent concrete strength was found 3190 psi (22 MPa). Live load considered 4 kPa for all floors. Factory is required to check the design report considering live load above 3 kPa with the value obtained from core test report. Otherwise maintain live load below 3 kPa.

Observation : Pond Building



Canopy in the northern elevation

Observation : Pond Building



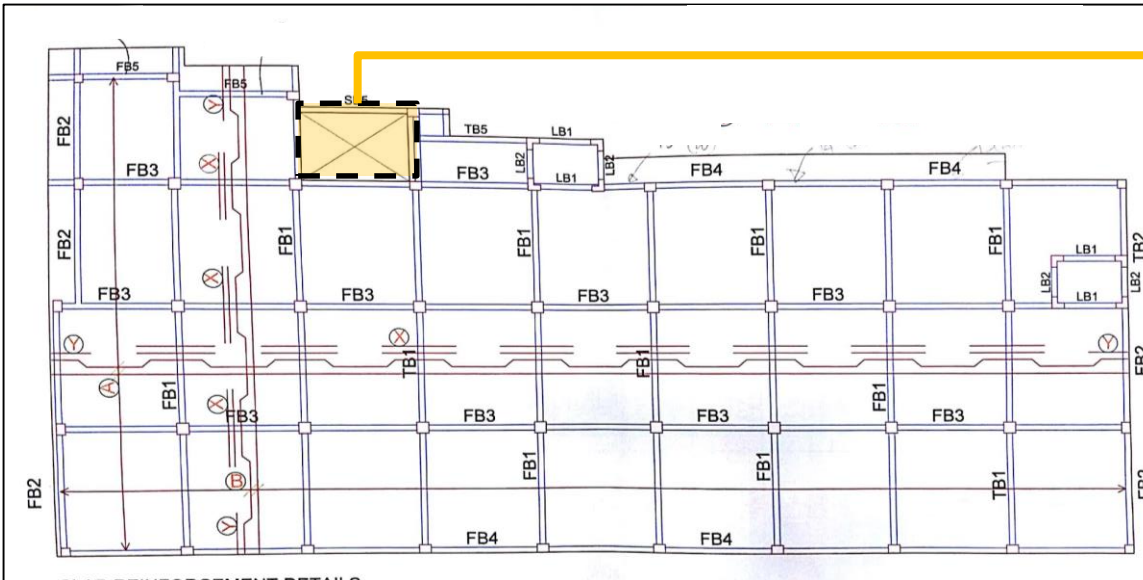
Non-engineered connection was observed in the canopy. The details of connection or Canopy is not included in the as-built drawing.

Observation : Pond Building



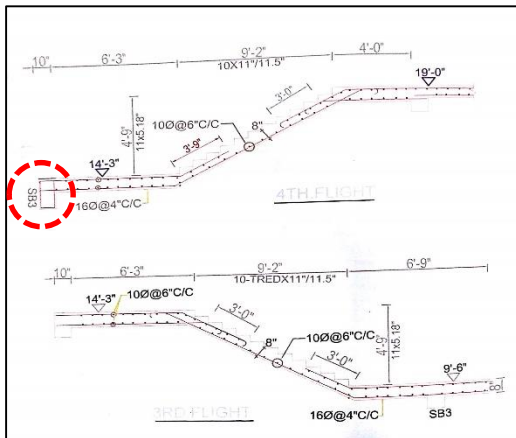
Discrepancies between as- built drawings and on site condition

Observation: North-West Tower



Beam layout

Beam layout on site didn't match with as-built drawing. In 6th floor staircase, the landing beam SB3 wasn't found on site. But the beam was shown in as-built drawings.



Cross section of Stair.





Implement floor load management program

Observation: North West Tower



Loading in 5th floor



Loading in 2nd floor



No load management program was found. Load was more than 63 psf. Load restriction height marking is required and load management plan is required to be followed.



Yarn dyeing building

Observations



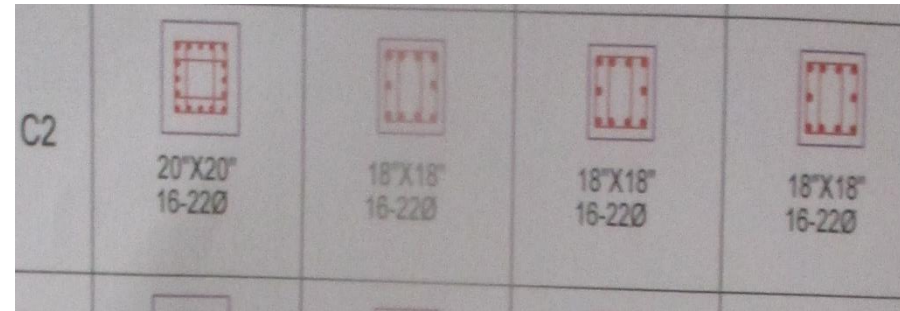
Discrepancies in structural drawings

Observations: Yarn Dyeing Building

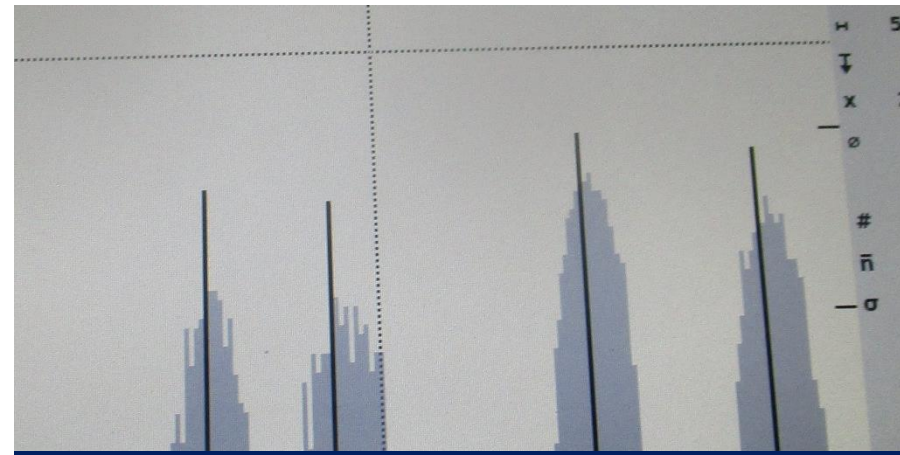


COLUMN SCHEDULE

Column No:	Column size with main Reinforcement				TIE
	Below FGL/PL	Ground Floor	1st. & 2nd.Floor	3rd. & 4th.Floor	
C1	14"X14" 4-20Ø 4-16Ø	12"X12" 4-20Ø 4-16Ø	12"X12" 4-20Ø 4-16Ø	12"X12" 8-16Ø	10 Ø @5" - 8" - 5" C/C
C2	20"X20" 16-22Ø	18"X18" 16-22Ø	18"X18" 16-22Ø	18"X18" 16-22Ø	
C3	20"X17" 14-22Ø	18"X15" 14-22Ø	18"X15" 14-22Ø	18"X15" 14-22Ø	
C4	20"X17" 10-22Ø	18"X15" 10-22Ø	18"X15" 10-22Ø	18"X15" 10-22Ø	
C5	17"X17" 8-20Ø	15"X15" 8-20Ø	15"X15" 8-20Ø	15"X15" 8-20Ø	
C6	20"X14" 4-20Ø 6-16Ø	18"X12" 4-20Ø 6-16Ø	18"X12" 10-16Ø	18"X12" 10-16Ø	



During inspection, 12 rebars were found by ferro scan (4 rebars each side) in central C2 columns where provided drawings shows 16 rebars.



Scanning Image

Observations: Yarn Dyeing Building



WTP/Lab Building

Observations



Heavy load on ground floor

Observations : WTP/Lab Building



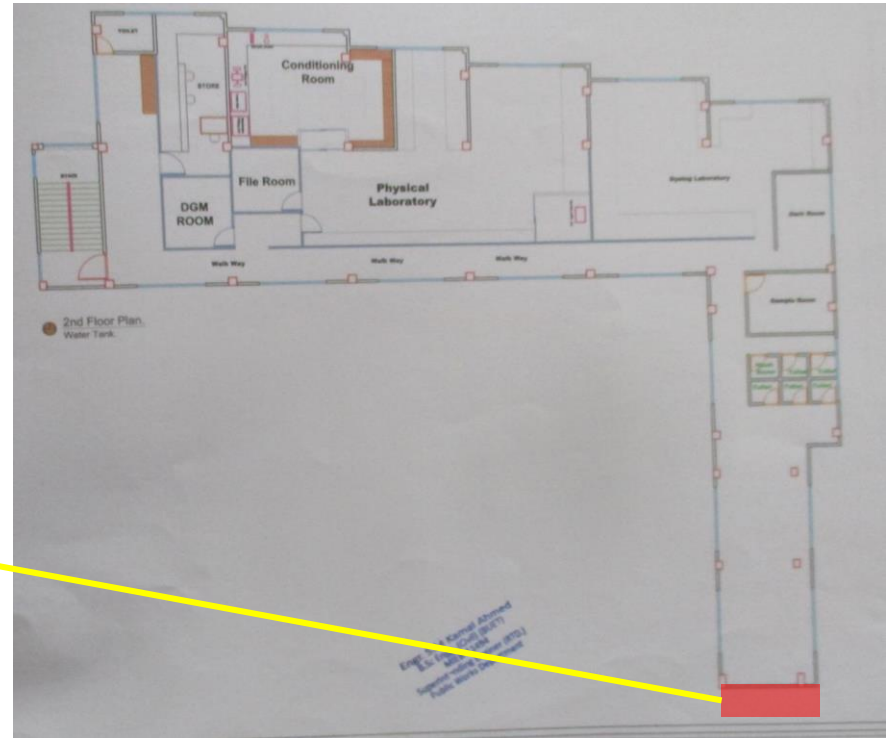
Large vessel were found resting on ground floor slab/top slab of U.G.W.R. So, factory engineer is required to check the adequacy of slab due to the heavy loading.

Observations : WTP/Lab Building



Undocumented steel stair

Observations: WTP/Lab Building



No structural details were available for steel stair.

Observations: WTP/Lab Building



Overhead Water Tank Building

Observations



Lateral stability



Poor connection

During inspection an apparently non engineered stair was found structurally connected to O.H.W.T building and also some bolt missing was observed. Factory Engineer is required to prepare as-built drawing(structural and architectural) and carry out stability check against the lateral loads.

Observations: Overhead Water Tank Building



Dyeing Shed

Observations



Crack in brick pier



Crack was observed in brick pier. Factory engineer is required to investigate reason of crack and suggest proper remedial method.

Observations : Dyeing Shed



Yarn Dyeing Shed

Observations



Lateral stability

Observations : Yarn Dyeing Shed



No obvious lateral stability system was observed. Factory engineer is required to carry out stability check against the lateral loads.

Observations : Yarn Dyeing Shed



Damaged column surface

Observations: Yarn Dyeing Shed



Column damaged due to installation of crane beam. The clear cover of column is reduced significantly. The capacity of the columns and corbel to be checked for the upcoming load from crane beams.

Observations: Yarn Dyeing Shed



Priority Actions



Problems Observed

1. Office Building:

- 1: Incomplete as-built documents.
- 2: Probable vehicle impact for ground floor columns.
- 3: Falling hazard in 3rd floor.
- 4: Non-engineering connection roof shed.

2. Inspection Building:

- 5: Discrepancies in structural drawings.
- 6: Lateral stability.
- 7: Dampness on brick façade.

3. ETP Building:

- 8: Discrepancies between as-built drawings and on site condition.
- 9: Undocumented emergency steel stair.

4 & 5. Twin Tower-1 & 2 Buildings:

- 10: Uncontrolled loading.
- 11: Undocumented Steel Stair, connecting bridge and roof frames.
- 12: Hairline crack on floor beam & slab.
- 13: Water ponding on roof.



Problems Observed (Continued)

6. Pond Building

- 14. Inaccurate as- built drawings.
- 15. Implement floor load management program.
- 16. Canopy in the northern elevation.

7. North-west Tower

- 17. Discrepancies between as- built drawings and on site condition.
- 18. Implement floor load management program

8. Yarn Dyeing Building: No observation

9. WTP/Lab Building:

- 19: Heavy load on ground floor.
- 20: Undocumented Steel Stair.

10. Overhead Water Tank Building:

- 21: Lateral stability.

11. Dyeing Shed:

- 22: Crack in brick pier.

12. Yarn Dyeing Shed:

- 23: Lateral stability
- 24: Damaged column surface.



Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Incomplete as-built documents (Office Building)	Building engineer is required to survey the as-constructed building and update drawings as required.	6-weeks
2	Probable vehicle impact for ground floor columns (Office Building)	Install safety guard to protect the columns from vehicular impact.	6-weeks
3	Falling hazard in 3rd floor (Office Building)	Factory is required to install safety guard for falling hazard.	6-weeks
4	Non-engineering connection roof shed (Office Building)	Check the adequacy of the members and connections against uplift forces.	6-weeks
5	Non-engineering connection roof shed (Office Building)	Implement remedial works suggested by the factory engineer.	6-months
6	Discrepancies in structural drawings (Inspection Building)	Update the as-built drawings to the as-constructed status.	6-weeks
7	Lateral stability (Inspection Building)	Building engineer is required to check the lateral stability of the building.	6-weeks
8	Lateral stability (Inspection Building)	Carryout any remedial works arise from Engineering Assessment.	6-months
9	Dampness on brick façade (Inspection Building)	For both durability and serviceability, repair works or any appropriate method is recommended.	6-weeks



Item No.	Observation	Recommended Action Plan	Recommended Timeline
10	Discrepancies between as-built drawings and on site condition (ETP Building)	Building Engineer to survey the building and update drawings which reflect the as-built condition.	6-weeks
11	Discrepancies between as-built drawings and on site condition (ETP Building)	Implement load plan for all floors.	6-months
12	Undocumented emergency steel stair (ETP Building)	Building Engineer is required to produce as-built drawings of the steel stair and check vertical and lateral stability.	6-weeks
13	Undocumented emergency steel stair (ETP Building)	Implement remedial works if required.	6-weeks
14	Uncontrolled loading (Twin Tower-1 & 2 Building)	Maintain floor loading below 3 kPa	6-weeks
15	Undocumented steel stair, connecting bridge and roof frames (Twin Tower-1 & 2 Building)	Update the as-built drawings to the as-constructed status.	6-weeks
16	Hairline crack on floor beam & slab (Twin Tower-1 & 2 Building)	Building Engineer to investigate the crack and prepare an investigation report with proper remedial measure.	6-weeks
17	Hairline crack on floor beam & slab (Twin Tower-1 & 2 Building)	Implement the remedial actions as per investigation report	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
18	Water ponding on roof (Twin Tower-1 & 2 Building)	Provide water proofing membrane on roof with proper slope.	6-weeks
19	Inaccurate as- built drawings (Pond Building)	Building engineer is required to survey the as-constructed building and update drawings as required.	6-weeks
20	Implement floor load management program (Pond Building)	Implement load management program.	6-weeks
21	Implement floor load management program (Pond Building)	Factory is required to verify the load plan by ACCORD if the factory management intends to maintain the live load plan > 3.0 kPa.	6-weeks
22	Implement floor load management program (Pond Building)	Continue to implement load plan.	6-months
23	Canopy in the northern elevation (Pond Building)	Building engineer is required to upgrade the connection to the building.	6-weeks
24	Canopy in the northern elevation (Pond Building)	Implement all repair and strengthening works as required.	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
25	Discrepancies between as-built drawings and on site condition (North-West Tower)	Building Engineer to survey as-constructed building and update drawings as required.	6-weeks
26	Discrepancies between as-built drawings and on site condition (North-West Tower)	Implement Load Plan	6-months
27	Implement floor load management program (North-West Tower)	Implement load management program	6-weeks
28	Implement floor load management program (North-West Tower)	Factory is required to verify the load plan by ACCORD if the factory management intends to maintain the live load plan > 3.0 kPa.	6-weeks
29	Implement floor load management program (North-West Tower)	Continue to implement load plan.	6-months
30	Heavy load on ground floor (WTP/Lab Building)	Building engineer is required to check the floor/slab capacity of the building.	6-weeks
31	Heavy load on ground floor (WTP/Lab Building)	Carryout any remedial works if required.	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
32	Undocumented steel stair (WTP/Lab Building)	Update the as-built drawings to the as-constructed status.	6-weeks
33	Lateral stability (OHWT Building)	Building engineer is required to check the lateral stability of the building.	6-weeks
34	Lateral stability (OHWT Building)	Carryout any remedial works arise from Engineering Assessment.	6-months
35	Crack in brick pier (Dyeing Shed)	Building Engineer to investigate the crack and prepare an investigation report with proper remedial measure.	6-weeks
36	Crack in brick pier (Dyeing Shed)	Implement the remedial actions as per investigation report	6-months
37	Lateral stability (Yarn Dyeing Shed)	Building engineer is required to check the lateral stability of the building.	6-weeks
38	Lateral stability (Yarn Dyeing Shed)	Carryout any remedial works arise from Engineering Assessment.	6-months
39	Damaged column surface (Yarn Dyeing Shed)	Building Engineer to investigate the extend scratch and prepare an investigation report with proper remedial measure.	6-weeks
40	Damaged column surface (Yarn Dyeing Shed)	Building Engineer to check the capacity of the columns for crane loads as well as lateral loads	6-weeks
41	Damaged column surface (Yarn Dyeing Shed)	Carryout any remedial works arise from Engineering Assessment.	6-months