

## Site Auditing for Building Works

### Introduction

This practice note announces the launching of a new strategy on auditing building works by Buildings Department (BD).

2. The Building Authority (BA) is empowered by Buildings Ordinance section 22 to enter building sites to ascertain whether the Buildings Ordinance and its subsidiary regulations are being complied with. It is BD's intention to exercise this power strategically so as to facilitate Authorized Persons (APs), Registered Structural Engineers (RSEs), and Registered General Building Contractors/Registered Specialist Contractors (RCs) in carrying out their statutory supervisory duties. The new strategy on site auditing helps to bring to light structural safety-related irregularities or procedures and practices conducive to substandard building works before they become very costly or impossible to put right.

### New Strategy

3. The new strategy for auditing building works, which focuses on compliance with requirements of the Buildings Ordinance and regulations, includes surprise checks without prior notification and encompasses the following features -

- (a) Expansion of the scope of audits to include detailed checking of foundation and superstructure works;
- (b) A performance-based approach to frequency of audit checks;
- (c) Removal of predictability from timing of audit checks;
- (d) Separation of submission-checking and auditing functions;
- (e) Rotation of auditing staff;
- (f) Investigative focus on structural safety and integrity; and
- (g) Seeking and evaluation of customer feedback.

### Scope of Audits

4. The scope of auditing the foundation and superstructure works will be expanded to include detailed monitoring of the items in Appendix I.

## **Frequency of Audits**

5. A performance-based approach is adopted to determine the frequency and timing of audit checks. On the initial auditing visit to a building site, various factors including its conditions, complexity of development, on-site organization of the RC, qualified supervisory personnel in attendance by RSE and RC, completeness of documentation kept on site and quality of the works completed to date will be rated accordingly. The rating will be used to determine the initial frequency of subsequent auditing inspections. The general principle will be that, as the works progress, the timing of the next auditing will be decided upon having regard to the standard of building works discovered in the last auditing. If the site is posing particular difficulties, or anomalies are discovered, or the quality of works has proved to be substandard, then the next auditing will be carried out earlier than it would otherwise have been.

6. The auditing officer will have the discretion to determine the proportion of works and items for inspection as appropriate in the circumstances of each site. That is, the percentage and structural components subject to auditing depend on the nature of the various stages of building works on a case-by-case basis. A flow chart for the performance-based site auditing approach is shown at Appendix II.

## **Timing of and Personnel Assigned to Audits**

7. Site auditing is most effective as a deterrent to malpractice if it is unpredictable in terms of frequency and timing of inspections, the work to be inspected and the personnel assigned to the inspections.

8. Any construction sites that are in progress or have been completed are liable to be audited by BD. There will be no pre-determined percentage of structural units, or specific items, to be audited on each site. Generally, there will be no pre-arrangement with the AP/RSE/RC on the date and time of inspection.

9. As regards personnel assigned to site auditing work, BD institutes arrangements to ensure that the officer assigned to audit a particular site is neither the officer who processes the documentary submissions in respect of that site nor the officer who visited the site on the previous audit occasion. Internal mechanism is in place within BD to ensure consistency and fairness of auditing and to monitor the overall progress of the site auditing programme.

### **Investigation of Anomalies**

10. BD will examine carefully all anomalies found during site audits but investigation will focus on anomalies that affect structural safety and integrity or that occurring frequently. The overall effect and extent of seriousness of such anomalies will be examined and consideration will be given to whether the anomaly has occurred inadvertently or otherwise.

### **Customer Feedback**

11. BD would like to have regular feedback from the building industry on the effectiveness of the auditing system and the effects on the industry. Accordingly, the AP/RSE will be requested to complete a questionnaire after each site audit, where they will be able to record their comments on such things as the attitude of the auditing officer, the impact of the auditing process on site activities and the fairness of the auditing. BD will look into the feedback in every detail and make full use of it in improving its services.

### **Impact on the Construction Industry**

12. The new strategy for auditing the building works will entail more extensive and rigorous on-site checking by BD. This should not be interpreted as any intention of BD to impede construction works or interfere with project management. Normal site operations will not be interrupted if building works are carried out properly. BD intends to work closely with the industry in enhancing the built quality and safety of buildings.



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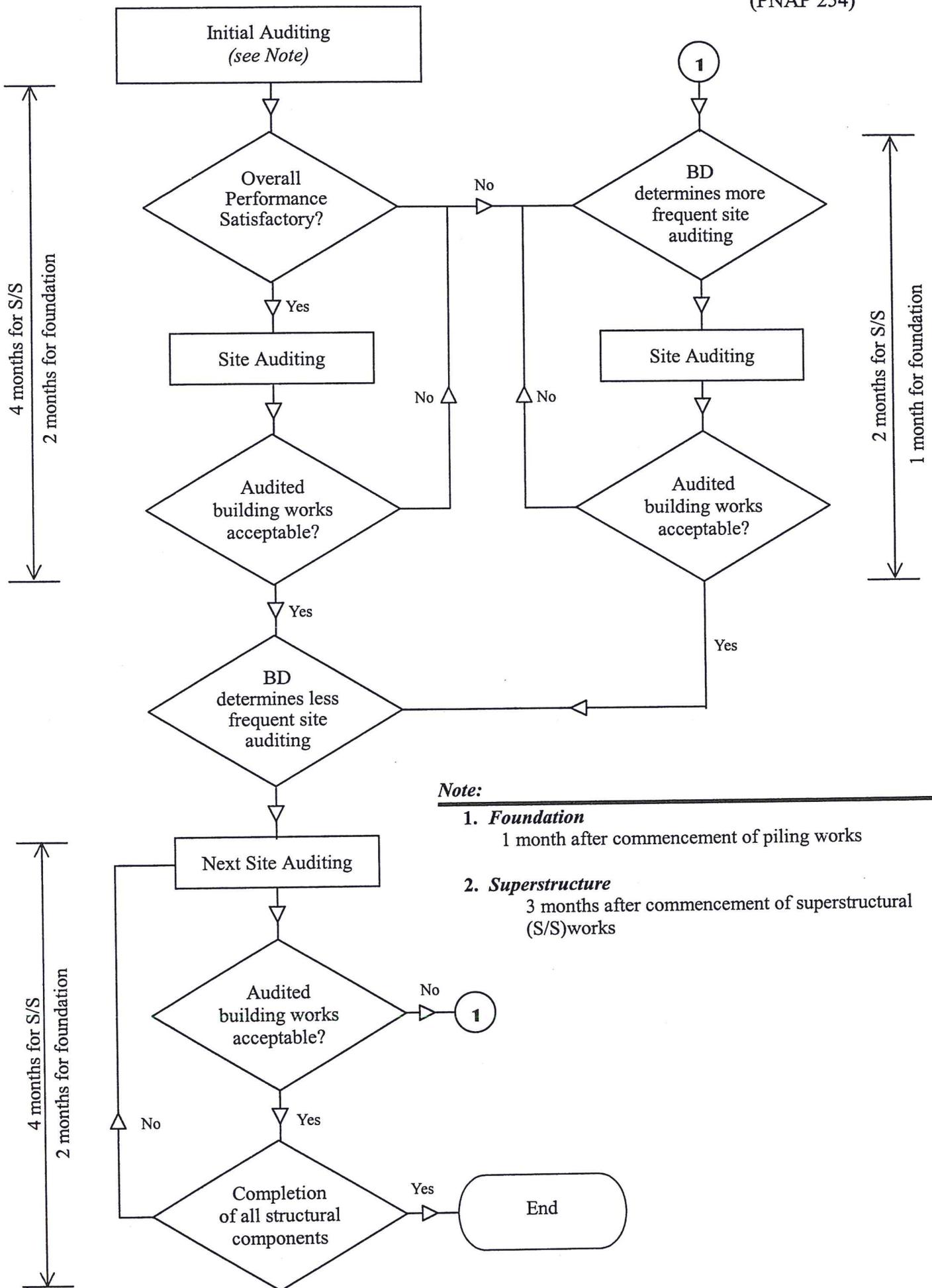
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| <b>Foundation</b>                         | <b>Things to be audited</b>                                | <b>Objective/concern</b>   |
|---|--|--|
| <b>Driven piles</b>                       |  |  |
| <b>(A)Materials</b>                       |  |  |
| - Steel H-pile                            | Mill certificates  | Proof yield stress   |
| - Precast prestressed Spun concrete pile  | Origin<br><br>Physical dimensions                          | Recognized type<br><br>Compliance with approved plans                                  |
| - Welding electrode                       | Grade of electrode   | Ensure splice joint strength   |
| <b>(B)Supervision personnel</b>           |  |  |
| - RSE & RSC                               | Presence of qualified supervisory staff                    | Compliance with Quality Supervision Plan (QSP)   |
| <b>(C)Final Stage of Piling operation</b> |  |  |
| - Diesel hammer                           | Sufficient driving energy and final set                    | Ascertain piles are driven to suitable founding stratum, complying with approved plans |
| - Hydraulic hammer                        | -ditto-  | -ditto-  |
| - Drop hammer                             | -ditto-  | -ditto-  |
| <b>(D)Documentation</b>                   |  |  |
| - Ground Investigation                    | Pile tip founding material                                 | Ensure founding stratum is able to sustain the designed load.                          |
| - Piling record of completed works        | Final set and founding level                               | Consistency of the as-built level and ground investigation borelog.                    |
| <b>Excavation piles</b>                   |  |  |
| <b>(A)Materials</b>                       |  |  |
| - Bored pile                              | Grade of concrete, mill certificate for reinforcement      | Compliance with approved plans   |
| - Mini-pile                               | Grade of grout, mill certificate of reinforcement, coupler | -ditto-  |
| - Socket H-pile                           | Grade of grout and mill certificate of Steel section       | -ditto-  |

|   |   |   |
|---|---|---|
| <p><u>(B)Supervision personnel</u><br/>- RSE &amp; RC</p>   | <p>Presence of qualified supervisory staff</p>  | <p>Compliance with QSP</p>  |
| <p><u>(C)Completion of excavation</u><br/>- Bored pile<br/><br/>- Mini-pile &amp; socket H-pile</p> | <p>Pile depth, diameter, bell-out size<br/><br/>Actual founding material and pre-drill records<br/><br/>Pile depth, dip angle for raking pile</p> | <p>Ensure bored piles are constructed in accordance with the approved plans.<br/>Consistency of founding materials<br/><br/>Ensure mini-piles are constructed in accordance with the approved plans</p> |
| <p><b>Spread Footing</b><br/>- Raft/spread footing</p>  | <p>Bearing stratum<br/><br/>Physical dimensions</p>   | <p>Ensure suitability of founding material<br/><br/>Compliance with approved plans</p>  |

| <b>Superstructure</b>   | <b>Things to be audited</b>  | <b>Objective/concern</b>  |
|---|--|---|
| <p><u>(A)Reinforced concrete</u></p>  | <p>Hammer test to structural elements<br/>Select samples of reinforcing bars for tensile test</p>  | <p>Concrete strength<br/><br/>Tensile strength</p>  |
| <p><u>(B)In-situ concrete</u></p>   | <p>Coring tests</p>  | <p>Strength of in-situ concrete</p>   |
| <p><u>(C)Critical elements</u><br/>- Transfer plate<br/><br/>- Prestressing member<br/><br/>- Cantilever canopy</p> | <p>Document showing RSE's acceptance on falsework design by RGBC<br/>Concreting sequence<br/><br/>Prestressing profile<br/><br/>Grout vent<br/><br/>Location of construction joint and cover</p> | <p>Ensure the stability of falsework<br/><br/>Instability of falsework<br/><br/>Compliance with the approved plans<br/>Ensure no air entrapped<br/><br/>Ensure safety</p> |
| <p><u>(D)Curtain wall &amp; Glass wall</u></p>  | <p>Member size, shape and grade<br/><br/>Cast-in anchors</p>   | <p>Compliance with approved plans<br/>-ditto-</p>   |



**Note:**

1. **Foundation**  
1 month after commencement of piling works
2. **Superstructure**  
3 months after commencement of superstructural (S/S) works

**Performance-based Site Auditing**