

**Memorandum for the Review Committee on Quality Assurance Issues
Relating to Fresh Water Supply of Public Housing Estates of
the Hong Kong Housing Authority**

**Flow Chart for Design, Construction and Completion of Fresh Water
Supply System in Housing Authority's Public Housing Developments**

PURPOSE

This paper informs Members about the major processes shown in a Flow Chart for Design, Construction and Completion of Fresh Water Supply System in Housing Authority (HA)'s Public Housing Developments.

BACKGROUND

2. At the meeting held on 30 July 2015 when Paper No. RC 3/2015 was discussed, Members requested the Department to provide a comprehensive A to Z presentation of the existing quality control of the fresh water supply system at the next meeting. The Department could walk Members step-by-step through the stages of construction (e.g. planning, tendering, contract specifications, construction, works supervision and quality inspection etc.) and show the requirements under existing ordinances and the corresponding measures taken by HD to comply with such requirements, so as to facilitate Members to understand the existing mechanism and to enable them to make informed decisions.

MAJOR PROCESSES

----- 3. **Annex 1** shows the major processes in the form of a “**Flow Chart for Design, Construction and Completion of Fresh Water Supply System in Housing Authority's Public Housing Developments**”. Further details for each job stage would be presented in greater details by supplementary information under separate cover.

Crux of Problem Leading to Excessive Lead in Water and Improvement Measures

4. Based on prevailing information, we have reasons to believe that the major cause of excessive lead in water lies in the use of non-conforming solder material for jointing of copper pipes, which may have been a malpractice that escaped unnoticed, despite our monitoring system.

5. We monitor main contractors' works regularly to ensure fresh water plumbing installations are executed in accordance with contractual requirements. For instance, we inspect the alignment of water pipes, position and quantity of brackets and whether they are firmly fixed, adequacy of pipe sleeves and spacing, the connection of pipes, whether the materials used comply with contractual requirements, etc. However, we do not inspect the joints between pipes (including the soldering materials) for lead content. The reason is the construction industry has all along believed that such widely accepted and broadly applied soldering materials comply with relevant requirements. However, with the recent discovery of lead in water, the Department has formulated follow up actions and improvement measures (see paragraph 6). We have mentioned this issue as well as the improvement measures during our briefing session for HA Members on 16 July 2015, as well as Members of the Legislative Council on 22 July 2015.

IMPROVEMENT MEASURES

6. HD will continue to thoroughly investigate the issue of lead in soldering materials used in fresh water plumbing systems. HA is implementing the following improvement measures -

Short and medium term measures

- (a) the latest additional water sample testing requirements, published under WSD's Circular Letter No. 1/2015 on 13 July 2015¹, have been incorporated in all HA contracts;

1 The four new test parameters and acceptance criteria required under this Circular Letter are: lead ($\leq 10\mu\text{g/L}$), cadmium ($\leq 3\mu\text{g/L}$), chromium ($\leq 50\mu\text{g/L}$) and nickel ($\leq 70\mu\text{g/L}$).

- (b) strengthen inspection on soldering materials, ensuring compliance with contract requirements, i.e. –
- revise the specification to require regular inspection of soldering materials at pipe joints of fresh water plumbing systems as well as intensifying spot checks on the same to ensure the material is lead-free;
 - liaise with the Hong Kong Accreditation Service (HKAS) to investigate the possibility of implementing an accreditation scheme for testing lead content in soldering materials for copper pipes under the Hong Kong Laboratory Accreditation Scheme (HOKLAS);
 - explore the use of hand-held equipment in speedy on-site checks for lead content in soldering material; and
- (c) minimise the risk of non-compliant materials by exploring the use of copper pipe fittings with mechanical joints (i.e. press or compression fittings) to ensure lead-free water pipes.

Other long term measures

- (d) collaborate with industry stakeholders to raise the safety standard of sink mixers, other fittings and materials in fresh water plumbing systems; and
- (e) work with WSD, the Construction Industry Council, the Hong Kong Construction Association Ltd., the Hong Kong Plumbing & Sanitary Ware Trade Association Ltd., the HK Licensed Plumbers Association Ltd., the Chartered Institute of Plumbing and Heating Engineering – Hong Kong Branch, the Hong Kong Institution of Plumbing and Drainage, the Hong Kong Water Works Professional Association, and the Hong Kong Plumbing General Union to strengthen the training of licensed plumbers and workers in the plumbing trade, and comprehensively promote quality construction and quality control.

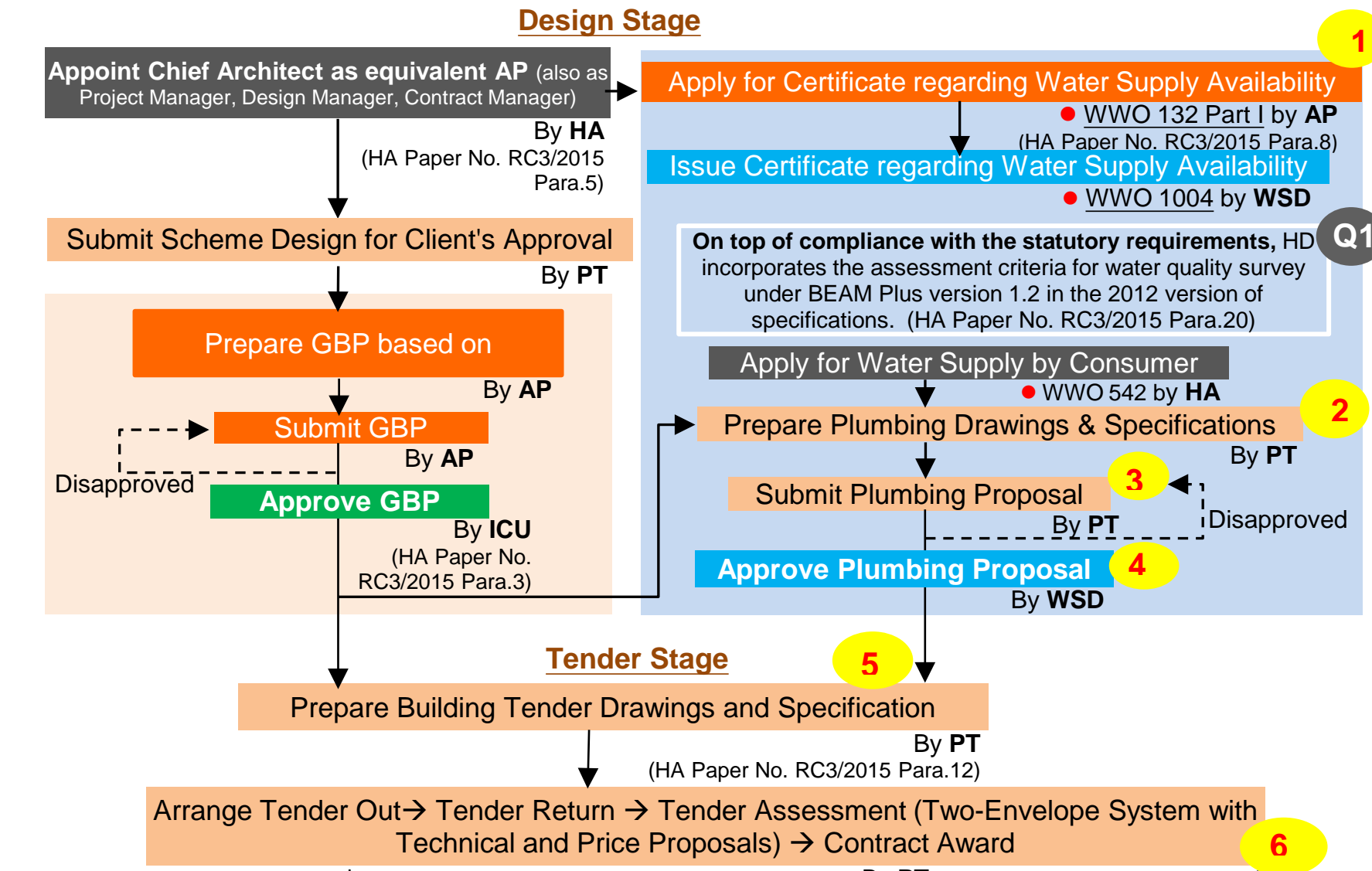
INFORMATION

7. This paper is for Members' information.

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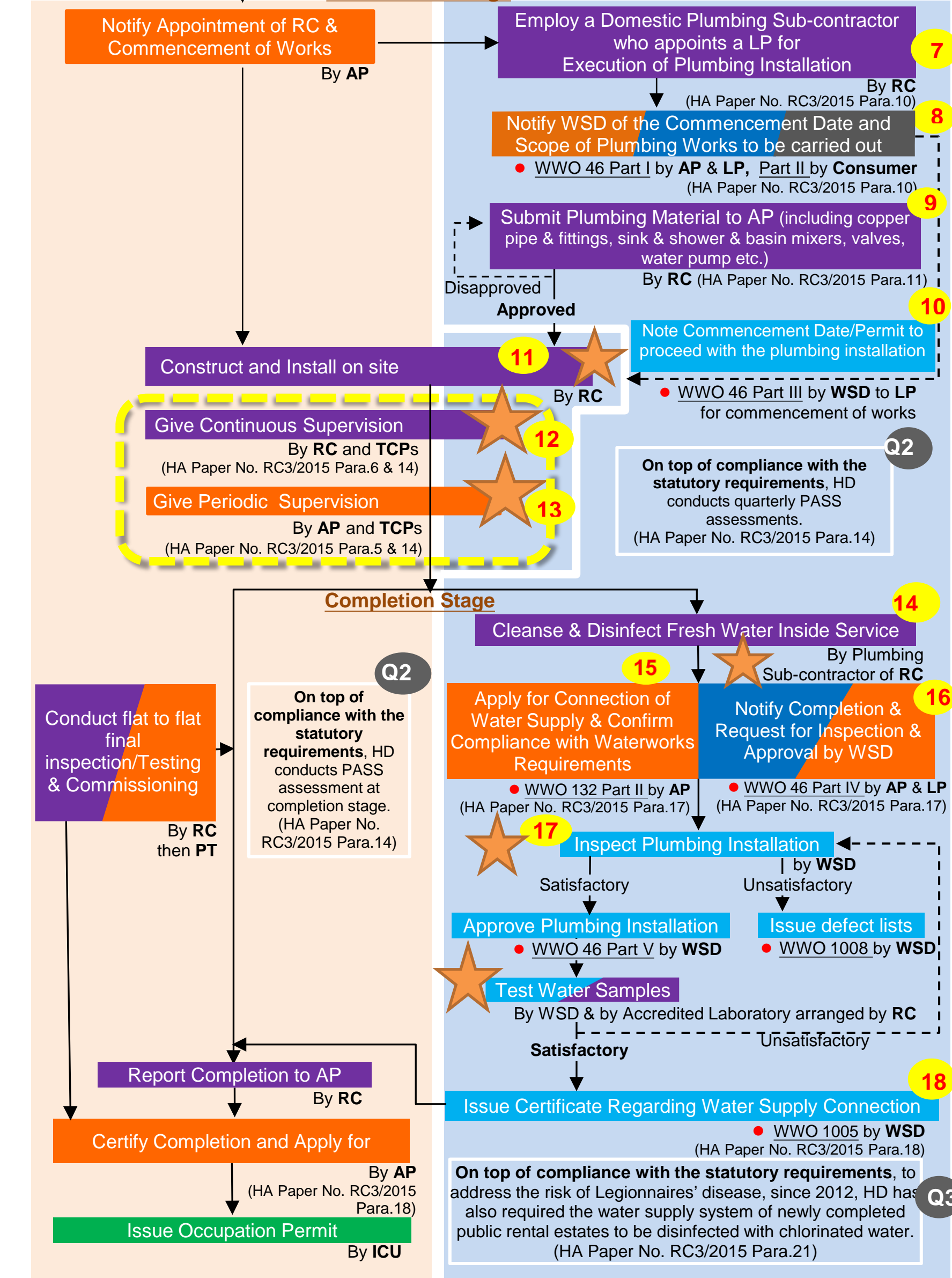
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Pre-Contract



- 1) HA has been specifying the use of lead-free solder materials for jointing of copper pipes. (BS EN 1254-1:1998)
- 2) HA has checked submission of lead-free solder materials and approved for use on site.
- 3) HA has identified the major cause of the incident is the use of non-conforming solder materials for the jointing of copper pipes, which has escaped unnoticed, at the project stages highlighted with a "star" ★.
- 4) HA has been / will be implementing improvement measures to address this problem -
 - a) the latest additional water sample testing requirements, published under WSD's Circular Letter No. 1/2015 on 13 July 2015, to be incorporated in HA specifications and implemented to all on-going HA contracts with immediate effect. The four new test parameters and acceptance criteria required under this Circular Letter are: lead ($\leq 10\mu\text{g/L}$), cadmium ($\leq 3\mu\text{g/L}$), chromium ($\leq 50\mu\text{g/L}$) and nickel ($\leq 70\mu\text{g/L}$);
 - b) ask contractors to declare the application of solder materials on site is lead free;
 - c) include solder materials in on-site delivery verification; and
 - d) strengthen inspection on soldering materials, ensuring compliance with contract requirements, i.e., explore the use of hand-held equipment in speedy on-site checks for lead content in soldering materials.

Post-Contract



Legend

- No.** Key steps from Design to Completion Stage of Fresh Water Supply System
- Q** Current HD's practice on top of compliance with statutory requirements
- BO** Processes related to Buildings Ordinance (Chapter 123 & 123a) (BO) **under exemption** (enforced by ICU to exercise independent administrative building control over HA buildings in line with the BO and related requirements)
- WO** Processes related to Waterworks Ordinance (Chapter 102 & 102a) **without exemption** (enforced by Water Supplies Department)
- HA's Practice** HA's Practice on top of statutory requirements

Colour Legend of Activities

- By HA
- By AP
- By PT
- By RC
- By LP
- By WSD
- By ICU

Abbreviations

- AP** Authorized Person
- ICU** Independent Checking Unit
- GBP** General Building Plans
- LP** Licensed Plumber
- PT** Project Team
- RC** Registered Contractor
- TCP** Technically Competent Person
- WSD** Water Supplies Department