

Committee(s):	Date(s):
Markets	26 November 2014
Subject: Smithfield Market – Condenser Water Cooling System – update	Public
Report of: The City Surveyor	For Information

Summary

This report provides Members with an update on the performance of Smithfield Markets' Condenser Water Cooling System, which serves Tenants' refrigeration equipment, and the works currently being undertaken to improve the system.

The performance of the condenser water cooling system since the last report given in September has generally been satisfactory, but operational issues have been experienced which have had an impact on refrigeration equipment. These have included a power supply failure on 6 October disabling fridges and cooling system pumps, which led to an interruption of the service for about 7-8 hours, a broken valve restricting the water flow to one fridge, which resulted in an unacceptable stall temperature, and a further contamination issue, which is being investigated.

Following work carried out by Tenants to upgrade three fridge condensers during the summer, a further condenser has now been replaced, with one more due to be replaced shortly.

Phase 3 of the City's improvement works are largely complete with new equipment installed in operation. The final item – inspecting, flushing and cleaning the Poultry Market distribution pipework – should be complete in 2-3 weeks.

On completion of this the City intends to increase gradually the system operating temperature to reduce running costs and wear on cooling tower fans.

The City will continue to monitor the system closely.

Recommendation(s)

Members are invited to:

- Note the contents of this report.

Main Report

Background

1. The Market's condenser water cooling system removes waste heat from 120 tenants' refrigeration units in East, West and Poultry Markets and dissipates it to the atmosphere via five cooling towers located in the Poultry Market. The system is operated and maintained by the City Corporation.
2. Over the last four years the City Corporation has been undertaking a programme of works to improve the system in East and West Markets. The first two phases are complete.
3. A third phase of work intended to address dirt contamination in the system commenced in June 2014 and is largely complete. This has involved work in East, West and Poultry Markets to inspect, clean and flush pipework and install additional filtration equipment.

Current Position

4. The cooling system is currently supplying water to the Tenants' fridge condensers at 20°C. The low setting will gradually be increased once the current Phase 3 works on site are complete, as the City would like to operate the system at a higher temperature to reduce its operating costs. A few operational issues have been experienced since the last report to Members in September and these are covered in the Non-Public Annex to this report.
5. As reported in September's report, three Tenants had replaced their fridge condensers in East and West Markets with uprated units, giving immediate benefits. A further condenser has now been replaced, with one more due to be replaced shortly. Details of the fridges concerned are given in the Non-Public Annex to this report.
6. In the City's view this is addressing the underlying problem with refrigeration equipment which prevents stall temperatures being achieved and it is hoped that the same solution will be adopted for other fridges with problems.
7. The City's work to service and repair cooling tower fans undertaken during August and September is complete and critical spares are held on site. Mitie, the Building Repairs and Maintenance Contractor, has been instructed to carry out a weekly inspection of the towers. The purpose is to check for visible problems (eg tower sumps overflowing), unusual sounds (eg fan shaft bearings or belts failing) or excessive vibration.
8. Following past incidents which caused interruptions to the water circulation the City has reviewed the control of the cooling system pumps (a total of 4 pairs). With the aid of the City's specialist control system contractor, proposals have been developed to improve the alarm system and facilitate pump maintenance operations. The cost is assessed at about £15,000, for which funds are being procured.

9. Phase 3 of the improvement works, intended to address dirt contamination problems in the system, is nearing completion. The Contractor is Hanmar Environmental Ltd. Completion has been delayed by problems achieving satisfactory isolations of pipework within the Poultry Market, concerns expressed by the Market Tenants Association about the effects of 5 hour fridge shutdowns on stall temperatures, and the need to gauge the effects of fridge shutdowns. A more detailed report on each section of the work is given in Appendix 1.
10. In view of particular concern about the effect of fridge shutdowns on stall temperatures in West Market, the City has modified its design to avoid the need for any shutdowns of West Market fridges. This has involved relocating new filtration units to a position where new pipework can be connected into the system whilst in operation, using a technique known as 'live tapping'. This has entailed more work and taken longer, however the priority has been to maintain the service as far as possible. East Market and Poultry Market fridges appear to be more tolerant of fridge shutdowns.
11. The last item in Phase 3 currently underway is the inspecting, flushing and cleaning of the Poultry Market distribution pipework. This is expected to be complete in 2-3 weeks.
12. On completion of the Phase 3 work the City intends to increase gradually the system operating temperature to reduce running costs and wear on cooling tower fans. Ideally this would be to at least 25-26°C, a more typical temperature for this type of system. This will be done in consultation with the Tenants' Association.
13. Two Tenants have sought meetings with the Superintendent and City Surveyor. These are covered in the Non-Public Annex to this report.

Corporate & Strategic Implications

14. The system supports the following Strategic Aims:
 - To provide modern, efficient and high quality local services and policing within the Square Mile for workers, residents and visitors with a view to delivering sustainable outcomes.
 - To provide valued services to London and the nation.

Implications

15. The cooling system provides a critical service for Tenants' refrigeration equipment and the City is completing its programme of work to improve its performance and resilience. A failure of the system could expose the City to claims for loss or damage suffered by tenants as a result of refrigeration equipment breakdown.

16. The replacement of undersized fridge condensers by tenants is continuing and will address historic problems with stall temperatures in the associated stalls.

Conclusion

17. The performance of the condenser water cooling system since the last report given in September has generally been satisfactory, but operational issues have been experienced which have had an impact on refrigeration equipment. These have included a power supply failure on 6 October disabling fridges and cooling system pumps, which led to an interruption of the service for about 7-8 hours, a broken valve restricting the water flow to one fridge, which resulted in an unacceptable stall temperature, and a further contamination issue, which is being investigated.
18. Following work carried out by Tenants to upgrade three fridge condensers during the summer, a further condenser has now been replaced, with one more due to be replaced shortly.
19. Phase 3 of the City's improvement works are near to completion, following a delay due to difficulties achieving isolations of pipework in the Poultry Market, concerns expressed about the effects of 5 hour fridge shutdowns on stall temperatures, and a change implemented to avoid the need for a shutdown of fridges in West Market.
20. The City will continue to monitor the system closely.

Background Papers:

Report of the City Surveyor (ref CS319/14) dated September 2014 to Markets Committee: 'Smithfield Market – Condenser Water Cooling System - update'

Appendix 1:

Summary of progress on Phase 3 improvement works

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Appendix 1: Summary of progress on Phase 3 improvement works

Section	Description	Position
A	Installation of in-line duplex filters, removal of redundant strainers, internal inspection of pipework	Complete and in use
B	Installation of new sidestream filtration unit in cooling tower circuit	Installed; awaiting connection of power supply when the next system shutdown takes place, and commissioning.
C	Installation of additional sidestream filtration unit to serve cooling towers 1 & 2	Installed and awaiting commissioning.
D	Opening up of pipework to East Market in car park for inspection, installation of additional isolating valves and dirt collection pockets	Complete
E	Installation of new valves on all individual branches in Poultry Market (total 26), jet cleaning and flushing of pipework, setting flow rates	New valves: complete Cleaning/flushing: in progress Setting flow rates: following flushing
F	Replacement of main flow meter in East Market circuit and new flow meter in Poultry Market circuit.	Complete and in use
G	Installation of pressure sensor in Poultry Market circuit to monitor system pressure and control pump speed	Complete and in use