

Collaborative engineering audit brings many rewards

A collaborative approach to fully auditing the backlog maintenance requirements and priorities for the engineering plant supplying the retained clinical estate at Walsall Manor Hospital has, the head of estates at the Walsall Healthcare NHS Trust, Steve Lawley, explains, 'brought numerous benefits' to the Trust's Estates team, the 'hard FM' provider, Skanska, and surveying partner, Oxhey Hall Consulting. Demonstrating the benefits of collaboration between three such parties, the year-long project has provided 'a robust and structured set of data' on current and anticipated backlog needs, identified where future capital will need to be targeted to keep key equipment running efficiently, and given the Estates team invaluable 'hard facts' on the condition of hospital plant to support future business cases.

Formed on 1 April, 2011 with the bringing together of Walsall Hospitals NHS Trust and NHS Walsall Community Health, Walsall Healthcare NHS Trust provides local general hospital and community services to around 260,000 people in Walsall and the surrounding area. Walsall's only provider of NHS acute care, it offers both inpatient and outpatient services at the Walsall Manor Hospital, plus a wide range of services in the community.

Walsall Manor Hospital houses the full range of district general hospital services. A £170 m development of the hospital's Pleck Road site was completed in 2010, and, the Trust says, the continued upgrading of existing areas ensures that the acute healthcare facility has 'state-of-the-art' operating theatres, treatment areas, and equipment, upon which to call. To discover more about a recent backlog maintenance audit that saw all of the engineering plant serving the hospital's retained clinical estate surveyed by external surveyor, Oxhey Hall Consulting, and the resulting benefits, I met up at the site with Steve Lawley, John O'Sullivan, managing director at Oxhey Hall, Alan Walsh, senior implementation manager, and Mark Rogers, senior engineering manager, from Skanska.

A 33-year PFI contract

Beginning the discussions with some background, Mark Rogers explained: "The 33-year PFI contract between the Trust and Skanska here at Walsall Manor Hospital got under way in 2007, with the construction of a new extension housing a new diagnostic outpatient centre and medical training facility. Ownership of the hospital estate is split approximately 50/50 between the Project Company investors and the Trust (Skanska maintains the hard services only on behalf of both parties). Much of the retained clinical estate dates back to the early



Head of estates at the Walsall Healthcare NHS Trust, Steve Lawley, said: "We needed an effective way to identify the highest risk backlog areas to determine our spending priorities."

1980s." Moving to explain the reasons for the engineering equipment audit, Steve Lawley said: "Skanska has very good engineering 'asset' information on the hospital on its works management system, and we had some backlog maintenance data from it as part of its PFI lifecycle contract requirements. However, we needed greater certainty on the backlog position on the plant serving the hospital's retained clinical estate. We also wanted to ensure that when we planned to invest in maintaining or, where necessary, renewing plant, we spent the funds on the right things at the right time, deriving the maximum value and benefit. We needed an effective way to identify the highest risk backlog areas to determine our spending priorities, as well as to ensure compliance with HTM 00 in having the right asset information available for inspection."

Handheld technology used

John O'Sullivan, of RICS-accredited chartered surveyors, Oxhey Hall Consulting (OHC), explained that having been appointed to comprehensively survey the M&E plant serving the retained clinical estate early in 2017, the company's three-strong team began work in June last year, and completed the exercise – which involved surveying some 35,000 m² of plant using OHC 'Aspect' handheld technology – by September. He said: "The survey focused on engineering plant and components in areas including the Accident and Emergency Department, Pharmacy, Pathology Department, ward blocks, and theatres – in all about two-thirds of the hospital's retained estate." It is planned that a follow-up survey will focus on determining the backlog position in respect of built assets on the clinical estate. Steve Lawley elaborated: "We are talking with Skanska about a next phase involving a backlog survey for the building fabric and roadways here, but our initial goal was to get to a point where we could prioritise investment on M&E services. One of the issues we have, for example, is with switchgear and power generation plant. Mark Rogers elaborated: "Historically, prior to the PFI project, money hasn't necessarily been invested in the correct avenues, which is becoming ever more evident now."

Issues with the Maternity Block

"One of the areas in the retained estate where we found power issues," he added, "was the Maternity Block, where a low voltage switch panel switch in the plant room failed, and we couldn't get spares, because the supplier is no longer in business. The panel had only been produced in about 1995, but the installation method meant that the failed switch couldn't be worked on without major disruption to clinical services. What

the contractor had done back in the mid-1990s was to build a 4/4 panel with rear access, and all the connections on the back, pushing the panel right up against a wall. To undertake the necessary remedial works would have meant us stripping it out completely. The Oxhey Hall survey helped us devise a failure replacement plan in that building, where there are five Maternity wards. The survey also highlighted the problem of unavailable spares. We had no prior warning that the panel switch would fail.”

John O’Sullivan said: “This was a good example of the benefits of collaboration. As it was a non-intrusive survey, we ensured that we engaged with the stakeholders, and harnessed the resulting knowledge. Our surveyor wouldn’t know that you can’t get the particular components for that switchgear, but because we were able to extract that information, we were able to say: ‘It looks good – in Condition B, but we are going to have to call it Condition D because of the unavailability of the spares.’ Bringing that knowledge into the dataset was key.”

Issues clearly identified

“What then helped us,” said Steve Lawley, “was that when the new ‘Maternity’ scheme (which is ongoing, and involves an extension to the hospital’s neonatal unit), was underway, the discovery of the faulty switch allowed us to ensure that that element of work – to replace that switchgear – had been included. From my perspective, with comprehensive survey data from the Oxhey Hall backlog audit, I can now demonstrate to the Board the true risk position for M&E plant serving the clinical estate. We obviously do everything we can to mitigate risks, but ultimately we can now raise any issues in the right way, and the information is fed in, for example, to allow us to better complete ERIC returns. The additional data from the backlog survey can also be included within any business planning. We now have the supporting evidence to make the case to the Board for the most high risk backlog work; it is independent and thus incontrovertible.” John O’Sullivan said of the survey: “One of the key requirements was that it be an NHS backlog risk-adjusted-compliant survey. It also had to include all the M&E assets, whereas with a ‘traditional’ such survey you wouldn’t get data on all the assets, only the components that are failing.”

A full list of plant assets

Steve Lawley went on to explain the Trust’s key objectives in a little more detail: “We wanted to have a full list of all the engineering assets and their condition, and our lifecycle investment projections for the next 10 years, and to be able to pull out prioritised, filtered data on criticality. This was where the



John O’Sullivan of Oxhey Hall Consulting: “The key benefit is that all the asset data is held in one place, accessible to all authorised users.”

collaborative approach came in; the senior representatives from the various parties sat down together early on to work out what mechanisms we could use to get the data to the point we wanted it, looking at things such as HTM 06, and the electrical criticality, focusing on resilience in clinical and non-clinical areas. We then started identifying locations and assets via those criteria, so that if I said the Trust had a strategy to approach high-risk clinical areas first, we could filter this huge reserve of backlog data and assets accordingly. We could thus quickly produce the information we needed.”

Classification and categorisation

John O’Sullivan added: “For instance you could have an air-conditioning unit in this meeting room we are sitting in fail with little wider impact, whereas if similar plant failed in a clinical environment, it could have a major effect. Thus, by classifying and categorising all the areas, we could bring that intelligence into our survey and the resulting data for modelling. This entailed harnessing the knowledge of both the Estates team and Skanska.”

Steve Lawley said: “Skanska’s input has been invaluable throughout. I am really just the facilitator.” He continued: “What I was keen to do was get to a position where we had the business intelligence to allow Trust directors to make informed decisions on priority engineering backlog work, and to be able to assure them that, when they looked at our data, we had already done the prioritisation, and undertaken as many of the mitigations as possible, so that when we came to them with the risks they were as accurate a reflection as they could be.”

John O’Sullivan said: “I think the way we undertook the survey, and then produced the resulting data, breaks away from the existing trend of ‘What was last year’s budget? Now add 2 per cent to it’. The data is both very robust and compelling.”

A document for the Board

Steve Lawley said the backlog maintenance audit data had also proven very useful in terms of a document to go to the Trust’s Board. He said: “While the Board might not agree with what we have put forward, I know the data is accurate, believable, and would stand up if I were challenged on it. I have the assurance on the M&E services that I can confidently present an accurate picture. It also supports our Authorising Engineers when they are reviewing the site infrastructure. Equally, we have a multi-million pound Accident & Emergency redevelopment project ongoing, which has gone out to tender. I was asked about the M&E backlog for A&E. I spoke with Mark Rogers, asked him what plant rooms were associated with this, we went through the survey, identified the backlog, and within half an hour I could give the Trust’s project team a picture of what they needed to look at as part of the engineering services provision.

“Traditionally, that would have taken considerably longer, and the data would probably have been out of date. Where we want to get to,” Steve Lawley added, “is that this becomes a dynamic document, so that when any assets are identified as obsolete, the data updates immediately. When we have capital schemes in hand, we also need to update the assets, by removing obsolete assets and adding new ones, so we can then project the spend going forward.”

Dangers of ‘static’ data

John O’Sullivan explained that Oxhey Hall had only begun working with the NHS within the past couple of years: “It’s a new sector for us,” he said, “which is helpful for the Trusts we serve, because we are looking at it afresh. The feedback we are getting is that NHS estates and facilities teams are used to undertaking backlog surveys the same old way, with partial and ‘static’ data.” Skanska’s Mark Rogers added: “Often the asset data from NHS surveys is out-of-date, and produced as part of a ‘tick-box’ exercise – very different to what we have achieved here. As a hard FM provider we need up-to-date information to identify where money needs spending as a priority, but current data also assists us in monitoring failures of plant items.”

“Because a backlog survey is usually so narrow in scope, and often only looks ahead for five years” John O’Sullivan added, “it tends only to focus on defects, so you don’t get a full picture. Here, with an audit project funded 50/50 by the Trust and Skanska, we have achieved that full picture. Although we adopted the principles of traditional backlog methodology – as regards condition indicators and risk profile – we applied it much more comprehensively estate-wide.

“We fused the different capabilities within our businesses – engineering, commercial, and IT – to produce these outcomes.

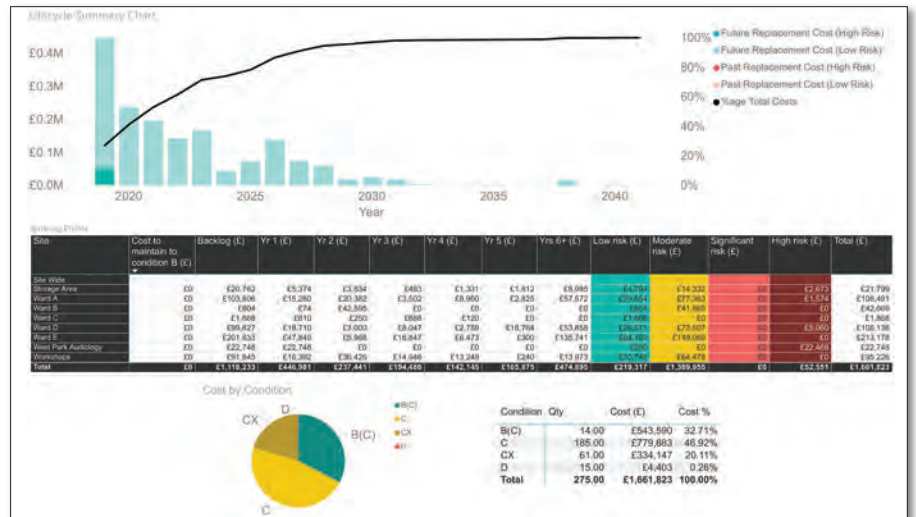
A ‘web-based tool’

“Now, harnessing Skanska’s four-tier asset categorisation strategy, we have moved on from what Skanska and the Trust had previously, to a powerful web-based tool, which enables the Estates team to dynamically model its estate and keep the data updated – quite different from static spreadsheets where you have to ‘re-invent’ every five years. Part of the project has entailed establishing a standardised list of location types, and classifying each against HTM clinical definitions. Consistency has been key, and by using handheld technology to capture assets, we developed a feature that incorporated the NHS Backlog condition indicators against each asset. The selection of the relevant condition indicator per asset type then generated the overall condition grade, which has avoided inconsistency. We also used the ‘Aspect’ handheld technology to capture dilapidations, and imported the full location hierarchy to ensure that each asset’s location accorded with the site layout drawings and Skanska’s CAFM system.”

Benefits of collaboration

Mark Rogers said: “I think the collaborative working helped towards this, because we worked so closely together that there were a lot of elements we were inputting due to our site knowledge.” Steve Lawley added: “The traditional survey tool was used, but the output – in terms of the reporting – was where we really got the discussion going, so we could chop up the data and use it for many different functions. John O’Sullivan said this had ‘worked’ because the tripartite team had ‘invested the time upfront to work out the project’s goals and how to go about it’.

Mark Rogers said: “We at Skanska maintain the clinical estate here, but it is the Trust’s responsibility to undertake lifecycle replacement of the assets.” Steve Lawley explained: “Where there is an issue



A graphic from the audit showing the risk-adjusted lifecycle replacement costs for a range of engineering plant across the retained clinical estate at Walsall Manor Hospital.

with plant, the data from the engineering backlog survey now allows us to discuss with Skanska how we go forward. If the Trust hasn’t invested in particular plant, and there is a repeated failure with it identified on the backlog survey, the data can be used for Skanska to apply the Schedule 18 payment mechanism – via an excusing clause. The relationship doesn’t spoil, because Skanska is giving us the facts. When I am looking to explain a failure to directors, I can attribute it to a particular factor, and explain that, to resolve ‘this’, we need to do ‘that’. It is then not just Mark and I saying this; we have a third-party, RICS-Chartered organisation providing the data.”

Naylor Report

John O’Sullivan said: “The survey highlighted many of the issues brought up in the Naylor Report, because we were able to demonstrate that there were assets past their life, and Steve could then go back to the Trust and argue for more to be spent on key plant now, due to the lack of past investment.” Mark Rogers added: “In all the survey highlighted that the current backlog for M&E alone at Walsall Manor Hospital is estimated at

£21.8 million (net of project costs). High-risk-wise, however, the figure is around £6.7 m.”

The Oxhey Hall MD said that, in contrast to the wealth of clearly laid out and easily accessible data generated by the new engineering backlog survey, with a more ‘typical’ survey, the estates team would generally receive large spreadsheets, incorporating 5,000-10,000 lines of data, ‘with some risk-related data and a summary in pie charts’ He added: “That is about all they will get – static data.” “In this instance,” added Mark Rogers, “we developed joint terms of reference that Oxhey Hall worked to, so it was a collaborative approach from start to finish– even with the risk assessments at the conclusion.”

Giving a flavour of the data generated

Here John O’Sullivan said he would ‘give a flavour’ of what came out of the exercise, using a number of charts from the survey report. He said: “In profiling the retained clinical estate from an M&E perspective, we could demonstrate that it’s in good condition, and well maintained. We profiled the M&E assets in terms of risk in

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accordance with backlog, but it was interesting that when we examined the data in different ways, we could say, in terms of failure: 'If you go by condition alone, failure is unlikely. However, factor in the past under-investment and its impact, plus items past their life, and the risk profile changes quite dramatically.' Because we invested the time to categorise all the different HTM risk ratings, when Steve is asked to make the backlog plan fit into his budget, and has to determine the priorities, we can identify the levels of risk to clinical activity."

Backlog risk per block and building

The survey also highlighted M&E backlog risk levels for each block. Steve Lawley said: "From there we can identify high backlog risk areas by individual building, and then drill down into location." John O'Sullivan said users of the data would be able to look at a high risk number, and then 'really drill down' to see what was behind it. He added: "The trouble with the traditional backlog survey approach is that it doesn't give you that granular detail, whereas here the estates engineer can go right down and look at a single distribution board in among 700-800 assets in a particular block."

He added: "A condition of the Estatecode, HBN 00-08, the risk-adjusted backlog information document, is to output the condition indicators, which I don't think most healthcare providers actually do. The Estatecode stipulates, for instance, that for every asset type you check for certain criteria, and if they are not met, the asset is in 'Condition B'. If other elements then don't meet the criteria, the asset is in Condition C. To ensure consistency of information we built into the software a feature whereby each time the user selects an asset type, it comes up with the item and generates a condition."

Accredited references

Mark Rogers added: "All the references are accredited; for instance we have used CIBSE's Guide M and Spon's for condition and expected life. In all some 2,700 assets were surveyed - from distribution boards to air-handling units, generators, switch panels, chillers, pressurisation units, steam pipework, and medical gas plant." John O'Sullivan added: "We decided not to survey elements such as individual light fittings and detectors, focusing instead on main plant, since the exercise was all about criticality."

Steve Lawley explained that because the surveying team had used CIBSE guides for plant life expectancy, they also incorporated factors that would identify how the model would look lifecycle-wise if particular assets were 'sweated' by another 10-20 per cent. He said: "We can thus give the Board the revenue versus



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capital consequences if they want to sweat particular plant a bit longer."

Among the recipients of the survey data at the Trust, the head of Estates explained, would be the Directors of Finance and Strategy, "because Estates reports to two directors here; the director of Finance is the PFI 'representative', whereas the Director of Strategy is the day-to-day Estates lead". Steve Lawley continued: "The debate we had was about the 'business risk', and the 'health and safety risk', around certain areas, and that was the collective approach used to get to the various scores."

Software-as-a-service

Moving to discuss the format used to present the survey data, Oxhey Hall's John O'Sullivan explained: "This a web-based software-as-a-service solution, the aim being for say, all of a Trust's Estates team, to be able to rely on one accurate, up-to-date resource." Showing me a chart, he explained that it highlighted graphically where there had been significant spending gaps in the past, and the current resulting backlog position. He said: "The user can see there is a big spike in required spend in Year One, with the dark green area indicating high and significant backlog risk, and the light green low and moderate risk areas, spread out over a longer period. The software has thus already taken the data from the survey, applied some risk adjustment, and spread out the risk and required spend over some years. You can also apply elements such as project uplift and inflation. You have your condition profile, as on a 'traditional' spreadsheet, and all your buildings, and at any point you can drill down."

"The accessible format of the survey data has proven a major boon for us in formulating our Estates Strategy," Steve Lawley explained. "For instance, I can use it to say and model: 'I want to achieve 'Good' under the Premises Assurance Model by 2020, and all clinical areas to be at a minimum Condition B by 2019'. "If funds are tight," added John O'Sullivan, "you can also quickly and easily identify the high and significant risk plant and look at either mitigation or replacement, thanks to the high level of granularity. This is dynamic data that you can keep current all the time. Users can interface with their own existing systems; for example you can decide whether you want to update your asset in this model first and then update your CAFM system, or vice-versa. The web-based software solution won't displace any previous investments."

Ensuring that data is 'live'

"Where we'd like to get to," Steve Lawley explained, "is that, with this web-based system, if Mark and the Skanska team identify an issue with a particular asset, we can check against the backlog information to see what it says, and if it needs changing, we have an upload form. We then have an audit trail of who has taken what action and why, so that the data becomes 'live'. If, for example, you change a chiller, the system not only acknowledges this, but also changes the risk profile accordingly. You can also input all your different percentage uplifts, so plant or components in good condition in a low or moderate risk category might, for instance, be 'sweated' by 20 per cent. All this can be brought into the modelling."

Steve Lawley said that following the survey, he and his team were able to be 'more of an informed client in managing



A record drawn from the new asset data showing the condition and likelihood of failure of a leaking pump.



Skanska's senior engineering manager, Mark Rogers, explained: "Often the asset data from NHS surveys is out-of-date, and produced as part of a 'tick-box' exercise – very different to what we have achieved here."

what we have'. He added: "The survey data also enables us to display why particular backlog maintenance actions have been taken, and to have an audit trail in case of a CQC visit or incident. In the latter situation you can then justifiably demonstrate the rationale behind your decision-making."

John O'Sullivan explained: "Because the system is web-based, you can give different staff different access levels, but all the time you will know that the data is up-to-date. Here at Walsall Manor Hospital the data will be available to both Trust estates personnel and their Skanska counterparts."

A 'proactive' tool

"Take a situation," Steve Lawley said, "where your works management system flags up to you as the Estates manager repeated call-outs to a particular chiller. This will in turn identify that the chiller needs looking at to determine whether it needs replacing. It all thus becomes a proactive approach, rather than waiting until plant breaks down. Also, where that chiller is replaced, either the CAFM system or the survey-based data only needs updating

once, since the two systems 'talk' to each other." He added: "The modelling-type information will also be a powerful tool when I am looking at any commercial opportunities for tendering contracts, which is difficult to do without that granular data."

The report based on the data from the Oxhey Hall survey at Walsall Manor Hospital also incorporates photos of all the M&E 'assets', while data can be output in a number of different ways – including via a spreadsheet, via the online portal, and in a number of formats looking at different elements. John O'Sullivan said: "The key benefit is that all the asset data is held in one place, accessible to all authorised users. Traditionally, estates team have typically got together perhaps annually, or at best six-monthly, for a tabletop backlog review. However, sitting down and trying to remember things about the site takes time, whereas if you update the database as soon as plant is repaired or replaced, you have far less of a challenge."

ERIC and PAM

Steve Lawley explained that the report based on the survey had gone to the Trust's Board last November, and was being fed into the Trust's ERIC reporting and Premises Assurance Model



Skanska's senior implementation manager, Alan Walsh: "The ability to drill down to a granular level will really benefit us."

assessment, and its Estates Strategy. He said: "This one central piece of business intelligence will now feed our business planning, budgets, and external reporting. We knew this one survey could service six or seven different requirements. Not only did we get up-to-date data, but we have also improved our compliance, risk modelling, and transparency."

I wondered when the engineering plant survey might need repeating. John O'Sullivan said: "The great thing is you are not re-inventing the wheel in five years; if you have maintained the data it eliminates the need to start again from scratch." Steve Lawley said: "The strategy I have proposed is based on us maintaining the data ourselves for the next three years, working with Skanska, and in the third year undertaking a desktop review with the external surveyor, and then looking a 'refresh' at least every five years. Alan Walsh said: "You could look at critical items on those occasions." John O'Sullivan added: The survey's comprehensive nature will undoubtedly reduce the costs of future ones."

Surveying the built assets

The 'next step', Steve Lawley explained, would be to survey the site's built assets. He said: "Currently we have traditional static spreadsheets for our buildings, but they are not sub-divided into the risk categories and the operational indicators we have with the M&E survey. We are aiming to get the buildings surveyed this year, so we can then align the two, with M&E and buildings fabric on one central database. We will again be working with Oxhey Hall. We have received a quote from Skanska, which has gone to our Strategy director for approval, along with a supporting paper. If we get the go-ahead the building survey will again focus on the retained clinical estate."

Mark Rogers said: "As a hard FM company, a survey like this, and the resulting data, enable us to target our maintenance service at the right areas – so, for example, where there is evidence of assets being sweated, we can tailor our



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maintenance to focus intensively on them. The data will also help us with managing our capital projects and project planning. For instance, Steve mentioned the Accident & Emergency Department redevelopment business case. We had significant involvement in that engineering-wise, and the new data was able to feed into that. There are thus lots of ways it has helped us.”

Energy-saving enhancements

Alan Walsh said: “You can also use the data to look at elements such as new energy-saving technology, filtering it out and asking: ‘Actually, do we have any plant items that we could change using an invest-to-save approach?’. The ability to drill down to a granular level will really benefit us, particularly as Skanska already has an excellent works management system and asset databases in place at the Trust.” He continued: “Looking at the business case for enhancing A&E and Maternity, the survey data proved invaluable, highlighting, for example, that we needed to augment the calorifiers with plate heat to provide the increased capacity required.”

The Maternity project referred to involves an extension to the hospital’s 1995-built neonatal unit, which will roughly double its size, while the A&E project entails a complete replacement of the existing Accident & Emergency Department. Steve Lawley said: “The data from the Oxhey Hall survey helped us to support the business case for both. The Maternity scheme has already started, and is due for completion mid-2019, while the A&E project is awaiting approval.”

This saw the close of a comprehensive discussion on a far-reaching survey and auditing project, which should afford considerable benefits to the Trust and Skanska. Summing up, Steve Lawley said: “You hear a lot of bad press about the relationships between PFI providers and Trusts, but here the opposite is true, and the people involved in this project have demonstrated a very adult and collaborative way of working, to the considerable benefit of all the participating parties.”



The participants in the meeting - from left to right, Steve Lawley, Mark Rogers, Alan Walsh, and John O’Sullivan.



The survey focused on engineering plant and components in areas including the Accident and Emergency Department and Maternity Unit (top inset) Pharmacy, Pathology Department (bottom inset), ward blocks, and theatres - in all about two-thirds of the Walsall Manor Hospital’s retained estate.



‘Tablets’ running Oxhey Hall’s ‘in-house’-developed ‘Aspect’ software were used for the engineering backlog survey.



Walsall Manor Hospital houses the full range of district general hospital services, while Walsall Healthcare NHS Trust provides local and general hospital services to a population of around 260,000.