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The Christie NHS
NHS Foundation Trust

BUSINESS INTERRUPTION REVIEW

Presented to

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The Christie NHS Foundation Trust: Business Interruption Review

Introduction

The Christie is a NHS Foundation Trust hospital providing highly specialized cancer treatment to patients based principally in the North West of England. The Christie is a tertiary centre, receiving referrals from other hospitals, and is the largest single-site cancer treatment centre in Europe, treating 40,000 patients per year. The Christie provides diagnosis, treatment and care for cancer patients, research and education in all aspects of cancer. The Christie has an annual turnover of £173m and 2,500 staff.

Willis were approached by The Christie to undertake a review of the financial consequences of a major physical loss at the site, with a view to using the findings to establish a more reliable "business interruption" value for insurance purposes.

Methodology

The approach agreed with The Christie at the outset and which has been followed is simple and has involved the following steps.

- Understand how the revenues flow and how costs are incurred
- Research and agree realistic physical loss scenarios which could trigger a loss of revenue and profit to the Christie
- Agree the realistic "worst case scenario" and estimate how long it will take for the affected areas to be back up and fully operational
- Work with department heads to understand the high level impacts of the event on revenues
- Investigate and agree with department heads how The Christie would mitigate loss of patient care and revenue in each department affected
- Understand what additional costs each of the mitigating contingency plans would involve
- Project the overall financial impact on the anticipated profit of The Christie
- Estimate the level of emergency one-off costs required as an immediate response to the event

It should be noted that whilst the process has involved the most expert and knowledgeable senior managers, the review is by definition high level and based on views, estimates and projections. All participants have been keen to point out that it is most difficult to predict with any degree of accuracy precisely what would happen in the event of a serious loss. This is partially due to the high level of integration and interdependency of the treatments administered, but also due to the relative unpredictability of available capacity in other hospitals.

Key People

Key people involved in the review from The Christie have been Joanne Fitzpatrick and Sue Hayes from Finance, Bob Higginbotham, Gavin McEntee and Dale Farrow from Estates, Pat Lawrence and Jackie Wrench from Network Services, Martin Hamer and Neil Wrathall from Clinical Services, John Glover from IT and Carl Rowbottom from Medical Physics.

These managers have referred to other experts as required.

We would like to thank all of these individuals for the time they have expended on this review.

Executive Summary

The review has modeled two scenarios. Firstly, a highly improbable total loss, which might result from an aircraft crash landing. Secondly, a more plausible major fire, beginning in one of the basements and then burning through the hospital to destroy a number of blocks including the key radiotherapy and chemotherapy departments.

It would be important to point out that the senior managers interviewed in the review expressed great uncertainty about exactly what would happen in the event of a major loss, in that this sort of loss had not up to this point been contemplated and modeled in contingency planning. For this reason the calculations produced should be seen as broad estimates of potential outcomes, rather than finite forecasts.

In the first scenario, it is anticipated that The Christie would be non-operational for over five years as the planning and then rebuilding period would be extremely protracted. On the key assumption that most clinical staff would be seconded to other hospitals to meet the additional capacity, then the main loss would revolve around lost margin, continuing payment of salary costs for senior management, critical admin staff and a residual number of "unplaced" clinical staff. The loss would be in the order of £112m.

The more plausible fire scenario is also more complex. Essentially the major impact of the fire would be on radiotherapy, chemotherapy and to a lesser degree on the supporting departments. The damaged buildings would take two and a half years to fully replace, commission, and be declared "clinically safe."

Since chemotherapy is less dependent on equipment, the department would be up and running in three months, using an alternative available area on the Withington site. There would be substantial additional costs, funding of continuing salaries and full loss of margin in the first 3 months, and the financial loss would be in the order of £10m.

The recovery in radiotherapy would be quite intricate. The steps involved would be the purchase of the Pinnacle hardware and installation as a top priority, maximizing the use of the 4 linacs at Oldham and Salford, building 3 additional linacs at Oldham and Salford on the existing sites, and maximizing their usage. Mobile bunkers would be investigated, but cannot at this point, be relied upon. Finally, it is a key assumption that the majority of radiotherapy and supporting staff, not required at Oldham and Salford, would transfer on a temporary basis, to other hospitals to support the additional capacity. This scenario would produce a financial loss to The Christie in the area of 15m.

The total loss could therefore be estimated at around £25m with an additional £1.5m potentially spent on emergency one-off expenses immediately after the loss. Due to the uncertain nature of the recovery plans, it would be wise to build some contingency into these figures. We would suggest a figure of £2.5m is more realistic.

Description of Activities

The core activities at The Christie are as follows:

- Radiotherapy through one of the largest radiotherapy departments in the world, both at the main site in south Manchester and via The Christie radiotherapy centre in Oldham
- Chemotherapy in the largest chemotherapy unit in the UK and via 14 other hospitals
- Highly specialist surgery for complex and rare cancer
- A wide range of support and diagnostic services

Loss Scenarios

There are two broad scenarios to consider.

Firstly, we considered a catastrophic and highly improbable event, involving an incident such as an aircraft from the local Manchester International Airport losing control and having to crash-land. This potentially could impact the entire Withington site, with 100% loss of treatment activities.

Secondly, we considered a more realistic set of circumstances involving a major fire starting in the principal hospital buildings. A major event loss assessment was undertaken by a fire engineer along with Gavin McEntee of Estates, which revealed the conclusions shown in Appendix 1.

The “worst case scenario” identified is based on a fire commencing in the basement of Block 30. A steadily spreading fire would ensue; spreading vertically via the stairwell to the ground floor level that is also adjacent to the Main Gas House, which if involved would assist the speed of the spread.

Detection would be prompt as would brigade attendance; however, with concentration focused on evacuation, the fire would continue to spread via corridors to neighbouring Blocks, 31, 39 and 28, and 21.

By the time the brigade were able to tackle the fire it would be well established in the latter mentioned blocks. By the time the brigade had control of the fire spread, it would have further extended to Blocks 27 and 41, bringing partial direct

damage to these blocks. It could also be anticipated that there would be secondary smoke and water damage to Blocks 24, 25, and 26.

The departments impacted here would be as follows:

Type of Damage	Block	Departments
Primary damage	Block 30	Medical physics, diagnostic radiology, radiotherapy, linear accelerators 4,6,7,11 &12
	Block 31	Mould room, simulator unit
	Block 39	Linear accelerators 1,2,3, physics, radiotherapy
	Block 28	Linear accelerators 5 & 6
	Block 21	Chemotherapy, medical statistics, diagnostic radiology, pathology, diagnostic radiology, radiotherapy
	Block27	Pat seed diagnostic radiology department
	Block 41	Radiotherapy, MRI
Secondary Damage	Block 24	Infection control, endoctrinology
	Block 25	M A unit, ward
	Block 26	Theatres

Knowledge gained from the experiences in the Royal Marsden (2008), the University Hospital London (2008), the Great Ormond Street hospital, and the Chase Farm site of Barnet, Enfield and Haringey Mental Health Trust, demonstrate clearly that fires do occur in hospitals, and that on occasions, they can have very significant consequences (see Appendix 3 for brief description of fires cited).

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Indemnity Periods

The next phase of the review concerns agreeing estimates of the periods that the Christie would be out of action whilst rebuilding took place.

Scenario 1: Catastrophic Event

Since this event involves the entire loss of the hospital, it has been particularly difficult to estimate rebuilding time, mainly due to the uncertainty about how The Christie would in fact rebuild. Strategic decisions would have to be taken as to whether the hospital would be rebuilt on the existing site, or alternatively, whether the Board would decide to build at a number of different locations around the area. For the sake of this exercise it is assumed rebuilding would take place at the existing site to provide the same services as currently provided. In this case very high level timelines might be as follows:

Making site secure	3 months
Debris removal	3 months
Development of plans	6 months concurrent
Planning permission	Further 6 months
Rebuilding	4 years
Fitting out and commissioning	6 months
Total period	5.5 years

These timelines assume that resources would be available and would be prioritized following a disaster such as the one outlined.

Scenario 2: Fire Event

In this case, a substantial and important part of the hospital is lost, but not the hospital in its entirety. Access to the damaged buildings would be complex in terms of debris removal, and rebuilding work would also be somewhat hampered.

It is assumed that The Christie would decide to rebuild the damaged portions of the hospital broadly in line with existing. In this case, the timelines could be as follows:

Making site secure and debris removal	3 months
Development of plans and planning permission	6 months (3 months concurrent)
Rebuilding, fitting out and commissioning	2 years
Total period	2 years and 6 months

This estimated period is not out of line with comparable events such as the Royal Marsden, which was out for two years, and at Chase Farm, which was unable to resume care for just less than two years.

Again, it must be emphasized that these are high level estimates and no account has been taken of potential delays on planning grants, unavailability of construction resources, exceptional lead times on key items of machinery etc.

Post Loss

Further to conversations with a number of departmental managers, it is clearly very difficult to predict exactly how The Christie would react in the event of a major loss at the hospital. The following descriptions are based on those conversations and represent the best views available.

Scenario 1: Catastrophic Event

Given the nature and extent of this highly improbable event, it would be safe to say that treatment to current patients would be entirely interrupted. It would not be possible to make use of Oldham or Salford for radiotherapy in the short term due to the loss of the detailed patient planning and associated software, but once the replacement hardware and software were in place Oldham and Salford would be able to provide the existing and additional capacity through extended working hours.

The majority of new radiotherapy patients though would be treated by other hospitals in the area where that was possible. Existing and new patients requiring chemotherapy or other services would be treated by other hospitals in the area. It is a key assumption here that clinical staff linked to both radiotherapy and chemotherapy would “transfer” to other hospitals to support the additional

capacity required and only a small number would remain unfunded on The Christie payroll.

Scenario 2: Fire Event

In the described loss scenario we have focused on the impact on radiotherapy and chemotherapy, since these departments drive the lost revenue and particularly lost margin calculations.

Both these departments would be out of action in their entirety as a result of the fire. There is an important assumption made that other key areas such as clinical and medical oncology, radiology, pathology etc (which also drive a significant part of the revenue, though not margin) would be able to continue activity, albeit with a reduced number of patients.

Chemotherapy

The key premise here is that following a major loss of this nature The Christie would be able to continue to provide 100% of the service currently provided by remodeling other areas of the hospital on the existing Withington site. This is principally because the service relies on specialized staff, beds (or chairs) and drugs, rather than expensive items of machinery (like radiotherapy).

There are a number of alternative areas of the hospital that could be used to accommodate chemotherapy, amongst them, wards 3 and 5. Other options would include the use of mobile wards placed on existing car parking space, or remodeling of the administration areas in blocks 9 and 11.

There would be an interruption to the service whilst remodeling and renovation work took place, which would take three months. During this period existing patients would continue to be treated through a combination of home visits and transfers to other hospitals, albeit with some additional costs associated. During this short period, The Christie would not be able to admit new patients, but would continue to pay all clinical and nursing salaries. It is anticipated that a proportion of these salaries would be offset by temporary “secondments” to the hospitals taking on the additional work, which would need extra capacity.

Additional costs would include the following:

- Refurbishment and redecoration of facility
- Purchase of new chairs (which are expensive given their specialist nature)
- Purchase of other ancillary equipment
- Additional transport costs to support home visits, ongoing treatment in other hospitals etc

The services supporting chemotherapy treatment (oncology, radiology, pathology etc) would also experience a reduction in capacity during this three month period.

Once the new facilities had been commissioned The Christie would be able to provide 100% of the chemotherapy service. However, certain services currently supporting chemotherapy would be partially outsourced (such as portable X-ray, MRI etc) and might come with their own operators, which would mean a slight drop in staff required in these areas. This would only be for a finite period as these highly specialized staff would be seconded to surrounding hospitals on a temporary basis.

There would be a level of additional costs incurred throughout the rebuilding period to cater for temporary rental of additional or temporary buildings, additional transport costs due to home visits, etc., but for the most part the chemotherapy service would continue to be provided as currently, albeit located at a different part of the Withington site. All existing staff would be fully deployed during this period.

Other key departments lost in the fire and linked to the chemotherapy service, including oncology would be able to continue operating from other areas of the hospital or by flexible use of personnel or outsourcing, again at some additional cost.

There might be an issue with physical medical records that would be lost, which might add to treatment time (further checks being required). However, temporary case notes could be generated from Medway.

Radiotherapy

The situation with radiotherapy would be more complex. This is due to the heavy reliance the treatment has on specialized equipment (the linear accelerators).

The fire as described would cause a total loss to the radiotherapy department and a loss of all 12 linear accelerators on the Withington site. Other items of key equipment such as MRI and CT scanners would also be lost. Physical patient notes would not be recoverable from the fire.

The core Mosaic software is replicated in a server beyond the extent of the fire spread and so would be intact, but the clinical planning data held on Pinnacle and the Pinnacle server would be lost. There is no replicated or mirror server outside the fire area. The hardware that the Pinnacle software runs on is specialized and can only be run on the Philips hardware. In the event of a fire, The Christie would be restricted by the ability of Philips to replace the specialised hardware, which could take anything from a week to several months.

The key strategy post loss would be to continue to provide radiotherapy treatment to as many patients as possible under the Christie name. The recovery would be based on a number of key assumptions:

- Due to loss of Pinnacle, there would be no radiotherapy services provided from The Christie's facilities at Withington and Oldham for three months, and a new server would need to be purchased and installed
- Thereafter the Christie would look to maximize the use of the four linear accelerators at Oldham and Salford
- Three additional bunkers at Oldham and Salford would be commissioned
- Mobile bunkers would be brought in, where possible
- Remaining capacity would be taken up by surrounding hospitals and Christie clinical and medical staff would be seconded to support that extra capacity

Pinnacle Server

Due to the fact that the Pinnacle server would have been lost in the fire, a new one would have to be purchased, software loaded and configured, and the new

system of patient planning commissioned and launched. It is anticipated that this could take three months. During this period it is estimated that 50% of the radiotherapy staff would support other hospitals – and be funded by them – and the remaining 50% would be funded by The Christie. There would be no revenue in this period.

Oldham and Salford – Extended Working

Currently there are two linear accelerators at Oldham and there will be two available when Salford becomes operational mid 2011, working five days a week from 8.30am to 6pm.

The recovery plan would be to extend daily working to 9pm, and to work 10am to 4pm on Saturday and Sunday. This would increase local capacity by approximately 50%, reaching the equivalent of 6 linear accelerators working normal hours. The extended hours would be aimed at palliative patients.

There would be certain logistical issues that would have to be overcome relating to transport, on site clinical support and pharmacy, all of which would involve additional cost.

Oldham and Salford – Additional Bunkers

Both satellite sites have had piling done to accommodate additional bunkers: two at Oldham and one at Salford. The recovery plan would assume activating planning and building work as soon as possible after the fire. Even assuming priority treatment by the authorities, this would likely take 18 months until the new bunkers were operational. All the new bunkers could work extended hours as above.

Witherton – Mobile Bunkers

There are around 75 mobile bunkers currently in the UK and 220 worldwide. The Christie might be able to secure say one mobile unit after six months and another after 12 months, which would be located, say, in existing car parking areas, with the services coming up through the ground. More work would have to be done to

assess the availability of such units. The costs associated with these units would be significant.

Support from Surrounding Hospitals

Remaining capacity would be taken up by the hospitals in surrounding areas, such as Clatterbridge, Preston, Stoke and Shrewsbury. Christie clinicians would be temporarily seconded to those hospitals to support the additional capacity. The revenue associated with these treatments would most likely pass to the hospitals, who would then meet the costs of The Christie clinicians. There would be some additional costs associated with transport, out of hours working, etc.

Continuing Salary Costs associated with radiotherapy

It is assumed that all the support services that are required would continue to be provided in line with the location of the radiotherapy treatment. That is, Christie staff in these areas would transfer to regional hospitals to cater for the additional capacity.

Equally, it is assumed that any reduction in patients in the Clinical and Medical Oncology (two big areas of revenue), and therefore reduction in revenue, would be matched by a reduction in costs as Christie clinicians supported treatments in the other hospitals. This is a key assumption.

Finally, although it has been assumed that radiotherapy clinical staff will transfer to other hospitals, there is a possibility that a small proportion might still have to be funded after the initial three months for an additional three months. This has been estimated at 10%.

Other Costs

The vast majority of administration and maintenance staff would remain because activity would be continuing in both chemotherapy and radiotherapy – and in some areas, there would be additional work to deal with the rebuilding process.

All other non pay expenditure would be saved or spent in line with revenue, hence is dependent on volume and would not form part of this review.

Financial Consequences

Total Loss

In the event of a highly improbable total loss to the site, we have made the following assumptions:

- All senior management would be retained throughout the period
- 75% of all medical staff would "transfer" to other hospitals to support the additional capacity created by the loss of The Christie. It might take 12 months for up to 25% of the medical staff to transfer so this would be a cost to the Christie
- All but a small number of nursing staff would transfer to support additional capacity
- 25% of admin/clerical staff would be retained as The Christie would continue to have administrative tasks to perform.
- The vast majority of non-pay expenditure ceases, with the exception of fixed charges, such as ground rent, standing charges, impairments, etc

This leads to a total amount of fixed continuing costs over the 5.5 year reconstruction period of approximately £70m.

To this should be added the lost annual margin of £7.5m over 5.5 years which is £41.25m.

This would make a total between continuing costs and lost margin of approximately £112m.

Fire Loss scenario

As has been explained above, the financial consequences in this scenario are focused on radiotherapy and chemotherapy since between them they are the most significant components of The Christie's margin. See appendix for full calculations.

- **Chemotherapy**
  - First 3 months
    - Loss of 100% margin of 2.1m
    - Funding for 50% continuing salaries of 1.8m

- Funding for 50% continuing salaries in supporting areas of 2.5m
- Remodelling/refurbishment/re-equiping costs of 1.5m

➢ Months 4-12
- Funding for 25% continuing salary costs in support areas which are outsourced, for 12 months, of 1.2m

➢ Months 13-30
- Additional costs of certain outsourced services for 12 months of 1.0m

➢ Total financial loss estimated at 10.1m

➢ **Radiotherapy**

➢ First 3 months
- Loss of 100% of radiotherapy margin in the first 3 months due to loss of Pinnacle server of 1.5m
- Funding for 50% continuing salaries for 3 months of 1.2m

➢ Months 4-18 months
- Funding for 10% of continuing salaries for a further 3 months of 0.2m
- Loss of equivalent of 67% of capacity and margin for 15 months, comprising 5.1m
- Additional costs to achieve this reduced loss of margin of 1.9m

➢ Months 19-30
- Loss of equivalent of 33% capacity for the next 12 months until the Withington site is rebuilt, comprising 1.6m
- Additional costs to achieve this reduced loss of margin of 3.0m
- Additional costs to achieve accelerated building of new bunkers of 0.5m

➢ Total financial loss estimated at 15.0m

➢ Emergency one off costs

In addition The Christie would incur a number of initial "emergency" costs in the days and weeks immediately following the incident, as follows:

➢ Emergency transfer of patients to surrounding hospitals

- Additional transport costs for clinicians to attend hospitals
- Some additional accommodation costs
- Overtime for staff involved in making and executing emergency arrangements
- Emergency facilities for telephones, data and other infrastructure etc.
- Cost of repairing and reinstalling infrastructure
- Buffer for contingency

These emergency costs could be estimated at a total of £2.5m.

- This would suggest that the total financial loss as a result of a serious fire event would be in the order of £25m, with an additional emergency one-off costs provision of £2.5m.

Conclusions

The review has concluded that there is a significant business interruption potential in The Christie's operations following a major event. In the case of a highly improbable total loss due to an extraordinary incident, such as an aircraft crash-landing on the site, the potential business interruption loss could be in the order of £112m. A rather more possible scenario – that of a significant fire affecting a large central area of the hospital including the radiotherapy and chemotherapy departments – would cause an approximate financial loss £25m and recovery would be centred on moving chemotherapy to another area of the Withington site, and for radiotherapy, maximizing the use of the Oldham and Salford sites.

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Paragon Risk Engineering
February 2011

Appendices:

Appendix 1: Full loss estimate calculations
Appendix 2: Loss scenarios and marked up plan
Appendix 3: Loss examples

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Appendix 1: Full Loss Estimate Calculations

	The Christie - Financial Impacts of Major Fire Loss		**Feb 2011**	
All in £m	Activity	Chemotherapy	Radiotherapy	Source: Network Services Summary P&L
	Annual Revenue SLA	34.7	20.3	Other revenue streams/adjustments not included
	Annual Direct Costs	21.4	9.8	Assumption salaries and wages = 66% of total direct costs
	Annual Indirect Costs	2.3	1.8	
	Annual Overhead Allocation	2.6	3.0	
	Total Annual Costs	26.3	14.6	
	Annual Reported Margin	8.4	5.8	
				Margin per linac of 415k (based on annual margin of 5.8m and 14 linacs)
	Chemotherapy			
initial 3 months	Reduction in capacity during remodelling phase	1.8		50% of chemo staff "seconded" to other hospitals for 3 months. Remaining 50% salary costs would be picked up by the Christie
	One off remodelling/refurbishment costs	1.5		Refurbishment costs cost 1.25m and equipment 0.25m
	Reduction in all chemotherapy support areas for 3 months during remodelling	2.5		50% reduction of capacity required from base salaries in supporting areas (oncology, radiology, pathology etc) of 30m
	Loss of chemotherapy margin for 3 months	2.1		
Month 4 to month12	Reduction in capacity required from chemotherapy support services (like radiology etc)	1.2		25% reduction for next 9 months, followed by secondment. Base of 10m salaries
Months 4-30	Additional ongoing costs to provide continuity of service eg outsourced scanning etc	1.0		Estimated at 1.0m, mainly in first 12 months before replacing equipment
	Total	10.1		
	Radiotherapy			
Plan 1	New Pinnacle server and installation		0.0	Covered under property policy
0-3 months	Initial period of lost margin		1.5	100% lost margin for 3 months
	50% continuing staff costs		1.2	50% of 3 months staff costs
4-6 months	Continuing staff costs		0.2	10% of 3 months staff costs
4-18 months	Loss of margin		5.1	6 linacs equivalent on stream. Loss of 10 out of 16 capacity. Each linac contributes 0.4m margin annually
4-18 months	Additional costs		1.9	Additional shift work/transport etc could cost 30k per week for 63 weeks
19-30 months	Loss of Margin		1.6	12 linacs equivalent onstream (8 in place working at +50% capacity) out of total capacity of 16 ie continued loss of 4 linacs capacity equivalent
19-30 months	Additional costs		3.5	Additional shift work/transport etc could cost 30k per week in each centre for 50 weeks. Plus planning and preparation costs for new bunkers of 0.5m
	Total		15.0	
	Emergency Costs			
	Patient transfer		0.1	600 patients at 250 each
	Additional transport		0.4	Additional transport costs to have staff in the right hospitals to look after current patients. 250 key staff spending 50pds fpr 30 days
	Additional accomodation for staff		0.3	Emergency overnight accomodation for 100 people per night for 30 days
	Emergency facilities		0.3	Could need up to 20 rented temporary cabins for 3 months at 25k each
	Infrastructure repairs		0.3	Costs of emergency repairs to infrastructure
	Miscellaneous		0.2	Other necessary costs
	Total		1.5	

The Christie - Financial Impacts of a Total Loss at Withington **Feb 2011**

All in £m	Activity	Chemotherapy	Radiotherapy	Source: Network Services Summary P&L
	Annual Revenue SLA	34.7	20.3	Other revenue streams/adjustments not included
	Annual Direct Costs	21.4	9.8	Assumption salaries and wages = 66% of total direct costs
	Annual Indirect Costs	2.3	1.8	
	Annual Overhead Allocation	2.6	3.0	
	Total Annual Costs	26.3	14.6	
	Annual Reported Margin	8.4	5.8	
				Margin per linac of 415k (based on annual margin of 5.8m and 14 linacs)
	Senior management salaries	33.0		6m for 5.5 years
	Medical staff continuing salaries for 12 months	5.0		25% of medical staff salaries of 20m would have to be funded by the Christie
	Nursing staff continuing costs for 12 months	2.2		10% of critical nursing personnale would have to be funded by the Christie (from salary base of 22m)
	Admin/clerical staff continuing salary costs	20.6		25% of 15m salary costs would be funded for 5.5 years. Includes maintenance
	Other fixed continung costs	10.0		standing charges, impairments, rent etc
	Sub Total	70.8		
	Lost margin	41.3		
	Total	112.1		

Appendix 2: Fire Loss Scenarios

FIRE BURN LOSS SCENARIOS

Christies Hospital, 550 Wilmslow Road, Manchester M20 4BX

Date of Survey-19th January 2011.

General Comments.

It was confirmed on site that there were three main burn scenarios, which would both cause significant material damage and business interruption for the hospital.

This document deals with primarily explaining the estimated fire inception, spread, and extent of damage from those scenarios.

In each scenario it is estimated that due to 24hour/7 day presence on site, and extensive smoke detection throughout the site, that fire detection would be very prompt, and also similarly fire brigade attendance, due to nearby whole time brigade.

The crucial factor however in each scenario is safe evacuation (be it total or horizontal) of all staff and particularly patients, which would delay the brigade's capability to tackle the fire.

Scenario 1.

Based on a fire commencing in the basement of block 30, a steadily spreading fire would ensue, spreading vertically via stairwell to ground floor level which is also adjacent to the Main Gas House, which if involved would assist speed of spread.

As indicated detection would be prompt as would brigade attendance, however with concentration focused on evacuation, the fire would continue to spread via corridors to neighbouring blocks, 31, 39 and 28, and 21.

By the time the brigade tackles the fire it would be well established in latter mentioned blocks, and once the brigade had control of the spread, it would have further extended to blocks 27 and 41 bringing partial direct damage to these blocks, and also there would be secondary damage to blocks 24, 25, and 26.

It is estimated this area of "burn" of the building equates to 20% loss of the site's buildings.

NB-It should also be noted there is a high concentration of contents value within this particular area of the site, as it contains 12 linac accelerators and 5 scanners, which total £20 million pounds plus in value, and also other hospital equipment which even if not within direct fire damage would be particularly susceptible to secondary damage.

Scenario 2.

This scenario assumes fire is based in block 32, commencing in the basement. Detection and brigade attendance would be prompt, but unlike the main scenario, where fire was mainly located in the centre of the buildings, resulting in both, evacuation needing to be extensive, with subsequent significant delay in tackling of fire, and also the fire being more difficult for the brigade to access. In this instance however limited evacuation would ensue, and fire fighting would be more prompt. Also being an outer "hub" of the site would make the fire more accessible for the brigade, unlike the main scenario.

It is estimated direct damage would be contained within block 32, with some secondary damage to surrounding blocks (34, and 16*).

Overall the "burn" would be no more than 10% of the sites buildings.

* Block 16 is known as the Paterson Building, and though owned by The Christie, it is understood the tenants are responsible for insuring the building and contents.

Scenario 3.

Block 26 was also considered as a scenario but as it falls within Scenario 1's "burn" was consequently discounted as it would naturally default to the latter.

Final Comments.

Scenario 1 undoubtedly results in the largest building "burn", and also business interruption.

Though significant business disruption would result from the other two scenarios, the site contact advised this would be only a relatively initial impact, as the Continuity Plan would address these scenarios.

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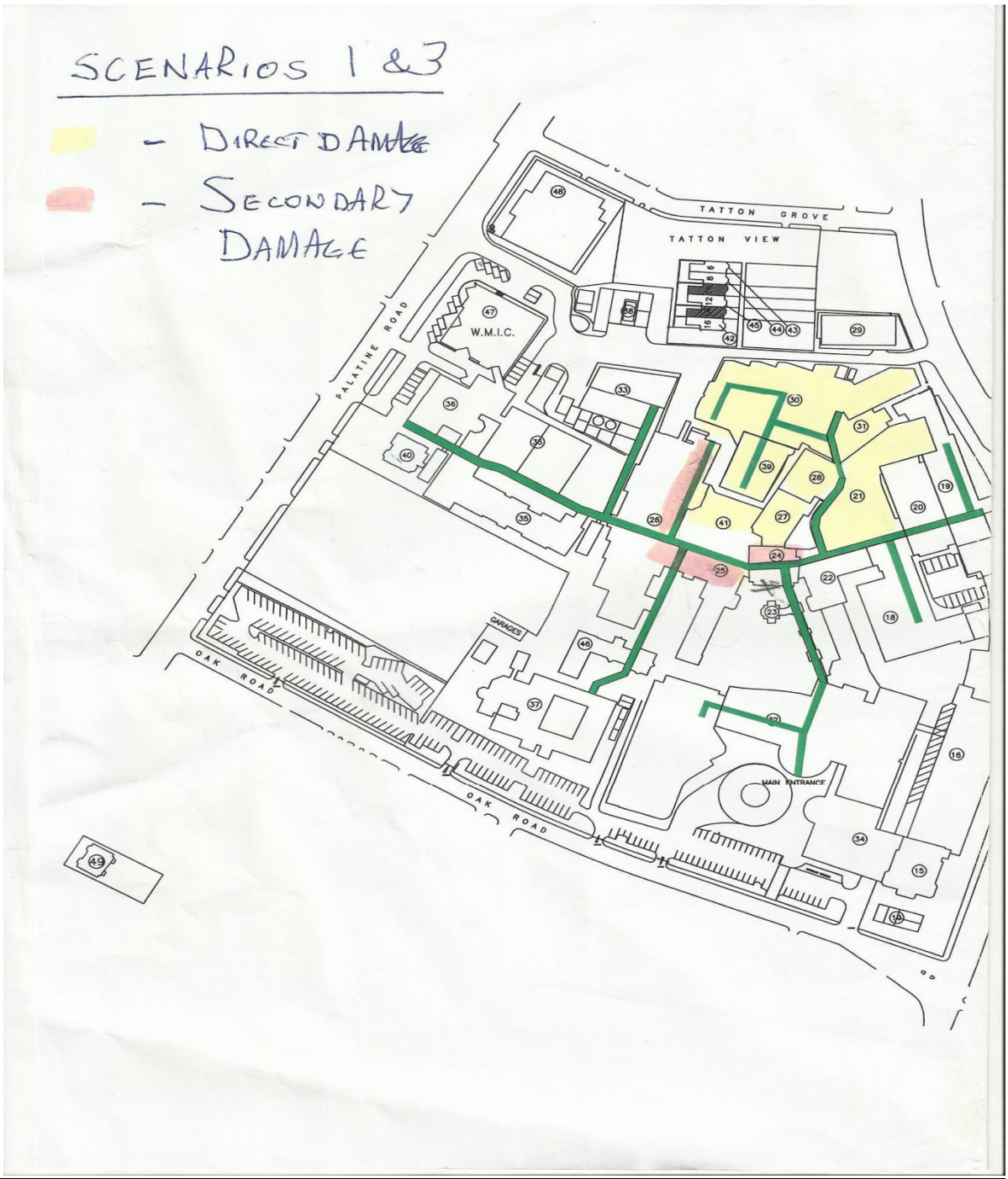
Fire Loss Scenario: Plan



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Appendix 3: Loss Examples

Source: Risk Committee Report March 2010

Incident 1 The Royal Marsden Hospital fire, Wednesday 2nd January 2008.

The fire started in a plant room at the Royal Marsden Hospital. Smoke and fumes spread rapidly through the building affecting the CCU within 3 to 4 minutes. Much of the site had to be evacuated including 120 in-patients and around 75 outpatients. Patients were evacuated from the building to the Royal Brompton Hospital and patients fit enough were held at the near by church of St Pauls.

The patients transferred to the Royal Brompton returned to the Royal Marsden 3 days later, however full site recovery did not occur until January 2010.

Incident 2 The University Hospital London fire, July 25th 2008.

The fire started in the basement of the unoccupied Rosenheim building at the University Hospital London. Smoke and fumes spread via underground tunnels to the Elisabeth Garrett Building. Patients did not require evacuation; patients were moved to a safe area for assessment during the incident. Medical Gas, Communications, and damage to the power supply took place. During the incident patients had to be diverted to other hospitals and disruption was caused due to the loss of the pneumatic carrier system carrying vital specimens.

The service returned to normal over the next few days.

Incident 3 Great Ormond Street Hospital fire, Monday 26th September 2008

The fire started on a cardiac ward causing smoke and fumes to spread to other areas and the evacuation of 23 patients with pre existing heart and lung problems. Initially patients were moved to alternative locations within the hospital.

Within ten minutes of the start of the fire an oxygen cylinder exploded causing further damage. The resulting damage from the fire and explosion caused the affected ward to be closed for 6 months, however most services returned to normal within 1 to 2 days.

Incident 4 The Chase Farm site of Barnet, Enfield and Haringey Mental Health Trust fire, Wednesday 15th October 2008.

At 18.35 the fire alarms were activated and a hospital director at the trust noticed that the roof of the building was on fire. In total 69 patients and staff were evacuated from the affected area initially to other parts of the site, as is normal in a mental health hospital of this type, to ensure the safety of the patients, staff and members of the public. Eventually patients had to be transferred to alternative accommodation, including a gym with members of the police force guarding them. The fire continued to burn for 14 hours and the building was later declared as being unsafe. Work continues to restore the building and to save the front elevation.

Incident 5 - Northwick Park Hospital Fire Wednesday 11th February 2009

The fire broke out in an electrical panel room which resulted in the partial evacuation of the hospital. Fire spread across 2 wings of the hospital causing anxiety and concern. A number of communication problems caused the evacuation to be delayed.