# Delivering healthy environments via Private Finance Initiative (PFI)

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Can good environments for the delivery of healthcare be successfully achieved under the Private Finance Initiative (PFI)?

PFI has been touted for bringing private sector expertise and capital to the development of healthcare facilities, effecting the transfer of risk to the private sector, and achieving a better balance between capital costs and long-term running costs. PFI has become the principal method by which major healthcare facilities are procured in Great Britain and is viewed with increasing interest elsewhere.

Critics, however, charge that the pressurised commercial culture at the heart of PFI leads to sacrifices in quality, innovation, flexibility and the broader contributions to the community of which such projects should be capable.

To address this debate, this paper draws lessons from the experience of Anshen Dyer Architects' decade-long involvement in the planning and design of PFI healthcare projects. In particular the paper offers examples from four aspects of hospital design that are essential to creating successful healthcare projects: - physical integration with the surrounding community; a lively, coherent campus; optimal building blocks, adjacencies, and flows for clinical efficiency; and a physical environments that promote healing.

The examples, all from recent PFI healthcare projects, offer evidence which indicates that, under the right circumstances, hospitals developed under PFI can achieve these aims as well as hospitals developed by other methods.

## Integrating the Hospital with Its Community: Newcastle, Royal Victoria Infirmary

A hundred years ago, the Royal Victoria Infirmary was developed in Newcastle, near to the centre of town, next to the University and the city's major park. But the hospital was fenced.
The project comes at a time when the city itself is changing. With the decline of the coal industry, Newcastle has been regenerating itself as a

service-oriented city, often relying on architecture to help raise its profile. The city is already well known for its built form, from the seven landmark bridges that span the River Tyne to the famed classical buildings of Grey Street. Recent redevelopment efforts have included the £240 GBP million transformation of Grainger Town, the historic heart of the city centre, into a high-quality mixed-use urban quarter, restoring dozens of historic buildings. In addition, more than £250 GBP million is being invested along the river front to create one of the largest cultural and leisure destinations in Europe. As part of this regeneration, the redevelopment of the Royal Victoria Infirmary will connect the hospital to a vibrant city centre and further add cohesion to the urban fabric.

The hospital's new master plan includes 70,000m2 of new clinical space for tertiary emergency and elective services, and a new children's hospital - along with measures to better integrate the campus with the surrounding community.

The potentially overwhelming physical scale of the new hospital building is reduced by disaggregating it into its natural components – wards and outpatient facilities, diagnostic and treatment block, children's hospital, clinical offices and restored historic buildings for non-clinical uses. Further, each element is designed as a bespoke block of distinctive shape and material - for instance, the round copper-clad children's hospital. These blocks are joined to ensure clinical functionality.

**Figure 1** *Red lines indicate major hospital circulation routes. Left-hand vertical line represents external mall. Righ-hand vertical line represent internal gallery*

Major circulation routes are introduced through the campus - outside in the form of a mall that enables free passage north to south for the convenience of the University community and the general public - and inside in the form of a long skylit gallery envisioned as the new heart of the hospital, providing reception points, catering and retail outlets and clear passage for patients and staff throughout. The glazed end of the gallery offers views of the University iconic Armstrong Tower, thereby symbolically reinforcing the connection between hospital and University.

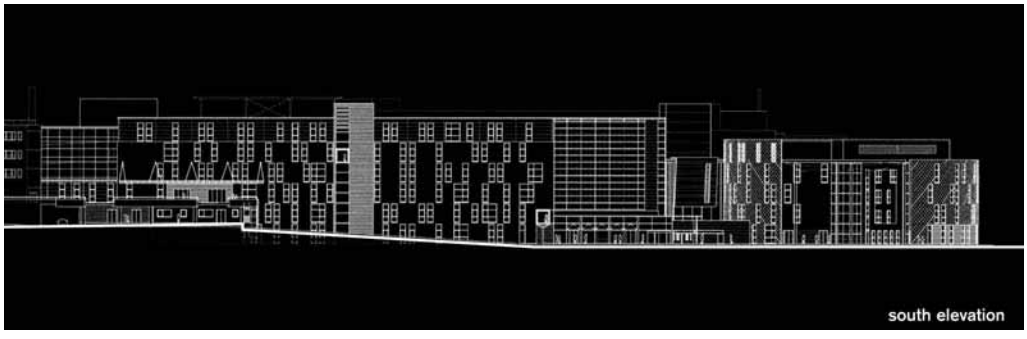


**Figure 2** *The facade of the hospital form the edge of the external mall, variety of shapes diminish the scale of whole. Children's Hospital at far right.*

**Figure 3** *View of the main entrance with distinctive copperclad drum of Children's Hospital to the right.*

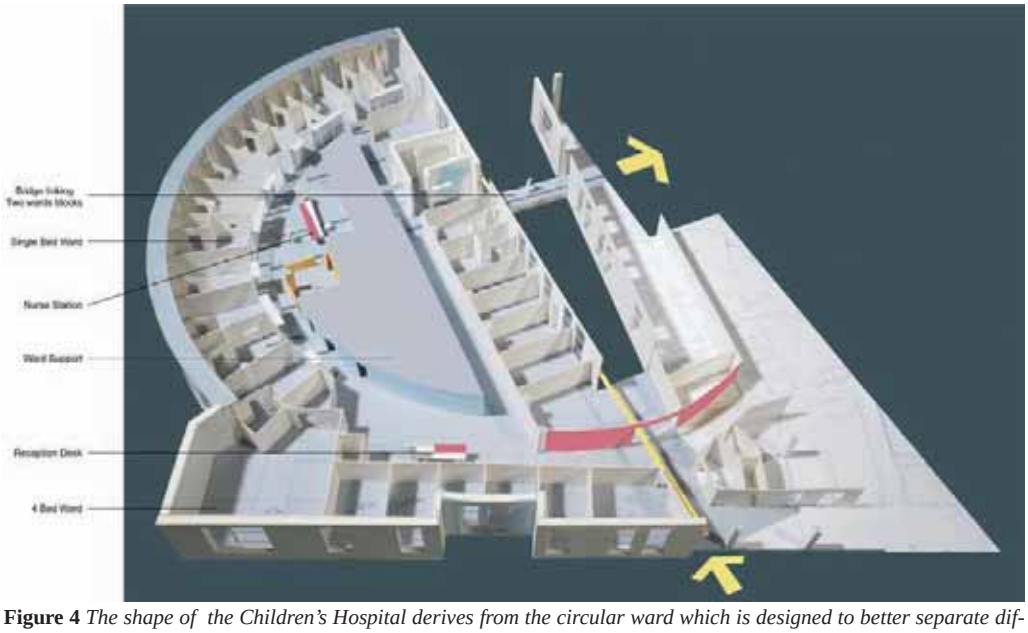


**Figure 4** *The shape of the Children's Hospital derives from the circular ward which is designed to better separate differing patient groups and impart informality.*

Not long ago, in a speech marking the start of construction, the Chairman of the hospital Trust, Sir Miles Irving, predicted that "although this facility is being built for treating patients, it will have a much wider impact - that is its contribution to the regeneration of the northeast of England". This statement goes far to emphasise the signal importance that this and other major hospital projects have for their communities – socially, economically, in terms of civic pride and quality of healthcare. It also emphasises the importance of integrating the hospital with its community, operationally and physically.

## Planning a Lively, Coherent Campus
## Manchester Joint Hospitals Project

Over time, healthcare campuses often lose their original coherence, as new buildings are added or old ones modified without an overall plan guiding development. Gradually it becomes harder for visitors to find their way. Open space gets filled in. Fewer and fewer landmarks provide guidance. Posting maps and directional signs can only do so much when the physical layout has become too complex. Most importantly, clinical effectiveness is diminished.

An example of this is the major healthcare campus in the university district of Manchester, less than a mile from the city's downtown. Built over a century ago, the campus includes the Manchester Royal Infirmary and four specialist hospitals. A variety of factors have conspired to blur the original plan over the years and make navigation through the site difficult: infill development to replace buildings destroyed by bombing during World War II, additions and alterations to meet changing clinical requirements, and piece-

**Figure 5** *MRI Campus, 2003*

meal redevelopment. The spaces between the patient ward blocks have been filled in. It is no longer possible to walk across the campus except through a maze of corridors, with little exterior space to provide a sense of orientation. The campus needs other upgrades as well. Few of the facilities are configured and equipped for modern healthcare delivery. And because each of the hospitals had originally been established separately and operated independently, there is much duplication of spaces and services. The recent consolidation of all these hospitals under the administration of one hospital Trust, enables the rebuilding of the campus for improved clinical functionality, and in the process, to take advantage of the economies of sharing specialist services and to improve the quality of the campus environment.

The Manchester Joint Hospitals Project creates a unified campus. The key was to insert a major green space and landscaped boulevard, creating a new centre for the campus. The second largest open public space in Manchester, this green space not only provides respite, it also serves as an orienting device for navigation through the complex. Vehicles have a clear path through the campus, with car parks at either end.

The boulevard serves as the nexus for pedestrian paths and provides access to public transportation. The 150,000m2 of phased development includes new facilities for six distinct hospitals. Four of these—Manchester Royal Infirmary, Royal Eye Hospital, St. Mary's Women's Hospital, and Manchester Children's Hospitals (relocated here from outlying sites) - are placed


**Figure 6** *The new boulevard and complex of six hospitals, four of witch are under one roof, Children's Hospital to the right.*

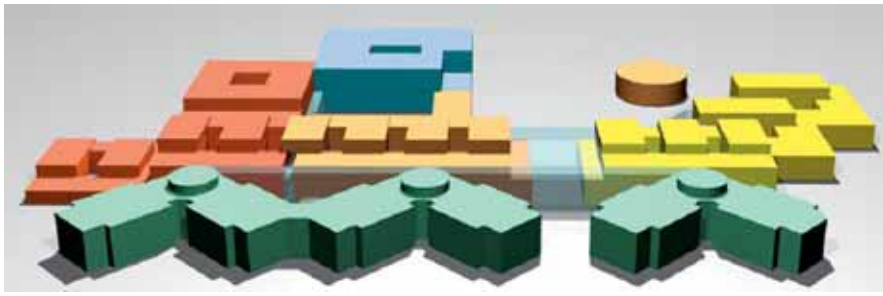

**Figure 7** *Generic model of principal building blocks of hospital: wards, diagnostic and treatement, outpatient/office, specialist intitute (blue).*

under a single unifying roof. To allow each hospital its identity, each has its own individual entrance, skylit reception hall, outpatient, and ward facilities.

**Figure 8** *From the terrace of the new cafe on the boulevard; the creche, education centre and staff residences in restored historic buildings beyond.*

However, they are connected to a shared diagnostic and treatment block with imaging rooms, surgical theatres, and key diagnostic and treatment services. The Children's Hospital located on the corner of the facility, features a playful curving façade random-height windows and roof top play area to give it a child-friendly identity. The other two hospitals on campus, the Rehabilitation and Mental Health Hospitals, are located in new freestanding buildings.

The campus retains a number of historic buildings, restoring the best of the Edwardian Baroque structures along one side of the new boulevard to create a nucleus of nonclinical support facilities, including administrative offices, staff residences, education centre, library, café, and crèche. Historic buildings along the traditional front of the hospital, Oxford Road, have been preserved, while new infill buildings such as the crèche and part of the graduate education centre afford this complex new relevance and vitality. There are also plans to develop some of the older buildings into residential flats, which will further enhance the liveliness of this part of the campus.

## Optimizing Buildings, Adjacencies, and Flows: Norfolk & Norwich University Hospital

The massive flow of design work that has resulted from PFI programme in Great Britain has provided a unique opportunity for the study of hospitals as a building type. This is particularly true of hospitals in the 50,000m2 - 100,000(+) m2 range, of low to medium height, as these constitute the majority of major new hospitals being developed.

From Anshen Dyer's studies a generic model has emerged that derives from the key functional elements of the hospital:- inpatient wards, heavily-serviced diagnostic and treatment areas and outpatient/administrative areas. Each of these has unique characteristics that are best satisfied in a bespoke facility of optimum configuration, structural spacing, balance of natural and

assisted light and ventilation, etc - all of which can contribute to maximising functionality and sustainability and minimising costs.

The generic model enables the practical use of such building blocks by joining them for clinical effectiveness. Related clinical services extend seamlessly between them. For instance a cardiology service may occupy space in the wards block, which is located adjacent to the cath labs in the diagnostic and treatment block which, in turn, is adjacent to cardiac outpatient clinics in its bespoke block. This "matrix" pattern of organisation achieves what might be considered to be the best of both worlds - the benefits of functionality-driven, efficient bespoke building blocks, together with integrated clinical departments that cross seamlessly between them.
The new Norfolk and Norwich University Hospital offers an example of the application of the matrix approach. This 950-bed facility is one of the largest hospitals completed under PFI. The plan reflects trends toward greater reliance on ambulatory care and multidisciplinary working, as well as the need for greater efficiencies and flexibility for future changes.

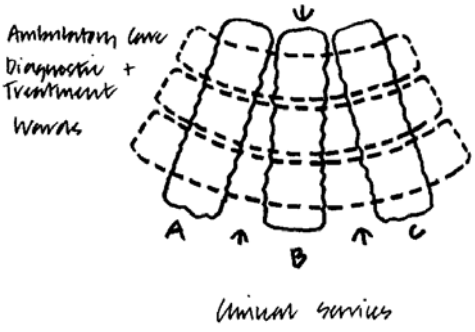


**Figure 9** *Application of matrix pattern of organisation for Norfolk and Norwich Hospital.*

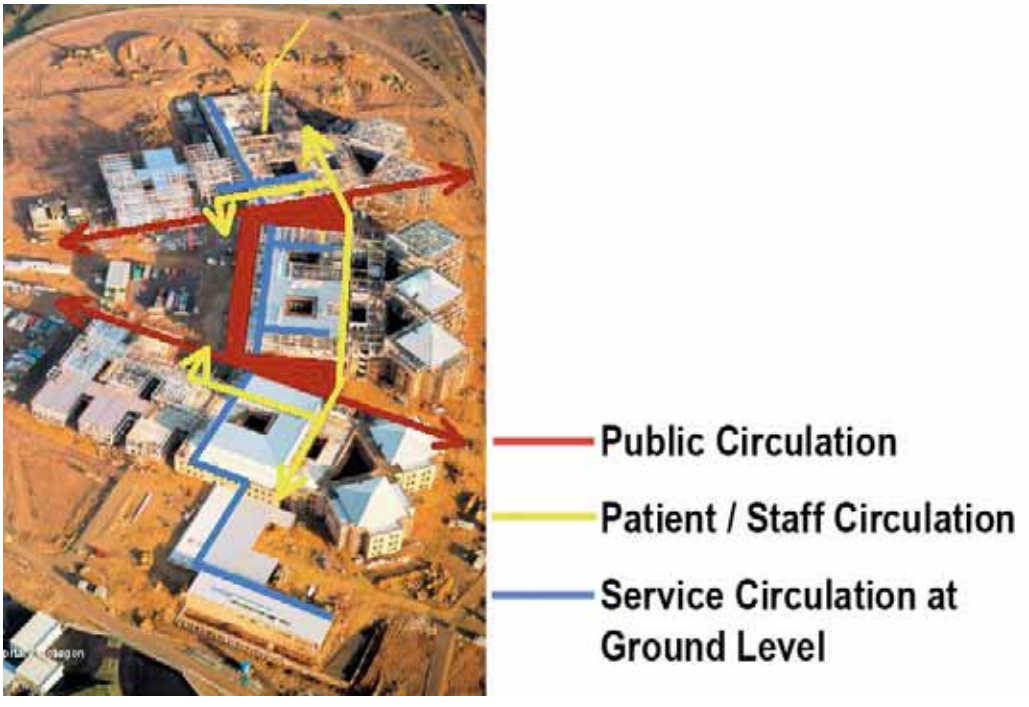


**Figure 10** *Composite diagram of circulation routes shows separate flows for public, patients and staff, and service traffic.*

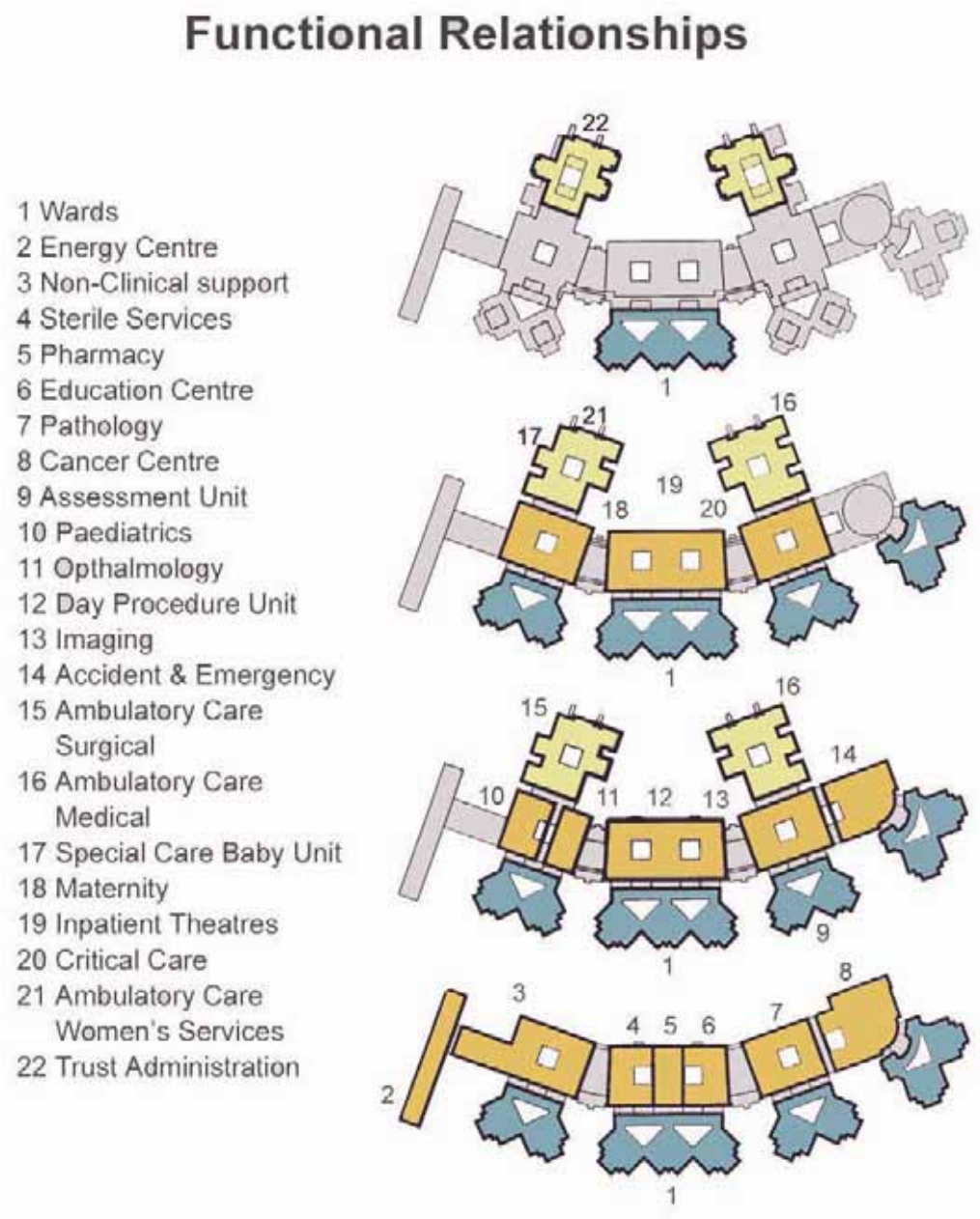


**Figure 11** *Functional relationships based on matrix pattern for Norfolk and Norwich.*

**Figure 12** *The finger plan surrounding landscaped courtyards enables good light and views to all patient areas.*

Services are arranged in the above described, three zones. The highly serviced clinical diagnostic and treatment zone, configured as adaptable loft-space, was constructed of concrete to enhance vibration and acoustic performance and to improve the flexibility of mounting heavy equipment in theatre and radiology departments. Diamond-shaped ward blocks, that maximise perimeter and ensure efficient staff movements are located immediately adjacent to one side of the central block; modular outpatient clinic buildings are located on the other side. Both are of steel frame construction which delivers the required performance most economically. As described above, clinical specialities cross all three zones.

This pattern can only work effectively when combined with a network of circulation that provides discrete paths for the movement of public, clinical and service traffic. At Norfolk and Norwich the public can enter from either of the long sides of the building and pass through the hospital via atrium lobby spaces, which serve as reception points. Hospital streets for patients and staff join all clinical areas. As these streets cross the public space they do so on bridges that protect patient privacy. At the lowest level a dedicated service consider system joins the materials management centre to dedicated service lifts that bring goods close to their point of use on all floors. Each of these flows is kept separate from the others. Although the concept for the hospital is very disciplined, the resulting building has a less rigid, softer, more user-friendly appearance.

Natural light and landscaping are necessary for patient areas anywhere in a hospital, but perhaps no more so than in radiation therapy areas, where bunkers, placed within the building's podium, can create an oppressive feeling – in this case mitigated by south-facing courtyards cut into the podium base. Above the podium, wards are arranged around these south-facing courtyards. The hospital is conducting special fundraising to assure that these courtyards are generously landscaped.

In buildings taller than three stories, enclosed courtyards may bring in daylight, but they tend to resemble light wells, too narrow to alleviate a sense of enclosure. The open-ended south facing finger plan of the wards at St. James's ensure that all patients have not only access to natural light, but also long views beyond the hospital's boundaries.

Outpatient services on the ground and first levels also benefit from these courtyards which enable views, framed by windows to the outside as well as to the gallery and café inside.

A glazed gallery runs the full length of the building. Serving as an internal public street, this gallery provides a generous daylit passage that gives access to all clinical areas and contains cafés and retail space for patients and staff.

**Figure 13** *The New Oncology Wing is zoned vertically, with ward and outpatient areas over a podium housing radiation therapy chambers.*

## Creating Healing Environments St James's University Hospital, Leeds

The term 'healing environment' has come to mean all aspects of hospital design that directly contribute to patient comfort, wellbeing, and safety. Natural light, views, landscaping, colour, artwork, and well-designed patient rooms all play a role.

The New Oncology Wing at St. James's University Hospital in Leeds offers a catalogue of examples of these devices. It will be the largest cancer research hospital in Europe, with 66,500m2 of research, teaching, and patient facilities. The facility features 12 Linac chambers, large outpatient and daycare suites, a significant imaging department, theatres, critical care, 300 patient beds, laboratories and support spaces.

Research demonstrates that providing patients with single-occupancy rooms produces several benefits:- it minimises patient transfers, which lowers the possibility of medical errors and patient falls; it diminishes stress and noise for the occupant, which can result in shorter patient stays; and it decreases the rate of hospital-based infection transmission. The National Health Service is interested in increasing the proportion of single rooms for upcoming projects to at least 50 percent and beyond. However, interest in increasing the percentage of single rooms has not yet been matched by increases in funding for them. As a result, much study has been oriented toward achieving more single-occupancy rooms at little or no extra cost. Some studies suggest that the efficiencies gained by all-single ward units can justify reductions in numbers of patient rooms and support areas to offset the inherently higher cost of single rooms. It seems inevitable that hospitals in Great Britain will eventually match the high proportion of single rooms found in French and American hospitals. St. James' represents the high end of what is typical for new NHS hospitals, with about half of all beds located in single-occupancy rooms; the other half are in four-person rooms.

**Figure 14** *Thoughtful detailing and use of colour enhances patient bedroom.*

Other ways to enrich patient environments can be less expensive. Thoughtful use of finishes, lighting, colour, themes, signage, and art can all make the environment more pleasant while adding little or no extra cost. Repetitive design elements contribute to an institutional feel; introducing variety tends to make patients and visitors alike feel more comfortable. St. James' features four colour schemes, each with complementary sub-colours groupings, arranged so that they all work well together. The colours also relate to the themes, directional signs, and art for each zone, economically unifying the environment whilst giving the building texture and a sense of variety.

## Conclusion

This paper indicates how issues that affect the creation of healthy environments were addressed in several recent hospital projects. We believe that these examples indicate that the PFI development regime did not diminish their ability to address the above issues. Rather the success and weaknesses of these projects were determined by those factors that affect any project: the adequacy of budget and brief, and the aspirations and technical competence of those who participate in both public and private sectors.

**Figure 15** *Thoughtful interior design mitigates claustrophobic nature of radiation therapy chambers.*