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# Post-Occupation Evaluation Study Report

Project: George Green Library, University Park

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Date: April 2018



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# INTRODUCTION

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In January 2017, Building Understanding submitted a proposal, to the University of Nottingham Estates Department, to conduct post-occupation evaluations. The proposal was accepted. The George Green Library is the fifth project to be evaluated by Building Understanding.

This report aims to detail the strengths and the weaknesses of The George Green Library project, put forward recommendations and highlight best practise and excellence that can be applied to future projects at the University of Nottingham.



# OBJECTIVES AND METHODOLOGY

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## OBJECTIVES OF THIS POST-OCCUPATION EVALUATION

- To bring to light any key issues associated with the building procurement process and management of the project
- To draw out stakeholder feedback concerning the design of the building and the experience of its end users
- To facilitate a half-day workshop, to discuss and debate the key issues revealed through the primary research
- To analyse all output from the face-to-face depth interviews, telephone interviews and the workshop to provide a summary report with recommendations

## SCOPE OF THE STUDY

Building Understanding sought feedback on the following aspects of the George Green Library project:

- Overall user satisfaction
- Design issues
- Satisfaction with the space and specific room types
- Construction issues
- Security
- Accessibility
- Air quality
- Cleanliness
- Internal room temperature
- Distraction from noise
- Lighting conditions: natural and artificial
- Operational technology: IT, data connectivity, AV equipment
- Sustainability
- Operations and facilities issues

## STUDY PARTICIPANTS AND METHODOLOGIES

Building Understanding conducted face-to-face interviews and telephone interviews. Five different questionnaires were prepared in order to canvas feedback from respondents drawn from the following categories:

- Consultant team
- Contractors and suppliers
- End-users of the facility
- Estates office staff
- Internal client

### **Face-to-face depth interviews**

The study participants included depth face-to-face interviews of approximately one hour's duration with the following stakeholder organisations:

- The University's Estates Department
- The architect
- Contractor
- End users of the facility

### **Telephone interviews**

In addition, telephone interviews were conducted with respondents in the following roles:

#### **End users and key stakeholders:**

- An engineering student
- Director of Catering

#### **Estates Office staff**

- Senior Engineer
- Building Surveyor
- IT manager
- Environment manager
- Domestic Services manager

#### **Consultant team**

- Consultant Structural Engineer
- Consultant Project manager

### **The workshop**

On Tuesday 17<sup>th</sup> April, a workshop took place involving 11 attendees from the various stakeholder organisations. The workshop objectives were to:

- Discuss and debate the findings of the primary research
- Generate recommendations to be applied to future projects commissioned by the University of Nottingham
- Highlight nuggets of best practise and excellence revealed in the project that can be adopted and applied elsewhere

The workshop commenced with a presentation, by Building Understanding, of the findings of the primary research. Attendees were divided into breakout groups, with each group charged with assigning recommendations to specific points of feedback.

## **SAMPLE SIZES**

It is important to emphasise that the quantitative statistics in this report are based on very small samples. A total of 15 respondents were approached and feedback was received from 14.

# PROJECT DATA

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<b>Name of facility:</b>	<b>George Green Library</b>
<b>Location:</b>	University Park Campus
<b>Gross area:</b>	7,955m <sup>2</sup>
<b>Number of storeys:</b>	Five
<b>Users of the facility:</b>	University of Nottingham Libraries
<b>Room types:</b>	Library, study rooms, teaching rooms, offices, cafe
<b>Start on site:</b>	July 2013
<b>Date completed:</b>	October 2016
<b>Period on site:</b>	170 weeks
<b>Net project cost:</b>	£16.5 million excluding VAT
<b>Funding:</b>	University of Nottingham
<b>Contract type:</b>	Joint Contracts Tribunal (with contractor's design) 2011

# PROJECT BACKGROUND

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## THE NATURE AND FUNCTION OF THE GEORGE GREEN LIBRARY

The new George Green Library is the latest landmark development for the University of Nottingham on the University Park campus. The development was undertaken to enhance the University's acknowledged position in the leading group of universities and to improve library and study facilities on University Park.

The scheme presented a significant opportunity to enhance the student experience and respond to the current high demand for student study space. The finished building provides double the number of reader spaces offered by the old facility.

The redevelopment involved the complete refurbishment and overhaul of the existing library, including a new facade. This cladding is continuous around both the new and refurbished elements to unite them as one building.

The two main entrances lead into a large, bright double storey atrium space with service points for queries and questions.

The finished building also provides a mix of quiet and silent reader study spaces, individual study desks, group study areas, bookable individual and group study rooms, a very popular café, fixed and moveable book stacks, four language laboratories, a post-graduate study space, offices and a computer room. It has created a 'third space' for students, a link between the formal areas of the university and the relaxed environment of home.

The new library has achieved BREEAM Excellent status

Work began on site in July 2013 and completed in October 2016.



# THE BIG PICTURE

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**“We didn’t knock the building down, but the spaces have been transformed significantly. It’s now always busy, even outside of term time. Students want to go to those spaces and use them. A lot of students from other faculties are using the library too. It’s such a success story that we’ve rehabilitated an existing building and transformed it.”**

Across all the respondents, there is a high level of satisfaction with the new George Green Library. The library represents a huge improvement on the previous facility for the Science and Engineering faculty and also impacts positively on the image of the University. It is such an improvement that it has, in a way, become a victim of its own success. Reportedly, students from other faculties use it to the extent that the facilities are already at full capacity.

Throughout this post-occupation evaluation, respondents raised a number of key successes, challenges and learnings. It was also clear that all respondents feel this building to be innovative in a number of ways. These points are outlined here to provide an overview of the evaluation’s outcomes before issues are covered in more detail.

## INNOVATIONS

**“This has been more innovative than anything else I’ve worked on because the challenges faced were highly complex. It required a lot of specialists to resolve the issues.”**

### Engineering

- The project injected a new lease of life into the old, 1960s building. This created enormous challenges but also opportunities to innovate. It was acknowledged by respondents to be a real feat of engineering
- Re-imagining the basement in the original building by removing columns and lowering the floor. This created engineering challenges as the library was still operational, albeit in the new premises
- A type of explosion called ‘cardox-blasting’ was used to break up the foundations in the old building to create the basement
- Creation of the atrium space by opening up concrete fins that were structural columns

### Design

- Cladding the existing building in order to meet the functional requirements and create a unified exterior to both buildings was innovative
- One end-user feels that students particularly value the continuous desk space along the ‘petal’ walls and can choose to ‘follow the sun’ during the day. It is a very efficient way of including many study spaces in a relatively small area without them feeling crowded

- The design made a feature internally of the bespoke 'petals' areas by making structural features visible, such as the curved beams and timber panelling. This involved complex engineering works
- The original concept design was highly innovative in the way it looked to incorporate the existing library
- All floors were created as double-storey by staggering the floor levels. This enabled higher ceilings and more free-flowing space. By being clever with floor plates there is an additional floor in the new building. For some people, however, the staggered floors have created orientation challenges
- The five-storey atrium, straddling old and new, is particularly innovative
- There are only 10-15 metres of corridors in the whole building. This is new for the University and creates a more open space.

### Operational

- The 'third space' that students asked for has been achieved. The number of books has remained the same, but the number of seats has doubled
- Decanting the whole library into the new-build section while work continued on the original building and keeping it operational throughout the three-year build was innovative for a library. Respondents cannot think of another organisation that has done this for so long. The experience was not easy for those working in the library, but it worked.

## THE SUCCESSES

The original library was dark, cramped and unpopular with students. A respondent reported that students used it simply because they had nowhere else to go. The University's vision was to create different spaces for students and access to the different resources they need to study that are flexible enough to cater for varying needs throughout the academic year, including a very popular café. The new library has met this vision. Many students spend long periods in the library and so need facilities to take a break and socialise, as well as study. By getting these things right, usage is a lot higher than anticipated and these learnings are being taken forward to other projects.

**“What makes it nice is the updated architecture and furnishings. There are a variety of work environments you can go to; quiet, group and meeting rooms. It's what you want to see in a modern library.”**

The original design was not compromised through financial constraints and key features remained. Delivering these key features while the library remained operational involved some engineering feats of which many team members are proud. Whilst relationships became difficult at various points during this innovative project, they remained intact at the end.

**“The project has managed to turn the desperate interior of the old George Green Library into a modern and attractive series of spaces.”**

## THE CHALLENGES AND LESSONS LEARNED

The University could have carried out a more comprehensive survey of the old building (pictured below) at the beginning of the project, which might have provided a more accurate

reflection of the costs involved in the programme. The University was keen to retain the existing building, rather than to demolish, for environmental as well as cost reasons.



The University could have chosen to omit the complete refurbishment of the basement area. This took three years to achieve but the decision was made to continue because of the high cost of changing the design and further delays that may have occurred.

**“Phase two was a series of natural disasters.”**

The biggest challenge, when work started on the original library building, was the extremely poor state of the structure, which required the concrete frame to be reinforced and all the window furniture to be replaced. Other challenges raised by respondents were the basement refurbishment, underground services not being ‘as drawn’ and the structural support beams around the lift area which had been compromised some five years previously.

There were other, unforeseen, problems that also delayed the project, such as a flash flood, two weeks before final handover that ruined the atrium furnishings, resulting in a delay of some months.

A key challenge raised by the project team was working with the main contractor on the first phase. All recognised that such a complex project would present relationship challenges at times but were surprised at the level of challenge on this phase. Phase one was late to complete creating implications for many stakeholders such as the library staff who were not sure which term, or at what point during a term, they could plan to move. This caused friction.

Throughout the project, there were complexities that had to be worked through. Everyone had to find ways to get around these and learn from the experiences. There were limited systems of documenting and recording views and decisions of the project. This was missed particularly during times of complexity and disagreements.

It was very difficult for library staff to work continuously in close proximity to a building site for so long, particularly when there was drilling and other loud noise.

# QUANTITATIVE FEEDBACK

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Quantitative satisfaction ratings were collected during the face-to-face and telephone interviews. Respondents were asked to rate their satisfaction with various aspects of the project on a scale of 'zero' to 'ten', where 'one' is very poor and 'ten' represents excellent.

Bar charts displaying the percentage split by rating, are shown in Appendix I. It is very important to emphasise that these quantitative results are drawn from very small samples and are therefore not statistically significant. Some respondents were only involved with specific aspects of the work and so their responses are limited to only that area. However, these results show, at a glance, the range of levels of satisfaction with the George Green Library project itself and the construction process with scores ranging from three to nine.

The areas showing the highest levels of satisfaction are interpretation of the vision, satisfaction with the different room types, air quality and the relationships with the University and the extended team.

Lower levels of satisfaction were reported for noise levels and satisfaction with the contractors and suppliers.

Here is some commentary to the charts:

## **Overall satisfaction with the George Green Library**

All 14 interviewees responded to this question and a high level of satisfaction with the George Green Library was recorded, with most respondents either mostly or totally satisfied. Nine people rated the building either an 'eight' and 'nine'; mostly satisfied, and one rated it 'ten', totally satisfied. Four people were 'just satisfied', rating it a 'seven'.

## **Provision for disabled users**

While only two respondents were in a position to provide a rating for the provision for disabled users, both rated this area 'eight'; mostly satisfied.

## **Security**

Only one interviewee provided a rating for this question and awarded an 'eight'; mostly satisfied.

## **The finished quality of the facility**

There was a largely positive response from respondents relating to the overall quality of the facility. Nine of the respondents were 'mostly satisfied', providing ratings of 'eight' or 'nine', and four rated their satisfaction as 'just satisfied' with one rating of 'six' and three of 'seven'.

## **Quality of the features and equipment**

Of the eight respondents who provided a rating for this question, most were 'mostly satisfied', with three rating their satisfaction as an 'eight' and two a 'nine'. Two said they were 'just satisfied' with ratings of 'seven'. There was one notable exception here, with a rating of 'five' which reflected the respondent's concern that there could have been more

attention to detail with some of the finishing. The AV equipment was rated separately by two respondents, who gave ratings of 'seven' and 'eight'.

### **Handover**

There was a mixed response from the six interviewees who responded to this question. Most respondents were 'mostly satisfied' with the handover, with two rating this 'eight' and the remaining two as 'nine'. However, one respondent gave a rating of 'five' and another rated 'six', this reflected some dissatisfaction with the lack of O&M manuals at handover.

### **The extended team**

Three questions were addressed to twelve respondents about the extended team. Respondents were 'mostly satisfied' in relation to the relationships with the University and the extended team, with eleven respondents rating this an 'eight' or a 'nine'. Only one respondent was less satisfied, rating a 'six', reflecting some dissatisfaction with the level of involvement site maintenance teams in the development of projects.

In relation to collaboration between extended team members, there was slightly lower satisfaction overall. One respondent rated collaboration as 'six' and six rated it as 'seven', most respondents were therefore, 'just satisfied'. However, four rated communication as 'eight' and one as 'nine'. There was, unsurprisingly a similar picture with regards to communication among the extended team with one 'six', six 'sevens', four 'eights' and one 'nine', showing that again, most respondents were 'just satisfied' with communication.

### **Main contractor, sub-contractors and suppliers**

Of the seven respondents asked to rate their satisfaction with the work of the main contractor, four were 'just satisfied' with two ratings each of 'six' or 'seven', and two were 'mostly satisfied' with one rating each of 'eight' and 'nine'. However, one respondent was 'completely dissatisfied' and rated the main contractor as a 'one', this related to their dissatisfaction with the quality of the finishes and the delay of the programme timetable.

There was a very mixed picture from respondents in relation to their satisfaction with the work of subcontractors, with ratings ranging from 'three' 'mostly dissatisfied' through to 'nine', 'mostly satisfied'. Understandably, ratings given by respondents related to their areas of specialism so, for example, the kitchen subcontractor was rated poorly, however, the cabling subcontractor was rated highly. Respondents who were able to provide a more overarching view of the performance of subcontractors, as a whole, rated positively with two 'eights'.

### **Satisfaction with how defects were handled**

Satisfaction ratings for defect resolution were mixed, ranging from 'four' to 'eight', however three of the six respondents rated defects resolution as 'just satisfied' with two ratings of 'seven' and one of 'six'. Unsurprisingly, again the lowest rating was awarded because of a specific sub-contractor.

### **Satisfaction with room types, their space and design**

Satisfaction with room types among end users of the George Green Library is high with the three interviewees who responded to this question all rating their level of satisfaction as 'nine'.

### **Satisfaction with the functionality and flexibility of the space**

Thirteen people responded to questions relating to the functionality and flexibility of the space. With regard to functionality, there was no dissatisfaction reported with all respondents rating their level of satisfaction as either 'just satisfied' or 'mostly satisfied'. Five respondents rated functionality of the space as 'nine', four rated it 'eight' and a further four rated it 'seven'.

There was a slightly more mixed picture when it came to flexibility. While eleven of the thirteen respondents to this question rated their satisfaction with flexibility as 'seven' (two), 'eight' (six) or 'nine' (three) two respondents provided lower ratings of one 'five' and one 'six'. One low rating related to the difficulties associated with storage of furniture during events like exhibitions, and another wasn't a particularly negative comment, it was simply their view that the space was well defined and therefore was not designed to be particularly flexible.

### **Operation and management of the building**

All respondents who provided a rating to this question rated the operation and management of the building highly. All respondents were 'mostly satisfied' with three interviewees rating this 'eight', and one respondent rating it as 'nine'.

### **Air quality**

Satisfaction with air quality is high for the two respondents answering this question, with one rating of 'eight' and the other, 'nine'.

### **Temperature**

Again, two interviewees responded. One was 'just satisfied', rating room temperature as 'seven' citing that on occasions the building felt cold. The other respondent was mostly satisfied, rating it 'nine'.

### **Lighting**

Both natural and artificial lighting was rated by the two interviewees who responded to this question. One rated this as 'six', the other person was more satisfied rating this 'eight'. The lower rating related to students experiencing glare on computer screens during certain times of the day.

### **Noise levels**

Only one rating was provided for noise levels and that was 'six'. Other feedback was received about noise, with the main culprit that affected satisfaction being noise from the café travelling up the atrium on the 'petal' side of the building.

### **Data connectivity**

Data connectivity was consistently rated as 'eight' by the two end users providing feedback.

**Cleanliness**

Four respondents rated the cleanliness of the George Green Library and the ability to keep it clean. All were satisfied, rating it 'six' (one respondent), 'seven' (one respondent) and 'eight' (two respondents).

**Toilet facilities**

Respondents were 'just satisfied' with the toilet facilities, both respondents rating them as 'seven'.

# QUALITATIVE FEEDBACK - THE DESIGN AND THE CONSTRUCTION PHASE

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**“It was a not an easy journey.”**

The construction phase of this project was very much a ‘journey of two halves’. During phase one, the new building was constructed then during phase two, the old building was refurbished and incorporated with the new build. The main contractor changed their project management team for phase two.

## FEEDBACK RELATED TO THE DESIGN AND LAYOUT

### Functionality and flexibility

Interviewees feel both functionality and flexibility are good:

**“The space is as flexible as a library can be.”**

Respondents generally believe that because so many students are using the building, functionality must be good. The Library has been set up for full functionality 24-hours a day during exam periods.

There is a good choice of different types of spaces within the Library. The old building has constrained flexibility as it has been more difficult to add services. In the new building it has been easier to consider future-proofing in areas such as electrical service distribution. However, even in this area of the development there are limitations in that access to certain areas of the building is challenging, for example in the wooden ceilings of the ‘Petals’.

Two main issues were raised. Adequate access to computers for the intended customers, science and engineering students, and the use of the atrium as a thoroughfare. Computer rooms can be booked out resulting in less access for engineering students who can require the same computer for some hours to run complex models.

While everyone likes the building, one respondent representing end-users commented that the atrium can be noisy and somewhat draughty and can feel “more like a train station”.

Some other functionality and flexibility issues were raised:

- Room booking is not available for the group rooms which means students cannot arrange to meet in a specific place. There are plans to introduce this as the University has been able to obtain an appropriate software system
- The main staircases are considered to be too narrow but do meet all necessary requirements
- The maintenance requirements are the most challenging thing about the functionality of the building, especially accessing the high-level lights
- The wood panelling in the ceilings of the ‘Petals’ presents a challenge. Should additional wireless points be needed, it is possible that the ceilings will have to be dismantled
- When spaces are moved around for things like exhibitions there is nowhere to store furniture, so staff have to dismantle it.



## Room types

Some respondents commented that rather than libraries being quiet spaces, today students learn and study differently. They want airy and inviting double-height spaces with lots of natural light, as well as books.

According to feedback from the student interviewed as part of this process, user needs are met in terms of study spaces available in the George Green Library. The different room types enable students to work alone or in groups, using their own laptops or computer terminals on A Floor. The new design studio spaces are particularly appreciated. However, feedback has also been received that students would like additional workspace in open spaces and additional group rooms.

According to respondents closest to the library, two room types that did not appear to work as well are the originally glass-fronted Assistive Technology Room, which was on C Floor and the language labs.

The usage level of the language labs was questioned during the workshop. These areas are quite cold and so, apparently, the lecturers don't like to use them. A check of the booking system revealed that the labs are seeing about 80% usage, so it may be possible to change one of the labs into an additional quiet study area.

The Assistive Technology Room has been moved to B Floor. Students with mental health issues did not like the 'goldfish bowl' effect of the glazed room and did not like to be seen entering and leaving the room.

Contrary to the feedback from the respondent representing students, attendees at the workshop said that the individual study rooms are popular and well-used.

Most of the rooms in the library are used as intended, except for the reception area near the entrance gates, which is not being used. This could become a useful area for students with anxiety, to enable them to adjust to the building.

High usage of the library means that the demand for quiet space can outstrip supply, especially at exam time.

## Recommendation

- Look at the possibility of converting one of the language laboratories into an additional quiet study area

## FEEDBACK RELATING TO RELATIONSHIPS, COMMUNICATION AND COLLABORATION

Overall, respondents were satisfied with the levels of collaboration. However, there were examples where working together was problematic for some parties. Responses contained comments such as:

**“We had a close-knit team from the outset. We knew where we were going and were able to build on the relationships that we had. There were difficulties along the way, but ultimately the team did work pretty well and successfully together.”**

## **Achievement of the Vision**

Relationships between different parties were strained at times owing to the complexity of the project and perhaps internal pressures from individual organisations. This caused delay on resolution of issues throughout the project. However, the University and the architects in particular drew praise from respondents in the way they related to the wider team. Relationships with the contractor and some sub-contractors received criticism.

**“Unfortunately, I was in the position of where relationships went beyond just the project manager. When that happens, it is because the scheme isn’t going too well. Relationships were preserved with all parties. I certainly think that’s one of the positives that came out of it.”**

This close team was disrupted, especially during the first phase, as not all team members ‘pulled in the same direction’, which particularly impacted levels of trust and the timeliness of completion of phase one. The team stabilised during phase two, the refurbishment of the original library, and this was reflected in interviewee comments:

**“Once the new contractor-director on the project was brought in, things improved significantly.”**

**“In the first phase it was pretty bad [with the main contractor], lots of arguments and not working cooperatively. In the later phase it was more successful.”**

Unforeseen problems, like the flood two weeks before handover, brought team members together to resolve the situation rapidly.

## **Collaboration within the wider team**

For the respondents, collaboration not only meant how people worked together each day to progress the project and to resolve problems, it also meant organisations delivering what they had agreed to deliver.

One respondent feels that some individuals working on the project were delayed in being able to respond to queries by internal procedures within their own organisations. This impacted the timeliness of delivery and ability to overcome issues.

Most respondents felt listened to, provided they had opportunity to sit round a table and discuss requirements. Some groups, for example the University’s engineering team, felt collaboration was inadequate as the building developed. The University’s engineering team felt there is room for improvement within the University to involve contributing parties earlier. Conversely, some sub-contractors were able to circumnavigate internal and project processes to keep their work on track. This was appreciated by the University.

It was recognised by all respondents that collaboration was tested at times. When complicated scenarios arise that mean organisations have to look after their own interests first, this can result in more closed communication. This was apparent at various times throughout the project, when collaboration felt fragmented.

## Communication between the extended team members

**“In the initial design phase when relationships were strong, it was a very collaborative team. As personnel changed throughout the team the communication ebbed and flowed as those different relationships were built.”**

The workshop participants reported that communication on the two phases of the project represented two entirely different experiences. While phase one started well, once problems arose, issues developed in the clarity and accuracy of timelines. In the second phase it was noted that there was no ‘blame game’, issues were tabled, understood and a solution was devised together. The project management team remained open, with regular dialogue which aided this issue resolution. Some respondents felt this had been missing in earlier stages as people were so wrapped up in the detail. A particular example of this close working together was with the resolution of the issues discovered around the concrete frame.

One of the consultants interviewed commented that the University’s project manager was instrumental in bringing communication together on the project.

Some stakeholders, such as the catering team, felt well consulted and informed. For the data cabling team however, there was a long period with no contact that added to a feeling of uncertainty about the delays they knew were happening.

It was felt by some respondents that there was not much happening between team members outside of progress meetings. Plus, it was mentioned that design meetings ceased after phase one even though they could have been helpful. Systematic documentation was not apparent, emails were used to communicate but there were no regular meeting minutes which would have helped decision making.

In the workshop discussion group, it was suggested that there should be quarterly principles meetings between the contractor and the University’s capital projects manager. This may be a valuable addition in future projects to allow issues concerning changes in personnel and programme management to be discussed frankly at times when relationships are challenged.

During the transitions between personnel within the main contractor and other parties, some information and knowledge was lost. There was a discussion at the workshop around how projects are handed over from old to new members of the team to ensure that data is retained. No conclusion was reached.

During the George Green Library project, the architect made the effort to come up from London to meet with the main contractor every four or five weeks, this was highly valued.

The main contractor took care that the University had a good range of material samples to choose from, going as far as to provide full-scale mock-ups of the curtain walling. The University found these to be very helpful.

## Recommendations

- Consider implementing quarterly ‘principles meetings’ between the main contractor and the University’s capital projects manager
- Arrange monthly site meetings including the appropriate people
- Consider methods to retain knowledge when personnel change during a project

- Ensure the main contractor provides a proper array of samples so that the University has sufficient choice
- Provide full-scale mock-ups of items, such as curtain walling, so that the University can clearly see what the finished product will look like

### **Communication with library staff and end users**

Library staff found it hard to work so close to a building site for such a long period of time. Despite best efforts by the contractor, noise, dust and fumes were endured each day. Staff were moved further away from the active areas when possible. Respondents felt the contractor was adequately responsive in this regard. Both the University and contractor sought to reassure and demonstrate that health and safety requirements were covered. The contractor worked at quiet times where possible. However, these efforts did not prevent some staff feeling that their needs were not taken seriously.

The quality of communication with staff ebbed and flowed. Throughout the project, staff continued to provide a service to students, which was hard as their working conditions were changing every day. It was important that staff were notified when drilling, or explosions, were going to happen and when they could expect quiet periods. At times it felt that they had to 'chase' to find these things out.

It was acknowledged in the workshop that the main contractor made efforts to communicate closely with staff during the protracted period of the library construction works. However, the main contractor admitted that sometimes, in an effort to get things done, communication with users did slip. The library representative highlighted just how important this clear and frequent communication was. Potential methods of suitable communication were discussed.

### **Recommendations**

- Consider using a big screen in the entrance area of any live building where works are taking place. This would be an eye-catching and easy way of keeping users well informed of planned works and noisy periods. Think about using moving images to catch the attention of users
- Arrange weekly meetings between the main contractor and library management to ensure that they are well informed about what will be happening in the coming week
- Use white boards, with colour coded warnings of expected noise levels, as a cost effective and flexible way of communicating with users
- Consider the use of the mynottingham app to communicate and update

### **FEEDBACK RELATING TO MAIN CONTRACTOR AND SUPPLY CHAIN**

Workshop participants discussed that, from the perspective of the extended team, the project journey through phases one and two "was like two different jobs".

Phase one was a much more difficult experience than phase two in respect of working together and had a 'harder landing' than it should have had. These difficulties were caused largely by key players' different approaches to delivering the project and was exacerbated by changes in personnel both within the main contractor and in a number of partner

organisations. The situation improved markedly when the new managing director of the main contractor became involved and brought in a new project manager for phase two.

During phase one, the site manager was felt by respondents to be far too optimistic. Communication was not sufficiently frank, and the University recognised they should have asked for a replacement project manager earlier. In phase two, there were regular meetings on site and the communication was open and honest.

If anything, the challenges facing the main contractor in phase two were greater and there were very 'abnormal abnormals' on this job including the temporary works to support the fragile structure. Most respondents recognised this was a complex project and that some of the key issues (flash flood, poor condition of the original building structure and columns) that arose were not of the main contractor's making.

Respondents' feedback on the main contractor and sub-contractors remained mixed but was more positive for the latter stages of the build. Some respondents spoke very highly of the main contractor in particular because of their helpfulness, responsiveness and collaborative approach. An onsite presence was retained for some months after completion to facilitate resolution of snagging and other problems.

At times it was felt the pace of works was too slow, although the project overran for valid reasons. The handling of the flash flood was given as an example. While the main contractor worked hard to resolve the situation quickly, they were reliant on bringing back sub-contractors who were at the end of their work on the project and probably had little motivation to return. The new build opened within a couple of weeks, while the refurbished area took around five months to open.

Workshop participants felt that tighter management of the programme timeline could have enabled closer focus on the multitude of tasks needing to be completed at any time, enhancing understanding and expectations throughout the wider project team and close stakeholders.

## **Supply chain**

During the project, the main contractor parted company with the original concrete frame contractor because of a disappointing approach to collaboration and quality of finish, as well as commercial issues. In addition, when the façade contractor went into liquidation, the main contractor absorbed their personnel in order to finish the project.

There were mixed views amongst the respondents regarding the sub-contractors involved in this project. The catering sub-contractor did not have experience dealing with front of house furniture and fittings. It was reported by one workshop attendee they did not deliver what was promised.

The lift contractor, engaged by the main contractor, was felt to be unsatisfactory for the University. They had programmed the lift to be managed via their external call centre only, meaning the University could not add it to their campus-wide programme of lift management. This has now been rectified. Respondents felt that some sub-contractors had not 'bought into' the project vision in the same way as the main contractor, which caused some friction with late starts and late deliveries.

However, some members of the supply chain received praise from respondents. The furniture supplier received particular praise. They stored the furniture through the delays at

no extra cost. Likewise, the company that put up the book stacks was delayed by a year but kept to their original prices. The main M&E contractor did what they needed to in order to get jobs done rather than follow process which Estates appreciated, as did the cabling contractor. The joiner was “superb”, delivering high quality desks along the curved walls of the ‘petals’ and workshop participants agreed that the joinery work in the new building is very good.

During the second phase of this project, the main contractor co-located the site office with the supply chain and this was found to be positive in encouraging better interaction and communications.

## Recommendations

On future projects:

- Take care to create the right forums for honest discussions regarding progress against programme
- Consider adopting the directive used by the Ministry of Justice, that no programme activity can last longer than a two-week period
- Request that the main contractor provides dedicated aftercare resource on the site during the defects resolution period
- The University of Nottingham could consider creating a two-tier list of preferred and prescribed supply chain members. This should provide a balance between control and competitiveness. A list of suppliers to avoid would also be helpful
- Suggest to the main contractor that co-locating with supply chain partners may be a benefit

## FEEDBACK RELATING TO VALUE ENGINEERING

Before the main contractor was appointed there was a value engineering exercise, however, a lot of the original features maintained. It was reported that the design was not ‘watered down’ as typically can happen as a result of such exercises.

However, library staff believe that computer numbers were decreased during the value engineering, which is putting pressure on them

## FEEDBACK RELATING TO DESIGN AND CONSTRUCTION ISSUES

### Risks

It was felt that there were a disproportionate number of issues on this project that were client risks, for example the poor state of the existing structure and the foundations of the existing building not being as shown on the original drawings and the flash flood.

The drainage problem had been raised the year before the flash flood occurred. The drainage has since been reinforced but some respondents feel flash floods that will penetrate the building remain a risk.

### Surveying

Surveying of the original building took place only once the library had decanted to the new build which revealed the extent of the building problems. It is recognised that the University felt the risk of closing or moving the library outweighed the risk of not doing a more robust

survey at the outset. A number of respondents said that, in their view, the old building should have been demolished.

With the benefit of hindsight, conducting a more extensive survey would have provided helpful information. One of the barriers to this was the need to keep the building operational. There is no doubt that a survey would have been time-consuming and difficult. If asbestos had been discovered, works would have had to stop immediately.

Repeated repairs to the windows that took place in the years preceding this development could have indicated the presence of a problem. Also, speaking to library staff would also have revealed information about issues with the building.

The workshop participants agreed that better records of works carried out and changes to services would be very helpful. This could have highlighted problem areas such as condensation from windows dripping onto concrete below. The Estates Department has a masterplan but not all works are logged.

### Recommendations

- Canvas long standing problems with the building, with existing staff
- Maintenance and other works done over the years should be logged in a central place and curated, so that there is always an up-to-date and accessible record of the building services.

### The plant room

A plant room was put on the roof because of space issues. This is not felt by some respondents to be ideal, as the kit is open to the elements and access is difficult.

### FEEDBACK RELATING TO HANDOVER

There were two handovers. The first was the end of phase one when the old library was closed for a week while everything moved to the new build. The second handover was at final completion, in October 2016.

The handover at the end of Phase One, when library staff decanted to the new build, was reportedly 'messy'. The final handover was late and during term time, which meant that the building had to open for students to use before it was completed.

Library staff appreciated the various tours and updates they took part in. However, maintenance staff felt they were told "here's the building, take it on." Yet during the workshop it was felt by attendees that members of the maintenance team had been given opportunities for involvement but had not engaged with the project at key milestones.

### Recommendations

- Take steps to 'ringfence' a six-week period at the end of the project as a proper handover period
- Ensure there is a walkaround a specific number of days in advance of handover with clear, advanced notification
- Deliver a clearly defined handover period to allow for snagging, which is linked into the programme.

## Defects

Generally, defect resolution was felt to be managed well by the contractor. Snagging went on until after completion of the accounts and has been handled well, the onsite person responsible was responsive. There were some specific criticisms:

- The man-safe wire system on the roof was unprotected and the access ladder was not ideal as clipping to it from the ladder is unprotected. The respondent thought the University's contractor has resolved that issue
- The catering sub-contractor did not configure the freezer-chiller units correctly which caused operational difficulties for staff. This took about six months to resolve
- There has been a problem of glass window panels shattering, which has been resolved, the final fix being the day before the workshop. This is due to a naturally occurring fault caused by the growth of a crystal that reacts to warm sunlight. Even with exceptional quality control these can be missed
- Operations and Maintenance manuals were late in being handed over. These should be available at handover
- There was dust in one of the wiring centres, which caused the failure of key equipment. This was because the contractor had not sheeted the area adequately
- As the project progressed and overran, one person, responding on behalf of library staff said they felt like 'piggy in the middle' between the Estates Department and the contractor as defects were being resolved.

It was acknowledged that the presence of the contractor's site manager onsite for three months during the defects resolution period had been invaluable and made the resolution more effective.

## Recommendations

- Ensure that the main contractor allocates a customer services manager on the site for the first three months of the defects resolution period





# QUALITATIVE FEEDBACK - POST-OCCUPATION ISSUES

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## FEEDBACK RELATING TO THE QUALITY OF THE INTERNAL ENVIRONMENT

### Capacity

**“It is a victim of its own success, it isn’t big enough.”**

Respondents commented that the library is a ‘victim of its own success’. Usage levels are higher than anticipated, with many students and visitors using the library for study, eating, meeting colleagues and also as a thoroughfare. While one respondent referred to it as a “nice challenge to be faced with”, this has put pressure on the space and how it is used.

The old library had around 3,000 users a week. Usage of the new library increased by over 200% in the first year of opening. It is recognised that the building is at capacity. There are about 1,500 study spaces and students want more. A hundred more chairs were purchased quite soon after opening.

### Lighting

Overall the lighting is reported to be appropriate.

The natural lighting is seen as excellent because of the amount of glazing contained in the building. However, the sunlight can create problems. Even with the blinds down, sunlight ‘peeps’ through the gaps creating glare on computer screens. Apparently, the blinds are also frequently broken.

There is PIR lighting on D Floor which means the lights go off unless you move. This can prove something of a distraction for students working in the evening. Even though the two people who responded to this question feel the shelving lighting is really good, it was reported that some people find it annoying in the books area.

The little desk lights in some seating areas are good but the little lamps beneath the desks have not been lined up with the switches so students do not use them as anticipated.

### Noise levels

The refurbished part of the building is reported to be quiet. However, according to some respondents, the sound travels straight up the void in the extension from the main atrium and cafe. The balconies can be noisy, especially at peak times because of the café below. There is also a problem around confidential conversations as students in the silent space can hear what is being said on the next level down.

The biggest issue reported by users to library staff is that the building is not big enough, but it was noted at the workshop that library staff also “get a lot of flack” about noise, particularly around the busiest times, such as exam periods.

Acoustic baffling was supposed to reduce sound travelling through the building but is not as effective as anticipated.

More people are using the building than was envisaged and this means that the level of noise is greater. Students also use the atrium as a cut-through, whilst talking with friends.

### Recommendations

- Look at commissioning a noise survey to identify the 'hot spots' and then consider what actions can be taken
- Review signage to quieter spaces within the Library
- Look at ways of providing more quiet spaces, especially at exam time

### Temperature

While there was limited feedback (only two respondents commented on temperature), there were some differing views over temperature in the building. Some people feel it can be quite warm. However, the library staff feel it can be really cold, and that temperature levels are erratic. There is great variation throughout the building. On A Floor, the two entrances situated directly opposite one another allow "a gale to howl" through when there are a lot of people using both entrances, making the atrium very cold.

Overall however, room temperatures are a big improvement on the old building and are better than a lot of the older engineering buildings in the surrounding space.

### Air

The air quality is satisfactory.

Some of the air vents on the north side of the building were reported to have been very noisy. The contractor has had to return a few times to resolve this issue.

### Navigation

There were mixed views on navigation. Some respondents feel it is very easy as the stairs are clearly visible, and each floor is identified with big letters. However, the different levels can make it hard to navigate around the building. Each side has a different number of floors because the building is built into a steep slope. If you have good spatial awareness this is not a problem, but many people who have used the building since it opened still find it hard to navigate, according to one respondent representing end users. It is not intuitive enough. One respondent suggested that perhaps the irregular shape disorients people.

The use of signage was discussed at the workshop as the library faces two challenges, students have a tendency not to read signs and there are not many flat walls where signs can be located. Nevertheless, attendees agreed that library signage should be reviewed, especially for key features such as the toilets. Five workshop attendees had to ask for directions.

The workshop discussed the use of the mynottingham app, which would be readily embraced by student users, to enable them to find their way around the library, locate the best route to other buildings and even find their friends who are already in the library

### Recommendations

- Review the quantity and location of signage to key areas that are most used, such as the lifts, the toilets and the height-adjustable desks

- Prioritise the navigation requirements of different categories of people using the building
- Investigate the possibility of developing further the mynottingham app to assist students with navigation

### **Operational Technology**

Respondents commented that mobile reception in the building is poor. The IT team has retrofitted boosters to library offices and the cafe, but the signal remains patchy. The University's mobile provider happens to be the least effective one for providing a signal that can penetrate the library walls. Further retrofitting is possible provided finance can be arranged and access through the wooden petal ceilings can be enabled. It is thought that the plaster boards used in the building do not contain foil, which would have helped resolve this issue.

Respondents are happy with WIFI coverage and it was intended that AV would operate through this, but it has not happened. According to one respondent, this has resulted in some issues, such as on C Floor where there are good televisions that laptops can be connected to, few cables to connect with and no supportive WIFI-AV system. This means students are unable to use the televisions for group work.

The way the cabling has been set up on the upper floors means that computers are in the middle of desks rather than to one side, as would be preferred by students.

Respondents reported that computers provided on A Floor do not work well and are of an inferior specification. Also, additional computers, laptop ports power sockets and data points are needed throughout the building. The library staff are under pressure to put more computers in. The 'catalogue' computers on A Floor have not worked and are being replaced so that all computers in the library will be of the same high 'engineering' specification. There was an issue with the card machine in the café, but this has been resolved.

Future data capacity was discussed at the workshop. IT ensured the building was completed with 25% additional capacity for the future which is now needed, as the library is so popular. Access to add data points is very difficult because of the need to go through the wooden ceilings in the petals area. Access through the floors is awkward as much of the carpeting is roll carpets and not carpet tiles. Different access routes are being considered.

### **Recommendations**

- As far as possible, future-proof new buildings by adding in extra data capability in the form of cabling, data points and power sockets
- When deciding on ceiling finishes, consider accessibility for future cabling installations
- Investigate the reasons for the poor mobile signal. If it is because of the plaster boards and they are to be reused, consider including a mobile booster in any future building plans
- Lay carpet tiles rather than carpet in rolls, to make maintenance easier going forward

## FEEDBACK RELATING TO PEOPLE WITH MOBILITY AND OTHER HEALTH ISSUES

### Considerations for users with mobility issues

#### Access

Access to the floors of the building and café for people with mobility challenges is via the lift, which has been frequently out of action. There is no ramp to the café from the ground floor. This also means that when the lift is broken, such people cannot access the Assistive Technology Room on B Floor.

A number of contributors feel the steep slope to the Maths entrance to the library is difficult for able-bodied people so must be very difficult for those with mobility issues. The disabled parking spaces are on a hill on this side. Separate to this exercise, the SU disability officer has already fed back that this is far from ideal. The architect reports there are ramps which enable disabled access to the building along with a curve bringing people to the building at an angle. This slope is also reported to be a problem for people working in the café as deliveries are trollyed down from the delivery ramp and it can be difficult to control the very heavy weights.

It would be helpful if the area for disabled parking could be relocated to a flatter area, possibly by swapping some of the parking with the Maths building.

Library staff revealed that there are, in fact, dual level desks in the library. Maybe awareness needs to be raised through additional signage.

Workshop attendees agreed that people with mobility issues have very specific signage needs and should have advance warning of any access changes so that they can plan their routes to the George Green Library and around the campus.

#### Usability of the building

An Assistive Technology Room was available on C Floor that had good access to the lift and so was good for people with mobility issues, provided the lift works. However, as was a glass-fronted room it was felt not to be suitable for those with mental health concerns, it has now been moved to a different location, on B Floor. The new location is not as convenient for those with mobility issues.

Workshop attendees felt that additional signage may be required to make accessibility for those with both physical and mental health concerns, easier. There is a lack of signage pointing to the lifts for instance. Lifts are often located near stairs in University buildings, but not in the George Green Library. When you enter the building, it is not immediately clear where the lifts are.

There are two lifts in the building but neither accesses all floors. It was revealed at the workshop that there have been incidences when disabled users have been stranded on a floor because their only lift has broken. The lifts do break while being used and there is a question whether lift telephones are effective.

## RECOMMENDATIONS

- Consider installing an external handrail down the slope to the Maths entrance

- Look at ways of providing mobility impaired students with suggested routes from the Library to other buildings on the University Park Campus
- Provide parking bays, for disabled student using the library, on flat ground close to the entrance
- When designing buildings in the future, consider ways of ensuring mobility without reliance on lifts, for instance by installing ramps (this particularly relates to the café area)
- Improve the signage in order to highlight the availability of the height-adjustable desks
- Consider installing lower-level counters in the café as in other University buildings
- Perform weekly tests to ensure that phones in the lifts/refuges do work
- Ensure doors to facilities such as the Assistive Technology Room has push buttons

## **Considerations for users with mental health issues**

In addition to ensuring that the needs of those with physical disabilities are met, there is an increased focus on meeting the needs of users needing some form of mental health support, so they can feel comfortable, secure and 'at home'.

According to one respondent, there are increasing numbers of students coming into University with mental health issues. Some students walk into the building and just stop because they are overwhelmed. It is so noisy and difficult to get bearings. One respondent suggest that a transition area is needed to allow people to 'acclimatise'.

At the workshop it was agreed that a learning point from this project is that the needs of those with mobility issues would be best met by locating facilities on lower levels of the library. However, for those with mental health needs, a private and more secluded area of the library would be best suited to one of the higher floors in the building.

## **Usability of the building**

People with mental health issues need spaces that may have slightly different configurations for example with greater sensory control. They do not want to feel they are in a 'goldfish bowl' so generally prefer no glass fronted rooms and rooms that are quiet.

The glass-fronted, Assistive Technology Room was felt to be unsuitable for those with mental health concerns so has been moved to a different location that is more discrete, quiet and not on show. It appears that, going forward, an Assistive Technology space may be more about a suitable study space than the technology.

A suggestion at the workshop was the introduction of a 'chill room', a calm, quiet room where students could spend twenty minutes or so away from the hustle and bustle of the rest of the library. Such a room would contain no technology but have very soft furnishings, perhaps bean bags.

## **Recommendations**

- Look at the possibility of adding a transition space in front of the Library security gates, to allow users to orientate themselves prior to entering the library
- Consider levels of lighting in areas put aside for use by individuals with mental health issues



- Consider individual self-study areas where the student can control their environment, for example with lighting
- When designing future buildings, consult the guidelines issued by the International WELL Building Institute
- Consider the possibility of creating a 'Chill Room'

## FEEDBACK RELATING TO OPERATIONAL AND QUALITY ISSUES

### The quality of the features and equipment

Owing to the increased volumes of people using the café, the University has had to invest in heavier equipment than originally supplied in order to cope with the numbers of customers using the café.

**“In reality we’re doing twice [the business] we thought so the equipment has gone more and more industrial, and it’s a nice look.”**

More furniture to cater for the increased café business would be beneficial, according to one respondent.

### Lifts

The lifts are roundly criticised by many respondents for the amount of time they are out of operation. They are broken at least once every couple of months. They seem to be very sensitive to motion. Users have been stuck in the lifts. Both lifts have had to be re-cabled recently, which seems to be quite early in their lifespan. There was also noted to be rubble in the bottom of the lift shaft by the cafe. There is ongoing concern around the telephones in the lifts. Initially the supplier had to maintain the lifts, this has now been passed to the University team. It was agreed at the workshop that the University should, in future, avoid using the lift supplier that provided the lifts at the George Green Library.

According to some respondents the quality of the building fabric in general was not good, particularly in the new part. Finishes needed greater attention, for example the concrete and open plan staircases. One respondent was particularly unhappy at the revised balustrade finish. The painting of the concrete was disappointing and created an inferior result at a greater cost. The decision to do this was made at a senior level within the University Estates team in an effort to achieve a consistent effect throughout the campus.

### Recommendations

- Find alternative suppliers for lifts in future building projects
- Regularly check the functioning of the telephones within the lifts

### Security

While overall security was rated favourably by respondents, some issues were highlighted.

### Entering and leaving the Library

There are not enough gates, and therefore students have to queue to enter or to exit. The library’s core users are science and engineering students who have full lecture timetables. When they have an hour or so between lectures, students tend to come to the library which means there is a huge flow at ten to the hour and five past the hour. This was known during

planning, but the anticipated usage has more than doubled meaning that entry gates are swamped at specific times. There is more traffic on the Pope entrance where only one gate can be switched between in and out.

There is a staff member at each entrance to help students. Workshop attendees agreed this person could be located further away, allowing an additional gate to be added at the Pope entrance.

There are two 'push and go' fire exits from the café and the same at the back doors at the bottom of the staircases which create an access security risk, however there have been no reports of these having been abused.

## Recommendations

- Help manage traffic flows by switching gates from 'entry' to 'exit' and vice versa
- Look into ways of speeding up student entry and exit by replacing the swipe pass with a proximity pass.

## Cleanliness

According to one respondent the building should be easy to clean however there have been, and remain, a number of issues.

- There has been a problem with inadequate cleaning manpower and library staff have had to call staff in particularly around exam times when the library is particularly busy
- High-level cleaning and glass was reported to need improvement. This is particularly evident as the building is so open and lower levels are clearly visible to people who are on the higher floors
- Cobwebs and dirt are becoming more evident over time according to one respondent
- Plug sockets have been put into the floors, which collect food and become dirty
- Two respondents feel the café causes a lot of litter issues
- The cleaner's cupboard on A Floor did not contain a sink when it was first built which has subsequently been retrofitted
- There are reported to be inadequate power points for the cleaners
- The nylon barrier matting fitted in various parts of the building is extremely difficult to keep clean
- Toilets block frequently because cisterns are slow to fill

## Toilet facilities

Toilet facilities are satisfactory. In the refurbished part of the building, the hand dryers to some toilets have blown water onto the wall which is starting to create staining.

There is more demand for facilities on the lower floors because of the high levels of usage, particularly in the café. However, workshop attendees decided that this is not an issue. The facilities in the building as a whole are adequate and only a short walk from any point.

There were not enough toilets available during the construction of the Library. During phase one, there were only four for library users and staff.



## Café

The café in the George Green Library is the most successful on University Park, taking double what was predicted.

**“The way the café mingles into the study spaces. People are comfortable there. People just leave their laptops and bags lying around which is unbelievable. It’s just right.”**

The location of the café is good, both in relation to other facilities in the building and within the campus.

Given the high level of customer traffic, it is important that the area behind the counter works well and is ergonomic. However, feedback was that the area is too small for the amount of business being done and now that it is all integrated and bolted down, it is difficult to change. One respondent stated that as the counter is not as originally designed it reduces the functionality of the café. Yet, according to some respondents, this has not prevented the space being crammed with people eating all day long.

Students and staff, alike, value the café. It has a good menu and plenty of seating, although it has the capacity to take many more seats. There is space to add an extra 160 seats which would help but table sizes should be reviewed as students appear to prefer two-seater tables, according to one workshop attendee.

Some problems were mentioned:

- There is often a large amount of litter and mess in the area where people add milk and sugar to their drinks
- Some respondents commented that food smells travel up the building from the cafe
- The queuing system could be improved. The café was intended for science and engineering faculty students but is now catering for a much wider group. While some people use the café to meet friends and colleagues, or to work in, many people need to grab something quickly
- Deliveries to the café, often in heavy trollies, have to navigate a very steep slope that has the added problem of becoming slippery when it is wet
- It took a long time to get the freezer working properly

## Recommendations

- Ensure that the cleaning schedule is adequate to properly service busy café facilities
- Take steps to ensure that the counter and preparation areas are as ergonomic as possible
- Ensure that the agreed design is delivered
- On future builds, ensure adequate storage areas as in the George Green Library
- Involve the Catering Department in designing the seating configuration
- Increase consultation with the Catering Department throughout the programme

## Staff room

The library staff really appreciate their staff room. Here, they can sit at a table and there are also separate toilets and showers. There were no issues raised.

## **Flooding**

During construction, the library suffered from two different types of flood and it is feared that, given the proximity of the large incline, there remains a danger of a flash flood could damage the building again, despite secondary drainage being added.

Works have recently been completed to improve drainage in the area.

## **FEEDBACK ON MAINTENANCE ISSUES**

### **Maintenance**

It was agreed at the workshop that the maintenance team should continue to be invited and further encouraged to attend key meetings such as the initial design meetings and contribute to the POE process. Their lack of involvement means that they are unaware of changes that are made following the initial brief. It was also noted that the IT team should be involved throughout the project.

Library staff said that they are regularly asked operational questions by members of the Estates Maintenance team which suggests that while the necessary information has been passed to Estates at handover, it is not being passed to teams on the ground.

### **O&M Manuals**

Currently, the main contractor uses Viewpoint to collate O&M documentation but some attendees at the workshop suggested that SharePoint should be used instead, as it is easier to use, and the folder structure can be agreed in advance. The University of Nottingham already uses SharePoint.

It would have been better to have a clearer definition of what was expected in terms of O&Ms at the end of each of the two phases. Given that the new building was in full operation for some time before the whole project was completed, O&Ms for that area should have been available at the handover of phase one.

At the workshop it was mentioned that some documents, such as test certificates, can take time to obtain, and this is the final 20% of the content.

Maintenance issues from the project:

- The lift has been manufactured so that only the manufacturer can maintain it. Parts are expensive. This has been resolved and the University team now maintain it
- Some glass panels have shattered in the balustrade around the atrium at higher levels and are expensive to replace, especially as specialist machinery has to be hired to fit them. The contractor is in discussion with the glazing provider to resolve the issue but there remains concern over the cost of maintenance and inconvenience to library users. It should be noted that the glass is safety glass and there is no health and safety risk
- Incidents have been reported on the steps between the new library and the Coates Building. There was water pooling behind the nosing on the steps to the Coates Building. The Estates department has now recovered the steps and the issue has been resolved
- The handrails have had to be reworked by University contractors

- The warm air curtains in the entrance doors can only be maintained by going through the ceiling

Operational issues reported included:

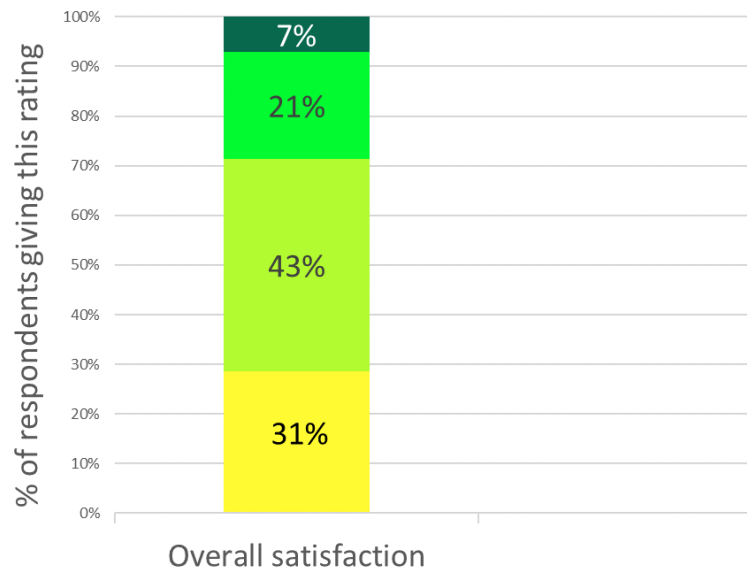
- There have been issues with proper access panels for over-door heating. It was acknowledged that when there is quick occupation following completion issues don't come to light until the building is in action.
- The plug sockets in the floor break frequently and constitute trip hazards
- Café chairs are not sufficiently robust
- Door handles and locks are poor quality and break easily
- Locks on toilets doors break easily

### Recommendations

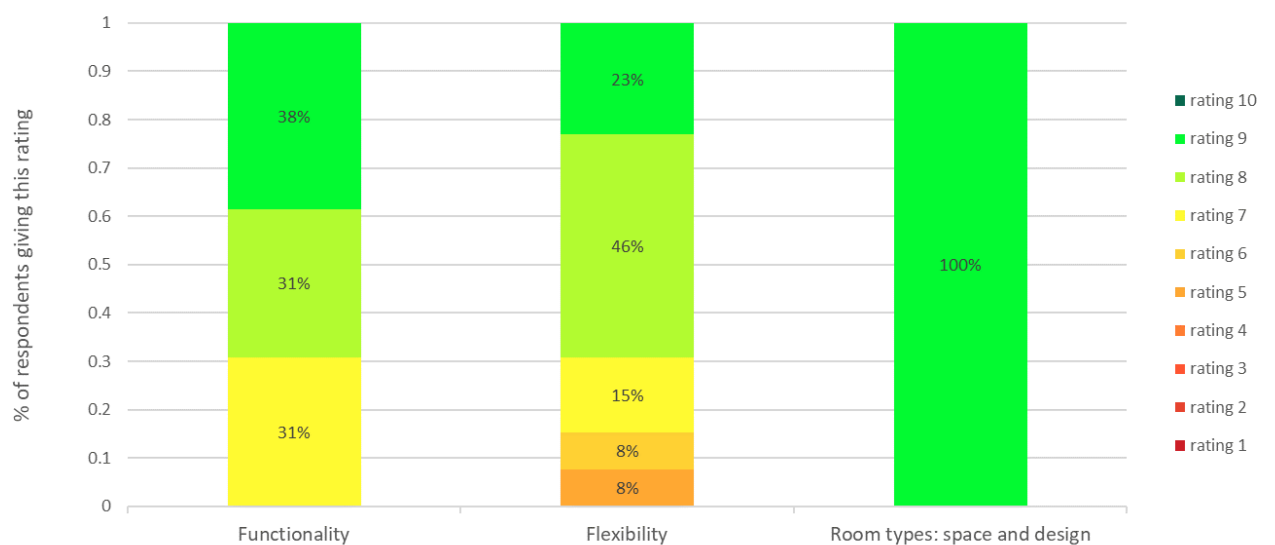
- Take steps to ensure that members of the University's maintenance and IT teams are invited and encouraged to attend design meetings and PoE workshops
- Ensure that advance notice of the walk-rounds with key specialists is provided to the maintenance team
- Ensure that information is passed down the line of command within the maintenance team
- Ensure that there is a properly defined space for access hatches
- Consider using a 'Portal' to assemble information that will go into the O&M manuals
- Look at engaging a clerk of works on future projects to decrease the number of project maintenance issues introduced by project errors

# APPENDIX I: QUANTITATIVE RESULTS

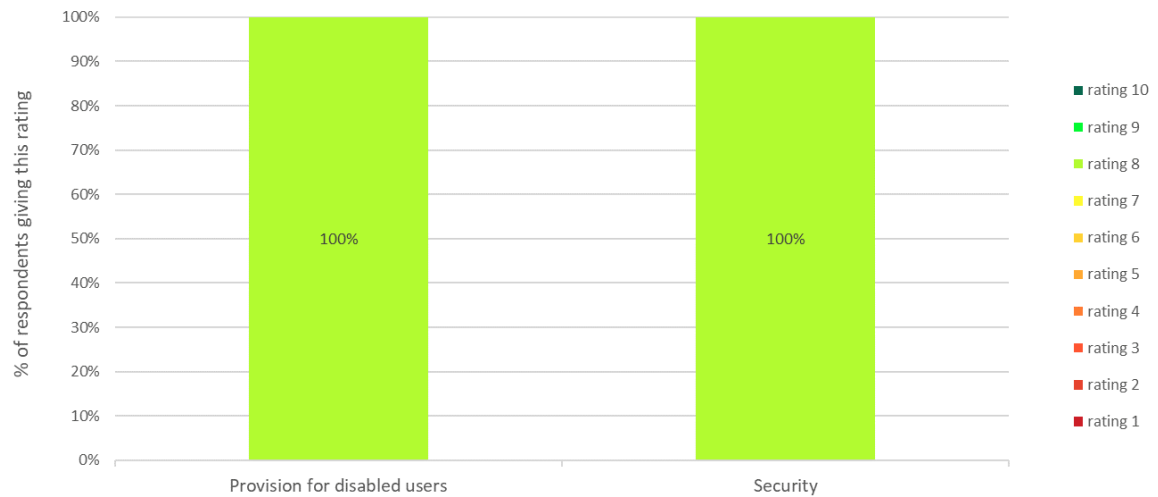
## 1.0 Overall Satisfaction with the George Green Library



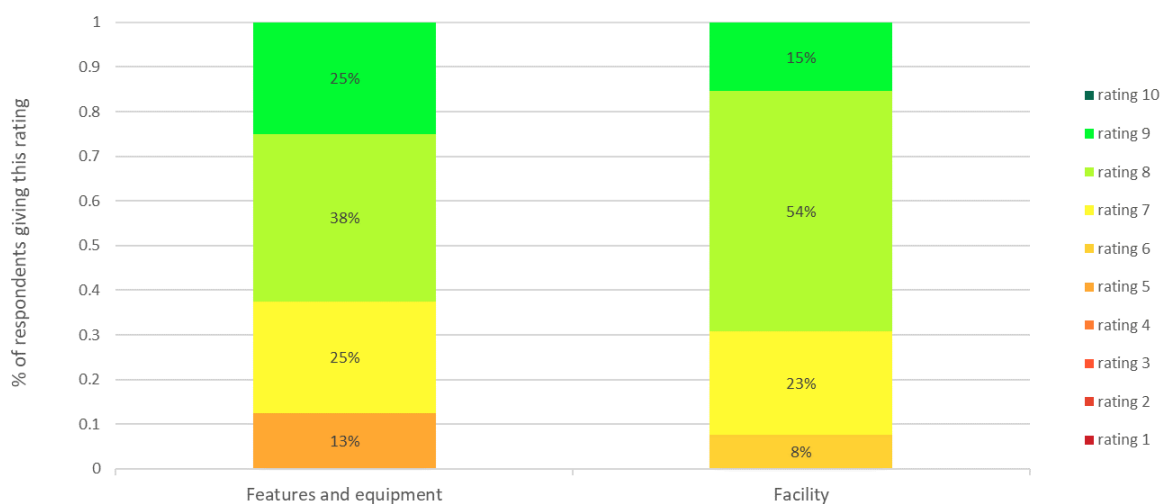
## 2.0 Satisfaction with the space in the George Green Library



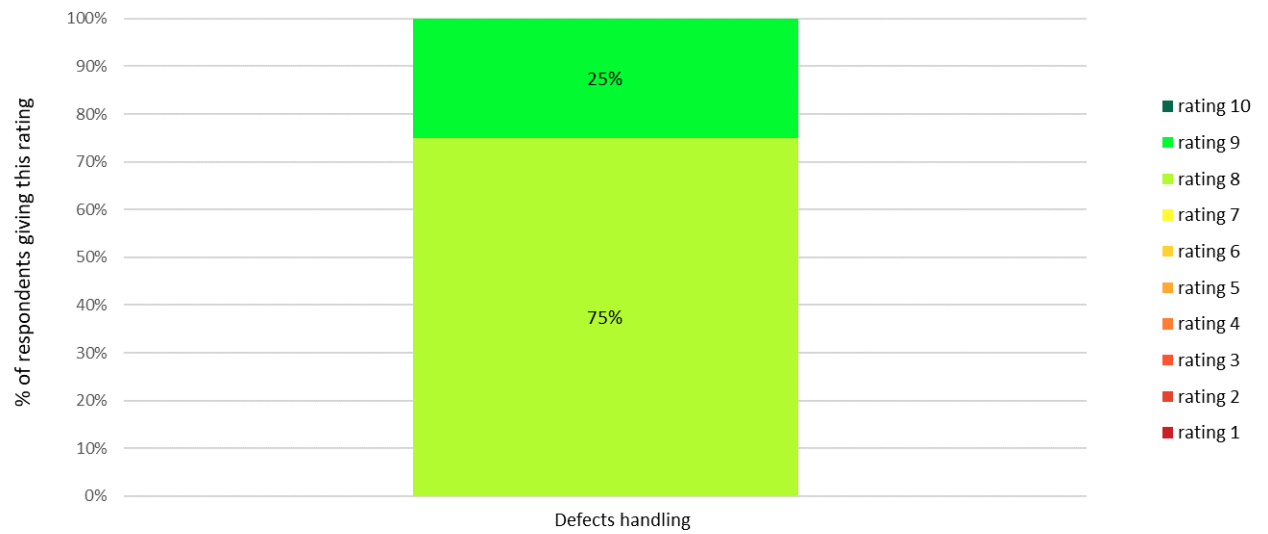
### 3.0 Satisfaction with accessibility of the George Green Library



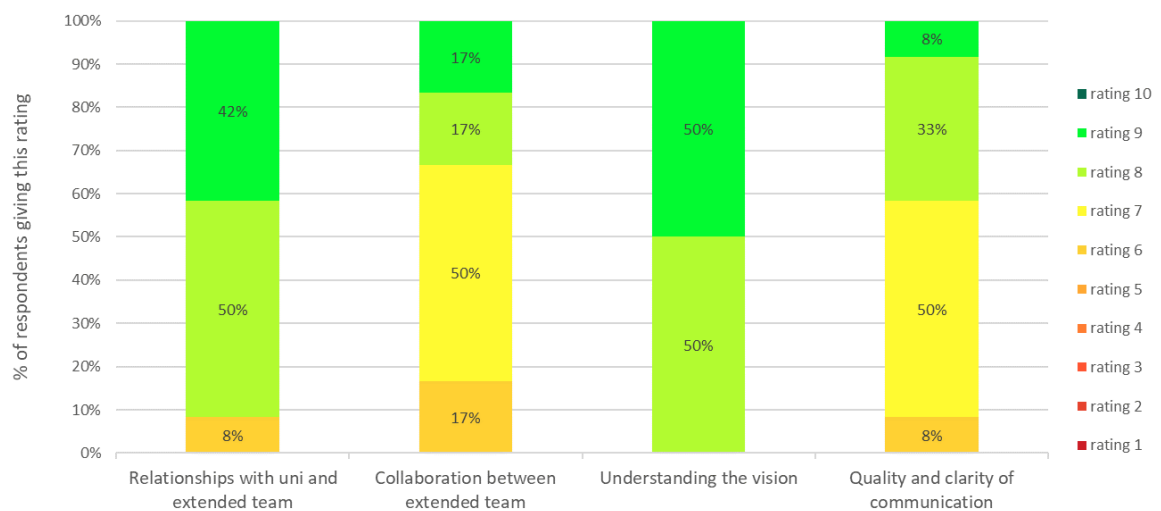
### 4.0 Satisfaction with the quality of the George Green Library



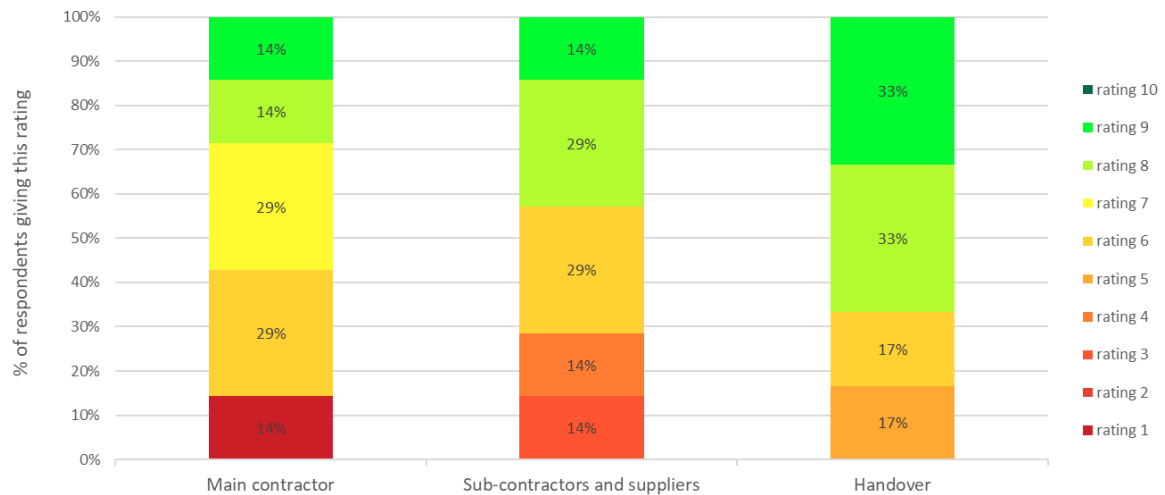
## 5.0 Satisfaction with how defects were handled



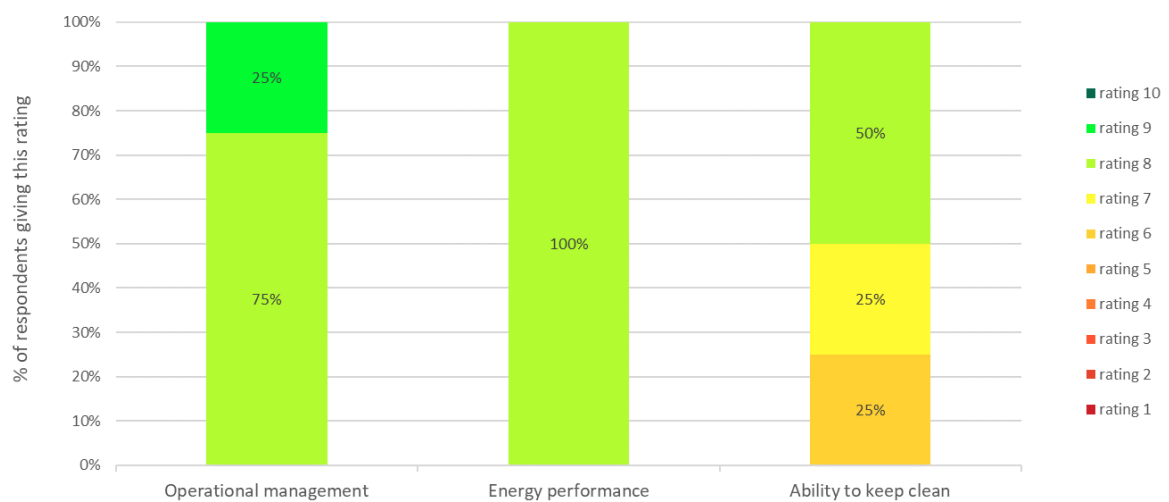
## 6.0 Satisfaction with relationships between member of the project team



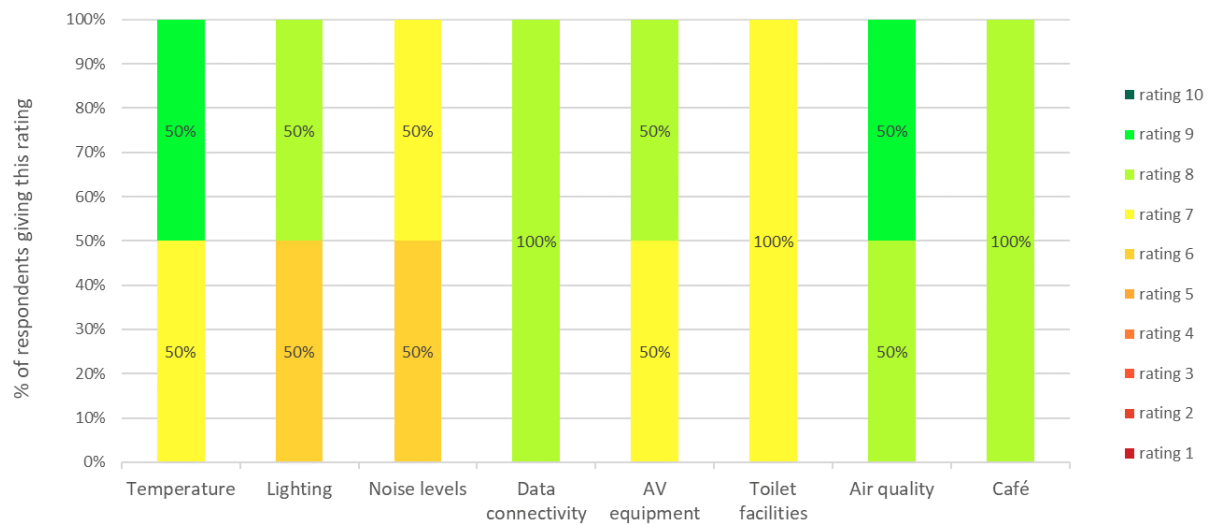
## 7.0 Satisfaction with the handover of the George Green Library and the team involved in the programme



## 8.0 Satisfaction with the operation and environmental performance of the George Green Library



## 9.0 Satisfaction with the internal environment of the George Green Library





# APPENDIX III: SUMMARY OF RECOMMENDATIONS

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## RECOMMENDATIONS FOR APPLICATION TO FUTURE PROJECTS

### Communication between extended team members

- Consider implementing quarterly 'principles meetings' between the main contractor and the University's capital projects manager
- Arrange monthly site meetings including the appropriate people
- Consider methods to retain knowledge when personnel change during a project
- Ensure the main contractor provides a proper array of samples so that the University has sufficient choice
- Provide full-scale mock-ups of items, such as curtain walling, so that the University can clearly see what the finished product will look like

### Communication with library staff and end-users

- Consider using a big screen in the entrance area of any live building where works are taking place. This would be an eye-catching and easy way of keeping users well informed of planned works and noisy periods. Think about using moving images to catch the attention of users
- Arrange weekly meetings between the main contractor and library management to ensure that they are well informed about what will be happening in the coming week
- Use white boards, with colour coded warnings of expected noise levels, as a cost effective and flexible way of communicating with users
- Consider the use of the mynottingham app to communicate and update

### The main contractor and supply chain

- Take care to create the right forums for honest discussions regarding progress against programme
- Consider adopting the directive used by the Ministry of Justice, that no programme activity can last longer than a two-week period
- Request that the main contractor provides dedicated aftercare resource on the site during the defects resolution period
- The University of Nottingham could consider creating a two-tier list of preferred and prescribed supply chain members. This should provide a balance between control and competitiveness. A list of suppliers to avoid would also be helpful
- Suggest to the main contractor that co-locating with supply chain partners may be a benefit

## **Surveying**

- Canvas long standing problems that have occurred in the building, with the building end-users
- Maintenance and other works done over the years should be logged in a central place and curated, so that there is always an up-to-date and accessibly record of the building services.

## **Handover**

- Take steps to 'ringfence' a six-week period at the end of the project as a proper handover period
- Ensure there is a walkaround a specific number of days in advance of handover with clear, advanced notification
- Deliver a clearly defined handover period to allow for snagging, which is linked into the programme.

## **Resolution of defects**

- Ensure that the main contractor allocates a customer services manager on the site for the first three months of the defects resolution period.

## **Operational technology**

- As far as possible, future-proof new buildings by adding in extra data capability in the form of cabling, data points and power sockets.
- When deciding on ceiling finishes, consider accessibility for future cabling installations
- Investigate the reasons for the poor mobile signal. If it is because of the plaster boards and they are to be reused, include a mobile booster in any future building plans
- Lay carpet tiles rather than rolls to make maintenance easier going forward.

## **Considerations for people with mobility issues**

- Look at ways of providing mobility impaired students with suggested routes from the Library to other buildings on the University Park Campus
- When designing buildings in the future, consider ways of ensuring mobility without reliance on lifts, for instance by installing ramps (this particularly relates to the café area).

## **Considerations for people with mental health issues**

- Look at the possibility of adding a transition space in front of the Library security gates, to allow users to orientate themselves prior to entering the library
- Consider levels of lighting in areas put aside for use by individuals with mental health issues
- Consider individual self-study areas where the student can control their environment, for example with lighting
- When designing future buildings, consult the guidelines issued by the International WELL Building Institute
- Consider the possibility of creating a 'Chill Room'

## **Quality of features and equipment**

- Find alternative suppliers for lifts in future building projects.

## **Café**

- Take steps to ensure that the counter and preparation areas are as ergonomic as possible
- Ensure that the agreed design is delivered
- On future builds, ensure adequate storage areas as in George Green
- Involve catering in designing the seating configuration
- Increase consultation with catering throughout the programme.

## **Maintenance**

- Take steps to ensure that members of the University's maintenance and IT teams are invited and encouraged to attend design meetings and PoE workshops
- Ensure that advance notice of the walk-rounds with key specialists is provided to the maintenance team
- Ensure that information is passed down the line of command within the maintenance team
- Ensure that there is a properly defined space for access hatches
- Consider using a 'Portal' to assemble information that will go into the O&M manuals
- Look at engaging a clerk of works on future projects to decrease the number of project maintenance issues introduced by project errors.

## **RECOMMENDATIONS FOR POST COMPLETION CHANGES TO THE LIBRARY**

### **Room types**

- Look at the possibility of converting one of the language laboratories into an additional quiet study area

### **Noise levels**

- Look at commissioning a noise survey to identify the 'hot spots' and then consider what actions can be taken
- Review signage to quieter spaces within the Library
- Look at ways of providing more quiet spaces, especially at exam time

### **Navigation**

- Review the quantity and location of signage to key areas that are most used, such as the lifts, the toilets and the height-adjustable desks
- Prioritise the navigation requirements of different categories of people using the building
- Investigate the possibility of developing further the mynottingham app to assist students with navigation

### **Considerations for people with mobility issues**

- Consider installing an external handrail down the slope to the Maths entrance
- Look at ways of providing mobility impaired students with suggested routes from the Library to other buildings on the University Park Campus
- Provide parking bays, for disabled student using the library, on flat ground close to the entrance
- Improve the signage in order to highlight the availability of the height-adjustable desks
- Consider installing lower-level counters in the café as in other University buildings
- Perform weekly tests to ensure that phones in the lifts/refuges do work
- Ensure doors to facilities such as the Assistive Technology Room has push buttons

### **Considerations for people with mental health issues**

- Look at the possibility of adding a transition space in front of the Library security gates, to allow users to orientate themselves
- Consider levels of lighting in areas put aside for use by individuals with mental health issues
- Consider individual self-study areas where the student can control their environment, for example lighting
- When designing future buildings, consult the guidelines issued by the International WELL Building Institute
- Consider the possibility of creating a 'Chill Room'.

### **Lifts**

- Regularly check the functioning of the telephones within the lifts

### **Entering and leaving the Library**

- Help manage traffic flows by switching gates from 'entry' to 'exit' and vice versa
- Look into ways of speeding up student entry and exit by replacing the swipe pass with a proximity pass.

### **Café**

- Ensure that the cleaning schedule is adequate to properly service busy café facilities
- Take steps to ensure that the counter and preparation areas are as ergonomic as possible
- Ensure that the agreed design is delivered
- On future builds, ensure adequate storage areas as in the George Green Library
- Involve the Catering Department in designing the seating configuration
- Increase consultation with the Catering Department throughout the programme