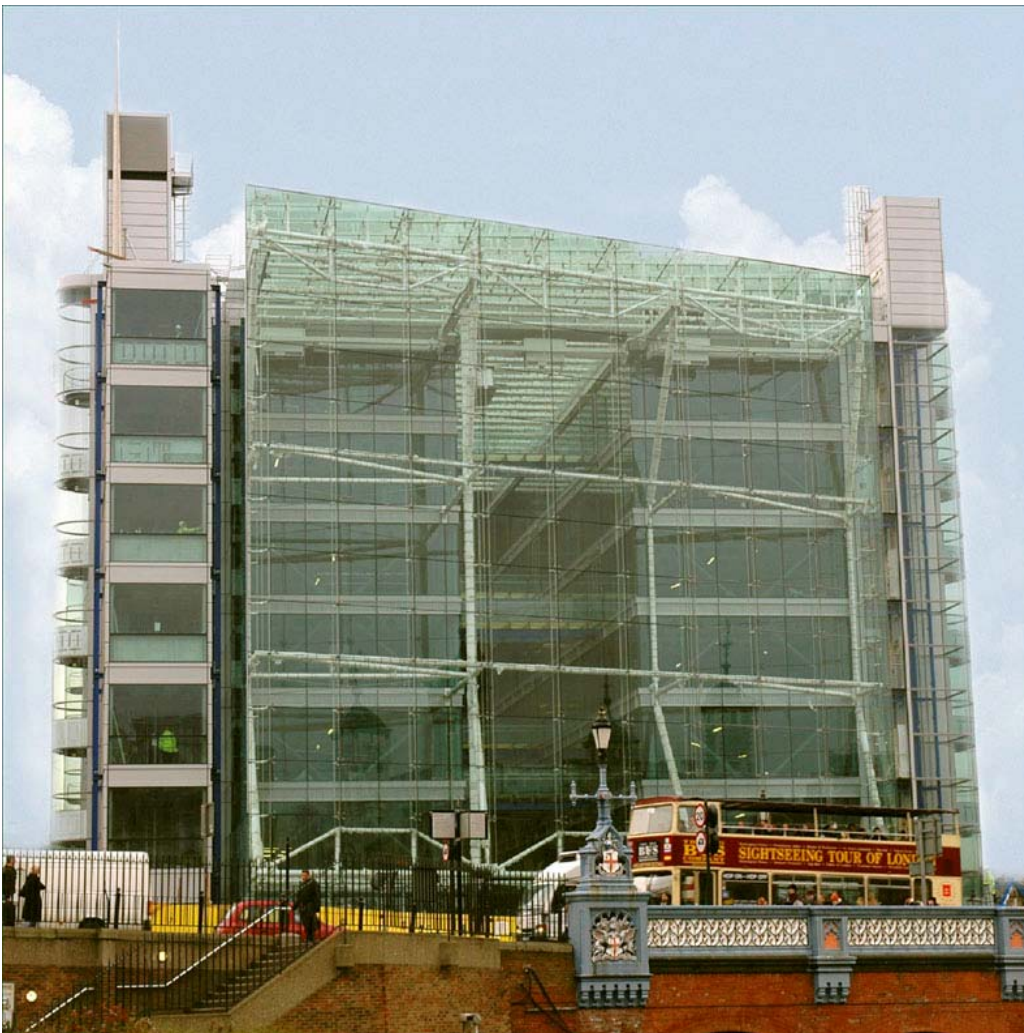


# SAP

*Case study*

Presented by the Strategic Alliance Partnership

## Case Study 02 - K2 Building, St. Katharine's by the Tower



Issue 02

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# SAP Case Study No. 02

## The K2 Building, St. Katharine's by the Tower

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# 1. Introduction



## Project Highlights

- Early appointment of SAP partner.
- Pre-construction co-ordination of building services design.
- Adoption of Value Engineering proposals
- 3D modelling successfully used to enhance co-ordination of design and installation.
- Significant pre-assembly off site.
- Partnering approach to problem resolution.

When the opportunity arises to build a prestige City office block, designed by one of UK's leading architects and situated opposite one of London's top tourist attractions any contractor would welcome the opportunity to demonstrate its capabilities.

As completion of the K2 building at St. Katharine's Dock draws to a close, this Case Study looks at the role of the Strategic Alliance Partnership in supporting Taylor Woodrow Construction Ltd. in the delivery of this exciting project. The study incorporates many of the views expressed by the client and members of the project team, as well as the SAP partners. In particular, the study tries to draw comparisons between the SAP approach and past experience of building services installation using traditional sub-contract arrangements.

A more detailed study will be found in the Project Close Out Report, to be issued in due course.

## 2. Scope of works

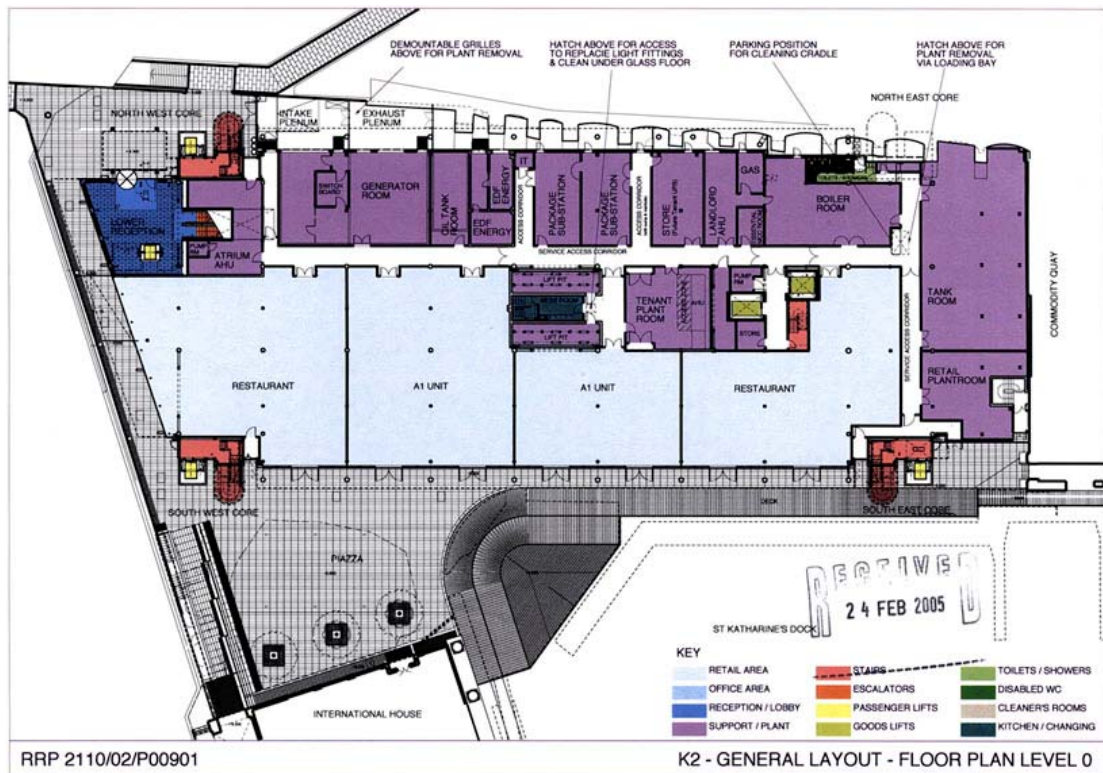


Situated on a prime quay-side site, this stunning Richard Rogers Partnership designed office building enjoys panoramic views over the City, the Tower of London and the old Royal Mint. The building comprises 245,000 sq.ft of office accommodation over 7 floors with retail units below.

The floor space is arranged around a central atrium with a glazed roof over and a full height, structurally-suspended glazed wall on the West elevation. In the centre the atrium adjoins a central services core.

Space on site for temporary works and material storage was at a premium, so off-site prefabrication included steelwork, cladding, ductwork and pipework. Further space was saved by locating the 3 storey containerised offices on a pontoon floating in the adjacent dock.

Plant rooms are generally located within the building at quay-side level, with a Pump Room, Lift Motor Rooms, chillers and AHUs on the roof.



Ground Floor plan showing layout of plant rooms and building services support facilities.

### 3. Project Data

# 3

<b>Employer</b>	Taylor Woodrow Developments Ltd.
<b>Management Contractor</b>	Taylor Woodrow Construction Ltd.
<b>Project Manager</b>	Buro Four Project Services
<b>Architect</b>	Richard Rogers Partnership
<b>Structural Engineer</b>	Waterman Partnership
<b>Building Services Engineer</b>	Waterman Gore
<b>Building Services Partner</b>	Rotary Southern Ltd.
<b>Quantity Surveyor</b>	Davis Langdon Mott Green Wall
<b>Project Value</b>	£50 million
<b>Building Services Value</b>	£ 9.0 million
<b>Form of Contract</b>	JCT 1998 Management Contract
<b>Commencement Date</b>	July 2002
<b>Completion Date</b>	April 2005

## 4. Pre-Construction

The JCT Management Contract requires the main contractor to use the Pre-Construction stage to develop a works package strategy and to procure the works package contractors on the basis of design information available for tender purposes. This process offers a number of advantages over the traditional Lump Sum procurement route, particularly in allowing the Management Contractor to recommend placing early orders for preliminary works or long lead items. However, the major packages are unlikely to be awarded until the Contract Sum has been agreed and the Management Contractor has been instructed to commence work on site

TWC commenced preliminary work on the project in 2001, although the contract did not start until July 2002. More significantly, the Strategic Alliance Partnership had been established by the time TWC commenced work on the project and TWC was therefore able to invite **Rotary Southern Ltd.** to also participate in the preliminary work from July 2001 onwards.

Single source procurement is now an established TWC strategy, to add value through early supply chain involvement, but at the time there were, understandably, some doubts expressed about this departure from the norm. However, the logic of early involvement is undeniable :-

- An “open book” approach was taken by Rotary to building up the cost of the building services package i.e. the professional team was able to see the quotes received from Rotary’s suppliers together with make up of all costs.
- Rotary were able to make recommendations on a variety of buildability issues such as the layout of the chillers, incoming power supply, access for both installation and removal of major items of plant.
- Strategy for vertical distribution of services was agreed with the structural designers as early as December. 2001.
- Value Engineering proposals were submitted for consideration, such as the possible use of grey water from the dock.
- Rotary were pricing the package with greater knowledge of the scope and therefore less risk allowances included. (The scope actually changed during preconstruction, as the eventual client for the completed building wanted to use a different contractor for the fit-out.)

### Traditional Approach

Although Management Contracts involve the works package contractors (WPCs) before the Contractor is instructed to proceed to the construction stage, the work is still being priced before the WPCs have had the opportunity to contribute to the design on co-ordination, buildability issues etc. In other words, the design is being priced first and made to work subsequently. An example of this was Rotary’s input to the detailed planning of vertical riser installation. Rotary planned to pre-fab the riser frames but, without early involvement, they would not have been able to advise on the need for cast-in Halfen channels to support these frames.

## 5. Construction

For most of the TWC and Rotary staff appointed to the project, this was their first experience of working on a SAP project. An roll out workshop was held to communicate the principles of SAP and both parties worked hard to develop an open, collaborative environment. With the benefit of hindsight, greater effort should have gone into ensuring that all members of the SAP team fully benefited from the induction and that all parties involved, including the professional team and the other key suppliers, were aware of the SAP philosophy – otherwise the arrangements were open to misinterpretation or misrepresentation. On future project there needs to be consideration given to additional introduction roll out presentations being made to the project team as it grows.

In keeping with standard SAP practice, TWC did not provide a full time M&E Package Manager. This was a reflection of trust and confidence in Rotary's building services ability and procedures. When any additional works/clients instructions arose Rotary completed the instruction paperwork for sign off by Taylor Woodrow. These procedures had the common objective of removing duplication and waste.

Collaboration and focus on delivering the project was evident throughout the construction period, examples being :-

- **Pre-fabrication.** Rotary involved their suppliers and the design team from the outset in their prefabrication strategy. "Design for manufacture" meant the design took account of the supplier's standard stock items and prefabrication could be optimised. The benefits included less material on site, improved safety and less waste.
- **Programme.** A Greater contribution to the programme sequencing and a good understanding of the building constraints allowed an increased flexibility to respond to programme changes.
- **Re-sequencing toilet construction.** The toilet enclosures could not be built until the building was watertight. Rotary proposed re-sequencing the work to take the service risers and toilet first fix up through the structure ahead of the construction of the enclosures with obvious programme benefits. This also reduced the substantial amount of interface with the toilet fit-out WPC.
- **Standardisation.** Rotary adopted the standard format used by TWC for their documentation, thus eliminating the usual duplication.
- **Project Modelling** (see Section 6 below).

### Comparison with Traditional Approach

The SAP culture was apparent to all involved. Rotary's focus was on delivering the building services element of the project. TWC's focus was on ensuring that Rotary could perform and were fairly and reasonably reimbursed in accordance with their contract. The traditional artificial barriers between Lead Contractor and Subcontractor were absent which meant that when differences did arise they could be resolved at an appropriate level on site, without recourse to a lengthy claims process. When acceleration measures were called for Rotary suggested a range of proposals which enabled TWC to recommend to the Client which proposals provided best value. Rotary were proactive in identifying potential problems and suggesting solutions reflecting the partnering, rather than the traditional, approach.



*Walkway through atrium*



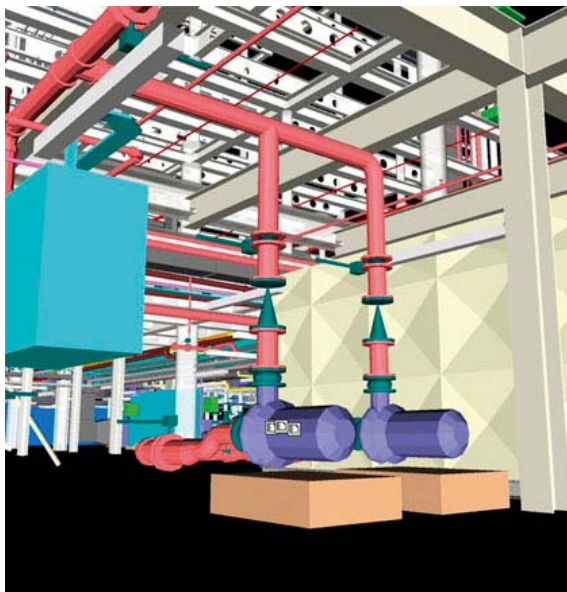
*15/10/04 – View from St Katharine's Dock*

## 6. Project Modelling

The initial proposal to use object modelling for the building services came from **Waterman Gore**, the building services consultants. The cost of £50,000 was accepted by the client and TWC and Rotary collaborated in ensuring that the client received a satisfactory return on their investment. In fact, SAP consider the use of project modelling to be have been so beneficial that recommendations will be made to use the tool as a standard procedure on similar projects in the future.

Although it would be speculative to try to quantify the benefits, there is general agreement by all involved that the sum of £50,000 was well spent. Benefits included :-

- Obviously, **facilitating clash detection** – and there were numerous examples of this benefit. In terms of direct cost, this meant fewer variations.
- **Prefabrication.** Use of the model facilitated prefabrication, in particular by eliminating the need to produce 2D prefabrication drawings before producing workshop drawings. Pipework and ductwork drawings were taken directly from the model.
- **Safety & Environmental.** Less waste and cutting equipment on site.
- **Buildability.** Greater flexibility through better understanding of the building structure and its interfaces with the involvement of the whole professional team.
- **Service routes.** Optimised the use of available space.
- **Communications.** Improved information flows between all parties involved with the project.
- **Mock ups.** No need for physical mock ups.
- **Manufacturers.** Most manufacturers have a database of their own plant allowing CAD departments to be able to download exact plant sizes and dimensions.



Model of Plant Room



Completed Plant Room (April 2005)

SAP is committed to continuous improvement, and it is hoped that the recommendations to be carried forward will benefit all parties involved. Recommendations include :-

- Adopting object modelling from project commencement onwards.
- Ensuring that all the consultants are using compatible technology and committed to the process..
- Consultation with the client on continuous updating of the model so that it can be handed over as a facilities management tool.
- 3D model to be “owned” by the most appropriate member of the project team and used for quick reference as and when required.

#### Traditional Approach



#### 3D approach



5/10/04 – Roof Level Ductwork Installation

## 7. Conclusions and Recommendations

1. For most of the team members appointed to this project in 2002, the concept of partnering with the building services supplier was a new experience. Nearly 3 years on, SAP has already received a number of industry awards for innovation in supply chain partnering and there is a much greater understanding of the benefits. It is therefore to be expected that some of the improvements, which will be recommended from the experience on this project, are already being implemented on other projects. However, some of the recommendations below will highlight where greater emphasis or higher priority should be given to a number of SAP procedures.
2. The earliest possible involvement of the SAP partner in the project is widely understood to be beneficial and this project was no exception, despite some misgivings within the project team at the outset.
3. It is most likely that TWC will want to obtain the buy-in of all parties to adopting a partnering approach to progressing any project, as was the case at K2. This must be clearly communicated and carefully managed if misunderstandings are to be avoided.
4. All SAP projects are expected to run a roll out workshop to ensure that SAP principles are fully communicated to the project team. Many of those involved in this Case Study commented on the need to constantly reinforce the message and to ensure that people joining the project later in the programme have the same briefing. Consideration must be given to how best to inform other key trade contractors on the reasons for SAP (see 3 above). There was evidence that some trade contractors resented the perceived different treatment accorded to Rotary. Periodic trade contractor Workshops should be considered to obviate this misconception of SAP, and to reinforce the partnering ethos, benefits and added value throughout the project. Also, the SAP partner needs to consider how to communicate the SAP philosophy into its own supply chain if there is to be significant amount of 2<sup>nd</sup> tier subcontracting, as happened at K2.
5. The Client and the senior TWC management on the project appreciated the collaborative, non-adversarial approach taken by Rotary.
6. The introduction of the 3D Project Model of the building services installation was not a SAP initiative but the technology should now be embraced by SAP as standard for all similar projects in the future, in particular considering the expertise within TWC in the development of this technology.
7. Rotary's pre-fabrication strategy delivered all the text book benefits and also took advantage of, and was enhanced by, the availability of the 3D model. "Design for manufacture", with shop drawings being produced directly from the project model is the way forward.
8. The Rotary team attended the TWC Safety Courses, free of charge, as set out in the TWC Safety Training matrix. This practice should continue.
9. TWC and SAP partners should review how the principles of SAP are communicated, such as inclusion in induction courses for all staff joining each organisation.
10. At tender stage the decision was taken that a part time M&E QS would be sufficient. However it was found that a full time M&E QS was required and as a result on future SAP projects this role will be given closer consideration.
11. The site team recognised that there were issues where good intentions were unfulfilled. TWC could have provided Rotary with better office space, ideally providing adjacent offices for the project managers, but there were severe space constraints only partly resolved by the temporary floating office
12. This was a JCT Management Contract. One of the views expressed was that this was an inappropriate form of contract for a partnering arrangement, because the SAP partners had quite different responsibilities in their respective contracts. (As Management Contractor TWC were on a fee, employed to get maximum value out of the works, whereas Rotary were on a fixed sum with risks, seeking to protect their profit). This is an issue which should be included in any briefing involving the wider project team. There should be no misunderstanding. Partnering is about relationships – not about contracts. Although certain forms of contract facilitate partnering relationships, some of SAP's most successful projects have used traditional, potentially adversarial forms of contract. **"Good housekeeping", whatever the form of contract, and relationship building are not mutually incompatible.**

# SAP

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