5 What is Equipment? What is Planning?

The term equipment has many definitions but is generally defined as 'the articles and implements required to perform specific activities,' Random House Kernerman, Webster's College Dictionary, © 2010 K Dictionaries Ltd. (Online). For an equipment planner this is best defined as items which have a service provision such as power, water and data.

To assist with the clear definition of equipment versus fixtures and fittings, equipment is generally defined as items which have a service provision such as power, water and data and is not a fixture or furniture.

Planning is the process developed and implemented to ensure that the equipment provided to perform this specific activity is selected, supplied and ready for use in the most effective and efficient manner.

6 Equipment versus Furniture, Fittings and Fixtures

Furniture and fixtures are defined as items that are movable and have no utilities or permanent connection to the structure of a building, whilst fittings are considered as items which are fixed to the structure of the building but can be removed, (Oxford dictionary: Online).

Gray, Hooper, Holt LLP. (Online) states that, 'there is no legal definition of what constitutes fixtures and what constitutes fittings, however, it is generally considered that 'fixtures' are items that are secured or bolted to the walls or floor and 'fittings' are free standing items'.

An example of some common fixtures and fittings are:

Fixtures

- Light fixtures
- Central heating systems (including radiators)
- Kitchen units
- Bathroom suites
- Built in wardrobes

Fittings

- Paintings, pictures (hung on wall)
- Curtains and rails
- Free standing furniture (i.e. chairs)
- Brackets attached to walls or ceilings

There is a general assumption that, unless otherwise specifically stated, fixtures will remain in the property and fittings can be removed by the owner/ occupier of the building if exiting.

7 Fixed Equipment versus Loose Equipment

Fixed equipment is generally defined as equipment which is attached the building during the building phase. This can be structurally significant such as an MRI or a large steriliser, or as basic as a paper towel dispenser. Commonly these items will be managed by the MC although FF&E planners would generally assist with the selection, budget costings and identification of services requirements.

Loose equipment can be any item of equipment that has no permanent connection to the structure of a building or utilities. It is not a requirement for this group to have services but many items do.

A few examples of loose equipment are:

- Physiological monitoring
- Portable diagnostic sets

- Stethoscopes
- Scales
- Ultrasonic cleaners

8 Classifications of FF&E

The Australasian Health Facility Guidelines Part F- FF&E (AFHG) has been used to define the base line groups 1, 2 and 3 FF&E Groups within this document. Additional options which may be used have also been listed in the definitions shown below:

- Group 1 - Items supplied and fixed by the contractor. These are included in the construction contract
- Group 2 - Items supplied by the client and fixed by the contractor. These include items that are transferred but require installation by the contractor, or where the client chooses to buy a piece of equipment and give it to the contractor for installation
- Group 3 - Items supplied and installed by the client. These include all moveable items that can easily be transferred or installed by staff and major items of electro medical equipment that are purchased from the project budget but are installed and commissioned by a third party

Additional Classifications:

It is possible and relevant to consider additional classifications to help assist with the management of the FF&E through a project. For example, a 'T' could be placed after the group such as 3T or 2T to help identify relocatable items in the FF&E list and allowing the budget to be adjusted in the FF&E budget sheet.

Whatever additional categories are used it is important to ensure that all stakeholders are informed and in agreeance with the options.

9 Exemptions in FF&E for Equipment Planners

It is generally agreed that items which are in the MC contract are not in the equipment planner's FF&E management package, but it should be clearly stated in the agreement at time of engagement as sometimes there is a request by the MC for support on selected items. An example of this is pan flushers which have a services package.

Exemptions of equipment vary from project to project, and it is very important that equipment planners establish what these exemptions are from the commencement of engagement.

Exemptions impact on the FF&E budget, as these items are generally financed from an alternative source.

Examples of the types of exemptions are:

- Information Technology (IT) such as:
  - PABX system or similar
  - Nurse Call systems
  - Computers and printers
  - Network Equipment
- Furniture (Non-Clinical) such as:
  - Office furniture
  - Front of house

Non-clinical furniture which can be defined as any equipment not required by clinicians to perform a service directly to the patient, can also be partially exempt from the FF&E package.

Although some furniture and fittings may be specified by a third party such as interior designers who may have the responsibility of colour and fabric selection of chairs etc., these items may still be required to be included in the overall FF&E budget.

10 Room Data Sheets (RDS) & Room Layout Sheets (RLS)

Room Data Sheets (RDS) are the ultimate in detailed briefing for the project. They represent the single source of truth for all consultants to follow into full detailed design and later construction. RDS defines the precise requirements of rooms in written and scheduled form. RDS is a match for RLS (Room Layout Sheet) which is the designed version of RDS. The information in RDS will include as a minimum:

- Room Primary Information- Name, Tag, Code, Size (m2)
- Special Requirements
- Building Fabric and Finishes
- Furniture and Fittings
- Fixtures and Equipment
- Building Services and MEP services Outlets

Under each category, the quantities and outline specs will be provided. Below is sample RDS:

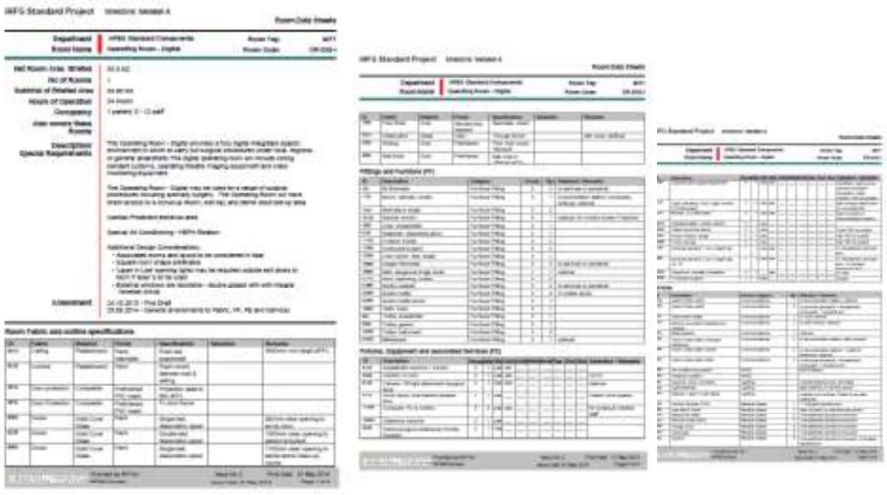


Figure 3: Room Data Sheet (RDS)

Room Layout Sheets (RLS) are usually prepared for critical and typical room types in the facility. These are in 1:50 scale with 4 elevations and reflected ceiling plans and rendered internal view. These are to be fine-tuned and integrated with the services to match the Room Data Sheets. Please refer to the sample RLS below:

Figure 4: Room Layout Sheet (RLS)

11 Stakeholders

Stakeholders can be defined as a range of participants with differing views and priorities, as either individuals or representatives of groups, that have the ability to significantly influence the plan's direction and productions (Green, 2007). Stakeholder identification and consultation establishes a participatory process for the incorporation of particular expectations into planning.

Equipment planners can be engaged by a variety of project stakeholders such as, directly by the client, or by other groups in the project team such as architects, managing contractors or project managers.

Positive engagement and effective stakeholder management can facilitate and guide the engagement process; undertaken poorly though, stakeholders can in instances, have the power to veto or delay the plan (Eagar et al., 2001, Varvasovszky and Brugha, 2000).

Critical to the success of planning are the relationships between equipment planner and stakeholders. Active consultation with stakeholders may occur at different stages of the process, each with implications for decision making, quality of the information and sense of ownership created; and hence the successful implementation of the plan (Green, 2007).

12 Responsibility Matrix

To assist with clearly identifying the key responsibilities of the parties involved in planning, purchasing, delivery, placement, and commissioning of all the FF&E required for the project including information technology equipment, a responsibility matrix should be created by the project manager as part of the different design phases of the project.

The complexity of this matrix can be determined with consultation with the MC and other key stakeholders who will have responsibilities assigned in the completed and agreed document.

Whatever format is selected, it is important that the agreed matrix is presented in a format that is both concise and easy to distribute and read. Several versions are currently being used by equipment planners and project team and examples can be found on-line.

An example of the type of information and format that may be incorporated into a responsibility matrix is shown in Figure 5:

#	Design Services	Master Plan/ Concept Plan		Schematic Design		Design Development /Construction Documentation	
	R=Responsible S=Support	Consultant	TAHPI	Consultant	TAHPI	Consultant	TAHPI
1	Survey						
	Data Collection	R	S				
2	AOR						
	Design Management & Coordination	R	S	R	S	R	S
	Infrastructure Coordination with Building Services	R	S	R	S	R	S
	Authority Interface & Submission	R	S	R	S	R	S
3	Architectural/ Interior Design						
	Architecture Core & Shell		R		R		R
	Departmental Design Clinical areas		R		R		R
	Departmental Design Non-Clinical Areas		R		R		R
	Medical Planning & Benchmarking/ Guidelines		R		R		R
	Phasing Strategy		R		R		R
	Fire & Life Safety	R		R	S	R	
	External Envelope, Thermal & Waterproofing		R		R		R
	RDS & RLS		R		R		R
	Interior Design & Fit-Out- Clinical & Non-Clinical areas		R		R		R
	FF&E Design- Clinical areas		R		R		R
	FF&E Design- Non-Clinical areas		R		R		R
	Medical equipment scheduling		R		R		R
4	Structural Design						
	Sub-Structure	R		R		R	
	Super-Structure	R		R		R	
	Ground Works, Thermal & Waterproofing	R		R		R	
	Geotechnical	R		R		R	
5	MEP						
	Mechanical (HVAC)	R		R	S	R	S
	Medical Gases, Air & Vacuum	R		R	S	R	S
	Electrical, power and lighting	R		R	S	R	S
	Plumbing and Hydraulics	R		R	S	R	S
	Fire & Life Safety Inc. Emergency Power	R		R	S	R	S
	Lighting Exterior/Façade (Inc. Dark Sky)	R		R	S	R	S
	Earthing & Lightning Protection	R		R	S	R	S
	Aviation Lights	R		R	S	R	S
6	ICT & Smart Destination Design						
	Integration with medical devices, equipment, IOT	R		R	S	R	S
	Security & Surveillance / CCTV	R		R	S	R	S
	Access Control & Digital Key	R		R	S	R	S
	Wi-fi, Telecommunication and Low Voltage	R		R	S	R	S
	Audio Visual	R		R	S	R	S
	BMS	R		R	S	R	S
	Fire detection & alarm and PA/VA	R		R	S	R	S
	Digital Signage	R		R	S	R	S

Figure 5: Sample of Responsibility matrix

13 Greenfield versus Brownfield Sites

Hospital capital works projects can generally be referred to as either a Brownfield or Greenfield site build.

The term Brownfield development site is generally used in the development of land that, at some point, had been occupied by a permanent structure or structures that, due to a variety of reasons, no longer achieved the highest and best use of the property, necessitating the need to demolish or renovate those improvements. A brownfield option may be used when the existing facilities are generally well located and it is almost impossible to acquire large sites of land suitable for Greenfield development in comparable locations, (m3property, Property Update Feb 2014).

The term Greenfield development site can be defined as a site which is developed with no need to work within the constraints of existing buildings or infrastructure'. The sites refer to the development of purpose built or converted hospital buildings in locations where there is no existing hospital business operating prior to development taking place, (m3property, Property Update Feb 2014).

Both build options will have different requirements and issues which the equipment planning team must be aware of. Some of these issues are:

- The management of equipment to be relocated from an existing site to a new facility
- The management of equipment to be relocated within an existing site without impacting on services
- Identifying any structural issues related to installation of new equipment in a brownfield site
- Identifying and confirmation that the services required for major new FF&E can be accommodated
- Management of the security and storage of new equipment

14 Project Delivery Phases

There are generally five phases in a healthcare project delivery process consisting of the following:

- Strategic plan phase
  - Mission
  - Internal/ external assessment
  - Strategies and initiative
  - Financial plan
- Project launch phase
  - Project delivery team
  - Master plan
  - Operational and space programme
  - Land acquisition analysis
  - Master project budget and schedule
- Design phase
  - Concept design
  - Schematic design
  - Design development
  - Construction documentation
- Construction phase
  - Start-up
  - Project construction and planning
  - Equipment delivery and installation (site supervision)
  - Certificate of occupancy

- Occupancy/ Commissioning phase
  - Move planning
  - Building commission
  - Staff training
  - Staff and patient occupation
  - Post Occupancy audit

Equipment planners can get involved during the Strategic planning phase to identify major capital equipment, budgeting, and layout requirements however, generally equipment planners are engaged at the beginning of the design phase. The typical activities and deliverables for equipment planners from this point of the project have been included in this section.

There is always a requirement for equipment planners to advise architects of how equipment should be integrated into the project architectural drawings, however if engaged directly by the architects, an equipment planner may be required to provide room layouts sheets (RLS) which are specifically focused on the equipment to ensure the layout appropriately accommodates the FF&E fit out.

Design Phase

Concept Design

Concept design is the preparation of Blocking and Stacking diagrams which represent the global arrangement of activities on every level of the building in a series of diagrams which are to approximately correct scale.

Blocking and stacking correctly locates the Functional Planning Units (KPU's) or Departments on various floors, please refer to the picture below. The diagrams have sufficient information to show:

- The required departmental geometries and dimensions
- The appropriate functional relationships horizontally and vertically
- The major grouping of functions such as Patients, Staff, Services, Support
- Staging and future expansion
- Any decanting and relocations on refurbished projects

Figure 6: Concept Design

During this phase, a high-level medical technology report is prepared detailing the types and complexity of the medical equipment technology intended to be used to meet the project's requirements and needs, on department-by-department basis.

Schematic Design

The purpose of Schematic Design is to translate the project program into physical drawings of space and to present it in a form that achieves client understanding and acceptance.

The project team determines the areas, physical requirements, and relationships of all the required building spaces and components including the FF&E, and confirms or revises the total building square footage, the total project budget, and the project schedule and occupancy dates, please refer to the figure below:

Figure 7: Schematic Design

Critical information is always identified during this phase regarding the requirements of the architecturally significant equipment (ASE). This is equipment which due to its size and/ or intricacies has an impact on the design and engineering planning of the building.

During the SD phase, the equipment planner must identify the required FF&E for the project, provide spatial and utility requirements to the architect to ensure accurate designs create realistic calculations for the complete equipment budget and develop the projects FF&E plan.

The following is a list of activities and deliverable which should be included in this phase:

Activities & Deliverables

- Develop preliminary FF&E room-by-room schedule
- Establish FF&E groupings
- Attend user group meetings as required
- Coordinate and communicate with design team including architect, engineers, project manager, construction firm and IT
- Provide updated listing of new and existing equipment
- Update Room Data Sheets (RDS)
- Develop preliminary budget
- Provide engineering/ mechanical, electrical, plumbing (MEP) specifications for Architecturally

Significant Equipment (ASE) to MC and architects

- Provide preliminary Room Layout Sheets (RLS)
- Develop preliminary timeline list for major equipment
- Develop the Project FF&E plan
- Develop change report process for FF&E database

Design Development

The design development phase provides for further refinement of the project design and fit out.

Plan arrangements, specific space accommodations, FF&E, building design, materials and colours, and complete definitions of all systems serving the project are developed.

All design decisions are completed during this phase in order to prepare the subsequent construction documents.

During the design development phase, the equipment planner needs to continue to refine the FF&E schedule, provide all information required to the MC and associated stakeholders to ensure that it is appropriately coordinated with the architectural build and ensure that the procurement schedule and the associated planning process are moving towards tender level. Assistance with the FF&E requirements for the mock up room may also be required.

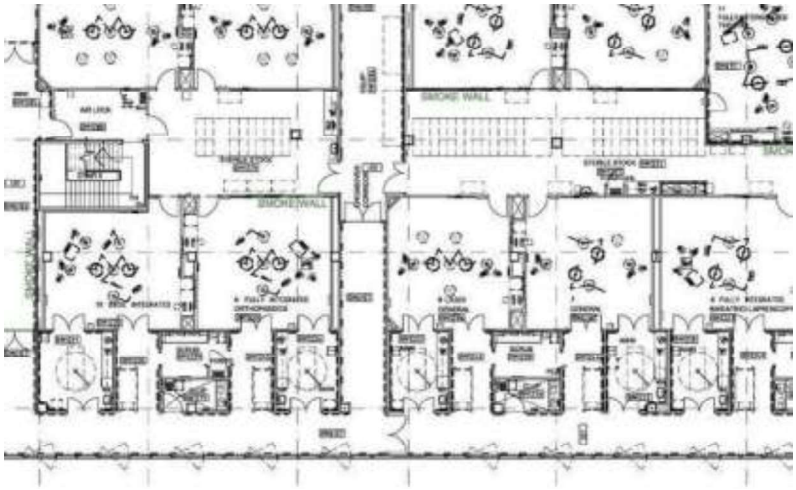


Figure 8: Design Development

The following is a list of activities and deliverable which should be included in this phase:

Activities & Deliverables:

- Ongoing coordination & communication with design team
- Refine room by room listing of equipment
- Review bill of quantity report (BOQ)
- Update equipment budget
- Validate Room Data Sheets (RDS) and Room Layout Sheets (RLS) for FF&E fit
- Provide equipment specification data for all medical equipment to MC in an agreed format
- Assist with mock up rooms
- Refinement of FF&E procurement timeline consistent with project build
- Provide and review construction & procurement schedule

- Maintain change reports

Construction Documentation

Contract Documentation involves the development of complete and appropriately coordinated documents including working drawings and specifications, suitable for tendering and construction.

During the construction document phase the equipment planner is required to ensure that the FF&E schedule is completed including all related budgetary information. All equipment service documents need to be completed, timeline schedules confirmed and the room-by-room FF&E listing validated. Appendix 2 represents an example of a scheduling template that could be used. FF&E specifications need to be suitable for tender issue.

The following is a list of activities and deliverable which should be included in this phase:

Activities & Deliverables:

- Ongoing co-ordination & communication with design team
- Provide final room-by-room listing of new and existing equipment
- Prepare a comprehensive bill of quantity report (BOQ) of equipment to be procured to MC and relevant stakeholders
- Generate construction documents budget based on agreed equipment
- Update construction documents for equipment requirements
- Submit the final updated set of Room Data Sheets (RDS) and Room Layout Sheets (RLS)
- Refine the tender level specifications for procurement of selected FF&E (as applicable)
- Update and review construction & procurement schedule
- Coordinate early delivery items/ long lead time items required for construction
- Develop delivery delay contingency plan

Construction Phase

The construction phase incorporates the contract administration phase. This commences when the building contractor is formally engaged to deliver the building project and associated works. The Contract Administration phase covers all construction, subcontracting, procurement and installation of engineering services, commissioning, handover, defects rectification works, and extends to the final financial close of the project.

During this phase the equipment planner must ensure that all the FF&E in the schedule of equipment (refer to section 10.4), is located within the building and all information required ensuring that the installation of the FF&E has been provided to the MC. The procurement process and tendering timeline must also reflect the project schedule. The equipment planner should liaise with the MC to ensure that the delivery dates for specific items are identified and communicated between the parties.

Contingency plans for delays in supplier delivery of critical items should be developed to ensure that delivery of such items is achieved within project timeframes. This will ensure no delays in the completion of construction or operational commissioning requirements.

The following is a list of activities and deliverable which should be included in this phase:

Activities & Deliverables:

- Ongoing co-ordination & communication with design team
- Coordinate procurement process with relevant stakeholders
- Maintain procurement and delivery process within construction & procurement schedule
- Coordinate early delivery items required for construction

- Update pre-installation requirements for selected equipment
- Review shop drawings
- Update room readiness reports in coordination with the MC
- Coordinate on-site deliveries
- Supervise the installation, testing & commissioning process
- Update FF&E schedule to reflect finalised pricing at time of order
- Coordinate the clinical and technical training for FF&E in coordination with the end users and medical equipment suppliers
- Organise hand-over

As part of the relocation/ transition plan, items required for the proposed occupation date will be scheduled to arrive so as to be able to undertake required commissioning checks and installation at the point of use in a timely manner.

Occupancy/ Commissioning Phase

FF&E is an integral part of the operational commissioning of new or refurbished facilities and as such FF&E personnel form part of the Commissioning Team and all FF&E activities need to be incorporated into the Commissioning Plan.

In the occupancy/ commissioning phase, a certificate of practical completion is issued when the construction work has been completed and the building is suitable for occupation. At this stage, the control of the building passes from the contractor to the facilities owner occupiers.

The handover stage of the project is planned, to avoid impact on service delivery.

During this phase, the equipment planner must ensure that all certificates, warranties, operation and maintenance manuals are provided for all relevant FF&E. The equipment planner must also ensure that all equipment is fully functioning and has met all safety, compliance, validation testing and commissioning requirements and training programmes for staff have been organised to suit the equipment purchased.

15 Deliverables Matrix

To help summarise the FF&E consultancy project deliverables, the following matrix has been provided.

Project Phase	Deliverables
Concept Design	High-Level Medical Technology Report
Schematic Design	Preliminary Room-by-Room Equipment Schedule Engineering Data Sheets (EDS) Room Data Sheet (RDS) Preliminary Room Layout Sheets (RLS) Preliminary Bill of Quantity Preliminary Equipment Budget
Design Development	Revised Room-by-Room Equipment Schedule Revised Engineering Data Sheets (EDS) Revised Room Data Sheet (RDS) Revised Room Layout Sheets (RLS) Revised Bill of Quantity

Project Phase	Deliverables
	Revised Equipment Budget
	Equipment Tender Specifications
Construction Documentation	Final Room-by-Room Equipment Schedule
	Final Engineering Data Sheets (EDS)
	Final Room Data Sheet (RDS)
	Final Room Layout Sheets (RLS)
	Final Bill of Quantity
	Final Equipment Budget
	Final Equipment Tender Specifications
Construction Phase	Prepare Tender Package
	Invite Tenders
	Receive and Evaluate Received Bids
	Award Letters/ PO Issuance
	Review of Material Approval Submittals (MAS)
	Review of Shop Drawings & Pre-Installation Requirements
	Coordinate Deliveries
	Supervise Installation, Testing & Commissioning
	Coordinate Clinical & Technical Training
	Hand-over
Commissioning Phase	Pre-Operational Management
	Staff Training & Dry Runs

Figure 9: Deliverables Matrix

16 Equipment Planning

Client Service and Technical briefs

Prior to the commencement of any project, it is essential to establish the scope of work required to complete the required task. To assist with establishing this, the equipment planner must obtain from the client or the assigned representative a copy of the client service brief, which can also be called the functional brief and the technical brief.

Service Brief

The Service Brief is a written statement of the functions to be accommodated and the inter-relationships of these functions for a proposed capital project. It should describe the services to be provided, activities to be performed and clearly identify how the project meets the organisation's objectives and policies. The Health Service/ Agency is responsible for preparing, a functional brief. Generally, this process involves the engagement of relevant consultants to assist with its development.

The document should contain sufficient detail to initiate the design process. It should establish the optimum solution to meet service requirements and outline the total scope of works to be undertaken.

A Service Brief for a capital works project should contain the following information:

- Agency role statement
- Management and operational policies
- Type and level of services to be provided
- Existing and future service trends
- Staffing profile
- Project objective
- Existing facilities
- Departmental functions associated with the project
- Departmental and functional relationships
- Accommodation requirements on a departmental or functional area basis
- General design considerations
- Equipment needs
- Recurrent cost statement

Technical Brief

The Technical Brief for a capital works project is generally set out to provide the project's minimum design and technical requirements which must be incorporated into the design of the Facility. Although this document will provide the equipment planner with the additional information necessary to help refine the equipment required and outlined in the project's functional brief, it is important to cross reference any equipment information listed in these documents with the available SOA.

Obtain or Create Schedule of Accommodation

A Schedule of Accommodation (SOA) is generally developed by the project architect to specify the type and number and size of rooms that will be required. Depending on the available information to the architect, this may include data on the finishes, equipment and furniture that will be required in the allocated rooms.

The equipment planner should obtain this document along with the briefs to develop the preliminary schedule of equipment.

This document can usually be generated from the project's database or the architectural drawings.

Negotiation with the architects and the MC is essential if this is required as additional time and cost will be incurred by the project if it was not included in the fee proposal.

Development of a Schedule of Equipment (SOE)

Once the equipment planner has a copy of the SOA, this document should be used to develop a High-Level Medical Technology Report to identify the level of technology that suits the project requirements and budget. Once the end users' feedback is received, then the Schedule of Equipment (SOE) can be developed. This schedule can be created in a spreadsheet although depending on the software available other database system may be used either as an alternative or in combination.

The created SOE must show as a minimum the FF&E information of:

- Room reference
- Department
- Sub department
- Room name
- Item description
- Item group (if included in package)
- Item selection
- Quantity of items
- No of rooms
- Total quantity
- Cost per item (optional)
- Total item cost (optional)

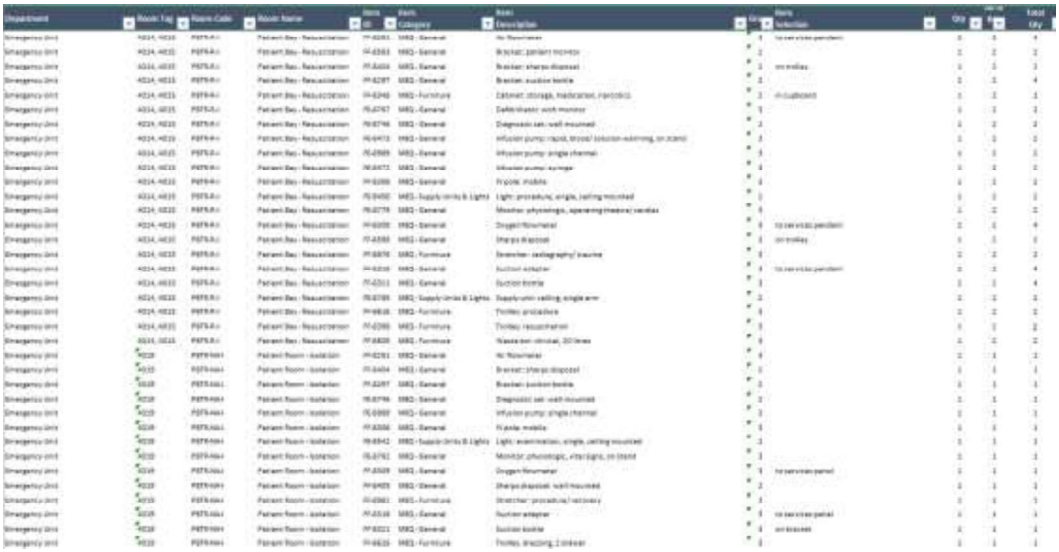


Figure 10: Sample Schedule of Equipment (SOE)

Irrespective of the database used to develop the SOE, it is still a requirement that it eventually be uploaded into the main database for handover. Communication with project's MC and other

relevant stakeholders is essential for this to be planned prior to selection the SOA/ SOE format for the project.

Assess the Need for Equipment

Equipment requirements for the project are initially generated from the project briefs and the SOA. The input of information to refine this list will come from user group interface and communication with other project team members as well as the knowledge base and experience of the equipment planning team.

Equipment planners are required to assist the user and project MC to ensure that all equipment selected is:

- In line with the project briefs in conjunction with user group input
- Fit for purpose yet user friendly with upgradable life cycle options
- Of a technology level allowing each specialist to provide a high quality of care while keeping the budget under control
- Of a technical standard addressing current need and future requirements within departmental area
- Compliant with all relevant standards
- In accordance with the end users' requirements and the operational policies of the hospital (as applicable)
- Easy to maintain

Development of a Services Package

An equipment services package is a schedule which provides specification information to the construction and architectural teams incorporating all the service information required to install and run the equipment as specified in the project briefs. It is also used to assist with contractor tenders to specify the scope of work required to install the listed equipment service.

This package is a requirement for which the equipment planner is responsible for creating and maintaining.

The list of equipment and its subsequent services document format should be discussed in communication with the MC and relevant stakeholders who will require this information in the planning and installation on this equipment.

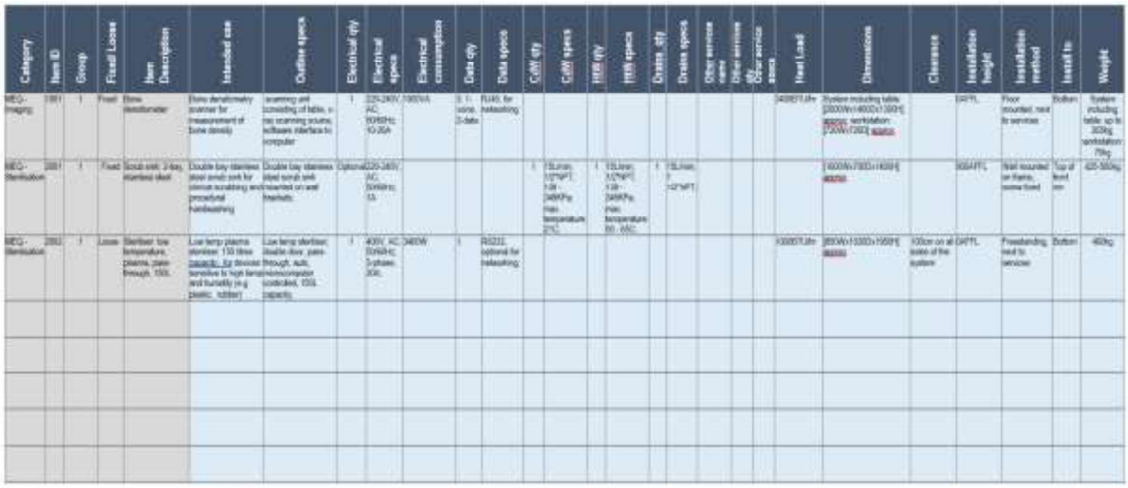
This package can be created in excel although depending on the software available other database systems may be used.

To meet the needs of the construction team, the FF&E services package should at a minimum, contain the following information:

- Item Description: Make, model and catalogue number (optional)
- Architectural: Dimensions and weight
- Electric: Power phase, voltage, current, frequency, connection type, and power type/ requirement
- Communications: Data requirements, and BMS Connection
- Hydraulics: Drainage and water requirements
- Mechanical: Extraction and gases required

Additional information such the product provider and contact details are also useful.

The abovementioned information is usually based on worst-case scenario requirements between the top 3 or 4 recommended models, please refer to the figure below:



Abbreviations: CdW – Cold water; HtW – Hot water; Specs- specifications; qty - quantity

Figure 11: FF&E Services Package Details

Supplier Site Planning Guides/ Cut Sheets

To help ensure that major equipment is correctly installed, the services package is correct, and the rooms are appropriately designed, suppliers can provide installation cut sheets/ site planning guides.

The intended use of cut sheets/ site planning guides is to communicate the spatial requirements as well as the basic architectural, electrical, structural, and mechanical requirements for the particular piece of equipment. The information provided in these documents is for reference only, during the pre-planning stage, and therefore does not contain any site-specific detailed requirements. More than one cutsheet may be shared with the project team for 3 or 4 top brands, and worst-case scenario requirements are concluded accordingly.

It is essential that the FF&E planner has access to these documents and can share them with the relevant construction team stakeholders.

These documents can be used to provide the basis for developing the tender specifications for the required equipment although care must be taken to ensure that the tender specifications are not supplier specific.

Pitfalls

It is essential to be aware of the full range of specifications associated with the relevant products available on the market. Generic fit out should incorporate the maximum parameters of the available product range to ensure that the item can be tendered appropriately and not be locked into one supplier.

Room Data Sheets (RDS) & Room Layout Sheets (RLS)

Room Data Sheets (RDS) are meanwhile developed in accordance with the abovementioned information. RDS defines the precise requirements of rooms in written and scheduled form. The information in RDS will include as a minimum:

- Room Primary Information- Name, Tag, Code, Size (m²)
- Special Requirements
- Building Fabric and Finishes
- Furniture and Fittings
- Fixtures and Equipment
- Building Services and MEP services Outlets

Under each category, the quantities and outline specs will be provided.

RDS is a match for Room Layout Sheet (RLS) which is the designed version of RDS. Room Layout Sheets are prepared in scale 1:50 with 4 elevations and reflected ceiling plan. Rendered internal view may be provided depending on the project requirement. Please refer to the figure below.

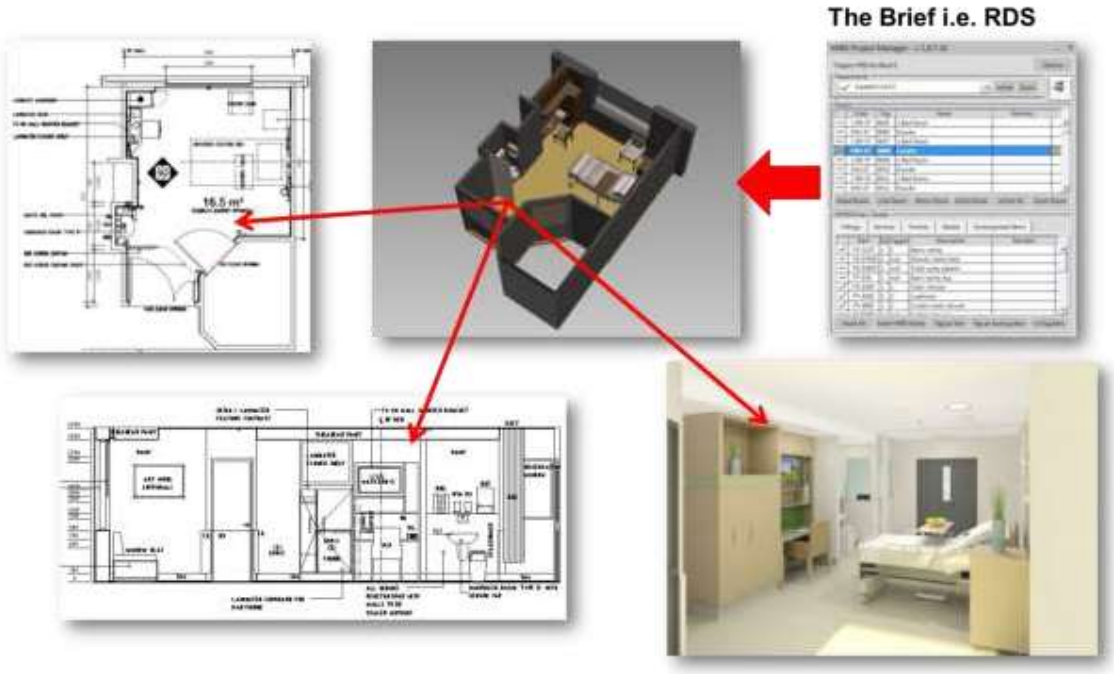


Figure 12: Room Data Sheet & Room Layout Sheet

Budget Management

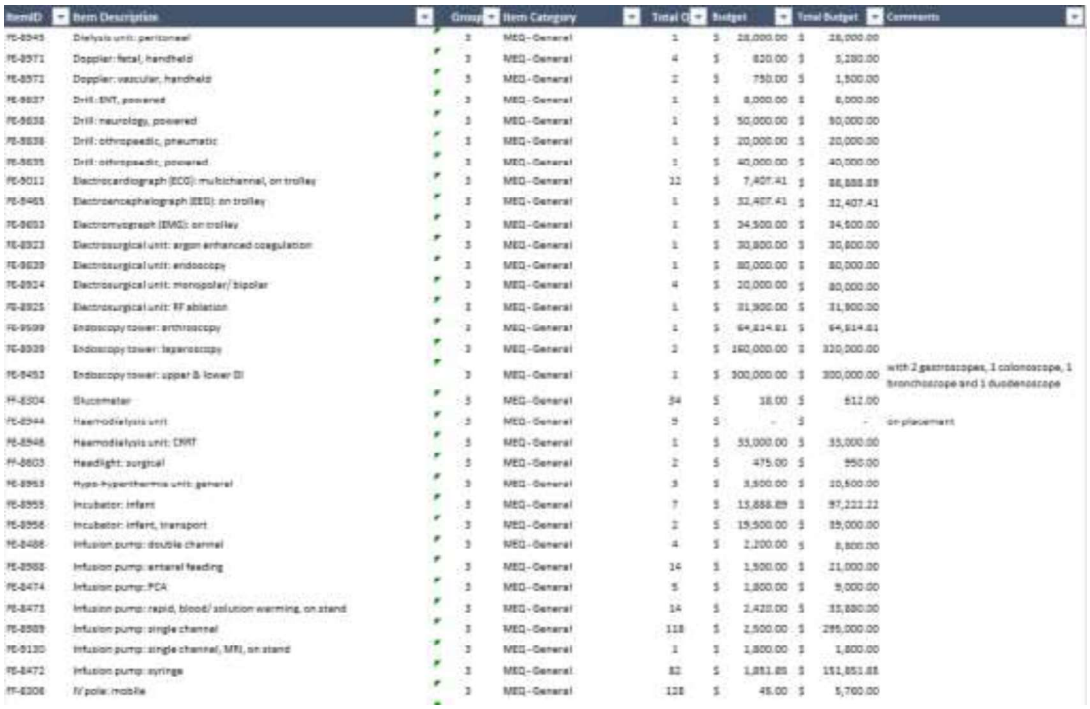
A clear understanding of the FF&E budget and how it has been allocated into agreed and defined project groups is essential to the FF&E planning and procurement strategy.

Preliminary budgets are developed from the initial FF&E schedule which is created from the project briefs and the schedule of accommodation document. It is generally accepted as a single item, cost price listing. It is largely void of any costs associated with supplier negotiation and multiple product purchase pricing which is generated from tendering.

More accurate estimates based on detailed furniture, fittings and equipment lists can be developed at the design development stage, in parallel with the normal capital cost planning process.

Budgets may differ from one country to another and according to project requirements, for example; high-end project versus low-end. Therefore, budgets should be prepared carefully to reflect the client's preference and requirements.

Budget summaries should be produced and reported on to the designated project coordinator on a regular basis to confirm that the project procurement plan is tracking inside the budget.



Item(ID)	Item Description	Group	Item Category	Total Q	Budget	Total Budget	Comments
FE-8045	Dialysis unit: peritoneal	3	MEQ - General	1	$ 28,000.00	$ 28,000.00	
FE-8571	Doppler: fetal, handheld	3	MEQ - General	4	$ 820.00	$ 3,280.00	
FE-8572	Doppler: vascular, handheld	3	MEQ - General	2	$ 750.00	$ 1,500.00	
FE-8637	Drill: ENT, powered	3	MEQ - General	1	$ 8,000.00	$ 8,000.00	
FE-8638	Drill: neurology, powered	3	MEQ - General	1	$ 50,000.00	$ 50,000.00	
FE-8638	Drill: orthopaedic, pneumatic	3	MEQ - General	1	$ 20,000.00	$ 20,000.00	
FE-8635	Drill: orthopaedic, powered	3	MEQ - General	1	$ 40,000.00	$ 40,000.00	
FE-8011	Electrocardiograph (ECG): multichannel, on trolley	3	MEQ - General	12	$ 7,407.41	$ 88,888.89	
FE-8465	Electroencephalograph (EEG): on trolley	3	MEQ - General	1	$ 32,407.41	$ 32,407.41	
FE-8653	Electromyograph (EMG): on trolley	3	MEQ - General	1	$ 34,500.00	$ 34,500.00	
FE-8923	Electrosurgical unit: argon enhanced coagulation	3	MEQ - General	1	$ 30,800.00	$ 30,800.00	
FE-8639	Electrosurgical unit: endoscopy	3	MEQ - General	1	$ 80,000.00	$ 80,000.00	
FE-8924	Electrosurgical unit: monopolar/ bipolar	3	MEQ - General	4	$ 20,000.00	$ 80,000.00	
FE-8925	Electrosurgical unit: RF ablation	3	MEQ - General	1	$ 31,900.00	$ 31,900.00	
FE-9599	Endoscopy tower: arthroscopy	3	MEQ - General	1	$ 64,814.81	$ 64,814.81	
FE-8939	Endoscopy tower: laparoscopy	3	MEQ - General	2	$ 160,000.00	$ 320,000.00	
FE-8493	Endoscopy tower: upper & lower GI	3	MEQ - General	1	$ 300,000.00	$ 300,000.00	with 2 gastroscopes, 1 colonoscope, 1 bronchoscope and 1 duodenoscope
FF-8304	Glucometer	3	MEQ - General	34	$ 18.00	$ 612.00	
FE-8944	Haemodialysis unit	3	MEQ - General	9	$ -	$ -	on placement
FE-8948	Haemodialysis unit: CRRT	3	MEQ - General	1	$ 35,000.00	$ 35,000.00	
FF-8603	Headlight: surgical	3	MEQ - General	2	$ 475.00	$ 950.00	
FE-8963	Hypo-hyperthermia unit: general	3	MEQ - General	3	$ 3,500.00	$ 10,500.00	
FE-8955	Incubator: infant	3	MEQ - General	7	$ 13,888.89	$ 97,222.22	
FE-8956	Incubator: infant, transport	3	MEQ - General	2	$ 15,500.00	$ 35,000.00	
FE-8486	Infusion pump: double channel	3	MEQ - General	4	$ 2,200.00	$ 8,800.00	
FE-8968	Infusion pump: enteral feeding	3	MEQ - General	14	$ 1,500.00	$ 21,000.00	
FE-8474	Infusion pump: PCA	3	MEQ - General	5	$ 1,800.00	$ 9,000.00	
FE-8471	Infusion pump: rapid, blood/ solution warming, on stand	3	MEQ - General	14	$ 2,420.00	$ 33,880.00	
FE-8569	Infusion pump: single channel	3	MEQ - General	118	$ 2,500.00	$ 295,000.00	
FE-8130	Infusion pump: single channel, MRI, on stand	3	MEQ - General	1	$ 1,800.00	$ 1,800.00	
FE-8472	Infusion pump: syringe	3	MEQ - General	82	$ 1,851.85	$ 151,851.88	
FF-8306	IV pole: mobile	3	MEQ - General	128	$ 45.00	$ 5,760.00	

Figure 13: Sample Budget Estimates Report

Contingency Sum

A contingency sum is an amount of money set aside to cover additional costs incurred for unforeseen/ additional building repairs, landscaping or site works for a building project. A reasonable contingency to allow in the budget would be 5-10% for new construction, and up to 20% for renovation or addition projects.

A contingency sum should be used during the design and construction phases of the project. The inclusion of a contingency sum helps ensure that the project can develop, and additional work can be absorbed into the project without additional funding being required.

With regards to FF&E, a contingency sum is an amount of money set aside to cover additional costs incurred for unforeseen changes in the cost of the required FF&E which may include additional accessories, options, software applications, consumables, and disposables... etc. Although a contingency of around 3-5% is suggested, some projects clients accept the variation from the preliminary budget to the tender response packages as the method of contingency processing.

How this sum is incorporated into the FF&E budget must be established early in the project as it will significantly impact on determining what the available budget funds will be.

Equipment Specifications

Other than the information provided as part of the services package for the project, equipment specifications for all items within the scope of the equipment planner need to be developed and refined in preparation for tendering.

A typical specification could include the following sections:

- Intended use of the item
- Technical features
- Software/ system interface
- Consumables and disposables (usually start-up kits are to be supplied with the FF&E)
- Accessories

- Options
- Compliance with standards (FDA and/or CE)
- Site preparation & installation requirements

The specifications must be concise enough to ensure that the supplier clearly understands what is required to be supplied, please refer to the template below as an example of tender specifications.

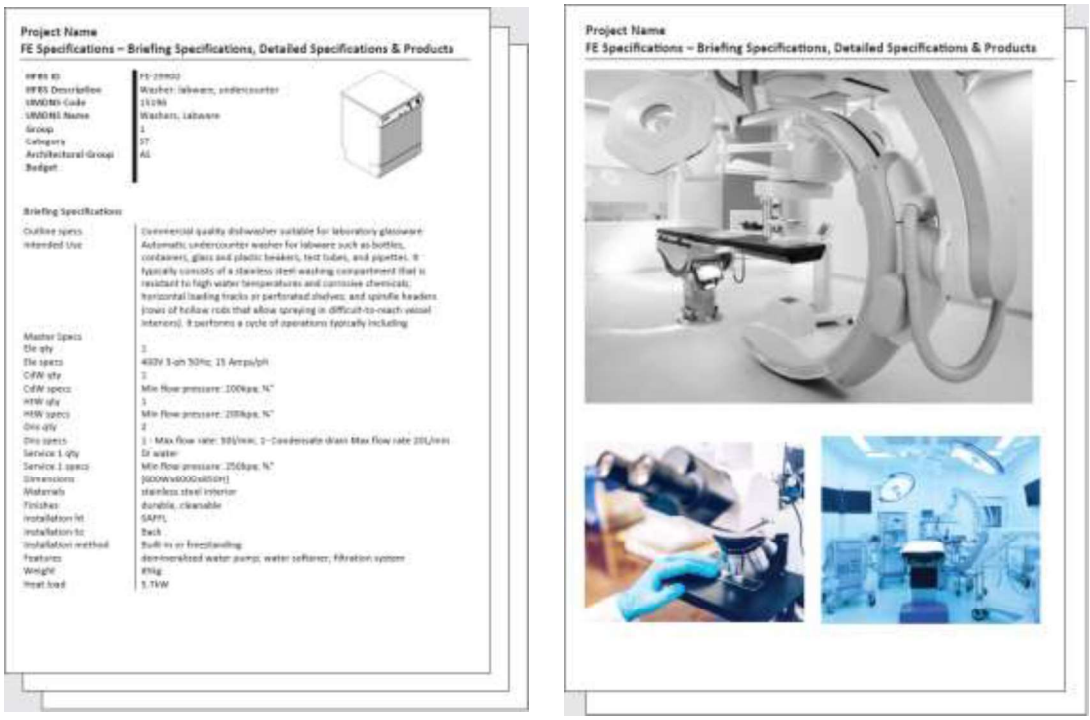


Figure 14: Equipment Tender Specification Template

17 Equipment Procurement

Early procurement planning is critical to the development of an effective and complete procurement list. This schedule can then be incorporated into the overall project timeframe.

This planning needs to take into account:

- Selection timeframes which include end user consultation, risk assessment and equipment trials
- Lead times of selected items
- Approval processes for sign-off to procure
- Contingencies for delays in delivery

To ensure that the ongoing procurement strategy continues to meet the client's requirements, an effective reporting process must be agreed upon. This should consist of:

- Regular scheduled meetings with the MC and/ or delegate/s to report on budget, update on the procurement management and discuss any relevant issues
- Team meetings with the relevant client and contractor's FF&E planning teams to maintain coordination and validation of timeline and delivery process
- A regular reporting schedule to the designated stakeholder in an agreed format and time frame, providing information on procurement and progress against the project plan

The strategy should be based on a range of factors, including the agreed delivery and timeline schedule, procurement methodology developed through information provided within the project briefs, and consultations with the project's key stakeholders.

The selection of an effective procurement strategy:

- Reduces the risk of project time and budget overruns
- Assists in securing satisfactory project outcomes
- Reduces the likelihood of contractual disputes and litigation
- Encourages the appropriate allocation of risk between industry, project team and client.

Successful selection and procurement of FF&E ensures that the project is not disrupted by delays in fit out of FF&E and the subsequent health service provided at the completion of the project is able to be delivered in an environment that optimises patient outcomes whilst promoting operational efficiencies.

Common Equipment Procurement Methods

The objective of the tendering/ quotation process is to ensure the best value for money product is provided and supported. Understanding the market and engaging with it in the most effective way is crucial to achieving desired outcomes in a way that produces value for money.

The various methods which generally are used in the procurement of FF&E are:

- Direct purchasing: contacting the supplier directly for a price and placing an order.
- Verbal and written quotations; for this option the supplier is requested to provide a price and terms of procurement for an item or group of items which can be provided by a supplier. Usually, several quotations are obtained for comparison.
- Open tender: a purchasing procedure whereby potential suppliers are invited to make a price and terms offer which on acceptance, should be the foundation of the subsequent contract, based on a published written document formatted by the procurement team.

The length of time and the steps required for procurement will depend on the selected method and the internal process which needs to be adopted as part of the overall procurement format.

The equipment planner and any associated procurement team should clarify the method which is required for each of the items which make up the procurement in the FF&E schedule.

As part of the review to determine which methods are best suited the following questions should be answered:

- What is the basis for selection?
- Which procurement method promises the best value for money?
- Which procurement method best suits which procurement contract?
- Can all methods be considered or are there policies in place which drive suitable options?

The ability to select the appropriate procurement method is one of the professional skills required to drive increased value from procurement.

Vendor Assessment

It is essential to ensure that the vendors which can provide the project with the necessary FF&E are reliable and can provide a good quality product that can comply with all the relevant product standards. To help ensure this it may be necessary to undertake vendor assessments.

Vendor Assessment may be defined as the assessment or evaluation to ensure a prospective vendor can effectively meet the obligations and needs of the business regarding a service or product. (Business Analyst Leaning, 2016 [Online] Refer to: https://businessanalystlearnings.com/ba-techniques/2016/1/15/vendor-assessment-technique

To assist with this analysis, the equipment planner may be required to develop evaluation tools to assist the procurement team in selecting the appropriate vendors which will be included in the tender process.

To assist with developing a structure for this assessment, three subheadings have be provided:

- Vender assessment criteria
- Vender assessment process and
- Vender assessment report.

Vendor Assessment Criteria

There are numerous factors that need to be considered in the vendor assessment criteria. These may include such things as technical competence, vision, financial stability, capability, motivation, cultural compatibility, and the knowledge base of the vendor.

The focus should always be one of a ‘best for project’ assessment which means not always considering items on a best price only format.

The assessment should also be done in a way that separates the commercial from the clinical/ technical requirements with the final assessment review being the combination of both.

Business Analyst Leaning, 2016, states that these two approaches can then apply due diligence in assessing the prospective vendor with regards to:

- Availability
- Resource capacity
- Technical capability
- Financial security
- Availability of local support
- Experience in the sector
- Client testimony
- Understanding of the geographic location
- Understanding of business drivers and client’s business

- Specific staffing and skill levels &
- Compliance with standards.

The other factors that may need to be considered include:

- Commercial & trading license
- Shipment, delivery, and storage management process
- Installation testing and commissioning process
- Site organisation and coordination with the MC and subcontractors
- Manpower and staff expertise
- Shop drawing capabilities.

The FF&E consultant and client will agree on the vendor assessment criteria and the importance weightage.

Civil Service India, also provides another descriptive and breakdown of the requirements of this vendor assessment process, refer to:
http://www.civilserviceindia.com/subject/Management/notes/vendor-evaluation-and-audit.html,

Vendor Assessment Process

There are basically three different types of vendor evaluation. These are:

Informal Use of Records

In this type of vendor evaluation, data is collected from many sources such as journals, diaries, logbooks, or financial records, and knowing what happened in the past allow one to evaluate an event in order to make better decisions for the future.

After-The-Fact Evaluation

When event has occurred, a manager may ask questions like:

- What happened?
- How did it happen?
- Why did it succeed? or why did it fail?
- How well did it do?

Responses to such questions give data for decisions and future planning after an event has been completed.

Before-The-Fact Designed

In this type of evaluation, the evaluator plans and starts gathering data early in the history of the project. Evaluation vendor capabilities are an example.

An example of the vendor assessment process is shown in figure 16.

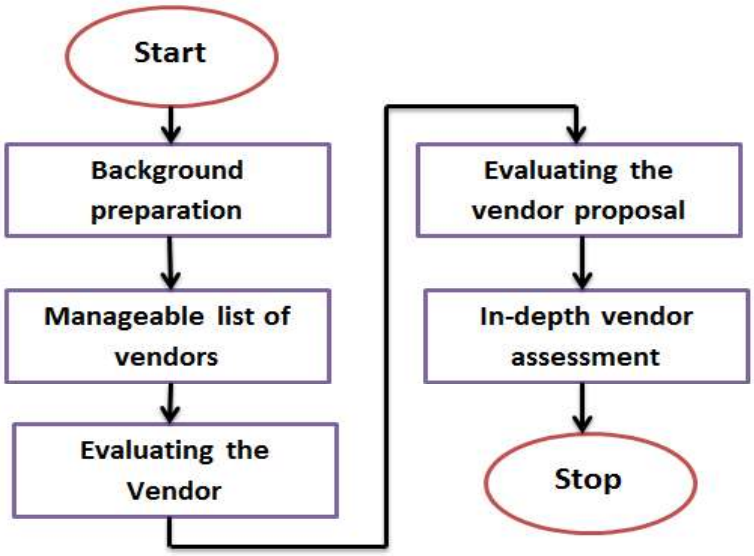


Figure 16: Vendor Assessment Process (Civil Service India 2017)

Vendor Assessment Report

A vendor assessment report can summarise the outcomes of the vendor assessment process and may be defined as a deliverable based on the client requirements.

The process should be formatted and provided in a way that the successful supplier can be clearly identified.

However, the team decides to develop vendor evaluation assessment tools, it should always be an acceptable and agreed format with the key aim of providing FFE products which are selected on a 'best for project' basis.

Vendor Assessment can be a time-consuming process especially when assessing multiple vendors. For this reason, it is essential to allow for this process in the project procurement timline.

Short List Tenders

In some cases, it is better to seek responses from suppliers to determine the suitability of a supplier to meet the requirements of the tender. This can be due to such reasons as the complexity of the items required or the quantity and multiples of the items is significant.

A single stage tender is unlikely to provide the team with a suitable outcome and often creates a messy tender review process due to the multiple responses and subsequent evaluations required. To improve the tender process when addressing these types of item tenders it is more appropriate to undertake a two stage tender process.

A two-stage process is where a call for expressions or registrations of interest (EOI or ROI) are undertaken to establish baseline capabilities of respondents. After EOI/ ROI responses are received and evaluated, a shortlist of suitable respondents can be issued a Request for Tender (RFT) using the planned tender process.

Equipment Tendering

Equipment tendering is part of the overall procurement plan. It is the chosen method for the majority of the purchasing for projects. The open tender process is generally preferred, particularly when there is high end equipment required or there are large quantities of items.

The open tender process is preferred because it:

- Is formal and regulated
- Opens the market up to all suppliers who have suitable products
- Operates from a standard formatted tender document
- Allows for transparency of bid
- Encourages competitive bidding
- Operates under formal written procedures and probity rules.

The tender documents usually include but not limited to:

- Contract with equipment distributor
- Tender terms and conditions
- Bill of Quantity Report (BOQ)
- Tender Specifications
- Room-by-Room Schedule
- Training and Warranty Schedule
- Floor Plans
- Room Layout Sheets (optional).

An example of the tender process which would be included in the procurement plan is as follows:

- Approvals would be sought by the equipment planner from the MC or the designated person for all FF&E prior to placement of tenders
- A detailed approved FF&E schedule is to be used for procurement. The tender procurement option will be selected based on whether specific models and specifications are provided or whether items of similar or equal specification are to be considered. The project procurement process guidelines must be adhered to when making this decision
- Tenders are to be of sufficient detail so there is clarity about what is required
- Reporting and monitoring of the FF&E budget will be the responsibility of the equipment planner
- Where no preferred supplier is indicated, then the appropriate tendering process must be used to ensure a cost-effective solution is considered
- Alternate selection of equipment may be required over the project timeframe due to changes in technology, clinical practice and as the review process associated with the detailed examination of operational polices and detailed design progresses
- Ordering is generally the responsibility of an appointed purchasing officer
- Items managed by the contractor may require coordination and liaising between the contractor and FF&E coordinator to ensure that a regular review of critical milestone dates for selection procurement arrival to site and installation are able to be met to ensure that the overall construction and project deadlines are achievable
- A regular review of procurement schedule and milestones should be undertaken to ensure that all major milestones including building and operational commissioning are able to be met
- A contingency plan for failure to supply will need to be developed during the early stages of the project to ensure that the project is able to cover possible failures of suppliers to deliver on time
- The identification of items with long lead times will be identified early in the project to ensure

that orders are placed well in advance of the project program. This will ensure that items are onsite and ready for installation by the critical milestone dates.

As with all processes developed by the equipment planner the goal is to provide the FF&E to the project in a timely manner whilst ensuring the selected equipment meets both operational and financial requirements and is fit for purpose.

An example of a traditional request for tender process is illustrated in Figure 15.

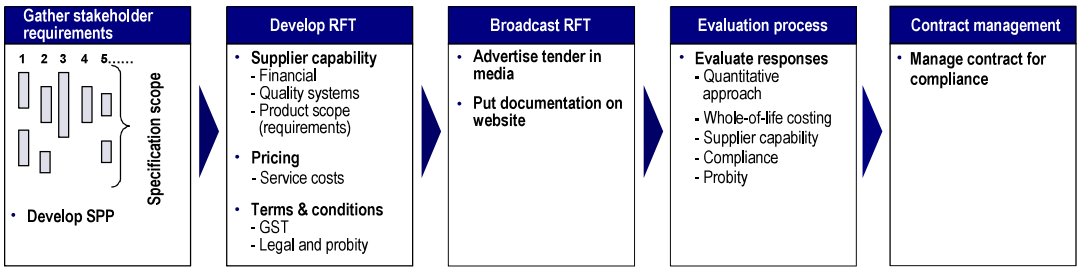


Figure 15: Traditional Request for Tender Process

Process and Deliverables

- Develop a detailed FF&E list that meets detailed operational requirements and procedure including contractual obligations
- Conduct equipment trials and risk assessments in consultation with key end users
- Review FF&E schedule to ensure that the selection list is complete and accurate
- Release tenders or where applicable obtain comparative quotes
- Post tender Evaluation of products
- Submit selections for approval to agreed stakeholders
- Place orders
- Arrange supply contracts ordering and delivery

Tender Evaluation and Product Selection

To provide for an effective evaluation process during the tender phase, an evaluation panel should be established. The selection of this panel should be determined by the relevant stakeholders depending on the classification of the items and the requirement of the project brief.

A tendering, evaluation and acceptance plan should be considered to assist with the procurement planning, supported by an appropriate product evaluation matrix.

The evaluation panel must evaluate the quotes in accordance with the agreed procurement strategy and selection criteria, in line with a developed tender evaluation plan.

Evaluation reports, both technical and financial should be prepared outlining the evaluation process and providing justification for the chosen supplier representing best value for money. The report should cover all aspects of the purchase and must be able to stand up to independent review, please refer to the figure shown below as an example.

			Vendor #1	Vendor #2	Vendor #3	Vendor #4	Vendor #5	Vendor #6	Vendor #7	Vendor #8	Vendor #9	Vendor #10
Item ID	Description	Item Category	Final Score	Final Score	Final Score	Final Score	Final Score	Final Score	Final Score	Final Score	Final Score	Final Score
FE-8767	Defibrillator: with monitor	MEQ - General	NA	71.4		93.6			NA		NA	76.8
FE-8806	Diagnostic set: ophthalmic, portable	MEQ - General	83.6	NA	68.6	68.6		87.8			69.6	
FE-8302	Diagnostic set: portable	MEQ - General	83.6	NA	68.6	68.6		87.8			93.6	NA
FE-8971	Doppler: fetal, handheld	MEQ - General				98.0			82.2		NA	
FE-8972	Doppler: vascular, handheld	MEQ - General				98.0			82.2		NA	
FE-9837	Drill: ENT, powered	MEQ - General										
FE-9838	Drill: neurology, powered	MEQ - General										
FE-9835	Drill: orthopaedic, powered	MEQ - General										
FE-8747	Drill: podiatry	MEQ - General										60.8
FE-9011	Electrocardiograph (ECG): multichannel, on trolley	MEQ - General	NA	71.4		93.6		NA			NA	84.8
FE-9465	Electroencephalograph (EEG): on trolley	MEQ - General				98.6			NA		80.6	NA
FE-9651	Electromyograph (EMG) with evoked potential: on trolley	MEQ - General				98.0					80.6	
FE-8923	Electrosurgical unit: argon enhanced coagulation	MEQ - General	98.6	NA	NA	93.6			NA	NA		82.8
FE-8924	Electrosurgical unit: monopolar/ bipolar	MEQ - General	98.6	NA		93.6			NA	NA	NA	82.8
FE-10398	Electrosurgical unit: monopolar/ bipolar, with vessel sealing	MEQ - General	98.6	NA		93.6			NA	NA		82.8
FE-8939	Endoscopy tower: laparoscopy	MEQ - General	88.6	76.4	NA	NA			NA			92.8
FE-9236	Endoscopy tower: laparoscopy/ hysteroscopy	MEQ - General	88.6	76.4		NA			NA	NA		92.8
FE-9453	Endoscopy tower: upper & lower GI	MEQ - General	78.6	NA		NA			82.2			92.8
FE-10124	Foot pressure measurement system	MEQ - General							82.2			74.8
FE-8304	Glucometer	MEQ - General		39.4		66.6			50.2			30.8
FE-8946	Haemodialysis unit: CRRT	MEQ - General				88.6						
FE-8601	Headlight: surgical	MEQ - General			83.6	26.6			72.2		57.8	92.8
FE-10501	Heart/ lung bypass machine	MEQ - General										
FE-8955	Hypo-hyperthermia unit: general	MEQ - General	98.6			88.6						
FE-10370	Imaging system: aesthetic, full body, 3D	MEQ - General			93.6							90.8
FE-8955	Incubator: infant	MEQ - General	NA			98.6	85.8		NA	NA	NA	
FE-8956	Incubator: infant, transport	MEQ - General	NA			90.6	85.8				NA	
FE-8486	Infusion pump: double channel	MEQ - General		87.4		88.6	NA					68.8

** Final Score is out of 100*

Figure 17: Evaluation Scoring Template per Item

Any negotiations with preferred respondents must be accurately recorded and any agreements incorporated into the final acceptance.

Once the product and the supplier have been agreed upon there are generally several documents which will need to be issued to the supplier. These documents are:

- A notification of being the successful tenderer (Award Letter)
- A purchase Order (PO)
- A Contract of engagement to undertake the sale and related installation package.
- Maintenance Contract/ Service Contract (as applicable).

It is essential that the equipment planner has a clear understanding of the probity process relating to the provision of procurement services to the project and the conduct required when dealing with equipment reviews prior to undertaking any discussions with external parties. A probity process generally requires that:

- There are no benefits to any one Respondent
- All organisations are treated in an even-handed manner
- Information is only provided from the designated sources and in the form specified
- Any conflicts of interest that exist or which may arise are declared.

Legislation relating to all processes is complied with, in relation to practices and behaviours connected to dealing with parties not part of the project team.

Key Equipment Supply Contract Provisions

Understanding that correct equipment selections are integral to the effectiveness and efficiency of the clinical services to be provided in any project is important.

The supply contract must also include sufficient information to ensure received quotes from a number of suppliers, are comparable in quality and cost. Information that describes the item/s to be purchased must be set out in schedule of requirements which provide instructions to tenderers on the terms and conditions for supplying the items.

The principal requirements are as follows:

- Describe what the equipment should do – the purpose, scope, function, and capabilities
- Describe the design and features required, taking into account factors such as:
  - Performance to be achieved, and technical characteristics as follows:
  - Operational requirements
  - Versatility of the equipment
  - Safety requirements and manufacturing standards
  - Quality expected
  - Durability and energy saving features
  - Physical characteristics (for example, construction/ material requirements, colour, and finish, unit or pack size, power-type, whether or not it is portable).
- Describe what preferences are required when there are alternatives
- Include the expected performance or output, but do not necessarily define how this should be achieved
- Use recognised titles for equipment types
- Outline all the accessories needed
- Include any consumables necessary
- Details what the requirements are for preventive maintenance and repairs
- Specify what length of time the warranty is to cover and when it is to commence
- Specify the delivery requirements
- Specify whether the goods are to be insured during the delivery period
- Specify the after-sales support required
- Specify the site preparation details
- Specify what the requirement is with regards to the commissioning of the item
- Specify what the requirement is with regards to the installation of the item
- Describe in detail the responsibility of both the purchaser and supplier with respect to testing and/ or acceptance of the goods
- Include the training requirements from the supplier for both of users and technicians
- Specify what level of maintenance contract is required.

Maintenance Contract Types

The definition of a maintenance contract is “a formal agreement between two parties which states that one party will keep a building, vehicle, machine, etc. belonging to the other party in good condition by regularly checking it and repairing it when necessary “, Collins English Dictionary 2017 (Online), Refer to: http://www.collinsdictionary.com/dictionary/english/maintenance-contract

Maintenance contracts are becoming more and more popular when purchasing complex and critical items. Knowing the different types of contract options can greatly increase the chances of finding a maintenance contract that meets specific requirements.

These contracts are generally included in the tender document and the type of contract required should be clearly outlined. The aim is to reduce the risk associated with the running and maintenance of the selected item through the provision of high-level technical service by the provider of the equipment in an agreed cost and time.

Ordering Process

The ordering of all equipment is required to align with the project timeline. The equipment planner and any personnel assigned to assist with this process must ensure that the procurement of all the FF&E keeps pace with the build requirements.

For major projects, FF&E procurement activities may be undertaken by a number of different people. A purchasing officer may be appointed to manage the purchasing and receipt of FF&E.

Commissioning personnel may be responsible for installation and post installation activities.

For minor capital projects and routine equipping activities, all activities will normally be undertaken by one person such as the equipment planner in liaison with MC or an appointed stakeholder.

If the project has access to existing personnel who are skilled in procurement it is recommended that these personnel undertake FF&E procurement and routine equipping activities. This ensures that:

- Established procedures for approval, ordering, contract management and maintenance requirements are followed
- Personnel, who will be responsible for the management and maintenance of the purchased FF&E once the Project Team leaves the site, are involved in the scheduling, ordering, and receiving process

Irrespective of who has responsibly for the procurement, personnel involved are required to follow all agreed processes as outlined in the agreed project procurement plan.

It is important to ensure that as part of the procurement strategy an efficient electronic procurement system is utilised. This will help ensure that a complete record of each item procured can be tracked through each phase of procurement and provide all the details needed to track, maintain, and manage all the FF&E in the facility through its life cycle.

CAPEX vs OPEX

Capital expenditures (CAPEX) is defined as major purchases designed to be used over the long-term meanwhile the Operating expenses (OPEX) are the day-to-day expenses to keep the business operational. An example of FF&E which is commonly leased is haemodialysis machines, infusion pumps, major laboratory analysers, etc

If buying equipment using the project capital budget is not possible or options are sought, some form of leasing arrangement, which uses funds from the recurrent budget instead may be an option. If this option is considered it is essential to weigh up carefully the costs and benefits, kindly refer to the table below:

Model	Advantages	Disadvantages
CAPEX	1. Lower cost of consumables/ reagents/ tests 2. Accurate ordering of consumables/ reagents based on actual consumption	1. Upfront payment 2. Pay for breakdown service and parts' replacement after warranty period. 3. Equipment depreciation 4. Pay for planned preventive maintenance after warranty period. 5. Additional cost for upgrading the equipment.
OPEX	1. No upfront payment 2. Breakdown service and parts'	1. Higher cost of consumables/ reagents/ tests

Model	Advantages	Disadvantages
	replacement covered. 3. Planned preventive maintenance cost covered. 4. Equipment depreciation is irrelevant. 5. Equipment upgrades with no additional cost.	2. Reagents Quantities will be based on projections only for the first few years. 3. Depending on the actual workload, some reagents may expire if not used during the contract period leading to loss in revenue.

Table 1: CAPEX versus OPEX

It is important to note that with any purchase of equipment, a cost/ benefit analysis should be undertaken to ensure that the revenue generated from the equipment will provide an adequate return on investment.

FF&E Timeline

In conjunction with the MC or the designated person/s, a timeline for the procurement of required FF&E is to be developed. This will ensure that all identified FF&E is procured in a timely manner thus preventing delays in the project build and completion.

This information is presented to the project's MC and incorporated in the project management chart known as a Gantt chart.

Individual items must be identified, and final quantities are to be validated using data from the final review of the RDS and the related data summary. All items are to be imprinted onto the project construction timeline based on:

- FF&E information extracted from FF&E master list
- Identification of the phases within the construction
- Fixture schedules within the construction phases
- Identification of equipment which has major structural fit requirement
- Length of time required for procurement of FF&E items including installation commissioning and staff educational requirements
- Warehouse storage capacity
- Early procurement requirements
- The item locations in the project build and its relationship to the transition planning process.

Gantt Charts

To ensure that any critical milestones are identified and met, a procurement timeline such as a Gantt chart should be developed, maintained, and regularly reviewed & updated by the equipment planner, MC and key stakeholders in coordination with the medical equipment suppliers.

A Gantt chart is a type of bar chart provided as part of project management software that illustrates the start and finish dates of the terminal elements and summary elements of a project schedule. Terminal elements and summary elements comprise the work breakdown structure of the project. Several other versions of this chart format are available commercially.

Terminal elements are the smaller more intricate tasks that need to be completed as part of a larger task. A summary element is made up of terminal elements to form the larger task.

An example of the format by which the equipment timeline is shown in the overall project schedule and how it subsequently links to the procurement schedule is shown in the figure below:

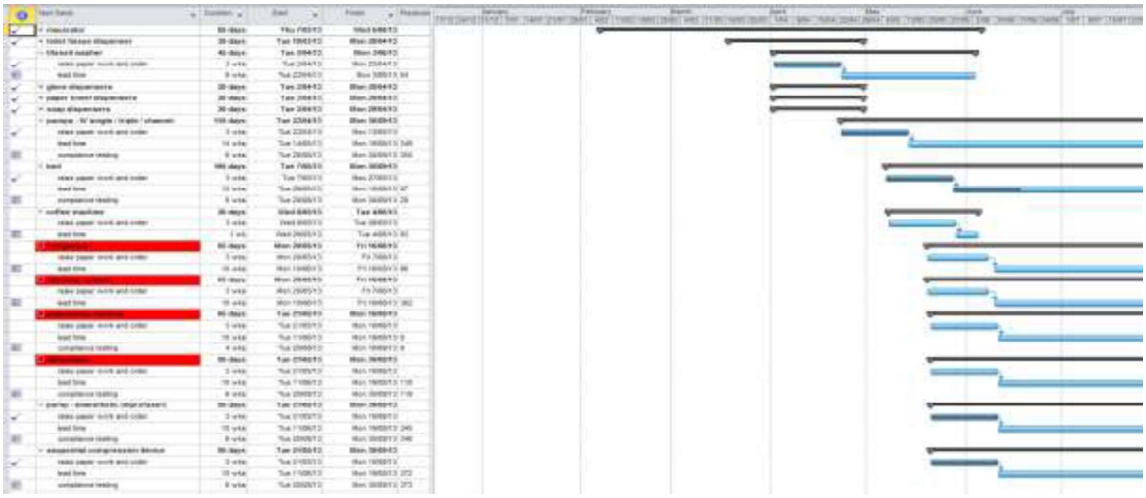


Figure 18: Gantt Chart

18 Site Supervision

Define Builders Work in Conjunction with Equipment Supply and Installation

The term builder's work generally refers to builder's work that is necessary as a result of other works, typically mechanical and electrical services.

Builder's work is generally carried out by the main contractor for a mechanical and electrical sub-contractor and other such specialist trades. However, in some projects the mechanical and electrical works might be the main contract and the builder's work in connection with sub-contractors.

A good relationship between the equipment planning team, the builder's works group and the rest of the project build team is critical to the successful fit out and commissioning of the facility.

The need to identify the FF&E, and the required site management to install the equipment early in the design phase, will be builders' works priority.

The type of information that will be required early in the project to assist with planning the builder's works is as follows:

- Procurement timeline
- FF&E services package
- Completed Room Data Sheets (RDS) and Room Layout Sheets (RLS)
- Relocation/ transitional FF&E and any required access to site (where applicable)
- Completed/ reviewed Material Approval Submittals (MAS)
- Completed/ reviewed shop drawings with confirmed FF&E locations
- Room readiness against shop drawings & pre-installation requirements
- Warehousing & storage capacity
- Access to site for items not installed by the builder prior to practical completion
- Security requirements of items brought to site
- Coordination of FF&E deliveries
- Supplier involvement for installation
- Commissioning, and compliance testing requirements

- Waste removal requirements
- Asset management processes.

Mock-ups and Prototypes

There may be a requirement to provide mock-up rooms and prototypes as part of the equipment and fit out review by the user groups. The mock-up rooms are generally constructed by the MC but equipment planners may be required to assist with the fit out with the designated prototypes in locations determined in negotiation with the client.

The mock ups and prototypes are required to be of a standard which will:

- Assist the key stakeholders and the user groups in review of the clinical areas in accordance with design documentation
- Validate equipment selection and layout within the design
- Provide the key stakeholders and user groups with an opportunity to access and review the workings of allocated clinical areas and related prototypes
- Visually demonstrate the functional design and allow progressive design development to achieve an optimal fit for purpose outcome.

To assist with the review of the mock-up rooms, a review process will be required so that user groups can give feedback regarding the suitability of all design elements included within the Design Documents in relation to the relevant room. This also is generally managed by the MC.

Delivery & Installation Contracting Methods

For all FF&E there are generally two options for delivery, point of care or on-site delivery.

Point of care is the delivery of items directly to the location in the building where the item is required for clinical use. When this is undertaken, the supplier is required to deliver, install, and commission the items. This needs to be stipulated in the agreed purchase contract.

On-site delivery generally refers to items which are delivered to an agreed location, whether it be a warehouse or site within the project building. These items are usually not required to be commissioned and no installation process is needed. The project team is then responsible for the installation.

Neither method exempts the supplier from undertaking any required education and training which may be required.

On delivery and receipt of FF&E, liaison will be required with the contractor to identify dates for the delivery of specific items. This is particularly important with regard to items that the contractor is required to install that are being purchased by the client i.e. Group 2 items.

Ensure that the suppliers are aware of and have all associated site industrial agreements and Occupational Health & Safety (OH&S) requirements in place prior to installation of equipment. Not having these documents in order can result in significant delays in the installation process.

Where possible, all items required for the proposed occupation date should be available and on site approximately 3 to 4 weeks prior. This allows for preparation of items for final placement, ensuring all mandatory checks have been carried out and a smooth coordinated installation.

As previously stated in the document, contingency plans need to be prepared to cover failure of suppliers to deliver on time or delayed completion of construction.

Arrangements must be made to ensure that goods are properly checked for both quality and quantity on delivery. 'Technical' equipment can be held in a separate room until inspected and certified correctly by authorised personnel.

ASE items may need to be delivered to the contractor prior to the date required. This ensures that opportunities do not occur where the contractor can claim loss of time due to non-availability of items and further ensure there are no disputes as to actual receipt of goods. All items handed

over to the contractor should be acknowledged by a written receipt from the contractor's representative.

Education and Training of Clinical Staff

The equipment planner may be required to ascertain the educational requirements for the clinical and technical staff for all FF&E included in the FF&E schedule, prior to being used in the clinical environment. Training will be carried out for two purposes; training the clinical professionals on how to operate the equipment and training the biomedical personnel on how to troubleshoot and repair the equipment as required.

On most occasions the education of the FF&E is undertaken by the product supplier. This would be included as part of the site supervision phase and as part of an ongoing education provision. The level of supplier commitment would generally be dependent on the contract agreement included in the tender package.

Clinical Training (Clinical Professionals):

As a minimum, the training shall cover correct and safe operation of the equipment and understanding and using the operation manuals. Certificates shall be issued by the manufacturer to all successful trainees indicating that they are capable of operating the equipment according to manufacturer’s requirements.

Service Training (Biomedical Personnel):

The level and content of service training provided will, at a minimum, be equal to that provided to the product supplier’s field service personnel. This training must prepare and equip the biomedical personnel to diagnose, repair, and calibrate the equipment purchased, and shall include the same training manuals, training aids, software, extension boards, and technical information that the equipment manufacturer normally gives to their own field service personnel. Certificates shall be issued by the manufacturer to all successful trainees indicating that they can service the equipment according to manufacturer’s requirements.

The educational requirement should include:

- Induction of staff in the safe operating procedures and work practices associated with procured equipment
- The evaluation of staff in regard to competency for use regarding the equipment, safe operating procedure and work practices
- Provision of sufficient education sessions to ensure all relevant employees who have involvement in the use and management of the equipment are able to attend
- On site, off-site or at the factory supplier-based training (as required)

Project Handover

At the end of the project and as part of the contract agreement the equipment planner will usually be required to formalise the sign-off process with the MC or the party who engaged the service. The composition of this sign-off may vary depending on the size of the project and the complexity of the building.

As a minimum a sign-off letter should be completed. This is to ensure that all parties are in agreeance that the service provided in the contract is completed.

Other information which could be required in a handover package may include but is not limited to the following:

- Emails not on the project selected database
- Reports generated and used in the project
- Correspondence related to the project
- Budget summaries
- Schedule of equipment

- Responsibility matrixes
- Procurement plan and timeline schedules
- Tender review and selection documents (These may have already been registered as part of the tender process)
- Receipt of good summaries
- Service and Operation manuals for the supplied equipment in hard copy and USB
- Warranty documents, preventive maintenance, list of spare parts, consumables/ disposables and accessories in hard copy and USB.

This information should be provided in an agreed format and should be acknowledged as received and accepted by the designated recipient.

19 Relocation Planning

Relocation planning of FF&E is a complex process that requires a high level of coordination. Establishing the level of relocatable FF&E, the time and cost necessary to relocate as well as the need to perform the process with little or no disruption to services should not be underestimated. For large and complex facilities, specialty relocation providers should be considered for this process.

Equipment planners must ensure the funds required for the relocation process have been accounted for and whether these items are included in the FF&E budget sum.

Any equipment which is suitable for relocation should be noted on the FF&E schedule and the budget adjusted accordingly.

If the relocation package is to be managed by the equipment planner in conjunction with the relevant stakeholders, the team will be responsible for identifying strategies to facilitate the receipt, holding and installation of FF&E items prior to the occupation. Strategies may include these steps:

- Develop a relocation policy including an inspection and age-based condition assessment formula
- Develop or obtain a master inventory and biomedical service reports of existing FF&E
- Undertake a condition assessment to determine suitability for relocation and provide a report to relevant stakeholders
- Identifying possible secure holding are areas prior to handover of the building
- Organising temporary storage areas to allow for progressive receipt and installation
- Advanced handover of parts of the building to provide storage and facilitate receipt of goods to site
- Staging of deliveries such as beds, stainless steel furniture, office, and soft furnishings to reduce storage requirements
- Ensuring that dangerous goods and other special items are stored appropriately
- Ensuring warranty arrangements are confirmed to ensure that early possession doesn't limit or invalidate contractual obligations
- Liaise with suppliers to discuss specific relocation requirements for delicate and complex equipment.

20 Occupancy/ Commissioning

Life Cycle Planning

A life cycle plan is generally a database associated to an asset register and used when developing the tasks needed to properly maintain the facility, plant, or process equipment. It assists in developing the required maintenance program to maintain equipment over a designated

length of time. It also provides clarity of the asset management process when evaluating and assessing the timing for replacements and upgrades of equipment.

Overall, the purpose of lifecycle planning as shown in the figure below, is to develop the best strategies for asset utilisation over the expected products life.

The benefits of lifecycle planning include:

- Providing a sound basis for making investment, maintenance, and disposal decisions
- Providing explicit consideration to the optimal balance of operating and maintenance costs relative to capital works investment/ procurement costs
- Capital costs are considered with the knowledge of the consequential impact on life-cycle cost

Figure 19: The Life Cycle Process

Inventory Management

To assist with the inventory management process, equipment procured or transferred to site should be allocated an asset number entered into the asset database. This information is best stored on an inventory/ asset management database which is assessable to all relevant parties engaged in the management of the FF&E post-handover.

The responsibility for the selection an implementation of the asset management database is generally with the projects IT team. Communication with this group during the project should include the identification of this package and establishing if any training is required.

An example of the information which could be supplied for this inventory is:

- Type of equipment/ item
- Brief description of item
- Manufacturer
- Model/ part number
- Serial number
- Physical location within facility
- Condition/ operating status
- Power requirements
- Operation/ service requirements
- Date inventory updated
- Maintenance service provider
- Purchase supplier
- Other information as needed

Inventory of Current Assets

It is essential to identify what asset management database will be used for the FF&E prior to procurement as this will ensure that all goods received can be recorded on the database at the time of delivery.

For projects which are connected to a relocation of an existing facility, it is essential to have an inventory of current assets so that a relocation FF&E list can be developed. If the equipment

planner has been engaged to undertake this role, the following process is an example of activities and deliverables required to achieve a suitable outcome.

Communicate with the client prior to arrival to coordinate dates, logistics, and security clearance.

Review the current layout of departments and rooms in the existing facility to logistically set up a plan of action to perform the inventory.

Prior to performing an on-site inventory, arrange a meeting to inform hospital managers, staff, and other stakeholders the objectives, and overall review of the inventory process.

Once the inventory schedule is in place, a physical count of the relevant areas of the existing facility is required. The physical count process includes the following steps:

- Identify the locations of furniture and/ or equipment by department, current room name and room number
- Include the item description by the architectural nomenclature
- Identify the manufacturer and model
- Identify furniture or equipment type (F/E)
- Evaluate current condition to determine quality or obsolescence (Good, Fair, or Poor) using agreed assessment criteria
- Add dimensions of items
- Capture an image of all items (optional)
- Record any serial number, biomed number, or asset number
- Add additional comments or note about the condition, age, etc.
- Asset tag items using an agreed process
- Update Inventory information into agreed database
- Provide report to client and MC
- Update project FF&E schedule to reflect expected relocation equipment

Once the relocatable FF&E review is completed a process must be developed to ensure that any new or relocated equipment at the review facility is captured and communicated to all relevant parties. This will ensure that all assets are tracked correctly and duplication is prevented.

Periodical Inspections

As part of the quality assurance and risk management process for the project, the equipment planner or a designated person will need to conduct periodical inspections of the equipment planning service. The aim is to prevent mistakes and avoid problems when delivering solutions or services to clients.

It will help ascertain that FF&E processes and the agreed management procedures continue to be implemented properly, and that the relevant stakeholders are familiar with individual responsibilities. It also allows for any issues observed to be addressed.

The inspection could be formatted in line with the KPI process or based on an agreed project review plan.

In an effort to minimise the time impact, a streamlined but succinct process should be used. The time frames should be determined on a project-by-project basis in coordination with the MC.

21 Common Mistakes and Pitfalls

There are many common mistakes and pitfalls in equipment planning. Below is a list of issues which planners should be aware of although these should be regarded as examples and not the definitive list.

Equipment Planners must not lose contact with the end user during the early stages of the project. This is an issue which is more prevalent when the equipment planner is engaged by a third party on a restricted budget. This can be misconstrued as lack of commitment and can impact on the ability of the equipment planner to communicate with the end user as the project progresses.

Make sure that all the relevant briefs are cross referenced to ensure that the project goals are clearly understood along with the level of equipment required.

Validate the database and other programs which will need to be used for the project at the time of engagement.

Work closely with the timeline to avoid issues with delayed early procurement items.

When presenting information on FF&E which is architecturally and structurally significant in the build, it is advisable to provide maximum parameters in the services package to prevent room design and engineering issues.

Obtain the architectural plans as early as possible in all stages of the project to allow review by the equipment planner for FF&E fit out and flow patterns.

Take care if all the FF&E is not included in the FF&E package. To avoid confusion with stakeholders and the potential for additional review meetings it is best to keep responsibility for both the clinical and non-clinical FF&E with the equipment planner even if these items are split up.

Have an agreed and comprehensive responsibility matrix to help with communication and management of team members on FF&E matters. It is best discussed and developed early in the project with key stakeholders.

Have a key contact person list for all communication in each of the disciplines involved in the project.

If the equipment planner is working as part of an equipment planning team, outline and communicate clearly with the team the expectations of each consultant and agree on a level of communication.

The equipment planner should not be excluded from architectural user group meetings so that users can both identify and ask questions regarding the design in relation to FF&E options to the correct source.

Clearly communicate to the MC and relevant team members of the project that the equipment specifications shown in the equipment list prior to tender are generic and until the equipment is tendered and has been selected exact specifications cannot be provided.

Try to ensure that the collation between the room data sheets (RDS) and the FF&E schedule is reviewed as early as possible in the project to prevent a major review at construction phase. Coordination with the architects and users is essential.

Ensure that the time required for the procurement of items includes the process that needs to be undertaken as part of the pre and post tender preparation. It may take a considerable amount of time to tender, review and select some equipment. This can be significant, particularly in government projects.

Keep all electronic communications which are relevant to the project and always communicate through the agreed method.

Risk Analysis

A risk is "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives."

Risk Management is the systematic process of identifying, analysing, and responding to project risks. It includes maximising the probability and consequences of positive events and minimising the probability and consequences of adverse events to project objectives. A risk management plan defines how a project team will handle risks to achieve that goal. It is used to summarise the proposed risk management approach for the project.

Procurement type risks can range from high to low depending on the type, complexity and quantity of the items. The risk can also be associated with tender and selection, procurement, delivery, storage, transport, cleaning, installation requirements, and testing & commissioning. Depending on who is responsible for managing the item/s, the management of the risk can be either the MC or the client or shared.

Examples of risk include potential loss of a critical resource, technology changes, regulatory changes, dependence on a third party, scope changes, project sponsorship or management changes, budget, and legal issues.

An example of the risk evaluation process is shown in Figure 20.

The benefits of risk management in projects are huge. The result will be that the impact of project threats are minimised and the opportunities that occur are secured. This allows delivery of the project on time, on budget and with the quality results that the project sponsor demands. Also, team members will be less stressed if they do not enter a 'firefighting' mode needed to repair the failures that could have been prevented. B. Jutte, '10 Golden Rules of Project Risk Management, 2016 [Online],

https://www.projectsmart.co.uk/10-golden-rules-of-project-risk-management.php

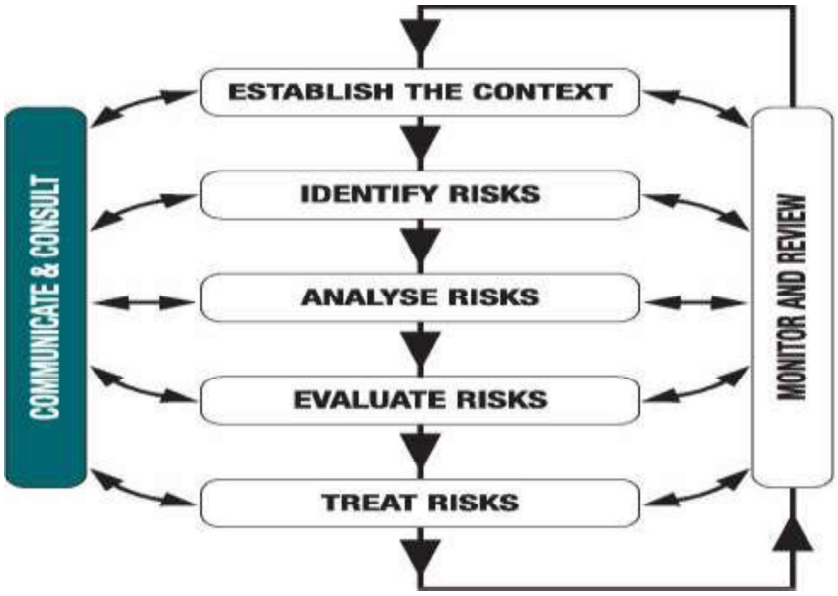


Figure 20: Risk Evaluation Process