City of Melbourne was the primary sponsor of this guide. Support was received through the Hi-RES project, which aims to develop and test solutions to help transform Victoria’s apartment buildings to become more sustainable. Hi-RES is a City of Melbourne led initiative in partnership with the Cities of Port Phillip and Yarra, Strata Community Australia (Vic), Moreland Energy Foundation and Yarra Energy Foundation, and was supported by the Victorian Government Sustainability Fund. For more information, please visit www.melbourne.vic.gov.au.

Disclaimer

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Preface

Welcome to the first in a series of Facilities Management Good Practice Guides being developed to provide detailed, objective and independent information on ‘key areas of interest’ for facilities management professionals and stakeholders in Australia.

This Guide provides an overview of facilities management in multi-unit residential buildings, focusing on common areas and shared services. Its purpose is to provide a common understanding of issues and good practice requirements, helping to bridge knowledge gaps between the various stakeholders involved in the development, construction, operations, maintenance, management and administration of multi-unit residential buildings.

The Guide covers all key areas relevant to those involved with facilities management activities within Multi-Unit Residential facilities, regardless of size, complexity or location.

As the peak national industry body for facilities management, we are proud to have developed this Guide in association with our industry partners and stakeholder Reference Group. Like all Good Practice Guides, this milestone document would not have been possible without the valuable support of our sponsors, including the City of Melbourne’s Hi-RES project and Facility Management Victoria.

Our mission is to inspire, shape and influence the facilities management industry and at every opportunity to promote and represent the interests of Facilities Managers nationally and internationally. Publications such as this are essential to support our broader role in representing and supporting all professionals and organisations involved with the management, operation and maintenance of buildings, precincts and community infrastructure throughout Australia.

I hope that you find the content of this Guide valuable in your work and we welcome any feedback you may have to assist with future editions.

Yours sincerely,

Nicholas Burt
Chief Executive Officer
Facility Management Association of Australia
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1 About this Guide

This Guide provides an overview of facilities management in multi-unit residential buildings, focusing on common areas and shared services. The purpose of the Guide is to provide a common understanding of issues and good practice requirements involved in running an efficient building, helping to bridge knowledge gaps between the various stakeholders involved in the development, construction, operations, maintenance, management and administration of multi-unit residential buildings.

Structured to support the requirements of a wide range of users, the Guide can be read as a whole or for its stand-alone elements. It also acts as an initial reference for anyone involved with multi-unit residential facilities, including but not limited to:

- Apartment/unit owners
- Owners Corporation (OC)
- Owners Corporation or Strata Committee members
- Owners Corporation or Strata managers
- Facilities (building) managers
- Developers
- Specialist service providers
- Residents
- Local Government

1.1 Reference Group

This Guide has been developed by the Facility Management Association of Australia (FMA Australia) with the aid of a Project Reference Group that included involvement from the following organisations:

- Carbonetix
- City of Melbourne
- City of Sydney
- Owners Corporation Network of Australia
- Port Phillip City Council
- Facility Management Victoria P/L
- Green Strata
- QIA Group
- Strata Community Australia (Vic)
- Zero Waste SA

FMA Australia
Facilities Management (FM) involves guiding and managing the operations and maintenance of buildings, precincts and community infrastructure on behalf of property owners. Employing over 200,000 people in the commercial and residential markets, the industry contributes over $20 billion annually to the Australian economy, and plays a vital role in the realisation of strategic and operational objectives of business, government and the wider community.

Facilities management is an age-old practice which has existed out of necessity since buildings were first constructed to support human activities. The FM industry is generally acknowledged as having stemmed from services provided by janitors and caretakers during the 1970s.

As an increasing number of multi-unit residential buildings have been developed over recent decades, the demand for facilities management has also grown accordingly.

Today’s Facilities Managers require a broad and diverse skill set, much more in line with management and business services than the building trade oriented services of those who once dominated the industry.

2.1 The role of the modern Facilities Manager

The Facilities Manager organises, controls and coordinates the strategic and operational management of buildings and facilities in order to ensure the proper and efficient operation of all its physical aspects, creating and sustaining safe and productive environments for residents. In residential buildings this is typically conducted at all times of the day, every day of the year.

The Facilities Manager can consist of a single individual or a team, with services able to be delivered by dedicated ‘in-house’ professionals or ‘out-sourced’ in whole or part to external providers.

An important role of the Facilities Manager is to provide services, meet varying expectations, support, information, be a good listener, and deal with conflict to create a community environment residents are willing to call home.

Their role includes dealing with various contractors and suppliers in carrying out maintenance and upgrades, and providing services such as security, cleaning, and property maintenance.

In larger buildings the Facilities Manager may be required to manage staff and be part of the recruitment and induction process. Therefore, they are again required to have excellence people management skills. Their relationship with support staff and contractors is critical in ensuring the building is a great place to live and work.

In many areas the actual title of Facilities Manager is not commonly used, however as the wider industry moves toward greater consistency and standardisation more providers and professionals are adopting it.

Tips for selecting a Facilities Manager

- Ask for experience and track record in similar facilities
- Expect formal qualifications in facilities management or a relevant discipline
- Expect continuing professional development, and ask how this is extended to the FM’s staff and contractors
- Expect active involvement in the industry and awareness of current issues and legal requirements affecting the built environment
- Expect to have a good network of suppliers and technical specialists
- Excellent interpersonal skills are a must.
Also, some professionals use the title Facilities Manager when in fact their role has little or no relationship to facilities management. Care should be taken when engaging a Facilities Manager to ensure their skills and knowledge match your requirements.

Note: For the purpose of simplicity, the term ‘Facilities Manager’ is used exclusively throughout this Guide.

For reference, the following are some of the alternative titles adopted by professionals who may be Facilities Managers:

- Accommodation Manager
- Building Manager
- Building Supervisor
- Caretaker
- Contracts Manager
- Essential Services Manager
- Maintenance and Services Manager
- Facilities Services Manager
- Facilities Administrator
- Facility Management Consultant
- Facility Operations Manager
- Operations Manager
- Property Manager

Note: A professional with one of the above titles may also not be a Facilities Manager.

2.2 Career progression and training

There are currently four different types of professionals in facilities management supported by FMA Australia, each of which will be involved in the management of a multi-unit residential building. These professionals are supported by on-the-ground staff such as concierge and security officers.

An entry-level role providing administrative support and at times overseeing maintenance tasks to ensure the day-to-day smooth operation of a building’s infrastructure.

An operational-level role providing administrative support, including budgeting, procurement negotiation, contract liaison and documentation, as well as coordination of staff and equipment during relocation, and at times supervision and physical assistance with maintenance tasks, to ensure the day-to-day smooth operation of a building’s infrastructure.

Organises, controls and coordinates the strategic and operational management of buildings and facilities in public and private organisations to ensure the proper and efficient operation of all physical aspects, including creating and sustaining safe and productive environments for occupants.

Has full accountability and authority for the successful coordination and performance of facilities management activities within their organisation or business unit. Responsibilities may cover numerous sites, multiple types of facilities and can include responsibility for hundreds of staff and associated set up of professional performance standards.

The skills, education and experience requirements for each of these roles increases at each level, with the vast majority of professionals involved in providing facilities management services at the Facilities Manager level. For example, the expectation for a Facilities Manager is expected to have either:

- 2 years minimum experience and a Diploma of Facilities Management or Bachelor in related field
- 5 years minimum experience with no formal education

This is complemented by Continuing Professional Development (CPD) as required to maintain professional competence.
Facilities Management Good Practice Guide

Owners Corporation established
- Budgets
- Insurances
- Administration
- Secretarial
- Levies

Selection of FM Provider
- Identify supply chain
- Engage with stakeholders

Feasibility
- Advise developers
- Identify risks

Design
- Establish supplier networks
- Identify stakeholders
- Risk assessment

Approval
- Handover
- Defects liability
- Appointment of contractors
- Develop asset knowledge
- Appointment of staff for building

Construction
- Commissioning
- Operations
- Maintenance
- Capital Projects
- Demolition

Operations
- Relationship management
- Performance monitoring
- Contract management
- Legislative compliance
- Provision of soft services (e.g. mail)
- Waste management
- Risk management

Maintenance
- Assess risks
- Preventative maintenance
- Reactive maintenance
- Risk mitigation
- Identification of opportunities
- Maintenance plans (sinking funds)

Handover
- Defects liability
- Appointment of contractors
- Develop asset knowledge
- Appointment of staff for building

Figure 2.1: Facilities Management throughout the building lifecycle
2.3 Multi-unit residential FM services

Within facilities management, each type of facility brings its own particular challenges, and demands particular skill sets. In the case of multi-unit residential facilities, the large volumes of people living in close proximity to one another dramatically increases the emphasis required on effective communication and relationship building skills. Multi-unit residential facilities operate on a full-time basis seven days a week and involve multiple individual user concerns and requirements, many of which are subjective. Consequently, there is a need to respond and adapt to almost constantly changing conditions.

FM services in the past were confined to building operations only, however today the activities undertaken by Facilities Managers can extend throughout an entire building’s life cycle (Figure 2.1).

With the increasing trend toward the development of higher density residential buildings, Facilities Managers have an important role to play in ensuring the assets are well managed and the property’s value is maintained. This in turn requires Facilities Managers to have access to ongoing external training and support and resources in order to continually enhance their skill set and knowledge base.

Figure 2.2: Typical multi-unit residential facilities management services

- Access and egress
- Asset management (mechanical services, etc.)
- Building management control systems
- Building Code and Regulatory Compliance
- Building repairs and maintenance
- Cleaning and general maintenance
- Concierge, mail and other ‘soft’ services
- Conserving asset value
- Contract and contractor management
- Energy and water management (lighting use, etc)
- Enhancing comfort and amenity for facility users
- Essential services provision (fire systems, etc)
- Gardening and grounds maintenance
- Improving building performance
- Maintaining security for property occupants and assets
- Maintenance planning (equipment, etc)
- Projecting a building’s identity and image
- Record keeping (legal requirements, monitoring, etc)
- Reducing operational impacts and life cycle costs
- Responding to complaints and suggestions
- Risk management
- Space management (i.e. effective utilisation of space)
- Sustainability projects and implementation
- Tracking and recording energy & water consumption
- Undertaking larger capital or maintenance projects
- Stakeholder engagement
- Waste management
3 What is Multi-Unit Residential?

Australia is one of the most urbanised countries in the world, and increasingly, Australians are opting for higher density living, with apartments and townhouses now accounting for about one third of all new housing constructed.

3.1 Growing importance of multi-unit residential
Over the next five years, growth in new multi-unit residential apartment construction is forecast to surge, with particularly strong growth in areas such as northern New South Wales, southern Queensland, Western Australia and central Victoria due to existing housing shortfalls in these areas.

The growing trend for Australians to seek higher density living instead of traditional single unit housing stems from a range of factors including preference toward inner city living, escalation in residential land values, and declining average household sizes.

3.2 Understand your asset
Multi-unit residential facilities cover a range of property types and construction styles, from high rise apartments with units stacked horizontally and vertically to low rise villa style complexes with units clustered around central features.

Each type has its own unique features, challenges and opportunities. However, a common theme is they all involve a number of individual property owners sharing in the decision making regarding management, maintenance and operation of common property and shared services, which introduces a different element of complexity to the management of each facility.

A number of factors make multi-unit residential different from other types of buildings such as commercial office facilities:

- It is someone’s home (every hour of every day)
- Different types of emotions are involved
- Different priorities (e.g. the need for continuous hot water)

Type 1: Villas and Townhouses
One to two storey with multiple dwellings on the same parcel of land or around central amenity features such as pools or courtyards.

Type 3: Medium-Rise
Four to eight storey developments, often comprising a mix of dwelling sizes vertically integrated with lift access.
Multi-Unit Residential

Type 2: Low-Rise

Two to three storey ‘walk ups’ comprising small blocks of units.

Type 4: High-Rise

Typically located in or around major activity centres, high rise residential facilities consist of nine or more storeys of vertically integrated accommodation, with lift access to the upper floors.

For the purpose of this guide, multi-unit residential facilities are considered to include one of the four types above.
3.3 Strata (Owners Corporation) legislation

It is important that Owners, Facilities Managers and Strata Managers alike understand their responsibilities and rights under strata law.

The strata title system is applied to many different property development types (e.g., townhouses, commercial offices, factories, retail shops, warehouses, etc.) as it provides a framework for the separate ownership and collective management of a building. It has become an increasingly popular method of land development and ownership in Australia.

Owners corporations or bodies corporate are created to manage and maintain the common or shared property created when properties are strata-titled or subdivided. **All lot owners automatically become a member of the owners corporation or body corporate.**

There is currently no national regulatory government body to guide the development of strata legislation, and as a result, strata legislation is complex, with terminology and specific requirements varying across jurisdictions.

Table 3.1 shows the primary strata legislation applicable to each Australian state and territory.
3.4 What makes up common property?

In multi-unit residential, common property is all those areas of land and building not included in any private lot:

In most strata schemes, the lot owner owns the inside of the unit but not the main structure of the building. Usually the four main walls, the ceiling, roof and the floor are common property. The internal walls within the lot (e.g. the wall between the kitchen and lounge room), floor coverings such as carpet and fixtures such as baths, toilet bowls, benchtops are all the property of the lot owner.

NSW Fair Trading 2011

What constitutes common property varies between the various States and Territories in Australia.

Without a good understanding of the various assets within a building and the relationships between them, it is impossible to maintain efficient operations or identify areas to reduce cost, improve performance, or increase value. Within multi-unit residential buildings, major asset components can vary widely and include the building superstructure and its facade, hallway and shared spaces, lighting, pools/spas, gyms, gardens, shared water heating, and car parking areas.

Figure 3.2 provides a more detailed breakdown of assets and equipment commonly found in multi-unit residential buildings and their related purpose in overall building operations.

Queensland
- Body Corporate and Community Management Act 1997
- Body Corporate and Community Management Act (Accommodation Module) 2008
- Body Corporate and Community Management Act (Standard and Commercial Modules) 2008
- Body Corporate and Community Management Act (Small Schemes Module) 2008

South Australia
- Community Titles Act 1996
- Strata Titles Act 1998

Victoria
- Owners Corporations Act 2006
- Owners Corporations Regulations 2007

Tasmania
- Strata Titles Act 1998

Source: Strata Community Australia (http://www.stratacommunity.org.au/)
<table>
<thead>
<tr>
<th>Facility Service Area</th>
<th>Service</th>
<th>Indicative Assets and Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access &amp; egress</td>
<td>Lifts</td>
<td>Lift cars, lift motors, lift controllers</td>
</tr>
<tr>
<td></td>
<td>Parking</td>
<td>CO detectors, Garage doors &amp; security gates, Door openers &amp; gate controllers, Bike storage facilities, Change facilities</td>
</tr>
<tr>
<td>Health &amp; wellbeing</td>
<td>Resident lounges / seating areas</td>
<td>Chairs, tables, mirrors, desks, TVs, monitors, TV repeaters</td>
</tr>
<tr>
<td></td>
<td>Landscaped areas</td>
<td>Pot plants, garden plants, green roofs, rooftop food gardens, organics composting</td>
</tr>
<tr>
<td></td>
<td>Health &amp; Fitness</td>
<td>Treadmills, training equipment and other gym equipment</td>
</tr>
<tr>
<td></td>
<td>Pools Saunas &amp; Spas</td>
<td>Pool heater, sauna heater, Thermostats, heating &amp; ventilation control devices, Water pumps, water filters, Chemical storage, chlorinator, chlorine controller</td>
</tr>
<tr>
<td></td>
<td>Outdoor entertaining</td>
<td>BBQ stainless steel/electric, BBQ tables, chairs</td>
</tr>
<tr>
<td>Security</td>
<td>Video surveillance</td>
<td>Monitors, cameras, video recorders, Surveillance cameras (internal and external), Lift and car park surveillance cameras</td>
</tr>
<tr>
<td></td>
<td>Security lighting</td>
<td>Emergency lighting, exit lights, exterior grounds and car park lighting</td>
</tr>
<tr>
<td>Safety</td>
<td>Fire protection</td>
<td>Fire doors, Fire water storage tank, level indicators, Fire hose Reels, hydrant pumps &amp; hydrant valves, Fire extinguishers, smoke detectors, smoke alarms, sprinkler system</td>
</tr>
<tr>
<td>Energy</td>
<td>Building energy supply</td>
<td>Building electricity management, LPG storage bullets and management, Transformers, Renewable energy installations (e.g. solar, small scale wind, etc.), Energy usage meters (electricity and gas) and related monitoring devices, Other lighting (hallway, aesthetic, etc.)</td>
</tr>
<tr>
<td>Water services</td>
<td>Clean water</td>
<td>Water pumps, flow pumps, booster valves, Water filters, Water meters and related monitoring devices</td>
</tr>
<tr>
<td></td>
<td>Hot water service</td>
<td>Water heaters (gas solar, electric), hot water tanks, In line pumps; solar hot water pumps</td>
</tr>
<tr>
<td>Heating, ventilation &amp; air condition (HVAC)</td>
<td>Ventilation</td>
<td>Ceiling fans, air supply, ventilator and extraction fans, rooftop fans, Fan motors &amp; controllers</td>
</tr>
<tr>
<td></td>
<td>Heating &amp; cooling</td>
<td>Air conditioning units, Boilers, heater controllers, Cooling water towers</td>
</tr>
<tr>
<td>Owner &amp; Resident services</td>
<td>Front of House</td>
<td>Concierge, reception &amp; mail services, Computers, printers, facsimile machines, safes</td>
</tr>
<tr>
<td></td>
<td>Waste</td>
<td>Garbage chute and collection equipment, garbage exhaust fan</td>
</tr>
<tr>
<td></td>
<td>Cleaning</td>
<td>Dangerous goods storage sheds and cabinets, cleaning products storage cabinets</td>
</tr>
<tr>
<td></td>
<td>Catering</td>
<td>Refrigerators, ovens, microwaves, cook tops</td>
</tr>
<tr>
<td></td>
<td>Communications</td>
<td>Intercoms, telephones, data loggers</td>
</tr>
</tbody>
</table>
4 Understanding the Stakeholders

Strata title communities are effectively small democracies and their effective management is as much about people management as it is about building and asset management. Understanding and responding to the needs and requirements of the owners and residents, as well as the various professionals involved in building operations, management and maintenance, is a critical component of multi-unit residential facilities management.

The Property Developer
Generally the developer is the initial owner of the property, however most multi-unit residential developers do not maintain ownership of the property throughout its operational life. The asset is passed to a Strata Scheme (or a sole building owner if the property is not Strata titled). As lots sell each new purchaser becomes a member of an Owners Corporation (OC) with the developer’s ownership gradually reducing until all lots are sold. During the transition of ownership, liability for building workmanship may be passed to the developer’s contractors and/or transferred to the OC under contract, and the Strata Scheme may carry additional risk associated with the management of defects and liabilities. In many cases there is little dialogue between the developer and future owners or Facilities Managers, and as a consequence some design aspects particular to multi-unit residential facilities (such as provision of adequate waste facilities) can be overlooked. Increasingly, the property industry is seeing the benefit in developers consulting Facilities Managers to ensure operational requirements are understood during the building design stage.

The Owners Corporation or Body Corporate (OC)
All lot/unit owners in strata schemes automatically become members of the OC and in doing so, take on responsibility for all decision making affecting the OC, its assets, common property, and shared services. An Owners Corporation is a legal entity. Ultimately, the collective decision making of the OC shapes the overall direction of the facilities management and maintenance, and the decisions made can vary considerably between OCs. An OC can delegate powers and functions to its committee, giving them the authority to make a majority of the decisions on behalf of the OC in between annual general meetings (exclusions do apply).

The Committee
The Committee (also known as Executive Committee, Managing Committee, Committee of Management, or Council) is made up of members of an OC elected at an annual general meeting. They have the authority to act on behalf of the other owners in the maintenance and management of common areas and shared service through a collective decision making process. They may also share responsibility for running administrative and financial aspects of the property.

The Facilities Manager is required to liaise on a needs basis with Committee members and implement their decisions.

The Strata Manager
A Strata Manager (also known as OC Manager, Body Corporate Manager, or Strata Managing Agent) works at the direction of the OC Committee to manage and administer the property and assist to create a safe and appropriate environment for the residents, their guests, and facility employees and contractors. This typically includes:

- Accounting, budgeting and financial reporting
- Invoicing and collecting levies and service charges
- Contract management
- Communication with property stakeholders
- Enforcement of rules/by-laws
- Issuance of notices, orders and certificates
- Meeting preparation and general secretarial tasks.

In smaller facilities, the Strata Manager may act as the Facilities Manager.

The Facilities (Building) Manager
The Facilities Manager organises, controls and coordinates the strategic and operational management of buildings and facilities in order to ensure the proper and efficient operation of all physical aspects, creating and sustaining safe and productive environments for residents.

For larger properties OCs can elect to out-source management and maintenance of their assets to an external provider (such as a facilities management service provider). It is important to note there are currently no minimum industry standards required in order to provide FM services in Australia. OCs must be vigilant ensuring those they engage to provide an external facilities management service have the skills, knowledge, attributes and experience.

The Resident Manager
In some strata properties, caretaking and leasing rights may be out-sourced to a Resident Manager (or Caretaker) by the OC. The Resident Manager may be a company or individual, and typically conducts services for an agreed period, living, owning and working from within a lot in the complex, with their fee paid from owner levies. In some cases, Resident Manager’s rights are sold in advance by the property developer.

The Residents
Residents are those individuals who live within a given multi-unit residential building and constitute its local community.
4.1 Stakeholder relationships

Figure 4.1 shows key multi-unit residential stakeholders (note this is indicative only). The Committee acts on behalf of the OC with the power to make decisions in the best interests of all Owners. The Facilities Manager / Strata Manager act as both trusted advisors and service providers to the OC, directing and managing service providers within their respective areas or responsibility. Contracts with utilities, service providers and consultants are usually directly between the OC and the provider.

4.2 Stakeholder engagement

The degree of input and buy-in residents and other facility stakeholders have over decisions affecting their home is a major factor in maintaining harmony amongst the residential community, and can have a significant impact on the effectiveness of any initiatives being planned. Some key principles of effective engagement within a multi-unit residential facility are described as follows.

Resident Expectations

A key component of strata or facilities management within residential buildings is the ability to react and respond to multiple resident issues in a reasonable timeframe. Resident concerns can be mitigated in large part from simply knowing they have been heard and that someone (i.e. the Facilities Manager) is going to take action. Many issues can also be avoided by providing residents with some degree of control over their environment (e.g. access to blinds and lighting controls). Residents are often more tolerant of varying conditions when they understand how various systems, assets and equipment are supposed to perform and operate. It is critical that there be open and effective communication between Residents, OCs, Strata Managers and Facilities Managers to ensure the expectations of each are able to be understood and met.

Relationship Building

Good communication between the Facilities Manager and Strata Manager underpins the effective functioning of any strata scheme. When issues occur it usually results from a breakdown in communication. It is therefore critical to get relationships off to a good start, have a close dialogue and a collaborative approach.

Effective Communication

As most building initiatives will inevitably impact upon residents and other facility stakeholders at some point, involving key stakeholders from the outset is more likely to ensure stakeholder ‘buy-in’ through having been part of the decision making process. This includes communicating any new initiatives using a variety of channels (such as emails, newsletters, notice boards, presentations, etc) to ensure stakeholders are constantly informed.
Figure 4.1: Stakeholder relationships within a multi-unit residential facility

**Government**
- Federal, State & Local Policy Makers | Compliance and Enforcement Officers | Courts, Tribunals & Dispute Centres
- Building and Construction Codes
- Planning & Environmental Legislation
- Strata Scheme Regulations

**The Developer / Initial Owner**
- Liable to individual lot owners for defects within apartments
- Liable to OC for defects within common property

**Real Estate Agents**
- Engaged by developer or owners to sell or lease apartments and assets

**Facility Residents**
- **Tenants** (Lot owner is investor / landlord)
- **Lot Owners** (who occupy their lot)
- **Lot Owners** (who lease their lot)

**The Owners Corporation** (Collective body of lot owners)
- **Committee**

**The Facilities Manager**
- Contracted or employed directly by Owners Corporation

**The Strata Manager**
- Contracted by the OC to administer the OC’s affairs

**Facility Services**
- **Contractors / trades people**
  - Engaged to carry out repairs, maintenance, replacement of assets, etc
- **Service & utilities providers**
  - OC’s enter into agreements for services (energy, water, broadband, etc)
- **Professional Consultants**
  - Engaged for specific services (auditors, valuers, lawyers, planners, etc)

**Education and Awareness**
Ensuring stakeholders are aware of specific roles, responsibilities and requirements will go a long way towards avoiding many of the issues and delays which can be associated with strata living. This should include effective management and provision of training to key contractors so they understand and adhere to safety and environmental requirements when performing work. Residents and building users should be constantly updated on proposed initiatives or changes, the reasons behind them, and any specific requirements.

Training and awareness should include provision of signage, and mechanisms for provision of feedback or suggestions. Additionally, the environmental performance of initiatives should be shared, so residents and other facility stakeholders are able to see the result of any improvements implemented.

Figure 4.2 displays the degree of engagement that can be used when dealing with stakeholders.
Citizen Committees

One stakeholder engagement technique well suited to multi-unit residential facilities is the use of ‘citizen committees’. Also known as public advisory committees, citizen committees consist of a group of representatives from a defined community who are asked to provide comment, input or advice on a particular issue, with participants meeting regularly for the duration of a project or initiative. The technique is commonly applied by local councils to inform planning decisions, but can readily be applied to guide OC decision making processes.

Engaging with non owner residents and other building stakeholders will help to ensure decisions take into consideration multiple stakeholder requirements and perspectives, as well as providing opportunity to leverage value through the experience and resource support of the individuals involved.

Examples of how the approach could be adopted include the establishment of energy, water or waste management committees.

The benefits of this approach include:

- Facilitates involvement of a wide range of people
- Enables consensus to be reached for action on complex issues that affect the entire community
- Effectively disseminates tasks to community members
- Provides opportunity to explore alternative strategies
- Builds on commonalities and alliances
- Allows for detailed analysis of issues, timelines and deliverables, with a focus on outcomes
- Participants gain an understanding of others perspectives leading toward an agreed, integrated outcome
- Builds community capacity and strength.

4.3 Example: Hi-RES Owner’s Guide

The following pages display a leading example of stakeholder engagement through an owners guide to strata decision making produced in conjunction with this guide. This has been reproduced with the kind permission of the Hi-RES project, a City of Melbourne lead initiative.

For more information or to download a copy simply visit: www.melbourne.vic.gov.au.

Figure 4.2: Stakeholder Engagement Spectrum
HOW TO MAKE POSITIVE CHANGE AROUND YOUR APARTMENT BUILDING

YOU HAVE A SAY IN WHAT HAPPENS AROUND YOUR APARTMENT

If you own, rent or work within an apartment building you should know that there are things around you that are shared. Because they are shared, all owners share in the decisions that are made about keeping them up to date or improving them. When you buy an apartment, you are automatically a part of a community that has a say about what happens to this shared property. This guide will help you to better understand how this works.

AS AN OWNER, DO YOU KNOW YOU CAN CHANGE THINGS AROUND YOUR APARTMENT BUILDING?

But first, you need to understand a few important differences between your property and shared property.

YOUR PROPERTY

To see what is owned by you and what is shared property, you need to look at your Plan of Subdivision or Strata Plan. The boundaries used to determine whether a lot is owned or available (title of the lot), or controlled by the strata body trust.

SHARED PROPERTY

Shared property, formally known as common property, will also be shown in your plan. Generally, shared property includes things like hallways, elevators, foyers, laundry rooms, gyms, pools and driveways.

REMEMBER THAT EVERY BUILDING WILL BE DIFFERENT. YOUR PLAN WILL TELL YOU WHAT YOURS AND WHAT’S SHARED.

OWNERS CORPORATIONS

WHAT IS AN OWNERS CORPORATION?

Think of an owners corporation as the group of all the apartment owners in a building or development where there is shared property. As owner it is important you are aware of what you own and what you are responsible for.

WHO IS INVOLVED?

Running an owners corporation involves people with different roles and responsibilities. Any owner can be on the committee and help manage and improve your building. Committee members are elected.

OWNERS CORPORATION COMMITTEE

Helps administer and manage the owners corporation’s responsibilities. Any owner can be on the committee and help manage and improve your building. Committee members are elected.

OWNERS CORPORATION MANAGER

Helps the owners corporation do their job. This may include coordinating meetings, arranging insurance, and managing finances.

OWNERS CORPORATION ADMINISTRATOR

Helps the owners corporation do its job. This may include coordinating meetings, arranging insurance, and managing finances.

SHARED PROPERTY AND SHARED SERVICES ARE CONTROLLED BY THE OWNERS CORPORATION. FORMERLY CALLED A BODY CORPORATE...

WHAT DOES AN OWNERS CORPORATION DO?

The powers for an owners corporation are set out in the Owners Corporations Act 2006 and Owners Corporations Regulations 2007. As an owner, you have the right to participate in decisions made by the owners corporation.

WHAT ARE THE RULES THAT GOVERN AN OWNERS CORPORATION?

The Owners Corporation Act 2006 and Owners Corporations Regulations 2007 apply. They set out the processes for owners corporations to make decisions and hold owners accountable.

ACCOUNTABILITY

The owners corporation is ultimately accountable for all decisions and actions to be with shared property.

The committee has a legal obligation to make decisions on behalf of the owners corporation and to hold accountable to the outcomes. The owners corporation must also meet the demand of the committee.

If you keep your building in good work, it respects your home.

OWNERS CORPORATIONS ARE LEGALLY REQUIRED TO MAKE THEIR DECISIONS PUBLICLY AND TO KEEP YOUR BUILDING HEALTHY.

If you keep your building in good work, it respects your home.

OWNERS CORPORATIONS ARE LEGALLY REQUIRED TO MAKE THEIR DECISIONS PUBLICLY AND TO KEEP YOUR BUILDING HEALTHY.

IF YOU KEEP YOUR BUILDING IN GOOD WORK, IT RESPECTS YOUR HOME.

OWNERS CORPORATIONS ARE LEGALLY REQUIRED TO MAKE THEIR DECISIONS PUBLICLY AND TO KEEP YOUR BUILDING HEALTHY.

IF YOU KEEP YOUR BUILDING IN GOOD WORK, IT RESPECTS YOUR HOME.
Multi-Unit Residential
5 Sustainability

Sustainable or green buildings are defined by the Green Building Council of Australia as a building that incorporates design, construction and operational practices that significantly reduce or eliminate its negative impact on the environment and its occupants. A sustainable building not only uses resources efficiently but creates healthier environments for people to live and work in.

Over the past decade, this concept of sustainability has shifted from a niche market to the mainstream. Many sustainability efforts and initiatives previously seen as voluntary or optional have now become de facto requirements, largely as a result of rising consumer awareness and expectations. Within the property sector, improved value is being placed on sustainable buildings, as owners, investors, residents and tenants place a higher priority on social and environmental sustainability.

Sustainable design and operation of buildings encompasses the following principles:

- Energy and water efficiency
- Waste avoidance and minimisation
- Ecological conservation
- Conservation of building materials
- Enhancement of indoor air quality
- Appropriate landscaping
- Enhancement of community life.

Key factors influencing the uptake of sustainability initiatives within multi-unit residential buildings include:

**Liveability**
Studies show there is a strong link between efficient building design and improved indoor air quality with improved livability, increased productivity, and wellbeing.

**Economics**
As building design and operation becomes increasingly sustainable, operating costs are reduced as a result of reduced resource expenditure and utilities charges. Increased plant and building life cycles through sustainable design and operations can also offer significant long-term cost savings.

**Government Regulation**
Governments around Australia have introduced minimum performance standards for new residential buildings, and are looking at introducing mandatory disclosure of building performance. Increasing compliance requirements are also being applied to existing buildings, as discussed throughout this Guide.

**Market Pressure**
The Australian property market is increasingly valuing environmental performance in leasing and sales decisions, with trends moving towards property premiums for environmentally friendly buildings.

**Awareness**
As consumer awareness increases, there is growing pressure from owners, residents and investors to ensure environmental impacts associated with building operations are minimised and social benefits such as health, liveability and amenity are maximised.
6 Energy

Multi-unit residential buildings consume more energy than other housing types. This is due to the provision of shared space and common area facilities and services, and the fact that most existing facilities in Australia were not specifically designed for operation in a low carbon economy. Improving energy efficiency and management is one of the key actions which can be undertaken to future-proof owners and facility occupants against rising electricity costs, as well as reducing greenhouse gas emissions associated with the burning of fossil fuels for generation of electricity.

Drivers and Barriers for Improving Energy Efficiency

As a contributor of up to 40% of the Australia’s greenhouse gas emissions, the property sector plays a significant role in government strategies to transition to a low carbon economy in order to minimise the ongoing impacts of climate change.

Around 11.9% of Australia’s energy consumption is for residential purposes, with reported data indicating that on a per capita basis people living in urban areas consume more energy than those in rural areas.

Various strategies and incentives have or are in the process of being introduced at all levels of government in order to reduce greenhouse gas emissions associated with the burning of fossil fuels, and central to these is Clean Energy Future: a package which includes introduction of the carbon price, distribution of household assistance, the Clean Energy Finance Corporation, and Energy Efficiency Grants. Other government mechanisms include mandatory greenhouse gas reporting requirements, renewable energy targets, and state government energy efficiency schemes.

While reducing greenhouse emissions associated with energy usage will help minimise costs passed on to end users associated with introduction of a price on carbon, it is important to be aware that regulated energy prices are rising significantly, independent of the price on carbon - in order to become sustainable, owners and facility/strata managers need to future proof now.

Energy Consumption in Multi-unit Residential Facilities

Studies show there is an increasing proportion of greenhouse gas emissions associated with high rise residential apartment complexes compared with low rise and multi-unit villa complexes and a clear relationship between the height of the building and the proportion of consumed energy attributable to shared spaces.
Figure 6.3: Typical electricity consumption sources in multi-unit residential buildings

<table>
<thead>
<tr>
<th>Common spaces</th>
<th>Individual uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Lifts</td>
<td>• Hot water heating</td>
</tr>
<tr>
<td>• Building external lighting</td>
<td>• Interior lighting</td>
</tr>
<tr>
<td>• Lighting in lobbies, stairs &amp; hallways</td>
<td>• Individual apartment space heating and cooling</td>
</tr>
<tr>
<td>• Hot water supply and circulation pumps</td>
<td>• Domestic uses (i.e. televisions and appliances, etc)</td>
</tr>
<tr>
<td>• Carpark ventilation</td>
<td>• Internal exhaust fans</td>
</tr>
<tr>
<td>• HVAC exhaust fans</td>
<td>• Refrigerators</td>
</tr>
<tr>
<td>• Pool &amp; spa water filtration &amp; pumps</td>
<td>• Washing machines</td>
</tr>
<tr>
<td>• Security systems, doors &amp; gates</td>
<td>• Clothes driers</td>
</tr>
<tr>
<td>• Cooling tower pumps/fans</td>
<td>• Dishwashers</td>
</tr>
<tr>
<td>• Cold water supply (lift and pressure pumps)</td>
<td>• Cooking appliances</td>
</tr>
</tbody>
</table>

Figure 6.4: Greenhouse gas emissions for high rise residential buildings

Source: Multi-unit Residential Buildings Energy & Peak Demand Study, Energy Australia, 2005

Figure 6.4: Residential energy consumption by end use (Australia)

Source: Energy use in the provision and consumption of urban water in Australia and New Zealand S.J. Kenway, A. Priestley, S. Cook, S. Seo, M. Inman, A. Gregory and M. Hall, Published by CSIRO, December 2008
6.1 Energy management process

Energy efficiency retrofits and improved management practices have the potential to result in significant cost savings and operational efficiency gains from common areas and within private dwellings. However, before planning and undertaking works, the following steps should be undertaken:

**Establish an energy baseline**
An energy baseline outlines current energy performance and provides a basis from which to measure change. Baseline data can be collected from energy invoices, building management system (BMS), and utility provider’s reports, and should include at least twelve months to account for seasonal variations.

**Develop an operational energy profile**
Develop a picture of how the building operates throughout the day by liaising with residents, and by understanding the building’s energy supply contracts (including off peak & peak times and charges and usage levels that trigger tariff changes).

**Undertake an energy audit**
Energy audits are essential in the energy improvement process; however there are different levels of detail, and a basic audit may not suffice to develop a business case for improvements. It is usually beneficial to engage an energy consultant to ensure critical elements are not overlooked.

**Set performance targets**
Develop targets taking into consideration the energy baseline, identified opportunities, and available resources. Other factors may include building performance ratings, resident expectations and budget constraints.

**Identify preferred energy improvement initiatives**
Evaluate opportunities to improve energy performance based on the return they offer against targets and the feasibility / practicality of implementation.

**Develop monitoring and reporting processes**
Establish a system to collect, analyse and report on energy consumption and develop or purchase a system that records consumption and enables tracking against targets. Measure consumption against the initial energy baseline in order to assess energy performance trends, the effectiveness of initiatives implemented, and further opportunities to improve.

**Communicate with residents & owners**
Discuss energy efficiency intentions with identified stakeholders to establish intentions and communication mechanisms, and seek input or support from residents.

6.2 Energy efficiency retrofits

An energy efficiency retrofit is a complex and dynamic process involving many steps including opportunity planning, identification, tendering and procurement (i.e. consultants), developing work specifications and contractor requirements, project management and contractor monitoring during implementation, and measurement and verification of results post implementation. Beyond that, an ongoing effort is necessary to maintain and sustain the retrofit benefits.

Each building is different, and there is no such thing as a ‘standard retrofit’. The process of identifying energy efficiency opportunities, then implementing and maintaining them requires a wide range of skill and competencies including project management; knowledge of government and building standards; ability to perform cost-benefit analysis and develop business cases seeking funding; awareness of energy efficiency technologies; and stakeholder engagement and management.

**Renewable Energy Installations**

Renewable energy fixtures such as photovoltaic panels are generally less cost effective per dwelling in multi-unit developments since there is less available roof space per unit – however they can be very effective for offsetting the energy usage and associated costs of common and shared spaces, and associated services.
HVAC Management Strategies

Heating, ventilation and air conditioning (HVAC) is a significant energy consumer in multi-unit residential buildings, and can often consume up to a third of total electricity usage.

Energy savings strategies relating to HVAC include:

- Review and tune HVAC settings through the BMS
- Select realistic operating hours - every extra hour per day of operation represents around 7% additional air-conditioning energy
- Select realistic space conditions. Controls should be set to provide a dead band between 20°C and 23°C where neither heating nor cooling will occur
- Fresh air control. When it is cooler outside than inside, it is often possible to cool buildings using outside air
- Optimum start/stop routines. These routines monitor the time taken for the building to reach design conditions in the morning and to depart from design conditions when the HVAC is shut off at night
- Install Variable Speed Drives on pumps and fans
- Install CO monitoring to control fresh air intake.

Building System Tuning

Over a building’s life time, the performance of its systems will tend to decrease for a variety of reasons. Building tuning involves a series of processes applied to HVAC, control and electrical systems to counter this and optimise performance, in order to help the building retain its energy efficiency performance for longer. This involves:

- Calibrating controls such as thermostats and sensors
- Adjusting operating schedules to ensure equipment is on only when needed
- Checking for improperly operating equipment
- Adhering to maintenance schedules.
6.3 Energy management techniques

Power Factor Correction
Power factor is a measure of how efficiently certain equipment makes use of the electricity network. Inductive loads, such as electric motors and fluorescent lights, draw more current from the electricity network than they need to perform the useful work they are designed to do. These additional currents are out of phase with the supply voltage and perform no useful work, but are required to maintain the magnetic fields within the devices. This means you may end up paying for more power than you actually need through the peak demand portion of your tariff. The concept is expressed as the ratio of power consumed (kW) to current flow required (kVA). A power factor of 1.0 is perfect.

Controls Strategy
Developing a controls strategy can be one of the most effective ways to reduce building energy consumption. This should take into consideration factors such as temperature set points, thermal comfort boundaries and hours of operation.

Peak Demand Management
Peak demand management is essentially minimising electricity consumption during peak periods and maximising consumption during off-peak or shoulder periods in order to minimise cost. Understanding which loads can be reduced without impacting building operations enables Facilities Managers to manage consumption in a way that will maximise cost savings.

Thermal Mass
Many multi-unit residential facilities have large concrete structures such as stairwells or lift shafts which provide a large volume of thermal mass which can be used for the benefit of heating or cooling purposes.

Actions as simple as installing motion sensors in stairwells so that lights are switched off when stairwells are not in use can ensure this thermal mass provides cooling services to the building rather than heating. This can have flow on benefits such as reduced demand on apartment air conditioning within multi-unit residential buildings, and reduced electricity consumption costs for the base building.

Lighting
Lighting in common areas is an area where substantial cost savings (often >50% and in some cases >80%) can be achieved. More efficient lamps reduce heat gain, which in turn reduces air conditioning costs, and longer-life lamps need replacing less often, reducing maintenance costs. Installing energy efficient lighting technologies and controls requires capital expenditure. However, payback periods (the time taken for savings to reach the same level as the initial project cost) can be less than three years, and are often between 2-4 years, as highlighted in the following case study.

Lighting initiatives
- Establish mechanisms to ensure lights are turned off when not in use (e.g. motion sensors in stairwells)
- Provide clear signage encouraging responsible lighting practices (e.g. turning lights off when not in use)
- Remove light bulbs in overlit areas (de-lamping) or where high luminance is not critical (e.g. stairwells)
- Lamp replacement – T5 fluorescent lamps are 38% more efficient than standard T8 lamps and compact fluorescent lamps, consume 75% less energy than incandescent lamps, and last up to 13 times longer.
- Reflector replacement – specula reflectors direct more light downward from fittings than standard reflectors
- Motion sensors – automatically activate lights when a person enters a room, through heat or movement detection (e.g. common area bathrooms or gyms)
- Daylight-linked dimming system - photocell dimming controls sense natural light levels and turn lights down or off when sufficient daylight is available
- Identify measures to show reductions in energy consumption.
Case Study

Freshwater Place, Melbourne

Freshwater Place is a luxury high rise residential facility in Melbourne with 530 apartments over 62 levels. In 2010 the Freshwater Place Committee of Management engaged a consultant to undertake an energy audit in order to:

- Assess overall energy consumption and establish energy consumption benchmarks
- Identify practical opportunities to reduce consumption and costs
- Develop a 5 year strategy to reduce electricity use, exposure to increasing electricity prices and carbon levies
- Achieve additional benefits such as improved service quality, maintainability and operability.

The total annual GHG emissions for Freshwater Place are equivalent to 3223 cars or 1074 homes. This equates to approximately 6 cars (2 homes) per apartment. The below data shows costs and GHG emissions (common area only).

<table>
<thead>
<tr>
<th>Utility</th>
<th>% of total cost</th>
<th>GHG emissions Tonnes/CO2/yr</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>70.4%</td>
<td>10,598</td>
<td>82.2%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>19.4%</td>
<td>2,296</td>
<td>17.8%</td>
</tr>
<tr>
<td>Water</td>
<td>5.3%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Waste water</td>
<td>4.9%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

The audit identified a number of opportunities to reduce energy consumption with lighting and HVAC (heating, cooling and air-conditioning) changes. The greatest visual impact for residents was lighting (e.g. the car park, corridor lighting, gym & change rooms, and foyers). These areas represented around 12% of total electricity consumption. Of this, 42% was associated with the car park and 33% the corridors.

The Committee allocated $40K to replace 1,200 20 watt halogen down lights with a 6 watt LED and driver for the whole building. A project plan was developed incorporating measures of improvement, the ROI, and methods for getting the message out to the residents.

Comparison between halogen and LEDs showed that making the change would reduce electricity consumption by 62,231 kWh/yr and reduce CO2 emissions by 84,012 kg/year, with a payback of 2.32 years and an ROI of 39.40%. Residents were given the opportunity to purchase LEDs at the same bulk price negotiated for the common areas.
7 Water

Water is a precious commodity, and as the effects of climate change continue to increase drought and flooding conditions across the country, water efficiency and management is likely to become increasingly important. Water consumption and efficiency are key indicators of building performance with potential to provide significant operational savings. Increasingly, governments, organisations and businesses are demanding water efficient buildings for their operations.

Water Use in High Rise Residential Developments

Within strata developments a Facilities Manager is likely to face challenges of reduced ability to control water efficient outcomes. For example, while an OC typically has control over water usage in shared spaces, the vast majority of water usage within the complex is associated with residential use. For some residential buildings separate / sub-meters for common and private uses have not been installed, presenting further issues for determining and managing water use.

While it may be easy to assume the majority of water use is associated with pools and spas in shared spaces, metering shows this is rarely the case – up to 90% of water use is usually associated with water use inside apartments, from showers, toilets, taps, leaks, dishwashers and washing machines.

7.1 Key water efficiency principles

Achieving water efficiency within multi-unit residential facilities is a difficult practice which requires a sustained approach and good communication and engagement with residents as the primary water users. Leak detection and management is generally recognised as the ‘low hanging fruit’ for water efficiency, as lighting replacement is for energy efficiency.

Did you know?

- A water-efficient washing machine may use only one-third the water of an inefficient model
- An old-style single-flush toilet could use up to 12 litres of water per flush, while a standard dual flush toilet uses just a quarter of this on a half-flush
- A standard showerhead may use up to 25 litres of water per minute whereas water-efficient showerhead might use as little as seven litres per minute, which is less than a third.

Source: Water Efficiency Labelling and Standards (WELS) Scheme (http://www.waterrating.gov.au/)

The difficulty in practice however, is that energy and water management should be considered together and an integrated solution developed (i.e. pumping water around a building has an associated energy cost).

The following steps should be undertaken as a guide:

- **Develop a water baseline**
  A water baseline provides a basis from which to measure change.
  Data can be collected from retail water invoices from utility providers, and metering. At least twelve months data should be collected to give an indication of seasonal fluctuations.

- **Develop an operational water profile**
  Develop a facility water use profile by collecting water consumption data and monitoring the consumption patterns of residents.

- **Engage with residents**
  While collecting consumption and other relevant data engage with residents to gauge their interest in having water improvements undertaken within their apartments. Consider establishing a water management committee to guide water efficiency initiatives, monitor performance, report achievements and promote awareness.

- **Set performance targets**
  Establish short and long term targets with consideration of the water baseline and available benchmarking data (see HiRise Case Study on page 32). Targets should reflect the environmental objectives of the owner or OC, budget constraints, and what can realistically be achieved given the age and condition and age of the property. Targets are usually expressed in kL/day or kL/apartment.

- **Evaluate and implement initiatives**
  Evaluate opportunities to reduce water consumption based on the return they offer against targets and the level of difficulty for implementation.

- **Monitor consumption and check for leaks**
  Monitor water consumption and regularly inspect water fixtures and outdoor areas for signs of dampness/leakage. Implement a proactive water leak detection policy that identifies where and to whom leaks are to be reported through clear and obvious signage.

- **Report performance and communicate results**
  Regularly measure water consumption against the initial water baseline, consumption trends, and reduction targets. Report performance and achievements to residents and other building users.
### 7.2 Inspections and collecting baseline data

To assist in identifying opportunities to reduce water consumption and associated costs, it may be necessary to physically inspect each unit or apartment where these are not normally separately metered (this may present issues for some OCs depending on the arrangements for each particular building). Such an inspection also presents the opportunity to assess the condition of common property that can only be seen inside an apartment (such as common walls). An example of the type of data that can be collected during this process is shown below.

**Figure 7.1 Inspection and Baseline Data Collection (Water)**

<table>
<thead>
<tr>
<th>Kitchen</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tap flow rates</strong></td>
<td>How water – 9L/min or less</td>
</tr>
<tr>
<td></td>
<td>Cold water – 9L/min or less</td>
</tr>
<tr>
<td></td>
<td>New flow regulators installed &amp; tested</td>
</tr>
<tr>
<td><strong>Water leaks</strong></td>
<td>Minor water leaks identified &amp; rectified</td>
</tr>
<tr>
<td></td>
<td>Major water leaks identified</td>
</tr>
<tr>
<td><strong>Air vents</strong></td>
<td>The air vents are functioning correctly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bathrooms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shower</strong></td>
<td>Shower flow rate – 9L/min or less</td>
</tr>
<tr>
<td></td>
<td>New shower flow regulators installed &amp; tested</td>
</tr>
<tr>
<td></td>
<td>Minor water leaks identified and rectified</td>
</tr>
<tr>
<td></td>
<td>Major water leaks identified and rectified</td>
</tr>
<tr>
<td></td>
<td>Tiles &amp; seals in good waterproof condition</td>
</tr>
<tr>
<td><strong>Bath</strong></td>
<td>Minor water leaks identified and rectified</td>
</tr>
<tr>
<td></td>
<td>Major water leaks identified and rectified</td>
</tr>
<tr>
<td></td>
<td>Seals in good waterproof condition</td>
</tr>
<tr>
<td><strong>Basin</strong></td>
<td>Hot water flow rate - 5L/min or less</td>
</tr>
<tr>
<td></td>
<td>Cold water flow rate - 5L/min or less</td>
</tr>
<tr>
<td></td>
<td>New flow regulators installed and tested</td>
</tr>
<tr>
<td><strong>Toilet</strong></td>
<td>Dual flush toilet</td>
</tr>
<tr>
<td></td>
<td>Flush volume reduced (single flush)</td>
</tr>
<tr>
<td><strong>Air vents</strong></td>
<td>The air vents are functioning correctly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laundry</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tub &amp; washing machine</strong></td>
<td>Minor water leaks identified &amp; rectified</td>
</tr>
<tr>
<td></td>
<td>Major water leaks identified &amp; rectified</td>
</tr>
<tr>
<td><strong>Air vents</strong></td>
<td>The air vents are functioning correctly</td>
</tr>
</tbody>
</table>
7.3 Water conservation initiatives

In a multi-unit residential facility it is often possible to achieve a 30 - 40% reduction in water consumption through behavioural modification and minor works. Some of the options available are shown above and below. As with energy, for existing buildings, the time to capitalise on many of the opportunities is during building maintenance and refurbishment, or through more intensive capital project works following a successful business case.

Water conservation initiatives (apartments)

- Install flow controllers on existing taps, and consider installation of sensor taps
- Insert flow controllers in cisterns to reduce the volume of water per flush
- Improve the WELS rating of internal fixtures, by replacing taps and showerheads with higher WELS rated fixtures
- For new fixtures, specify a minimum 5 star WELS rating for any water fixtures and white goods.

Water conservation initiatives (common areas)

- Seek opportunities to install sub-metering
- Install flow controllers on existing taps, and consider installing sensor taps
- Proactively maintain cooling towers to minimise loss through overflow, leaks, evaporation, bleed, and drift. A constant flow of water from overflow pipes is an indicator of a problem with the valve cut off height
- Where cooling towers are installed close to boilers, consider installing a heat exchanger to use the heat from the condensers to pre-heat water going into the hot water heaters. This has the added benefit of reducing load on both the boilers and cooling tower.

Water conservation initiatives (grounds)

- Plant native and indigenous species which require less water than exotics
- Use mulch on garden areas to prevent water loss
- Irrigate after sunset to reduce evaporation loss
- Capture and store water from routine fire services testing for re-use in other suitable applications
- Install moisture sensors or sub-surface drip irrigation systems
- Instal rainwater tanks for irrigation and washdown of plant and equipment using rainwater harvested from roofs and balconies
- Consider stormwater harvesting (refer to case study).
Case Study

HiRise Pilot Project (NSW)

High rise residential developments consume significant amounts of energy and water associated with occupant use and the provision of services in shared spaces and common areas, however detailed resource use data for this type of facility is limited.

The HiRise pilot project was a Sydney Water initiative which added to the existing data and knowledge base by undertaking detailed water efficiency audits of 22 high rise multi-unit residential facilities in Sydney, with the aid of consultants BMT WBM. Each audit involved a walkthrough of common equipment areas and shared spaces, review of historical water consumption patterns from billing data, checking flow rates in a sample number of apartments and installation of submeters for better analysis of specific use areas.

The findings of the study showed that the dominant water consumption source was by far from resident activities within their apartments; with showers representing on average 39% of total usage, and toilets, washing machines and taps adding a further 9-10%. Leaks represented another substantial opportunity area (10% of total consumption) (Figure 7.2).

The study confirmed that some areas traditionally perceived as those to focus water efficiency efforts (e.g. cooling towers, pools, spas, irrigation) represented only small proportions of the total water consumed. As a consequence, remedial actions recommended as a result of the study show preference for activities such as replacement of shower fittings and repair of leaks, as these make up the largest proportion of identified savings (Figure 7.3). While leaks were detected across all sites in plant and equipment such as irrigation equipment, float valves and cooling towers etc., the majority of leaks detected again originated inside apartments, from worn toilet valves and tap / shower washers.

Approximately 28% of recommended savings related to the following activities:

- Install lower flow shower fittings in apartments
- Install flow regulators in apartment basin taps
- Install flow regulators in apartment kitchen sink taps
- Reduce toilet flush volume

Overall, the combination of leak repair, new shower fittings and tap flow regulators across the 22 sites represented 93% of all savings recommended. This highlights the potential associated with programs targeting these areas, combined with resident behavioural change engagement and awareness strategies.

Another important contribution arising from the HiRise Pilot Project was the development of suggested benchmarking data which can be used for comparative purposes in high rise residential facilities. Figure 7.4 shows the proposed benchmarks, which include an ‘aspirational’ target of <130 L/bedroom/day.
Multi-Unit Residential

<table>
<thead>
<tr>
<th>Category</th>
<th>Water use per bedroom benchmark (L/bedroom/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher use</td>
<td>300 and higher</td>
</tr>
<tr>
<td>Typical</td>
<td>200 to 300</td>
</tr>
<tr>
<td>Current best practice</td>
<td>Less than 200</td>
</tr>
<tr>
<td>Unachieved target</td>
<td>Less than 130</td>
</tr>
</tbody>
</table>

Source: HiRise Pilot Summary Report, Overall Findings from Completed Water Audits, Sydney Water & BMT WBM Pty Ltd June 2011
Case Study

Ardoch Estate Stormwater Harvesting

Ardoch is a heritage listed residential estate in St Kilda East, Victoria. It is a unique environment covering 2.2ha, with 92 apartments in 15 stand-alone buildings (shown above). The property is subject to Conservation Management Plan requirements and owners/residents are obliged by legislation to maintain landscaped areas, most of which are specified as being of ‘primary significance’. Many of the estate’s trees are classed as significant trees and require special care and attention, including English-style planting in accordance with the era.

Exemptions from water restrictions over recent years were not sufficient to prevent significant distress to the gardens and trees during the drought period. A concept plan was developed to address the long term issue of the Ardoch water cycle and to work towards a sustainable solution to maintain and enhance Ardoch’s grounds and gardens. The solution incorporated an innovative, holistic approach to stormwater harvesting, with potential to significantly improve the benefit to cost ratio over conventional stormwater harvesting techniques, using practices pioneered by Melbourne’s Royal Botanic Gardens.

The projected outcome is a benefit to cost ratio of 2 to 1, with cost savings over stand-alone stormwater harvesting, in the order of 22% (gained primarily by substantially reduced required storage volumes). At the same time, potable water supply to the estate can be reduced by 80% (or from 10 ML to 2 ML) per annum.

Other benefits of stormwater harvesting such as reduced downstream pollution (in this case affecting Port Phillip Bay) and flood mitigation are also achieved. The cost of providing this water is less than alternative public supply means (25% less than desalination) and is significantly more cost effective and efficient than rain water tanks.

8 Waste

Waste represents inefficient use of resources and energy. Reducing waste is an immediate, tangible and measurable way of reducing costs and improving environmental performance. However, there are a number of challenges to effective segregation and management of waste within multi-unit residential developments. Landfills, where the majority of waste is currently sent, consume valuable space and pose threats to waterways through the leakage of hazardous materials, and contaminate the atmosphere through methane (a greenhouse gas) produced from decomposing waste.

8.1 Environmental impacts and benefits

The need to transport waste to disposal sites further increases emissions of greenhouse gases. It is known that methane is more than twenty times more potent a greenhouse gas than CO2. Through recycling organic waste, the methane emitted can be harvested as an energy source in the form of household gas.

Implementing waste management initiatives within multi-unit residential developments can bring about the following benefits:

- Cost savings: recycling is cheaper than waste disposal, and reducing waste management costs has an immediate impact on financial bottom lines and the potential to offset rising waste collection and disposal charges.
- Streamlining building operations: separating out recyclables leaves a much smaller amount of putrescible waste to be handled.

Most state governments in Australia have or are in the process of introducing various policy instruments such as increased landfill disposal fees and levies in an attempt to encourage recycling and reuse of waste streams.

Waste Challenges in Multi-unit Residential Facilities

Many older style multi-unit residential developments present unique waste management challenges, which differ depending on the type of development. For example, most existing high rise residential facilities have a single chute which is accessed from each level via a service compartment. The chute empties garbage into one or more garbage skips, typically located in the basement or carpark.

Recycling facilities are generally not provided on each level due to a lack of available designed space and, where provided, there is an associated cost of removing the items on a regular basis. Therefore residents wishing to recycle must either physically carry recyclables to the lower floor waste collection area (which may be somewhat of a deterrent) or utilise a separate recycling chute if provided.

Amenity Considerations

Waste collection, manual handling and disposal within a multi-unit residential development can give rise to a number of nuisance, health and amenity related impacts such as noise from the garbage chute and collection vehicles, odour, possible hygiene issues from waste awaiting collection, and traffic hazards from vehicles reversing and manoeuvring to collect waste (particularly where there are space constraints).

8.2 The waste hierarchy

The waste hierarchy should be adopted as a basis for all decision making involving waste management within a building or facility, however in some cases effective use of this hierarchy requires a change in mindset and an ability to view waste as a resource. The hierarchy recognises that disposal to landfill is environmentally the least preferred option when dealing with waste, and avoiding generation of waste in the first instance is the primary goal.

Figure 8.1: The Waste Hierarchy

Terminology

Opportunities for improving performance include waste avoidance and minimisation. Waste minimisation includes reduction, re-use, repair and recycling during a facility’s operational life. Waste avoidance is best achieved during fit-out and refurbishment and is mainly a function of design.
Facilities Management Good Practice Guide

Responsibilities
Reducing waste through the day-to-day operations of the building generally comes down to the resident’s responsible practices, however the design and layout of the facility may determine to what extent waste can be effectively segregated and recycled. The Facilities Manager typically plays an important role in supporting waste minimisation through:

- Provision of separate storage and recycling spaces
- Provision of hard waste collection locations
- Provision of charity bins in waste rooms or car parks
- Managing cleaning subcontractors to ensure that waste is separated and appropriately disposed of
- Monitoring and reporting on waste performance
- Educating residents on waste efficiency.

During building maintenance and refurbishment, waste should be managed through the promotion of reuse and recycling, and packaging reduction.

8.3 Waste efficiency options
Opportunities to improve waste management practices within multi-unit residential facilities relate to the following considerations.

- Design
- Refurbishment
- Recycling and reuse
- Education and awareness
- Purchasing and procurement
- Contracts & agreements.

Design Considerations
In accordance with the waste hierarchy ‘designing out’ waste is the best way to reduce waste in the long term. For new buildings, several options are now available for improved waste management. The following options to improve waste efficiency can be implemented during building design.

Design related waste opportunities (construction)
- Write into the designer’s brief that they minimise waste and reuse/recycle materials wherever possible
- Use durable materials and furnishings
- Use materials that can be (or are) refurbished or remanufactured (e.g. carpet tiles)
- Require designers to develop a waste management plan for construction
- Reuse demolition materials on-site (for example, timber, partitions, light fittings, glass)
- Specify minimal, returnable or recyclable packaging from suppliers.

For existing buildings where it is too costly or impractical to retrofit improvements to existing waste facilities (e.g. installation of second waste chute or single chute dual stream technology), effective and low cost segregation facilities can still be established with a little coordination between stakeholders, provided there is sufficient space within the facility (e.g. car park area).

Design related waste opportunities (Operations)
- Require designers to develop a waste management plan for facility operations. WMP must comply with the relevant Council’s guidelines or planning controls
- Consider on-site compaction of garbage to reduce collection frequencies
- Ensure garbage and recycling streams are made equally as easy to dispose of
- Ensure long term costs of managing recycling and garbage are minimised. Promote dual chutes or single chute dual stream technology
- Ensure there are adequate separate storage and recycling spaces
- Ensure there are adequate separate spaces for hard waste and charity goods
- In high density developments designers should consider onsite loading of waste to avoid loss of local amenity and noise due to on-street collections.
Refurbishment Initiatives
Waste reduction can be achieved during refurbishment and retrofit related construction work as follows:

Waste opportunities during refurbishment
- Use a company that deconstructs rather than demolishes
- Require demolishers to develop a waste management plan
- Use a demolition company that has its own retail outlet for second-hand building materials
- Get receipts from the waste company documenting the amount reused, recycled and diverted from landfill
- Some of the materials may be left onsite for reuse by the builder (e.g. glass, timber and carpet underlay)
- Use a builder who is flexible and can reuse materials
- Have materials ‘made to measure’, to minimise off cuts, particularly plasterboard.

Recycling and Reuse
Segregation of waste streams in older facilities is often limited to paper/cardboard, glass, aluminium and recyclable cartons, and there is often no space for large bulky items such as hard waste or unwanted items which could be collected by Council.

Good practices in waste segregation include provision of bins and collection services for various waste streams including:
- Paper and cardboard
- Containers (glass, plastic and metal)
- Computers and electronic equipment
- Mobile phones and batteries
- Fluorescent lamps
- Electrical equipment
- Charity goods.

The case study over page provides a good example of where this has been successfully implemented for minimal cost outlay, reducing the volume of waste diverted to landfill and at the same time providing additional resource streams and social benefits.

Education & Awareness Tips
- Educate facility residents and contractors about recycling processes and why they have been established
- Inform cleaners and other contractors of the recycling system in place, what their responsibilities are, and which waste streams are to be separated from general waste
- Promoting awareness and understanding of waste requirements amongst all subcontractors.
Case Study

Princeton Apartments, Melbourne

Princeton Apartments, St Kilda Rd, Victoria is a high rise residential facility comprising 128 apartments over 28 stories. Members of the OC participated in the City of Port Phillip’s SOCS (Sustainable Owners Corporations) and Blocks Program, targeting improved environmental management in high rise apartments.

Andrew Foulkes, a member of the OC indicated waste is one area which has been very successful as part of this process:

“There are bins for rubbish, paper and cardboard, general recycling, corks, batteries, print cartridges, mobile phones, cards and charity bins. The content of all these bins would have gone into the rubbish if they had not been there, and we would have to pay for it to be taken away. The two most successful of these are the general recycling and the charity bins. The amount of clothing that used to get thrown in the rubbish was amazing - when moving it is easier and quicker to throw it in the rubbish rather than taking it down to the nearest charity. So if you haven’t got charity bins that would be a good place to start. We fill two charity bins every week”.

Examples such as this demonstrate that despite some obvious design challenges, OCs can still obtain significant savings and benefits by implementing practical measures and involving members of the residential community.
9 Maintenance

Optimising the performance of a building is the best ‘first step’ in ensuring it is financially and environmentally sustainable. For example, maintenance for greater energy efficiency is mandatory for new and refurbished buildings under the National Construction Code and requires a maintenance program to ensure all equipment is operating correctly and efficiently.

The following sections provide a general guide to maintenance in multi-unit residential buildings in Australia.

9.1 Maintenance planning

Maintenance activities fall into two basic categories – planned (i.e. routine maintenance) and unplanned (i.e. breakdowns). Manuals and specification documents should be used as a guide when developing a maintenance program which should clearly outline what needs servicing and when, as well as general routine maintenance tasks, who will undertake them and when.

Establish Policies and Objectives

Ensure policies are in place and objectives developed taking into account the needs and aspirations of the OC, residents and other key stakeholders.

Develop Maintenance Strategies

Ensure a maintenance strategy and supporting plan is in place with benchmarks and KPI’s included for contractors. Consider incentives for maintenance contractors to enhance efficiency in operations and maintenance.

Allocate Resources

Ensure there is sufficient budget from OC levies to carry out maintenance, and sufficient rigor over management of the associated budget. Employ suitably trained and experienced professionals to carry out maintenance activities and associated monitoring, seeking professional advice where necessary.

Document Requirements

Ensure key documentation is in place and accessible to contractors (e.g. O&M Manuals, As Built Drawings, Maintenance Log Books, Commissioning Data). Consider developing and distributing a building user guide to relevant stakeholders to ensure that equipment and maintenance requirements are understood and adhered to.

Monitor Progress

Hold regular progress meetings and encourage a team effort from all stakeholders in conducting their duties. Carry out monitoring using specialists where necessary.

Planning maintenance strategy types

Preventative Maintenance: where a contractor regularly inspects, maintains and calibrates building plant and equipment, providing reports to the owner (i.e. typically OC) or their designated managing agent (i.e. typically the Facilities Manager), who approves any required work.

Comprehensive Maintenance: similar to the above, however the contractor typically pays for the work and sets their own work plan within a full service contract commissioned by the managing agent for a set period.

Performance-based Maintenance: where the maintenance contractor is responsible for delivery of planned maintenance services, sets their own program, and is paid based on the reliability of services provided.

Areas to include in planned maintenance include:

- Air handling units (AHU)
- Boilers
- Building Management System
- Chiller system
- Cooling towers
- Fire systems
- Humidification and dehumidification
- HVAC
- Lighting
- Pumps and fans
- Packaged HVAC systems
- Power Factor Correction System
- Safety controls
9.2 Maintenance and sinking funds

The primary source of funding for the maintenance of multi-unit residential buildings under strata schemes is from Owners through the use of levies. These funds are used in a recurrent budget or Maintenance Fund or a Sinking Fund (the terms vary depending on context) to cover the cost of works.

The balance of funds and the detail of its associated maintenance plan vary depending on the complexities of the building, its size and age.

Despite not being ideal, it is common for maintenance and budget planning in residential strata schemes to occur on an ad hoc reactionary basis (i.e. when something needs to be fixed, it is). This approach can represent poor financial management, often leads to a lack of funds to pay for required works and can result in Owners being burdened with excessive short-term costs.

To fund capital replacement, Owners have the option to adopt a sinking fund budget that adequately provides for the future needs of their buildings and assets – these budgets are usually based upon a report prepared by a property professional such as a quantity surveyor, builder or building cost estimator.

Alternatively they may adopt a sinking fund budget that is not adequate and supplement the short falls in the sinking fund balance with additional special levies to pay for a particular project such as painting, fencing or guttering.

Another option available is to take out a loan with a financial institution to cover the costs of works and have repayments paid by Owners from existing fees or a special levy.

In many states and territories it is a requirement for Owners of strata schemes to develop and implement a 10 year Maintenance Plan or Sinking Fund Plan. This may be based upon a user pays system whereby the Owner living in a strata ‘uses’ the common property and ‘pays’ for what they use. For example if an owner owns a unit for 5 years they have used 5 of the 10 years of the life of the paint and should pay for 5 years worth of the cost to repaint in their sinking fund levies.

If a Maintenance or Sinking Fund Plan is properly determined in the first place, Owners will contribute a required amount over a period of time towards the replacement of major capital items. This approach is usually the easiest to manage and pay – it is something like a superannuation plan for a building.

A Maintenance or Sinking Fund Plan should take into account all of the costs of a capital or non recurring nature such as replacement of fencing, gutters, downpipes, plant and equipment and items such as repainting. The Plan will generally apportion costs into 1 of 3 categories and provide funding for them accordingly:

1. Costs for items with a known life span within the 10 year time of the Maintenance Plan – e.g. painting of a building will generally be required every 8-10 years.

2. Costs for items that will require replacement over a 10 year time frame but for which the life of the item is not determined – e.g. external lighting will generally need to be replaced over a 10 year time frame but not all of the lights will fail at the same time and so will be replaced somewhere between years 5 and 10.

3. Costs for items that will be replaced outside of the 10 year time frame for which Owners need to collect a proportion of the eventual replacement cost – e.g. replacement of fencing will generally be required 30 years from installation, so Owners will collect up 1/3 of the eventual replacement cost of the fencing in the 10 year Maintenance or Sinking Fund Plan.
9.3 Risk management
Within any facility there are critical pieces of equipment (assets) which have a greater impact on overall performance. There is a need to identify what equipment is critical in ensuring the safety, comfort and amenity of a building. Particularly in larger buildings, the OC may wish to plan for major plant failure by purchasing these critical assets and having in place a process to minimise downtime and inconvenience to residents.

The following are some suggested key steps in identifying critical assets and managing the risk associated with them.

**Identify critical assets and asset audit trail**
An asset audit trial should be undertaken to understand the interdependency of assets upstream and downstream – very few critical assets are stand-alone entities (e.g. electrical supply and a machine’s electrical controls are both required in order for the machine to do work).

**Identify and document replacement lead time**
If assets or parts are able to be replaced promptly without significant impact on building operation, they are unlikely to be critical and should be addressed as routine maintenance.

**Identify and document replacement cost**
Assets or components which are readily available but have such a high replacement cost that they cannot be funded may be critical assets and should therefore be managed strategically as distinct from routine maintenance.

**Conduct risk assessment**
Fire is one of the greatest threats to the effective operation of assets and equipment, however other threats may include flood, water ingress, vandalism, mould, or smoke damage. Credible threats to the performance of each asset should be documented and a risk assessment conducted on each asset.

**Protect critical assets**
The risk assessment process should determine the controls necessary to manage threats to each critical asset, such as alarms, values, detectors or response equipment and processes.

9.4 Record keeping
Records of all works should be kept for all maintenance carried out in multi-unit residential buildings on behalf of the OC. A building management system (BMS) may be used to meet this requirement as well as provide control over some or all building systems.

All programmed maintenance, in particular essential service maintenance, must be recorded accurately and be readily available. Contractors must ensure each scheduled inspection is recorded and signed by the person carrying out the maintenance.

Logbooks must be provided for activities relating to essential services. Maintenance records also assist in planning for future asset replacement.

**Maintenance Contractor records should include:**
- Date of inspection, test or maintenance
- Name of person carrying out the inspection / maintenance
- Details of any faults identified.
- Action taken to rectify any faults, including the date they were rectified
- Cost of any rectification works outside the scope of the agreement with the FM.

Spare equipment can be stored in convenient locations to minimise downtime, such as this condenser water pump motor and associated lifting equipment. (images courtesy of FMV)
10 Safety

Owners, Facilities Managers and their employees have a clear legal and moral obligation to provide a safe physical environment for residents, contractors and visitors to a building.

The provision of a safe environment is critical for the long-term success of any building and presents an essential aspect of the duty of care that must be demonstrated by the various stakeholders with the ability to do so.

While identifying and mitigating existing safety issues is important, so too is safety planning, ensuring the systems and processes are in place to identify and deal with safety issues as they arise throughout the life of a building. Figure 10.1 displays a general approach to safety within a multi-unit residential building.

Effective safety planning also limits the consequences that can arise from poor safety procedures (such as higher insurance premiums resulting from a serious incident).

Safety management and planning is no less critical than for residential buildings, where there is a far wider variety of building users (i.e. compared to a commercial office) and with the building typically occupied to some degree all day every day.

Figure 10.1: General approach to safety planning
11 Dangerous Goods

Storage and use of dangerous goods and flammable substances within apartment facilities has potential to cause damage to property, the environment and the building’s occupants. The use of chemicals for routine activities such as cleaning can give rise to significant impacts on indoor environment quality, as well as affecting the health of cleaners or those in the immediate facility.

The term ‘dangerous goods’ covers a wide range of materials and products, many of which are commonly stored and used within multi-unit residential developments, such as:

- Paints
- Fuel
- Kerosene
- Diesel
- Petrol
- Paint thinner
- Primer
- Oil
- Glue
- Solvents
- Cleaning chemicals
- Dry cleaning chemicals
- Pool chemicals.

Irresponsible disposal of chemicals (such as pouring them down the drain) can cause significant impacts to water and waste water drainage systems, waste treatment process, and the natural environment.

Terminology

It may seem easy to confuse dangerous goods with hazardous substances, however they are classified according to different criteria. Dangerous goods are classified on the basis of potential immediate physical or chemical effects, such as fire, explosion, corrosion and poisoning, affecting property, the environment or people; whereas hazardous substances are classified on the basis of health effects alone (whether immediate or long-term). As a consequence of the need to control the different risks they present, dangerous goods and hazardous substances are administered by separate legislation.

Dangerous goods management involves:

- Knowing the type and volume of each of the dangerous goods used within the facility, and the disposal requirements associated with each type
- Providing appropriate storage, signage and segregation of dangerous goods
- Providing spill kits for clean-up of oil and diesel spills
- Ensuring Material Safety Data Sheets (MSDS) are available at the point of use for all dangerous goods
- Storing and using chemicals in accordance with MSDS recommendations to avoid fumes and odours
- Storing flammable goods in a lockable metal fireproof cabinet
- Ensuring service providers (such as cleaning and waste removal contractors) are adequately trained in the safe storage and handling of the dangerous goods they use, and incorporate requirements into contracts
- Ensure large volumes of dangerous goods (such as underground fuel storage tanks) are notified to the relevant Authority (generally this is the Work Cover Authority at the state government level) and that any licensing requirements are adhered to.
12 Hazardous Materials

The term ‘hazardous materials’ applies to a group of materials that are classified based on the human health risk they present. Within a multi-unit residential building, particularly those built prior to 1990 in Australia, there is a good chance the following hazardous materials may be present:

- Asbestos Containing Materials (ACM)
- Synthetic Mineral Fibres (SMF)
- Lead Based Paint
- Polychlorinated Biphenyl Compounds (PCBs)
- Ozone Depleting Substances (ODS).

12.1 Asbestos-containing materials
Asbestos was widely used in housing in Australia due to its excellent construction properties. Common uses of asbestos within multi-unit residential buildings include:

- Asbestos cement downpipes and guttering
- Vinyl floor tiles
- Electrical switchboards and backing boards
- Grouting around pipes and windows
- Asbestos cement sheeting used as wall partitions
- Rope lining around ovens and dangerous goods sheds
- Fire insulation
- Sprayed decorative finishing.

The year 1990 is recognised as the ‘safe cutoff date’ for the use of asbestos containing materials (ACMs) in building construction within Australia. Any building constructed before this date, including residential properties of any size may contain ACMs.

For buildings constructed before 1990, an asbestos audit should be undertaken by a competent person and a register developed including a risk assessment of each identified instance, taking into account the location, condition, frequency of access, volume and other factors. The register is the primary tool for managing identified ACM within a facility, and should be provided to any contractors doing work on identified ACM, such as cleaners and painters.

12.2 Synthetic mineral fibres
Synthetic Mineral Fibre (SMF) is a generic term which covers a range of man-made fibrous materials made from glass, rock, alumina and silica. SMFs have been widely used as alternatives to asbestos in insulation and fire-rating products, as well as reinforcement in cement, plaster and plastic materials. They have also been used extensively in residential buildings for insulation from temperature and sound, one of the most common applications being acoustic noise ceiling tiles. There are four main groups:

- Continuous Glass Filaments
- Fibreglass, glass fibre or glasswool
- Rockwool
- Ceramic fibres.

For some years, there were concerns SMF may cause health effects akin to asbestos, due to its similar appearance and use in building applications. Research has since proven SMF to present altogether different effects:

- Skin and eye irritation from short term exposure (e.g. reddening, burning, itching, scaling, thickening and inflammation around the fingernails)
- Upper respiratory tract irritation during exposure to high concentrations of airborne SMF).

The World Health Organisation (WHO) classifies rockwool, ceramic and glass fibre as Class 2B carcinogens (meaning they are possibly carcinogenic to humans), however general scientific consensus is that chronic health effects caused by SMF will not occur as long as appropriate precautions are undertaken. This includes minimising potential for generation of dust during removal activities, and wearing appropriate personal protective equipment (PPE).
12.3 Lead-based paint

Before 1970, paints containing high levels of lead were used in many Australian homes. While lead-based paint itself is not usually an issue, the paint chips and dust that humans can ingest can present a major health risk. Children and elderly people in particular are considered the most negatively affected: children, as they absorb more lead into their bloodstream on a relative basis, and elderly people due to heart risk.

Lead-based paint is most likely to be found on window frames, doors, skirting boards, kitchen and bathroom cupboards, exterior walls, gutters, metal surfaces and fascias. It can also be found on interior walls, ceilings and areas with enamel paint (particularly pink and red primer paints). Lead paint on building exteriors can leech into soil around the structure, creating hazards for gardeners or for children playing in the garden or landscaped areas.

Paint removal activities undertaken by contractors during maintenance and refurbishment activities such as by blasting, burning, dry scraping, dry sanding and using power tools creates the most serious danger as the particles are small enough to be inhaled or deposited in furnishings or carpet, making removal extremely difficult.

Lead based paint in good condition (i.e. not flaking or chalking) or which is covered by well maintained lead free paint, does not present a hazard in itself, however anyone painting or doing maintenance on buildings constructed in the 1980s or earlier is undertaking an activity with potential exposure risk.

12.4 Ozone depleting substances

The Federal Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 and its Regulations help ensure Australia meets legal obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer (the first environmental protocol to be ratified globally) and the United Nations Framework Convention on Climate Change. The Act controls the manufacture, import and export of all ozone depleting substances (ODSs) and synthetic greenhouse gases (SGGs) while the Regulations control major end-uses.

Compliance Obligations
In Australia, the complete phase out of HCFCs is required by 2020. Within multi-unit residential buildings the most common use of these substances in existing buildings is the use of refrigerant gases for cooling purposes, the most common being the refrigerant R-22 in air conditioning systems (visit www.environment.gov.au for more information).
13 Health & Amenity

Developing and maintaining a high standard of health and amenity is a major factor influencing livability and satisfaction for residents within multi-unit residential buildings. Studies show there are strong linkages between sustainable and efficient building design and management with improved indoor air quality and amenity, which in turn leads to improved livability and increased productivity.

Facilities Managers have a key role to play in implementing processes to ensure residents and building staff are able to live and work in a healthy environment.

13.1 Indoor air quality

Indoor Air Quality (IAQ) is used to assess the impact of facilities on the wellbeing of occupants and is a product of measurable physical parameters (such as temperature) and subjective parameters, which may vary based on individual perceptions and preferences. It includes measures of the quality of the following attributes:

- Air quality
- Thermal comfort
- Visual amenity (glare, lighting and views)
- Acoustics
- Pollutants (e.g. from maintenance and cleaning).

Poor IAQ within multi-unit residential buildings can result in health issues ranging from non-specific symptoms such as watering eyes, dry skin, sore throat, and fatigue, to severe health conditions such as asthma, allergies, cancer, and legionnaire’s disease. In addition to minimising health risk for building occupants and inhabitants, there is mounting evidence suggesting there is a strong correlation between improved indoor air quality (particularly heating, cooling, lighting, ventilation and noise) with increased productivity and satisfaction.

In maintaining optimal indoor air quality, an overall goal should be to obtain a balance of air temperature, air movement, relative humidity and radiant temperature of surrounding surfaces.

Establishing an IAQ profile involves measuring various parameters and comparing the results with accepted standards, and speaking with residents and other building users to establish awareness and satisfaction levels, and behavioural practices. Use the checklist below as a guide.

13.2 Lighting and visual environment

Within a multi-unit residential development different parts of the facility may require different lighting levels and quality, depending on the users and activities undertaken in these areas. In addition to task based lighting, visual amenity is an important consideration within a residential building. This may include for example, arranging the layout of seating in lounges and common areas to maximise views and minimise distractions.

**Lighting and visual environment strategies**

- Integrate natural and artificial lighting through appropriate lighting layout
- Use high frequency electronic light ballasts to reduce flicker
- Ensure windows are cleaned regularly
- De-lamp over lit areas
- Provide flexible lighting options via dimmers and switches
- Install external shading or internal blinds which can be manually adjusted to reduce glare
- Consider window tinting, west and north facades, or automatic window blinds for shading options

**Indoor air quality actions**

- Resolve identified issues such as fixing leaks, unblocking vents and diffusers, and replacing flickering lights
- If temperature is identified as an issue commission a consultant to undertake thermal modelling
- Flush out stale air and contaminants by ensuring high air change effectiveness, optimal ventilation rates and fresh air intakes
- Select building materials, paints, and furnishings with low volatile organic compounds (VOC)
- Isolate machines with high emission rates to separate rooms with exhausts directly to the outdoors
- Install carbon dioxide monitoring (best practice - one CO₂ sensor per air return duct)
- Implement an annual HVAC maintenance program with separate temperature controls for summer and winter
- Educate residents on building operations and performance through development of a Building or Facility User Guide
13.3 Space management
To create and maintain an enjoyable living environment, OCs must decide on how best to utilise what is often limited space in the facility, including general grounds and garden areas, common lounges and seating areas, carparks and shared areas, including provision of waste facilities, and utilisation of rooftop space (refer to the case study overleaf as an example).

13.4 Thermal comfort
Thermal insulation in apartment buildings has only been recently introduced to the National Construction Code (formerly the Australian Building Code). Many multi-unit residential developments built in accordance with minimum standards will be unlikely to maintain their thermal performance over the lifetime of the building without applying controls. When considering how to improve thermal comfort in existing buildings, strategies should be based around building infiltration, insulation and shading. Refer to the box for a list of items which should be checked during ongoing monitoring.

More advanced strategies include thermographic (infra-red) surveys of the building fabric and roof to check for heat loss, or investigating the feasibility of painting rooftop areas with solar reflective paint (e.g. white roofs).

**Thermal comfort actions**
- Check building entrance automatic doors are operating properly and not open for excessive periods
- Inspect external doors for gaps/leaking door seals
- Inspect the condition of windows, frames and seals
- Regularly check for doors left open unnecessarily
- Check ceiling tiles are in place and in good condition with no gaps
- Inspect inside ceilings for displaced thermal insulation
- Inspect the condition and adequacy of roof insulation
- Inspect for perimeter air leakage
- Inspect floor–wall-ceiling joints for air gaps
- Check the correct operation and use of shading devices
- Where possible, redirect conditioned air to more needed areas (i.e. by closing ducts)

The provision of an air-lock by assists in isolating the internal environment from climatic external variations. (FMV)
13.5 Noise and acoustics
Regardless of the type of development, noise in multi-unit developments can affect livability and amenity values, and requires consideration and management on an ongoing basis. Many issues associated with noise can be mitigated during design, or in existing buildings, during refurbishment and retrofits.

Noise improvement actions
- Separating noisy equipment from quiet areas
- Using sound absorbing materials and sound barriers in noisy areas, and decoupling partitions from structures to reduce structure-borne sound transmission
- Limiting the transmission of noise from building services and outside, by using low sound transmission walls between quiet and noisy spaces
- Selecting surface finishes which reduce reverberation; and using insulation and sound absorbing materials.

Where noise levels appear excessive, an acoustical (noise) consultant should be commissioned to undertake noise monitoring in accordance with the recognised Australian Standard for Acoustics, AS 2107-1987.

As these basic requirements can add up to a significant expense, it is important to design bicycle parking facilities that meet the needs of cyclists or the facility risks being unused and bicycles parked in unsuitable locations. Ideally, bicycle parking areas should be located in the most convenient location for cyclists and close to building entrances or lifts. The parking area should be sheltered from weather, in clear view of the public or under surveillance, and be sufficiently lit at night.

When selecting and retrofitting bicycle parking products, it is important to consider security, vandal resistance, weather resistance, durability and the most efficient use of available space. In addition, the products should be attractive by design, easy to use and be positioned to allow easy access in and out of the facility. AS2890.3 Parking Facilities provides useful guidance in the design and installation of bicycle parking facilities and outlines the following 3 Classes of bicycle parking facilities:

Class 3
Bicycle racks and rails that are designed to minimise damage to a bike by supporting the bike frame and maximise security of a bike by allowing the wheels and frame to be locked to the parking device using the cyclist’s own lock. Class 3 racks can be surface or wall mounted.

Class 2
Bicycle rooms and compounds protected from the weather and accessed via an attendant or key system. Class 3 bike racks and rails are provided within the compound to allow secure locking of bikes.

Class 1
Fully enclosed, weather protected, individual bicycle lockers with unique key or electronic access.

13.6 Sustainable transport
The use of bicycles as a mode of transport and recreation has steadily increased in recent years as the health and environmental benefits of cycling become widely accepted. With state and local governments promoting sustainable transport options and facilities such as dedicated bicycle lanes, there has become an increased need for bicycle parking and storage facilities.

Bicycle parking facilities for residents require dedicated parking areas and devices that bicycles can be locked to or secured in.
14 Essential Services

Also referred to as ‘essential safety measures’, essential services are the fire and safety protection items installed in a building to protect the safety of its occupants and inhabitants.

The maintenance of essential services will ensure that the safety systems (such as those dealing with fire situations within the building) remain at the required operational level throughout the life of the building. The type of maintenance depends on the complexity of the service, equipment or feature.

What is an essential safety measure?

Essential services are the fire and life safety items installed or constructed in a building to ensure adequate levels of fire safety over the life of the building. They include all traditional building fire services such as sprinklers, mechanical services, but also include passive fire safety such as fire doors, fire rated structure and other building infrastructure items such as paths of travel to exits.

The following are some examples from the Victorian Building Commission (www.buildingcommission.com.au) of essential services defined under the building regulations:

- Air conditioning systems
- Emergency lifts and lighting
- Emergency power supply
- Emergency warning systems
- Exit doors and exit signs
- Fire control centres
- Fire curtains and doors
- Fire detectors and alarm systems
- Fire extinguishers
- Fire hydrants
- Fire isolated stairs, passages ramps
- Fire rated materials
- Fire windows
- Mechanical ventilation
- Path of travel to exits
- Smoke alarms
- Smoke control systems
- Sprinkler systems

A critical role of a Facilities Manager is to identify what services are essential for their building (i.e. through the Annual Audit Report and Occupancy Permit) and to then ensure that these are well maintained and operate as designed.
15 Emergency Management

Good practice in emergency management should include development of an Emergency Management Plan that outlines responsibilities (Fire Wardens, etc), identification of high risk areas and appropriate responses, clear identification of safe areas during an emergency, an evacuation plan for vulnerable persons, and an emergency training program and maintenance schedule.

**Emergency Management Plans should include:**
- Evacuation floor plans clearly displayed on each floor
- Display of an overall site plan, including north point and emergency contact details
- Display of a current version of the Annual Fire Safety Statement
- Maintenance records for Essential Fire Safety Measures should be readily available.
- Consideration of the need for fire first response training
- Facility evacuation procedures
- Clear signage and procedures for building users.

An Emergency Management Plan may include any of the following, depending on the nature of the building involved:
- Emergency contact list
- Building safety features
- Emergency Control Organisation
- Warden duties
- Evacuation procedures
- Stages of evacuation
- Site/floor plans
- Building security
- Checklists

15.1 Evacuations

One of the most critical periods in any building is when occupants are required to evacuate (such as in the event of a fire). Building systems and procedures are tested as the Emergency Management Plan is put into action.

A well managed building will be able to achieve a smooth and orderly evacuation in the minimum amount of time. Lives can be placed at increased risk should the building be poorly managed.

Australian Standard AS 3745-2010 outlines the minimum requirements for the establishment, validation and implementation of an emergency plan for a facility to provide for the safety of occupants of that facility and its visitors leading up to, and during an evacuation.
16 Security

Security is an essential component of creating and maintaining a safe environment for residents and other key stakeholders, which also encompasses protection of the physical assets and infrastructure. Maintaining security for large groups of people living together in a residential context brings a unique set of challenges and mix of required attributes.

16.1 Security audits

Best practice in security management includes undertaking a security audit or review of Security practices and processes, using a security consultant (local police may also be available to assist). The methodology for this process typically involves a series of inspections, interviews and documentary reviews, and may reference a number of different standards and guidelines in the development of a crime prevention policy.

A security audit should include:

- Perimeter protection
- Access and traffic management
- Emergency management
- Internal security
- Systems management.

Actions and recommendations arising from security or access audits can include the following:

- Additional security cameras
- Changes or improvements to lighting
- Changes to door hardware
- Improved access control and traffic management
- Removal of easy access points
- Resident education
- Upgraded signage
- Restricting access to floors
- Initiating security patrols

### Key standards and guidelines

- AS/NZS4360:2002 Risk Management
- AS/NZS4081:2000 Auditing OHS Management Systems
- AS HB167 Security Risk Management
- AS3745:2002: Emergency control organisation and procedures for buildings, structures and workplaces
- AS 3745-2010 Planning for emergencies in facilities.

Residential apartment security tips

- Ensure security systems restrict access to residents only (e.g. swipe card access)
- Secure storage areas with quality locks
- Always lock accessible doors and windows even if you’re just going out for a few minutes
- Never leave fire exit doors propped open
- Never leave lower floor balcony doors unlocked or open even in warm weather
- Don’t provide easy access to upper level balconies, for example; wheelie bins, lattice, trees, nearby fences
- Don’t let people that you don’t know into your building even if they seem trustworthy
- Never give out copies of building or apartment keys to trades people or friends
- When driving into garage areas, avoid allowing anyone follow you through the garage entry door
- Fit main apartment doors with high quality deadlocks, noting if they are fire rated and/or required for emergency purposes.
Facilities Management Good Practice Guide

17  Contract Management

Contracts and out-sourcing are fundamental components of facilities management, and central to this is the identification and selection of a good network of contractors and suppliers. While the majority of skills necessary for building and facilities maintenance can be readily found, Facilities Managers increasingly require negotiation and management skills due to a growing diversity and complexity within the industry.

17.1 Contracts and relationships
Contract relationships for procurement of facilities management and maintenance generally fall into two broad categories, traditional procurement, and alliancing/partnering. Traditional procurement involves strict adherence to a defined specification or scope of work, whereas both partnering and alliance arrangements involve greater flexibility, and generally include incentives to encourage the delivery of better service.

Outsourcing is any task, operation, job or process contracted to a third party for a period of time. The majority of skill sets required for multi-unit residential facilities management and maintenance services (e.g. cleaning, air-conditioning maintenance, etc) are relatively predictable and readily available (and therefore have predictable pricing). Any specialist skill sets which may be required at some point for facility operations and management should be identified and sourced well ahead of time.

Knowledge gained should be shared and recorded.

17.2 Contractor management

Contractor Induction
It is important to ensure all contractors and suppliers working within the facility are adequately inducted. Consistent contractor induction processes should be developed and implemented including the following minimum requirements:

- A record of all employees and contractors inducted, including the date of induction
- An introduction to the facility (building) management team and other relevant personnel
- Provisions for security cards and access keys
- Verification of the ability to operate or maintain equipment
- An outline of any work conditions or requirements (e.g. use of lifts, safety or environmental requirements, etc)
- Copies of relevant contractor certificates, registrations, licences, etc
- Work schedules
- Details of the system used for recording time
- Specific occupational health and safety requirements

Contractor Management Systems
An important element of consistency in contractor management is the development of a Contractor Management System, outlined in the box below:

Contractor management systems should include:

- Contractor induction arrangements for ensuring all safety, environmental and building user requirements are adhered to
- Contractor registration and identification system, (e.g. display of professional licence or contractor sticker)
- Documentation listing names, positions and responsibilities of all contractors
- Details of arrangements for managing occupational health and safety incidents, including contact details for all person(s), available to prevent, prepare for, respond to and recover from occupational health and safety incidents
- Outline of site safety rules and arrangements for ensuring all contractors, employees or visitors are aware of the rules
- Other specific task or activity-specific training requirements
- Safe work method statements for all activities assessed as having safety risks (including electrical, welding, working at heights, etc)
- Recorded and file filed copies of insurance certificates.
Figure 14.1 Contract relationships

| Traditional contracts are well suited to situations where: | The scope can be adequately defined  
The potential for variation during the contract period is low  
The risk of failure of the service to the client is low |
|----------------------------------------------------------|---------------------------------------------------------------|
| Alliance contracts may be more effective where:        | The scope of services is difficult to define  
There is higher risk and greater uncertainty  
The services are critical to building operations and/or performance  
The services need to be commenced early  
Innovative solutions are required from the service provider  
Creative management is required by the OC |

Provisions to include in contracts

- **Technical specification** – define rules and requirements expected from contractors or suppliers
- **Evaluation** – develop measuring criteria that correspond to the technical specification
- **Management** – Establish a Service Level Agreement (SLA) to monitor the performance of contractors or suppliers.

Figure 14.2 The procurement process

<table>
<thead>
<tr>
<th>Project Objective</th>
<th>Outline the objective to be achieved by the procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background Information</td>
<td>Provide context to the procurement and what is to be achieved by it</td>
</tr>
</tbody>
</table>
| Scope | Set out the scope of procurement i.e.:
  - Inclusions (e.g. research an issue and provide report)
  - Exclusions (e.g. to supply, but not to install and item)
  - Optional (e.g. extensions for which proposals are sought)
  - Key logistic / supply chain impacts |
| Business case | Refer to or attach an approved business case or provide other justification for the procurement |
| Estimate of costs | Provide an estimate of the total cost of the procurement project, including the cost of the resultant contract, and whole of life costs. |
| Budget | Provide information on the status of budgetary provisions in place now and budget review mechanisms |
| Stakeholder expectations | Outline the results of stakeholder analysis, highlighting key issues |
| Risk analysis | Highlight key risks and attach the Risk Management Plan (if required) |
| Method of procurement | Outline the selected method of procurement and approval status |
| Tender evaluation plan | Outline evaluation criteria |
| Probity plan | Highlight key elements of the probity plan and attach a copy |
17.3 Sustainable procurement
Sustainable procurement looks beyond the traditional procurement focus of value for money, taking into consideration broader factors such as the impact the product, good or service has on the environment; social aspects such as local sourcing and labour conditions; and the performance and track record of the contractor or supplier. Under a sustainable procurement approach, cost becomes one of many factors considered and a longer term approach to measurement of costs and benefits is adopted, with contracts awarded on overall value.

Durability
Durability is an important element in product selection: durable products generally impose a lesser burden on the environment than those requiring frequent replacement. Products with replaceable parts tend to reduce waste and resource consumption, and are also likely to cost less over their life time.

Product Selection
While the initial construction of a building has a large material impact, the ongoing maintenance, refurbishment and resident turnover accounts for a building’s largest material impact through high rates of resource use and waste. Typical products used include paints, partitioning, carpets, glazing, floor coverings, furniture, cabling and wiring, and adhesives. The impact of these products and materials should be considered when making purchasing decisions, and sustainable purchasing criteria embedded into contracts (e.g. requiring hydrocarbon and solvent-free cleaning products to be used in cleaning contracts).

Close the Loop on Materials Flows
Facilities Managers and others involved in the operations and maintenance of the complex can achieve more from less by striving to close the loop on materials flows.

Life Cycle Costing
Life cycle costing is an important consideration in sustainable procurement. As an example, while green products are often perceived to be more expensive than conventional products, based on higher upfront costs; they usually cost less than conventional products when life cycle costing is applied, due to lower operating costs as a result of less water, energy and consumables required.

Sustainable purchasing considerations
- Is the product water and/or energy efficient?
- Is the product Australian made?
- Will the product release volatile organic compounds (VOC’s) such as formaldehyde, or other chemicals which reduce indoor air quality?
- Does the product contain toxic or hazardous materials?
- Can the product or its components be readily reused or recycled at the end of their life?
- Does the product have recycled content?
- Will the supplier take the packaging back?
- Is the timber obtained from renewable and sustainably harvested sources?
- Are there instructions for installing, operating, storing and disposing of materials or products?
- Does the product have independent third party certification?
- Does the product contain upgradeable, repairable or replaceable parts?
- Is the product durable?

Contract strategies for ‘closing the Loop’
- Look for opportunities for suppliers to take back products at the end of their life
- Investigate leasing arrangements for products which include maintenance, repair and replacement/upgrade during use
- Rather than leaving the OC and residents to carry the cost of disposal of producer-generated waste, require contractors to take back packaging used for transport when they deliver products/materials.
To meet growing demands for disclosure and transparency, trends in business reporting on sustainability performance have increased dramatically. Where reports once focused primarily on operations, they now also look at products from a life-cycle perspective, from raw materials and resources to the final disposition of goods at the end of their useful lives. Facilities Managers similarly need to adapt to more sophisticated data collection and reporting processes, and involve and educate owners about the performance of their assets, taking into account broader stakeholder requirements.

Drivers for Monitoring and Reporting
One of the main drivers for sustainable monitoring and reporting is community attitudes. Communities are showing greater interest in understanding how organisations are mitigating their business activities to reduce environmental risk whilst creating value. They want to see more than financial indicators and as a result are demanding good corporate governance and transparency. The same applies to residential communities within a multi-unit development, and this demand can be met through sustainability reporting.

To be able report on sustainability, sustainable practices must be implemented, objectives established and targets identified to monitor performance against these objectives. Reports can then be provided to stakeholders to indicate sustainability performance in line with accepted standards. One of the most commonly adopted reporting frameworks is the Global Reporting Initiative. This framework sets out the principles and indicators for organisations to measure and report their sustainable practices around the three pillars of economic, environment and social outcomes.
18.1 Objectives, targets and performance indicators

To measure the performance of planned initiatives or improvements, objectives and measurable performance targets should be implemented in advance. For initiatives involving resource use, short and long term targets should be developed taking into consideration identified baselines, industry benchmarks and best practices. Where possible, targets should take into account social and environmental objectives, budget constraints, and what is achievable given the age and condition of the facility.

Figure 15.1 shows the type of data and associated units relevant to monitoring and reporting on resource use within multi-unit residential facilities.

Figure 15.1: Data types and associated units

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENERGY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total energy use</td>
<td>Total of all non-renewable and renewable energy</td>
<td>kWh</td>
</tr>
<tr>
<td>Non-renewable energy</td>
<td>Non-renewable energy is energy generated by fossil fuels such as gas, oil, etc</td>
<td>MJ</td>
</tr>
<tr>
<td>Renewable energy</td>
<td>Renewable energy includes solar, wind, hydro, biomass</td>
<td>kWh / MJ</td>
</tr>
<tr>
<td>CO₂ Equivalent Emissions</td>
<td>Total amount of carbon dioxide produced and released into the atmosphere</td>
<td>CO₂ tonnes</td>
</tr>
<tr>
<td><strong>WATER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total water use</td>
<td>Total of all sourced and recycled water use</td>
<td>kL / volume m³</td>
</tr>
<tr>
<td>Sourced water use</td>
<td>Sourced water is water from mains water or water extracted from onsite bores or water courses</td>
<td>kL / volume m³</td>
</tr>
<tr>
<td>Recycled water</td>
<td>Recycled water is any waste water that is recycled and reused or any harvested rain water</td>
<td>kL / volume m³</td>
</tr>
<tr>
<td><strong>WASTE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total waste</td>
<td>Total of all non-recycled and recycled waste</td>
<td>tonnes</td>
</tr>
<tr>
<td>Non recycled waste</td>
<td>Non-recycled waste is any waste that is produced and is not recycled or reused.</td>
<td>tonnes</td>
</tr>
<tr>
<td>Recycled waste</td>
<td>Recycled waste is any waste that is composted, recycled or reused</td>
<td>tonnes</td>
</tr>
</tbody>
</table>
19 Continual Improvement

Multi-unit residential developments are small communities which are dynamic and constantly changing as a result of internal and external factors. As the facilities management industry has evolved and adapted over time, there is a need to adopt an adaptive management approach to the management of multi-unit residential facilities and communities.

19.1 Key principles

Framework for Continual Improvement

The most commonly adopted and recognised framework for continually improving systems and processes is the continual improvement loop promoted by ISO14001:2004 – Environmental Management Systems: Specification with Guidance for Use, shown below. Based on the Japanese concept of Kaizen (which loosely translates to: ‘change for the better’) this framework establishes a process for capturing data, responding to change, and implementing processes within an overall goal or set of objectives. The framework has been universally applied to manufacturing, engineering, and management decision making across most industry sectors.

Knowledge Retention and Transfer

One of the most common factors associated with systems failure is information access. Maintaining current and accurate records of a facilities systems and performance is essential to maintaining continuity of facility operations and will assist in identifying problem areas, and opportunities to improve. Good documentation and records management systems help ensure valuable time is not lost as a result of a change of OC members, Facilities Managers, key contractors, or other stakeholders. All information relating to the building should be the intellectual property of the OC and should be readily accessible and retrievable. Where possible, electronic systems are recommended. Investing in good documentation management systems will help drive greater performance by continually building on the knowledge developed by preceding operators.

Summary of key building documentation

- Building Manual describing how it is intended to operate under normal and abnormal conditions
- Complete set of design and construction specifications and drawings, noting any changes to the original design
- Complete set of maintenance manuals including as installed drawings
- Complete and update set of schematics of all air, water, power, gas and hydraulics systems
- A complete asset register
- Metering register linking meters to assets
- Building Management System (BMS) functional description (inc. data gathering and controls strategies)
- Schedule showing base building equipment and any resident equipment connected to the building BMS
- List of residential equipment including uses of chillers, heating, condenser water or outside air to enable assessment of constraints on system capacity
- Current OH&S manual
- Fit out manual defining building design criteria and fabric performance limitations to ensure fit outs comply with building limitations
- Register of switchboards with all connected loads and metering available on each board.

Key Standard:
Glossary of Terms & Abbreviations

ACM  Asbestos Containing Materials  NCC  National Construction Code
AHU  Air Handling Unit  O&M  Operation and Maintenance
AIRAH  Australian Institute of Refrigeration Air-conditioning and Heating  OC  Owners Corporation
AS  Australian Standard  ODS  Ozone Depleting Substances
BMS  Building Management System  OH&S  Occupational Health & Safety
CCTV  Closed Circuit Television  PCBs  Polychlorinated Biphenyl Compounds
CO  Carbon Monoxide  PF  Power Factor
CO2  Carbon Dioxide  PPE  Personal Protective Equipment
FM  Facilities Management  ROI  Return on Investment
HCFC  Hydrochlorofluorocarbons  SGS  Synthetic Greenhouse Gases
HVAC  Heating, Ventilation and Air Conditioning  SLA  Service Level Agreement
IAQ  Indoor Air Quality  SMF  Synthetic Mineral Fibres
ISO  International Standards Organization  VAV  Variable Air Volume
kl  Kilolitre (1,000 litres)  VOCs  Volatile Organic Compounds
kPa  Kilopascal (pressure measurement unit)  VSD  Variable Speed Device
KVA  kilo Volt Amps  WELS  Water Efficiency Labelling and Standards Scheme
kW  Kilo watts  WHO  World Health Organisation
LED  Light Emitting Diode  WMP  Waste Management Plan
MSDS  Material Safety Data Sheets

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What’s next?

This Guide has been developed as the first of its kind in Australia. As part of the Good Practice Guide Framework, the content is will be reviewed two years from the date of publication, with the expectation that an update be provided within three years.

As part of this process, FMA Australia welcomes feedback on the structure, content and focus on this Guide, as well as the broader Good Practice Guide Framework.