

# Property Data Management Framework

A model for connecting New Zealand's property data



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# 1 Overview for users of property data

Property Data Management Framework: A model for connecting New Zealand's property data describes the potential of the framework's model to connect core concepts in property information to deliver a package of data about a property.

The Property Data Management Framework (PDMF) model identifies and defines accurate relationships between property data (for example, address, parcel, titles, buildings, and rating units). This will help to enable local authorities, central government agencies, and other organisations to access, combine and share their information quickly and reliably. We expect these agencies to be the main audience for the PDMF, although any organisation who uses property data should find it useful.

It's possible the model could be used to benefit national initiatives across government. It could also be used to improve services and support for industries such as emergency services, insurance, construction, transport, and health (e-Spatial Ltd, 2015).

## 1.1 Acknowledgements

Toitū Te Whenua Land Information New Zealand acknowledges the efforts of those who contributed to the original project between 2012 and 2015. Without their efforts, this updated version of the framework would not have been possible.

We also acknowledge the contributions of the following organisations in the development of this model:

- Christchurch City Council
- EQC – Earthquake Commission
- Stats NZ
- e-Spatial Ltd
- Optimisation Group Ltd
- Datacom Systems Ltd Wellington

## 1.2 Structure of the following chapters

### **Introducing Property (The PDMF story)**

[Chapter 2 - Introducing the Property Management Framework](#) sets the scene for this version of the PDMF, by looking back at a programme of work between 2012 and 2015, following the Canterbury earthquakes in 2010 and 2011.

[Chapter 3 - Why the PDMF is important](#) summarises the stakeholder engagement work which identified the need for the PDMF as a national solution to a lack of integrated property data.

[Chapter 4 - No agreed definition of 'property'](#) reports our attempt to determine a single definition of a 'property', and how the PDMF accommodates our finding that there isn't a single definition, because everyone has their own (valid) perspective.

[Chapter 5 - Developing the PDMF model](#) shows how the components of the property story contribute to the complete diagram of the model, shown at the end of the chapter.

### **Describing the PDMF**

[Chapter 6 – Describing the PDMF](#) builds the core concepts of a property into the PDMF model in a simplified way.

### **The PDMF model**

[Chapter 7 - Technical view of the PDMF model](#) presents a simplified view of the PDMF model, as well as a diagram in unified modeling language.

[Chapters 8-15](#) describe the content of the respective packages in the PDMF model, with additional information where relevant.

[Chapter 16 - Consolidated PDMF model](#) shows the classes, relationships, and constraints on how to connect data about a property that is contained in different datasets, in a unified modeling language class diagram.

### **Demonstrating the PDMF model**

[Chapter 17 - Demonstrating the PDMF model](#) shows how the PDMF models five types of common property situations.

[Chapter 18 - Schematic example and real-world example](#) illustrates the ideas and concepts behind the PDMF using a schematic diagram and a real-world example of a farm.

### **Extending the PDMF model**

[Chapter 19 - Dwellings](#) describes how a dwelling relates to a building or property, and is a class in its own right in the PDMF model as it cannot be modelled purely as a structure, physical building or a unit of property.

[Chapter 20 - Consents](#) describes how resource consents and building consents relate to a building or property, although they are not part of the PDMF model.

[Chapter 21 - Historic sites](#) includes information about modelling historic buildings, although they are not part of the PDMF model.

[Chapter 22 – Water facilities](#) suggests how onsite water facilities and connections to offsite water networks could be modelled.

### **Implementing Dwellings**

[Chapter 23 -Dwellings and the PDMF](#) discusses how the PDMF was used to connect dwellings to buildings, findings we made, and problems that were encountered.

## **The Valuation perspective**

[Chapter 24 – The Valuation perspective](#) defines a unit of property for rating units used in rating valuation, and applies the PDMF model to form a unit of property of type rating unit.

## **Supporting information**

[Chapter 25 - Supporting information](#) gives a sense of scale on how many properties there are in New Zealand, and the size and current state of the supporting datasets.

[Chapter 26 - Illustrating the lifecycle of a property development](#) presents a realistic set of scenarios based around changes that might be expected in a property development over time.

## **[References](#)**



# Introducing Property (the PDMF story)

## 2 Introducing the Property Data Management Framework

Chapter 2 outlines the beginning of the Property Data Management Framework (PDMF), why we developed it, and what is in scope.

See:

- [2.1 Need for framework identified following Canterbury earthquakes](#)
- [2.2 Inconsistencies and disconnects between property datasets](#)
- [2.3 Scope of the PDMF.](#)

### 2.1 Need for framework identified following Canterbury earthquakes

The PDMF began as a Toitū Te Whenua-managed project in 2012, following the Canterbury earthquakes of September 2010 and February 2011. The response following the earthquakes identified the need for a framework that would provide well-defined, reliable, and accurate property data relationships (Vicinity Solutions Ltd, 2014; Toitū Tē Whenua, 2018).

During the first half of 2017 Toitū Te Whenua conducted a strategic assessment to understand the problems a wide cross-section of stakeholders (not just those in Canterbury) had with property information. This moved the focus nationally.

[Chapter 3](#) reports findings from this stakeholder engagement.

### 2.2 Inconsistencies and disconnects between property datasets

The purpose of the PDMF project was to help solve long-standing issues with inconsistencies, gaps and disconnects between the core datasets that comprise property information, for example, building footprints, addresses, land parcels, rating units and ownership data.

At different times and in many different contexts, the notion of property and how it is defined, ranging from the physical fact to abstract notions of entitlement and responsibilities, has raised a number of tensions. The mismatch of sense and context, and the ultimately elusive quality of the essentially human institution of property, has resulted in complex and often inefficient ways of trying to identify and manage property information.

Different stakeholders in property have different areas of interest and focus, from the legal and the physical to the commercial and 'people' aspects, all of which create a raft of different perspectives.

These issues prevent data from being connected, which means individual data records for the same property cannot be unambiguously identified and linked.

## 2.3 Scope of the PDMF

The vision of the original PDMF project team was to develop a framework that would help solve these issues by showing, at a conceptual level, the relationships that apply between different types (or classes) of core property information (Toitu Te Whenua & e-Spatial, 2015).

While these types of property information are commonly grouped into datasets created by different agencies for their own operational purposes, the framework and the model based on the framework we are developing is not about the datasets. It is primarily about the relationships, and the rules for those relationships, between the core physical and legal entities that comprise a property.

The PDMF defines the specifications and rules about the relationships that bind records in separate datasets together in order to create a queryable collection of records for individual properties. These queryable records can then be accessed by different systems and applications to deliver accurate, complete and unambiguous property information services to customers.

Toitū Te Whenua has not built a system that will deliver these services. However, we have built a research tool called the Property Explorer. We populated the tool with real property data and used it to test the modelling of the PDMF.

Because it is focused on relationships, the PDMF model is not designed to drive the development of database schema. It is also not designed to drive the development of an exchange schema for data transfer (for example xml).

The PDMF model shows the relationships that people (and parties, for example, owner, occupier or body corporate) have with a property. The model does not contain any information about individuals. Nor does it specify schemas (either conceptual or implementation) for datasets, although it may provide attribution on classes where appropriate.

Addressable objects are limited to objects commonly identified as being addressed in New Zealand, that is, properties, buildings and connections. People as addressable objects is out of scope.

The concepts of geographic places, localities and city blocks are not in scope. These concepts are primarily about navigation and are coincidental, rather than integral, to property information.



## 3 Why the PDMF is important

Chapter 3 outlines why the inability to provide consistent data and information about land and property is relevant in everyday instances, not just after a major earthquake.

The content is based on findings of stakeholder engagement conducted by Toitū Te Whenua in 2017 to understand the problems stakeholders throughout New Zealand have with accessing property information.

See:

- [3.1 Need for informed decision-making about property](#)
- [3.2 Data is not always accessible](#)
- [3.3 Data quality is variable](#)
- [3.4 Assembling information is costly and takes effort](#)
- [3.5 Supply chain is not digital-ready.](#)

### 3.1 Need for informed decision-making about property

Land and property touch many aspects of the lives of individual New Zealanders and the government agencies that serve them. There is an increasing awareness of the need to investigate all issues before a property decision is made. This is whether it is transactional, for example, home ownership, or a strategic and far-reaching matter of public policy.

New Zealanders need to know exactly what they are buying, selling or trading, and what their property rights and responsibilities are.

Similarly, policy makers need to know the potential impact their decisions will have on New Zealand.

Many different agencies provide advice and make decisions under a wide range of legislation – either using private sector data providers or assembling data themselves from various data sources.

Although decisions are made every day using existing property information, our stakeholder engagement identified areas where significant improvements are needed to provide an efficient property data environment.

The main issues are:

- inability to access relevant information
- data inconsistencies
- complexity and disconnection between data preventing informed and timely decision-making
- technological changes generating demand for greater accuracy, speed of delivery, transparency and accessibility of property information.

These issues are confounded by the:

- lack of a shared view across the property system (that is, the systems, people and processes that support the perspectives people have of property)
- limited sharing of information and knowledge between government agencies
- absence of connected and interoperable data
- lack of a consistent approach to how data is managed and stored.

As a result, government lacks the complete data it needs to fully inform the development of plans and policy advice.

We grouped the issues identified in the 2017 stakeholder engagement into four fundamental problems, outlined in the following sections.

## 3.2 Data is not always accessible

Our consultation with stakeholders indicated it is difficult to access information that is relevant to their decision-making. Examples of this ranged from far-reaching decisions by insurers wishing to assess their risk profile to issues concerning methamphetamine contamination at a particular property.

Some data is more readily accessible than others as agencies take very different approaches in making their data available. Some are yet to digitise their property records and some make their data publicly available, while others do not.

A number of agencies are not aware of the data available to them.

## 3.3 Data quality is variable

Property professionals told us they often don't trust the data provided to them because it is of variable quality – there are numerous instances where data is not up-to-date, is inconsistent and incomplete.

After the Christchurch earthquakes of 2010 and 2011, emergency and recovery efforts were complicated by inconsistent address data and an inability to identify buildings and points of entry.

Different local authority systems and combinations of systems have resulted in inconsistencies in the way data is collected, stored and managed. Some regulations are interpreted differently resulting in an inconsistent approach to data management. This results in data that is of variable quality and cannot always be easily combined or cross-referenced to individual properties.

Equally, central government's own data has been described as requiring considerable cleansing and manipulation.

Additionally, the data and information produced by private sector providers has been variously described as partial, narrow and incomplete.

## 3.4 Assembling information is costly and takes effort

Significant cost and effort are incurred by those who assemble property data and information partly due to the data quality issues discussed above in 3.3 Data quality is variable.

Anyone (for example, a landowner, prospective purchaser, developer, lawyer, property professional, government official, planner or policy maker) wishing to comprehensively research all relevant property information may face a complicated, time-consuming and expensive task. The inability to easily access that information can adversely affect government and business decisions. Sometimes people use several systems to try and manually build an aggregated view.

Data must be aggregated and linked from a variety of sources, a need that is being partially met by the private sector providers who package central and local government data and sell it back to agencies. However, those providers may themselves have to purchase data from other sources before cleansing, manipulating and aggregating it with other information.

## 3.5 Supply chain is not digital ready

There is currently a lack of understanding across the supply chain of property information about what a true digital connected chain could look like. This is due in part to not having an integrated system-view of property data.

There has also been increasing demand for real-time interoperability, driven by the growing maturity of API services that take advantage of increased capability provided by high-speed broadband. These services are essential for delivering automated, real-time, and algorithm-based analysis of property information. One example is the growing use of automated property valuations.

In the absence of an integrated system view of property data, it is difficult to set up the environment required to support and enable a shared vision for digital connectivity.

### **Shift from paper to digital paper to digital data**

The advance of technology means that information previously captured on paper progressed to being captured on digital paper (for example, as a PDF file that replicates paper but on a computer) and is now captured as fully digital data (for example, as data records stored in a database). However, data captured on paper or digital paper is not always converted to digital data, which leaves information and lifecycle gaps.

### **Shift from 2D to 3D**

As development of land for residential or commercial purposes becomes more intensive in urban areas, and with the emergence of new forms of property rights, there is likely to be an increasing need for more effective ways of representing and visualising land and property in three dimensions.

With advances in spatial data technologies, the possibilities in this area are rapidly expanding. There is a global shift from 2D to 3D views of property and even 4D (time) and a move towards use of 3D models such as building information models (BIMs), which generate and manage digital representations of physical and functional characteristics of places. They consist of files (often but not always in proprietary formats and containing proprietary data) that can be extracted, exchanged or networked to support decision-making about a building or other built asset.

Some local authorities are leading the way in adopting innovative spatial systems. However, a system for viewing spatial data is not the same as a system for managing consenting. Many local authorities are unable to process consent/permit applications electronically, resorting instead to electronic interchange of virtual forms. Whilst this helps with document identification and security, it does not unlock the value of the data being processed.

## 4 No agreed definition of 'property'

Chapter 4 explores the challenges of determining a universally agreed definition of a 'property'. We found there isn't a single definition of property because everyone has their own (valid) perspective.

See:

- [4.1 Conflicting definitions](#)
- [4.2 Lack of clarity](#)
- [4.3 People-centric approach to defining property](#)

### 4.1 Conflicting definitions

In the absence of a universal definition, we developed an alternative approach that allows the PDMF model to accommodate the variety in definitions by starting with a 'people perspective' rather than a 'technical perspective'.

In this discussion the term 'property' or 'properties' refers to the perspective that a user has of the property under discussion, for example, farm, home, shop, factory, or national park. It does not include personal property, lost property or material property.

The terms 'unit of property' and 'units of property' refer to the class (or definition) in the PDMF model. They represent data stored in an information system and link data together in a way that can represent a property or properties.

Internal consultation with property experts within Toitū Te Whenua showed that attempts to define property have mostly approached the problem through a technical lens, trying to merge the legal and physical aspects of a property together into a single, consistent definition. This approach has been unsuccessful due to:

- the many ways that land and space can be legally parcelled up and have rights attached
- an assumption that the term property only applies to owned land and not to land occupied by some other method (for example, lease, rental and so on)
- the use of various proxies that have become definitions by default. These proxies include parcel, title, rating unit and address
- the different ways the term 'property' is interpreted depending on the occupation and the background of people working with property information. For example, a surveyor's interpretation of the term 'property' is different from that of a real estate agent.

## 4.2 Lack of clarity

The strategic assessment also found that although people use the word 'property' often, they do not share an understanding of what is meant by the word 'property'.

This lack of clarity was also apparent during the early development of the PDMF model (e-Spatial, 2015). Although early versions contained an item (or a 'class' in modelling terms) called 'property', and showed what classes contribute to 'property', the model was challenged by contributors whose use of the word 'property' did not align with the modelling in the PDMF.

There isn't even a universal definition of property in legal terms. Just as non-legal definitions of property depend on the context, so do legal definitions. The lay definitions of property are also used in law, but some statutes provide specific definitions for use when applying specific provisions of the statute.

Property can be tangible (for example, a piece of writing, a specific piece of land or a building) or an attribute or characteristic (a quality common to an individual or group of substance). In a legal sense, property is often used in the abstract sense of rights, for example as 'property in a piece of land'. It is also used in its collective sense, as 'she owns a lot of property'.

The use of the word property for the PDMF model is restricted to 'real property'. This common law term means property as it relates to land. It does not include personal property, lost property, or material property.

## 4.3 People-centric approach to defining property

In order to develop a model about property, we needed a different way to understand property as it relates to land. We took a people-centric approach. Most people can instinctively recognise a property when they see it, even if it is a struggle to define the term precisely.

As our thinking matured, we moved towards the concepts presented in Chapter 5. However, this early thinking about how people interact with property, presented in Figure 1, influenced how we incorporated people and perspectives into the PDMF model.

Figure 1 places people along with spaces and rights at the centre.

Property Data Management Framework: A model for connecting New Zealand's property data

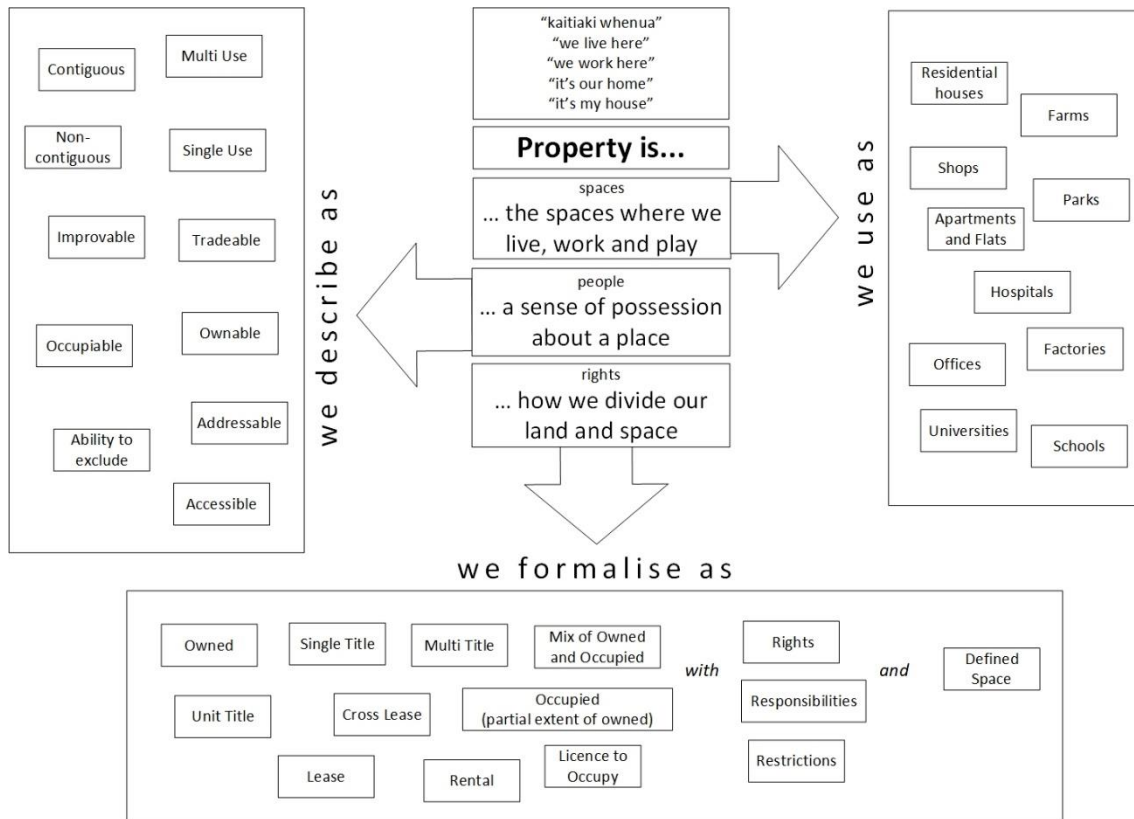


Figure 1: Taking a people-centric approach to property.

Figure 1 suggests that property is about spaces, people, rights - "Kaitia ki whenua", "We live here", "We work here", "it's our home", "it's my house".

# 5 Developing the PDMF model

Chapter 5 illustrates the key components of the PDMF model, which we developed by building up a property story, piece by piece.

See:

- [5.1 Starting point: people, decisions and perspectives](#)
- [5.2 Perspectives on property](#)
- [5.3 Constraints imposed on what a property can be](#)
- [5.4 Transition from constraints to data](#)
- [5.5 Unit of property – a unique identifier to connect data](#)
- [5.6 Combining property elements in a framework](#)

## 5.1 Starting point: people, decisions and perspectives

We developed our property story when we grasped the implication that people have many different perspectives about property.

Without a universal definition of property, we had to have at least a working understanding of property. This allowed us to translate property into data that can be represented in a model, and therefore in information systems.

It is this data that people use to make decisions.

Figure 2 shows the starting point is people and their decisions and perspectives about property and property data.

Figures 4-8 progressively build on Figure 2 as the story unfolds.



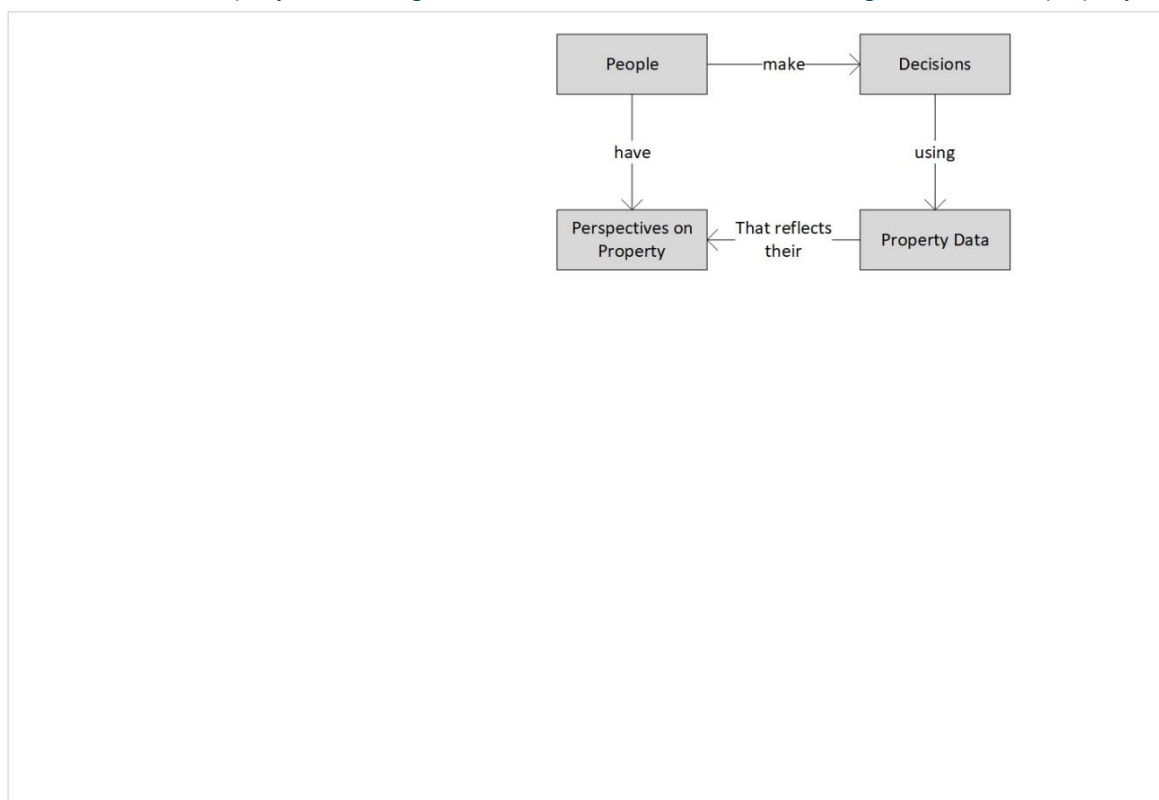


Figure 2: the starting point – people, decisions and their perspectives

## People

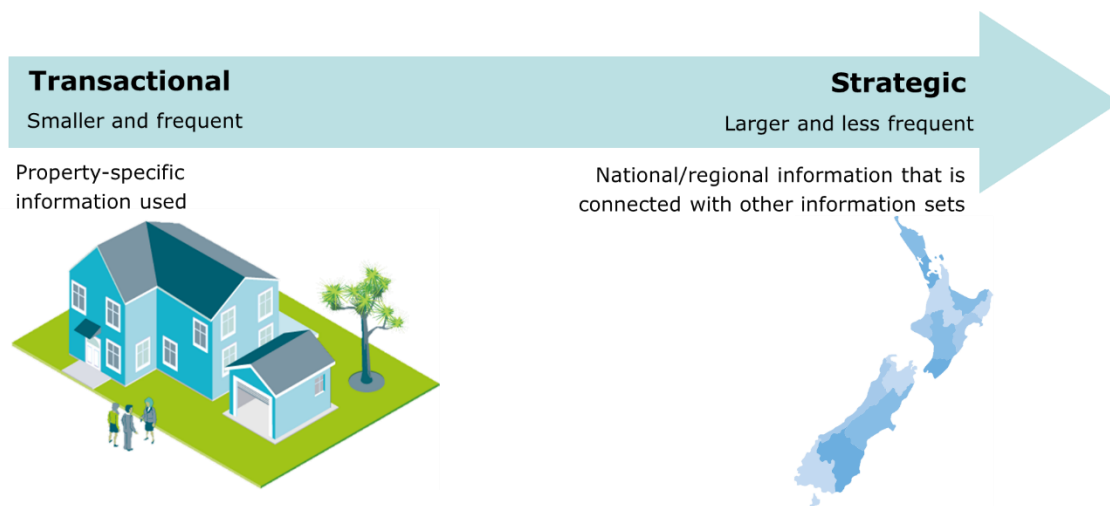
A good starting point is the reason why the concept of property exists at all. It's all about people: the things we do and how we do them.

Property is fundamentally about the way human society organises its use of land. While some animal species have territories, and fiercely defend them, they don't trade their territories the way we trade properties.

## Decisions

We have the concept of property because we want to do things with land. We want to make decisions: where to live, what sort of house to build, what sort of farm to own, where to build a factory or what to protect in a national park.

Property decisions are made every day and vary from frequent transactional decisions to less frequent national strategic decisions, see Figure 3.



**Figure 3: Decisions people make with property information**

Transactional decisions include considering buying or selling a property, developing or renovating a property, and changing the commercial use.

For straightforward residential properties, New Zealanders can generally find the information they need with relative ease. However, it becomes increasingly more difficult when dealing with more complex properties, such as those that are commercial or rural, and when making national strategic decisions.

Strategic decisions are typically made by local and central government and include setting government policy for housing, urban development and resilience, and setting district and long-term plans by territorial authorities.

Many decisions around property, particularly at the strategic level, can be complex and contentious. Multiple interests and perspectives often lead to competing demands. For example, decisions around land use often need to balance economic and environmental interests. What is clear is that decisions require quality information and data to support them.

Everyone has their own perspective of what a property is, based on what they have done, are doing, or want to do with the property.

## 5.2 Perspectives on property

Our internal consultation found that those working with the survey and title system or those involved in transacting property were most likely to identify parcel or title as their primary view of 'property'. However, when they were asked about a layman's view of property, almost all of them said their home.

Those working in other areas of Toitū Te Whenua were more likely to relate a property to how it was being used, for instance, a rating unit for those working in Valuation. Again, when they were asked about a layman's view of property, almost all of them said their home.

The difference of perspective was most pronounced for those with a Māori view of land. Those people talked about custodianship and kaitiakitanga, but also described their ownership of a family home or bach.

The perspective a person has depends on what they are doing or want to do, and to a certain extent this defines their view of what a property is at that moment in time. It means different data will be more or less important to them depending on their perspective at the time.

In the absence of a single definition of property, the common defining factor across everyone we consulted was that everyone has a perspective based on what they are doing or want to do. Everyone holds a perspective that reflects their own circumstances at the time. An infinite variety of perspectives are possible and exist. However, we were able to identify four main themes:

- **kaitiakitanga** – an inter-generational theme that reflects a Māori view of land
- **culture** – based on a social-centric view of what's going on now
- **use** – most people, for most of the time, have a use-based view on property, for example, a 'rent, lease or occupy' use, or something they own or administer
- **transfer** – people have a transactional view of property when they want to buy or sell.

People change their perspective when they decide to change what they are doing or have changed what they are doing. Some people may change their perspective frequently, while others may hold the same perspective for a long time.

We identified the following benefits of using perspectives in the PDMF model:

- It acknowledges and embraces different views. This inclusive approach avoids legitimising some people's views and alienating others. It means that everyone can find a perspective they relate to and personalise it to their own experience.
- It is customer-centric. These perspectives allow us to identify the data that will satisfy the needs of those holding that perspective and highlight the data important to that view to those users.
- It unburdens a property model from carrying the weight of having to define property by default. The PDMF model can focus on its core technical role of describing, identifying and connecting property data. By doing this technical role well, data can be delivered to the user in a way that supports the perspective they hold.

## 5.3 Constraints imposed on what a property can be

Although an infinite variety of perspectives of a 'property' are possible and exist, we live in a society that constrains what a property can be with legal and administrative structures. We also live in a physical world. The physical world constrains what we can do on or with our property.

These constraints are reflected in the properties we have – whether that is a home, a farm or a park. Our society and our physical environment dictate the set of valid perspectives people can hold for property and what is required to have a property.

In order to build our picture of property for the PDMF model, we needed to identify the constraints that are imposed by society and the physical environment about what a property is - see Figure 4.

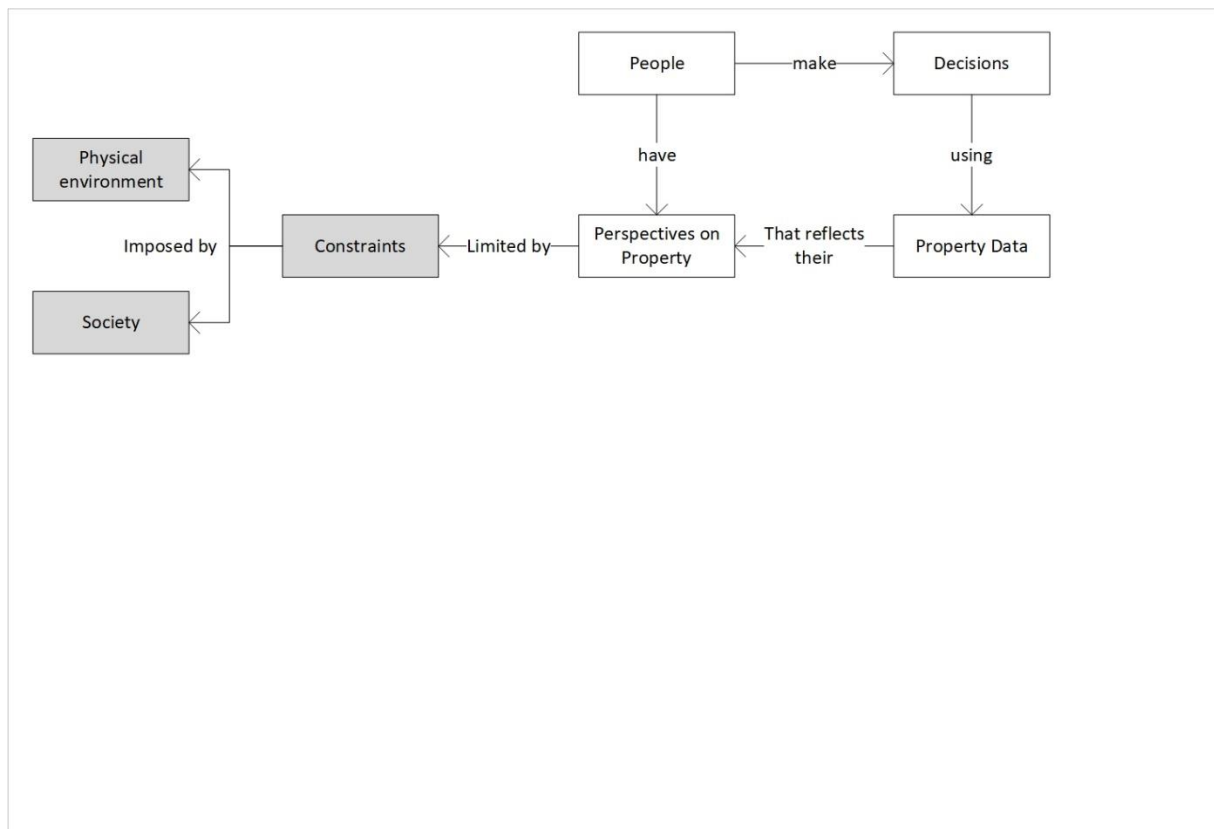


Figure 4: Constraints imposed on what a property can be

To describe the constraints, we asked ourselves, "What are the fundamental tangible and intangible things that make a property a useful thing to have?" Put another way: "When a person describes a property, what are the things they see, and what allows those things to be there?"

We identified the following five aspects that support people's perspectives about property, within the constraints imposed by the physical environment and our society:

- **boundary** – Where are the boundaries of the property?
- **owner/occupier** – Who owns and/or occupies the property and what rights do they have?
- **structures** – What buildings or structures are on the property?
- **services** – What services does the property have?
- **location** – How do I find the property?

We translated these questions into five broad concepts, which are embedded in the packages in the PDMF model:

- land (or 3D space connected to the land)
- authority/permission
- ability to use/build/improve
- ability to get services on/off
- ability to locate/share location.

The packages in the PDMF model reflect these constraints on what a property can be - see Figure 5.

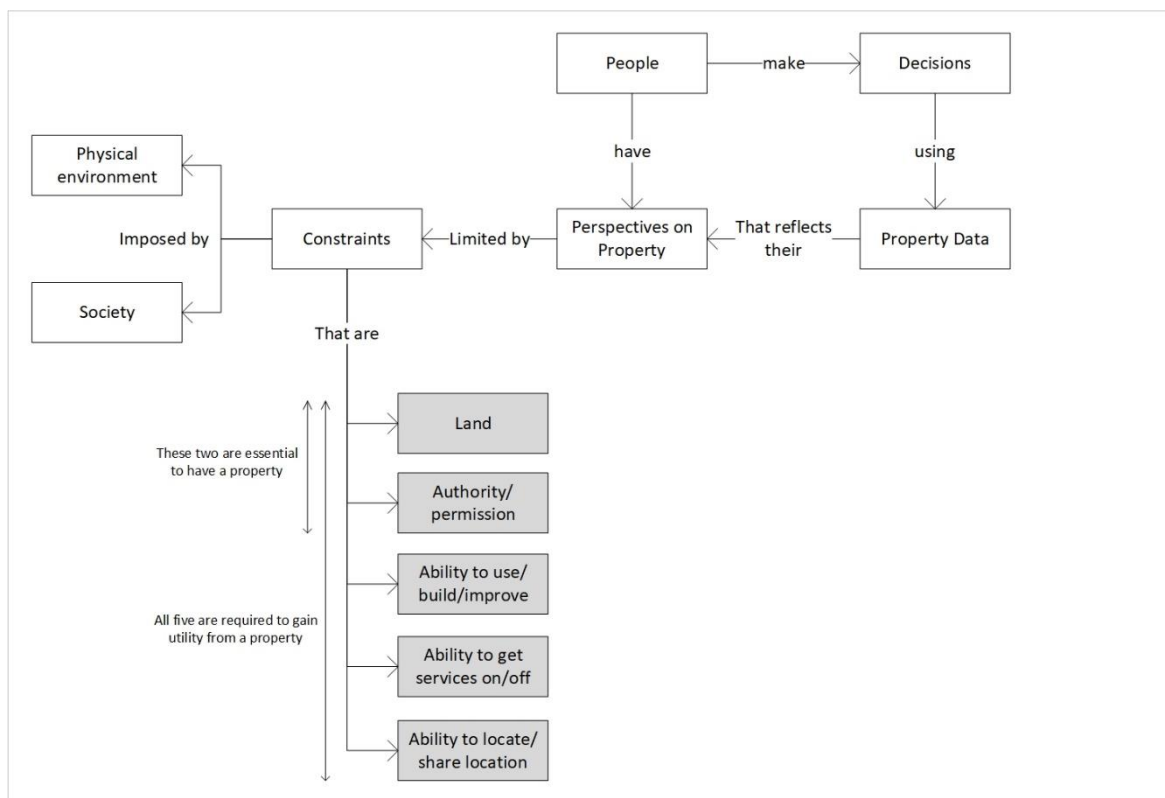


Figure 5: Five concepts representing the constraints on what a property can be

Two of these five concepts (land and authority/permission) are based on the legal framework of land ownership in New Zealand and are an essential part of the PDMF model. Even when the two concepts of land and authority/permission are used to represent leased or rented properties, an underlying ownership needs to be in place.

To gain use and utility from a property, all five of the concepts are required.

These five concepts commonly translate into data elements as:

- the geospatial extents of the property (land)
- title and/or any lease/rental agreements (authority/permission)
- buildings and/or structures (ability to use)
- access points – more broadly, connections (ability to get services on/off)
- address (ability to locate/share location).

## 5.4 Transition from constraints to data

Common examples of these data elements are:

- parcel, lease/rent extent
- title, lease agreement
- building, structure
- letterbox, front door, power meter, water toby, driveway
- physical address.

These data records are stored in thematically grouped datasets. The datasets are separate and independent of each other because the data in each dataset has a lifecycle independent from the data in the other datasets - see Figure 6.

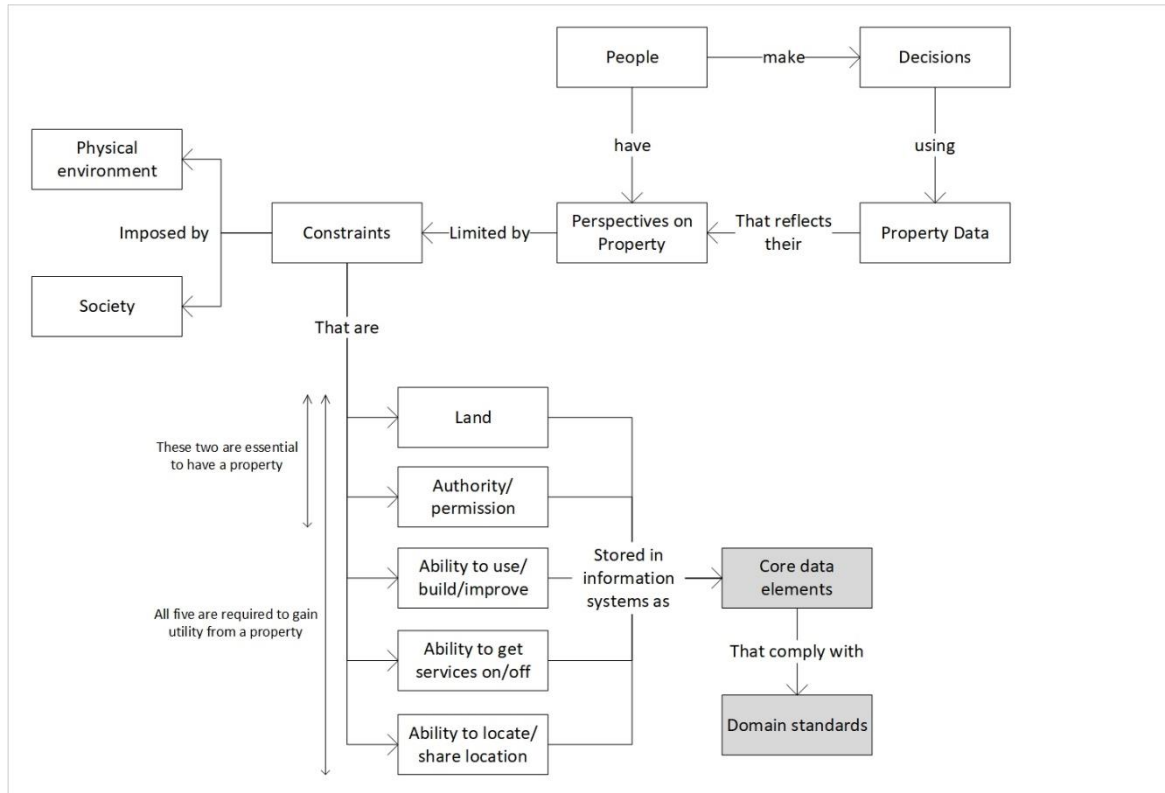


Figure 6: The core data elements of a property

## 5.5 Unit of property – a unique identifier to connect data

Without extra information, data for an individual property cannot be extracted from these datasets and grouped together. We created a new class of information to provide a unique identifier that can be used to connect data about individual properties.

We called this new identifier a unit of property. It allows the unique set of data records for a property to be connected.

Figure 7 shows the additional element 'units of property', which joins the perspectives on property and property data with the core data elements and domain standards.

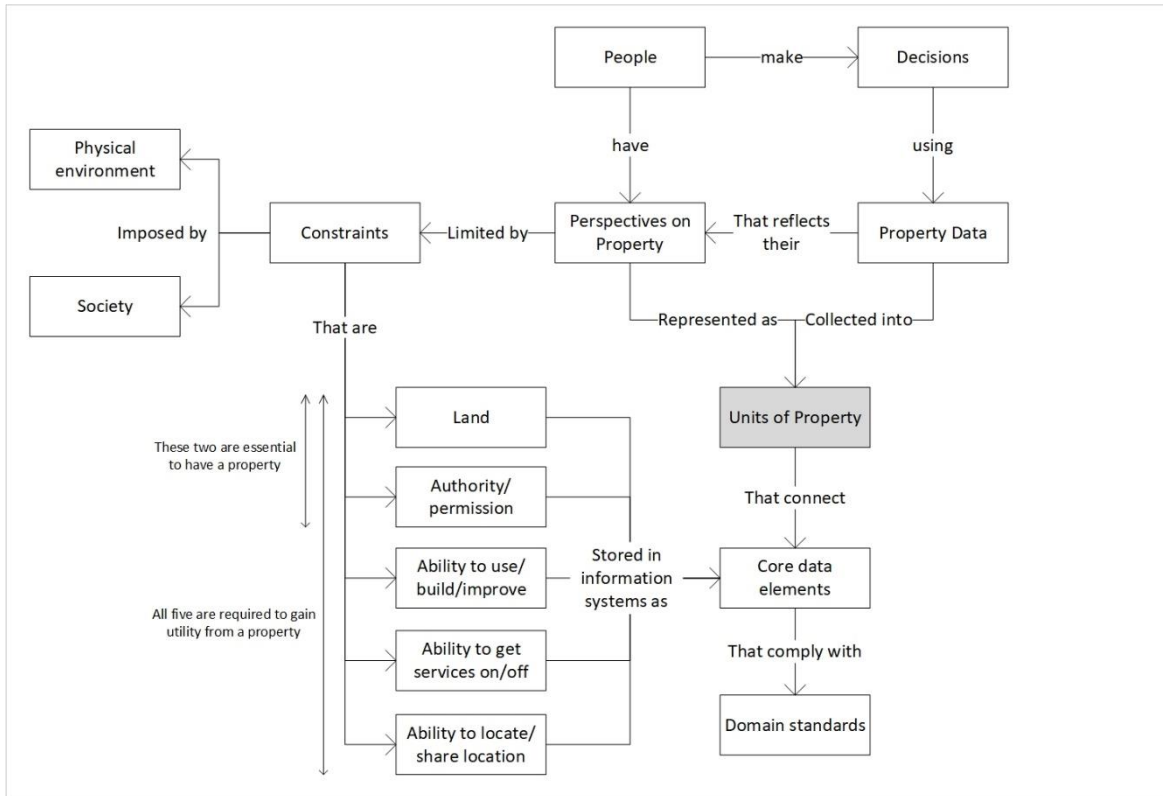


Figure 7: Unit of property

## 5.6 Combining property elements in a framework

In order to gather relevant data together into a unit of property, we designed a structure that would identify and describe the relationships that exist between the data in each dataset. This structure is the PDMF.

The PDMF model enables data records to be drawn from datasets based on the five core elements, and connects them in a structured manner, using a set of rules, into units of property. These units of property form the basis of a package of data about a property.

Without this set of rules, data could be incorrectly connected in ways that do not result in a 'package of data about a property' that matches the perspective of the people concerned. This would ultimately lead to lack of a shared understanding and potentially sub-optimal decisions.

Figure 8 shows the complete diagram of how the elements of the PDMF model relate to each other.



Property Data Management Framework: A model for connecting New Zealand's property data

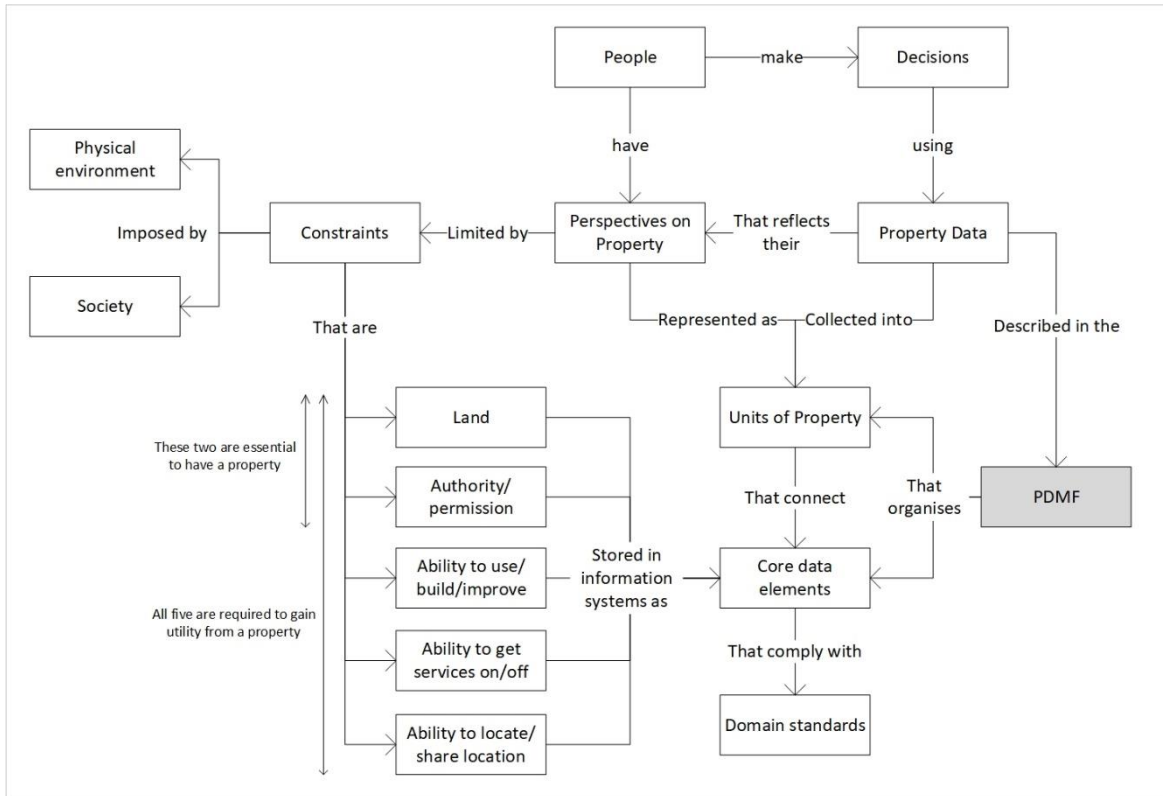


Figure 8: Where the PDMF fits

# Describing the PDMF



## 6 Describing the PDMF

Section 5 introduced the fundamental tangible and intangible things that make a property a useful thing to have. Table 1 summarises these things.

Table 1 Fundamental tangible and intangible things

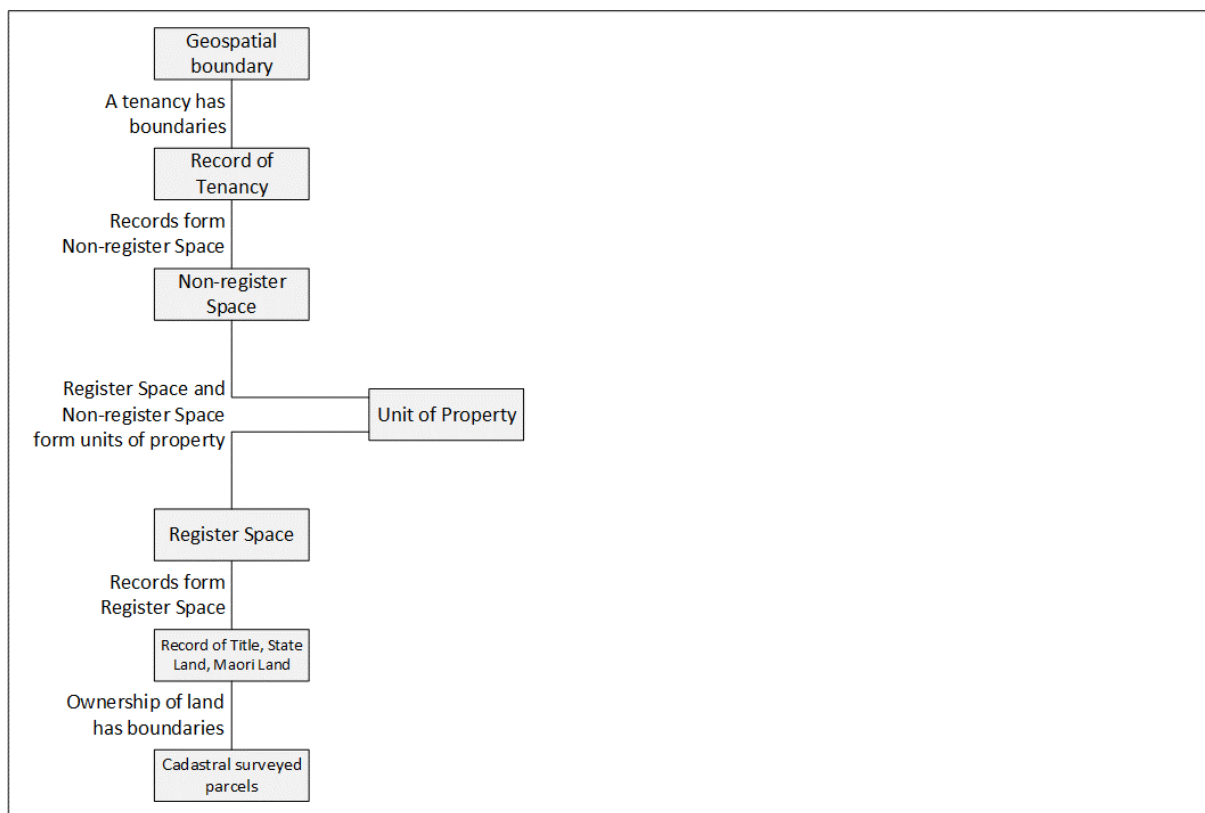
Aspects	Concepts	Data elements	Data
boundary – Where are the boundaries of the property?	land (or 3D space connected to the land)	the geospatial extents of the property (land)	parcel, lease/rent extent
owner/occupier – Who owns and/or occupies the property and what rights do they have?	authority/permission	title and/or any lease/rental agreements (authority/permission)	title, lease agreement
structures – What buildings or structures are on the property?	ability to use/build/improve	buildings and/or structures (ability to use)	building, structure
services – What services does the property have?	ability to get services on/off	access points – more broadly, connections (ability to get services on/off)	letterbox, front door, power meter, water toby, driveway
location – How do I find the property?	ability to locate/share location	address (ability to locate/share location)	physical address

These, and the relationships between them, form the core of the PDMF model.

Two of the five concepts (land and authority/permission) are based on the legal framework of land ownership in New Zealand and are an essential part of the PDMF model. In the PDMF, these property rights together form what we have termed “Register Space”.

However, subsets of these rights to land can be temporarily passed to others through renting or leasing. These form a set of rights we have termed Non-register space. While Non-register space is usually subservient to Register space, it can also include the informal occupation of land not based on any formal rights.

Either together or separately, instances of Register Space and Non-register Space form a Unit of Property. Figure 9 shows how Register Space and Non-register space build to form a Unit of Property.



**Figure 9 Register space and Non-register space from a unit of property**

Once the foundational elements of a Unit of Property are in place, the other core data elements can be introduced. These data elements allow utility to be gained from the property. Figure 10 shows all five core data elements.

Property Data Management Framework: A model for connecting New Zealand's property data

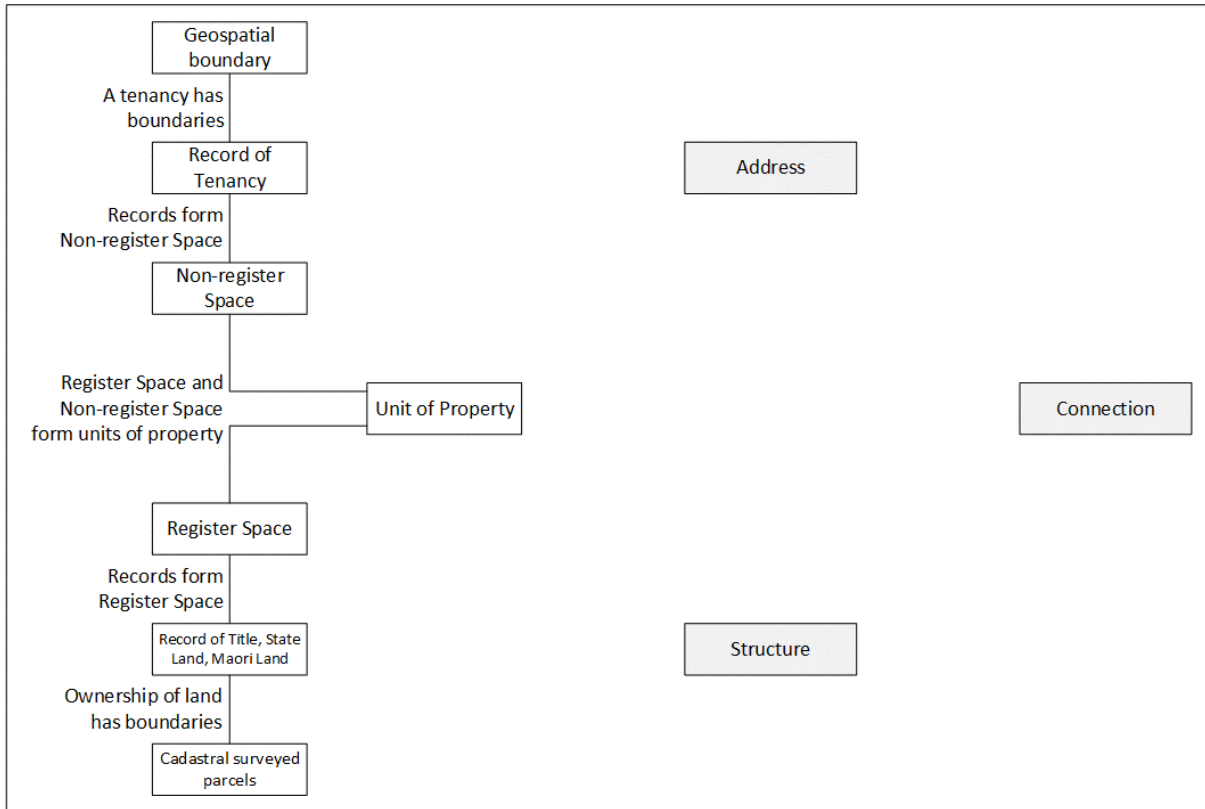
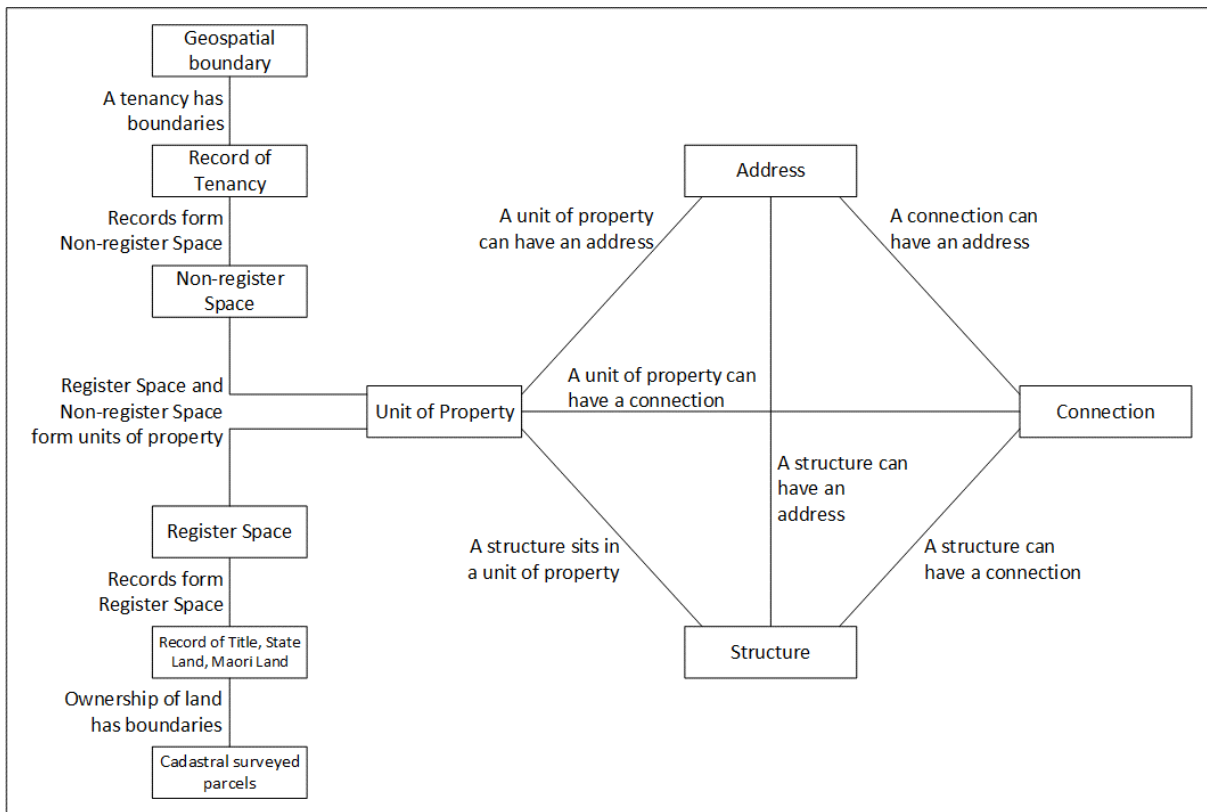


Figure 10 The core elements

We can now determine how the four data elements of unit of property, address, structure, and connection are linked. Figure 11 describes these relationships.



**Figure 11 The core relationships**

While we now have a representation of all 5 concepts and the connections between the core data elements, we do not know which actual data records contained in a database, and how many of those records, to choose to form a unit of property. To do this we need to know what sort of property it is we are forming and have a set of rules that tell us how to build it. This information is contained in a Perspective. Mostly sitting outside the PDMF model are similar definitions and rules for the other core data elements. Figure 12 shows the addition of Perspective.

Property Data Management Framework: A model for connecting New Zealand's property data

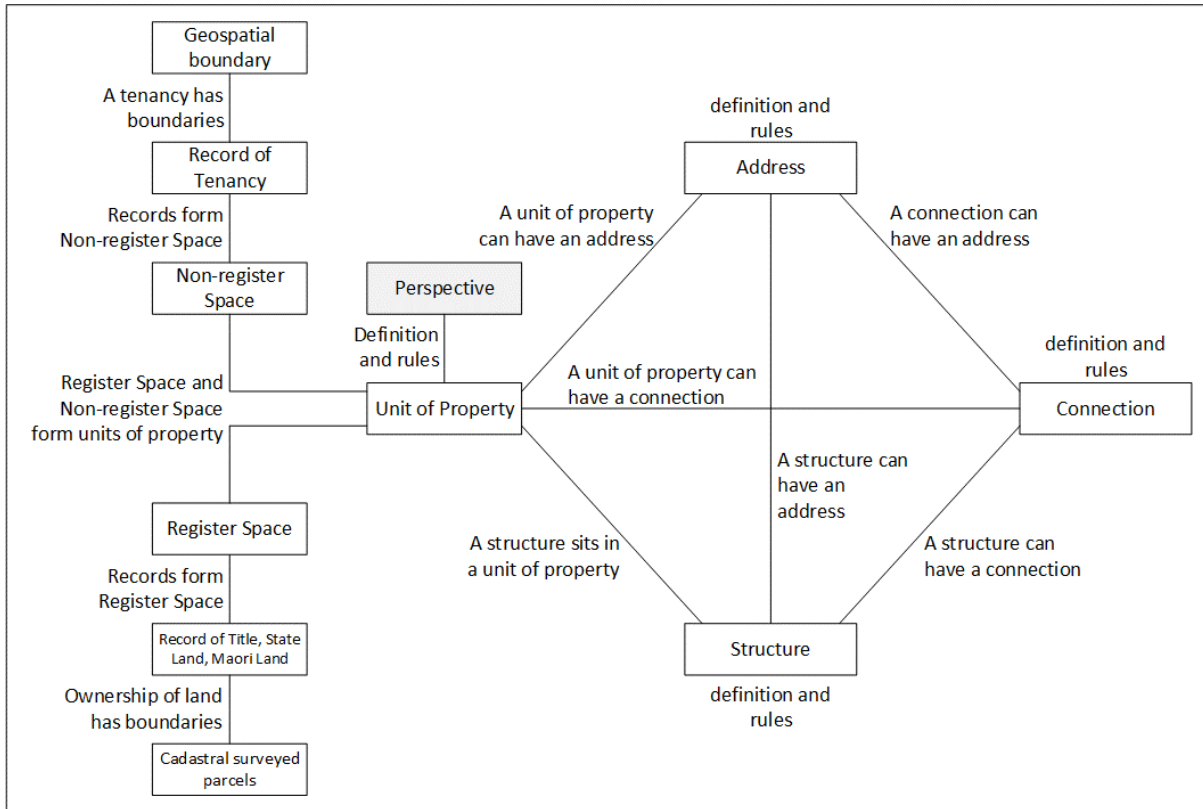


Figure 12 Addition of Perspective

The PDMF is extendable to incorporate further property data elements, but all of these extensions relate to one or more these 5 concepts and data elements. For example, an extension for dwellings could connect to Structure. An extension for consents could connect to Structure (for building consents) or Unit of Property (for resource consents).

# The PDMF model





## 7 Technical view of the PDMF model

Chapter 7 presents a simplified, packaged, view of the PDMF model. Chapter 20 presents a complete diagram of the model in unified modeling language.

The unified modeling language diagrams in this section show the packages, core elements and the relationships between these elements. These relationships inform and help define the modelling domain required to describe the legal and physical entities that make up a real-world property (represented as a unit of property or a set of several units of property).

See:

- [7.1 Immature classes and relationships](#)
- [7.2 PDMF simplified schematic](#)
- [7.3 Packages in the PDMF model](#)

### 7.1 Immature classes and relationships

We have not completed our analysis and research of all identified property elements and their relationships. In order to help us develop the model and learn how it could work, we have included some classes and associations that are 'immature' in the sense we need to do further work to accurately model these classes and associations. This means that some parts of the model are quite detailed, while other parts have very little detail.

The following parts of the model need further development:

- Tenure systems such as Māori customary title, record of Māori land and the deeds register. We know these contain between five and ten percent of New Zealand's land area, however, the focus in the PDMF model to date has been on private land held in a record of title and state land (record of state land).
- Non-register space, particularly the four specialisations connecting to unit of property. We know these are factors contributing to what a person perceives to be their property so have been captured in the model, but we have not yet accurately modelled them.
- The perspectives section of the model, which we added after the general structure of the model was already in place. We know that alternative ways to model the relationships that exist and we have not yet fully explored the options.
- The business rules controlling some of the relationships which we haven't fully understood. This is most noticeable for the complicated relationships between addressable object, physical building, unit of property and connection.
- Constraints to the model that we haven't yet identified.
- The full extent to which a unit of property based on a rating unit is re-usable in other perspectives. We know that a rating unit is often used as a default unit of property.

## 7.2 PDMF simplified schematic

Figure 13 is a schematic of the PDMF model in a unified modeling language class diagram. Much of the detail in the model has been simplified into packages.

All five core concepts of a property are included in one or more of these packages.

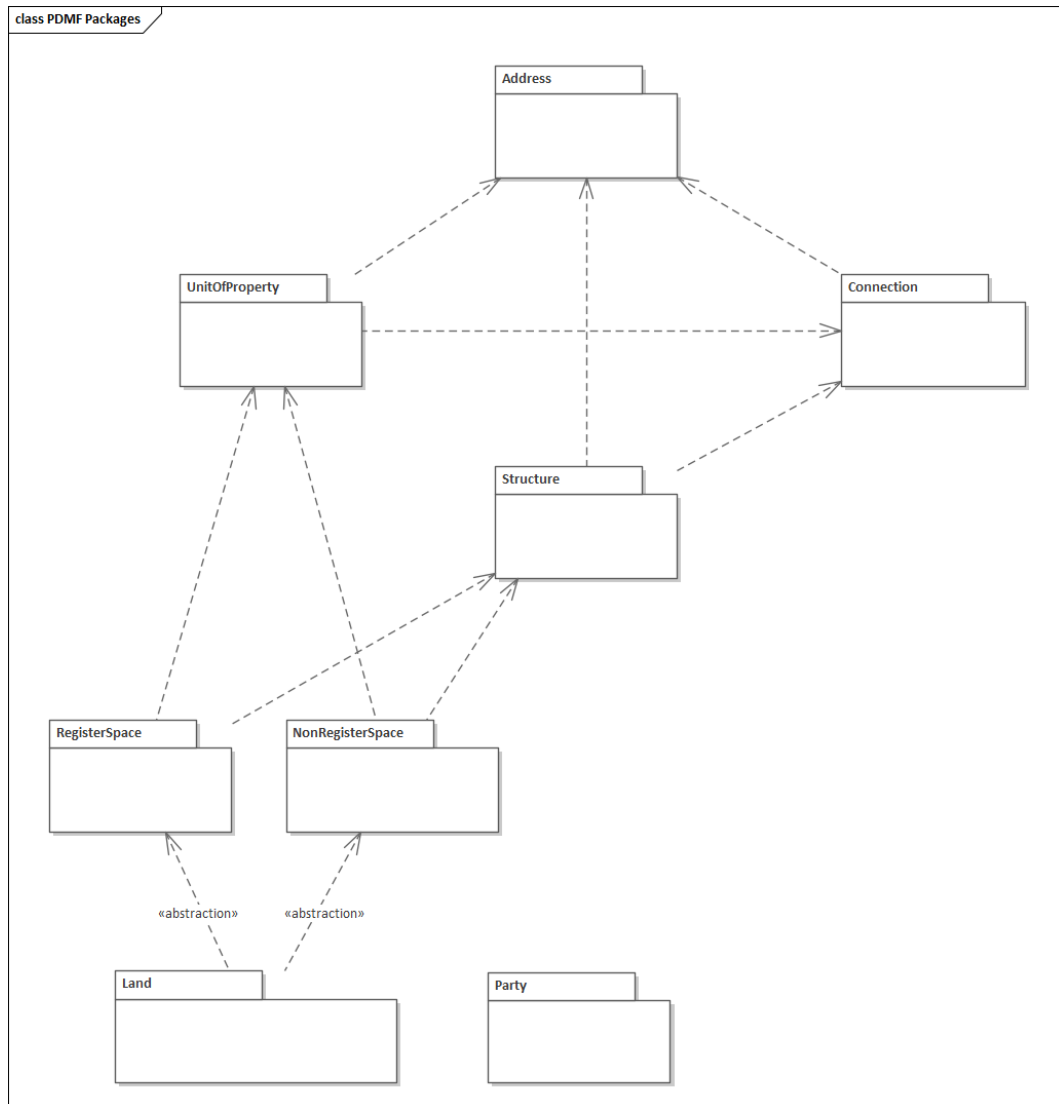


Figure 13: Simplified PDMF schematic

## 7.3 Packages in the PDMF model

The following chapters describe the content of each package of the PDMF model.





The diagrams in each chapter show the classes and the relationships within a package. Some diagrams also include the classes outside the package that are directly linked to classes within the package, along with the relevant relationships.

If we have identified rules describing the behaviour of a class or a relationship, we've included that information.

We've also included further information where possible to assist others wanting to build a property system using the PDMF model.

Where a name from the PDMF model is spelt exactly as it is in the model (camel case, for example: UnitOfProperty) the text is referring specifically to the class in the model. Where a name from the PDMF model is spelt in a plain English manner (sentence case, for example: unit of property) the text is referring to an instance of the class as it would be used to illustrate a real-world example, or implemented and/or populated with real data in a database

To assist with reading, we've placed icons next to some sections. The icon provides a quick guide to what that section contains.

	<p><b>Information</b></p> <p>A discussion about the concepts and what we considered</p>
	<p><b>Interpretation</b></p> <p>How to read, interpret and use the PDMF model</p>
	<p><b>Implementation</b></p> <p>Application of the PDMF to real-world data, and what we've learnt</p>
	<p><b>Data</b></p> <p>Any data issues we've identified, including availability, errors, and limitations with existing datasets</p>

See [Chapter 16](#) for a consolidated view of the model.

## 8 Party

A party is identified in the model in one of two ways:

- In a codelist where the party is playing a role. The party may play different roles in different parts of the model
- As a class in its own right.

Figure 14 shows the Party class and specialisations used in the PDMF model.

The Party codelist and class specialisations contains all identified instances of parties that play a part in the property system as modelled in the PDMF. Other parties may exist that we have not yet identified.

See:

- [8.1 Terms and definitions](#)
- [8.2 Parties as a codelist](#)

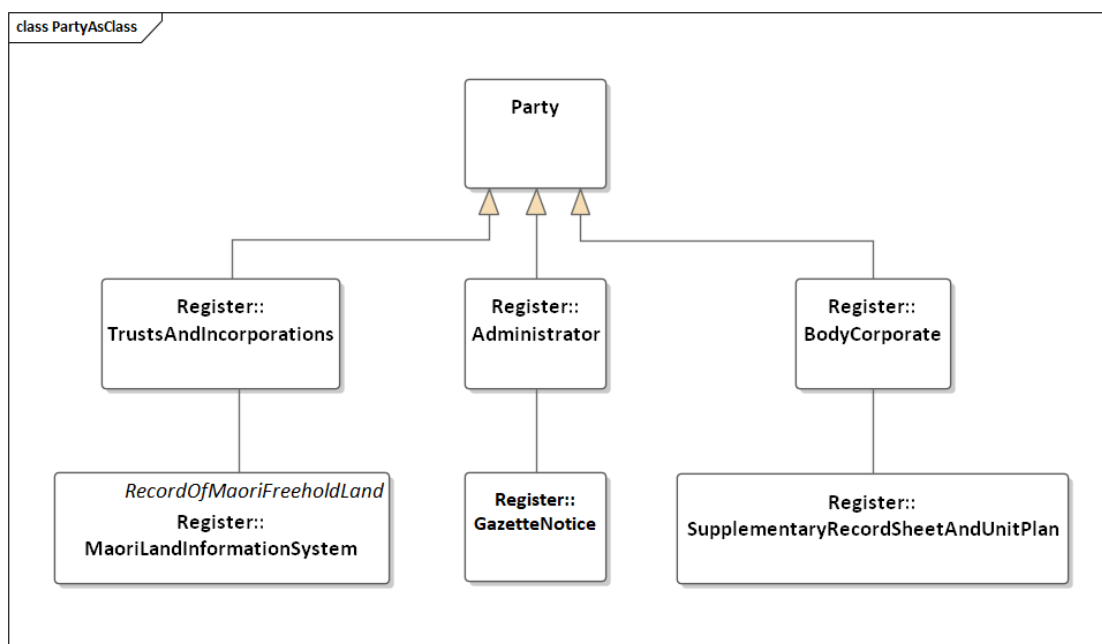


Figure 14: Party and key associations

### 8.1 Terms and definitions

#### **Administrator**

Crown agency or entity with the administration right.

#### **BodyCorporate**

The party that manages the common areas (usually including improvements like buildings) in a unit title development. It may have an important role for some needs.

Forms a unit of property that acts as a parent to the (child) unit title units of property.

### Party

A natural person or an organisation or any other legally valid entity, such as an incorporated trust or body corporate.

### TrustsAndIncorporations

(Definition not yet available.)

## 8.2 Parties as a codelist

The Party codelist contains the following values:

Value	Description
administrator	Crown agency or entity with the administration right.
bodyCorporate	The party that manages the common areas (usually including improvements like buildings) in a unit title development. It may have an important role for some needs.
individual	A person
registeredBusiness	
trustsAndIncorporations	

## 9 Land

Land (or, when used in a 3D context, space) is one of the five core concepts of a property.

Land is also one of the two fundamental pre-requisites of a property. However, to be useful in a property context, land has to be defined and documented so that some authority/permission may be applied to it.

The legal definition of land in New Zealand is determined by cadastral surveyors and results in the formally documented division of land into parcels. Landonline is the authoritative source for parcels and the PDMF's modelling of cadastral surveyed space reflects Landonline.

In the case of undocumented space that is informally (possibly illegally) occupied, the space can be informally defined, even if it is not documented as such.

Figure 15 shows the classes and specialisations in the land package.

See:

- [9.1 Terms and definitions](#)
- [9.2 Parcel](#)
- [9.3 Data availability](#)

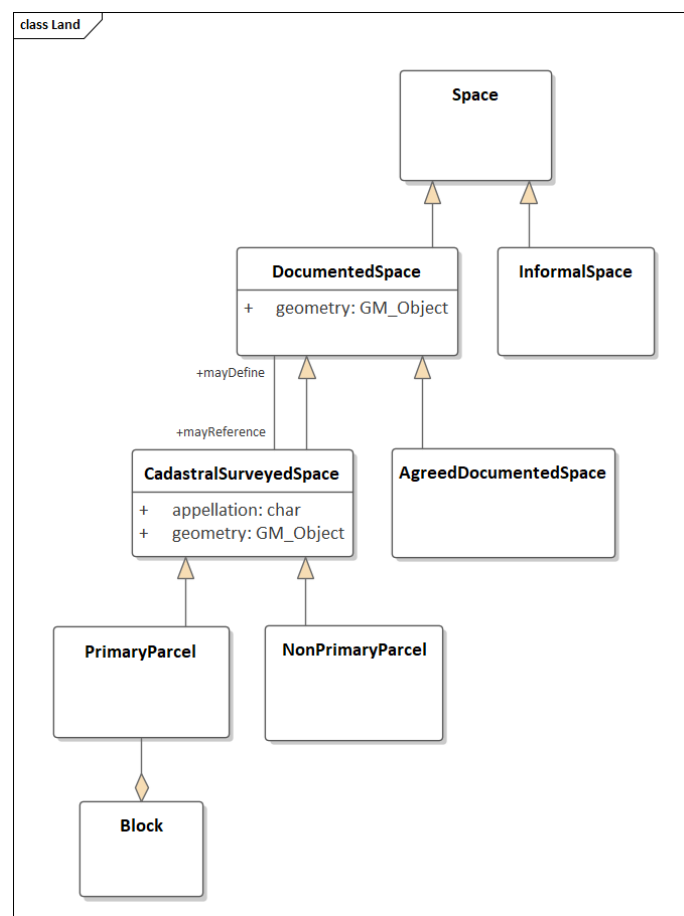


Figure 15 Land

Figure 16 shows the associations to other classes.

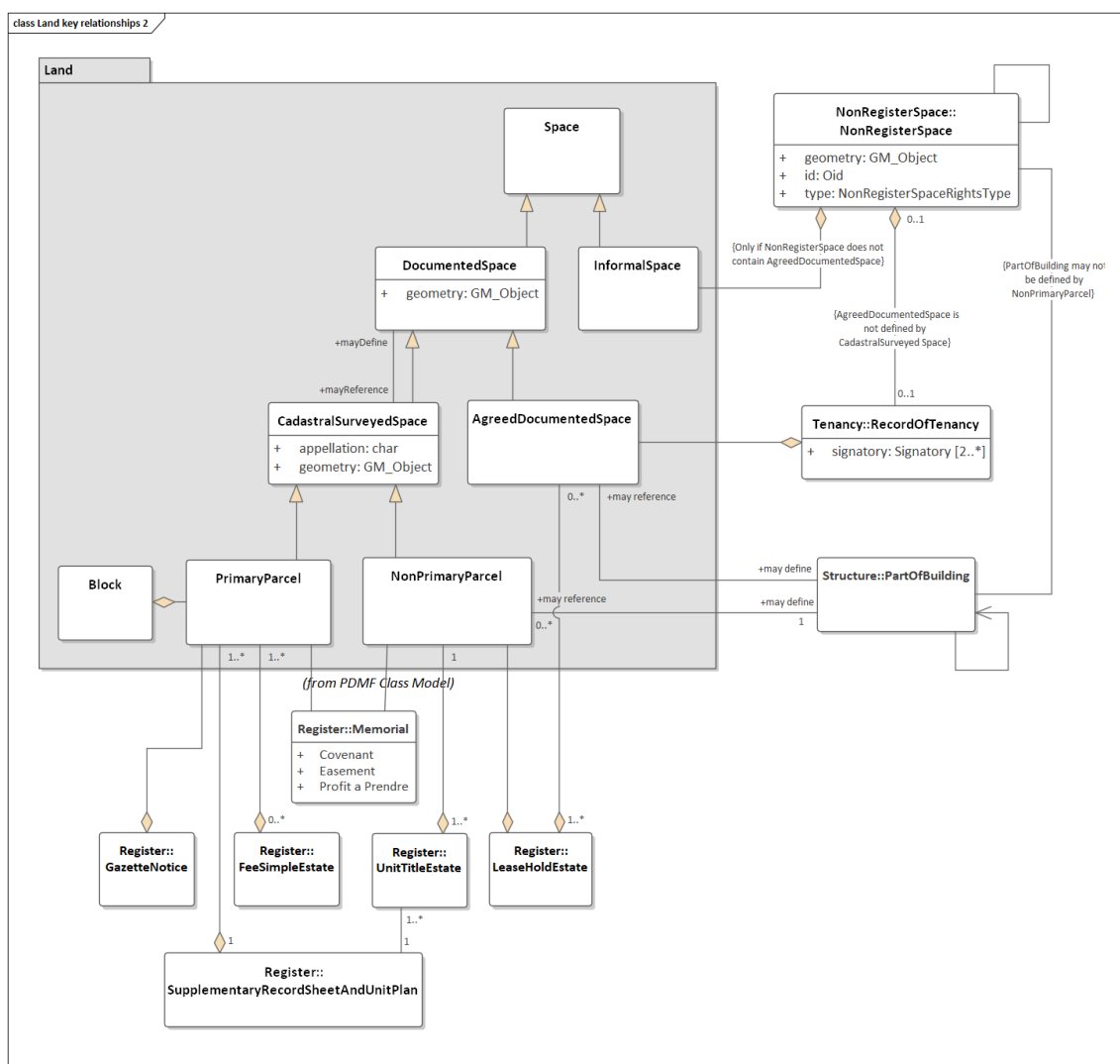


Figure 16: Land package key associations

## 9.1 Terms and definitions

### AgreedDocumentedSpace

A defined area of land (or space) that acts as or contributes to a unit of property on the basis of an agreement between two parties.

### Block

Māori traditionally talk about having 'shares in such and such a block'. Block is defined in Te Ture Whenua Māori Act 1993 as a whole parcel of land comprised and described in an instrument of title. Block name is the primary identifier for Māori. The block name will be the original block name (such as the Puketapu block) given by the Crown or the Māori Land Court when land was originally granted.

The block name is the single most used identifier in researching Māori land.

(Definition sourced from [www.linz.govt.nz](http://www.linz.govt.nz).)

### **CadastralSurveyedSpace**

Space surveyed by a cadastral surveyor, subject to the Cadastral Survey Act 2002.

CadastralSurveyedSpace has the following attributes:

attribute	description
appellation	
geometry	

Other attributes may exist that we have not yet identified.

### **DocumentedSpace**

(Definition not yet available.)

DocumentedSpace has the following attribute:

attribute	description
geometry	

Other attributes may exist that we have not yet identified.

### **InformalSpace**

An area of land (or space) that acts as or contributes to a unit of property, but for which there is no legal basis or record of tenancy.

An example is a fenced-off portion of road reserve incorporated into a property's garden so that it appears to be a part of the property, but for which there is no agreement between the property owner and the controlling authority.

Another example could be a paddock in a farm. The paddock is informal space defined by the farmer but may be rented as a unit of property in its own right.

This includes concepts of adverse possession.

### **NonPrimaryParcel**

(a) means any parcel that is not a primary parcel; and

(b) includes:

- (i) an easement, including an esplanade strip or an access strip:
- (ii) a covenant:
- (iii) a lease or an area associated with a lease:
- (iv) a licence or a permit area:
- (v) a unit or common property for the purposes of the Unit Titles Act 2010:
- (vi) a movable marginal strip:
- (vii) a roadway or a restricted roadway that is an encumbrance over a primary parcel:
- (viii) a right over the common marine and coastal area

(Definition sourced from the Cadastral Survey Rules 2021.)



Includes unit title spaces and cross lease spaces (in 2D or 3D). The aggregation of all these spaces for a property matches the extent of the title.

### **PrimaryParcel**

means any parcel that is intended to be:

- (a) owned by the Crown, with the exception of a movable marginal strip parcel,
- (b) held in fee simple,
- (c) Māori freehold land or Māori customary land,
- (d) part of the common marine and coastal area,
- (e) the bed of a lake or river,
- (f) road or railway parcel,
- (g) vested in a local authority.

(Definition sourced from the Cadastral Survey Rules 2021.)

### **Space**

An undefined physical area of the surface of the earth, or an undefined physical volume with a connection to the surface of the earth.



## **9.2 Parcel**

There are a number of different types of land parcel, as defined in the Cadastral Survey Rules 2021 (Parliamentary Counsel Office (2017)):

- primary parcel
- non-primary parcel
- residue parcel
- underlying parcel
- balance parcel

Only PrimaryParcel and NonPrimaryParcel have been modelled in the PDMF, as these are the basis for the property perspectives identified to date and underpin the majority of units of property that the PDMF models.

The type of parcel most commonly thought of as forming a unit of property is a primary parcel. All primary parcels are digitally available with a geospatial extent.

We think that primary parcels with a parcel\_intent of road, hydro or rail could form units of property by applying the PDMF model. However, the linear and networked nature of these parcels, and the nature of their ownership, may affect how a unit of property can be formed. They may be property perspectives with their own sets of rules. The PDMF model has not been tested to understand these perspectives and how these units of property could be formed.

Non-primary parcels (also known as aspatial parcels) are required for some types of unit of property (predominantly those formed from cross leases and unit-titles) but generally do not have digital geospatial extents available, restricting the ability to display a unit of property

using a GIS system or webmap. However non-primary parcels are mapped on cadastral survey plans, even though these plans are not available as digital data.

In previous versions of the PDMF model NonPrimaryParcel was called EntitledSpace (e-Spatial, 2015). The intent at the time was to capture and model the problem that occurred in Canterbury with the lack of a spatial object for these types of title. We renamed the class NonPrimaryParcel based on further development and additional context around the broader concept of space, and to align with legislation and rules.



## 9.3 Data availability

Digital data for land (with spatial objects) is only consistently available for primary parcels. Other divisions of land (such as for records of tenancy) are not generally available as digital data.

The authoritative source of data for parcels is Landonline, with datasets made available from the [LINZ Data Service](#) (LDS) (Toitu Tē Whenua, nd,b). Parcels comprise a number of relatively complex data tables and relationship tables, and include both primary and non-primary parcels.

Another set of simplified tables are available from the LDS, designed for easier use in GIS systems. These manipulated tables simplify some of the relationships within the Landonline datasets and may not be compliant with the PDMF model or appropriately support PDMF-based property information systems.

See [25.12 Availability of parcel datasets](#) for a summary of the manipulated tables.

# 10 Register space

Register Space is part of the concept of authority/permission, which is one of the five core concepts of a property. Authority/permission is one of the two fundamental pre-requisites of a property.

Register space includes registers, tenure, and transaction.

See:

- [10.1 Tenure](#)
- [10.2 Registers](#)
- [10.3 Transaction](#)
- [10.4 RegisterSpace](#)

## 10.1 Tenure

There are four types of tenure system in New Zealand:

- private
- state
- Māori freehold
- Māori customary.

For ease of understanding, we refer to these four types of record collectively as records of rights and ownership. Figure 17 shows the tenure system and its association to register space.

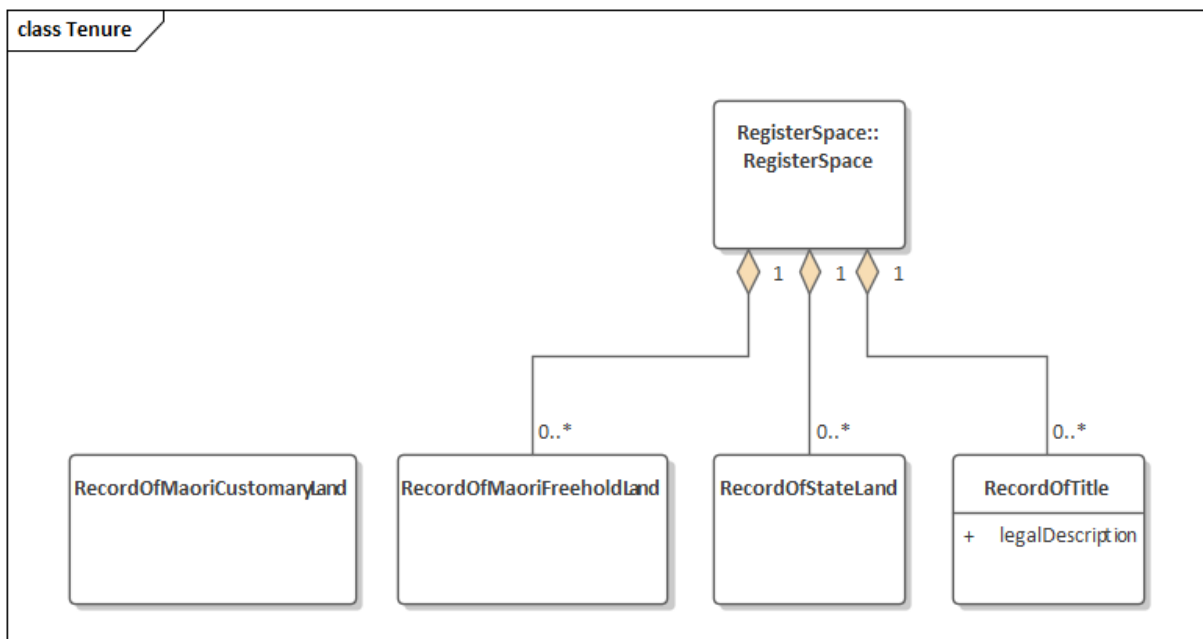


Figure 17 The four types of Tenure systems

Figure 18 shows the associations to other classes.

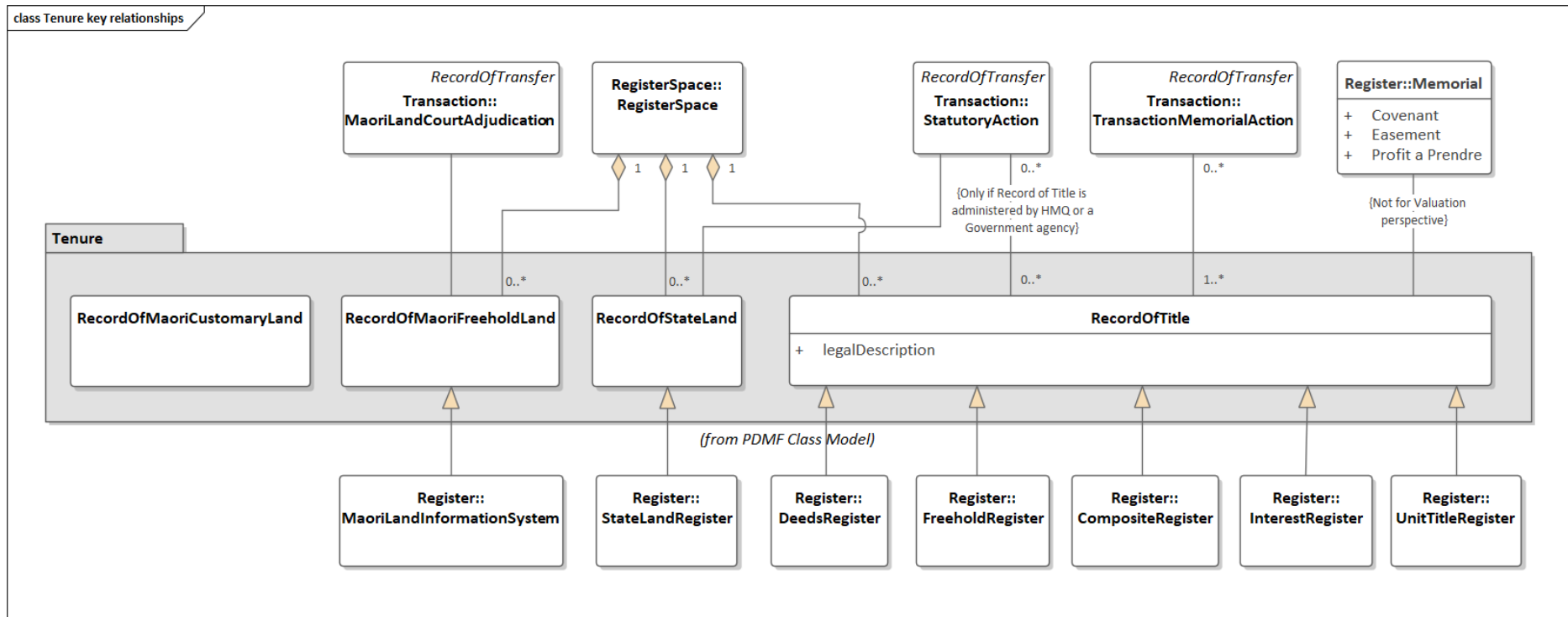


Figure 18: Key Tenure associations

## 10.1.1 Terms and Definitions

### RecordOfMāoriCustomaryLand

(Definition not yet available.)

### RecordOfMāoriFreeholdLand

(Definition not yet available.)

### RecordOfStateLand

Similar to RecordOfTitle, except applies to state land.

### RecordOfTitle

A record of title (previously referred to as computer register or certificate of title) proves the ownership of land and the rights and restrictions that apply to the land. They have been recorded electronically since 2002. (Definition sourced from [www.linz.govt.nz](http://www.linz.govt.nz).)



## 10.1.2 Record of title (private land)

Land held under private tenure is recorded in a record of title and is held in an authoritative register within the Landonline system managed by Toitū Te Whenua and regulated by the Registrar General of Lands. Figure 19 shows the key record of title associations.

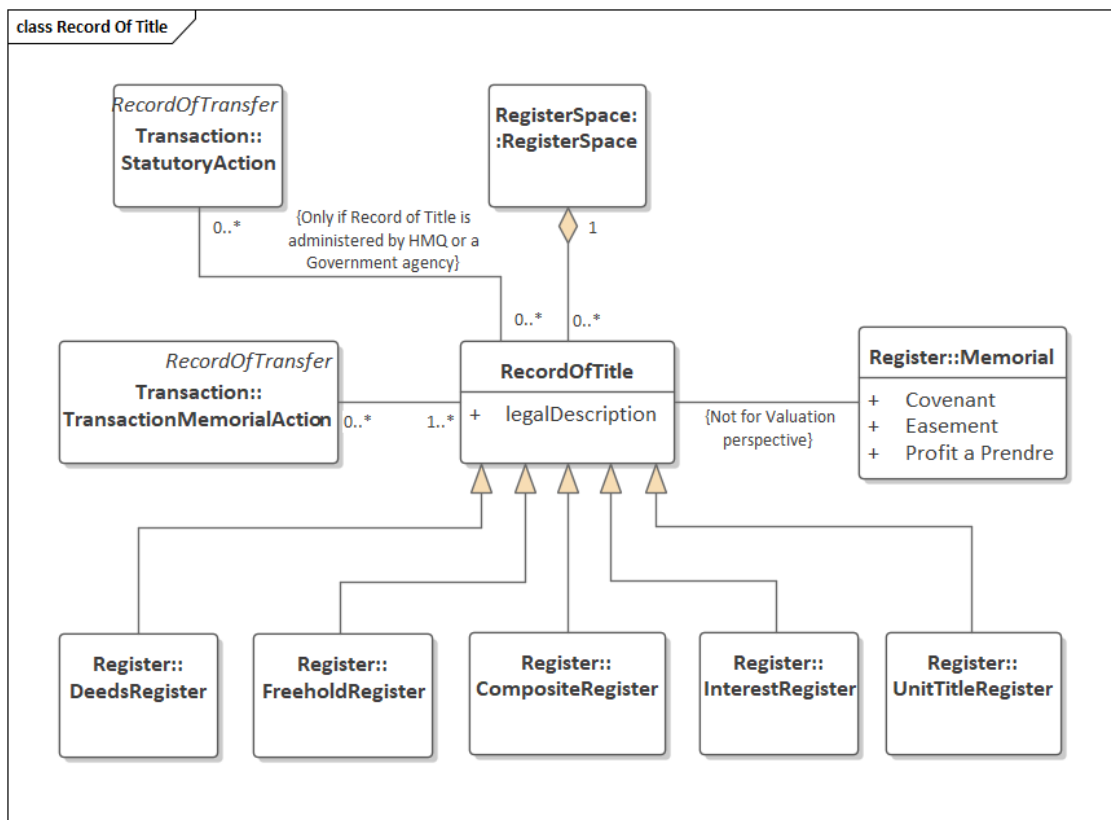


Figure 19 Key RecordOfTitle associations



### 10.1.3 Māori Land

Land held as Māori freehold land or Māori customary land is recorded in the Māori Landonline service managed by the Ministry of Justice.

The PDMF model includes RecordOfMāoriFreeholdLand and RecordOfMāoriCustomaryLand that behave similarly to RecordOfTitle. These are not part of the Māori Landonline system and the use of such records has not been researched.

Figure 20 shows the known associations and classes, but these are not complete.

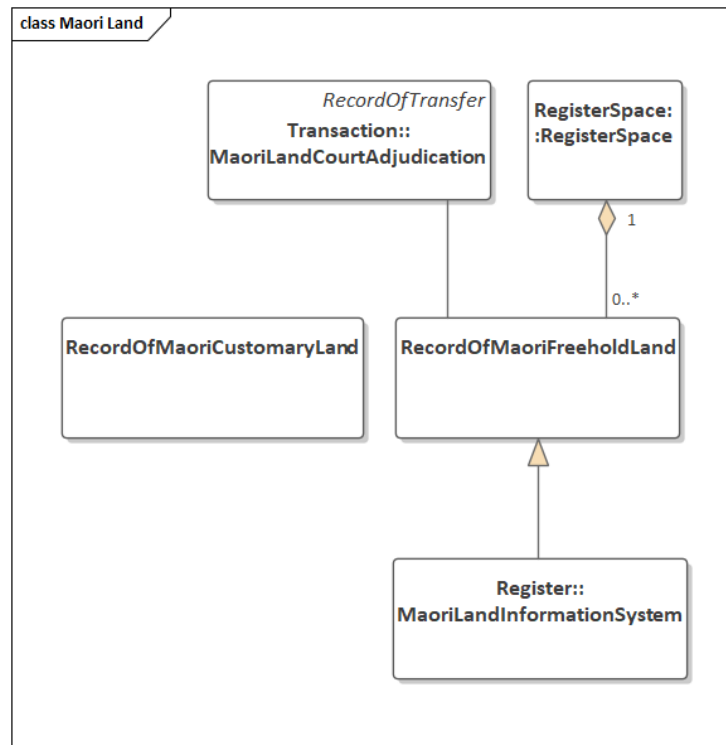


Figure 20 Key Maori land associations



### 10.1.4 Record of state land

Current record keeping across government about the land it owns or administers is poor, which means that government's and the public's visibility of the Crown estate is low.

Additionally, the accessibility of information about Crown-owned land is poor. Records are manual, piecemeal and fragmented across government. While individual agencies manage land in a way that best suits their objectives, they manage their information in isolation.

Under New Zealand law, records of title are created when land passes into private ownership. While Crown entities can request a title for land they administer, many do not. This means that the majority of Crown-owned land lacks a title and is not recorded in Landonline. Some areas of New Zealand have never been sold and are not well defined in terms of ownership and responsibility.

Property Data Management Framework: A model for connecting New Zealand's property data

Currently it is a manual process to obtain a consolidated picture of Crown-owned land. Data has to be extracted from Landonline and/or collected from the agencies that administer the land. Land notices from the [New Zealand Gazette](#) need to be reviewed, if they can be located. Often information has not been formally verified, nor has a process been implemented to verify and maintain this data.

The resulting lack of visibility over Crown-owned land limits the government's ability to determine the most productive use of its assets from an 'all of government' perspective (whether that be for economic, social or recreational purposes).

To achieve a consistent use-based view of land, the PDMF model requires all state land without a title to have a record of state land. RecordOfStateLand behaves similarly to RecordOfTitle and allows aggregation of state land, along with land in other tenure systems, into units of property. Figure 21 shows the key record of state land associations.

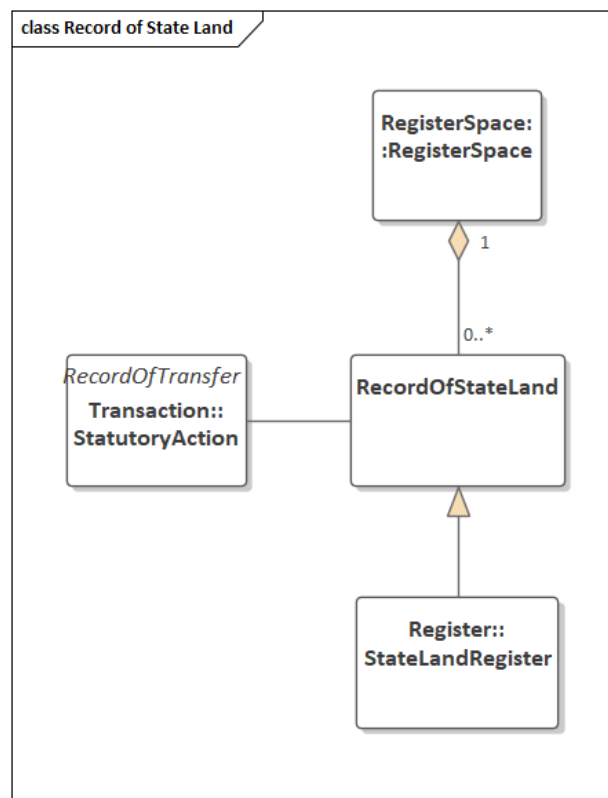


Figure 21 Key RecordOfStateLand associations

A record of state land may exist alongside a record of title where one exists, or may act in place of a record of title where one doesn't exist.

A record of state land may potentially contain estates in a similar manner to a record of title. Research using the Property Explorer has created an informal record of state land and demonstrated the need for such a record.



## Land that requires a record of state land

Within Landonline, the recording of purpose for state land occurs at the parcel level via statutory actions. Even for land with a record of title, in many cases the recording of administrator and purpose is still managed at the parcel level as the title simply records Her Majesty the Queen as the owner.

State land is generally not integrated with land held in other tenure systems or with leased or rented land. Creating a record of state land and applying the PDMF model will enable state land to be formed into units of property that reflect the actual use of the land.

In the PDMF model, to form a unit of property that includes state land, a record of state land is required:

- for a primary parcel that is not held in a fee simple title in Landonline (or a deed in the deeds index)
- where a title of a type less than fee simple (for example, leasehold) has been issued and where the underlying land is not in an existing fee simple title
- where stratum limitations are not fully encapsulated in a land transfer title, and a 'base title' is needed for Crown, private or customary use (for example, foreshore, rivers or lakebed)
- where a land transfer title records the Crown as having a 'greater ownership' interest.

In the PDMF model, a record of state land is not necessary to form a unit of property for:

- primary parcels where an existing fee simple title exists
- land beyond the foreshore (that is, permanently covered by ocean).



## Rules for a record of state land

A record of state land will be no smaller than a single primary parcel.

All land in a record of state land must be administered by the same agency.

Primary parcels may be aggregated to form a record of state land where they are:

- contiguous and have the same legislated, proclaimed, or gazetted purpose
- contiguous, there is no known legislated, proclaimed, or gazetted purpose, and they were created on the same survey plan (usually a survey office plan)
- non-contiguous but separated by no more than a single primary parcel, and have the same legislated, proclaimed, or gazetted purpose (including no purpose).

New primary parcels may be amalgamated into an existing record of state land where the land has been acquired for the same purpose (for example, parcels acquired for road widening).

Records of state land can be amalgamated where land has been acquired or transferred to common administration to enable the land to be managed or used as a single unit.



Where land is alienated (for example, transferred to a record of title), a record of state land must be cancelled or part cancelled as appropriate

## 10.2 Registers

A register is a collection of legislation, regulations and processes that stipulate how data in each of the tenure systems is to be managed. The PDMF models these registers in order to inform the creation of register space via the records contained in the tenure package. The PDMF model is not the authoritative source of information on the registers contained in Landonline (unit title, leasehold, composite and freehold registers).

The Māori land and state land registers have not been fully modelled or implemented. The classes shown are placeholders and further work is required.

Figure 22 shows the registers currently held and maintained in the property rights system.

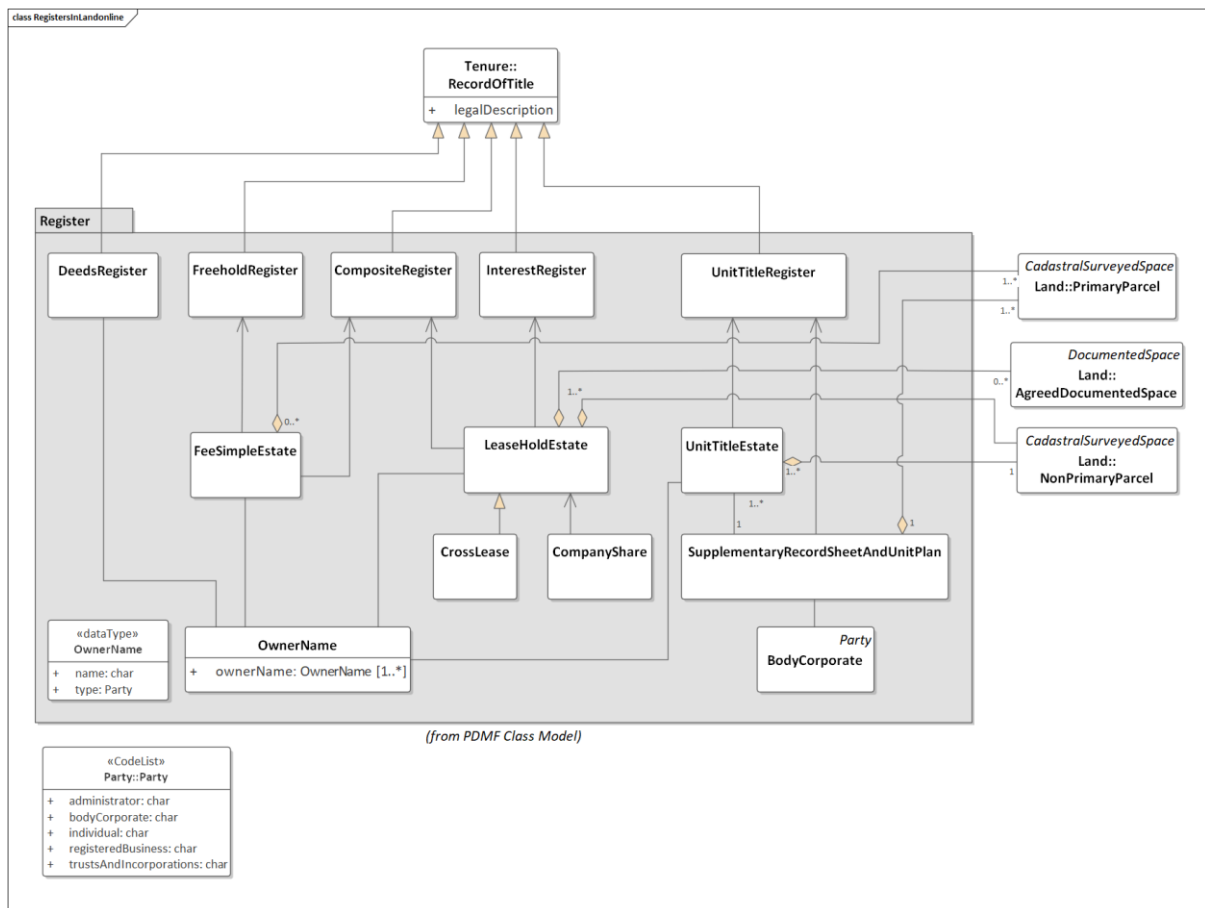


Figure 22 Registers in Landonline

Figure 23 shows registers not currently held in the property rights system.

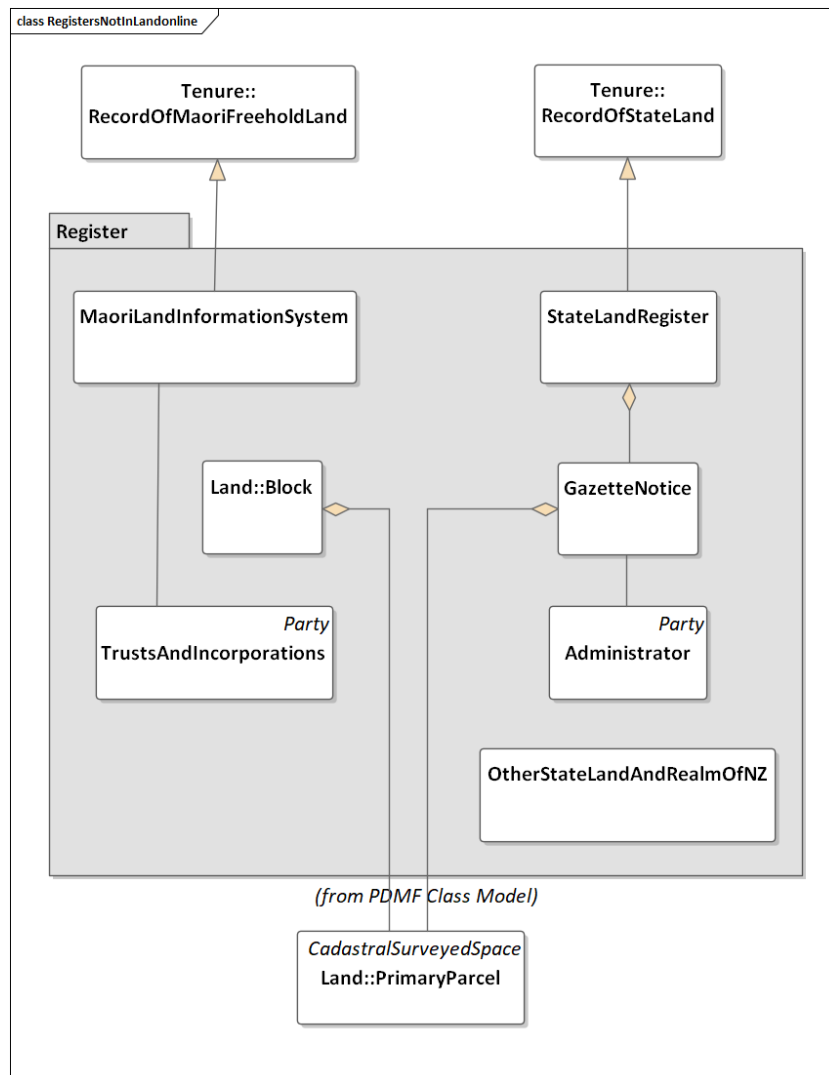


Figure 23 Registers not in Landonline

## 10.2.1 Terms and definitions

### CompanyShare

A type of shared ownership in which each owner has a share in a company that owns the development, usually with an agreement for exclusive occupation of a portion of the development (for example, the apartment).

### CompositeRegister

Contains a composite of estates, for example, a FeeSimpleEstate and a LeaseholdEstate of type CrossLease, that describes an owner's complete interest in a cross lease.

This register is a collection of legislation, regulations and processes that stipulate how data in it is to be managed. As such, this register is likely to be an abstract class, as it is not implemented as an independent dataset, but as part of a wider titles dataset.

### CrossLease

A combination of shared ownership of land defined by an undivided share of a fee simple estate and a leasehold estate over a building, and also usually a portion of the land.

There is no digital definition of the spatial extent held in Landonline.

### **DeedsRegister**

A collection of legislation, regulations and processes that stipulate how data in a DeedsRegister is to be managed. As such, this register is likely to be an abstract class, as it is not implemented as an independent dataset, but as part of a wider titles dataset.

### **FeeSimpleEstate**

A type of ownership of a piece of land, sometimes also called freehold. The registered owners own the land and anything built on it (subject to any registered interests).

### **FreeholdRegister**

Contains freehold rights.

This register is a collection of legislation, regulations and processes that stipulate how data in a FreeholdRegister is to be managed. As such, the register is likely to be an abstract class, as it is not implemented as an independent dataset, but as part of a wider titles dataset.

### **GazetteNotice**

Official commercial and government notifications that are required by legislation to be published.

### **LeaseholdEstate**

Long-term right to occupy. Taken as ownership in local authority domain.

### **LeaseholdRegister**

Contains leasehold estates.

This register is a collection of legislation, regulations and processes that stipulate how data in a LeaseholdRegister is to be managed. As such, the register is likely to be an abstract class, as it is not implemented as an independent dataset, but as part of a wider titles dataset.

### **MāoriCustomaryTitle**

(Definition not yet available.)

### **MāoriLand**

(Definition not yet available.)

### **MāoriLandCourtAdjudication**

(Definition not yet available.)

### **MāorilandInformationSystem**

(Definition not yet available.)

### **OtherStateLandAndRealmOfNZ**

May include New Zealand's exclusive economic zone, offshore parcels, continental shelf, 200-mile limit, offshore islands (not in a register), the territorial claim over the Ross Dependency in Antarctica, and the dependent territory of Tokelau.

## OwnerName

The owner of a record of title, as registered in Landonline.

OwnerName contains the following attribute:

Attribute	Description
ownerName	The name of the owner, as contained in the OwnerName datatype

Other attributes may exist that we have not yet identified.

The OwnerName datatype contains the following values:

Value	Description
name	The name of the owner
type	The type of owner, from a value contained in the Party codelist

Other values may exist that we have not yet identified.

The Party codelist contains the following values:

Value	Description
administrator	
bodyCorporate	
individual	
registeredBusiness	
trustsAndIncorporations	

Other values may exist that we have not yet identified.

## StateLandRegister

A collection of legislation, regulations and processes that stipulate how data in a StateLand register is to be managed. As such, the register is likely to be an abstract class, as it is not implemented as an independent dataset, but as part of a wider titles dataset.

## SupplementaryRecordSheetAndUnitPlan

A supplementary record sheet records the ownership of the common property, any legal interests registered against the common property or base land, and other information such as the address for service of the body corporate and the body corporate operational rules. (Definition sourced from NZ Tenancy Services.)

## UnitTitleEstate

Ownership rights of a defined portion of space. This could be in three dimensions when associated with buildings and is usually a smaller area than a primary parcel.

## UnitTitleRegister

A collection of legislation, regulations and processes that stipulate how data in a unit title register is to be managed. As such, this register contains and controls the unit title estates data held in the record of title dataset.



### 10.2.2 Unit titles

A unit title is a form of ownership where an owner owns their own defined space (commonly an apartment in a large building), and additionally has a share in the common space (commonly things like the building itself, lifts, corridors or shared landscaped areas). Common space is managed collectively for all owners by a body corporate. All owners of a unit title in a development have a share in the body corporate for that development and are beneficially entitled to the common property.

As at March 2017 approximately seven percent of all properties in New Zealand are of this type, and the number is growing as more apartment complexes are built in our major cities.

See [25.2 Number of unit titles](#) for more detail.

A supplementary record sheet lists all the unit title estates in the development. The unit plan shows the location of all the unit title estates along with the common space and improvements managed by the body corporate.

A body corporate manages the common property for a development as set out in the supplementary record sheet and unit plan.

Records of title for timeshares are also referenced in supplementary record sheets. Timeshare titles have not yet been modelled in the PDMF due to the time-restricted nature of the shared ownership.



#### How the PDMF models unit titles

For PDMF purposes, there are two main types of information about a unit title held in the UnitTitle register:

- the unit title estate
- the supplementary record sheet and associated unit plan.

There are at least two instances of a unit of property for a unit title development:

- one unit of property for each of the unit titles
- one unit of property for the development as managed by the body corporate.

There can be many non-primary parcels for a single unit title (for example, the main apartment, a carpark or a storage locker).

The unit of property for a unit title can have an address and can be a rating unit.

In the PDMF model, UnitTitleEstate brings together NonPrimaryParcel and Owner and forms (via UnitTitleRegister) RecordOfTitle. RecordOfTitle aggregates to RegisterSpace and then to UnitOfProperty.

If the non-primary parcel is within a building and refers to only a portion of the building, the PDMF model defines a relationship between NonPrimaryParcel and PartOfBuilding, and PartOfBuilding and PhysicalBuilding. In this case, only NonPrimaryParcel and PartOfBuilding aggregate to RegisterSpace and form part of UnitOfProperty; PhysicalBuilding does not aggregate to RegisterSpace and does not form part of UnitOfProperty.

Individual unit titles (under a body corporate) have their own non-primary parcel legal description, so the PDMF model does not allow a unit title to be directly linked to a primary parcel.

### **How the PDMF models body corporates**

The PDMF model considers a body corporate to be a unit of property distinct from the units of property for the individual unit titles.

A body corporate's unit of property links to the primary parcels on which the unit title development sits. In the PDMF model, SupplementaryRecordSheetAndUnitPlan links PrimaryParcel to BodyCorporate.

A supplementary record sheet and unit plan behaves as a record of title and, for PDMF purposes, forms (via UnitTitleRegister) a record of title even though no such actual title is issued. RecordOfTitle aggregates to RegisterSpace and then to UnitOfProperty.

A unit of property for a body corporate can have an address in its own right. This unit of property is not rated so does not have a rating unit.

Although the supplementary record sheet and unit plan list all the unit titles for the development, it is the body corporate's unit of property that explicitly and digitally connects all the unit titles for the development together. It acts as the 'parent' unit of property, and the individual unit titles as the 'child' units of property.

If a development includes a building managed by a body corporate, the PDMF model requires PhysicalBuilding to aggregate into RegisterSpace and then into UnitOfProperty, becoming part of the unit of property for the body corporate.

### **Data availability**

Unit title estates are held in Landonline's unit title register and specify an owner and a space defined by a non-primary parcel. The non-primary parcel is defined on a unit plan; it is not held as digital data within Landonline.



### 10.2.3 Cross leases

A cross lease is a form of ownership where all owners of a development hold an undivided share in the land and, additionally, have a legal agreement with the other owners defining the building or flat and the land that they can exclusively occupy.

The defining characteristic of a cross lease is that each owner has a leasehold estate that defines an agreed occupation, and a share in a fee simple estate for the whole development. For each cross lease these two estates (the share in the fee simple and the leasehold) may be on separate records of title or may be two estates on a cross lease record of title.

The fee simple estate references the legal descriptions of the primary parcels that underlie the cross lease development.

The leasehold (mostly) references a legal description for the exclusive occupation, which must be within a structure (building). In most cases there is a survey plan that shows the extent of the exclusive occupation, although in some (mainly older) instances the area of exclusive occupation is shown on a diagram within the title. Areas of land (that is, not within a structure) where there is exclusive occupation are shown on the plan and specified in each lease document.

There is unlikely to be a single record of title for the development in its entirety, as the ownership of the development may be represented as multiple undivided shares of fee simple estates, each owned separately. For example, if there are two cross leases in a development, each lease holder will also have their own fee simple estate for a half share in the whole development, a total of two estates per owner (one leasehold, one half share fee simple), four for the whole development.

As at March 2017 approximately 11 percent of all properties in New Zealand are of this type. They are more prevalent in Auckland and Christchurch than elsewhere in the country. The number is relatively static as the "issuing of new cross lease properties has declined and this form of title is now predominantly only used for legacy titles held this way. This is thought to be due to the introduction of the Resource Management Act in 1991 classifying a cross lease as a subdivision" (e-Spatial, 2015).

See [25.3 Number of cross leases](#) for more detail.



#### How the PDMF models cross leases

Cross leases are recorded in the land transfer registry in different ways. While this has been accounted for in the PDMF model, it does affect the availability of some data.

In the PDMF model, each cross lease, represented by the leasehold estate, acts as a unit of property in its own right, similar to the situation for a unit title.

In the PDMF model, for a cross lease where a fee simple estate and a leasehold estate are recorded on a single record of title, LeaseholdEstate and FeeSimpleEstate form RecordOfTitle

via CompositeRegister. RecordOfTitle aggregates to RegisterSpace, and then to UnitOfProperty.

In the PDMF model, for a cross lease where a fee simple estate and a leasehold estate are recorded on separate records of title, LeaseholdEstate form RecordOfTitle via LeaseholdRegister. FeeSimpleEstate form RecordOfTitle via FeeSimpleRegister. These two separate records of title then aggregate together to a single instance of register space. RegisterSpace aggregates to UnitOfProperty



### **How the PDMF models a cross lease development**

Similar to a unit title development, the entirety of a cross lease development also acts as a unit of property for the physical and legal parts of the development in common ownership, or common to all cross leases. However, unlike a unit title development, there is no legal entity like a body corporate responsible for those common aspects of the development, and no document like a supplementary record sheet that could behave like a record of title.

In the PDMF model, to achieve a complete view of the entirety of a cross lease development, it is necessary to account for parts of the development common to the whole development (for example, the primary parcels and any common spaces like a driveway) and shared among all the owners (if it is common space, the driveway is not included in any of the leasehold estates).

This means the undivided fee simple shares split across multiple estates need to be consolidated to a whole. For instance, three fee simple estates, each on a separate record of title, each with a one-third share, need to be brought together as a whole that represents 100 percent of the interest in the ownership of the development.

This whole 100 percent interest effectively behaves as a record of title, however, no actual record of title is issued. In the PDMF model each instance of a fee simple estate aggregates to a single instance of a record of title. RecordOfTitle aggregates to RegisterSpace and hence UnitOfProperty.

The consolidated 100 percent unit of property identifies the development as a whole and acts as a parent property. The leasehold estates are child properties. The PDMF model requires each leasehold estate's unit of property to have a child relationship to the parent unit of property.



### **Data availability**

Cross lease estates are held in Landonline's composite register, or in the freehold and leasehold registers, and specify an owner and a space defined by a non-primary parcel. The non-primary parcel is defined on a title plan; it is not held as digital data within Landonline.



## **10.2.4 Easements, covenants, and memorials**

While adding functionality to the Property Explorer in order to display mapped easements and covenants, we spent some time investigating how to connect the digitally mapped



Property Data Management Framework: A model for connecting New Zealand’s property data easement or covenant (represented as a spatial non-primary parcel) to the memorial that contained a description of the associated legal rights.

We hoped to model an easement or covenant as a part of **all** properties to which it related. This is because an easement, for example, may take a set of access rights across one property and pass them to a neighbouring property. An example would be an easement where a property has rights for water pipes or sewer pipes to cross the neighbouring property. Both properties are affected by the easement, but the easement spatially maps to only one property.

Our research using the Property Explorer found this was not currently possible, as there is no reliable and complete data in Landonline that links a mapped (non-primary parcel) easement and the associated memorials.



### Memorials in the PDMF

While the relationship between non-primary parcels and memorials is correctly determined within the Property Rights and Landonline environments, the relationship of these to PDMF classes has been modelled, see figure 24. For example, a memorial for a profit a prendre affects the composition of an instance of RegisterSpace, and so affects the unit of property.

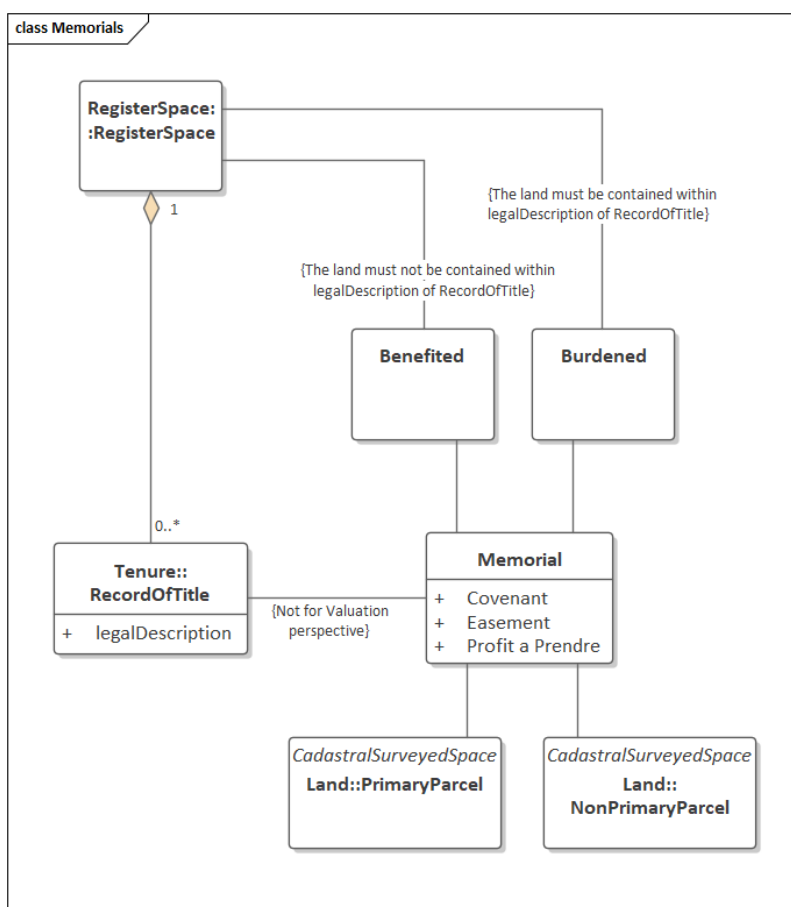


Figure 24 How Memorial affects RegisterSpace

## 10.3 Transaction

Transaction contains the classes that allow land to be transacted. Figure 25 shows the Transaction classes and the key associations to other classes.

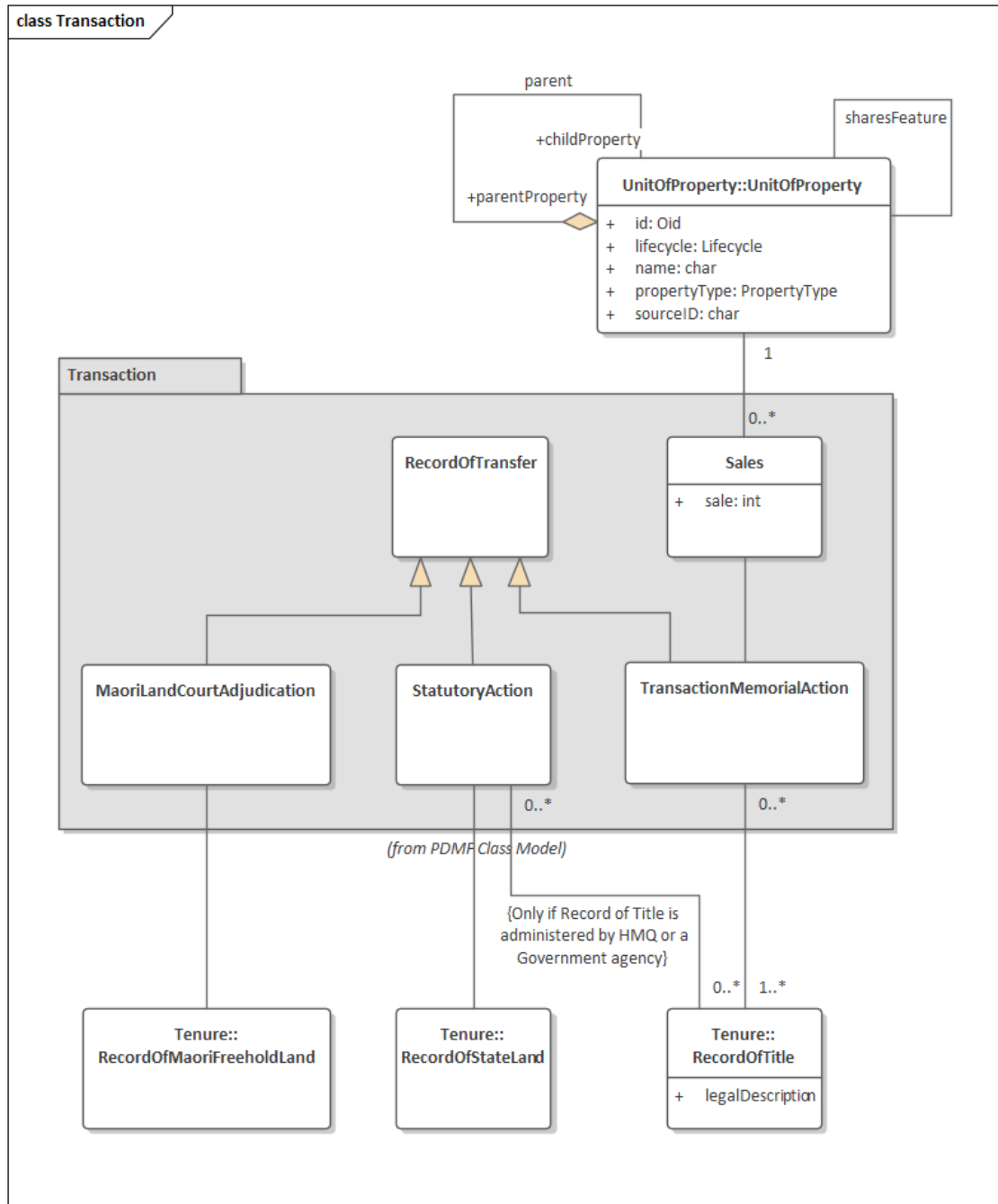


Figure 25: Transaction and key associations

## 10.3.1 Terms and definitions

### **MāoriLandCourtAdjudication**

(Definition not yet available.)

### **RecordOfTransfer**

Property professionals refer to the transfer of a record of title as a dealing. A more common-usage term is a transaction.

A single transaction may be for a single record of title or for a bundle of titles up to a maximum of 300.

### **Sales**

The price paid for a title or group of titles that have been transferred.

Sales has the following attribute:

Attribute	Description
sale	

Other attributes may exist that we have not yet identified.

### **StatutoryAction**

An action recorded against a parcel that is authorised by a specific part or section of an act.

### **TransactionMemorialAction**

(Definition not yet available.)

## 10.4 RegisterSpace

Land and/or space contained in a regulated register, or in an intended regulated register, (owned) and managed as a single unit of property.

The aggregation of all sets of foundational entitlements for a single unit of property. It includes all buildings and other improvements within the defined area and can behave as a property.

Figure 26 shows the RegisterSpace class and the key associations to other classes.

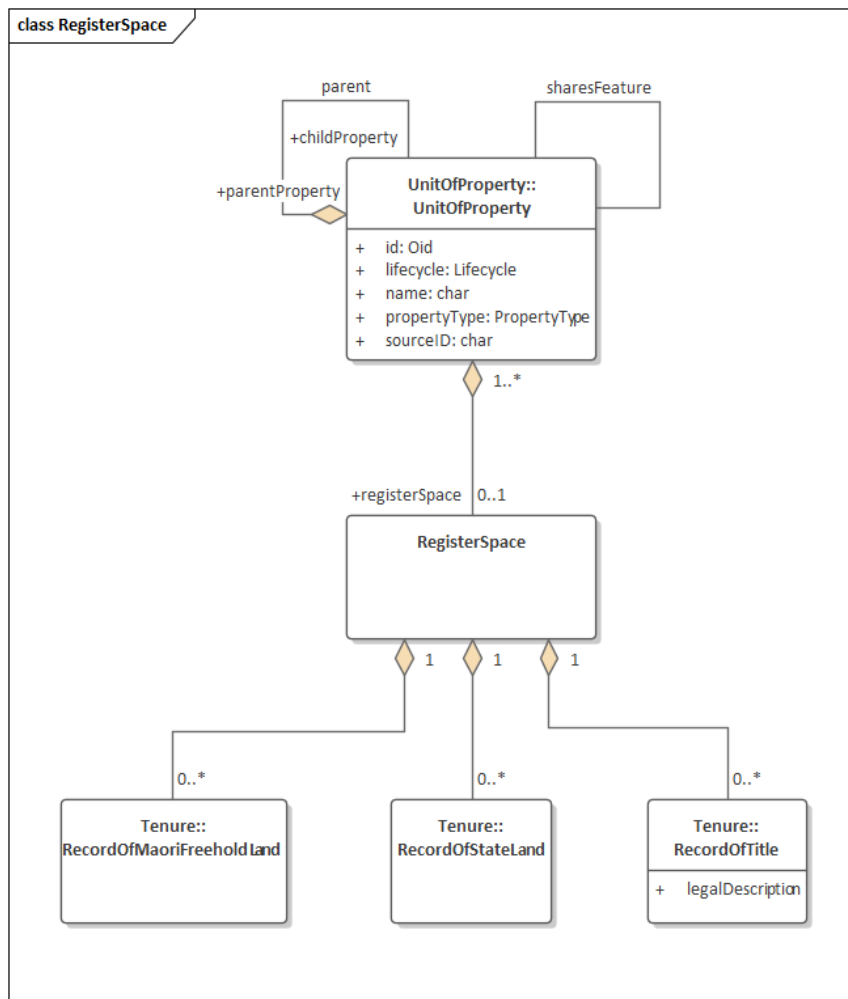


Figure 26 Register space and key associations



## 10.4.1 How RegisterSpace works

The RegisterSpace class brings together the Land and Authority/Permissions that exist in the regulated registers (and form the foundation of a property) and any improvements (structures, buildings) that have been made.

RegisterSpace is legislated, regulated and enforced through statutory bodies. The types of ownership, rights available, methods and processes of transfer are all prescribed in law and are non-negotiable.

Notwithstanding the absolute rights retained by the Crown, the owner or administrator has foundational rights on the land contained in a register space. They may grant subsidiary rights on all or portions of the land through a leasehold estate or through non-register space.



### Register space as an abstract class

The PDMF model imposes a constraint on the relationship between RegisterSpace and UnitOfProperty – there can be no more than one RegisterSpace aggregating to UnitOfProperty.

This is because RegisterSpace aggregates together all instances of records of rights and ownership from the Tenure package, along with all structures from the Structure package.

Although this version of the PDMF model doesn't include abstract classes, the one-to-one nature of the relationship between RegisterSpace and UnitOfProperty means that RegisterSpace may act only as a container, so may be an abstract class.

If more than one RegisterSpace could aggregate to UnitOfProperty (that is, a unit of property could have two or more register spaces), then in order to break a unit of property into its constituent parts (for example, to answer a question like "What building is on what register space?") an ID would be required for RegisterSpace, hence it could not be abstract.



## 10.4.2 Use of Landonline data to form RegisterSpace

The intent of RegisterSpace is to bring together records of rights and ownership that should aggregate to the same unit of property. New Zealand's private land tenure system (held within the Landonline system, Toitu Tē Whenua, nd,c) does not attempt to bring records of title together in this way. However, it does contain some information that could be used to do so.

One option is to use the Registered Owner information in Landonline to tie together records of title that are contiguous and have the same owner. Another option is based on the Building Act 2004, section 75, which ties together records of title where a structure is built across the boundary between two titles and is registered as a memorial on the titles. Other options may exist but require more in-depth analysis of the survey and title data in Landonline. These options could become rules in the PDMF model.

These options are limited in their scope and there are difficulties in extracting accurate data from Landonline, meaning it is possible to create units of property in system databases only to a limited extent without resorting to the use of an external definition like rating unit.

# 11 Non-register space

Non-register Space is part of the concept of authority/permission, which is one of the five core concepts of a property. Authority/permission is one of the two fundamental pre-requisites of a property.

Non-register space includes tenancy which can be thought of as roughly equivalent to the registers in Register Space.

See:

- [11.1 Tenancy](#)
- [11.2 NonRegisterSpace](#)

## 11.1 Tenancy

Tenancy is concerned with an intent to transfer of subset of foundational rights from one party to another party, resulting in a space intended to be leased or rented. The intended space does not necessarily have to be occupied. Figure 27 shows the Tenure classes and associations.

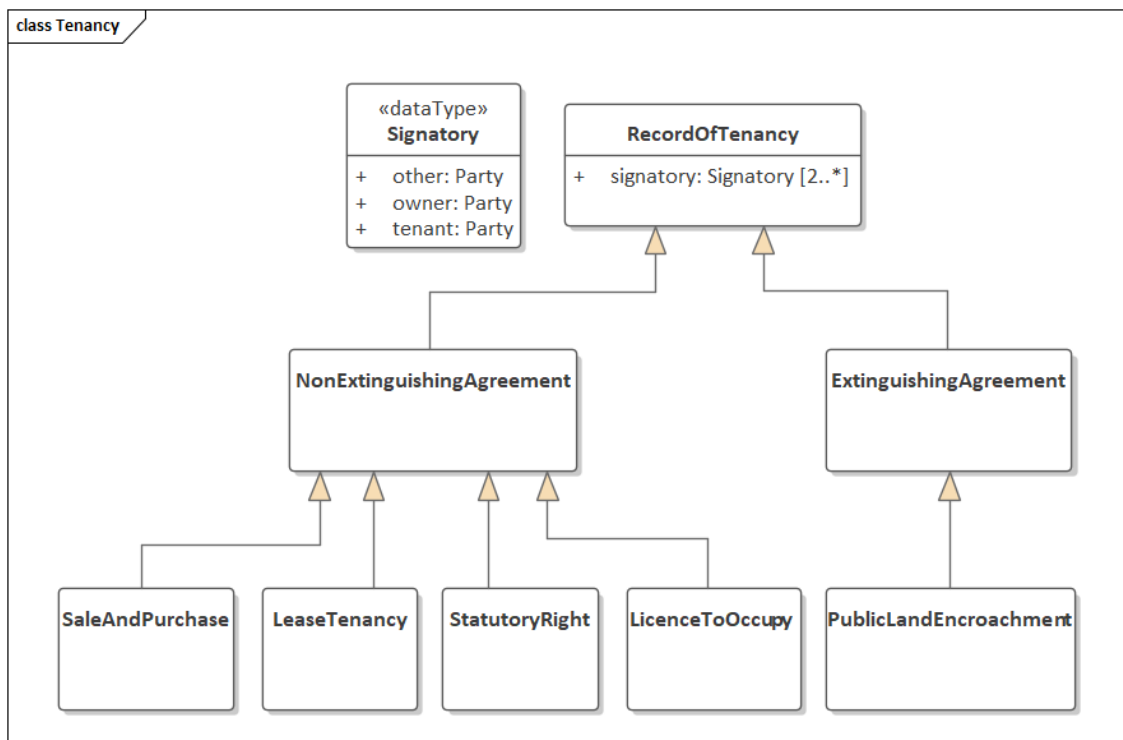


Figure 27: Tenure classes and associations

Figure 28 shows the key associations between RecordOfTenancy and NonRegisterSpace.

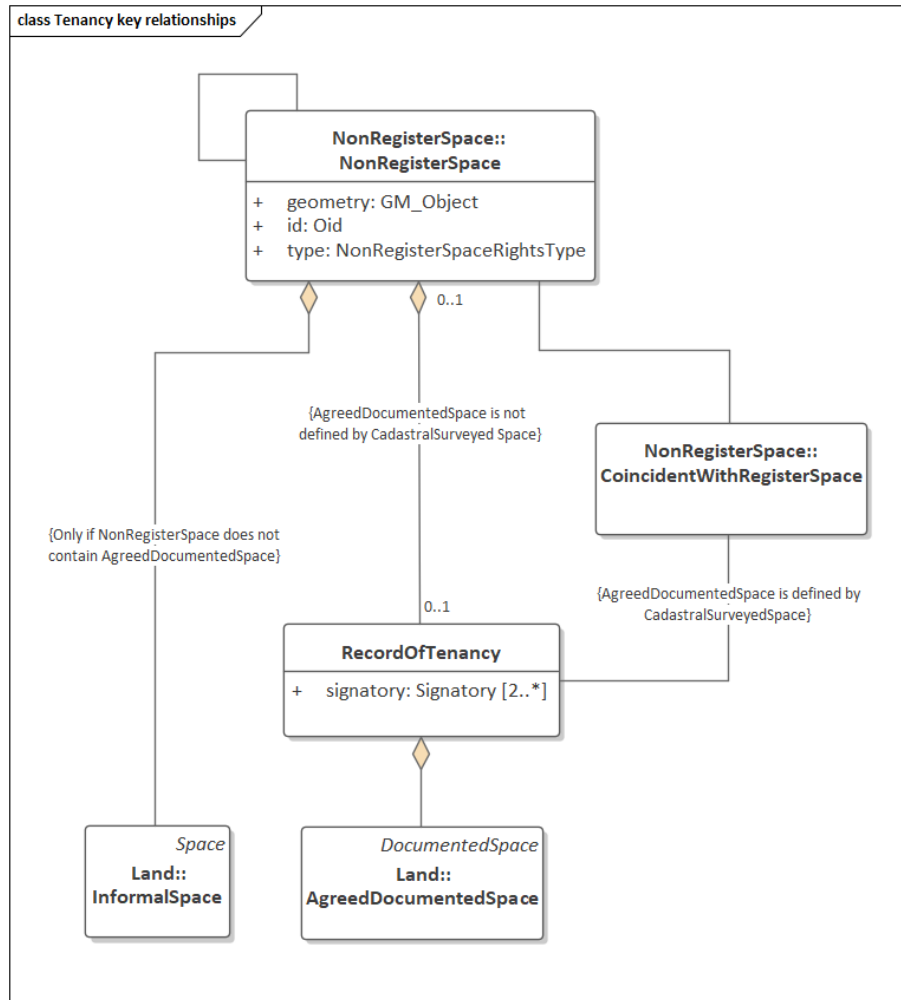


Figure 28 Key RecordOfTenancy associations

### 11.1.1 Terms and definitions

#### RecordOfTenancy

A record specifying an agreement between two parties relating to an instance of NonRegister space.

RecordOfTenancy has the following attribute:

Attribute	Description
Signatory	A party to the agreement. There are usually two signatories to an agreement. Signatories are described in the Signatory datatype

The Signatory datatype contains the following attributes:

Attribute	Description
Other	
Owner	The registered owner, from a value contained in the Party codelist
Tenant	The persons or organisations that physically occupy the Property, from a value contained in the Party codelist

The Party codelist contains the following values:

Value	Description
administrator	
bodyCorporate	
individual	
registeredBusiness	
trustsAndIncorporations	

### **ExtinguishingAgreement**

A contract agreement between two parties over a non-register space that terminates when the party receiving the rights sells their property.

The parties are usually those specified on the title(s) of the property and the authority which owns the encroached land.

### **Lease/Tenancy**

(Definition not yet available.)

### **LicenceToOccupy**

(Definition not yet available.)

### **LicenceToOccupy (PublicLandEncroachment)**

An agreement signed between the owner of a property and the authority that owns the land, which authorises the property owner to occupy a portion of land owned by the authority.

Usually the authority is a territorial authority, and the land being occupied is a portion of road reserve. Another instance of an authority is New Zealand Rail, where the land being occupied is a portion of the rail corridor.

### **NonExtinguishingAgreement**

A legal right through a contract agreement that may continue when the property to which the contract refers is sold.



### **SaleAndPurchase**

A legally binding contract between the buyer and the seller of a property.

### **StatutoryRight**

(Definition not yet available.)



## 11.1.2 Use of informal space

In most cases, records of tenancy are private agreements between the signatories and are not publicly available, making it difficult for them to contribute to a unit of property. However, the lack of availability of a record of tenancy does not prevent instances of NonRegisterSpace contributing to a UnitOfProperty. In this case the area may have to be defined as InformalSpace, even if it is coincident with CadastralSurveyedSpace and would otherwise be AgreedDocumentedSpace.

## 11.2 NonRegisterSpace

Areas of land/space (and associated rights) not managed or contained within a regulated register (or an intended regulated register). These areas of land/space and/or improvements can act as a unit of property in their own right or contribute to an existing unit of property.

Figure 29 shows the NonRegisterSpace class and key associations to UnitOfProperty.



No new instance of a unit of property is created, as the instance already exists and has been defined via RegisterSpace.

### NonRegisterSpace

NonRegisterSpace contains the attribute nonRegisterRights type. This attribute may contain the following values:

Value	Description
airspace encroachment	
informal occupancy	
private lease	
public land encroachment	
road reserve encroachment	
subsurface encroachment	
tenancy	

This list is not exhaustive. Other values may exist that we have not yet identified.

### SubtractsFromUnitOfProperty

NonRegisterSpace aggregates into an existing instance of UnitOfProperty that has been defined via RegisterSpace.

No new instance of a unit of property is created.



## 11.2.2 How NonRegisterSpace works

A distinctly occupiable space, like a tenancy, can act as a unit of property in its own right. Whether it is tenanted or not does not change its status as a property that **can** be independently occupied. Where these occupiable spaces are dependent on either a record of tenancy (for example, a rental agreement) that is not registered in the leasehold register or on an informal arrangement where there may be no record of tenancy, they form a non-register space.

NonRegisterSpace is permission-based, with the permissions being negotiated between parties using commercial law.



### Using NonRegisterSpace

An instance of non-register space may form an entire unit of property if based on a lease of an entire rentable space (for example, an entire building, a flat or a shop).

An instance of non-register space may be part of a unit of property formed through register space, but with rights independent from the register space.

Where a non-register space refers to exactly the same set of land and authority/permissions and structures/buildings as a register space, then the non-register space does not generate a new instance of a unit of property. In this case, the only difference between RegisterSpace and NonRegisterSpace is the rights that apply. An instance of NonRegisterSpace contributes a record of tenancy (via CoincidentWithRegisterSpace) to a unit of property already defined by RegisterSpace.

However, where a non-register space refers to only a **portion** of the land and authority/permissions and structures/building in an existing register space, the PDMF model requires a new unit of property for the non-register space. The new unit of property may have a child relationship to the unit of property generated by the register space.

If the non-register space is a tenancy or land lease dependent on foundational rights, then it must be within the spatial extent of the land area with foundational rights.

Non-register spaces that act as a unit of property can be (and in the real world commonly are) associated with an address. Without UnitOfProperty, Address cannot be linked in the PDMF model to AddressableObject (in this case, the unit of property generated by the non-register space acts as the addressable object).

# 12 Unit of Property

Unit of Property connects the five concepts of a property. It aggregates together the core elements of a property and, by the application of the rules contained in a Perspective and the relationships defined in the PDMF model, binds them together to form an organised set of information about a property.

See:

- [12.1 Perspective](#)
- [12.2 Unit of Property](#)

Figure 30 shows UnitOfProperty and the important key associations of RegisterSpace, NonRegisterSpace, Perspective, Connection, and Address.

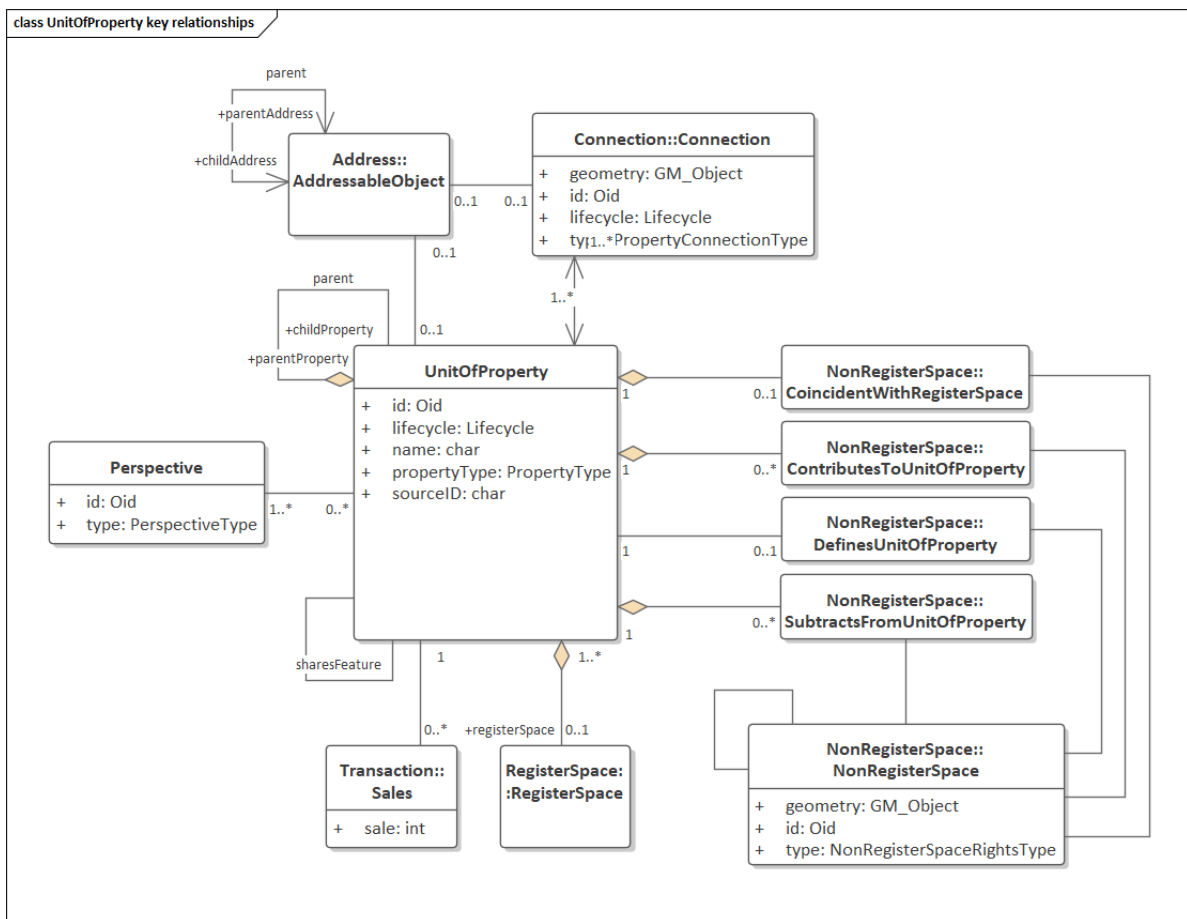


Figure 30 Unit of property and key associations

## 12.1 Perspective

Perspective describes a property as the owner, occupier or user would recognise it in the real world.

Perspective is the basis on which a unit of property is formed. A perspective defines a type of property and sets the rules that apply to it. These rules, along with the relationships defined in the PDMF model, allow the instances of the core elements that form the unit of property to be identified. Figure 31 shows the Perspective classes and the key association to UnitOfProperty.

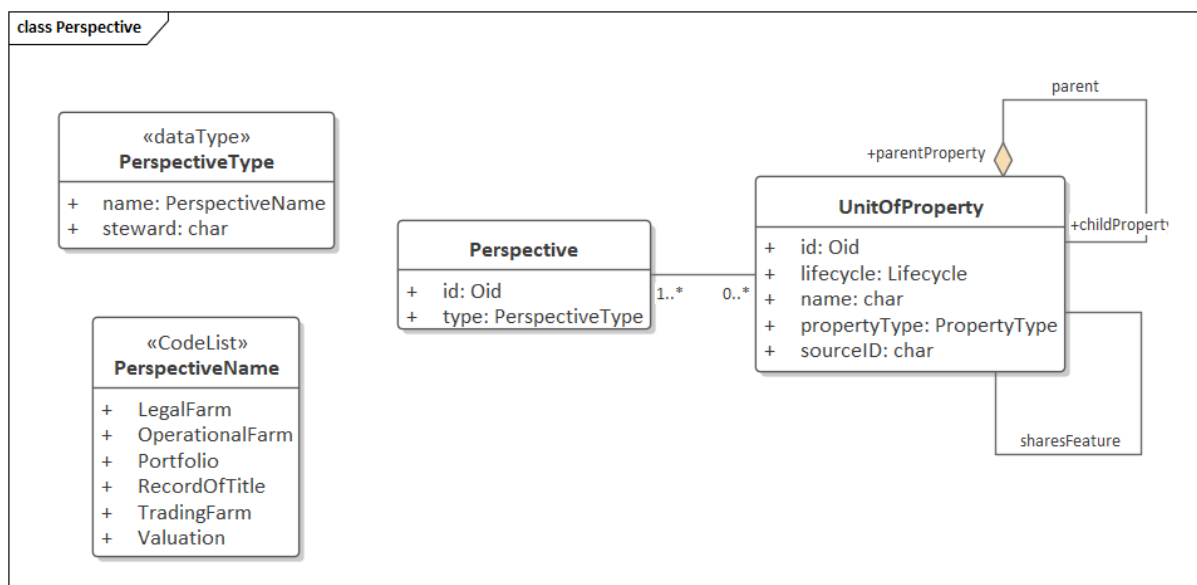


Figure 31 Perspective

### 12.1.1 Terms and definitions

#### Perspective

How a person perceives a property to be. This depends on what the person is doing or wants to do, at that moment in time.

Because a person's perspective changes with time, the data a person needs to make decisions about a property is not fixed. Different data will be more or less important to them depending on their perspective at the time.

Perspective contains the following attributes:

Attribute	Description
id	
type	Specific perspectives that have been identified and defined by users. Types of Perspective are described in the PerspectiveType datatype. Not all perspectives have been identified.

The PerspectiveType datatype contains the following attributes:

Attribute	Description
perspectiveName	perspectiveName values are described in the PerspectiveName codelist.
steward	The person or organisation that identified and defined, and manages, a specific perspective

The PerspectiveName codelist contains the following values:

Value	Description
LegalFarm	
OperationalFarm	
Portfolio	
RecordOfTitle	
TradingFarm	
Valuation	



## 12.1.2 Types of perspective

Because perspective depends on how a person perceives a property, there will be many possible perspectives. When we asked people what a property was, people commonly talked about their home. Another common perspective people mentioned was a farm. For those involved in buying and selling properties, a common perspective was title.

We have not attempted to identify in the PDMF model all possible perspectives. We have included the perspectives that were mentioned during our work developing the concept of perspective.

### **RecordOfTitle**

A perspective based on ownership of a single and individual title.

### **Valuation**

The District Valuation Roll (DVR) is a database of all rating units in a territorial authority's area. It contains individual property details including values (capital, land and value of improvements).

Each taxable unit contained in a DVR is called a rating unit and is based on ownership and common use. Section 2.4 of the Rating Valuation Rules 2008 (Toitu Tē Whenua, 2010) describes how to construct a rating unit.

Valuation is a widely held perspective because of the widespread use by territorial authorities of rating unit as a default property.



### 12.1.3 Parcel

A parcel is a polygon or polyhedron consisting of boundary lines (features which are boundary features) which may be, or may be capable of being, defined by survey and includes the parcel area and appellation. (Definition sourced from the LINZ Data Service.)

Parcel is a commonly held perspective of a property. This was heard during Toitū Te Whenua internal interviews and consultation with territorial authorities. It is especially prevalent among geospatial professionals and those who work in the property rights system (for example, surveyors).

While it may be viewed as a valid perspective, the PDMF model does not permit a parcel to be a unit of property. A parcel alone does not have any permissions, authority or rights, and these are fundamental to the existence of a property. Because of this, parcel is not included as a type of perspective.



## 12.2 Unit of Property

A defined area of land (or space connected to the land) and improvements with a distinct set of rights that potentially could be traded for the purposes of occupation or navigation.

A complete view of a complex property can be achieved by associating together a number of units of property.

Figure 32 shows the classes and associations to UnitOfProperty not shown in figure 30.

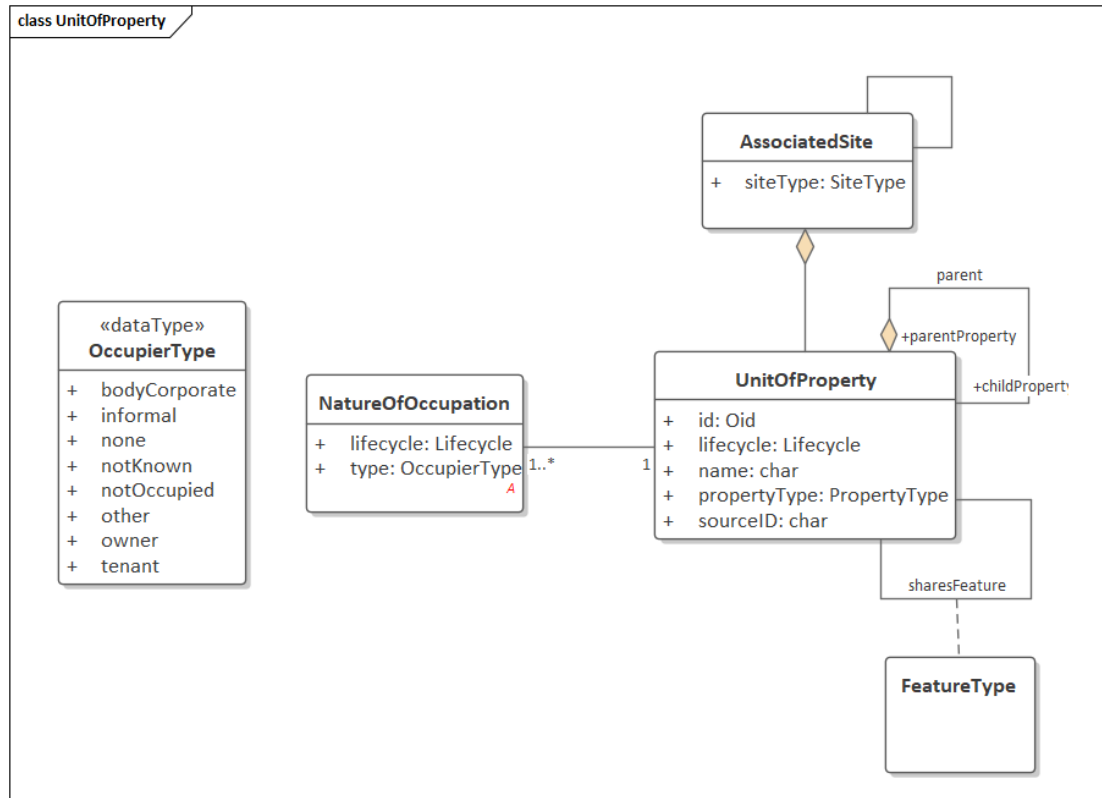


Figure 32: Unit of property and other associated classes

### 12.2.1 Terms and definitions

#### AssociatedSite

Brings together units of property that are related to each other by way of common usage, ownership, management or some other similar manner.

An aggregation of properties that act as a readily understood unit.

Types of associated sites include complex sites like a university campus, a hospital or a retirement home. Other examples include:

- ownership portfolios, for example, all Housing New Zealand houses
- a single billing account for units of property of perspective type Valuation (rating unit).

Associated site contains the attribute SiteType. This attribute may contain the following values:

value	description
education	
health	
military	
research	
retirement	

This list is not exhaustive. Other values may exist that we have not yet identified.

### FeatureType

A feature shared between a number of units of property.

A shared driveway is an example of a feature type.

### NatureOfOccupation

The type of occupation of a unit of property.

NatureOfOccupation contains the following attributes:

Attribute	Description
lifecycle	
type	The nature of the occupation, from values in the OccupierType datatype

This list is not exhaustive. Other attributes may exist that we have not yet identified.

The OccupierType datatype contains the following values:

Value	Description
notOccupied	The property is not occupied
notKnown	The nature of the occupation is not known
informal	The occupier is neither the owner or a tenant
none	A parent unit of property with no nature of occupation, but containing child units of property that do have a nature of occupation
bodyCorporate	The party that manages the common areas (represented as a parent unit of property) in a unit title development.
owner	The property is occupied by the owner
tenant	The property is occupied by a tenant

This list is not exhaustive. Other values may exist that we have not yet identified.

### UnitOfProperty

Land area and contents managed as a property.

A defined area of land (or space connected to the land) and improvements with a distinct set of rights that potentially could be traded for the purposes of occupation or navigation.

A discrete set of rights over an area of land (or space connected to the land) and/or improvements.

UnitOfProperty contains the attribute propertyType. This attribute may contain the following values:

Value	Description
mixed	
nonRegister	
register	

UnitOfProperty contains the attribute lifecycle. This attribute may contain the following values:

Value	Type
validFrom	DateTime
validTo	DateTime
version	char



### 12.3.1 Rules and constraints on a unit of property

Real world (physical) land areas that form units of property can be achieved through RegisterSpace plus NonRegisterSpace. That combination can appear as a single real-world property through the aggregation of those two subsidiary spaces.

A property may exist solely of non-register space, with no direct register space, although non-register space is usually dependent on existing register space.

A unit of property does not duplicate if it's exactly the same for different perspectives.

A unit of property does not duplicate if the NonRegisterSpace is exactly coincident with the RegisterSpace except for the addition of a RecordOfTenancy.

When aggregating units of property to associated sites, an associated site cannot have nested associated sites of the same siteType (for example, a hospital campus cannot exist within another hospital campus). However, an associated site can be related to other associated sites. For example, the three separate sites of Massey University Wellington, Massey University Palmerston North and Massey University Auckland can be associated to each other. Associated sites are likely to be user identified.

Research in 2022 (Toitū Te Whenua, 2022) identified a set of rules applying to unit of property that are necessary to integrate dwellings into the PDMF. These rules have an impact across the PDMF model, influencing the structure of the properties that a dwelling is associated with:

- if a unit of property is a parent property, it may not contain a part of a building
- if a unit of property is a child property that contains a structure, it may not contain a part of a building
- if a unit of property is a child property, and formed from non-register space, it must connect to non-register space through DefinesUnitOfProperty
- if a unit of property is a parent property and has a child property that contains part of a building, then the parent property must contain a structure that is a physical building and the child property's part of a building must aggregate to the parent property's physical building that it is physically within.

See section 23 for further information.

### 12.3.2 Forming a unit of property



This section explains how a unit of property may be formed using RegisterSpace and/or NonRegisterSpace.

In the PDMF model, an instance of register space contains one or more instances of records of rights and ownership drawn from any of the tenure systems. Two or more records of rights and ownership from the same register may aggregate to the same register space. For example, two fee simple records of title may aggregate to a single register space.

In the PDMF model, a non-register space contains one or more instances of a record of tenancy, and/or one or more instances of informal space.

Table 2 shows the combinations of records of rights and ownership (which aggregate into RegisterSpace) and occupation (which aggregate into NonRegisterSpace) that we have identified as commonly forming units of property. We have called these combinations the property-forming constructs.

We have also identified an additional type of property-forming construct modelled as aggregating to RegisterSpace. To fully model a unit title development (held in the unit title register), the common space and buildings specified in a supplementary record sheet and managed by the body corporate would need to be accounted for. The supplementary record sheet would effectively form a unit of property and, as such, would behave as a property-forming construct. However, for the PDMF model this would require a record similar to a record of title to hold the rights and ownership of the body corporate.

More research is required to understand what combinations of record of tenancy (lease/rental agreements and/or informal space) could form non-register space. However, from research work conducted to date, we know that such space exists and forms units of property, so is included in Table 2 as a property-forming construct.

Record of Māori freehold land and record of Māori customary land are also property-forming constructs but are not yet understood well enough to include in Table 2.

Table 2: Property-forming constructs

Property forming construct	Land or space				Rights, responsibilities, restrictions, ownership, occupation, administration							Property ID	
	Parcel			Lease/rent extent <sup>1</sup>	Record of title					Record of state land <sup>2</sup>	Other agreement <sup>1</sup>	Proxied by rating unit <sup>7</sup>	Unit of property
	Primary parcel	Non-primary parcel			Fee simple register	Unit title register	Composite register	Leasehold register	Supplementary record sheet				
Spatial		Aspatial <sup>3</sup>											
Record of state land	✓									✓		✓	
Record of Title	Single title	✓			✓							✓	
	Multiple title	✓			✓							✓	
	Registered leasehold <sup>8</sup>	✓						✓				✓ <sup>5</sup>	
	Cross lease			✓				✓ <sup>4</sup>				✓	
	Unit title <sup>6</sup>			✓			✓			✓		✓	
Body corporate <sup>6</sup>	✓								✓				✓
Record of Tenancy				✓							✓		✓

1. Information for this type of property forming construct is typically private and not digital.
2. Record of state land is intended to record the rights, responsibilities and restrictions (including administering agency) that apply to Crown land, in a similar manner to a Record of Title for private land.
3. The lack of a digital spatial object means properties dependent on these types of property forming constructs cannot be spatially represented using existing data.
4. The composite register for a cross lease consists of a fee simple estate and a leasehold estate.
5. The registered lease may or may not be the basis for the rating unit depending on whether the leaseholder is responsible for paying the rates.
6. A Unit Title is always associated with a Body Corporate. A body corporate is always associated with at least one unit title.
7. There is no nationally consistent unique ID for a rating unit. However, ValRef can be used as long as historic information is not required (some territorial authorities re-use Val Refs).
8. Any leasehold (registered or unregistered) or rental is always dependent on the existence of an underlying single title, multiple title or record of state land.



### 12.3.3 Data limitations

Data issues (including existence, availability and quality) limit the ability to use these property-forming constructs to form units of property as described in the PDMF model. See Table 3.

Table 3: Limitations on property-forming constructs as units of property

Property-forming construct	Able to be used as units of property	Main limitation
Record of state land	No	Record of state land to support creation of properties for state land does not exist. It is not reliably known who administers parcels of State land, or for what purpose, although some data exists that could be used to infer where a record of state land should exist.
Single title	Yes	The simplest case and possible now. No limitation exists because the linking is very straightforward.
Multiple title	Partially	Lack of complete title data in the available DVR data limits the ability to link titles together.
Registered leasehold <sup>1</sup>	Partially	Depends on whether the leaseholder pays the rates, and also whether the underlying title or record of state land exists.
Cross lease	Partially	No spatial representation means the property cannot be accurately located or represented on a map.
Unit title <sup>2</sup>	Partially	No spatial representation means the property cannot be accurately located or represented on a map.
Body corporate <sup>2</sup>	Yes	Technically possible, although a supplementary record sheet is not intended to behave as a record of title.
Record of Tenancy	No	No data available. A limited representation could be inferred from other data, for example, addresses.

1. Any leasehold (registered or unregistered) or rental is always dependent on the existence of an underlying single title, multiple title or record of state land.
2. A unit title is always associated with a body corporate. A body corporate is always associated with at least one unit title.



### 12.3.4 Unit of property ID

In order to form the relationships that the PDMF model requires, we need a unique identifier (including unique through time) for each unit of property.

The PDMF requires a unit of property formed from register space to have two fundamental characteristics: a defined area of land and rights associated with the land. For a given unit of property these two fundamentals will often stay the same even while other characteristics of the unit of property change (e.g. address, buildings, use, access). But even when one of these two fundamentals changes, the unit of property often remains stable. For example, a record of title is cancelled and replaced by a new record of title that refers to exactly the same defined area of land. Even though the record of title has changed, the unit of property has not.

Unit of property is the most constant factor across all elements in the PDMF model. A unit of property ID will remain stable even while the connected data changes around it, for example, as buildings are demolished and built, and as tenants move in and out of dwellings. This fundamental stability is a feature of identifiers (data connectors) in statistical data systems and registers (Toitu Te Whenua, 2022).

Any element in the PDMF that represents data will also require a unique identifier to ensure no misunderstanding or ambiguity about the connections being made and the unit of property being formed.

As the data and relationships that form a unit of property accumulate over time, having consistent identifiers assigned at the earliest opportunity is a key factor in preserving a historical view of a unit of property over its entire life.



#### **Parent-child association**

Unique unit of property identifiers are also important when using the parent-child reflexive association. A complex parent unit of property is an aggregation of smaller, repeatable child units of property. The relationships between these child units of property and the parent unit of property need to be uniquely determined using these identifiers so the overall construct of complex property can be correctly determined. An example of a complex property that can utilise the parent-child association is a retirement village, where each individual unit in the village is a child unit of property, and the retirement village is the parent unit of property.



#### **Use of ValRef as a unit of property ID**

We considered the potential of the valuation reference number (ValRef) as a unique ID for a unit of property. It is a unique property identifier for valuation purposes, providing an identifier for a rating unit. A ValRef is a composite identifier composed of three parts:

- [roll number](#)
- [assessment number](#)
- [alphabetical suffix](#).



The Rating Valuation Rules 2008 (Toitu Tē Whenua, 2010) provide more detail on the composition of a ValRef.

Although ValRef could potentially be used as a unique ID for a unit of property within the valuation perspective, they are not ideal as a unit of property ID for the PDMF model. They do not cover all perspectives of property or the types of units of property identified in the PDMF model (for example, leased or rented units of property that do not fit within the rules used to create rating units and apportionments).

Additionally, the ValRef is not unique through time as some territorial authorities reuse ValRefs. This means ValRef cannot be used for explicitly linking property records as, over time, it can appear as if a rating unit can relate to many Titles. ValRef cannot be used as a unique ID for a unit of property in any situation where there is a requirement to track change relating to a rating unit.



### 12.3.5 Body corporate as a unit of property

The space and rights and any buildings managed by a body corporate on behalf of the owners of the unit titles in the development does not form a rating unit and is not rated in its own right. The value of the common space and buildings is apportioned across all the rating units for the unit titles. The body corporate may have its own address (either street or postal), particularly if there is an onsite management office.

However, when considered against the five core concepts of property, a body corporate meets all five requirements and, as such, can be considered to be a unit of property. In this case, it would be a parent unit of property, with all the unit titles within the development associated as child units of property.



### 12.3.6 Unit of property for state land

Records of state land can be aggregated into units of property in the same way as record of title. However, research conducted using the Property Explorer found a number of difficulties creating units of property for state land.

The main difficulty is that without a record of title or a record of state land, it can be difficult to link existing units of property (for example, rating units) to parcels (both of which cover all of New Zealand). No dataset bridges this gap in an explicit manner.

Another difficulty is identifying who the administering agency is. Records of title, where they exist, often only reference Her Majesty the Queen as the owner. Statutory actions recorded against a parcel may reference a gazette notice that may then identify the administering public sector agency, but not all parcels affected by a gazette notice have a recorded statutory action. In many cases, the agency referenced on a record of title or a gazette notice no longer exists.

[25.10 Creating a record of state land](#) describes some of these difficulties, and attempted solutions, in more detail.

# 13 Address

Address is part of the concept of ability to locate/share location, which is one of the five core concepts of a property.

An address is the most common way that we share information about location. In New Zealand, we usually associate the term address with a string of data containing a number, road name, suburb name and city name. How addresses are assigned is specified in AS/NZS 4819: Rural and Urban Addressing.

See:

- [13.1 Terms and definitions](#)
- [13.2 Alignment with ISO 19160 – Addressing](#)
- [13.3 Addressable object](#)
- [13.4 Address relationships](#)
- [13.5 Address ID.](#)

Figure 33 shows the Address classes, and the three important classes that can be an Addressable Object.

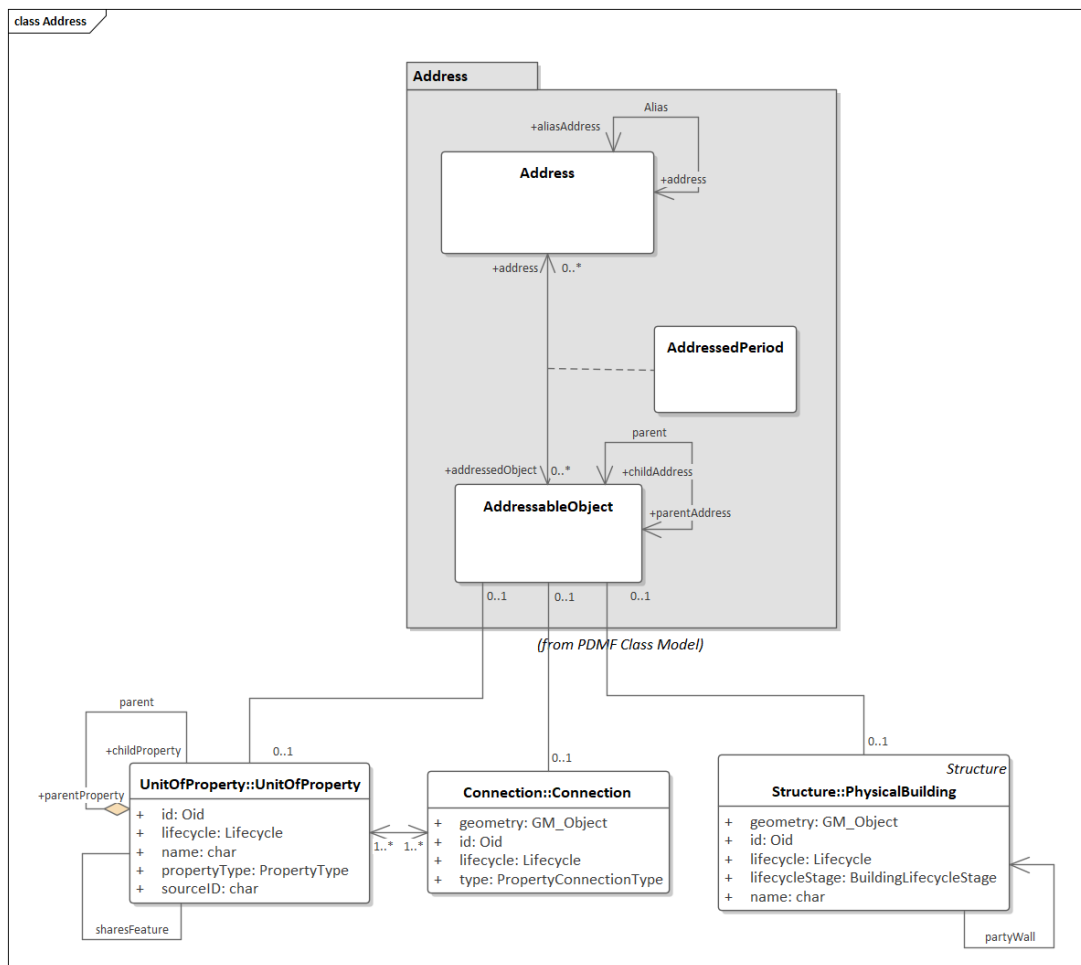


Figure 33: Address and key associations

## 13.1 Terms and definitions

### **Address**

Structured information that allows the unambiguous determination of an object for purposes of identification and location.

### **AddressedPeriod**

Period during which the address unambiguously determined the addressed object.

### **AddressableObject**

Object that may be assigned an address.

The object does not have to have been addressed. It just has to be an object that can be addressed.

(Definitions sourced from ISO 19160 Part 1: Addressing.)



## 13.2 Alignment with ISO 19160 – Part 1: Addressing

While we always intended the PDMF model to contain address as one of the core elements of property information, we didn't have a conceptual model for address information until the International Organization for Standardization (ISO) published *ISO 19160-1:2015 – Addressing: Part 1: Conceptual model* (ISO, 2015).

In mid-2016, Toitū Te Whenua contracted Optimization Ltd to investigate adapting the ISO 19160 conceptual view of address for the PDMF model, and illustrate how the proposed approach could be applied, taking into account the practicalities of applying it for New Zealand.

As a result of Optimization Ltd's work, plus work conducted by Toitū Te Whenua, we incorporated elements of ISO 19160 Part 1 into the PDMF model. We found that the addition of the addressable object class from ISO 19160 Part 1 provided a clear connection between the PDMF model and ISO 19160 Part 1.



### 13.2.1 Alias addresses

By allowing one address to be associated with multiple aliases, ISO 19160 Part 1 suggests that the address is more important than any of its aliases, where in fact it may just be the first one captured. We acknowledge some users of address information prefer a master address plus other addresses, which could be achieved through the use of the alias class.

Using address plus aliases allows multiple addresses to be related without requiring an addressable object.

However:

- there is no relationship in ISO 19160 Part 1 between aliases other than via the address to which they relate

- it is not clear how, when implemented in an address system, the alias class in ISO 19160 would cope with a situation where there is a primary address plus address aliases but no addressable object. In this situation, if the primary address was deleted but not the aliases, it would be necessary to re-designate one of the aliases as the primary address and re-associate the remaining aliases.

Eliminating the use of aliases and having instead multiple addresses linked to an addressable object removes many limitations but means that addresses cannot be associated other than via their link to a common addressable object. Therefore, an addressable object would have to exist before an address could be created and addresses would always be linked to an addressable object.

As an alternative, many addresses could be defined, each with alias relationships to one or more other addresses. This would eliminate the need for an addressable object to be a prerequisite for the creation of an address but could require the management of highly complex many-to-many relationships between aliases.



### 13.3 Addressable object

ISO 19160 Part 1 does not provide any examples of what an addressable object might be.

The Local Government Act 1974, section 319b gives territorial authorities powers to issue a property number to 'any area of land or building or part of a building'. The draft New Zealand profile of ISO 19160 Part 1 adopts this legal definition of what a property number can be allocated to.

Our research while developing the PDMF model indicated that, in reality, addresses are allocated to properties, physical buildings or connections. The PDMF has modelled building, unit of property and connection as addressable objects. This makes the PDMF conformant with ISO 19160 Part 1, but less conformant with the New Zealand profile. The nature of the relationships between addressable object and unit of property, building and connection needs to be confirmed.

An addressable object is referenced by an address for a period of time. An address uniquely and unambiguously references only one addressable object at a time. For example, an address referencing a property cannot also reference a connection or a building. However, a building or connection may inherit the address from the property.

No dataset of addressable objects currently exists, although datasets contain records that could be considered addressable objects. Although addressable object as a data table exists in the AIMS: Street address set (Toitu Tē Whenua, nd,a), it replicates the parcel table and cannot be considered to contain actual addressable objects.

#### **Addressable object as a unit of property**

When allocating addresses, 'property' is commonly interpreted as anything with an accessible street frontage that people may wish to find or provide a service to. Examples

Property Data Management Framework: A model for connecting New Zealand's property data include rented spaces, shops, unit titles and cross leases. Apartments or flats in a larger building may also be considered as properties and allocated an address. For some territorial authorities, property may also include assets like substations and parks.

### **Addressable object as a building**

Addresses are often allocated to any sort of built structure or part of a built structure. The structure may be an occupiable building or it may be a structure like a substation. Addresses may also be allocated to parts of a building like apartments and shops.

### **Addressable object as a connection**

Addresses are allocated to connections (access points) and it is assumed that these fall under the category of either an area of land or part of a building. Examples include addresses allocated to separate entrances to a multi-storey building, where the entrances could be for people or for goods (a loading bay).



## **13.4 Address relationships**

It is not known just by looking at an address in an address dataset why it exists, what it is for or what it references. This is because address datasets do not contain relationship data that links an address to its addressable object.

The relationships in the PDMF model between AddressableObject and the three types of addressable object (UnitOfProperty, PhysicalBuilding and Connection) are complex and interlinked. Figure 34 shows simplified UnitOfProperty-PhysicalBuilding-Connection-Address relationships from the PDMF model.

If the relationship between the address and the type of addressable object is not known, conflicting sets of information may be associated with the address depending on which type of addressable object is used. For example, associating an address through a connection to a physical building may return a different set of building information than associating the same address through a unit of property to a physical building.

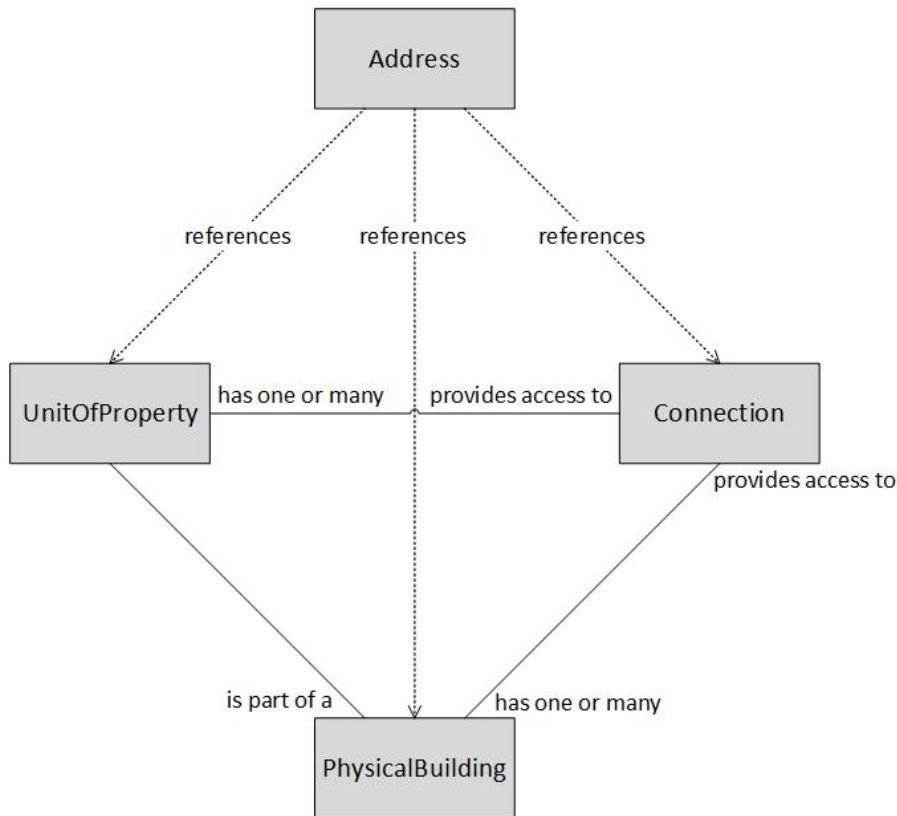


Figure 34:Address relationships

Because an address can only reference one addressable object at a time, in the PDMF model Address can only be associated with one of UnitOfProperty, Connection, or PhysicalBuilding. It cannot be associated with two or more of these classes at the same time.

The PDMF model requires an unambiguous relationship to be determined between an address and its addressable object. In the absence of any existing data, the relationships between addresses and their addressable objects could be determined using a hierarchy and a set of associated rules.

Our work suggests that the hierarchy is:

- an address primarily references a property
- if not the property, then a building
- if not the building, then a connection.

These rules and hierarchy determine how the complex and interlinked relationships can be navigated. For example, if an address references a connection (for example, a door) and the connection is part of a building (for example, the front door), then the unit of property connects to the address via the building and the connection. The relationship chain that must be followed is: Address – Connection - PhysicalBuilding – UnitOfProperty. The relationships between Address - PhysicalBuilding and Address - UnitOfProperty are invalid. However, if the address references a connection that is, for example, a driveway, and the

Property Data Management Framework: A model for connecting New Zealand's property data driveway provides access to the unit of property, then all buildings on the property will connect to the address via the unit of property and the connection. The relationship chain is Address - Connection – UnitOfProperty – PhysicalBuilding.

A set of rules to create the relationships could use existing information, for example:

- if there is one property with one address and one building, then the address references the property
- if there is one property with two buildings, each containing an address, then each address references its respective building.



## 13.5 Address ID

In the PDMF model, UnitOfProperty, PhysicalBuilding and Connection are special types of AddressableObject (although the relationships are not presented as specialisations). In a database, instances of these classes are represented and identified by unique IDs. Addresses in a dataset are also represented and identified by unique IDs.

These unique IDs are how addresses are associated with addressable objects. The unique ID of the address cannot be used as the unique ID for any of the addressable objects because an address, even if uniquely referencing an addressable object, can change over time, independently of the addressable object.

Unique identifiers for building, property, connection and address enable the unambiguous and precise integration, sharing and exchange of information related to these entities. Practically, it is not enough to simply assign a unique identifier to an object. The identifier must be maintained through the object's lifecycle and clear, concise rules must be implemented to manage the creation, transition and retirement phases of objects assigned a unique identifier. The definition of the lifecycles and triggers (for example, a demolished building) that cause changes in the state of the object lifecycle form a critical implementation consideration for the PDMF model.

Users, when implementing systems using the PDMF model, will need to carefully and precisely define their unique identifier encoding. The re-use of existing open and authoritative identifiers is preferred.

It is important to ensure that the identifiers are durable and consistent over time. For example, a composite identifier encoding that included a territorial authority identification code component may break when territorial authority boundaries change or when amalgamation/devolution occurs.

The PDMF model requires addressable objects to have an ID that is unique across all three types of addressable object. One reason for this is to manage the requirement that an address can only reference one addressable object at a time. Users need to consider that in their address system, addressable object may not be just as a container for unit of property, building and connection, but may need to exist as a real entity in its own right. To account for this, addressable object is not an abstract class in the PDMF model.

# 14 Structure

Structure is part of the concept of ability to use/build/improve, which is one of the five core concepts of a property.

See:

- [14.1 Terms and definitions](#)
- [14.2 Part of a building](#)
- [14.3 Distinction between structure and building](#)
- [14.4 Party walls](#)
- [14.5 Data and availability](#)

Figure 35 shows the structure classes and associations.

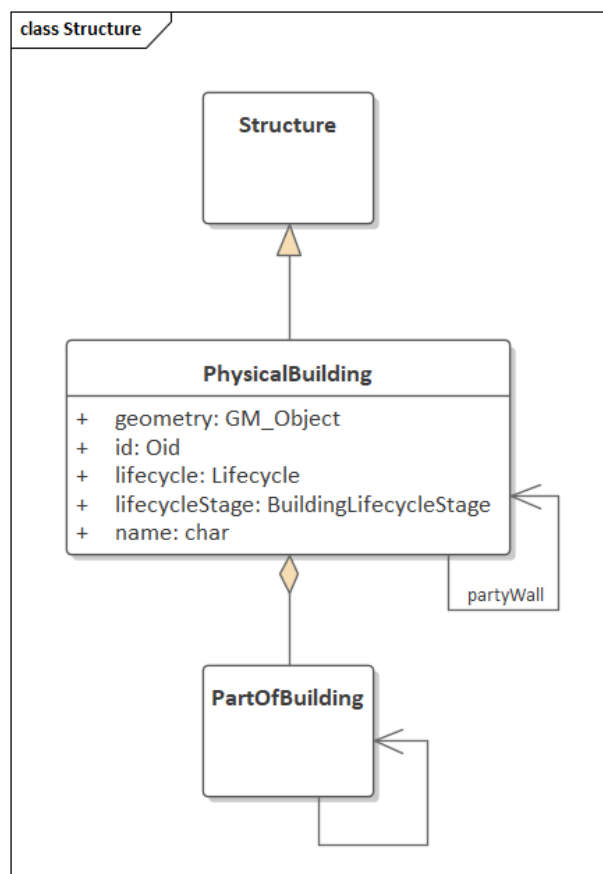


Figure 35 Structure

Figure 36 shows the associations to other classes.



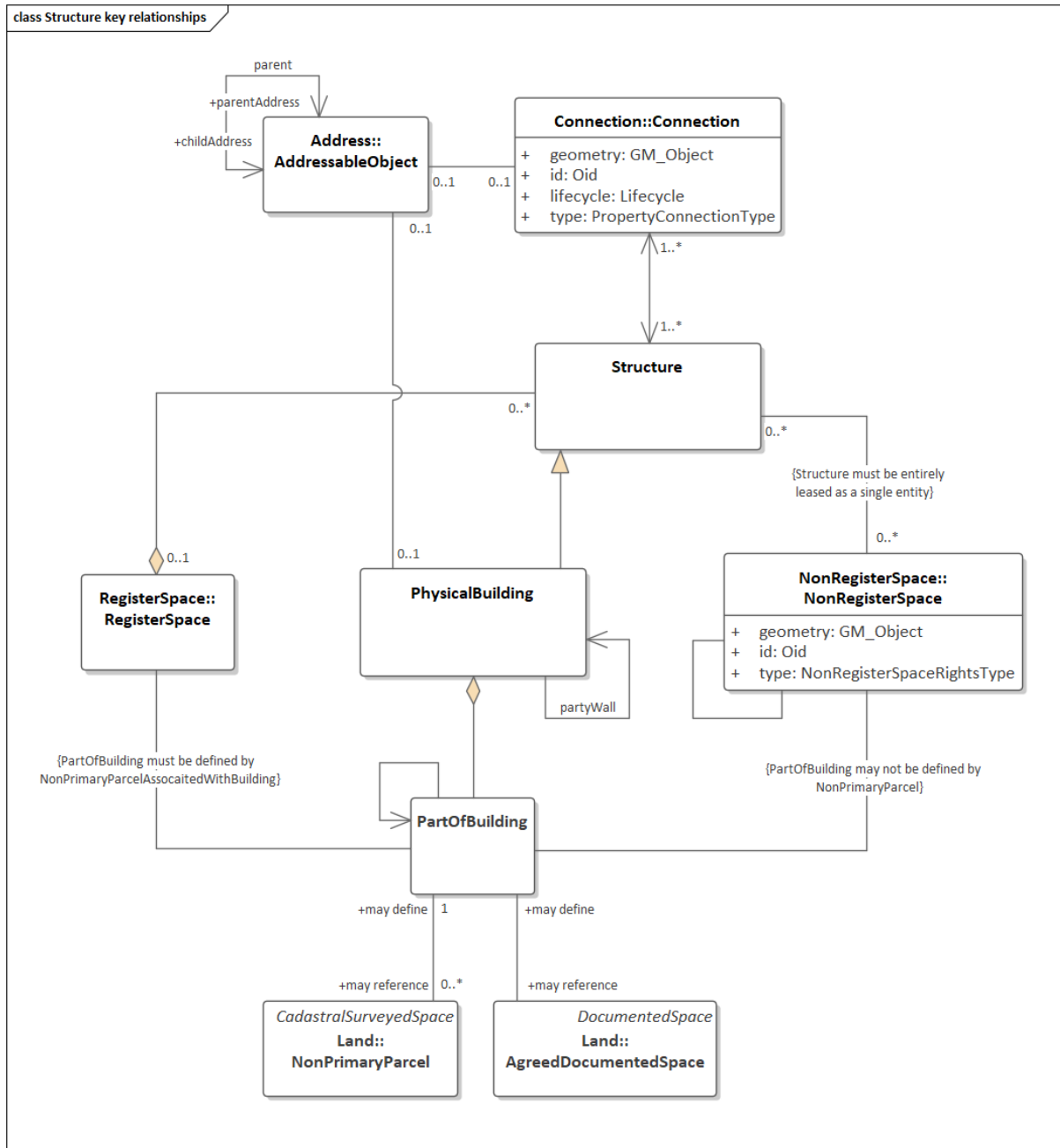


Figure 36: Structure key associations

## 14.1 Terms and definitions

### PartOfBuilding

A defined portion of a building that may act as a Unit of Property or contribute to a Unit of Property.

### PhysicalBuilding

The physical building that exists in the real world and that people interact with. It usually (but not always) coincides with the legal representation of a building contained within the cadastre.

People experience properties as physical buildings whose spatial extent may be different to the legal space against which rights are assigned in the land transfer system. Physical buildings can be demolished and the legal rights still remain.

PhysicalBuilding contains the attribute BuildingLifecycleStage. This attribute may contain the following values:

value	type
current	char
demolished	char
Not known	char
proposed	char
Under construction	char

This list is not exhaustive. Other values may exist that we have not yet identified.

PhysicalBuilding contains the attribute Lifecycle. This attribute may contain the following values:

value	type
validFrom	DateTime
validTo	DateTime
version	char

This list is not exhaustive. Other values may exist that we have not yet identified.

## Structure

An object in the real world that has been constructed.

For the purposes of property and the PDMF model, a structure can be restricted to those objects that are related to the use of land. For example, a building, a statue, a dam or a substation.

## 14.2 Part of a building

Defined portions of a building are derived from two main sources:

- **Documented space.** An extent of space within the building that has rights defined through commercial law agreements. In previous versions of the PDMF this was a separate class called DocumentedSpaceAssociatedWithBuilding.
- **Cadastral surveyed space.** An extent of space within the building that has rights defined in the land transfer system. In previous versions of the PDMF this was a separate class called NonPrimaryParcelAssociatedWithBuilding.

Initial research developing the PDMF identified the need to define portions of a building and modelled these portions of a building as divisions of land based on legal rights. However, more recent research on incorporating dwellings into the PDMF model (Toitū Te Whenua, 2022) determined that it was more appropriate to model portions of a building as part of a physical building. The legal rights over a portion of a building are still represented in the model by associations between PartOfBuilding and AgreedDocumentedSpace, and PartOfBuilding and NonPrimaryParcel.



## 14.3 Distinction between structure and building

There are many definitions of a building, many of which refer to the existence of a structure with a roof and walls. These definitions do not provide the level of precision needed for the PDMF model.

The primary legislation for construction, the Building Act 2004, section 8, describes a building as 'a temporary or permanent movable or immovable structure (including a structure intended for occupation by people, animals, machinery, or chattels)'. This broad definition can include occupiable and non-occupiable structures.

It is important to note that the Building Act 2004 considers 'building' as both noun and verb. The Act is primarily concerned with safety of life and regulates for it by both controlling the act of building (known as building work) and setting minimum standards of performance for the final product of the building work.

The need to regulate both building work and the safety of the completed structure, via the issuing of building consents, gives rise to some oddities that would not traditionally be regarded as buildings, but because they are permanent and attached to the land must be considered as part of the property. These are:

- dams
- bridges
- masts/aerials
- retaining walls.

The PDMF model requires a narrower definition for buildings than that used in the Building Act 2004. This is because the PDMF models elements of property with a relationship to only certain types of buildings (for example, a dwelling or address).

To resolve this requirement, the PDMF models a building as a special type of structure, where a structure is described as 'an object in the real world that has been constructed'.

The PDMF model's definition of a building (the most useful and practical working definition found to date) is from Christchurch City Council (nd):

A Building is a built structure that is hollow and can be occupied for living, working or storage, which would need a Building Consent if it were to be replaced and that:

- is over 10m<sup>2</sup> in area or over 2m in height

- has a roof and,
- can be demolished without affecting another built structure.



## 14.4 Party walls

We included a partyWall association in the PDMF model after finding that a lack of information about shared walls caused confusion with insurance in the aftermath of the Canterbury earthquakes (Vicinity Solutions, 2014). A particular issue is when a party wall straddles two properties and effectively separates what appears to be a single building into two separate buildings.

We have not included in the PDMF model any physical requirements for a party wall between two properties as we have not identified these yet. However, there are legal requirements for the use and maintenance of, and access to, party walls (using easements).

An example is a property that was developed on a single title with a single building containing eight apartments. Subsequently, the owner subdivided the land into eight fee-simple titles, one for each apartment, with the legal boundaries running through the party walls of the apartments. There is no legal requirement on the owners of the fee simple titles to co-operate on maintenance of what is still, in effect, a single building.

This may have an impact on the modelling of a building in the PDMF, when considering the relationship to UnitOfProperty. The building is not entirely within any of the fee-simple titles but is jointly across them all. The extent of the occupancy of each fee-simple title (which acts as a unit of property) needs to be defined and associated (using PartOfBuilding) to the building. The building is not fully within any of the fee simple titled units of property but could be associated with a parent unit of property that references as children all eight of the fee simple titles. There is no basis on which to create this parent unit of property other than to contain the entirety of the building.

The fire-proof rating of a wall could be a useful measure for separating buildings, although it is not designed for this purpose.



## 14.5 Data availability

There is currently no existing building register that accurately records individual buildings or maintains them over time. Toitū Te Whenua maintain a building outlines dataset but it is not a totally satisfactory substitute for a building register because:

- building outlines are feature-captured using automated algorithms from satellite and aerial photography
- a limited amount of quality assurance is done on the resulting captured features
- buildings that are close to each other, or have walls contacting each other, have not been identified or separated into separate buildings.

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A building register with every building assigned a unique building identifier would be required to unambiguously connect data about a building to a building, and then to a unit of property.

# 15 Connection

The Connection package is part of the concept of ability to get services on/off, which is one of the five core concepts of a property.

See:

- [15.1 Terms and definitions](#)

A connection is most easily imagined as an access point for either people or services, represented as a point object. However, our research developing the PDMF model identified situations where connections could be modelled as line features (for example, to support network modelling) and instances where connections could need linking to other connections. See figure 37.

Access could be for pedestrians and vehicles (for example, a driveway), mail (for example, a letterbox), or utilities (for example, an electricity meter or a broadband connection point).

While our research developing the PDMF model recognised the importance of connections to a property, we have not modelled them in detail. A comprehensive model of Connection is required to more fully understand the concept. For example, Connection data could provide crucial information to assist with the dispatch of emergency services to the correct property access location for the given mode of transport (for example, a fire engine to the driveway not to the pedestrian path).

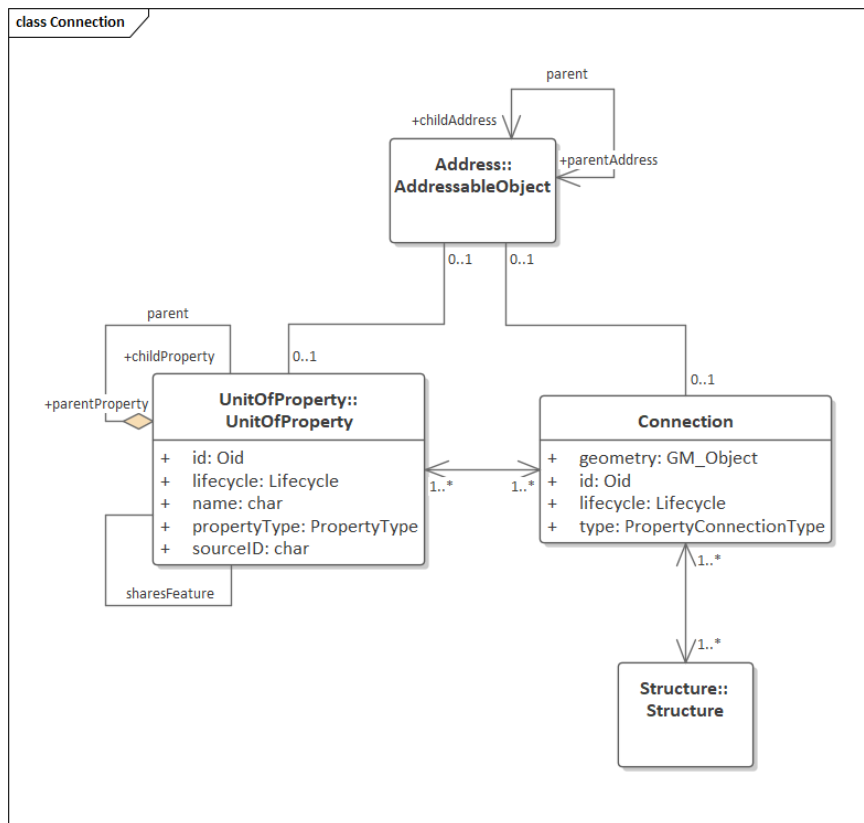


Figure 37: Connection and key associations

## 15.1 Terms and definitions

### Connection

An interconnection point that can act as access to the property or enable the right connection to a property to be found given the purpose or type of connection needed.

For example, it allows interconnection with foot or vehicular access, each of which may have an Address. Connection may be used to support a prime or default address associated to the property for a period. Other example of connections include delivery points for services like electricity, communications, water and mail.

Connection contains the attribute PropertyConnectionType. This attribute may contain the following values:

value	description
buildingAccess	
drivewayFrontage	
emergencyAccess	
emergencyAccessSecondary	
frontDoor	
letterbox	
noPhysicalAccess	
notSpecified	
pedestrianFrontage	
secondaryDoor	
serviceConnection	
serviceMeter	

This list is not exhaustive. Other values may exist that we have not yet identified.

Connection contains the attribute Lifecycle. This attribute may contain the following values:

value	type
validFrom	DateTime
validTo	DateTime
version	char

This list is not exhaustive. Other values may exist that we have not yet identified.

## 16 Consolidated PDMF model

Figure 38 shows a consolidated view of the PDMF concept model for property in a unified modeling language class diagram.

This diagram shows all classes in the model, the relationships between all the classes, and (where identified) constraints on how to connect data about a property from different datasets.



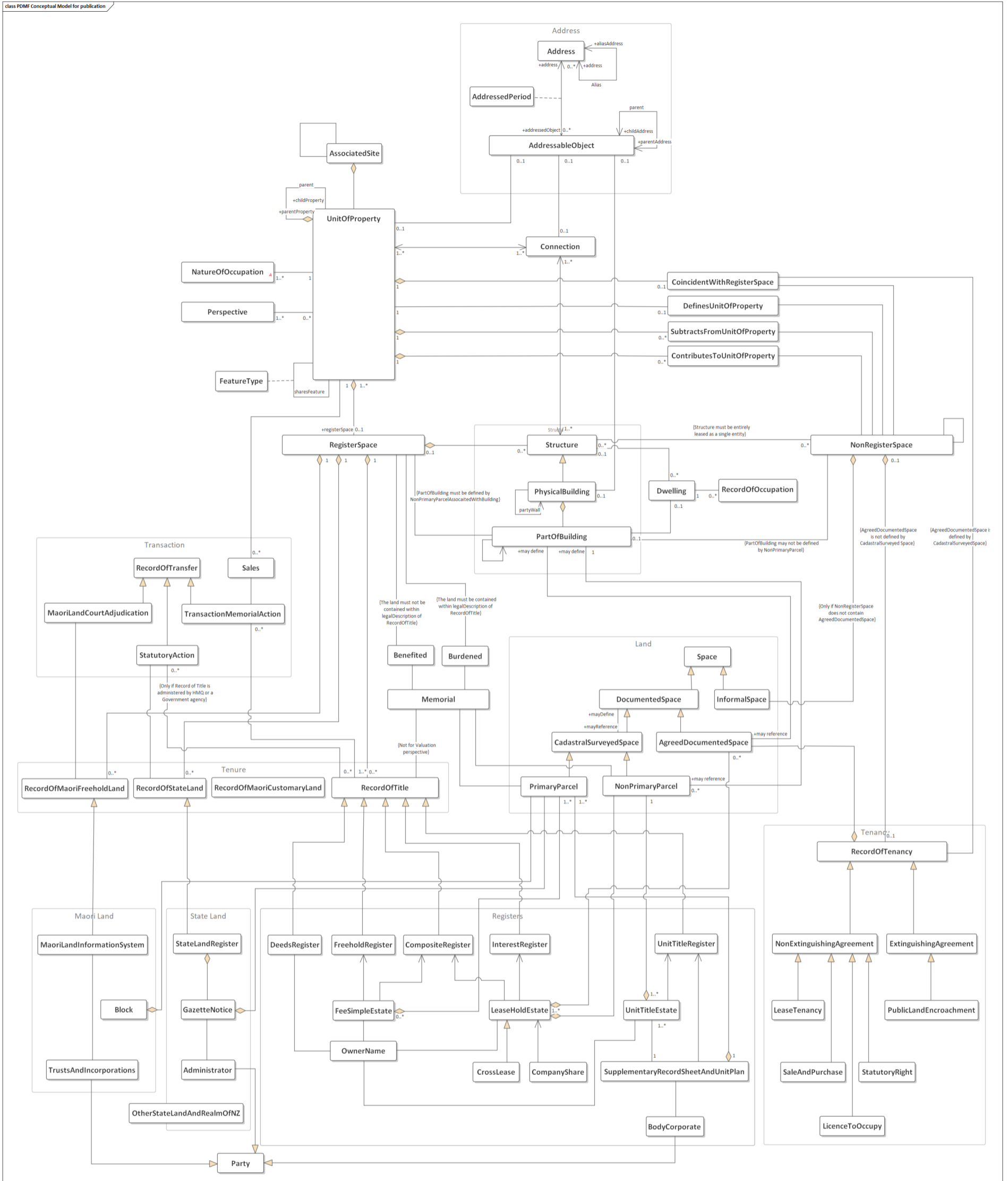


Figure 38: Consolidated PDMF model

# Demonstrating the PDMF model



## 17 Demonstrating the PDMF model

Chapter 21 demonstrates how the PDMF would model five different types of common property situations.

We created diagrams for each situation using the PDMF model, to check that the PDMF model could connect the data for these properties in the way we expected.

See:

- [17.1 Straightforward residential property](#)
- [17.2 Complex residential property](#)
- [17.3 Cross lease property](#)
- [17.4 Encroachment](#)
- [17.5 Row of three shops](#)

We used these diagrams to inform the development of the Property Explorer, a tool we built that tests the PDMF model with real data.

In the diagrams, a grey box indicates an instance of administrative or physical property data that exists or may exist in a dataset. A white box indicates a class in the PDMF model that provides the structure necessary to unambiguously connect the data.

## 17.1 Straightforward residential property

A straightforward residential property has only one of each of the core property data elements: one parcel, one title, one address and one building - see Figure 40.

Figure 39 shows the classes of the PDMF model used in this example. PerspectiveType is Valuation.

Because there is only one of each element, the relationships between the elements are all simple one-to-one relationships. A property like this can mostly be modelled in existing GIS systems (providing all the elements are spatially contained within the extent of the parcel).

While the simple one-to-one nature of the relationships work for a straightforward residential property like this example, we cannot assume that each data element can behave as a surrogate for another data element in the following, more complex examples. For a cross lease, encroachment or row of three shops, the parcel cannot act as a substitute for the unit of property, nor can the address substitute for the parcel.

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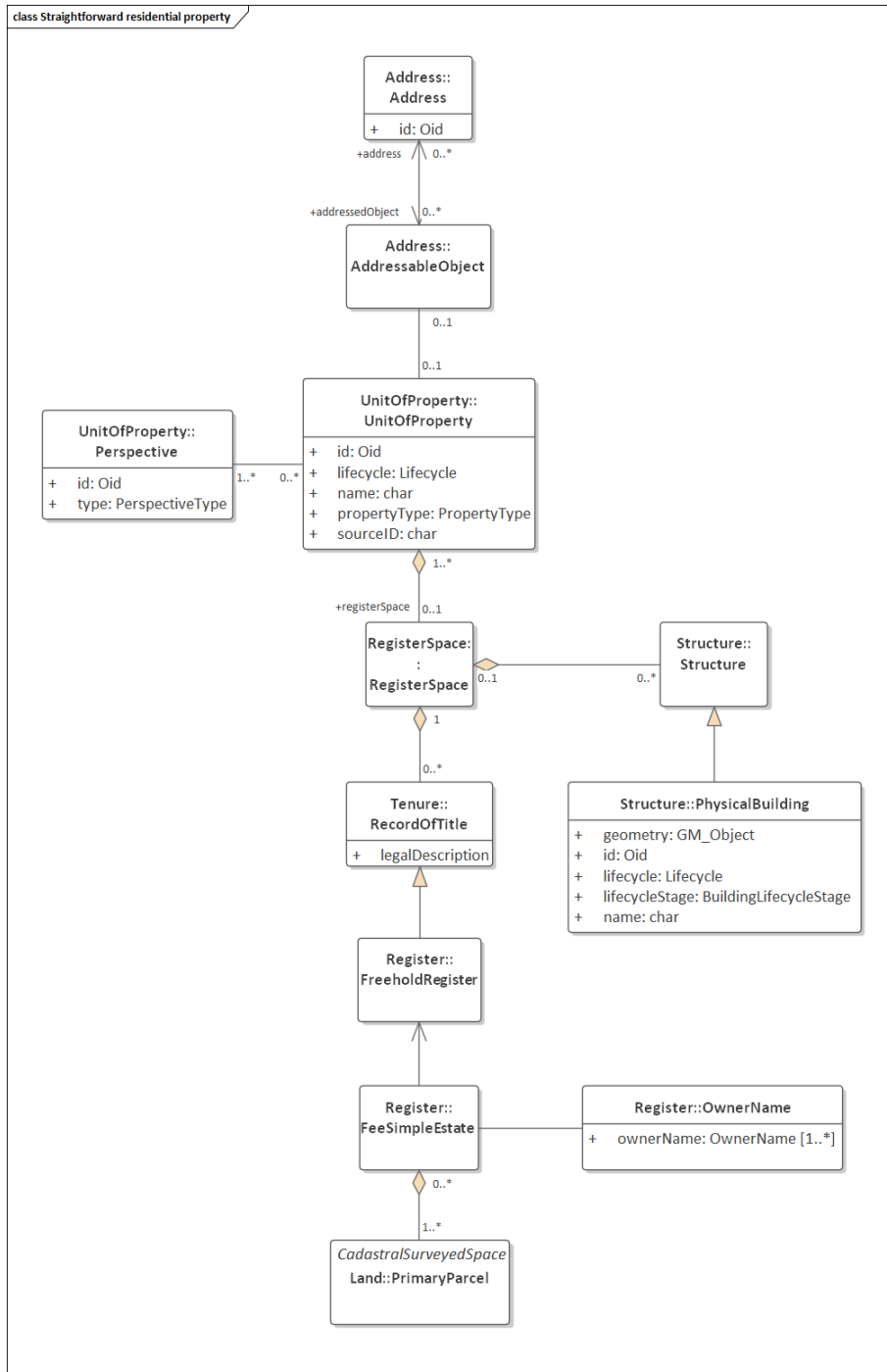


Figure 39: PDMF classes

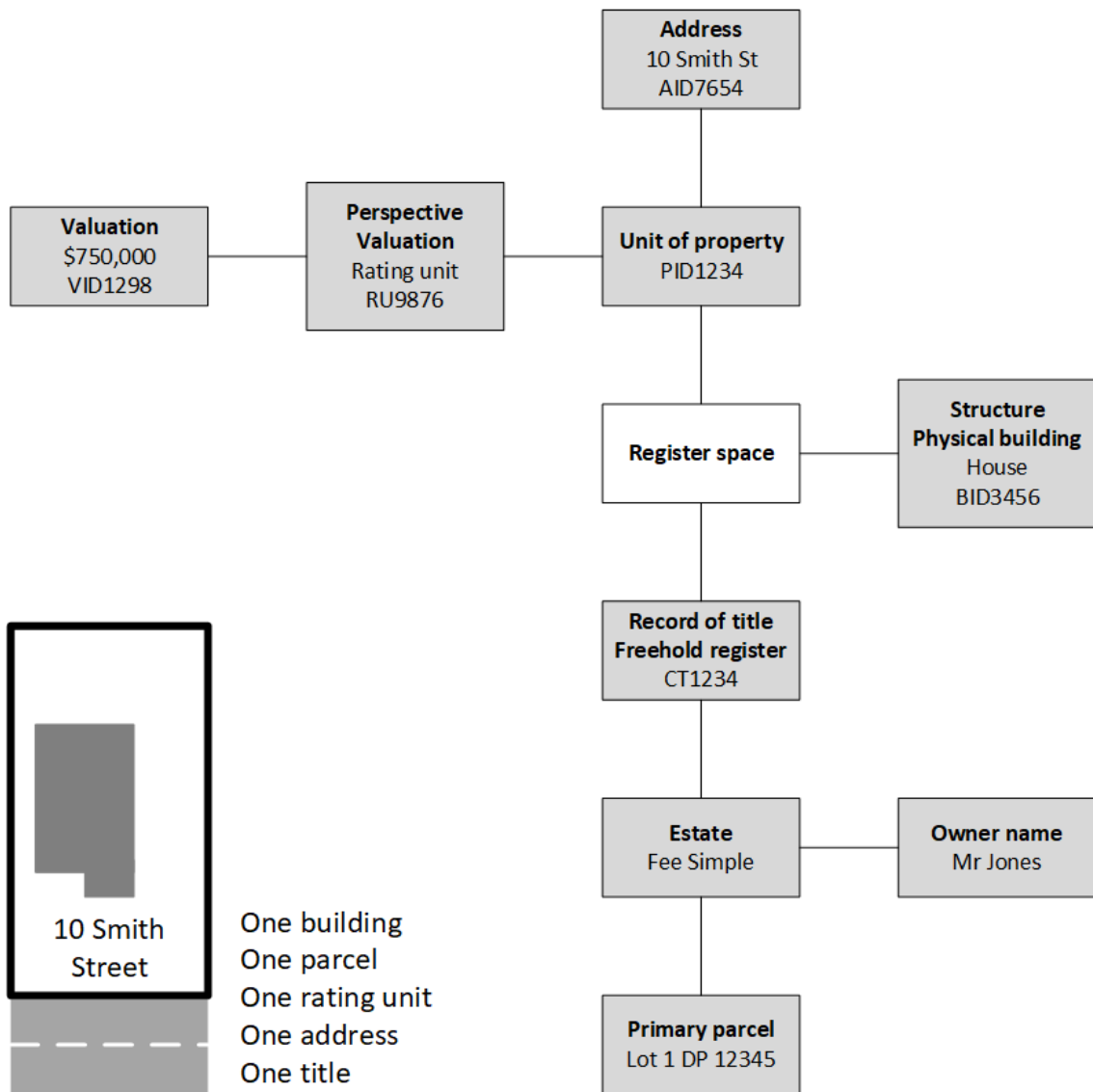


Figure 40: Straightforward residential property

## 17.2 Complex residential property

A more complex residential property has multiple instances of the same core data elements. The relationships that link the data elements are no longer simple one-to-one relationships. In particular, the title relationships are not so easily modelled in a GIS system.

The classes of the PDMF model used in this example are the same as those for the straightforward residential property and are shown in figure 39. PerspectiveType is Valuation.

In Figure 41, four primary parcels of land are held across two records of title. The two titles are independent of each other and not linked together in the authoritative system they are stored in. They connect to a single unit of property because they are owned by the same person, and (equally, if not more importantly) are used as one residential property.

Note that the garage crosses the title boundary, meaning that the buildings must aggregate into the unit of property via register space.

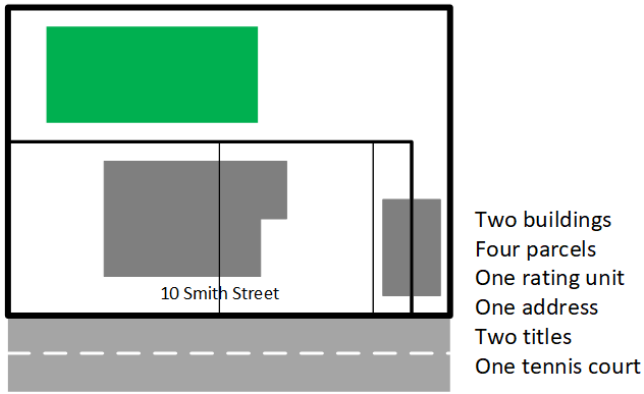
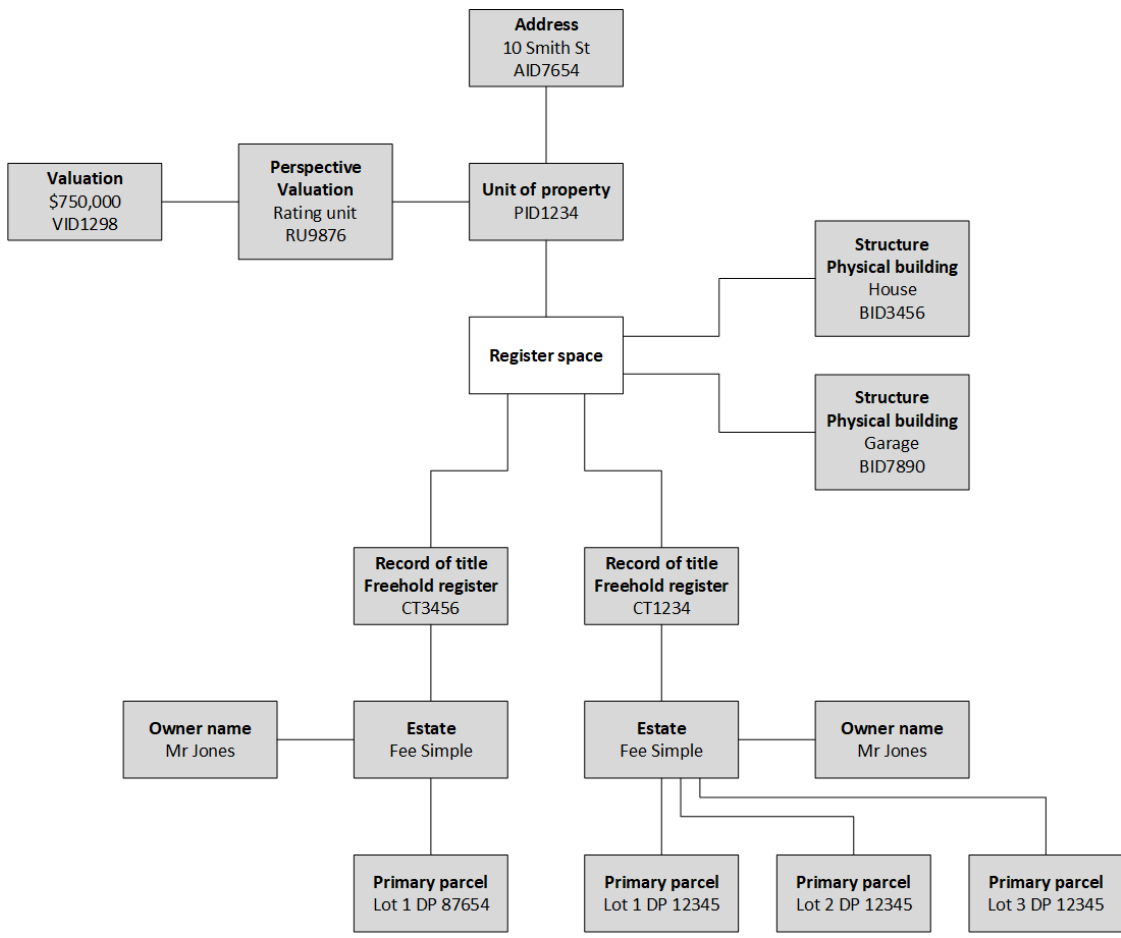


Figure 41: Complex residential property



## 17.3 Cross lease property

A cross lease is a more complex type of property involving more complex relationships between several owners and multiple instances of the same core data element.

Figure 42 shows the classes of the PDMF model used in this example. PerspectiveType is Valuation.

Figure 43 demonstrates two cross leases sharing a single parcel, with each cross lease as a separate and distinct unit of property. The parent unit of property brings together all the child units of property with a record of title containing a share of the same fee simple estate, in this case two child units of property. The parent unit of property would also hold any common space not included in either of the leases (not represented in this example).

In this example, where the relationships between the elements are not simple one-to-one, the data elements cannot behave as surrogates of each other. For example, the primary parcel cannot substitute for the unit of property for either of the cross lease properties.

Note that it is the child units of property that behave as rating units and are therefore allocated the address.

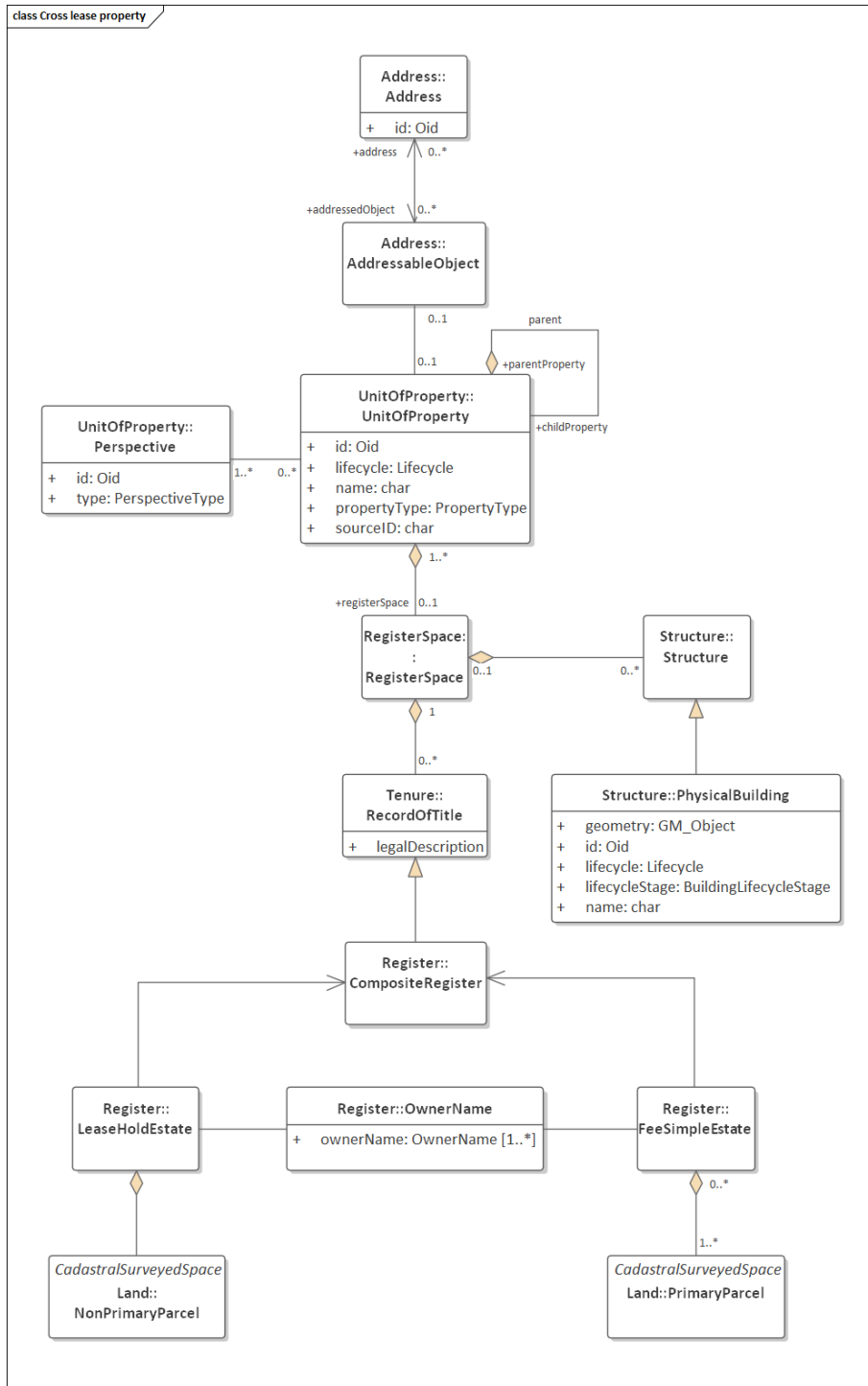


Figure 42: PDMF classes

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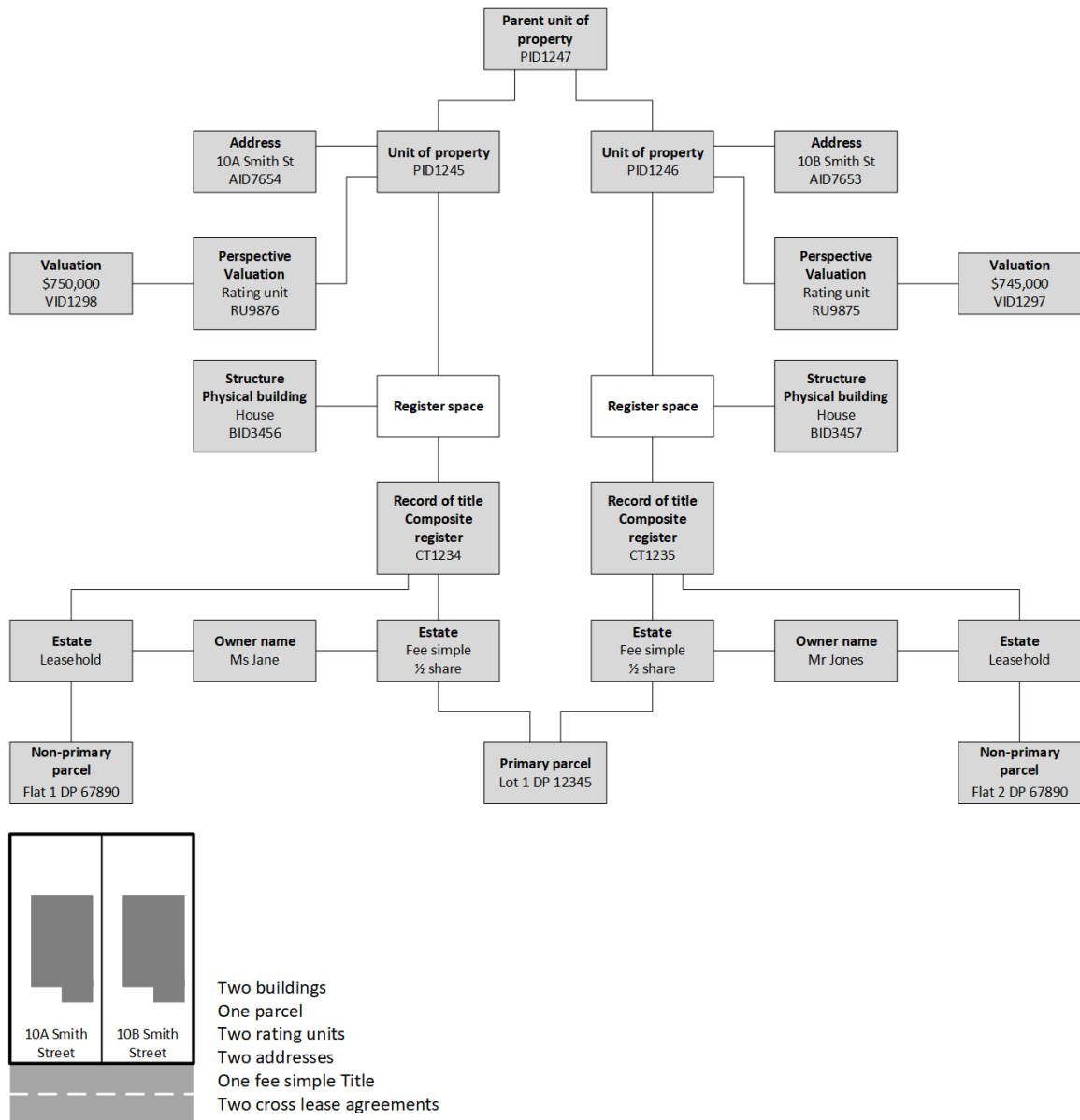


Figure 43: Two-property cross lease

## 17.4 Encroachment

In the context of property, an encroachment is the intrusion of one property onto another. Encroachments may be informal or may have been legalised through a licence to occupy or a public land encroachment (types of RecordOfTenancy). Common examples are cardecks, carpads or garages extending onto road reserve, or where a section of land not owned by title has been fenced and incorporated into the property's garden. Encroachments are not necessarily contiguous with the property.

Figure 44 shows the classes of the PDMF model used in this example. PerspectiveType is Valuation, so the unit of property is primarily built through register space as valuation is ownership based.

Encroachments are not listed on a record of title as they are not legally part of the title. Because it is not owned by title, an encroachment is not part of a register space.

An encroachment is, however, part of a unit of property that is in most cases founded on register space. Encroachments aggregate into the unit of property through non-register space (whether there is a licence to occupy or not).

In some cases, an encroachment may act independently of, and not aggregate, into a unit of property. In this case the encroachment may form its own unit of property.

Figure 45 shows how an encroachment formalised through a licence to occupy generates an additional relationship between the encroachment and the owner.

Property Data Management Framework: A model for connecting New Zealand's property data

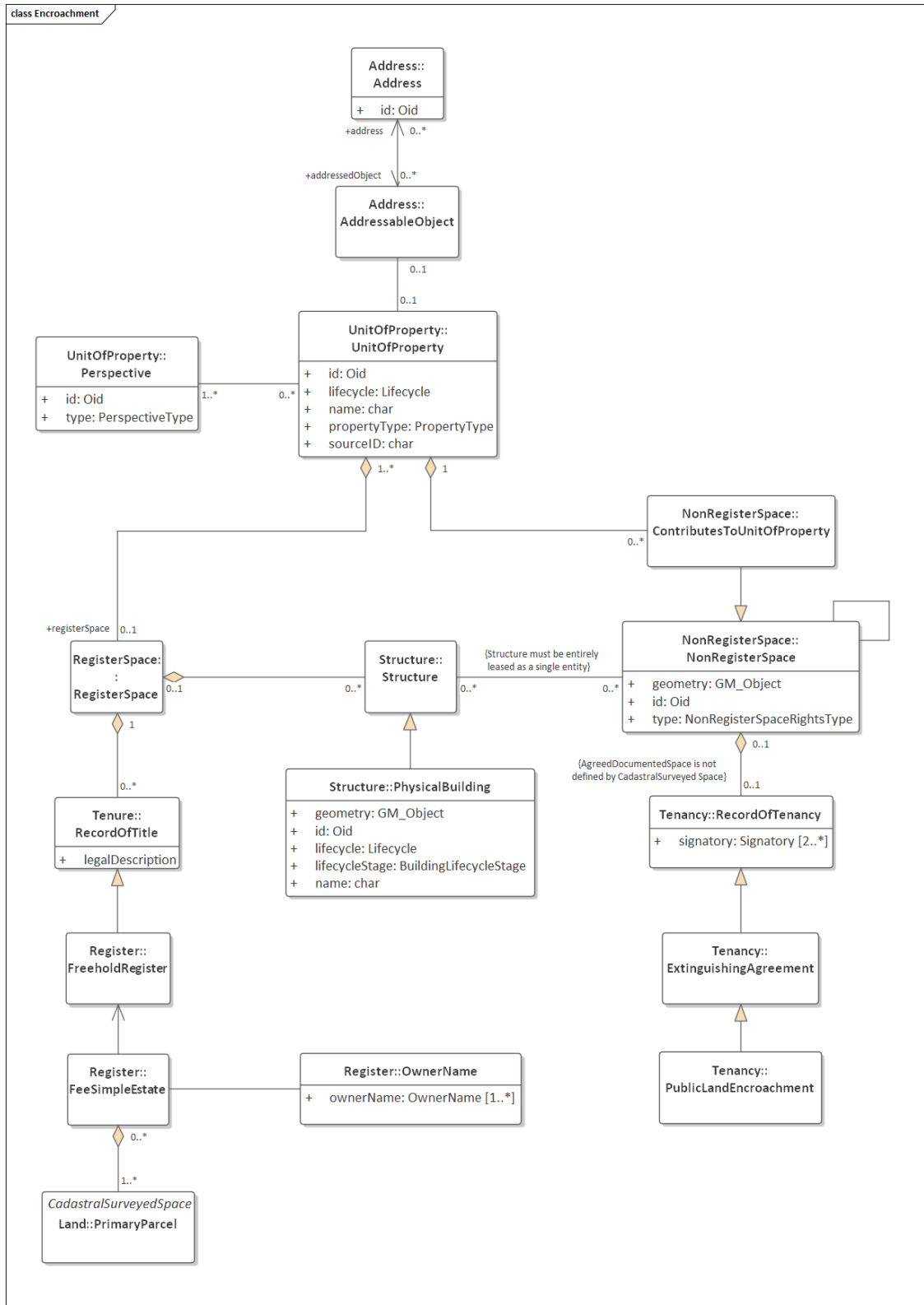


Figure 44: PDMF classes

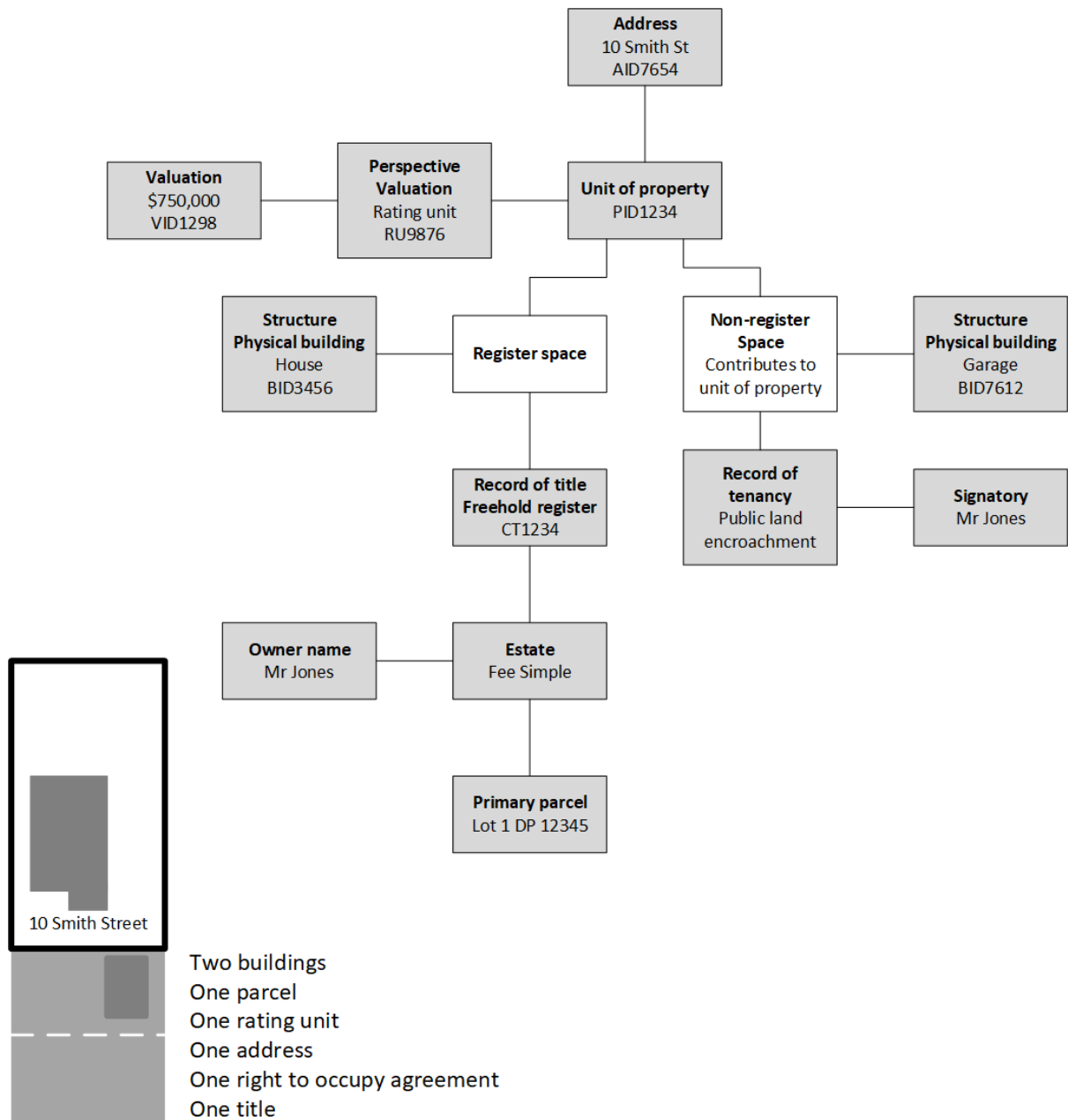


Figure 45: Encroachment on to council road reserve

## 17.5 Row of three shops

The 'row of three shops' example demonstrates ownership by one party and occupation by other parties, all in the same area of land. In this example, it is the occupied spaces that are more visibly recognised as properties, rather than the owned space.

Figure 49 shows a parcel of land owned under a single title. This forms a unit of property from register space. The owner has constructed a building containing three shops and rented those shops to others. By doing so, the owner has passed on some rights to the shop owners. Each shop also behaves as a unit of property but is formed from non-register space (via a commercial rental agreement).

The existence of the units of property for the shops depends on the existence of the owned unit of property. They are child units of property. These shops each have a street address, as it is the shops that services are delivered to.

The owned unit of property is a parent unit of property. It contains the building and carries the rating unit and valuation. However, it does not have a street address.

These four units of property are bound together by the nature of the servient relationship of the rented properties to the dominant owned property.

Figure 46 shows all the classes of the PDMF model used in this example.

Figure 47 shows the classes required to construct the parent unit of property. PerspectiveType is Valuation.

Figure 48 shows the classes required to construct the child units of property. PerspectiveType is for a rented property, but this type of perspective has not been fully defined yet.







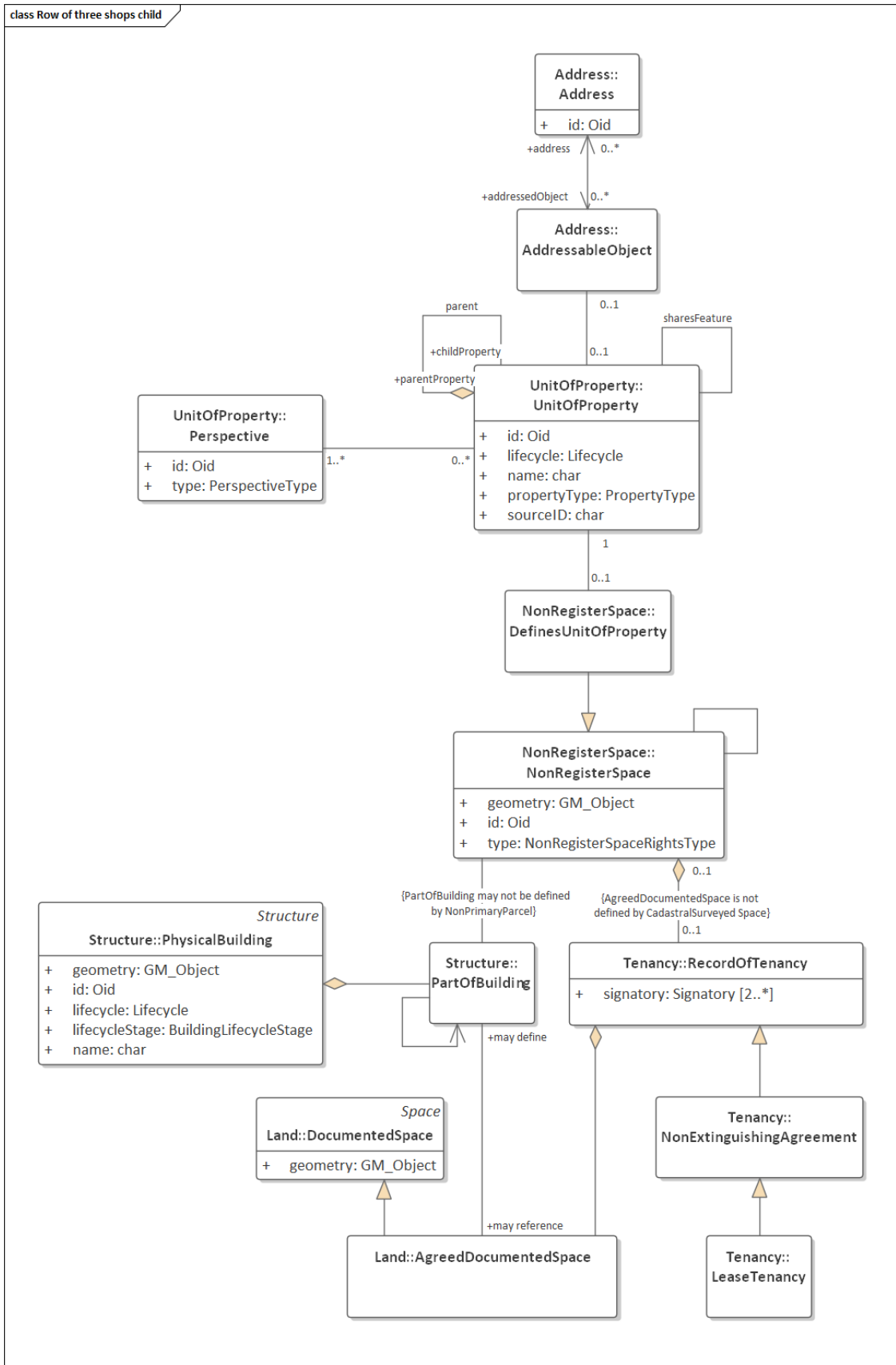


Figure 48: Child unit of property classes

Property Data Management Framework: A model for connecting New Zealand's property data

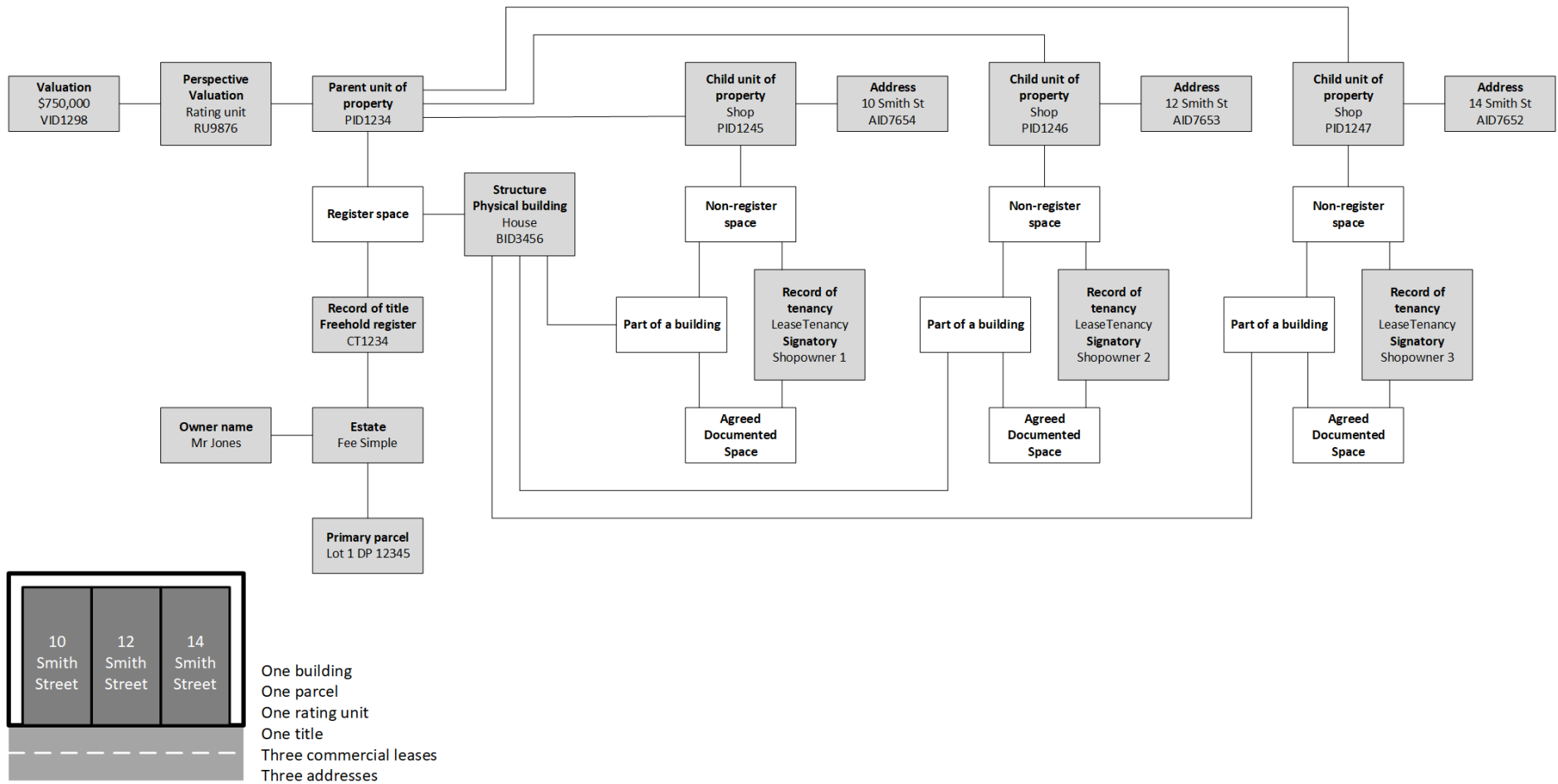


Figure 49: Row of separately tenanted shops in single ownership

# 18 Schematic example and real-world example

Chapter 18 brings together ideas and concepts discussed in previous chapters. It illustrates these concepts in a schematic diagram and a real-world example of a farm.

These examples bring together the concepts of:

- perspectives
- unit of property
- property forming constructs
- properties that span more than one tenure system and contain register space and non-register space
- parent and child units of property
- package of data about a property
- application of the PDMF model.

Figure 50 presents an explanatory schematic diagram. The left-hand side of the diagram starts with a customer-centric perspective of a property that reflects how a customer is using the property. From this starting point and moving to the right we can:

- identify the property forming constructs
- use register space and/or non-register space to extract the land and authority data
- identify other relevant data that has been connected by the relevant units of property
- create a package of data about a property
- deliver the package of data to users.

Figure 51 applies the explanatory schematic in Figure 50 to a real-world example of a farm that consists of both freehold land and state land held under a pastoral lease.

For clarity some PDMF relationships have been simplified.

Property Data Management Framework: A model for connecting New Zealand's property data

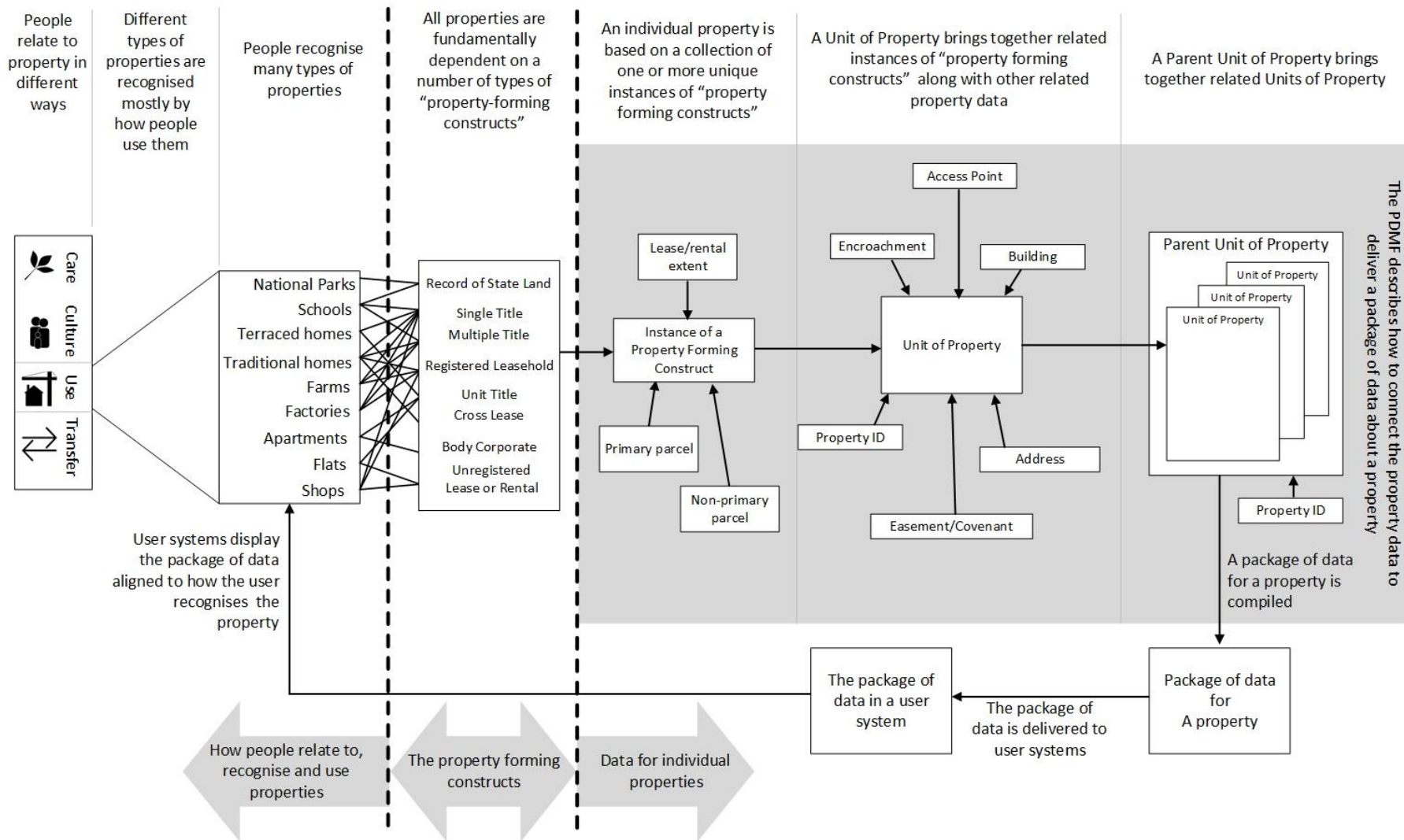


Figure 50: Formation of a property spanning two tenure systems

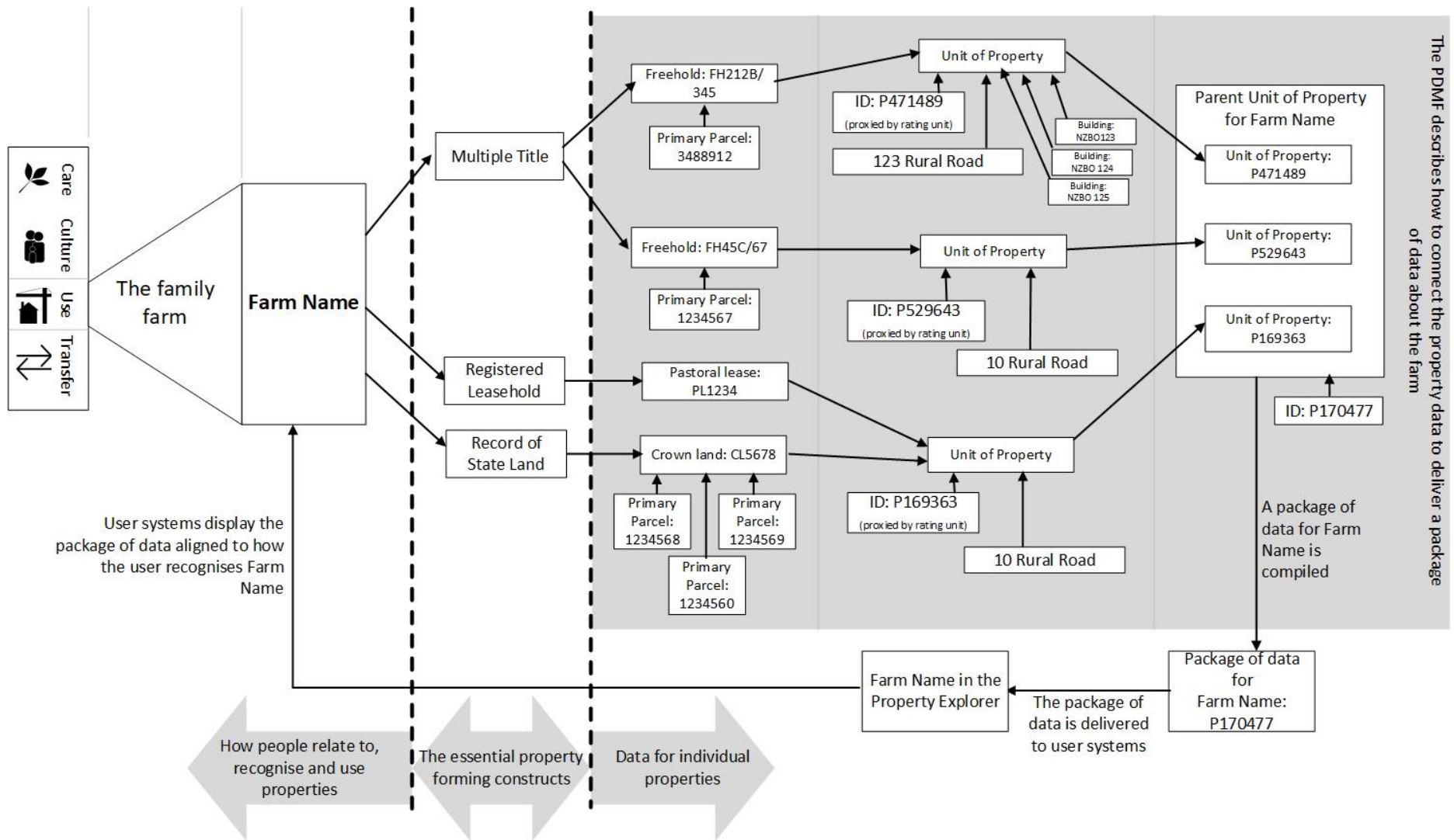


Figure 51: Example of a farm that spans two tenure system

# Extending the PDMF model



# 19 Dwellings

For some uses (for example, the Census of Population and Dwellings) it is important to identify dwellings. Dwellings may be buildings, but may also be part of a building or not a building at all (for example, a tent). This means that dwelling is a class in its own right as it cannot be modelled purely as a structure, physical building or a unit of property.

See:

- [19.1 Terms and definitions](#)
- [19.2 Classification of dwellings](#)
- [19.3 Association to buildings](#)
- [19.4 Rules constraining the relationships](#)

Figure 52 extends the PDMF model to incorporate dwellings.

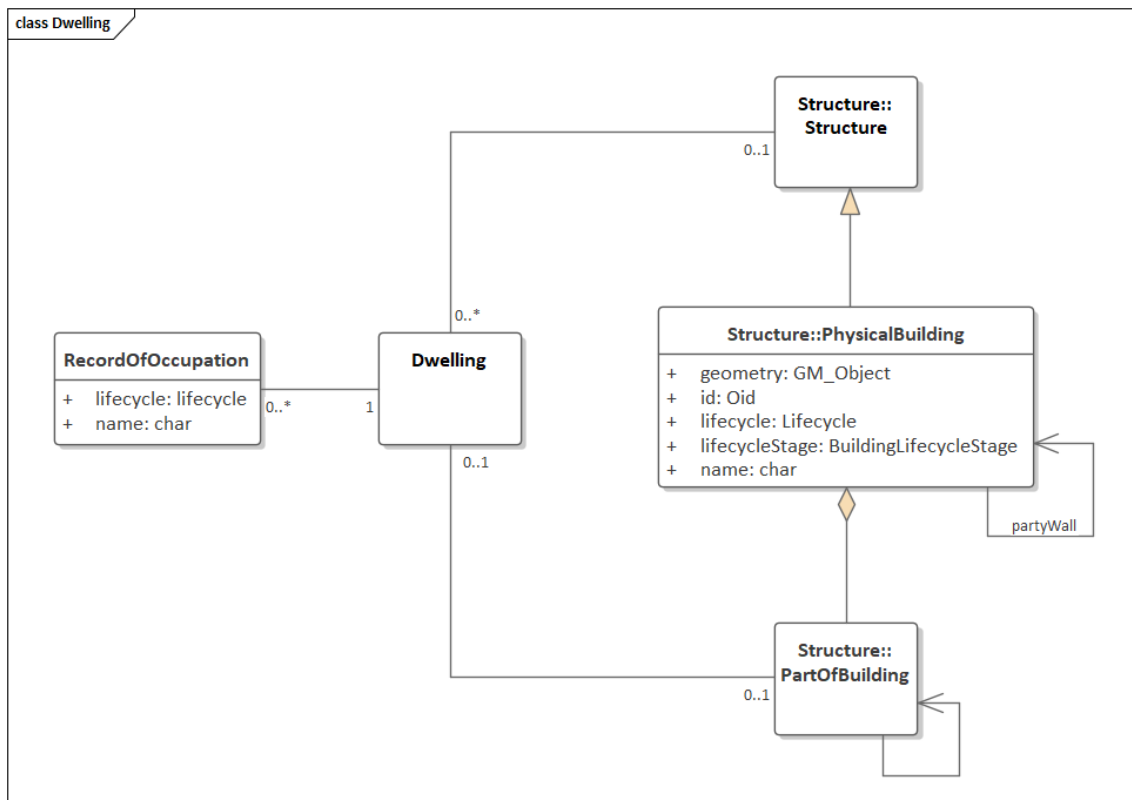


Figure 52: Extension for dwellings



## 19.1 Terms and definitions

### Dwelling

A dwelling is any building or structure, or part thereof, that is used (or intended to be used) for the purpose of human habitation.

A dwelling can be of a permanent or temporary nature and includes structures such as motels, hotels, prisons, motor homes, huts and tents. At the highest level, dwellings are classified as private or non-private.

### PartofBuilding

A defined portion of a building that has a distinct set of rights and can either form, or contribute to, a unit of property

### RecordOfOccupation

The people occupying a dwelling.

RecordOfOccupation contains the following attributes:

Attribute	Description
lifecycle	
Name	Name of the occupier

This list is not exhaustive. Other attributes may exist that we have not yet identified.



## 19.2 Classification of dwellings

A private dwelling accommodates a person or a group of people but is not available to the public. A private dwelling may be permanent or temporary. Permanent private dwellings include houses and flats, residences attached to a business or institution, and baches, cribs and huts. Caravans, cabins, tents and other makeshift dwellings that are the principal or usual residence of households are classified as temporary private dwellings.

All other dwellings are non-private and are available to the public. They may be available for use generally, or by virtue of occupation or study, special needs or legal requirements. Such dwellings may have facilities (such as a dining room) that are for shared use.

(Definition sourced from Stats New Zealand.)



## 19.3 Association to buildings

Within the current scope of the PDMF model, and consistent with the definition of a dwelling, a dwelling is either a separate (and whole) building or part of a building.

Where a dwelling is a separate building, Dwelling associates to Structure, and Structure must be a PhysicalBuilding. Connecting the dwelling to a structure allows for future extension of the model to other types of dwellings that are not physical buildings, for example, temporary structures like caravans and tents. However, these types of temporary structures are currently out of scope.

Where a dwelling is joined to other dwellings, Dwelling associates to PartOfBuilding. PartOfBuilding is defined by either NonPrimaryParcel (if a legal property right held in a register) or AgreedDocumentedSpace (if a private commercial rental/lease agreement). See figure 53.

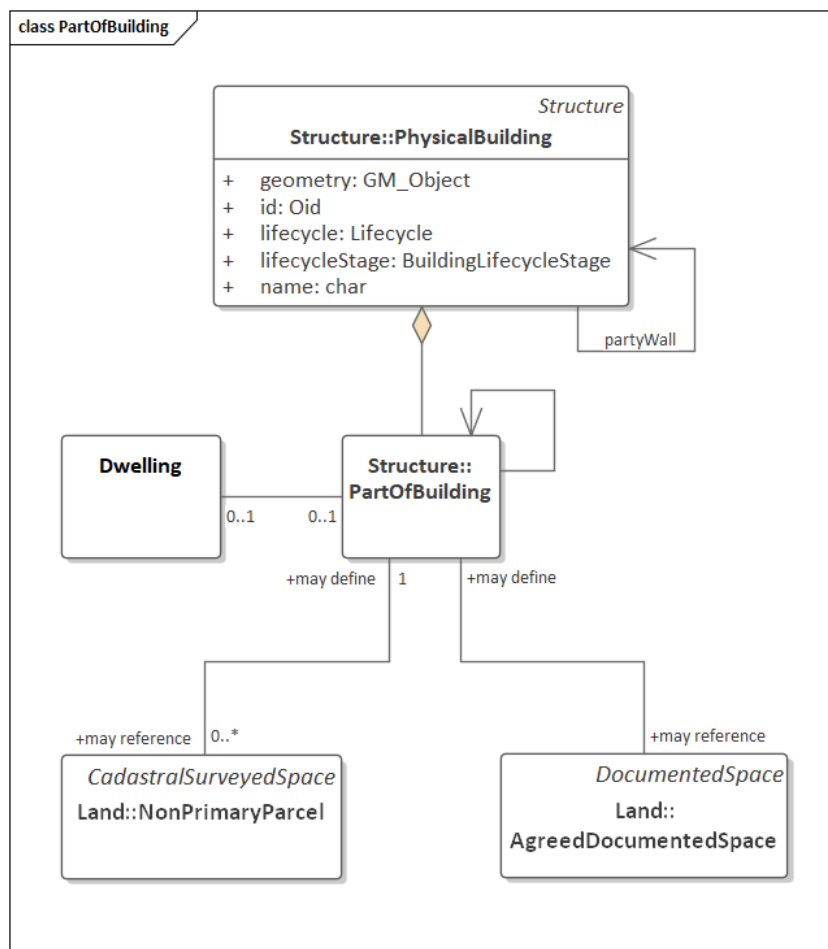


Figure 53: PartOfBuilding associations

PartOfBuilding associates to PhysicalBuilding so that the building containing the part of the building is known, and all parts of a building can be identified.

PartOfBuilding also allows the unambiguous identification of multiple parts of a building that collectively all form part of the same unit of property. For example, a unit titled apartment may contain a primary unit, a carpark, and an accessory unit, of which only the primary unit is the dwelling.



## 19.4 Rules constraining the relationships

The definition of a dwelling constrains which relationships can be formed for different types of dwellings. These constraints enable the data to connect in a logical and predictable way. They ensure a dwelling connects unambiguously not only to the correct property, but also that the property then correctly relates to other properties (for example, an apartment correctly relates to other apartments, and to the complex within which they are located).

Some rules are based on the classifications of the data at both ends of a relationship. These classifications can determine how data of a particular category in one dataset connects to data of a particular category in another dataset. For example, a rented apartment is a part of a building, but is not the same as an owned free-standing house that is a whole building, even though both are dwellings and relate to buildings. In this case, the definition of a dwelling defines the different types of dwelling, which in turn determines what those dwellings can connect to.

- a dwelling that is joined together with other dwellings must connect to a part of a building
- a dwelling that is a separate building must be a structure, and the structure must be a physical building.

Other rules are more complex and have a wider impact across the PDMF model, influencing the structure of the properties that the dwelling is associated with:

- if a unit of property is a parent property, it may not contain a part of a building.
- if a unit of property is a child property that contains a structure, it may not also contain a part of a building.
- If a unit of property is a child property that contains part of a building, it may not also contain a structure.
- if a unit of property is a child property, and formed from non-register space, it must connect to non-register space through `DefinesUnitOfProperty`.
- if a unit of property is a parent property and has a child property that contains part of a building, then the parent property must contain a structure that is a physical building and the child property's part of a building must aggregate to the parent property's physical building that it is physically within.

It is likely that further rules will be identified as further research is conducted and implementation is undertaken.

## 20 Consents

Consents are not part of the core PDMF model. However, one of the five core concepts of a property is the ability to use/build/improve a property. Consents are often required before an activity (for example, building) can be conducted. An element of property data that is modelled in the PDMF is often the result of an activity (for example, a building).

The diagrams we present in this section are an illustration of how an extension to the core PDMF model may work. They are not domain model diagrams.

See:

- [20.1 Resource consents](#)
- [20.2 Building consents](#)
- [20.3 Specified systems](#)

It can be important to know when making decisions about a property whether the activities or results of the activities (for example, a building) have been properly consented. Because of this, consents have been modelled as an extension to the PDMF.

Some of the activities to use/build/improve a property can be carried out by the owner with no further permission required (usually because they do not contravene a district or regional plan or do not require a building consent). However, other activities require consent to be gained from local or central government (usually because they contravene a district or regional plan or require a building consent).

The information generated by gaining a consent contributes to a digital package of data about a property. If the activity directly relates to a unit of property or results in an element of data that is modelled in the PDMF, then the information generated by gaining a consent can be connected to the relevant element in the PDMF through an extension to the model.



### 20.1 Resource consents

Resource consents are fundamentally about environmental stewardship.

Some types of consent will have a direct relationship to a property and, as such, an appropriate extension to the PDMF model could be applied to account for these relationships. Other types apply more generally to land and will not be coincident with any individual property. These types of consents could be considered as stand-alone units of property in their own right, defined solely by non-register space. In these cases, spatial relationships determined in a GIS system may be an appropriate linking method.

In Figure 54, LandUse and Subdivision consents have been directly related to UnitOfProperty. These consents transfer with a property when the property is sold.

Water consents do not transfer with a property but are specific to the current owner. No direct relationship to UnitOfProperty has been determined. Licenses to occupy road reserve land (PublicLandEncroachment) seem to work in a similar manner but no attempt to model water consents similarly to a PublicLandEncroachment has been made.

Figure 54 is based on preliminary work to connect resource consent data in the Property Explorer and should be treated as a starting point. Further work is necessary to better understand and confirm these relationships.

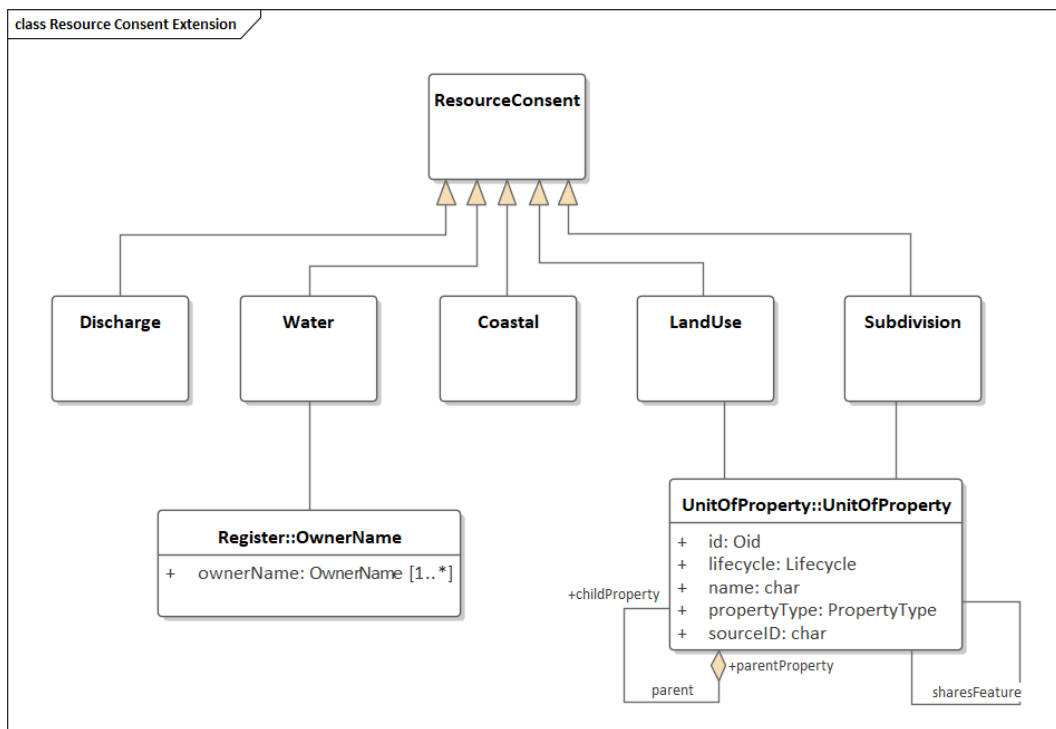


Figure 54: Extension for resource consents

### 20.1.1 Types of resource consents

Resource consents are as specified in Resource Management Act 1991, s 87 (Parliamentary Counsel Office (2019,b)):

- land use consent
- subdivision consent
- coastal permit
- water permit
- discharge permit.

See the Act for detailed definitions of the consents.



## 20.2 Building consents

Building consents are fundamentally about safety, wellbeing and sustainability.

The Building Act 2004 does not make a distinction between a structure and a building in the way the PDMF model does. In the PDMF model, while all building consents will be for structures, only some building consents will be for physical buildings.

Typically, once a building has been issued a code compliance certificate, data about it is held in the relevant local authority's system, often as scanned documents.

Figure 55 is based on preliminary work connecting building consent data in the Property Explorer but should be treated as a starting point for the BuildingConsent class. Further work is necessary to better understand and confirm these relationships.

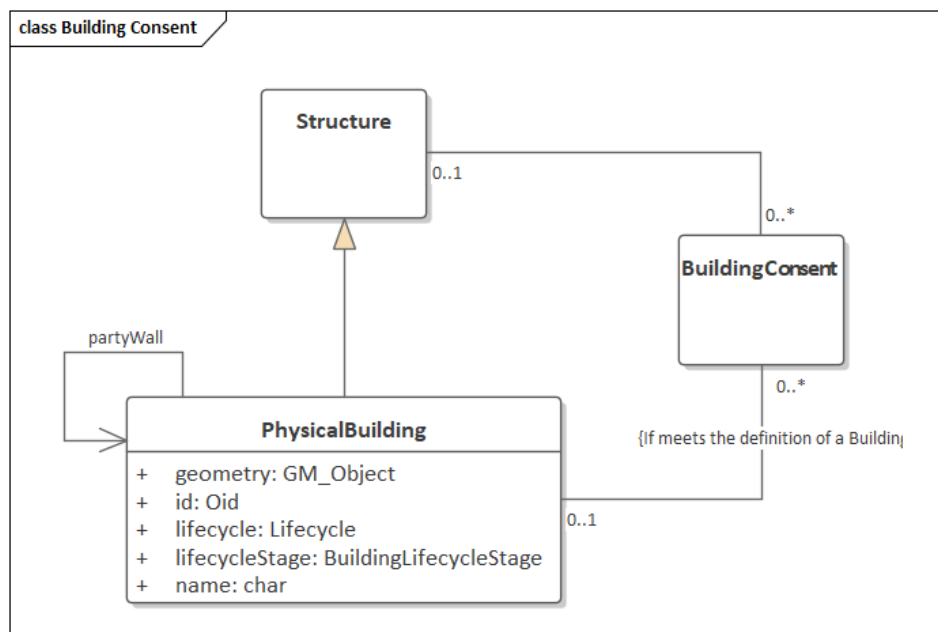


Figure 55: Extension for building consents

### 20.2.1 Definition

A building consent is defined in the Building Act 2004, section 7 as: “a consent to carry out building work granted by a building consent authority under section 49”. Other types of consent may also be required before building work can commence, for example, resource consents.



## 20.3 Specified systems

Non-residential buildings usually contain a number of subsystems (called specified systems) that are required to be inspected on a regular and ongoing basis according to the compliance schedule.

This is known as the Building Warrant of Fitness. In territorial authority property data, it is the only regular source of live data about buildings that have already been built and issued with a code compliance certificate.

These specified systems are usually related to the maintenance of safety or amenity in the building:

- fire sprinklers
- elevators
- HVAC
- hearing loops
- smoke control systems
- evacuation signs and pathways
- sanitary plumbing backflow preventers.

These systems could be modelled as part of the PhysicalBuilding class in the PDMF model.

## 21 Historic sites

Historic sites are not part of the core PDMF model. However, information about historic buildings is often requested by users of building data, so has been modelled as an extension to the PDMF.

The diagram we present in this section is an illustration of how an extension to the core PDMF model may work. It is not a domain model diagram.

See:

- [21.1 Terms and definitions](#)
- [21.2 Connection to the PDMF model](#)

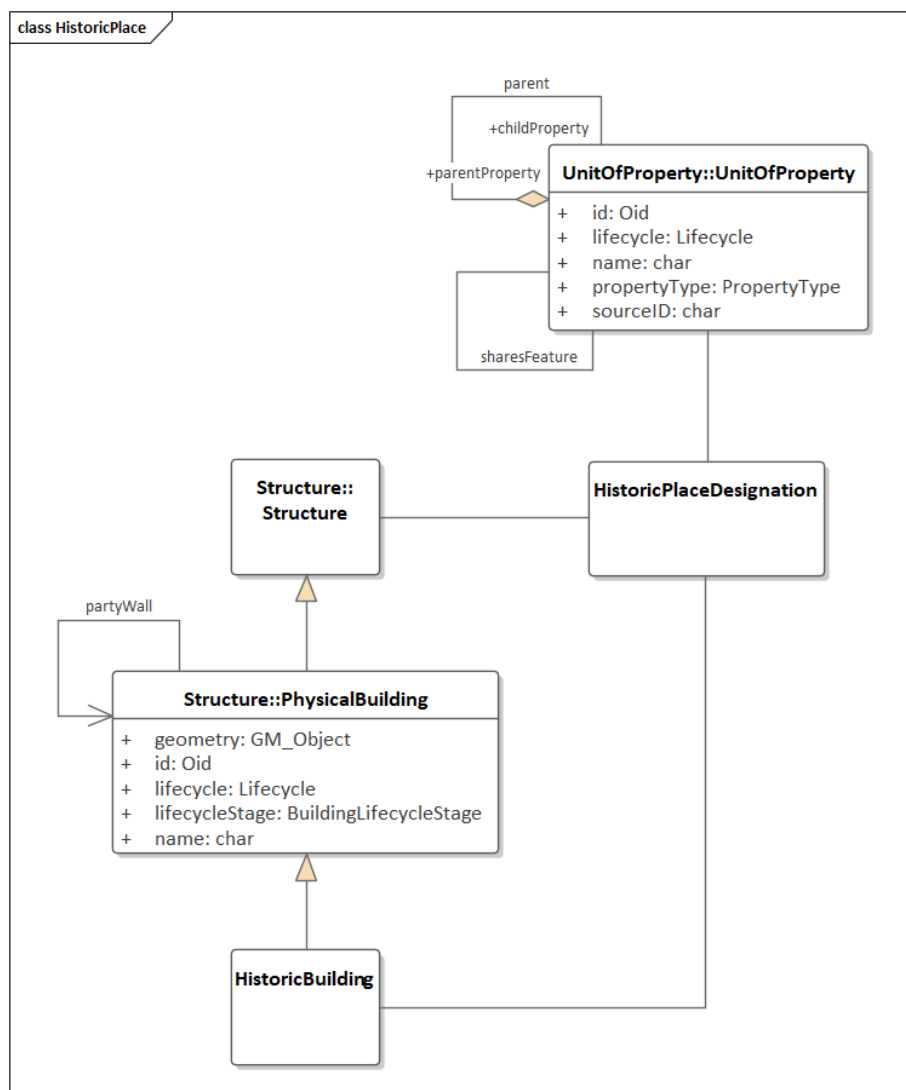


Figure 56: Extension for historic sites



## 21.1 Terms and definitions

### **HistoricPlaceDesignation**

A designation that is placed on a feature from either the PhysicalBuilding, Structure or UnitOfProperty classes. It does not replicate the feature, rather it adds additional information to the feature.

### **HistoricBuilding**

A special type of physical building, upon which a historic place designation has been placed.



## 21.2 Connection to PDMF model

Historic places can be archaeological sites, buildings or memorials. Historic areas are groups of related historic places such as a geographical area with a number of properties or sites, a heritage precinct, or a historical and cultural area.

Preliminary work connecting historic places data in the Property Explorer suggests that many historic places behave as a designation on a class already modelled in the PDMF (UnitOfProperty, Structure, PhysicalBuilding), with a dependence on the existence of register space to support a unit of property.

However, some historic place designations (and maybe most historic sites) may apply more generally to land. These types of historic places could be considered as stand-alone units of property in their own right, defined solely by non-register space. In these cases, spatial relationships determined in a GIS system may be an appropriate linking method.

Figure 56 is based on preliminary work connecting historic sites data in the Property Explorer but should be treated as a starting point for the HistoricPlaceDesignation and HistoricBuilding classes. Further work is necessary to better understand and confirm these relationships.



## 22 Water facilities

Water facilities are not part of the core PDMF model. However, where water facilities are part of a property, they form part of the information about that property. As property information, we have an interest in understanding how they could connect to the PDMF model.

The diagram we present in this section is an illustration of how an extension to the core PDMF model may work for water facilities. It is not definitive, nor is it a domain model diagram.

For this extension, we have considered two different situations:

- onsite water facilities like septic tank systems, water tanks, or bores.
- where an external water network connects to a property, for example, water meters.

Water, either delivered from offsite, or contained onsite, is often considered by TAs to be a “must have” as a property could generally not be inhabited otherwise.

figure 57 shows how potentially onsite water facilities, and connections to external networks, could be linked to the PDMF.

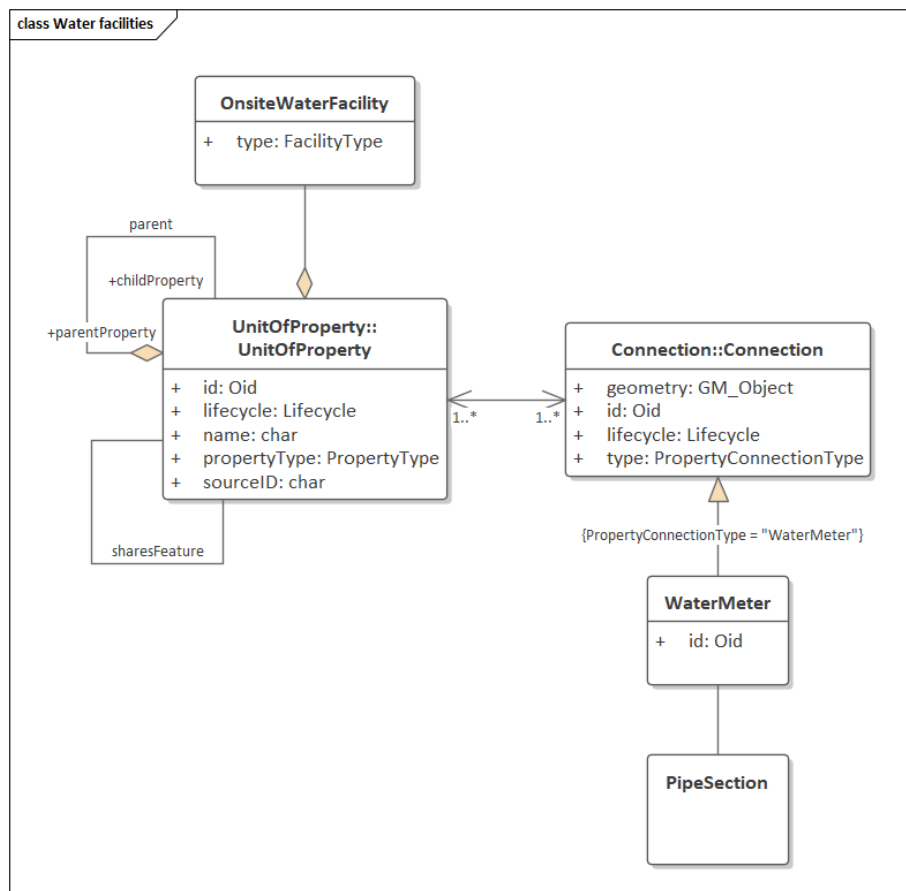


Figure 57 water facilities

An onsite water facility is contained within the property generally, so the logical association is to the property. It could be a class with a relationship to a UnitOfProperty.

For the interface between external water networks (for example, a water supply pipe network) and a property, the Connection class can be used. The connection class can be used to define a point at which a service is delivered to a property. It could be the point of transfer from the provider to the consumer. For water, an example of a connection point could be a water meter. A water meter connects to the pipe network.



# Implementing Dwellings



## 23 Dwellings and the PDMF

In 2022, Toitū Te Whenua and StatsNZ jointly researched how dwellings would integrate into the PDMF, and tested the approach using real data in a research application (Toitū Te Whenua, 2022).

See:

- [23.1 PDMF modifications](#)
- [23.2 Determining appropriate relationships](#)
- [23.3 Forming relationships using methods](#)
- [23.4 Comparison of attributes to assess quality](#)
- [23.5 Data issues](#)
- [23.6 Examples](#)

### 23.1 PDMF modifications

An assessment of the PDMF model identified that a number of changes were required to incorporate dwellings. These changes were needed to ensure that the definitions and classifications of dwellings were adhered to, and that the incorporation of dwellings did not introduce ambiguity or uncertainty into the model.

Only permanent dwellings are within scope of the PDMF. Temporary or moveable dwellings like tents, caravans, etc. are out of scope. It may be possible to incorporate such dwellings by considering the land underneath the tent or caravan to be the unit of property, but this has not been investigated.

The changes to the PDMF model are:

- dwellings connect through a building or part of a building to a unit of property. There is no direct relationship between a dwelling and a unit of property, and the relationship that previously existed has been removed from the PDMF.
- Dwellings that are joined to other dwellings are only a portion of a building, meaning a new class "PartOfBuilding" has been introduced to the PDMF to correctly connect dwellings of this type.
- parent/child relationships for units of property need clear rules restraining the use of those relationships to ensure integrity of use.
- Occupation by people is an attribute of a dwelling, resulting in a change to RecordOfOccupation. RecordOfOccupation no longer relates to UnitOfProperty, but now directly relates to Dwelling and records people occupying the dwelling, but not the nature of the occupation. A new class of NatureOfOccupation has been introduced associating to UnitOfProperty to record the type of occupation, but not the people occupying.



## 23.2 Determining appropriate relationships

The definition of a dwelling requires a dwelling to connect to either a building or part of a building. There are no other elements that dwelling can connect to, including address, as the definition of a dwelling does not refer to address.

Figure 58 shows a simplified path for a dwelling that is a separate building.



Figure 58: Simplified path for separate dwelling

Figure 59 shows a simplified path for a dwelling that is joined to other dwellings.

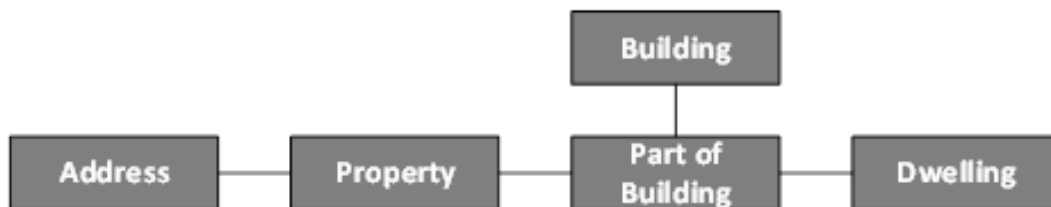


Figure 59: Simplified path for a joined dwelling

However, the exact PDMF path and classes required will differ depending on how the unit of property has been formed as well as the type of dwelling. For example, a rented flat is a part of a building formed through a commercial agreement, so the unit of property will be formed form register space. A unit title apartment is part of a building, but is a property right in the unit title register, so the unit of property is formed through register space.

Figure 60 shows the PDMF classes and associations for a dwelling that is a separate building and connects to a property that is based on register space.

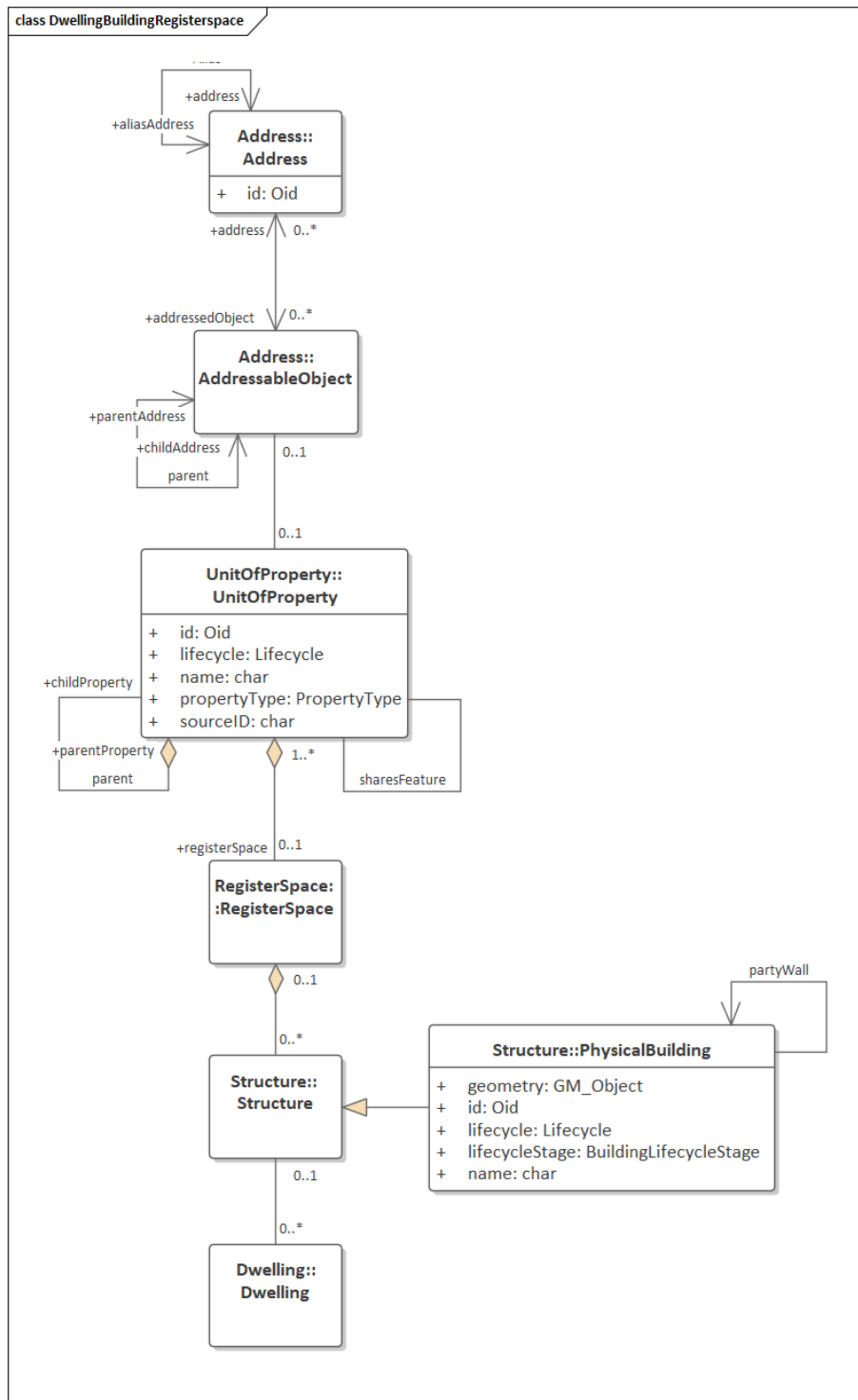


Figure 60: separate dwelling, register space

Figure 61 shows the PDMF classes and associations for a dwelling that is joined to other dwellings and connects to a property that is based on register space.

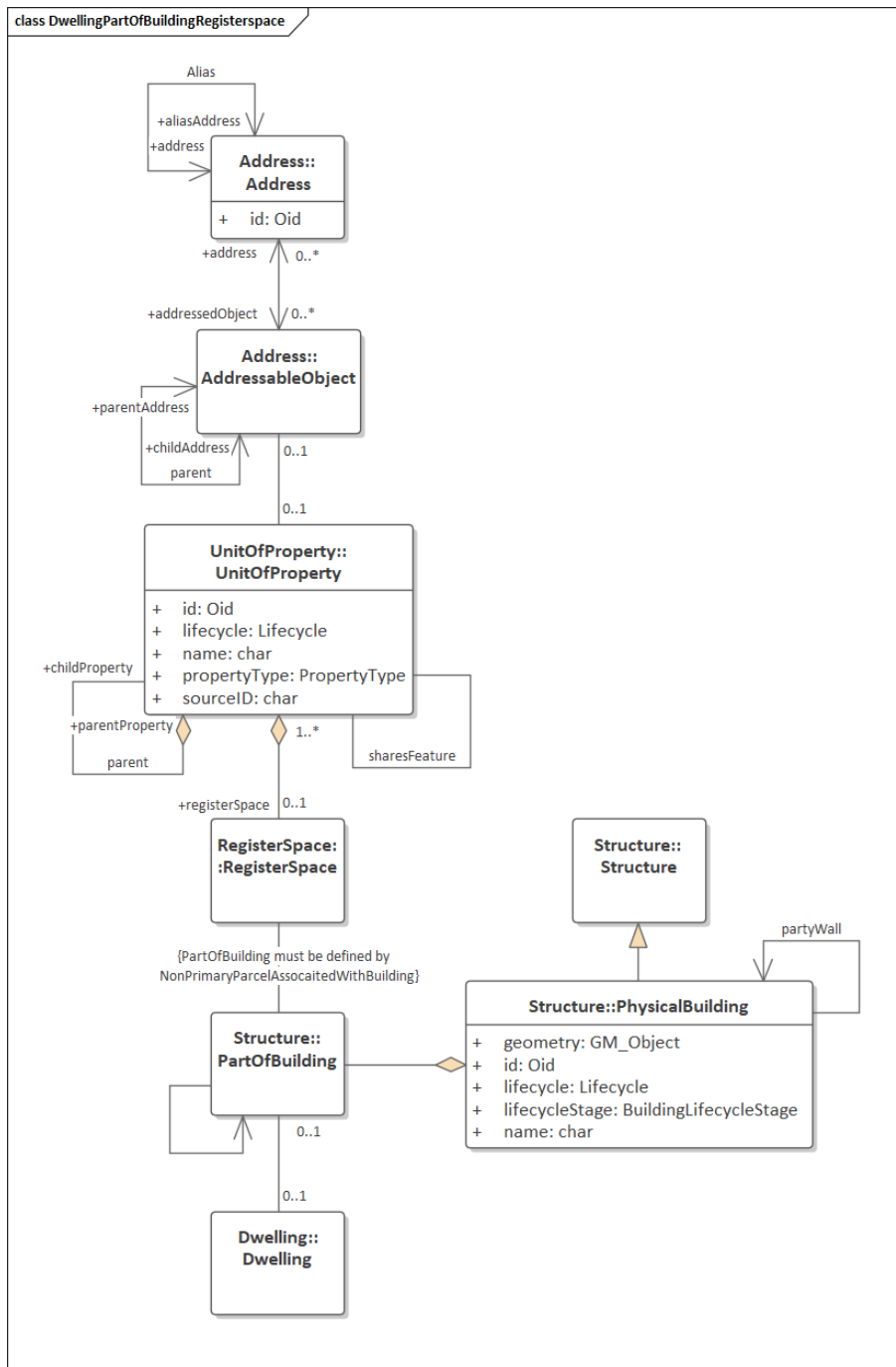


Figure 61: joined dwelling, register space

Figure 62 shows the PDMF classes and associations for a dwelling that is a separate building and connects to a property that is based on non-register space.



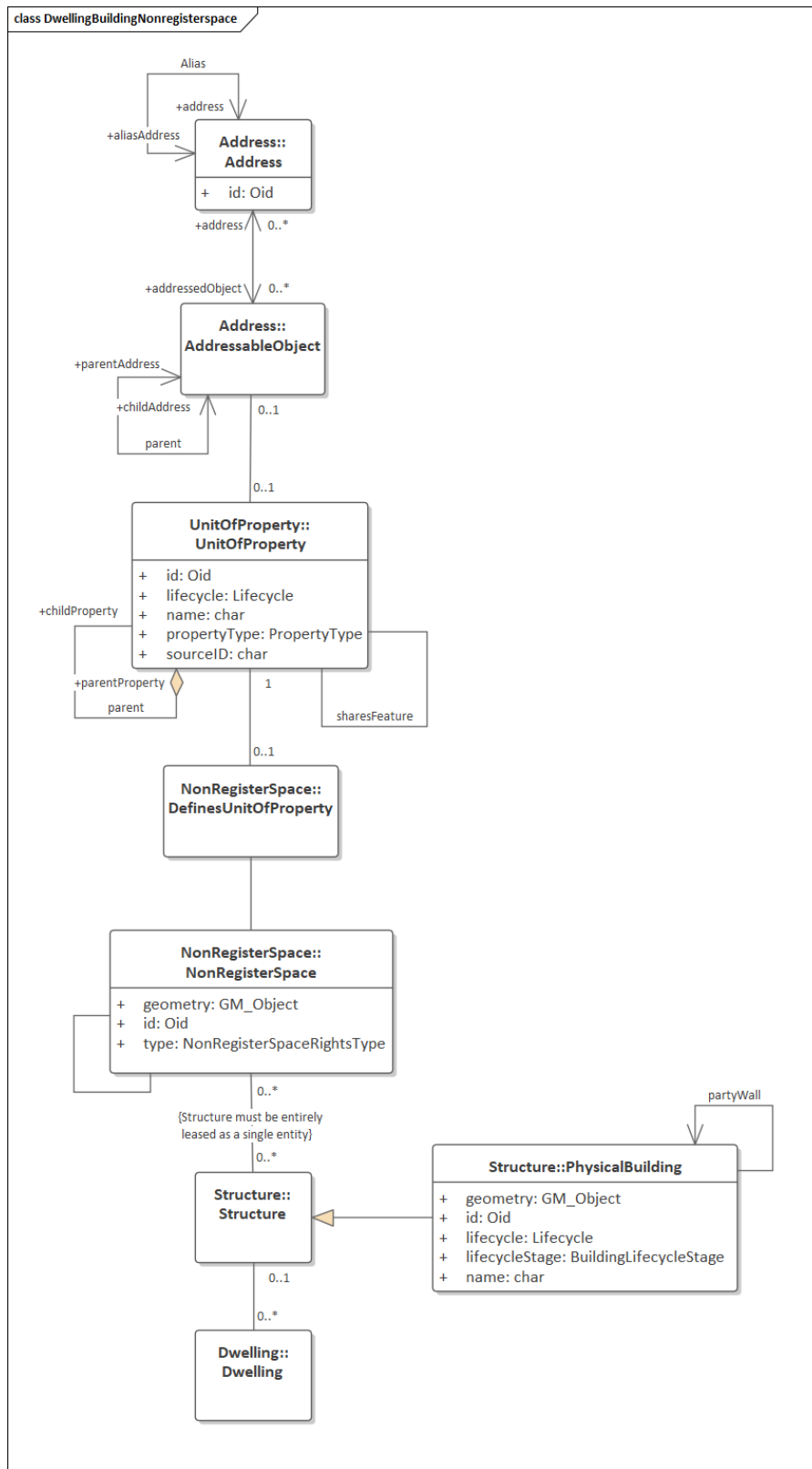


Figure 62: separate dwelling, non-register space

Figure 63 shows the PDMF classes and associations for a dwelling that is joined to other dwellings and connects to a property that is based on non-register space.

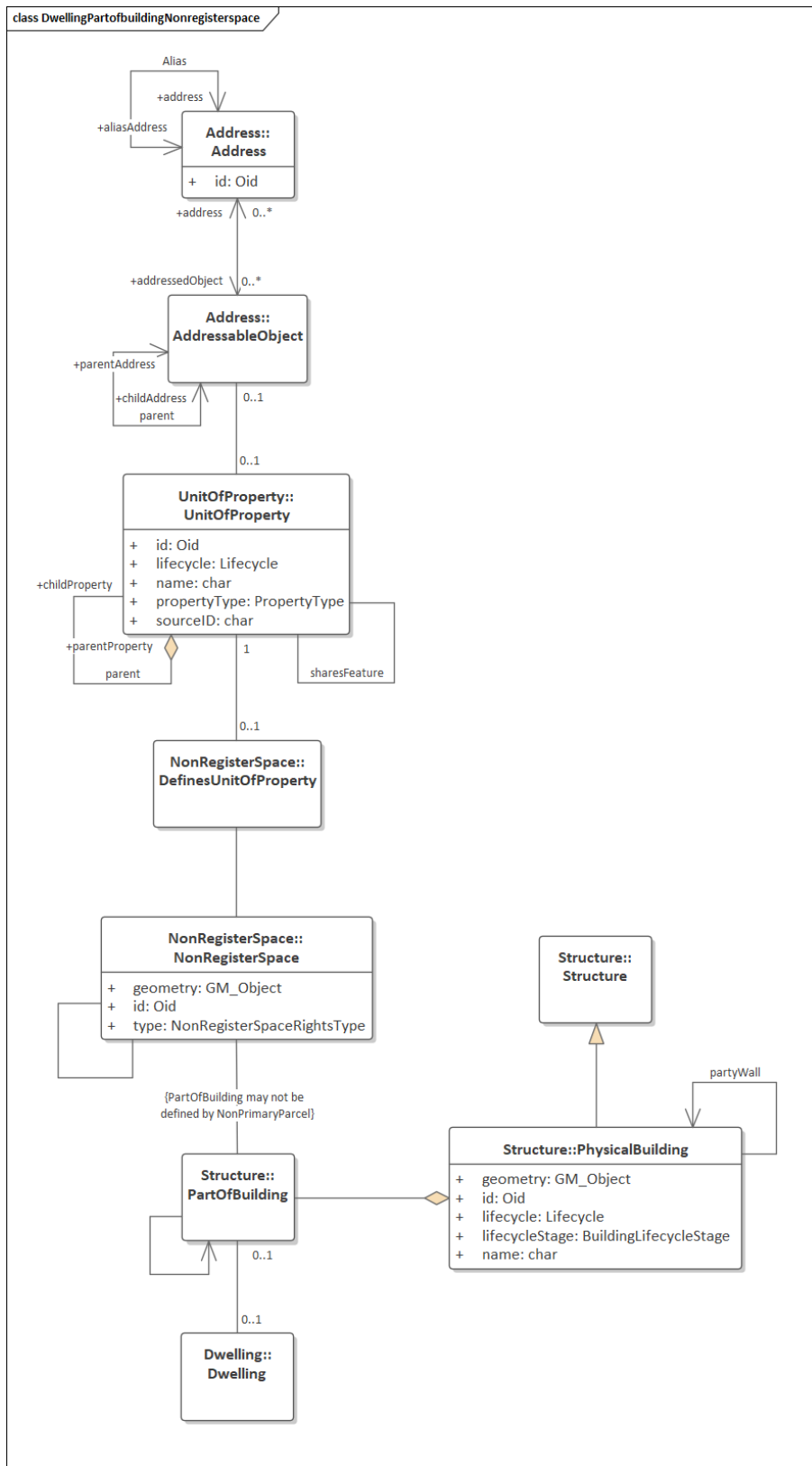


Figure 63: Joined dwelling, non-register space



## 23.3 Forming relationships using methods

We found that even using the PDMF model and the relationship rules identified, there were instances where our ability to form PDMF compliant relationships was significantly improved by using our knowledge about the structure of, the additional features in, and the additional attributes of, the data at either end of the relationship. These additional features and attributes, while not directly related to the relationship being formed, could nevertheless assist in forming that relationship.

For the 2022 dwellings research project, we identified and tested three methods to connect dwelling to building or part of building. These methods were based on the knowledge that the dwellings dataset we were working with geospatially located a dwelling at the same position as an address.

The three methods identified and tested were:

- spatial proximity of address point to building outline: an address point is generally located close to the primary building.
- comparative building size of building outlines: A dwelling is generally larger than other structures on a property like a garage.
- freestanding garage attribute in the district valuation roll: if this attribute is yes then one of the building outlines is a garage.

We found that the three methods could be combined, further increasing the confidence and ability to match dwellings to buildings.

Positive results confirmed the viability of the approach, resulting in significantly more correct suggestions than incorrect suggestions.

Other methods will exist that have not yet been identified.



### 23.3.1 Confidence

Using methods to determine a connection contains an inherent amount of uncertainty. The uncertainty exists in the interpretation of the data itself for a single method, and also across the combination of methods used.

We found it was essential for the integrity of the PDMF model to provide information about the quality and confidence of the relationship formed.

We tested a 3-tier confidence rating where a connection could be established:

<b>Green</b>	<b>Direct connection</b>	Dwelling can be tied directly to a single building
<b>Orange</b>	<b>Inferred connection</b>	Dwelling can be tied directly to a single property and tied to a single building using a set of defined assumptions.
<b>Red</b>	<b>Likely connection</b>	Dwelling cannot be tied directly to a single property or building but can be connected to a parcel of land

Additionally, confidence ratings allow a user to:

- Determine whether they need to validate the relationship using additional manual or other processes (eg, a site visit, or comparing against aerial or satellite imagery)
- determine whether there is enough confidence in the connected data to apply it to their use case.



## 23.4 Comparison of attributes to assess quality

We found that we were able to validate the PDMF relationships formed by identifying common attributes across the connected data, and comparing the values of these attributes. We tested the following comparisons:

- building outlines building size with DVR floor area
- district valuation roll units of use with the number of dwellings connected to the unit of property
- district valuation roll property category with dwelling classification



## 23.5 Data issues

There are well acknowledged and understood shortcomings with data along the PDMF relationship paths from dwelling to property and address. For example, errors in title references in district valuation roll data results in connecting incorrect titles, or not connecting titles that should be connected. Both result in an incomplete or incorrect property boundary.

Similarly, shortcomings with address data include point locations in ambiguous locations, and differing formats for the same address across different datasets.

These errors impact the relationships formed and the ability to unambiguously connect dwellings. For example, the combination of an ambiguous address point location, combined with a property that contains several buildings, may mean that a precise connection between a dwelling, a building and a property cannot be achieved.

Additionally, if the property boundary is incomplete, a building that should be within the property may not be, so is not identified as a potential dwelling.

Misaligned currency of different data sets can also provide challenges. For example, dwellings data is updated once every 5 years, whereas parcel and title data are updated weekly, and district valuation roll data is dependent on a variable update maintenance cycle. Building outlines tend to be on a three-year cycle.

Using the PDMF to connect dwelling data means we can:

- provide transparency of data quality issues including misalignment, conflicts and possible missing data
- apply logical, structured, and reusable data rules to infer relationships that cannot currently be created.

## 23.6 Examples

These examples show how the PDMF was applied to various types of properties, containing either separate dwellings or joined dwellings.

### 23.6.1 Straightforward residential property

Figure 64 shows a single property containing one building, one separate dwelling, with one street address. The unit of property is based on a rating unit from valuation data, which means it is formed through register space and a record of title. In this example we have used a fee simple estate from the freehold register. There is no non-register space in this example.

Because the dwelling is a separate building, and there is only one building on the property, the connection between the building and the dwelling can be made directly with high confidence.

The connection between the building and the unit of property can be established spatially.

The single street address connects directly to the unit of property and in this example is made spatially as the address point lies within the unit of property boundary. If there is only one address inside the unit of property boundary, the address point can be located anywhere within the unit of property boundary.

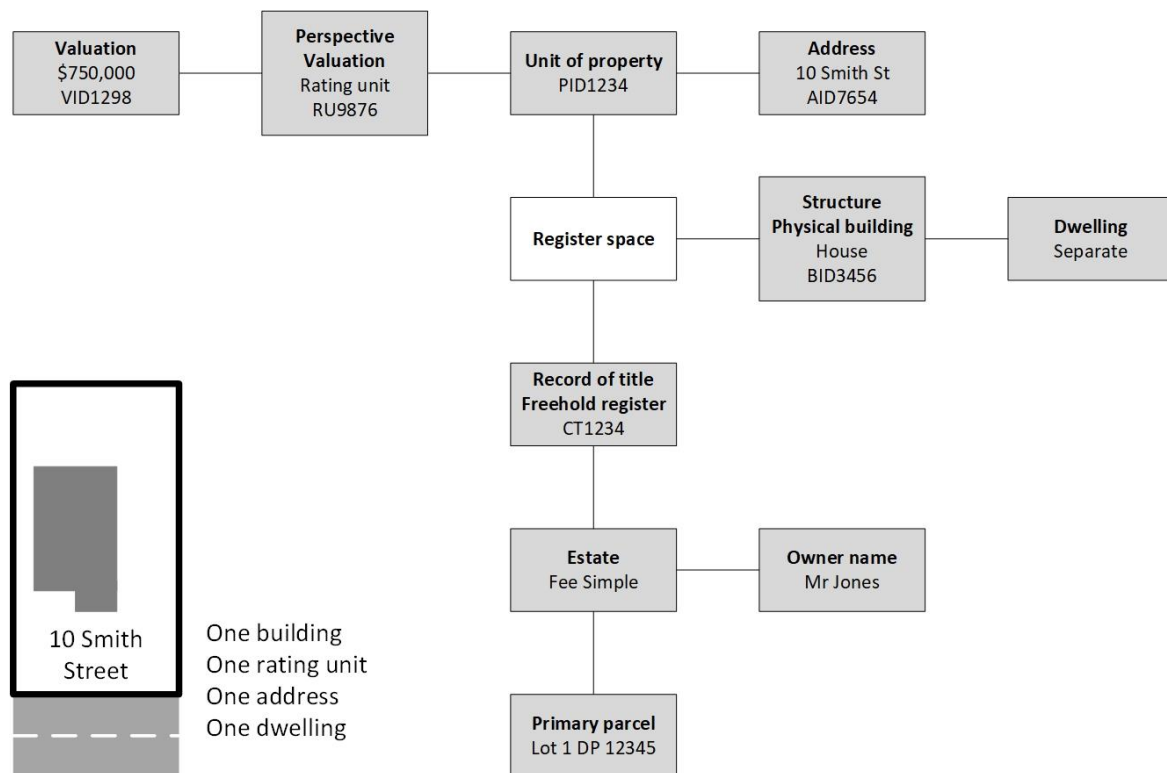


Figure 64: straightforward residential property with single separate dwelling

## 23.6.2 Multiple buildings on a single property

Figure 65 shows a single property containing two buildings, one separate dwelling, with one street address. The unit of property is based on a rating unit from valuation data, which means it is formed through register space and a record of title. In this example we have used a fee simple estate from the freehold register. There is no non-register space in this example.

In this example the problem is identifying which of the buildings is the dwelling.

All three methods described in section 23.3 can be used to identify the correct building.

- The address point is closer to the larger building
- One building is substantially larger than the other, with the smaller falling within the area range of a garage
- The DVR attribute "Freestanding Garage" for this property is "1", indicating that one of the buildings on the property is a garage.

These methods allow a connection to be made between the dwelling and the larger building, now identified as a house. The smaller building can be identified as a garage.

The connection between the buildings and the unit of property can be established spatially.

The single street address connects directly to the unit of property and in this example is made spatially as the address point lies within the unit of property boundary. If there is only one address inside the unit of property boundary, the address point can be located anywhere within the unit of property boundary.

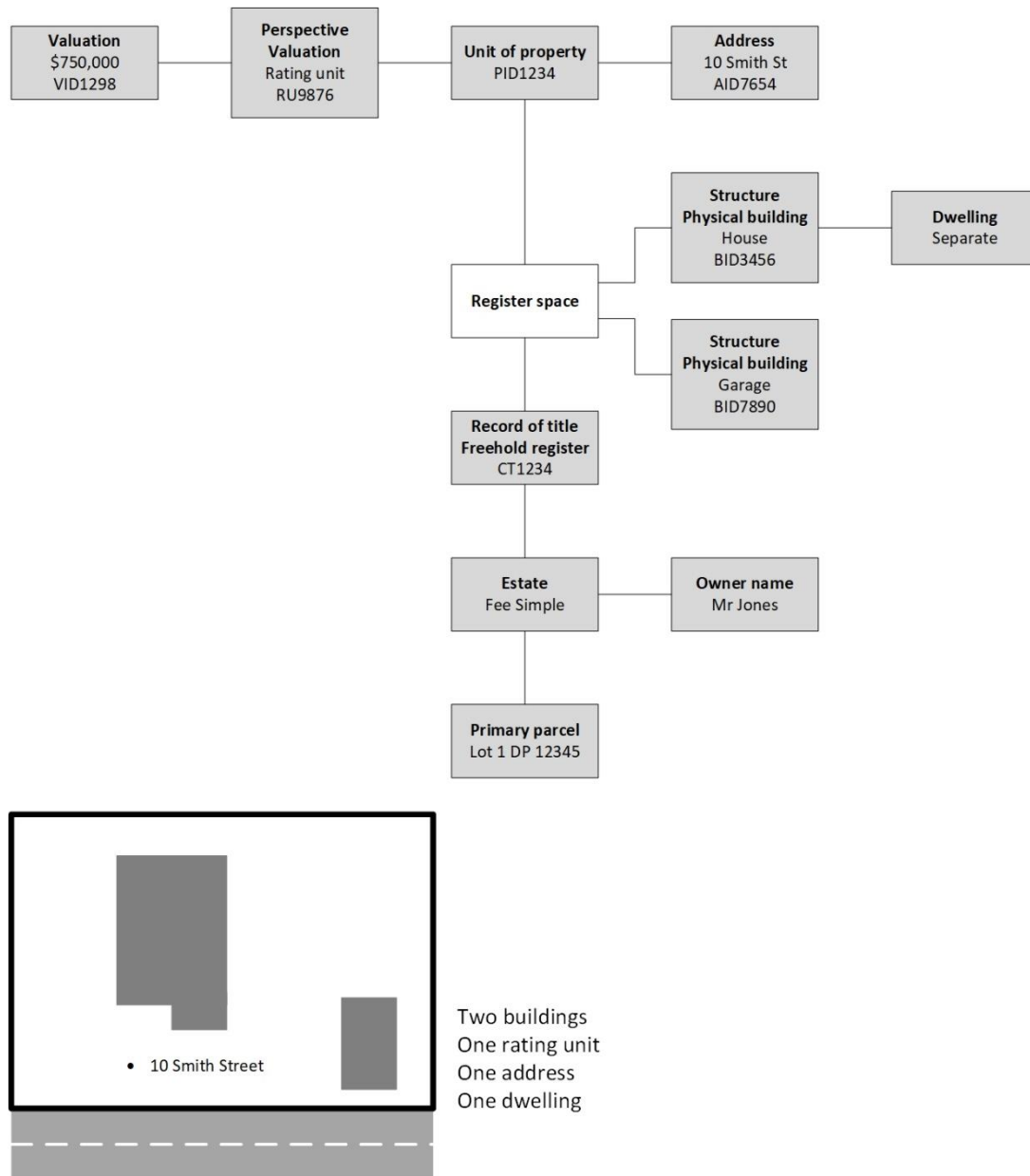


Figure 65: multiple buildings with a single separate dwelling

### 23.6.3 Self-contained flat

A variation of the multiple buildings on a single dwelling example.

Figure 66 shows a single property with a single address but two buildings, both of which are separate dwellings. The second dwelling is often referred to as a granny flat.

The problem is identifying which dwelling is which building.

While this example has not been tested, the methods described in section 23.3 could still be applied, along with other potential methods we haven't identified yet.

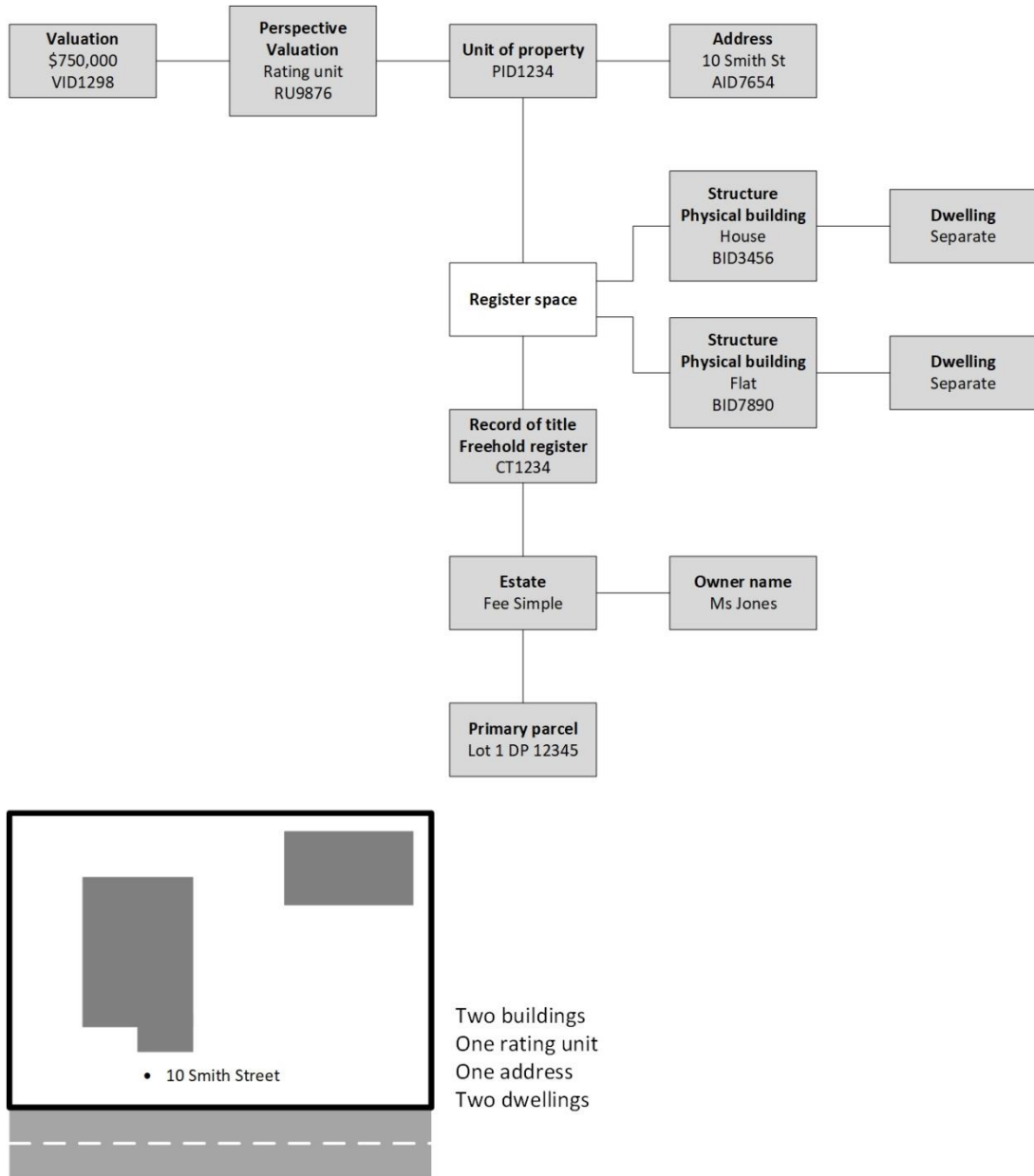


Figure 66: Single property with two separate dwellings

### 23.6.4 Apartment

Figure 67 shows a property that is an apartment in a building containing other apartments. The apartment is a dwelling joined to other dwellings. In this example, the apartment is a unit title held in the unit title register, which means the unit of property is formed through register space and record of title. There is no non-register space in this example.



Structuring the unit of property as a child property is essential to unambiguously connect the dwelling data to other relevant data like record of title or address information. Without a child property data can only connect at the parent level, meaning information for individual apartments (for example, sub-address, title, dwelling) cannot be linked to each other, only to the parent.

We found that with current data, a connection between the dwelling and a part of a building is only possible where a dwelling is supplied with an address, and that address can be matched to the situation address in the district valuation roll. Where a dwelling is not supplied with an address, we can only connect the dwelling to a building by using a spatial connection.

The connection to other apartments in the same development is made through the parent property, using the supplementary record sheet from the unit title register.

The connection to other apartments in the same building can be made by connecting the part of the building to the building.

For clarity figure 67 only shows a single apartment. In reality there would be many apartments (to satisfy the joined dwelling requirement there needs to be two at a minimum).

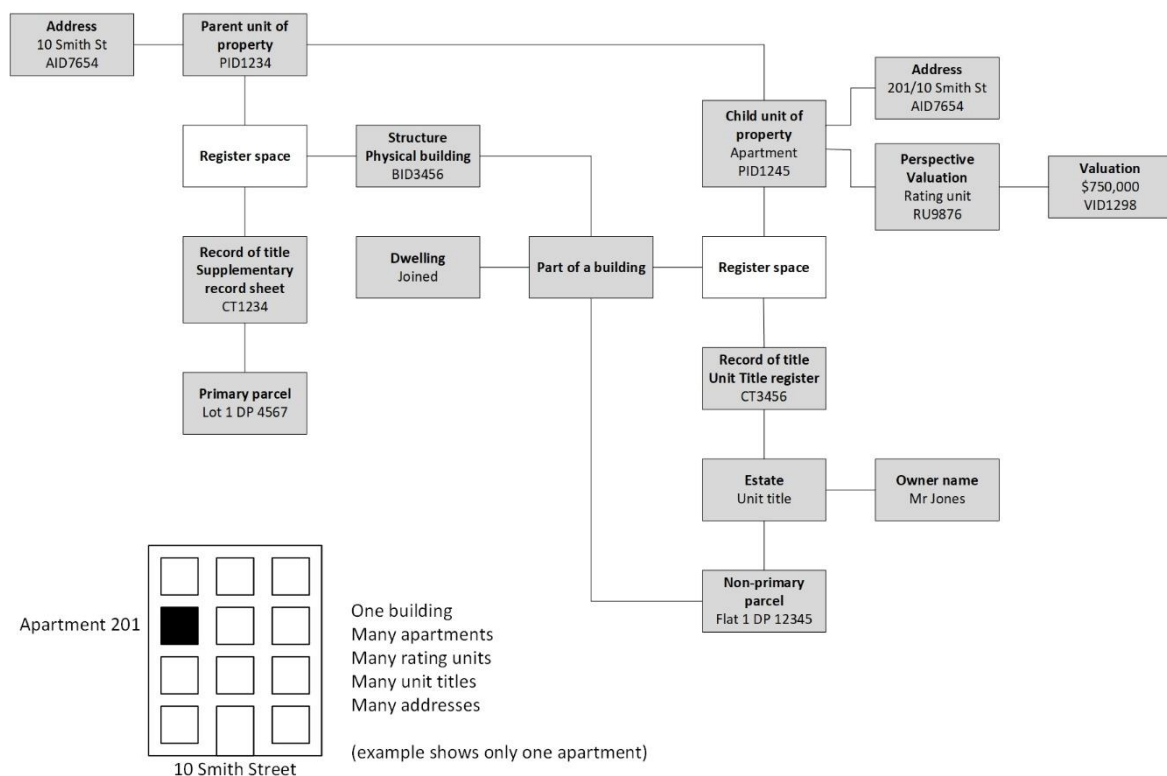


Figure 67: An apartment that is a joined dwelling

## 23.6.5 Townhouse

Figure 68 shows a property that is a townhouse joined to other townhouses in a single building, separated by party walls. The townhouse is a dwelling joined to other dwellings. In this example, the townhouse is a fee simple title held in the freehold register, which means the unit of property is formed through register space and record of title. There is no non-register space in this example.

There is no parent unit of property in this example as each townhouse is individually owned on a freehold section. Despite this, the structure of the townhouse is very similar to the structure of an apartment and uses the same sections of the PDMF model.

The building itself is not entirely contained by any unit of property, highlighting the importance of part of a building in forming the link between the unit of property, the building, and the other joined townhouses.

For clarity, only two townhouses are shown in figure 68.

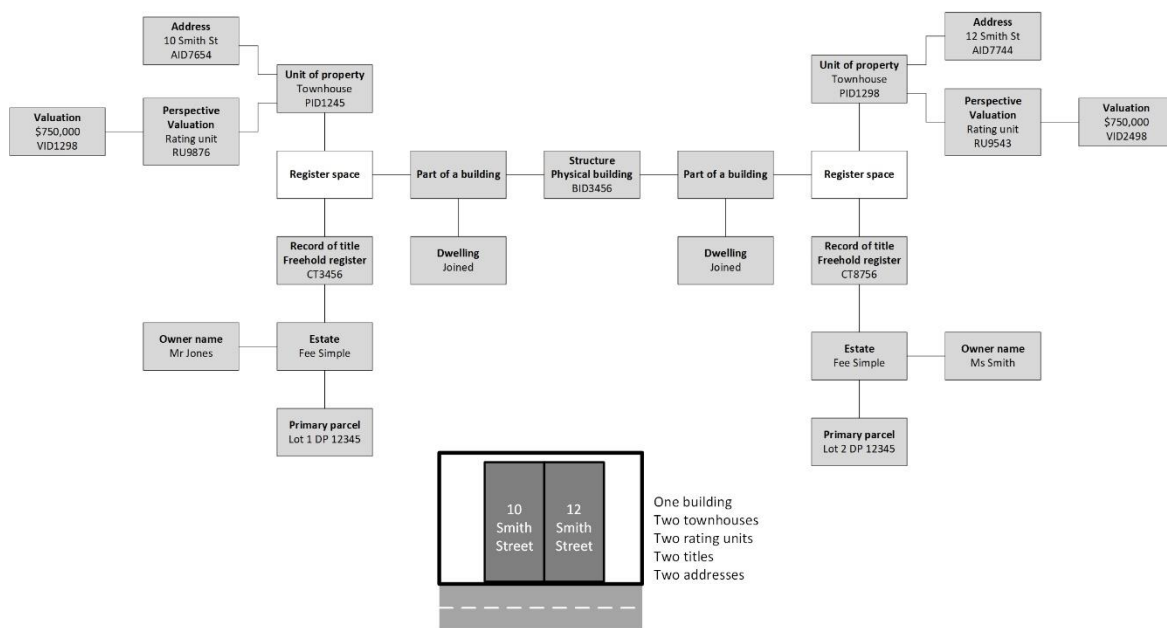


Figure 68: A townhouse that is a joined dwelling

## 23.6.6 Composite complex properties

A composite property comprises a parent property within which there are child properties. Complex properties contain child properties of differing types.

Retirement villages are a type of composite complex property and are used in this example and shown in figure 69. Student accommodation complexes could possibly be another type of a composite complex property.

The parent property does not have any dwellings associated with it. It represents the extent of the retirement village, along with the common assets owned and maintained by the village operator.

Each child property represents a tenancy within the retirement village and contains just the elements that comprise the tenancy. The separate dwelling is based on the example in section 22.6.1, and the joined dwelling is based on the example in section 22.6.4 and 22.6.5, except that the child properties in a retirement village are usually a licence to occupy, which is a commercial agreement so is based on non-register space.

This example contains a mix of register space and non-register space.

For clarity, only one separate dwelling and one joined dwelling have been shown in figure 69. In reality a retirement village would contain many dwellings, both separate and joined.

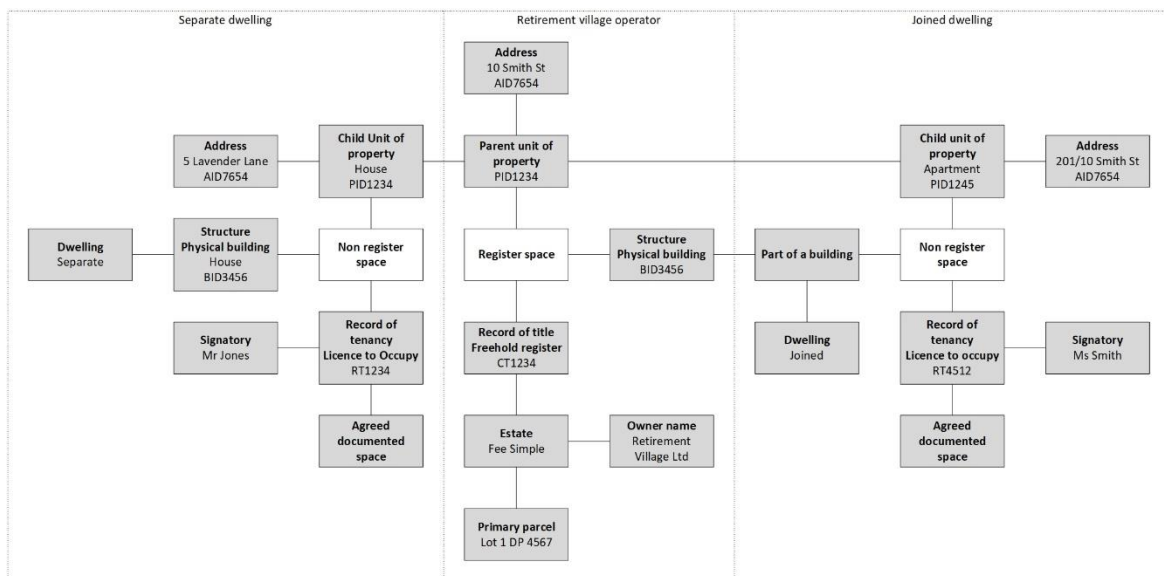


Figure 69: composite complex property with dwellings



# The Valuation perspective

## 24 The Valuation perspective

The Valuation perspective defines a unit of property based on the regulatory system local councils use to set their rates. For the purposes of collecting rates, a council maintains a district valuation roll that contains a list of all properties in their district, as defined for rating purposes. A property in a district valuation roll is represented by a rating unit. Each rating unit is identified by a valuation reference number.

A rating unit is a type of unit of property, and is based on ownership.

See:

- [24.1 Terms and definitions](#)
- [24.2 Rules for rating units](#)
- [24.3 Section 2.4.1 Land with a record of title](#)
- [24.4 Section 2.4.2 Land without a record of title](#)
- [24.5 Units of use to identify non-register space](#)
- [24.6 Rating unit as a unit of property](#)
- [24.7 Rating unit for state land](#)
- [24.8 Issues with rating unit as a unit of property](#)
- [24.9 Re-use ability of DVR audit files](#)
- [24.10 Example of a property with multiple rating units](#)
- [24.11 DVR situation address](#)
- [24.12 Comparing rating unit, title and parcel as a unit of property](#)
- [24.13 Units of use to identify non-register space](#)

Figure 70 shows the classes in the Valuation perspective.

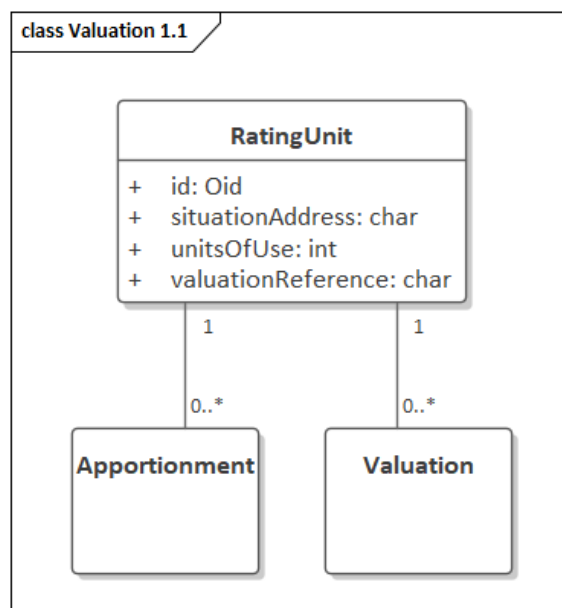


Figure 70: The Valuation perspective

## 24.1 Terms and definitions

### **Apportionment**

A method of calculating rates based on multiple land uses for a single rating unit, each use charged at a different amount.

### **RatingUnit**

A unit for the purposes of rates collection by territorial, regional and unitary authorities, as defined in Rating Valuations Act 1998, sub section 5B and 5C.

RatingUnit has the following attributes:

- id
- situationAddress
- unitsOfUse
- valRef

Other attributes may exist that we have not yet identified.

### **Valuation**

The rateable value, which is either capital value, land value or annual value depending on which is maintained by the territorial authority.

Capital value of land means, subject to sections 20 and 21, the sum that the owner's estate or interest in the land, if unencumbered by any mortgage or other charge, might be expected to realise at the time of valuation if offered for sale on such reasonable terms and conditions as a bona fide seller might be expected to require. (Definition sourced from the Rating Valuations Act 1998.)

Land value, in relation to any land, and subject to sections 20 and 21, means the sum that the owner's estate or interest in the land, if unencumbered by any mortgage or other charge, might be expected to realise at the time of valuation if:

- offered for sale on such reasonable terms and conditions as a bona fide seller might be expected to impose; and
  - no improvements had been made on the land.
- (Definition sourced from the Rating Valuations Act 1998.)

## 24.2 Rules for rating units

The rules for creating a rating unit are in section 5B and 5C of the Rating Valuation Act (Toitu Tē Whenua, 2008) and section 2.4 of the Rating Valuation Rules 2008 (Toitu Tē Whenua, 2010).

## 24.2.1 Other requirements

All rating units must have a physical address, called Situation Address in DVR data.

While many of the valuation attributes contained in DVR data make reference to buildings, there is no representation of individual structures or buildings in the DVR. There is no requirement for individual buildings to be identified.

## 24.3 Section 2.4.1 Land with a record of title

Section 2.4.1 of the Rating Valuation Rules (Toitu Tē Whenua, 2008) refers to land held in a record of title. The rating unit is formed from land contained in a record of title, or multiple records of title in common ownership. In certain circumstances the rating unit may be part of a record of title.

The applicable portions of the PDMF that contribute to this type of rating unit are UnitOfProperty, RegisterSpace, RecordOfTitle, and the classes contributing to RecordOfTitle.

In some cases a rating unit may be based on a lease, but the lease must be registered in Landonline meaning it will still contribute to a unit of property through RegisterSpace.

Land from Non-register space does not contribute to a rating unit. For example, an encroachment onto council land, or a rented property that is a portion of a larger owned property. However, the unit of property that is formed from a rating unit may contain non-register space.

Figure 71 shows the parts of the PDMF model that apply to the creation of a rating unit based on section 2.4.1 of the RVA, where the rating unit is formed from either one or many records of title

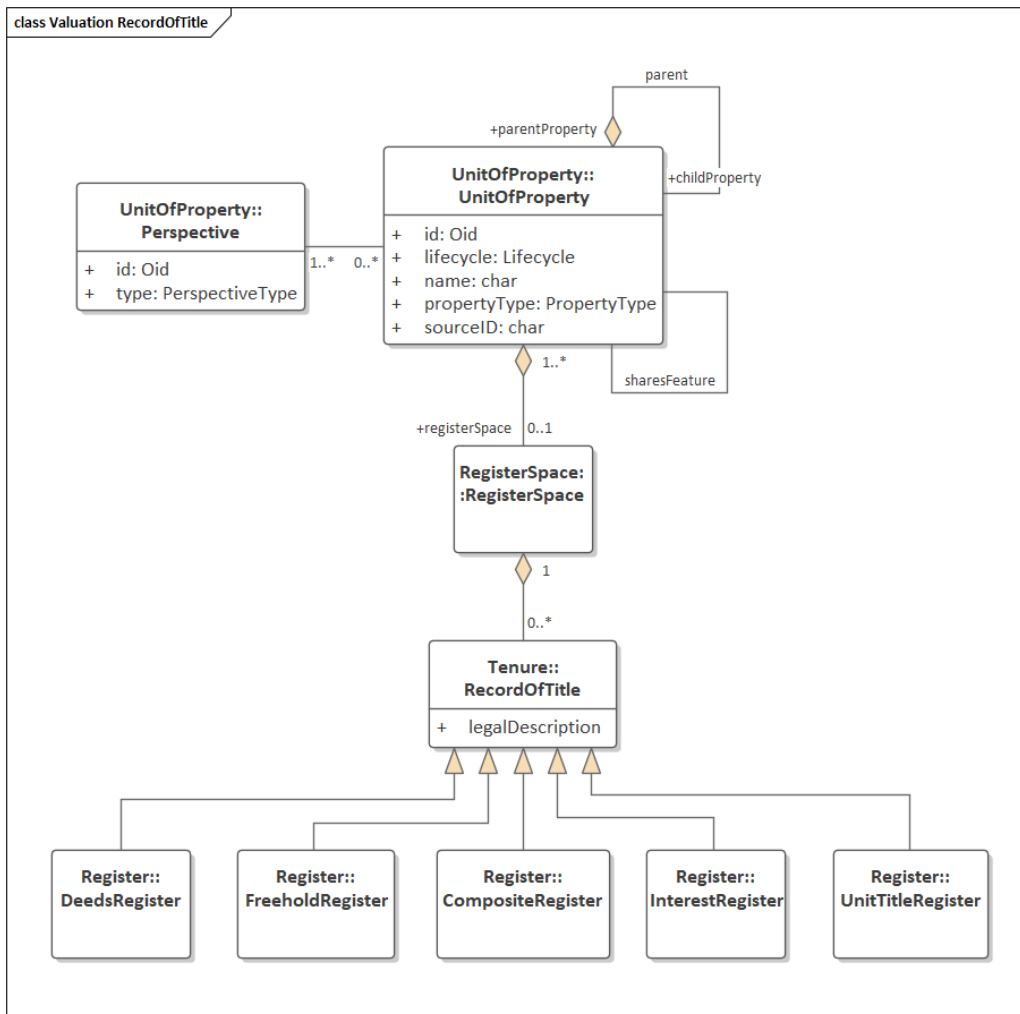


Figure 71: Section 2.4.1 key relationships for section 2.4.1

### 24.3.1 Rating units that are a portion of a title

The core PDMF model only allows entire records of title to form a unit of property. However, it is possible for a rating unit to be created for only a portion of the land contained in a record of title. Section 2.4.1.3 of the Rating Valuation Rules 2008 (Toitu Tē Whenua, 2010) says:

Part of a certificate of title constitutes a rating unit where:

- (a) The land is owned by the Crown and is developed other than as a single entity, as defined in rule 1. In this case:
  - (i) rating units must be created that correspond to the certificates of title that would have been created had the development been carried out by the private sector, and
  - (ii) rating units must be valued as if all necessary authorisations existed under the Resource Management Act 1991 for their creation as single certificates of title.



(b) The land has been surveyed and is subject to a separate lease registered under s 115 of the Land Transfer Act 1952 (LTA), for a term of not less than 10 years including renewals, and the lessee owns the improvements.

(c) Māori freehold land is subject to an occupation order under s 328 of the Te Ture Whenua Māori Act 1993, or an equivalent order made under a former provision.

However, another commonly identified situation where a rating unit is a portion of a record of title is where the land in the record of title spans a TA boundary. In this situation, section 2.6 of the Rating Valuation Rules (Toitu Tē Whenua, 2010) says that two rating units must be created, one in each TA, each containing only the land that lies within that TA's boundary.

To account for rating units that contain only a portion of the land in a record of title, an additional class, `PartRecordOfTitle`, has been added to the PDMF model. No instance has been identified in any other perspective where `PartOfRecordOfTitle` is required, so at this stage, this additional class is only available to units of property in the valuation perspective.

Figure 72 shows how we expect the class `PartRecordOfTitle` to fit into the PDMF model. `PerspectiveType` must be "Valuation". However, `PartRecordOfTitle` has not been tested and may change.

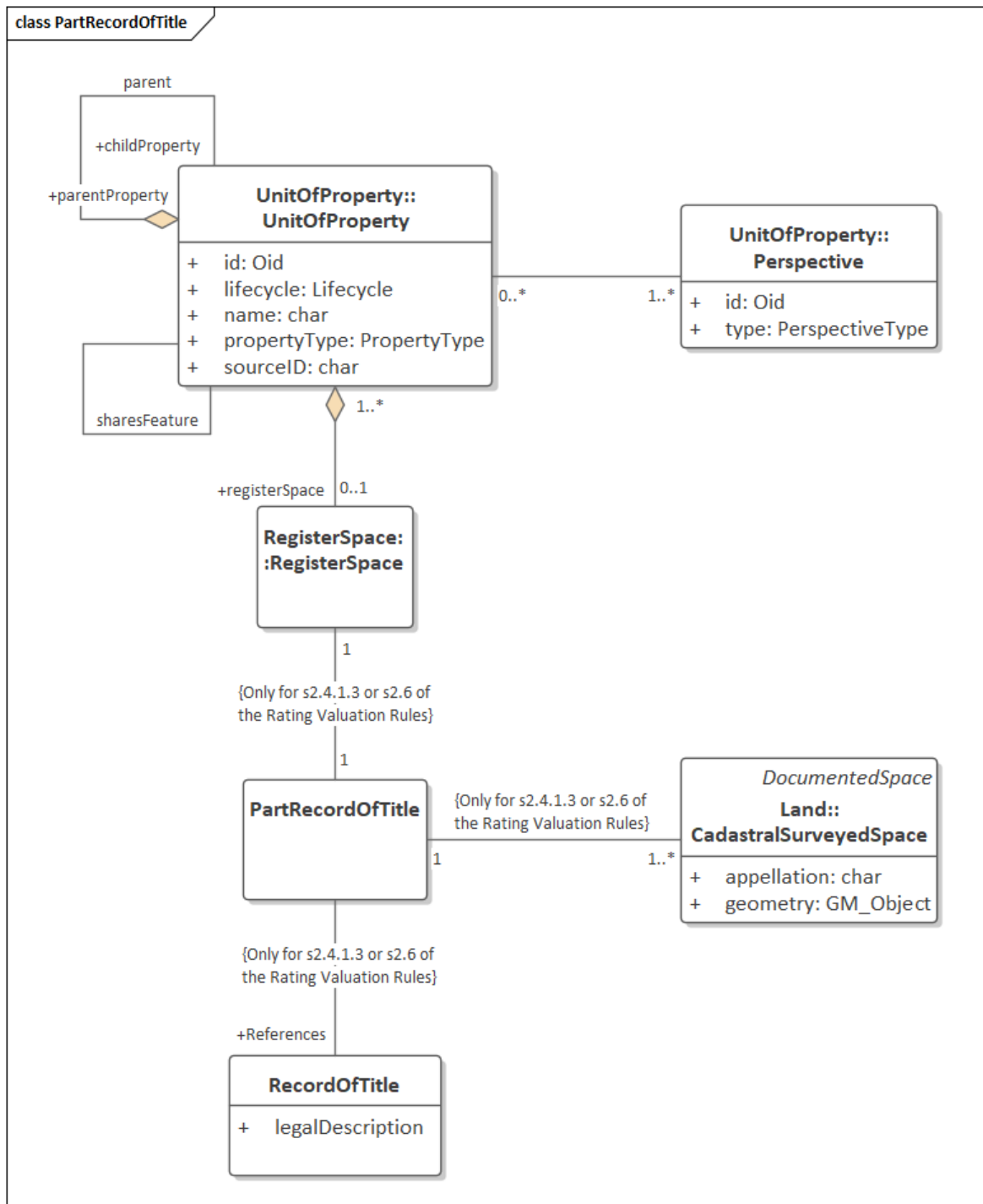


Figure 72: Part of a Record of Title

## 24.4 Section 2.4.2 Land without a record of title

Section 2.4.2 of the Rating Valuation Rules ((Toitu Tē Whenua, 2008) refers to land owned by the Crown where there is no record of title, and applies to the relationships between UnitOfProperty, RegisterSpace, RecordOfStateLand, and classes contributing to RecordOfStateLand.

The absence of a record of state land is discussed in section 10.1.4.

## 24.5 Units of use to identify non-register space

The unitsOfUse use attribute contained in DVR data could give a reasonable indication of NonRegisterSpaces that act as UnitOfProperty.

The Rating Valuation Rules 2008 (Toitu Tē Whenua, 2010, p. 49) say a unit of use is: "... each physical component within a rating unit, which is capable of separate use, constitutes a single unit of use. For example, a property comprising a dwelling and a flat must be recorded as having two units of use."

Not all units of use will be a non-register space that acts as a property, for example, a concession inside a national park. However, these should be a relatively small number compared to non-register spaces that act as property (for example, flats or shops).

## 24.6 Rating unit as a unit of property

The Rating Valuation Rules 2008, section 2.4 (Toitu Tē Whenua, 2010) defines rating units and in a way that is fairly close to what we expect a property to look like, in most cases. Rating unit is widely used as a default unit of property.

Analysis conducted using the Property Explorer showed that rating unit represents a unit of property better than either a single record of title by itself, a group of records of title (including those tied together by a memorial) or parcels.

However, rating units are defined by ownership and apply almost exclusively to units of property formed from register space.

We have identified the following areas where a rating unit will not align with a property.

- A unit of property is formed from non-register space.
- A unit of property is a mix of register space and non-register space.
- A property is a collection of rating units (because each rating unit is separately owned or owned/occupied under different tenure).
- A property is not contiguous and has to be split across several rating units in order to satisfy the rating rules.

Farms do not necessarily comprise contiguous areas of land or may be a mix of owned and occupied land. Rating rules mean that in some circumstances a farm operating as a single property may comprise a number of rating units. The same situation may apply to commercial land that has been redeveloped from small holdings into one larger retailer.

[23.11 Comparing rating unit, title and parcel as a unit of property](#) has more details and an example of this.

A unit of property formed from non-register space will generally not have a rating unit as it is about occupation, not ownership. The PDMF model considers many of these non-register spaces to be units of property in their own right because an occupier would consider the space that way. Examples include:

- Any residential rental unit, flat or apartment where the extent of the non-register space is not the same as the extent of the register space. Many of these spaces will have a unique address.
- Any commercial tenancy, for example, shops, where the extent of the non-register space does not match the extent of the register space. These spaces will have an address if they front to a street but may not have an address if they are inside a shopping mall.

Research conducted using the Property Explorer uncovered a number of problems when using the existing DVR datasets to build a unit of property according to the PDMF model. These problems are outlined in section 24.8 Issues with rating unit as a unit of property and section 24.9 Re-use ability of DVR audit files.

### **Possible use of ValRef as a unit of property ID**

We considered the potential of the valuation reference number (ValRef) as a unique ID for a unit of property. It is a unique property identifier for valuation purposes, providing an identifier for a rating unit. A ValRef is a composite identifier composed of three parts:

- roll number
- assessment number
- alphabetical suffix.

The Rating Valuation Rules 2008 (Toitu Tē Whenua, 2010) provide more detail on the composition of a ValRef.

Although ValRef could potentially be used as a unique ID for a unit of property within the valuation perspective, they are not ideal as a unit of property ID for the PDMF model.

They do not cover all perspectives of property or the types of units of property identified in the PDMF model (for example, leased or rented units of property that do not fit within the rules used to create rating units and apportionments).

Additionally, the ValRef is not unique through time as some territorial authorities reuse ValRefs. This means ValRef cannot be used for explicitly linking property records as, over time, it can appear as if a rating unit can relate to many Titles. ValRef cannot be used as a unique ID for a unit of property in any situation where there is a requirement to track change relating to a rating unit.

## 24.7 Rating unit for state land

Record of State Land can be used to create units of property for rating units comprised of state land. The Rating Valuation Rules 2008, section 2.4.2 (Toitu Tē Whenua, 2010) can be applied to substitute record of state land for instrument.

With some exceptions like road parcels and possibly some hydro parcels and riverbed parcels, all land in New Zealand is part of a rating unit. This means that even if the rating unit is zero rated, it is likely existing rating data could assist in creating a record of state land, as a rating unit contains some information on use, for example, the managing agency or school name.

See section 10.1.4 for more detail on Record of State Land

## 24.8 Issues with rating unit as a unit of property

The best-known type of unit of property is currently a rating unit, sourced from DVR data. However, there are some significant issues with the existing structure of DVR audit files that make it difficult to build a unit of property with accurate and complete links to parcel, title and address. Much effort and work is required to import, re-format and clean the DVR audit files.

Issues include:

- DVR audit files are presented as a flat file, either a spreadsheet or a CSV style text file. Format errors require manual intervention to fix.
- The structure of the file means that only one field is available for each datatype. This is a problem where there are two or more records for each datatype. For example, there is only one field for title, but many rating units contain two or more titles. This is a significant problem for the address, parce, or title information used to link information and create a unit of property and prevents a full spatial view of the property from being built.
- DVR audit files contain field length limits. Where the data exceeds this limit, it is simply truncated and information is lost.
- Where there are multiple titles comprising a rating unit, only the first title is listed in DVR audit files. There is a column indicating whether other titles are present (boolean, yes/no), but these other titles are not listed.

- There is no domain restriction (for example, limited to applicable codelist entry or validation against an authoritative source) on fields in DVR data, hence manual data entry causes many minor errors like spelling mistakes. Additionally, as there is no requirement to ensure entries match the authoritative source, data in DVR audit files will not exactly match the corresponding record in the authoritative source. For example, much data cleansing effort is required in order to link titles listed in DVR audit files to titles in Landonline (the authoritative source).
- The valuation reference number (ValRef) cannot be used as a unique identifier for either a rating unit or a property. This is because some territorial authorities re-use ValRefs when subdivisions occur, making a ValRef not unique to a rating unit.

## 24.9 Re-use ability of DVR audit files

If rating units are acquired through DVR audit files, then cleansing of the data is required, but once cleansed, our experience using the Property Explorer suggests there is approximately a 99 percent match between a title referenced in DVR data and a title in Landonline. This can then form the base for an initial set of units of property. However, where there are two or more titles in a rating unit, DVR audit file data may not reference all the titles. As at May 2017, approximately 80,000 rating units referenced more than one title.

Based on knowledge gained while developing the Property Explorer, the development team proposed the following key recommendations, centred on the ability of developers to use DVR audit files in an application development environment.

- **Accuracy**  
The audit file format should be designed to allow complete and accurate representation of rating data and should not impose any restrictions that impede its accuracy.
- **Machine-readability**  
The audit file format should be designed to make it as easy as possible to parse the files using a computer program.

The development team also made the following more detailed recommendations:

- **Require a relational data structure rather than a flat file**  
The format could be either JSON or XML.  
This will allow more accurate data to be provided and allow it to be processed more easily. Certain fields in DVR data inherently require multiple values – including titles and owners – this is better represented in a structured format. This change supports other recommendations below.

- **Require the files to use the UTF-8 character encoding**

The use of different character sets and, in some cases, mis-encoding of data makes DVR files difficult to process for analytical purposes. Requiring UTF-8 will ensure consistent data.

- **Eliminate field length limitations**

Certain fields, such as 'legal description' and 'improvements' are currently truncated due to historical field length limitations that do not apply to the originating databases but are mandated by the regulations.

These truncations reduce the accuracy of the data and could impede the ability to understand the nature of some rating units. There is no longer a technical justification for these limitations, therefore they could be removed.

- **Require all titles to be represented**

At present, only one title number is given in DVR audit files for each rating unit (the regulations only allow room for one). The data structure could be changed so that all titles that comprise a rating unit are identified - for example, in a JSON array.

Even if the physical extent of the property could be determined by the legal description alone, missing titles may still contain relevant information (for example, memorials covenants and so on).

- **Require title numbers to be correct**

Many rating units in DVR data are currently provided with title numbers that do not match a title in Landonline. For example, DVR data contains CT12/3456 but Landonline data contains SA12/3456).

- **Add units of use descriptions (rather than a single number)**

Instead of simply recording that there are two units of use, the unit of use field could specify the actual use. For example, a property with two units of use should specify that one is the upper flat and the other the lower flat, or that one is the main house and the other a separate granny flat. These could be referred to as occupations, and an occupation identifier could be provided along with an address.

- **Normalise building information**

Many fields of DVR data relate to the building(s) on a property (for example, building age, condition, construction and site cover). However, DVR data does not convey information well where there are multiple buildings.

Fields relating to buildings could be moved into a nested building structure (an array of buildings). This allows each building to be identified individually. A unique building identifier should be provided within this structure.

- **Add parcel number reference**

Some rating units (such as some Crown and Māori land) do not have titles. The land that these rating units are comprised of can only be identified from the legal descriptions. All land, however, sits on a parcel. Adding a parcel number field to DVR data could make it much easier to identify the land contained within these rating units.

- **Allow grouping of rating units**

Territorial authorities sometimes group commonly owned rating units together for billing purposes and/or consider them to be part of a single property. Providing an optional field, 'Group ID' or similar, would allow territorial authorities to convey this in DVR data.

- **Add a 'bounds' field**

To provide the most direct mechanism to see the extent of a rating unit, a 'bounds' field could be added. This could be a GeoJSON object representing the geographic extent of the whole rating unit. This would make it easier to see and verify the extent of a rating unit, especially for complex multi-titled or untitled land.

## 24.10 Example of a property with multiple rating units

Land that has been redeveloped from a number of smaller developments into one larger development can comprise multiple records of title, each with a rating unit if the titles are in different ownership. The new development may have lease agreements that allow them to occupy and redevelop the whole site. The example in figure 73 is based on a real-world property, with a single building (shown in grey).



Figure 73: Property with multiple rating units

The property is nine primary parcels, being all the land in Lot 1 to Lot 9. Originally nine separate properties, each property used to have its own address. Currently, as a single property, there is only one address, 31 Smith St.

There are four separate rating units (outlined in red in the diagram) because adjoining parcels can only be part of the same rating unit if ownership is the same. In this case, the occupying company (Two Ltd) owns one of the rating units (Lot 5). The other three separately owned rating units are all individually leased to Two Ltd, which is using the site as a single property for a large retail store. The local territorial authority refers to all four rating units as 31 Smith St because one retail store, in one building, covers them all and



emergency services would be expected to treat the whole area as one occupancy, even if there are different owners.

This is a good example where the perspective of the property does not align with either the underlying legal and physical arrangements, or the rating unit. However, the PDMF can correctly model this situation. The parent unit of property would be based on the single occupancy, with four child properties, one for each rating unit (equivalent to the register spaces). The parent unit of property would be addressed as 31 Smith St, with each child unit of property inheriting this address.

## 24.11 DVR situation address

An important attribute of a rating unit is the situation address. While there is no clear definition of a situation address, the commonly understood interpretation is that situation address is intended to be the physical location of the rating unit.

Many territorial authorities interpret the Rating Valuation Rules (Toitu Tē Whenua, 2010) to mean that a rating unit must have a situation address, but can only have one situation address. Using this interpretation, where a rating unit has only one street address, the street address is likely to be used as the situation address.

However, in some circumstances, a rating unit may contain more than one street address. Examples where this is likely to be the case include the following scenarios.

- Rating units that are corner sections, have dual frontages or multiple access points where each has been separately addressed.
- The address being used differs from the territorial authority address.
- The rating unit contains rented spaces (flats, shops and so on) that have been separately addressed.
- The rating unit is comprised of multiple titles, each of which has been separately addressed.
- The rating unit contains multiple buildings, each of which has been separately addressed.

It may be unclear which street address to use as the situation address. The result is that the address that populates the situation address field may not be an accurate reflection of the addresses that actually exist. In some cases, the situation address may be made-up and may not perform as an address should (for example, the situation address has 0 as a number meaning the address cannot be used to uniquely find a property).

Where a rating unit is behaving as a unit of property, it may not be possible to match the situation address to an officially allocated street address. This is a particular problem for unit title or cross lease units of property where the situation address is currently the only known source of a link to a street address (other than physically visiting the property).

We have identified two examples where a situation address may not be the appropriate street address: a 'sausage flat' example and a 'row of shops' example.

### Sausage flat example

A sausage flat is a row of joined flats on a single property. In this example, the single rating unit is a parent unit of property and contains four separately rented flats. Each flat is a child unit of property and each has been addressed separately, see Figure 74.

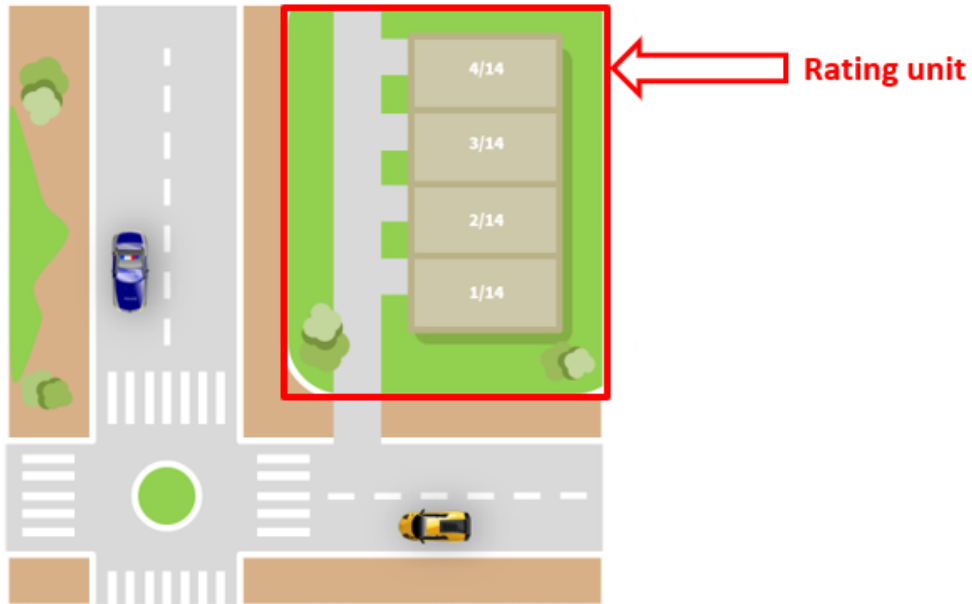


Figure 74: Rating unit with four flats

There is no address that could reasonably be described as the situation address for the rating unit. There are two options we know territorial authorities use to populate the situation address.

**Option 1.** Create a parent address as the situation address for the rating unit. In Figure 75, number 14.

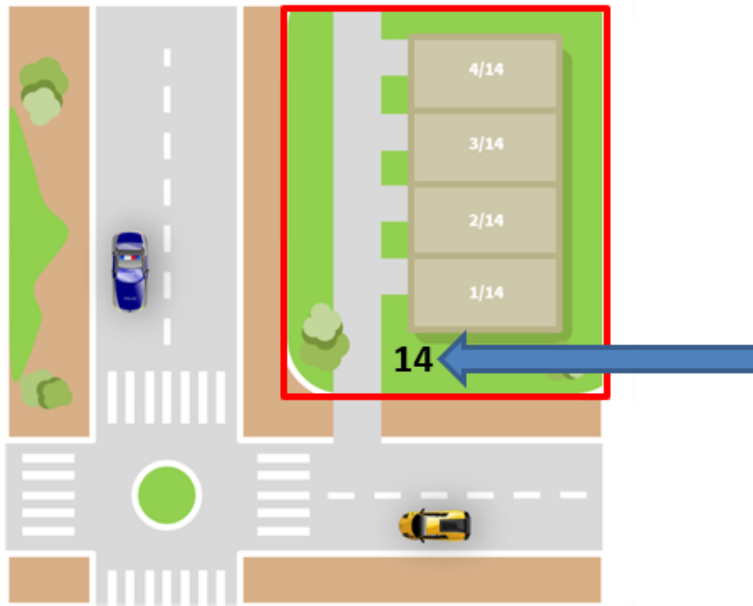


Figure 75: Parent address used for rating unit

While uniquely referencing the rating unit (parent unit of property), number 14 cannot be found on any of the letterboxes that may be present for the flats (child units of property). It does not individually identify any of the flats at the property so cannot be used as an address for physical delivery to a flat.

**Option 2.** An existing address is selected as the situation address. In figure 76, number 1/14.

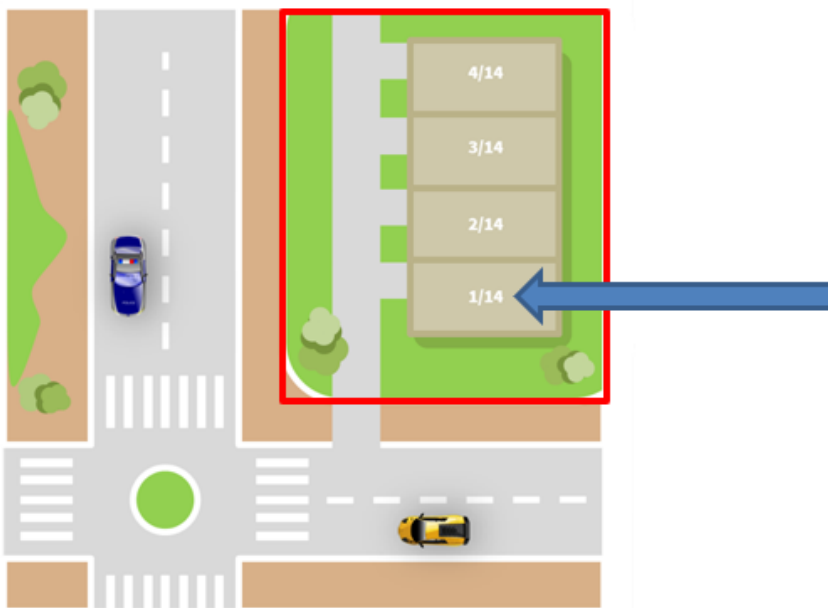


Figure 76: Sub-address used for rating unit

While number 1/14 is in use and can be found when physically arriving at the property, it is not intended to be the situation address for the rating unit (parent unit of property). The number 1/14 is allocated to a single flat only (a child unit of property).

Such a practice violates a basic principle of an address (an address uniquely determines an addressable object) and compromises the ability to uniquely link an address to a unit of property. In this case, number 1/14 should be uniquely and unambiguously identifying the front flat. If used for the rating unit situation address, number 1/14 is now referencing two units of property at the same time (the flat **and** the rating unit). Information relating only to the rating unit may be confused with information relating only to the flat.

### Row of shops example

This example covers a row of four joined shops owned by a single owner but individually rented. The single rating unit is a parent unit of property and contains four separately rented shops. Each shop is a child unit of property and has been addressed separately, see Figure 77.



Figure 77: Rating unit with four shops

There is no address that could reasonably be described as the situation address for the rating unit. There are two options we know territorial authorities use to populate the situation address.

**Option 1:** Create a range address as the situation address for the rating unit. In Figure 78, number 3-9.

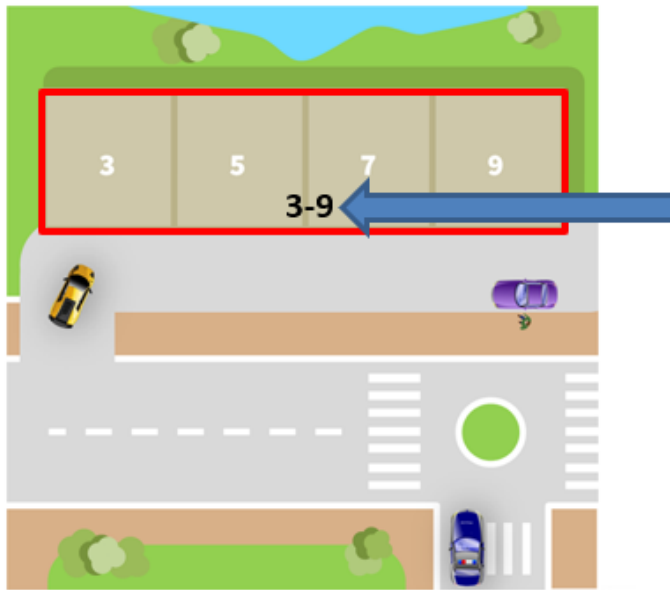


Figure 78: Range address used for rating unit

While uniquely referencing the rating unit (parent unit of property) number 3-9 is not found on any of the shop fronts (child units of property). It does not individually identify any of the shops, while at the same time grouping all the shops together. It cannot be used for delivery to any of the shops.

**Option 2:** An existing address is selected as the situation address. In Figure 79, number 5.

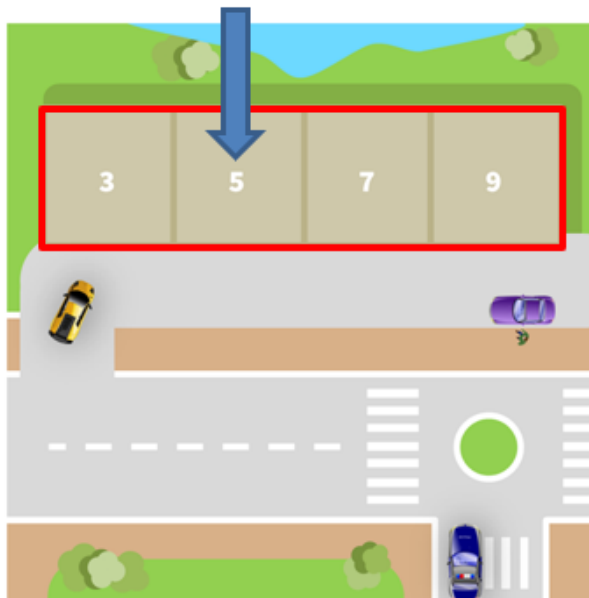


Figure 79: Shop address used for rating unit

While number 5 is in use and can be found when physically arriving at the property, it is not intended to be the situation address for the rating unit (parent unit of property). The number 5 is allocated to a single shop (a child unit of property).

Such a practice violates a basic principle of an address (an address uniquely determines an addressable object) and compromises the ability to uniquely link an address to a unit of property. In this case, number 5 should uniquely and unambiguously identify one of the shops. If used for the rating unit situation address, number 5 is now referencing two units of property at the same time (the shop and the rating unit). Information relating only to the rating unit may be confused with information relating only to the shop.

This may cause problems if the shop deals with a territorial authority for purposes other than rating (for example, number 5 may require a liquor licence).

## 24.12 Comparing rating unit, title and parcel as a unit of property

Our research found that many users of property information (including territorial authorities and third-party providers) use one of three existing proxies for unit of property: primary parcel, title or rating unit. However, we found that those working with valuation data often assumed that rating unit is the better unit of property. We tested that assumption.

Because this analysis compared rating units, we only considered units of property formed from register space. Units of property formed from non-register space were excluded from this analysis as they generally do not have a rating unit. Road and riverbed parcels were excluded for the same reason.

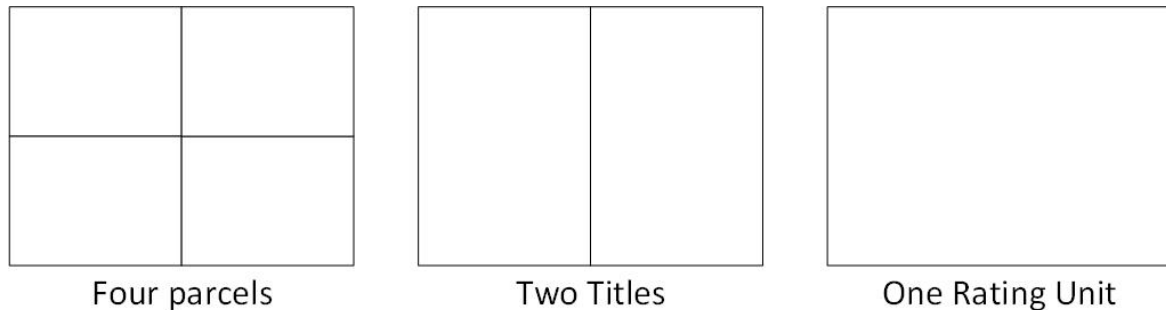
We assumed every unit of property has one address.

We thought about common situations we could identify, using spatial relationships, where a rating unit would not better represent a unit of property, and where a rating unit would better represent a unit of property than a title or a primary parcel.

We know that where a unit of property is composed of one primary parcel, one fee simple title, one rating unit and one address, each will act equally well as a proxy for unit of property.

We know that cross lease (10.6 percent of titles) and unit title (6.7 percent of titles) units of property comprise a title referring to a non-primary parcel that is only a portion of a primary parcel. We cannot clearly define the relationship between the address and the non-primary parcel, title or rating unit because we do not have a spatial representation of a non-primary parcel. Using existing spatial data, it would appear as if there are multiple titles and multiple addresses within a primary parcel.

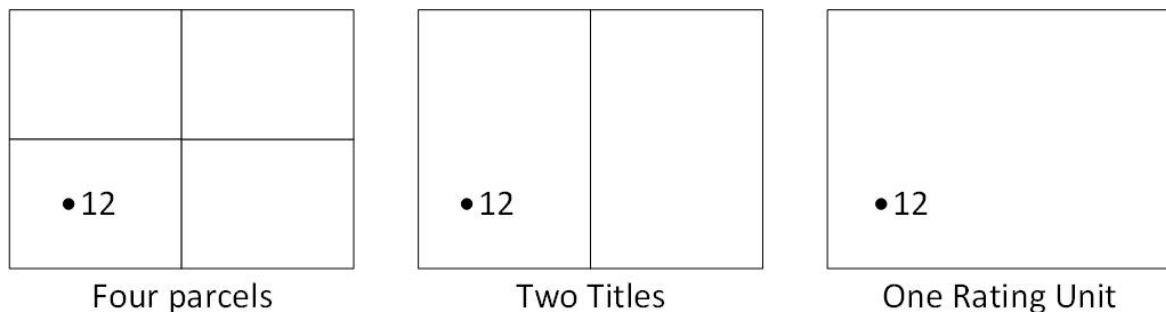
Figure 80 shows a unit of property with an arrangement of primary parcel, title and rating unit that would result in a rating unit being a better unit of property. In this example, the unit of property comprises four parcels, two titles and one rating unit.



**Figure 80: Single unit of property with four parcels, two titles, and one rating unit**

Properties like the one in Figure 80 comprise fee simple titles. In this situation, a primary parcel defines the land that the title contains. We know that a title can contain one or many parcels of land. We also know, from the Rating Valuation Rules (Toitu Tē Whenua, 2010), that a rating unit can contain one or many titles.

Figure 81 shows the situation in which, using our example from Figure 80 but with an address added, the rating unit remains a better unit of property.



**Figure 81: Single unit of property with one address**

If a rating unit is the better unit of property, when we look at the relationship between unit of property and address, the percentage of all primary parcels containing one address should be lower than the percentage of all titles containing one address, which should be lower than the percentage of all rating units containing one address.

Figure 82 shows how this would look like for our example unit of property.

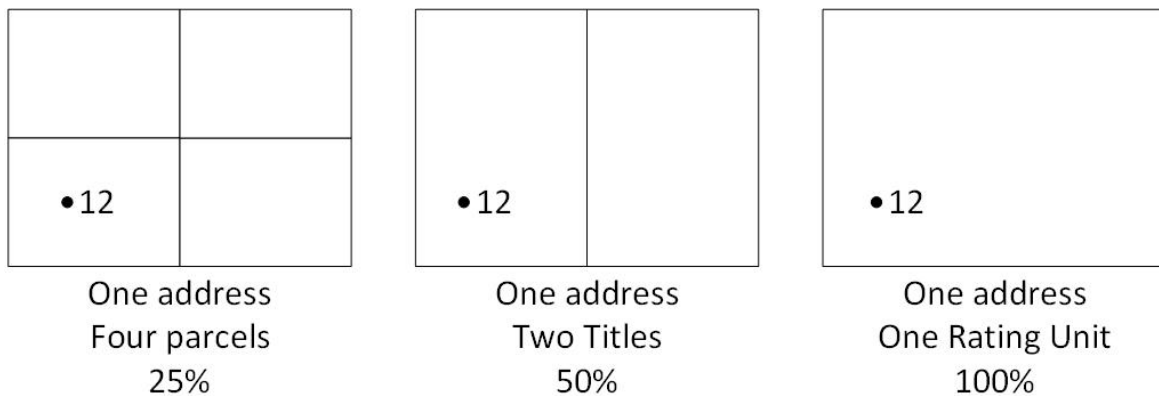


Figure 82: Parcels, titles and rating units containing one address

The reverse should also apply, where the percentage of all primary parcels containing no address should be higher than the percentage of titles containing no address, which should be higher than the percentage of all rating units containing no address. For our example this would be 75 percent (three of four) of the primary parcels, 50 percent (one of two) of the titles and zero percent (none of one) of the rating units.

Using real datasets and spatial analysis, we can count the number of primary parcels, titles and rating units containing one address point, and then compare the resulting figures to see which of primary parcel, title or rating unit is higher (when containing an address) or which is lower (when not containing an address).

### Limitations

The results of this analysis did not identify or determine individual properties. It looked for trends across all fee simple properties in New Zealand, based on information on how unit of property and address relates in a certain situation.

The method of determining the current state relationships is spatial. This means titles will need spatialising using primary parcels (for example, the property titles layer on the LDS) and rating units will need spatialising (using title and parcel information from DVR data). We assumed that DVR data is relatively complete.

### Results

We used data from Christchurch City Council, where we were able to make a mostly complete and accurate link between title, primary parcel and rating unit in order to spatialise the titles and rating units.

Table 4 presents the results. We found that the expectation that there will be a greater percentage of rating units (93 percent) with one address compared to title (92 percent) or primary parcel (86 percent) was true. Those primary parcels without addresses appear to have mainly aggregated into titles and rating units that only had one address, resulting in little actual overall change in the number of properties with one address.



The differences between primary parcel, title and rating unit suggest that a rating unit is a much better unit of property than parcel, and slightly better than a title.

Table 4: Comparing primary parcel, title, and rating unit as a unit of property

	Primary parcel		Title		Rating unit	
	Count	%	Count	%	Count	%
0 Addresses	12,590	11	5451	4	4153	3
1 Address	115,108	86	113,926	92	113,151	93

Source: Christchurch City Council data, 2017

Given that there are more total parcels than total titles than total rating units, the comparative figures need to be expressed as percentages of the total of that entity to account for the difference in totals across the three entities.

Also in line with expectations, the lesser percentage of rating units (3 percent) without an address compared to titles (4 percent) or primary parcels (11 percent) suggests that aggregating parcel and title into rating unit results in a better overall representation of unit of property.

## 24.13 Units of use to identify non-register space

The unitsOfUse use attribute contained in DVR data could give a reasonable indication of NonRegisterSpaces that act as UnitOfProperty in the Valuation perspective.

The Rating Valuation Rules 2008 (Toitu Tē Whenua, 2010, p. 49) say a unit of use is: "... each physical component within a rating unit, which is capable of separate use, constitutes a single unit of use. For example, a property comprising a dwelling and a flat must be recorded as having two units of use."

Not all units of use will be a non-register space that acts as a property, for example, a concession inside a national park. However, these should be a relatively small number compared to non-register spaces that act as property (for example, flats or shops).



# Supporting information

## 25 Supporting information

Chapter 24 contains material of interest to those wishing to further understand property information and how it is structured in New Zealand. This information gives a sense of scale on how many properties there are in New Zealand, the size and current state of the supporting datasets, and discusses some of the problems, issues, and inconsistencies we encountered as we tried to use the data in the Property Explorer.

Most of the information was gathered as part of the strategic assessment conducted in the first half of 2017 and the IPS Business Case conducted from mid-2017 to mid-2018.

Because datasets mentioned in this section were used in our research, some may not support the PDMF model. For example, when discussing DVR data, audit files may be mentioned. From the research we have done, we know that audit files are sometimes missing the information necessary to properly form units of property.

See:

- [25.1 Land tenure types in 2017](#)
- [25.2 Number of unit titles](#)
- [25.3 Number of cross leases](#)
- [25.4 Number of units of use that act as a non-register space](#)
- [25.5 Number of units of property](#)
- [25.6 Total number of addresses in New Zealand](#)
- [25.7 Value of properties compared to count of properties](#)
- [25.8 Using address to compare parcel and title](#)
- [25.9 Forming a unit of property using only register space](#)
- [25.10 Creating a record of state land](#)
- [25.11 Legal definition of parcel](#)
- [25.12 Availability of parcel datasets](#)

## 25.1 Land tenure types in 2017

New Zealand has a total land area of 268,000 sq km. Roads/rivers account for approximately three percent of land by area (8,040 sq km).

Local authority land is roughly four-five percent by area, but much of that is roading (10,720–13,400 sq km). Table 5 shows the approximate area of land in New Zealand by tenure type.

**Table 5: Area of land by type of tenure, 2017**

Tenure of land	Area	
	Percent	sq km
Māori freehold and customary	5–8	13,400–21,400
State	35–40	93,800–107,200
Private	52–60	139,360–160,800

When comparing private/Māori/state land to the total land area with a record of title, there is titled land across all these types. It is currently difficult to work out how much of each is titled. This means it is not possible to take the main types of titled land property (single title, multi-title, cross lease and unit title) and express them as a percentage of private land, Māori land or state land.

Some titles do not necessarily translate to a land area or overlap other titles, for example unit titles where the land area of the development is measured instead of each unit title.

## 25.2 Number of unit titles

As at May 2017, from Landonline data, there are a total of 141,479 unit titles spread across 14,158 developments. The majority of unit title developments are in the Auckland, Wellington and Canterbury land districts, with a notable number of the remainder in the Otago land district.

On average, each development contains ten unit titles. Auckland is slightly above the national average at 11 unit titles per development and Otago is lower than the national average at six unit titles per development.

Figures obtained in 2016 (e-Spatial) show that in Auckland in 2015, new dwellings in multi-unit buildings accounted for 43 percent of all building consents issued. The number of joined dwellings in Auckland is increasing, from around one in five (21.1 percent) in 2001 to nearly one in four (24.8 percent) in 2013.

Note: 'joined dwellings' includes fee-simple terraced housing developments. Some unit title developments may include stand-alone houses.

## 25.3 Number of cross leases

As at May 2017, Landonline data recorded a total of 214,704 cross lease leasehold estates. Most cross leases are located in the Auckland, Wellington and Canterbury land districts. Figures obtained in 2016 (e-Spatial) found that approximately 18 percent of all titles in Auckland and Christchurch were cross leases, but only about six percent of all titles in Wellington were cross leases.

Those cross leases are spread across 88,983 developments.

On average, each development contains 2.4 cross leases. This is reasonably consistent across the country, ranging from 2.19 in Nelson to 2.91 in Southland, with the notable exception of Otago, where the average is 8.8.

e-Spatial (2016) also found that "issuing of new cross lease properties has declined and this form of title is now predominantly only used for legacy titles held this way". This is thought to be due to the introduction of the Resource Management Act in 1991 classifying a cross lease as a subdivision.

## 25.4 Number of units of use that act as a non-register space

The units of use attribute in DVR data could give a reasonable indication of the number of non-register spaces that act as a unit of property. Not all units of use will be a non-register space that act as a unit of property, for example, a concession inside a national park. However, these should be a relatively small number compared to non-register spaces that act as unit of property (for example, flats or shops). It is not clear if tenancies inside large shopping malls are considered separate units of use.

Table 6 uses district valuation roll data from 2014 to 2017 to find the number of non-register spaces that act as a unit of property.

Table 6: Number of non-register spaces that act as a unit of property

Description	Count
Total number of units of use, for all rating units	2,247,072
Total number of rating units with units of use greater than two	120,134
Count of total number of units of use for rating units with units of use greater than two	398,642
Remove duplicated units of use to get a figure that approximates the number of non-register spaces where the extent of the non-register space is not the same as the extent of the register space (subtract 120,134 from 398,642)	278,508

This means there are approximately 278,500 properties composed entirely of non-register space. These are properties that cannot be identified using data contained within Landonline.

## 25.5 Number of units of property

For the strategic assessment we tried to estimate the total number of properties in New Zealand. While we found we could not determine a precise answer to the total number of properties, we could make an educated estimate.

One methodology we tried counts different types of titles in Landonline to give an estimate of owned properties (from register space), along with DVR data to estimate the number of occupied properties (from non-register space). It excludes state land without a title or Māori land without a title, as in these cases it is difficult to estimate how land is divided up (that is into a property).

We have assumed that rating unit is a reasonable existing proxy for a property.

The following 'known' properties are not captured as a rating unit:

- body corporates
- cross lease developments
- farms where land is not contiguous or there is a mix of register space and non-register space
- commercial tenancies (register space) where the extent of the rented space (non-register space) is not the same as the extent of the owned space (register space)
- residential tenancies (non-register space) where the extent of the rented space (non-register space) is not the same as the extent of the owned space (register space)

The number of farms and register space commercial tenancies are not counted due to the difficulty of obtaining an estimate figure.

Body corporates are estimated by counting the number of supplementary record sheets in Landonline.

Cross lease developments are estimated by counting the total of fee simple estates in Landonline **after** summing part share estates together to 100 percent.

Non-register spaces based on DVR units of use where the unit of use is two or more (but not including the first unit of use), provides an indication of the total number of non-register spaces.

Table 7 presents the results using data as at March 2017.

**Table 7: Number of units of property**

Description	Count
Total number of rating units in New Zealand	1,970,103
Number of supplementary record sheets in Landonline	14,158
Fee simple estates in Landonline after summing part share estates together to 100 percent	88,983
Non-register spaces based on DVR units of use, where the unit of use is two or more (but not including the first unit of use)	278,508
Total number of properties is 1,970,103 plus 14,158 plus 88,983 plus 278,508	2,351,752

An alternative, simpler methodology we tried is shown in table 8.

**Table 8: Alternative method to determine number of units of property**

Description	Count
Total number of units of use from DVR data	2,247,072
Number of body corporates	14,158
Number of cross lease developments	88,983
Total number of properties is 2,247,072 plus 14,158 plus 88,983 plus 278,508	2,350,213

The closeness of the two figures suggests we can estimate that there is about 2,350,000 properties in New Zealand.

## 25.6 Total number of addresses in New Zealand

New Zealand addresses are either allocated or unofficial.

An allocated address (or official address or formal address) is allocated by a territorial authority through regulatory processes, and accepted by Toitū Te Whenua.

An unofficial (or in-use) address is one that is in-use and/or has found its way into an information system but has not been created through regulatory processes.

As at May 2017, Toitū Te Whenua's Address Information Management System (AIMS) contained 1,938,341 addresses, almost all of which have been officially allocated by a territorial authority through existing regulatory processes and accepted by Toitū Te Whenua.

Of these, 933 are not located inside a primary parcel (most of these are located in road reserve).

The Toitū Te Whenua address dataset probably undercounts the total number of addresses in New Zealand by several hundred thousand addresses, for the following reasons:

- Toitū Te Whenua only holds addresses officially allocated by territorial authorities. It does not hold unofficial addresses that are in use.
- AIMS addresses are skewed towards residential properties (that is, Toitū Te Whenua does not hold as many non-residential addresses as it knows exists). This is because the main focus for Toitū Te Whenua collecting addresses has been to support the activities of the electoral commission in ensuring citizens can vote and there is no voter fraud.
- AIMS may lack sub-addresses for multi-unit developments like unit titled flats and apartment blocks.
- AIMS may represent addresses as a range (for example, 12–26), where each address should be recorded individually.

A rough, unvalidated assumption would be 1,938,341 plus 200,000, resulting in a total of 2,138,341 addresses in New Zealand.



## 25.7 Value of properties compared to count of properties

During the development of the Property Explorer, we noticed that properties composed of multiple titles seemed to be predominantly commercial properties (for example, farms). That led us to ask if there was a difference between the total count of a type of property, versus the total value of properties of that type.

Table 9 compares the main types of titled property we identified. Of particular note are multiple title properties. They are only 4.1 percent of the total number of properties, but are 13.9 percent of the value.

Table 9: Count and value of properties, by main type

Type		Count	Average value	Total value	Count (%)	Value (%)
Single title	Freehold	1,444,293	\$601,470	\$868,699,354,379	78.0	73.3
	Leasehold	6,043	\$466,644	\$2,819,930,900	0.3	0.2
	Cross lease	195,726	\$461,348	\$90,297,832,100	10.6	7.6
	Unit title	123,795	\$439,187	\$54,369,137,557	6.7	4.6
	Other	6,506	\$509,147	\$3,312,511,050	0.4	0.3
Multiple titles	75,694	\$2,180,167	\$165,025,586,410	4.1	13.9	
		<b>1,852,057</b>	<b>\$639,572</b>	<b>\$1,184,524,352,396</b>	<b>100.0</b>	<b>100.0</b>

The number of properties for each type of title is sourced from DVR data and based on rating units. These counts will be less than the number of titles of that type (if counted from Landonline data) because:

- some of the properties have multiple titles and are included in multiple titles
- some properties are not correctly referenced in DVR data.

The DVR data used here is also older than Landonline data used for comparison so it may not include some recent developments included in the Landonline data.

If the table is grouped by simple properties reasonably easy to work with (single title freehold) and complex properties difficult to work with (cross lease, unit title and multiple title), and excludes leasehold and other, the result is shown in Table 10.

Table 10: Count and value of easy and complex properties

	Count	Total value	Count (%)	Value (%)
Easy	1,444,293	\$868,699,354,379	78.0	73.3
Complex	395,215	\$309,692,556,067	21.4	26.1

Just over one quarter of the value of property in New Zealand is in property types that cannot be accurately and easily worked with in a digital environment.

## 25.8 Using address to compare primary parcel and title

The PDMF introduces the concept of a unit of property. However, without unit of property and without a link between an address and a unit of property, it is not possible to determine how many properties have an address using currently available data. However, primary parcels and titles are commonly proxied as unit of property.

Using data for all of New Zealand, we compared primary parcel and title to addresses in order to see which would be the better unit of property. We assumed that every property has one address.

We found that more titles can be tied to an address than primary parcels, suggesting that title is a better unit of property than parcel (see Tables 11 and 12). However, the mismatch of 11 percent suggests that title is not a perfect unit of property (assuming that all properties have an address).

Tables 11 and 12 show estimates made by looking at the spatial relationships between those entities and address. The tables have data from May 2017.

Table 11: Record of title represents a property

Title	Count	Difference from total (%)	Number (%)
Total number	2,162,194	-	-
Number that can be tied to address through parcel	1,924,075	238119	89
Number that cannot be tied to address through parcel	236,368	1925826	11

Table 12: Primary parcel represents a property

PrimaryParcel	Count	Difference from total (%)	Number (%)
Total number	2,528,947	-	-
Number with an address	1,937,408	591,539	76
Number with no address	881,288	1,647,659	34

### Limitations

Unit titles and cross leases cannot be spatially matched to an address through parcels, as there is no spatial representation of non-primary parcels on which to make the connection. There are 141,479 unit titles and 214,704 cross leases. Subtracting these from the total number of titles means that a maximum of 1,806,011 titles could theoretically have been exactly matched to an address spatially through parcel, where in fact 1,924,075 were - an overcount of 118,064.

The AIMS address dataset is estimated to be at least 200,000 addresses short. This shortage is thought to be largely due to many cross lease and unit titles having only a primary address recorded in AIMS, which would result in an overmatch of title to address.

## 25.9 Forming a unit of property using only register space

During the strategic assessment, some thought was given to the viability of forming units of property exclusively using Landonline data (for example, parcel, title and memorials, and other information where identified). The resulting number of units of property could be compared with the number of rating units to test the completeness of the result, and the viability of creating a unit of property in this way.

A tentative method was developed; however, we did not carry out this analysis. The method does not use address information.

We expect that the method would result in a total count of units of property close to, but slightly higher than, the count of rating units. This is because it is likely that not all aggregations of record of title can be identified due to:

- the owner's name for parcels in common ownership not identically recorded on each title in Landonline.
- inability to identify common use from Landonline.
- not all instances of 'contiguous except where separated by road or river' able to be identified.

Contiguous means the parcels are adjacent to each other with a coincident boundary but may be separated by a maximum of one road or river.

Primary parcels with the purpose road or hydro are excluded as they do not form units of property similar to a rating unit. Non-primary parcels for unit titles and cross leases are included, but non-primary parcels for easements, covenants and so on are excluded as they do form units of property similar to a rating unit.

The tentative method we developed is:

- 1) Determine the total count of parcels.
- 2) Determine the total count of titles.
- 3) Determine the count of titles that reference only one parcel.
  - a) Reverse check: Determine the count of parcels referenced in the titles. The figure in step 3 should be the same as the figure in step 3a.
- 4) Determine the count (distinct) of titles tied together by a memorial or ownership. This will require the titles that are tied together to be merged and the resulting number counted. For example, two titles tied together by a S75/77 counts as one. Three contiguous titles in common ownership counts as one.
  - a) Determine the count of ties based on common ownership of contiguous parcels.
  - b) Determine the count of ties based on Building Act s75/s77.
  - c) Determine the count of any other option for tying together titles.

- d) Determine the count of parcels referenced in all tied titles.
- e) Add together 4a, 4b, 4c and 4d to determine the count of all tied titles.
- 5) Add together the figures from step 3 and step 4e. This count is the total number of units of property.
- 6) Determine the difference between the figures from step 2 and step 5. The bigger the number, the less well title acts as unit of property.
- 7) Determine the total count of rating units.
- 8) Determine the difference between the figures from step 7 and step 5.

If the figure from step 8 is a small number (for example, a difference of less than 5%), then it may be assumed that both rating unit and this method may be substantially equivalent proxies for unit of property.

If the figure from step 8 is significant (for example, a difference of more than 5%), it may be due to an exception listed in step 4, or another reason we haven't identified.

If the figure from step 8 is significant (for example, a difference of more than 5%), and cannot be accounted for by any exceptions, it may be that this methodology is not valid.

- 9) Determine the count of parcels without a title
- 10) Determine the difference between the figure in step 1 and the figures in steps (3a + 4d + 9). The larger the difference between the figure in step 10 and the figure in step 5, the less valid the result in step 5.
- 11) Determine the difference between the figures in step 2 and steps (3 + 4e). The larger the difference between the figure in step 11 and the figure in step 5, the less valid the result in step 5.

## 25.10 Creating a record of state land

Research conducted using the Property Explorer found a number of difficulties creating units of property for state land. Some of the difficulties identified and some of the solutions we considered are discussed below.

### Gazette notices

Only gazette notices in the [New Zealand Gazette](#) from 1993 onwards are digitised. Prior to 1993 only paper records, or images of paper records, exist. As older gazette notices are not available for digital use, it is difficult to form a complete view of any property held by a state sector agency that relies on gazette notices prior to 1993. These gazette notices are also not available to automatically match against a rating unit.

Where gazette notices are available digitally, they are often too vague to be useful for computationally linking property components.

See, for example, notice 2014-3042: [Land set apart for scenic reserve purposes-State Highway 2 Western Hutt road, Petone, Hutt City](https://gazette.govt.nz) (<https://gazette.govt.nz>).

## Appellations

Appellations have potential for linking state land as Landonline data contains the following useful columns:

- sub\_type (for example, DP)
- appellation\_value (for example, 1418)
- parcel\_type (for example, LOT)
- parcel\_value (for example, 3)
- par\_id (for example, 4305020).

This may provide an opportunity to build up a legal description from these columns, and then match that against a rating unit legal description. This could result in a parcel to rating unit mapping for all New Zealand.

However, there are issues with the uniqueness of the mappings of legal descriptions. For example, when searching for an appellation with LOT 1 DP 1418, overlapping records are found, see Table 13.

Table 13: Overlapping records from same legal description

Appellation	ParcelDesc	ParcelId
DP1418	LOT1	4765238
DP1418	LOT1	3013078
DP1418	LOT1	3254611
DP1418	LOT1	3686118
DP1418	LOT1	4134909
DP1418	LOT1	4765238

## Statutory actions

Statutory actions are recorded against a parcel and provide details about the purpose of a parcel (for example, 'State Primary School New Zealand Gazette 1969 p 2634' for Karori Normal School), as well as the details needed to find the most recent Gazette notice describing what the parcel is gazetted for. However, the Gazette issue number would still need to be known to get an exact match. This is only possible for digitised gazette notices (post-1993).

### Re-use local authority data

Some local authorities maintain a mapping of all parcels to rating units. This means there is an exact match for state land parcels to rating units.

### Legal descriptions and legal\_description\_parcel

Using DVR audit file data from 2015 to 2017, we found 26,135 legal descriptions in Landonline that match a rating unit legal description exactly and 1,981,580 legal descriptions that don't.

A similar mismatch also occurs when using legal descriptions from property datasets maintained by central government agencies. For example, the legal description 'PT LOT1 DP1418 LOT1 DP57731 PT LOT1 DP 33366 LOT1 DP87635 LOT1 DP90089 LOT3' sourced from DVR data is made up of many parcels referenced in deposited plans that overlap with other legal descriptions in other deposited plans.

Table 14 shows an example of one legal description (Lot 1 DP 1418) found in four different rating units. However, DP 1418 does not exist in the Landonline legal description table. This means it is not possible to accurately and automatically identify the land that comprises the rating unit.

Table 14: One legal description found in four different rating units

ValRef	Address	Legal description
8070-1600	28 Kipling Road	LOT 1 DP 1418
25791-44312	57 La Fontaine Road	LOT 1 DP 1418
2241-42500	Pah Road, Royal Oak	PT LOT1 DP1418 LOT1 DP57731 PT LOT1 DP 33366
n/a	n/a	LOT1 DP87635 LOT1 DP90089 LOT3

Several tools have been explored to assist with text matching of legal description:

#### Exact matching

- Using sql queries to find exact matches between rating units, legal descriptions and other datasets returns only a small subset that have matching legal descriptions.

#### Fuzzy matching

- Several fuzzy text matching libraries were tested to try matching legal descriptions; however, they all run into the same issue of many descriptions being extremely similar due to having the same structure. The result is they have difficulty distinguishing different DP numbers.
- Algorithms explored for fuzzy matching:

- Levenshtein (also known as match difference)
- Soundex (also known as match soundalikes)
- Double Metaphone (also known as better soundex)
- Trigrams (match misspellings)

None of these techniques gave good results on matching legal descriptions. This was due to the overwhelming number of false positives caused by too much similarity.

## 25.11 Legal definition of parcel

There are a number of different types of land parcel. The PDMF model is mostly concerned with primary parcels and non-primary parcels, as these form most properties in New Zealand. They are defined in the Cadastral Survey Rules 2021 (Parliamentary Counsel Office (2017)) and are part of the [PDMF Land package](#).

There are other sorts of parcels defined in the Cadastral Survey Rules 2021, but their definitions have not been included in the PDMF model:

- residue parcel
- underlying parcel
- balance non-primary parcel.

In addition, the Standard for lodgement of cadastral survey datasets (Toitu Tē Whenua, 2013) provides information about spatial and aspatial parcels. Of note to the PDMF model is section 4.5: Capture of non-primary parcels and centreline easements, in particular, clause (c):

- Irrespective of (a) and (b), parcels must be captured as aspatial parcels and defined on a plan graphic where the parcel is defining a right:
- (i) under the Unit Titles Act 2010, or
  - (ii) when associated with a company or cross lease.

This clearly states that the space for each unit title and cross lease is a Non-primary Parcel, even if the parcel does not have a spatial object captured (is aspatial).

## 25.12 Availability of parcel datasets

Toitū Te Whenua makes parcel datasets available via the LDS. The LDS was our source of parcel data for the Property Explorer. However, we found that the LDS delivers a variety of parcel datasets. One set of tables replicates the structure in Landonline, and this is the data we used in the Property Explorer. Another set of tables has been manipulated by the Toitu Tē Whenua open data and reuse team for easier use in GIS systems. We found that these tables may not appropriately support PDMF-based property information systems.

See Table 15 for a list of the manipulated tables and why they should **not** be used in PDMF-based property systems.



Table 15: Parcel datasets

Dataset name	Content of dataset	Description of the dataset	PDMF considerations
NZ parcels	<b>Primary parcels and non-primary parcels</b>	All cadastral parcel polygons and some associated descriptive data that details the appellation (legal description), purpose, size and a list of titles that have an interest in the parcel.	Attribution of a title to a parcel breaks PDMF relationship.
NZ primary parcels	<b>Primary parcels</b>	The current primary parcel polygons and some associated descriptive data that details the appellation (legal description), purpose, size and a list of titles that have an interest in the parcel.	Attribution of a title to a parcel breaks PDMF relationship.
NZ primary land parcels	<b>Subset of primary parcels</b>	This layer provides the current land parcel polygons with associated descriptive data and is provided for users that require a separation of road parcels and hydro parcels and thereby require the balance layer.	Attribution of a title to a parcel breaks PDMF relationship.
NZ primary road parcels	<b>Subset of primary parcels</b>	This layer provides the current road parcel polygons with associated descriptive data.	Attribution of a title to a parcel breaks PDMF relationship.
NZ primary hydro parcels	<b>Subset of primary parcels</b>	This layer provides the current hydro parcel polygons with associated descriptive data.	Attribution of a title to a parcel breaks PDMF relationship.
NZ non-primary parcels	<b>Non-primary parcels</b>	The current non-primary parcel polygons (for example, easements) and some associated descriptive data that details the appellation (legal description), purpose and size.	Does not include non-primary parcels without a spatial extent. Attribution of a title to a parcel may break PDMF relationship.
NZ non-primary linear parcels	<b>Subset of primary parcels</b>	The current non-primary linear parcels (for example, Centreline easements) and their associated descriptive data as a single layer to facilitate their use independently of other non-primary parcels.	Attribution of a title to a parcel may break PDMF relationship.
NZ strata parcels	<b>Subset of Non-primary parcels</b>	Portions of land where the vertical extent is limited.	Attribution of a title to a parcel breaks PDMF relationship.

## 26 A note on lifecycle

Chapter 25 presents a brief summary of our thinking on lifecycling in the PDMF model. It does not provide any detail on how to implement lifecycling using the PDMF model.

The PDMF model treats the associations between classes as data in their own right. These relationships bind together classes, each of which has its own lifecycle.

In order to fully model, and be able to connect changes through time, it is not enough to solely lifecycle the classes. The relationship between the classes must also be treated as an object with its own lifecycle and identity, and recorded as such.

While some classes contain basic lifecycle attribution, the initial development focus has been on identifying the classes and relationships and building the model. For this reason there is little detail in this version of the PDMF model about how relationships should be treated over time.

### 26.1 Changes to unique identifiers

We have some preliminary thoughts about the use of unique identifiers to record change, and what the rules could be when changes occur to the ID of an address, addressable object and the relationships between them.

We considered two options for how to model changes to the ID of an object for these scenarios:

- **'INSPIRE' method** – lifecycling is performed on the component object. For example, a change to a road name is lifecycled on the road segment, and not on the address. The change does not generate a change of ID of addresses on that road. Only a change to the location and number of an address results in the address being retired and a new one created (with a new ID).
- **'Common' method** – a change to any component of an address that defines the national uniqueness of an address, causes the existing address to retire and a new address to be created (with a new ID).

We prefer the common method because it does not have the lack of clarity around location inherent in the INSPIRE method. It is easier to understand and allows for a full, chained and connected, history through time to be achieved.

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