The **Green Construction Board**

Valuation and Demand Working Group

Project GCB610 – Mapping the ReaL Estate Lifecycle for Effective Policy Interventions

1 Introduction

The real estate market is characterised by multiple interactions between many parties across a lifecycle of several decades, and in some cases centuries. The profound social, economic and environmental significance of buildings, together with their lengthy and complex lifecycles, mean that achieving the relatively rapid changes required to meet the UK's climate change and other commitments will require carefully crafted and targeted interventions.

With these challenges in mind, the Valuation and Demand Working Group of the Green Construction Board (GCB) commissioned three related studies to consider the role of property policy in helping to achieve UK sustainability goals.

This project, undertaken by Sweett Group, SIAM and Kingston University, reviews the real estate life cycle and examines the stakeholders, direct and indirect, involved in decision-making through a building's physical life. It identifies the influences and motivations of key players throughout the lifecycle, thereby highlighting opportunities to achieve carbon savings by strengthening existing interventions or targeting opportunities that are not being fully exploited.

Method

The research involved a literature review and a series of semi-structured interviews with around 40 relevant stakeholders (listed in Appendix A); other informal consultations also took place. The interviewees spanned the whole real estate lifecycle for both domestic and non-domestic sectors and included those working in sustainability-related roles and others with different expertise. No individual householders or SME tenants were interviewed but consultees included representatives and consultants working with these groups.

Interviews were conducted between June and October 2013. Further team meetings and a workshop enabled discussion and development of ideas.

The findings of the interviews were reviewed and from this a diagrammatic representation of real estate life cycle activities was developed. This identified that activities could be designated as either design/physical or economic/management. Often economic issues trigger management decisions which may, or may not, have physical consequences.

Once identified, these events were tabulated according to:

- The frequency with which they normally take place (e.g. redevelopment is a 'rare' event; paying rates and utilities is 'constant', whilst for investment properties, rent reviews and lease renewals are 'periodic');
- The estimated proportion of properties affected, both domestic and non-domestic, (for example, all properties are subject to repair, but not all have leases and few have planned preventative maintenance programmes);
- The current main policy interventions associated with the activity (for example: EPCs on sale/letting; planning and Building Regulations for (re)development); and
- In the light of the interview findings, the views as to whether the impact of current interventions is high or low and the potential for future interventions.

The resultant analysis enabled the activities to be placed into quadrants according to their actual and potential impact and by frequency. These findings are shown schematically in **Figure 1.** Selection of each activity displays relevant information on the lifecycle stage and the opportunities to further develop its contribution to energy and carbon savings.

2 The Life Cycle

Most depictions of the real estate life cycle are biased towards design and construction and do not provide a representative view of the key opportunities for energy and carbon reduction. Some representations acknowledge the impact of economic and management decision-making, but still place emphasis on physical events.

In reality, the real estate lifecycle comprises economic triggers and resulting design / physical responses. There are many more economic and management events in the lifecycle than design / physical activities; furthermore they tend to occur more frequently. Indeed, some events occur almost constantly e.g. payment of rents, taxes, rates and utilities, whereas others, such as lease renewals, are less frequent or, in the case of owner-occupied properties, do not occur at all.

Figure 1 provides an alternative way to illustrate the lifecycle in terms of events which are routine or frequent and those which are rare (horizontal axis). It also shows the impact of each event on energy and carbon (vertical axis) and the proportion of UK real estate affected (size of box). Each quadrant is described in more detail below.

Quadrant 1: Higher impact; higher frequency:

Key events include both design/physical and economic/management activities, but are concentrated on the latter.

The occupier's management of the building and the associated payment of energy costs are linked to, and have an impact on, energy consumption and carbon emissions, but at present this impact is not financially or socially significant for many occupiers. Significant potential savings can be achieved through effective building management (domestic and non-domestic) and many studies have shown that management is a key influence over building performance.

Building management and payment of utility bills are routine and can be considered frequent, affecting all stock, though to differing degrees[1].

Planned maintenance provides opportunities to upgrade asset performance and ensure effective operations of current assets. Undertaking works 'in use' e.g. during a period of continued leasing is often a significantly more expensive and complex undertaking. However, it may be required where current services are not fit for purpose.

Activities in this quadrant are generally lightly regulated, even where the level of spend and potential impact is high. In some limited cases, they are subject to mandatory reporting regulation (CRC), but these affect few buildings, even within the commercial sector, and none in the domestic sector.

Increasing the proportion of buildings subject to energy management and good quality planned maintenance would deliver quick wins due to the frequency and potential impact of these activities. At present drivers are relatively weak, despite energy costs being important for some occupiers.

Quadrant 2: Higher impact; lower frequency:

This quadrant contains activities related primarily to development and other significant physical events such as major refurbishments. Policy has primarily focused on these events through the operation of planning consents and Building Regulations.

Events in this quadrant deliver long-term upgrade of the building stock; however, their infrequency means that progress is slow. Further, these benefits are only fully realised if the building is operated and maintained to a high standard (see Quadrant 1).

[1] e.g. for a prestige office this might involve a sophisticated management system, whilst for a home it could be little more than considering the set point of the heating system.

Consultees felt that Building Regulations and planning are generally effective and respected mechanisms, with Building Regulations being the most appropriate intervention for designing in energy efficiency. The influence of planning consents has reduced recently due to the increased number of 'deemed' consents under the General Permitted Development orders. This is particularly the case for the domestic sector. Concerns were also raised about the training and experience of committee members and even planning officers in relation to technical energy and construction matters.

Although policies affecting this quadrant have been successful in driving improvements in energy and carbon design, they are ineffective in predicting or controlling subsequent energy use and enforcement is considered to be insufficiently rigorous. The research showed support for tightening of standards, with stronger enforcement and penalty regimes. There was concern that loosening of planning controls could have unintended consequences for energy and carbon efficiency.

The research found that many schemes initially aspire to high performance, but that design characteristics are compromised during the development process to reduce cost. Energy efficiency will not be compromised if, and only if, it translates into market value, or where compliance is an essential enabler of wider business activities. Evidence suggests that a link to value is weak except in some sub-markets and that current compliance regimes to not typical require aspirational standards to be demonstrated in practice.

These events already have a major impact on buildings and are essential to the success of any developer. Given their rarity and significance, every effort should be made to lock in high performance and ensure that these benefits are achieved in practice.

Quadrant 3: (Bottom Left) Lower impact; higher frequency:

This quadrant primarily includes management/economic events such as payment of business rates/council tax and debt repayments. Also included, but occurring less frequently, are rent reviews and lease renewals. Regular maintenance, re-fit and 'churn' activities, which help improve building management and make incremental performance improvements are also included in this quadrant.

Some sales may also fall into this sector (if not Quadrant 4). Several of these events affect all properties (e.g. payment of business rates or council tax), while others are limited to leased buildings or those for which there are borrowings. Regulations, such as Minimum Energy Performance Standards, will increase the significance of lease events for rented buildings helping to drive physical interventions; however these measures do not address in-use performance or the large proportion of buildings that are owner-occupied.

Events in this quadrant are not currently strongly linked to energy use or carbon, but might have significant potential as mechanisms for performance-based incentives or choice editing. These might include incentives to provide variable rates of council tax, business rates or insurance premium tax. Experience from other sectors (e.g. vehicles) suggests that even relatively small performance-based incentives can help drive behaviour change.

While there is a potential opportunity for lenders to drive change by placing requirements on borrowers, the research revealed little evidence of this in practice as energy/carbon performance is not currently seen as a material risk to the lender's security which links back to a perception of a weak relationship between energy/carbon and market values. Some small movement was identified in the domestic mortgage market, where household expenditure is becoming more thoroughly considered in loan affordability assessments.

Ultimately, behaviour change will only be affected when the impact of energy consumption and the associated carbon emissions is such that landlords and occupiers

are motivated to take action to reduce their costs, secure associated incentives or, most powerfully, maintain the ability to transact or secure income and debt from a property.

Events in this quadrant have the potential to leverage change. Minimum Energy Performance Standards are significant as they will target lease events but they will only impact potential performance for rented buildings. Further measures to incentivise actual performance outcomes could be applied to target a far wider range of occupiers.

Quadrant 4 (Bottom Right) Lower impact; lower frequency:

In this quadrant events are concentrated in the economic/management cycle. They include capital transactions (if not in Quadrant 3), together with longer commercial lease transactions (primarily those of 10 years and above on full repairing and insuring terms) and financial restructures. Owners are required to provide an EPC on sale, but currently this has little impact beyond those described previously for Minimum Energy Performance Standards (where the building will be subsequently let).

There is some potential to target this quadrant, although the limited and unpredictable frequency of events means that some properties will remain unaffected for long periods[2]. One option might be to link incentives to sales events (e.g. a link between stamp duty rate and EPC rating), although this would, again, link only to theoretical rather than actual operational performance. There is some evidence that home owners are more likely to make improvements to their homes in the first 12 months after purchase, so an incentive linked to the sales process (with some retrospective action) could prove effective.

In general, these events have less potential to trigger energy or carbon saving. However, effective interventions could be linked to residential sales, where sales typically bring a change of occupier and an increased willingness to undertake improvements.

3 Participants

Principals

Participants with legal interests in real estate are diverse and respond differently to energy efficiency interventions. Whilst they can be categorised into easily identifiable groupings (e.g. developers, landlords and occupiers), these labels disguise significant variations within each group:

- **Developers often have only a transitory interest.** Maximising the gross development value of the scheme and ensuring its saleability may be the primary drivers, but cost containment is also critical. Energy efficiency over and above levels of compliance becomes a driver only if and when it is a desirable attribute which will enhance the return or reduce the risk to the developer. The impact of cost, combined with a lack of an eventual price differential to support going 'beyond compliance' means that compliance is often a ceiling, not a floor, to standards.
- **There are many different types of landlord.** Whilst most are interested in optimising their risk/return ratio, not all landlords are 'deliberate' investors (e.g. occupiers sub-letting surplus space).

[2] This is not necessarily a bad thing, e.g. linking an incentives / penalty to sales is one means of achieving a 'soft start' policy introduction as only a proportion of properties will be affected in any given year.

Further, charities, public bodies, overseas-based investors and high net worth individuals may all react differently to interventions to enhance energy efficiency.

- **Owner-occupiers dominate both in numbers of holdings and in energy terms.** Overall, approximately 65% of the residential market is owner-occupied, with the figures being just over 50% for commercial . The size of the residential market far exceeds that of the commercial so the largest single stakeholder group comprises domestic owner-occupiers. Whilst the majority have mortgages, approximately one-third do not; many of these occupy older, less efficient stock. Energy efficiency improvements are not a priority for many unless incentives are significant, easy to access and likely to be sustained. Non-domestic owner-occupiers are similarly diverse, ranging from the Government and other public sector bodies to SMEs and individuals. Many occupy inefficient older buildings. Large owner-occupier organisations may pro-actively manage energy, particularly where this is part of company reporting. However, many SMEs do not.
- **Tenants lease buildings either for business or home occupation.** Large occupiers have Corporate Responsibility policies, and strong awareness of environmental concerns. However, to many tenants, energy is simply an expense that is typically only a small proportion of total occupancy costs. This could explain weak take up of opportunities to invest in energy efficiency schemes by tenants. Further, many lack the financial ability to carry out improvements or tenure over the time horizon to recoup costs.

Advisors/Influencers

Clients are ultimately responsible for decisions, but are normally influenced by advisors and more widely by professional standards (established by professional bodies), financiers and, in some cases, shareholders. SMEs and residential owner-occupiers seldom have property advice on an on-going basis, and the advice they receive may not be trusted .

Architects and engineers are engaged only for infrequent big interventions; building surveyors and facilities managers have increasing relevance within the in-use phase but are not typically in a position to instigate activity.

Planners and building control officers have power and influence; but need to oversee very broad portfolios and may not always have the necessary detailed knowledge.

Valuers and financiers play a critical role during most activities, from planning/design to annual reporting and acquiring and re-structuring debt. Although valuers are increasingly taking sustainability issues into consideration, there is little evidence that energy matters are reflected in lending criteria. Where energy and carbon is considered this is typically for compliance purposes, for example a green building certification (e.g. a BREEAM rating) is often now required for planning approval and a minimum EPC rating for transaction purposes. However, neither directly translates to actual energy performance.

For some, knowledge about the factors influencing a building's energy use is still relatively low. Further, the relatively siloed nature of construction and property professionals means that whilst they are expert in their own discipline they may not have the necessary breadth of experience or opportunity to initiate the level of collaboration required to bring about change. Further education and cross-over of knowledge could assist better decision-making.

4 Motivations

Compliance with statutory interventions is an imperative for most participants. Whilst its importance will inevitably vary within both residential and non-domestic markets, an overwhelming message from those consulted was that meeting regulatory requirements is the chief motivation for all stakeholders. The research also revealed an appetite for stronger enforcement and stricter penalties for non-compliance.

Ability to transact and thereby realise value from property is key, and anything that influences this will have the close attention of the market. Any intervention that links energy or other sustainability-related consideration to the right to develop, sell or let a property will rapidly receive close attention and is likely to have an early influence on value and valuations, perhaps disproportionately so.

Enhanced returns are an important motivator for many. For deliberative investors, energy efficiency is normally seen as a cost, which requires justification in terms of eventual rental/capital value or risk reduction. The research indicated little belief in differential market pricing, especially in buoyant markets where 'anything will let', although an energy efficient building certification and other ratings (e.g. BREEAM) are now seen as part of the expected specification for prime properties.

Few funders consider energy and carbon matters in determining lending applications. However, some borrowers may be asked for evidence of their improvement strategy for target assets falling short of an EPC of E. Further, lifestyle and affordability questions to residential borrowers could extend to energy costs.

Corporate responsibility has made energy and carbon issues reputational matters. The reputational benefits of a 'beyond compliance' culture are important to some property owners and investors. However, they are small in number compared with the total market.

In the residential sector motivations are complex, but energy efficiency does not feature highly. Some home owners are both energy conscious and prepared to invest in efficiency measures. However, for many, energy is simply taken as a cost which they absorb or their inability to raise finance and or unwillingness to take on new debt for this purpose discourages action. Residential tenants are unlikely to make improvements and often do not pressurise landlords to improve efficiency and are unlikely to be in a position to require improvements in a market with restricted supply. Social landlords will invest in energy improvements, but there is little evidence of this in the private rented sector.

5 Opportunities for intervention

Four broad categories of intervention exist for improving energy efficiency and carbon performance in buildings.

- **Gateways** where specific performance standards must be achieved (e.g. building regulations or planning)
- Market **stimulation** by providing clear **information** on performance
- **Incentives** linked to performance
- **Choice editing** whereby minimum performance standards are adopted for key technologies so that the minimum is always achieved (e.g. for example minimum standards of efficiency for a boiler or chiller).

The previous sections of this report show that action is required in both of the following areas to achieve energy and carbon reductions; firstly, the creation of buildings with the potential to be efficient, and secondly efficient use of these buildings by occupiers (including fit out, maintenance and management).

To create buildings with the potential to be efficient it is essential to **maximise the impact of significant events in the lifecycle** (e.g. development, sales and letting). These interventions will be most influential if they are

linked to the ability to undertake these transactions and thereby to the principal's ability to gain value from their undertakings.

At present, there is **relatively little focus on the frequent events occurring during the operational stage of a building's** life. There is evidence to suggest that this is a major omission and that the quality of operational management is a key, if not the most important, factor influencing a building's energy use.

Encouraging efficient use of buildings by occupiers requires ongoing incentives/penalties and choice editing that reflect their engagement with management and maintenance activities together with periodic small works. While energy prices are a stimulus for some, further incentives are required for many to raise the profile and amplify the impact of energy efficiencies.

Incentives linked to real performance (and underpinned by high quality operational energy use data and benchmarks disseminated freely to users) would encourage occupiers to get the best out of their buildings and, in the case of let buildings, would also make them demand higher standards from their landlords. This would in turn create a stronger case for developers and asset managers to consider a 'beyond compliance' approach, and importantly it would encourage developers to prioritise 'real' performance rather than the theoretical assumptions of a compliance model.

There is evidence from the NABERS system used in Australia that the availability of reliable and benchmarked energy performance data can be a powerful stimulus to both landlord and occupier behaviour and form a cornerstone in the establishment of a strong market for energy efficient buildings.

Much of the current focus on energy efficient behaviour targets developers, landlords and their professional teams. For many of these professionals, the ability to pass key regulatory gateways is material to their businesses success. However, these participants are only involved at certain lifecycle stages and are subsequently absent for most of the ongoing decision-making during the building's life. Crucially these parties typically have very little knowledge of the actual energy use of the buildings the deliver, post completion.

Conversely, those who are engaged in advisory roles during the lengthy in-use period (valuers, financiers, agents, lawyers) may have insufficient knowledge to advise clients adequately on energy/carbon matters. Additional education and professional training is required for all disciplines, not just engineers and architects, to avoid missing opportunities to improve energy and carbon performance.

Opportunities to make changes to existing leased buildings are infrequent and brief. The cost and disruption of moving means that tenants tend to stay in their buildings through multiple leases or lease extensions. Short leases have not necessarily resulted in short periods of occupation. As a result, a landlord's possession of a building is less frequent than might be indicated by average lease lengths. Vacant space is expensive for landlords in terms of lost income and continued outgoings (including void rates). A landlord will typically do the minimum required to get a building back to a lettable condition quickly and therefore any measures extending the vacancy period will be resisted (even if there is no associated capital cost) unless they demonstrate a clear impact on value or lettability or are required for compliance purposes.

Many (most for the domestic sector) buildings are owner occupied. Measures targeted solely at landlords will not impact on the decisions or behaviours of this group. Further, property is not the core business activity of many landlords who may not respond as expected to economic drivers, particularly where they are complex.

Conversely, occupiers are involved with their buildings on a daily basis and have the opportunity to improve materially their building's operational performance. However, they do not routinely do so because performance is generally not assessed or made relevant to their wider business or personal goals. Interventions that target occupiers and make their energy use more material (e.g. by using performance based incentives) could stimulate both greater energy efficient behaviour and demand for more energy efficient buildings.

6 Recommendations

1. The opportunities afforded by rare or infrequent events with a large or very large impact on energy/ carbon performance should be maximised. Whilst standards for new construction and refurbishment have continued to tighten, there is evidence that actual performance does not meet the intended design standard sometimes by a factor of three or more , . There are many reasons for this covering design, construction, commissioning and operational activities. It is important that these relatively rare opportunities to make a major intervention in the building stock are optimised in practice as well as in theory.

2. New interventions should explicitly address actual energy use through measures focused on occupier performance. A range of high profile and constant / frequent lifecycle events (e.g. payment of rates or taxes) could be used to heighten the significance of operational performance, but only if robust in use performance data is available. The impact of incentives and increased transparency of (real) performance for occupiers would be a greater focus on fit out standards, management and behaviour together with increased demand for accommodation that is capable of achieving higher performance, thereby catalysing landlord and developer actions to enhance their assets' performance.

3. Reduce complexity by prioritising a few, significant and long term mechanisms to measure and drive behaviour. Harmonising existing regimes to create consistent and compatible reporting requirements would help to reduce the current complexity relating to energy and carbon in buildings and businesses. It would also help to establish greater market transparency and necessary benchmarks around which performance incentives can be developed.

4. Where measures are introduced, they should be rigorously enforced with sufficient penalties to ensure compliance. Transactions, be they development permissions, sales or letting events are key points in the cycle where minimum standards can be enforced.

5. Choice editing should ensure that by default the best available technologies are used for periodic activities (e.g. repairs, churn and minor refurbishment). A focus on the above in use incentives will also help drive energy efficient decision-making during these events.

6. Energy and carbon topics should be fully incorporated within professional development programmes[3]. All professional bodies associated with the built environment should ensure that their initial education and ongoing training schemes explicitly include information needed by their professional members to make informed decisions and provide clear-sighted advice.

These recommendations will involve additional regulation and costs to Government, e.g. in establishing a mechanism for measuring, benchmarking and incentivising in use performance and in closing the performance gap. However, these costs need to be considered in the context of:

- Annual investments in new buildings of ~£5Bn and a further ~£3.7Bn spent on repair and maintenance. Even a small improvement in the scale of actual energy efficiency delivered by this investment would justify significant actions by Government
- Potential cost effective energy savings of 84 billion kWh are available in domestic and non-domestic buildings by 2020, equivalent to the output of more than 9 power stations . Securing these savings requires both investment in the physical condition of buildings and a desire to operate the building efficiently combined with better knowledge of how to achieve this.

[3] This topic is explored further in a separate study by the Green Construction Boards Knowledge and Skills Working Group.

- Potential growth in the UK market for energy services and related employment and the establishment of the UK amongst international market leaders in this important area. This sector is estimated to be worth in excess of £17bn to the UK economy and has the potential to be a driver of considerable continued economic growth.

Finally, the research found within all stakeholder groups consulted, a strong majority of participants supported and indeed indicated they would welcome well designed, clear and rigorously enforced regulation to help get the most from the above opportunities.

Appendix A: Data sources

Data has been gathered from a number of sources, but in many cases there are no firm statistics to inform the sizing and placing of events in a specific position. For example, although it is known that the average lease length for commercial properties is now less than 5 years, many leases are renewed, often on several occasions. Similarly, although the normal lease used domestically is the Shorthold Tenancy granted for 6 or 12 months, the incidence of longer-term renting has grown significantly; further in the social housing sector, tenants may occupy the same property for very many years. Therefore lease length is not a good indication of occupation period. Similar difficulties exist with transactions, even where average data are available, it can be misleading: a headline figure of 34% of residential property being let , disguises the variability; for example in London over 50% of property is rented .

In terms of capital transactions, estimates vary. Whilst holding periods for prime commercial stock in strong markets may be as low as five years, the Land Registry, which requires all property transacted since 1970 to be registered, records that over 30% of land is still unregistered. We have therefore concluded that for the whole market capital transactions must be considered as infrequent.

Building lifespan is also problematic. Whilst a tendency to make assumptions based on a 60 year cycle may have firm foundations, life length is a product of a complex inter-play of physical, economic and social factors. Where permitted building densities increase and technologies change rapidly, building lives will be shorter, for example, central London offices. Domestic properties tend to have a longer life length with approximately 37% of stock pre-dating World War II and almost 60% being in excess of 50 years . It is estimated that the renewal rate is approximately 1% .

For these reasons, we have used referenced data sources, combined with interviewee opinions and expert views to arrive at what is hoped to be a fair, if schematic, representation of the real estate life cycle.

Appendix B: Consultees

1 World Green Building Council, 2013. The Business Case for Green Buildings.

2 UK Green Building Council, 2013. Retrofit Incentives: Boosting take-up of energy efficiency measures in domestic properties.

3 UK Green Building Council, 2013. Retrofit Incentives: Boosting take-up of energy efficiency measures in domestic properties.

4 Haines, V., & Mitchell, V., 2014. A persona-based approach to domestic energy retrofit. Building Research & Information, pp:1-15.

5 Green Construction Board, 2013. The Performance Gap: Causes and Solutions.

6 Technology Strategy Board, 2013. The performance gap in non-domestic buildings: evidence collected from the Technology Strategy Board's Building Performance Evaluation Programme.

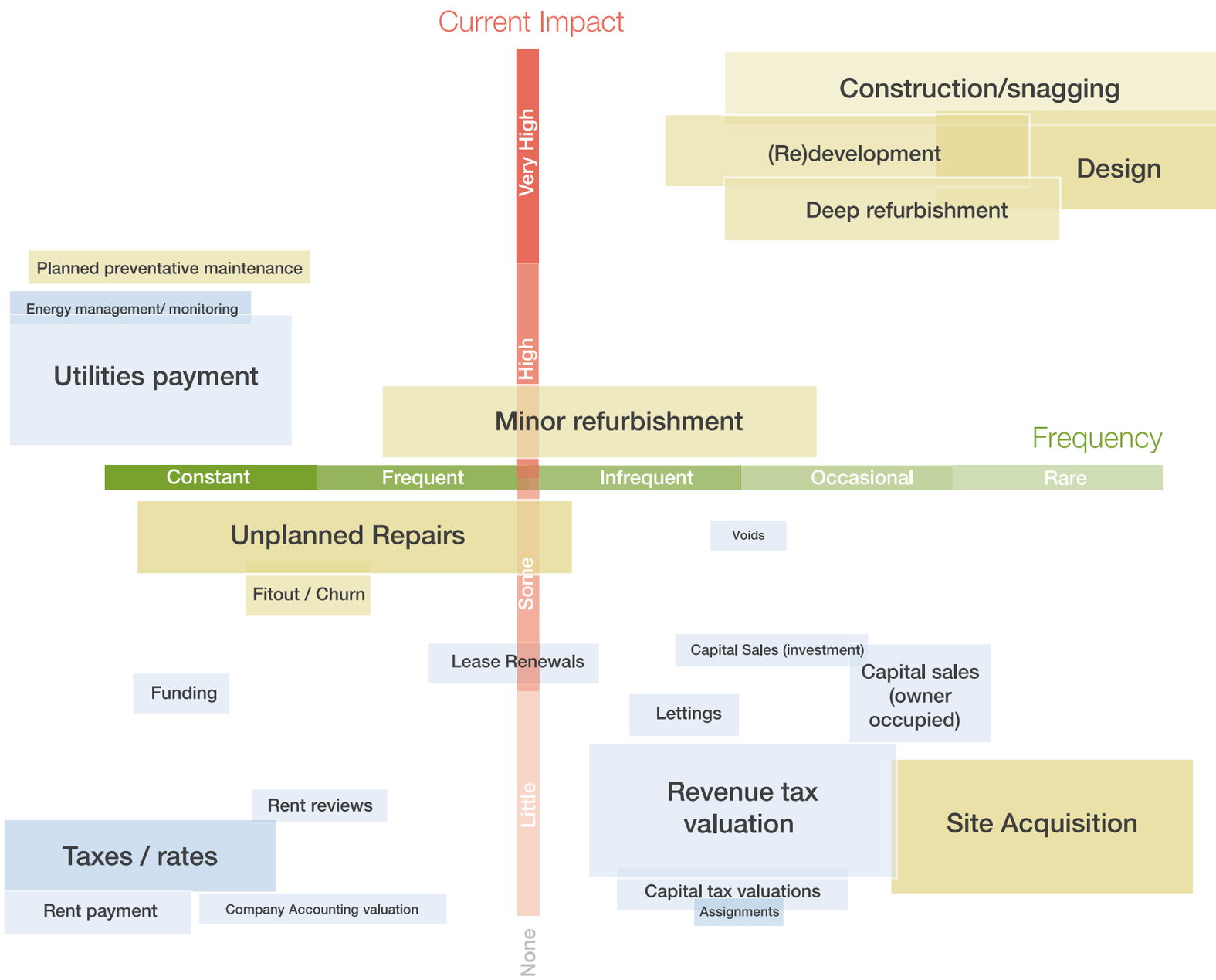
7 Zero Carbon Hub (2014) Closing the gap between design and as built performance – end of term report

8 Office for National Statistics, 2013. Construction Output, October and New Orders, Q3 2013.

9 Department for Energy and Climate Change, 2012. The Energy Efficiency Strategy: The Energy Efficiency Opportunity in the UK.

Name	Organisation
Bob Maxted-Jones	Cluttons
Christopher Brigstocke	Squire Sanders
David Goatman	Knight Frank
Ian Bragg	GVA Grimley
Jess Stevens	IPD
John Heawood	Ashtenne Industrial Fund
John Staheli	Nabarro
Justin Snoxall	British Land
Mark Trowell	Gerald Eve
Martin Russell-Croucher	RICS
Matt Lown	Tuffin Ferraby Taylor
Miles Keeping	Deloitte
Patrick Brown	British Property Federation
Robert Houston	St Brides Managers LLP
Tim Garnett	Wates

Name	Organisation
Philip Parnell	Deloitte
Rachel Woolliscroft	Wates
Josh Dale-Harris	CBRE Global Investors
Giles Worrall	Cluttons
Mark Dendy	Cluttons
Claudine Blamey	Crown estates
Steve Smith	Sweett Group
Andrew Morgan	Corporate Property Advisors
Tim Garnett	Wates
John Burnside	Capital Symonds
Rupert Barron	Colliers
Dermot Kiernan	M&G
Roger Thornton	Maples Teesdale
James Bretton	RBS



Activity **Site acquisition**

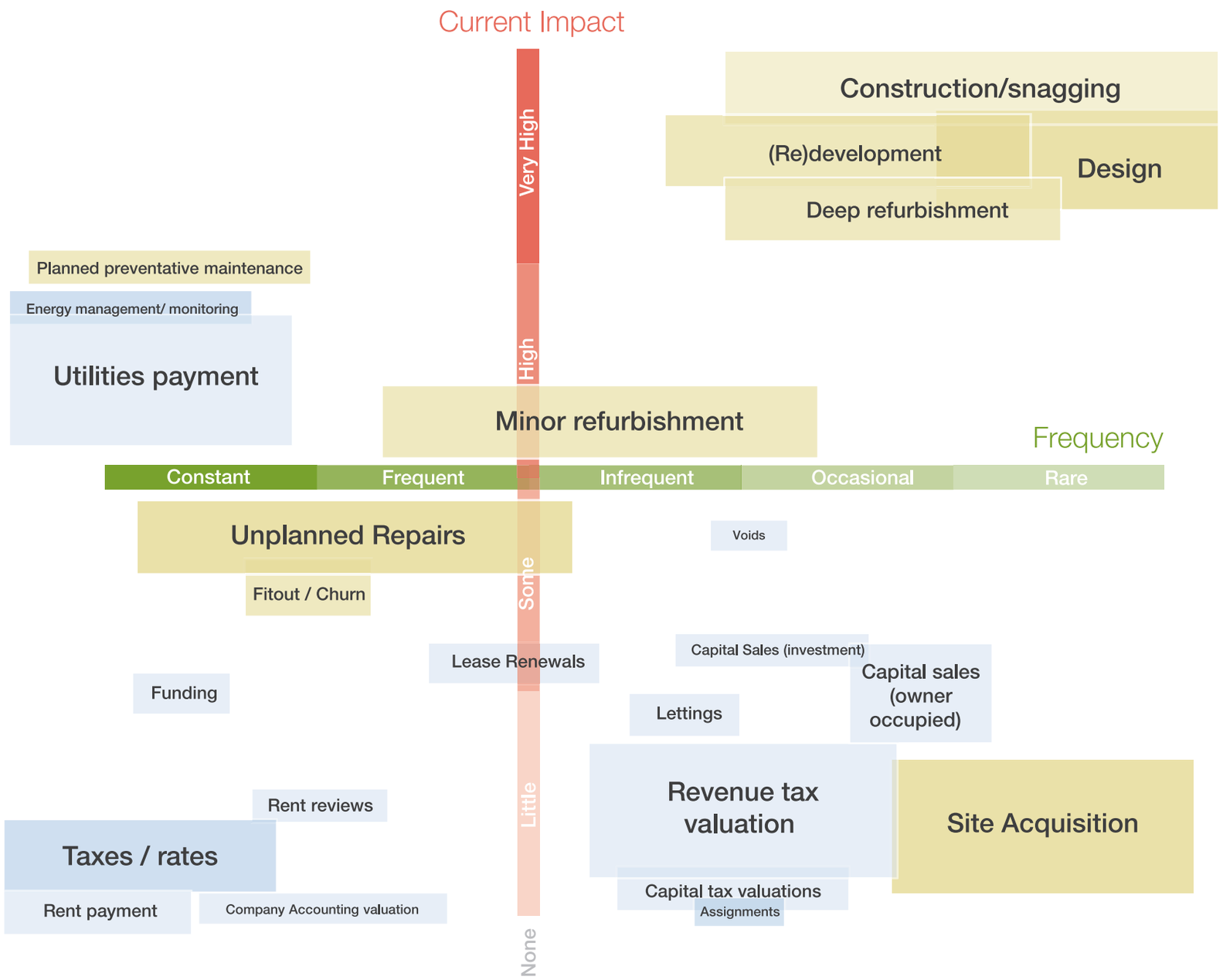
Quadrant		4
Frequency		Very Rare
Current Impact		None
Current interventions		None
Potential impact		None
Properties affected	**Dom**	100%
	Non -Dom	100%

Comment

Site acquisition is identified by RIBA as Stage 1; however this may be a misnomer as many developments take place on land that is already sitting within the owner's portfolio. In many cases site assembly can be a long and complex process.

The development potential of the site will impact on its value and this will make allowance for potential obligations and taxes. Sites can be prepared for development with, for example, outline planning in place to reduce development risk and increase site value.

The vendor and potential purchaser of the site are major influencers within this process and key motivations will be the value of the site, including development value, development risk and ease of transaction. Uncertainty around potential planning or other legal compliance obligations will effect land value.



Activity **Design**

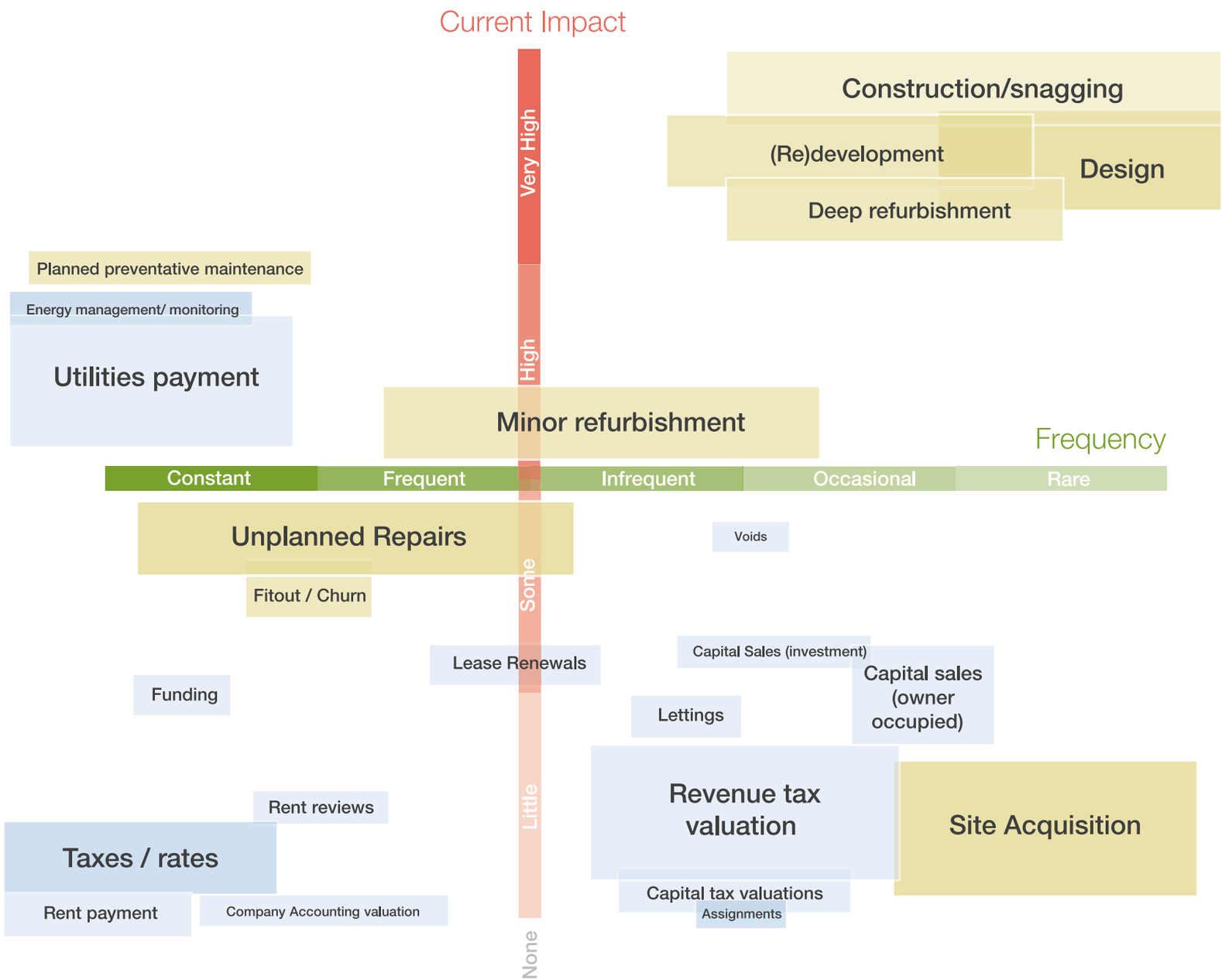
Quadrant		2
Frequency		Very Rare
Current Impact		Very high
Current interventions		Planning Consent; BREEAM and other certifications, Building Regulations
Potential impact		Very high
Properties affected	**Dom**	100%
	Non -Dom	100%

Comment

This set of activities has a very high impact on the carbon and energy performance of the eventual building. Planning consent is a 'gateway' measure and increasingly some form of environmental building certification is linked to it. Research confirmed the importance of these measures in effecting long-term change. However they do not provide quick wins and the research also found that the negotiation involved in the process could lead to sub-optimal results in terms of carbon and other environmental impacts. A lack of knowledge of the most appropriate energy/carbon solutions by planning officers/consultants has led, at times, to adoption of certification as a shorthand or proxy for sustainability. Ambitions for high specification in terms of energy efficiency and low carbon solutions were often found to be diluted during the design phase due to cost considerations. Further, the compliance tools used to determine performance at this stage are typically poor indicators of actual in use consumption levels as many of the generic assumptions to not reflect the actual use of completed building.

The research found support for stronger insistence on low carbon solutions during the planning application process and a need for education among decision makers and their advisors.

The participants in this process are the planning officers who will be motivated by succesful development activity taking place within their region of responsibility, the development manager who will be seeking an economically viable consented scheme generating the best profit. IS THIS SO??? THE CONSULTANT/ CLIENT WILL BUT NOT THE LA DM !!If carbon and energy efficiency measures are seen to be undermining either of these outcomes and are not mandatory they will be in danger of being negotiated away.

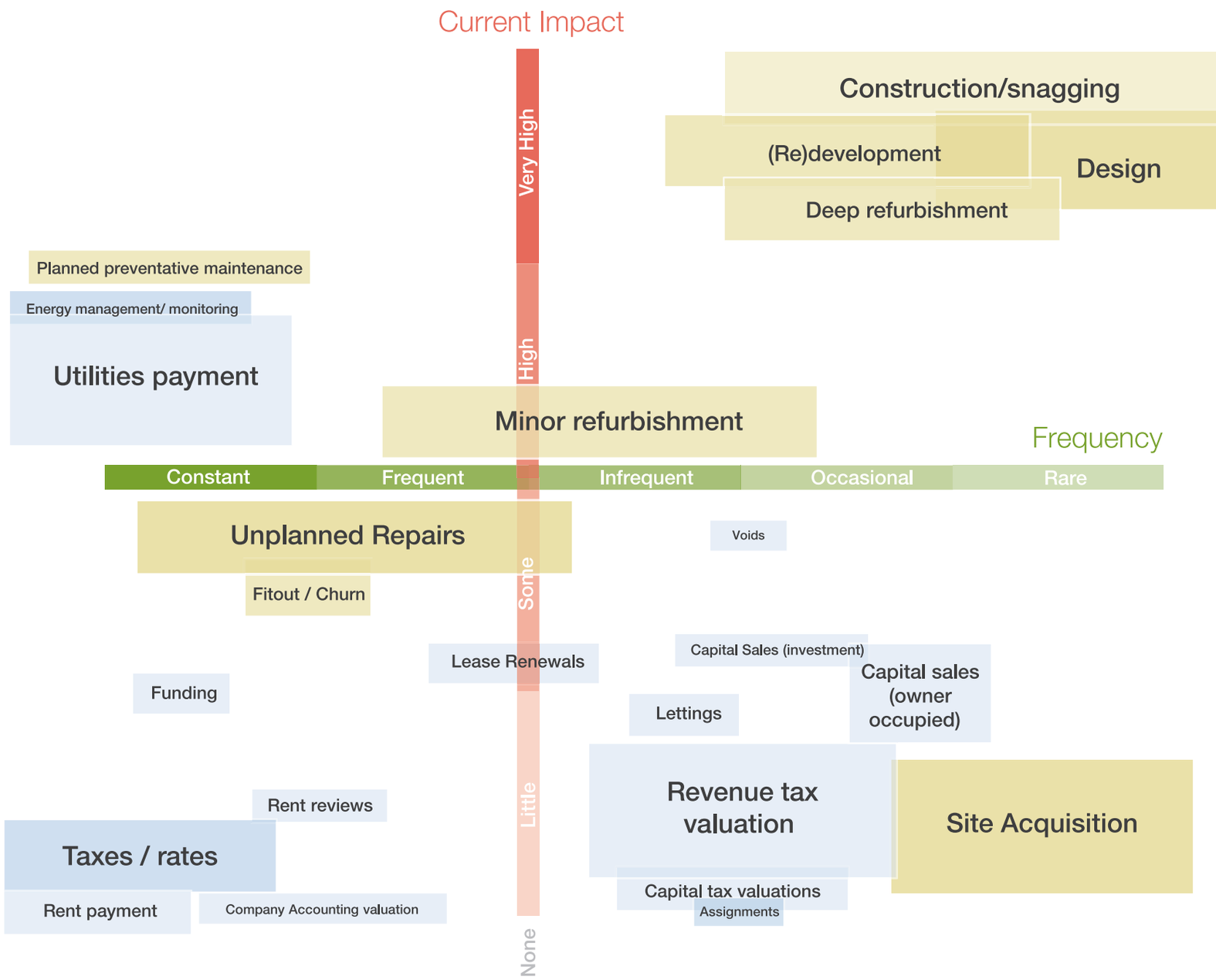


Activity	Construction / snagging	
Quadrant		2
Frequency		Very Rare
Current Impact		Very high
Current interventions		Building Regulations
Potential impact		Very high
Properties affected	Dom	100%
	Non -Dom	100%

Comment

The Construction process has major implications for both embodied and operational carbon and energy. Slippage during the construction process and sometimes poor enforcement of Building Regulation standards can also contribute to a 'gap' in performance between the initial design and completed building (other major influences being design stage modelling assumptions, commissioning practices and handover). Research found support for progressively tighter regulations and encouragement for tighter enforcement.

Key participants here include the development manager, project manager and contractor. Delivering a building to time and budget are overriding considerations. Anything which impacts on this increases the risk within the project. The risks inherent within the project will be shared between the contractor and developer with a view to risk being carried by the party most able to manage and mitigate it. Clarity with regards any requirements, including environmental, reduces risk by enabling them to be incorporated into the project early in the process. However changes to contracts are frequent and can negiatively impact on environmental considerations.

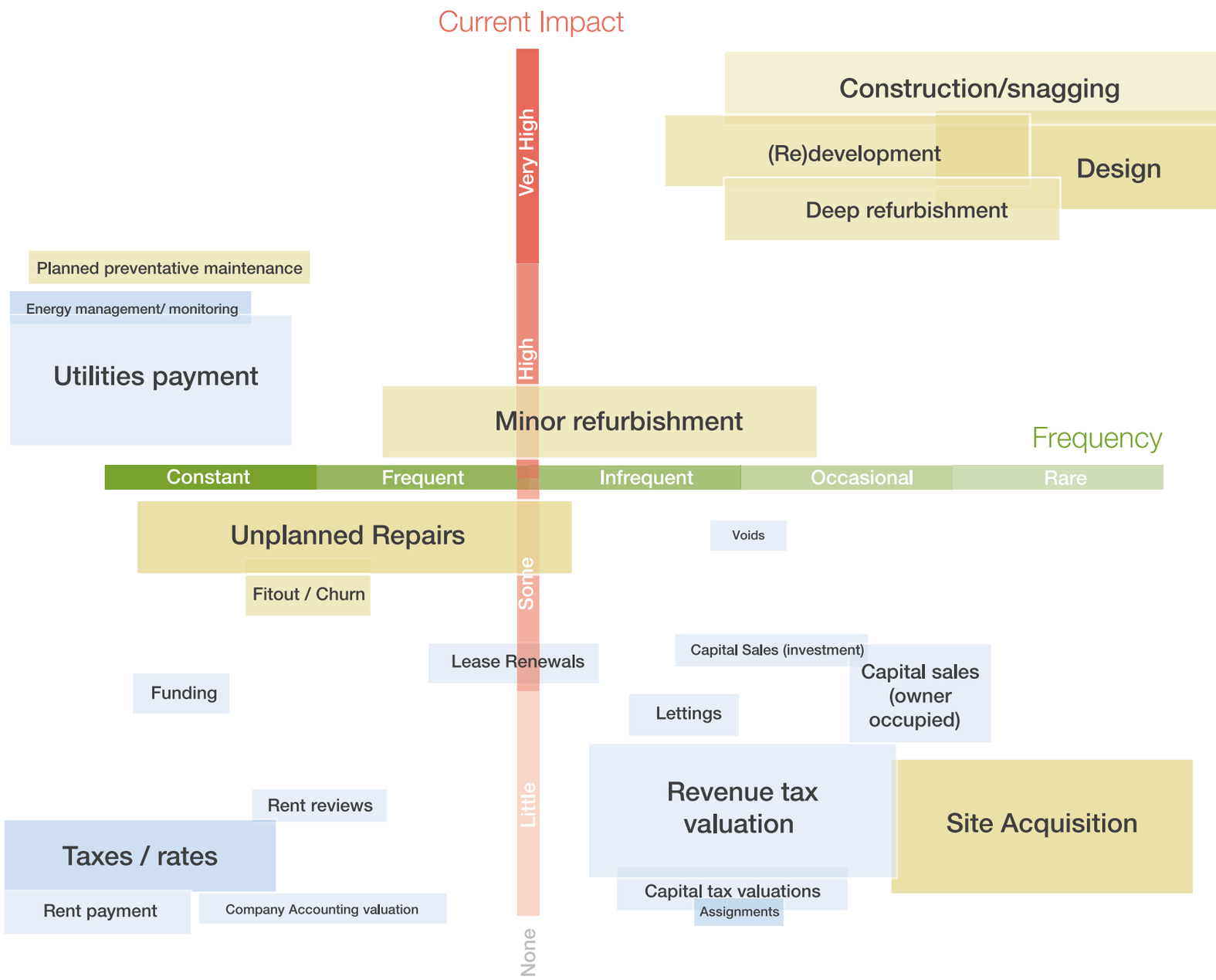


Activity	Planned preventative maintenance	
Quadrant	1	
Frequency	Constant	
Current Impact	High	
Current interventions	None	
Potential impact	Very high	
Properties affected	Dom	25%
	Non -Dom	17%

Comment

It is estimated that a minority of non-domestic stock is subject to systematic planned preventative maintenance programmes and even less domestic stock. However, where these exist, they provide useful opportunities to improve energy efficiency in a manner that fits with other work and is not disruptive to occupiers. Wider use of such schemes, linked to incentives or greater occupier awareness and demand for energy savings, could yield incremental improvements.

Key participants here include asset managers, property managers and those occupiers of rented property who pay service charges. Motivations will be maintaining occupier demand, minimising service charge, operating the building efficiently, compliance with regulation in a timely manner and allowing for costs within the business planning process. Measures that reduce operating costs and/or reduce carbon tax liabilities will support these motivations if they generate a return over an appropriate period. Anything that is paid for through service charge has to be approved by occupiers.

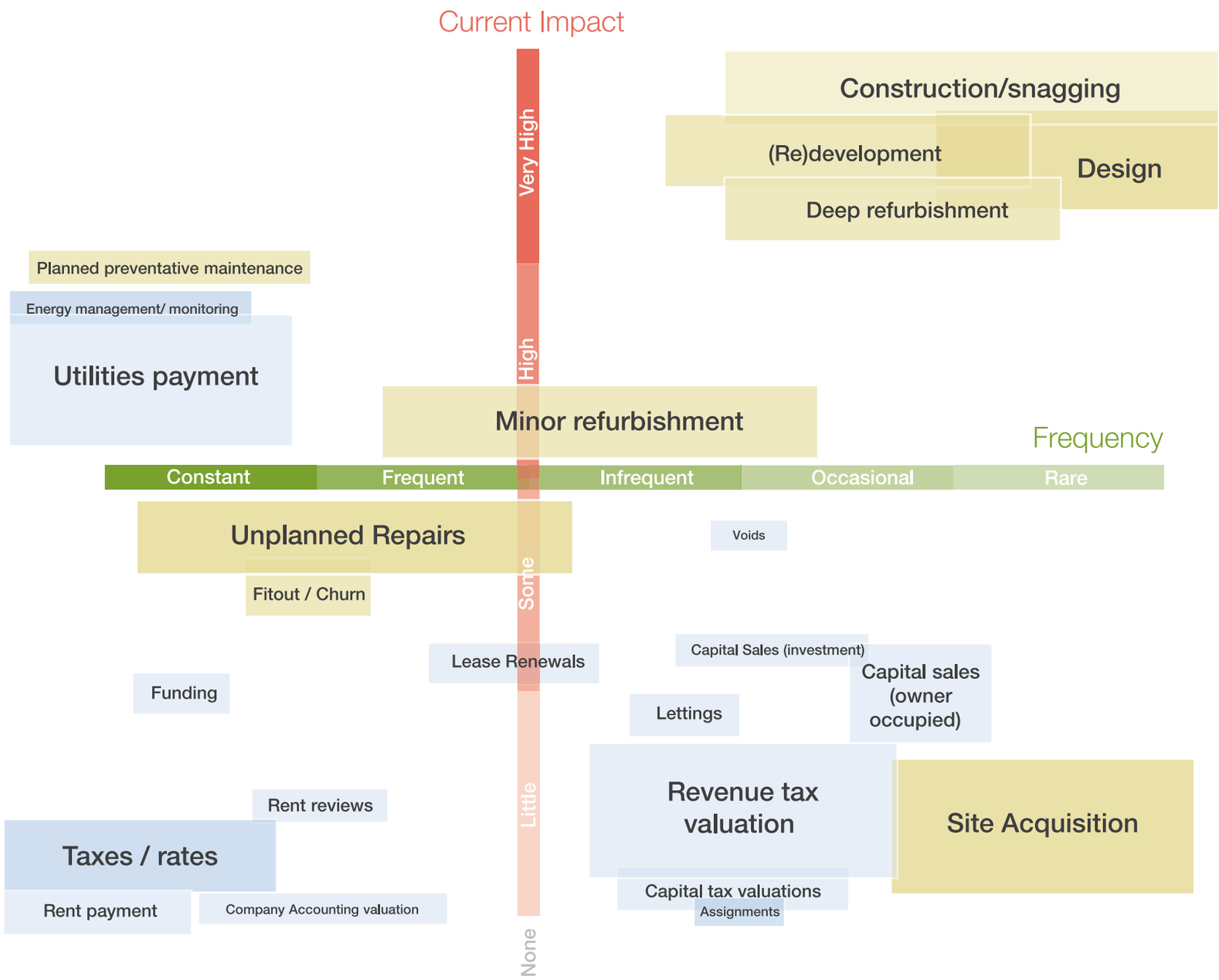


Activity	**Unplanned repairs**	
Quadrant		3
Frequency		Frequent periodic
Current Impact		Some
Current interventions		None
Potential impact		Some
Properties affected	**Dom**	100%
	Non -Dom	100%

Comment

Even where planned programmes exist, unplanned repairs will sometimes be required. In such cases consideration of energy/carbon may be ignored as work is undertaken in a hurry. However some of this will be funded through insurance claims in which discussions regarding the nature of the work will be triggered prior to commencement. This could provide an opportunity to consider carbon/energy considerations, possibly through supply chain management.

Key participants for rented property will include property managers, asset managers, building service and facilities managers and operatives. Motivators will be speed and cost of repair to ensure the property remains occupied and business disruption is avoided or minimised.

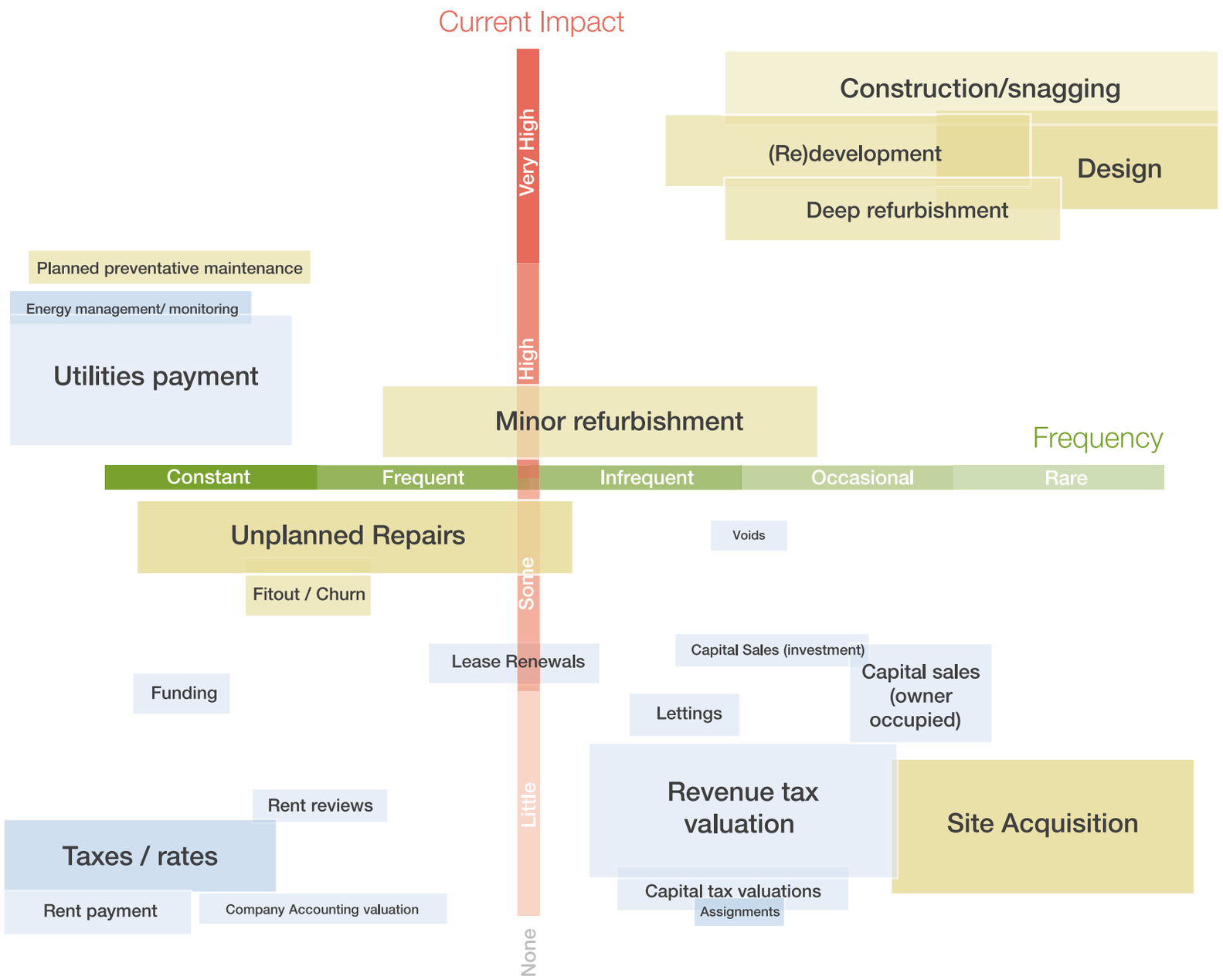


Activity	**Fitout/churn**	
Quadrant		3
Frequency		Frequent periodic
Current Impact		Some
Current interventions		None
Potential impact		High
Properties affected	**Dom**	70%
	Non -Dom	80%

Comment

Fit out and churn are common occurrences for some property types. These events are not monitored through any regulation or policy but may have energy and carbon implications as the works will produce waste, use materials, emit carbon and impact on the operational performance of the property. A positive aspect is that they may be associated with upgrade work such as the installation of more efficient heating or lighting systems. Opportunities to make energy efficient options the default position exist through supply chain controls and standards set within leases. Retail property in particular will have fit out standards and design guides set by occupiers themselves in some instances and by landlords in managed centres.

Key participants in the fit out process will be the occupier, their design team and project manager and the fit out contractor. Key motivators will be delivering the fit out to budget and time. For the occupier additional motivating factors will be the delivery of a high quality work, trading or living environment. Reducing energy costs may be one element of this process.

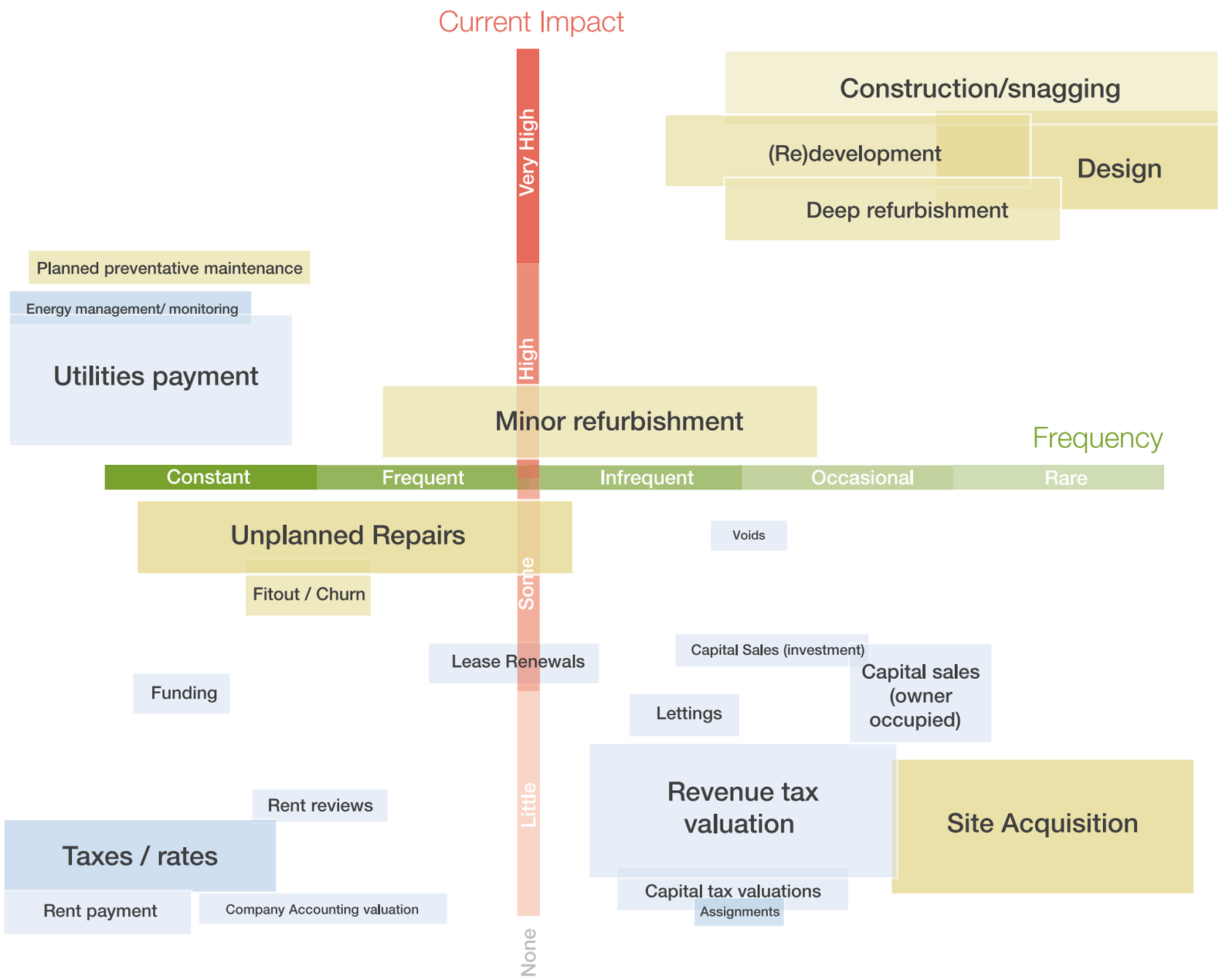


Activity	**Minor refurbishment**	
Quadrant	1	
Frequency	Infrequent periodic	
Current Impact	Some	
Current interventions	Only through control of material supply chain + some incentives (FITS; RHI etc)	
Potential impact	High	
Properties affected	**Dom**	85%
	Non -Dom	95%

Comment

It is likely that all, or almost all, properties, in whatever sector, will be subject to minor refurbishment or component replacement over time. Often this will link with change of occupier/ownership. However, this is not always the case. Time is typically very limited for refurbishment with the aim of minimum disruption to operational activities or the duration of a void period, in many instances those involved will not be energy efficiency specialists and may be briefed to target lowest capital cost rather than the most efficient solution. Incentives (such as enhanced capital allowances) and 'choice editing' (ie limiting the number of available options to those that are more efficient or have lower impacts) can help encourage energy and carbon efficient decisions and can help to deliver incremental or in some cases significant improvements in building performance.

Key participants here are occupiers, asset managers and property managers, the primary motivations will be to manage cost and maintain space availability. In some situations (eg owner occupiers or those on longer leases) consideration is given to the efficiency considerations, particularly where the current and / or target occupiers have corporate reporting or other drivers. Initiatives to raise awareness of the opportunities for efficiency through refurbishment activities (eg the Energy Saving Opportunity Scheme) can help to encourage more consideration of operational performance in decisions.

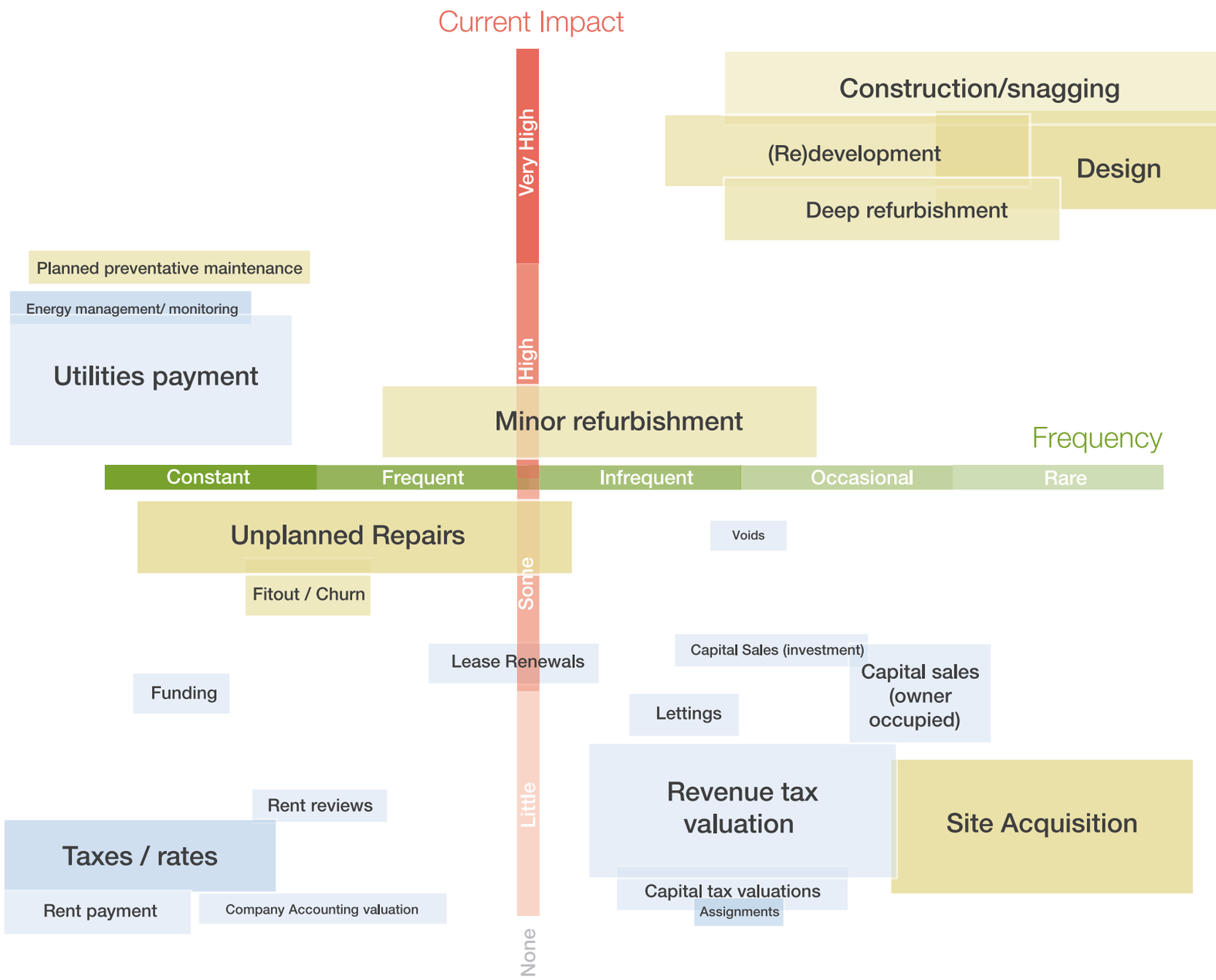


Activity	**Deep refurbishment**	
Quadrant	2	
Frequency	Occasional	
Current Impact	Very high	
Current interventions	Building Regulations/ possibly planning	
Potential impact	Very high	
Properties affected	**Dom**	70%
	Non -Dom	80%

Comment

Obsolescence and value depreciation trigger the need for either redevelopment or refurbishment. The type of property, its location and value and land value will impact on the decision and the frequency. Research points to city centre offices and shopping centres being most prone to suffer obsolescence with its occurrence less likely for residential property. Deep refurbishment offers the opportunity to improve energy efficiency and, as an alternative to demolition and redevelopment, provides longer amortisation of embedded carbon. Normally Building Regulations are required and possibly planning consent. The opportunities are similar to those for new buildings with the same concerns about enforcement. Residential owner-occupied and some private rented together with tertiary non-domestic buildings may be very energy inefficient yet go for extremely long periods before they are refurbished as the financial returns do not justify the capital expenditure. Therefore in some instances they go straight to demolition and rebuild, frequently for a different or higher density use.

The key participant at this point in the property lifecycle is the owner. The motivating factors will be cost, including the cost and availability of finance, and the value of the asset post refurbishment which will be driven by occupier demand and planning policies.

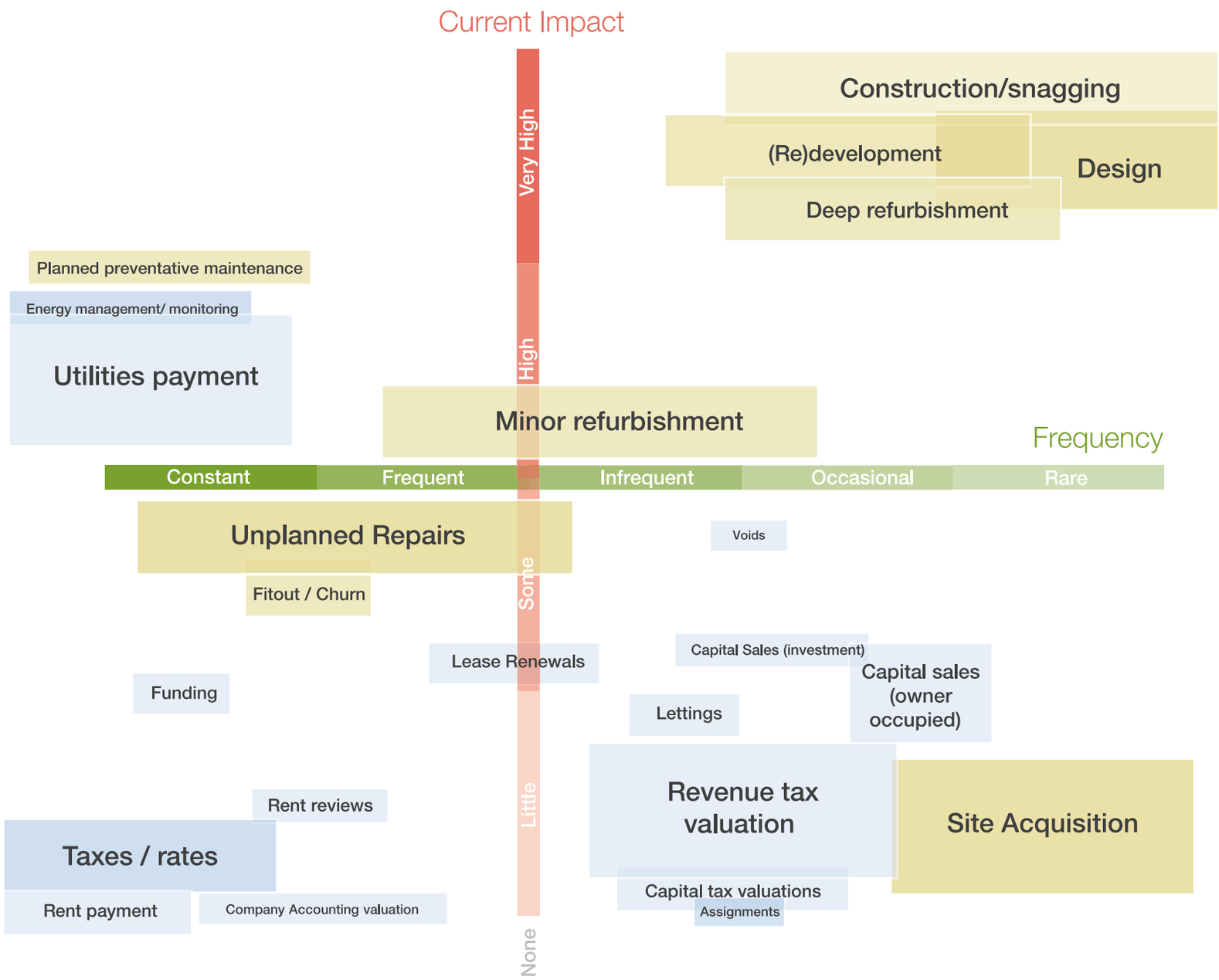


Activity	**(Re)development**	
Quadrant		2
Frequency		Occasional - Very Rare
Current Impact		Very high
Current interventions		Building Regulations/Planning
Potential impact		Very high
Properties affected	**Dom**	95%
	Non -Dom	90%

Comment

Building life length varies, but eventually, unless a building is protected for heritage reasons, it will reach the end of its physical or/and economic life, predominatly the latter. Due to the longevity of buildings, even strong and effective regulation on demolition/redevelopment will not produce quick changes in the energy efficiency and carbon emissions of the existing stock. Speeding up the pace of replacement might produce energy and operational carbon savings but has to be balanced against the embodied carbon and waste generated by redevelopment.

Key participants at this point in the property lifecycle include the owner, any provider of finance, potential or confirmed future occupiers, planning officers/committee members and building control officers. The motivating factors will be cost, including the cost and availability of finance, and the value of the asset post redevelopment which will be driven by occupier and in the case of some commercial stock investor appetite. For planning officers, motivation will be successful, compliant redevelopment and for Building Control, compliance with regs.



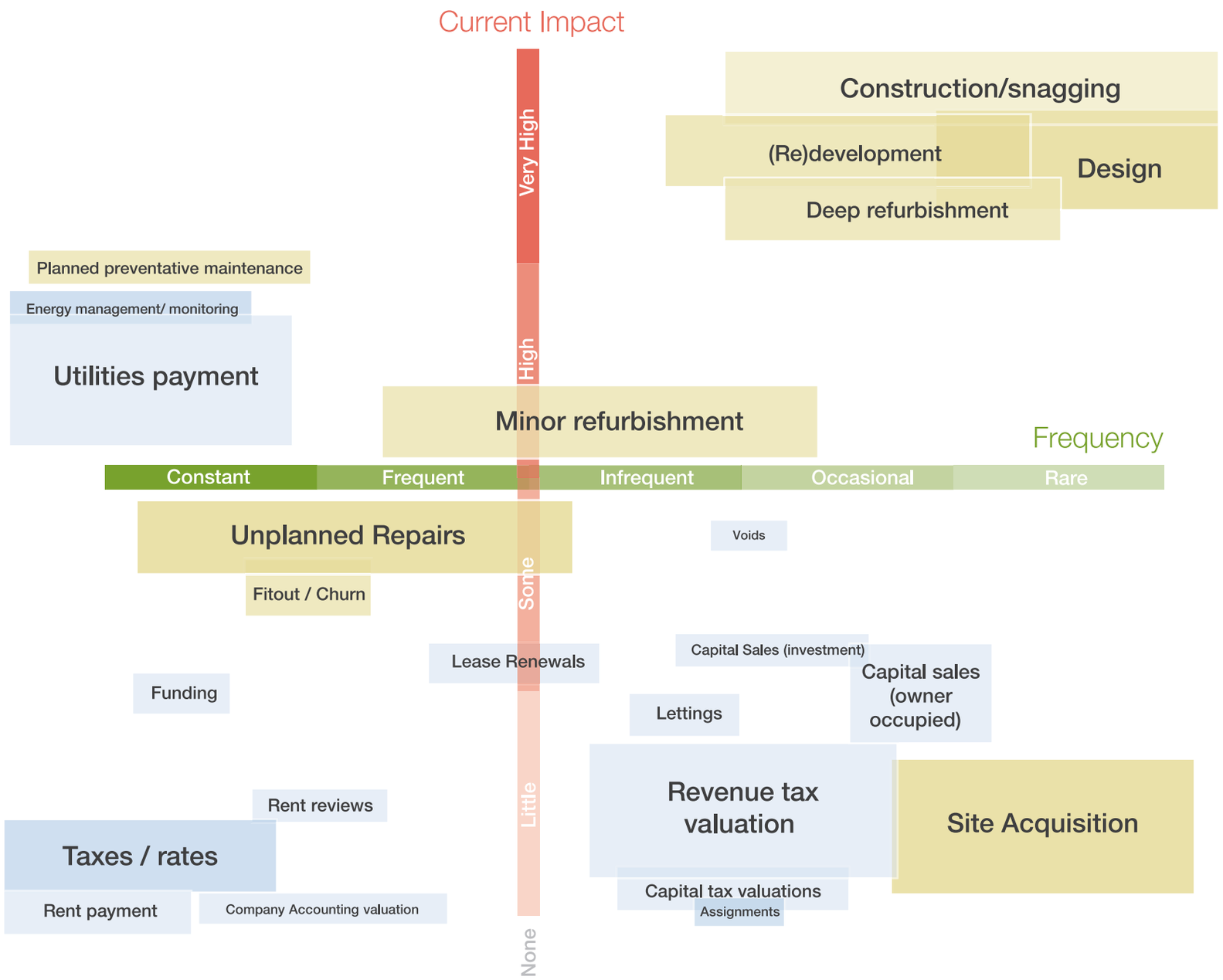
Activity	**Funding**	
Quadrant	3	
Frequency	Constant – Frequent periodic	
Current Impact	Little	
Current interventions	none	
Potential impact	Some	
Properties affected	**Dom**	30%
	Non -Dom	50%

Comment

At the time of construction, funding is required; this is often re-negotiated frequently during a building's life. In terms of standing stock, National statistics reveal that some 30% of domestic stock is owned outright without borrowings; no figures are available for non-domestic but it is assumed that 50% of commercial stock is subject to borrowing. Currently there is no formal intervention in terms of energy/carbon policies although the tying of borrowing levels to ability to pay is an opportunity to stimulate demand for energy efficient buildings. There is an opportunity to connect lending policies to buildings which are deemed less risky due to their energy/carbon profiles. However, this would not affect properties where there are no borrowings.

Key participants here are the borrower and the funder, the borrower is looking to demonstrate effective management of the development/ aquistiion/ownership with the aim of securing the most favourable borrowing terms relative to the nature of the asset. A provider of debt's key consideration is that the amount they are lending is covered by the value of the asset over duration of the borrowing period, should they be required to take posession of the asset on the default of the borrower they want to be able recover the amount loaned. For equity providers, the risk of loss is higher and they would therefore want to see a compensating return if they are to invest.

Effective management of risk is important to both debt and equity providers although their tolerance for risk to their capital is different. Energy / carbon only becomes a factor at this stage where the costs of necessary investment (eg. to comply with minimum performance standards) or the risk of value depreciation are sufficient to impact the returns from the asset (for equity providers) or the risk of default and subsequent failure to recover the loaned sum (for debt providers).

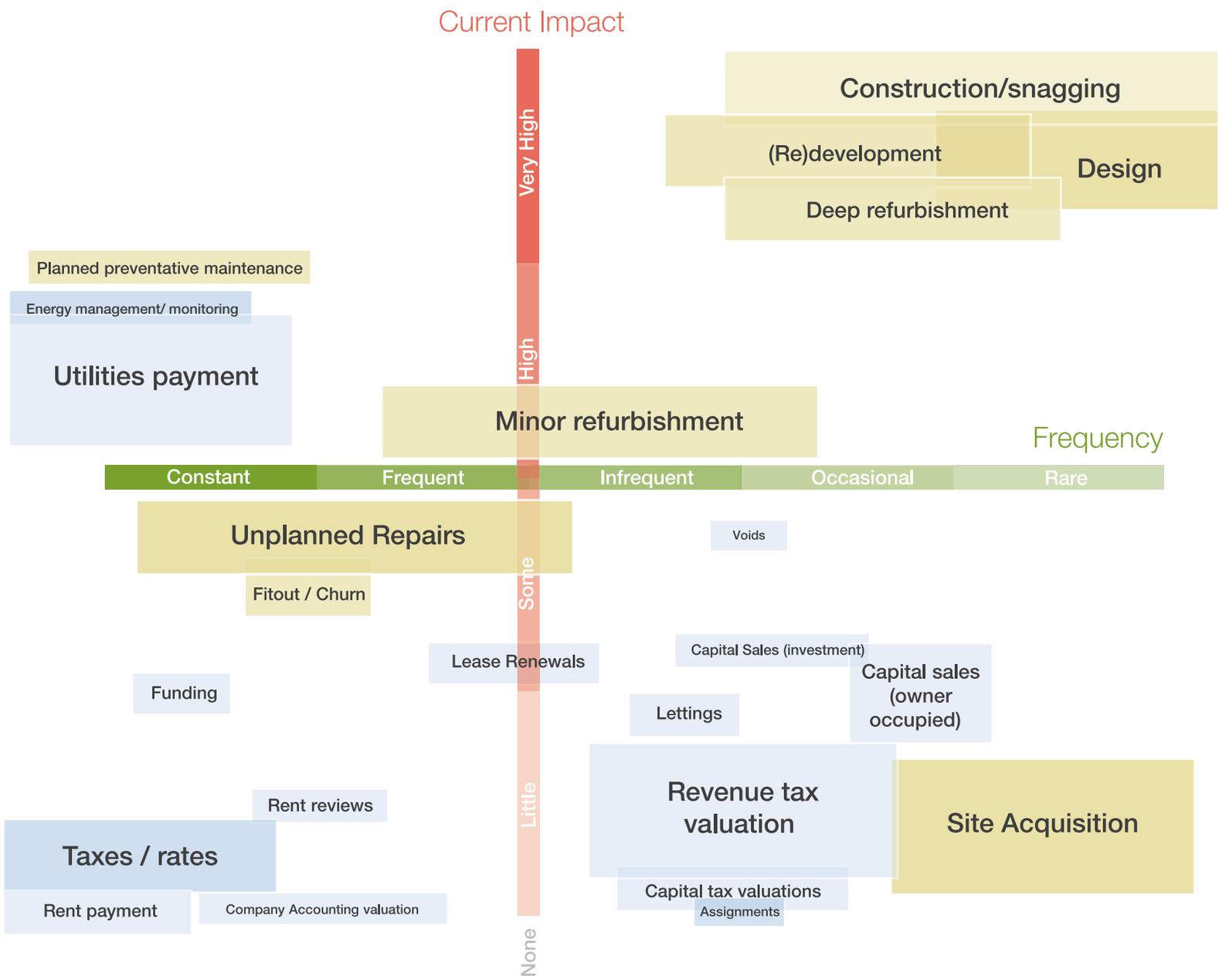


Activity	**Lettings**	
Quadrant	4	
Frequency	Infrequent periodic	
Current Impact	Little	
Current interventions	EPC (also MEES from ٢٠١٨)	
Potential impact	Some	
Properties affected	**Dom**	35%
	Non -Dom	55%

Comment

It is the minority of properties that are let, particulalry in the domestic sector; therefore any measures targeting letting events will impact on only part of the overall market (albeit the part where a split incentive exists that can inhibit cost effective investments taking place). Few domestic buildings are constructed for letting, although this is changing and there is a signficant increase in the percentage of standing residential stock moving from owner-occupation to the private rented sector. Research shows the current impact of EPCs is limited in terms of reducing energy/carbon use but the impending introduction of Minimum Energy Efficiency Standards (MEES), which will be linked to EPC ratings, is already becoming influential in changing behaviours and increasing awareness. Very few leases yet control energy matters.

Key participants here are the landlord and occupier together with professional advisors (eg agents). Primary motivations are property location, size and condition and lease length, terms and cost - albeit this typically means the rent over the lease period and the total cost of occupancy is rarely considered. There is often a paucity of information about actual energy performance at this stage which contributes to the relatively low level of consideration it currently recieves during negotiations. MEES may result in more occupiers asking questions about energy performance (particularly if they are being asked to contribute towards investment in efficiency measures), however substantive discussions on energy performance during lettings will not become typical until operational performance data and benchmarks are more widespread. MEES may well trigger upgrades in advance of letting or sales transactions.

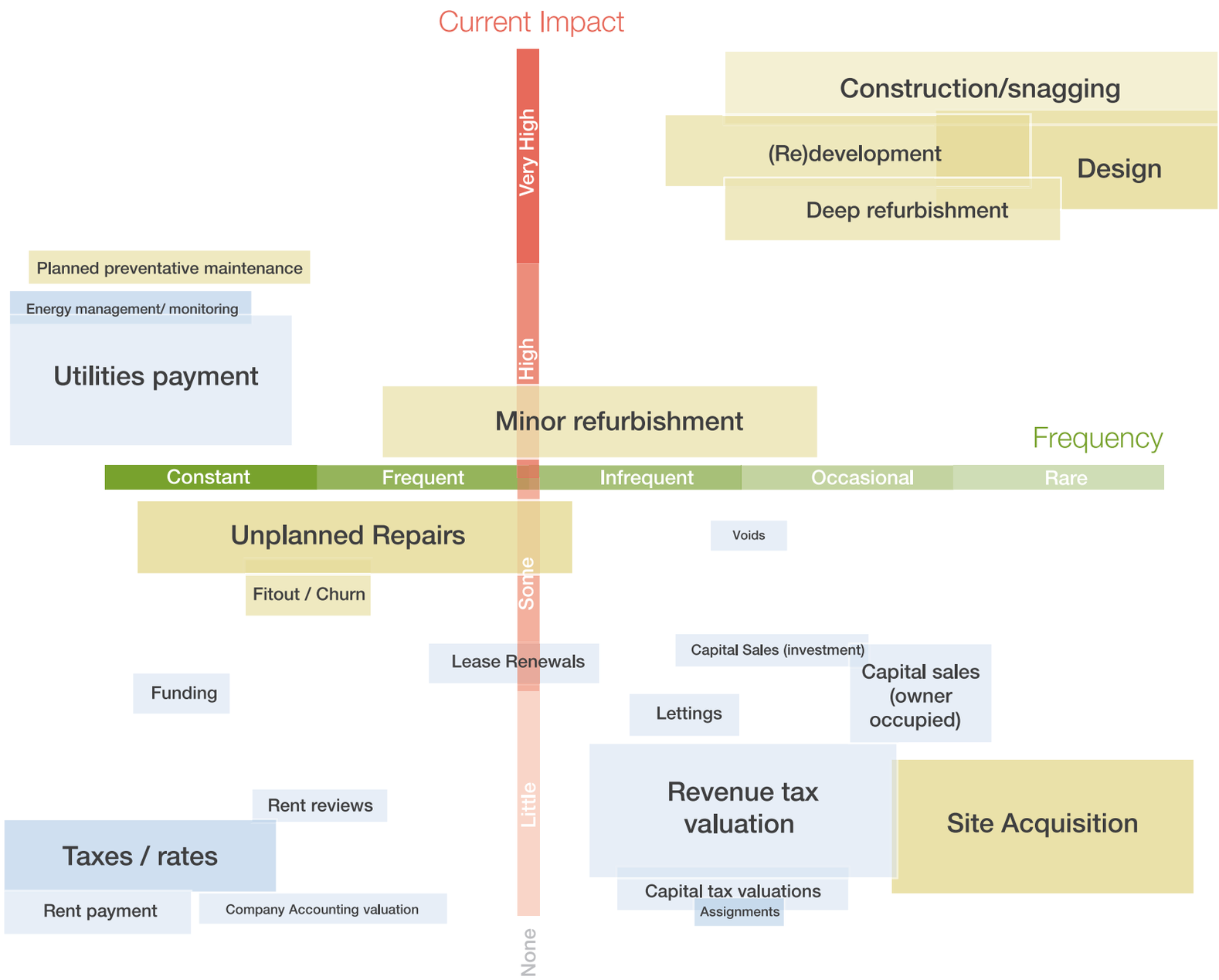


Activity	Capital sales (investment)	
Quadrant		4
Frequency		Infrequent periodic
Current Impact		Little
Current interventions		EPC
Potential impact		Some
Properties affected	**Dom**	20%
	Non -Dom	40%

Comment

Some investment stock is held for very long periods in investment portfolios or possibly where owned by ‘accidental’ landlords. However, other stock changes hands frequently, where return optimisation is paramount. This can result in holding periods being less than 10 years in many cases.

Key participants include the vendor and purchaser together with professional advisors and, in many instances, funders providing debt and /or equity. Key considerations are the price and risks to the future value of the asset; for let property this will include factors such as location, age, condition, current lease length and terms (eg. break clauses and rent reviews), lessee covenants and rent level. For both let and owner occupied buildings, the risk of value loss as a result of locational factors or inability to meet market expectations is a consideration, as is any need to incur above normal costs for property maintenace, eg. as a result of a need to invest to comply with legislation or to replace failing services or fabric. Motivations of buyers are to ensure they understand the performance and conditon of the asset in order to factor in any necessary works into their offer price. Where energy efficiency measures necessitate investment to meet minmum standards or market expectations they could have a negative impact on the price offered.

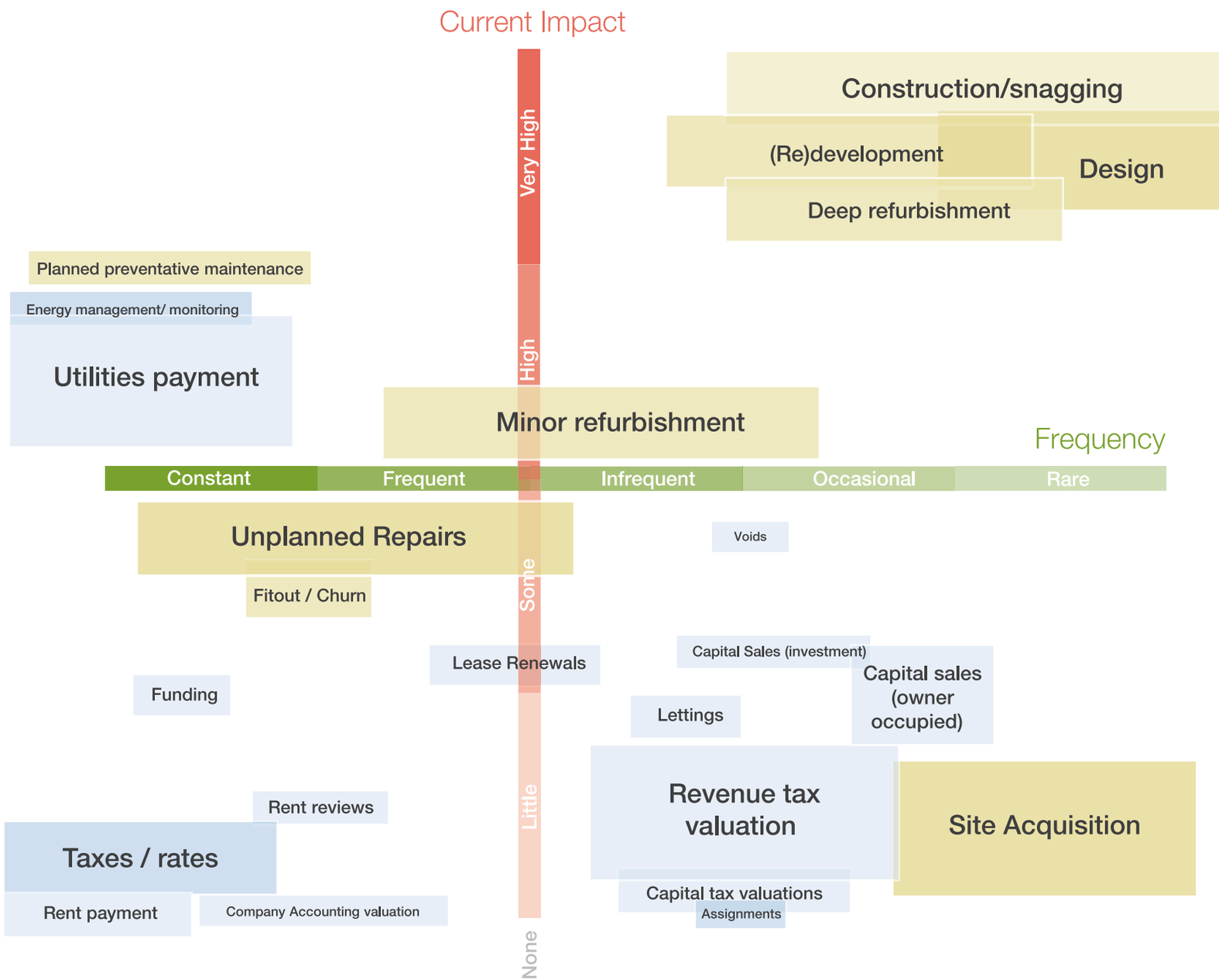


Activity	Capital sales (owner / occupied)	
Quadrant	4	
Frequency	Infrequent periodic	
Current Impact	Little	
Current interventions	EPC	
Potential impact	Some	
Properties affected	**Dom**	50%
	Non -Dom	40%

Comment

The majority of stock (domestic and non-domestic) is owner-occupied. However much of it does not change hands frequently – and Land Registry records that some 30+% of land has not transacted since compulsory registration was introduced over 30 years ago. The holding periods will depend in part on the levels of economic activity; high levels of SDLT can potentially reduce turnover of stock. Although infrequent, sales are likely to happen more frequently than redevelopment, so represent an important opportunity to intervene possibly through incentives or strengthening EPCs.

Key participants include the vendor and purchaser together with professional advisors and in many instances funders providing debt. Key considerations are the price and the, ability to meet requirements (eg location, condition, size, etc). Although energy costs are becoming a more significant factor for some occupiers, there is little market evidcne that they are currently influential for many purchasers execpt in high grade commercial stock which is likely to be energy efficient anyway. The risk of value loss as a result of locational factors or inability to meet market expectations is a consideration, although less important for long term owners, as is any need to incur above normal costs for property maintenace, eg. as a result of a need to invest to comply with legislation or to replace failing services or fabric. Motivations of buyers are to ensure they understand the performance and conditon of the asset in order to factor in any necessary works into their offer price.

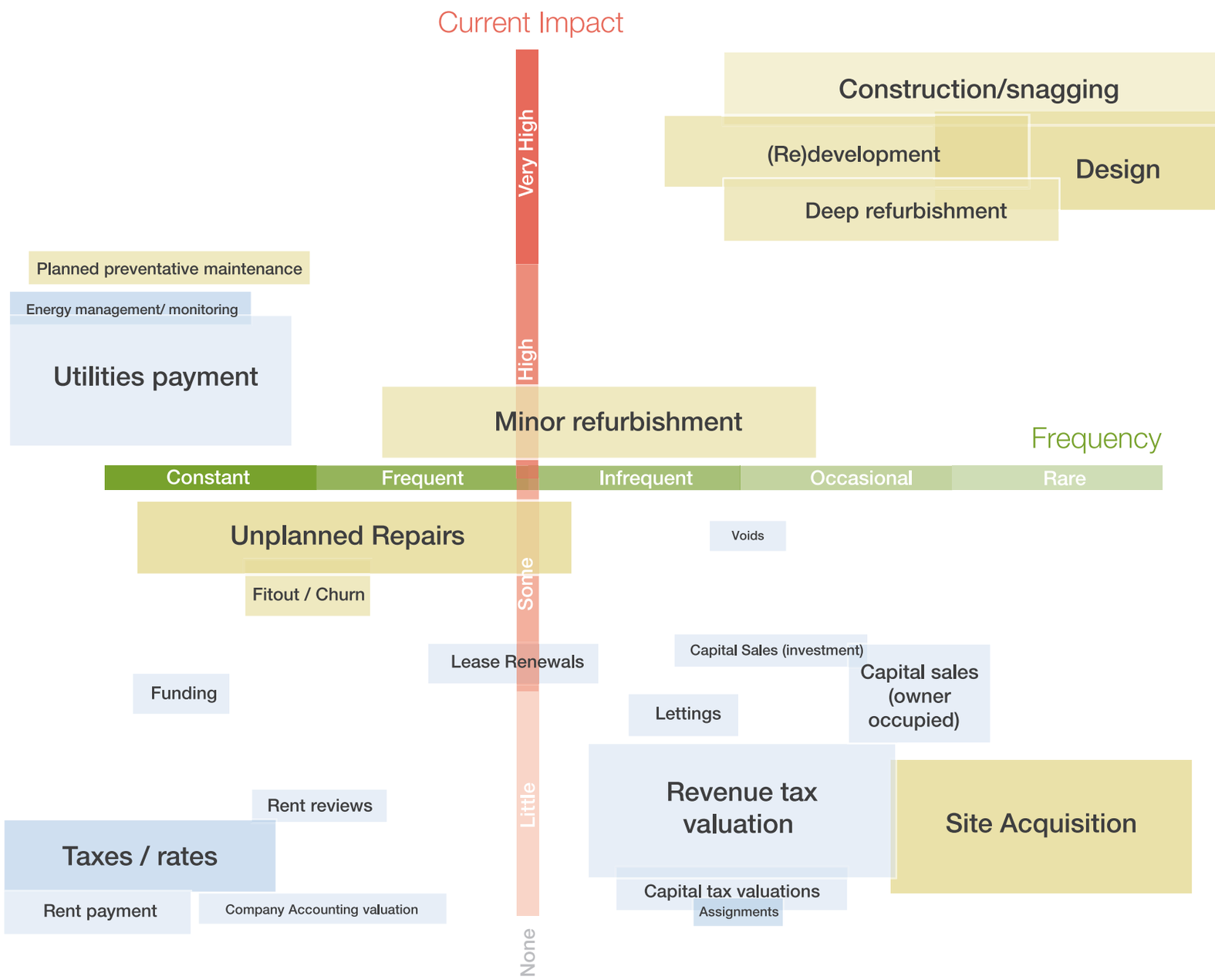


Activity	**Rent reviews**	
Quadrant	3	
Frequency	Frequent Periodic	
Current Impact	None	
Current interventions	none	
Potential impact	Little	
Properties affected	**Dom**	25%
	Non -Dom	n\a

Comment

"35% of let domestic properties are primarily let on shorthold tenancies or other arrangements subject to review. Of the 55% of non–domestic let property, probably close to half are on leases of 5 years and less with no review provisions. Currently, unless there is some form of 'Green lease' in place (and they are unusual in commercial buildings and unknown in domestic stock), there is no link between rent reviews and energy/carbon behaviours. Unless Green Leases are widely adopted (and MoUs have been brought in under statute in France) there is little opportunity for effective interventions, even among the stock that is affected by rent reviews. The introduction of MEES may result in more meaningful disucssions about energy performance and any associated improvement measures during rent review periods.

Key participants are the landlord, occupier and any professional advisors. Motivations are to negotiate favourable terms for a revised rent. Where circumstances have changed that impact the relative merit of a lease (eg the ability to sublet surplus space is curtailed becaue of a poor energy rating) this could impact on the revised rent."

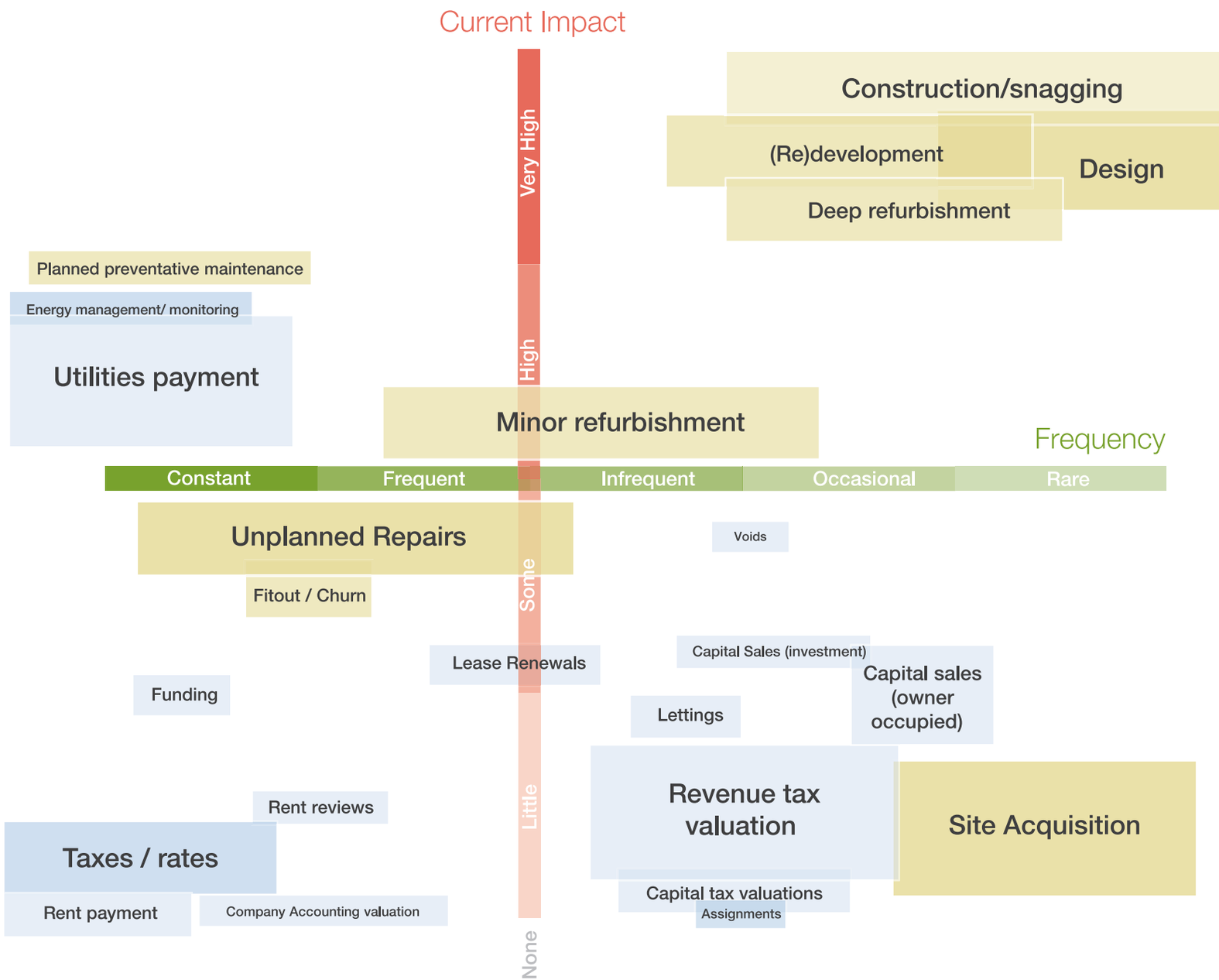


Activity	**Lease renewals**	
Quadrant		3
Frequency		Infrequent periodic
Current Impact		Little
Current interventions		MEES
Potential impact		High
Properties affected	**Dom**	20%
	Non -Dom	60%

Comment

Lease renewals are more prevalent than rent reviews, given the increasing prevalence of short leases. Many lease expiries (including domestically the shift from shorthold to periodic ‘holding over’ tenancy) result in new leases being granted by agreement to the existing lessees. This is a point at which all terms are open to negotiation and a point at which incentive style interventions may prove effective. Interventions requiring improvements which could be out of cycle are likely to be resisted. Improvements will best be achieved through negotiated processes and the advent of MEES will change the nature of these discussions for affected properties.

Key participants are the occupier, landlord and in some cases their respective advisors. Landlord motivations are to secure the best combination of rent levels and lease length, while occupiers are looking for flexibilty and cost control. As part of discussions some investment in the property may result to address quality or other concerns. The negotiations between each party will depend largely on market conditions (eg the availability of comparable stock) although in most cases it is in both parties interest to renew lease to avoid the risk, uncertainty and inconvenience of relocation / reletting.

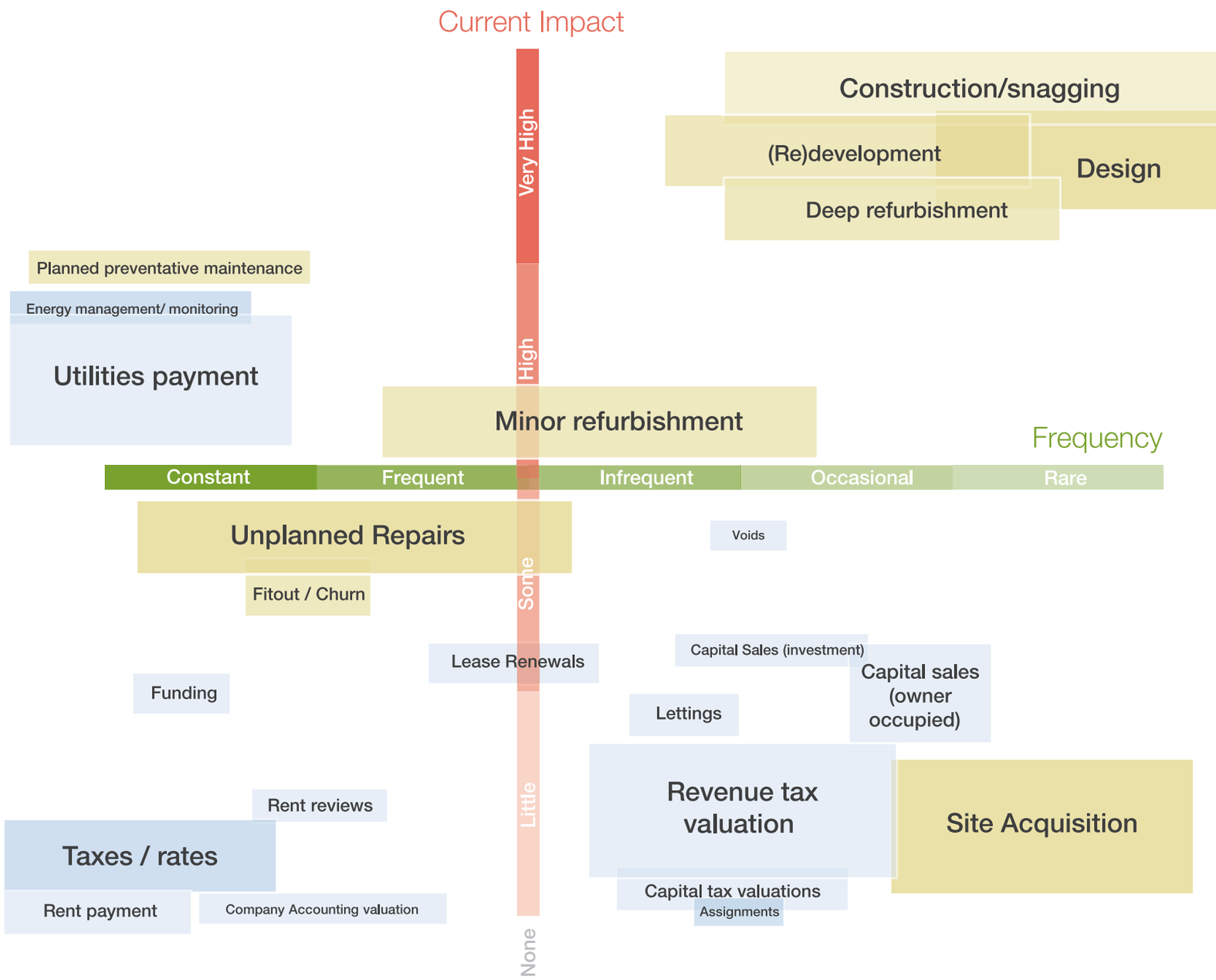


Activity	**Assignments/sub-letting**	
Quadrant		3
Frequency		Infrequent periodic
Current Impact		None
Current interventions		MEES
Potential impact		Some
Properties affected	**Dom**	5%
	Non -Dom	20%

Comment

Assignments/sub-lettings are normally prohibited in domestic leases (except ground leases), but are commonplace in longer commercial leases (subject to consents). There are often conditions on assignments/ sub-lettings but these are not related to energy/carbon and under current regulations, there are no powers to require any improvements on these transfers. This could change if MEES were to be applied at this point but could result in works out-of-cycle. Where the landlord is not liable to undertake works until the end of the lease, MEES could act as a disincentive to assignments for buildings with F or G ratings as the cost of improvement works might need to be borne by the lessee rather than the landlord.

Key participants are the lessee and sublessee with similar motivations as exhibited between landlords and occupiers (lessee's).

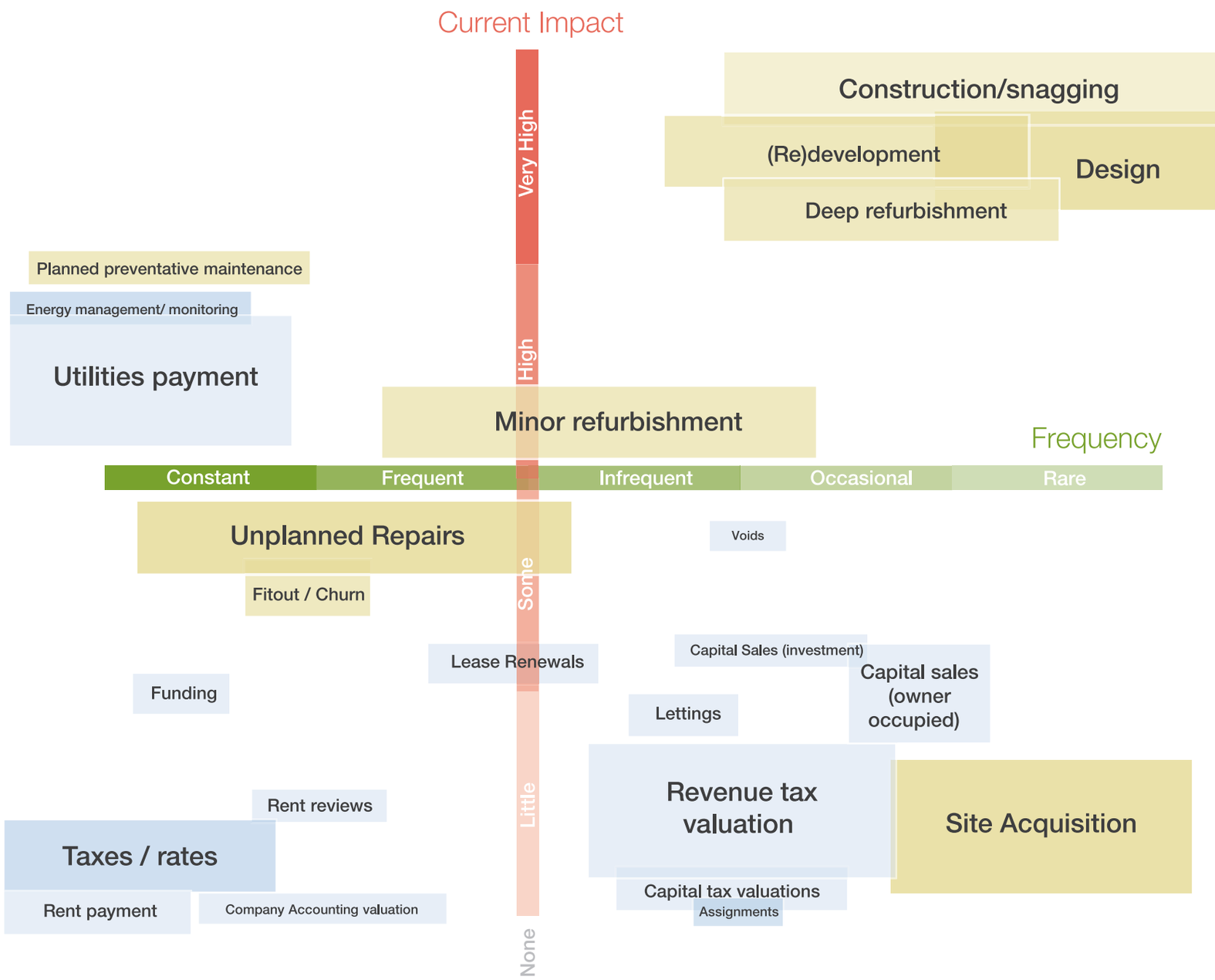


Activity	**Voids**	
Quadrant	3	
Frequency	Infrequent periodic - Occasional	
Current Impact	Some	
Current interventions	None	
Potential impact	High	
Properties affected	**Dom**	3%
	Non -Dom	6%

Comment

Since the introduction of empty rates, the number of vacant properties has decreased: owners are incentivised to keep them occupied or to render them unfit for occupation. However keeping them occupied to avoid empty rates does not imply gaining a commercial return in many cases. Where buildings are empty awaiting sale, re-letting or alteration/ refurbishment, the opportunity would exist for gateway or/and incentive measures for improvement implementation.

Key participants here are the landlord and their professional teams. Motivations are normally to get the building occupied on reasonable economic terms as quickly as possible. Where work is needed to improve the likelihood of a satisfactory future letting this will be undertaken as quickly as possible.

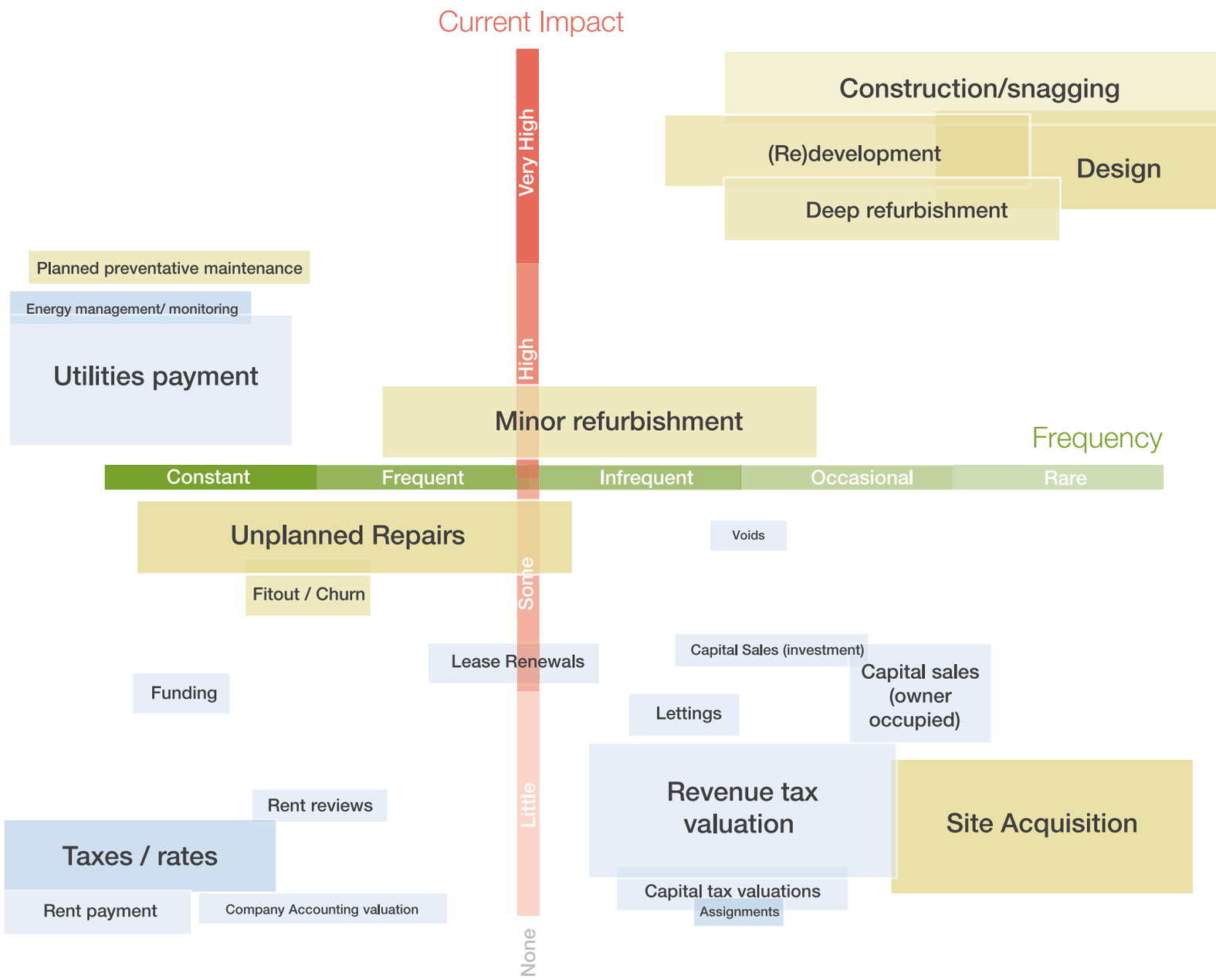


Activity	**Utility payment**	
Quadrant	1	
Frequency	Constant	
Current Impact	Some/high	
Current interventions	None	
Potential impact	High/ very High	
Properties affected	**Dom**	97%
	Non -Dom	94%

Comment

Utilities payments affect almost all stock. Occupiers pay for utilities and insurance – directly or indirectly (through service charges). Likewise it is the occupier who will receive the benefit of energy efficiency savings, for example, and will also suffer the consequences of high energy costs. In some types of building, the costs of energy can be significant (i.e. lower value and/or energy inefficient buildings) but in many (higher value/ efficient buildings), they represent a small proportion of total occupancy costs. Whilst commercially such costs may be monitored, often within the commercial SME sector and domestic setting energy costs are simply accepted as a 'given' despite the fact that there is typically potential for significant investment in cost effective energy efficiency measures.

Participants here are the occupier who should be looking to reduce utility costs, but often without substantial capital investment and interuption to building use. The regular nature of utliites payments means that they, perhaps, don't get the recognition they deserve as an avoidable business cost and while some occupiers actively manage their energy use this is still the exception. Better data provided by the supplier to the energy payee on a regular basis could be influential in heightening awareness especially if combined with benchmarked data.

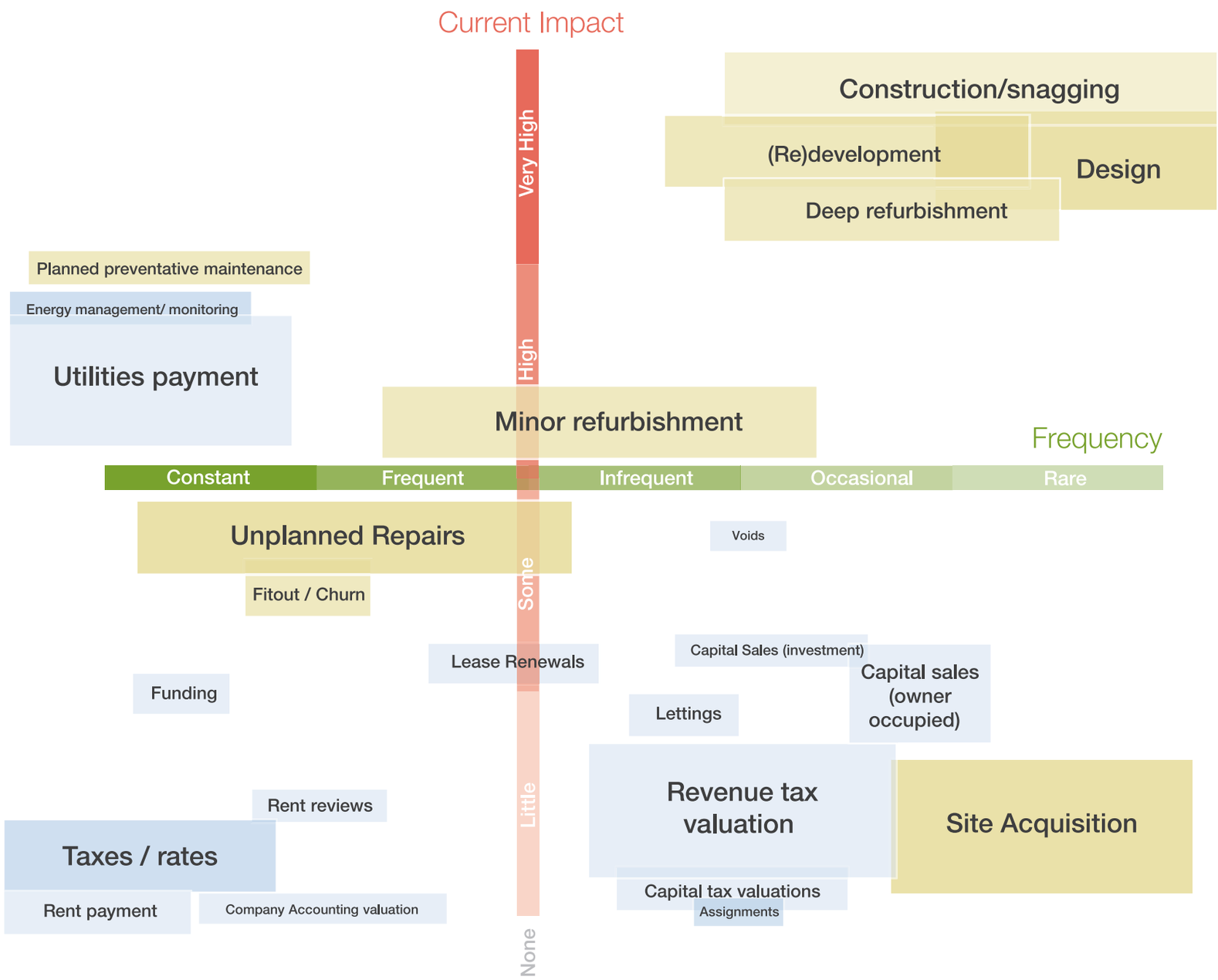


Activity	**Taxes / rates**	
Quadrant	3	
Frequency	Constant	
Current Impact	None	
Current interventions	None	
Potential impact	High	
Properties affected	**Dom**	>85%
	Non -Dom	95%

Comment

Some empty properties have relief- but very few. Students and some other groups are eligible for discounts or exemptions from Council Tax and charities and small businesses are eligible for reduced rates of business rates. As rateable values are based on market rental value (or historic capital in the case of domestic properties) concern is often expressed that improvements to energy efficiency in theory will lead to a higher rates bill. Therefore, it could be argued that current methodologies act as a perverse disincentive to improve. The research found considerable support to counter this by linking energy improvements to some form of rates discount. As it would potentially affect almost every property on an annual basis, an incentive scheme related to rateable values might present a signficant opportunity.

The key participant here is the occupier and their primary motivation is compliance with the relevant tax / rates code. They would like to minimise their legitimate outgoings in tax / rates and will therefore be interested in any measure that offers the potential to reduce this expense.

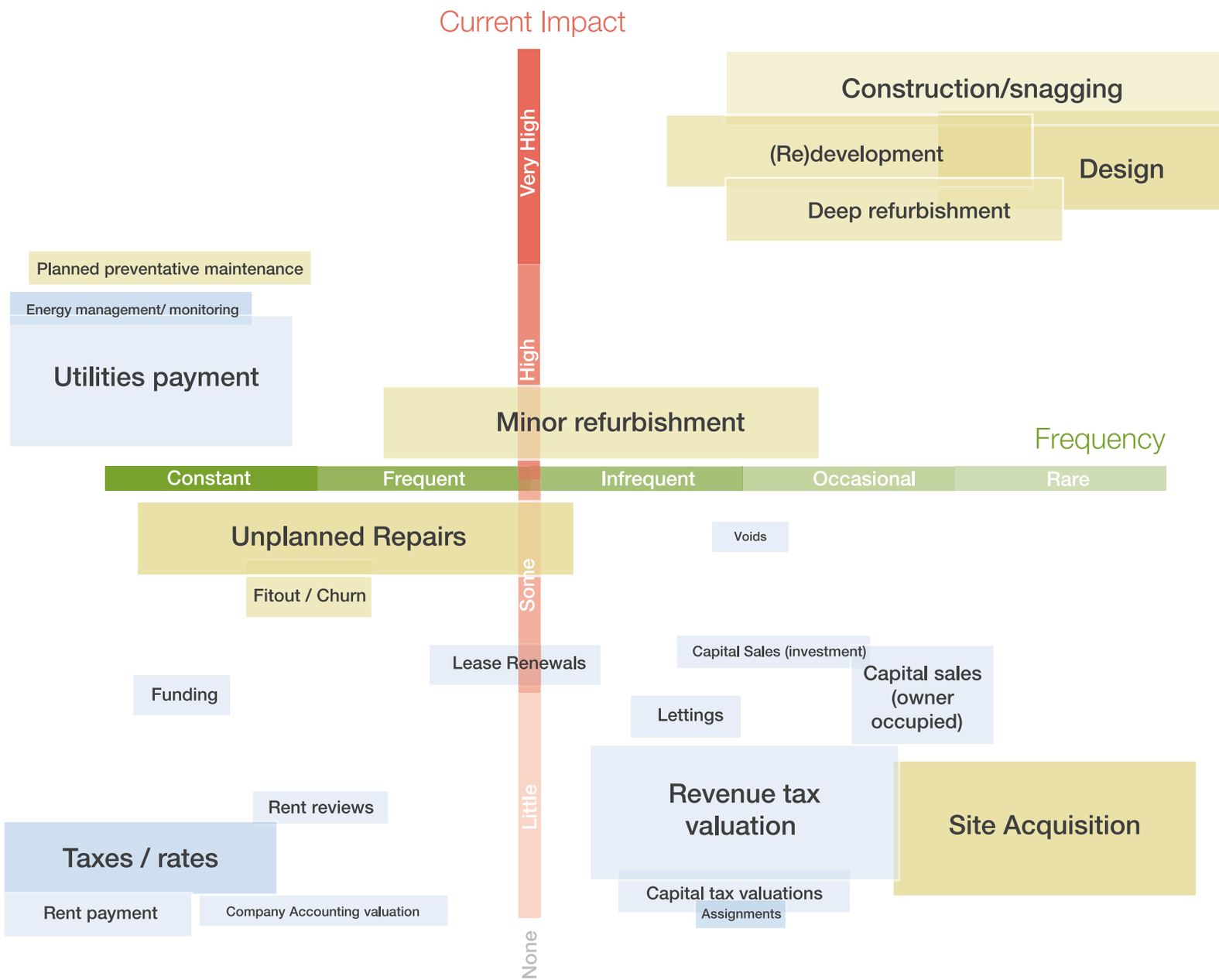


Activity	**Rent payment**	
Quadrant		3
Frequency		Constant
Current Impact		None
Current interventions		none
Potential impact		Some
Properties affected	**Dom**	35%
	Non -Dom	60%

Comment

Energy and carbon will only become an issue if it enters rental negotiations, thereby encouraging landlords to upgrade at the next appropriate point. Where a tenant is on a short lease they are unlikely to seek to to ask the landlord to upgrade and even less likely to undertake works themselves, but they might use lack of efficiency resulting in high utility bills as a bargaining ‘chip’ against landlords. Empirical evidence of this in the UK does not necessarily back up the theoretical case, except in some sub-sectors: for example energy efficiency is an expectation within prime commercial stock; it is also an issue in low value domestic stock where ability to pay is compromised. Impact on rent is indirect and only a minority of properties are affected.

Key participants here are the occupier and landlord with motivations being to ensure the terms of the lease are met and due rents paid in a timely manner.

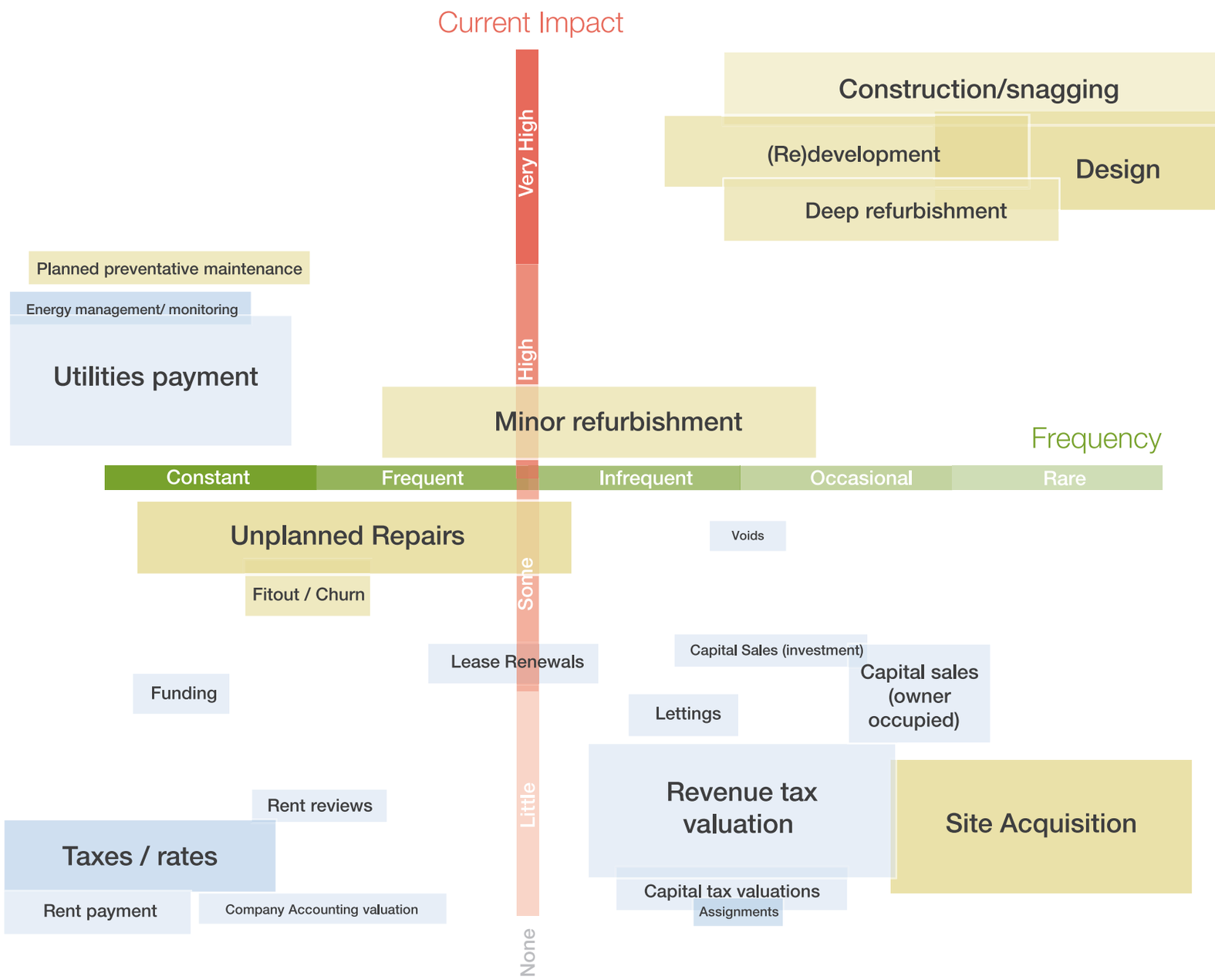


Activity	Company accounting valuation
Quadrant	3
Frequency	Frequent Periodic
Current Impact	None
Current interventions	none
Potential impact	Some
Properties affected — **Dom**	0%
Properties affected — **Non -Dom**	40%

Comment

Properties in corporate ownership, in UK based investment company portfolios or the public sector all require regular revaluations, normally to market or fair value in accordance with RICS Valuation Professional Standards (Red Book). Properties lying in private non-listed company ownership or individual ownership probably will not be revalued on a regular basis. Where properties are subject to revaluation in accordance with the Red Book the valuer is now obligated to gather sustainability data where such data is available and to comment on the potential value implications. Over time this may raise awareness and feed through to the value chain. The speed with which this happens and its level of influence will depend on government measures and incentives.

Key participants here are the owners (many are freehold in occupation) and their valuers. The prime motivation is to provide a fair reflection of the current market value of the asset. Valuers can only consider factors that might lead to a change in the market value of the asset but there is now a strong steer to collect data. In many cases there is insufficient evidence that energy performance impacts value and therefore this is not typically included in valuations, unless performance is far outside industry norms. The introduction of MEES may result in more attention being paid to the energy rating of certain buildings and allowance taken of the cost of compliance with the regulations. However, there is less indication that valuers take into consideration actual energy use or energy ratings that are above the minimum threshold.

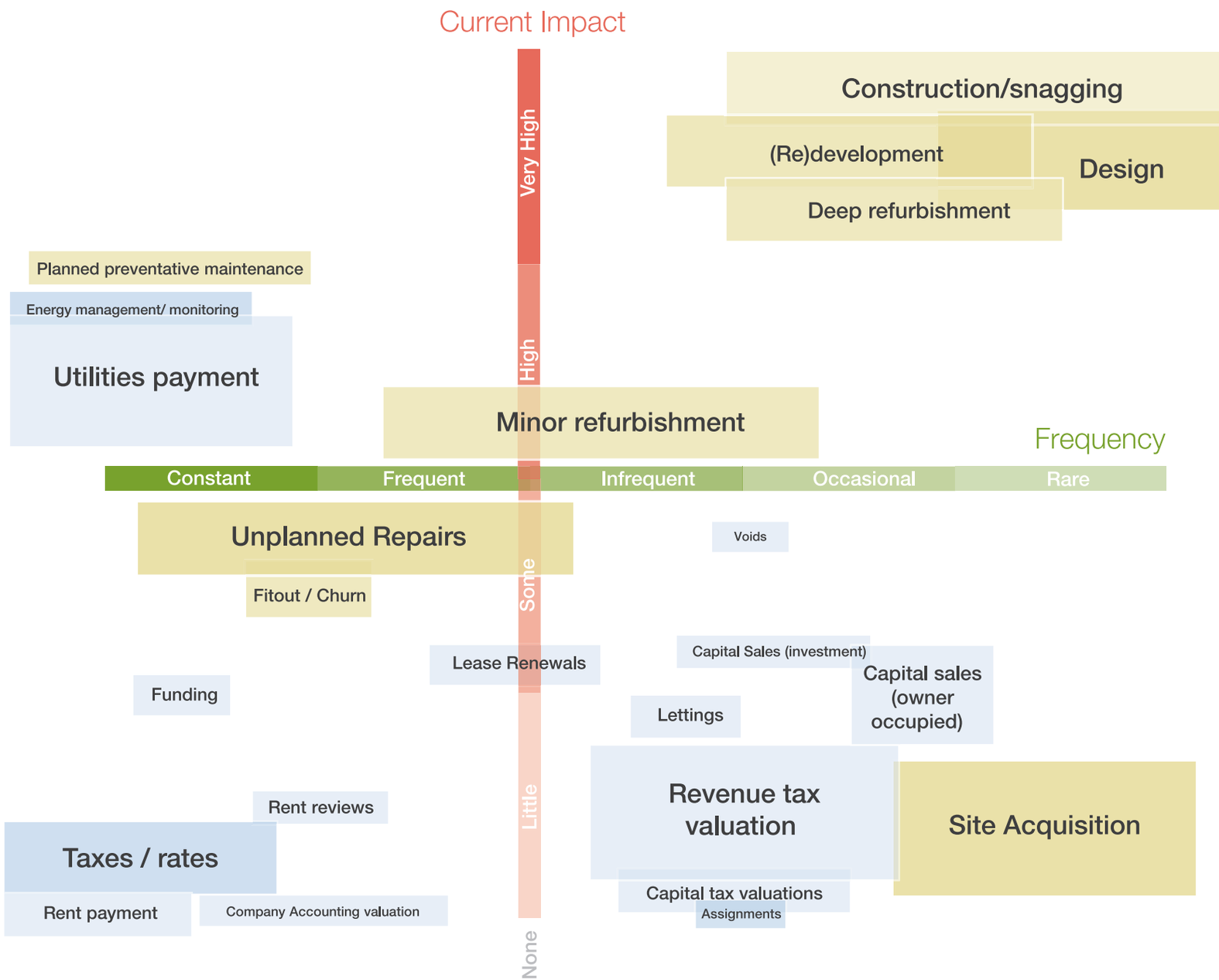


Activity	Capital taxes valuation	
Quadrant	4	
Frequency	Infrequent periodic	
Current Impact	None	
Current interventions	none	
Potential impact	Some/ high	
Properties affected	**Dom**	50%
	Non -Dom	40%

Comment

Properties are valued for capital tax infrequently, normally only in the case of transactions (Stamp Duty Land Tax) or death (Inheritance Tax). There is no connection with energy/carbon unless it feeds into market values. However, high rates of SDLT may act as a disincentive to buy/ sell. Whilst the actual valuations present little opportunity, research found encouragement to link energy efficiency as measured through EPCs to differential rates of tax as an incentive to improve.

Key participants here are the seller and their valuer. The prime motivation is to provide a fair reflection of the current market value of the asset. Valuers can only consider factors that might lead to a change in the market value of the asset, in many cases there is insufficient evidence that energy performance impacts value and therefore this is not typically included in valuations, unless performance is far outside industry norms. The introduction of MEES may result in more attention being paid to the energy rating of certain buildings and allowance taken of the cost of compliance with the regulations. However, there is less indication that valuers take into consideration actual energy use or energy ratings that are above the minimum threshold.

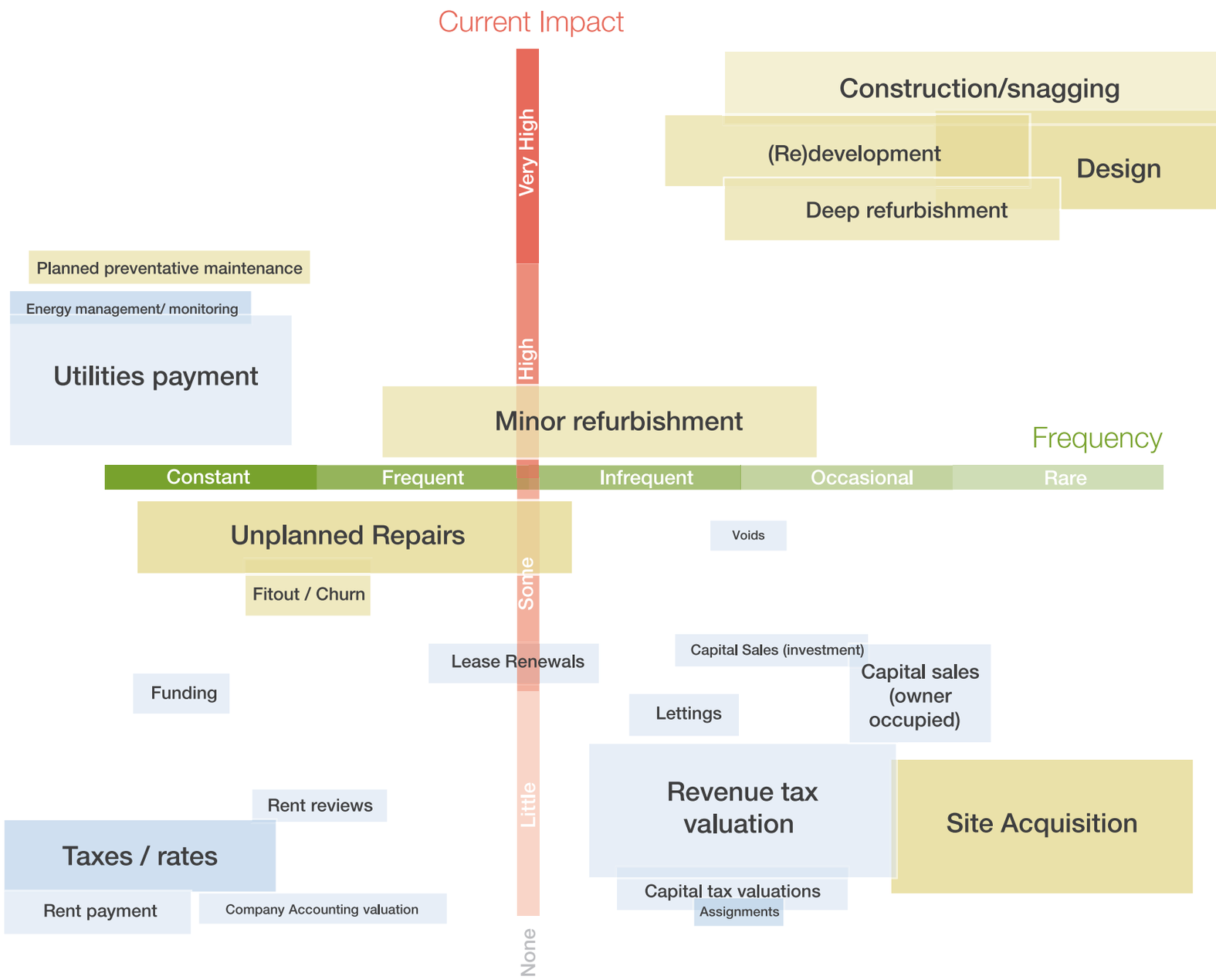


Activity	Revenue tax valuation	
Quadrant		3
Frequency		Infrequent periodic
Current Impact		None
Current interventions		None
Potential impact		Some
Properties affected	Dom	100%
	Non -Dom	100%

Comment

Properties are valued for revenue taxes infrequently but regularly; for Business Rates this should be every 5 years whereas Council Tax revaluation has not taken place since the system was introduced over 20 years ago. The revaluation will only reflect energy efficiency if this is a market value matter. Whilst the actual valuations present little opportunity, the research found encouragement to link energy efficiency to differential rates of tax as an incentive to improve.

Key participants here are the owners, occupiers and their consultants and the valuers acting for the revenue. The prime motivation is to provide a fair and consistent reflection of the current market value of the asset. Landlords and occupiers are keen to legitimately reduce any outgoings in rates or taxation and will therefore be interested in any opportunities to reduce these costs.



Activity	Energy management/ monitoring	
Quadrant	1	
Frequency	Constant	
Current Impact	Some / High	
Current interventions	EPC,DEC, CRC	
Potential impact	High/ Very high	
Properties affected	**Dom**	25%
	Non -Dom	35%

Comment

In the majority of cases, energy use is not actively monitored and managed. Research in the domestic sector points to energy normally being an accepted cost, rather than a managed provision, albeit this generalised position covers a broad spectrum of behaviours. Further, social landlords and some private sector multiple landlords are now actively managing energy levels and a connection with tenant default rates was noted. Within the non-domestic sectors, large commercial investors and owner-occupiers increasingly have FM functions and specialist energy managers who are actively managing energy use. The introduction of CRC was reported as being critical in changing behaviours – but only among the minority of organisations that are affected. DECs were seen as more effective as influences than EPCs, implying that the market is more likely to respond to easily understood annual measures of actual consumption than occasionally assessed theoretical assessments. The research found support for greater incentives and transparency in terms of energy use statistics to provide 'nudges' to support behaviour change.

Potential participants here include landlords, occupiers and their energy advisors. Key motivations are to reduce operating costs with measures that deliver rapid returns and to evidence reductions in energy and carbon emissions to support corporate reporting, etc. Where energy performance models are used to outsource energy management and investment there is an additional requirement to provide monitoring and verification to validate changes in underlying consumption.