



Research to Identify Opportunities to Update the Demolition Bylaw for the City of Richmond

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DISCLAIMER

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Executive Summary

This paper presents a comprehensive analysis and evaluation of municipal demolition policies in the Metro Vancouver Region, with the aim of providing a framework to update the City of Richmond’s Demolition Waste and Recyclable Materials Bylaw No. 9516. This update is a key component of the City’s strategy to reduce embodied carbon emissions. The research involved a thorough jurisdictional scan, including a robust review of policies and literature, as well as semi-structured interviews with municipal staff to identify and assess current practices in regional municipalities. The findings reveal a range of existing practices, followed by an in-depth analysis and evaluation of best practices. Based on the literature review, interviews, and a detailed examination of Richmond’s current bylaw, the paper proposes actionable recommendations to enhance Richmond’s policies, promote circularity, and reduce embodied carbon emissions. Proposed recommendations include: increasing the minimum recycling requirements to 100% for clean wood and 85% for all other materials, expanding building types to include multi-family dwellings and industrial, commercial, and institutional (ICI) buildings, as well as several recommendations to encourage deconstruction and reuse in order to promote circularity such as fostering a local reuse hub, providing deconstruction education and training, and utilising technology for improved data collection, utility and tracking—all of which ultimately contribute to the City’s circular and climate goals.



1. Introduction

The City of Richmond, a leader in innovative sustainability policies, recently developed the Richmond Circular City Strategy – the first of its kind in North America – which aims to achieve 100% circularity by 2050 (City of Richmond, 2023). As part of this strategy, the City of Richmond has an intended goal of reducing embodied carbon by 40% by 2030. To achieve these targets, a significant factor will be the built environment and waste management approaches taken, specifically with regards to the management of construction, renovation, and demolition waste.

Construction, renovation, and demolition (CRD) waste is a significant contributor to solid waste streams, contributing over 4 million tonnes (about 12%) of waste to landfills annually in Canada. This CRD waste poses serious risks to environmental and human health, and is one of the largest sources of methane, contributing significantly to greenhouse gas emissions (Canadian Council of Ministers of the Environment, 2019) (Government of Canada, 2024). The built environment sector is currently the largest contributor to greenhouse gas emissions in the world, emphasising the urgent need to implement policies to reduce these substantial emissions (United Nations Environment Programme, 2023).

1.1 THE IMPORTANCE OF EMBODIED CARBON AND THE CIRCULAR ECONOMY APPROACH

Embodied carbon refers to greenhouse gas emissions coming from the extraction of natural resources, and the manufacturing, transportation, installation, maintenance, and disposal of materials. As shown in Figure 1, embodied carbon emissions, in comparison to operational carbon emissions, are significant at each stage throughout the life cycle of a building and contribute vastly to the amount of greenhouse gas emissions from this industry (Carbon Leadership Forum, 2024) (City of Richmond, 2024).

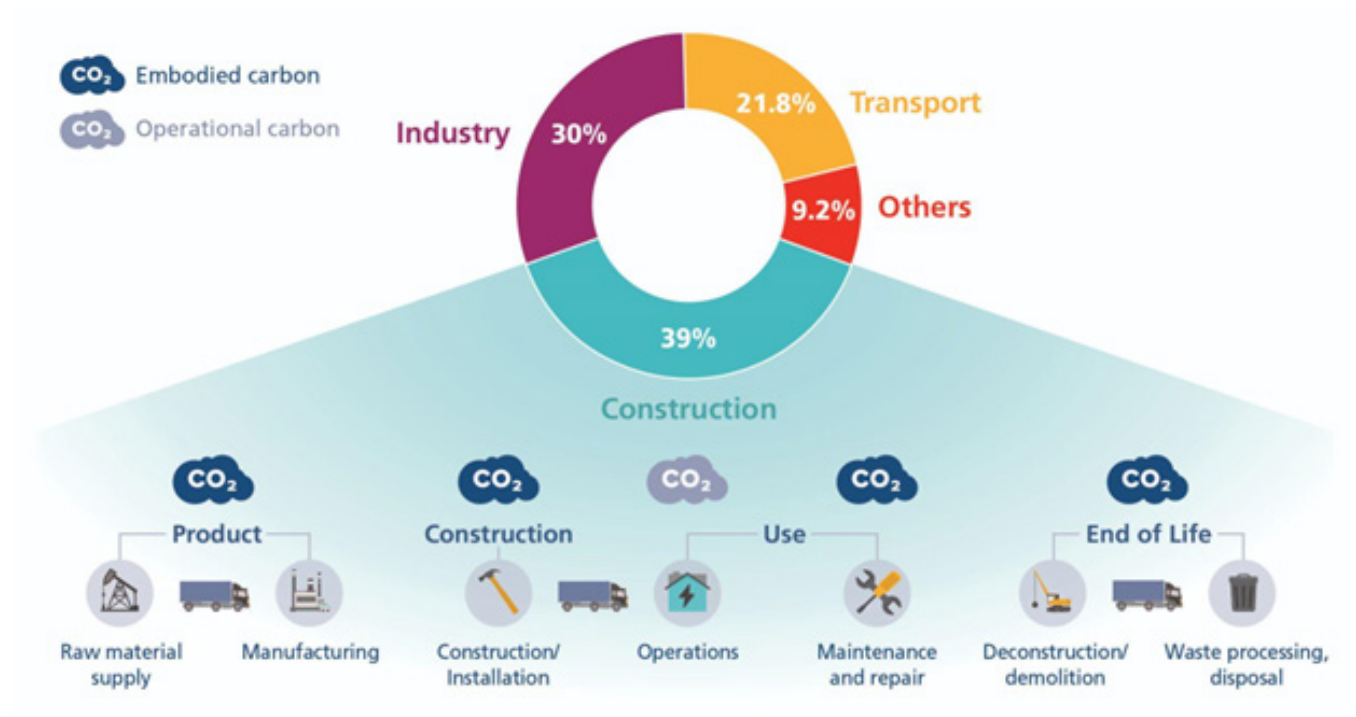


Figure 1–Embodied Carbon Emissions in the Building Life Cycle (City of Richmond, 2024)

With policy advancements like the BC Energy Step Code and the City of Richmond's Community Energy and Emissions Plan, buildings in Richmond are becoming increasingly energy efficient. As a result, operational emissions are significantly decreasing, placing a greater emphasis on tackling embodied carbon emissions. This shift, as illustrated in Figure 2, highlights the growing importance of addressing embodied carbon as building efficiency increases. Reducing embodied carbon emissions will play an increasingly crucial role in minimising overall greenhouse gas emissions and promoting a circular economy within the built environment sector (Carbon Leadership Forum, 2024) (Pembina Institute, 2020).

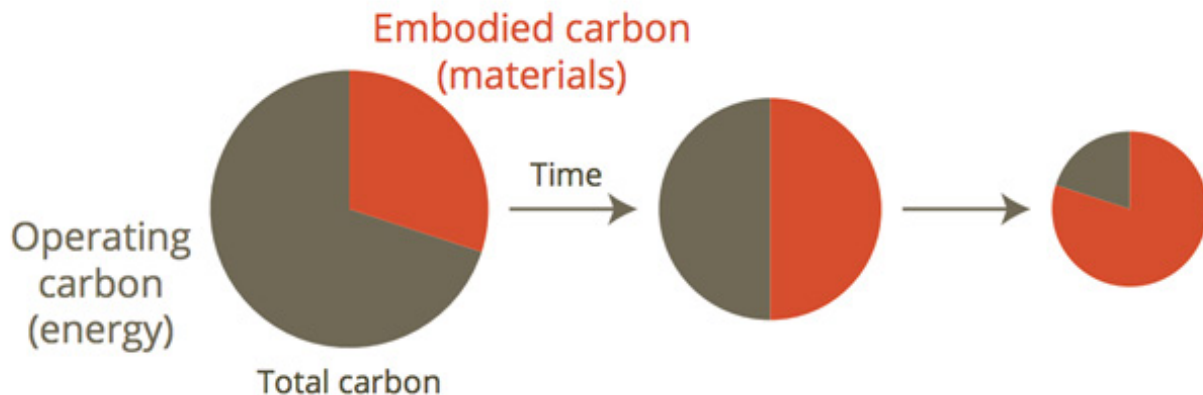


Figure 2–Importance of Embodied Carbon as Building Efficiency Increases (Pembina Institute, 2020)

As operational carbon decreases with more energy-efficient buildings, embodied carbon becomes a more prominent contributor to the overall carbon footprint of the construction sector. This is where the concept of a circular economy becomes vital. By rethinking how materials are produced, used, and managed at the end of their life cycle, a circular economy reduces the need for new raw materials and ensures that existing materials, particularly those with high embodied carbon, are reused or recycled. This not only reduces waste but also significantly lowers the overall carbon emissions from the construction process, aligning environmental goals with economic sustainability (Ginga, 2020).

Currently, the waste management system operates on a linear model called “take-make-waste” (Gorgolewski, 2017), which results in valuable materials being discarded as waste rather than being reused or recycled. This system leads to significant volumes of waste that contribute to landfills and increases demand for virgin materials, many of which are non-renewable, placing additional pressure on ecosystems and increasing environmental degradation and emissions (CCME, 2019).

A circular economy, in contrast, focuses on closing this loop by proposing an alternative model in which products do not have an end-of-life. Instead of sending materials to waste, the focus is on repairing, reusing, recovering, and recycling materials designed to be durable and long-lasting. This model maximises the value of materials already in our systems, reduces the need for new raw materials, and minimises environmental impact while contributing positively to the economy (Ginga, 2020).

In British Columbia, the need for new homes is projected to be in the hundreds of thousands by 2050. Given the substantial increase in construction and development anticipated in the coming decades, and in accordance with provincial Bill 44, there is an urgent need to adopt circular economy principles. By closing the loop, we can create more affordable homes, decrease waste, and increase resource efficiency, with the goal of achieving a circular economy that delivers environmental, social, and economic benefits (Ginga, 2020) (CCME, 2019).

1.2 REGULATORY LANDSCAPE: FEDERAL, PROVINCIAL AND REGIONAL LEGISLATION

In Canada, waste management processes are under the jurisdiction of municipal governments. This means that municipalities are responsible for the collection, diversion, disposal and recycling of all local waste—specified more directly through the Local Government Act of British Columbia. Although Canada does not have direct jurisdictional authority, developing guidelines provides support for provincial, territorial and local governments to take action on sustainable waste management practices for CRD (Government of Canada, 2024).

As part of the 2022 to 2026 Federal Sustainable Development Strategy, Canada has made commitments to reduce the amount of waste Canadians send to disposal by 30% by 2030, from a 2014 baseline level. The same strategy aims to further reduce waste by 50% by 2040. National guidelines have also been developed to aid in this process such as the Guide for Identifying, Evaluating and Selecting Policies for Influencing Construction, Renovation and Demolition Waste Management (CCME, 2019), as well as the Canadian-Wide Action Plan for Extended Producer Responsibility.

Canada has a clear commitment to address climate change and promote sustainable practices for a circular economy, with critical targets to achieve net-zero by 2050, as part of the Paris Agreement and the A Healthy Environment and A Healthy Economy Plan. Initiatives such as the Canada-wide Strategy on Zero Plastic Waste highlight the growing emphasis on sustainable waste management practices (Government of Canada, 2024).

Many Canadian municipalities have developed legislation or programs to encourage the reuse and recycling of CRD waste. Many provinces and territories have also committed to developing Extended Producer Responsibility (EPR) programs for CRD that make corporations responsible for the life cycle of their product. The federal government has clear commitments to sustainable development and promoting a circular economy, and these national guidelines provide encouragement and support to municipalities to align regulations with climate and waste management goals (Government of Canada, 2024).

In British Columbia, provincial legislation emphasises the importance of managing CRD waste effectively and provides funding towards waste management initiatives. The Environmental Management Act, specifically through the Recycling Regulation, provides frameworks for environmental protection and waste management. These regulations require municipalities to establish programs that manage waste streams, including CRD. Additionally, the CleanBC program sets forth a comprehensive climate action agenda which includes targets to reduce waste and enhance recycling processes for the ultimate goal of a circular economy (CleanBC, 2024). These provincial efforts are essential for alignment to achieve greenhouse gas emissions targets and promote sustainable waste management practices across all municipalities in British Columbia.

The Metro Vancouver Regional District is also responsible for recycling and waste management, operating several waste facilities in the region. Through the Integrated Solid Waste and Management Plan, there are frameworks brought forth to reduce CRD waste, including targets to achieve regional recycling rates of 70% by 2015 and 80% by 2020. There are also disposal bans in place for clean wood and gypsum. Metro Vancouver has also developed guidance on best practices, including a sample bylaw for increased recycling of demolition waste to encourage municipal policy alignment. Metro Vancouver also provides research and tools, such as waste management calculators and toolkits, to support and encourage municipal policies (Metro Vancouver, 2024).

1.3 THE ROLE OF AFFORDABILITY IN SUSTAINABLE DEVELOPMENT

CRD waste in Metro Vancouver accounts for about 1.3 million tonnes annually, making up roughly one-third of municipal solid waste (Metro Vancouver, 2024). Much of this waste could be resold, reused, or recycled, but instead its economic value is wasted, contributing only to emissions and landfill overflow. Research in Metro Vancouver estimates that salvageable wood alone would be worth approximately \$343 million each year. If other common building materials are included, this financial value would significantly increase. These materials, when sold or reused, can generate revenue and reduce the need for purchasing virgin materials. Over time, this can lead to significant cost savings for builders and municipalities as demand for supply increases (Vancouver Economic Commission, 2020).

Implementing circular practices, such as deconstruction, can seem costly, but these costs are outweighed by the long-term benefits that contribute to affordability goals. Initial costs associated with deconstruction and material salvage can be higher than the traditional demolition approach. However, these costs are offset by long-term economic and social growth, as deconstruction creates six times more job opportunities compared to traditional demolition. This local job creation and stimulation of economic growth greatly benefits communities as a whole (Union of British Columbia Municipalities, 2021).

Managing waste through deconstruction and recycling can also lower disposal costs by reducing the amount of waste headed to the landfill. Landfill tipping fees and waste disposal charges can be substantial and by diverting materials from landfills, municipalities and contractors can reduce these costs. Additionally, recycling can generate income from the sale of recycled materials, further offsetting costs for municipalities (Metro Vancouver, 2024).

Properties that incorporate circular economy principles, such as using reclaimed materials, can also see an increase in value with environmentally conscious buyers. Buyers invested in the preservation of our environment are interested in sustainable and environmentally friendly features, such as reclamation for historic and cultural value, enhancing the market value of these properties (Royal Institution of Chartered Surveyors, 2024).

Creating local reuse hubs and supporting businesses that focus on deconstruction and material salvage can boost the local economy. These hubs make it easier for builders and contractors to access reclaimed materials which also reduces costs. Embracing circularity in demolition practices represents a forward-thinking approach that aligns economic efficiency with environmental stewardship, ultimately supporting a more sustainable, affordable and resilient economy.

1.4 MATERIAL USE AND MANAGEMENT

When discussing demolition policies, it is also critical to consider the material types involved. Different materials hold varying levels of environmental impact and economic value which in turn affects the ease of diversion of these materials. As can be seen in the figure below, there are varying degrees of value and ease of diversion attributed to CRD material types. These range from high value and easier to divert materials such as clean wood, concrete and brick, to lower value and difficult to divert materials such as painted wood, mixed glass, and plastics (CRE, 2019).



Figure 3—CRD Material Value and Ease of Diversion (CRE, 2019)

Moreover, it is essential to integrate the R-Ladder Approach to Waste Management into demolition policies to ensure that environmental and economic priorities are aligned. The waste hierarchy, as illustrated in Figure 4, ranks waste management strategies from most to least environmentally favourable. At the top of the hierarchy is prevention, which seeks to minimise embodied carbon emissions and waste at its source by designing out waste or extending the lifespan of materials. This is followed by reuse, where materials are repurposed in their original form, thus avoiding the need for new resources and further emissions. Recycling comes next, enabling materials to be processed into new products, which reduces the environmental impact of raw material extraction and manufacturing, thereby significantly cutting down embodied carbon emissions. When materials cannot be reused or recycled, recovery captures energy from them through Waste-to-Energy processes. Finally, disposal, which includes safe treatment and landfilling, is the least favourable option, having the most significant environmental and economic drawbacks.

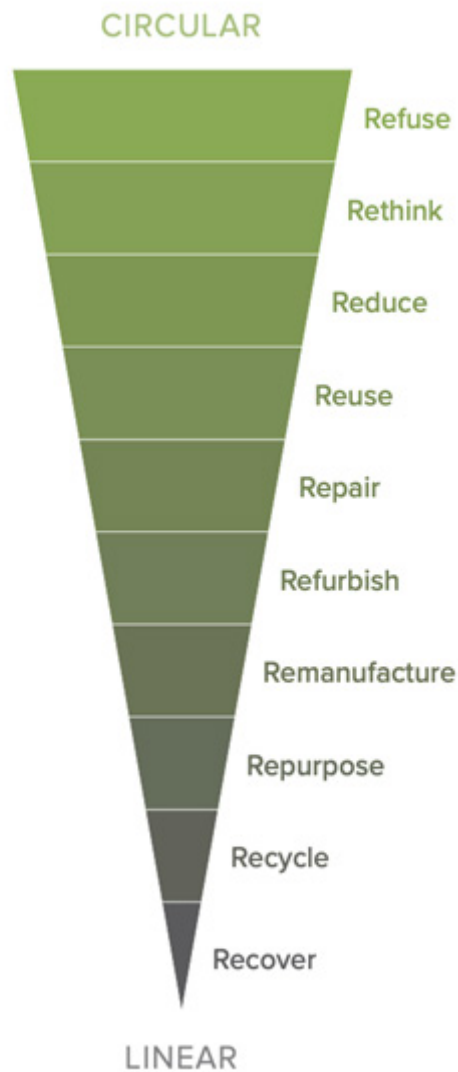


Figure 4– The Circular R-Ladder Approach to Waste Management (City of Richmond, 2023)

By adopting this hierarchy into municipal demolition and waste policies, cities like Richmond can prioritise material recovery, reducing waste sent to landfills and, most importantly, curbing embodied carbon from building materials. Minimising embodied carbon through reuse and recycling of construction materials is critical for achieving sustainability goals, as these efforts reduce the need for energy-intensive raw materials (Government of Canada, 2024; City of Richmond, 2023).

2. Methodology

In order to develop a well-informed and evidence-based approach to the City of Richmond’s demolition bylaw update, a multi-step research process was implemented in order to best understand and accurately benchmark demolition policies in the region. This comprehensive methodology involved a robust policy and literature review, as well as semi-structured interviews with municipal staff to identify and assess current practices in regional municipalities.

A jurisdictional scan was conducted to identify relevant municipalities in the region. The research scope focused on Canada, largely in the province of British Columbia, more specifically in the Metro Vancouver region. In Metro Vancouver, only 10 out of 21 municipalities were found to have demolition recycling policies. These municipalities are as follows: City of Burnaby, City of Coquitlam, City of New Westminster, City of North Vancouver, City of Port Moody, City of Richmond, City of Surrey, City of Vancouver, District of North Vancouver and District of West Vancouver. Further research outside of the Metro Vancouver region extended to the City of Victoria, District of Squamish and City of Guelph. Each municipality’s demolition policies were thoroughly reviewed and analysed.

Semi-structured interviews were also conducted with municipal staff to develop a deeper understanding of the demolition policies examined. All 12 municipalities examined were invited to participate, with a final sample of 8 municipalities who had staff willing to be interviewed. Semi-structured interviews were conducted to cover interview topics, which can be found in Appendix A. Thereafter, drawing from these findings, best practices and lessons learned are analysed. Finally, recommendations are given for the City of Richmond to reduce embodied carbon in their demolition bylaw update and promote circularity and sustainability.



3. Findings

The following matrix shows a summary of findings, while comprehensive findings for each municipality can be found in Appendix B.

Municipality	Policy Type	Building	Minimum Requirement	Non-refundable Fees	Enforcement Mechanism— Refundable Fees
City of Richmond	Bylaw - Recycling	One-family, two-family dwellings and accessory buildings	70% total	\$288.00	\$3.25/square feet
City of Burnaby	Bylaw - Recycling	All buildings (residential and commercial)	70% total	\$250.00	\$2.25/square feet(max \$50,000)
City of New Westminster	Bylaw - Recycling	Single-family and duplex	70% total	\$277.00	\$5,000
City of Surrey	Bylaw - Recycling	All buildings (residential and commercial)	70% total	\$250.00	\$5,000
District of Squamish	Bylaw - Recycling	All buildings (residential and commercial)	80% total		\$20.00/square metre
City of Port Moody	Bylaw - Recycling	All buildings (residential and commercial)	100% wood, 85% all other materials	Proportional to square footage - 0-2,000=\$235.00, 2,001-5,000=\$250.00, 5,001-20,000=\$351.00, over 20,000=\$920.00	By square footage - 0-2,000 = \$845.00, 2,001-5,000 = \$1,910.00, 5,001-20,000=\$5,085.00, over 20,000=\$9880.00
District of North Vancouver	Bylaw - Salvage	Pre-1950s	3.5kg or 2.6 board feet per square foot	\$262.50	\$15,000
City of Victoria	Bylaw - Salvage	Pre-1950s	40kg per square metre	\$500	\$19,500
City of Vancouver	Bylaw - Recycling and Salvage	pre-1950s, pre-1910	75%, 90%, 3 tonnes of wood	\$436	\$14,650
City of North Vancouver	Recycling Plan Checklist				
City of Coquitlam	Recycling Plan Only				
District of West Vancouver	Recycling Plan Only				
City of Guelph	Guidelines Only				

4. Key Insights and Best Practices

Higher Goals and Targets: Many municipalities examined, such as Vancouver, Victoria, Port Moody, and Squamish, have implemented higher recycling rate requirements or wood salvage targets. For example, Port Moody and Squamish have set diversion goals exceeding 70%, while cities like Vancouver and Victoria focus on wood salvage. This demonstrates that higher goals and targets are achievable, and Richmond should consider increasing its targets, drawing on the experiences of these cities that have successfully raised their diversion goals. By doing so, Richmond will continue to be an innovator, promoting higher rates of recycling and contributing to municipal and regional efforts in reducing embodied carbon.

Expanding Building Types: The cities examined have varied in the building types included within their bylaws, with some municipalities focusing on older residential homes for wood salvage, while others, like Surrey and Burnaby, have broadened their recycling requirement scope to include commercial and multifamily buildings. Notably, these cities have had great success with recycling minimums for commercial and multifamily structures. Surrey, for instance, achieved higher compliance rates in commercial projects than in residential ones, demonstrating that the commercial sector is often already equipped to meet these requirements due to already established processes. Across the findings, it was consistently reported that the commercial sector encounters little difficulty with these bylaws, as they are generally prepared for compliance. Moreover, these large-scale projects employ vast quantities of materials, resulting in significantly higher embodied carbon emissions, making it critical to prioritise targeted efforts in reducing their impact.

Richmond has already implemented a phased-in approach, initially targeting residential buildings, which allows stakeholders time to adapt to new regulations. This mirrors successful approaches in other cities which have demonstrated that phased-in policies help industry participants gradually prepare for broader expectations. Expanding Richmond's scope to include commercial and multifamily buildings, through similar gradual implementation, is both achievable and aligned with best practices.

Material Inclusion: Most of the cities reviewed have similar material inclusion requirements to Richmond's current bylaw, focusing on commonly recyclable materials such as concrete, asphalt, and clean wood. This alignment shows that Richmond's material scope is consistent with broader regional efforts. However, a notable difference is seen in municipalities like Victoria, the District of North Vancouver, and Vancouver, which prioritise the salvage and reuse of wood, particularly from older buildings. Old-growth lumber, in particular, has great economic, cultural, and historic value, making its salvage especially impactful both environmentally and economically. Prioritising wood salvage not only preserves valuable materials but also significantly reduces embodied carbon, as reusing salvaged wood prevents the need for new timber. By focusing on wood reuse, Richmond can close this loop for circularity, reduce reliance on raw materials, and make a substantial contribution to lowering emissions.

Reporting Requirements: Most municipalities reviewed are consistent with Richmond's current process, requiring the submission of a waste management plan at the time of permit application, followed by a compliance report post-demolition. This approach is seen across municipalities like Surrey, Burnaby, and North Vancouver, ensuring transparency and accountability in the recycling and salvage processes. The requirement to provide documentation such as receipts and material tracking reports further supports effective monitoring and enforcement of the waste diversion targets.

Enforcement Mechanisms: Across all municipalities with a demolition waste bylaw, a fee-based enforcement mechanism is consistently used to ensure compliance. These fees range from \$5,000 in Surrey to \$19,500 in Victoria, which are either refunded upon meeting diversion targets or forfeited for non-compliance. Richmond's current use of a refundable fee aligns well with this successful model. Additionally, financial penalties for non-compliance are commonly implemented, further incentivizing adherence. This approach has been demonstrated as an effective instrument in encouraging higher diversion rates by providing both a financial incentive for compliance and a deterrent for non-compliance.

Community Engagement: Continuous engagement with the construction industry and community members, as done in municipalities such as Burnaby and Vancouver, has shown that consultations and feedback loops are essential in refining and improving policies over time. Richmond can continue to prioritise stakeholder engagement to build trust, gain industry buy-in, and ensure smooth implementation with minimal pushback.

Technology, Data Collection and Utility: Lessons from all municipalities consistently show that manual data collection is a challenge, and there is a clear need for improved technological solutions. Richmond should look into adopting software tools that can help automate and streamline data tracking, which will not only reduce the administrative burden but also provide valuable insights into policy effectiveness such as through the implementation of online permitting.

Integration into Existing Strategy: Many municipalities have integrated their demolition bylaws into broader sustainability strategies. Similarly, Richmond has also done so, with the CEEP and RCCS, to integrate its demolition waste diversion goals for reducing embodied carbon emissions into its broader sustainability and circular economy strategies, ensuring cohesive progress towards environmental targets.

5. Recommendations

Based on the findings from this report, several key recommendations are proposed to enhance the City of Richmond's demolition bylaw. These recommendations aim to advance Richmond's sustainability goals, foster circular economy principles, and ensure the effective management of construction and demolition waste in line with the City of Richmond's commitments to reduce embodied carbon emissions.

5.1 INCREASE MINIMUM RECYCLING REQUIREMENTS:

The City of Richmond has already established itself as a leader in sustainable waste management, with recycling rates that meet or exceed regional averages. To further strengthen its environmental stewardship and align with best practices, it is recommended that the minimum recycling requirements be elevated. Increasing the recycling rates will have a direct and significant impact to reduce the City's embodied carbon emissions. More specifically, it is recommended that the recycling requirement for clean wood be increased to 100%. This material is highly reusable and valuable, and maximising its recycling can significantly reduce the volume of waste sent to landfills. For all other demolition materials, the recycling requirement should be raised to 85%. This threshold is not only achievable but is already being met or exceeded by several municipalities in the region. By setting a higher target, Richmond can drive improvements in recycling practices and reinforce its position as a leader in sustainable policy.

5.2 EXPAND BUILDING TYPES COVERED BY THE BYLAW:

The City of Richmond, currently does not include Multi-Family Dwellings or Industrial, Commercial, and Institutional (ICI) Buildings in its current demolition recycling bylaw. To address the significant waste and embodied carbon emissions generated by these other types of construction, it is essential to broaden the scope of the bylaw to include both types of buildings which produce a substantial amount of demolition waste and contribute heavily to embodied carbon due to the large volume of materials involved. Expanding the bylaw to cover these building types will ensure that recycling and reuse practices are consistently applied across all sectors, significantly reducing the embodied carbon associated with demolition. Demolition companies specialising in commercial projects already possess the capacity to manage these expanded requirements. Additionally, municipalities that have implemented similar bylaws for multi-family and commercial properties have reported high compliance rates. The expansion will ensure that recycling and reuse are enforced effectively, maximising diversion rates and reducing the environmental impact of demolition activities and embodied carbon emissions.

5.3 ENCOURAGE REUSE AND DECONSTRUCTION TO PROMOTE CIRCULARITY

Incorporating reuse and deconstruction practices aligns with the principles of a circular economy, which seeks to minimise waste and maximise the lifecycle of materials. The following measures are recommended. Firstly, establish minimum wood salvage requirements: Mandate the salvage of wood from deconstructed buildings to promote higher-value reuse. Although Richmond's current housing stock includes a relatively small percentage of pre-1960 structures, where wood is typically more valuable, implementing minimum salvage requirements will support broader circular economy goals. This practice has been successfully adopted in cities like Vancouver, Victoria, and the District of North Vancouver. Secondly, Organise workshops with builders to promote awareness and provide training on deconstruction practices. Additionally, create and distribute toolkits that offer accessible guidance to support contractors in effectively implementing deconstruction. This

initiative will equip demolition companies with the necessary knowledge and resources to enhance material salvage and align with Richmond's sustainability goals. Lastly, foster a local reuse hub: Establish a local reuse hub, potentially in partnership with organisations such as Habitat for Humanity or BMEX by Light House. Research indicates that the proximity of reuse facilities to waste disposal and recycling centres significantly increases drop-off rates and reuse activities. For example, Whistler's reuse store, located at a recycling depot, generates considerably higher revenue per capita compared to similar stores in larger urban areas like Vancouver. Promoting reuse and deconstruction will not only support the circular economy but also contribute to Richmond's goal of reducing embodied carbon. By integrating these practices, Richmond can maximise the value derived from deconstructed materials, reduce the need for raw materials, and lower overall carbon emissions.

5.4 LEVERAGE TECHNOLOGY FOR DATA COLLECTION:

To improve the effectiveness of demolition waste management and track progress towards Richmond's sustainability goals, it is recommended that the City leverage technology for data collection. Implementing software solutions to track and analyze demolition waste will enhance the accuracy and efficiency of compliance monitoring, especially as Richmond is recommended to transition to online permitting systems.

By automating the data collection process, Richmond will be able to monitor recycling rates, identify areas for improvement, and assess progress in reducing embodied carbon emissions. Additionally, improved data collection can help inform future policy updates and support Richmond's broader sustainability goals.

5.5 REGIONAL ALIGNMENT AND COORDINATION

A key finding from the research is the desire for regional alignment in sustainability practices. Richmond's leadership in developing innovative policies can serve as a model for other municipalities in the region. To enhance coordination and promote consistent practices across jurisdictions, the following measures are recommended. Firstly, promote data sharing and partnerships, encourage collaboration between municipalities by sharing data on demolition waste and recycling practices. By partnering with other cities, Richmond can foster a unified approach to sustainability and address common challenges, particularly around the alignment of bylaws and the development of end markets for recycled materials. Secondly, continue to lead and inspire, as a recognized leader in sustainability, Richmond should continue to spearhead initiatives that set a precedent for other municipalities. By adopting and promoting enhanced demolition bylaw measures, Richmond can inspire regional peers to implement similar practices, contributing to broader sustainability and circular economy goals.

Regional alignment in demolition practices will lead to more consistent and effective waste management strategies across municipalities. By maintaining its leadership role, Richmond can support regional efforts to reduce embodied carbon emissions and advance sustainability objectives.

5.6 OPPORTUNITIES FOR FUTURE RESEARCH:

There are several areas for future research that can further strengthen Richmond's demolition and circularity strategies, particularly with a focus on reducing embodied carbon. The first step would be to conduct research on Housing Stock to understand the types of buildings most prevalent in Richmond, especially regarding their age, material composition, and embodied carbon potential. This will allow the City to tailor its recycling and deconstruction policies more effectively, targeting building types that offer the greatest opportunity for material recovery and embodied carbon reduction. Understanding the embodied carbon profile of Richmond's housing stock will be critical for setting more ambitious recycling and reuse goals specifically with regards to a wood salvage bylaw. Secondly, investigating end markets for recycled and salvaged materials will be very important to identifying gaps and opportunities for growth in these markets. This will help inform policies that incentivize the recycling and reuse of materials for circularity. Expanding these markets can ensure that the materials salvaged from demolition projects are reintroduced into the construction supply chain, further reducing the need for new materials and cutting embodied carbon emissions. Lastly, it is highly recommended to explore the feasibility and potential impact of establishing an Online Reuse Hub where salvaged materials can be bought, sold, and repurposed. This reuse hub would promote circularity by connecting contractors, developers, and the public to available materials, thereby reducing the need for virgin materials and lowering the overall embodied carbon associated with new construction. This approach not only supports local sustainability goals but also encourages the wider adoption of circular economy practices.

6. Conclusion

Richmond’s commitment to sustainability and the circular economy is evident, and addressing embodied carbon is a critical next step in advancing these goals. While operational carbon reductions are progressing, embodied carbon reductions remain a significant challenge for the built environment sector. By increasing recycling requirements, expanding the scope of the demolition bylaw to include more building types, and promoting deconstruction and material reuse, Richmond can significantly reduce the embodied carbon emission from CRD activities. These actions will ensure that valuable materials are kept in circulation, lowering the demand for new raw materials and the associated emissions and environmental impacts, all while promoting a circular economy.

Implementing these recommendations will also continue to position Richmond as a regional leader in sustainability. By aligning its strategies with broader regional efforts and emphasising embodied carbon reduction, Richmond can ensure both environmental and economic benefits for the city. These measures will contribute to a more resilient community and help Richmond achieve its sustainability and circular economy objectives.



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RESOURCES LINKS

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8. Appendices

APPENDIX A—RESEARCH SUBTOPICS

- **Goals and targets:** Identify the specific goals and targets established by other municipalities regarding recycling, deconstruction, and material diversion rates.
- **Building types:** Examine how different municipalities address various building types within their bylaws.
- **Reporting requirements:** Investigate the reporting mechanisms and processes that owners and builders must adhere to in order to demonstrate compliance with the bylaws.
- **Material inclusion:** Assess the range of materials covered by the bylaws and any specific requirements or guidelines for their recycling or reuse.
- **Incentives and support:** Explore any incentives, educational programs, or support systems provided by municipalities to encourage industry participation and understanding of the bylaw goals and purposes.
- **Results and outcomes:** Analyse the available data on the effectiveness and impact of the bylaws in terms of achieving recycling targets and promoting sustainable demolition practices.
- **Permitting process:** Examine the permitting requirements and processes outlined in the bylaws, including application procedures, submission requirements, and approval criteria, to understand how they support the achievement of the bylaw goals.
- **Critical partnerships:** Identify the key partners and stakeholders that municipalities engage with to successfully implement and enforce their demolition bylaws, such as industry associations, recycling facilities, and environmental organisations.
- **Legal and regulatory framework:** Evaluate the legal and regulatory framework within which the demolition bylaws operate, including any relevant national or provincial laws, ordinances, or regulations.
- **Enforcement mechanisms:** Examine the enforcement mechanisms employed by municipalities to ensure compliance with the demolition bylaws, such as penalties for non-compliance, inspection procedures, and enforcement agencies.
- **Community engagement:** Assess the level of community engagement and involvement in the development, implementation, and enforcement of demolition bylaws, including public consultations, stakeholder feedback mechanisms, and community outreach programs.
- **Technological advancements:** Explore any technological advancements or innovations utilised by municipalities to enhance the effectiveness and efficiency of demolition practices, such as demolition waste tracking systems, building material recycling technologies, or demolition permitting software.
- **Economic considerations:** Consider the economic implications of the demolition bylaws, including the costs associated with compliance, potential economic benefits of recycling and reusing materials, and any financial incentives or subsidies provided to encourage sustainable demolition practices.
- **Data collection and utility:** Examine the methods utilised to collect, manage and analyse data. This includes understanding the application and utility of data in evaluating bylaw effectiveness and informing future policy updates.
- **Integration into existing strategy:** Examine how the demolition bylaws are integrated into larger sustainability strategies for each municipality. This includes alignment and integration into existing policies and programs promoting environmental sustainability and sustainable waste management.

APPENDIX B—JURISDICTIONAL FINDINGS

City of Burnaby

Goals and targets: The City of Burnaby adopted the “Burnaby Construction and Demolition Waste Diversion Bylaw” in June 2022. It requires that all structures being demolished have a minimum 70% diversion rate to approved disposal and recycling facilities.

Building types: This bylaw applies to all structures which means it is applicable to all single-family, two-family and multi-family dwellings, as well as non-residential (ICI) buildings.

Permitting Process and Reporting Requirements: All demolition permit applications must include a construction and demolition waste diversion plan permit application. The construction and demolition waste diversion plan permit application requires information such as application information, property information, and the construction and demolition waste diversion plan. The construction and demolition waste diversion plan must include the material which will be generated, how the material will be disposed of, and the estimated weight of each material. This application must be submitted to the Building Division for permit approval. This will be reviewed by staff and if approved the City of Burnaby will issue the Building Permit for Demolition. The demolition permit application also requires a non-refundable fee of \$250. It requires a refundable Waste Diversion Deposit at a rate of \$2.25 per square foot of the building to be demolished, at a maximum deposit of \$50,000. Once the demolition is completed, the deposit is refunded based on the recycling performance. If 70% or more of materials by weight are diverted and recycled, the full Waste Diversion Deposit will be refunded. If not, the refund amount is reduced proportionately, as follows, if waste diversion is less than 70%: $(\text{Level of Compliance (i.e. diversion rate)} \div 70) \times (\text{Deposit}) = \text{Refund}$. After demolition is completed, within 90 days, the construction and demolition waste diversion compliance report must also be submitted with copies of receipts from all disposal facilities and signed forms from all salvagers for material re-use and weight bills. These receipts are then manually verified by City staff to ensure proper compliance.

Material inclusion: The following materials are included: Walls and Flooring: Drywall/Gypsum (Post 1990), Wood –clean, Carpet/tiles/laminate/vinyl, Other; Roofing: Asphalt shingles, Wood, Other; Foundation and Footings: Cement and concrete, Asphalt, Bricks/stones, Other; Other Material: Cardboard, Metal(s), Plastics, Tile, Soil/dirt/green waste.

Integration into existing strategy: The new bylaw is a part of Burnaby's Climate Action Framework, which commits to decarbonizing buildings and could account for 9% of city emission reductions by 2050. The City has a larger target to reduce greenhouse gas emissions by 45% by 2030, 75% by 2040 and carbon neutrality by 2050.

Incentives and support: The City of Burnaby has a very clear and accessible website with a lot of relevant information and links to useful resources. The City of Burnaby has developed a toolkit to help ensure better understanding of the waste diversion requirements. The City of Burnaby also offers relocation and deconstruction alternative pathways.

Critical partnerships: The City of Burnaby participates in the Local Government Climate Action Program (LGCAP). The LGCAP is a provincial government program that provides funding for municipalities to plan and implement actions that will reduce emissions, create new opportunities for people in the clean economy and prepare communities for future climate impacts. It utilises Metro Vancouver resources such as the list of licensed recycling facilities and waste estimation calculations.

Results and outcomes: The one-year post-review demonstrated that this has been very successful so far, with a 86.8% diversion rate across all buildings. Moreover, between October 1, 2022, and March 1, 2024, single-family buildings achieved an 88% diversion rate, two-family buildings achieved an 89% diversion rate and non-residential buildings achieved an 86% diversion rate.

Enforcement mechanisms: Will not receive demolition permit without the construction and demolition waste diversion plan. Will not receive the deposit back, which is financially cumbersome. Further, the bylaw states that: "Every person who violates any of the provisions of this Bylaw, or who suffers or permits any act or thing to be done in contravention of any of the provisions of this Bylaw, or who neglects to do or refrains from doing anything required to be done by any of the provisions of this Bylaw, is guilty of an

offence and is liable, on summary conviction, to a minimum fine of five thousand dollars (\$5,000) and a maximum fine of fifty thousand dollars (\$50,000.00). If an offence continues for more than one day, a separate offence occurs on each day or part of a day, and separate fines may be issued for each day or part of a day in respect of which the offence occurs or continues. A violation of any of the provisions identified in this Bylaw shall result in liability for penalties and late payment amounts established in Schedule A of BURNABY BYLAW NOTICE ENFORCEMENT BYLAW, 2009, and be subject to the procedures, restrictions, limits, obligations and rights established in BURNABY BYLAW NOTICE ENFORCEMENT BYLAW, 2009 and the *Local Government Bylaw Notice Enforcement Act.*”

Community engagement: Many engagement activities occurred to consult local builders including builder breakfast events to provide support and education surrounding the bylaw. The toolkit also received great feedback in supporting builders' understanding and education. A phased-in implementation occurred to get the community onboard and ready for the full bylaw implementation.

Technology, Data Collection, and Utility: Forms are sent via email but no software is utilised. Data is manually collected from each form submitted to City staff. Manual data entry from forms into spreadsheets for data management and utilisation. This data is utilised to inform program progress and to assess relevant future updates.

Economic considerations: The economic impact of this bylaw was considered in developing and implementing this policy. The economic costs of factoring in additional staff was considered and it was recommended to have one full-time staff available for every 200 demolitions with administration fees to cover this additional cost. Economic

benefits were also considered for facilities and industry which may benefit from this end market in the area, but more research is needed on this topic.¹²³⁴⁵

City of Coquitlam

Goals and targets: Does not currently have a bylaw.

Permitting and Reporting requirements: The City of Coquitlam requires a Waste Management Declaration Form as part of the demolition permitting process.

Building types: Applicable to single-family homes.

Material inclusion: The Waste Management Declaration Form lists the following materials: Wood/Plywood/OSB, Cement/Concrete, Metals/Wires, Gypsum/Drywall, others.

Integration into existing strategy: The City of Coquitlam has a Climate Action Plan to reduce GHG emissions by 45% by 2030 and carbon neutrality by 2050.

Partnerships: Directs towards Metro Vancouver resources to encourage sustainable demolition.

Technology, Data Collection, and Utility: No software currently in use. All forms are manually reviewed by staff as part of their regular portfolios. Data is not currently utilised.

Additional Information: Coquitlam has had two city-owned pilot projects to compare standard demolitions both with and without a 70% recycling requirement. Both properties vastly exceeded the 70% diversion rate regardless of the requirement. Coquitlam has not yet implemented a bylaw due to the administrative burden and lack of resources. House relocations are also encouraged by Coquitlam. There is also a desire to better understand

¹ City of Burnaby, *Demolition Waste Diversion*, <https://www.burnaby.ca/services-and-payments/development-permits-construction/demolition-waste-diversion>.

² City of Burnaby, *Construction and Demolition Waste Diversion Toolkit*, <https://www.burnaby.ca/sites/default/files/acquiadam/2023-11/Construction-and-Demolition-Waste-Diversion-Toolkit.pdf>.

³ City of Burnaby, *Construction and Demolition Waste Diversion Plan Permit*, <https://www.burnaby.ca/sites/default/files/acquiadam/2022-08/Construction-and-Demolition-Waste-Diversion-Plan-Permit.pdf>.

⁴ City of Burnaby, *Construction and Demolition Waste Diversion Compliance Report*, <https://www.burnaby.ca/sites/default/files/acquiadam/2022-08/Construction-and-Demolition-Waste-Diversion-Compliance-Report.pdf>.

⁵ City of Burnaby, *Climate Action Plan*, <https://www.burnaby.ca/our-city/strategies-and-plans/climate-action>.

end markets and work regionally to develop this market to support green jobs through a harmonised approach.⁶⁷⁸

City of New Westminster

Goals and Targets: The City of New Westminster adopted the “Demolition Waste and Recyclable Materials Management Bylaw No. 7660” in 2015, requiring a minimum recycling rate of 70% for all demolition projects.

Building Types: This bylaw applies only to single-family and duplex homes. It is not applicable to industrial, commercial, institutional (ICI), or multi-family buildings.

Permitting Process and Reporting Requirements: All demolition permit applications must include a Waste Disposal and Recycling Services Plan and Compliance Report. The plan should detail the materials to be generated, the estimated weight of each material, and where it will be disposed of. The bylaw is enforced through a Waste Disposal and Recycling Services Fee (Recycling Incentive Deposit) and Compliance Report. The fee structure includes a \$277 non-refundable fee and a \$5,000 refundable fee per building to be demolished. To receive the refundable portion, applicants must submit disposal receipts and the “Demolition Compliance Report” within 90 days of final inspection. If 70% or more of materials are diverted and recycled, the full Waste Diversion Deposit will be refunded. If waste diversion is less than 70%, the refund is calculated as follows: *(Level of compliance ÷ 70) x Refundable Portion of Fee = Fee Incentive*. Non-compliance (<20%) results in no refund. The signed forms and receipts are reviewed by the Building Department.

Material Inclusion: The bylaw covers materials listed in Table “A” of the Waste Disposal and Recycling Services Plan, including drywall, wood, asphalt shingles, cement, metal, and other recyclable materials.

Integration into Existing Strategy: The bylaw was part of New Westminster’s efforts to align with Metro Vancouver’s regional strategy to reduce construction and demolition

⁶ City of Coquitlam, *Demolition Permits*, <https://www.coquitlam.ca/513/Demolition-Permits>

⁷ City of Coquitlam, *Demolition Permit Brochure*, <https://www.coquitlam.ca/DocumentCenter/View/3475/Demolition-Permit-Brochure-PDF?bidId=>

⁸ City of Coquitlam, *Waste Management Declaration Form*, <https://www.coquitlam.ca/DocumentCenter/View/4588/Demolition-Permit-Package-PDF>

waste, as part of the Environmental Strategy and Action Plan (ESAP). Further, outlined in the most recent Community Energy and Emission Plan (CEEP) from 2022, New Westminster has plans to expand and update this bylaw to further reduce waste and promote circularity.

Incentives and Support: The city collaborates with Metro Vancouver to provide a list of recycling facilities for various materials. Demolition guideline documents are available to ensure clarity of instructions for applicants, outlining all necessary requirements.

Partnerships: New Westminster partners with Metro Vancouver to align with regional waste diversion targets and provide recycling resources for compliance.

Results and Outcomes: Between 2016 to 2018, the compliance rate was between 47% and 30%. It was determined that the bylaw would be updated to increase compliance resulting in the current increased refundable fee. Current data for results was not available.

Enforcement Mechanisms: Failure to comply with the bylaw may result in fines up to \$2,000. A demolition permit will not be issued without the Waste Disposal and Recycling Services Plan, and the refundable deposit will not be returned without proper compliance. All necessary documentation must be submitted within 90 days of final inspection to receive the refund.

Community Engagement: Conducted consultations and community engagement with stakeholders including surveying builders about the bylaw.

Technology, data collection and utility: No specific technological advancements are mentioned. The process relies on standard documentation and manual submission procedures.⁹¹⁰¹¹¹²¹³¹⁴

City of North Vancouver

Goals and Targets: The City of North Vancouver aims for recycling of all demolition waste through a contractor waste checklist to ensure that recyclable materials are diverted from landfills and properly managed.

Building Types Included: All building types.

Materials Included: The Contractor Demolition Waste Recycling Checklist requires recycling of the following materials: brick and block, concrete and asphalt, drywall, land clearing debris, scrap metal, wood, metal windows, concrete base stucco, and other materials.

Permit Structure and Enforcement Mechanisms: The demolition permit is tied to recycling compliance. Contractors must submit weight tickets from recycling facilities before the final inspection and issuance of the demolition permit. If the required materials are not recycled, the final approval for the permit is withheld.

Technology Used: No data available.

Results and Outcomes: No data available.

Community Engagement: No data available.

⁹ City of New Westminster, *Demolition*, <https://www.newwestcity.ca/demolition>

¹⁰ City of New Westminster, *Demolition Permit Application*, [https://www.newwestcity.ca/database/files/library/BUILDING_DIVISION_Demolition_Permit_Application_Package\(9\).pdf](https://www.newwestcity.ca/database/files/library/BUILDING_DIVISION_Demolition_Permit_Application_Package(9).pdf)

¹¹ City of New Westminster, *Demolition Waste and Recyclable Materials Management Bylaw*, [https://www.newwestcity.ca/database/files/library/Demolition_Waste_and_Recyclable_Materials_Management_Bylaw\(1\).pdf](https://www.newwestcity.ca/database/files/library/Demolition_Waste_and_Recyclable_Materials_Management_Bylaw(1).pdf)

¹² City of New Westminster, *Waste Disposal and Recycling Services Plan and Compliance Report*, [https://www.newwestcity.ca/database/files/library/BUILDING_DIVISION_Demolition_Permit_Application_Package\(8\).pdf](https://www.newwestcity.ca/database/files/library/BUILDING_DIVISION_Demolition_Permit_Application_Package(8).pdf)

¹³ City of New Westminster, *Guidelines for Demolition*, [https://www.newwestcity.ca/database/files/library/Consolidated_Guide_for_Demolition\(1\).pdf](https://www.newwestcity.ca/database/files/library/Consolidated_Guide_for_Demolition(1).pdf)

¹⁴ City of New Westminster, *Demolition Waste & Recyclable Material Management Bylaw Compliance Update - Council Meeting Agenda*, <https://pub-newwestcity.escribemeetings.com/FileStream.ashx?DocumentId=2726>

Integration into Existing Strategies: The policy aligns with Metro Vancouver's list of active recycling locations, ensuring that North Vancouver's demolition waste management is consistent with broader regional sustainability efforts.¹⁵¹⁶¹⁷

City of Port Moody

Goals and Targets: The City of Port Moody adopted the "Deconstruction Waste Management Bylaw No. 3381" in 2022. The primary goal is to regulate and minimise the amount of waste generated by the deconstruction or new construction of structures, diverting a significant portion of waste from landfills by prioritising recycling and reuse. The city aims for 100% recycling of clean wood and 85% recycling of other materials, with a minimum threshold of 70% for partial refunds.

Building Types: This bylaw applies to all demolitions, with a potential exemption for buildings under 50 square metres at the discretion of the Building Official. This ensures flexibility while maintaining broad applicability.

Permitting Process and Reporting Requirements: To receive a Deconstruction Permit, contractors must submit a Waste Management Plan, a Hazardous Materials Report, and pay the Waste Management Fee as prescribed in the City of Port Moody Fees Bylaw. After the project is completed, a Compliance Report, along with receipts from recycling facilities, must be submitted within 90 days to qualify for a refund of the Waste Management Fee.

Refunds are calculated based on recycling performance:

- Full Refund: If 100% of clean wood and 85% of other materials are recycled or reused.
- Partial Refund: If a minimum of 70% of materials are recycled.
- No Refund: If less than 70% of materials are recycled.

¹⁵ City of North Vancouver, *Building Permits*, <https://www.cnv.org/Business-Development/Permits-Inspections/Building-Permits>

¹⁶ City of North Vancouver, *Demolition Permits - Policy, Application, and Checklist*, <https://www.cnv.org/Business-Development/Permits-Inspections/Building-Permits/Demolition-Permits>

¹⁷ City of North Vancouver, *Contractor Demolition Waste Recycling Checklist*, <http://www.cnv.org/~media/1E7385EED03A4545B36118E03EEAF3CD.pdf>

Material Inclusion:

The following materials are included:

- Clean Wood (100% recycling required for a full refund)
- Other Recyclable Materials (85% recycling required for a full refund)
- Certain materials, although not recyclable in Metro Vancouver, are still tracked for data purposes, highlighting opportunities for future market development.

Integration into Existing Strategy: The 2022 bylaw replaces the City of Port Moody Waste Management Bylaw No. 2822 from 2011, aligning with broader waste management goals in Metro Vancouver. The city supports regional recycling strategies and aims to enhance waste diversion and reuse in its waste management practices.

Incentives and Support: Port Moody provides clear financial incentives through the Waste Management Fee refund structure. The deconstruction permit process offers support through standardised documentation, such as the Waste Management Plan and Compliance Report, helping contractors comply with the city's waste management requirements.

Critical Partnerships: Port Moody works in alignment with Metro Vancouver's recycling guidelines, ensuring consistency across the region in terms of waste management and demolition practices. This partnership facilitates access to a comprehensive list of recycling facilities.

Results and Outcomes: Case studies of deconstruction projects in Port Moody demonstrate high compliance rates, with the majority of projects meeting or exceeding the city's recycling and reuse thresholds. However, Port Moody processes fewer demolition projects compared to larger municipalities like Richmond due to its smaller population size.

Enforcement Mechanisms: A demolition permit will not be issued without submission of the Waste Management Plan and Hazardous Materials Report. If recycling thresholds are not met, the Waste Management Fee is not refunded, creating a financial disincentive for non-compliance. The requirement to submit weight tickets and Compliance Reports after project completion ensures that recycling and disposal are thoroughly documented and verified.

Community Engagement: Community engagement, such as with the building community, occurred during the development and implementation of this bylaw.

Data Collection, Utility, and Technology: Data is collected through the Waste Management Plan and Compliance Reports, which include weight tickets and receipts from recycling facilities. This data helps track compliance, measure program success, and identify opportunities for improving waste diversion.¹⁸¹⁹²⁰²¹²²

City of Surrey

Goals and Targets: The City of Surrey's "Demolition Waste and Recyclable Materials Bylaw No. 19453," enacted in 2017, mandates that all demolition projects achieve a minimum 70% diversion rate of waste to recycling facilities. This goal supports compliance with mandatory recycling requirements as part of Surrey's broader sustainability strategy.

Building Types: The bylaw applies to all types of demolition projects, ranging from small structures like sheds and pools to large commercial projects. Larger commercial projects typically demonstrate higher compliance rates due to established recycling systems.

Permitting Process and Reporting Requirements: To obtain a demolition permit, contractors must submit a Waste Disposal and Recycling Services Plan and pay a \$5,000 refundable fee. After the project is completed, a Compliance Report, along with receipts from recycling facilities, must be submitted within 90 days. The refundable fee incentivizes adherence to recycling requirements, with forfeiture of the fee if not claimed within one year.

Integration into Existing Strategy: Surrey's bylaw is part of the city's zero waste strategy, which aligns with regional waste reduction and recycling goals, such as Metro

¹⁸ City of Port Moody, *Deconstruction Bylaw*, <https://www.portmoody.ca/common/Services/eDocs.ashx?docnumber=595255>

¹⁹ City of Port Moody, *Deconstruction Permit Application*, <https://www.portmoody.ca/common/Services/eDocs.ashx?docnumber=547752>

²⁰ City of Port Moody, *Deconstruction Permit Process*, <https://www.portmoody.ca/common/Services/eDocs.ashx?docnumber=293707>

²¹ City of Port Moody, *Compliance Report*, <https://www.portmoody.ca/en/home-and-property/resources/Documents/Compliance-Report.pdf>

²² Government of British Columbia, *Case Study: Port Moody's Demolition Bylaw*, https://www2.gov.bc.ca/assets/gov/environment/waste-management/zero-waste/case-studies/cs_portmoody.pdf

Vancouver's Clean Wood Waste Ban. This integration supports Surrey's broader efforts to promote sustainability.

Incentives and Support: A \$5,000 refundable fee serves as a financial incentive to ensure compliance with the bylaw. Contractors are supported through informational brochures and a multi-step checklist outlining recycling requirements. While the city's website is perceived as somewhat difficult to navigate, it still offers clearer guidance than those of some other municipalities.

Critical Partnerships: Surrey partners with Metro Vancouver to utilise resources such as demolition waste calculation tools and recycling facilities. The city also participates in regular meetings with other municipalities to collaborate on best practices for waste management and recycling.

Results and Outcomes: Since the bylaw's implementation, Surrey has achieved high compliance rates, with commercial projects averaging 88.37% compliance and residential projects 84.82%. Most materials are recycled, though there is limited market activity for reuse. The city uses internal data to update the bylaw, though detailed reports are not frequently published.

Enforcement Mechanisms: Enforcement is tied to the submission of compliance reports and the refundable fee. Receipts from recycling facilities are cross-referenced to ensure accuracy and detect fraud. Non-compliance can result in fines ranging from \$200 to \$10,000, with each day of violation constituting a separate offence.

Community Engagement: Surrey engaged with the building community to set the refundable fee amount and compliance timelines. While there was some pushback on the fee for smaller projects, overall feedback has been positive. The city provides informational resources and maintains ongoing communication with contractors to ensure understanding of the bylaw requirements.

Data Collection, Utility, and Technology: Data from compliance reports is manually entered into Surrey's AMANDA system, which helps track compliance rates and inform future updates to the bylaw. The city processes approximately 600-800 demolition applications per year, and although manageable, there may be potential for further technological advancements to streamline the process.

Economic Considerations: Surrey's policy promotes recycling and reduces landfill use, with most recycled materials going to facilities outside the city, such as Mitchell Island. Although there is limited focus on developing a market for reuse or deconstruction, the policy supports the local recycling economy.

Technological Advancements: Surrey uses the AMANDA software to manage and track data from compliance reports, which is manually reviewed and entered. While this system is sufficient for current needs, there may be opportunities for further technological integration to improve efficiency.

Integration into Existing Strategy: The demolition waste diversion policy is part of Surrey's long-range planning tool within its zero waste strategy. It aims to enhance waste management practices and supports the city's overall sustainability goals.²³²⁴²⁵²⁶²⁷

City of Vancouver

Goals and Targets: The City of Vancouver's Green Demolition By-law (No. 11023), updated in 2019, requires that pre-1950 one- and two-family homes meet a minimum 75% diversion rate for recycling and reuse of materials. For character residential buildings built before 1950, the target increases to 90% diversion. Additionally, pre-1910 and heritage-registered homes must undergo deconstruction, requiring the salvage of at least three metric tonnes of wood. These targets align with the city's long-term sustainability goals, including Zero Waste by 2040 and the Greenest City Action Plan.

Building Types: Pre-1950 homes: Required to meet a 75% recycling and reuse rate. Character residential buildings built before 1950: Must meet a 90% diversion target. Pre-

²³ City of Surrey, *Demolition Recycling Requirements*, <https://www.surrey.ca/renovating-building-development/building/residential-building/residential-building-permits/demolition-permits/demolition-recycling-requirements>

²⁴ City of Surrey, *Demolition Bylaw*, https://www.surrey.ca/sites/default/files/bylaws/BYL_reg_19453.pdf

²⁵ City of Surrey, *Waste Disposal and Recycling Service Plan Application*, <https://www.surrey.ca/sites/default/files/media/documents/WasteDisposalandRecyclingServicesPlanForm.pdf>

²⁶ City of Surrey, *Compliance Report*, <https://www.surrey.ca/sites/default/files/media/documents/WasteDiversionComplianceReportForm.pdf>

²⁷ City of Surrey, *Demolition Waste Brochure*, <https://www.surrey.ca/sites/default/files/media/documents/DemolitionNewConstructionWasteBrochure.pdf>

1910 and heritage-listed homes: Must undergo deconstruction, focusing on salvaging at least three tonnes of wood.

Permitting Process and Reporting Requirements: Contractors must submit a Waste Management Plan and a Green Demolition Compliance Report, along with receipts from approved recycling or salvage facilities. Compliance reports must be submitted within 30 days of project completion to verify that recycling and salvage targets have been met. Failure to comply can result in penalties or loss of the \$14,650 security deposit, which is refundable based on compliance with the recycling or salvage requirements.

Integration into Existing Strategy: The Green Demolition By-law is integral to Vancouver's Greenest City Action Plan and Zero Waste by 2040 strategy. It ensures that demolition practices are sustainable, aiming to reduce the environmental impact by prioritising material reuse over landfill disposal.

Incentives and Support: The \$14,650 refundable deposit serves as a financial incentive for compliance with the bylaw. In addition, the City provides tools like the Recycling Requirement checklist to guide contractors through the permitting process. City staff are available to assist contractors with navigating the system and meeting compliance standards.

Critical Partnerships: The City collaborates with Metro Vancouver and regional facilities to ensure that contractors have access to recycling and salvage locations. The bylaw is aligned with regional initiatives such as the Clean Wood Waste Ban. Vancouver is also exploring partnerships to develop a deconstruction hub for salvaged materials, promoting material reuse across the region and has previously funded a hub with Habitat for Humanity.

Results and Outcomes: Since the bylaw's 2019 update, Vancouver has diverted approximately 40,000 tonnes of material from landfills, with an average diversion rate of 86% for pre-1940 homes. The expanded scope to pre-1950 homes is expected to increase this by an additional 8,000 tonnes annually. Compliance has generally been high, though some contractors opt to pay penalties instead of meeting the targets.

Enforcement Mechanisms: Enforcement is based on compliance reports and documentation from recycling and salvage facilities. If contractors fail to meet the bylaw's

requirements, they forfeit the refundable deposit. In cases of non-compliance, fines range from \$250 to \$10,000 per offence, with penalties increasing for ongoing violations.

Community Engagement: Vancouver has engaged extensively with stakeholders, including contractors and homeowners, through consultations and workshops. The City continues to gather feedback from the industry to ensure the bylaw is effective and practical. Some builders have expressed concerns about the costs and additional steps involved, though industry leaders in deconstruction have shown strong support.

Data Collection, Utility, and Technology: The City uses Excel spreadsheets and the Tempest software to track data from compliance reports. While there is no advanced data management system in place, the current system is sufficient for tracking project compliance and informing future updates to the bylaw.

Economic Considerations: The bylaw has created economic opportunities in the green building sector, particularly through the reuse of valuable materials like old-growth wood. However, challenges remain with limited end markets for some salvaged materials, and the City continues to explore ways to stimulate demand for these materials. Support for a deconstruction hub was also aimed at supporting the growth of this sector.²⁸²⁹³⁰³¹

District of North Vancouver

Goals and Targets: The District of North Vancouver's Demolition Waste Reduction Bylaw No. 8582 aims to reduce the amount of construction waste sent to landfills by promoting the salvage and reuse of materials, especially old-growth wood. The bylaw mandates a minimum 3.5 kg or 2.6 board feet of reclaimed wood per square foot of finished floor space. The goal is to achieve 90% material diversion, focusing on salvaging materials for their highest and best use, especially from pre-1950 homes.

Building Types: The bylaw specifically applies to pre-1950 single-family residential homes. These homes often contain valuable materials like old-growth wood, making them

²⁸ City of Vancouver, *Green Demolition Bylaw*, <https://bylaws.vancouver.ca/11023c.PDF>

²⁹ City of Vancouver, *Green Demolition Bylaw Update*, <https://council.vancouver.ca/20180516/documents/pspc2c.pdf>

³⁰ City of Vancouver, *Demolition Waste Diversion Strategy Report*, <https://council.vancouver.ca/20140610/documents/rr1b.pdf>

³¹ City of Vancouver, *Demolition Permit*, <https://vancouver.ca/home-property-development/demolition-permit.aspx>

suitable for deconstruction rather than traditional demolition. Newer homes with composite materials are currently excluded from the bylaw due to the difficulty in deconstructing them. Expanding to other building types will be considered after assessing market readiness and staff capacity.

Reporting Requirements: Applicants must submit a Wood Salvage Plan and pay a \$15,000 Waste Diversion Security Deposit. Following deconstruction, a compliance report, including receipts from recycling and salvage facilities, must be submitted within 90 days. This report verifies compliance with the bylaw's wood salvage and material diversion requirements.

Material Inclusion: The bylaw primarily focuses on the salvage and reuse of old-growth wood from pre-1950 homes. Other recyclable materials like concrete, metals, and plastics are also included, but the focus is on ensuring that wood is reused rather than recycled through energy recovery or waste-to-energy processes.

Incentives and Support: A \$15,000 Waste Diversion Security Deposit incentivizes compliance. Contractors receive a full refund if 3.5 kg or 2.6 board feet of wood per square foot is salvaged. Partial refunds are provided if 2.5 to 3.49 kg of wood per square foot is salvaged. The bylaw also offers time incentives by uncoupling the demolition and building permit processes, allowing deconstruction to begin before building permit issuance, thereby expediting project timelines.

Results and Outcomes: Initial results have been limited due to the small number of projects completed under the bylaw. So far, one residential home and one civic site have been fully deconstructed. Early indications suggest that 70% diversion rates can be easily achieved with materials like concrete. However, wood salvage has proven more challenging. The District is closely monitoring these initial cases to assess the feasibility of expanding the bylaw to include more building types.

Permitting Process: The permitting process requires applicants to submit a Wood Salvage Plan, pay the Waste Diversion Security Deposit, and comply with reporting requirements after deconstruction. The bylaw is enforced through a rigorous review of compliance reports, which are cross-referenced with receipts from salvage and recycling facilities.

Critical Partnerships: The District has partnered with Habitat for Humanity, which receives salvaged materials for resale. Collaboration with other municipalities, including Victoria

and Vancouver, has informed the development and implementation of the bylaw. Ongoing communication with deconstruction companies and recycling facilities helps ensure the bylaw's success.

Legal and Regulatory Framework: The bylaw is part of the District's broader regulatory framework for waste reduction. It aligns with Metro Vancouver's existing material bans and waste management strategies. The bylaw allows the chief building officer to exempt certain portions of homes from deconstruction if they have been damaged or altered, ensuring that the process remains practical and effective.

Enforcement Mechanisms: Compliance is enforced through the Waste Diversion Security Deposit, which is withheld or refunded based on adherence to the bylaw's requirements. Non-compliance can result in fines of up to \$50,000, with additional penalties for continued violations. The submission of compliance reports and receipts is mandatory to verify that salvaged materials are properly reused or recycled.

Community Engagement: Extensive community engagement was conducted prior to the bylaw's implementation, including consultations with industry stakeholders and public feedback sessions. Ongoing engagement with the building and deconstruction community ensures that the bylaw's requirements are understood and adhered to, while educational efforts highlight the benefits of deconstruction.

Technological Advancements: Data collection and enforcement are currently handled manually, with records kept in Excel spreadsheets. The District is exploring ways to streamline this process, but no dedicated software system is in use at present. The District remains open to adopting technological solutions as more applications are processed.

Economic Considerations: The bylaw promotes economic benefits by supporting green jobs in the deconstruction sector and facilitating the reuse of salvaged materials through partnerships with Habitat for Humanity. However, deconstruction remains more expensive than traditional demolition, and market volatility, especially regarding the availability of skilled deconstruction companies, presents ongoing challenges. The bylaw was designed to ensure that the Waste Diversion Security Deposit is high enough to deter non-compliance while balancing concerns about the additional costs to developers.

Data Collection and Utility: Data collection remains manual, with compliance reports and receipts entered into Excel. This data will be used to inform future policy updates and

assess the overall success of the bylaw. The District also aims to use this data to monitor circular economy job creation and the long-term impact of deconstruction on waste diversion.

Integration into Existing Strategy: The bylaw integrates into the District's broader sustainability and zero-waste goals, aligning with Metro Vancouver's waste reduction strategies and material bans. It represents a key element of the District's efforts to promote circular economy principles and support sustainable building practices.³²³³³⁴

District of West Vancouver

Goals and Targets: West Vancouver requires all demolition debris, including hazardous and recyclable materials, to be disposed of according to municipal and regional standards at Metro Vancouver-certified facilities. Currently, there is no set recycling minimum.

Building Types: All building types.

Reporting Requirements: Applicants must complete a Demolition Material Recycling and Disposal Report, tracking materials like wood, concrete, and steel. While there is no mandatory recycling percentage yet, this form helps establish a foundation for future data collection.

Material Inclusion: Materials covered include wood, concrete, drywall, steel, and hazardous materials, all of which must be processed at Metro Vancouver-approved facilities..

Results and Outcomes:

With limited data available, the district has not yet published recycling or compliance results.

Permitting Process: The Demolition Material Recycling and Disposal Report is part of the permit application. The district uses Tempest software to track permits, though manual data entry remains the current method of processing.

³² District of North Vancouver, *Demolition Waste Reduction*, <https://www.dnv.org/business-development/demolition-waste-reduction-bylaw>

³³ District of North Vancouver, *Demolition Waste Reduction Bylaw*, <https://www.dnv.org/sites/default/files/bylaws/Bylaw%208582.pdf>

³⁴ District of North Vancouver, *Building Permit (Single-Family Home)*, <https://www.dnv.org/business-development/building-permit-single-family-home>

Critical Partnerships: West Vancouver partners with Metro Vancouver for certified recycling facilities and regional standards compliance, aligning with broader waste diversion goals.

Technological Advancements: Currently, data is collected manually via the Demolition Material Reports.

Economic Considerations: Future economic incentives may include reduced fees and extended timelines for projects that meet recycling targets. The district is evaluating ways to reduce the cost of deconstruction projects while promoting sustainability.

Integration into Existing Strategy: The bylaw aligns with West Vancouver's broader sustainability and climate action goals, including regional zero-waste objectives.³⁵³⁶

City of Victoria

Goals and Targets: The City of Victoria's deconstruction bylaw aims to divert 3,000 tonnes of construction and demolition waste from landfills annually as part of its broader Zero Waste Victoria Plan, which seeks to reduce waste by 50% by 2040. The bylaw requires a minimum salvage of 40 kg of wood per m² of above-ground floor area from buildings being demolished. This wood must be reused or repurposed, contributing to the city's efforts to prioritise waste reduction, reuse, and recycling in line with the waste hierarchy. The bylaw includes a refundable fee of \$19,500 to incentivize meeting the salvage target.

Building Types Included: Victoria's deconstruction bylaw applies to single-family dwellings and duplexes built before 1960. In Phase 1, which started in September 2022, the bylaw applies only to properties where a new single-family dwelling or duplex will replace the structure. Phase 2, beginning in May 2025, will expand the requirements to all applicable properties, and further phases will include commercial buildings. Homes being replaced by multi-family developments are currently excluded to avoid slowing down affordable housing projects.

³⁵ District of West Vancouver, *Demolition Permit Application Form*, <https://westvancouver.ca/sites/default/files/media/documents/Demolition%20Permit%20Application%20Form.pdf>

³⁶ District of West Vancouver, *Demolition Material Recycling and Disposal Report*, https://westvancouver.ca/sites/default/files/dwv/assets/home-building-property/permits-and-licences/construction/DEMOLITION_MATERIAL_RECYCLING_AND_DISPOSAL_REPORT.pdf

Permitting Process and Reporting Requirements: Contractors applying for a demolition permit are required to pay a \$19,500 refundable fee at the time of application. To receive the refund, they must meet the wood salvage target and submit a compliance report detailing the amount of wood salvaged and waste sent to landfill, along with receipts from recycling and salvage facilities. If the salvage target is not met, the fee is forfeited. Additionally, contractors must install signage on-site indicating that deconstruction is underway.

Material Inclusion: The bylaw focuses primarily on wood, particularly old-growth lumber, given its high value and the historical significance of such materials in Victoria. The intent is to reuse this wood at its highest and best use, avoiding downcycling such as chipping it for fuel. Other materials, such as drywall and concrete, are also tracked, though wood remains the primary material of interest due to its salvage potential.

Incentives and Support: The primary incentive is the \$19,500 refundable fee, which provides a financial motivation for contractors to meet the wood salvage target. The city has also engaged consultants to support contractors through the deconstruction process, helping them meet the bylaw's requirements. Additionally, the city provides guidance and ongoing support for contractors who may be unfamiliar with deconstruction practices.

Results and Outcomes: The bylaw saw a slow start, with only a few permits qualifying in its first year. However, as the market adapts and contractors become more familiar with the requirements, uptake has improved. Some projects have successfully met the salvage targets, while others opted to forfeit the refundable fee due to the complexity or time involved. The overall success of the bylaw is still being evaluated, though early feedback indicates a need for more end markets to handle the volume of salvaged wood, particularly from old-growth forests.

Permitting Process: The process for securing a demolition permit includes the payment of the refundable fee and submission of a waste management plan. Contractors must meet specific targets for wood salvage and submit detailed documentation upon completion. The city uses Tempest software to track permits and compliance reports, and an Excel-based system is used to manage additional data related to salvage targets.

Critical Partnerships: Victoria collaborates with local deconstruction companies, salvage markets, and consultants to ensure the bylaw's success. One of the major partners,

Unbuilders, was instrumental in the bylaw's early days but has since gone out of business, creating a gap in the local market. New deconstruction companies are emerging to fill this space, and the city continues to work with industry stakeholders to support market growth.

Enforcement Mechanisms: The key enforcement mechanism is the \$19,500 refundable fee, which contractors can only reclaim by meeting the salvage target. The requirement to submit detailed reports and receipts helps ensure compliance. If contractors fail to meet the target, they forfeit the fee, which serves as a financial deterrent against non-compliance.

Community Engagement: Community and industry engagement were critical in shaping the bylaw. The city received initial pushback from the construction industry, concerned about increased costs and project delays. However, by adopting a phased approach and engaging stakeholders through educational efforts, the city has gradually gained industry support. Some homeowners and developers have also championed the bylaw, embracing deconstruction for its sustainability benefits.

Technological Advancements: Currently, the city uses Tempest software to manage permits and compliance reporting, with data being manually tracked in Excel. While this system is functional for now, the city is exploring other technologies to streamline data management as the bylaw scales.

Economic Considerations: Deconstruction in Victoria tends to be more expensive than traditional demolition, due to the time and labour involved. However, the high salvage value of old-growth wood helps offset these costs. The city is also focused on expanding market opportunities for salvaged materials, which will be key to making deconstruction more economically viable in the long term.

Data Collection and Utility: The city tracks data on compliance through Tempest and Excel spreadsheets, collecting information on the amount of wood salvaged, other materials diverted, and overall project compliance. While current data is limited, as the number of deconstruction projects increases, the city plans to optimise its data collection methods and potentially make this information public in future reports.

Integration into Existing Strategy: The deconstruction bylaw is a core component of the Zero Waste Victoria Plan and is integrated into the city's broader sustainability goals, including waste diversion, climate action, and circular economy strategies. The phased

approach ensures that the bylaw can be expanded gradually, aligning with Victoria’s long-term waste reduction objectives.³⁷³⁸³⁹⁴⁰

District of Squamish

Goals and Targets: The District of Squamish’s Demolition Waste Diversion Bylaw No. 2813, 2021 aims to reduce the volume of divertible demolition waste entering the Squamish landfill by setting clear targets and reporting requirements for building demolitions. The bylaw establishes an 80% diversion rate for recyclable and reusable materials from the landfill. This goal aligns with the broader sustainability objectives outlined in the District’s 2019-2022 Council Strategic Plan.

Building Types: The bylaw applies to all demolitions.

Reporting Requirements: Permit holders are required to submit a Demolition Waste Diversion Report after demolition completion. The report must detail the volumes of materials (wood, metal, concrete, etc.) that were recycled or reused and those that were sent to the landfill. The report is key to determining compliance with the bylaw’s diversion targets. The bylaw uses a financial incentive mechanism, where permit holders pay a refundable Demolition Diversion Fee. A full refund is granted if 80% or more of the divertible material is properly handled. A partial refund applies if 40-79% of the material is diverted.

Material Inclusion: The bylaw defines “divertible materials” as those that can be recycled, composted, or reused. This includes organic materials, metals, wood, asphalt, and other marketable commodities. Hazardous materials such as drywall and gypsum must also be reported but are not included in the diversion rate calculation.

Results and Outcomes: No available data.

³⁷ City of Victoria, *Demolition and Construction Waste Main Page*, <https://www.victoria.ca/building-business/permits-development-construction/building-renovating/demolition-construction-waste>

³⁸ City of Victoria, *Demolition Waste and Deconstruction Bylaw*, <https://www.victoria.ca/city-government/bylaw-services/demolition-waste-and-deconstruction-bylaw>

³⁹ City of Victoria, *Deconstruction Bylaw Brochure*, <https://www.victoria.ca/media/file/deconstruction-bylaw-brochure-22-proof-5-finalpdf>

⁴⁰ CTV News, *Victoria Passes Demolition Waste and Deconstruction Bylaw*, <https://vancouverisland.ctvnews.ca/victoria-passes-demolition-waste-and-deconstruction-bylaw-1.5960932>

Permitting Process: At the time of submitting a demolition permit application, applicants must pay the Demolition Diversion Fee and comply with all conditions laid out in the bylaw. After project completion, they are required to submit a Demolition Waste Diversion Report within 90 days, detailing how the waste was handled.

Enforcement Mechanisms: The bylaw is enforced through penalties for non-compliance, with fines of up to \$50,000 for offences such as providing false information in the Demolition Waste Diversion Report. Enforcement is carried out by the Director of Engineering or a Bylaw Enforcement Officer. Offences can result in fines, and daily penalties apply if the violation continues over time.

Technological Advancements and Data: No available information.

Economic Considerations: The refundable fee structure is designed to create a financial incentive for achieving high diversion rates. The bylaw recognizes the importance of the market for recyclables and the need to ensure that sufficient end-use options exist for diverted materials.

Integration into Existing Strategy: The bylaw is well-aligned with the District's broader environmental strategies, such as the Council's Strategic Plan and the Solid Waste Management Plan. It forms part of the District's ongoing efforts to enhance sustainability and reduce landfill contributions.⁴¹⁴²⁴³⁴⁴⁴⁵⁴⁶⁴⁷⁴⁸⁴⁹

⁴¹ District of Squamish, *Demolition Bylaw*, <https://squamish.civicweb.net/FileStorage/ECE49A9D1E45405C835C088CA02F374E-Demolition%20Waste%20Diversion%20Bylaw%202813%202021.pdf>

⁴² District of Squamish, *Construction and Demolition Waste*, <https://squamish.ca/our-services/garbage-and-waste-diversion/industrial-commercial-institutional/construction-and-demolition-waste/>

⁴³ District of Squamish, *Waste Diversion Notice Article*, <https://squamish.ca/business-and-development/home-land-and-property-development/builders-corner-blog/planning-a-demolition-waste-diversion-is-a-requirement/>

⁴⁴ District of Squamish, *Demolition Permit*, <https://www.slrd.bc.ca/sites/default/files/pdfs/building-inspection/frequent/Demo%20Permit%20Application%20Pkg%202020.pdf>

⁴⁵ Light House, *Deconstruction and Demolition Report*, <https://www.light-house.org/portfolio/squamish-deconstruction-and-demolition-report/>

⁴⁶ The Squamish Chief, *Squamish Council Cleans Up Waste Bylaw Adding Construction Activities*, <https://www.squamishchief.com/local-news/squamish-council-cleans-up-waste-bylaw-adding-construction-activities-8319617>

⁴⁷ District of Squamish, *Construction Business Recycling Guide*, <https://squamish.ca/assets/solid-waste/Organics-Guides/Construction-Business-Guide.pdf>

⁴⁸ District of Squamish, *Zero Waste Strategy*, <https://squamish.ca/our-services/garbage-and-waste-diversion/zerowaste/>

⁴⁹ District of Squamish, *Zero Waste Action Plan*, https://squamish.ca/assets/Master-Plans/Squamish-Zero-Waste-Action-Plan_2022-2027.pdf

City of Guelph

The City of Guelph has developed comprehensive and highly accessible guidelines for managing construction, renovation, and demolition (CRD) waste. These guidelines, outlined in their CRD Waste Management Guidebook, offer practical steps for both residents and contractors to reduce, reuse, and recycle materials effectively. The guides not only demonstrate how to handle CRD waste sustainably but also make the process clear and user-friendly. However, while these resources provide an excellent framework for environmentally conscious practices, the city currently lacks formal policies or bylaws to mandate compliance, relying on voluntary participation.⁵⁰⁵¹⁵²⁵³

⁵⁰ City of Guelph, *Construction, Renovation and Demolition Waste Management*, <https://guelph.ca/living/environment/garbage-and-recycling/construction-renovation-and-demolition-waste-management-guidebook/#for-more-information>

⁵¹ City of Guelph, *Construction, Renovation and Demolition Waste Management Guidebook*, <https://guelph.ca/wp-content/uploads/Construction-Renovation-and-Demolition-Waste-Management-Guidebook.pdf>

⁵² City of Guelph, *Guidebook Summary for Residents*, <https://guelph.ca/wp-content/uploads/CRD-Guidebook-Summary-for-Residents.pdf>

⁵³ City of Guelph, *Guidebook Summary for Contractors*, <https://guelph.ca/wp-content/uploads/CRD-Guidebook-Summary-for-Contractors.pdf>



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