



Dockside Green, Victoria. Photo by NAI

Both /And: Integrating Natural Asset Management into Federal Housing Supply Policymaking



Canadian
Urban
Institute

Institut
Urbain du
Canada



Natural
Assets
Initiative

MAKING NATURE COUNT

June 2024

Acknowledgements

Writing and research lead: **Canadian Urban Institute**

Carolyn Whitzman, CUI Senior Associate - Author, Lead Researcher

Jennifer Barrett, Managing Director, Programs, Planning & Policy

Shavtai Pinchas, Research Planner

Berta Kaisr, Research Planner

Funding support for this project was provided by the Province of British Columbia through the Ministry of Municipal Affairs.



CUI is Canada's Urban Institute. We are a national platform where policy makers, urban professionals, civic and business leaders, community activists, and academics can learn, share, and collaborate with one another from coast to coast to coast. Our mission is to support vibrant, equitable, livable, and resilient cities in Canada through research, engagement, and storytelling.

canurb.org   



Natural Assets Initiative (NAI) is a non-partisan Canadian not-for-profit organization that provides scientific, economic, and municipal expertise to support and guide all levels of governments in identifying, valuing, and accounting for natural assets in their financial planning and asset management programs, and developing leading-edge, sustainable, and climate-resilient infrastructure. naturalassetsinitiative.ca   

Disclaimer

While reasonable efforts have been made to ensure the accuracy of the report's content, any statements made are made only as of the date of the report and such information and data are subject to uncertainties, inaccuracies, limitations and to changes based on future events.

CUI and NAI acknowledge the Indigenous Peoples of all the lands that we are on today and acknowledge the importance of the lands, which we each call home. We do this to reaffirm our commitment and responsibility to UNDRIP in improving relationships and ethical space to share knowledge systems, and to improving our own understanding of local Indigenous Peoples and their cultures. From coast to coast to coast, we acknowledge the ancestral and unceded territory of all the Inuit, Métis, and First Nations Peoples that call this land home. We continually seek ways to reflect and acknowledge the harms and mistakes of the past and to consider how we can collectively move forward in a spirit of reconciliation and collaboration.

Please cite as:

Whitzman, Carolyn and Roy Brooke. (2024). *Both/And: Integrating Natural Asset Management into Federal Housing Supply Policymaking*. Victoria: Natural Assets Initiative (NAI). naturalassetsinitiative.ca

Copyright ©2024. Natural Assets Initiative. All rights reserved.

Introduction

Integrating Nature into Rapidly Evolving Federal Housing Policy

The Natural Asset Initiative (NAI), a non-partisan Canadian not-for-profit organization, provides scientific, economic, and municipal expertise to support and guide all levels of governments in identifying, valuing, and accounting for natural assets in their financial planning and asset management programs, and developing leading-edge, sustainable, and climate-resilient infrastructure.

We acknowledge the rapid strides the federal government is making towards valuing natural assets by supporting more well-located housing in built-up areas of Canada's cities and towns, as well as in rural areas and the north. We want to help integrate natural asset management (NAM) into these efforts.

Integrating NAM into federal housing policy would:

- Strengthen decision-making by ensuring it is informed by the strong and growing evidence that green infrastructure provides vital services on which communities rely.
- Stretch existing infrastructure dollars further, including by minimizing investment in dead-end engineered assets.
- Help ensure that emerging housing supply is resilient over its lifespan in a rapidly changing climate.
- Help avoid perverse consequences in which housing supply is expanded at the expense of the very natural systems that provide infrastructure services required to support housing stock.

Natural assets are features of an ecosystem that provide, or could be restored to provide, essential services and benefits to Canadians. Green infrastructure¹ consists of natural assets as well as enhanced or engineered aspects that can mimic biological functions.

1 The term 'blue infrastructure' is sometimes used to separate out water-based infrastructure, as compared to 'green' denoting land-based infrastructure.

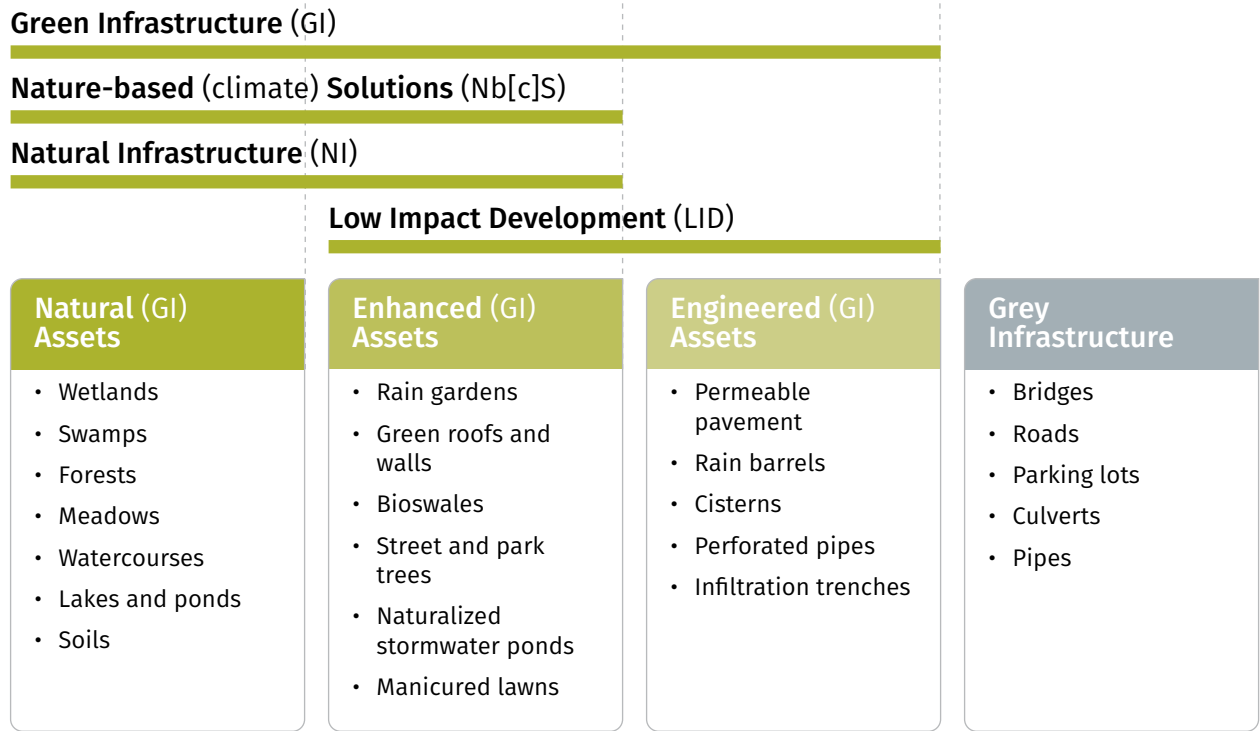


Figure 1: Range of assets that local governments manage, adapted from Green Infrastructure Ontario Coalition.

Since the 1990s, the Canadian government has acknowledged that restrictive municipal zoning and approvals processes, which do not consider the full lifecycle costs of infrastructure, have been fuelling suburban and regional sprawl, worsening greenhouse gas (GHG) emissions and destroying irreplaceable natural resources. Built-up areas of cities are already serviced by physical infrastructure like water and sewer lines and public transit, and social infrastructure such as non-market² housing, schools, and hospitals.

However, populations in most built-up areas have declined over the past 50 years, due to smaller households, an aging society, multi-family homes such as rooming houses being converted to single-family occupancy, and increasingly restrictive planning rules. At the same time, natural assets such as agricultural land, woodland, and wetlands have been lost forever due to new low-density, housing-based sprawl, accessed by highways (Tomalty & Alexander 2006). For example, according to Ducks Unlimited Canada, “approximately 70 percent of wetlands have been lost in southern areas of Canada—and up to 95 percent in densely populated areas. But because a complete picture of the country’s wetlands does not yet exist, figures are likely even higher.” (Kaumeyer 2022).

There has been a policy lag between acknowledgement of the problem and measures towards a solution, especially given the federal government’s absence from housing policy leadership from the early 1990s to the late 2010s.

² Housing that is built for social purposes rather than profit. This includes housing built by governments (public housing), non-profit organizations (community housing) and co-operatives.

A 2006 study for the Canada Mortgage and Housing Corporation (CMHC) of ‘smart growth’ in six Canadian metropolitan areas (Halifax, Toronto, Montreal, Saskatoon, Vancouver, Calgary) found a widening gulf between ‘triple bottom line’ sustainability rhetoric and worsening results for both affordability and environmental sustainability. This included a critical lack of new affordable urban housing supply in built-up areas (*Tomalty & Alexander 2006*).

A related challenge is the current state of Canadian infrastructure. For example, the Federation of Canadian Municipalities (*2023a*) notes that “14 percent of municipal waste and water infrastructure and nearly 14 percent of municipal transportation infrastructure is currently in “poor” or “very poor” condition and requires immediate repair or replacement... [with a cost of] more than \$176 billion.” This compounds the complexity - and ongoing costs - of both the infrastructure upgrades required to service new housing, and the ongoing operating, maintenance, and replacement costs associated with upkeep of existing housing.

The federal government has stepped up its efforts to address the national shortage of affordable and well-located housing supply across Canada, with a plan to more than double home production to 3.87 million new homes by 2031 (*Government of Canada 2024a*: 27). But “solutions to address one issue of concern (e.g. housing supply) should not cause deterioration and instability for other essential systems (e.g. critical habitat and biodiversity)” (*van Dijk & Stewart 2023*).

“Solutions to address one issue of concern (e.g. housing supply) should not cause deterioration and instability for other essential systems (e.g. critical habitat and biodiversity)”

Especially in times of increased climate-related risks of fires and floods, the environmental and economic benefits of carbon sequestration through woodlands, and flood regulation and nutrient recycling through wetlands, to give two examples, need to inform how and where new housing is developed.

The need to preserve and enhance parks and waterways – nature in the city – for physical and mental health is especially acute if we intensify housing close to public transit and services (*NAI 2023*).

The re-entry of the federal government in housing policymaking in 2017, and more recently, significant changes to housing policy in the 2024 Budget and the accompanying *Canada’s Housing Plan* (*Government of Canada 2024a, 2024b*), provide three main opportunities for an enhanced role for NAM within sustainable housing supply growth:

- 1/ Public Lands for Homes Plan:** This is a new program to combine leased federally-owned brownfield sites³ (and other land owned by

3 Brownfield housing development builds homes in a formerly industrial, office or commercial district. Greyfield development improves or intensifies uses in existing residential or mixed-use districts. In contrast, greenfield development requires woodland, wetland, or agricultural land loss to build housing.

governments and non-profit organizations), low-cost finance, and zoning and building code changes to facilitate the creation of higher density housing communities in built-up parts of cities and towns. It replaces the Federal Lands Initiative announced in 2017. In addition to priority access to \$55 billion in Apartment Construction Loan low-rate financing, \$650 million has been pledged in the 2024 federal budget towards mapping, transferring, and leasing some of the 11,700 properties owned by the Crown to create 30,000 homes in the next three years. In addition, a Canada Builds partnership promises matching funding for provincial initiatives such as BC Builds that are taking similar approaches.

- 2/ Federal-Municipal Conditional Infrastructure Agreements:** Under the \$4 billion Housing Accelerator Fund, first announced in 2023, 147 federal-municipal agreements that link infrastructure funding to zoning and other regulatory and approvals reforms that enable more affordable, well-located housing, faster have been signed, with additional agreements and \$400 million in funding proposed in the 2024 Budget. The Permanent Public Transit Fund, which is promised for 2026, will further link municipal and regional infrastructure funding to enabling more homes in walking distance to public transit lines and colleges/universities, based on standardized housing needs assessments.
- 3/ Provincial-Municipal Conditional Infrastructure Agreements:** A new \$6 billion Canada Housing Infrastructure Fund will accelerate water, wastewater, stormwater, solid waste, and other critical infrastructure. This will be accomplished through agreements signed with provinces by January 1, 2025 (April 1, 2025, for territories). Conditions for funding include zoning and building code changes to enable increased densities in built-up areas, a three-year freeze of development charges from April 2024 levels for municipalities with a population greater than 300,000; dedicating at least 20 percent of the funding to northern, rural and Indigenous communities; and implementing measures from the forthcoming Home Buyers' Bill of Rights and Renters' Bill of Rights. If provinces and territories don't sign on, the infrastructure funding will revert to the municipal infrastructure stream.

There are also potential reductions to ecosystem disruption on development sites if factory-built housing is scaled (*Henderson, 2020*), an outcome supported through a \$100 million Homebuilding Technology and Innovation Fund in the 2024 federal budget. There are proposed changes to the National Building Code that can greatly improve natural infrastructure outcomes, such as allowing single-stair buildings to increase density in built-up areas. And \$4 billion in funding over seven years for both on-reserve and off-reserve Indigenous housing, while nowhere near the amounts requested by First Nations, Métis and Inuit groups, raise the question of how support for NAM can be integrated into For Indigenous By Indigenous housing strategies.

This report focuses on these nascent federal policy directions and asks: “How can federal housing policy best integrate natural asset management to maximize community resilience and sustain quality of life for Canadians?”

The Benefits of Natural Asset Management

What are Natural Assets?

Natural assets are features of an ecosystem that provide, or could be restored to provide, essential services and benefits to Canadians. Green infrastructure consists of natural assets as well as enhanced or engineered aspects that can mimic biological functions:

- Natural assets include wetlands, forests, parks, lakes/rivers/creeks, fields, soil.
- Enhanced assets include rain gardens, bioswales (channels designed to concentrate and convey stormwater runoff while removing debris and pollution), urban trees, urban parks, and stormwater ponds.
- Engineered assets include permeable pavements, green roofs, rain barrels, and green walls (NAI 2017).

Natural assets are essential to the air we breathe, the water we drink, the food we eat, and overall wellbeing. They serve multiple purposes. As examples:

- Parks may reduce flooding risks as well as provide recreational and health benefits. Wetlands can provide water, store carbon, process waste, and may have cultural and heritage significance (NAI 2023, Lindgren 2022).
- Trees and wetlands provide local climate regulation like cooling effects to combat extreme heatwaves, an increasing public health risk.
- Wetlands and forests can be critical features of, for example, stormwater management systems that, when protected and managed, can extend the life of existing grey infrastructure assets or limit the need to expand them as our communities grow.

The value of these services makes nature a sound economic driver. However, the economic reality of nature’s services has rarely underpinned investment decisions. Nature has been historically considered only narrowly, in terms of aesthetic benefits or in terms of products that be readily commodified.

To illustrate, almost 90 percent of land in Canada is publicly owned. International and Canadian public-sector accounting standards exclude non-purchased natural resources from financial statements. Local governments (and others) are often unaware of the goods and services that a specific natural asset provides, let alone the dollar value of those goods and services, other than when they are sold as commodities.

So, when an economic argument is made to develop a wetland, for example, decision-makers typically do not know the value of preserving the ecosystem. There's no commonly accepted business case for leaving nature alone. The costs of maintaining natural assets are counted, but not their economic benefits. Degraded natural assets, like an aquifer providing water for a community, might not be counted as a liability, although the replacement value would be high. Without significantly enhanced efforts to value natural assets, it has been difficult to attract private capital or to argue the benefits to market developers. (*Eyquem et al 2022, CSA 2023*).

Growing Number of NAM Examples

However, this is beginning to change, including through the increasingly well-defined practice that has become known as NAM.

Since 2016, over 150 local governments across Canada, in every province and in the North West Territories, have undertaken NAM efforts, including conducting inventories, modelling, valuing, and managing natural assets. Furthermore, the rate of such activities is increasing (*Eyquem et al 2022: 18-19*). Examples of valuations arising from NAM projects include:

- A seven-kilometre riverbank in the Oshawa Creek watershed in Ontario provides \$18.9-million worth of stormwater conveyance/drainage annually to nearby communities based on replacement cost.
- Within the metropolitan area of Quebec City, rural and urban forests have been estimated to provide carbon storage services to a value of \$11.59 billion (total), and carbon sequestration services of \$ 9.3 million (per year). Wetlands have been estimated to provide carbon storage services to a value of \$ 4.67 billion (total), and carbon sequestration services of \$ 0.9 million (per year).
- In the National Capital Region, which contains the cities of Ottawa, Ontario and Gatineau, Quebec, urban and rural forests provide erosion control services worth an estimated \$327,500 and \$5.2 million annually, respectively.
- In the City of Hamilton, Ontario, a restored wetland complex costing approximately \$15.3-million (compared with \$28.5-million for an engineered solution) will reduce floods and provide recreation and other services valued at up to \$44.2-million (*Eyquem et al 2022: 20*).



Grindstone Creek Watershed, courtesy of Conservation Halton

The initial impetus for this groundswell was in Gibsons, BC, a town of 10,000 people 50 km north of Vancouver. The Town determined that new development in Upper Gibsons could cause additional water runoff and flooding in Lower Gibsons. Instead of defaulting to engineered options, the municipality expanded its natural stormwater ponds for less than \$1 million, rather than building a \$4-million concrete drainage system to send the water to the ocean. That decision allowed the town to decrease development cost charges for drainage services by 74 percent in 2023, because the natural assets that provide stormwater services to Upper Gibsons do so at lower costs than engineered alternatives ([Molnar 2023](#); [Baum 2021](#)). This illustrates that deliberate action to bring nature into decision-making can allow substantial cost savings to municipalities, which in turn could improve reliance on charges for new development.

NAM is an *inherently scalable approach* because it is based on asset management approaches that must be adopted by all public sector entities in Canada.

Emerging Body of Norms

Action “on the ground” is starting to be complemented by norms that, over time, will result in the emergence of a mature market for NAM. For example, the Canadian Standards Association’s National Standards for Natural Asset Inventories, allow comparable, consistent, and replicable practices for the development of baseline natural asset inventories across Canadian communities ([CSA 2023](#)). Another example is a professional directive from BC’s engineering regulator regarding NAM ([EGBC 2021](#)).

Having basic definitions and standards allows collaboration between adjacent governments (e.g., within watersheds and economic regions) and between levels of government.

As is the case with federal housing need assessments, having basic definitions and standards allows collaboration between adjacent governments (e.g., within watershed or economic regions) and between levels of government. A nationally validated way to account for natural assets encourages diverse sources of funding and supports integration between complementary objectives, such as more affordable housing and better environmental outcomes (*CSA 2023*).

Indigenous Knowledge, Worldviews, and Perspectives

NAM can be complementary to approaches that have informed land management over millennia in what is now called Canada. Indigenous Traditional Ecological Knowledge stresses stewarding land, water, soil, and air, rather than treating them simply as a source of profit extraction. For this reason, emphasizing Indigenous leadership in NAM can be a form of reconciliation (*Bear & Bill 2023, Lindgren 2022*), despite discomfort with “connecting dollar values to natural assets” (Helen Bobiwash, quoted in *Baum 2021*). Indigenous people continue to fight for Indigenous title and rights, with 100 comprehensive land claim and self-government negotiation tables across Canada (*Baum 2021*). Including natural asset considerations in the negotiations may allow for agreements on the value of those natural assets and the benefits and services they provide.

Thistle (*2017*) defines Indigenous homelessness as “individuals, families and communities isolated from their relationships to land, water, place, family, kin, each other, animals, cultures, languages and identities”. Adequate housing and NAM should be seen as complementary methods of achieving the same end, whether for Indigenous or non-Indigenous people: living in harmony with the biosphere and with one another.

Barriers to NAM

Notwithstanding rapid uptake and emerging norms, NAM faces well-documented barriers in widespread adaptation, ranging from lack of sense of urgency among policymakers and politicians, to an absence of supportive legal frameworks. Short-term plans can get in the way of long-term goals, such as climate change mitigation and adaptation. There are silos and lack of skilled knowledge brokers, for instance between housing and environmental policy. As is also the case in housing, there is lack of consensus and intergovernmental collaboration on up-to-date standards, transparent monitoring mechanisms, and needs-based targets for NAM (*NAI 2023*).

Growing relevance in a disrupted climate

Canada's current housing supply efforts present a unique window of opportunity that, if seized, will help to overcome some of these barriers to the benefit of housing efforts and other federal priorities including infrastructure resilience, net-zero targets and 2030 biodiversity targets.

The country's rapidly changing and disrupted climate provides an additional strong rationale for seizing this opportunity. As we approach two degrees of global warming, adaption to future climate scenarios must be an integral part of any future planning, including planning for housing supply. This point is amply illustrated by the reported \$9 billion cost of rebuilding following 2021 flooding in BC (*Hunter 2022*). NAM is, in effect, a potent climate resilience tool, enabling governments (both Indigenous and non-indigenous) and watershed agencies to conceptualize, account for, restore, protect, and manage nature as a vital asset and support its health, connectivity, biodiversity, and viability for the long-term (*Bear & Bill 2023, Lindgren 2022*).

In this context, it is important to note that all new housing is dependent on municipal infrastructure, from water and wastewater facilities, to community amenities, public transit and roads (*FCM 2023b*) and many of these costs will increase in a changing climate. It is therefore vital to consider the growing body of evidence showing where and how natural assets have saved money. As "big ticket" examples, New York City reduced by several billion dollars the capital and operating costs of building new water treatment infrastructure by focussing instead on land protection in upstream watersheds (*Perrot-Maitre & Davis 2001*), and the City of Portland saved an estimated \$300 million on stormwater infrastructure through measures that included downspout disconnection and new green infrastructure (*O'Neill & Cairns 2016: 26*).

The Canadian Potential for Integrating NAM with Housing Supply Policymaking

Recent reports: Blueprint for More and Better Housing (2024) and CSA Standard on Natural Assets (2023)

In Canada, there is a growing consensus that federal leadership on housing supply must include guidance on better sustainable development, whether that is building and zoning reforms that allow small apartment buildings throughout urban areas, abolishing parking minimums and building housing on largely vacant urban parking lots, or legalizing pre-approved housing designs as of right. An example of this consensus may be found in, for example, the Taskforce for Housing and Climate's *Blueprint for More and Better Housing (2024: 10)*, which recommended that the federal government "value and conserve nature to protect homes and reduce emissions". Specific Task Force recommendations include:

- Providing \$500 million over five years to scale up natural asset management capacity under the Natural Infrastructure Fund or FCM's Green Municipal Fund channels, to properly value and integrate green infrastructure investments.
- Using the Canada Infrastructure Bank to support front-end costs of new district energy and cooling systems, prioritizing green over grey (entirely engineered) infrastructure.
- Creating a model zoning code for intensification that aligns with national climate goals.
- Redesigning government disaster financial aid programs to incentivize communities to realign land use planning and focus new construction in areas with lower hazard exposure.

The Task Force for Housing and Climate also recommend federal leadership on provincial and municipal planning matters, including:

- Restricting development on floodplains, and on farmland, wetlands and other protected areas to reduce risks and preserve land that provides significant ecosystem benefits.
- Ensuring that provinces develop and publish hazard maps to ensure new housing is not built on areas that are prone to climate-related floods and wildfires.
- Encouraging public sector accounting rules to allow the valuation of natural assets at the provincial and municipal levels.
- Encouraging watershed-based planning that considers natural topography and pre-settlement hydrological patterns.

They further recommend establishing a National Ecosystem Services Incentive Program, which incentivizes municipalities and private landowners to preserve and restore natural areas that provide significant ecosystem services, such as flood mitigation, air and water purification, and carbon sequestration. The federal government can offer grants, tax breaks, or other financial incentives to landowners who commit to conserving and restoring natural areas, particularly in or near urban settings where development pressure is high. The funding criteria should also include educational programs and training to build capacity and help landowners better understand these systems and how to care for them over the long-term (*Taskforce 2024*: 10).

NAM can help make some of the Task Force recommendations fully operational.

We take this emerging consensus as positive, and a point of departure for additional analysis and recommendations specific to NAM, which can help make some of the Task Force recommendations fully operational. For example:

- **Model zoning codes** are going to be most effective when supported by the completion of natural asset inventories by local governments and other watershed agencies so that they understand what natural assets they have in their jurisdiction, their condition, and the risks they face.
- **Restricting development on floodplains, farmland, wetlands and other protected areas** can be made practical, precise and implementable when local governments and other watershed agencies have the tools, methods and capacities to understand where, when, why, and how to “restrict” effectively.
- **Encouraging public sector accounting rules to allow the valuation of natural assets** is something that the federal government can stimulate through leadership by undertaking NAM on its own lands, especially those adjacent to areas of potential housing development, and including natural asset values in its own financial statements.
- **Effective watershed planning** can be supported by the federal government by undertaking NAM on its own lands and collaborating with other levels of government to ensure a holistic, ecosystem-scale understanding of the natural assets and the services they provide, beginning in areas with high anticipated rates of housing development.

Sources for Green Infrastructure Funding

There are several green infrastructure funding opportunities that municipalities can draw upon to improve brownfield regeneration in relation to increased housing supply. The federal government should support an integrated approach to considering these programs as part of housing intensification policies and projects:

- The Investing in Canada Fund’s Green Infrastructure Stream has a total of \$9.2 billion in federal funding over 10 years (2017-27), with matching provincial and territorial funding delivered through bilateral

agreements. The funding emphasis includes both traditional built and green infrastructure projects that will result in increased capacity to withstand and adapt to climate change impacts and climate-related disaster mitigation, especially in relation to treating water and waste, and reduce or remediate soil and air pollution.

- The Disaster Mitigation and Adaptation Fund is a unilateral (funded solely by the federal government) fund with \$2 billion over 10 years. It supports both new and rehabilitated public infrastructure, including assets that might work together as a system, with an emphasis on areas subject to natural disaster such as drought, wildfires, and floods. The criteria emphasise Canada's vulnerable regions, including Indigenous, northern, coastal, and remote communities.
- The Canada Infrastructure Bank is investing at least \$5 billion over the same decade in revenue-generating green infrastructure that is in the public interest and can attract investment from both private sector and institutional investors.
- Unlike the first three more recent sources of funding, the Gas Tax Fund has provided \$2 billion a year, indexed for 2 percent inflation, since 2007. It is administered by provinces and territories, except in BC and ON, where it is administered by respective municipal associations. The emphasis is on acquiring, planning, designing, constructing, or renovating tangible capital assets, which have not traditionally included natural assets. There is also an emphasis on capacity and system building.
- The Green Municipal Fund dates from the same era and has a similar budget, \$1.6 billion a year. It is managed by the Federation of Canadian Municipalities. It funds both plans, feasibility studies, and capital projects that improve air, water and soil, and reduce greenhouse gas emissions. There has been a similar problem with natural assets not being eligible, with the exception of wastewater management, although a growing field of practice is moving NAM forward.
- A smaller fund, the Municipalities for Climate Innovation Program (MCIP) has \$75 million in funding for training and resources to help municipalities prepare for, and adapt to, climate change, and to reduce greenhouse gas emissions (*Cairns et al 2019*).
- Finally, \$3.2 billion of funding is going to the 2 Billion Tree program across Canada, which has programs that serve both urban and remote communities. As part of that program, Green Communities Canada and the Network of Nature have a Mini Forest program to transform under-natured urban and suburban sites into thriving mini forests, which grow at accelerated rates into dense, diverse, native-planted forest communities. These mini forests, in turn, reduce stormwater run-off, diminish heat island impacts, and promote community engagement in nature (*Government of Canada 2023, Green Communities 2024*).

Integrating NAM into Housing Supply Policy: International Good Practices

According to the OECD (2020), housing policies can support the transition from a reliance on single-family to multi-family units, which use less energy per unit. Good housing policy can redirect greenfield development toward infill of existing built-up areas. As part of these efforts, the OECD recommends that national governments regulate the creation or improvement of natural assets such as urban parks, forests, and wetlands as a part of intensification of built-up areas, including former industrial and institutional areas that are being redeveloped.

At the municipal level, the World Economic Forum (2024: 8) is developing guidelines for “nature-positive cities”, which includes shared definitions, attributes, enablers, transition pathways, good practices, and ways to engage the public and private sector, as well as civil society. They have developed a framework for locally based action.

	AVOID	REDUCE	RESTORE	TRANSFORM
Land	Don't build on environmentally sensitive/ dangerous areas (e.g. floodplains)	Grow up not out	Woodlands and green corridors for wildlife	Value nature in housing policy
Water	Limit pollution (e.g. direct rain and sewer outlets to waterways)	Recycled water for irrigation	Wetlands and streams	Sustainable water management systems
Natural resources	Move to renewable sources (solar, tidal, wind-based, biofuel)	Energy efficiency	Urban agriculture	Circular economy

Source: World Urban Forum (2024), 8.

SINGAPORE

a City-state that Integrates Housing Supply with Natural Assets

Since independence in 1964, Singapore has pursued integrated planning co-benefits of affordable housing supply within a ‘city of nature’. The Housing Development Board has developed over a million homes, 80 percent of the homes in this city-state of 5.5 million people. The emphasis has been limited equity home ownership, with government control over sale and resale prices⁴. This approach has paid off: in 2021/22, typical prices for a one-bedroom home ranged from \$95,000 to \$234,000 CAD, and for a four-bedroom from \$372,000 to \$525,000. A housing grant of up to \$80,000 is available to first-time home buyers earning less than \$108,000 a year (*Lee 2023*). At the same time, Singapore has developed a network of 7,800 hectares of green space, connected by 370 hectares of park connectors. The housing itself is actively planted with 300 hectares of “skyway greenery” (*Singapore Natural Parks Board 2024*).

Singapore’s green infrastructure is anchored by four large nature reserves that provide ecosystem services, cleaning air and water for the city-state. These are buffered by a growing network of nature parks, with 200 more hectares planned to be added between 2024 and 2030. Re-naturalization of existing water and land assets is ongoing, with concrete canals transformed into naturalised rivers, and new reservoirs that serve as naturalised lakes to catch and retain rainwater. This supports rich biodiversity and protects nearby homes as well as amenities from the risk of flooding brought about by climate change. Environmental justice in regard to access to green infrastructure is a strong theme, with 30 new therapeutic gardens designed to provide restorative spaces for people with conditions such as Attention Deficit Hyperactivity Disorder (ADHD) and dementia. Meanwhile, nature playgrounds emphasize ecological connections for children and 80 hectares of restored forest, marine, and coastal habitats are bringing back once-rare species. With over 300 km of “Nature Ways” (tree-lined pedestrian paths) and 500 km of park connectors planned by 2030, every household in Singapore is planned to be within a 10-minute walk from a park (*Singapore Natural Parks Board 2024*). Singapore is currently engaged in a national-scale assessment of the economic value of its natural capital assets, which will research how to better integrate housing development with protecting natural assets in the face of climate change. This will be the first such assessment for a tropical, heavily urbanised country (*ETH Zurich 2024*).

4 When the Canadian government enabled over a million Victory Houses from 1946 to 1960 on acquired land, it controlled initial sales prices of \$6-7,000 (the equivalent of \$70-80,000 today). However, once homes were resold, they lost their affordability (Buchove 2021). If the federal government had leased the land instead of selling it along with the houses, affordability could have been better preserved.



Ulu Pandan Park connector in Singapore, courtesy of Sportify Cities

Singapore demonstrates the value of integrated housing and NAM policies. The city-state has 5.5 million people within 734.3 km², with a population density of 8,592 per km². In contrast, Greater Vancouver Regional District, with four times the area (2,883 km²) and 2.5 million people, has a population density close to a tenth that of Singapore (918 people/km²). Yet it only has 13,842 hectares of green space, less than half the green space per hectare as Singapore (*Metro Vancouver 2022:17*). Higher densities mean more green space, especially if less space is taken up by roads and parking due to good public transit infrastructure. Moreover, Vancouver has some of the strongest correlations in Canada between wealth and access to green space – if you are searching for tree shade on a hot day, you are out of luck in many low-income areas (*Quinton et al 2022*). Vancouver has lost about 14 percent of its green space in the past two decades (*Statistics Canada 2022*), in contrast to Singapore, which is increasing and enhancing its green infrastructure even as it densifies.

PARIS

Responding to Global Heating with Residential Intensification and Infrastructure for Resilience

Like many cities in the global North, the number of new homes in Paris roughly kept up with population growth during the first two decades after World War Two. It helped that the national government regulated land-use rules such as zoning. But by the early 1990s, the broader Paris region (known as Île-de-France) had moved into residential lockdown. With about 20 percent of France's population (the same proportion as the Greater Toronto and Hamilton Area's share of Canada's population), it enabled just slightly more than nine percent of French homes in 1996. A lot of construction was in former greenfield sites known as 'banlieues', which is where public housing and new migrants were

concentrated. A huge ring road — the largest in Europe — separated these suburbs from central city amenities. Productive agricultural land — 48 percent of French agricultural production is in Île-de-France — was being lost because of sprawl.

In 2010, the national government set a target for the Paris Region to build at least 70,000 dwellings a year, up from about 42,000 the previous year. Moreover, there was a national sub-target for 25 percent of all homes — not just new homes — to be non-market housing for low- and moderate-income households (*Durning 2021*). Municipalities, not developers, were responsible for reporting to the non-market sub-target, with separate federal housing programs aimed at very-low-, low- and moderate-income households (*Freemark 2021*). The City of Paris increased its proportion of non-market housing from 16 percent in 2009 to 24 percent in 2022, with over 75,000 new non-market homes and 35,000 acquired from the private sector. The City of Paris has now increased its non-market housing targets to 30 percent, while meeting aggregate supply goals. Their focus on underutilized sites, such as former office and commercial space and parking lots, and on refurbishment of existing buildings rather than tearing them down, which reduces carbon emissions and tenant displacement (*Maaoui 2022*).



Playground in Paris, © CAUE de Paris

The City of Paris has simultaneously pursued natural asset co-benefits as part of its urban resilience strategy. Almost 108,000 homes in the City of Paris lie in a 100-year flood zone, the vulnerability of which was highlighted by a catastrophic flood in 2016 (*Mairie de Paris 2017*: 16 and 25). A 2003 heatwave killed an estimated 1,110 Parisians. The cost of air pollution, primarily caused by road traffic, is \$2.5 billion CAD (*ibid*: 25).

The City of Paris has planted hundreds of ‘green oases’ in the past decade, with the target of no Parisian being more than seven minutes from a shaded park by 2020.

The City of Paris is therefore prioritizing sustainable transit, intensified housing, and NAM as integrated goals. It began by mapping and valuing natural assets in a project affiliated with Stanford University’s international Natural Capital Project. Monitoring and evaluation reports have followed, looking at topics as diverse as environmental justice⁵ to the cooling impacts of tree planting (*IDEFESE 2024*). More than 50 new or restored wetlands are planned for a city that has traditionally disdained nature-

based solutions, as part of an integrated strategy to reduce flooding (*World Economic Forum 2024*). The City of Paris has planted hundreds of ‘green oases’ in the past decade, with the target of no Parisian being more than seven minutes from a shaded park by 2020. It achieved a target of building 30 hectares of new parks, mini-forests and community gardens between 2014 and 2020, many in the courtyards of new housing developments. The buildings themselves have up to 200 hectares of green roofs, with green walls (using clinging vines such as ivy) helping to cool the buildings as well (*City of Paris 2020, Benepe 2019, O’Sullivan 2018*).

The co-benefits of green infrastructure are evaluated and publicized. Community gardens are intended to support local produce consumption and provide alternatives to a meat-based diet, as well as combat social isolation in apartments. The city has prioritized the redevelopment of 700 schoolyards, with a total area of 70 hectares, to replace asphalt with permeable groundcover and add water features, which can reduce local heat islands by 4-6 degrees Celsius as well as be safer play spaces for school children. Simultaneously, schoolyards are open after hours for the entire neighbourhood to enjoy. The new school yards are co-designed by the local communities, with optional training as tree planting stewards (*City of Paris 2020, Benepe 2019, O’Sullivan 2018*).

Paris has replaced road lanes with bicycle lanes separated with trees, as part of an effort to plant 20,000 urban trees by 2020 as well as induce a modal shift to sustainable transit. Not only does this reallocation of shared space reduce car traffic and improve cyclist safety, but it also provides increased pedestrian amenity, improves local air quality, and reduces stormwater runoff. Public spaces and linear parks have also been reclaimed from car parks, the Seine riverbank, and both aboveground and underground abandoned rail lines (*Benepe 2019*).

Water from the Seine River is being used to cool buildings, to reduce air conditioning-related energy use. Paris Water, which was reinstated as a public utility in 2000, has 12,000 water-fountain stations throughout the city, reducing need for bottled water. It’s also taking a watershed approach to water quality,

5 Environmental justice means people are treated justly and involved meaningfully, regardless of gender, income, race, disability or other grounds of discrimination. They are protected from environmental harm and have equal access to sustainable and healthy environments.

with everything from a giant new stormwater storage basin in central Paris to address flooding issues, to rewilding upriver, with a goal of public swimming in the river by the 2024 Olympics (*Benepe 2019, O'Sullivan 2018*).

These two international case studies of Singapore and Paris show that NAM can be integrated into highly urbanized environments, with water, soil, trees, and wetlands added, while preserving agricultural and natural resources through intensification instead of sprawl. To do so, it is necessary to go beyond aggregate housing supply targets to encompass non-market and affordable housing within precinct, city-wide, and regional/watershed-level plans that prioritize the co-benefits of green infrastructure.

Green Infrastructure in Large Scale Redevelopments: HEIDELBERG Germany, STOCKHOLM, Sweden and SAN FRANCISCO, USA

As part of the Jericho Lands redevelopment (see below), the City of Vancouver and UBC collaborated on a report describing sustainability measures in large scale redevelopments around the world (*Busch 2019*). Bahnstadt is a large former freight and switch yard in Heidelberg, Germany, with a target of 5,000 homes (20 percent non-market) and an equal number of employment

opportunities.⁶ At 116 hectares, it is the largest passive house/ zero net carbon development of the world. Natural asset management measures include soil recycling (soil removed for development was transferred to another part of the site, then returned), extensive water permeable areas, including green roofs that dissipate 70 percent of rainwater and 710 metres of



Bahnstadt Heidelberg 2017. Photo by HD Valentin under license CC BY-SA 2.0

interconnected waterways and ponds, and protecting a rare species of lizard that had infiltrated the site in the decade between its industrial use and its redevelopment. The lizards now live within several areas that were left undisturbed as well as on the green rooftops (*Busch 2019: 22*).

⁶ Most large-scale European redevelopments aim for a similar number of homes and local employment as part of their sustainability strategies.



Stockholm Royal Seaport. Photo by Norra Djurgårdsstaden under license CC BY-NC 2.0

Stockholm Royal Seaport is Sweden's largest urban redevelopment project, with 12,000 homes and 35,000 jobs expected over 96 hectares. Of the 3,000 homes built so far, 52 percent are purpose-built rentals, and eight percent are student housing. One of the development's principles is "leaving nature to do the work". The green network is planned to support corridors for oak-dependent species and amphibians, while plants with different flowering times are intended to provide pollinators with a constant supply of food. Dead wood, nesting cavities, and access to fresh water create ideal habitats for pollinators to proliferate. A series of dispersed parking garages help preserve green space and encourage walking (*Busch 2019*: 50).

In San Francisco, a former naval base on a 183-hectare artificial island called Treasure Island is being redeveloped, with single family housing replaced by multi-family homes that will allow five times the population while doubling open space. Of the 8,000 homes, 25 percent will be affordable to low- and moderate-income households. The alignment of the street grid is being shifted 35 degrees to maximize solar exposure and protection from winds. This, in turn, allows rooftop solar heating panels to provide much of the power needed in the community, along with tide-driven turbines in the Golden Gate channels. A 10-hectare urban farm will use wastewater and compost generated on the island for cash crops as well as community gardens (*Busch 2019*: 52-54).

Canadian Good Practices in Integrating NAM with New Housing Supply

Dockside Green, Victoria

Dockside Green shows how innovation in green infrastructure can be co-developed with high density housing design on government land. Dockside Green is a six hectare (15 acre) redeveloped industrial site near central Victoria, BC. When sold by the provincial to the municipal government for \$1 in 2001, it was a landfill site with heavy metal and petrochemical residue from nearby wood processing and other heavy industrial uses. It has since been developed in stages for a total of 1,000 homes with 2,500 residents.

The City of Victoria took a ‘performance-based’ approach to zoning the site, doubling the residential density immediately and then trading off further density for environmental performance in the 2004 request for proposals. Then-City of Victoria Project Manager Kim Fowler, who was interviewed for this report, described this as a “sandbox, rather than a straightjacket” form of urban development. The winning bid was led by Windmill Development, who shared with the project’s finance provider, Vancity Credit Union, a commitment to green innovation. The development is mixed use, with commercial (e.g. a bakery partly powered by rooftop wind turbines and whose oven exhaust contributes to a district heating system), light industry and office space taking up about 30 percent of the floor space. Counting green roofs, half of the site is left as green and blue open space.

Dockside Green, Victoria, photo PWL partnership



This green/blue infrastructure more than pays for itself, with the water and wastewater treatment plants recovering stormwater, sewage, bathwater, and dishwater use, exempting residents from fees assessed to pay for the new city-wide sewage system.

A blue spine of interconnected wetland ponds, with native plantings and re-introduced local fish, anchors the development, acting as wastewater treatment as well as amenity and community gathering space. This green/blue

infrastructure more than pays for itself, with the wastewater treatment plant recovering stormwater, sewage, bathwater, and dishwater use, exempting residents from fees assessed to pay for the new citywide sewage system. Treated water is looped back into buildings to flush toilets and irrigate site landscaping. An additional 68,000 litres of treated water is sold to nearby industrial users. With water-efficient appliances, the project could save up to 265,000 litres of

public water annually, a reduction of 65 percent over similar conventional projects. There are also numerous green building aspects (from siting to use of local recovered wood) and a biomass micro-generator. The walking paths all use permeable materials, allowing rainwater collection.

However, as an early innovator, it is worth learning from its flaws. The land was sold to a private corporation and was entirely developed as market housing, although a little less than 10 percent of the units are subsidized moderate income affordable. The engagement of the local Songhees First Nation was minimal: some involvement on advisory committee, some public art (*Pirie 2010*). If it was designed today rather than 20 years ago, it would probably have less underground parking and higher buildings instead of interspersed townhouses and six-storey apartments. It would also have more non-market housing. The 2017 Revised Master Plan, created by PWL Landscape Architects (part of the original team) includes a retail centre with a new grocery store, a children's playground, and a dog park, and was based on post-occupancy consultation with residents as well as the Songhees (*PWL 2024*).

Senákw and Jericho Lands

The new development in Senákw located in central Vancouver at the head of False Creek, could be Dockside Green plus two decades of societal change. A four-hectare (10.5 acre) site, a third less land than Dockside Green, is being planned for 6,000 rental homes and 9,000 residents, six times as many homes as Dockside Green. Rather than 26 smaller buildings in Dockside Green, Senákw has proposed 12 buildings with heights between 12 to 58 storeys. Due to these building heights, 60 percent of Senákw will be green space, even more than Dockside Green. The plan calls for 1,200 homes or 20 percent to be 'affordable housing',⁷ double the amount of Dockside Green (*Chan 2022*). Furthermore,

7 Due to the criteria of the Apartment Construction Loan program, the 'affordable homes' will be local market rate or below, which equates to median or higher income affordability.

250 of those homes are set aside for deeply affordable⁸ homes for Squamish households, managed by the nation’s non-profit society Hiya’m Housing (*Cyca 2024*). At the same time, the green infrastructure provision is even more innovative, demonstrating that Indigenous Nations who have been marginalized from the centres of cities like Vancouver, Winnipeg, and Halifax are beginning to claim space and spur green innovation.

Senákw is part of the unceded territory of the Squamish Nation, dating back to the time immemorial. In 1868, the Federal Government established Kitsilano Indian Reserve No. 6, a parcel of land of approximately 15 hectares. Over several decades it was further annexed until the Squamish residents were barged off the land and their community burned down. After a decades long court battle launched in the late 1970s, ownership of only four hectares of the Kitsilano Reserve lands were returned in 2003 (*Nch’kay’ West 2024*). Senákw is thus on-reserve housing, although its housing and green spaces are intended to be used by non-Indigenous as well as Indigenous households. The proposal was adopted by the Squamish Nation in 2018, had received federal environmental assessment and agreements with the adjacent City of Vancouver by 2020, and is expected to be built out by 2036 (*Cyca 2024*).

Like Dockside Green, Senákw will have a district heating system providing heating and cooling to each building by reclaiming heat from the main sewer system, with the potential of exporting energy to nearby communities. Because of the scale of the development, the district heating system is projected to reduce carbon emissions by 140,000 tonnes, the equivalent of planting 5.5 Stanley Parks or 165,000 acres of trees, making it the largest carbon neutral rental development in Canada. The development will also feature green roofs, permeable paving materials, native plantings, and rainwater capture and collection (*Nch’kay’ West 2024*).

Iyálmexw, or Jericho Lands as it is more commonly known, is an even more ambitious project, with at least 13,000 homes planned on 36 hectares (90 acres), one of the largest remaining land sites in Vancouver. The site is being jointly developed by the Musqueam, Squamish, and Tsleil-Waututh Nations (MST Partnership) and Canada Lands Company, on a former Department of National Defence site. The City of Vancouver and UBC undertook a scan of large-scale sustainability practices in urban redevelopment soon after redevelopment commenced, recognizing that “larger redevelopments present a unique opportunity to balance the environment and assorted resources with growing urban populations” (*Busch 2019: 4*).

8 Deeply affordable = 30 percent of household income, mostly for low- or moderate-income households.



Artist's rendering of Jericho Lands development. Source: [Canada Lands Company](#)

The MST Partnership want to start with the existing natural systems and design around them. Biodiversity, significant trees, hydrology, ecologically rich open spaces, and the dramatic topography of the site are considered foundations of the new development. According to the current plan, there is a ridge rising from Jericho Beach whose hydrological and ecological value will be maximized retaining significant trees and forested areas, while sensitively incorporating buildings or walking and cycling connections. The natural and historic movement of water across the site will be respected by capturing, cleaning and reusing rainwater through water sensitive urban design, that responds to the impact of climate change. Significant trees and key habitats that enrich the ecology of the site and provide natural carbon capture and storage will be kept and connected to adjacent parks, naturally managed areas and open spaces. Changing climate conditions are being considered with “clean air shelters” in community spaces, in recognition of the increased frequency and severity of forest fires, and reuse of rainwater for most non-potable uses ([City of Vancouver 2021](#)).

But land is a limited resource, as the MST plan acknowledges. There are trade-offs between building height and density, and providing land for parks, open space, water management and biodiversity, public amenities, and affordable housing. The plans, which include buildings of up to 49 storeys, are being met with opposition from nearby residents of much lower density neighbourhoods ([Gold 2023](#)).

Expert Views on How NAM and Federal Housing Policies can Intersect

To validate recommendations around integrating NAM and federal housing policies, as well as elicit Canadian and international good practices, interviews were held in May 2024 with eight experts at the intersection of environmental and housing policies:

- **Donna Chiarelli**, *Principal, Planet A Consulting*
- **Michelle Molnar**, *Technical Advisor, Natural Asset Initiative*
- **Jonathan Tinney**, *Principal, SvN Architects*
- **Dustin Carey**, *Lead, Climate Adaptation, Federation of Canadian Municipalities Green Municipal Fund*
- **Mike Moffatt**, *Director, Place Centre, Smart Prosperity Institute*
- **Patience Cox**, *Facilitator and Leadership Consultant, Think Leadership Inc.*
- **John Purkis**, *Director Partnerships and Engagement, The Transition Accelerator/ Building Decarbonization Alliance*
- **Kim Fowler**, *Regional District of Nanaimo*

Key themes that emerged from the interviews:

- **Smart Growth – up not out, green not grey:** Every interview participant commended the policy direction of reducing sprawl through rezoning and changes to the Building Code to allow a diversity of housing, including plexes and small apartments as well as taller apartments throughout cities. Most of the interview participants also had case studies that showed the cost savings of maintaining and enhancing green and blue infrastructure at the master plan stage for redevelopment.
- **Avoiding Natural Hazards:** Mike Moffatt warned that floodplains need to be excluded from development, giving the example of recent development in London ON. Kim Fowler added that areas prone to wildfires need to be excluded from development/redevelopment.
- **Natural and enhanced assets in the context of urban and regional housing development:** While natural assets are often thought of as pristine and untouched (wilderness, not cityscapes), the reality is that brownfield developments include opportunities for regeneration, rewilding, and enhanced assets, potentially as much as protecting ‘intact’ streams and forests. Patience Cox provided the example of retrieving a buried stream on a former golf course in Saanich. Donna Chiarelli talked about urban stormwater management to protect streams and rivers, especially in the face of increased population growth.

- **The importance of mapping natural and heritage assets on Crown land:** Dustin Carey talked about how the potential value of natural assets on Crown land haven't been calculated, while Patience Cox talked about mapping natural and Indigenous heritage sites and co-development with local Indigenous Nations and communities to inform master planning processes.
- **Conditional Infrastructure Funding Linked to Natural Asset Plans:** Jonathan Tinney gave the example of Calgary's inclusion of a natural asset blueprint within its Municipal Development Plan, which also includes an ambitious target of 3,000 new non-market homes developed per year. John Purkis gave the examples of Blatchford, a former airport in Edmonton that is being redeveloped as a net zero energy community of 20,000 homes by the city, with restoration of natural habitats, as well as Downsview, a former airport in Toronto that is being redeveloped by the Canada Lands Company.
- **Planning for global heating mitigation and adaptation:** Michelle Molnar talked about the importance of including water level rises and increased risk of flooding, wildfires, and heatwaves in precinct planning. Measures like wetland protection and tree planting must take increased temperatures into account.
- **Scale matters:** Kim Fowler pointed out that the extensive green infrastructure planned in Dockside Green was only possible in a redevelopment of over five hectares. However, smaller interventions, from siting and materials of buildings to permeable footpaths, green roofs, community gardens, tree planting, and stormwater ponds or bioswales, are possible in smaller sites. Patience Cox also said that "quick wins on big sites" were a priority, especially when it came to Indigenous development or co-development.

Conclusions and Recommendations

Common themes emerged from the literature review, international and Canadian good practices, and interviews with Canadian experts.

First, the federal government needs to maintain and enhance leadership in housing policy in relation to infrastructure agreements and using federal land for affordable, well-located, energy efficient, and accessible housing for the future.

Second, the federal government needs to integrate a NAM lens into its housing policy, particularly regarding conditional agreements with provincial, territorial, regional, and municipal governments. The fact that infrastructure, housing, and community planning are now integrated into one federal department is positive, but there was a sense from both literature and interviews that housing and environmental policies were still siloed.

Third, and building on the concept of overcoming siloes, the federal government needs to actively and deliberately find synergies between growing imperatives to increase housing supply, reach net-zero and 2030 biodiversity targets, and wise stewardship of finances through infrastructure resilience to maximize areas of federal responsibility⁹. Superficially, these appear to be separate issues but seen through a NAM lens they are inextricably linked.

Fourth, linking conditional infrastructure funding and housing supply targets offers a huge opportunity to mainstream green infrastructure and NAM, and towards co-benefits that both support the progressive realization of the right to housing, and make Canada a leader in climate change mitigation.

Fifth, scale matters. The federal government focus on large scale sites such as Jericho Lands in Vancouver and Pickering Lands east of Toronto can model innovative green infrastructure.

Finally, and throughout, Indigenous perspectives on natural assets must be prioritized as an integral part of the process of development, consistent with the upholding of Indigenous rights, and to ensure that the natural environment is recognized as an asset to be balanced with the built environment.

We conclude with 10 recommendations that support the integration of NAM into housing policy for the maximization of both green infrastructure and affordability outcomes:

⁹ It was noted, for example, that Environment and Climate Change Canada funded National Standard W218 for natural asset inventories, the first of several required national standards to ensure a comparable information base.

Amplifying recommendations from recent Housing and Climate Task Force

- 1/ As part of mapping of federal lands suitable for housing, exclude floodplains, areas at high risk of wildfires, and natural areas, and emphasize brownfields (former industrial, office and commercial uses) and greyfields (underutilized residential sites) close to transit, jobs, and services.
- 2/ Map and cost out the value of services to a range of beneficiaries from existing and potential natural assets on federal land suitable for housing, developing precinct master plans that preserve and enhance these assets, including new urban parks, forests, and wetlands alongside higher-density housing.

Indigenous knowledge, worldviews, and perspectives

- 3/ As part of negotiations over federal lands, include local Indigenous Nations as full partners from the outset, which will tend to lead to a focus on natural and cultural heritage; and prioritize co-development and land back models.

Conditionalities

- 4/ As part of infrastructure agreements with municipalities and provinces, prioritize green infrastructure, especially in relation to land freed up by eliminating minimum parking requirements and car-dominated road systems.
- 5/ As part of infrastructure agreements with municipalities and provinces, prioritize the retention of existing, and development of new, natural and enhanced assets such as ponds, new or recovered streams, wetlands, naturalized parks, mini forests, green roofs, community agriculture, and permeable pavement.

Strengthen existing funding mechanisms

- 6/ Use Canada Infrastructure Bank, Natural Infrastructure Fund, FCM's Green Municipal Fund, and other federal funding opportunities to enhance green infrastructure, including favouring district-based green energy and water infrastructure as part of intensification.

Linkages to social infrastructure

- 7/ Ensure that social infrastructure — new childcare centres, schools, libraries, health services — have shade trees, water features, green roofs, permeable surfaces, and other aspects of global heating mitigation. This helps protect more vulnerable citizens: children, older people, and people without private recreational space.

Measures complementary to Canada's Housing Plan and Budget 2024

- 8/** Support the continued development of national standards for NAM.
- 9/** Fund the development of natural asset inventories that align with National Standard CSA W218 to ensure that local governments understand what natural assets they own and/or rely on, as well as their condition and the risks they face.
- 10/** Undertake NAM, in collaboration with other levels of government, on federal lands that are not suitable for housing, but which are close to areas with high potential for housing development.

References

- Baum, Katherine Blaze (2021). *Is It Time to Make 'Natural Capital' an Asset Class?* *Globe and Mail*, December 10.
- Bear, Jim, and Laren Bill (2023) *The Journey So Far: Reconciling First Nations Worldview and Perspectives* with Natural Asset Management.
- Benepe, Adrian (2019), *From City of Light to Ville Verte: How a Comprehensive Approach to Climate Change Adaptation Is Making Paris the World's Green Innovator*, *The Nature of Cities*, August 22.
- Buchove, Danielle (2021). *How Wartime Victory Houses Shaped Modern Toronto*, Bloomberg CityLab, March 24.
- Busch, Craig (2019). *Jericho Lands: A Global Sustainability Study*. Vancouver: University of British Columbia Healthy City Scholars Program.
- Cairns, Stephanie, Sara Jane O'Neill, and Sara Wilson (2019). *Opportunities to Fund Municipal Natural Asset Management Projects: An Overview of Six Federal Infrastructure Funding Programs*. Victoria: Natural Assets Initiative.
- CSA [Canadian Standards Association] (2023). CSA W218:23 - *Specifications for Natural Asset Inventories*.
- Chan, Kenneth (2022). *Senakw Project: The Unique Squamish Nation and City of Vancouver Partnership Outlined in Agreement*. Urbanized, August 5.
- City of Paris (2020). *Paris Climate Plan (2nd edition)*.
- City of Vancouver (2021). *Jericho Lands: Emerging Site Planning Ideas*.
- Cyca, Michelle (2024). *Vancouver's New Mega-Development Is Big, Ambitious and Undeniably Indigenous*. *Macleans*, March 11.
- Durning, Alan (2021). *Yes, Other Places Do Housing Better, Case 3: Paris*. *Sightline Institute*, July 26.
- EGBC [Engineers and Geoscientists British Columbia] (2021). *Local Government Asset Management*.
- ETH Zurich [Swiss Federal Institute of Technology] (2024). *Natural Capital Singapore*.
- Eyquem, Joanna, Bailey Church, Roy Brooke, and Michelle Molnar (2022). *Getting Nature on the Balance Sheet: Recognizing the Financial Value of Natural Assets in a Changing Climate*. Waterloo: Intact Centre on Climate Adaptation, University of Waterloo.
- FCM [Federation of Canadian Municipalities] (2023a). *Next Generation Infrastructure: A Summary of FCM's Recommendations for the Future of Federal Infrastructure and Transit Programming*.

- (2023b). Backgrounder: *New Research—Canada’s Housing Challenge Is Also an Infrastructure Challenge*.
- Freemark, Yonah (2021). *Mandating Access to Affordable Housing, City by City: Is France’s Fair-Share SRU Law a Model for U.S. Metropolitan Areas?* Cambridge MA: Lincoln Institute of Land Policy.
- Gold, Kerry (2023). *Jericho Lands Advocates See a Tradeoff between Towers and Green Space*. *Globe and Mail*, September 29.
- Government of Canada (2024a). *Budget 2024: Fairness for Every Generation*.
- (2024b) *Solving the Housing Crisis: Canada’s National Housing Plan*.
- (2023) *2 Billion Trees Program*.
- Green Communities Canada (2024). *Mini Forests*.
- Henderson, Elyse (2020). *Modular Construction for Energy Efficient, Affordable Housing in Canada*. Vancouver: RDH Building Services.
- Hunter, Justine (2022). *Cost of Rebuilding B.C. After Flooding Nears \$9-Billion*. *Globe and Mail*, February 19.
- IDEFESE*. (2024).
- Institute for Sustainable Prosperity (2016). *New Solutions for Sustainable Stormwater Management in Canada*.
- Kaumeyer, Larry (2022), *What’s Happening to Canada’s Vanishing Wetlands? Without a Proper Inventory, We Won’t Truly Know*, *Ducks Unlimited Canada*, January 26,
- Lee, Marc (2023). *“Housing Lessons from Singapore”*. *Policy Note*, August 10.
- Lindgren, Elyse (2022), *Indigenous Resource Management and Natural Asset Management – Two-Eyed Seeing for Climate Resilience*, ZN Advisory, July 28.
- Maaoui, Magda (2022). *“Social Contract: Parisian Social Housing”*. *The Architectural Review*, June 30.
- Marie de Paris (2017). *Paris Resilience Strategy*.
- Metro Vancouver (2022). *Regional Parks Annual Report*.
- Molnar, Michelle (2023). *“Lowering Development Cost Charges through Eco Asset Approach,”* *Natural Assets Initiative blog*.
- NAI [Natural Assets Initiative] (2023). *Natural Asset Infrastructure in British Columbia: Barriers and Opportunities*.
- (2020). *Cohort 2 National Project Overview*.
- (2018). *Primer on Natural Asset Management*.
- Nch’kay’ West (2024) *Sen’ákw*.

- OECD [Organization of Economic Cooperation and Development] (2020). *Housing Policies for Sustainable and Inclusive Cities: How National Governments Can Deliver Affordable Housing and Compact Urban Development*.
- O'Neill, Sara Jane, and Cairns, Stephanie (2016). *New Solutions for Sustainable Stormwater Management in Canada*. Ottawa: Smart Prosperity Institute.
- O'Sullivan, Feargus (2018). *A City That Takes Climate Change Seriously: Paris*. Bloomberg City Lab, October 18.
- Perrot-Maitre, Danièle, and Davis, Patsy (2001) *Case studies of markets and innovative financial mechanisms for water services from forests*. Washington: Forest Trends.
- Pirie, Ken (2010). *Unsprawl Case Study: Dockside Green in Victoria, British Columbia*. *Terrain.Org: a Journal of the Built and Natural Environment* 25, March 31.
- PWL Partnership (2024). *Dockside Green Case Study*.
- Quinton, Jessica, Lorien Nesbitt, and Agatha Czekajlo (2022). "Wealthy, Educated, and... Non-Millennial? Variable Patterns of Distributional Inequity in 31 Canadian Cities". *Landscape and Urban Planning* 227, online first.
- Singapore Natural Parks Board (2024). *Singapore: Our City in Nature*.
- Statistics Canada (2022). *Census of Environment: Urban Greenness, 2022*.
- Taskforce for Housing and Climate (2024). *Blueprint for More and Better Housing: How Federal, Provincial, and Municipal Governments Can Ensure We Build 5.8 Million Homes That Are Affordable, Low-Carbon and Resilient*.
- Thistle, Jesse (2017). *Definition of Indigenous Homelessness in Canada*. Toronto: Canadian Observatory on Homelessness.
- Tomalty, Ray, and Don Alexander (2006). *Smart Growth in Canada: Implementation of a Planning Concept provincial and territorial*. Ottawa: Canada Mortgage and Housing Corporation.
- van Dijk, Peter, and James K. Stewart (2023). *The Value of Natural Assets Must Be Measured for Truly Sustainable Development, Policy Options*, October 10.
- World Economic Forum (2024). *Nature-Positive Cities: Guidelines for Rehabilitating Nature in the Urban Era: Consultation Paper*.

Natural Assets Initiative

