Prospecting Regenerative Design and Development:

An emerging sustainability paradigm for the Canada Lands Company?

[CFB Calgary Projects – Garrison Woods and Currie Barracks]

by

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Abstract

Ecological and social challenges have tested the ability of conventional land development as a route to a sustainable future. Early sustainability paradigms have been part of the response towards better development practices, but many critics have argued that more needs to be done – to move beyond essentially degenerative sustainability paradigms towards more explicitly regenerative sustainability paradigms. This practicum examines the Canada Lands Company (CLC) development of its CFB Calgary properties (Garrison Woods and Currie Barracks) to explore the progress around sustainability paradigms and to prospect the case for Regenerative Design and Development (RD+D) as a new operative worldview governing CLC's planning and land development practices.

A literature review and a series of focused interviews with key informants were the main research methods, within the context of the case study set, to pursue a series of research questions, culminating with: How – and in what ways, with what rationale – could RD+D be considered an appropriate new worldview for CLC's next generation of leading-edge-seeking projects? What are its prospects?

It was generally concluded that RD+D is a viable, emerging sustainability approach for CLC. More specifically, on the basis of this research, CFB Calgary was assessed as having been developed with what may now be defined as a *green* approach – implicitly sustainable, in aspiration at least; the next progression on this would involve a more explicit *sustainable* approach, then *restorative*, all laying the ground for a potentially *regenerative* approach. If RD+D had been the operative worldview during inception and execution of CFB Calgary, there would almost certainly have been a very different process and outcome. However, it would probably require a dedicated champion of RD+D, within CLC, for this post-conventional sustainability approach to be seriously considered. The Company's track record – as an innovative land developer – encourages the view that RD+D could well be a good fit – as a potential next-generation planning and development approach.

Keywords: *Regenerative Design and Development, Sustainability, Sustainable Development, Urban Sustainability, Canada Lands Company, Garrison Woods, Currie Barracks, CFB Calgary*

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“If no one believed in the impossible, there would be nothing left to dream about”
– Liev Schreiber

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Chapter 1: The Research Opportunity

In the wake of ecological and social challenges, early sustainability paradigms provided a good starting point en route to a more sustainable built environment, but it has been argued by some that conventional sustainability approaches are still barely altering the status quo (Cole, 2012b; Drexhage & Murphy, 2010; Lyle, 1994; Newman & Jennings, 2008). The Canada Lands Company (CLC), as an innovative Canadian land developer, has been in a position to pursue emerging sustainability approaches, often trying to go beyond the conventional. This has been especially the case in relation to development of their properties in Calgary, on the former CFB Calgary. More than conventional sustainability approaches may still be associated with a comparatively status quo context, especially when distinctions are considered between essentially **de**generative sustainability paradigms and more explicitly **re**generative sustainability paradigms. While conventional sustainability approaches may therefore be considered problematic, a distinct research opportunity is presented by the prospect of new paradigms being operationalised by developers such as CLC, in contexts such as the former CFB Calgary. This is the thought-experiment underlying the current research.

The sustainability approaches considered in this practicum are generally situated along a continuum from degenerative (doing less harm; decline in value or worth) to sustainable (doing no harm; keep from failing) to regenerative (doing some good; give new life, strength, or vigour) (Cole, 2012b; Plaut Dunbar, Wackerman, & Hodgin, 2012; Reed & Boecker, 2012). Based on these distinctions, most proponents of the latter regenerative approach would likely argue that in Canada there are no current examples of 'sustainable as regenerative' built environments – planned, developed or proposed.

Early sustainability paradigms have been criticized for a variety of reasons. They have been variously referred to as: vague, difficult to implement, lacking political support, impeding real progress, viewing humans as "separate and above nature", degrading living systems, and as simply maintaining the status quo – without contributing restoratively or regeneratively to natural systems (Cole, 2012b; Drexhage & Murphy, 2010; du Plessis, 2012; Lyle, 1994; Newman & Jennings, 2008).

A recent report by the UN Secretary-General's High-level Panel on Global Sustainability (GSP) suggests that progress, in terms of sustainability, "has been neither fast enough nor deep enough, and the need for further-reaching action is growing ever more urgent" (GSP, 2012, p. 6). A range of authorities – Cole (2012a, 2012b), du Plessis (2012), Hoxie, Berkebile, & Todd (2012), Lyle (1994), Mang & Reed (2012), Pedersen & Zari (2012), and Svec, Berkebile, & Todd (2012) – suggest that one emerging sustainability paradigm, Regenerative Design and Development (RD+D), aims beyond earlier sustainability paradigms and challenges conventional development efforts; it appears to raise the bar, beyond being simply 'sustaining'. Significantly, Mang & Reed (2012) observe that RD+D requires "a very different worldview, and approaches the world from a very different paradigm than what has shaped buildings for centuries" (p. 26).

With formal beginnings in the early 1990s, yet recently becoming more generally recognized, RD+D aims to support the "co-evolution" of human and natural systems, to ultimately restore and enhance life (Cole, 2012b; du Plessis, 2012; Girardet, 2010). Mang & Reed (2012) provide a simple explanation of RD+D as requiring a deep understanding of the site and how the site and the interconnected systems relate to each

other, designing with those systems, and allowing for the systems to be able to regenerate.

RD+D may hold potential as a new operative worldview for land re-development companies such as CLC, which has pursued sustainability objectives in part through development of their properties in Calgary, Alberta. CLC's work at Canadian Forces Base (CFB) Calgary features three properties, the development of which has demonstrated progress in sustainability terms: Garrison Woods, Garrison Green, and Currie Barracks (see **Figure 1**). This makes CFB Calgary an ideal case study set of projects to evaluate the application of sustainability theorising in practice, especially – in terms of the current project – with RD+D in mind.

Canada Lands Company CLC Limited – to give it its full title – manages, improves (redevelops), and/or sells surplus strategic Government of Canada properties across Canada. CLC employs a "balanced scorecard" approach, with key objective areas and associated targets and metrics, to report on and manage their progress. One of CLC's key objectives is to "create environmentally sustainable neighbourhoods and buildings in line with urban planning best practices" (Canada Lands Company Limited (CLCL), 2011, 2012, p. 10; Kaganova & McKellar, 2006). CLC has been recognized for its leadership in sustainability, including awards from the: the Consulting Engineers of Alberta[1], the Canadian Home Builders Association[2], the Canadian Urban Institute, and the Canadian Institute of Planners[3] (CLC, 2012; Tsenkova, 2009).

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[1] http://cea.ca/images/stories/2009-10_Annual_Report_web.pdf
http://www.clc.ca/learn-more-about-clc/awards/consulting-engineers-alberta-showcase-awards
[2] http://www.clc.ca/learn-more-about-clc/awards/'sam'-award-canadian-home-builders'-association
http://www.clc.ca/learn-more-about-clc/awards/national-grand-sam-award
[3] http://www.clc.ca/learn-more-about-clc/awards/award-planning-excellence

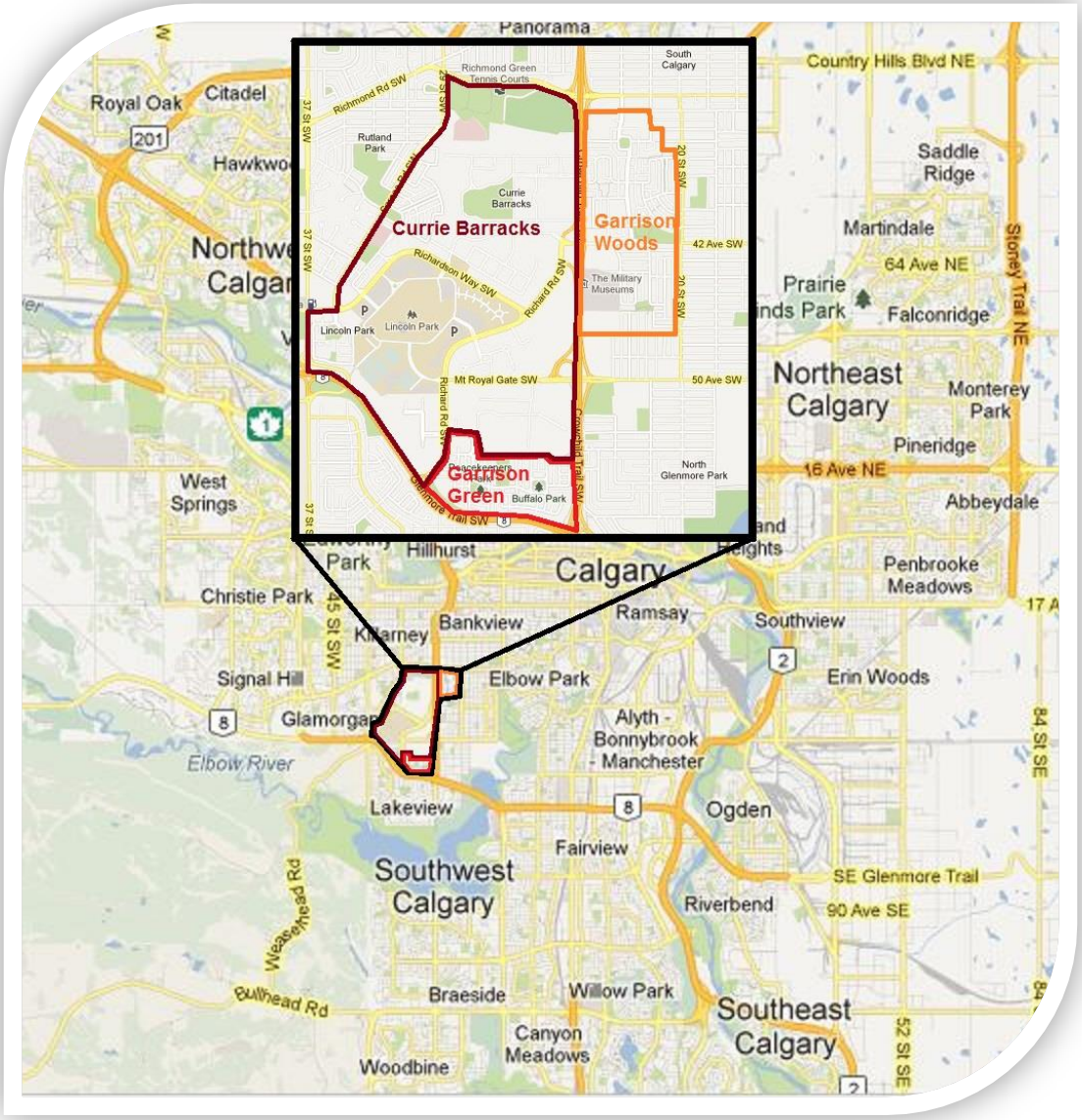

Figure 1: ***Project Context Map (CFB West and CFB East Planning Areas)***

Garrison Woods, completed in 2004, was a ‘forward-thinking’ plan first adopted in 1998, that led the way for new non-traditional developments in Calgary (Canada Mortgage and Housing Corporation (CMHC), 2004; City of St. Albert, 2009; Congress for the New Urbanism (CNU), 2007). Garrison Green, completed in 2006, is smaller than Garrison Woods, and is considered by CLC as the sister property to Garrison Woods because the properties shared similar development approaches (CLC, 2013). Currie Barracks, with development commencing in 2008, builds upon the experience at Garrison Woods and Garrison Green, and became one of the first projects in Canada to achieve one of the highest ratings under current sustainability assessment tools (CMHC, 2004; Ewing, 2012).

Despite CLC’s past and current achievements, in the Calgary projects especially, it may be contended that more could be done if land and community development is to move beyond the outcomes of essentially degenerative sustainability paradigms towards the potential outcomes from more explicitly regenerative sustainability paradigms. This research project attempts to better discern the nature of the sustainability valued in these projects, especially in the context of the emergence of the regenerative interest, occasionally referred to as a third-generation approach (Dale et al., 2012). The underlying interest is to effectively ‘prospect’ RD+D as a business model for future CLC property development.

1.1 Purpose of Practicum

The purpose of this practicum was to explore the prospects for what could be the next generation of leading-edge planning and land development practice. This was pursued through efforts to understand, re-evaluate, build upon, and innovatively extend CLC's experience with neighbourhood/community planning and related land development in Calgary, Alberta. Critically, this has been undertaken with a potential new worldview in mind, namely RD+D, and the associated shift in emphasis – from what some might assess as inadvertently 'degenerative' to an explicitly 'regenerative' approach to planning and land development.

Canada Lands Company's CFB Calgary properties were investigated as a case study set to help assess how CLC viewed 'sustainability' during the inception and development of these projects. What benchmarks were being observed or targeted? What 'planning and development' paradigm was applied? This de facto post-hoc evaluation was guided by what was perceived to be emerging at present, in terms of the RD+D paradigm. What might have been different if RD+D had been the operative worldview informing the Calgary CFB projects? How might this currently inform CLC's consideration of how to advance their practices in pursuit of sustainability? Could RD+D be a relevant paradigm for their next generation of leading-edge-seeking projects? This practicum – viewing CLC as the potential client – is expected to provide planners and land developers with practical insights on a potential new worldview for leading-edge planning and land development.

1.2 Key Research Questions

The following key questions guided the research for this practicum:

1. What is RD+D and how does it relate to the earlier sustainability paradigms identified in this research?
2. What sustainability approach was envisioned during the inception and execution of the Garrison Woods and Currie Barracks projects?
3. What might have been different if RD+D had been the operative worldview?
4. What was learned from the sustainability experience at CFB Calgary that could inform CLC's consideration of how to progress their sustainability practices?
5. How – and in what ways, with what rationale – could RD+D be considered an appropriate new worldview for CLC's next generation of leading-edge-seeking projects?

1.3 Significance of Project

As noted at the outset, in the wake of mounting ecological and social challenges, early sustainability paradigms provided a good starting point en route to a more sustainable planet, but they are still regarded as barely an advance on the status quo (Cole, 2012b; Drexhage & Murphy, 2010; Lyle, 1994; Newman & Jennings, 2008). CLC has pursued sustainability approaches through the company's properties at the former CFB Calgary, Alberta. However, it may now be argued that a completely new way of thinking must be adopted if development is to move beyond essentially *degenerative* sustainability paradigms towards more explicitly ***regenerative*** sustainability paradigms.

Beatley (1995), Jepson (2001), Miller (2012), and Rees (1995) all suggest that planners are positioned to play a significant leadership role in such a paradigm transition. The planning profession's nature is to be holistic and integrative; planners also work at a local and/or regional level, with a concern for the global (Beatley, 1995, pp. 383-384, 392; Jepson, 2001, pp. 506-507; Rees, 1995, p. 355). This research, with the benefit of some hindsight, has aimed to succinctly highlight a trajectory of sustainability paradigms, outline how RD+D offers an emerging regenerative sustainability paradigm, and explore – through a case study and post-hoc evaluation of the design and development of CLC's CFB Calgary properties – what sustainability paradigm thinking propelled CLC's initial efforts. This research also considers how an RD+D strategy might have fared at that time, and what CLC's next step in relation to sustainability might be. Could RD+D be a potential new worldview for Canada Lands Company, and other progressive land developers?

This research is of potential significance to CLC, land developers, planners, political leaders, and those generally interested in planning, development, and sustainability – with a propensity for radical change.

1.4 Assumptions

There is a personal element to the research that involved the following assumptions:

- RD+D is the next-generation of sustainability approaches; this may represent some wishful thinking on the part of the researcher, but it has driven the research.
- CLC is regarded as valuing continued improvement of their development practices; therefore, RD+D would potentially be regarded, quite naturally, as a candidate for the 'next-generation' sustainability approach for their projects.

- Bill Reed and Regenesis Group have the most developed RD+D framework meriting consideration at this time, although application in primarily urban sustainability contexts is limited at this time; more practical precedents are needed, and it is assumed that this project could begin to address this need.
- A review of sustainability literature, especially of RD+D, will provide a common understanding of the topic and help embrace a regenerative worldview.

1.5 Limitations

The following section recognizes potential limitations associated with this research:

- The CFB Calgary redevelopment was first conceived and instituted almost twenty years ago; some of the people originally involved at the inception are now either difficult to access, or have passed on.
- Sustainability is now a somewhat ‘sprawling’ topic area, difficult to address comprehensively, and requiring some expedient targeting or categorisation – to enable this research.
- RD+D is an emerging but still largely unknown paradigm, which nevertheless helps to establish a basic degenerative/generative/regenerative continuum of perspectives; this could be too limiting for some.
- The interviewees approached for this research emerged as having a limited understanding of RD+D; ideally, interviewees would have been more informed.
- RD+D requires a new and somewhat unconventional – or post-conventional – worldview; without a capacity to inhabit such a worldview it appears difficult to fully grasp the meaning of a regenerative disposition.
- The researcher himself has had limited hands-on design and development experience with RD+D as a route to a more sophisticated conception of sustainability; the work therefore represents – for better or worse – essentially idealistic or utopian thinking in action.

Chapter 2: Literature Review

A review of relevant literature set the foundation for the research, targeting – in order: sustainability in general - and urban sustainability in particular; RD+D's place within the continuum of sustainability paradigms; the main principles of RD+D; and the planning, development, and design of CLC's land development projects in Calgary, Alberta. An effort was made to specifically represent urban sustainability – to recognise coverage of highly urban, urbanising, or re-urbanising contexts, such as those represented by the CFB Calgary projects. The literature review also informed the development of a post-hoc evaluation framework for these projects. This framework aimed to evaluate Garrison Woods and Currie Barracks against the core tenets of RD+D, to assess: whether any aspects of RD+D could be considered to have been incorporated at their inception and/or by the time of their completion; what an explicit consideration of RD+D might have offered for the CFB Calgary property developments; and what might be valued now, that could inform CLC's consideration of deliberately progressing their practice of sustainability into the realms of 'regenerative'?

Sustainability is a very large topic – marked by complexity, and a very extensive literature, making it virtually impossible for all the related ideas, interpretations, and nuances associated with the topic to be comprehensively addressed (Jepson, 2001). One of the choices made here has been to try to focus on urban sustainability. Accordingly, the literature review focused on the following areas:

- Sustainability
    - Defining sustainability
    - A brief history of sustainability
    - Criticisms of sustainability

    - Positioning sustainability paradigms
- Urban Sustainability
    - Defining sustainability in an urban context
    - RD+D in an Urban Context
    - Urban Regeneration
- Regenerative Design and Development (RD+D)
    - Main principles of RD+D
    - RD+D tools
- Canada Lands Company (CLC)
    - Corporate Social Responsibility
    - Balanced scorecard
    - Moving Forward
    - The CLC Calgary CFB Projects Experience

2.1 Sustainability

This section defines sustainability in the context of this research, presents a brief history of sustainability (from the time that sustainability was popularized to the emergence of RD+D), positions the various sustainability approaches along an informative continuum, outlines the main principles of RD+D, and discusses some of the criticisms of early sustainability approaches, with the emergence of RD+D in mind.

2.1.1 Defining Sustainability. *Sustainability* and *sustainable development* were two terms found frequently used in the literature, often times interchangeably. A common criticism of 'sustainable development' is that the concept is too vague, making it difficult to implement (Dale, Dushenko, & Robinson, 2012; Drexhage & Murphy, 2010). In addition, researchers have found that, although sustainability and sustainable development are frequently used terms, no single, clear definition has emerged for either

of them (Brown, Hanson, Liverman, & Merideth, 1987; Kidd, 1992; Molnar & Morgan, 2001). Kidd (1992) has observed that:

> the roots of the term 'sustainability' are so deeply embedded in fundamentally different concepts, each of which has valid claims to validity, that a search for a single definition seems futile. (p. 2)

Brown et al. (1987) and Kidd (1992) recommend that, when using the terms sustainability and sustainable development, the authors should clearly define what they mean by sustainability and sustainable development.

Molnar & Morgan (2006), reporting on research (for the Sustainable Toronto Project) which is regarded as among the most comprehensive for the purposes of this research, present "some examples of the historical uses of the three terms [sustainability, sustainable development, and sustainable communities] and (explore) how the words have been defined by various sectors" (p. 3). The various sectors considered by Molnar & Morgan (2006) were: government, business, civil society, and academia. Their background paper concluded, in general, that sustainability and sustainable development are used interchangeably by government, business, and civil society, but academia prefers to distinguish the terms and therefore does not 'interchange' them as often (2006). In addition, Robinson (2004) reviewed "how the concept of sustainable development has played out in industrialized countries since 1987" (p. 369). He suggests that, in similar contexts, the term sustainable development tends to be used by government and private sector organizations, while academic and NGO sources tend to use the term sustainability (Robinson, 2004). However, Robinson (2004) notes that there is a growing shift towards the use of the term sustainability in government and private sector publications.

In line with the findings of the Sustainable Toronto Project research, CLC uses the terms sustainable development and sustainability interchangeably throughout the

company's annual reports and publications, albeit, without clear definition or distinction. CLC (2011) does provide a definition of sustainable development on the company website – under the page heading of sustainability. Similar to most governments (Molnar & Morgan, 2006), CLC uses the most frequently quoted definition of sustainable development (International Institute for Sustainable Development (IISD), 2013; Molnar & Morgan, 2006) presented in the World Commission on Environment and Development (WCED) report, "Our Common Future":

> development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (WCED, 1987, p. 43)

This practicum followed the recommendation of Kidd (1992) and Brown et al. (1987), to clarify what the author means when they use the terms sustainable development and sustainability. This research also adopted the logic provided by Cole (2012b) that sustainability is "an overarching globally scaled, evolving aspiration" (p. 47) and that green, sustainable, restorative, and regenerative design and development are "complementary approaches to the design of buildings and the built environment that aid in this process [of a sustainable future]" (p. 47) (Plaut et al., 2012; Reed & Boecker, 2012). More detail on the relative positioning of different sustainability paradigms is provided below, in Section 2.1.4.

2.1.2 A Brief History of Sustainability. In the 1980s, the WCED released the report, "Our Common Future". This is generally considered as the starting point for the popularization of the concept of sustainability, and was promoted through the definition of sustainable development provided by the WCED (Mebratu, 1998). The WCED report, and its subsequent definition of sustainable development, increased awareness of sustainable development, and emphasized the significance of development that

acknowledged not only the economy, but also the vital interrelationship of the economy, environment, and society (Sustainability Reporting Program, 2000; United Nations Conference on Sustainable Development, 2011). Recognizing this interrelationship was important because the world was facing, and continues to face, increasing ecological and social challenges which include, but are not limited to: climate change, global warming, access to food and water, and social inequality (Cole, 2012a; du Plessis, 2012; Newman, 2006; Pedersen Zari, 2012).

du Plessis, in "Towards a Regenerative Paradigm for the Built Environment", suggests that this response to the ecological and social challenges laid the foundations for **three different sustainability paradigms** that are generally "situated within the broader theoretical context of sustainability" (2012, p.7). Similarly, in the book *Urban Sustainability: Reconnecting space and place* edited by Dale, Dushenko, & Robinson, they identify three generational responses to 'sustainable development'[4] that:

> can be characterized as a discourse on definitional debates about sustainable development that has moved from shallow to deeper conceptualizations, from singular to more systemic changes, and evolving from an emphasis on defining sustainable development to a recognition of the critical need for fundamental institutional reform… (2012, pp. 3-4)

du Plessis suggests that the **first** paradigm was developed in the context of public policy-making and was driven by international organizations, such as the UN, with an objective to "develop a set of common criteria, indicators, and strategies through international consensus" (du Plessis, 2012, p. 8). Pamela Robinson and Ann Dale suggest the **first** generational response spanned roughly from 1985 to 1995 and that "first-generation approaches can be characterized mainly by definitional debates…that

[4] Dale et al. use the terms sustainable development and sustainability interchangeably (2012, p. 3)

framed sustainable development as a future state or desired outcome…" (Dale et al., 2012, p. 15).

The **second** paradigm, du Plessis suggests, developed out of the private sector as "businesses responded to the risks, pressures and opportunities presented by an environmental agenda" (2012, p. 8). Svec et al. (2012) suggest that the first two paradigms approach sustainability with a "focus on energy efficiency and materials, evolving into various measurement and rating systems" (p. 82).

Robinson & Dale identify the timing of the **second** generational response from 1995 to 2005 (Dale et al., 2012) (which roughly represents the period corresponding to the inception and execution of the Garrison Woods project). Resembling du Plessis's evolution of sustainability, Dale recognizes the role of the private sector in the second generational response. Dale says, "many believed that the constructive ambiguity of the concept of sustainable development … was instrumental in bringing the economic and environmental communities together with the development community" (Dale et al., 2012, p. 5). Furthermore, Robinson & Dale offer a slightly different point of view than du Plessis for the overall second shift in sustainability which they summarize as "a deepening understanding of the magnitude of the changes required, of a growing appreciation of the need for new governance models…" (Dale et al., 2012, p. 19) and "greater realization of the importance of process…in the form of strategies of civic engagement, empowerment, and collaboration in decision making and a growing understanding of the importance of social capital" (Dale et al., 2012, p. 271).

The **third** paradigm – RD+D – was introduced, and continues to evolve, as a concept that challenges conventional 'sustainable development', situating itself beyond

the first two sustainability paradigms (Cole, 2012b, du Plessis, 2012; Mang & Reed, 2012, Svec et al., 2012). Of particular relevance to this practicum, Dale & Dushenko suggest that:

> the **third-generation** responses are more than cleaning up pollution, environmental performance, or increasing energy efficiency…instead they are about preventing pollution in the first place through the design of new processes and products that mimic and complement ecological processes that are regenerative, rather than degenerative (Dale et al., 2012, p. 272).

Although, overall, the third-generation response offered by Dale et al. and the third sustainability paradigm offered by du Plessis have differences, their similarities have a decidedly ecological perspective. This is mainly because RD+D progressed initially from what Dobson (1990) and Mol & Spaargaren (2000) have referred to as "radical 'ecologism'" (as cited in du Plessis, 2012, p. 8) and "eventually became the regenerative sustainability paradigm" (du Plessis, 2012, p. 8). Of particular interest here, the definition of 'radical', as defined by Merriam-Webster (2013), means "very different from the usual or traditional" or "extreme" change. By this definition, ecologism is radical in comparison to environmentalism, just as RD+D might be and should be considered 'radical' in comparison to earlier sustainability paradigms (Dobson, 2000; Mol & Spaargaren, 2000). In addition, Cole (2012a), commenting on the articles presented in a recent special issue of *Building Research & Information* (focusing on RD+D), indicates that RD+D appears to have been:

> born out of the convergence of a number of historical threads that have either been latent or running parallel to conventional green building discourse and practice over the past 40 years or so. (2012a, p. 1)

du Plessis adds:

> the practices and technologies developed by this movement [self-sufficiency] formed for many years the mainstay of proposed 'green' building and living

> solutions: renewable energy generation; natural building materials (e.g. earth and straw bale); organic farming, permaculture and urban agriculture; and the development of alternative models of communal living such as co-housing, eco-villages and local currencies. It is from these antecedents that the regenerative paradigm evolved. (2012, p. 9)

The third paradigm, or third-generation response, is of prime relevance for this practicum. Its onset corresponds with the period when the commencement of the Currie Barracks project was being actively considered by CLC. This practicum enables consideration of the extent to which such paradigm-shifts were being reflected in development practice, by developers such as CLC.

2.1.3 Criticisms of Sustainability. The three sustainability paradigms offered by du Plessis share a number of objectives and strategies, such as "localized action, efficient use of resources, reducing toxic pollution and the use of renewable energy" (du Plessis, 2012, p. 19). However, broader criticism of early sustainability paradigms indicates substantial differences between the first two sustainability paradigms and the third regenerative paradigm.

One of the main critiques, differentiating the first two sustainability paradigms from the third paradigm, offered by du Plessis (2012), is that the first two were developed with a mechanistic worldview that sees humans as "separate and above nature", viewing nature "through technology and science" as something that can be controlled and managed – rather than "as an integral part of nature and partners in the processes of co-creation and co-evolution" (as offered by the regenerative paradigm) (du Plessis, 2012, pp. 8 & 15). Similarly, Robinson (2004) observed – in his review of sustainable development literature – that sustainable development, which aligns with the first two sustainability paradigms, "maintains an anthropocentric view and favour(s) incremental

change that 'does not challenge any existing entrenched powers or privileges'" (p. 376), as well as favouring "institutional reforms and technological advance" (as cited in Cole, 2012b, p. 43). Robinson's observation points to the fact that, to date, approaches to sustainability have not done enough to elicit impactful change as regards ecological and social challenges.

Furthermore, advocates of RD+D have suggested that current planning and development approaches degrade living systems, and the goal of most conventional sustainable approaches simply maintains the status quo – without contributing restoratively or regeneratively to natural systems (Cole, 2012b; Lyle, 1994; Newman & Jennings, 2008). Cole[5], a Canadian contributor to the literature on RD+D, summarized the criticism of sustainable development as being "primarily directed at 'doing less harm' or, more generally, reducing the degenerative consequences of human activity on the health and integrity of ecological systems" (2012b, p. 41).

2.1.4 Positioning Sustainability Paradigms. Cole refers to an illustration that helps to provide "a basis to begin to both clarify and position green, sustainable, and regenerative approaches" (Cole, 2012b, p. 45-46). The illustration is credited to Steve Larrick, a former Coordinator of Sustainable Development at the University of Nebraska-Lincoln (Dane et al., 2007, p. 102). Larrick's illustration (**Figure 2**), presented in 1997, is characterized by Cole (2012b) as, "one of the earliest graphic characterizations of

[5] Dr. Ray Cole is a professor and past director in the UBC School of Architecture and Landscape Architecture (SALA). He is "co-founder of the Green Building Challenge, and a past Director member of the Canadian Green Building Council" (University of Manitoba, 2012, "about the jury"). He has over 35 years of teaching experience in environmental issues in building design, and his current research interests involve regenerative design (UBC SALA, n.d.).

degenerative and regenerative processes and actions and their consequence for human and natural systems" (p. 45).

More recently, and more closely aligned to the present practicum research, is an adapted and restructured illustration (presented by Bill Reed of Regenesis Group[6] at the 2012 Living Future conference) of the trajectory of sustainability 'approaches' (**Figure 3**) (Reed & Boecker, 2012, slide 12). **Figure 3** shows the trajectory of the sustainability approaches from degenerating to regenerating – from left to right respectively, along the horizontal axis, divided at the centre point by a vertical axis, showing the energy requirements – from more energy required at the bottom to less energy required at the top (Reed & Boecker, 2012). 'Green' and 'conventional' approaches are identified on the 'degenerating' side of the illustration, which is considered a technical system design, developed through fragmented thinking and a reliance on technology, which are associated with buildings and infrastructure that require more energy than a regenerative approach (Reed & Boecker, 2012). By contrast, on the right side of the vertical axis are living system design approaches identified as 'restorative' and 'regenerative' (Reed & Boecker, 2012). Regenerative approaches are associated with 'living systems' that implicate pattern thinking and the perspective of 'living' and 'whole' systems (Reed & Boecker, 2012).

[6] The Regenesis Group is widely considered "a leader in evolving and articulating a regenerative design and development paradigm and putting it into practice" (Svec et al., 2012, p. 82) and have provided "by far the most significant contribution to defining the scope, emphasis and key principles of regenerative design and development, and have amassed considerable experience in its practice in North America" (Cole, 2012b, p. 48).

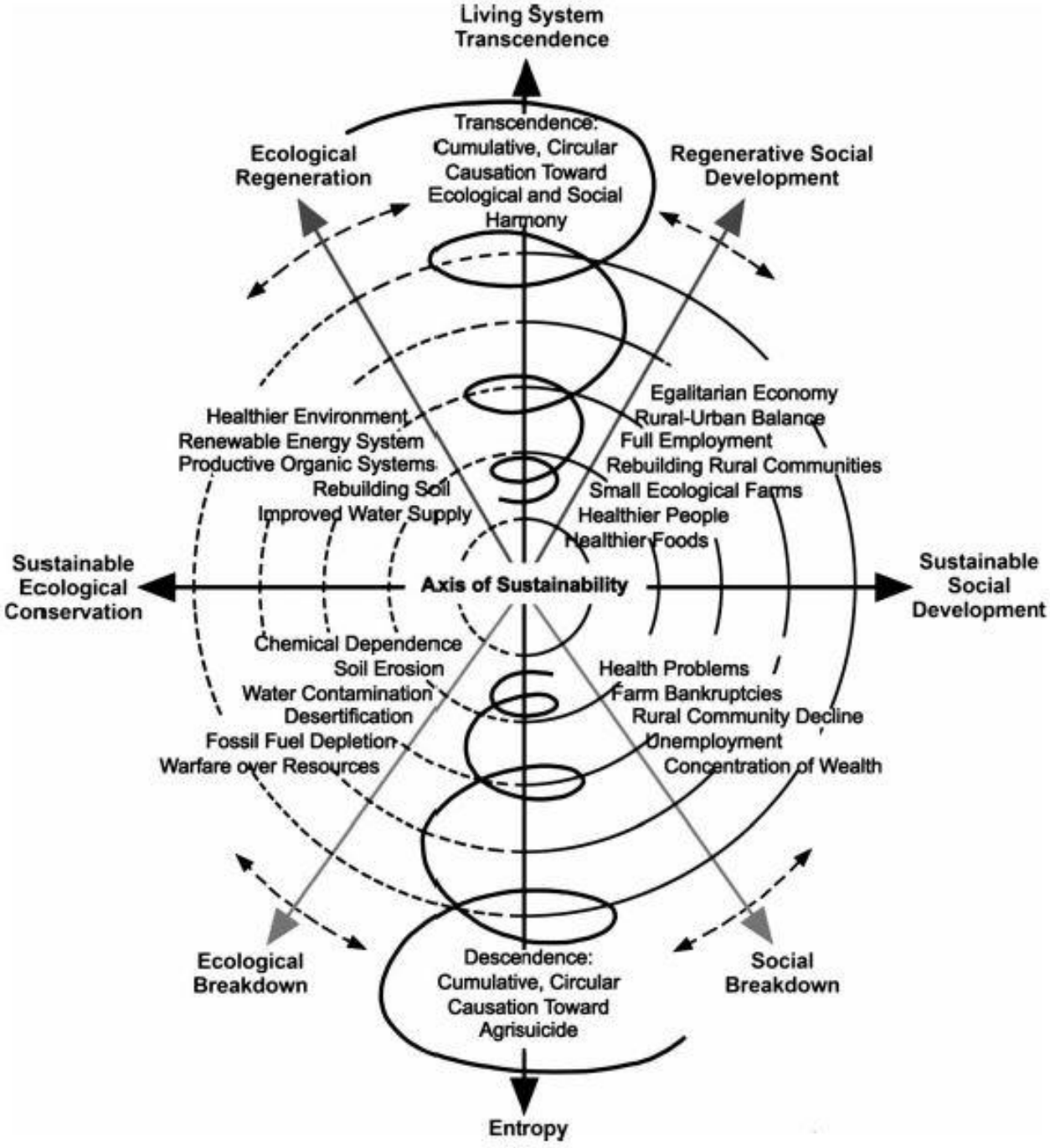

Figure 2: Living Systems Model of Community Development (Cited in Cole, 2012b, p. 46)

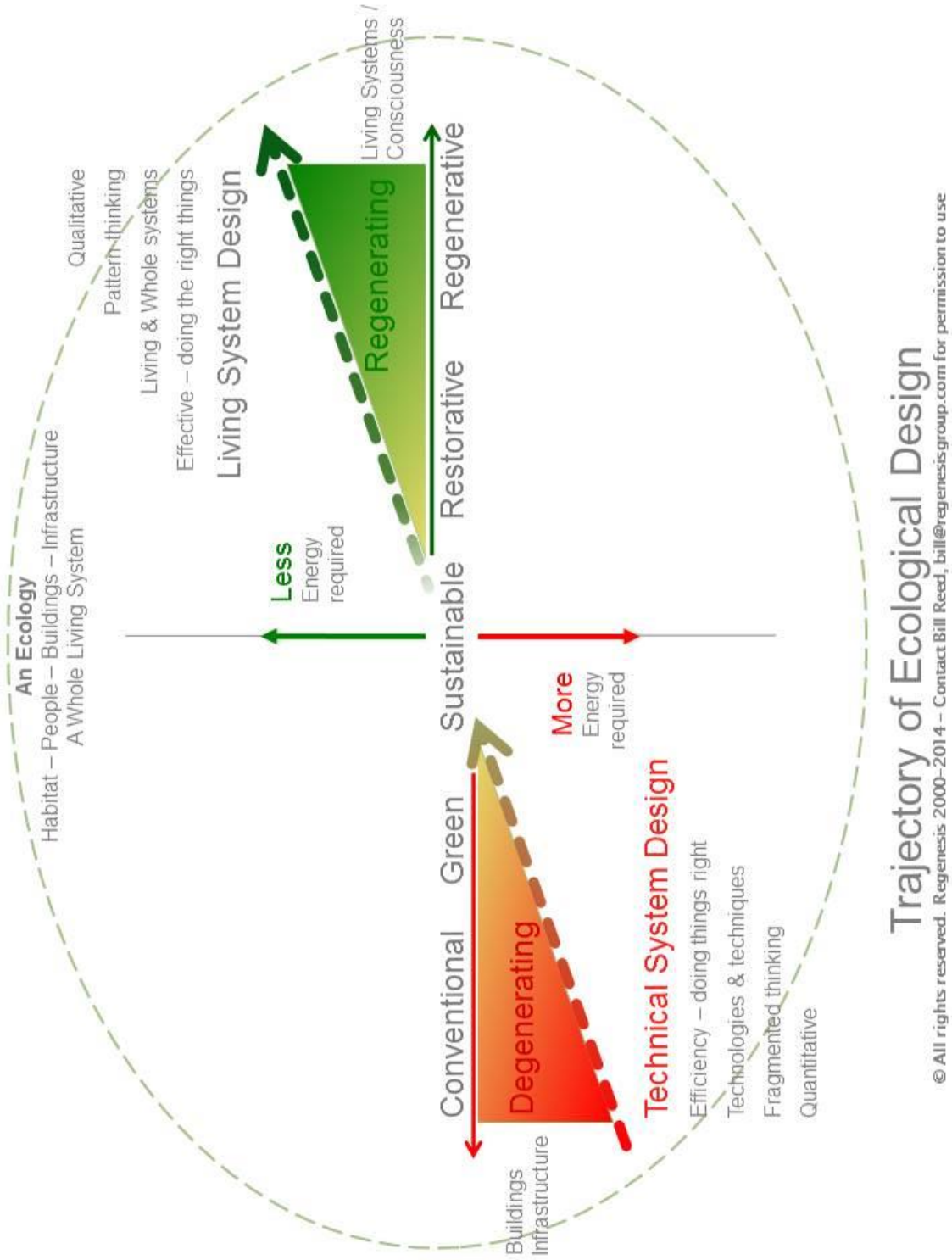

Figure 3: "Trajectory of Ecological Design" – © All rights reserved. Regenesis 2000-2014 – Contact Bill Reed, bill@regenesisgroup.com for permission to use

Plaut et al. (2012) also demonstrate the relationship – between 'degenerative', 'sustainable', and 'regenerative' approaches – with another illustration (**Figure 4**): "Degenerative and regenerative activities fall into two spheres of activity on a gradient scale, with the concept of sustainability at a neutral point" (p. 114).

Plaut et al. (2012) purposely use basic definitions for degenerative, sustainable, and regenerative "in order to engage whole communities and make the process accessible" (p. 114). Plaut et al. (2012) define the terms as follows:

- 'Degenerative': to decline in value or worth;
- 'Sustainable': to maintain; to keep from failing; and
- 'Regenerative': to give new life, strength, or vigour (p. 114).

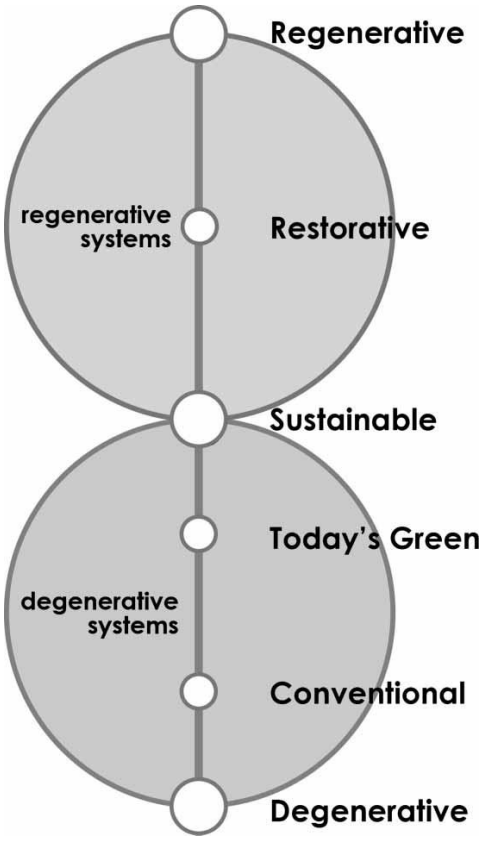

Figure 4: Degenerative and Regenerative Spheres (Plaut et al., 2012, p. 114)

Similar to Plaut et al. (2012), the terms, green, sustainable, and regenerative, are generally interpreted by Cole as "doing less harm, doing no harm, and doing some good,

respectively" (as cited in Svec et al., 2012, p. 82). A research document for the New Zealand Government titled, "Rethinking our built environments: Towards a sustainable future" provides a table that briefly compares the different sustainability approaches which further supplements the information in this section (Jenkin & Pedersen Zari, 2009) (see Appendix A).

du Plessis (2012) suggests the first two sustainability paradigms have reached a point where they have come to an "evolutionary 'dead end'" (p. 19). Cole's assessment, regarding green building, is that "the maturing of green building practice has meant that leading-edge practitioners who have operated at the highest level, are seeking to push much further than the performance aspirations embedded in current assessment tools" (2012b, p. 42). Having emerged as a third sustainability paradigm, RD+D offers leading-edge practitioners a new worldview, and a fresh basis for re-evaluating previous initiatives – such as CLC's Calgary CFB projects.

2.2 Urban Sustainability

Sustainability in a specifically urban context was not initially targeted for particular consideration in this practicum, in part because there are limited urban community, or urban neighbourhood-scale, examples of RD+D. However, as the research progressed, the importance of the urban context of the CFB Calgary properties became better appreciated, along with the realisation of the growing importance of urban contexts generally. Retrospectively, "Urban Sustainability" has come to assume a greater importance for this practicum, than was the case at the outset.

In the recent book, *Urban Sustainability: Reconnecting space and place*, it was noted that Dale had observed that the "focus on urban sustainability is timely", especially

considering that "Canada's major population growth has occurred in four major urban areas", one of which happened to be the Edmonton-Calgary corridor (Dale et al., 2012, p. 3). To underline the importance of the urban context, the document, *Integrated Community Energy Solutions: A roadmap for action*, reports that, "Since 1901, the proportion of Canadians who live in urban areas has grown from 38 percent to 80 percent, and by 2020, this figure could reach 85 percent (Council of Energy Ministers, 2009, p. 5). In addition, Batzel & Haufschild observe that, "urbanization is a key global challenge of our time as all population growth will soon take place in cities large and small" (2007, p. 44) and Tigran Haas importantly suggests, "urbanization is the defining phenomenon and process of this century" (2012, p. 9). And, to return to the Canadian context, the *Sustainable Community Planning in Canada: Status & Best Practices* report, prepared for the Federation of Canadian Municipalities (FCM) (2009), comments that:

> the vast majority of Canadians live in metropolitan regions made up of many municipalities. To be addressed properly, many environmental, social and economic issues need to be planned or otherwise addressed at the regional scale (e.g., the transportation system, watersheds, air quality management). (2009, p. 112)

The regional scale aspect suggested by the FCM report is one of the essential principles of RD+D; it is best applied – most comprehensively – at a larger scale. However, at this time there is limited experience and information directed specifically to mature urban contexts, such as that represented by the former CFB Calgary properties. Most attention so far has been directed at large, relatively undeveloped 'greenfield' sites – and not urban infill sites; such infill sites present a different set of challenges. And consideration of larger-scale contexts, such as city-regions or metropolitan areas, has been quite limited to date.

2.2.1 Defining Urban. The meaning of urban can vary from person to person, and from region to region. In many cases urban is synonymous with cities; however, that is not always the case. Urban can also be described as something that is not simply physical – but which may also be sociological or cultural. To ground this discussion, this section references the definition of 'urban' as formally identified by Alberta, the province of the CFB Calgary site, and by Manitoba, the province of residence of the researcher. However, there are reservations over a wholehearted adoption of these rather narrow physical/functional definitions of 'urban'; it is acknowledged that broader definitions, incorporating non-physical aspects, might also be entertained in future work.

Alberta Municipal Affairs has stated that "urban municipalities consist of areas where there is a concentration of people and buildings" and they refer to the Alberta Urban Municipalities Association website (AUMA) for further information about urban municipalities (Alberta Municipal Affairs, 2012, "Types of Municipalities in Alberta"). On the AUMA website a paper, titled *Multi-jurisdictional Planning,* defines "urban" in the following terms:

> Urban **—** a type of settlement, land use, and development with population, population density, built form, and both range and level of municipal services that are relatively higher or more intensive than neighbouring or comparable areas of rural development. Economic activities typically found in urban areas include land-intensive commercial and industrial uses that benefit from access and proximity to other similar or varied land-intensive activities and high residential populations. (AUMA, 2007, p. 8)

In Manitoba, the Municipal Act states that, "An urban municipality may be formed for an area with at least 1,000 residents and a population density of at least 400 residents per square kilometre" and that a "rural municipality may be formed for an area

with at least 1,000 residents and a population density of less than 400 residents per square kilometre" (Manitoba, 2013, "The Municipal Act"). In addition, the Act states that:

> a local urban district may be formed in a municipality if the locality
>
> (a) has at least 250 residents and a population density of at least 400 residents per square kilometre or such other density as the minister may in a specific case consider sufficient for the type and level of services to be provided in the local urban district;
> (b) is wholly within the boundary of a rural municipality; and
> (c) is contiguous with the rest of the locality and there is no area within the boundary of the local urban district that is not part of it. (2013, "The Municipal Act

As presented, the definitions of 'urban' in Manitoba and Alberta are largely related to the physical form, and both share a relation to higher population density; specifically a population density of 400 residents per square kilometre. Calgary's general population density of 1,329 people per square kilometer clearly defines that city as urban, using the population density references. However, aside from this physical definition of 'urban', there are other descriptions or urban that includes cultural, economic, and sociological, for example, and other distinctions – such as urban versus suburban versus ex-urban or peri-urban. The case-study set for this practicum represents a comparatively 'urban' (rather than sub-urban or ex-urban) context, and a comparatively high population density (higher than the general city average). RD+D is therefore effectively being considered in such an 'urban sustainability' context.

2.2.2 Urban Sustainability. Thomas Elmqvist, a professor in Natural Resource Management at Stockholm University, and Theme Leader at the Stockholm Resilience Center, in a blog titled, *Urban Sustainability and Resilience – Why We Need to Focus on Scales* (2013), observed that:

> The classical definition of sustainable development (Brundtland Report on Sustainable Development) focuses on how to manage resources in a way that guarantees welfare and promotes equity of current and future generations, in general addressing the global scale. However, in the urban context, research and application of sustainability have so far been constrained to either single or narrowly defined issues (e.g., population, climate, energy, water) or rarely moved beyond city boundaries. (Elmqvist, 2013)

Elmqvist's observation on the narrowly defined issues, in relation to urban sustainability, is reinforced by Michael Hough's definition of sustainability, in a section of his book titled *Urban growth and identity* (2004, p. 221). Hough commented:

> Sustainability is defined, in part, as the conservation of energy and minimizing car emissions, encouraging accessibility without mobility (being able to walk or cycle to local places); in part by public transit that contributes to sustainable patterns of urban development, and access to the countryside. In practice this means that urban growth needs to be denser and more compact, focusing on small neighbourhoods, and combining homes with jobs and services. (p. 221)

These narrowly defined issues in relation to 'sustainability' have contributed to the confusion around what sustainability means, which has contributed to a limited amount of progressive change. For example, Elmqvist has also cautioned that:

> …a narrow focus on a single city is often counterproductive and may even be destructive since building resilience in one city often may erode it somewhere else with multiple negative effects across the globe. (Elmqvist, 2013)

A Canadian paper, authored by David V.J. Bell and Michelle Grinstein, titled, *Sustainable Urban Communities in Canada: From Rio to Johannesburg* – with a focus on urban communities – highlights the particular complexities associated with urban areas (2001). The authors note that:

> Canadian cities face complex, inter-related sustainability challenges, including poverty, homelessness, waste, water and air quality, GHG emissions, transportation, energy, and crime. (Bell & Grinstein, 2001, p. 8)

Peter Newman and Isabella Jennings have also observed that:

> there is a critical need to envision human settlements in more positive ways, first to reduce per capita impacts but then to move to a new and more exciting possibility where cities begin to be a positive force for the ecological regeneration of their regions. (2008, p. 3)

The preceding statements highlight that urban sustainability is a complex issue, and that – to date – such issues have not been adequately addressed by conventional sustainability approaches. This practicum argues in part that the holistic approach of RD+D attempts to better understand, and respond to, the complex interrelationship of the issues present in urban areas. Along these lines, Chrisna du Plessis alludes to an objective of urban sustainability in her paper, *Urban sustainability science as a new paradigm for planning*, presented at the Smart and Sustainable Built Environment (SASBE 09) Conference):

> the objective of urban sustainability is to uphold relationships and dynamics (within and across levels and scales) that maintain the ability of the city to provide not just life-supporting but also life-enhancing conditions for the local and global community of life by maintaining the critical structures, functional integrity, overall health and well-being, and capacity for regeneration and evolution of the city, its sub-systems and the global SES [social-ecological systems] of which it is a part. (2009, p. 5)

Further to the objective of urban sustainability offered by du Plessis, Dale & Dushenko offer "the seven tenets perceived as critical for urban sustainability" in the “Reflections” chapter of the book, *Urban Sustainability: Reconnecting space and place* (Dale et al., 2012, p. 273):

> The seven tenets perceived as critical for urban sustainability are to
>
> 1. reconcile place and space by designing ‘with’ rather than ‘over’ nature with an emphasis on regeneration;
> 2. design and redesign human space equally for social capital needs as well as the built environment;
> 3. develop robust and continuing community engagement processes and systems of governance actively engaged in regenerating the public sphere;
> 4. integrate scale, limits, and diversity considerations and recognize that

> individual communities are nested as part of larger complex and interconnected systems into decision-making, both in terms of strategic interventions and government leadership and as a means to address gaps in implementation;
> 5. develop strong municipal (local) leadership that takes stock and equally values the various forms of capital extant in their communities – natural and social as well as commercial and economic – and how they vary in dynamic balance over time;
> 6. pursue spatial justice (for example, sustainability for all) across multiple levels and scales; and
> 7. understand the need for fundamental institutional transformation and new governance models, to address asymmetries of access to resources, as well as for changes in our knowledge systems and policies. (Dale et al., 2012, p. 273)

While these 'seven tenets' offered by Dale & Dushenko could also be argued to be relevant for non-urban areas, they do contribute to better linking urban sustainability and RD+D.

2.2.3 RD+D in an Urban Context. Cole (2012a) and Pedersen Zari (2012) both identify a lack of information, and distinct challenges, around relating RD+D to an urban context. In reference to the special issue of *Building Research & Information*, Cole points out that the case studies found in the article by Hoxie et al., and the projects included in Mang & Reed's article, are:

> almost exclusively non-urban, set within relatively coherent community contexts and with greater access to natural amenity. It remains unclear at this time how the notion of 'place' and the regenerative approach might accommodate densely urban settings with more complex and diversified communities and obliterated natural amenity. (2012a, p. 4)

Peter Clegg – architect, author, and educator – also supports Cole's point:

> "the exemplars quoted tend to refer to the planning of more idealistic new communities rather than dealing with the complexity of existing urban contexts where most projects reside" (Clegg, 2012, p. 366)

Pedersen Zari adds that:

> Although ecosystems are perhaps the best-known examples of effective organization of life in given locations (Benyus, 1997), the availability of a model

> to compare to or mimic may be lacking in some areas. For example in older urban environments, there may be little known about what ecosystems were like on a site before development, or there may be no similar ecosystems left to study. (2012, p. 61)

One of Pedersen Zari's conclusions is that:

> There is the need to determine to what extent a rural hinterland must be considered in tandem with an urban counterpart if regenerative goals are to be achieved across multiple ecosystem services. This implies a need to understand ecosystem services at a larger scale (city, region or ecosystem boundary) when devising goals and targets for individual buildings or small developments. Careful thought needs to be put into whether it is more appropriate to use human-defined urban boundaries or those related to ecosystems themselves, such as, for example, habitat-type demarcations, or water catchment zones when using ecosystem services analysis. (2012, p. 62)

The authors in this section highlight one of the main challenges of RD+D, namely, the challenge of how RD+D approaches the complexities found in urban areas. RD+D in such urban contexts is challenging, and certainly merits more targeted future research; this practicum has only managed a tentative beginning of such research; this researcher is still working through all the implications of RD+D in an urban context. In terms of initial hunches, based on this research to date, it is considered that RD+D – in more intensively developed urban contexts – would need to focus much more – not only on living systems – but also on the complexities associated with the wider political, cultural, social and economic systems, i.e. on the totality of the natural and living/human systems.

2.2.4 Urban Regeneration. Urban Regeneration is a term that is frequently used in the United Kingdom in reference to areas of decline. It is important to avoid confusion between the terms 'urban regeneration' and 'RD+D'. In Cole's introduction to RD+D in the special issue of *Building Research & Information*, he clarifies that:

> [the] notion of regeneration – 'rebirth' or 'renewal' – has been variously applied in relation to the built environment and the communities it supports following major acts of devastation or when a prior condition had declined to an extent

> considered ripe for renewal – and, of course, where the commitment has been found to initiate rebuilding. The resulting transformed condition, while embodying traces from its prior condition, is infused with new aspirations and possibilities. Over the past years, however, regeneration has been garnering increasing interest as a means of reframing green building practices and, carrying with it, qualitatively different and broader connotations than that used previously. (2012a, p. 1)

Although 'urban regeneration' could utilize a 'regenerative design and development' approach, it is important to note that 'urban regeneration' is not necessarily associated with 'regenerative design and development'. du Plessis further clarifies the difference between 'urban regeneration' and 'regenerative design and development' stating that:

> The objective of development in this version of sustainability [RD+D] is to create a future where people can live in mutually supportive symbiosis with their social and biophysical environment (their whole ecological system) – supporting their mutual evolution.
>
> This last point is what differentiates regenerative design and development from the models of urban regeneration that aim to bring new life to derelict city areas through restoration and upgrading of infrastructure and an eventual gentrification of the area. (du Plessis, 2012, pp. 17-18)

2.3 Regenerative Design and Development

This practicum has been pursued in part as an outcome of some curiosity around an observation by Svec et al (2012):

> Regenerative design, regenerative development, regenerative thinking and regenerative approach(es) are concepts that are increasingly heard in the professions related to community planning and the built environment. (Svec et al., 2012, p. 82)

John Tillman Lyle is generally acknowledged as having first introduced the term 'regenerative design' in 1994, in his book "Regenerative Design for Sustainable Development" (du Plessis, 2012; Ono & Reed, 2007). Lyle observed that, "a regenerative system provides for continuous replacement, through its own functional

processes, of the energy and materials used in its operation" and that "regeneration has to do with the rebirth of life itself, thus with hope for the future" (Lyle, 1994, pp. 10-11). Since Lyle's introduction of the notion, regenerative design has evolved by expanding from "whole-systems models of engaging with place" to also include "the cultural systems" (du Plessis, 2012, p. 18). Cole suggests that:

> while many of its [regenerative design's] core tenets – systems thinking, community engagement, respect for place – also have long individual histories in architectural discourse and practice, regenerative design begins to put them together in a cogent manner. (2012a, p. 1)

As evidenced in the recent special issue of *Building Research & Information*, the term *regenerative design*, as used in early literature, has evolved to include *development*, yielding the current combination – regenerative *design and development*. Cole (2012a) cites Mang & Reed for their differentiation – *regenerative design* being concerned with building the "regenerative, self-renewing capacities of designed and natural systems (the designed interventions)" (p. 4), and *regenerative development* represented as creating the "conditions necessary for its sustained, positive evolution" (p. 4) – by including and engaging people, as well as cultural, economic, and political systems (Cole, 2012a, 2012b; du Plessis 2012; Mang & Reed, 2012; Pedersen Zari & Jenkin, 2010).

RD+D seeks to support the "co-evolution" of human and natural systems in order to ultimately restore and enhance life so that "no further human management is necessary" (Cole, 2012b; du Plessis, 2012; Girardet, 2010; Mang & Reed, 2012; Pedersen Zari, 2012, p. 55). du Plessis (2012, p. 15) cites Birkeland (2008) and Kibert (2008) as saying:

> The idea is not to impersonate nature, or to replace living systems with high-technology artificial replicas of natural systems or products as Birkeland (2008, pp. 17-18) presages, but to design with and for nature to create regions, cities and

> buildings that function as ecosystems, using 'Nature's designs and processes' as the basis for human designs and processes. (Kibert, 2008, p. 367)

Haggard (2002) provides an example of how the RD+D paradigm views a site:

> Rather than seeing a site, or a development project, as a collection of things (slopes, drainages, roads, buildings, etc.), a regenerative designer cultivates the ability to see them as energy systems – webs of interconnected dynamic processes that are continually structuring and restructuring a site. (p. 25)

Cole (2012a) observes: "While the aspirations and key principles of regenerative design can be readily understood, its operation and practice are less clear" (p. 4). This is mainly because RD+D is still an emerging concept with "few proponents and very few built projects" (Cole, 2012a, p. 4).

2.3.1 Main Principles of RD+D. Mang & Reed (2012) identify the core tenets of the RD+D paradigm to include a significantly different *worldview*, a concern with *place* and how it is demarcated and understood, and an emphasis on continual *community engagement* – each elaborated as follows:

> ***2.3.1.1 Worldviews.*** *Worldviews* are coherent systems of beliefs that shape how individuals interpret and interact with the world by shaping how they think and, consequently, what they think about. (Mang & Reed, 2012, p. 25)

RD+D requires "a very different worldview and approaches the world from a very different paradigm than what has shaped buildings for centuries" (Mang & Reed, 2012, p. 26). This worldview shifts from mechanistic thinking to systems thinking in which "humans are seen as an integral part of nature and partners in the processes of co-creation and co-evolution" (du Plessis, 2012, p. 15), which leads to the question of "what does nature want to be in this place?" (du Plessis, 2012, p. 18) (Cole, 2012b; Mang & Reed, 2012).

2.3.1.2 Place. *Place* is defined by Mang & Reed as the "unique, multilayered network of living systems within a geographic region that results from the complex interactions, through time, of the natural ecology…and culture…" (2012, p. 28). The regenerative process "begins by reconnecting to the essence of place to provide the starting point for the design or planning process" (du Plessis, 2012, p. 18). The regenerative process works from the macro-scale (the watershed or bioregion) to the local, and serves as the basis for illuminating what has shared meaning for all human and natural stakeholders, bigger than any one issue or cause, and thereby (a basis) for discovering how a project can become truly meaningful (du Plessis, 2012, p. 18; Mang & Reed, 2012, p. 28).

Mang & Reed identify the 'Story of Place®' as a "method for deepening connection to and growing harmony with place" because stories help people learn, understand, organize, and connect (2012, p. 29).

2.3.1.3 Community Engagement. *Community* plays an important role in developing the Story of Place®. Hoxie et al. (2012) found that "forms of engagement with a community constitute a vital and necessary component for regenerative projects" (p. 76). The success of a project in achieving a "co-evolutionary, partnered relationship between humans and natural systems" is ensured through "sustained stakeholder engagement" (Mang & Reed, 2012, p. 34) by "putting in place, during the design and development process, what is required to ensure … the ongoing regenerative capacity of the project…" (Cole, 2012b, p. 40).

2.3.2 RD+D Tools. Pedersen Zari (2012) discovered that, "it is difficult to find successful built examples or guidance about how to begin and then work through the

process of regenerative design" (p. 54-55). Early sustainability paradigms benefited from assessment tools, such as checklists, and Kohler (2002) found assessment tools to be a "very important first step in providing basic guidance" (p. 133). Cole (2012a) notes that assessment tools were "…an enormously valuable vehicle for mainstreaming green building practice…" (p. 1). However, Svec et al. (2012) found in general there is currently "little published about regenerative design and development tools" (p. 84).

Even though assessment tools have been effective in promoting early sustainability paradigms, existing assessment tools have faced some criticism by proponents of RD+D. Cole (2012b) states:

> the structure and emphasis of current green building assessment tools offer little instruction regarding understanding and engaging local ecosystems and their processes or, more generally, of the systems thinking emphasized in regenerative design. (p. 40)

Svec et al. (2012) consider that:

> while LEED [an early assessment tool] has evolved in terms of content, rigour and scope, and will continue to evolve, it is unlikely that all of the qualities of regenerative design and development can be addressed most effectively within the rating system model. (p. 83)

Building on the LEED system, the Living Building Challenge was created by the US Green Building Council (USGBC) as an attempt to take the building and development community to the next level, but is still considered by Berkebile in simple terms as "doing no harm" which is still not associated with RD+D (Berkebile, 2012).

Despite criticism of existing assessment tools, two tools are currently under development to facilitate the practice of RD+D: LENSES (Living Environments in Natural, Social, and Economic Systems) and REGEN (Plaut et al., 2012; Svec et al., 2012). The tools are most likely being developed because planners and developers, such

as CLC, are familiar with the use of assessment tools – and assessment tools have historically helped advance the practice of sustainability (Cole, 2012b, Kohler, 2002; Plaut et al., 2012).

"Still in its infancy" (Plaut et al., 2012, p. 121), LENSES continues to be developed by the Institute for the Built Environment (IBE) at Colorado State University (IBE, 2010a). Plaut et al. (2012) represent LENSES as a "framework and tool" (p. 121) "designed to … lead users to appropriate, contextual, and regenerative decisions and actions" (p. 115) that "guide(s) the thinking and collaborative processes for the built environment in order to create life-enhancing outcomes" (p.121).

The IBE's vision for LENSES is to:

- guide dialogue and redefine success for the built environment
- help define the spectrum of degenerative, sustainable and regenerative practices
- be replicable across cultures and eco-regions (IBE, 2010a)

The key concepts of LENSES are:

- shifting mindsets is paramount
- process is as important as product
- qualitative and quantitative metrics are valuable
- solutions must come from a deep understanding of place
- the built environment becomes "living" by engaging the elements that flow through it (IBE, 2010a)

LENSES works by using a" layered visual model" comprised of three 'lenses' (Foundation, Flows, and Aspects of Place) "to illustrate interconnections and assists users in seeing and understanding whole systems" (IBE, 2010a; Plaut et al., 2012, p. 113). LENSES is different than existing sustainability tools in that "LENSES does not

provide for comparative assessment between buildings or projects" (Plaut et al., 2012, p. 121).

The Core Public Health Functions Research Initiative (CPHFRI) has generated a recent literature review which observes that LENSES is "quite new, and is not well tested" (2012, p. 6). As of 2013, IBE reports that the LENSES Framework has been developed and conceptually tested and that their next steps will be to develop a LENSES Facilitator's Guide and to test the Framework in pilot projects (IBE, 2010b). Based on the success of earlier frameworks and tools, it is anticipated that LENSES will help advance the practice of sustainable-as-regenerative approaches.

Sponsored by the USGBC, the main purpose of the REGEN tool is to facilitate and inspire a shift to the practice of RD+D, rather than provide a ratings system (Svec et al., 2012). The REGEN concept provides a framework to encourage systems thinking, collaboration, and interconnectedness (Svec et al., 2012). REGEN recognizes that each place is unique, provides place-based resources, and encourages positive thinking by providing examples of projects that have incorporated RD+D (Svec et al., 2012). The REGEN concept does not "propose a strict, universal definition of regenerative design or development" or "propose a specific process for carrying out regenerative projects" (Svec et al., 2012, p. 85).

During research for REGEN it was determined that regenerative practices contained the following elements:

- A different perspective or mindset that is systems-based, place-based and positive-outcome oriented.

- The use of different processes that are based on a collaborative dialogue of discovery, a revelation of the cultural, economic, constructed and ecological stories of a place – in a way that has not been told before.
- The gathering and use of different sets of information are broader in scope and content than data usually gathered for project planning and design. (Svec et al., 2012, p. 84).

Due to the conceptual and developing nature of the two 'tools', there was not enough literature to evaluate the tools or apply them in this research, but it is considered important to highlight their existence and the importance of assessment tools in the advance of earlier sustainability paradigms. In addition, Mang & Reed (2012) indicate:

> a number of challenges still face widespread adoption of RD+D, including: fragmented institutional structures of governance and ownership; the challenge of qualitative and long-term measurability; and economic pressures for scalability and replicability of local solutions. (p. 36)

2.4 Canada Lands Company

Re-activated in 1995, Canada Lands Company Limited (CLCL) is a self-financing, arm's-length Crown Corporation with its own board of directors reporting to the Parliament of Canada through the Minister of Public Works and Government Services Canada (CLCL, 2011; Kaganova & McKellar, 2006). 'Canada Lands Company CLC Limited' (CLC) is a non-agent Crown corporation that is a wholly-owned active subsidiary of CLCL (CLCL, 2012). CLC carries out the Company's core real estate business in all regions of Canada (CLCL, 2012). Kaganova & McKellar[7] (2006) describe the property management experience of several leading and emerging governments. They note that CLC:

[7] Kaganova & McKellar offer one of the few available third party accounts of CLC.

> operates essentially as a private sector, full-service real estate company, subject to municipal development processes and federal and provincial taxes at corporate rates. (p. 69)

CLC acquires land through various federal government departments, agencies, and Crown corporations, through what Kaganova & McKellar (2006, p. 67) refer to as "strategic disposal opportunities" (CLCL, 2011). Kaganova & McKellar (2006) further describe these as "surplus properties or property portfolios with potential for significantly enhancing value" (p. 67). They also indicate that, in general, the properties CLC acquire "have no official plan or municipal zoning status and have insufficient infrastructure available to support new development" (Kaganova & McKellar, 2006, p.70). Therefore, after CLC purchases the properties at fair market value, CLC adds value to the property through redevelopment activities such as rezoning, planning, and site servicing (CLCL, 2011; Kaganova & McKellar, 2006). CLC then makes a decision to either hold and manage the properties or sell them to the private sector (CLCL, 2011; Kaganova & McKellar, 2006). Any profits not needed for its operations are paid as annual dividends to the federal government (CLCL, 2011; Kaganova & McKellar, 2006).

Since 1995, 63 properties have been "converted back to productive use through sale to CLC" and approximately $494 million dollars in cumulative distributions – as dividends, up-front payments, and note repayments for properties – have been returned by CLC to the Government of Canada (CLCL, 2013, pp. 14 & 15). In addition to the money paid to the Government of Canada, CLC reports that they have stimulated over $7 billion in development expenditures from past and current projects (CLCL, 2011).

2.4.1 Corporate Social Responsibility. CLC has, since 2000, committed to the principle of Corporate Social Responsibility (CSR), as stated in their 2000-2005

Corporate Plan (CLCL, 2000). Gordon McIvor (2009), a former Vice President of CLC, defined CSR, as that defined by the World Business Council for Sustainable Development:

> Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large. (McIvor, 2009, Keynote Speech)

To measure how well CLC is implementing CSR initiatives, CLC uses, what they term, a *balanced scorecard* (CLCL, 2011).

2.4.2 Balanced Scorecard. Aapo Länsiluoto and Marko Järvenpää found that, "there are several different PMS [performance measurement systems] available but the most popular is the balanced scorecard (BSC), developed by Kaplan and Norton" (2010, p. 386). The balanced scorecard developed by David Norton and Robert Kaplan was introduced in 1992 as a way to measure performance in order to initiate improvements (Kaplan, 2010). Bain & Company, who conducts annual to bi-annual research on the 25 most "popular and pertinent management tools", says that a balanced scorecard:

> defines an organization's performance and measures whether management is achieving desired results. The Balanced Scorecard translates Mission and Vision Statements into a comprehensive set of objectives and performance measures that can be quantified and appraised. (2013, p. 12)

In 1997, CLC adopted the balanced scorecard approach to doing business to promote innovation by balancing both financial and community goals (CLCL, 2011). Although it is not known if Canada Lands Company developed their balanced scorecard approach using the approach developed by Kaplan and Norton, it appears as though there are similarities. CLC identifies their balanced scorecard as a tool used to document,

measure, and report on performance (CLCL, 2010, 2011, 2012). In an address to the National Executive Forum on Public Property, Gordon McIvor said:

> Our balanced scorecard provides the company with a sound vehicle for reporting to our shareholder and other interested parties on our goals and achievements. The scorecard also works as an internal self-assessment tool that makes it easier to manage and evaluate our performance. It does just what it says. It helps us to maintain balance and perspective. (2004, p. 3)

In 2009-2010, CLC conducted a stakeholder consultation process to update the balanced scorecard (CLCL, 2010). In a 2010 presentation to the National Executive Forum on Public Property, Gordon McIvor said the reason that the balanced scorecard was updated was because "CLC wanted to create a useful management tool that would steer its activities in directions deemed important by its stakeholders" and that CLC "also wanted to leverage its existing and future accomplishments in important areas by getting more credit for them in the public eye" (2010, p. 4). Furthermore, in their most recent annual report CLC said:

> In order to continually generate innovative solutions, CLC refined and enhanced the balanced scorecard in 2009–2010 in line with best practices. The scorecard today reflects the most relevant, meaningful and measurable economic, social and environmental performance targets, which are material to CLC's external and internal stakeholders. (CLCL, 2013, p. 9)

The revised balanced scorecard includes six key objective areas and was reported on for the first time in the 2010-11 annual report (CLCL, 2010, 2011, 2012). The six key objectives are:

- Engaging communities;
- Developing sustainably;
- Valuing people;
- Managing the environment;
- Contributing to society; and
- Strengthening business operations.

To achieve the six objectives, each objective includes targets, metrics, and results – achieved over the previous year – reported in the annual report (CLCL, 2012). The balanced scorecard is expected to continue to evolve as CLC revisits and refines it (CLCL, 2012). Although all of the key objectives are relevant to sustainability, of particular significance to this practicum research is the "developing sustainably" key objective, to "create environmentally sustainable neighbourhoods and buildings in line with urban planning best practices" (**Table 1**) (CLCL, 2012, 2011).

Table 1: Balanced Scorecard – 'Developing Sustainably' Objective[8] (CLCL, 2012, p. 10)

Developing Sustainably	
Objective: Create environmentally sustainable neighbourhoods and buildings in line with urban planning best practices.	
Target	**Metric(s)**
All new development projects and owned and operated buildings achieve third-party assessed equivalences to green certification (e.g. LEED Building, LEED-ND, BOMA)	Number of projects achieving this… Percentage of projects achieving this…
Design access to both planned and existing public transit for 75% of residential units in all new residential or mixed-use development projects	Number of residential units within a five-minute walk from a planned or existing public transit stop (measured at time of municipal planning approval) Percentage of residential units achieving this…
Optimize land use efficiency (density) in all new development projects	Percentage of projects receiving municipal planning approvals with a density of residential units higher than the average within 250 metres of the project
Optimize livability of all new development projects receiving municipal planning approvals, by designing for public open space and a mix of housing forms and pricing levels	Percentage of projects with a mix of at least three different housing forms Percentage of projects with more public open space than municipal requirement and improved to a level above municipal requirements Percentage of projects targeting various pricing levels (through housing form, quality and/or unit size)

[8] This table does not include the year end results because they change from year to year.

A cursory initial evaluation of CLC's 'developing sustainably' objective indicates that CLC's projects may be rated as 'degenerative' according to the earlier positioning of sustainability approaches; the objective could therefore be refined to aim for much more progress in terms of sustainability, in RD+D terms. The first target of the 'developing sustainably' objective discusses achieving 'green' certification and cites LEED as an example of green certification. However, as Berkebile[9] (2012) observed: "in simplified terms, many say that LEED is focused on 'doing less harm...'" (USA Today), which Cole – cited earlier – associates with the term 'green' (as cited in Svec et al., 2012, p. 82). In addition, Bill Reed (2011) declared that "LEED is not sustainable" (in a webinar presentation – "the future of sustainability" – for the Construction Specification Institute's sustainability practice group). Being associated with the terms 'green' and 'not sustainable' would position CLC's early sustainability efforts as being degenerative rather than regenerative.

2.4.3 Moving Forward. In CLC's 2012 annual report – "Moving Forward" – Mark Laroche, the President and CEO, states: "CLC's corporate mission requires us to perpetually innovate, constantly finding new solutions – only to immediately consider how we can then improve on them" (CLCL, 2012, p. 3). He also remarked "We want to lead, not follow". Their leadership inclination may be exemplified by their development at Currie Barracks; CLC "was among the first developers in Canada to pursue and achieve certification in LEED-ND" (CLCL, 2012, p. 3).

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9 Bob Berkebile, FAIA, is a founding principal at BNIM architecture. He was the 2011 AIA National Architecture Firm Award winner (BNIM, 2012). Berkebile has a long list of awards and accomplishments including "being instrumental in the formation of the US Green Building Council and its LEED rating system" and "is the founding chairman of the American Institute of Architects' National Committee on the Environment" (U.S. Green Building Council, 2012, "Greenbuild Speaker Bio – Bob Berkebile").

To date, the company literature does not reveal if CLC is familiar with RD+D or if the company might pursue RD+D but – given CLC's commitment to innovation – RD+D could provide an opportunity for CLC to continue to provide leadership.

2.4.4 The CLC Calgary CFB Projects Experience. In the five-year period between 2001 and 2006, Calgary's population grew by over 12%, and between 2006 and 2011 the population grew by nearly 11%, making Calgary one of the fastest growing cities in Canada and, at 1.1 million, the third largest of all Canadian cities in population (Statistics Canada, 2012, 2007a, 2007b) (see **Table 2**). By 2020, the projected Calgary population will exceed 1.5 million people (Stirrett & Shewchuk, 2012). In addition to population growth, over 100,000 private dwellings have been built – and the land area has expanded by over 120 square kilometers – between the years 2001 and 2011 (Statistics Canada, 2012, 2007b).

Table 2: City of Calgary Population (1991-2011)

Year	Population	Population Change (%)
1991	710, 795	-
1996	768, 082	8
2001	879, 003	14
2006	988, 812	12
2011	1, 096, 833	11

Within the City of Calgary, growth is managed by the Land Use Planning & Policy unit (LUPP) (City of Calgary, 2012). The LUPP unit implements policies that "reflect a desire for greater sustainability, smarter growth, and transit oriented development" (Perrott, 2008, p. 1). These objectives were introduced in the mid-1990s by the Sustainable Suburbs Study (Perrott, 2008), which was operative when the first of the CLC Calgary CFB projects was in design and development. The Sustainable Suburbs Study (1995) is just one of several documents that were under consideration during the

planning process for the CFB East Community Plan (Garrison Woods) and CFB West Master Plan (Currie Barracks) (City of Calgary, 2000, 1998). An overview of the Sustainable Suburbs Study reveals that the focus of the study was to explore a cost effective approach to providing infrastructure, such as roads and pipes, to new development (City of Calgary, 1995). **Table 3** summarizes some of the characteristics of a more sustainable community, as described in the Sustainable Suburbs Study.

In 1998 the Canadian Forces Base (CFB) Calgary, located in the southwest core area of the City of Calgary, closed its military operations – providing an opportunity for redevelopment which would reflect the City's aspirations (CMHC, 2004; Stirrett & Shewchuk, 2012). CLC planned three new communities – Garrison Woods, Garrison Green, and Currie Barracks, following new urbanism and smart growth principles, focusing on "walkable streets, mixed-use development, higher density patterns of growth and transit-oriented development" (Stirrett & Shewchuk, 2012, p. 4). It should be noted that Garrison Green is not included in this research mainly because it is smaller in area, is mostly residential, and was developed with a similar approach as Garrison Woods.

Table 3: (City of Calgary) Sustainable Suburbs Study - Characteristics of a more sustainable community (1995)

Fiscal	• Lower costs through:
	  • More compact urban form
	  • Better utilization of services
	  • Less infrastructure

Social	• Strong sense of belonging to a community: vibrant community life • Wide housing choice catering to many household types and lifestyles • Attractive public areas encourage walking and socializing • Most routine shopping needs met within community • Some mix of uses including employment • Need for car much reduced
Environmental	• More efficient use of land • Much reduced vehicle and conservation encouraged • Significant environmentally sensitive areas largely protected and integrated into the regional open space system

Garrison Woods was the first of the three CLC communities to be developed, and is considered one of the earliest 'new urbanism' communities in Calgary (Seymoar & Anderson, 2009); Garrison Green was completed in 2006 and is considered by CLC as the sister property to Garrison Woods (CLC, 2013). Currie Barracks is the latest development project to be initiated at CFB Calgary, and is "improving on the new urbanism and smart growth principles of the previous phases" (Seymoar & Anderson, 2009, p. 4). Currie Barracks has already been recognized as one of Canada's most sustainable communities under current sustainability assessment tools (Seymoar & Anderson, 2009, p. 4).

2.4.4.1 Garrison Woods. In 1998, the CFB East Community Plan (Garrison Woods) was approved and the property was considered completed in 2004 (City of Calgary, 1998; CMHC, 2004) (see **Figure 5**). Garrison Woods is located on 176 acres of land that was formerly the eastern part of Canadian Forces Base (CFB) Calgary (CMHC, 2004). Garrison Woods is made up of a mix of 1,600 residential units, 70,000 square feet of retail, two private schools, and an existing museum and twin hockey arena (CMHC, 2004; Ontario Growth Secretariat, 2009).

Although not originally conceived as a new urbanism development, Garrison Woods was developed using principles of smart growth and new urbanism, following CLC's mandate of environmentally sustainable development and respect for the City of Calgary's planning policies, such as sustainable development (CMHC, 2004; Green Spaces, 2009). The goals of the CFB East plan were to:

- Implement relevant strategic City policies including the Calgary Transportation Plan and the Sustainable Suburbs Study.
- Support sensitive residential intensification.

- Create a well-designed, liveable, integrated community.
- Incorporate principles of sustainable development.
- Ensure timely redevelopment.
- Integrate the CFB East Plan area with the larger Altadore community and enhance and complement existing development.
- Recognize, where possible, the military legacy. (City of Calgary, 1998, pp. 19-21)

According to CLC and the City of Calgary, one of the reasons for the success of the project was the extensive public consultation component (CMHC, 2004):

> The extensive public process was the largest the City of Calgary has seen, covering a 17-month period of consultation jointly conducted by the City of Calgary and CLC. (CMHC, 2004, p G-4)

Although the Garrison Woods project was considered to be a success from the point of view of the developers, the new community residents, and the City, there were some challenges along the way (CMHC, 2004). One of the biggest challenges at Garrison Woods was bringing the engineers, who were used to designing traditional suburbs, 'on board' with new design concepts (CMHC, 2004). Another challenge, according to CMHC (2004), was that, "The City is supportive on a strategic level, but not yet on the approval level" (p. G-5).

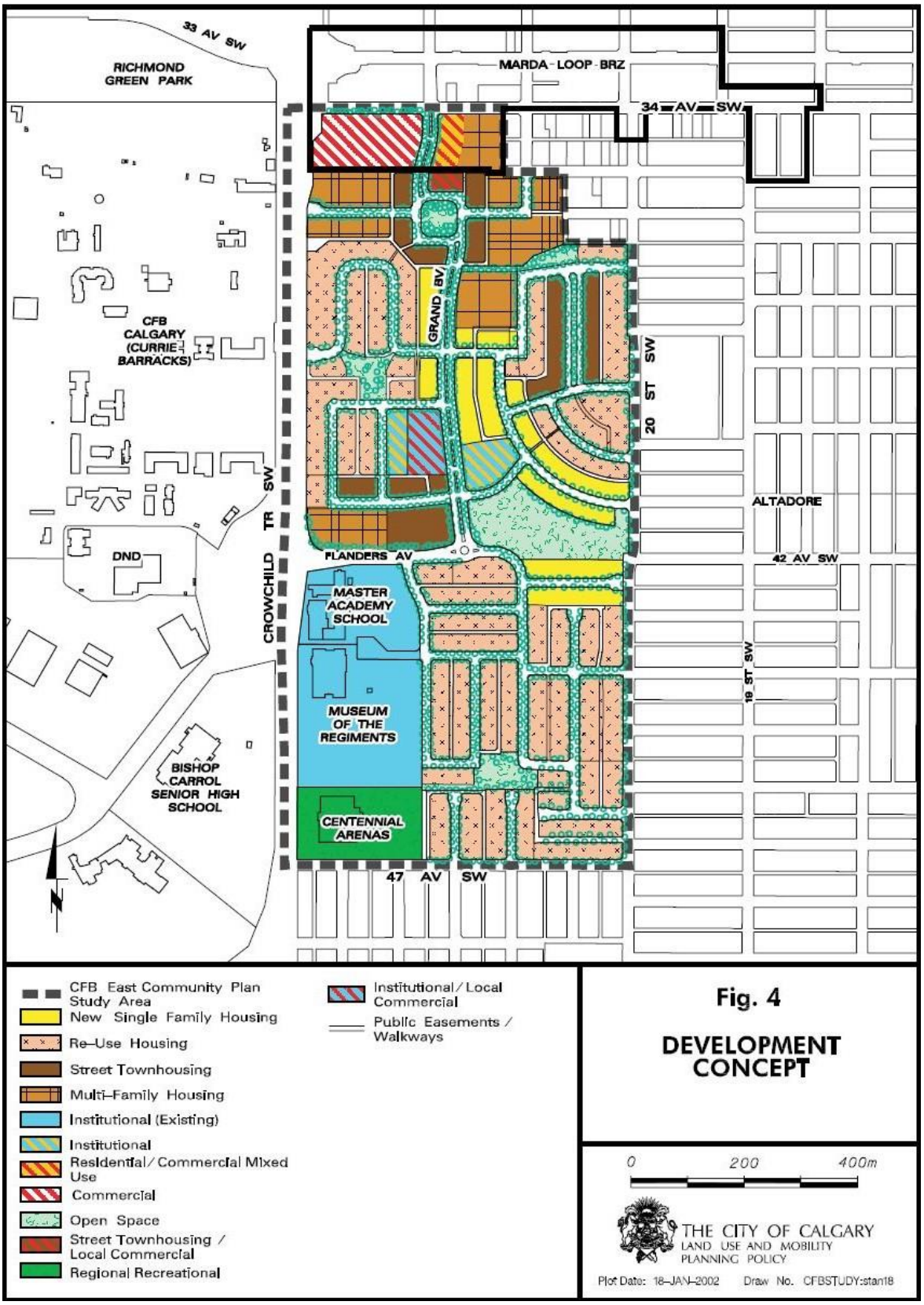

Figure 5: CFB East Development Concept (City of Calgary, 1998, p. 25)

2.4.4.2 Currie Barracks. Currie Barracks is a 196 acre former military base located five kilometers southwest of Calgary's downtown core. The CFB West Master Plan was approved at the end of the year 2000 (City of Calgary, 2000) (see **Figure 6**). The goals of the CFB West Master Plan are to:

- Make efficient use of existing infrastructure and services.
- Reduce reliance on the automobile.
- Support sensitive intensification.
- Bring jobs and homes together.
- Create a unique, diverse, and integrated urban community.
- Promote environmental sustainability.
- Enhance and complement surrounding communities.
- Commemorate the history of the military in Calgary.
- Encourage innovation and creativity.
- Address landowners' interests. (City of Calgary, 2000, p. 33)

Development of Currie Barracks began in 2008, with the first homes being sold in 2010. The design of the new neighborhood takes advantage of existing community infrastructure, ensuring that all new homes are within walking distance of existing schools, stores, restaurants, public transportation and other amenities (Enermodal Engineering, n.d.). A diverse mix of housing types is being incorporated into the project to achieve a targeted housing density of 16 units per acre – almost three times that of the average density of Calgary. Currie Barracks will be built out over an approximately ten-year period (CLCL, 2008). Upon completion, Currie Barracks is expected to accommodate approximately 3,200 housing units, 225,000 square feet of retail space, 300,000 square feet of office space, and close to 23 acres of parks and open space.

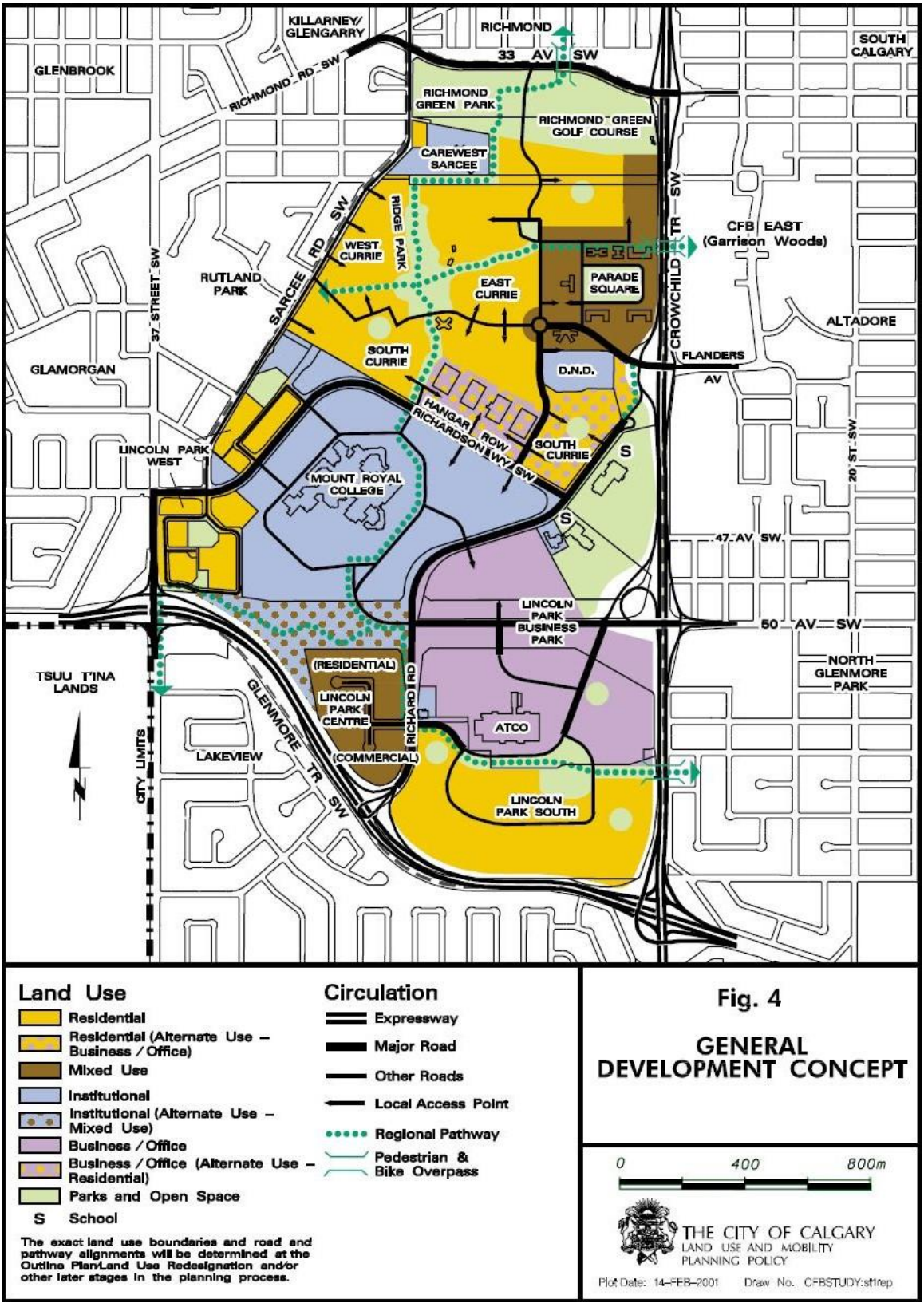

Figure 6: CFB West General Development Concept (City of Calgary, 2000, p. 40)

The planning and design of Currie Barracks builds on the experience of the previous properties, and as a result, was the "first real estate development project in Canada to receive LEED Gold (Stage 2) environmental certification for Neighbourhood Development" (Stirrett & Shewchuk, 2012, p. 5).

Table 4: Comparison of Currie Barracks and Garrison Woods

Calgary, AB case study summary		
	Currie Barracks	**Garrison Woods**
Developer	CLC	CLC
Size	196 acres	176 acres
Distance from Downtown	5 km	5 km
Former Land Use	Canadian Forces Base	Canadian Forces Base
Average Overall Density	16 units/acre (40 units/ha.) (proposed)	10 units/acre (25 units/ha.)
Sustainability Principles	LEED-ND	New Urbanism & Smart Growth
Assessment Tool Certification	LEED ND 1.0 Pilots Only	n/a
Certification Level	Gold – Stage 2	n/a
Points Achieved	65	n/a
Date Certified	Sept. 21 2008	n/a
Community Plan Approval	December, 2000	April, 1998
Completion Date	2021	2004 (CLC)

2.5 Summary

The literature review focused on the areas of sustainability, urban sustainability, RD+D, and CLC, and urban sustainability. Section 2.1 clarified the use of, and defined, the words sustainability and sustainable development, provided a brief history of sustainability, discussed common criticisms of sustainability and then compared the sustainability paradigms based on their position along a continuum to provide readers with a general understanding of sustainability as proposed by this practicum.

The literature review determined that, for the purpose of this practicum, terms such as *green*, *sustainable* development, *regenerative* design and development are all complementary approaches that fit under the umbrella of sustainability. The different definitions and usage of the terms appeared to be dependent on whether they were being used by government, business, academia, or the general public. Somewhat interrelated, the concept of sustainability was first popularized at the government level as a response to social and environmental concerns, then emerged in the private sector, and continues to advance in all sectors. This practicum focuses on RD+D as potentially the most advanced of the modern sustainability paradigms – demonstrated by the trajectory in **Figure 3**.

Building on Section 2.1, Section 2.2 focused specifically on urban sustainability. The CFB Calgary projects are located in an urban area and urban growth is at unprecedented levels presenting new opportunities and challenges. The literature was weak on specific examples of RD+D in urban areas, but urban sustainability alludes to the opportunity – and challenge – for RD+D to make significant changes in urban areas, as they will continue to grow in significance. Also, it was noted that although 'urban regeneration' can apply a regenerative approach, the overall objective is usually not the same, especially with RD+D conceived as being heavily concerned with ecological reconciliation (rather than conventional urban economic development).

Section 2.3 provided a more detailed overview of the RD+D paradigm. RD+D was established as very different from conventional sustainability paradigms – requiring a new worldview in order to fully comprehend it. The core tenets of the RD+D approach focus on place – and the patterns within that place, alongside early and continuous

community engagement, which ultimately facilitates the ultimate objective around the co-evolution of human and natural systems.

Section 2.3 also introduced RD+D tools. Several authors argue that, in the past, sustainability tools have proven to be effective in promoting and advancing sustainability; it was deemed valuable to investigate the available tools that appeared in the literature. However, the tools are still early in their development and there have been some serious concerns raised by RD+D practitioners about the use of tools for RD+D. So far, the tools are still essentially a list of universal items, resulting in users simply selecting preferred elements. However, sustainability, as proposed by the RD+D approach, does not operate well in this way. One cannot simply pick and choose what is desired for implementation. RD+D demands that its exponents first need to understand the patterns of the place they are in, and then work with those patterns to ensure evolution can occur. A standardized checklist would not be suitable to achieve this objective.

Section 2.4 introduced CLC and the company's history, corporate social responsibility, their balanced scorecard sustainability objective, future aspirations, and the CLC Calgary CFB projects experience. CLC was re-activated in its current form around 15-years ago. CLC essentially acquires surplus properties from various federal government departments, a number of the most recent properties being military bases. CLC redevelops the property and then makes a decision to either hold on to the property and manage it, or sell it to the private sector. Whatever the decision, CLC has committed to the principle of Corporate Social Responsibility which is measured by a balanced scorecard.

The balanced scorecard has six key objectives, with ‘developing sustainably’ being the most pertinent to the research of this practicum. Each objective includes targets, metrics, and results achieved over the previous year. CLC has set high standards in comparison to the general land development community, and with each project progress has been demonstrated; the opportunity for CLC to embrace RD+D as a route to further progress is an innovative proposition and should be included in future versions of their balanced scorecard.

CLC’s progress to date is well-demonstrated by the development of their properties at CFB Calgary. Garrison Woods was the first property to be planned and developed, and Currie Barracks was the third and final property to be planned – and is still under development. Although CLC faced challenges with City of Calgary approvals, (by introducing new standards) they were successful in modifying the development culture than what was normal in Calgary. Furthermore, the developments demonstrated progress from the first property, Garrison Woods, to the third property, Currie Barracks. The CFB Calgary property re-development was considered to achieve a more sustainable community in the literature because CLC introduced higher densities, a mix of uses, better access to transit and active transportation, a focus on landscaping which preserved natural landscapes, and applied low impact development stormwater management (City of Calgary, 2000, 1998, 1995; Stirrett & Shewchuk, 2012). Although CLC demonstrates a commitment to an improved development approach, proponents of RD+D would suggest that CLC’s ostensible sustainable community projects are not actually ‘sustainable’ from a regenerative perspective. Given CLC’s history, of being a leader

and the desire to be innovative, it may be an ideal champion for the introduction of RD+D to the Canadian market.

Chapter 3: Research Methods

The development of the CFB Calgary properties presented an opportunity to research CLC's sustainability approach during the inception of Garrison Woods and Currie Barracks, with an interest in what was actually designed and developed, and how the adopted sustainability approach compared with the approach of RD+D. An analysis of CLC's recent CFB Calgary property re-developments was conducted through the use of a targeted literature review (reported in Chapter 2) and focused interviews (reported in Chapter 4) and written up as a case study.

The research commenced with a literature review of the most recent and relevant journal articles, books, research documents, news and magazine articles, and websites on the themes of planning, sustainability, urban sustainability, regenerative design and development, and the Canada Lands Company. The qualitative field research (focused interviews) was informed by the literature review and guided by the research questions (Babbie & Benaquisto, 2010).

Although not specified as a formal research method, the CFB Calgary properties were visited by the researcher to achieve some on-the-ground familiarity with the study area, which then helped when doing the telephone interviews. This field-work comprised a walk-around of the entire area of the first phase of Currie Barracks, and several parts of Garrison Woods, experiencing some of the design features such as the density, land uses and housing types, land drainage, and historical significance (see Appendix B for photos from the field-work).

Figure 7 highlights the main research questions under investigation, conveying how the questions were related to the main research foci.

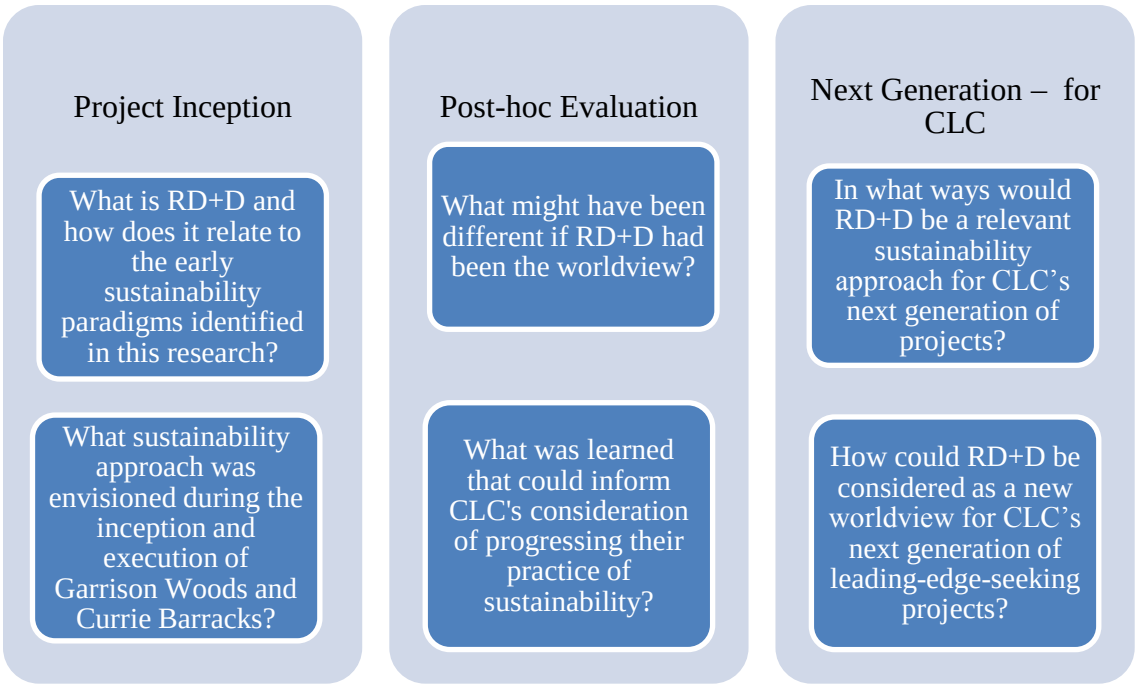

Figure 7: Project Research Highlights

3.1 CFB Calgary Case Study

Case study design was used by the researcher "to develop intensive knowledge" about sustainability and the inception and development of CLC's development of the CFB Calgary properties (Zeisel, 2006, p. 97). The primary purpose of case study design in this research was to "focus on the specificities of the case, providing rich, detailed data" (Babbie & Benaquisto, 2010, p. 319) by asking "how" and "what" questions through the focused interviews (Yin, 2009, p. 2). Although there are few detailed literature sources on the re-development of the CFB Calgary properties, a case study approach appeared to offer the prospect of a useful and valuable setting for the current 'prospecting' exercise, with a new sustainability paradigm – RD+D – in mind.

In hindsight, it would have been valuable to have had more access to more direct expert knowledge of advanced sustainability approaches, especially of RD+D, to better evaluate the applicable sustainability approach – and to undertake the post-hoc evaluation

– of the CFB Calgary properties. This deficiency is not necessarily a reflection of the research design; rather, it is more indicative of what came to be revealed as the relatively low level of experience of the researcher and interviewees, in what was revealed as a rather novel, still-emerging field.

Despite a generally good response to the questions posed, I had initially been hoping for a more informed response on RD+D aspects, possibly vindicating my somewhat utopian vision of RD+D, as a desirable 'ideal' where sustainability was concerned. Interest was shown by interviewees – though this was necessarily a qualified, limited interest. Nevertheless, a demonstration of some progression was revealed through the case study set, generally supporting CLC's reputation as a leading-edge land developer.

3.1.1 CLC CFB Calgary Projects. The CLC's re-development of the CFB Calgary properties furnished the case study set for this practicum. The now defunct CFB Calgary, a former military base within the City of Calgary, comprised three distinct project locales – Currie Barracks, Garrison Green, and Garrison Woods. Currie Barracks and Garrison Woods were the focus of this practicum because these properties best demonstrate progress in terms of the sustainability continuum, with common delineated boundaries – often critical for good case study design.

Some 'common' and 'related' elements within the 'delineated boundaries' of Currie Barracks and Garrison Woods include: historical land use, proximity to the downtown, large-scale urban infill, the same lead developer, and similar city-region context.

3.2 Targeted Literature Review

A review of the relevant literature set the foundation for the research, provided necessary framing, and generally informed the focused interviews. Since this research topic area is currently emerging, rather than well-established – recent journals, on-line reports, and media presentations were important sources to round out and update the more conventional literature review sources. The initial overview of existing literature helped to identify gaps meriting further study, such as the initial sustainability intentions for the CFB Calgary properties and CLC's awareness of RD+D, as well as yielding a framework for the research, and the underlying 'research opportunity' strategy. The literature review initially focused on planning, sustainability, and CLC – with guidance from the key research questions, which referenced the interest in exploring the sensed 'opportunity' associated with RD+D. There were therefore elements of 'post-hoc evaluation' and 'future opportunity assessment' at the heart of the research.

The research was pursued as a practicum, with CLC perceived as the potential 'client' – although there was no formal relationship with CLC in this regard; the relationship was more hypothetical than real – although it is hoped that CLC will find the outcome to be useful in their future strategizing. In particular, they may be challenged to elaborate their 'balanced scorecard' to embrace 'developing regeneratively'.

3.3 Interviews

The focused interview was the main research method employed to gather information about the sustainability intentions at the time of inception of the property development projects, what the process might have looked like if RD+D had been introduced at that time, and what might be CLC's sustainability intentions going forward.

Interviews were conducted with a sample of current and past employees of CLC, involved City of Calgary planning staff, and particular members of the planning and design team associated with the development of the CFB Calgary properties. Due to the various locations of interviewees, and the timing and cost associated with doing in person interviews, interviews were conducted by telephone. As a consequence, it was not possible to establish the close rapport, and to directly experience the related body language, that might have been possible through in-person interviews. With hindsight, this might be considered a limitation of the current interview research.

In total, seven people were contacted by email for interviews which resulted in five people being interviewed. Two people who were contacted did not respond and one individual directed me to one of the individuals who was already scheduled for an interview. One of the individuals made what proved to be a valid point, that it is 'tough' to obtain good personal accounts of the projects twenty years after they were initially considered, because some key people may be difficult to contact, or have passed on. That being said, I felt that the five individuals who were interviewed, having direct involvement with the CFB Calgary projects, were able to provide me with a sufficiently extensive, and reasonably intensive, understanding about the projects – and the subjects were probably the most knowledgeable of the individuals who were readily available for this component of the research. However, again with the benefit of hindsight, the research would probably have benefited by conducting more interviews, with a wider range of individuals, especially with those with more of an outsider's perspective.

Prior to each interview, 'background information' was provided to each interviewee (Appendix C). The backgrounder provided an overview of some of the

results of the preliminary research, including a briefing on RD+D, why and how RD+D informed the research, and how the interviewees would benefit from the research. However, the backgrounder did not prove to be as useful as the researcher had hoped.

Although the interviewees reported reading the backgrounder, for the most part, they were unable to recall much of the information at the time of the interview. However, with two interviewees in particular some dialogue did open up regarding the backgrounder, but given the lack of experience with RD+D, limited information was able to be shared – resulting in some questions not being able to be answered to the fullest.

Each interview was recorded with an electronic recording device, with the interviewee's permission, which ensured accuracy of the responses. As soon as possible after each interview was completed, the researcher reviewed the interview notes to ensure key ideas and themes were well-captured, while the interview was still fresh in the interviewer's mind (Stake, 2005). The ability to capture the interviews verbatim helped with the analysis and interpretation of the interviews.

3.4 Analysis and Interpretation

A flexible and adaptive approach was taken during the analysis of each interview (Lofland & Lofland, 1995). After the interviews were transcribed, they were analyzed and interpreted to reveal pertinent "themes or patterns" (Babbie & Benaquisto, 2010, p. 387). To begin the analysis, the interview responses were divided into the three focus areas of the interview guide: project inception, post-hoc evaluation, and next-generation sustainability (Appendix D). The responses were then collated and analyzed, and then key-words were pulled out to compare and contrast responses.

3.5 Summary

Case study design, using literature review and focused interviews as the key research methods, was employed to generate data, information, knowledge and understanding of the applicable sustainability approach taken by CLC for its re-development of the CFB Calgary properties. The specific foci included: during project inception and execution; through a post-hoc evaluation with RD+D in mind; and with an interest in the potential of RD+D as new sustainability approach for CLC. The targeted literature review and the series of focused interviews contributed useful information on the inception and execution of the development projects; however, the focused interviews proved the best method for the post-hoc evaluation, and for considering CLC's next steps towards greater sustainability. However, the interviews could have benefitted from a wider range of individuals, especially those with an outside perspective (outside CLC, and outside the City of Calgary). Prior to the interviews, it would have also been beneficial to have had a better understanding of what expertise the interviewee could offer, so that questions could be refined to more fully extract their particular knowledge.

The literature review focused on the areas of sustainability, urban sustainability, RD+D, and CLC. The literature review was valuable in providing a strong background on the history of sustainability approaches, introducing CLC, and helping to frame the interview questions but was weak regarding urban sustainability in the context of RD+D. The latter – urban sustainability – was a late addition to the literature review efforts, when it became apparent that RD+D needs to be much more cognisant of such contexts, and the associated challenges of applying such a sustainability approach in specifically urban settings (very different from sub-urban or ex-urban contexts, for example). Ideally

this urban sustainability interest would have been more front-and-centre early on in the research, so that it might have more fully informed the framing, literature review and interviews.

Due to RD+D being a relatively new sustainability approach, there was limited literature on the topic, but for the purposes of this practicum it was considered that the literature that was available was sufficient for at least 'introducing' this emerging approach, for more general consideration.

The focused interview technique was valuable for capturing the personal accounts of key individuals with first-hand knowledge of the CFB Calgary properties, RD+D, and CLC. However, most interviewees were less knowledgeable than was initially hoped as regards to the topic of sustainability in general, and the emerging sustainability approach of RD+D in particular. Only one individual, who had been specifically targeted for their knowledge on RD+D, had a strong understanding of RD+D. Despite a backgrounder on the sustainability approach featured in this practicum, and a brief introduction to RD+D provided to prospective interviewees, it is believed that there could have been better dialogue on the continuum around sustainability. Perhaps it might have been beneficial to have had a question and answer period on RD+D specifically, before the interviews commenced, but there was only so much that the time available from interviewees allowed for. That being said, the interviews generated an enhanced understanding, if not hard knowledge, of the CFB Calgary projects and related sustainability efforts, deemed valuable for this research.

Chapter 4: Interview Results

Focused interviews were conducted – by telephone – with informed and/or knowledgeable professionals, in August 2013 and September 2013, as part of the empirical research. Interview participants were selected based on the criteria that they were professionals that work for, or have worked for, CLC and/or the City of Calgary, while one participant was selected because of their expertise with RD+D. In total, five people were interviewed, with varied backgrounds – mostly in planning, engineering, and/or architecture. Three of the interview participants had relatively direct involvement with CLC, and with the re-development of the CFB Calgary properties, in various roles relevant to this research; other participants had a more indirect or more distant relationship – with the particular developments and/or the particular concept being researched. Between them, the interview participants included representatives from the public and private sectors, including corporate and government interests, as well as the consulting sector.

The interviews focused on the areas identified in the interview guide – project inception, post-hoc evaluation, and next-generation sustainability. Knowledge, experience, and expertise – especially in relation to RD+D – varied between participants; where possible and necessary, the interview questions were modified to reflect any unique attributes. The following sections present the findings from the focused interviews, in a way that attempts to preserve the anonymity of the responses, but with a focus on contributions that furnished informed responses to the main research questions. They are organized around the three main research interest areas, beginning with the inception of the CFB Calgary property re-development projects. Interviewees, for the

purpose of this reporting have been randomly assigned ‘letter-pair initials’ identifiers – that have no relation to their actual initials.

4.1 Project Inception

Questions under the area of project inception were used to gain an understanding of an interviewee’s experience and definition of sustainability, and ultimately to gain knowledge of how sustainability was envisioned at the inception of the Garrison Woods and Currie Barracks development projects.

4.1.1 Defining Sustainability. In line with one of the main outcomes of the literature review regarding this particular focus, the interviewees – as a group – did not express or manifest a common shared definition or understanding of sustainability. In addition, the terms *sustainability* and *sustainable development* were also apparently used interchangeably by the interviewees. In general, the interviewees used terms and statements that constituted their interpretation of sustainability per se, or elements that led to an outcome characterised as “more sustainable”.

One interviewee recalled the Brundtland Report’s definition of sustainability as the first definition that came to mind but also expressed that, in terms of developing neighbourhoods, sustainability is more about trying to “do things in a better way than is currently being done” (CD).

Common terms and statements that were employed by interviewees included what might be generalised as ‘a need to improve’, and essentially ‘to become more efficient’, with regard to energy and resource use especially. Being ‘more sustainable’ appeared to mean, for example: preserving trees, reducing vehicle trips, minimizing water and energy consumption, improving housing choices, incorporating affordable housing, integrating

the military heritage, and being financially effective. In addition, it was mentioned by some that the term *sustainability* was not in the general population's vocabulary during the inception phase of Garrison Woods.

4.1.2 Sustainability Framework/Approach. The two questions, 'was there a sustainability framework being used in the planning of the Garrison Woods and Currie Barracks properties?' and 'what sustainability approach – in terms of key design/development elements – was envisioned/targeted at Garrison Woods and Currie Barracks, during the inception and execution of the CFB Calgary Properties?', were important to help understand what particular sustainability framework or approach was being applied at the inception of the planning and design of the Garrison Woods and Currie Barracks properties. One interviewee (AB), described the operative framework for Garrison Woods as embracing what came to be referred to as *smart growth*, *new urbanism*, and *sustainability*, but those particular terms were not in general usage at the time of project inception:

> If you were to look at the principles embedded, in terms of the goals and objectives of the plan, (many) of them (spoke to matters) that people (had) talked about for a long time but (which have) never had a moniker attached to them; in other words, you couldn't call it *smart growth*, you couldn't call it *new urbanism* – because we never used those terms (at the time). Principles (such as) creating more walkable communities, creating more choice and better transitions (etc.)… that kind of verbiage was used in the objectives, but no one called it sustainability back then. (AB)

Another participant stressed the perceived 'superior qualities' of the CFB Calgary property re-developments:

> It is a wonderful project that (has) created a community that is far superior in terms of just quality of life than many communities that are being built in a more traditional way; and it's from a sustainability (perspective) because – primarily – the density is a bit higher and the community (reflects) a (greater) emphasis on tree preservation, interconnected small parkettes, walkable scale, close

> commercial; and it is far, far superior in terms of the social network than a traditional community. (CD)

Building on the experience at Garrison Woods, another participant indicated that, in the first phase of Currie Barracks, LEED-ND certification was obtained under a pilot program, and expressed the view that this was "a very significant step in terms of satisfying a metric for sustainable development" (EF). Another participant commented on this decision to go after LEED-NP certification:

> [CLC] had such a difficult time (obtaining) approvals (from) the City (of Calgary) in terms of (all) the innovations… road widths, traffic calming, you name it; it took so much time to (obtain) approvals… (that) we thought if (there was) an independent third party designation, or recognition … that what we were doing was sustainable… that it might buy us some good will (from the City) in terms of where we were trying to go. ((But) it did not speed up the process at all at the end of the day). (AB)

Another participant indicated that the following 'sustainability' measures were utilized:

> … some of the specific measures that were utilized – LID [Low Impact Development] stormwater management techniques, use of reduced flow water fixtures, certainly higher density in development, access to transit – those were all planned within the development plan in the first couple of phases, and those were the very specific metrics that were established in order to confirm that the community was being developed in a sustainable manner. (EF)

How did the execution of the development vary from the initial concept, if at all, in either or both projects? The execution of the development of Garrison Woods, in the view of several participants, did not vary very much at all from the initial concept plan. As one participant observed:

> (this) is pretty unusual because – usually – you see conceptual renderings when applications go forward (for) approval, and (then) what you get on the ground does not necessarily bear any resemblance; I would say that is the complete opposite from what happened at Garrison Woods. (AB)

On the other hand, the first phase of Currie Barracks is currently (December 2013) just beginning to be developed, and so far the first phase has remained 'pretty true'

to the original plans (AB). However, there have been discussions that may ultimately vary the Currie Barracks plans from the original concept, over time; one of the main discussion points is potentially a requirement to increase the density.

What sustainability progress does Currie Barracks demonstrate over Garrison Woods? Higher density was the primary 'sustainability' difference identified between Garrison Woods and Currie Barracks. Other differences included: "a significant office/employment node and retail node, and a stronger orientation towards a community where people don't need to have a vehicle" (EF). In addition, (Low Impact Development) stormwater management, a mix of housing types, narrower roads, and landscape controls were noted by several of the interviewees as additional differences.

4.2 Post-hoc Evaluation

The questioning here began to explore what could have been different if RD+D had been the operative worldview, as well as what was learned – from Garrison Woods and the current development of Currie Barracks – that might inform an assessment of the prospects for a future pursuit of RD+D.

Based on the sustainability framework that was applied, do you think you realized your objectives? Only two interviewees responded to this question, and in general they felt that the sustainability objectives were realized.

What – potentially – would have been different if RD+D had been the operative worldview? As mentioned in the limitations section (Section 1.5), there was – among most of the interviewees – limited understanding of RD+D and limited opportunity to furnish much of an informed appreciation of RD+D, beyond the backgrounder (Appendix C). This made it challenging for interviewees to give an

authoritative response. Design considerations, project boundaries, community engagement, and history of the site were all discussed.

One participant referenced that "initial design considerations… focused upon dealing with the LEED certification requirements" and that, due to the prescriptive nature of the City policies and the LEED process, "there was not a desire to go out and look beyond those at all" (EF).

The interviewees with expertise on Garrison Woods or Currie Barracks mostly indicated that there was no intent to look 'beyond the project property lines', and even within the property lines there was little to no systematic understanding, or pattern learning, in relation to the place qualities of the site – beyond the natural features that currently exist. As one participant observed:

> If you were to look at some old air photos of Garrison Woods there was a large slough in one area which is now where the large central Flanders Park is. So, that area was kept open - obviously because it is a kind of natural catchment area; and it was actually developed as a park with a dry pond. (AB)

It was also noted that as many trees as possible were preserved, and roads and paths were even routed around trees in some areas.

Regenerative design and development enables the community, through community engagement, to gain expertise in, and an understanding of, the operative 'place'. One participant (EF) described the engagement process at Garrison Woods and Currie Barracks as 'extensive' and another suggested that, at that time "it was probably the most public engagement the City (of Calgary) had ever done on a project" (AB). The other participant commented on a current process "working to establish a more consistent dialogue with residents that have purchased homes at Currie (Barracks)" (EF).

Another participant, reflecting at length on this particular question, offered:

> I would hope though that if we/they were to re-do it over again knowing what we/they know today, we might take a much more serious look at other elements of sustainability that – frankly – were not on the agenda at the time. Particularly, energy performance within the buildings, water performance within the buildings, how we deal with waste. (CD)

This participant was of the view that such matters have not been dealt with well in either project, questioning if there has been that much innovation. 'Urban food' was another example given of a possibly missed innovation opportunity: "There isn't a community garden; there isn't any kind of urban agricultural food strategy within those two" (CD).

What was learned – in retrospect – that might inform the current pursuit of RD+D? Some of the main lessons identified by interviewees related to: a leaning toward a broader view geographically, more emphasis on actively integrating disciplines and uses, being more adaptable and flexible in relation to the changing context, enhanced dialogue with stakeholders, a more comprehensive approach to multi-functional land and infrastructure uses, and a sharper understanding of reality.

One participant remarked that a broader, or broadening, view geographically could help inform the current pursuit of a more advanced form of sustainability. One interviewee also noted that CLC has its head office in Toronto; this has a strong influence on the way the company views its world, and could be important for assessing projects in other parts of the country, such as Calgary:

> This isn't necessarily a criticism of Canada Lands; we have a corporation that really is focused a lot on (the view from the) head office in Toronto; so the general understanding of the world is from that Toronto worldview. I actually think Canada Lands is well placed to break out of that because (it has) very successful projects across Canada…I think we/they need to take a broader view geographically, to see where best practices are achieving good results; we/they also need to be looking at precedents that have similar climates. (GH)

Throughout the interview this participant stressed the importance of context, integration, adaptability, and flexibility:

> In many respects I see regenerative design to be most effective when it is context-based; we (therefore) need to be adaptable… documents and policies need to be flexible, and they need to contemplate other innovations and other future conditions. (GH)

This participant also recognizes:

> We/they are going into not only a regenerative approach but a more integrated approach where different types of activities can start to become more effective because they are combined with different activities. (GH)

The notion of different types of activities being contemplated was also discussed by another participant:

> We need to think of our infrastructure in a very comprehensive way, that all land – whatever we use it for – we (need to) try to make it as multi-functional as possible. There is no reason that land (should not be expected to) do many, many things at one time. (CD)

This participant also noted: "the unfortunate thing is that, again, what you're really challenging…is the regulation", going on to remark: "Currie Barracks is an example of how a (municipality) needs to vary, and has varied, its regulatory standards – to encourage better quality, more sustainable design" (CD).

Further to this statement regarding changing regulations, another participant noted many municipalities are very risk-averse when considering approval of comparatively innovative proposals. The interviewee suggested that:

> …they don't want to take on the costs and long term maintenance of things they don't really understand, or don't have a lot of experience with… so if you're going to move some of this forward it is going to be an interesting exercise in how the land development industry tries to collaborate with (the municipal authority), to find ways to do what you are talking about – but in a way that still makes it cost-effective for a land developer to get what he needs out of it … and try to move some of these ideas forward (in ways) that the (the municipality) can accept – without trying to burden the land developer in perpetuity. (AB)

4.3 Next generation – for CLC

The questioning around the "next generation – for CLC" sought to garner the opinion of the interviewees generally on the next level of sustainability for CLC, and if RD+D could be a potential approach. Questions asked included whether RD+D would be a relevant approach for CLC's next generation of projects and, if so, what needs to change, how such a change might be accomplished, and what merits further investigation.

In what ways would RD+D be a relevant sustainability approach for CLC's next generation of projects? This question was challenging for interviewees. One participant commented: "it's difficult for me to answer because I am not an expert nor do I call myself a regenerative designer" (CD). Similarly, another participant commented: "…that is an interesting question and I am not sure I can give you a great answer, other than to say I think … each time Canada Lands (tackled) a project – at Garrison Woods, Garrison Green, and/or Currie Barracks – they tried to introduce new elements of sustainability" (AB). It was also observed:

> … there is only so much you can do in a process because you can't spend all of your time introducing every sustainability element. You… have to grow it, you have to evolve into it, and you can't expect it's … going to do everything. That's especially true for – I think not so much Canada Lands but – the development industry in general. (It does not generally) have the time or the money to do that; at some point you have to give the approving authority what they want in order to move ahead. (AB)

Another participant observed:

> …in many respects I see regenerative design to be most effective when it is context-based, and when it does respond to context. I think I see – for an organization like CLC – I (would) see (this) as (part of the) evolving growth of the organization. Where certain practices have been used in the past, and as new innovations are attempted and succeed in different projects… you know that will just become more of the common practice. (GH)

Another participant gave a more cautious response. CLC, at least in terms of its operations in the west of Canada, is actively reviewing the current phase of the Currie Barracks project. This participant indicated that, before looking at going beyond LEED-ND, or current sustainability frameworks:

> …I think at this point there is a desire to get a better understanding in terms of what has worked at Currie (Barracks), what hasn't worked and the financial implications of those previous choices. (EF)

What needs to change? How might such change be accomplished? What merits further investigation? Responses to these questions included: the need for a better understanding of what else is being done in other places, and of what the market perceptions of LEED are, and in terms of what other metrics exist. There was also a sense of a need to take bigger strides towards change, to move beyond some of our current thinking on what is represented as sustainable, and to accord greater consideration of how to make RD+D practical for municipalities and developers, such as CLC.

> It's important … to be looking at the world… where innovation has happened and transferable innovation is possible. I think to me that is one of the big things. We need to be looking further afield and seeing what's being done elsewhere. (GH)

> A better understanding of the market perceptions of LEED certification, sustainable design… and to ensure that we at least understand those market perceptions, and to also have a better understanding of what other metrics exist out there to demonstrate sustainable design. (EF)

> We need to move the needle in larger increments than we have been moving… and it is difficult because in many ways sustainability now is (simply) if a building has a little micro windmill on it, or a green roof, we call it sustainable. … we need to move past these one dimensional cutesy market advertisement pieces (calling that sustainability) into a much more comprehensive understanding that starts with density, transportation, and buildings and then adds waste, water, multi-functional open space, and food… and actually think about things on the kind of scale that LEED-ND looks at in a more comprehensive way. (CD)

> These things always evolve as we gain more experiences and practices (of such) development. (AB)

4.4 Summary

The preceding section has highlighted the relevant responses from the focused interviews. An interview guide was employed, structured first to garner a quick understanding of the interview participants' experience, and knowledge of sustainability, before moving into the areas of project inception, post-hoc evaluation, and next-steps consideration for CLC. The majority of the interview participants had substantial knowledge of the CFB Calgary properties; they had a range of expertise and knowledge of sustainability, but limited to no experience or knowledge of RD+D.

In general, sustainability was understood to mean preservation of natural areas, increased density, a better mix of uses, energy and water conservation, and reduced emissions. Therefore, the sustainability approach in re-developing the CFB Calgary properties involved the implementation of increased density, improved pedestrian connectivity, a new stormwater management system, a diversity of housing types and land uses, protection of trees and natural areas where possible, re-use of old buildings, and the celebration of the military history of the site. This could be classified as a re-urbanisation initiative, representing urban intensification, and thus a manifestation of urban sustainability in practice. However, the main questions for this research might be what generation, or form, of sustainability approach was being achieved: first-, second- or third-generation (Dale et al., 2012), and degenerative or regenerative (du Plessis, 2012; Plaut et al., 2012; Reed & Boecker, 2012)?

The responses in the areas of post-hoc evaluation and next-generation considerations revealed the challenge of introducing a new arena of innovation to the interviewees. Although not familiar with RD+D, their responses still proved to be

valuable for the research. The interviewees recognized that innovative approaches, such as RD+D, are part of the evolving growth of an organization like CLC, and that approaches to achieving sustainability will evolve over time. Not only will the progress of sustainability take time, but the approving authority (in this case the City of Calgary) should be open and flexible to changes that are more progressive as planning and development moves towards approaches that are more innovative and progressive. In addition, knowledge of the experience from other CLC projects, from innovative projects in other places in Canada and the World, and an appreciation of RD+D precedents may all combine to urge advancement, and open up the potential for RD+D as a relevant progressive sustainability approach for CLC.

Chapter 5: Analysis of Results and Interpretation

This chapter attempts an integrated overview analysis of the research findings from the literature review, the case study set, and the focused interviews. The analysis of the results and interpretation takes its cue from the overall research questions framework and the broad research process foci: the sustainability frameworks for CLC's CFB Calgary properties, at the time of inception of their development, through a post-hoc evaluation with RD+D in mind, and closing with a consideration – with CLC in mind – of the potential next generation of approaches to achieving sustainability.

Significantly, one interview participant commented – in response to how people respond to the RD+D approach versus the conventional sustainability approaches: "no wonder the sustainability movement hasn't caught on, because making people feel guilty is not highly motivating" (IJ). The underlying intent of the analysis is not to make anyone 'feel guilty', but to first acknowledge the leadership, innovation, and process that CLC has already demonstrated – and then to highlight what can be done to innovate further. One interview participant said "what I've been told is the development industry has always watched what Canada Lands have done" (AB). This comment is significant because it demonstrates that CLC has an exceptional opportunity of setting the bar in terms of planning and development standards.

5.1 Defining Sustainability

One of the first questions to arise when this practicum commenced was how sustainability is defined, and what were the intended meanings of the different terms – sustainable development and sustainability – commonly found in the literature relating to sustainability?

During the literature review, the words *sustainability* and *sustainable development* were used interchangeably, but also separately with no definition or only a vague definition – and generally with very little discernment. In addition, other terms were also referred to in relation to sustainability – such as *green*, *restorative*, and *regenerative*. Given the voluminous literature manifesting a range of vague meanings of sustainability, it was deemed important to be as clear as possible in definitional terms, especially as to how the different terms may be related, through an informative defining framework. An underlying interest was the extent to which sustainability and sustainable development shared some common meaning. This practicum opted to adopt less of a singular precise definition of sustainability and sustainable development and more of the 'logic' provided by Cole (2012b), that sustainability is "an overarching globally scaled, evolving aspiration" (p. 47) and that *green building*, *sustainable development*, *restorative*, and *regenerative* design and development are "complementary approaches to the design of buildings and the built environment that aid in this process [of a sustainable future]" (p. 47) (Plaut et al., 2012; Reed & Boecker, 2012). However, this still does not define sustainability in practical operational terms.

Based on the interviews, sustainability could be interpreted in many ways, such as: doing better, preserving natural areas, using natural resources more efficiently, saving water and energy, driving less, enhanced affordability, and (a longer-term view of) the future. These are all commendable intentions, but they alone are not sufficient to define a process outcome as 'sustainable', and do not categorically define 'sustainability'.

Perhaps more importantly than a single definition of sustainability is a question that another interviewee posed when asked how they defined sustainability. The

response was "what are we sustaining with sustainability"? In further response this participant suggested:

> I think we are sustaining life – to put it really simply. So, the question then is pretty simple. We are sustaining the process of life so that we can actually increase the opportunity and potential for evolution (increased diversity and diversity of exchange) to occur. (IJ)

The follow-up question naturally became: what is life? The interviewee remarked that, "a few sources, including Maturana [referring to the Chilean biologist Humberto Maturana], I believe, define life as the process of becoming" (IJ) and John Dewey (1916) says, "the most notable distinction between living and inanimate things is that the former maintain themselves by renewal" (as cited in Lyle, 1994, p. 11). With this insight – rather than defining sustainability or evaluating sustainability – we perhaps should be asking ourselves: Are we sustaining life? And, how can we sustain life?

5.2 Project Inception

The literature and interviews as a whole made it apparent that, at inception, the Garrison Woods and Currie Barracks properties were planned to be 'different' from any other developments in Calgary at the time. What set the projects apart was a new way of planning and development in Calgary, led by CLC. According to one interviewee, at inception of Garrison Woods the terms *new urbanism*, *smart growth*, and *sustainability* were not being widely used, but – arguably – they were embedded in the principles and objectives, without using the actual terms (AB). The interviews and literature identified certain design elements considered as being 'sustainable' – which were also, in combination, different from what had been proposed or pursued in past projects. Design elements considered sustainable in both Garrison Woods and Currie Barracks, and

commonly found in urban sustainability, included: walkability, more housing choices, increased density, more public space such as parks, a greater mix of uses, and easier access to transit.

When it was time to plan and design Currie Barracks, the central objective was to take the experience from Garrison Woods and improve on it. The main elements in Currie Barracks that were considered to demonstrate progress over Garrison Woods, were: low impact development stormwater management, increased density, narrower roads, tighter landscape controls, significant office/employment and retail node provision, and less reliance on private vehicles – through improved active transportation networks, easier access to transit and proximity to diverse uses. Unlike Garrison Woods, *new urbanism* design was explicitly discussed as a framework for Currie Barracks. Further discussions led to the Currie Barracks project targeting a LEED-ND designation – which satisfied a valued metric of sustainability. In addition, the LEED-ND designation pursuit gave Currie Barracks national, and North American, recognition.

The view of one participant is that CFB Calgary, "is an excellent demonstration project that shows us we can evolve into a better community that sells very, very quickly" (CD). However, this interview participant added a potentially significant qualification that CFB Calgary – in their opinion – is "much more of a better suburban model than a complete sustainability model" (CD). This connects to a premise of this practicum that the CFB Calgary projects demonstrate innovation, but are not necessarily good examples of sustainability – from an RD+D perspective – as to what actually constitutes sustainability. However, the CFB Calgary projects represent a valuable case study setting – to further explore what has been done, and what more might be done. In terms of

where Garrison Woods and Currie Barracks may be situated on the trajectory of sustainability, both can be characterised as reflecting the ‘green’ approach identified in **Figure 3**, as referenced earlier in Section 2.1.4.

One interviewee cautioned that “we must not dismiss the efforts of those who are not approaching sustainability from a regenerative worldview” (IJ). In support, Hunter Lovins was cited, in further reference to the ‘red zone’ in **Figure 3**: “We (have to) be working on ‘limiting the damage’ to give us time to figure out how to work with living systems” (IJ).

5.3 Post-hoc Evaluation

The post-hoc evaluation of the CFB Calgary properties – with RD+D in mind – proved to be a challenging arena for the interviewees. They were generally not able to offer a comprehensive evaluation because they generally had very limited knowledge of RD+D, and they did not necessarily embrace a regenerative worldview. All of the interviewees acknowledged having read the backgrounder document, but they remarked that they either only read it once, only had time to read it quickly, or that it was complex. It was not surprising to learn that the backgrounder document was not given closer consideration; leading-edge sustainability is of limited mainstream concern, especially if the related specifics or imperatives seem too far removed from the status quo. The interviewees could also have been too busy to give attention to seemingly foreign concepts. However, the potential importance of RD+D was not completely dismissed by the interviewees; notable curiosity was expressed, with firm indications of continuing interest, especially as regards receiving the results of this practicum.

It should be acknowledged that, in addition to the limited knowledge of the interviewees, the researcher's own experience with RD+D has so far relied solely on a reading and attempted understanding of the literature; it did not include first-hand experience, and this may also have had an influence on how RD+D was presented in the course of the interviews. This seems to have been more of an active and dynamic learning process, for all participants – that is still ongoing. Despite the related challenges, the more general nature of the interview guide appeared to compensate for some of the short- comings. Probes helped to establish that – in the view of the interviewees – Currie Barracks and Garrison Woods would have gone through a completely different process had RD+D been the operative worldview at the inception of these projects.

RD+D is a comprehensive leading-edge sustainability paradigm that probably deserves more attention than it can be reasonably accorded within the scope of the present analysis. Given the complexity of RD+D and the scope of this practicum, the post-hoc evaluation offered in this practicum is acknowledged to be a rather high-level and somewhat speculative analysis of how the RD+D paradigm might have been viewed at the inception of the CFB Calgary projects. The balance of this analysis is based largely on personal communication with Bill Reed, particularly in the context of the *Building Research & Information* article authored by Mang & Reed (2012), exploring regenerative methodology.

Mang & Reed observe that the "first step on the path to regenerative work is not a change of techniques but a change of mind" (2012, p. 26). Such a mind-shift does not

begin with "descriptions, examples and assessments of specific methods or techniques" (ibid, p. 24). Reed noted:

> as long as you are working with pieces of life in an abstract, mechanical way, applied across different multiple places around the world, you can't possibly be working regeneratively – because you don't understand the nature of the place you're working (with). (personal communication, September 17, 2013)

Mang & Reed urge recognition "that each place is a dynamic entity with its own unique history and future – growing and evolving, forming and decomposing, continuously influenced by the larger system in which it is embedded" (2012, p. 31). To better understand the nature of place, humans will "need to take their place again as a part of nature" (Mang & Reed, 2012, p. 26). RD+D is "not preservation of an ecosystem, nor is it restoration" (Mang & Reed, 2012, p. 26): "Regeneration is about the ability for life to recreate itself" (Reed, personal communication, September 17, 2013).

On a personal level, there were two particular insights generated by personal communication with Reed that changed the way I viewed sustainability, as well as affording a better perspective of RD+D. One insight related to the question of "what are we sustaining", previously discussed in Section 5.1, and the other was along the lines of the notion of co-evolution (of natural and living systems) each relating to what Reed referred to as "the capacity and capability of humans to be in a relationship with the life in that place" (personal communication, September 17, 2013). The RD+D methodology, as developed by Bill Reed and Regenesis Group, has been broadly applied to CFB Calgary, with these insights in mind.

According to Mang & Reed, based on their work in this field, there are three phases that have emerged as essential to application of RD+D methodology (Mang & Reed, 2012, p. 31). These are:

Phase 1 - “understanding and conceptualizing the right relationship to place”

Phase 2 - “designing for harmony with place”, and

Phase 3 - “co-evolution” (Mang & Reed, 2012, pp. 31-34).

Phase 1 begins by outlining the boundaries of the place. In the case of Currie Barracks and Garrison Woods, place was demarcated by the legal property boundaries, whereas RD+D delineates place on a much larger scale than simply property boundaries, and in a much larger context. Generally, the smallest level of place that RD+D references is the watershed which contains the site (and then the building/s thereon) (Reed & Boecker, 2012). The Currie Barracks and Garrison Woods developments were focused on the immediate ‘building and site’ level; the purview only extended beyond the site when discussing land drainage and transportation.

Once place has been delineated, an in-depth assessment is conducted to understand the ‘core patterns’. Mang & Reed advise: “the core is what organizes all of the dynamics that comprise a place, giving it a recognizable character and nature” (2012, p. 32). Reed adds: “we work from patterns, we don’t work from elements” (personal communication, September 17, 2013). To elaborate this point he used the body as an example:

> If I took your heart, liver, kidneys, lungs, circulatory system, the neuron system, your brain and threw it in a pot and stirred it around, I don't get Brock. So Brock is greater than the sum of his parts… there’s (also) something that illuminates, inspirits you, makes you conscious, a being; it’s one of the great mysteries. You are more than the sum of your parts. (personal communication, September 17, 2013)

Regenesis, in its work, looks for core patterns – “the hydrology, the geology, the social systems, the economic systems, the systems of consciousness, and any system that is

there" – that aligns with each other (Reed, personal communication, September 17, 2013).

The community's involvement is an important part of understanding the patterns of place; collaboration with the community begins early in the project and carries through beyond the project team's involvement. This is important because, as Reed observes, "the only thing that will make a project regenerative is that the people in that place have the capacity and capability to co-evolve with living systems" (personal communication, September 17, 2013). Through a collaborative process the stakeholders achieve the "capability and capacity to understand how life works in that place", through helping the community:

> understand and engage in a way going forward. It is necessary to build this understanding in a group of people who will hold and be aware of the evolution of those patterns; because if you don't leave people with this understanding you basically have to start over with redeveloping a community's relationship with place. (Reed, personal communication, September 17, 2013)

Accordingly, towards the end of the first phase of the assessment process, the assessment team shares what they have learned so far with community stakeholders, and in return they share their "own experience of place" which – together – helps build, what Regenesis calls, the Story of Place® (Reed, personal communication, September 17, 2013).

Once the story has formed and the core patterns of place are understood, the next step, Phase 2 – "designing for harmony with place", commences. Phase 2 "defines the distinctive patterns that need to be generated in and by a project in order to harmonize with that larger pattern" (Mang & Reed, 2012, p. 33). The design outcome of this phase, based on the development of the patterns, works with and increases the 'evolutionary

potential' of life in that place (Reed & Boecker, 2012). At this point Reed's definition of the word 'development' becomes important. Reed discusses the "process of development" which "is a synonym for evolution; it is about developing new potential" (Reed, personal communication, September 17, 2013). It should be noted that the official, statutory, definition of 'development' (under land use planning and development legislation in the City of Calgary and the City of Winnipeg) is very different from Reed's definition; the former tend to be very functional, reductionist and mechanistic (see Appendix E). Reed commented that such official, statutory definitions do not reflect what the word development means in RD+D terms. Rather, according to Reed, "design is an outcome of the developmental process" which is the key aspect of the second phase – 'designing for harmony with place' (personal communication, September 17, 2013).

Reed referenced one of their projects - at Mahogany Ridge, Idaho – as an example of patterning and designing for harmony with place. Located on 3,500 acres of abandoned or failing farmland, the landowner proposed to build 1000 homes. The land is located on an alluvial fan between the Big Hole Mountains and the Teton River. After about two weeks, Regenesis established the core pattern – the alluvial fan acting as a living bridge between the river and the mountains. They found that nutrients were being cycled between the river and the mountains, which generated life in that place. What they realized was that three ecosystems had been destroyed or degraded – the Teton River, the Prairie Savannah, and the Big Hole Mountains. They discovered that the ecosystems were altered when the farmers arrived over 100 years ago and dammed Mahogany Creek, for water to irrigate their fields. In turn, the agricultural use polluted the river with nitrogen from fertilizers, and disconnected the river from the tributaries;

farmland replaced the prairie savannah, and the natural integrity of the Big Hole Mountains was compromised. Based on their assessment, they had determined the purpose of the land was likely to serve as a living bridge. They then had to decide how to respond to the pattern they had discovered. If they were designing to apply for LEED-ND, as was the case with Currie Barracks, they could have been rewarded for retaining the farmland, and received one point. However, as Reed elaborated:

> You get one point for keeping the farmland, which implies that farmland is good. Except that most farmland is really bad for the environment. We've already made an amazingly bad assumption about farmland with respect to this approach. (personal communication, September 17, 2013)

They were therefore able to design for harmony with place based on the pattern they discovered. They eliminated the initial concept of three-acre lots spread out over the area, and placed those residential units in very narrow wedges of apartments and townhouses with 500 meter separation between the wedges and a similar buffer between the residential wedges and the waterways. These buffers created a comfortable distance for wildlife to move along the waterways, between the river and mountain, re-establishing the nutrient cycle. It should be noted that this example of "designing for harmony with place" at Mahogany Ridge is in a largely rural context of 3,500 acres of mainly farmland, compared to the just under 400 acres of the CFB Calgary properties. Nonetheless, the approach would be similar in an urban setting but with potentially more complex patterns to be navigated.

Phase 3, "Co-evolution", is where development of the capacity and capability of the stakeholders becomes of utmost importance. Mang & Reed stress: "it is in Phase 3 that the real potential of a project's systemic relationship to its place can be realized"

(2012, p. 34). The process of co-evolution emerges with the success of phase 1 and 2. Evolution is significant to RD+D because, as Parzen et al. (1996, p. 27) observe:

> what is sustainable today may not be so ten years from now. To stay 'alive' a system needs to maintain its adaptive capacity, and its capacity to create new and unpredictable things. (as cited in Mang & Reed, 2012, p. 34)

It is freely acknowledged that this post-hoc evaluation is very general and does not address all of the complexities of a regenerative approach, especially in an urban context. However, the author presumes that the three phases that have emerged as essential to the application of the RD+D methodology would not vary whether RD+D is applied in an urban or a rural context, but the complexities of the phases might vary from rural to urban, or from essentially undeveloped areas to already developed areas.

5.4 Next Generation – for CLC

The opinion of the interviewees was not clear on whether RD+D could be a relevant sustainability approach for the next generation of CLC, but they did allude to the opinion that an approach like RD+D would be part of the progression of a company like CLC. Also, the findings of the interviewees and literature identified that if RD+D were to be the next sustainability approach for CLC it would require the persistence of a someone to champion a regenerative approach.

Reed's Regenesis Group, and some of the literature, has demonstrated that RD+D is a plausible approach, but it requires a 'whole new mind', a mind that the interviewees may have yet to fully inhabit – at least in their professional capacities. The interviewees' responses to what needs to change, and how might that change be accomplished, did not address RD+D specifically or holistically. Instead, a more progressive technical mind-set was more front and centre.

The interviewees mostly appeared to approach sustainability with an abstract, technical mind-set; they had difficulty viewing the next generation of sustainability development from a different perspective. This was evidenced by the 'next generation' approaches that the interviewees suggested, such as elements and innovations, which are still working in the 'red zone' as identified in **Figure 3**. Working in 'the red zone' approaches sustainability through technical solutions that address individual concerns such as energy efficiency, water conservation, and emissions reductions – without looking at the whole and understanding the patterns of the living systems. Working in the 'green zone' involves approaches to sustainability from a holistic, living systems world view – that works with the systems towards interdependent co-evolution.

This is not to say that RD+D is not a possibility – as a relevant new, or next, approach to sustainability. The interviewees appeared to recognize that there has been progress over time, and that with each new project we will continue to see progress, as was witnessed at CFB Calgary. As one interviewee observed, "You kind of have to grow it [sustainability], you have to evolve into it [sustainability]" (AB). Another commented, "… for an organization like CLC, I see it again as an evolving growth of the organization" (GH). Some of the literature also points to RD+D as the most likely next approach to sustainability. Not only was there a recent special issue of *Building Research & Information* on RD+D, but some recent conference themes have involved the topic of RD+D, such as the International Living Future Institute's annual conference (http://living-future.org/unconference2014), and USGBC's interest, through the development of the REGEN tool.

What then needs to change, for RD+D to be a relevant sustainability approach for CLC? The interviews offered some changes that would be an improvement, but not necessarily relating to RD+D. One interviewee stated: "It's important for us to be looking at the world where innovation has happened and transferable innovation is possible" (GH). Another commented: "We need to move the needle in larger increments than we have been moving" (CD), with the further observation that CLC may need to move:

> into a much more comprehensive understanding that starts with density, transportation, and buildings and then add waste, water, multi-functional open space, and food, and actually think about things on the kind of scale that a LEED-ND looks at in a more comprehensive way. (CD)

This observation edges closer towards realisation of a more sustainable state, especially through the emphasis on a larger scale and a more comprehensive understanding – but it still may not be assessed as regenerative; it is also debatable whether it will 'sustain life'. There were no particular suggestions by the interviewees related to pattern understanding, designing for harmony with place, and co-evolution – all key principles of RD+D.

CLC has committed to the principle of Corporate Social Responsibility (CSR) and has adopted the balanced scorecard approach to doing business to promote innovation, but neither CSR nor the balanced scorecard was mentioned by interviewees as drivers for CLC's innovation. One interviewee made a comment that may be alluding to CSR or the balanced scorecard without explicitly using those terms. They said:

> CLC does have a certain approach, a certain track record, and a certain business model that is successful and I think there is a corporate culture with respect to sustainability that favours certain approaches. (GH)

However, even with a commitment to CSR and the balanced scorecard, it became apparent from the interviews that the sustainability initiatives that were introduced at

CFB Calgary were initially championed by a single person. The same interviewee expanded:

> I really believe a lot of it has to do with leadership. That is leadership within the administration and also at the political level in these public organizations. I have worked with different municipalities where there's been a strong political interest in achieving sustainable outcomes …. continuing down that always improving road in sustainability…. and it has been in large part because of the political leadership in those communities. (GH)

Therefore, almost certainly, if RD+D is to become a relevant sustainability approach, for CLC's next generation of projects, it will require an individual or individuals with a regenerative worldview to specifically champion the approach.

5.5 The Case Study – The Sustainability Story of the CFB Calgary Projects

One interviewee observed that CFB Calgary is emblematic of the notion that "if you build something different people will come" (CD). Working with the City of Calgary, CLC developed one of the most innovative new communities in Calgary, if not Canada. They accomplished this by improving on various components typically found in community development. The projects even won awards for being sustainable. The CLC efforts at CFB Calgary demonstrated continuous improvement, and can also be assessed as laying the ground for further progress. In the larger context of sustainability, the CLC CFB Calgary projects are still not considered sustainable, when evaluated in the context of the trajectory of sustainability referenced in this research (see **Figure 8** for a projected 'positioning' of past and prospective CLC practice, based on this research). One of the reasons for this could be because what was being sustained was never defined, and/or the whole notion of 'sustainability' was never explicitly addressed.

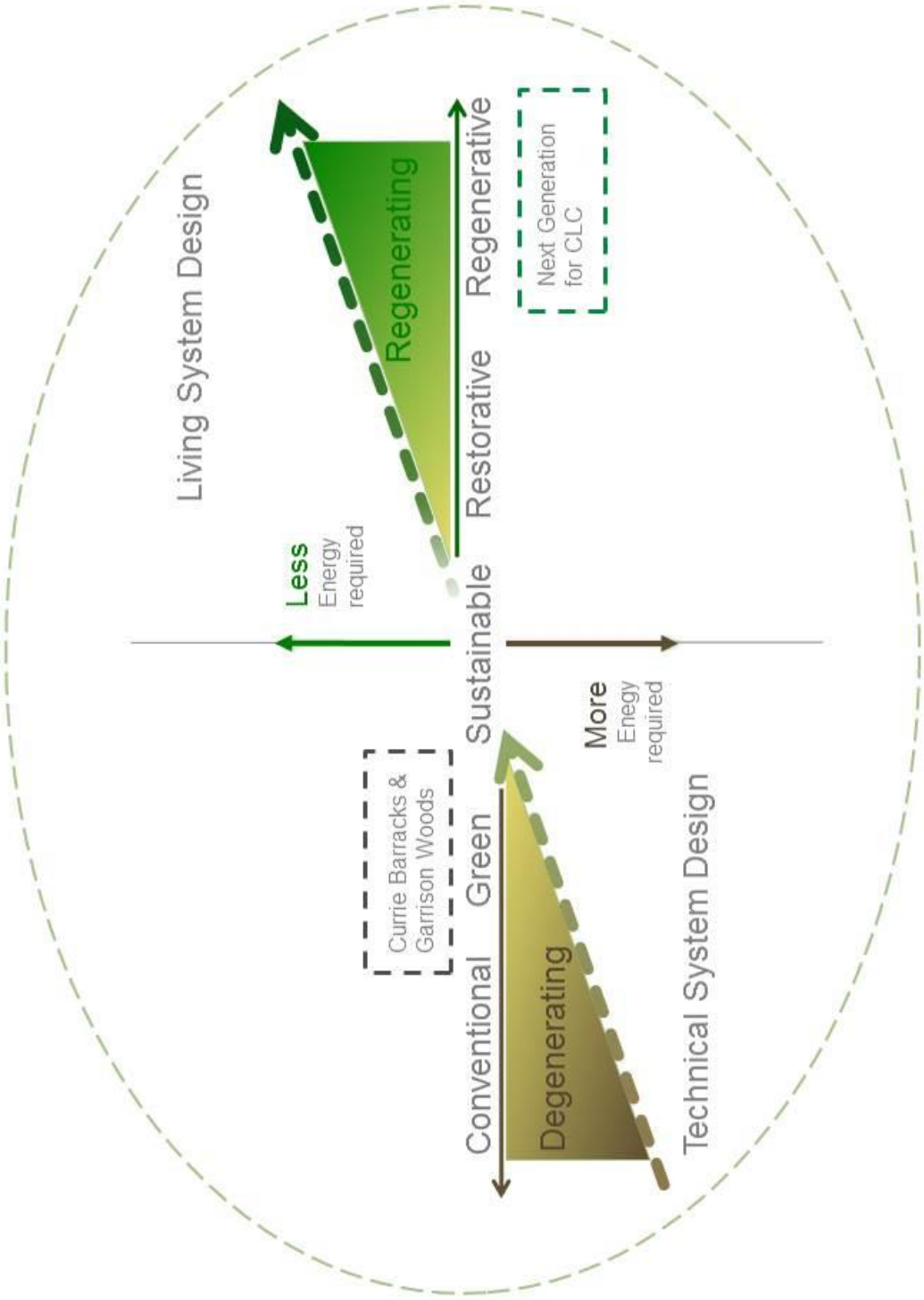

Figure 8: Adapted "Trajectory of Ecological Design" positioning the CFB Calgary projects and CLC's potential next generation projects.

A post hoc evaluation concluded that if RD+D had been the worldview at the time of project inception, there would have been a very different approach taken. Intensive stakeholder engagement, careful delineation of place parameters (at different scales), in-depth pattern discovery and understanding efforts, and ultimately a concern for operationalising the co-evolution of human and natural systems – would all have been part of the development process.

Given the responses of the interviewees, there would clearly have to be a major shift in thinking, before RD+D could be seriously considered by CLC, or the City of Calgary in this case. A hope is that this practicum will contribute some of the momentum needed to change the current largely technical and partial worldview to a more holistic regenerative worldview – and related action.

This analysis has revealed to the author that, although a common understanding of what is meant by sustainability and related terms would be useful, it might not be the most important factor. It is arguable that it is more important to better understand what is being sustained; with Bill Reed, we can possibly agree that we are trying to sustain life – because without life, what is there to sustain? Therefore, we need to better understand the living systems of a place in order to allow for their evolution.

It might be observed that 'sustaining life' could be considered to open up deeper inquiries, beyond the scope of this research, but potentially negotiable by wider more comprehensive, more inclusive, and/or more balanced perspectives, one possible example being the integral perspective offered by Mark DeKay in his recent book, *Integral Sustainable Design – Transformative Perspectives*. This could be a useful take-off point for others interested in launching such a deeper inquiry.

Chapter 6: Conclusions and Recommendations

My interest in the topic of sustainable planning and land development began over ten years ago. Through an undergraduate paper, I was introduced to the proposed Southeast False Creek project in Vancouver, BC that, at the time, in brief, was energy- and resource-efficient, and which provided affordable housing, daycare, and other community amenities. At the time, this development was quite innovative and, in consideration of what is currently being built in Winnipeg, Calgary, and most of Canada, the development would probably still be viewed as progressive.

However, more recently my inquiries and curiosity have exposed me to an emerging sustainability paradigm, RD+D, aims beyond current sustainability paradigms and challenges conventional development efforts. In effect it seeks to raise the bar from **de**generative – and effectively limited, or questionably sustainable – development, to development that is unreservedly **re**generative. Regenerative, in the context of this practicum, is considered to be more expansively, and more unqualifiedly, sustainable. The case study of the CFB Calgary properties has been pursued to further this interest in progressing sustainability.

This practicum began with a brief review of the trajectory of the sustainability approaches, outlining how RD+D offers an emerging sustainability paradigm that goes beyond commonly practiced sustainability approaches. This led to an exploration, through a case study of the design and development of CLC's Calgary CFB properties, with RD+D in mind. I wanted to know what sustainability paradigm CLC initially targeted, how RD+D might have been approached for the CFB Calgary projects, what the next sustainability approach for CLC might be – and, especially, how might RD+D

anchor a new worldview for CLC and other progressive land developers. The following sections outline the key findings, lessons learned, recommendations, and conclusions.

6.1 Key Findings Summary Review

CLC, as an innovative Canadian land developer, has pursued sustainability approaches and demonstrated progress through the development of their properties in Calgary, Alberta. Sustainability theory and related literature conveys that much more needs to be done, and can be done with a regenerative worldview – and that RD+D has the potential to be the 'next' innovative sustainability approach, in pursuit of a more sustainable future. The findings related to RD+D can largely be connected back to the work of Bill Reed and the Regenesis Group because of the knowledge and experience they have developed over the past twenty years. However, to date, much of the experience has not occurred in fully built-out areas, and further research is required to understand the potential for RD+D in an urban context.

One of the first research concerns was to better understand the definitions and terminology associated with sustainability. A diverse set of definitions of sustainability was encountered in the literature. Moreover, the terms *sustainability*, *sustainable*, and *sustainable development* were often used interchangeably, with little apparent thought to their particular meaning. Based mainly on the responses of the interviewees, and a review of the literature on CFB Calgary, sustainability came to be generally understood by the interviewees to mean 'doing better' or 'improving' – with no careful discernment as to what it was that was being sustained. The question, "what are we trying to sustain?" posed to me by Bill Reed in a personal communication, was the moment that changed fundamentally how I understood the terms associated with sustainability. Reed offered

that “we are trying to sustain life”. Obviously, a much larger debate could be triggered on the meaning of life but, on this matter, within the scope of this practicum, there was a reference to the definition put forth by the Chilean biologist Humberto Maturana who simply defines life as ‘the process of becoming’. Now, when I hear the word sustainable, I critically assess the use of the word by asking if life is being sustained, and wonder what might become – or come into being? Is life being degenerated, or generated, or regenerated? Is the envisaged sustainability approach supporting the co-evolution of natural and human systems?

CFB Calgary is often lauded as being the site of sustainable re-development (CLC, 2012; Tsenkova, 2009). There is no question that the development of the properties was innovative, but – based on this research – it is considered unrealistic to assess the development as sustainable, especially in the context of RD+D. The CFB Calgary developments are more accurately assessed as ‘green’ in relation to the positioning of the sustainability paradigms in Section 2.1.4. The properties were planned and developed with many improvements over conventional development – such as increased densities, LID (low impact development) stormwater management, a better mix of land uses and housing types, improved active transportation networks and access to transit, preservation of natural areas, reuse of existing buildings, and celebration of the military heritage (Appendix B). However, these improvements highlight that the sustainability approach considered the development in parts (as a series of elements) and through technological advances, rather than as a whole, i.e. as a whole integrated natural-living system. RD+D asserts a more progressive sustainability approach compared to

conventional, *green*, and *sustainable development*; it would have offered a completely different approach to the development of the CLC CFB Calgary properties.

Whereas some literature – if still somewhat limited – describes what RD+D is, as well as its potential importance to the sustainability movement, Bill Reed and the Regenesis Group may be singled out for the framework they have developed, over the past 20-years, to realise RD+D on the ground. They may be regarded as being amongst the foremost contributors to RD+D; much of my RD+D knowledge and understanding was gained from them – through their literature, conference presentations, and personal communication with Bill Reed. Their work is fundamental to this practicum because they have not only been studying RD+D, but they are practitioners and educators of RD+D, with many years of experience. Notwithstanding, there is still much knowledge to be garnered in an urban context, and also in how to effect a transformation in such contexts.

Ultimately, the purpose of RD+D is to facilitate the co-evolution of living systems – humans included as a living system (Cole, 2012b; du Plessis, 2012; Girardet, 2010). A simple form of this framework, which might have been applied at CFB Calgary had CLC pursued a regenerative approach, was referenced to support the post-hoc evaluation aspects of this research, addressed in Section 5.3. Simply put, a regenerative approach references a much broader area (or territory) than the site's legal boundaries; the first step of RD+D is to more capaciously define the project boundaries, or the broader arenas within which it is situated. Typically, the smallest unit that RD+D works with is the watershed. Once the boundaries are defined, all of the stakeholders, from across the public domain, work together to discover the defining patterns of the area, through a

pattern learning process. The patterns reveal how the systems work together in that place. Bill Reed remarked that people really enjoy the experience of discovering the patterns:

> So we basically take core members of the community on a tracking expedition and we help unfold those relationships in the community so they can fall in love [with the place]. I call it dating nature. (personal communication, September 17, 2013)

The importance of people falling in love with the place is extremely important to the sustainability of the project. The project team can design in a way to facilitate the co-evolution of the living systems, but the stakeholders (especially the prospective residents or occupiers) need to have the knowledge of how the discovered patterns function, so they can participate in the co-evolution. Once they are in love with the/their place, they will be more likely to protect the integrity of the design for regeneration and pass on their understanding of the place; ultimately it is *the people-in-place*, who are *of* the place, that *make* the place – and sustain it as a livelihood, that is at least a neighbourhood, that is in turn potentially a community in a wider 'community of communities', that cascades up to the scale of humanity as a whole.

Working with the RD+D approach is not likely to be as easy or straight-forward as has been generalised in this practicum. In the same way as CLC encountered significant approval challenges by the City of Calgary as regards the CFB Calgary development proposals, it is highly likely that a RD+D approach will face similar, greater challenges. However, the first challenge to overcome will be the embrace, and operational adoption, of the requisite new worldview. As evidenced by the interviews, this change is only likely to come if there is a person or a group of people who champion RD+D. Having a champion of RD+D would be especially important for a company such

as CLC who have a history of champions that have advanced their planning and land development practice.

CLC has committed to the principle of CSR since the year 2000 (see Section 2.4.1). To measure how well they are implementing their CSR initiatives, CLC uses a balanced scorecard. The balanced scorecard is a tool that is used to document, measure, and report on performance and includes six key objective areas, with one of these being 'developing sustainably'. I expected that CSR and the balanced scorecard would have been frequently referenced in some of the interviews as a key factor in CLC's efforts to practice innovative development, but this was not the case. However, the interviewees – and the literature – did recognize that CLC has a culture of being sustainable, which could likely be attributed in part to CSR and the balanced scorecard. That being said, it is unlikely that CLC would even consider RD+D through their balanced scorecard, unless a champion has a strong opinion that it should be included, or RD+D becomes so 'mainstream' that it is included in the balanced scorecard by default.

6.2 Lessons Learned

This section focuses on the lessons learned as they relate to the key research questions in Section 1.2.

1. **What is RD+D and how does it relate to the early sustainability paradigms identified in this research?**

RD+D is an emerging sustainability approach that seeks to support the co-evolution of human and natural systems. As positioned in this practicum, RD+D is currently positioned as possibly the most progressive sustainability approach. Sections 2.1.1 and 5.1 recognize sustainability as the overarching paradigm and *green*,

sustainable, *restorative*, and *regenerative* as a range of approaches that aid in the pursuit of sustainability. **Figure 3** in Section 2.1.4 compares the various approaches to date. *Conventional* and *green* approaches are seen as degenerating, relying on physical technologies and fragmented thinking. Advancing along the continuum one encounters *sustainable*, *restorative*, and – ultimately – *regenerative* approaches; the latter involve a living/whole systems perspective, and pattern thinking.

It is important to understand that RD+D is not intended to simply replicate life, or to mainly restore an area to some previous state. Restoration may be necessary in places where forms of life were destroyed, but RD+D values an understanding of how life works, through patterning, in the place you are referencing – in order to allow the living systems (natural and human) to evolve on their own; to be self-organizing. Ongoing evolution of life without unduly intrusive or destructive human management is the crucial factor of the RD+D approach. A new worldview is necessary to fully comprehend and operationalise RD+D; it is a complete departure from how land development in Canada has been approached to date.

2. **What sustainability approach was envisioned during the inception and execution of the Garrison Woods and Currie Barracks projects?**

At best, a 'green' sustainability approach was envisioned during the inception and execution of Garrison Woods and Currie Barracks (see **Figure 8**). I am able to conclude that a green approach was envisioned because the elements of progress that were demonstrated, by the development of the CFB properties, were based on technological advances, such as the stormwater management, while also reflecting comparatively fragmented thinking. Furthermore, LEED accreditation itself demonstrates fragmented

thinking because it simply considers elements of a development that meet the requirements of a checklist.

3. **What might have been different if RD+D had been the operative worldview?**

There is no easy comparison of the operative worldview, at the time of inception and execution of the CFB Calgary properties, and RD+D – if the latter had been the operative worldview. The overarching difference is that the active worldview was a technical system design that relied on various technologies and settled on fragmented thinking, whereas if RD+D had been the operative world view a living system design – effectively a whole systems perspective, along with pattern thinking, with an ultimate outcome of co-evolution – would have been operationalised.

In brief, a regenerative approach would have first identified the full extent of the reference 'place' (in all its facets and layering), which would involve looking beyond the site property boundaries (typically the smallest area referenced would be the watershed area). Then, the project team (the technical experts), working together with the stakeholders (any interested person), conducts a process of pattern learning to discover what patterns exist and how the patterns work together, as the threads and fabric of the Story of Place®. By working with others to discover the patterns, stakeholders learn about why the development is designed the way it is, and this fosters continuous community engagement, long after the project team leaves. Learning from these patterns, the designers can design in a way that supports the co-evolution of human and natural systems, and – because the stakeholders have an understanding of the patterns – they are continuously engaged with the place.

Also, unlike the strategy for Currie Barracks, a checklist approach, such as LEED-ND, is not considered conducive to RD+D at this time. Although there are two RD+D tools under development, it is difficult to say how these tools, REGEN and LENSES, might have been operationalised at CFB Calgary, because there is still little published about them (Section 2.3.2). Caution must be heeded; any tool or checklist that allows for elements to be cherry-picked from a list – whether the list is organized in a circle, horizontally, or vertically – implies a lack of understanding of whole systems and the underlying, character-defining patterns (Reed, personal communication, September 17, 2013).

4. **What was learned from the sustainability experience at CFB Calgary that could inform CLC's consideration of how to advance their sustainability practices?**

At CFB Calgary, CLC demonstrated that it is possible to achieve an innovative project, but the achievement was not without challenges. Garrison Woods and Currie Barracks faced many challenges from the City of Calgary when trying to implement new ways to develop, particularly from the engineering department, regarding road widths and land drainage. CLC was able to achieve an innovative project because the company worked closely with the City, and the City was open to finding solutions that would fit the needs of CLC's plan.

Key statements from the interviews, that could inform CLC's consideration of how to progress their sustainability practices, would be: to recognize a broader worldview; to place more emphasis on integrating disciplines and uses; to take a more comprehensive approach to multi-functional land and infrastructure uses; to be more

adaptable and flexible as regards changing contexts; to engage in greater dialogue with stakeholders; and to seek an understanding of what is realistic and pragmatic.

5. **How – and in what ways, with what rationale – could RD+D be considered an appropriate new worldview for CLC's next generation of leading-edge-seeking projects?**

CLC has demonstrated that it is a progressive company, willing to be innovative. Thus far, CLC has seen success with their more-than-conventional projects. The interviewees identified that growth within an organization like CLC will lead to RD+D, but that sustainability 'as a whole' will take time to evolve towards a regenerative approach in operational practice. However, RD+D is a sustainability approach that is available now. As was indicated at CFB Calgary, it is likely that in order for CLC to consider RD+D – as a new worldview for their next generation of leading-edge projects – there will have to be someone who champions RD+D. Only then will other considerations, such as updating the balanced scorecard, and proposing changes to the approving authority, become possible.

6.3 Recommendations for Future Research

This section offers recommendations for future research, based on the findings from this research and some further questions, outside of the scope of this research.

1. **How might the program content of conferences and the emphases of newer literature relate to the realisation of a paradigm shift?**

RD+D is an emerging paradigm that has become more recognized through recent conferences[10] and literature. How does the publication of literature on RD+D, and

[10]Conferences: http://living-future.org, http://www.futureofcitiesforum.com/, www.cagbc.org

presentations or themes at conferences, relate to the success and implementation of new paradigms? We have seen *smart growth*, *new urbanism*, and *LEED* all gain wide recognition in land development related professions. What were the key factors in their adoption? Does RD+D merit a similar strategy? Who/what can be expected to champion it, beyond those with a special interest (such as Reed and Regenesis)?

2. **How much does CLC's CSR initiative, and corresponding balanced scorecard, impact the sustainability approach to CLC's projects?**

Considering CLC's commitment to CSR and the corresponding balanced scorecard, I anticipated that there would have been more of a discussion – among the interviewees – about the role of CLC's balanced scorecard leading to the implementation of innovative development. Aside from the mention of CLC's corporate culture, there was no direct discussion of CSR or the balanced scorecard by interviewees. In addition, outside of CLC's annual reports, there was no specific mention of these aspects in literature relating to the CFB Calgary properties. It would be interesting to document if the balanced scorecard drives the sustainability approaches, or if the balanced scorecard objectives – especially 'developing sustainably' – are a product of a particular persistent champion of sustainability.

3. **What role do sustainability tools have in effecting change, and are REGEN, LENSES, or other tools practical for RD+D?**

This practicum briefly highlighted the REGEN and LENSES sustainability tools; sustainability tools have been found to be effective in promoting earlier sustainability approaches. However, RD+D is unlike any of the other sustainability approaches, and sustainability tools – especially as regards how they have historically been presented –

may not be functional for a regenerative approach that views places as wholes, and not as an assemblage of parts. An integrative, holistic approach does not lend itself to narrow technical treatments. Since a checklist approach is not ideal for RD+D, a research opportunity exists to understand what might work instead for advancing a regenerative approach.

4. **How might CLC operationalise RD+D in future projects (such as at Kapyong Barracks in Winnipeg, Manitoba for example), and what might a related RD+D process look like in such a specific context?**

This practicum has offered an overview of the RD+D approach, but it was focused more on the trajectory of sustainability in somewhat general terms, wondering about its viability for future application by the likes of CLC.

Kapyong Barracks is a former Canadian Forces Base located between two established neighbourhoods approximately nine kilometres from downtown Winnipeg, Manitoba. In 2004, the 90 acre site became vacant, and in 2007 Canada Lands Company was set to purchase the property from the Federal Government (CBC News, 2012). In 2009, the land transfer was declared invalid due to a lack of consultations with First Nation groups with Treaty Land Entitlement claims, and the case has been before the courts ever since (CBC News, 2012).

Whether CLC or a First Nations group acquires the Kapyong Barracks property, there is an opportunity for a real, grounded example of how to do RD+D in an urban context in Winnipeg, which might then help better position RD+D as a viable approach for future projects by CLC or others.

5. **How might a theoretical sustainability framework – such as the integral theory perspective employed by DeKay – strengthen the prospects for a greater take-up of a new regenerative worldview?**

This practicum has indicated that the RD+D paradigm probably requires adoption of a new, better accommodating, worldview, and *Integral Theory* has been identified as one possibility.

One way to transform a person's worldview is to "carefully frame a sustainability message in a way that resonates with someone's worldview" (Brown, 2005, p. 4). Brown contends that "the key ability [in communicating different worldviews] is to be able to honor all worldviews as they are, even if they differ from our own" (2005, p. 4). *Integral Theory* is an emerging theory, or as some refer to it – a meta-theory – that might be able to help 'honor all worldviews as they are'.

Mark DeKay and Mary Guzowski observe that, "integral theory begins with the assumption that everyone is right – at least partially –" and that "an integrally-informed approach to sustainable design (or anything else) challenges us to hold multiple simultaneous perspectives and to address different levels of awareness across the spectrum of human development" (2006, p. 2). The key element of Integral Theory is that "at its most essential level, Integral Theory organizes variables for any problem into a matrix of quadrants that intersect individual and collective phenomena with objective and subjective knowledge" (DeKay & Guzowski, 2006, p. 2). "By looking at a sustainability initiative through all of the quadrants, we're able to identify most—if not all—the major forces which influence the success or failure of that initiative" (Brown, 2007, p. 4).

As has become apparent in this practicum, RD+D is effectively positioned beyond – while honouring and encompassing – conventional, green and sustainable approaches (see Appendix 1). However, in terms of Integral Theory, DeKay & Guzowski note that "green architecture, systems approaches to building, and ecological and regenerative design all collapse reality to the lower right (systems) quadrant", essentially assimilating green and regenerative approaches (2006, p. 3). A more discerning and discriminating integral theoretical approach to RD+D may be what is needed to not only efficiently speed up adoption of a regenerative worldview, but also to increase the capacity of RD+D to be an even stronger approach to sustainability – if it can consider, and integrate, all four quadrants of Integral Theory (Experience, Behaviour, Systems and Culture).

6. **What kind of professional capacity-building and awareness-raising may be necessary if RD+D is to have a chance of becoming 'mainstream'?**

Especially with an integral approach in mind, it seems apparent that there will have to be considerable novel and/or innovative professional capacity-building and awareness-raising (via consciousness development) to help develop the new minds (and hearts and souls) that would appear to be so necessary for a widespread take-up of something like RD+D. This may entail a new overarching view of sustainability, more even than that captured by the 'urban sustainability' perspective that has been entertained here. One contender, as has been suggested earlier, might be 'integral sustainability' (Brown, 2011; DeKay, 2011; Fleming, 2013).

Barrett Brown is the main theorist/action inquiry leader around the broad theme of 'integral sustainability' at the present time. His doctoral dissertation work, especially relating to what is called the higher, post-conventional action-logics, may be considered

particularly relevant to the advancement of RD+D. To become ‘mainstream’ RD+D will need more of a critical mass of exponents who are at or beyond 'strategist' action-logic. Ideally, professional education programs will aim to turn out graduates who are at, or are aware of their prospects to become functional at, what Brown refers to as a post-conventional action-logic. A link to his dissertation may be found at: http://integrallife.com/integral-post/conscious-leadership-sustainability-executive-summary

At the moment, the educational and training 'programming' along these lines is very cutting-edge, and is probably well beyond that offered by conventional academies and professions. For those who may be interested, examples of such programming might include: Pacific Integral’s ‘Generating Transformative Change’ program and the Meta-Integral Academy’s ‘Embodied Practitioner’ program.

6.4 Conclusions

This practicum set out to recognize the trajectory of sustainability approaches and then pursued how CLC as a land developer, through their CFB Calgary projects, addressed sustainability and assessed the viability of RD+D as an emerging sustainability approach, that could be, and arguably should be, considered at the heart of CLC’s next generation of leading-edge projects.

The research found that *green, sustainable, restorative,and regenerative* were all complementary approaches that could be fitted under the sustainability paradigm. RD+D was recognized as the most progressive sustainability approach, and a very different approach than green and sustainable approaches – requiring, in effect, a new worldview in order to fully comprehend it. RD+D aims to support the co-evolution of human and

natural systems without human management through mechanical systems. Although RD+D may restore an area, the key goal is not restoration, but autonomous evolution. Although many of RD+D's core tenets are not new, it was suggested that RD+D begins to put them together in a convincing manner (Cole, 2012a). Regenerative practitioners ask not what is sustainability, but what is it that we are we trying to sustain? RD+D defines place geographically as reaching beyond the legal boundaries of a development site, and attempts to understand 'the patterns of place', relying on community engagement to help understand those patterns, to enable nothing less than the co-evolution of human and natural systems.

This practicum has supported the view that RD+D is very worthy of CLC's consideration, as a well-regarded land developer, interested in the leading-edge and more-than-conventional planning and land development practice. The case-study of the CFB Calgary developments indicated that CLC is receptive to new approaches, but the company still has much to do to significantly advance their sustainability approach. Bill Reed and his Regenesis Group have demonstrated that RD+D is a very worthy, possible approach for CLC's next-generation of projects. However, many of CLC's projects have historically been in urban areas, and, to date, there have not been any well documented examples of RD+D in fully built urban areas.

Although specifically urban sustainability was not notable as a strong concern of the RD+D literature (nor of this practicum research in the beginning), it should be acknowledged that urban areas provide a great opportunity – as well as challenge – for a regenerative approach to make a significant impact. Urbanization is a key global

challenge of our time: “urbanization is the defining phenomenon and process of this century” (Haas, 2012, p. 9).

Urban regions – city-regions or metro-regions – are increasingly relevant wider operational contexts. A report prepared for the Federation of Canadian Municipalities (FCM) (2009), comments that:

> the vast majority of Canadians live in metropolitan regions made up of many municipalities. To be addressed properly, many environmental, social and economic issues need to be planned or otherwise addressed at the regional scale (e.g., the transportation system, watersheds, air quality management).

The comment from the FCM report is of utmost importance for RD+D as it is clearly best applied by recognizing a larger scale than is normally referenced in development practice. However at this time there is limited experience and information directed specifically to urban contexts, such as that represented by the former CFB Calgary properties.

Ultimately, if sustainability is to overcome the current ecological and social challenges, much more substantial steps will need to be taken by planners and land developers in the direction of a regenerative worldview. Rodney McDonald said that, “as sustainability is the human imperative in the twenty-first century, society must continue to foster and develop the seeds of transformation that will lead us to the realization of sustainable communities” (as cited in Dale et al., 2012, p. 261). It may be contended, based on the current research, that there is no better seed of transformation for planning and land developers than moving from an effectively degenerative model to an explicitly regenerative model that explicitly supports the evolution of life. CLC appears to be positioned to demonstrate how this can be done in Canada.

This research has inspired an effort to expand the CLC's 'balanced scorecard', as one possible outcome of this thought-experiment en route to a regenerative approach (Table 5). The CLC currently includes a 'developing sustainably' component in its balanced scorecard efforts (as discussed earlier in Section 2.4.2). Could this current objective be complemented by, or be succeeded by, a 'developing regeneratively' scorecard element? Although the balanced scorecard was not a direct focus of this research, and while it is not known how much influence or impact it has on CLC's developments, there could be an opportunity – as CLC evolves – to improve their balanced scorecard to include a regenerative objective. Those applying the balanced scorecard should probably be cautioned that RD+D is not apparently conducive to a prescriptive approach; it is therefore important to consider that this offering should not be viewed narrowly as a checklist, but should be regarded mostly in aspiration terms at this juncture.

The proposed 'developing regeneratively' objective has been constructed from some 'building blocks' encountered in what may now be considered to be two key references, Dale & Dushenko's tenets urban sustainability (Section 2.2) (Dale et al., 2012), and Mang & Reed's regenerative framework and methodology (2012).

The following two tenets from Dale & Dushenko's list of seven tenets were thought to be most valuable for the proposed balanced scorecard:

1. develop robust and continuing community engagement processes and systems of governance actively engaged in regenerating the public sphere; and
2. integrate scale, limits, and diversity considerations and recognize that individual communities are nested as part of larger complex and interconnected systems into decision-making, both in terms of strategic interventions and government leadership and as a means to address gaps in implementation. (Dale et al., 2012, p. 273)

The core tenets of RD+D identified by Mang & Reed have been attempted to be reflected throughout the proposed balanced scorecard. The core tenets of RD+D as suggested by Mang and Reed are: a different worldview, a holistic understanding of place, and an emphasis on continual community engagement – each working together with a goal of co-evolution (2012).

In addition, if REGEN, LENSES, or another tool prove to be valid for RD+D, they are something CLC can consider adding in their balanced scorecard.

Table 5: Developing Regeneratively – Possible CLC Balanced Scorecard Objective

Developing Regeneratively	
Objective: support the "co-evolution" of human and natural systems to restore and enhance life	
Target	**Metric(s)**
All new development projects "recognize that individual communities are nested as part of larger complex and interconnected systems" (Dale et al., 2012, p. 273) by defining the place you are working in by the "unique, multilayered network of living systems within a geographic region that results from the complex interactions, through time, of the natural ecology…and culture…" (Mang & Reed, 2012, p. 28).	Number of projects achieving this… Percentage of projects achieving this…
"Develop robust and continuing community engagement processes systems" (Dale et al., 2012, p. 273) that builds the capacity and capability of all the stakeholders to understand how life works in that place to support co-evolution.	Number of projects achieving this… Percentage of projects achieving this… List the involved stakeholders and their stories…
Undertake an extensive pattern learning exercise with all stakeholders to learn how the process of life works in that place.	Number of projects achieving this… Percentage of projects achieving this… Identify the patterns…
Once the patterns are determined, define what is being sustained and design the site so to not interfere with the patterns of life, ultimately allowing the systems to evolve.	Number of projects achieving this… Percentage of projects achieving this… Define what is being sustained and how the design will support co-evolution of the living systems…

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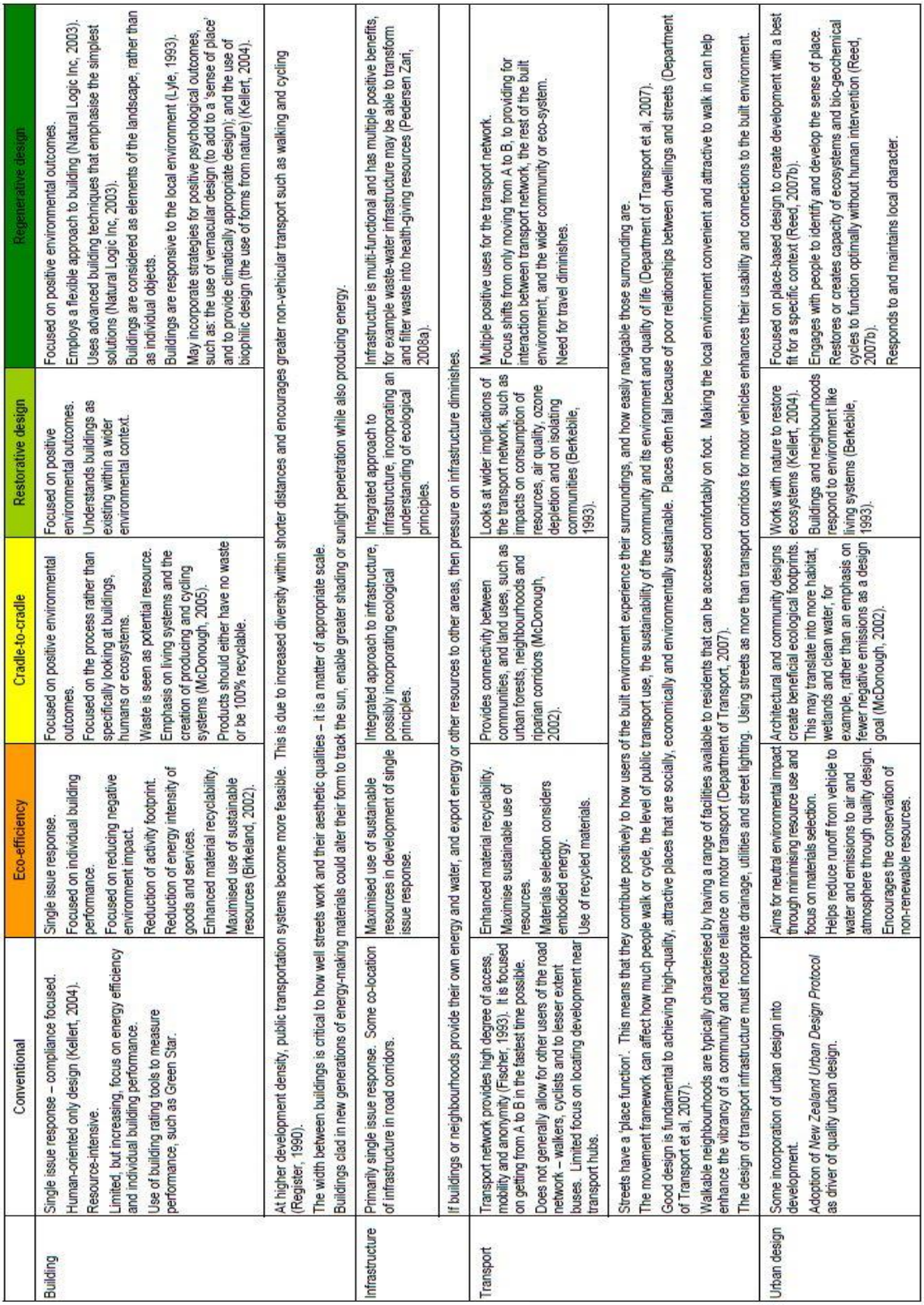
Appendix A: Comparing the Different Concepts



	Conventional	Eco-efficiency	Cradle-to-cradle	Restorative design	Regenerative design
Building	Single issue response – compliance focused. Human-oriented only design (Kellert, 2004). Resource-intensive. Limited, but increasing, focus on energy efficiency and individual building performance. Use of building rating tools to measure performance, such as Green Star.	Single issue response. Focused on individual building performance. Focused on reducing negative environment impact. Reduction of activity footprint. Reduction of energy intensity of goods and services. Enhanced material recyclability. Maximised use of sustainable resources (Birkeland, 2002).	Focused on positive environmental outcomes. Focused on the process rather than specifically looking at buildings, humans or ecosystems. Waste is seen as potential resource. Emphasis on living systems and the creation of producing and cycling systems (McDonough, 2005). Products should either have no waste or be 100% recyclable.	Focused on positive environmental outcomes. Understands buildings as existing within a wider environmental context.	Focused on positive environmental outcomes. Employs a flexible approach to building (Natural Logic Inc, 2003). Uses advanced building techniques that emphasise the simplest solutions (Natural Logic Inc, 2003). Buildings are considered as elements of the landscape, rather than as individual objects. Buildings are responsive to the local environment (Lyle, 1993). May incorporate strategies for positive psychological outcomes, such as: the use of vernacular design (to add to a 'sense of place' and to provide climatically appropriate design); and the use of biophilic design (the use of forms from nature) (Kellert, 2004).
	At higher development density, public transportation systems become more feasible. This is due to increased diversity within shorter distances and encourages greater non-vehicular transport such as walking and cycling (Register, 1990). The width between buildings is critical to how well streets work and their aesthetic qualities – it is a matter of appropriate scale. Buildings clad in new generations of energy-making materials could alter their form to track the sun, enable greater shading or sunlight penetration while also producing energy.				
Infrastructure	Primarily single issue response. Some co-location of infrastructure in road corridors.	Maximised use of sustainable resources in development of single issue response.	Integrated approach to infrastructure, possibly incorporating ecological principles.	Integrated approach to infrastructure, incorporating an understanding of ecological principles.	Infrastructure is multi-functional and has multiple positive benefits, for example waste-water infrastructure may be able to transform and filter waste into health-giving resources (Pedersen Zari, 2008a).
	If buildings or neighbourhoods provide their own energy and water, and export energy or other resources to other areas, then pressure on infrastructure diminishes.				
Transport	Transport network provides high degree of access, mobility and anonymity (Fischer, 1993). It is focused on getting from A to B in the fastest time possible. Does not generally allow for other users of the road network – walkers, cyclists and to lesser extent buses. Limited focus on locating development near transport hubs.	Enhanced material recyclability. Maximise sustainable use of resources. Materials selection considers embodied energy. Use of recycled materials.	Provides connectivity between communities, and land uses; such as urban forests, neighbourhoods and riparian corridors (McDonough, 2002).	Looks at wider implications of the transport network, such as impacts on consumption of resources, air quality, ozone depletion and on isolating communities (Berkebile, 1993).	Multiple positive uses for the transport network. Focus shifts from only moving from A to B, to providing for interaction between transport network, the rest of the built environment, and the wider community or eco-system. Need for travel diminishes.
	Streets have a 'place function'. This means that they contribute positively to how users of the built environment experience their surroundings, and how easily navigable those surrounding are. The movement framework can affect how much people walk or cycle, the level of public transport use, the sustainability of the community and its environment and quality of life (Department of Transport et al, 2007). Good design is fundamental to achieving high-quality, attractive places that are socially, economically and environmentally sustainable. Places often fail because of poor relationships between dwellings and streets (Department of Transport et al, 2007). Walkable neighbourhoods are typically characterised by having a range of facilities available to residents that can be accessed comfortably on foot. Making the local environment convenient and attractive to walk in can help enhance the vibrancy of a community and reduce reliance on motor transport (Department of Transport, 2007). The design of transport infrastructure must incorporate drainage, utilities and street lighting. Using streets as more than transport corridors for motor vehicles enhances their usability and connections to the built environment.				
Urban design	Some incorporation of urban design into development. Adoption of *New Zealand Urban Design Protocol* as driver of quality urban design.	Aims for neutral environmental impact through minimising resource use and focus on materials selection. Helps reduce runoff from vehicle to water and emissions to air and atmosphere through quality design. Encourages the conservation of non-renewable resources.	Architectural and community designs create beneficial ecological footprints. This may translate into more habitat, wetlands and clean water, for example, rather than an emphasis on fewer negative emissions as a design goal (McDonough, 2002).	Works with nature to restore ecosystems (Kellert, 2004). Buildings and neighbourhoods respond to environment like living systems (Berkebile, 1993).	Focused on place-based design to create development with a best fit for a specific context (Reed, 2007b). Engages with people to identify and develop the sense of place. Restores or creates capacity of ecosystems and bio-geochemical cycles to function optimally without human intervention (Reed, 2007b). Responds to and maintains local character.

Source: Jenkin & Pedersen Zari, 2009

Appendix B: Field-Work Photography

Figure A: Currie Barracks – LID Bioswale

Figure B: Currie Barracks – LID Dry Pond

Figure C: Garrison Woods – Mix of Uses

Figure D: Garrison Woods – Mix of Housing Type

Figure E: Garrison Woods – Mix of Housing Type and Density

Figure F: Currie Barracks – Single-Family Home

Figure G: Currie Barracks – Diverse Architectural Design

Figure H: Currie Barracks – Reduced Setbacks

Figure I: Currie Barracks – Military Heritage

Figure J: Currie Barracks – Active Transportation Network

Appendix C: Project Backgrounder

As a prospective interviewee, the following information is intended to provide you with background information about my Major Degree Project, why I think you may be able to help inform the research, and how the research might benefit you.

Understanding the various uses of the word sustainability and other terms associated with sustainability was a challenge during the literature review for this project. Therefore, before we begin, I want to clarify that this practicum currently adopts the perspective provided by Cole (2012b) that sustainability is "an overarching, globally-scaled, evolving aspiration" (p. 47) and that green design, sustainable development, restorative, and regenerative design and development are "complementary approaches to the design of buildings and the built environment that aid in this process [of achieving a sustainable future]" (p. 47) (Plaut et al., 2012; Reed & Boecker, 2012).

The purpose of this practicum is to explore the prospects for what could be the next generation of leading-edge planning and land development practice (namely, RD+D). This will be accomplished through understanding, re-evaluating, building upon, and innovatively extending Canada Lands Company's (CLC) experience with planning and land development. Critically, this will be undertaken with a particular potential new worldview in mind, namely Regenerative Design and Development (RD+D), and the associated shift in emphasis - from what some might assess as inadvertently 'degenerative' to explicitly 'regenerative' approaches to planning and land development.

The sustainability approaches identified in this practicum are generally situated along a continuum from *degenerative* ('doing less harm; decline in value or worth) to *sustainable* ('doing no harm; keep from failing') to *regenerative* ('doing some good; give new life, strength, or vigour') (Cole, 2012b; Plaut Dunbar, Wackerman, & Hodgin, 2012; Reed & Boecker, 2012). Figures 3 and 4 (below/attached) illustrate the relationship between these approaches to sustainability.

Based on these distinctions, most proponents of the *regenerative* (RD+D) approach would likely argue that, in Canada at present, there are no community-scaled examples of sustainable or regenerative built environments – planned, developed or proposed. This contention has been interpreted as providing a research opportunity to investigate what sustainability approaches CLC targeted at CFB Calgary, how

sustainability was operationalized, and what the planning and development could have looked like if RD+D had been the operational worldview.

Canada Land Company's CFB Calgary properties, Garrison Woods and Currie Barracks, are being investigated, as a case study set, to assess how CLC viewed these projects during their inception and development. What benchmarks were being targeted? What 'planning and development' paradigm was applied? A post-hoc evaluation is being pursued, guided by what is perceived to be emerging at present, in terms of the RD+D paradigm. What might have been different if RD+D had been the explicit operative worldview informing the Calgary projects? How might such understanding currently inform CLC's consideration of how to advance its practices in pursuit of sustainability? Could RD+D be a relevant paradigm for their next generation of leading-edge-seeking projects? This practicum – viewing CLC as the potential client - is expected to provide planners and land developers with practical insights from a potential new worldview for leading-edge planning and land development.

CLC's properties at CFB Calgary were chosen because Currie Barracks is one of the most lauded sustainability projects in Canada to date, demonstrating progress from Garrison Woods – a highly lauded project in its own time. In fact, Currie Barracks was the first project in Canada to achieve one of the highest ratings under current sustainability assessment tools, LEED for Neighbourhood Development Gold (Canada Mortgage and Housing Corporation (CMHC), 2004; Ewing, 2012).

RD+D may be generally explained - for the purposes of this research - as aiming to support the "co-evolution" of human and natural systems, to ultimately restore and enhance life (Cole, 2012b; du Plessis, 2012; Girardet, 2010). Furthermore, Mang & Reed (2012) provide a simple explanation of RD+D as: requiring a deep understanding of the site and how the site and the interconnected systems relate to each other, designing with those systems, and allowing for the systems to be able to regenerate. Cole (2012a) suggests that "while many of its [regenerative design's] core tenets – systems thinking, community engagement, respect for place – also have long individual histories in architectural discourse and practice, regenerative design begins to put them together in a cogent manner" (p. 1).

[NB: The next two paragraphs of the backgrounder will be catered to each prospective interviewee's expertise, but will generally be along the following lines:]

Your experience as a (planner, developer, consultant, etc.) with (affiliation) will provide invaluable insight into this research. I anticipate that you will be able to contribute (project experience, research experience, etc.) from your work with (insert work).

To complete this research, individual participants will be asked to participate in a one-time focused interview that is anticipated to last approximately one hour. Interview topics will involve questions about sustainability at the inception of the Garrison Woods and Currie Barracks projects, a post-hoc evaluation with Regenerative Design and Development in mind, and exploration of the next generation of leading edge planning and development.

I expect you will benefit from participating in this research. Benefits to you may include: the prospect of professional learning credits, the opportunity to contribute your knowledge and experience to research in your professional field, and the possibility of being introduced to a new arena for your own practice consideration.

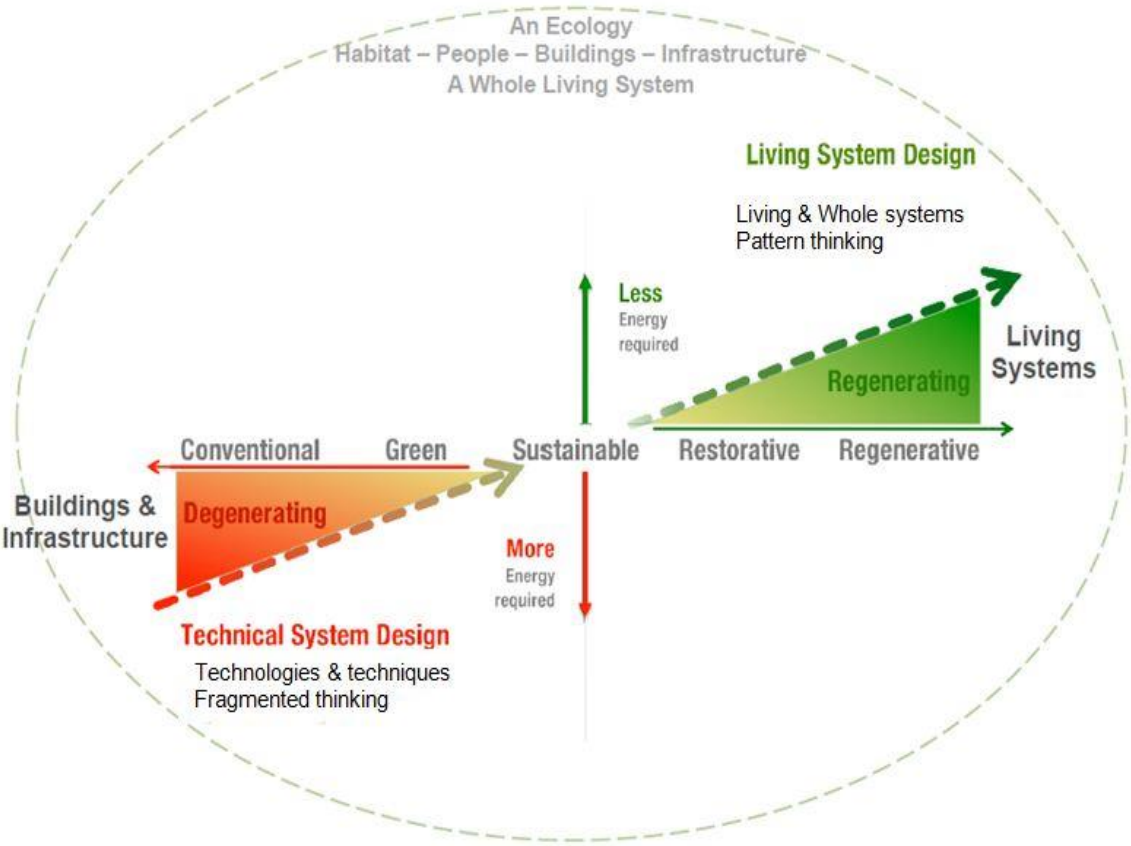


Figure 3: "Trajectory of ecological design" (Reed & Boecker, 2012, slide 12)

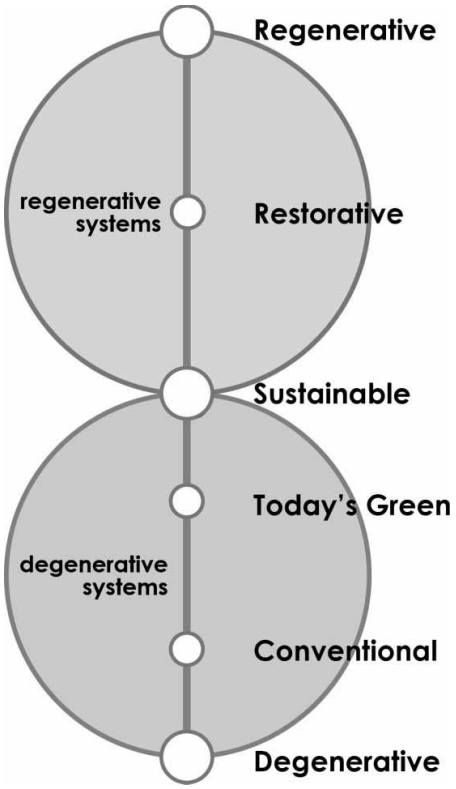


Figure 4: Degenerative and regenerative spheres (Plaut et al., 2012, p. 114)

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Appendix D: Interview Guide

The interview guide will focus on eliciting responses from informed individuals concerning development of CLC's CFB Calgary properties, especially regarding the topic of sustainability at the time of inception, through a post-hoc evaluation with RD+D in mind, and a consideration of the potential next generation of approaches to achieving sustainability for an entity such as CLC.

Probes will be used to elicit in-depth responses. Any number of probes may be used throughout the interview process during this research. Some possible, currently anticipated probes - under the areas of project inception, post-hoc evaluation, and next generation of sustainability - are also indicated below.

Project inception

- Intro Questions
    - How many years have you worked in the area of sustainability? What changes have you noticed? Any particularly big or significant changes from your perspective?
    - How do you personally define sustainability? And how have you attempted to achieve sustainability in your work?
- Was there a sustainability framework being used in the planning of the Garrison Woods and Currie Barracks properties?
    - What sustainability approach – in terms of key design/development elements - was envisioned/targeted at Garrison Woods and Currie Barracks, during the inception and execution of the CFB Calgary Properties?
    - In retrospect (referring to the backgrounder exhibits), how would you now assess the planning and development sustainability paradigm applied in the Garrison Woods and Currie Barracks properties?
- How did the execution of the development vary from the initial concept, if at all, in either or both projects?
- In your opinion, what sustainability progress does Currie Barracks demonstrate over Garrison Woods? What was learned from Garrison Woods that benefited Currie Barracks? What is being learned from Currie Barracks that might benefit future properties?

Post-hoc evaluation

- Based on the sustainability framework that was applied, do you think you realized your objectives?

- What – potentially - would have been different if RD+D had been the operative worldview?
    - How was the project boundaries defined?
    - Was there any discussion around integrating different natural systems?
    - Was the historical purpose of the site considered?
    - Was there any discussion of continued community engagement to ensure that the sustainability "targets" would be met, and evolve over time?
- What was learned – in retrospect - that might inform the current pursuit of RD+D?

Next generation – for CLC

- In what ways would RD+D be a relevant sustainability approach for CLC's next generation of projects?
- How can the experience at CFB Calgary inform CLC's consideration of RD+D as a new worldview, or target, for their practice of sustainability?
- What needs to change? How might such change be accomplished? What merits further investigation?

Appendix E: Cities of Calgary and Winnipeg Definitions of Development

The City of Calgary Land Use Bylaw 1P2007 (City of Calgary, 2007, p. 17) defines *development* as meaning:

- an excavation or stockpile and the creation of either of them;
- a building or an addition to or replacement or repair of a building, and the construction or placing of any of them on, in, over or under land;
- a change of use of land or a building or an act done in relation to land or a building that results in or is likely to result in a change in the use of the land or building; or
- a change in the intensity of use of land or a building or an act done in relation to land or a building that results in or is likely to result in a change in the intensity of use of the land or building.

The City of Winnipeg's definition, from the City's Charter, defines *development* as meaning:

> the construction of a building on, over or under land, a change in the use or intensity of use of a building or land, the removal of soil or vegetation from land, the deposit or stockpiling of soil or material on land, and the excavation of land. (City of Winnipeg, 2002, "Definitions").

Appendix F: Consent Form

Faculty of Architecture

UNIVERSITY OF MANITOBA

City Planning
201 Russell Building
84 Curry Place
Winnipeg MB
R3T 2N2
Tel: (204) 474-9458
Fax: (204) 474-7532

Statement of Informed Consent

Research Project Title:
Prospecting Regenerative Development: An emerging sustainability paradigm for the Canada Lands Company? [A Case Study of the CLC Calgary Projects – Garrison Woods and Currie Barracks]

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Project Description:
The purpose of this practicum is to explore the prospects for what could be the next generation of leading-edge planning and land development practice. This will be accomplished through understanding, re-evaluating, building upon, and innovatively extending Canada Land Company's experience with planning and land development. Critically, this will be undertaken with a potential new worldview in mind, namely Regenerative Design and Development, and the associated shift in emphasis - from what some might assess as inadvertently 'degenerative' to explicitly 'regenerative' approaches to planning and land development.

Participant Activities, Risk, and Benefits:
To complete this research, you are invited to participate in a one-time focused interview that is anticipated to last approximately one hour. Interview topics will involve questions about sustainability at the inception of the Garrison Woods and Currie Barracks projects, a post-hoc evaluation with Regenerative Design and Development in mind, and an exploration of the next generation of leading-edge planning and development. The research should pose minimal risk, if any.
You will not receive any monetary compensation as part of your involvement in the research. However, projected benefits may include the prospect of professional learning credits (from studying the backgrounder references), the opportunity to contribute your knowledge and experience to research in your professional field, and the possibility of being introduced to a new arena for your own practice consideration.

Feedback/Debriefing:
After each interview, individual feedback will be provided within one month of the interview. Feedback will be provided by myself, the principal researcher, by phone, email, in person, or in writing to ensure the information that you have provided is accurate. At the conclusion of the interview, an overall interview summary will be provided to you in accordance with this informed consent protocol. You will have two weeks to confirm that the information provided is correct which will also mark the last opportunity to withdraw your data from the study.

In addition, at the conclusion of the overall study you will be offered a copy of the practicum, in a digital format.

Audio Taping and Confidentiality:
In some interviews, and with your permission, the interviews may be audio-recorded and transcribed at a later date for research purposes, so that analyzing the material at a later date will be completed with greater ease and efficiency. Such audio-recordings will be kept in a secure place, and destroyed by myself after they have been transcribed. Your name or any other personal information will not be included in any publicly disseminated materials arising from the study. Where information occurs within a session transcript that will be included in the final project documentation, names and other personal information will be omitted, unless such permission has been explicitly granted.

Dissemination of Results:
Study results will be disseminated by myself through a Masters of City Planning practicum - by hard copy at the University of Manitoba Architecture/Fine Arts Library, a digital copy online, and through the oral defence. It is also possible, that the study results will be disseminated in a journal article or conference presentation. Dissemination of results will not compromise confidentiality of the participants.

Participant Correspondence:
Attached you will find a copy of the email/phone script and project backgrounder which was used for all potential participants.

Contact Information:
Principal Investigator: Brock Feenstra, Graduate Student, Department of City Planning, University of Manitoba
Phone:
Email:

Research Supervisor: Dr. Ian Wight, Associate Professor, Department of City Planning, Faculty of Architecture, University of Manitoba
Phone:
Email:

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Joint Faculty Research Ethics Board (JFREB). If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at 474-7122. A copy of this consent form has been given to you to keep for your records and reference.

Thank you for taking the time to contribute to this project. Your participation and insights are very valuable and are greatly appreciated.

I, _____, consent to the inclusion of my
(Name of Participant: please print)
name in publications resulting from the study.

I, _____, **DO NOT** consent to the
(Name of Participant: please print)
inclusion of my name in publications resulting from the study.

I, _____, consent to being audio-taped
(Name of Participant: please print)
during the interview as part of this study.

I, _____, **DO NOT** consent to being
(Name of Participant: please print)
audio-taped during the interview as part of this study.

I understand that the information I provide will be incorporated in a presentation and report by the student researcher. I also understand that all information will be treated as confidential, stored in a private and secure place, and subsequently destroyed two-years after the end of the project by the Principal Investigator.

Signature of Participant	Date
Name of Principal Investigator	Date
Signature of Principal Investigator	Date