

# Fairway to Greenway:

Transformation from golf course to a sustainable  
community in the Seine River corridor

by  
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## Abstract:

The intent of this Practicum is to explore the redevelopment of the Windsor Park Golf Course in Winnipeg, Manitoba. This aim was instigated by the release of an Expression of Interest by the City of Winnipeg in the fall of 2011 to sell a number of its publicly owned golf courses of which Windsor Park was named.

The land currently occupied by the golf course is rich with natural amenities, which includes a long and contiguous riparian corridor, mature patches of valuable upland forest, and areas of natural drainage. The overarching goal of this practicum is to retain these ecosystem services by implementing best practices that promote a repurposing of existing land use, create a new residential neighbourhood to limit new urban sprawl and enhance accessibility for residents and visitors.

## Acknowledgements:

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## Chapter 1 | Introduction

In the fall of 2011, the City of Winnipeg released Expression of Interest (EOI) # 497-2011 for the development of selected city-owned golf courses.

This EOI recognized the value of the land currently occupied by these golf courses and solicited proposals for commercial and/or residential development for one or more of the following city owned golf courses: Canoe Club, Crescent Drive, Harbour View, John Blumberg, Kildonan Park, Tuxedo, Windsor Park.

These golf courses are major placeholders of green spaces within metropolitan Winnipeg. Any transformation represents an opportunity to implement the promising development practices outlined in *OurWinnipeg*, the City of Winnipeg's most recent municipal development plan. The potential redevelopment the selected golf courses also presents an opportunity to promote and prioritize environmentally responsible growth within Winnipeg.

This Practicum aims to explore best practices in the areas of urban green redevelopment. The best practices reviewed and presented hold significant promise for the transformation of the Windsor Park Golf Course. Demonstrated within this project is that thoughtful, quality and sustainable development can help to retain the intrinsic natural qualities of the land for future generations while also making the space more accessible to the citizens of Winnipeg. Development of the golf course would re-purpose the land from a specific pay-per-use program into a sustainable neighbourhood, which curbs urban sprawl, while also curtailing the elimination of rural greenfields for residential neighbourhoods.

The practicum site of Windsor Park Golf Course is one of three 18-hole golf courses directly adjacent to the Seine River corridor in southeast Winnipeg. It has an established riparian corridor in addition to many mature stands of Bur oak. The course is used year round by golfers in the summer and the Windsor Nordic Ski Centre in the winter for cross-country skiing.

The City of Winnipeg *OurWinnipeg Initiative* defines transformative areas as ‘areas of the city that provide the best opportunity for growth and change’ (City of Winnipeg, 2011c). Although not yet listed as major redevelopment sites, the golf courses are under examination for development potential. *OurWinnipeg* deems major redevelopment sites as being highly valuable in that they are large, under-utilized lands along rail lines, major corridors or rapid transit corridors and are also adjacent to existing communities (City of Winnipeg, 2011c). They present opportunities for transformative and strategic mixed-use infill and intensification and are often serviced by some level of existing infrastructure.

## **1.1 Goals and Objectives of the Practicum**

### Goal

The goal of this practicum is to explore the development of the existing Windsor Park Golf Course as a transformative urban area within Winnipeg by preparing a development proposal in response to the City of Winnipeg EOI # 497-2011 for Select City-Owned Golf Courses.

### Objectives

- To explore three scenarios of neighbourhood development at different densities and arrangements to determine the most suitable neighborhood framework based on the environmental, economic and social objectives of the City of Winnipeg’s *OurWinnipeg* municipal development plan;
- To determine areas of potential development while exploring how to retain the intrinsic natural qualities within Windsor Park Golf Course;

- To implement the principal theories of landscape architecture, landscape ecology and urban planning to establish a set of best practice design parameters for transformative urban areas to ensure a high quality neighbourhood development, and
- To develop the most suitable neighbourhood framework into a sustainable community masterplan for the new development proposal.

## Chapter 2 | Key Concepts

### 2.1 Introduction

Three main concepts informed the design decisions for the new development proposal of the Windsor Park Golf Course. These include:

- The history of the Seine River Corridor and the Windsor Park Golf Course today;
- The plans and policies of the City of Winnipeg with respect to the development of new communities; and
- The concept of sustainable development in regards to new communities.

Together, these concepts guide the design proposal and provide an understanding of the existing site history in a context with current development policies and sustainable best practices for community development.

### 2.2 Site: Seine River Corridor + Windsor Park Golf Course

The Seine River is a small river that runs through southwestern Manitoba and the city of Winnipeg to the Red River. Historically, the Seine River was the principal drainage channel for the watershed but never used for transportation. The course of the river was non-continuous and broken in two places by marshes that flow back into the river (Chaupt, 1995).

Early settlement in the Seine River corridor was sporadic. In 1818, the earliest parish bordering the Seine was established on land allocated to the Roman Catholic Church by Lord Selkirk (Figure 2.1). These lands known



as “Seigneurie” were later divided into the smaller parishes of St. Boniface, St. Vital and St. Norbert on the west side of the Seine, while the Roman Catholic Church held 10,000 acres of land on the east side of the Seine River (Chaupt, 1995). Early economic development along the Seine consisted of several mills near its mouth at the Red River; brickworks companies, and hotels that serviced the CPR railway on the east side of the Seine by 1850 (Chaupt, 1995).

Urban development began sporadically with many settlers leaving the area after a flood in 1826. Those that remained lived at the end of their river lots near the Red River (Chaupt, 1995, p. 15). The City of St. Boniface, incorporated in 1908, annexed the former ‘Seigneurie’ lands into the Rural Municipality of St. Vital in 1915 (Figure 2.2). The river lot system west of the Seine was evident, while the development on the east side of the river was mostly gridded (Chaupt, 1995, p. 6). The site of Windsor Park Golf Course resided under the “Seigneurie” lands until 1921.

In 1921, the site of the Windsor Park Golf Club was chosen by a group of private golf enthusiasts. The clearing of trees began soon after during the winter

1818:



Figure 2.1: Seigneurie Lands.

Hurevy Survey 1836 (Archives of Manitoba).

1917:



Figure 2.2: Annexation of Seigneurie Lands

Chataway's Map of Greater Winnipeg Enlarged & Revised Edition (1917)

with hopes of opening for the next season. Site preparation was done without the aid of machinery (Figures 2.3, 2.4). The nine hole course opened May 24, 1922. Plans for expansion to eighteen holes were in progress. (Hackett, 1998, p. 258-260).

Due to the popularity of the game in the 1920's, the City of Winnipeg acquired the partially completed golf course in 1924 and opened with an additional nine holes in 1925; the second 18 hole municipal golf course in the city (Macdonald, 1995, p. 48).

The Windsor Park Golf course is used recreationally for twelve months of the year. In the spring, summer and fall, the City of Winnipeg operates the eighteen hole pay-per-use course, while the Windsor Park Nordic Centre operates cross-country ski trails during the winter on a fee basis (Cross Country Ski Association of Manitoba, 2013).

The City of Winnipeg is losing money on the operations of its public golf courses and is looking at options to curtail the losses (Skerrit, 2011). City of Winnipeg auditors have recommended that in order to do so, selling the property or properties and either

## 1921-1925:



Figure 2.3: Seeding of Windsor Park Golf Course

City of Winnipeg, 1995



Figure 2.4: Grading of Windsor Park Golf Course

City of Winnipeg, 1995

contracting out their management or amalgamating the properties would be viable options (Skerrit, 2011). It is estimated that the courses lose approximately \$1 million per year. One of the main reasons for the losses is due to an abundant supply of public courses which are out competed for business by private courses (Skerrit, 2011).

Geographically, these courses are located in established neighbourhoods within the city and are large enough parcels of land to create neighbourhoods to address the growing demand for housing supply, preferably affordable housing. The courses are also in close proximity to existing infrastructure such as roads, public transit, active transit routes, schools, libraries and utilities. This criteria meets with the direction of *OurWinnipeg* for major the redevelopment of sites with “large scale opportunities to enhance Winnipeg’s urban fabric by repurposing obsolete land uses as new developments” (City of Winnipeg, 2011c).

The Seine River corridor was recognized for its recreational and historic values in the early 1990’s. Stewardship for the corridor began with the volunteer group Save Our Seine (SOS) to preserve and protect these values. Local residents joined together to advocate for remediation of contaminated sites along the river and create recreation trails and development buffers along the urban Seine River to protect from new contamination (Save Our Seine River Environment Inc., 2012). Windsor Park Golf Course is a unique property that spans both sides of the river which increases the potential impact of any future development.

### **2.3 Planning + Direction in Winnipeg**

The previous planning and development document, *Plan Winnipeg* from 1993 anticipated a significant decline in the demand for residential and other new development (City of Winnipeg, 1993, p. 78). “Slow growth” to “no growth” was anticipated due to the out-migration of young adults to growing major urban centres (City of Winnipeg, 1993, p. 10). However, lands for new development in response to market changes were to continue to be provided. Mixed land use and compact development were areas addressed in the plan in regards to urban infill and minimizing land use in response to demand for sustainable development.

The City of Winnipeg was aiming in the 1993 plan to become a model city for sustainable development “through the attitudes of residents; attraction of environmentally conscious industry and businesses, and the encouragement of sustainable development practices” (City of Winnipeg, 1993, p. 40). However, being deemed a “slow growth” or “no growth” city, developers have had the upper hand in determining the quality of growth in Winnipeg, despite planning policy (Leo & Brown, 2000).

For Winnipeg, “slow growth” is determined by a regional economy that is less dynamic than other cities which are growing more quickly. Rapidly growing cities and “slow growth” cities exhibit different spatial patterns of development (Leo & Brown, 2000). Developers of “slow growth” cities are at the helm of where they want to develop and the City of Winnipeg, in desperation for growth, condones the developer’s patterns, resulting in low density, vehicle dependent subdivisions requiring lengthy connections to existing city infrastructure such as roads and sewers (Leo & Brown, 2000).

The City of Winnipeg’s *OurWinnipeg* plan recognizes this pattern and responds with defining areas of underutilization that focus on the potential for redevelopment. These areas are referred to as transformative areas and within these areas are parcels of land deemed major redevelopment sites which are actually areas of the city that provide the best opportunity for growth and change (The City of Winnipeg, 2011c).

*OurWinnipeg* deems major redevelopment sites as highly valuable as they are also large, under-utilized lands along rail lines, major corridors or rapid transit corridors and adjacent to existing communities. They present opportunities for transformative and strategic mixed use infill and intensification. They are often serviced by existing infrastructure.

The plan anticipates a significant growth for Winnipeg in the next 25 years and recognizes that housing will be needed to accommodate this growth. This includes the planning for new homes as well as upkeep and efficient use of existing housing stock (City of Winnipeg, 2011c).

One of the core direction strategies of *OurWinnipeg* is the *Complete Communities Direction Strategy*. A 'complete community' in the plan is defined as "places that both offer and support a variety of lifestyle choices, providing opportunities for people of all ages and abilities to live, work, shop, learn and play in close proximity of one another" (The City of Winnipeg, 2011b). It also examines the current state of land supply, anticipates the level and type of expected growth, and examines the best practices to achieve the creation of complete communities through balanced and sustainable growth. To do so, facilitation of underutilized properties to increase residential and mixed use development are identified to create sustainable new communities to minimize the spatial use of land (The City of Winnipeg, 2011b).

## **2.4 Sustainable Development + the Potential for Winnipeg**

To develop sustainably within a city, a number of variables must be considered. For the purpose of this Practicum the variables of focus will be: site selection, housing density, ecosystem services such as water and vegetation, low impact methods of transportation and creation of walkable communities.

Using land close to existing services and within city limits reduces the need for urban sprawl and the extension of infrastructure and roads. Low density suburbs have been in existence for over 50 years, but this pattern of land use will not prove sustainable as the supply of land to house a growing population at a low density that has become the norm is dwindling (Campoli, 2007). In the United States, suburbs are growing faster than city cores and the workforce is migrating outward accordingly (Campoli, 2007). This causes land consumption for urbanization to sharply increase and takes away from agricultural land required to feed a growing population (Campoli, 2007).

The low-density suburb has created the need to spread out making cities spatially larger and reliant on automobile use. Prior to individual automobile use, cities grew up or filled in by rebuilding structures within reach of public transportation or short walking distances (Campoli, 2007, p. 5). As land and energy sources deplete, the need to reverse this sprawling trend increases.

Sustainable cities, and on a smaller scale the neighbourhoods that compose them, require people to live closer together and share in public spaces. Without the need for private yards, larger public spaces can provide more amenities to a larger number of people. Higher density dwelling allows for larger areas of greenspace which can offer ecosystem services for the treatment of water and forests for shade and improved air quality. Living closer together also increases interaction between residents by creating a greater sense of community and increasing the number of activities within close proximity thus increasing active and public transportation use within the community (Campoli, 2007).

Increasing suburban growth requires the removal of natural features upon which the new developments are built. Removing forested areas, channeling of streams and destruction of valuable wetlands are a few of the ecosystems services impacted by this urban sprawl. Fragmentation of these ecosystems occurs and makes what land is left for wildlife habitat and agricultural purposes impacted and less productive.

This applies to human use as well as daily requirements such as work, school and access to services that are now farther apart, require more vehicular reliance and commuting time (Girling, 2005, p. 3). Larger roads are built to accommodate the suburban lifestyle. Larger roads mean more polluted storm-water run off with fewer wetlands to treat this water. The effects of this pollution is underestimated: run-off from roads and other impervious surfaces places 300 million litres of oil a year from vehicles into Canadian watersheds - seven times the oil spill of the EXXON Valdez (Canada Green Building Council, 2011) (Figure 2.5).

Setting a benchmark for sustainable development within growing cities like Winnipeg begins with utilizing existing road infrastructure, encouraging public and active transportation. In addition, maximizing the use of ecosystem services within the new development on the Windsor Park Golf course would create a sustainable new neighbourhood from an environmental perspective.

While the site of the Windsor Park Golf Course is deemed underutilized by the City of Winnipeg from an economic standpoint, the land is becoming increasingly valuable for development due to its geographical place in metropolitan Winnipeg. Development in this transformative area offers the opportunity to create sustainably as a form of urban infill ultimately reducing the impact of sprawl and creating more responsible development practices.

## **2.5 Overland Drainage + Water Treatment**

To ensure that urbanization has the least effect on local and global watersheds is to mimic nature's landscape hydrologic processes (Girling, 2005, pp. 131-132). Observing the topography of a site and using it for overland drainage offers two main benefits: 1) the water is receiving treatment as it flows through vegetation filtering out pollutants and 2) the reduced need for underground systems to move water to costly sewers.

Accepted environmental best-management practices in residential developments include the incorporation of water collection features intended to help mitigate the effects of storm-water runoff on downstream receiving waters by providing a measure of water treatment or bio-retention. Bio-retention is the process in which contaminants and sediments are removed from storm-water runoff (U.S. Geological Survey, 2005). Grassed filter strips, bio-swales, rain gardens, wet-ponds and riparian buffer strips are examples of bio-retention features (Metropolitan St. Louis Sewer District, 2013). These features generally serve as run-on sites for storm-

water overflow that are designed to trap nutrient, metals, hydrocarbons and sediment before these contaminants reach aquatic habitat (Campbell, 1999). Certain bio-retention features are designed to reduce the magnitude of run-off events by encouraging temporary on-site water storage, infiltration and evapotranspiration (Figure 2.6). Design parameters include the ratio of drainage area – treatment area, water storage time, the shape of the bio-retention feature, slope, type of vegetation and soil texture (U.S. Geological Survey, 2005). The effectiveness of bio-retention depends on adherence to these parameters within the hydrology of the site. These kinds of environmental best management practices can be used as an aid in meeting water effluent standards or can be incorporated to provide some enhanced measure of environmental performance within a development.

The surface water treatment of the Windsor Park Golf course site requires bioretention filters in the form of wet meadows and organic filter strips in the form of bioswales that need to be implemented. This is due to the potential size that a stormwater retention pond would require within the limited



Figure 2.5: Storm-water contaminants entering a sewer.



Figure 2.6: Street side vegetated filtration strips.

source: Seattle Housing Authority



buildable area of the site and the presence of an onsite natural dry creek bed which would act as a large bioswale leading to the Seine River.

The retention of the site's natural features in the form of mature forest, the Seine River and adjacent dry creek bed through a denser neighbourhood form would ensure ecosystem services on the site to continue and offer mitigation to the urbanization of the site.

### 3.1 Introduction

Through the exploration of case study as best practice development, natural and built elements of these studies are brought to the forefront. These elements have potential to apply to a practicum site in transformative areas along the urban Seine River in Winnipeg Manitoba.

The regenerative and transformative spaces explored in this Practicum involve development with the sensitivity to intrinsic natural features, sustainable land use, naturalized methods for storm-water holding and treatment, or for density and typology in the urban fabric.

Five case studies are explored for their potential use in this Practicum. Two sites in Winnipeg chosen for the use of ecological infrastructure were Assiniboine Landing and Sage Creek developments as well as a design proposal for the use of overland drainage within a neighbourhood called Living Streets in St. Paul Minnesota.

Quality urban spaces which exhibit a dense urban form were examined in Borneo/Sproenburg in the Netherlands and High Point in Seattle, Washington. Access to public greenspace within increased density added to the quality of these neighbourhoods as well as innovative ideas for neighbourhood placemaking.

Using the principles of landscape ecology as defined in Landscape Ecology Principles in Landscape Architecture and Land-Use Planning (Dramstad, 1996), each case study, where possible, is broken down graphically into: patches and corridors, development and human movement. Patches and corridors examines the ecological mosaic of the precedent in its context. Development compares the constructed human use of the land itself. Human movement shows the corridors or in some cases barriers created within the region and the flows created by them.

Ultimately, these layers illustrate connections or disconnections between components of the studies to help determine the commonalities that influence successful development.

### **3.2 Assiniboine Landing, Headingley, Manitoba**

Size: 52 acres

Density: 1 unit per acre

Year Built: 2004

Assiniboine Landing is a small, residential development located just outside Winnipeg city limits in a bend of the Assiniboine River. The landscape prior to the development was mature oak forest with some native prairie species. The regional landscape is a mix of residential, agricultural and light industrial development with a riparian corridor and patches of healthy upland oak forests, varying in size and configuration.

A special mandate to retain as much of the existing mature oak forest and riparian forest was implemented by the developer, which resulted in



source: ArcView GIS Bing Aerial Map

18 acres of public reserve forest (Mustard, 2005). Qualico, the developer, worked with landscape architects and native plant biologists to create an ecologically sensitive living environment for residents.

In order to create this environment, public reserves of native prairie grass plantings were used to minimize the size of manicured lawn spaces on the individual lots and enhance the natural aesthetic (Figure 3.1). Residents can have any type of lawn or other vegetation on the private manicured, non-reserve portions. This reduces maintenance on individual lots as well as well as in the development itself.

Native prairie grasses require considerably less maintenance than conventional Kentucky blue grass and requires only minimal thatch control at four to six year intervals (Qualico Developments, n.d.). Native grass seeding was contracted to proven professionals to ensure timely and long-lived establishment. This combined with thatch control has virtually eliminated weed encroachment into the development (Mustard, 2005).

Upland storm-water runoff is managed through



Figure 3.1: Native prairie grasses adjacent lawn grass.



Figure 3.2: Constructed wetland.

a series of small constructed wetlands (Figure 3.2). The extensive use of native wetland emergent vegetation and proper basin design adds a significant level of treatment to water run-off before it is eventually released into downstream receiving water; in this case, the Assiniboine River. Specifically, wetlands, through a variety of pathways and processes, can remove, store, transform or dissipate significant amounts of excess nutrient, sediment and hydrocarbons based pollutants from runoff. Subsequently, this subdivision releases cleaner water into the Assiniboine River than if the conventional ‘down-the-pipe’ approach has been implemented. The use of naturalized storm-water retention ponds is a growing trend towards ecologically sustainable housing development (Mustard, 2005).

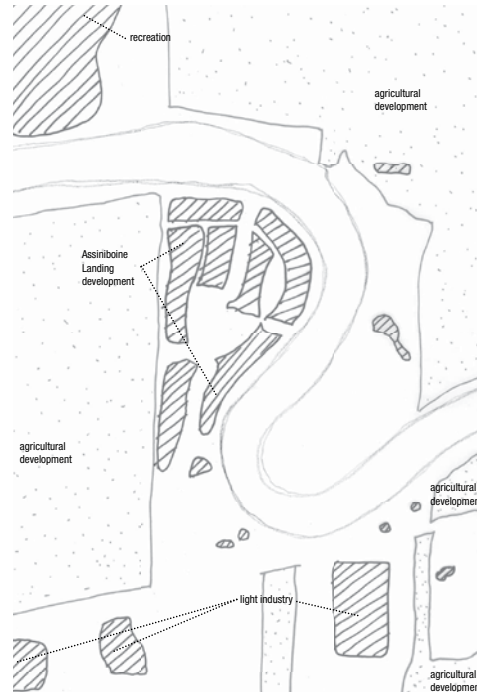


Figure 3.3: Development analysis.

A variety of larger scale housing lots exist in Assiniboine Landing with adjacent agricultural, light industry and recreational separated by vegetative patches and corridors. Overall intensity of land use is low. The effects of stormwater runoff are minimized somewhat by 2 small constructed wetlands in the development to buffer the impact on the river.

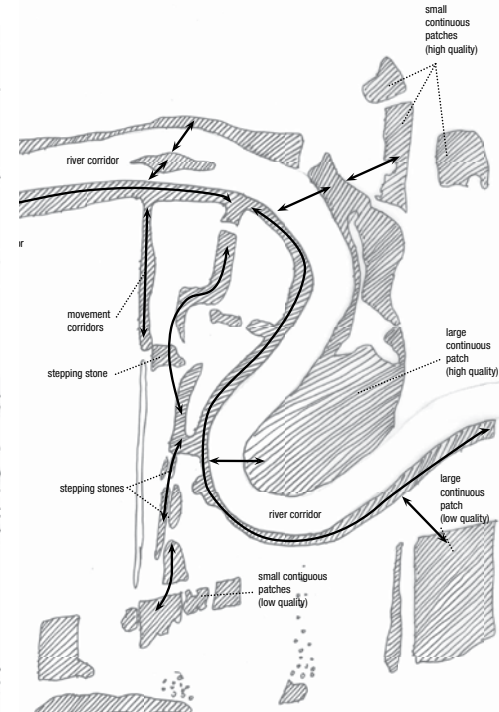


Figure 3.4: Patch, corridor and connectivity analysis.

Within a mosaic of riverbottom forest and agricultural activity, efforts were made to retain a corridor of existing oak forest through the residential development to the Assiniboine River corridor. Stepping stones of forest and hedgerows allow for the movement of habitat generalist edge species. High quality forest habitat exists across the river, and although thin, the riparian corridor, connects to a strips of high and low quality forest in the adjacent landscape.

**What works:** Ecologically, large, contiguous patches of mature oak and riparian forest are retained that provide a habitat within the surrounding mosaic of the region. The cost of planting new specimens, as well as the time interval required by slow-growing, long-lived canopy species like Bur oak make for a more instant mature neighbourhood. Restoration of historic prairie vegetation eliminates the need for fertilizer and irrigation inputs into the watershed, and measurably reduces maintenance requirements (Ducks Unlimited Canada, n.d.). This vegetation creates an ecological buffer and threshold between vegetation communities. Wetlands on site ‘polish’ storm-water before it enters the Assiniboine River. Unique dwellings were constructed as each owner was required to work with individual architects for the design and construction of their homes (Vogan, 2012).

**What doesn’t:** While admittedly aiming for the higher income residents, Assiniboine Landing is a high quality but low density suburban development (Vogan, 2012). The wetlands, while helpful in water management, are slightly undersized due to area limitations. The location of the development outside the city of Winnipeg reduces opportunities for active and public transportation.

### 3.3 Sage Creek, Winnipeg, Manitoba



Figure 3.5: Human movement analysis.

The majority of movement occurs as vehicular along Roblin Boulevard with secondary roads connecting to this main highway. Pedestrian movement in Assiniboine Landing occurs on the roads as sidewalks are absent. Public reserves are present, but are primarily vegetative and not recreational. There is a lack of interconnected pedestrian pathways through the neighbourhood.

Size: 800 acres  
Density: 5-7 units per acre  
Year Built: Started 2005 + ongoing

Sage Creek is a large residential development located on the east side of the City of Winnipeg. High quality, energy efficient homes with a variety of housing options in a naturalised setting within proximity to services was the goal of the development (Vogan, 2012).

Medium to high density apartment blocks of 300 rental units were first established to create a population to support the services of the “Village Centre”. These were soon followed by multi-family townhouses and single family dwellings to round out the development (Vogan, 2012). Qualico located their offices in Sage Creek and created an office space for other businesses to follow suit in the 70 acres set aside for commercial and mixed use development (McNeill, 2012).

Sage Creek implemented innovative landscape features on a large scale to enhance the



source: ArcView GIS Bing Aerial Map

environmental performance. These features included prominent wetland-style, naturalized storm-water retention (SRP's) ponds and diverse native grass plantings (Figure 3.6). Recreational pathways connect to adjacent city multi-use pathways while cutting through drought tolerant prairie grass communities, which include Little bluestem and Blue grama grass, eliminating the need for irrigation and fertilizer inputs and minimizing maintenance (Figure 3.7). Like standard City of Winnipeg storm-water retention ponds, the lakes at Sage Creek are designed primarily to store water and manage run-off volumes to prevent overland flooding. The difference at Sage Creek is the extensive emergent vegetation beds designed to optimize the natural capacity of wetlands to store, dissipate or transform pollutants washing in through the sewer system. Subsequently water runoff leaving Sage Creek will be significantly cleaner than water leaving a conventional facility (Ducks Unlimited Canada, n.d.). This has important ecological and environmental implications for downstream receiving water (the Seine River). Residents initially wanted open water; therefore large cattail beds were not an option for the ponds in this case (Vogan, 2012).

**What works:** Storm-water is stored onsite in a



Figure 3.6: Wetland-style retention pond.



Figure 3.7: Recreational pathway with native grasses.



series of constructed wetland retention ponds sized to for known runoff volumes. A mixture of housing types and densities offers opportunity for vibrancy in the neighbourhood. A village centre with a core of commercial and retail business is emerging providing services to residents. No valuable habitat was removed to create the development. Large patches of public reserves provide greenspace, however it is of low habitat value.

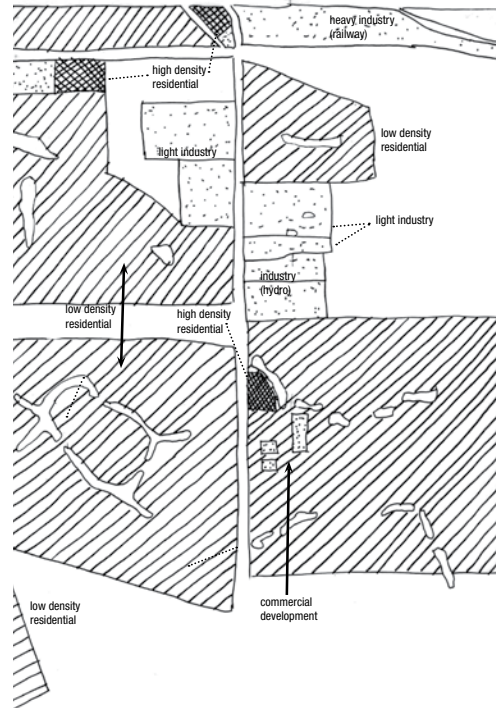


Figure 3.8: Development analysis.

Large scale, low density residential development is the primary land use within the regional context of Sage Creek. Small pockets of industry line the movement corridors.

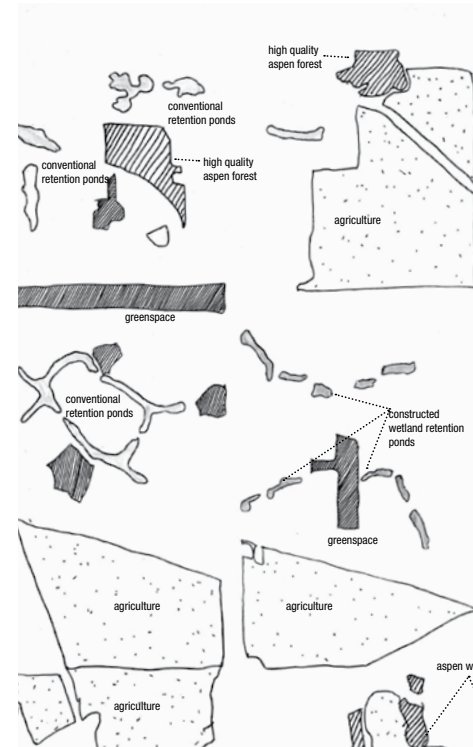


Figure 3.9: Patch, corridor and connectivity analysis.

The majority of patches in the regional context of Sage Creek is agriculture offering habitat for mainly generalist species. Some patches of higher quality forest exist, however they are too far apart to offer any contiguous benefit. Public greenspace is available, but disconnected.

**What doesn't:** Limited opportunities exist for public transportation within the suburb while active transportation is limited to neighbourhood recreation. Productive agricultural land being replaced with more profitable residential development. Despite pockets of higher density apartments, Sage Creek is mainly low density single family housing.

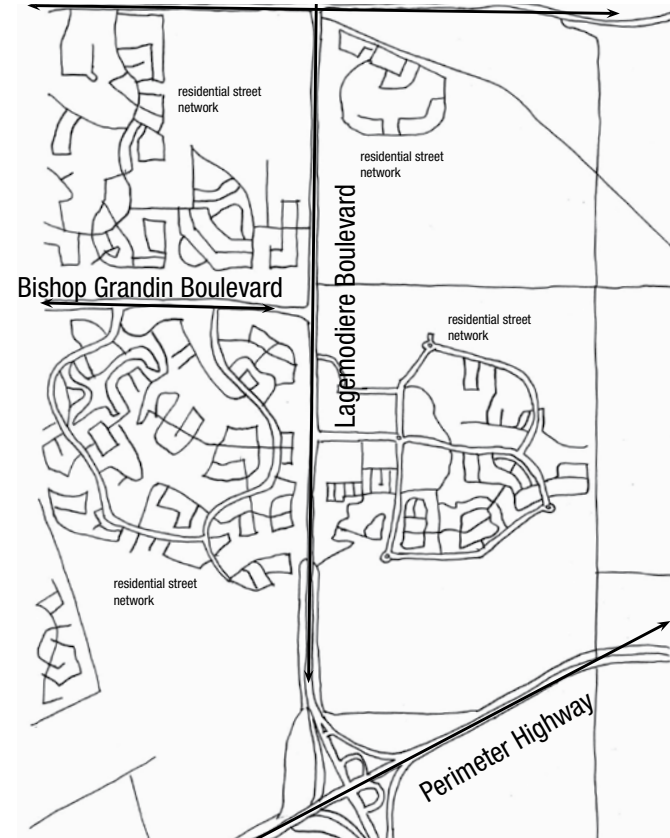


Figure 3.10: Human movement analysis.

Three major thoroughfares permeate the region: Bishop Grandin Boulevard, Lagimodiere Boulevard and the Perimeter Highway. Individual residential neighbourhoods are accessed through smaller winding street networks. The Bishop Grandin Greenway has multi-use pathways for pedestrians and cyclists.

### 3.4 Borneo | Sporenburg, Amsterdam, the Netherlands

Size: 67 acres

Density: 40 units per acre

Year Built: 1996-2000

Industrial areas in the harbour district in Eastern Amsterdam have undergone a transformation into high density urban residential neighbourhoods as the underutilized ports were seen as an opportunity for much needed housing in the city. The early planning process began in 1978 and was completed in 2003 (Marlies Buurman (Contributor), 2006, p. 25). The Borneo and Sporenburg islands were developed in the midst of the development boom of this district.

Building on urban planning ideas set out for each phase in this development, Borneo and Sporenburg evolved from the housing typologies of Java Island and KNSM Island that preceded them. Orientation, program and social policy were thoughtfully addressed in the previous phases to create a mix of social and owner-occupied housing of various



density that allowed for all to have a bit of a view but none to have a good view (Marliesuurman (Contributor), 2006).

A dense arrangement of attached single-family dwellings were created that allowed access directly from the street (Figure 3.11). Three high density blocks were incorporated into the neighbourhood to reach the target density of 100 units per hectare (roughly 40 units per acre) and act as landmarks within the development (Marliesuurman (Contributor), 2006). Owners of a select parcel of 60 dwellings along the inner harbour, each measuring between 4.2 to 6 m wide and 15m deep and three storeys high were encouraged to design their own dwellings within this footprint resulting in a unique floor plans, roof terraces, gardens and finishes as per each owner's wishes.

Integration of public space was planned as a regulating element in some designs throughout the neighbourhood and others treat the "blue" of the water as though it were the "green" of the park (Figure 3.12). (Marliesuurman (Contributor), 2006).



Figure 3.11: Greenspace between dwellings.



Figure 3.12: Residential street front.

Density was a key factor to provide ample public greenspace within the constraints of the water while embracing it as additional public space.

**What works:** A successful high density neighbourhood with mixed ownership of public and private, low-rise and high rise dwellings with access to public greenspace and water space that was created out of the leavings of industry. The neighbourhood is in close proximity to the city centre, well serviced by public transportation and recreation opportunities. The clients and the city of Amsterdam deem the neighbourhood a success and will be repeating these concepts of density for the provision of greenspace in future developments (Marlies Buurman (Contributor), 2006).



Figure 3.13: Development analysis.

The overall mosaic of development is a mix of medium and high density residential interspersed with mixed use commercial and industrial land uses.

Figure 3.14: Patch, corridor and connectivity analysis.

A variety of patches of public greenspace, agriculture community gardens appear in various sizes in a dispersed, non contiguous manner. The result is little opportunity for corridors, though the patches themselves are important in this urban context, they are of low ecological habitat value.

**What doesn't:** Patches of greenspace are interspersed with urbanized areas. While this offers public greenspace, it is of low ecological habitat value. Commercial areas are somewhat isolated from the bulk of the residential areas creating a disconnect in the neighbourhood.



Figure 3.15: Human movement analysis.

Water plays an important role in transportation in the bay. Not only across the bay itself, but into the urban fabric through various canals and waterways in the development. A few major roads provide access through the Eastern Harbour District and connect to smaller streets which provide access to the long rows of dwellings. Pedestrian movement occurs along the smaller residential road where movement areas for cars, bicycles and pedestrians share an undesignated road space. Pedestrian bridges link the development of Borneo and Sporenburg.

### 3.5 Living Streets Plan, St. Paul, Minnesota

Proposal  
Built Demonstration 2012

Water quality problems within the city of North St. Paul led to the investigation of best practices for storm-water management. Polluted water from the streets run off into Kolhman Creek and ultimately the lakes that define the Minnesota landscape. The watershed covers approximately 7,500 acres comprised of portions of North St. Paul, Maplewood, Gem Lake, White Bear Lake, Vadnais Heights, Little Canada and Oakdale (Ramsey-Washington Metro Watershed District, n.d.).

The proposal aims to balance motorists, cyclists and pedestrians using a design approach that reconfigures the streets of North St. Paul and uses ecological infrastructure in the form of overland drainage and functional vegetation (Figure 3.16).



Mitigating this water through treatment of the 'living streets' and filtering it through the earth minimizes the effects of pollutants and excessive nutrients from entering the watershed. By adding functional storm-water swales and rain gardens to existing road infrastructure the streets become smaller (Figure 3.16). Smaller streets mean less paving. Offering a level of treatment to storm-water at the surface of the land reduces the amount of underground infrastructure required in conventional neighbourhood planning (Ramsey-Washington Metro Watershed District, n.d.).

A demonstration of this proposal was constructed in the summer of 2012. A section of residential road 2 miles in length was reduced to 24 feet (7.3m) from a conventional width of 30-32 feet (9.1 to 9.7 m). 32 rain gardens, 200 streets trees and a retention pond were installed in addition to sidewalks. The functionality of the swales, gardens and permeable landscaping has reduced the amount of storm-water running into sewers to only 10% (Ramsey-Washington Metro Watershed District, 2013).

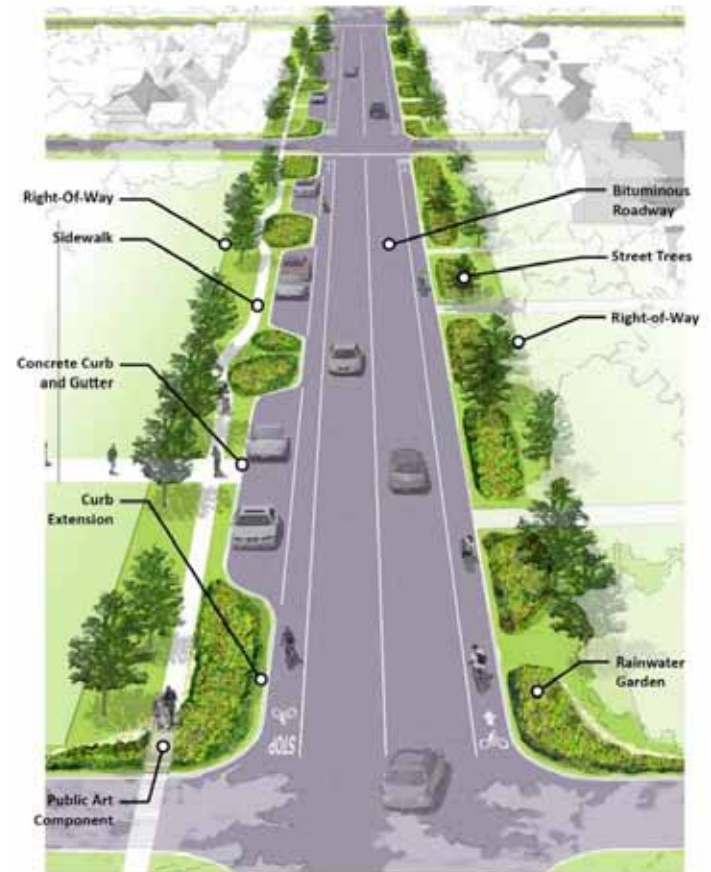


Figure 3.16: Primary elements of a Living Street source: Ramsey-Washington Metro Watershed District



**What Works:** The plan involves the modification of a traditional neighbourhood to reduce the cost of replacing underground infrastructure and uses surface water treatment not only in a functional way, but also by increasing the aesthetic properties for pedestrians by giving them a vegetative separation from the roadway. . This is achieved by narrowing the roadway to create room for pathways and raingardens (Figure 3.17).

**What Doesn't:** As the test section of the plan was only installed a few seasons ago, it is hard to determine what part of the plan may fall short if at all, however the plan has achieved a goal of reducing water direct to sewer by nearly 90% (Ramsey-Washington Metro Watershed District, 2013).

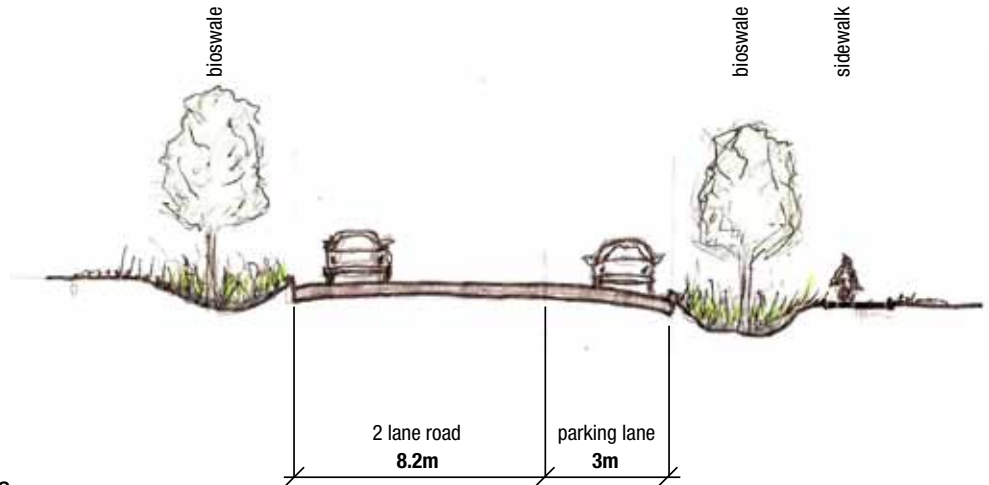


Figure 3.17: Typical road section.

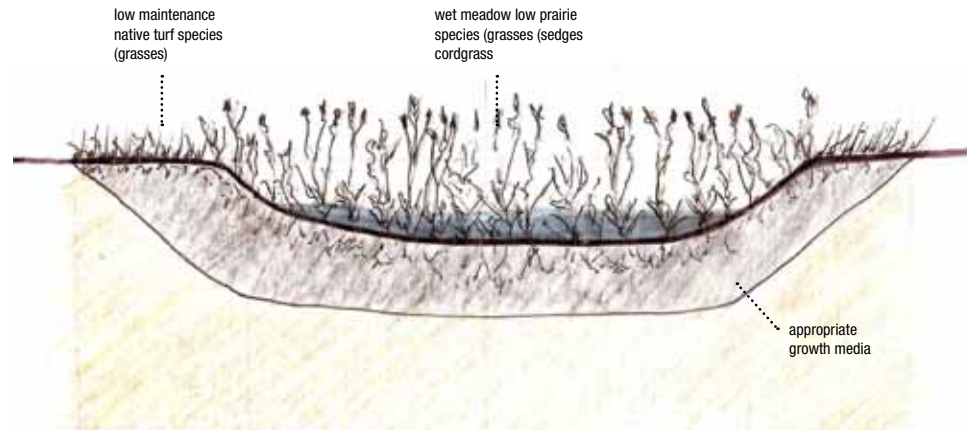


Figure 3.18 Typical raingarden section.

### 3.6 High Point, Seattle, Washington

Size: 120 acres

Density: 9.7 units per acre

Year Built: 2004 + ongoing

The neighbourhood of High Point in Seattle was initially built in the 1940's as a neighbourhood for low-income housing after World War II. The neighbourhood was disconnected from West Seattle and the initial low-income homes were becoming tired. The Seattle Housing Authority began a redevelopment plan for the High Point Area and secured funding in 1999 (Seattle Housing Authority, 2013).

The goals of the development were to create a neighbourhood of mixed density, income and ownership while reducing the impact of pollution on Longbow Creek and salmon within it. This involved careful planning for human spaces while finding ways to reduce the impact of human activity to the surrounding environment.

Seven hundred and sixteen low income units were



replaced by the Seattle Housing Authority and promised to the existing residents. Other units were erected by private developers for rental and sale to round out the community. The existing community was surveyed to see what residents wanted in a new community and the result was simple: the look of traditional single family housing in lieu of the barrack style houses. Also, the residents liked the look and feel of a traditional neighbourhood with gridded streets, sidewalks, curbs and gutters (City of Seattle, Department of Planning and Development, 2006).

To create a community, the interaction of inhabitants must occur. To facilitate this, parking and open space was arranged in such a way that residents could view children playing outside from inside their homes while adjacent parking was a short walk from each resident ensuring this necessary interaction.

Narrowing the roadways was the first step in reducing storm-water runoff in High Point. Smaller streets mean less water (Figure 3.19). Swales along the roadside were disguised by planting



Figure 3.19: Narrow streets with vegetative buffers.

source: City of Seattle, Department of Planning and Development,



Figure 3.20: Constructed wetland as a community amenity.

source: City of Seattle, Department of Planning and Development,

beds of native shrubs and mulch to form functional planting strips which capture water and to pre-treat the water from larger rain events that can't be stored before hitting sensitive Longbow Creek (City of Seattle, Department of Planning and Development, 2006). Constructed wetlands store and pre-treat water also while creating a community amenity (Figure 3.20).

**What Works:** A high quality and highly diverse neighbourhood is achieved at High Point through its mix of housing types, density, and ownership. Treatment of water ensures the neighbourhood has a reduced impact on its surroundings while providing a functional beauty to the streets of Seattle. Pockets of public greenspace throughout the development were able to be increased due to the higher number of multi-family dwellings in the neighbourhood.

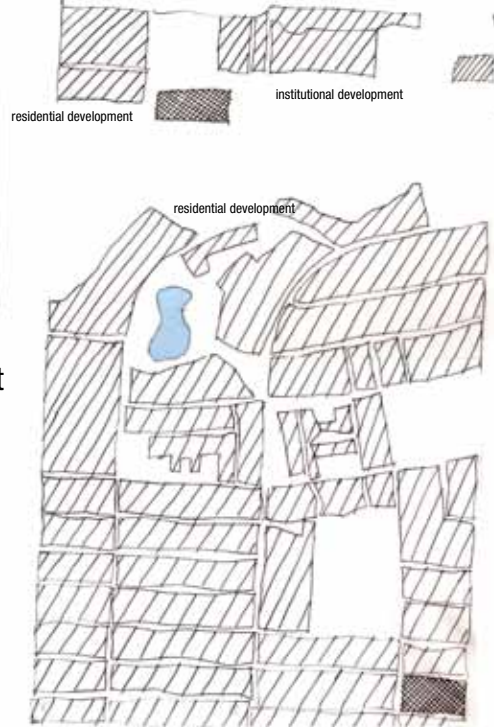


Figure 3.21: Development analysis.

High point is nearly all residential development with small pockets of institutional development. Green space is dispersed and accessible for the residents

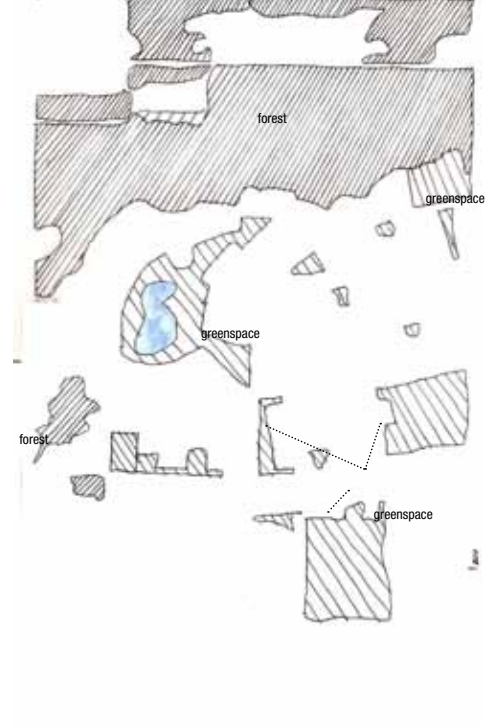


Figure 3.22: Patch, corridor and connectivity analysis.

A large patch of natural forest divides High Point from the adjacent neighbourhood. Large patches of dispersed greenspace pepper the development.

**What Doesn't:** The concept of moving cars to a more common parking area and away from the front of dwellings to some may seem unorthodox. In its practicality, however the planners weighed a sense of placemaking over the convenience of on-site parking to create a neighbourhood where people interact with one another in transit to their vehicles to increase contact and ultimately safety. There is a lack of integrated commercial services within the residential neighbourhood .

### **3.7 Conclusion**

Based on the analysis of the Winnipeg case studies (Sage Creek and Assiniboine Landing) and the examples from the Netherlands and United States, it is clear that some elements of what has been done locally as well as abroad could be brought together to create an ecologically sensitive development within the site of Windsor Park Golf Course.

The principles of landscape ecology as per Dramstad and Olson (2006) highlight regional features such as natural patches and corridors and how they function within the context of development. The mature oak forest of Assiniboine Landing, for example, provides a passage down the centre of the development linking habitat to the riparian corridor of the Assiniboine River. A similar ecology exists in the Windsor Park Golf course where patches exist between the fairways and connect at the Seine River.

The Living Streets Plan of North St. Paul realizes the value of treating water at the surface not only for reducing the costs of maintaining and replacing underground infrastructure, but to make streets feel more like parks through the functional vegetation that flanks the pathways with the added benefit of reducing the amount of water entering sewer systems and the adjacent watershed. Applying this logic to development at Windsor Park Golf Course would create a new case study for Winnipeg and also protect the sensitive Seine River from development impact.

The density and practicality of Borneo/Sporenburg and High Point allows for a greater number of people occupying and using the resources of smaller parcels of land than is seen in current developments in the City of Winnipeg. Having more people occupying smaller areas of land allows for larger areas of common greenspace. Using the lessons learned from the Eastern Harbour District of Amsterdam and the Seattle Housing Authority, smaller footprint development with mixed density and ownership creates a community of shared resources.

Shared resources reduces the need for single family yards that allows for people to interact within their community and increases safety and a sense of ownership in common spaces.

Integrating landscape ecology principles provides for better environments, both built and natural within developments and regional landscapes. Recognizing these connections creates opportunities for decisions that will enhance our communities aesthetically and functionally for future generations. It is with these ideas in mind that the design for future development at the Windsor Park Golf Course site began.

## Chapter 4 | Study site + Design Proposal

### 4.1 Introduction

The Windsor Park Golf Course has many intrinsic natural properties within its boundaries which this Practicum aims to preserve within its design exploration of a new neighbourhood on the grounds of the golf course . Of these natural properties, existing forest, water and topography have the greatest influence in guiding the design decisions through the course of this study.

The patches and corridors of riparian forest and upland connections are important to maintaining the ecological functions of the landscape. These forest areas provide rare and crucial urban habitat for wildlife as well as areas of “instant” park and recreation space for residents of Winnipeg. The preservation of the forests is, therefore an integral part of the arrangement of elements of the neighbourhood plan.

The influence of the Seine River and the ephemeral creek bed that lies to the west provides increased opportunities for the overland drainage of water. Realizing the natural drainage on the site and utilizing it to allow water to filter through vegetation before reaching the river greatly reduces the chances of seeing untreated sewage or worse, entering the watershed untreated.

Determining what portion of the 129-acre site was buildable area helped to further refine the design of the new neighbourhood. The Floodway Fringe Line, a topographical elevation which, according to the City of Winnipeg Charter Act 158 (4) requires that any built structure meet flood proofing criteria before a building permit will be granted (The City of Winnipeg, 2013). Any finished floor must be 30 cm above the Floodway Fringe Line. This line on the Windsor Park Golf Course offered protection for much of the existing forested areas on the course and as such was used as a no-build line for the design of the neighbourhood.

Three initial development scenarios were tested to see what opportunities and constraints would fit best within the property boundary and the Floodway Fringe restrictions. They created:

- Typical neighbourhood gridded block;
- Two Variations of modified bays or high density apartment blocks while retaining forest and water amenities on the site while trying to achieve a feasible density for potential tax revenues for the City of Winnipeg.

By testing these different scenarios it became apparent that using the configurations of adjacent neighbourhoods did not allow the new development to respond to the landscape organically. The size and shape of the buildable area required a different treatment in view of environmental and density objectives stated in the Practicum. The Seine River, existing forest desired to be retained and anchor points inside and outside of the site influence the circulation and layout of the new design.

The development proposal evolved into four distinct areas and each is treated with the most suitable framework specific to the area and its surroundings.

The final design was reworked through a series of exploration to show that respecting the landscape and using the existing topography, water and forest can reduce the impact of development and enhance it by reconnecting the natural flows through reforestation and overland drainage. This final scenario creates a more complete ecological infrastructure than the existing golf course offers, while making a quality neighbourhood space for the residents of Winnipeg.



## 4.2 About the Site

### Windsor Park Golf Course

Size: 129 acres  
Density: n/a  
Year Built: 1925

Three 18-hole golf courses reside in succession along the Seine River in southeast Winnipeg. The public Windsor Park Golf Course resides in the middle of the three. The 129 acre golf course begins on one side of the Seine River and continues on the other (City of Winnipeg, 2011a). As a result, a large contiguous patch of high quality riparian corridor is contained within the confines of the course in addition to large, mature upland oak trees which define the fairways. Increasingly rare urban forest habitat is provided here for resident and migrating bird species and terrestrial wildlife.

As a public golf course, the greenspace provides recreation to the citizens of Winnipeg. In the winter, the course provides a home for the Windsor Park Nordic Centre allowing for year round recreation and enjoyment for the Windsor Park neighbourhood (CCSAM, n/d).



Figure 4.1: Site + Region

source: ArcView GIS Bing Aerial Map

Development in the Windsor Park Golf Course region consists of recreation spaces, residential development, commercial development and institutional development such as schools, a community centre and a cemetery.

The Glenwood neighbourhood to the west of course responds to the Red River lot system and consists of mainly single family detached homes and multifamily dwellings. The overall gross density is 4.3 units per acre (The City of Winnipeg, 2006).

The Windsor Park neighbourhood to the east follows a larger lot grid and bay layout while incorporating more multifamily dwellings resulting in a gross density of 4.5 units per acre (The City of Winnipeg, 2006).

Niakwa Park has the largest single family lot size of this region while incorporating some multifamily dwellings. The gross density of this neighbourhood is 1.8 units per acre (The City of Winnipeg, 2006).

Neighbourhood services range from large grocery to local butcher shops, convenience stores, restaurants, coffee shops and retail stores.

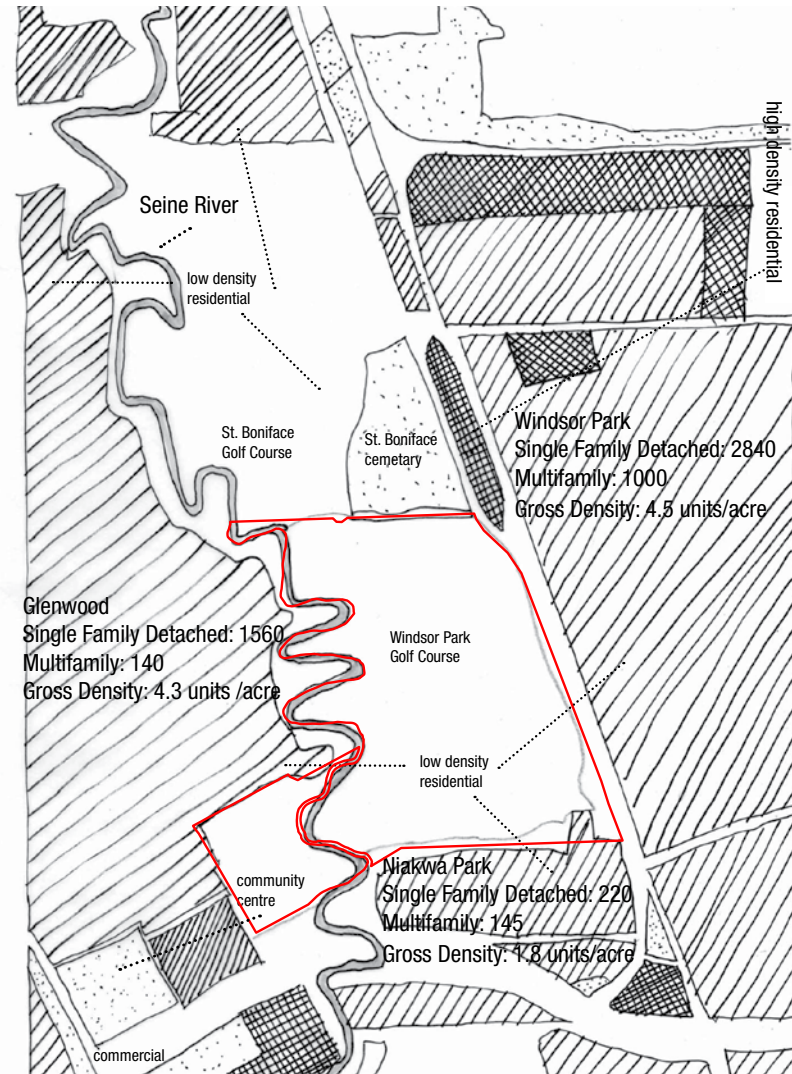


Figure 4.2: Development Analysis.

The Seine River corridor is comprised largely of remnant riverbottom forest. The upland forest consists of oak and aspen.

The Windsor Park Golf Course spans this riverbottom forest while the upland oak defines its fairways. The riverbottom forest extends along the river to the St. Boniface and Niakwa Golf Courses to the north and south respectively.

While these large patches are slightly interrupted by the course layout, they offer connectivity and habitat to a variety of resident and migrating species of birds and mammals such as a white-tailed deer, fox and coyote.

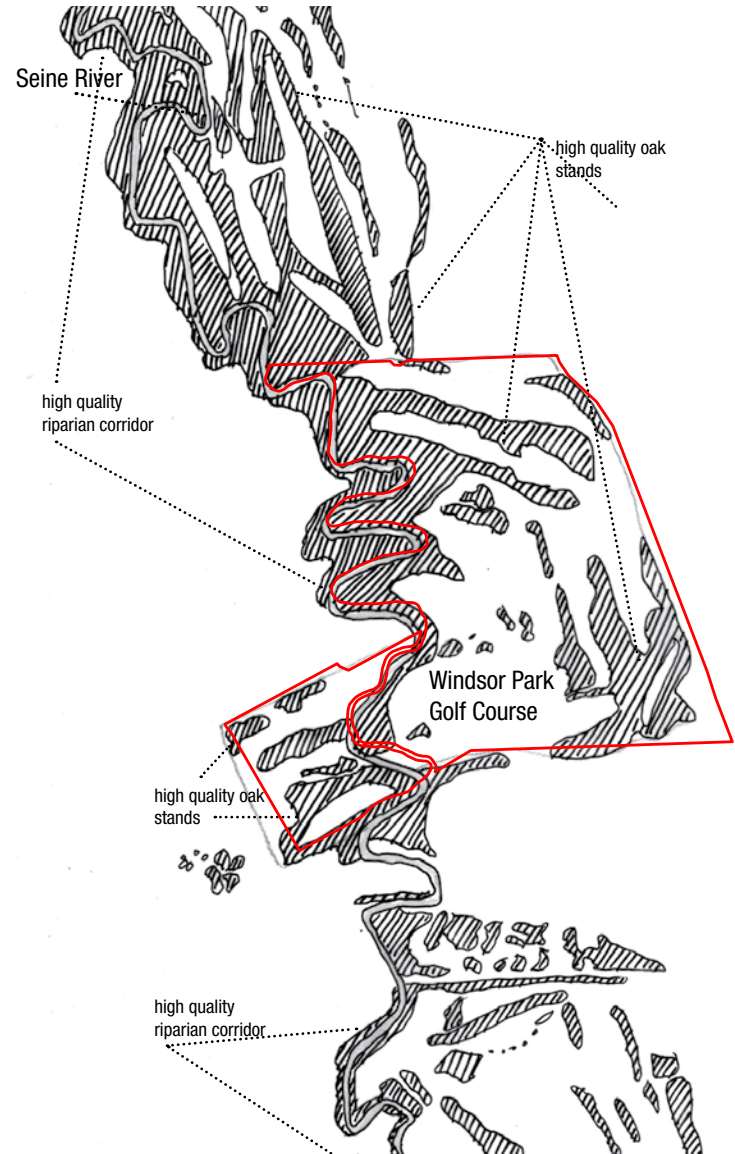


Figure 4.3: Patch, corridor and connectivity analysis.

The circulation network of the region surrounding the Windsor Park Golf Course site consists of three major roadways: St. Anne's Road, Fermor Avenue and Archibald Street.

The pattern of the Red River lot system is evident in the circulation of the Glenwood neighbourhood along Rue des Meurons, while the residential bay neighbourhoods of Windsor Park and Niakwa Park to the east and south of the golf course appear more spacious.

**What works:** Offers recreation opportunities for a variety of citizens within Winnipeg. Functions as a placeholder of greenspace within city limits. Currently preserves riparian and existing mature forest.

**What doesn't:** Windsor Park Golf Course offers two types of recreation: golf and cross country skiing on a pay per use basis. High inputs of maintenance are required to offer these recreational uses. The golf course requires fertilizer and herbicides that fend up in the Seine River and impact water quality and aquatic habitat. Water extractions for irrigation of the course impacts the water levels of the Seine River.

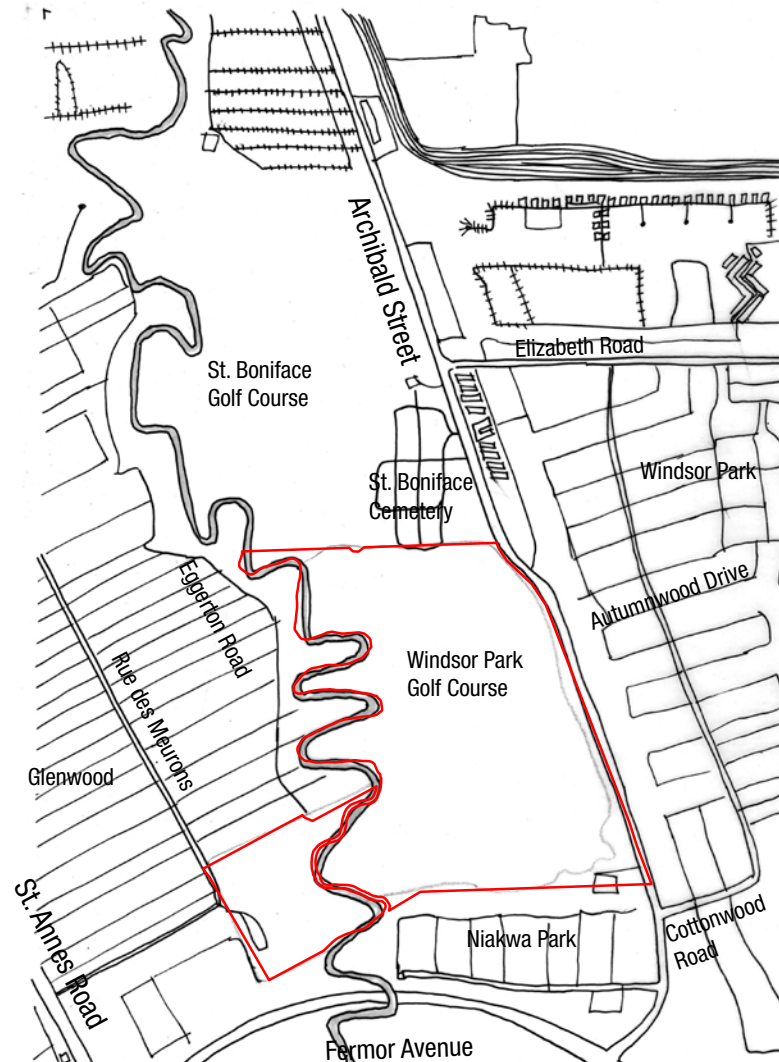


Figure 4.4: Human movement analysis.

### 4.3 The Seine River Corridor

The Seine River corridor is remnant forest corridor. Historically, plant communities in the Seine River riparian zone consisted of Manitoba maple, green and black ash, American elm, plains cottonwood, basswood, peach leaved and sandbar willow. Historic understory was comprised of ostrich fern and wood nettle. Upland plant communities were interspersed with bur oak and aspen giving way to tall grass prairie. Aquatic, semi-aquatic and upland wildlife were supported by this riparian habitat resulting in some of the most diverse plant and animal communities on the prairie (Cowan, 1995).

Settlement changed the natural landscape of the Seine River dramatically. Logging, road and bridge construction, agriculture and housing development altered historical plant communities and only small pockets of riverbottom forest remain today. Modification of the river's natural hydrology has affected flooding and as such the plant communities along the riverbank. In some places along the riverbank there is no vegetation.



Figure 4.5: Seine River Riparian Corridor

Save Our Seine (SOS) is a community-based volunteer stewardship group whose mandate is to protect, preserve and enhance the Seine River Environment within the city of Winnipeg. An important objective of SOS is to promote the development of an ethic of environmental stewardship with local citizens through leadership, public education and participation (Save Our Seine River Environment Inc., 2012).

SOS works with many stakeholders in the Seine River corridor to obtain their mandate. Their work involves many types of projects including environmental remediation of industrial sites along the river, promoting a connected recreational trail network in new developments on the Seine and active summer staff who perform a river clean up of the urban segment of the Seine River to remove garbage and fallen trees which in turn keeps the river navigable.



Figure 4.6: Navigating the Seine River.

## 4.4 Site Inventory

The site of the Windsor Park Golf Course is within 5 kilometers of downtown Winnipeg and connected by 5 major bus routes to downtown, St. James, the North End and St. Vital Centre, all of which are regional transportation hubs to other areas of the city. The majority of these bus stops are a 500- meter to 1-kilometer walk from the central part of the course.

Active transportation is well serviced through designated cycle routes on Rue des Meurons, Eggerton Road, Marion Street, Archibald Street and Farmor Avenue making a commute to downtown quick and feasible.

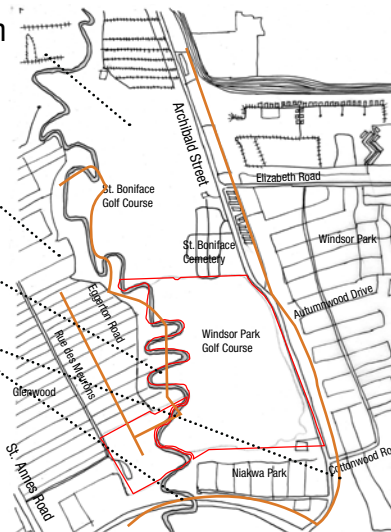


Figure 4.8 Active transportation routes.

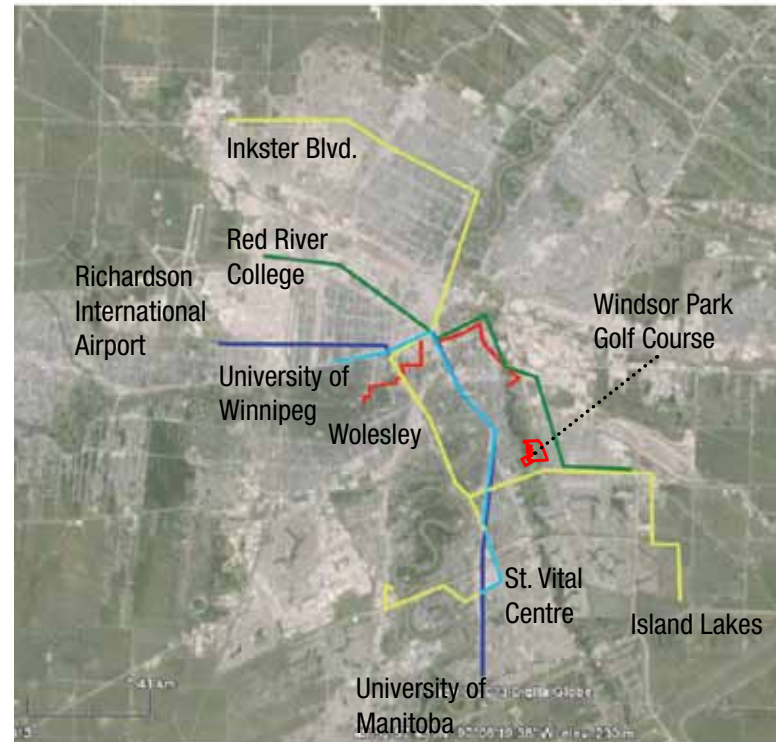


Figure 4.7 Transit Routes (adapted from Winnipeg Transit, 2013).

### Bus Routes:

- Route 10 – Service to Woseley —————
- Route 14 – Service to Ellice Avenue —————
- Routes 55, 54, 53 - Service to University of Winnipeg —————
- Route 16 – Service to St. Vital Centre, Selkirk Avenue , McPhillips Street and Inkster Blvd. —————
- Route 19 – Service to Red River College Notre Dame Campus (Winnipeg Transit, 2013) —————

Many community services are within 2 kilometers of the centre of Windsor Park Golf Course. Figure 4.3 shows the proximity of schools, community centres, sports fields, a public library and a YMCA (Figure 4.4).

- 1 – Frontenac School (K-8), with sports fields: 1.1 km
- 2– Glenwood School (K-8), with sports fields: 1.8 km
- 3 – Glenwood Community Centre: 1.8 km
- 4 – Glenlawn Collegiate (9-12): 2 km
- 5 – YMCA: 2 km
- 6 – St. Vital Public Library: 2 km
- 7 – Grocery: 1.1km

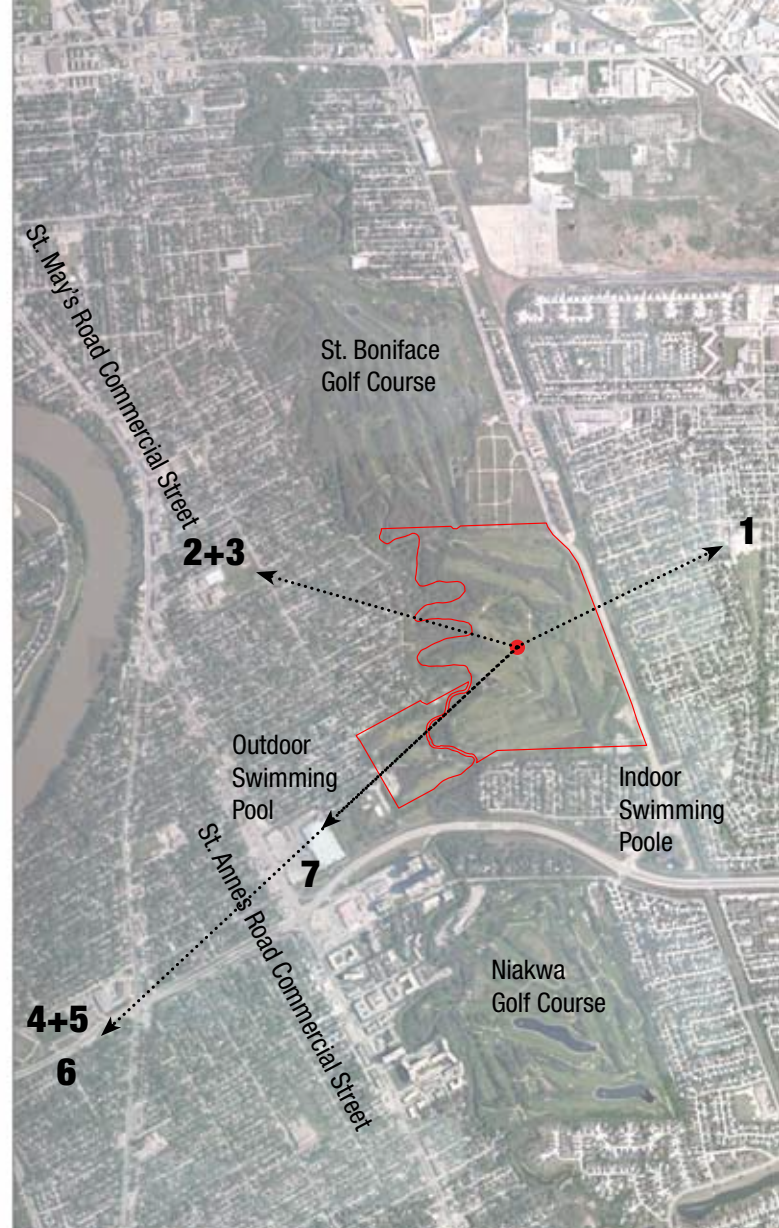


Figure 4.9: Location of services map.

source: ArcView GIS Bing Aerial Map



## 4.5 Site + Boundaries

Windsor Park Golf Course resides upon 129 acres and spans the Seine River with the majority of the property on the east side of the river. There is approximately 2.2 km of shoreline along the river. It is bounded by Rue des Meurons at the south west, Niakwa Park neighbourhood to the south, Archibald Street to the east and the St. Boniface Cemetery forms its northern boundary.

The Floodway Fringe Line determines what portion of the land is buildable. Non-buildable area means much more than simply a topography line with respect to this site. The land within the Floodway Fringe Line contains the major elements that influenced the design proposal: the Seine River, the dry creek bed, riparian and upland forest all of which are elements to be maintained.



Figure 4.10: Site and boundaries.

source: ArcView GIS Bing Aerial Map

## Connections

Across Archibald Street from the Windsor Park Golf Course site is Autumnwood Drive, which, in Windsor Park acts as a collector road for the local roads in that neighbourhood. Currently, it is truncated at Archibald Street. The opportunity of connecting to Autumnwood Drive from the new Windsor Park Golf Course site creates the potential for an anchor point for road infrastructure for the neighbourhood.

A connection to Archibald Street is another important anchor not only for the commercial district for which it is imperative, but also as a second point of entry to the new neighbourhood.

A third major connection is to Rue des Meurons in the Glenwood neighbourhood. A possible road connection over the Seine River would offer a third point of entry and exit from the neighbourhood. With Fermor Avenue just a short distance away, a fourth connection to this major artery is a possibility for the new neighbourhood.

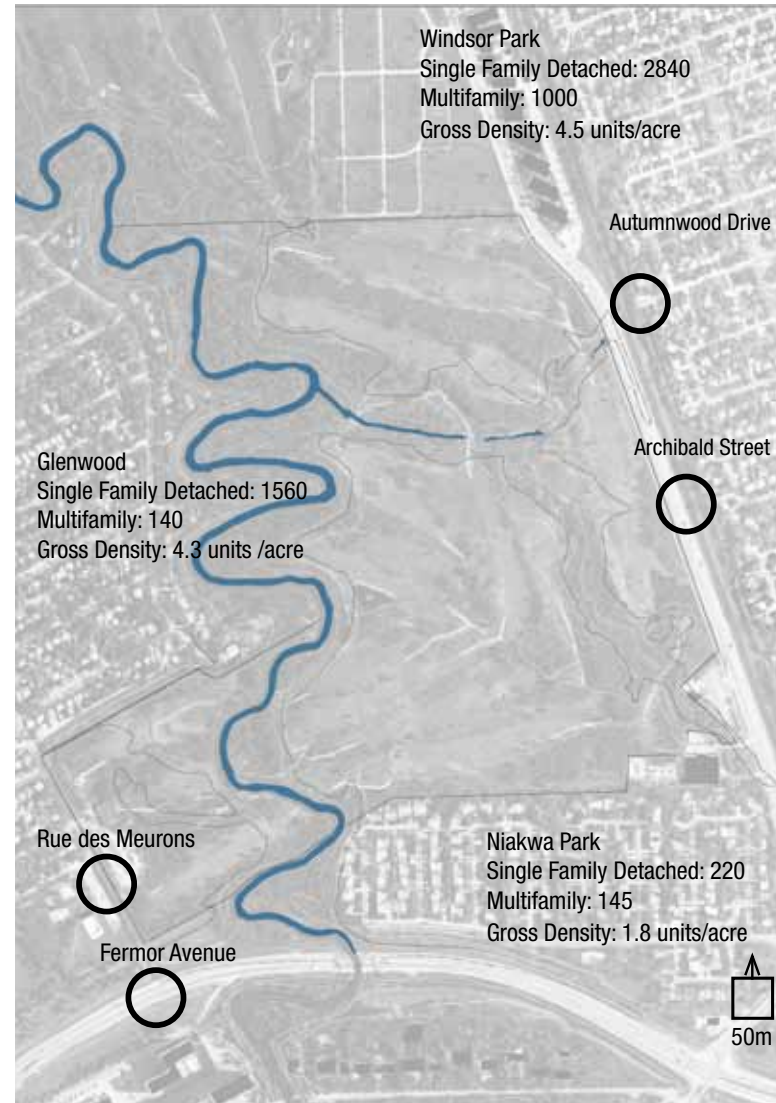


Figure 4.10: Adjacent neighbourhoods + connections

source: ArcView GIS Bing Aerial Map

## Existing Features: Forest

All of the riparian forest near the Seine River and much of the upland forest including the mature stands of Bur oak are to be retained in the design proposal. Strategic patches of important riverbottom forest and upland oak become guiding parameters of design decisions as integration of parks spaces and to retain the existing habitat corridors and connections for wildlife and migratory birds. This habitat is rare and crucial to the survival of the many species that use it. As mentioned previously, much of this habitat is bounded by the Floodway Fringe Line, however, many interesting corridors and patches worthy of reconnection are outside this boundary.



Figure 4.11: Existing forest

source: ArcView GIS Bing Aerial Map

## Existing Features: Water

The Seine River runs directly through the Windsor Park Golf Course. It is the primary amenity to the site, and the riparian corridor that follows its course falls within the protection of the Floodway Fringe Line. A former creek bed, now ephemeral and often dry, creates an opportunity to use its topography as a large bioswale to pretreat stormwater before reaching the Seine River. Making this creek active and functional again it becomes an amenity for forest habitat in addition to a collector of overland water. It also offers a plant community different from the forest in the form of low understory shrubs and sedges adding to the diversity of the ecology.



Figure 4.12: Existing water

source: ArcView GIS Bing Aerial Map

## Districts

The buildable area of the site is 90 acres once the fringe line is taken into account. Four distinct and unusually shaped areas of the site become defined. Due to their shape, size, orientation and adjacency to different contexts, each area was treated differently from the next throughout the design process:

**1** The area on the west side of the Seine River near the existing residential riverlots fit best with the existing type of housing and adjacent lots. These lots range between 25'x100' to 50'x100' with mostly small footprint single family bungalow houses. This area became known as the **Des Meurons Extension**.

**2** The area at the east side of the property suited a high density mix of residential and commercial uses at Archibald Street fitting with the regional context of existing apartments and townhouses, commercial and industrial uses. Archibald Street is a main arterial road connecting the north east and south east of the city. Here larger apartment complexes with commercial services at grade became known as the **Commercial District**.



Figure 4.13: Buildable area and districts.

source: ArcView GIS Bing Aerial Map

**3** The upper area of the centre of the property had a large copse of upland oak that was to seen as important to preserve. To do so required working with the awkward shape of buildable area that surrounded his large stand of trees adjacent to the cemetery and bounded by the Floodway Fringe line and dry creek bed. This area of upland forest provides a unique connection to the riparian corridor along the Seine River. This area is known as **Woodrow**.

**4** The largest and most central area of the property contained patches of riparian and upland forest that offered the best possibility for reconnection across the site. Contained by the buildable area and adjacent low density single family bungalows created an opportunity to retain as much of this forest as possible while generating diversity in the neighbourhood arrangement and shape. This area was aptly named **Forest**.

## 4.6 Three Scenarios

Three scenarios of different housing and road configuration were tested within the buildable area of the site using different configurations of single family lots, multi-family attached homes, large and high density apartment blocks, and high density mixed use commercial and residential complexes. These were arranged and rearranged to see how the various neighbourhood building blocks worked within each of the four areas in respect to fitting with the buildable area, preservation of forest and movement through the neighbourhood. A trial of road side bioswales was designed along the main roads for each iteration to see the size, shape and direction this would need to take to move storm water over the landscape.

### 1 Single Family Block + Multi Family

The intention of this scenario was to test the existing lot and block style of the Glenwood neighbourhood of Old St. Vital to the west of the site while integrating higher density multi family dwellings amongst the more oddly shaped buildable areas. This test was to see if the adjacent residential fabric would work within the constraints of the river, forest and flood line restrictions in addition to the circulation network necessary to move through the neighbourhood.

**What works:** The typical block style works well along Rue des Meurons extended to the Seine River. Multi family dwellings in the form of 6 plexes and 8 plexes fill the awkward spaces where single family lots prove difficult. This occurs at the north end of the Forest district and exclusively in the Woodrow district. The Commercial district along Archibald incorporates high density apartments of 160 suites each blends with the high density apartment blocks, commercial services and strip mall style businesses as this arrangement existing along Archibald and across Fermor Avenue in the Niakwa Place neighbourhood.

**What doesn't:** The residential blocks in the Forest district do not allow for the preservation of forest. The block style arrangement requires a perimeter ring road around the district was only able to be single-loaded (i.e. development only on one side of the road). This could prove problematic for developers who would be building the road and for the city that would be maintaining the road as it would serve only half the number of possible dwellings and as a result be a very expensive option. While the upland forest is preserved in the Woodrow district, a single loaded street is required to access the residences.

**Density figures:**

Property Area: 129 acres (509,904 m<sup>2</sup>)  
 Buildable Area: 85.2 acres (344,792 m<sup>2</sup>)  
 Single Family Detached: 222  
 Multi-Family Units: 990  
 TOTAL UNITS: 1212

Building Footprint Area: 13.1 acres (53,142 m<sup>2</sup>)  
 Floor Area: 36.7 acres (148,776 m<sup>2</sup>)  
 Road Area: 24 acres (98,208 m<sup>2</sup>)



Figure 4.14: Single family block + multi-family

source: ArcView GIS Bing Aerial Map



Lane Kilometers: 12.4 km

Greenspace within Buildable Area: 16.4 acres (66,580 m<sup>2</sup>)

Preserved Forest Area: 96.7 acres (391,250 m<sup>2</sup>)

Gross Density: 9.86 units/acre

Net Density: 14.52 units/acre

Gross Density of Buildable Area: 14.58 units/acre

This follows the intentions of creating density while aiming to preserve forest within the buildable area. Compared to the average gross density of the surrounding region of 3.5 units per acre, this scenario is significantly higher in gross density despite the restricted buildable area. Smaller lot sizes of 40'x100' for the single family portion in addition to the 6 and 8 plexes and the high rise apartments facilitate this density. The circulation of the design allows for two access points from Archibald Street with a pedestrian connection between the neighbourhood halves. The single loaded roads of the Forest and Woodrow districts keeps the greenspace at the neighbourhood perimeter public while offering a visually appealing way through the neighbourhood.

## **2 Single Family + Multi-Family**

This scenario was intended to build on the previous scenario and test the addition of 6 and 8 plex housing using a closer layout in the form of bay type streets. This was to further increase possible density while aiming to preserve a the forest and establish new forest connections through the neighbourhood. The single family block footprint at the Des Meurons Extension remained from the previous test and connected it to the site opposite the river by a bridged through road. The Forest district changed to multi-family dwellings in the form of duplex, triplex, 6 plex and 8 plex through much of the neighbourhood.

The Forest District is connected to Archibald by one road. This road connects to a single loaded ring road around the district. A main spine road runs north/south with bays of multi-family housing branching off at each side. A common greenspace area in the centre of the left half of the district allows for the possibility of reconnecting the existing forest with newly planted trees that would grow to complete the forest corridor.

The Woodrow district is treated with multi-family dwellings of 6 and 8 plex style. It remains largely single loaded due to its unusual shape. It is connected to Archibald Street in one place at an intersection it shares with the Commercial District south east of the dry creek bed.

Again, we see the Commercial District of mixed-use high density dwelling and commercial services at Archibald Street.

**What works:** This design makes a better case for the single loaded ring roads in the Forest and Woodrow districts due to the number of dwellings accessed by them. A connection across the Seine



Figure 4.15: Single family + multi-family

source: ArcView GIS Bing Aerial Map

River connects the neighbourhood for vehicles and pedestrians building upon the existing footbridge. New forest connections are possible in this layout and the movement of stormwater is handled by pockets of bioswales in addition to the swaled roadsides of the ring and spine roads.

**What doesn't:** While a greater area of forest connectivity is achieved and the design begins to follow the organic nature of the buildable area, it could respond much better to the natural landscape features. The bays of housing in the Forest district are tightly packed with 6 plexes offering no variation in housing type.

### **Density figures:**

The densities for this scenario are:

Property Area: 129 acres (509,904 m<sup>2</sup>)

Buildable Area: 85.2 acres (344,792 m<sup>2</sup>)

Single Family Detached: 37

Multi-Family Units: 1575

TOTAL UNITS: 1612

Building Footprint Area: 13.5 acres (54,917 m<sup>2</sup>)

Floor Area: 44.5 acres (180,227 m<sup>2</sup>)

Road Area: 20 acres (81,046 m<sup>2</sup>)

Lane Kilometers: 12.9 km

Greenspace within Buildable Area: 17.7 acres (71,844m<sup>2</sup>)

Preserved Forest Area: 96.7 acres (391,250 m<sup>2</sup>)

Gross Density: 13 units/acre

Net Density: 18.5 units/acre

Density of Buildable Area: 19.28 units/acre

The gross density of this scenario is nearly four times that of the surrounding neighbourhoods while preserving nearly an acre more of forest than the previous scenario. This greater density uses a comparable number of lane kilometers with nearly 400 additional dwelling units.

### 3 High Density Multi-Family

The third scenario is the most extreme of the three. It was an exploration of using tall apartment style buildings through the property to achieve the highest density level of development. The Des Meruons extension was densified using building footprints of three storey attached multi-family buildings within its buildable area. The remainder of the site shows footprints of apartment buildings ranging from 8 to 162 units per building.

**What works:** This test preserves a large amount of greenspace and forest within the development and offers 250% more dwelling units per acre than scenario 2.

**What doesn't:** The disturbance created by the need for a large amount of underground parking would be too great and has the possibility of doing more harm to the landscape than is intended by this Practicum. It is in sharp contrast with the surrounding region.



Figure 4.16: High density multi-family

source: ArcView GIS Bing Aerial Map

Property Area: 129 acres  
Buildable Area: 85.2 acres (344,792 m<sup>2</sup>)  
Single Family Detached: 0  
Multi family Units: 3942  
TOTAL UNITS: 3942

Building Footprint Area: 17.5 acres ( 70,820 m<sup>2</sup>)  
Floor Area: 19.8 acres (80,127 m<sup>2</sup>)  
Road Area: 17.1 acres ( 69, 202 m<sup>2</sup>)  
Lane Kilometers: 9 km  
Greenspace Area within buildable area: 50.6 acres

Gross Density: 32 units per acre  
Net Density: 172.8 units per acre  
Density of Buildable Area: 43 units per acre

This scenario pushed the gross density to 32 units per acre with nearly 4000 dwelling units. At ten times the density of the surrounding region, the objectives of low impact development cannot be met. Retention of forest and greenspace is achieved if not exceeded with over 50 acres of permeable, unbuilt space, however excavation for these large foundations and underground parking requirements will offset these benefits.

## **Conclusion**

The exploration of these three scenarios offered valuable information as to the scale of building lots, the building size and proximity to one another in addition to arrangement of the different neighbourhood configurations. Each had pros and cons but primarily they all lacked a true connection to the landscape at Windsor Park Golf Course.

Looking back at the site and the constraints of property lines, Floodway Fringe Line, desired forest to be preserved, and existing ways to move water over land on the site, it becomes apparent that the next step to design Windsor Park Golf Course as a residential neighbourhood is to look at the existing adjacent connections to the neighbourhoods outside the property boundaries.

A fourth and final iteration which became the design proposal uses the lessons from the three scenarios and applies them initially to a clean sheet of paper with the intent of creating a neighbourhood that responds to the landscape. Respecting topography, vegetation, neighbourhood connections and recreation opportunities while retaining the vision of using ecological infrastructure for the purposes of overland drainage are the fundamentals of what take the design to the next level.

## 4.7 Design Proposal

The design proposal revisits the main concepts of density, retention of existing natural features such as riparian and upland forest, works better with the dominant features of the site while responding to it in a more organic approach. The design favours a priority on natural features and was fortunate to have a lot to work with at the beginning of the design process

Features that were most influential to the design were the entrance points, the dry creek bed, existing forest and connections to the adjacent neighbourhoods. Working with the features of the site created the an organic palette of shapes and patterns that influence how and where the neighbourhood would best fit. These features created anchors within the site and connections to its surroundings. They became the most logical points of entry and allowed the neighbourhood to flow into the existing neighbourhood street layouts. Using existing clearings and crossings within the development allowed for the least amount of damage on the landscape.

Once the main road network was decided based on the site anchors, other roads were able to be visualized and important patches of forest for park areas and opportunities for reconnection with new forest were identified. These elements lend well to create connections rather than force them. Next steps involved working in the residential streets and bays and examine how dwellings would be organized and determine the type of dwellings for each district.

The incorporation of features to soften the environmental impact of development on the adjacent watershed came next. These movement and treatment areas determined the flow of water based on the run off from the hard surfaces of roads and rooftops.

Overall, the design of the neighbourhood development makes the most out of what it was given by the site, achieves a higher density and keeps the intrinsic natural features that exist within its boundaries.



## Road Infrastructure

The infrastructure for the roads of the new development was created to integrate the existing water and forest amenities of the site adding the key anchor points of road connections outside the property boundaries into adjacent neighbourhoods. Staying inside the buildable area with the design of the roads as much as possible allowed for a lighter touch on the existing site and, as such, reduced necessary amendments that could prove costly, both ecologically and economically. The road infrastructure aims to follow existing landscape patterns and connect existing networks while providing a route to Rue des Meurons. The road network functionally connects the Glenwood neighbourhood through the development to Windsor Park.



Figure 4.17: Road infrastructure

source: ArcView GIS Bing Aerial Map

## Bioswale Network + Water Movement

The network of bioswales, wet meadows, and vegetated filtration strips along the major roads and residential bays in the neighbourhood facilitates overland drainage of the road infrastructure and other hard surfaces such as sidewalks, rooftops and parking areas. This network filters run off and offers a level of treatment before the water reaches the sensitive Seine River. Larger catchment areas take the form of wet meadows while vegetated filtration strips flank the major road sides and increase in size to define areas of on street parking.

Directing the run-off water through vegetation allows for sediment to drop out in the vegetation. It is anticipated that the water will flow from the centre of the site outward to the Seine River at the west and the dry creek bed to the east giving the water a long vegetative treatment run before arriving at the river.



Figure 4.18: Bioswale + water movement

source: ArcView GIS Bing Aerial Map

## Dwellings

Three main types of dwellings are used in this proposal: single family detached, multi-family attached and apartments.

The Des Meurons Extension offers 56 single family lots which is the block style extended from the Glenwood neighbourhood. This was intended to blend with the adjacent neighbourhood and create a transition to the new development and the multi-family dwellings that occupy it.

988 multi-family attached dwellings ranging from duplex to 8 plex as well as larger 30+ unit apartment style buildings occupy much of the centre of the development in the Forest and Woodrow districts. The number and type of dwellings in addition to their arrangement creates a density that allows for the retention and reconnection of forest areas while creating opportunities for water filtration.

A variety of multi-family homes line the streets and bays which incorporate roadside bioswales or



Figure 4.19: Dwellings + district layout

source: ArcView GIS Bing Aerial Map

interior wet meadows for treating the water off the roads. Duplex and triplex homes are designed in symmetry on the main collector streets of the neighbourhood. Higher density 6 and 8 plexes form bay configuration and even higher density apartment blocks are found at the centre of the Forest district. These form a vertical punctuation at the centre of the development.

High-density apartments mixed with commercial services are seen along Archibald Street was tested in earlier iterations. These dwellings and services are consistent with the fabric that exists on the street and as such takes advantage of an opportunity to increase the units per acre of the development.

## Parking

All parking on the site of Windsor Park Golf Course is at grade. With a preference to keep cars away from housing fronts and to reduce the need for single-loaded back lanes, a shared driveway approach between buildings was implemented. Surface parking lots are used for the higher density blocks and drain into wet meadows for the pre- treatment of pollutants so they do not enter the watershed.



Figure 4.20: Parking locations

source: ArcView GIS Bing Aerial Map

## New Forest Connections

Reconnecting the existing riparian and upland forest is important to create corridors from patches of existing forest. This reforestation will create contiguous corridors in the new development as is seen primarily in the Forest district of the development. These newly planted forests add to the “instant” park spaces of the existing forest and create a larger greenspace than the Windsor Park Golf Course had previously.

The Glenwood entrance is framed by the existing riparian forest at the north of the bridge while the new upland forest flanks the road. Traveling north through the development, glimpses of new forest appear interspersed with the housing until you reach the creek bed where the low land maple and ash forest emerges. Across the creek the existing upland oak forest retained in the Woodrow district, new forest connects the riparian and upland forests with an extension of new forest reaching into the area near the creek bed.



Figure 4.21: New forest connections

source: ArcView GIS Bing Aerial Map

## Street Trees

Street trees add an additional layer to the existing forest and reforestation efforts in the neighborhood. Over time, this additional layer of connectivity creates character for the new neighbourhood. Anticipated species can now match the existing forest species. American elm and Green ash for the collector streets, Basswood, Bur oak, Manitoba maple are to be used for the residential streets.

Street trees provide shade in the summer and wind breaks against winter winds buffering the elements for the new development. They offer an element of biodiversity to the neighbourhood while extending a connection to nature along the streets allowing residents to experience them at a pedestrian scale.



Figure 4.22: Street trees

source: ArcView GIS Bing Aerial Map

## Pathways

Creating a walkable neighbourhood throughout the development was an important design decision. Allowing people to move through the development to connections and services in and out of the site reduces a need for car use. Pathways and recreational trails move through the forest near the river and connect the Woodrow District all the way to the Des Meurons Extension. From this path, another allows pedestrian movement through the Forest district and connects across the dry creek bed to the Commercial district. The existing neighbourhood of Niakwa Place is connected to by trails as well and links residents to both the public indoor pool at the south east and the community centre on Des Meurons. These pathways fit with the Save Our Seine goal of offering recreation paths along the Seine River Greenway.

The bridge linking the two sides of the development also offers trails and an area to embrace the Seine River with a dock and canoe launch. The river itself becomes a trail in summer by canoe and in winter by foot or by skate thus offering residents multiple ways to experience this ephemeral yet historic river.



Figure 4.23: Pedestrian path network

source: ArcView GIS Bing Aerial Map



## The Neighbourhood Plan

The overall neighbourhood with its four distinct districts is designed to respond to the unique landscape of the site. The plan mingles dwellings and pathways with the forest and water, and works with these amenities to create public spaces of forest and park that will change and grow through the seasons and years. Each of the four districts will be designed in detail.



Figure 4.24: Neighbourhood plan.

source: ArcView GIS Bing Aerial Map

## The Des Meurons Extension

The Des Meurons Extension is designed to blend in with the existing Glenwood neighbourhood, the style of the houses, lots and blocks of the older neighbourhood were carried through in the district with a couple of differences; each side of the road between the sidewalk and the street has a roadside swale in keeping with the rest of the new development. These swales run to larger swales which filter out sediment and pollutant before the water reaches the river.

Near the new bridge to the development on the south west side of the Seine River, the housing transitions with larger three storey 8 plex buildings to introduce the neighbourhood on the other side. Just before going over the bridge, at the east side is vehicle access to the canoe launch with parking for 8 vehicles. The canoe launch offers a river side park area as its slope to the river is very gentle in this location

Shown in section, the Des Meurons Extension closely resembles a typical riverlot neighbourhood with front and back yards and back lane vehicle access with garages. The main difference is the addition of bioswales between the curb and the sidewalk bringing the overland drainage philosophy into the existing Glenwood neighbourhood.

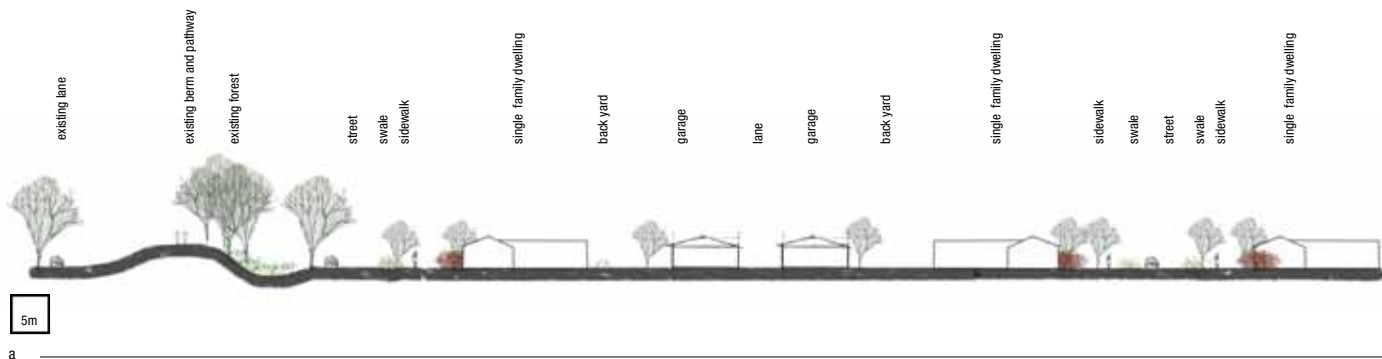


Figure 4.25 Des Meurons Extension section.

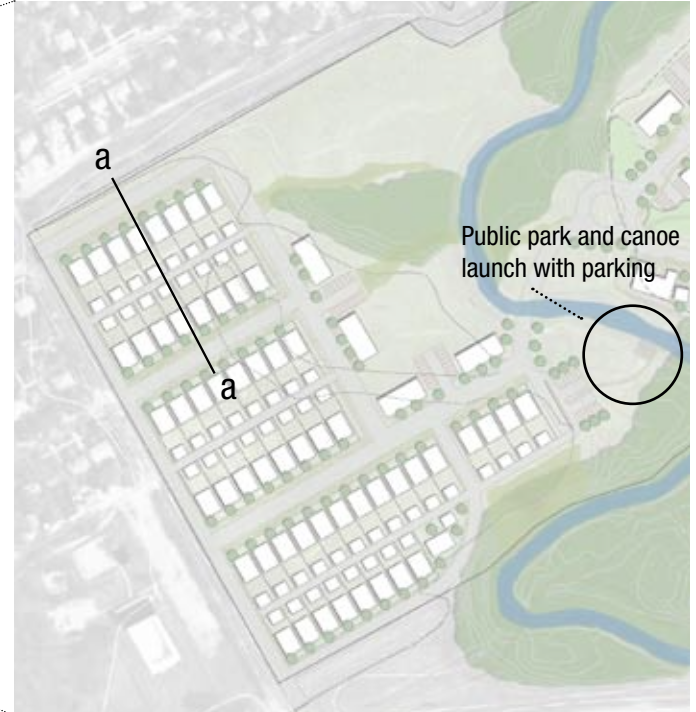


Figure 4.26 Des Meurons Extension section.

### Detailed section of the Des Meurons Extension

Units in the district:

Single Family Detached: 56 units

Multi-Family Units: 32

TOTAL UNITS: 88

Areas:

Building Footprint Area: 2.1 acres

Road area, access roads, driveways: 2.8 acres

Lane Kilometers: 1.6 km

Greenspace within Buildable Area: 1 acre

Preserved Forest Area: 1.8 acres

New Forest Area: 0 acres

Density:

Gross Density: 4.5 units/acre (of total property)

Net Density: 8 units/acre (of buildable area)

## **Commercial District**

The Commercial District is a mixed use high density residential area on Archibald Street. Higher rise apartments with 40, 60 and 80 units above commercial services are accessed off the larger Archibald Street thoroughfare in keeping with areas adjacent of the region. The apartment are ten to twelve storeys in height with a footprint of a half acre. Some have underground parking while all have parking at grade for the commercial services.

Access to this district from the new development is easily done by foot path or by car off Archibald. The dry creek bed directly behind these larger buildings acts as a bioswale for the run off from parkings lots, rooftops and even some water from the larger roadway to pre-clean it before it reaches the Seine. The creek acts as a buffer to the smaller scale neighbourhood on the other side reducing the potential imposition of the high rise apartments.



### Detailed section of the Commercial District

Units in the district:

Single Family Detached: 0 units

Multi-Family Units: 460

TOTAL UNITS: 460

Areas:

Building Footprint Area: 2.4 acres

Road area, access roads, driveways: .4 acres

Lane Kilometers: .5 km

Greenspace within Buildable Area: 2.2 acres

Preserved Forest Area: 0 acres

New Forest Area: 0 acres

Density:

Gross Density: 30.6 units/acre (of total property)

Net Density: 49.4 units/acre (of buildable area)

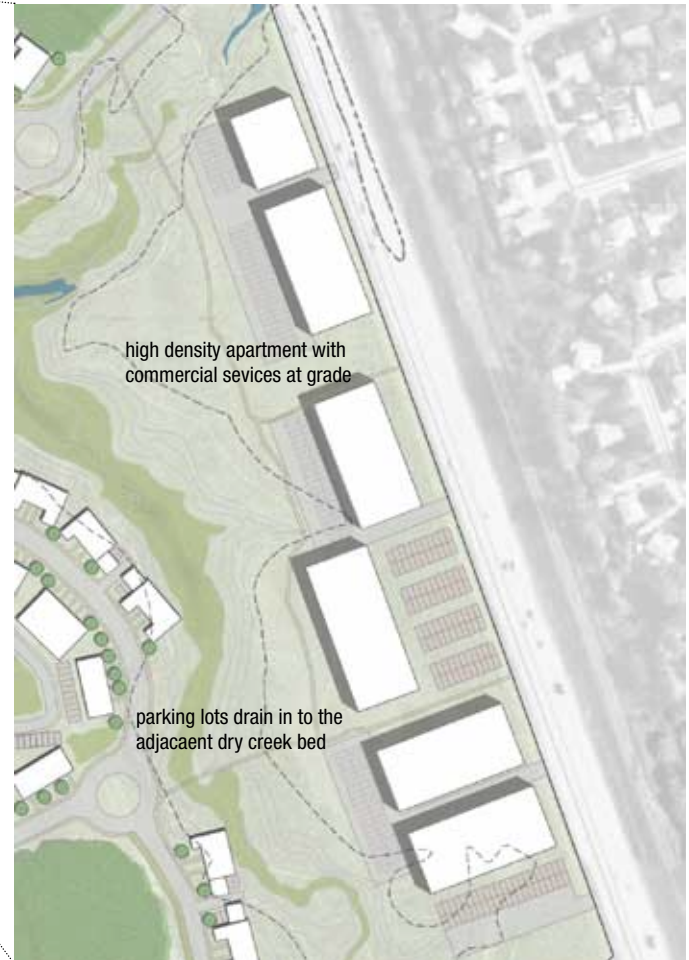


Figure 4.27 Commercial district detail.

## **Woodrow District**

The Woodrow District offers an interior forest of upland Bur oak that once divided two fairways. The idea was to keep the forest public and offer pedestrian trails while allowing the houses the opportunity to share in this amenity. Loose stands of oak with low understory of grasses and shrubs create a savannah condition to walk through while also being able to glimpse through the forest to the surrounding neighbourhood. Access to the Seine River is just a short walk down a gradual trail from the Woodrow forest.

A shared driveway approach is used to eliminate back lanes as well as dwellings with garages at the front. Moving the vehicular elements to the side of the 3 and 4 plexes reduces their significance and ensures a direct visual connection to the street enhancing the neighbourhood quality of the district. On street parking incorporates a swale at the roadside and a wet meadow treatment for “bump outs” where the road does not have a parking lane. This helps to keep the road narrow in places where parking is not required and to allow for storm water filtration where the road widens (Figure 4.21).

Pockets of smaller yet higher density duplex and 6 plex relate to the public space as they are configured compactly and benefit greatly from common areas. They also have a unique parking treatment. Not every dwelling has parking directly at the door. Carports with a dwelling above fulfill the parking needs with just a short walk from each dwelling thus maximizing interaction between the residents of the area.



### Detailed section of the Woodrow District

Units in the district:

Single Family Detached: 0 units

Multi-Family Units: 169

TOTAL UNITS: 169

Areas:

Building Footprint Area: 4.3 acres

Road area, access roads, driveways: 2.3 acres

Lane Kilometers: 2.5 km

Greenspace within Buildable Area: 13.3 acres

Preserved Forest Area: 3.2 acres

New Forest Area: .2 acres

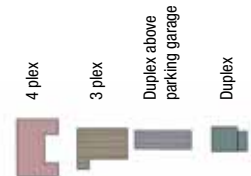
Density:

Gross Density: 4.9 units/acre (of total property)

Net Density: 8.1 units/acre (of buildable area)



Figure 4.28: Woodrow district detail.





## Woodrow District

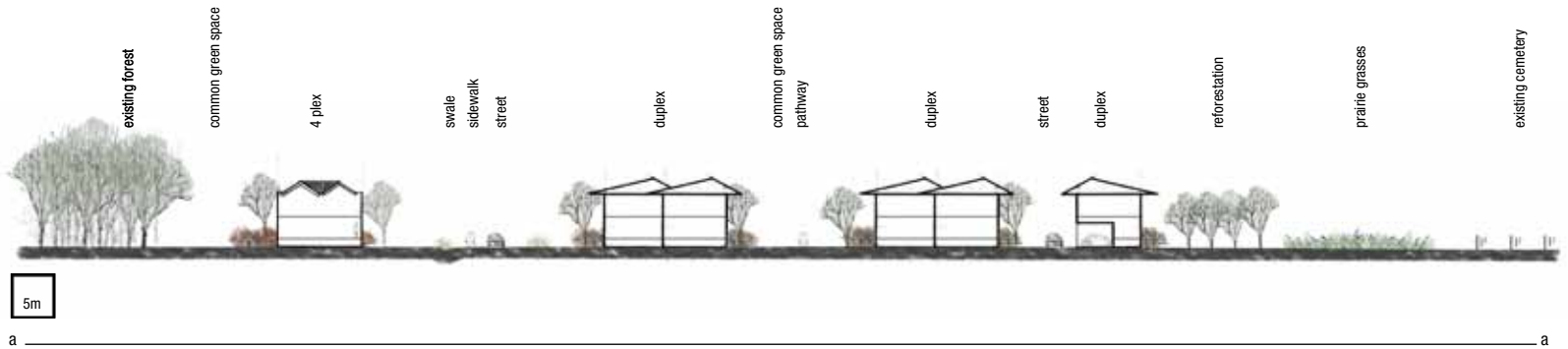


Figure 4.29: Woodrow district section.



## **Forest District**

The Forest District can be divided into two areas: central and south. The entrance into Forest Central occurs off Archibald Street at the extension of Autumnwood Drive with existing forest on each side a traffic circle. To the right is the entrance to the Woodrow district and further ahead is a bridge over the dry creek bed and leading into the development.

Forest Central is composed of bays of medium density three storey 4 to 8 plexes. A central swale in each bay of wet meadow gathers the water from the streets and rooftops. The wet meadow vegetation of sedges and shrubs creates a focal point within each bay. The shared driveway concept continues in the district but handles a larger amount of cars per building. Higher density apartment style buildings are found in the middle of the district near the new forest connections. These offer an increase in density which allows for much of the surrounding greenspace to be retained and the connection of forest corridors to be achieved through reforestation.

Forest South offers the symmetry of varied housing types on both sides of the collector road with side streets that reach into the development. The entrance into Forest South occurs from the bridge across from the Des Meurons Extension. A traffic circle is approached with existing forest as a focal point beyond it. To the left and to the right, the residential collector roads create a choice of movement that offer glimpses of the forest as one moves through. Lower two storey 3 and 4 plexes back onto the existing Niakwa Park neighbourhood with a small forest buffer to transition the new neighbourhood with the existing housing

As one moves east through Forest South, a turn to the North occurs with forest on the right, then left and the housing back onto the dry creek bed then circles up to the bridge at the north of the Forest district. Cars are treated in much the same manner as the Woodrow district with shared driveways and on street parking with vegetated “bump outs” and bioswales.



**Detailed section of the Forest Central District**

Units in the district:  
 Single Family Detached: 0 units  
 Multi-Family Units: 527  
 TOTAL UNITS: 527

Areas:  
 Building Footprint Area: 5.87 acres  
 Road area, access roads, driveways: 4.65 acres  
 Lane Kilometers: 5.7 km  
 Greenspace within Buildable Area: 32.3 acres  
 Preserved Forest Area: 6.37 acres  
 New Forest Area: 1.65 acres

Density:  
 Gross Density: 8.6 units/acre (of total property)  
 Net Density: 11.6 units/acre (of buildable area)



Figure 4.30: Forest Central detail.

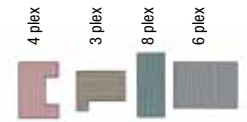




Figure 4.31 Forest Central perspective.

### Detailed section of the Forest Central District



Figure 4.32 Forest Central sectional elevation.

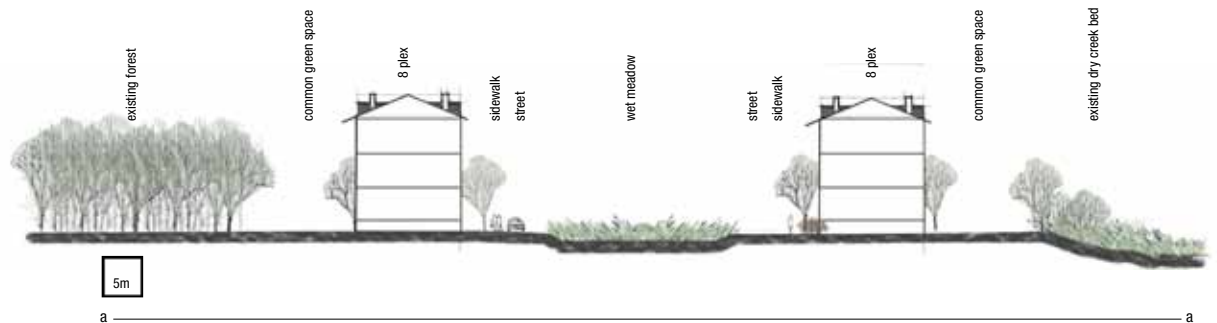


Figure 4.33 Forest Central section.

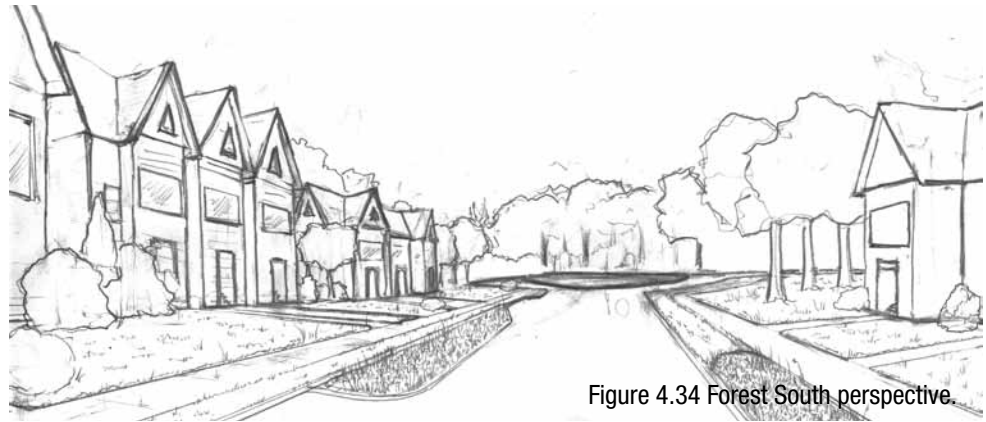
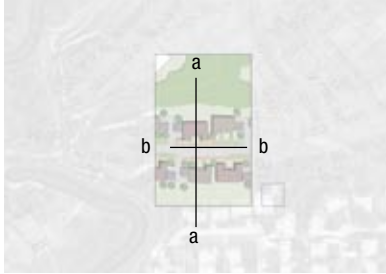


Figure 4.34 Forest South perspective.

**Detailed section of the Forest South District**



Figure 4.35 Forest South sectional elevation.

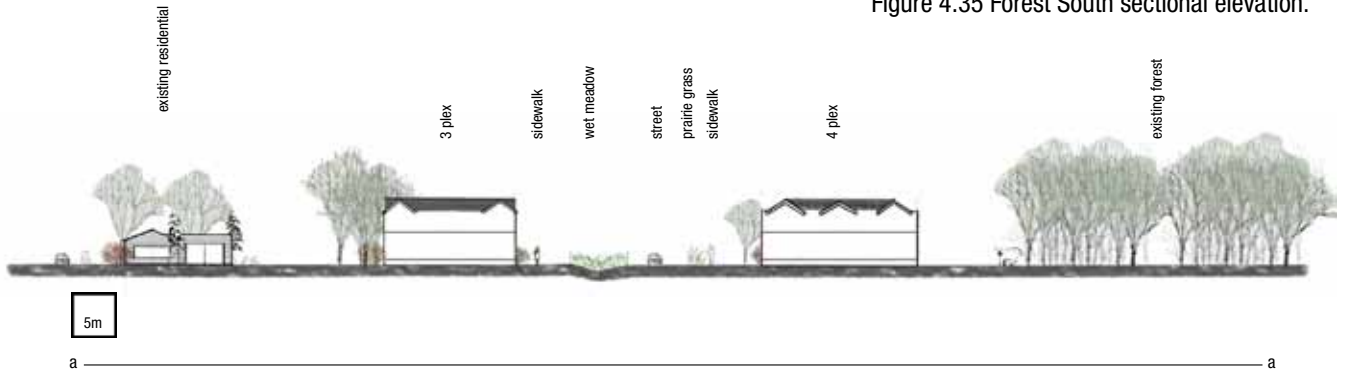


Figure 4.36 Forest South section.

## **4.7 Conclusion**

The design proposal for the development of Windsor Park Golf Course achieves the objectives of retaining, and in some places improving, the intrinsic natural properties of the site while developing the landscape to a potential economic feasibility while also adhering to the principles set out in the 2010 Our Winnipeg Plan. This proposal offers an organic design responsive to the existing landscape of the Windsor Park Golf Course without any major earth movement ensuring a light touch on the landscape.

This proposal is one possible outcome which creates a quality development of human space balanced with conservation of forest and habitat for non-humans by integrating the natural and built environments. It repurposes the space from a designated program to one that can be used every day by members of the community for living, recreation and commuting while also creating a connection to the neighbourhoods that surround this new development.

This is a human development for humans. The design attempts to retain what enhances a high quality neighbourhood, mitigate potential conflicting conditions, and create places that resonate with the human conscious and unconscious desire for the familiar and unpredictable.

## Chapter 5 | Conclusion

The needs of cities grow and change based on economic, social and environmental factors. A land use today may be more beneficial as another tomorrow: a golf course now, a neighbourhood later. Using a holistic landscape architect's view when evaluating these transformative spaces can lead to innovative design, especially when looking to retain intrinsic ecosystem services that often disappear in urban areas.

Although we must impose certain elements such as roads and dwellings in any built neighbourhood environment, responding to the existing landscape and allowing it to inform important design decisions is not only beneficial to landscape ecology, but to those that will inhabit the space by the preservation of the natural features and the improvement of their surrounding community:

- Improvement through the reestablishment of habitat corridors fragmented by previous land uses.
- Improvement through the use of natural drainage processes for clean water.
- Improvement through density of dwelling spaces to make room for the necessary ecology to accomplish sustainability and create a community.

The design proposal for the Windsor Park Golf Course is one possible design solution of many, however, it responds to the landscape of the site and touches lightly upon it while offering a walkable neighbourhood form with abundant public spaces. It attempts to mitigate the impact of development and the resulting pollution that will occur on a daily basis by using vegetation as a functional and visually appealing amenity. But mostly, it creates a unique community through a denser form and a connection with nature.

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Aerial photographs were from ArcView GIS Bing Aerial Maps and Google Earth as indicated and adapted by the author.

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