# Villa Canadensis

The Ontario Cottage as an instrument of rehabilitation

by

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I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

# Abstract

The tradition of the summer cottage in Ontario is a testament to Canadians' close identification with the wilderness. This thesis establishes a link between the Ontario cottage and the ancient villa originating in classical Roman culture, a building type that for over two millennia has given architectural expression to man's relationship with nature. In the twenty-first century, this relationship is characterized by a deep sense of crisis. This thesis proposes a new classification of the cottage: *Villa Canadensis*, a synthesis of the fundamental agricultural instincts of the ancient villa and the satisfaction of a productive relationship with the landscape, with the Canadian desire to experience nature in a wilderness setting. The *Villa Canadensis* will be actively engaged in the cultivation and rehabilitation of the wilderness.

The site for rehabilitation is a decommissioned suburban gravel pit near Cambridge, Ontario. It sprawls over 200 acres, and encroaches on several sensitive ecosystems that are unique to the Waterloo region. The proposal is for a community of cottages to be built on the disused site. Through the combination of regenerative architecture and an ecosystem approach to the devastated landscape, the occupants of *Villa Canadensis* will participate in the stabilization and remediation of the site, and will eventually become stewards of an enhanced ecosystem, a cultivated wilderness that they have helped to create.

# Acknowledgements

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Lastly, I would like to thank my family for their patience. I hope that this thesis and its designs reflect the convictions about architecture, community, and nature, that have emerged from our holidays together and our discussions over the last several years.

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Fig. 1 | Cottage at Gibson Lake, 2003

## ON THE COMPANIONSHIP WITH NATURE

Let us be much with Nature ; not as they
That labour without seeing, that employ
Her unloved forces, blindly without joy ;
Nor those whose hands and crude delights obey
The old brute passion to hunt down and slay ;
But rather as children of one common birth,
Discerning in each natural fruit of earth
Kinship and bond with this diviner clay.
Let us be with her wholly at all hours,
With the fond lover's zest, who is content
If his ear hears, and if his eye but sees ;
So shall we grow like her in mould and bent,
Our bodies stately as her blessèd trees,
Our thoughts as sweet and sumptuous as her flowers.

- Archibald Lampman

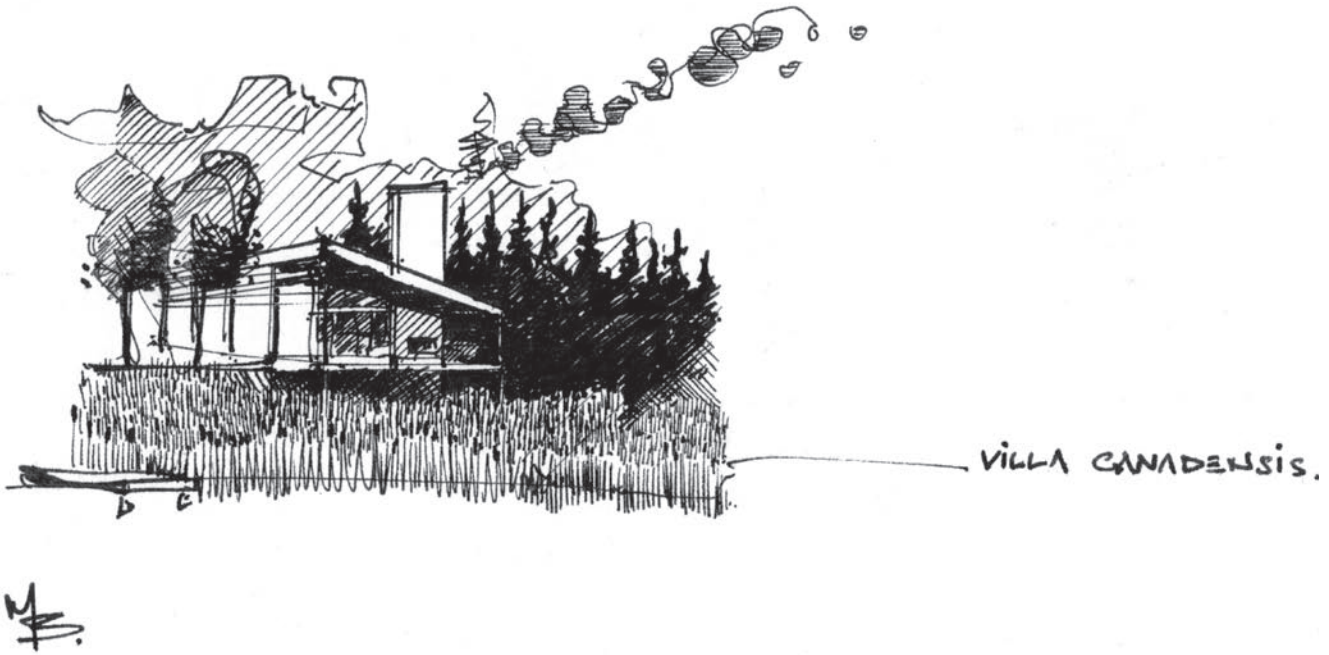



Fig. 2 | Proposed cottage sketch, 2007

# Introduction

This thesis investigates the heritage of the Ontario summer cottage and traces its origins to the ancient Roman villa, a typology that has endured and enabled urban dwellers to reconnect with nature for over two millenia. It uses the early Roman agicultral villa as the foundation for the proposal of a new mode of cottage – *Villa Canadensis* - that engages Canadians in a productive relationship with the environment. This link is established through Castle Frank (1794), Governor John Graves Simcoe's wilderness retreat on the edge of the Don Valley, above Fort York, and one of the first instances in Ontario of the villa type in the role of what would eventually become the widely distributed summer cottage. Through this connection to the British villa tradition and its associated landscape garden, it is possible to locate the origins of the Ontario cottage in James Ackerman's comprehensive and illuminating history of the villa and its gestation in Republican Rome. This thesis also emphasizes Ackerman's claim that the villa, because it embodies ideological values and is not beholden to material and economic ones, represents the most advanced and idealized conception of our relationship with the environment.

In the introduction to *The Villa: The Form and Ideology of Country Houses*, Ackerman discusses his motivation for undertaking his history of the villa and its transformation over time:

> The basic program of the villa has remained unchanged for more than two thousand years…this makes the villa unique…it has remained substantially the same because it fills a need that never alters, a need which, because it is not material but psychological and ideological, is not subject to the influences of evolving societies. The villa accommodates a fantasy that is impervious to reality. (Ackerman 9)

He goes on to explain how the villa is the idealized, architectural representation of urban man's desire to reconnect with the natural environment.

Having established the villa heritage of the Ontario cottage, this thesis critiques its outdated, exploitative relationship with its natural environment. Current cottage practice represents a hypocritical condition, the irony being that nowadays, it can be argued, visiting the cottage is an unsustainable and irresponsible practice, threatening to ruin the very thing that cottagers are attempting to reconnect with, the wilderness. This thesis therefore suggests a new mode of cottage that will reflect the contemporary climate of environmental fragility and ecological crisis, as well as Canadians' claim that the natural environment, and especially the wilderness, is of primary importance to our collective identity. By returning to the villa tradition, the new cottage-goer could be inspired to engage in a productive relationship with the environment, based on the core concept of the villa ideology: *otium* - a state of mental alertness inspired by physical activity and the contemplation of life in the country, described in the early agricultural treatises and the villas of Republican Rome. The title, or classification of the new cottage - *Villa Canadensis* - is intended to signify the synthesis of an early, agricultural sensibility that espouses productivity and stewardship of the land, with Canadians' expressed desire to experience nature in a wilderness setting,

and the increasing motivation and interest in participating in its protection and rehabilitation.

This new type of cottage will be constructed on damaged sites near urban centres. Rather than participate in the colonization of wilderness and lakes in more and more remote and inaccessible locations, greater distances from cities, *Villa Canadensis* will inspire the regeneration of wilderness and healthy, biologically diverse ecosystems where they have been destroyed by human use and development. The new cottage type will embrace regenerative design techniques, as defined by John Tillman Lyle, so that the presence of the new cottages will actually contribute to the energies that are necessary for ecological rehabilitation to take place. As significant, if not more so, will be the way in which the new cottages will be attuned to natural diurnal rhythms and cycles, such as patterns of solar gain and shading, seasonal heating and cooling, and rain water collection and waste management, so that cottage owners will be encouraged to participate in the function of the cottage in the landscape. Furthermore, through their stewardship and adherence to an "ecosystem approach" to rehabilitation, described by University of Waterloo professor James J. Kay, the investment of their time, resources, and energies (both physical and material) will enable the ecosystem to regenerate more quickly, and become more diverse than would have been possible without their presence and engagement in the landscape.

The concept of *Villa Canadensis* calls for the integration of individual cottages within a larger community in order to effect substantial eoclogical rehabilitation on an ecosystem scale. The site therefore chosen for rehabilitation is a 200 acre gravel pit near Cambridge, Ontario. It is particularly appropriate for a regenerative cottage development because of the lakes on the site, created when gravel is extracted below the water table. Moreover, the adjacency of several locally significant Environmentally Sensitive Policy Areas (E.S.P.A.s), and most auspiciously *raresites* (formerly the Cruickston Park Biological Reserve), the largest urban green space in Canada, suggests the enormous potential for the rehabilitated ecosystem and for the eventual integration of the cottage community with similarly-minded institutions and conservation areas.

The site strategy calls for an total of 124 cottages, a network of trails and an interpretive centre. The site is divided into three zones, which reflect the intensity of initial site preparation, the proximity to E.S.P.A.s, the character of rehabilitation, and final quality of each area. The cottages are described according to ecological and architectural criteria, as well as criteria of human use and behaviour, and for the purposes of the site in question, are separated into two types. The first are cottages in the Peripheral Zone, describing the perimeter of the site, which are adjacent to shoreline but not E.S.P.A.s, and the second are cottages in the Embedded Zone, which occupy flat land that will eventually become wetland areas at the interior of the site and are adjacent to E.S.P.A.s, this sensitivity being reflected in their design. The third zone, or Transitory Area, refers to the E.S.P.A.s themselves, and intervention is limited to trails and boardwalks that encourage a delicate relationship with those significant and fragile ecosystems. Five phases for the implementation of rehabilitation are also described: earthworks, infrastructure, cottage construction, re-vegetation and, finally, occupancy and continuing stewardship. Lastly, the interpretive centre acts as a community centre for the cottage owners, where the research and monitoring of the

ecosystems and of rehabilitation techniques, as well as the distribution of tools and plant material will be a crucial aspect of the success of the community and the ecosystem. In addition, the centre will act as a public access point for the dissemination of the ideology or concepts behind *Villa Canadensis*, and the access point for the public's enjoyment of the network of trails and lakes.

The thesis is divided into four parts. The first is an essay, titled *Villa Canadensis*, that introduces Castle Frank as an early example of a Canadian villa or summer cottage and relates it to Ackerman's history of the villa. The essay focuses on the British lineage of the villa that inspired Castle Frank in Canada, specifically the Palladian revival villas and picturesque landscape gardens that characterized the discussion of English landscape in the eighteenth century. The essay concludes with a critique of contemporary Canadian cottage practice, specifically that which takes place between Toronto and the surrounding cottage country - the popular landscape of lakes, forests and rugged terrain within a few hours drive of the city. Taking that as inspiration for a paradigm shift in our evaluation of our relationship with the the wilderness, the essay concludes with the description of the *Villa Canadensis*, and the principles by which it might become a viable and attractive alternative to current practice.

The second part of the thesis, *Site Analysis*, is concerned with the description, analysis, and depiction of the Blair Gravel Pit and its environs. It focuses especially on the character of the Blair Swamp and Altrieve Lake and Forest E.S.P.A.s in order to suggest the original qualities of the entire site before excavation, and provide a model for the potential for the rehabilitated ecosystems.

The third part, *Site Strategy*, describes the strategy for the rehabilitation of the site and the criteria for the design of the cottages. Its first section describes three zones of the site, Peripheral, Embedded, and Transitory, and their respective cottage types and infrastructure . Cottage types are described in terms of biotic, abiotic, and architectural (referring to human use) criteria. Its second section describes the strategy for the integration of those cottages with the site, in terms of their location and the phased process of earthworks, infrastructure, construction, re-vegetation, and rehabilitation.

The fourth and final part of the thesis, *Design*, presents drawings of the various cottage types and suggests the character of the site as it would appear several years after the initial rehabilitation, construction and occupancy. It describes the cottages that are a resolution of the performance criteria discussed in the previous section. The renderings attempt to suggest early ecological succession, as well as the strategic plantings by cottage occupants, and convey the sense of progress and natural growth, and the transformation of the site over time that would make the *Villa Canadensis* such a constructive and restorative engagement with a regenerating natural environment.

Fig. 3 | View of Castle Frank from the Don River.
Watercolour by Mrs. Elizabeth Simcoe

# Villa Canadensis

## Linking the Ontario Cottage to its ancient agricultural roots

> We can picture to ourselves the cavalcade that was wont, from time to time, to be seen in the summers and autumns of 1794-'5-'6 wending its way leisurely to the romantically situated chateau of the Castle Frank along the reaches and windings, the descents and ascents of the forest road, expressly cut out through the primitive woods as a means of access to it. (Scadding 170)

In 1793, work began on what is arguably Toronto's first summer cottage. Lieutenant John Graves Simcoe had arrived in Upper Canada two years earlier as governor of the province, a position that he would occupy until 1796. He had put his son Francis's name on a grant for 200 acres on the west side of the valley of the Don River, just north of the new town of York, the capital of Upper Canada, where he would build a summer house for his family. Named Castle Frank, after Francis, it was located within a half hour's ride from Fort York, and was also accessible by canoe along the Don River. It was used as a weekend destination for the family and their guests, and Francis as a frequently sick child was taken there for the fresh air (Innis 177). Although made of timber available on the site and built by soldiers from the garrison, its form, as described by the historian J. Ross Robertson in *The Diary of Mrs. John Graves Simcoe* (1911), had an ancient lineage:

> The building was about fifty feet in depth and thirty feet in width, the latter being the frontage, which faced south. The front elevation was not unlike that of a Greek temple. The trunks of four large, well matched, unbarked pine trees answered for columns supporting the pediment or the projection of the whole roof. The main doorway was in the centre of the front, but no windows on either side. On the east and west sides were four windows with shutters of heavy double planks running up and down on one side, and crosswise on the other, and thickly studded with the heads of stout nails. (207)

It is obvious from the diary and watercolours of Elizabeth Simcoe that Castle Frank was indeed built in the form of a Greek temple. At that time it would not have been imagined as a cottage (that term would not enter use until the nineteenth century) or even as a small summer house; it was a villa. It is remarkable that within a few years of settling in Fort York, the Simcoes responded to the urge to build a villa (stronger, it seems, was the mentality to build a summer house than the "garrison mentality" that might prevent it [Frye 225]) in the wilderness nearby.

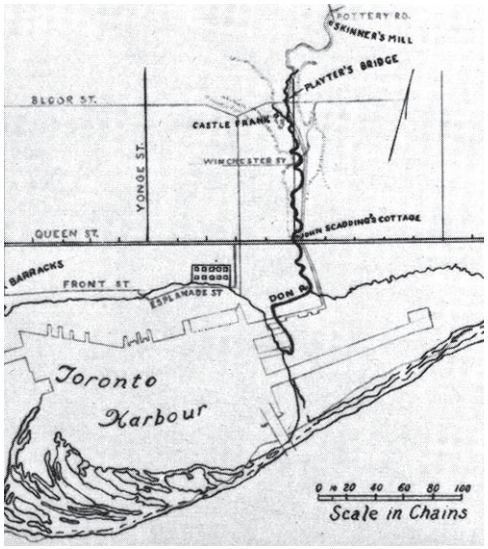
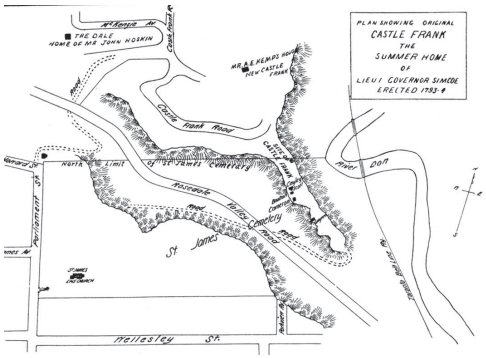



Fig. 4, 5 | Plan of Castle Frank in relation to Fort York (above), and the modern site at the edge of the Don Valley (below)



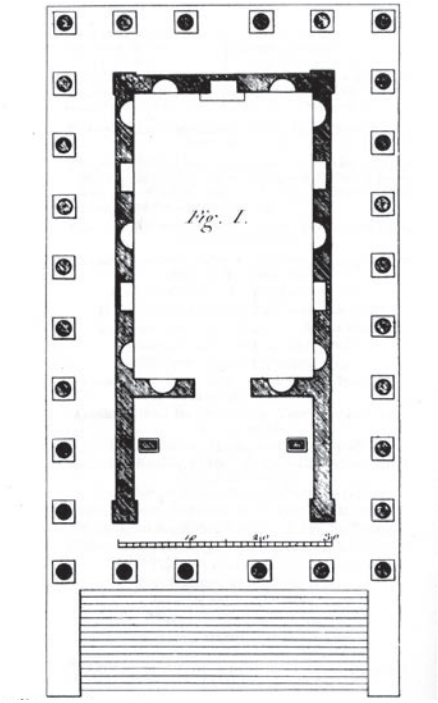



Fig. 6 | Plan of the Temple of Concord and Virtue

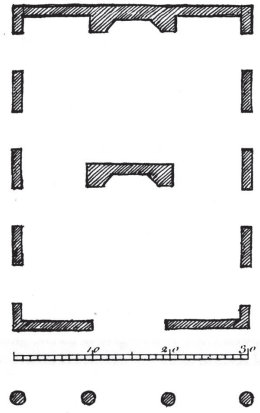


Fig. 7 | Plan of Castle Frank from description of Henry Scadding and Mrs. Elizabeth Simcoe

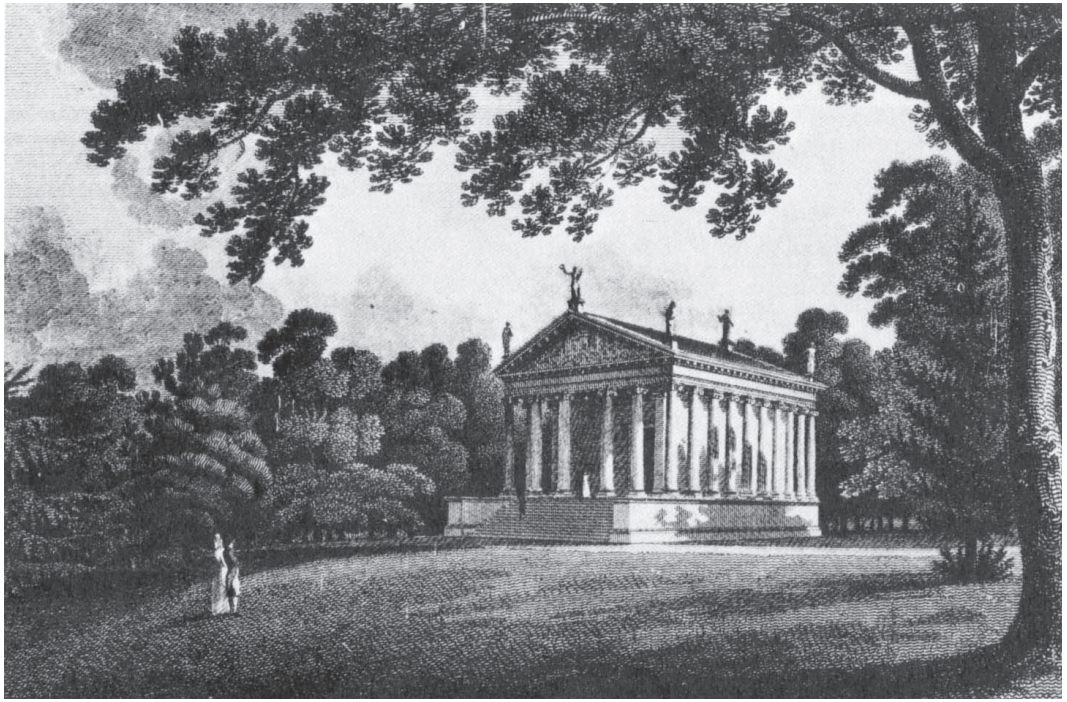


Fig. 8 | Greek Temple at Stowe (1749) designed by William Kent, later renamed "The Temple of Concord and Virtue"

In England, the Simcoes were part of upper class society that kept houses in the country. A year before leaving England, they had visited their friend George Grenville, the 1st Marquis of Buckingham and one of the richest men in England, at Stowe (Fryer 30), where in 1749 in the sprawling gardens, Viscount Cobham had completed construction on the Grecian Temple that was later renamed "The Temple of Concord and Virtue." Modeled on the Greek temple at Balchur, it was one of the first temples in the Greek style to be built in England, marking the beginning of the Greek Revival, but also the end of the final phase of the landscaping of Stowe's gardens, which, under the Viscount's instruction, had been in a state of continuous development since 1713 (Kluckert 352). There can be little doubt that when visiting Stowe Simcoe saw The Temple of Concord, which, being renamed to commemorate the end of the Seven Years' War, may have seemed especially poignant to a man with a military pedigree such as his. There is thus a strong likelihood that he had The Temple of Concord in mind when he planned Castle Frank. In this sense, Castle Frank represents the first foothold in Ontario of the villa tradition.

# I

In *The Villa: Form and Ideology of Country Houses*, his comprehensive study of the history and ethos of the villa, James S. Ackerman describes the foundations of an ideology of country houses in the earliest literature of Republican Rome, and demonstrates that in the villa there exists a typology that has remained essentially unchanged for over two millennia. As defined by Ackerman, a villa exhibits four characteristics:

1. It is a building in the country designed for its owner's enjoyment and relaxation,
2. Its pleasure factor distinguishes it from the farmhouse, and its surrounding estate from the farm,
3. It fulfills a psychological and ideological need, not a material one, and
4. It cannot be understood apart from the city because it exists not to fulfill autono mous functions but to provide a counterbalance to urban values and accommoda tions. It is a satellite, supported by monetary surpluses generated by urban com merce and industry. Its very existence is rooted in the contrast of country and city, in that the virtues and delights of the one are presented as the antithesis of the vices and excesses of the other. (9)

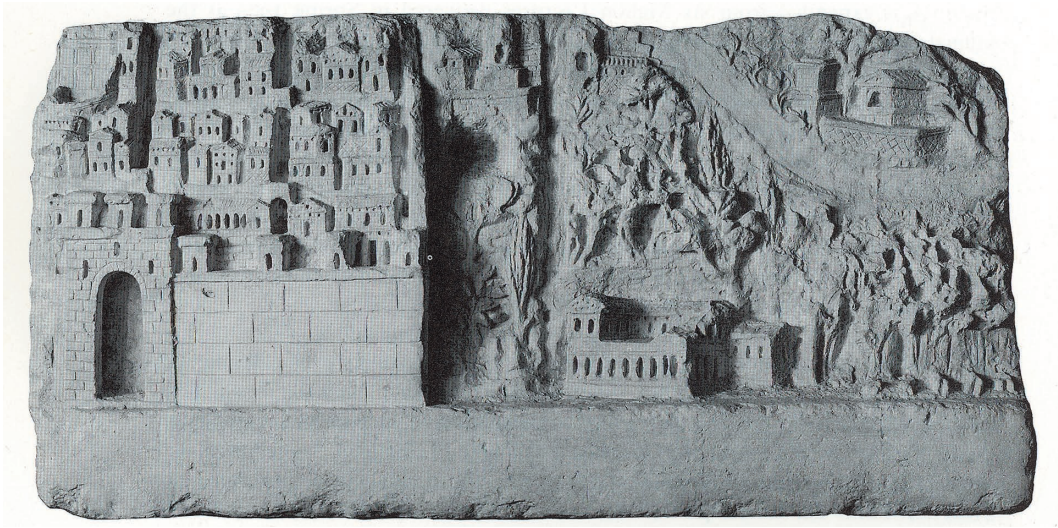


Fig. 9 | Cast of a Roman relief showing a suburban villa, from Avezzano

This thesis argues that the lineage of the Canadian cottage as we know it today lies at least in part in the ideology and history presented by Ackerman. That this is indeed the case becomes apparent when the typology of the villa is traced from antiquity, through its revitalization in the Italian Renaissance and its popularization a century later by Andrea Palladio, to its arrival in England during the Enlightenment, and then the subsequent transformation that made it available to the middle classes in England and then in North America so that it eventually became the cottage as we understand it today. Crucial to the North American phase of these developments was the suburbanization of cities in the late nineteenth century, which coincided with a strong urge for nature tourism and led to the development of what is know as "cottage country," a roughly 4000 square kilometer region within a two to three hour drive north of Toronto (Canada's most populous city) characterized by rugged, rocky terrain, primeval forests, and over 1600 lakes, inspiring the seasonal migration from the city to the cottage that we know today (King 10). This thesis focuses on Ontario because the province represents the largest concentration of an urban population along its border with the United States (60% of Ontarioans live in the Greater Toronto Area [The Canadian Atlas 16]) and this urban density, in accordance with the city / villa dichotomy described by Akcerman, has inspired a booming cottage industry, and, as this thesis suggests, the overdevelopment of former wilderness areas in a way that is unsustainable; crowding lakes past their capacity to support cottages whose increasing size and urban character destroy local ecological communities and threaten wildlife. Furthermore, a closer reading of Ackerman suggests that the villa is often the most advanced physical representation of man's conception of his relationship with nature (as demonstrated by the Medici villa at Fiesole and the landscape gardening phenomenon that accompanied the villa in Enlightenment England) giving grounds for the main argument of this thesis: that in this time of heightened environmental awareness and ecological crisis, the Canadian cottage could revisit its villa heritage in order to reconfigure our relationship with nature and the role of the cottage in Canada.

The first literary records describing the villa were practical agronomical treatises advising investors from the city on the acquisition and profitable management of farmland after the Punic Wars (264 – 246 B.C.) had ravaged the countryside and driven traditional farmers, peasants and freeholders off their land and into the safety of cities (Ackerman 38). The benefits of rural villas were said to be the virtue and purification to be gained from physical work and farming, and the satisfaction to be gained from productivity. As Ackerman observes, "the labour itself is seen as purifying the proprietor of the contamination of the city" (12). Writers such as Cato, Varro, and Columella drew on the Stoic tradition in order to celebrate the noble agricultural heritage of Romans (they feared the growing dependence on imported grains as farms were turned into more profitable vineyards and olive groves [see Ackerman 38, 52, 60]) and the virtue of a frugal lifestyle, hard work, and minimal comforts. Architectural description was concerned only with what was termed the villa rustica (a simple farmhouse, often with space for cattle on the ground floor) and advising on the positioning of barns, the housing of slaves, and the orientation of buildings for storing wine or wheat. Varro, in his agricultural treatise *Rer Rustica* wrote that "With respect to its buildings, a farm is certainly more productive if built rather according to the thrift of the anciens than the luxury of the moderns…" (I. xiii. 6). This ideal gradually came under threat as proprietors became increasingly city-based, and villas became increasingly more devoted to the comfort of their owners than the practical demands of farming.

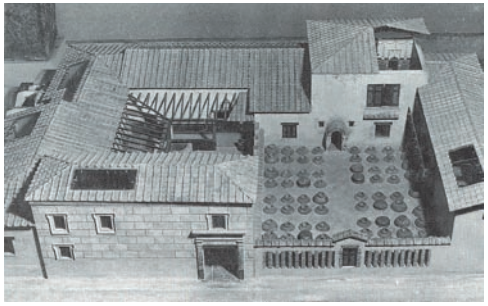


Fig. 10 | Villa Boscoreale, 1st century BC: modern model

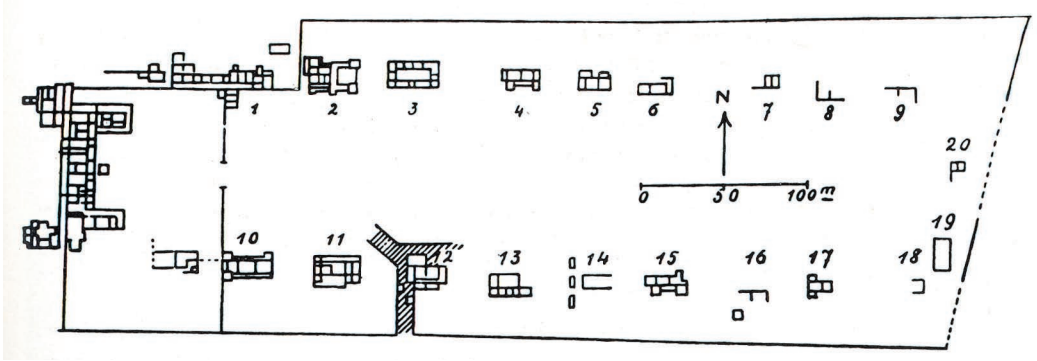



Fig. 11 | Diagram of Gallo-Roman villa showing agricultural buildings aligned on either side of the main house

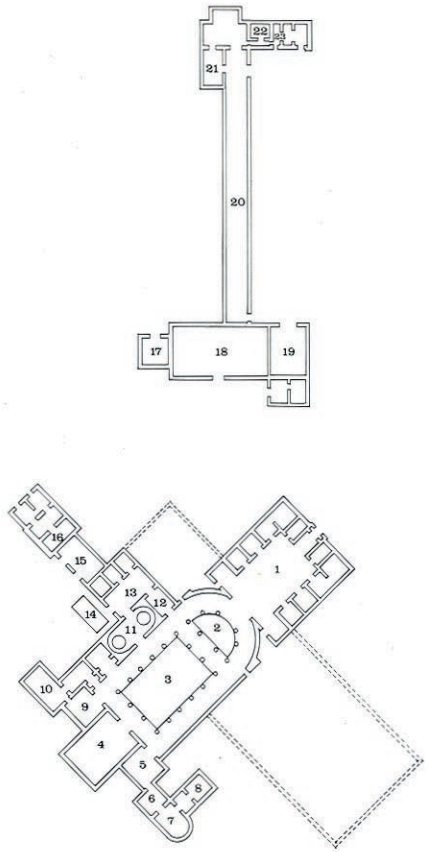


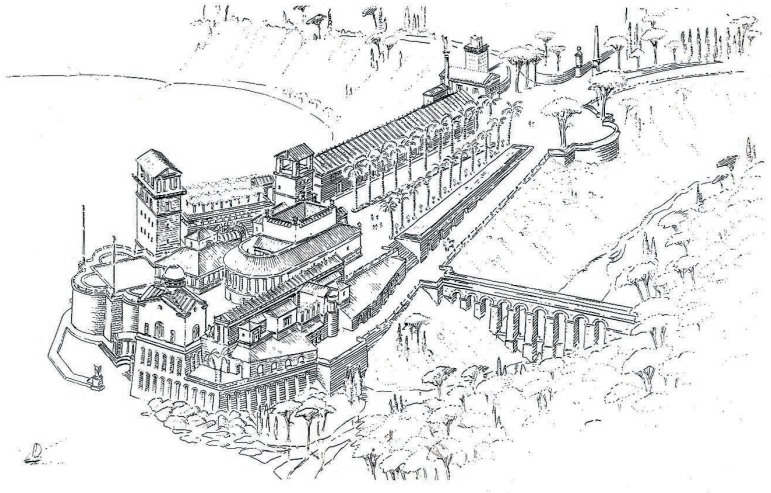

Fig. 12 | Plan of Pliny's Laurentinium (2nd century AD) imagined by Winnefield (above)

Fig. 12, 13 | Pliny's Laurentinium (2nd century AD) imagined by Leon Krier (right)

The most influential and lasting impressions of the villa ideology were written by Horace, Pliny the Younger, and Martial, who each owned villas of vastly different scales. Horace, who wrote in the first century B.C., was the son of a freed slave, his modest villa-farm had been a gift from his patron Maecenas. A century later, Pliny the Younger was a wealthy senator who owned "several properties and two palatial villas" and Martial owned a very small rural holding. However, Ackerman observes that,

> …despite the markedly different economic positions of the three, they shared a common attitude toward country life and, with a few others of their time, contributed to formulating for posterity the essential features of an ideology. Defined as an antithesis to urban life, its essential elements were the simplicity and the informality of country living, the healthfulness of the air and the opportunity for exercise (especially in hunting and fishing – though Pliny does confess to fishing from a couch), the scope for undisturbed intellectual and creative activities, leisurely conversation with friends, and the delights of contemplating the natural and cultivated landscape in different seasons and conditions. (36)

Here lies the concept of *otium*, the Roman ideal of life in the country. At its core is a sense of seclusion, serenity, or relaxation, though significantly for Romans it provided the opportunity to engage in "worthwhile physical and mental pursuits," including, until the first century AD, demanding farm labour. *Otium* was a "finely balanced combination of physical wellbeing and relaxation with great intellectual alertness" (Attlee 13). Its antithesis was *negotium*, the root of the English "negotiate," which represented the opposite conditions that were to be found in the city: business, affairs, noise, crowds, pollution, and vice.



A significant synthesis of the tendencies towards practical farming and contemplative leisure that is especially useful for this thesis appears in the poetry of Virgil, whose *Eclogues* or *Bucolics* were the foundation of the Arcadian tradition in which "shepherds and farmers inhabit an ideal countryside, joke with one another, or compose songs to heroes and beautiful boys and girls; mythology and legend enrich their daily existence." Virgil, continues Ackerman, "represents the life and labours of the husbandmen and the shepherd as the optimal and most ethical existence, but, like the city-based villa owners, he represents farming as a calling free of care and unwanted distractions, which offers even the farmer the opportunity for otium" (39). Virgil's later work, *Georgics,* drew inspiration from the agronomers, and was partly intended to instruct its readers on farming. It presents an idealized nature "tamed by men" so that Nature's bounty is offered up as the reward for hard work, and otium is found in the contemplation of a symbiotic relationship with Nature. In later centuries, Virgil and other Roman writers would be referred to by advocates of a return to villa ideology (see Ackerman 10).

Fig. 14 | Claude Lorrain, *Landscape with a Rustic Dance*, c. 1640-41


Fig. 15 | Giovanni Bellini, *St. Jerome in the Wilderness* (c.1450)

Because villas are funded by surplus wealth from cities, periods of urban economic decline were detrimental to their maintenance. During the so-called Dark Ages (from the late fifth century to the turn of the first millennium AD) there was a total absence of villa building. Classical villa literature survived, however, as did a memory of some Roman building traditions, but is was not until the later Italian Middle Ages that families were again able to use their wealth to consolidate farmland and build outside the city. This was a reaction to the growth of cities to a point where its citizens became conscious of a distinction between the city and the countryside. This contrast is illustrated by Boccaccio in *The Decameron*, set during the Black Death of 1348, as his characters flee plague-ridden Florence for the healthfulness of their summer palaces:

> Let us avoid like death itself the ugly example of others, and go to live in a more dignified fashion in our country houses (of which we all have several), and there take what enjoyment, what happiness, and what pleasure we can, without in any way going beyond the bounds of reason. There we can hear the birds sing, and we can see the hills and the pastures turning green, the wheat fields moving like the sea, and a thousand kinds of trees; and we shall be able to see the heavens more clearly, the heavens which, though they still may be cruel, nonetheless will not deny to us their eternal beauties and which are much more pleasing to look at than the deserted walls of our city. Besides all this, in the country the air is much fresher, and the necessities for living in such times as these are plentiful, and there are just fewer troubles in general.... (Boccaccio 15)

Petrarch's *Vita Solitaria* (1349) would be a lasting influence as the desire for villas grew. In it he described the potential for reflection to be found in the tranquility of the countryside away from the selfishness and increasing frenzy of the city, recalling the contrast of otium and negotium defined by Roman writers. At base, Petrarch combined the Christian monastic traditions of solitude and self-discipline with the burgeoning interest in intellectual pursuits…the study of classics, translation, and music. However, as Petrarch states, appreciation of the natural world took a secondary role to the more significant activities of prayer and religious meditation.

> The retired man, as soon as he had gained a flowery spot on some salubrious hill, the sun being now is his splendour, breaks joyously with pious lips into the daily praises of the Lord, the more delightedly if with his devout breath are harmonized the gentle murmur of the down-rushing stream and the sweet plainings of the birds. (Andrews 33)

This suggests the supplementary status of landscape in art at the time. Referred to as "parergon" (literally "by-work"), landscape lent scenic support to religious icons or allegories, but was not yet considered a worthy subject in its own right (Andrews 28).

Although the existence Petrarch described was too socially remote to qualify as villa life, its focus on quiet contemplation and study, and the idea of humanitas and self-improvement would fit well with the ideals of the Renaissance and help justify the return to villa life (Ackerman 64). By the end of the fifteenth century there were hundreds of villas dotting the landscape around Florence and other urban centres, but the Medici villa at Fiesole was the first to mark the shift from what were initially economic preoccupations (income, security, and the provisioning of the city palace) to purely ideological ones. Commissioned by Cosimo Medici and executed by the family's chief architect Michellozzo di Bartolomeo in 1455, it became the theatre for Cosimo's "Platonic Academy," to which he invited humanists of the day, Marsiglio Ficino, Pico della Mirandola, and Angelo Poliziano, along with artists and architects such as Donatello, Michelangelo, and, perhaps most significantly, Leon Battista Alberti (Kluckert 52) to discuss Plato's philosophy. The library also contained books by Varro and Columella (Alberti's *De Re Aedificatore* was completed at about the time of construction) and the interest in classical ideas and humanist thought was reflected in the architecture (Attlee 12). Not only were its pale stucco and geometric form a distinct contrast to the surrounding landscape, it was the first Medici villa to be built without a central court, instead featuring gardens extending on either side, looking out over the Arno valley. In fact, the hillside site was chosen especially for the views and would necessitate the construction of a massive and

Fig. 16 | View of Villa Fiesole.

Fig. 17,18 | The garden terrace with corresponding views of the Arno valley and Florence.

Fig. 19 | Leonardo Da Vinci, *Landscape* (Arno Valley?) 1473

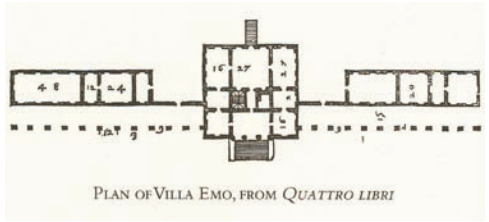




Fig. 20, 21 | Plan and elevation of Villa Emo, (1559), showing central living area flanked by wings dedicated to agricultural purposes

expensive substructure to support the villa and its terraces. It also had open porticoes leading into the garden, some of the first in the Renaissance and a distinctly classical reference that suggested a heightened awareness of the dissolution of the boundary between architecture and the garden. The villa was thus the first to acknowledge the aesthetic quality of the surrounding landscape, and marked a significant shift in the conception of landscape from having a merely supplementary role to primary one. Whereas in the past, the landscape had been morally interpreted, as in Petrarch, or imagined merely as a theatre for human activity, in the Renaissance it became an object of beauty in its own right (Andrews 56). The Villa Fiesole set the precedent for art and villa design: the views from the terrace anticipated Leonardo Da Vinci's landscape drawings of the Arno Valley, thought to be the first of their kind, by more than 20 years. Its ideological focus would permeate villa architecture so that it would remain at the cutting edge of the conception of the relationship between man and Nature in later centuries.

Though the early villas of the Medici resurrected interest in the villa typology, the architects employed by the members of the Venetian aristocracy, especially Andrea Palladio, would have the most pervasive impact on the further dissemination of the villa ideology. After the Venetian wars against the League of Cambrai (1508-1517) the acquisition of land in the Veneto was especially desirable. Venice was eager to decrease its dependence on foreign trade, and investment in land was prudent in financially unstable times. Country estates before the fifteenth century had either taken the form of practical farmhouses facing a courtyard enclosed by utilitarian buildings or been imitations of medieval feudal castles. Owing to the cessation of building during the war, when peace was restored, trained architects had to be brought from outside Venice. As the number of city gentlemen investing in farms increased, architects such as Jacopo Sansovino and Michele Sanmicheli were asked to combine in the new villas the practical demands of functional farms with the urbane tastes of their occassional occupants. Unlike the Medici, however, the Venetian landowners believed there was worthiness in farming and a value in the countryside. Luciano Barbaro, one of Andrea Palladio's earliest and most influential patrons, had read the agronomical treatises of Columella, Varro, and Cato, and cited them in the chapter on villas in his translation of Vitruvius, arguing that "these writers had depicted agriculture and horticulture as occupations worthy of a gentleman and even, in contrast to urban occupations, capable of promoting moral betterment" (Ackerman 93). Palladio's success lay in his ability to balance the practical, agricultural requirements of the farm estate with the expression of sophistication, and his creative and versatile use of classical elements, which he had studied extensively in the classical ruins of Rome, led him to adapt to a variety of projects for clients with quite different demands. For example, The Villa Emo (1559), described by Witold Rybcinski in *The Perfect House*, represents an elegant balance of functional and classical ideas. A noble portico containing the living areas framed on either side by arcades that recall the form of barchesse (a long barn with one side open towards a central piazza) and give access to rooms

dedicated to the estate's agricultural functions. According to Rybcinski, the columns of the central portico are Doric, supporting a plain Tuscan entablature, and "their proportions and intercolumnation are neither Doric nor Tuscan", a fact that demonstrates Palladio's ability to "bend the rules" to achieve an effect that lends the house a "moving, austere dignity" (173). In his *Quattro Libri* (1570) Palladio briefly discussed the practicality of the arcaded wings:

> The covered outbuildings for items belonging to the farm should be built for the produce and animals connected to the owner's house in such a way that he can go everywhere under cover so that neither the rain nor the blazing summer sun would bother him as he goes to supervise his business…besides which these porticoes are extremely attractive. (Palladio 123)

The success of the richly illustrated *Quattro Libri* confirmed Palladio's belief that images speak more loudly than words, and ensured that his genius for contemporizing the villa would have a lasting influence across Europe.

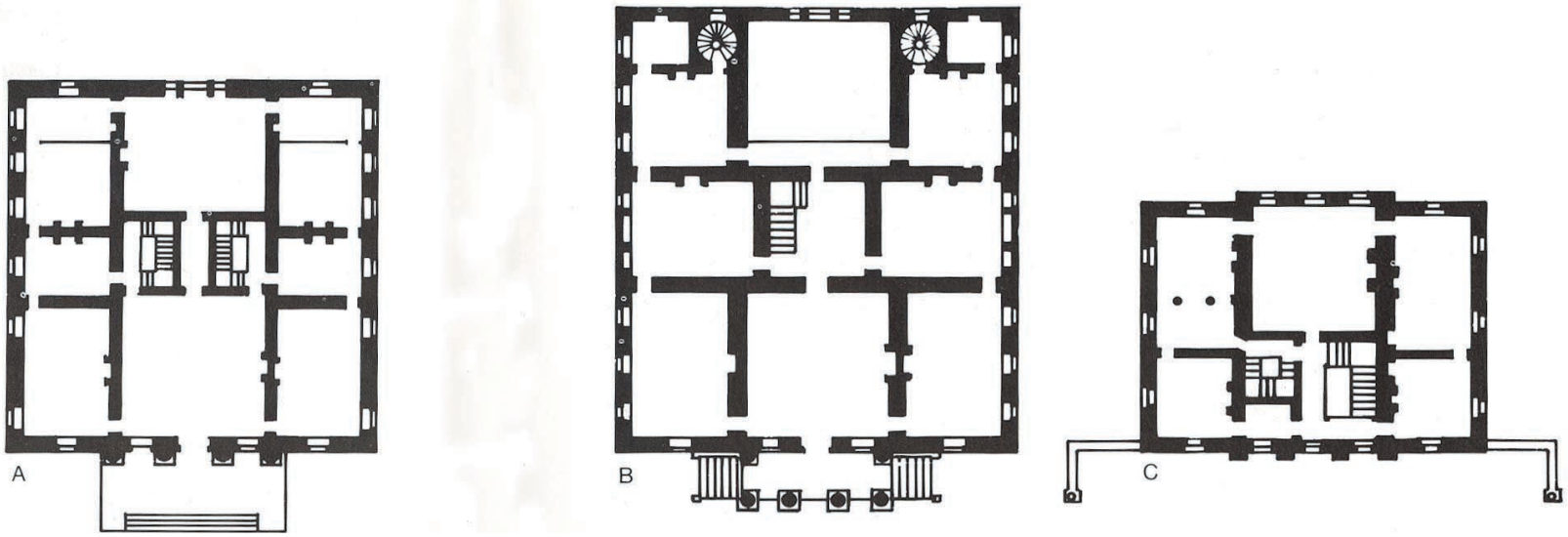
At the end of the seventeenth century, England was similar to the Veneto in the sense that the upper class divided its time between the country estate and the city. However, in England, those estates had long been the hereditary seats of the aristocracy, they provided wealth through the rents exacted from tenants who farmed the land, and represented power in the form of the political weight of its constituents. In England, land was believed to be the only sure basis of power, and landowners, rather than merchants, were the ruling class. People did not live in country houses unless they possessed power, or were making a bid to possess it (Girouard 2). At that time, the palatial country houses of the aristocracy would not have been thought of as villas for the connotations of the word "villa" were too rustic. In the Georgian era (1714-1830) a group of influential intellectuals and liberal aristocrats, led by Lord Burlington, would inspire a radical change in taste, popularizing the idea of the villa as an intellectual retreat, and with its new-found popularity, changing its rustic, agricultural connotations. Their belief that the naturalness and simplicity of classical form best represented the ideas of the Enlightenment led them to the work of Inigo Jones (one of the first English architects to visit Italy in the seventeenth century) and especially to embrace and imitate the work of Palladio. In 1715-16, Giacomo Leoni published an English edition of *Quattro Libri*, *The Four Books of Architecture*, which became a rich source of ideas, forms, and patterns for a series of amateur gentleman architects, exemplified by Burlington, whose Chiswick House (1727-1729) was an early example of several villas modeled on the iconic Villa Rotunda. Like the Villa Rotunda, which is exceptional among Palladio's designs for having no agricultural function whatsoever (it was designed as a belvedere), Chiswick House was never intended as a farmer's house. Although Burlington and his circle of artists, sculptors and poets, like the Venetians, embraced the work of Horace, Virgil and Pliny the Younger, all of whom, as has been seen, had villas with varying levels of

Fig. 22, 23 | Palladio's Villa Rotunda and Lord Burlington's Chiswick House.

agricultural functions, they themselves had no interest in farming. They were concerned only with the villa as a place for contemplation, entertainment, discourse and tranquility, and reminders of the agricultural underpinnings that made it possible were hidden from view (Ackerman 157).

The villas of the Georgian era, and, as will be seen, their attached gardens, became the arena for a new "Augustan Age" in English literature. The first two decades of the eighteenth century referenced heavily poets of the early Roman Empire, especially Virgil and Horace, and it offered intellectual justification for emerging tastes in landscape gardening. Connected closely with the Enlightenment, the villa became the focal point for writing about architecture, art, and most significantly, landscape architecture. At the same time, the villa became increasingly desirable to the middle classes, reflecting the all-pervasive cultural obsession with country life later apparent in the novels of Jane Austen in the late eighteenth and early nineteenth centuries. Moreover, the landscape was seen as an indictor of progress and prosperity, and the acquisition of a villa with land attached was away for the bourgeoisie to rival the status and power of the aristocracy (Kluckert 354). Through this popularization the term "villa" came to represent permanent suburban residences for wealthy city dwellers who had no agricultural estates at all, and a spate of books (beginning with James Gibbs in *A Book of Architecture* [1728]) provided templates for houses termed "villas," even though there was absolutely no representation of farming let alone a concept of *otium* at this point. The preeminence of the villa in England and its role as a status symbol ultimately stripped the typology of its noble agricultural heritage.

Fig. 24 | Plans of Suburban villas, from left to right, Newby Park, by Colen Campbell (begun 1718); Stourhead, by Colen Campbell, (1720-21), Marble Hill, Twickenham, by Henry, Lord Herbert (1724-29)



Concurrent with the growing preoccupation with the villa in upper - and middle-class circles, the Acts of Enclosure (1750–1860) consolidated the lands of the wealthy and helped to make the great landscape gardens of the eighteenth century and after possible (Kluckert 354). The villa and its surrounding estate became the testing ground for the evolution of landscape design and aesthetics that marks a shift in man's relationship to Nature and qualifies as one of England's greatest contributions to the history of western art (Ackerman 159). Prior to the interest in the villa and its associated literature, English gardens had carried on the tradition of the Renaissance and the Baroque. They thus consisted of highly organized, rectilinear or geometric designs that imposed the rules of architecture on the landscape until little or no evidence of untamed nature was left, a characteristic that they shared with French landscape design, as typified by the gardens at Versailles by André le Nôtre.

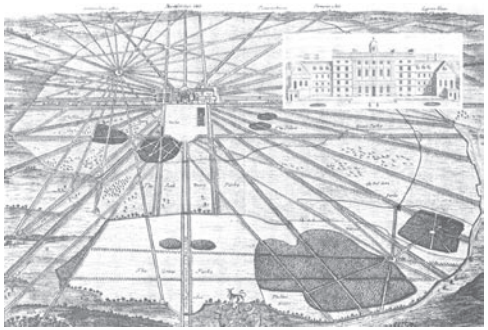


Fig. 25 | Badminton House, Gloucestershire, as remodelled c. 1665-70. The north front, and bird's-eye view of the park.

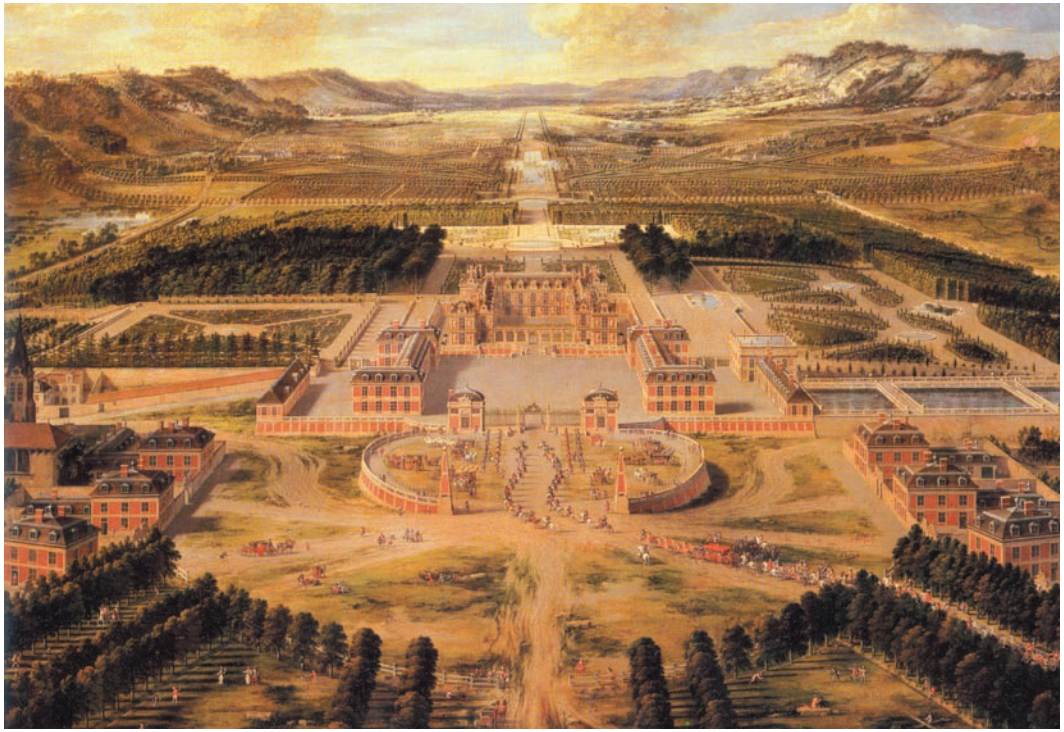


Fig. 26 | Pierre Patel, *Versailles, bird's eye view of the palace and garden* (1668)

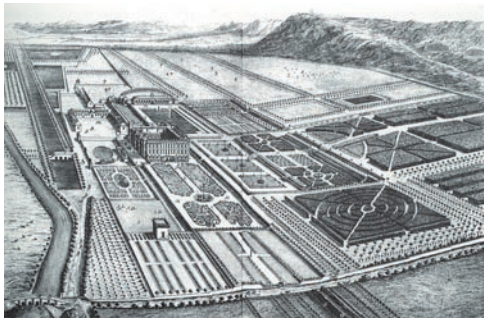


Fig. 27 | Johannes Kip, Chatsworth House and gardens, from *Britannia Illustrata*, 1727

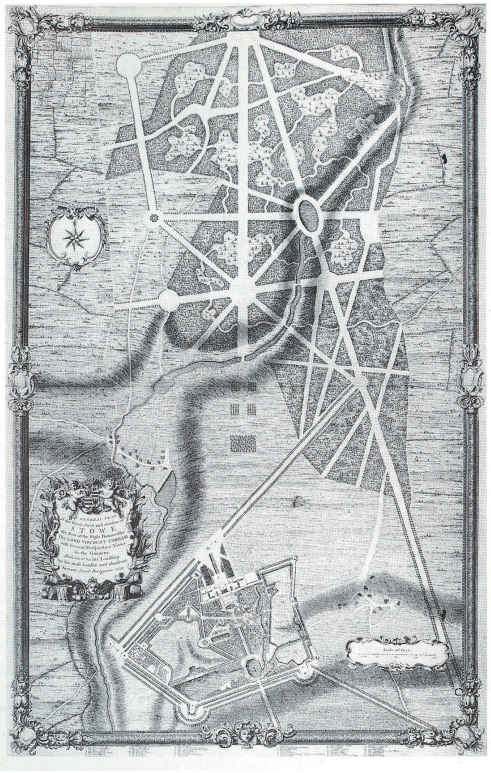


Fig. 28 | Charles Bridgeman's first plan for Stowe, 1728.

Although there were books promoting the naturalization of gardening in the middle of the seventeenth century (for example *Upon the Gardens of Epicurius: or, of Gardening, in the year 1685* [1692] by William Temple), the first substantial shift away from Cartesian gardens was inspired by landscape paintings in continental Europe. Gardeners sought to emulate the pleasing landscapes of painters such as Claude Lorraine and Nicolas Poussin, the belief being, as described by Joseph Addison, that "…we find the Works of Nature to be still more pleasant, the more they resemble works of art"(Addison 404). The picturesque landscape garden therefore sought to evoke, as Ackerman puts it, "a poetic mood of nostalgia for the purer more bucolic past that Virgil described in his poetry" (Ackerman 162). The preferred association was with Virgil's *Ecologues* or *Bucolics*, which, as observed earlier, described pastoral rather than the agricultural scenes of Virgil's *Georgics*, a preference that helped to further isolate the villa from its functional surroundings.

Initially this effect was achieved by the dissolution of rectilinear grids and the addition of "artinatural" pathways, a development represented by Charles Bridgeman's first plan for Stowe in the 1720s. But perhaps the most expressive symbol of the new taste for the pastoral was the Ha-ha, here described by Horace Walpole in *On Modern Gardening* (1771):

> ...the capital stroke, the leading step to all that has followed, was (I believe the first thought was Bridgeman's) the destruction of walls for boundaries, and the inventions of fosses – an attempt them deemed so astonishing, that the common people called them Ha! Ha's! to express their surprise at finding a sudden and unperceived check to their walk. (535)

The sunken fence created the illusion of uninterrupted landscape while removing sheep and other animals to the distance. It enabled the pastoral landscape beyond to seem continuous with the garden nearer to the house, which was then "set free from its prim regularity, that it might assort with the wilder country without" (Walpole 535). The blurring of this line of distinction between the "neat and the rude," as Walpole says, allowed nature to be taken into the plan, inspiring new ideas of landscape gardening on a large scale.

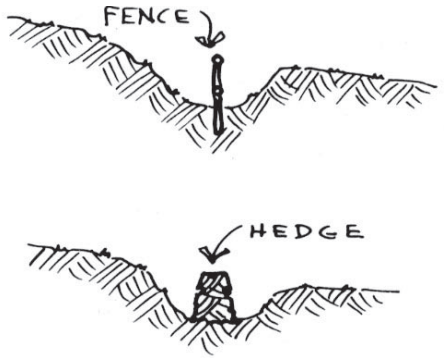



Fig. 29 | Two versions of a Ha-ha (above),

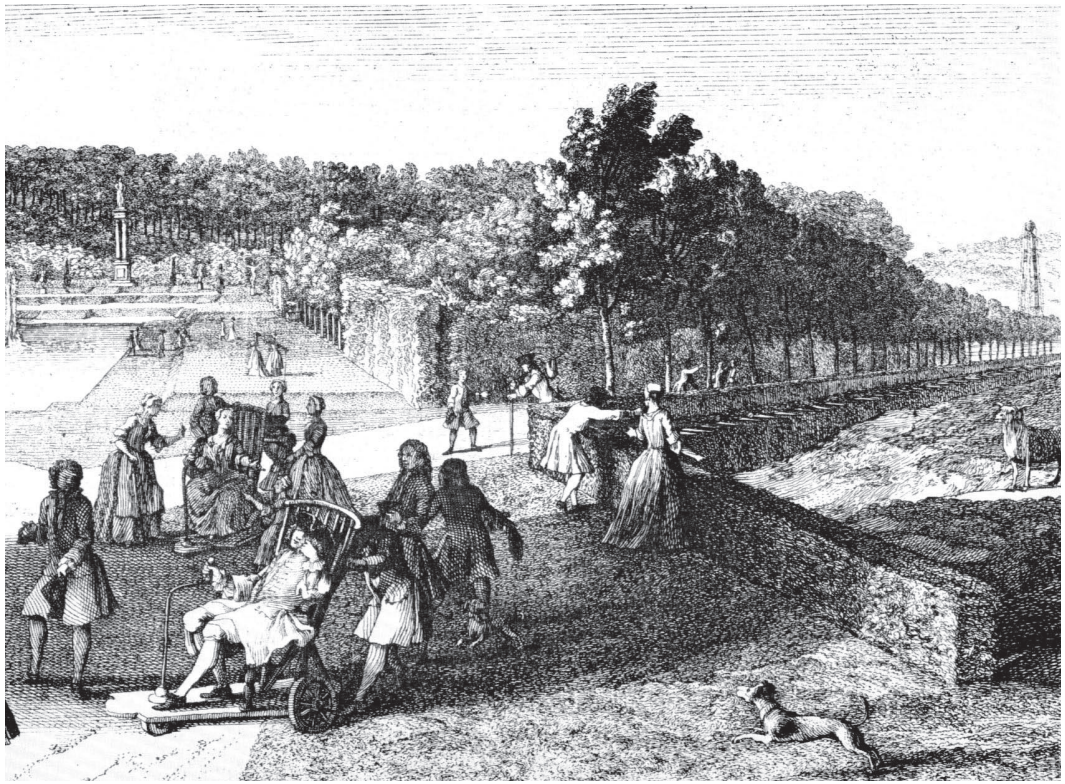


Fig. 30 | Detail of engraving by Rigaud and Baron, *View of the Queen's Theatre from the Rotunda*, (1739)

As the landscape increasingly became the focus of intellectual discussion in artistic circles, so garden designers sought to evoke more complex classical references. The philosopher John Locke encouraged designers to make historical, ethical, and mythical associations, believing that pleasure "was to be stimulated by the ideas and recollections called upon by one's passage through the garden" (Ackerman 164). The commissioning of William Kent, appropriately a former student of painting, by Viscount Cobham, marked the culmination of the picturesque in the 1730s. "Painter enough to taste the charms of landscape, bold and opinionative enough to date and to dictate, and born with a genius to strike our a great system from the twilight of imperfect essays. He leaped the fence, and saw that all nature was a garden" (Walpole 536). Kent succeeded Bridgeman at Stowe, and designed the "Elysian Fields", whose richly iconographic buildings evoked the Viscount Cobham's strident political views. In the 1740s, his assistant Lancelot "Capability" Brown developed the last phase of Stowe, the Grecian Valley, with a much more spare building program, so that the garden came to resemble "well-kept nature" rather than anything man-made (Ackerman 178).

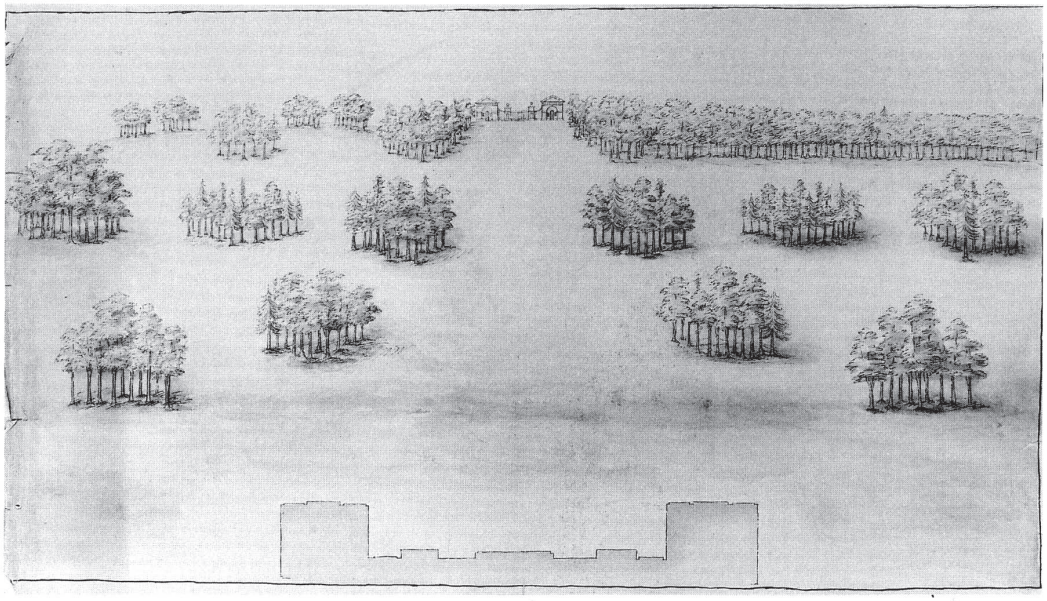


Fig. 31 | William Kent, drawing for garden at Holkham Hall. 1738.

The Elysian Fields and Grecian Valley at Stowe marked a departure from the strictly Roman classical tradition inherited from Palladio and Virgil, and also marked the beginning of a trend towards more exotic styles that grew directly from the notion of the picturesque. Ackerman argues that, by breaking down classical traditions and making the landscape the subject of personal interpretation, landscape architecture enabled the transition from classical consciousness to a romantic and eventually modern view of nature.

Fig. 32 | View of the Temple of Concord and Virtue (1749) in the Grecian Valley at Stowe, designed by Capability Brown

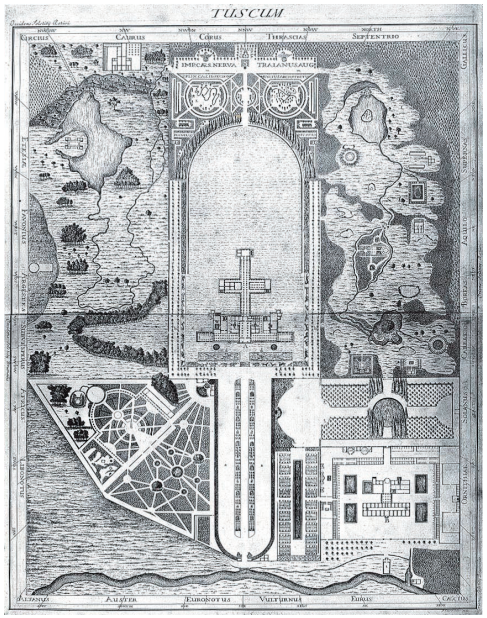



Fig. 33 | Robert Castell, Plan of Pliny's Villa at Tusci. 1728

II

In neo-classical sensibility, the villa and its surrounding landscape represented two visions of order that had existed since the Renaissance: *Natura naturata*, which described the villa, represented divine harmonies and was subject to proportion, symmetry, and mathematical principles, and *Natura naturans*, which described the landscape, represented "the random and fecund outcome of biological growth and geological evolution, [that was] not reducible by law or number" (Ackerman 213). In fact, landscape design was problematic for it could not be evaluated according to the neo-classical principles of symmetry, proportion, and harmony. Thus, contemporary tastes were justified by including classical references in the designs, such as statuary and classical buildings. Robert Castell, for example, in his *Villas of the Ancients* (1728) interpreted the gardens of Pliny's villa in a naturalistic mode, and were thus sympathetic to Lord Burlington's redesign of the gardens at Chiswick in 1715 (Ackerman 169).

At the same time, however, the exploration of psychology during the Enlightenment drew attention away from the object itself, in this case the landscape, and instead focused on its perception by the individual. In his influential treatise *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful* (1757), Edmund Burke introduced the idea of the sublime, described by Ackerman as "a feeling of awe, terror or solitude inspired by powerful natural scenes like forests, chasms, stormy seas, and the like"(215). In contrast, the "beautiful" referred to objects or scenes that "encompassed classical equilibrium and order and their effects – restfulness, smoothness, rationality" (Ackerman 215).

As Ackerman also points out, despite the influence of Burke on art and literature, the sublime was difficult to address in architecture and landscape design because the natural environment it responded to could not be easily built or planted. In the wake of Burke, Uvedale Price and Richard Knight "set about reformulating the picturesque so that it might merge with aspects of the sublime relevant to the arts of design and constitute, like the sublime, an antithesis or complement to the beautiful" (Ackerman 216). Architects were thus able to diverge from the classical canon and explore new forms, and a consensus gradually emerged that the most picturesque architectural form was the cottage, or peasant's hut. As John Ruskin remarked later, in *The Poetry of Architecture* (1815), "the cottage enhances the wildness of the surrounding scene, by sympathizing with it, the villa must do the same by contrasting with it" (102). Realizing the desirability of the villa lifestyle, and the economic potential of the middle class that had emerged as a result of the Industrial Revolution, at the beginning of the nineteenth century designers published an array of pattern books on villa and cottage architecture that would lead to the transformation of the villa from an exclusive enclave for the wealthy to an expression of middle-class achievement, in England and in North America.

Fig. 34 | John Ruskin, *The Highest House in England*

Fig. 35 | James Malton, *design for a cottage for a shepherd or woodcutter,* from *An Essay on British Architecture*, 1798

English immigrants to Canada in the nineteenth century, consistent with the example of the Simcoes, imported their ideals and vision of a life in the country. The picturesque formula was used to describe the variety of landscapes that they encountered, from farmland to forests, so that they were able to seek out scenes and objects that were sublime but also views that resembled paintings in their combination of colours, textures and shapes. In accordance with the paintings of Salvator Rosa, Claude Lorrain and others, such views (or prospects as they were frequently called) usually contained a colourful group of figures in the foreground (a role frequently filled in the North American context by Natives), a middle ground consisting of cultivated or semicultivated land, and a background leading the eye into the (sublime) distance and sky. In early Canadian writing, the eye of the reader / viewer is often led through the landscape by the use of the words "here" and "there." Thus in *Abram's Plains* (1789), Thomas Cary writes of a landscape outside Quebec City:

> Here hill and dale diversify the scene,
> There pensile woods cloth'd with eternal green;
> The russet plain with thorny brambles spread,
> Where clust'ring haws deep blush a ruddy red;
> The distant wood, wide-waving to the breeze,
> Where shining villas peep through crowded trees.
> Here babbling brooks gurgle above the glade,
> There rise mementos of the soldier's spade.
> Where on the green-sward oft incamp'd they lay,
> Seen by the rising and the setting ray. (272 – 81)

The ideal villa during the period would be sited so as to afford views like the one described in this passage. Thus when the fur trader Simon McTavish decided to build a villa, he did so where, in the words of Cornwall Bayley's *Canada* (1806), "Montreal's mountain heighth [sic] / Displays unnumbered beauties "to the sight" – "Landscapes which fancy scarcely can pursue: / The plenteous farm – the field – the buzy mill, / La-Prarie's spire; the azure distant hill; / The winding river…" (283 – 91).

The picturesque was associated with a sense of progress, and the idea that the English social model, represented by the country house, and agricultural expertise, encompassed in the surrounding productive farm, was civilizing the new land. As Northrop Frye observed, "the picturesque eye was an idealizing one, assimilating past experience in Europe to a future when the new world would look more like the old one" (quoted in Coates 335). Thus, when Elizabeth Hale, an emigrant from a wealthy, well-connected Yorkshire family, described her family's new estate, Sainte-Anne de la Pérade near Quebec, she compared it to the area of suburban villas around London. "The village is remarkably pretty, and the whole scenery reminds me very much of the Thames towards Putney, only that the St. Anne's is a finer river and nothing like mud" (quoted in Coates 330). In other letters she conveyed her sense that the old order had been established: "here we enjoy peace & quiet at present & all the comforts of a Country life far away from all political alarms" (quoted in Coates 329). The aesthetic appropriation of new territory was also captured in the sketches of Mrs. Hale, who, like Elizabeth Simcoe, and many genteel women of the day, was a talented amateur watercolourist. In her sketches of the area around Sainte-Anne she interpreted the landscape according to picturesque principles. The manor house, inherited from the former owners, was at the centre of many sketches, which were mainly of the property of the estate. Views were framed by coulisses of trees, objects were arranged to lead the eye into the distance, and, in the example shown (fig. 33), the foreground was occupied with some figures or humanizing object, in this case the canoe and ferry (Coates 335). Elsewhere, those who had the opportunity to build anew, as in Upper Canada, which was much less developed, did so in the Georgian Classical style. Its inherent order, symmetry, and regularity reflected architectural tradition in England, tempered with building techniques learned from Loyalists arriving from the United States. As time went on, and immigration returned to being mainly from England, the character of country houses became even more assertive in their Englishness, to the point that they were even built in hitherto French-influenced Quebec (Kaplan 18-19).

Fig. 36 | Elizabeth Hale, picture of the manor house

Fig. 37 | Elizabeth Hale, picture of the ferry across the Sainte-Anne

Fig. 38 | *Owl's Head, Lake Memphramagog*, Cornelius Kreighoff, 1859

With the Romantic valorization of wild nature and rural life – the former for its expansive effect on the imagination or the latter for its closeness to Nature – the sublime and picturesque aesthetics continued to dominate responses to landscape in North America as well as Europe, though now with more frequent inclusion of mountain scenery and rural dwellings. (Cornelius Kreighoff's painting titled *Owl's Head, Lake Memphremagog* [1859]) is an instance of the former and his many scenes of Habitant life exemplify the latter.) During the period following Confederation in 1867, however, a very different approach to landscape began to be felt in Canada because of developments south of the border that derived from the American Civil War and the migration of population to New York, Chicago, and other northeastern cities. As these cities grew, so too did pollution, congestion, noise, and - so such writers as George Miller Beard and S. Weir Mitchell argued – did the various psychological and nervous disorders that Beard termed "American nervousness" or, simply, "Americanitis" (Bentley 183). For the urban poor, the picturesque "wilds" of the parks of Frederick Law Olmsted built in several American cities, including Boston, New York, Montreal and elsewhere, provided a means of coping with urban stress. For the rich, various "mind cure" therapies such as Weir's "rest cure" became available, as did a medicinal literature of nature writing and the open road that promised a cure for frazzled nerves in vicarious contact with the natural world. "My design…in "Among the Timothy[1884]," wrote Archibald Lampman of his most accomplished nature poem, "was not in the first place to describe a landscape, but to describe the effect of a few hours spent among the summer fields on the mind in a troubled despondant condition" (quoted in Doyle. "Archibald Lampman" 40). Of course, brief and vicarious contact with the natural world was a more effective cure or preventative for nervousness than brief or vicarious contact, the result being the annual series of escapes from the city to the cottage that has become a staple of North American life, especially in the American northeast and its neighbouring Canadian provinces.

Here it is important to mention the influence of the American designer Andrew Jackson Downing. Although the Simcoes imported the design of their picturesque Grecian villa in the late eighteenth century, the major surge of villa and cottage construction in North America was to begin about fifty years later, influenced by the energetic writings of Downing. A horticulturalist by training, he adapted the villa tradition described in English pattern books to North American climate and tastes. In *The Architecture of Country Houses* (1842), he described the cottage and the villa separately, encapsulating the transition of the past centuries and establishing the forms that we recognize today. He defined the cottage as…"a dwelling so small that the household duties may be all performed by the family, or with the assistance of not more than one or two domestics," and the villa as "a country house of larger accommodation, requiring the care of at least three of four servants" (Downing 40). Enormously influential, Downing's success was due not so much to his talents as a designer, but on his timing and entrepreneurship. The availability of new techniques of mass publishing and the demographics of booming growth in cities and an affluent middle class meant the appetite for his books was strong. Combined with the desire to experience the "wilderness" by the middle classes, this led to the suburbanization of North American cities as well as the construction of summer houses or cottages by those who could afford it.

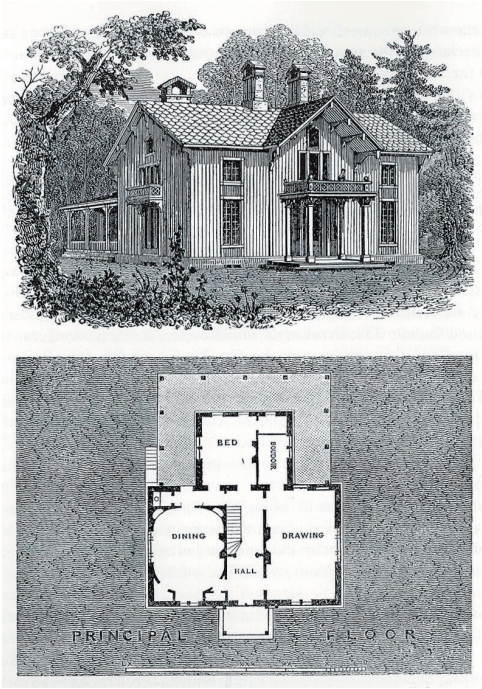



Fig. 39 | A.J. Downing, "A cottage Villa in the Bracketed Mode," from *Cottage Residences* (1844)

Fig. 40 - 42 | Cottages in the Muskokas became increasingly luxurious as access to the region became easier

Early visitors to the Muskokas and the adjacent areas of Ontario that are now known as "cottage country" had to endure arduous travels to reach these destinations. Railroads and roads were few and primarily dedicated to northern Ontario's principal industries of logging and mining. As the popularity of the Muskokas as a destination for hunting and fishing increased, however, better means of accessing the area became available. Improved railways and comfortable steamships made it considerably easier and more pleasant to reach from Toronto and the United States, and soon the "big three" lakes (Lake Muskoka, Lake Joseph, and Lake Rosseau) became dotted with luxurious hotels, and the wealthy bought bigger and more ostentatious "cottages" or summer homes. In *Arcadian Adventures with the Idle Rich* (1914) the humourist Stephen Leacock reveals the irony of cottages that purported to bring their wealthy owners into an intimate relationship with the wilderness. Though not written specifically about Muskoka, his description of the construction of "Castel Casteggio" captures the hypocrisy of the over-development of the wilderness as a means to enjoy it, and paints an accurate picture of its luxurious character and amenities.

> The Newberrys belonged to the class of people whose one aim in the summer is to lead the simple life. Mr. Newberry himself said that his one idea of a vacation was to get right out into the bush, and put on old clothes, and just eat when he felt like it. This is why he had built Castel Casteggio. It stood about forty miles from the city, out among the wooded hills on the shore of a little lake. Except for the fifteen or twenty residences that dotted the sides of the lake, it was entirely isolated. The only way to reach it was by the motor road that wound its way among the leafy hills from the railway station fifteen miles away. Every foot of the road was private property, as all nature ought to be. The whole country about Castel Casteggio was absolutely primeval, or at any rate as primeval as Scotch gardeners and French landscape artists could make it. The lake itself lay like a sparkling gem from nature's workshop – except that they had raised the level of it ten feet, stone banked the sides, cleared out the brush, and put a motor road round it. Beyond that it was pure nature.
>
> Castel Casteggio itself, a beautiful house of white brick with sweeping piazzas and glittering conservatories, standing among great trees with rolling lawns broken with flower beds as the ground sloped to the lake, was perhaps the most beautiful house of all; at any rate, it was an ideal spot to wear old clothes in, to dine early (at 7:30), and, except for tennis parties, motor boat parties, lawn teas, and golf, to live absolutely to oneself. (101)

In short, Castel Casteggio is actually a descendant of the villa and picturesque traditions. Pretentiously Italianate in name if not in form, "[W]hite brick" is of course, yellow brick, and "sweeping piazzas" are long verandahs or arcades, it is surrounded by a landscape that has been artificially made to look natural – indeed, "primeval". Its "Scotch gardeners" and "French landscape artists" may well have been intended by Leacock to evoke the grounds of Balmoral Castle and the gardens at Versailles. It was typical of the "Golden Age" of cottage country that spanned from the 1890s to the 1920s, when hunting and fishing clubs were transformed into luxury hotels and luxurious private mansions. At its most popular, there were over a hundred luxury and grand hotels on the main three lakes of the Muskoka region, with a capacity for 50, 000 guests, serviced by over one hundred and forty steam ships that navigated those waters.

The popularity of cottage country inevitably subsided during the Great Depression of the 1930s, and in the years following, all but one of the steamships sank, or ran aground, and many of the great hotels burned down. In the decades following, families were afforded the opportunity to invest in land and construct, often with their own hands, small cabins for summer visits. In the 1960s the Ontario government set about an ambitious highway building program to draw tourism north. The 400 series highways not only encouraged more Americans to visit, but also made more remote lakes suitable locations for weekend cottages that are easily reachable by car from Toronto. Since the improvement of cottage road networks, most recently the conversion of Highway 69 (nicknamed "Suicide 69," because most people who owned cottages near it could recall at least one person who had died on its treacherous curves) into a four lane highway as far as Parry Sound, and the economic booms in the 1980s and recent decades, there have been massive building booms in the area, with construction of cottages on an unprecedented scale.

Fig. 43 | Northbound traffic on Highway 400, Dominion Day weekend, July 1967

Fig. 44 | Illustration from *Cottage Life*, contrasting the percieved difference in attitudes towards the cottage over the past century

In 2001, *Cottage Life* magazine dedicated a special issue to address the question "What Are We Doing to Cottage Country" and described the onslaught of development and the dramatic shift in the perception of what constitutes a cottage. At that time, new cottages were being built at the rate of 4000 a year, and the average price of cottages sold on Lake Muskoka had risen from $220 000 in 1990 to over $370 000 in 1999 (Casey 42). More alarming to long-time cottage owners was the bizarre character of new development. A description of the extent and character of these new developments in Canada's Toronto-based national newspaper, the *Globe and Mail,* in 1999 uncannily echoes Leacock's account of the construction of Castel Casteggio and its surroundings:

> …money bombs are exploding on just about every square foot of shoreline…the dynamite and bulldozers leave behind a trail of four-season, embassy-sized chalets with marble bathrooms, three-car garages and seven-figure price tags. (Barber)

Prices of shorefront properties on popular lakes were even rumoured to exceed that of real estate on Toronto's Bay Street, in the heart of its financial district. Further echoing Leacock's description of Castel Casteggio, letters to the editor of *Cottage Life* complained of properties being bought and cleared of trees, inappropriate suburban-style landscaping, the architectural lighting of exteriors, lawns being added, fertilized and mowed weekly, and the growing number of permanent residences (up to 20 percent) on already crowded lakes (30 percent of which are already developed to capacity) (Casey 42). But, as the *Globe and Mail* observes, while "the romantic call of the loon is frequently drowned out by the roar of explosives" (Barber) or the whine of jet skis, for that matter, what is also remarkable about each publication was the sentiment for the traditional cottage, and the reiteration of the principles of villa architecture listed by Ackerman. According to the editor of *Cottage Life*, surveys of cottagers confirm: "that what you value most about your cottage life is the peaceful tranquility, the time away from the pressures of city living" - a twenty first century description of otium that is almost identical to the musings of Horace and Virgil in ancient Rome. But the editor goes on, "How ironic it is, then, that in our efforts to flee the urban pressures we've inflicted them on the place we love most…witnessing development spreading like a virus around cottage-country lakes" (Caldwell 13).

III

In the summer of 2007, we can witness a very different procession than the one we pictured winding its way to Castle Frank two hundred years ago. In time, Highway 400, north of Toronto, from Barrie to Gravenhurst, is likely to slow to a similar pace as cars and SUVs carrying thousands of Canadians snake their way towards the lakes of cottage country. Throughout history the villa has participated - and indeed been a driving force – in the evolution of our relationship with Nature. Its design has expressed man's growing confidence in his position and interest in the natural world. In the Medici villas of Florence, we witnessed the transition from the walled "hortus conclusus" that secured man against unruly wilderness, to the terraced gardens of the villa at Fiesole that marked the appreciation of landscape as a source of beauty. This anticipated the picturesque movement in England, and the phenomenon of the landscape garden, which demonstrated unprecedented confidence in our ability to enhance the beauty of our environment at the scale of the landscape. This was accompanied by the invention of the sublime and a desire to experience Nature's awesome power and scale that was not yet achievable by human endeavour. In the twentieth century, as David Nye has recognized, "the phenomenon of sublimity…[underwent] a historical redescription in response to [the] technologically mediated world" of the twentieth century. The "technological sublime", experienced at sites such as the Hoover Dam, "is not a communion of man with nature, but of man with man, a celebration of the rationality of our species….The technological sublime relates to the future" (Moore 168). True to the pace of technological development, it might be argued that the technological sublime has already been eclipsed by what may be termed the "post-industrial sublime." The large format landscapes of the Toronto photographer Edward Burtynsky capture this new sensation, not of awe at the scale of nature or of man's ability to match it, but of our terrible capacity to destroy it on a massive scale. In the face of such terrific, desolated landscapes, the long line of cars snaking its way north every weekend seems anathema.

Fig. 45 | The Hoover Dam, an example of the industrail sublime

The ideology of the villa and cottage has been consistent; for centuries humans have sought, and probably will continue to seek, to reconnect with nature and find sanctuary from the concerns and pressures of the city. What has shifted is the perception of nature, but sadly it has not kept pace with the increase in the scale of infringement and the impact we have upon it. As Al Gore recognized in 1992, "the problem is not our effect on the environment as it is our relationship with the environment" (Lyle 8). By acknowledging our impact on the earth's climate and our mark on the earth's surface, and pondering images like Burtynsky's and the figure of the "Anthropocene," we must realize that, if we care for the legacy left for future generations, it is no longer viable to simply participate in exploitation of the environment. As we have seen, in the past, the villa and later the cottage have expressed man's relationship with nature, suggesting that they have great potential to express the paradigm shift in our thinking about the environment that one hopes is imminent, and appears to be underway. Yet, in Canada, where we consistently rank the wilderness as a formative condition of our Canadian identity, the cottage tradition demonstrates a hypocritical, exploitative relationship to it. As George Kapelos wrote in the preface to *Interpretations of Nature* (1994), "Canadians subsist on myths about nature, deny its reality, and finally, squander our opportunities to enhance our relationship to it" (13).

This thesis therefore suggests a new mode of cottage – *Villa Canadensis* – that will provide the opportunity for Canadians to engage in a regenerative relationship with the environment. This new mode is defined over and against the cottage; whereas the former is remote from the city, difficult to access, and exploitative of its environment, *Villa Canadensis* is located close to the city, is easier to access, and is devoted to the regeneration of damaged sites that are a direct result of our consumptive industrial society. Its latin name is intended to suggest an affinity with the earliest villas of Republican Rome (established through the example of Castle Frank), when the satisfaction and contemplation embodied by *otium* was the reward for physical labour and a productive relationship with the land. "Canadensis" conveys the Canadian sense of the importance of the environment and especially the wilderness. As such, the updated villa typology substitutes environmental rehabilitation for the previous agricultural component of the earlier ideology, and therefore, requires an addendum to Ackerman's four criteria of the villa ideology. A fifth criterion should be: That the purpose of *Villa Canadensis* is to reestablish a balanced, active, and regenerative relationship with nature.

Fig. 46 | Ed Burtynsky, *Oil Fields #24, Oil Sands, Fort McMurray, Alberta*

## IV

The 1987 the U.N. World Commission on Environment and Development defined sustainable development as that which "meets the needs of the present without compromising the ability of future generation to meet their own needs" (quoted in Lyle 3). John Tillman Lyle has pointed out that to sustain is merely "to reproduce without the requisite of expansion or improvement to already degraded conditions" (quoted in Moore 134), and that, given the ecological problems that human development has caused, it is unacceptable to imagine that the current predicament should be sustained. Lyle defines a "regenerative" architecture as architecture that "provides for continuous replacement, through its own functional processes, of the energy and materials used in its operation" (10). The new mode of cottage proposed here will embrace this principle, and, rather than take part in development further north, will take advantage of wastelands and other sites damaged by human activity, and through construction and stewardship, rehabilitate them, using as for a template the original, untouched conditions of the site. Once it is understood that "there is no going back to nature," the new methodology allows us to embark on the design of landscapes, confident that we will be able to participate in the creation of a viable synthetic nature.

The site for rehabilitation is the 200 acre Blair Gravel Pit located on the periphery of Cambridge, Ontario. Although a variety of damaged sites would be eligible for renewal, the gravel pit in question is especially suitable because of its size and the presence of large lakes where excavation has occured and continues to occur below the water table. The size of the pit makes it possible for a community of cottages to effect meaningful rehabilitation, and the lakes offer an important amenity for cottage owners. The gravel pit is currently in use, but this thesis responds to its eventual condition upon closure in roughly twenty years time, using site plans provided by Dufferin Aggregates Ltd. According to the requirements of Ontario Pits and Quarries Act, the pit would undergo basic rehabilitation upon closure, but that only stipulates consistent grading of a layer of topsoil and the planting of fast growing grasses to prevent erosion. This minimal effort would result in a very limited early ecosystem with little diversity of species. The presence of two provincially significant Environmentally Sensitive Policy Areas (E.S.P.A.'s) on the site suggest the quality of the original landscape as well as enormous potential and the eventual character of rehabilitation, and, moreover, offer an example, as well as an attractor, for the new ecosystem.

In addition, the location of other E.S.P.A.s, a provincially significant wetland and *raresites* (formerly named the Cruickston Park Biological Reserve), suggests that the cottage community could become part of a network of conservation areas, with the potential for sharing resources, research, and, perhaps, a network of trails. *Raresites* is especially interesting for its intense ecological program, whose objectives include education, research, preservation and rehabilitation, and even organic farming. The property's 913 acres make it the largest urban green space in Canada (bigger than New York's Central Park and twice the area of Mount Royal in Montreal), and it has formed a barrier against the sprawl of Cambridge from the south-east, giving the area a character that further justifies the potential for a regenerative cottage development. Auspiciously, the grounds of the former Cruickston Park also include Langdon Hall, a luxurious eighteenth-century villa in the American Federal revival style (it was built as a summer house by Eugene Langdon Wilkes, an American with ties to England [Landell 28]). Langdon Hall was recently converted into a country inn and spa, its buildings and grounds were possibly designed by the firm of Frederick Law Olmsted. There are also examples of existing cottage communities on several small lakes in the Waterloo region, such as in Alder Lake in New Dundee, Puslinch Lake and Orr's Lake, just south of the site, raising the possibility that the new mode of cottage could be readily embraced by the local population.

Fig. 47 | Langdon Hall Country Inn and Spa, Blair, Ontario

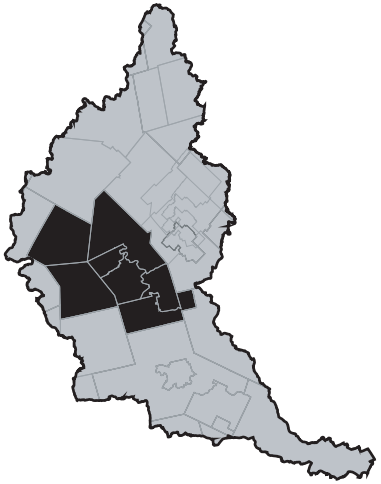
Swiss architect Mario Botta's idea of "building the site" captures the image of the proposed development, -- namely, that the building of the foundations of cottages sited on wasteland should be the first step of the rehabilitation process. When Botta complains that "[T]he bulldozing of an irregular topography into a flat site is clearly a technocractic gesture which aspires to a condition of placelessness" he could be describing, as we have seen, recent cottage building practice in Muskoka. *Villa Canadensis* aspires to the alternative: that "the terracing of the same site to receive the stepped form of a building is an engagement in the act of "cultivating" the site" (Frampton 86). In this sense, the cottage itself is a stabilizing element in the disturbed landscape. A scarified terrain is in effect a tabula rasa, the act of sculpting the site to accept the cottage foundation will dictate the form of the site and the character of the ecosystem that will grow up around it. *Villa Canadensis* will embrace contemporary regenerative design techniques, to minimize the demands the cottage places on the environment and maximize the output of productive energy and materials. It will encourage occupants to become engaged in the processes of the site, through its adaptation to natural cycles and orientation to the surrounding landscape. As well as cottages, the program will include an interpretive centre that will act as a community meeting point for dissemination of information and the distribution of technology and material that pertains to the rehabilitation process. It will also act as a centre for research, and as the public expression of the project and its values, providing access to the site, its lakes and trails, and promoting the concept of *Villa Canadensis* beyond its immediate territory.

In the process of building and visiting the new cottage, these new cottage owners will be taking part in the rehabilitation of a damaged site and in the stewardship of a new ecosystem. Their presence helps enhance diversity and speed the process of ecological succession. From their interaction and understanding of biological processes, they will become engaged with Nature and be able to take pride in the fruits of their labour, which they will see evolve around them. The reward for the investment of their time and energy will not be measured in just economic terms, but in numbers of species, the success of plant populations, the sound of birdsong, and the satisfaction that their recreation made it possible.

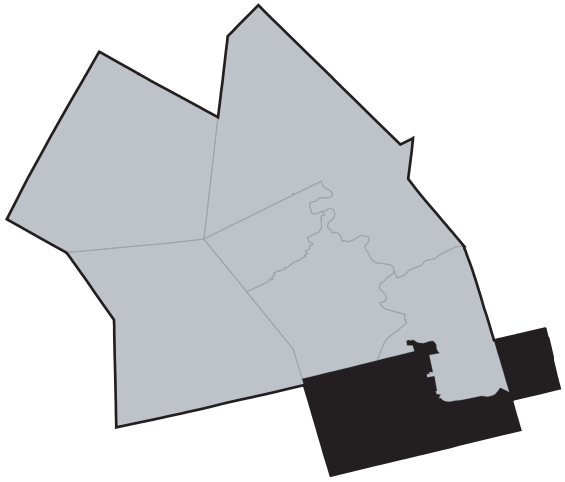
The World was hatch'd by Heavn's Imperial King:
In prime of all the year, and Holydays of Spring.
Earth knew no Season then, but Spring alone:
Then Winter Winds their blustring Rage forbear,
And in a silent Pomp proceeds the mighty Year.
Sheep soon were sent to people flow'ry Fields,
And salvage Beasts were banish'd into Wilds
Then Heav'n was lightedup with Stars; and Man,
A hard relentless Race, from Stones began.
Nor could the tender, new Creation bear
Th'excessive Heats of Coldness of the Year
But chilled by Winter, or by Summer fir'd,
The middle Temper of the Spring requir'd,
When Infant Nature was with Quiet crown'd.

For what remains, in depth of Earth secure
Thy cover'd Plants, and dug with hot Manure;
And Shells and Gravel in the Ground inclose;
For thro' their hollow Chinks the Water flows:
Which, thus imbib'd, returns in misty Dews,
And steeming up, the rising Plant renews.
Some Husbandmen, of late, have found the Way,
A hilly Heap of Stones above to lay,
And press the Plants with Sherds of Potters Clay.
This Fence against immod'rate Rain they found:
Or when the Dog-star cleaves the thirsty Ground.
Be mindful when thou hast intomb'd the Shoot,
With Store of Earth around to feed the Root;
With iron Teeth of Rakes and Prongs, to move
The Crusted Earth, and loosen it above.
Then exercise thy struggling Steers to plough
Betwixt thy Vines, and teach thy feeble Row
To mount on Reeds, and Wands, and, upward led,
On Ashen Poles to raise their forky Head.
On these new Crutches let them learn to walk,
Till swerving upwards, with a stronger Stalk,
They brave the Winds, and, clinging to the Guide,
On tops of Elms at length triumphant ride… (John Dryden, *Georgics* Pt II, ll. 458-96)

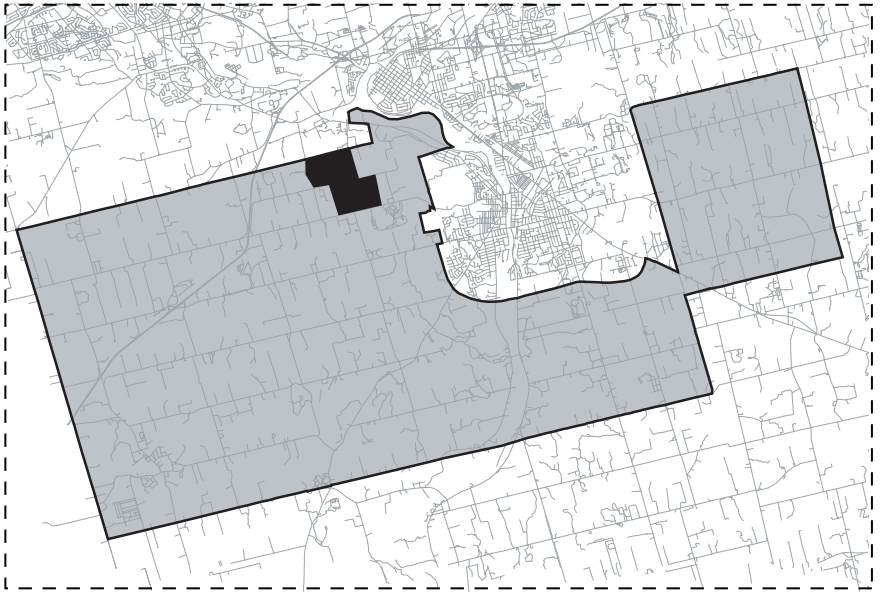
ONTARIO



GRAND RIVER WATERSHED



WATERLOO COUNTY



BLAIR GRAVEL PIT

# Site Analysis

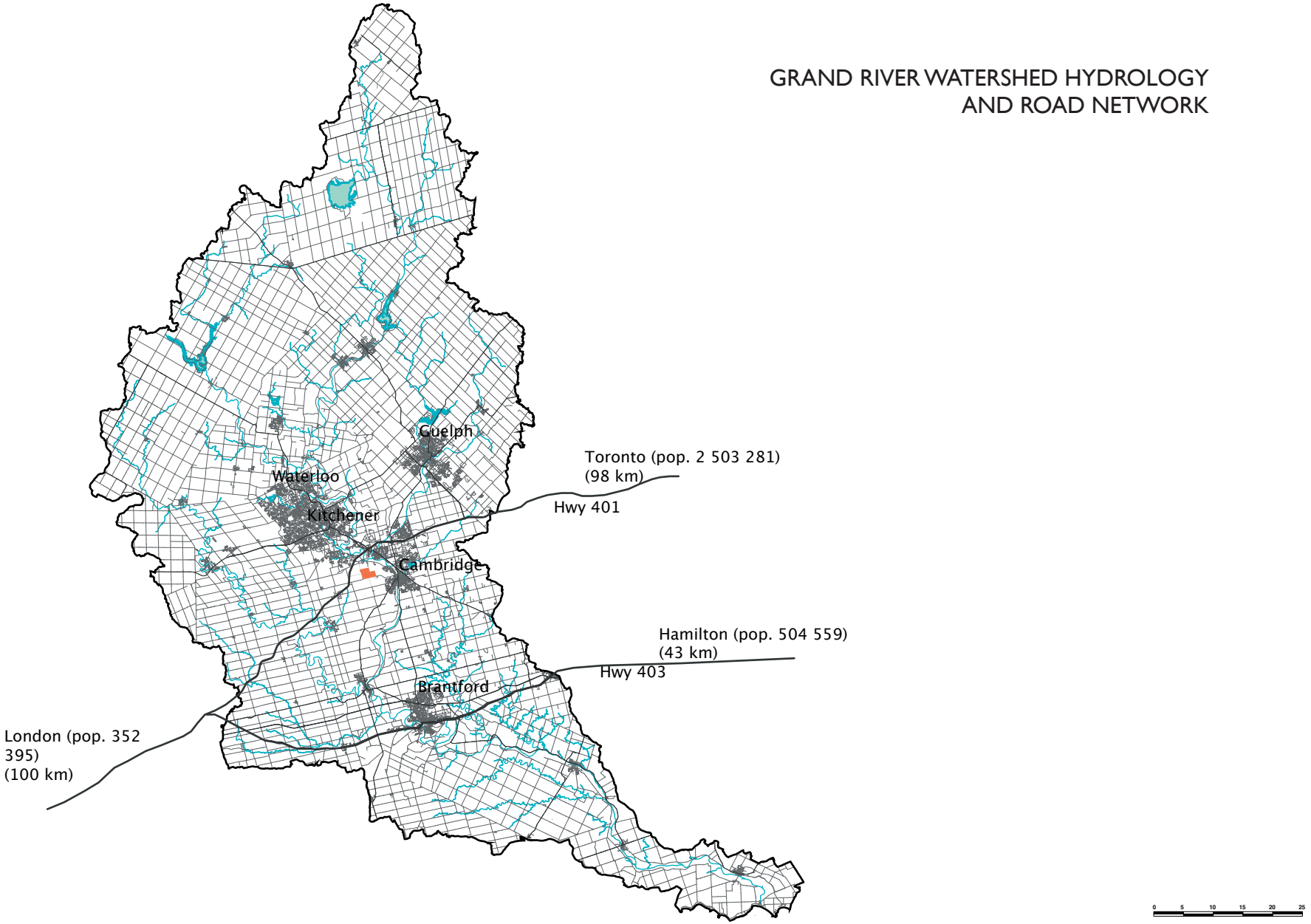
## Local History

The story of Galt begins in 1784, when the Governor of Quebec, Sir Frederick Haldimand, bought 570, 000 acres of land on either side of the Oesshinheguning River from the Mississauga Indians. The land had been granted to the Six Nations people in return for their allegiance during the American War of Independence and their chief, Joseph Brant, sold land to Europeans in order to gain agricultural expertise and increase productivity. Two of these settlers, William Dickson and his American friend Absalom Shade built the first mill in Galt in1816, but the town around it, known then as Shade Mills, grew slowly. Dickson convinced settlers to immigrate to the area from his native Scotland, and through his association with John Galt, a developer for the Canada Company, succeeded in connecting the town to Waterloo and Dundas with the first Macadamized road in the area. The town was renamed Galt, and by 1834 boasted a population of 4, 000 people, 11 saw mills and 6 grist mills. The mills were a focal point for commerce, the new highway and later the convergence of the Grand Trunk, Grand Western and Credit Valley railway lines guaranteed a steady flow of trade to Great Britain and the U.S.A. Thus in the 1840s and 50s the city boomed. Scottish masons were readily available, and the abundance of local limestone, sandstone, and granite enabled Galt to acquire an impressive collection of buildings, culminating in the Post Office (1885) designed by Thomas Fuller, Canada's foremost architect at the time. During this time Galt became known primarily for its production of silk, which was imported by rail from the northeastern United States, processed, and then shipped around the world.

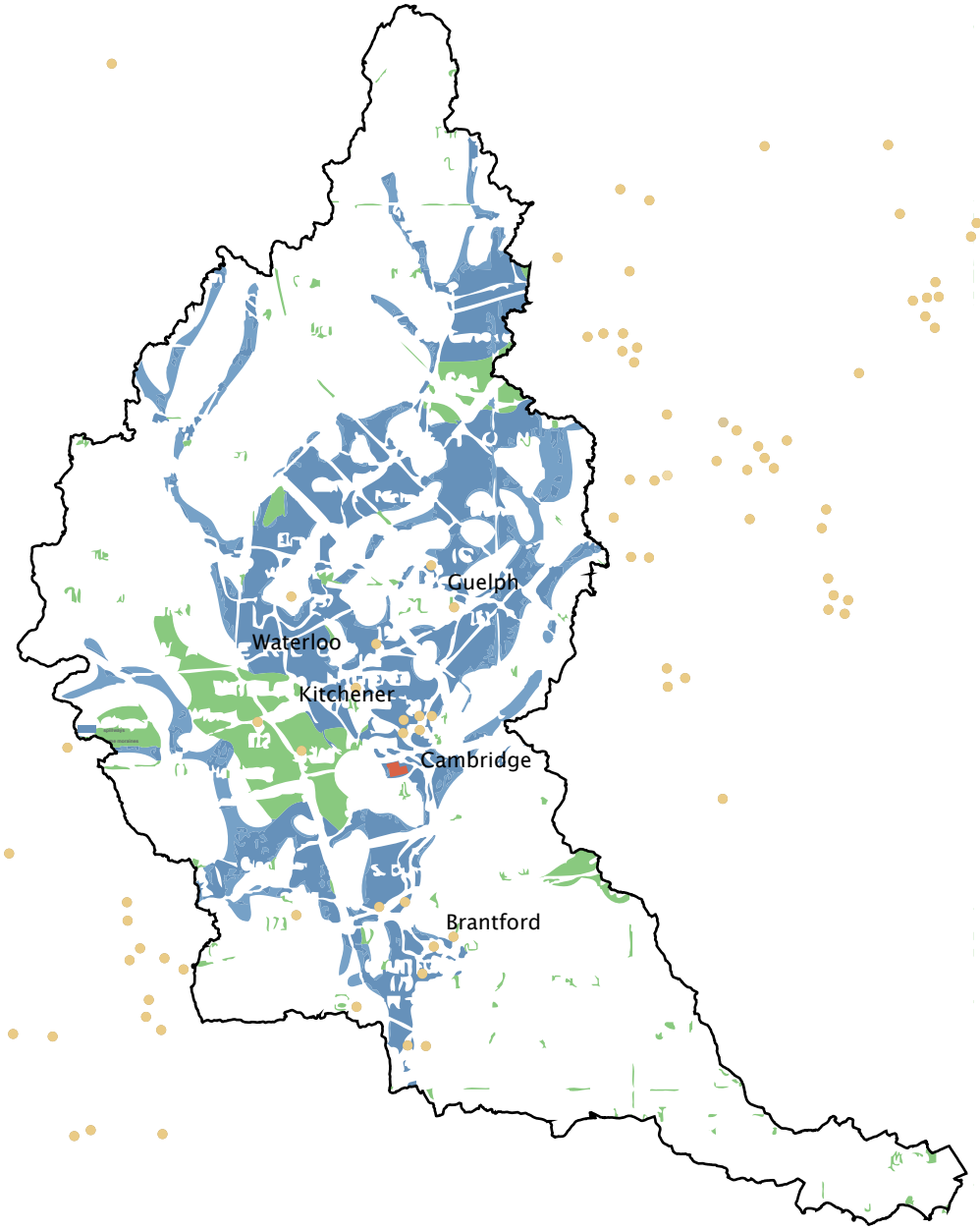
By the end of the nineteenth century the Grand River that runs through Galt started to become more of a hindrance to industry than a catalyst. It was no longer a crucial source of power, coal was a cheaper and more reliable source of energy, and the continued cultivation of the Grand River watershed above Galt meant that flooding became regular. Clear-cutting of forests led to quick snow-melts in the spring, and the draining of swamps and bogs reduced the ability of the land to hold this overflow; Galt was routinely submerged by damaging floods. Since the decline of the silk industry after the Second World War, when the price of imported silk from Japan led to its replacement by synthetic fabrics, the prosperity of downtown Galt has declined. Though it retains one of the most beautiful downtown cores in Ontario, commercial activity has shifted towards Highway 401, and the population to the suburbs. In 1973 Galt and the nearby towns of Preston and Heslpeler merged to become Cambridge.

Fig. 49 | Galt flood.

# GRAND RIVER WATERSHED HYDROLOGY AND ROAD NETWORK



# SAND AND GRAVEL DEPOSITS AND GRAVEL PIT DISTRIBUTION




spillways

kame moraines

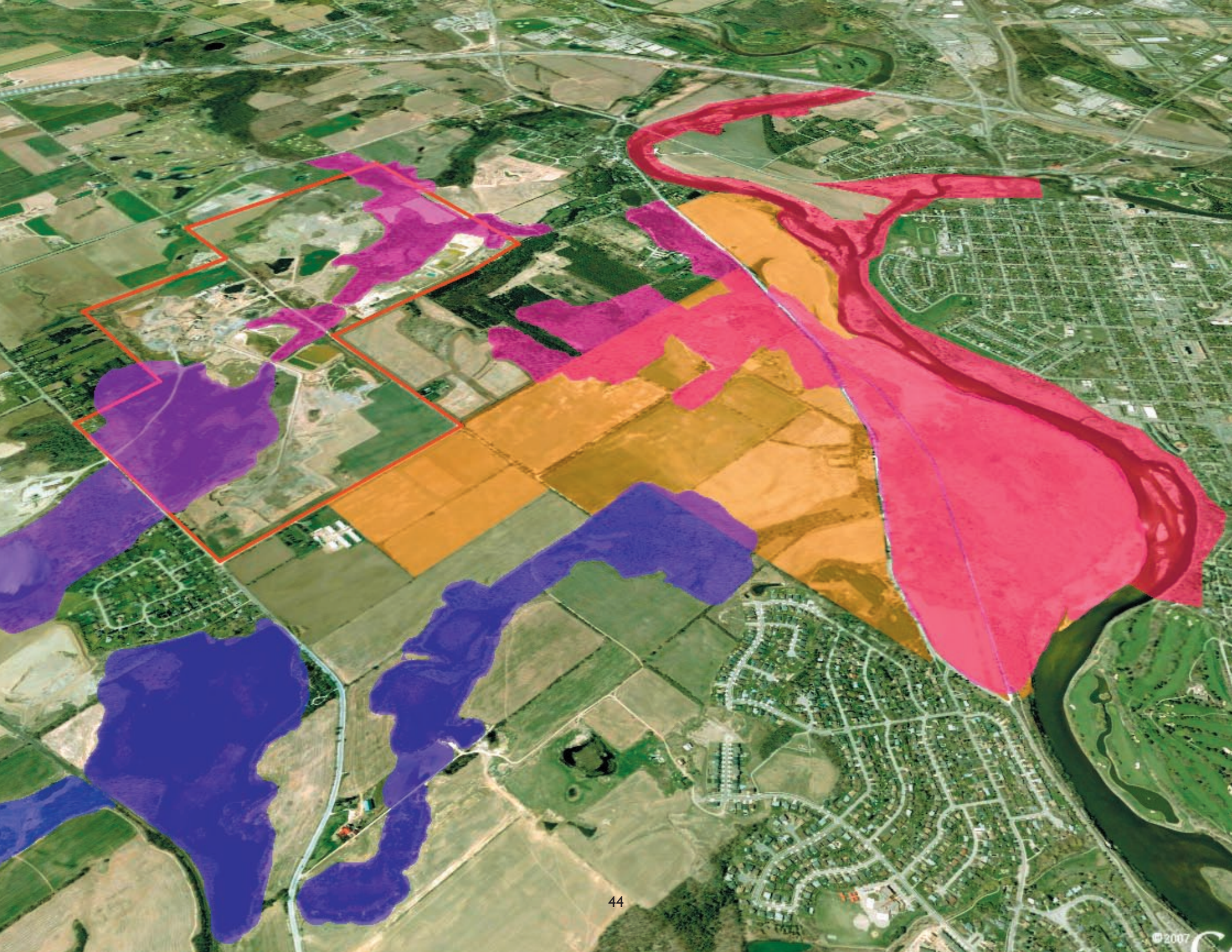
0 5 10 15 20 25

There has been a shift in the fortunes of Galt since the turn of the millenium, with new investment in the historic downtown core. This includes a number of townhouse developments, the University of Waterloo School of Architecture, and several new restaurants. A new city hall, designed by the Toronto architecture firm A. J. Diamond Associates, is due to be completed in 2007, and the former Tiger Brand factory is being converted into loft-style apartments. The proximity to Toronto and the scenic, historic quality of the streetscapes should make Galt a likely destination for visitors and new permanent residents in the years to come.

The Blair Pit is located on the western edge of Cambridge in North Dumfries township, 3 kilometres west from the city centre, and has been in operation since the 1960s. Previously operated by Forwell Ltd., it was purchased in 2004 by Dufferin Aggregates Inc., a division of St. Lawrence Cement. The gravel pit extracts up to 750, 000 tonnes of high quality, unconsolidated sand and gravel annually, which is used in the production of asphalt and concrete and in the manufacture of a variety of concrete products. The gravel pit sits in the Bechtel Creek sub-watershed and is part of the Grand River watershed, Ontario's largest, draining an area of 7,600 km$^2$. The Grand River is designated a Canadian Heritage River.,

The Blair Pit will be in operation for another twenty years. The "existing" site plans that are the basis of the site documentation represent a projection of how the site will appear after it undergoes basic rehabilitation upon its closing. Currently in Ontario there are thousands of gravel pits in operation.

Fig. 52 | View of Blair Pit from the West. Downtown Cambridge is visible in the distance. Whistle Bare golf course lies in the foreground.



## Setting

The suburban location of the Blair Pit and its natural setting makes it ideally suited for a development of cottages. It is only 5 kilometres from downtown Cambridge and within 4 kilometres of the 401 highway, offering easy access to the rest of southwestern Ontario. The pit sits in the middle part of the Bechtel Creek sub-watershed, which drains into the Grand River through Bechtel Creek, near the confluence of the Grand River and the Speed River (figures 45,46). The confluence represents the largest riparian area in the region, and is a designated E.S.P.A. (Environmentally Sensitive Policy Area #36). In fact, the Blair Pit is surrounded by a cluster of E.S.P.A.s. The Grand River and Speed River confluence is immediately adjacent to *raresites*, formerly the Cruickston Park Biological Reserve (containing E.S.P.A. #38), which contains stands of old growth forest and provincially significant cliffs and alvars along the river escarpment, as well as wetlands along the Grand River. On its eastern boundary the Blair Pit is contained by gravel roads and is adjacent to the conservation area of the *raresites* lands. On its south side it is bounded by Highway 97 and on the west by agricultural land. Within the Blair Pit property itself are two E.S.P.A. areas, the Blair Swamp (E.S.P.A. #37), which also extends to the north and west of the site, and the Altrieve Lake and Forest (E.S.P.A. #56), which is contained entirely within the boundary of the south section of the Blair Pit. Orr's Lake (E.S.P.A. #55) flows into the Altrieve Lake underneath Highway 97 and is connected to Barrie's Lake (E.S.P.A. #57) and Grisholm Marsh (E.S.P.A. #58) to the southeast. Barrie's Lake is designated a Provincially Significant Wetland, however, and the Altrieve Lake and Forest within the site represents one of "the most significant collecting regions in the county" (Eagles 3). Assessments in the 1990s confirmed that conditions on the site, "except for the loss of some wooded areas, are the same as when William Herriot, the pioneering Waterloo county biologist, collected here from the 1890s to 1907" (Campbell 1). The location of the two E.S.P.A.s within the site provides a detailed ecological records and species inventories that describe the quality of the site before extraction, and also suggest the great potential for the rehabilitation of the gravel pit that encircles them.

Fig. 54, 55 | The confluence of the Grand and Speed Rivers in the summer and winter.

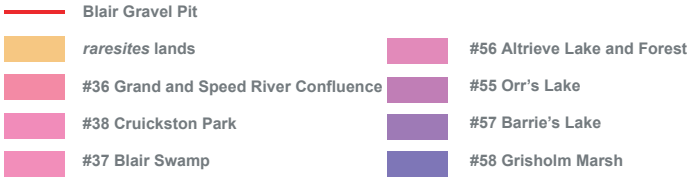
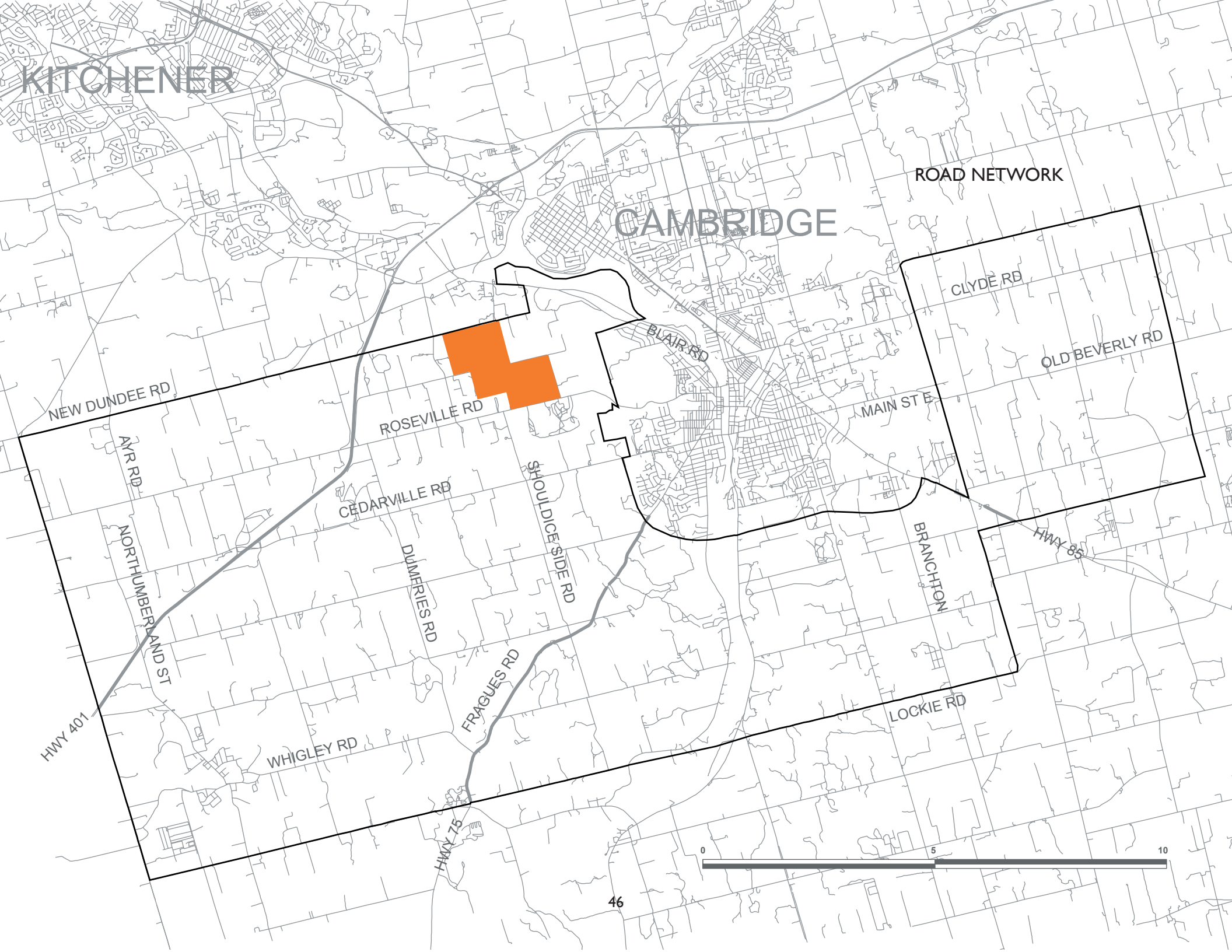



Fig. 53 | Suburban sprawl to the west of Cambridge has been blocked by the expanse of the *raresites* lands and a network of seven Environmentally Sensitive Policy Areas (E.S.P.A.s).


KITCHENER
CAMBRIDGE
ROAD NETWORK
NEW DUNDEE RD
ROSEVILLE RD
BLAIR RD
CLYDE RD
OLD BEVERLY RD
MAIN ST E
AYR RD
CEDARVILLE RD
SHOULDICE SIDE RD
NORTHUMBERLAND ST
DUMFRIES RD
BRANCHTON
HWY 85
HWY 401
FRAGUES RD
WHIGLEY RD
LOCKIE RD
HWY 75
0
5
10

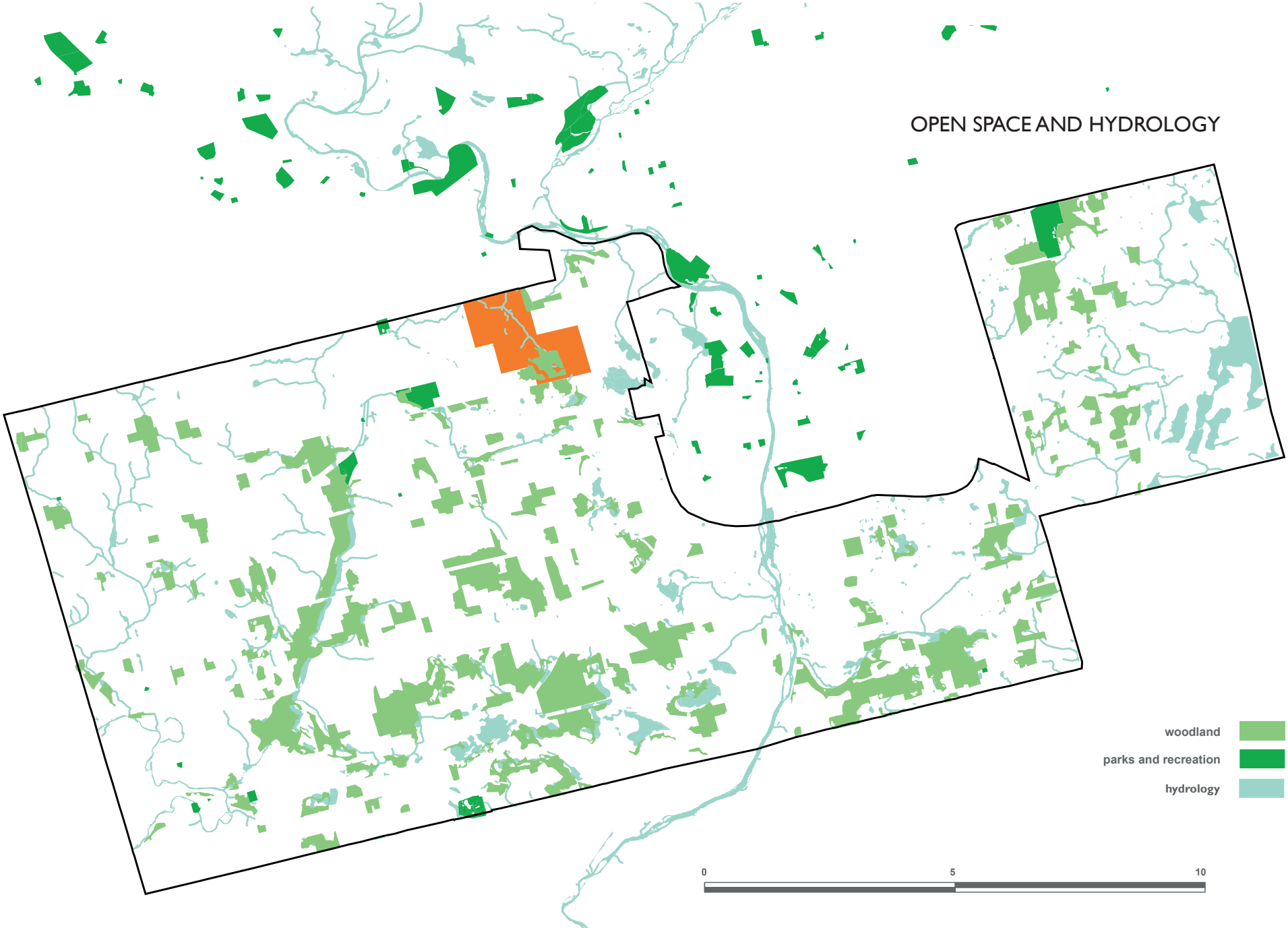

OPEN SPACE AND HYDROLOGY
woodland
parks and recreation
hydrology
0
5
10

Fig. 58 | Extraction in the southeast corner of the site

Fig. 59 | View from berm along the East edge of the Blair Pit

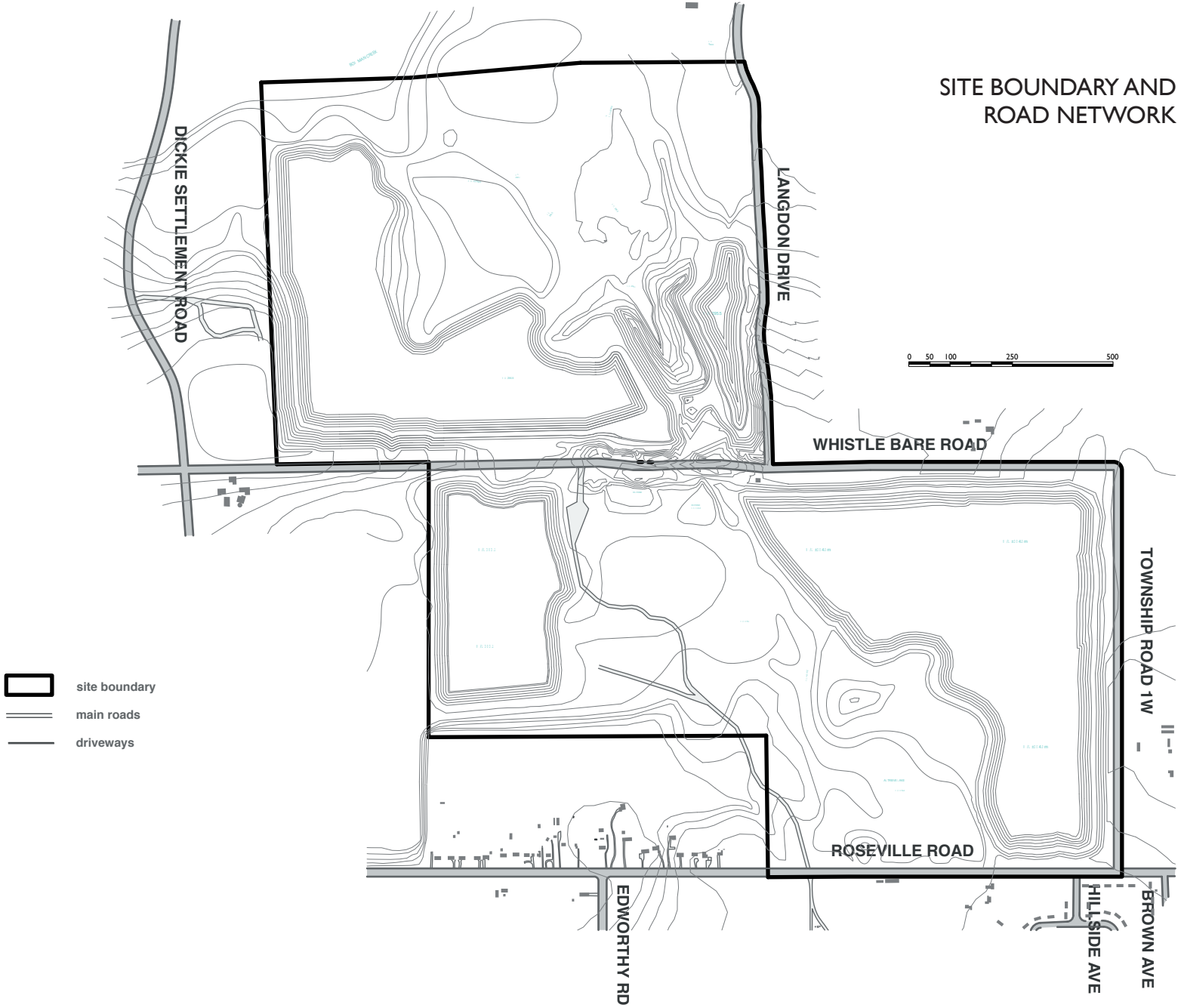
## Quarry Activity

Gravel extraction is from the Burford deposit, which consists of glacial outwash. There are approximately 8-9 metres of gravel above the water table, and Dufferin Aggregates is licensed to extract up to 12 metres below the water table. The bedrock below is the Guelph Formation, which consists of dolostone, a sedimentary rock with large quantities of the mineral dolomite, that was formed out of deposits at the bottom of inland seas that once inundated the area.

Site plans are phased in order allow for the blending of bank materials and thus to maximize the resource and improve the efficiency of the processing plant, which is located in the southern half of the site. In the current phase, the bulk of extraction is taking place in the south east corner of the site (see figure 47). There is also some extraction from the northern half. Before extraction, there was an average depth of 15-30 centimetres of topsoil, and 1-1.5 metres of overburden on the site. Topsoil and overburden are stored in large berms at the perimeter of the site (see fig. 48), and provide a visual barrier and acoustic protection from the pit. The material will be used in the rehabilitation of the site once extraction is complete (Bourrie).

Fig. 60 | Grading banks to a 3:1 slope

# SITE BOUNDARY AND ROAD NETWORK



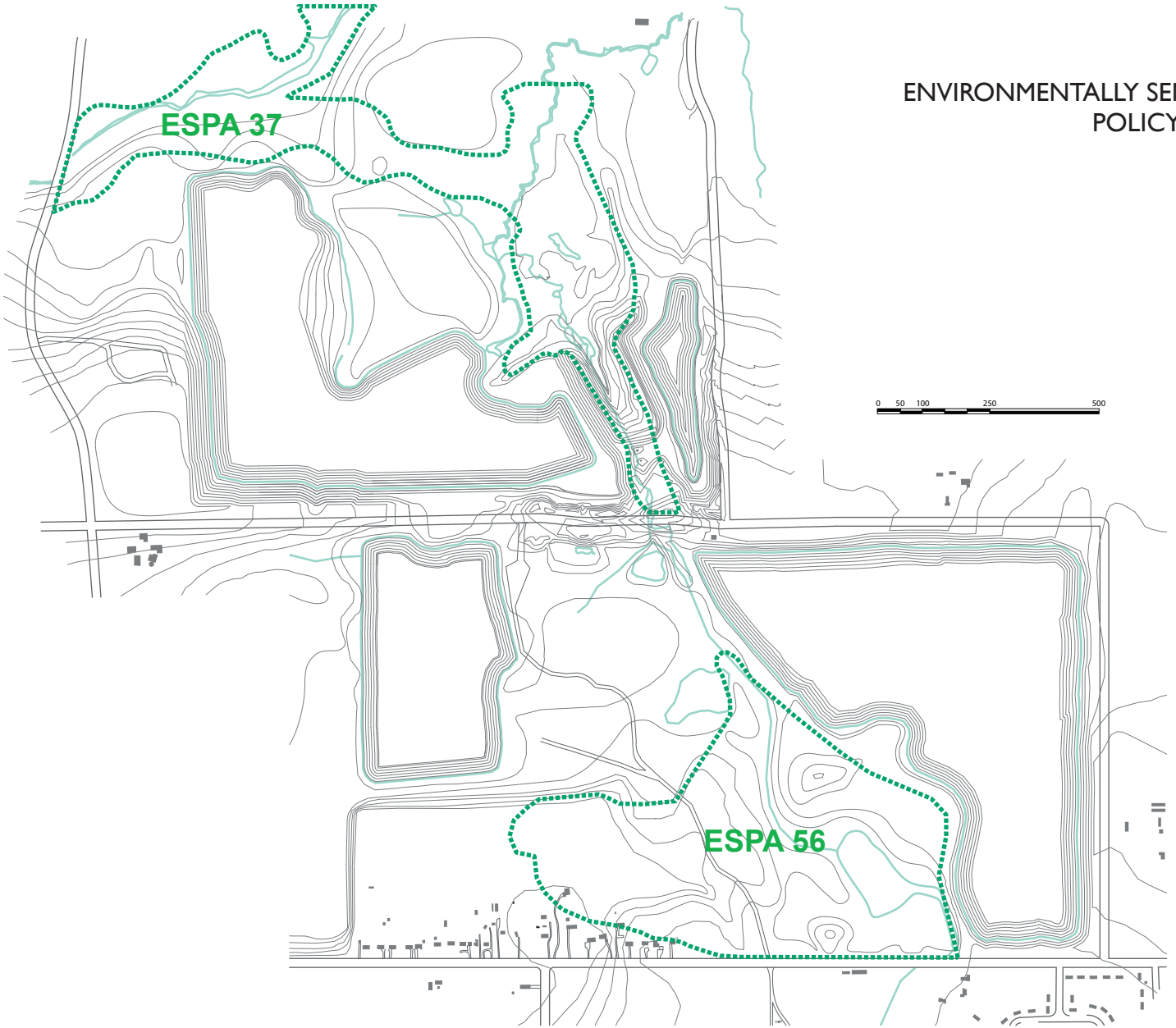
## Water quality

The water level of the ponds and lakes in the Blair Pit fluctuates seasonally due to precipitation, runoff, or drought, and are typically highest in the spring, after snow melt and rain, and lowest in the late summer, varying by approximately 1-1.5 metres.

The gravel extraction and production process does not require chemicals, so water is typically not adversely impacted during the operation of the pit. Fuel stored on site is carefully managed according to provincial legislation to protect the water table from contamination. The clarity and colour of ponds, such as the ones in the image below, reflect the small amount of suspended solids in the water. Despite water in the Blair Pit having lower than normal nutrient levels - a result of the lack of immediate plant life and run-off, it would not be unusual to find fish in the ponds. There is nothing to prevent aquatic plants and fish from being added to the ponds immediately upon the closure of the gravel pit (Bourrie).

Fig. 62 | The opacity of the ponds is caused by suspended mineral sediment, and not chemical contamination

# ENVIRONMENTALLY SENSITIVE POLICY AREAS



## Ecological Zones and significant species.

There are two E.S.P.A.s on the site.  E.S.P.A. #37, the Blair Swamp, makes up the northern boundary of extraction and reaches down into the middle of the property, bisecting two extraction areas.  It also extends beyond the site to the northeast and almost a kilometre to the northwest. E.S.P.A. #56, the Altrieve Lake and Forest, is located entirely within in the southern portion of the site.


E.S.P.A. # 37 SPECIES
white spruce
great blue heron
beaver
mink
0 50 100 250 500
upland deciduous forest
mixed forest [hemlock +beech]
mixed forest [cedar + yellow birch + b. ash]
plantation
shrub swamps
stream valley
dense skunk cabbage
fresh marches, bog forest
wooded swamps

## The Blair Swamp (E.S.P.A. #37)

The area of the Blair Swamp that intersects and encloses the site is characterized by upland deciduous forest typical of the northern portion of the Carolinian Forest Region, which is common in the eastern United States but extends into Canada only in southernmost Ontario. Carolinian forests are characterized by rich soils and diverse ecosystems, with a great variety of understory and overstory trees. Dominant species include sugar maple, beech, white ash and shagbark hickory. Most of this forest type has been cleared for development and agriculture and threatened by invasive introduced species such as purple loosestrife (Kershaw 21). Also present in the site are mixed forest areas that have a combination of coniferous and deciduous trees, including hemlock, beech, white ash, red maple, and white pine. A stream valley that once provided drainage from the area now occupied by the Blair Pit runs through the middle of the E.S.P.A. It has sloped sides and rich humus soils interspersed with seepage from artesian wells. Its damp soil leads to dense patches of skunk cabbage, an the presence of tree species that include yellow birch, red and silver maples, and hemlock along drier portions of the stream bed. Adjacent to pit extraction on the north edge of the site are shrub swamps, where the soil is waterlogged and often flooded. Typical tree species here are willows, dogwood, and alders, and lower growth is typically of cattails, bulrushes, and sedges (Spicer).

Fig. 65 | Small Purple Fringed Orchis

Fig. 66 | Male American Goldfinch

Fig. 67 | (left) Wet depression in mixed forest

Fig. 68 | Small pond connecting with Blair Creek

Fig. 69 | Mature hemlock stand

Fig. 70 | Looking down at Blair Creek

Fig. 71 | Visible sand-gravel substrate

Fig. 72 | Groundwater seeps keep the creek flowing during the winter

Fig. 73 | Red-tailed hawk

Fig. 74 | Regionally rare white trout-lily

Fig. 75 | Woods in the Blair Swamp ESPA.

Fig. 76 | Extensive patches of skunk cabbage

Fig. 77 | Bulbet bladder fern

Fig. 78 | Lowland forest - cedar / hemlock

Fig. 79 | Jack-in-the-pulpit

Fig. 80 | White trillium

Fig. 81 | Edge of shrub swamps

Fig. 82 | Open meadow next to well developed mixed forest

Fig. 84 | Water hemlock

Fig. 83 | Large wet meadow

Fig. 85 | Gray catbird


E.S.P.A. # 56 SPECIES
rue anemone
poke milkweed
beaked hazel
blue spotted salamander
yellow spotted salamander
bull frog
white spruce
great blue heron
0 50 100 250 500
upland deciduous forest
mixed forest [hemlock +beech]
mixed forest [cedar + yellow birch + b. ash]
plantation
shrub swamps
stream valley
dense skunk cabbage
fresh marches, bog forest
wooded swamps

## The Altrieve Lake and Forest (E.S.P.A. #56)

The Altrieve Lake and Forest was originally a shallow basin situated between gently rolling hills of calcareous gravelly sand and loam. Since the beginning of extraction around the area, it has been given an "A status" and is considered one of the unique E.S.P.A.s in the Waterloo region. Its 83 acres are located entirely within the Blair Pit Site, and contain a marl-bottomed lake that drains areas on both sides of Roseville Road. The Altrieve Lake eventually drains into the Blair Swamp to the north. There is a high diversity of flora and fauna in this small area because of the presence of several distinct biological communities. In the north-east corner of the site is a "spectacular" oak dominated Carolinian forest that is "distinctly southern in its affinities, and is at the northern limit of its range in the Galt area" (Eagles 2). In the south east of the area is a alkaline, sphagnum-tamarack bog that is part of a bog-forest complex that includes Orr Lake, unusual because of its affinities with Northern Canada. Elsewhere in the area is an upland maple-beech forest, as well as a marsh, with an association of cattail, canary grass and sedges that houses a small population of mallards, and the Altrieve Lake itself, which is a resting spot for migratory birds. The most interesting areas are the Carolinian forest and the bog around the lake which harbour a variety or rare species: Aromatic Sumac was discovered in 1902 by William Herriot, but it was not seen again at Altrieve Lake until rediscovered by Larry Lamb and Paul Eagles in the summer of 1975 (Eagles 3). Also notable are stands of Poison Sumac around the lake, the presence of an unusual species of shrub, the northern dwarf birch, a the presence of a "hybrid" swarm of uncommon ferns, including the locally-rare Clinton's Fern, and significant stands of bog herbs, especially the Tall White Bog Orchis. In the maple-beech forest, the most unusual species is the putty-root orchid, which is now almost extinct in southwestern Ontario due to grazing and cutting as well as herbal use. Species indicative of the unusual limy nature of the Altieve Bog shores are Buffaloberry and Shrubby Cinquefoil, both very scarce in this area. Furthermore, Black Chokeberry, a species new to the published fauna of Waterloo County, was found in the west part of the Altrieve Lake swamp. (Campbell 1)

Fig. 87 | Carolinean forest

Fig. 88 | Edge of wooded marsh

Fig. 89 | View from eastern edge of Altrieve Lake

Of special interest is the moist peat-muck soil that supports intermediate lowland wet woods to the north and west of the pond. This substratum apparently underlies all of the low-land area with the exception of rises of land.

The Blair , Bauman and Bechtel creeks support brook trout. Amphibious species include the chorus frog, the American toad, the gray tree frog, the eastern red-backed salamander, the wood frog and the Northern leopard frog.

There has been beaver activity in the Blair Swamp, as well as sitings of mink, a regionally significant species. Birds that may be of interest are the great blue heron, the Indigo bunting, the belted kingfisher, and a variety of woodpecker species.

In the Altrieve Lake and Forest, significant reptiles and amphibians include the blue-spotted salamander, the yellow-spotted salamander and bullfrog. There is also beaver activity in the area. Bird sightings are similar to in the Blair Creek area; notable species include the northern cardinal and the cedar waxwing.

Fig. 92 | Indigo bunting

Fig. 90 | Waterbody created by beaver pond

Fig. 91 | Old beaver pond - grown in

Fig. 93 | Male northern cardinal

Fig. 94 | Woods beyond Altrieve Lake

Fig. 95 | Upland deciduous forest

Fig. 96 | Blue bead lily

Fig. 97 | White-tailed deer

Fig. 98 | Altrieve Lake

Fig. 99 | Eastern side of Altrieve Lake

Fig. 100 | Green frog

Fig. 101 | Eastern end of Altrieve Lake

Fig. 102 | Sanpping turtle

Fig. 103 | North end of Altrieve Lake

# Gravel Pit Photographs

Fig. 104 | Approaching the site from the west along Whistle Bare Road

A site visit and an aerial photography session were undertaken in the summer of 2005. As mentioned previously, the Blair Pit is currently active and will remain so for another twenty years. However, it is possible to recognize in the photographs suggestions of the character of the site when it closes. Berms around the perimeter of the site act as a visual and acoustic barrier as well as stockpiles of topsoil that was removed before excavation and will be used in rehabilitation. The berms are sloped gradually and planted with fast growing grasses to prevent erosion, and the early stages of successional growth are visible. Small ponds indicate the eventual water level, and in some areas shorelines are already grown in with shoreline vegetation.

In the current phase of extraction, the southeast corner of the pit is active. The original topography of the property is indicated by a dotted line in the sections that accompany the photographs.

Fig. 105 | Looking west and north towards the treatment facility

Fig. 106 | Location of viewpoint

Fig. 108 | View from the northwest edge of the site lookining east

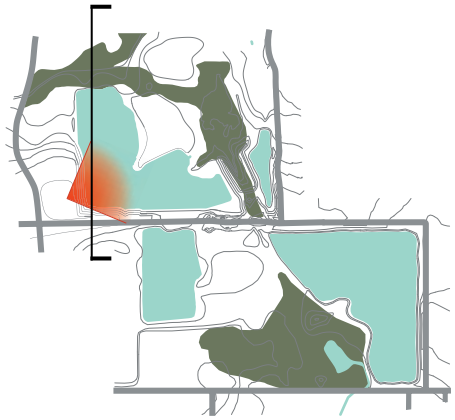
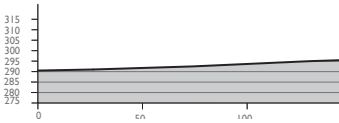


Fig. 109 | Location of viewpoint and site section



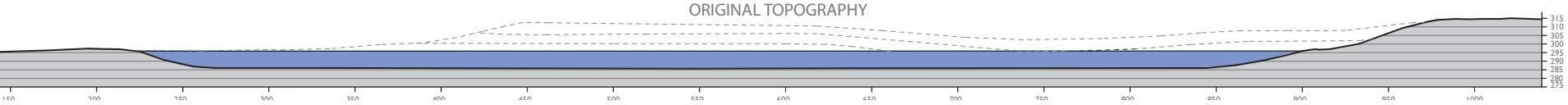



Fig. 110 | Site section

Fig. 111 | View from the centre of the site looking north. The Blair Swamp (E.S.P.A. #37) is in the distance

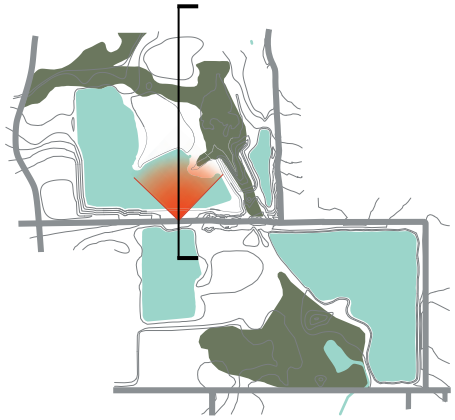
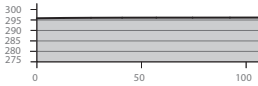


Fig. 112 | Location of viewpoint and site section



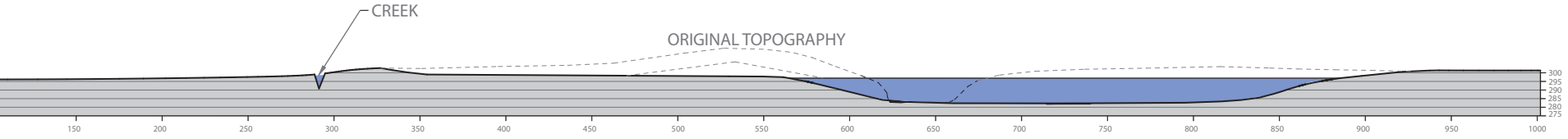
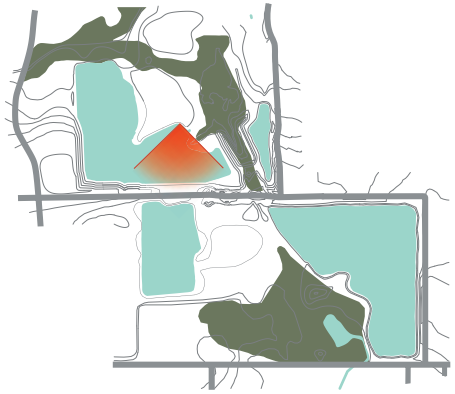



Fig. 113 | Site section

Fig. 114 | View from the centre of the site looking north. The Blair Swamp (E.S.P.A. #37) is in the distance



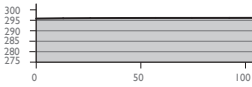



Fig. 115 | Location of viewpoint and site section

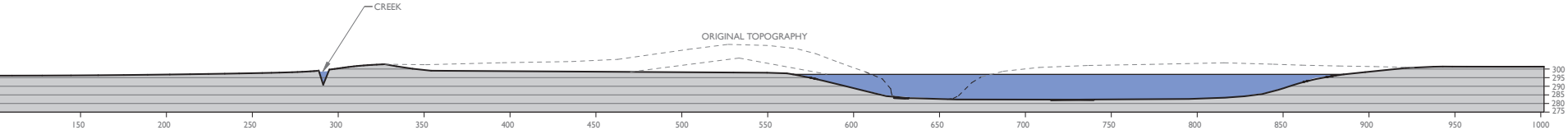



Fig. 116 | Site section

Fig. 117 | View to the north along the northeastern extraction area. The woods beyond are part of the Blair Swamp (E.S.P.A. #37)

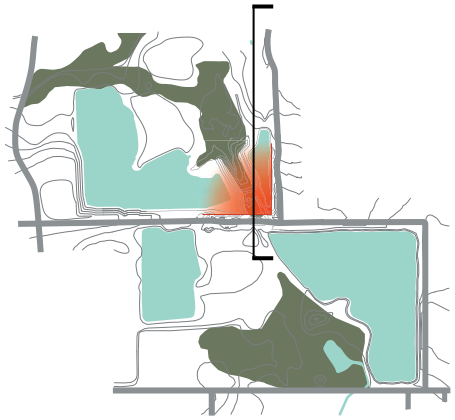
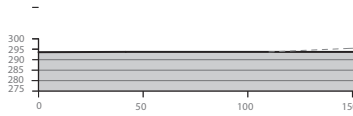


Fig. 118 | Location of viewpoint and site section



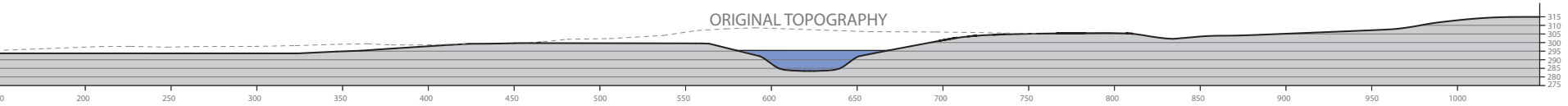



Fig. 119 | Site section

Fig. 120 | View from the centre of the site looking west and north. The plant operations are visible on the left.

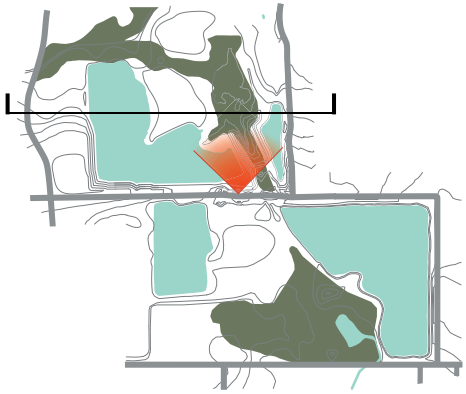
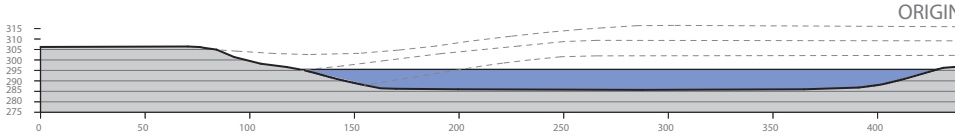


Fig. 121 | Location of viewpoint and site section



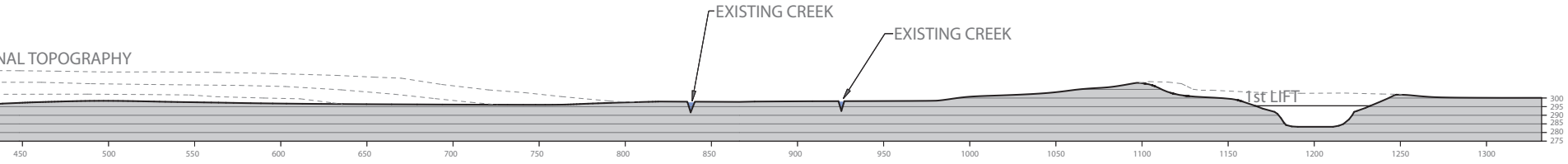



Fig. 122 | Location of viewpoint and site section

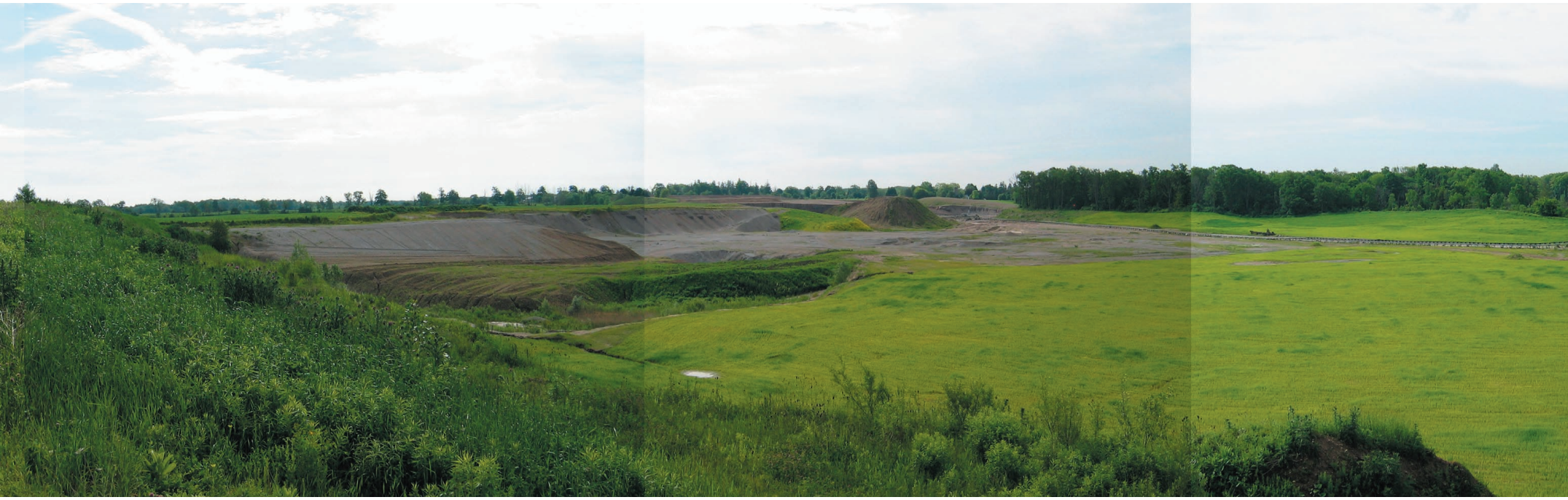


Fig. 123 | Looking south into southeastern extraction area. The Altrieve Lake and Forest (E.S.P.A. # 56) is the distance. Quick growing grasses are planted to prevent erosion as phases of extraction move to a different area of the site.

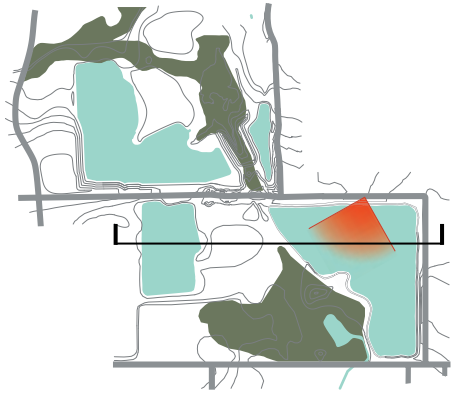


Fig. 124 | Location of viewpoint and site section

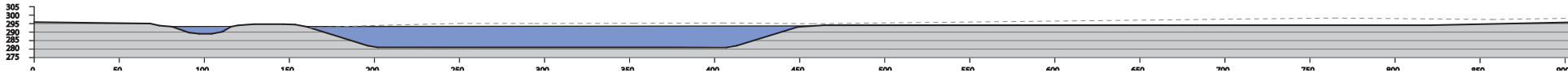
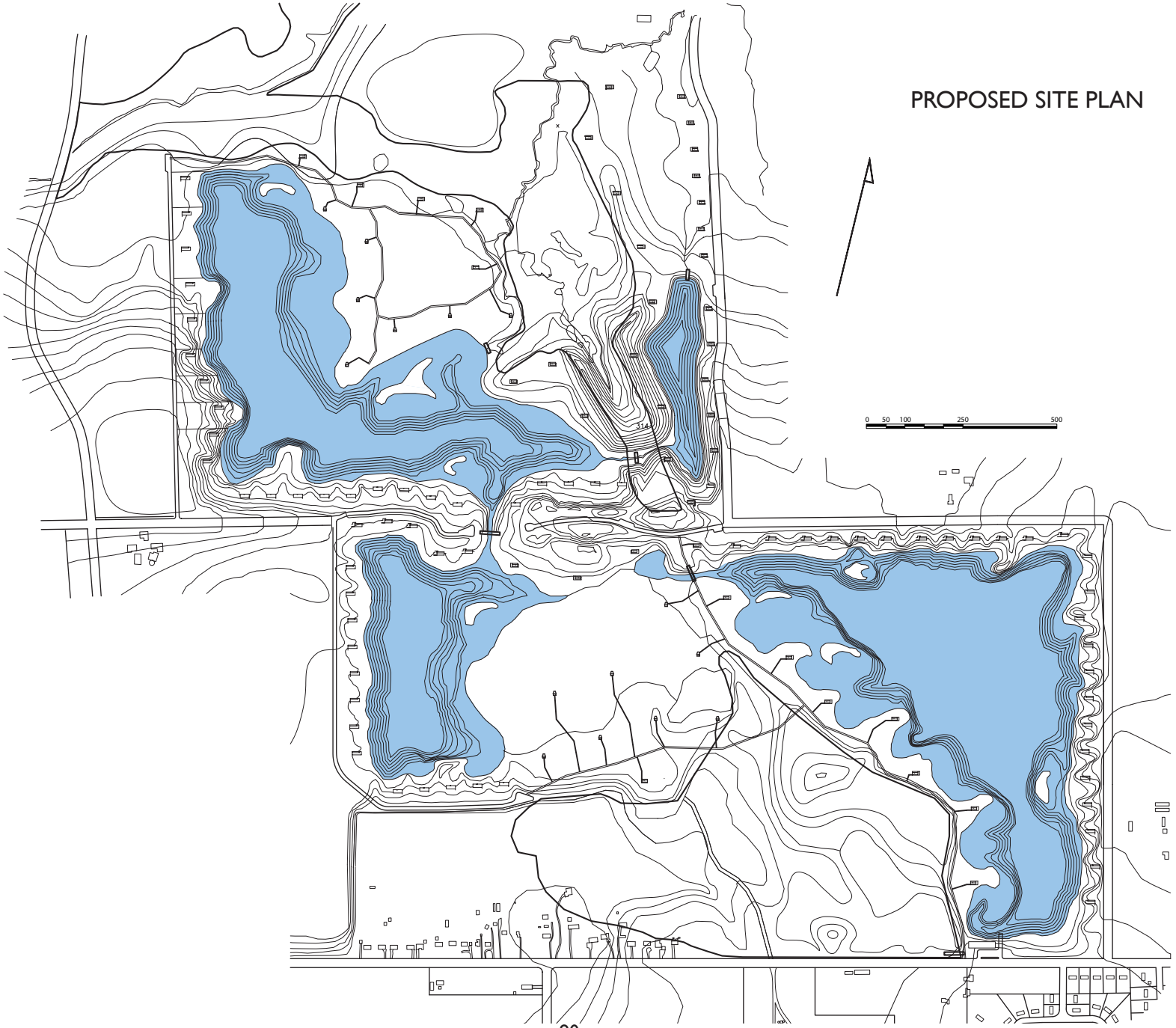



Fig. 124 | Site section

# PROPOSED SITE PLAN



# Site Strategy

## INTRODUCTION

The site will be developed according to three zones, whose territory is based on their position on the site relative to the protected Blair Swamp and Altrieve Lake and Forest E.S.P.A.s, and on the condition of the immediate terrain. The three zones represent a spectrum of rehabilitation, from aggressive landforming and habitat creation to careful preservation. The three levels of intervention are conceived both during and after the initial phase of habitat creation, and are reflected in the character of the cottage types and the role and responsibilities of their owners within the habitat management plan proposed for the site. Cottage owners will enter into a covenant, whereby they agree to abide by the principles of participation in the rehabilitation of the site and the preservation of the original, sustainable form of the cottages.

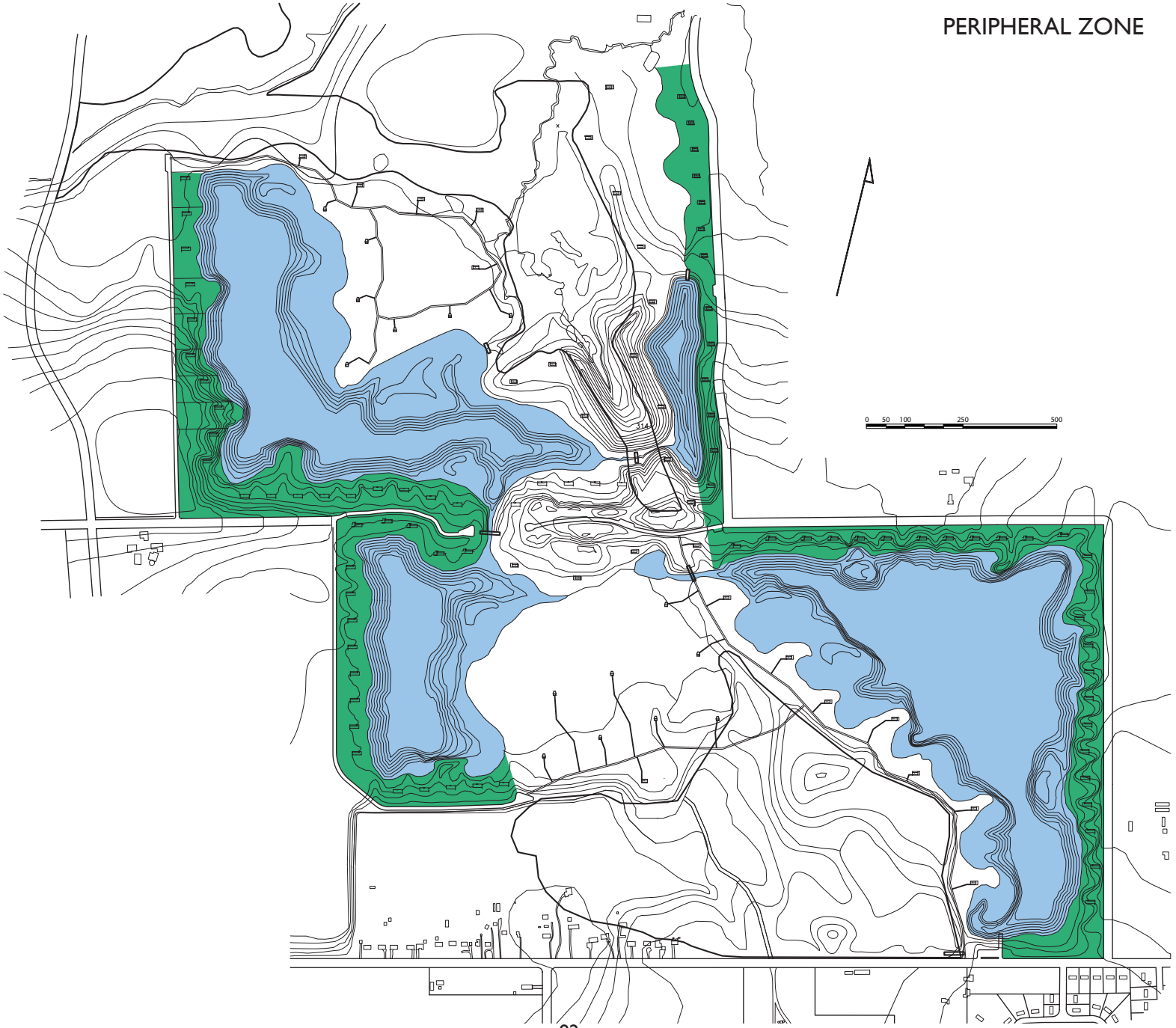
The Peripheral Zone refers to the perimeter of the site and contains Type A cottages, of which there are four designs responding to different solar orientations. The Embedded Zone refers to areas adjacent to the E.S.P.A.s that will eventually become wetlands, and contains Type B cottages. The Transitory Zone refers to the E.S.P.A.'s themselves, where construction is limited to pathways and platforms that encourage an appreciation of the natural setting and prevent damage to the sensitive ecological communities therein.

In addition to the cottage areas, an Interpretive Centre is to be completed with similar intentions as those of the cottages, but with a mandate to educate a public audience. As well as an exhibition space explaining the rehabilitation process and the concept of *Villa Canadensis*, the Centre will serve as the main acccess point to a network of trails and to a dock at which rental boats will be available on the lake in the southern portion of the Blair Pit site.

The Interpretive Centre will also provide essential services to the cottage community and its residents. It will serve as a meeting point for cottage owners, and will be essential for the dissemination of ecological information and instruction in the methods of stewardship that are crucial to the success of the rehabilitation process. As such, the program will include accommodation for a resident ecologist who will oversee site management.

This first part of this section describes the criteria for the design of two cottage types and the treatment of the E.S.P.A.s. The second part outlines the rehabilitation strategy.

# PERIPHERAL ZONE



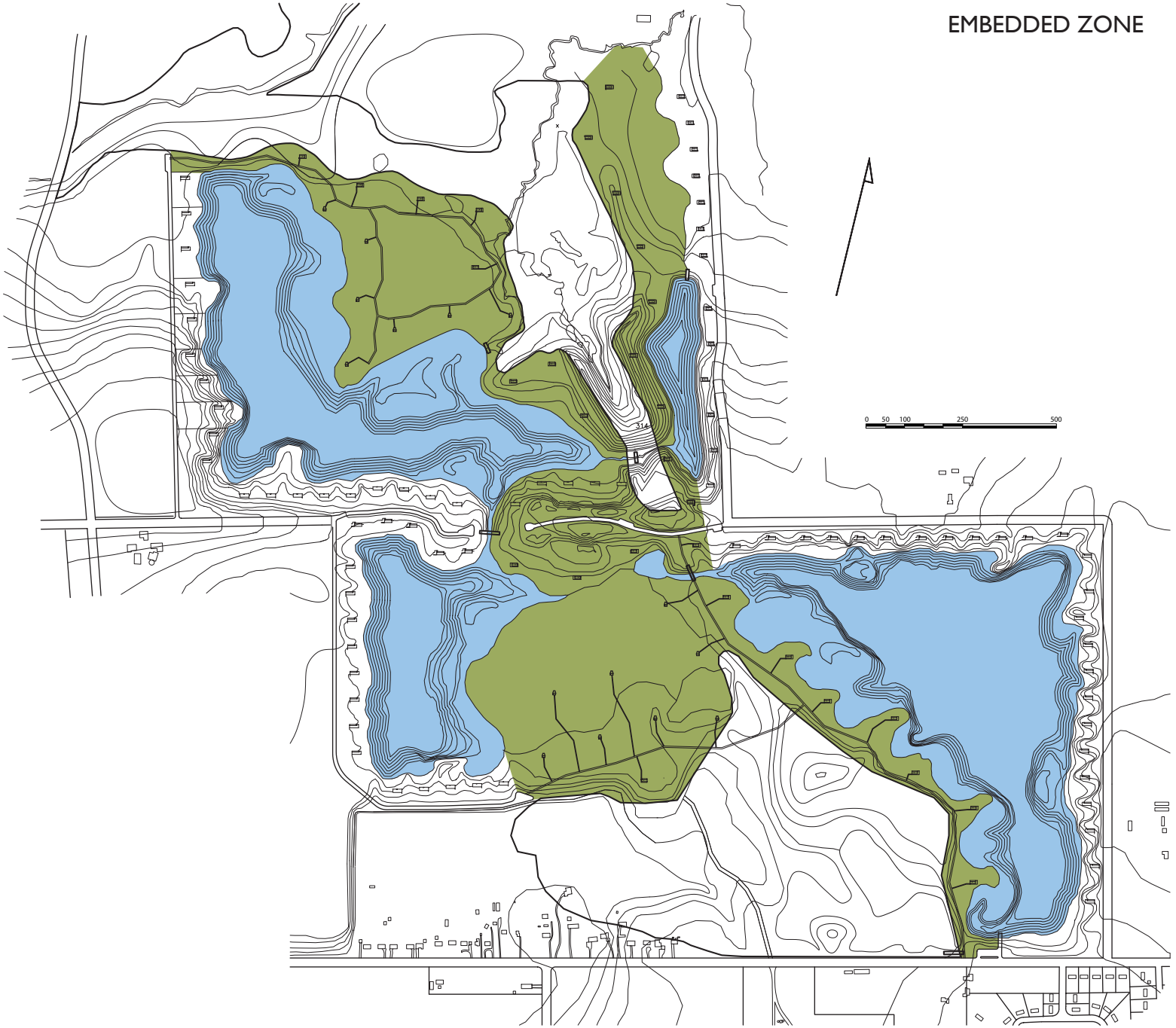
## PERIPHERAL ZONE: TYPE A COTTAGES

The peripheral zone contains Type A cottages. This area abuts the boundary of the gravel pit, and is not immediately adjacent to any significant ecological features, only to roads and agricultural land. Its condition upon the closure of the gravel pit is also unremarkable, consisting of continuous slopes graded at 3:1, constituted by soil that is unfertile and unproductive because it has been stripped of its nutrients and moisture during the excavation process. The narrow width of the lots and their adjacency to roads or agricultural land means that a self sufficient and diverse terrestrial ecosystem like a Carolinian forest is not possible. Instead, the peripheral zone acts as a sort of buffer, or screen, separating the site and its species from the agricultural landscape that surrounds it. Cottage occupants will play a significant role in the health of the shoreline, especially during its early stages.

The peripheral lots will be characteristic of an Immature Forest species group, which is typical of naturally reforesting agricultural land and shares many species with the agricultural /old field species group. "Patchiness" of trees and other vegetation is essential to its productivity (Michalski et al 16). Requirements of wildlife include hedgerows, scattered wooded areas, and moist to wet depressions, and irregular topography. Connections to adjacent woodlots and similar habitat such as in the *raresites* lands are desirable and encouraged. Special habitat creation may include artificial structures such as brush piles, boulders, snags, logs, fence row piles, and nesting boxes.

Special attention is paid to the shoreline, which is lengthened and also graded to provide a variety of shoreline conditions, for example, a shallow wetland that is suitable for waterfowl, and steeper areas that will support overhanging shrubs and help provide cover for fish.

# EMBEDDED ZONE



## EMBEDDED ZONE: TYPE B COTTAGES

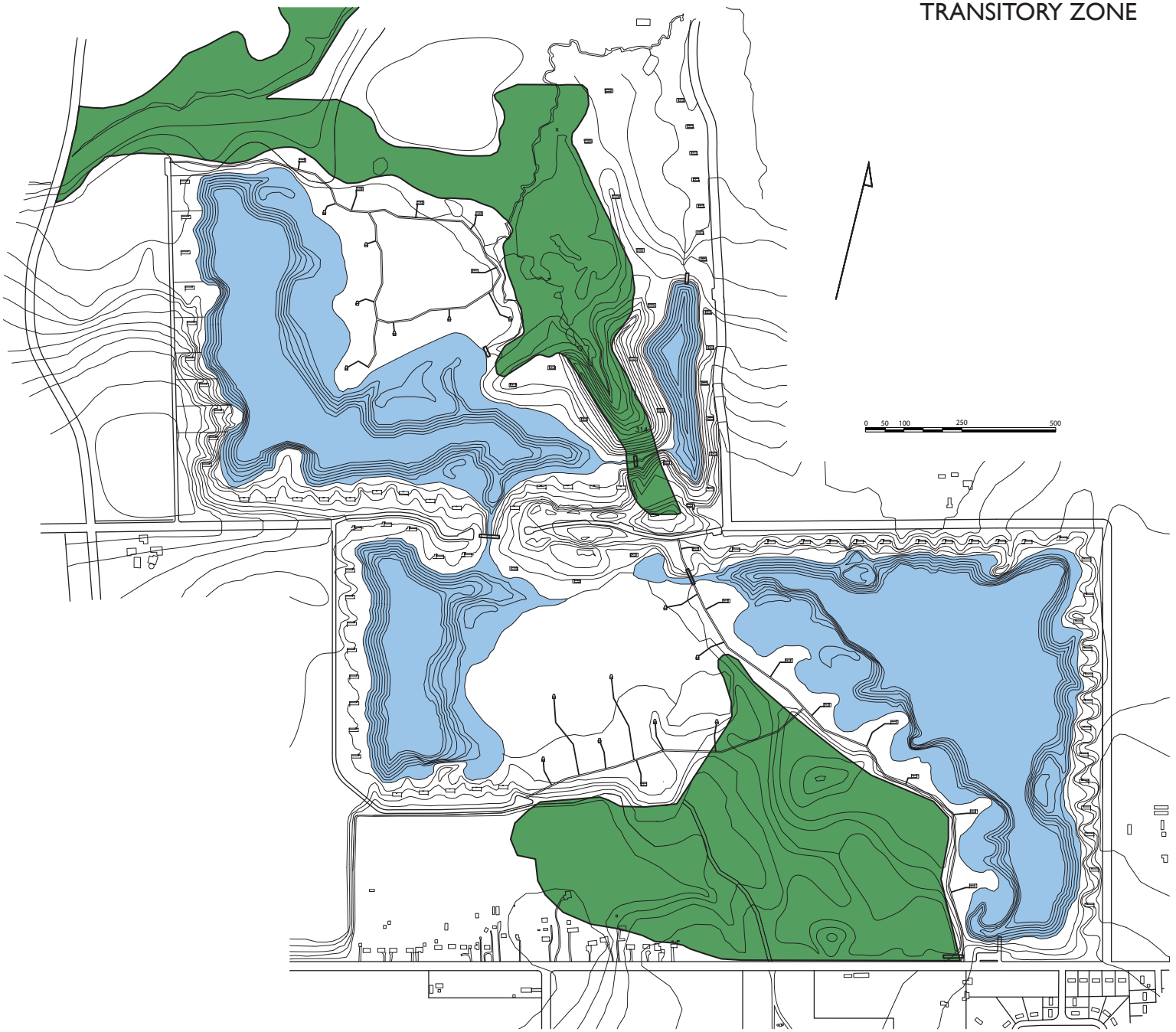
The type B "embedded cottages" are located in areas near the heart of the site that are adjacent to the Blair Swamp and Altrieve Lake and Forest E.S.P.A.s. They constitute flat, compacted terrain near the eventual water level, and, as such, are appropriate for development into wetlands. Wetlands are one the most productive types of ecological communities (Keddy 59), and a waterfowl protection area is a desirable and popular focus of the site rehabilitation, in part because of the interest in birdwatching. Cottage design responds to this exposed condition and to the wet soils and variable water level. Cottages will be raised above the saturated marshland on pilotis to maximize the extent of new terrain and the immediacy of the experience of the surrounding wildlife for occupants. Once construction is complete, cottages will be accessible only by footpath, through a network of trails and boardwalks that will cover the B zone.

The shoreline and aquatic habitat consists of shoreline zones, including shoreland zones and nearshore waters. The perimeter of ponds along peripheral "A" zones will exhibit many similar characteristics in order to provide habitat for waterfowl, furbearers such as muskrat, amphibians and fish. Essential habitat requirements for this group will be found along the shorelines of Zone B, and include "low banks and wide shoreline zones, stable water levels during breeding season, diverse habitat, combining tall weltand and terrain vegetation, open water, bare shores, small islands, and irregular shorelines"(Michalski et al 10). Cottage occupants will also be encouraged to take part in special rehabilitation, to help provide artificial habitat such as floating islands and nesting boxes that would encourage waterfowl nesting and breeding.

There are two versions of the Type B Cottage: a larger, two bedroom version that is positioned on the edge of the wetland areas, and an extremely minimal, raised dwelling, suitable for one or two people, which would be sited in more exposed areas.

It should be noted that, if the reabilitation were to prove successful, and a productive wetland were created, the presence of cottages may be deemed to be uncompatible with the status of a Provincially Significant Wetland and necessitate application for a variance (Murphy).

# TRANSITORY ZONE



## TRANSITORY ZONES: TYPE C

The transitory zones refer to the E.S.P.A.s themselves. The Blair Creek and the Altrieve Lake and Forest, and the network of wilderness areas to which they connect, represent ecological attractors, the potential climax state of the new ecosystem (Kay 22). They are a repository of locally significant flora and fauna, as well as a source of seeds from plants with the genetic imprint of successful survival in conditions specific to the area. It is hoped that they will disperse naturally into the rehabilitated gravel pit as conditions improve. Moreover, these areas will act as a seed source for new plantings, and certain species may also be transplanted to provide cottage lots with more mature trees during the early stages of revegetation. These areas would be accessible to the cottage community and the public through a network of trails, viewing platforms and rented boats. Full access to the zones will be limited for ecological purposes such as taking inventories of species, harvesting seeds and plants for transplantation, and the like.

## Rehabilitation Sequence

The cottages and their occupants in concert with nature are the essential components that will ensure successful and accelerated rehabilitation of the Blair Pit into a diverse ecological community. The opportunity to participate in the process of ecosystem restoration, and to become an integral part of that ecosystem, is the essence of the idea of *Villa Canadensis*. The process of owners taking possession of individual properties and participating in the rehabilitation process is crucial in the rehabilitation plan. Although the realization of a mature ecosystem will take decades, the transition from disused gravel pit to occupancy will be rapid. The process is here described in five phases.

EARTHWORKS
Heavy equipment will be used to carve out irregular landforms and create varied shorelines. Surfaces will be prepared for planting through ploughing or ripping depending on compaction. Cottage lots will be readied for construction, topsoil will be allocated for areas that will require dense plantings, and stockpiled overburden and waste materials will be redeposited above and below the waterline to create appropriate wildlife and fish habitat.

INFRASTRUCTURE
This phase is concerned with the construction of water control infrastructure, transportation and access infrastructure. Weirs and berms will be constructed to control drainage during contruction and control the final water level, as well as the periodic drawdowns that are essential to wetland function. Peripheral road and parking areas will be laid out and graded and a network of raised compacted pathways in the embedded zone will be formed.

CONSTRUCTION:
Cottage construction will proceed according to the criteria described for each cottage type. Bridges and raised platforms for access to embedded Type B cottages will be contructed, as well as raised pathways, bridges, and viewing platforms that may be required along the network of trails in E.S.P.A.s.

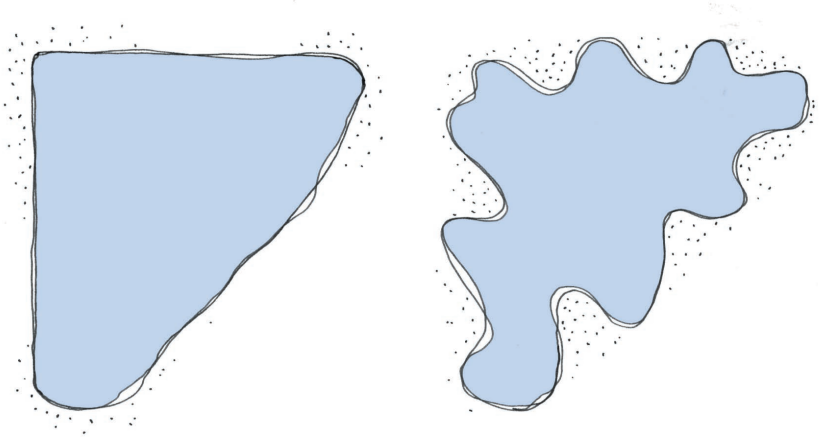
REVEGETATION
Cottage owners will take responsibility for planting and seeding lots, and will assist the transplantation of species from E.S.P.A.s. Marshlands will be spread with mulch and seeded, at which point cottage owners will be able to begin transplanting vegetation.

STEWARDSHIP
This phase consists of the ongoing responsibilities of cottage owners, which will include monitoring, continued planting, weeding, pruning, fertilizing, mulching, and so on.

EARTHWORKS: 12 months

Zone A: The peripheral zone exhibits the most drastic effects of excavation; it is in effect a *tabula rasa*. The Ontario Pits and Quarries Control Act legislation requires that upon closure of gravel pits, slopes be graded to 3:1. An irregular terrain is preferable because it will create a variety of ground conditions that is supportive of a greater diversity of wildlife. Continuously graded, straight-line slopes would also be avoided because they would create exposed and undesirable siting for cottages. For peripheral cottages, material would be pulled from the centre of each lot and spread to sides and towards the shoreline. This will provide the dual benefit of privacy and shelter for individual cottages, as well as extending and adding variety to the shoreline. The number of pairs of waterfowl a pond can support is directly related to the length of its shoreline (Michalski et al 26).

Material moved from the centre of each lot will also be used to embed the north side of each cottage, according to the aforementioned cottage design criteria, to provide additional insulation against heat loss and protection from prevailing winds. This higher ground will be naturally drier, and thus suitable for patches of coniferous trees that will eventually provide a wind and privacy screen for the northern side of each cottage. Correspondingly, the basin created in the centre of each lot will be suitable for deciduous plantings that require more moist soils. Material stockpiled during the excavation of the gravel pit will be distributed to add diversity, with topsoil allocated in concentrated areas for plantings, and large boulders providing habitat for wildlife as well as shelter for fish along the shoreline.



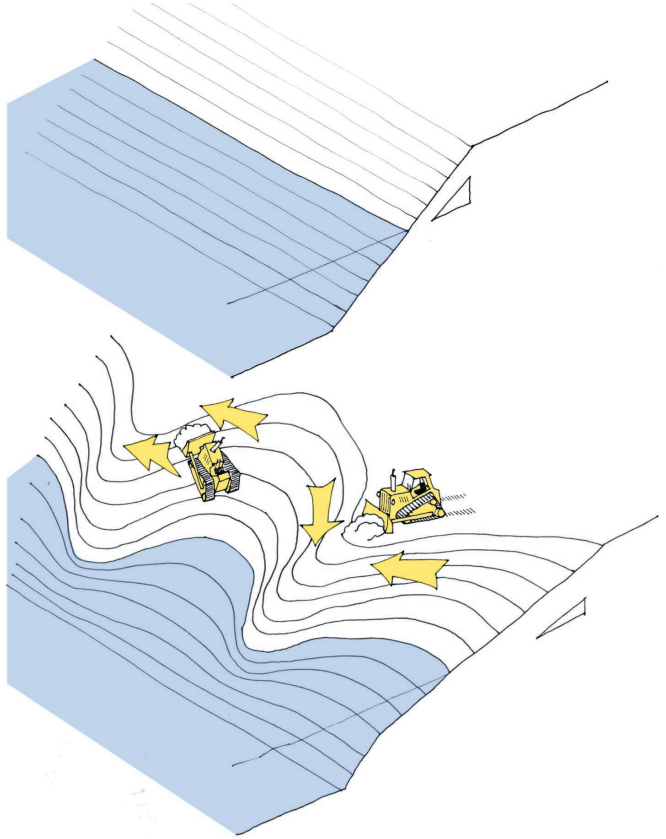


Fig. 130 | Heavy earth moving equipment will sculpt the shoreline to provide earth sheltering and privacy for cottages, enhance the water retention capacity of the terrain, and create a variety of on-shore and shoreline conditions.

Fig. 131 | Extending the shoreline increases the numbers of species, for example pairs of ducks, that are able to inhabit a pond or lake.

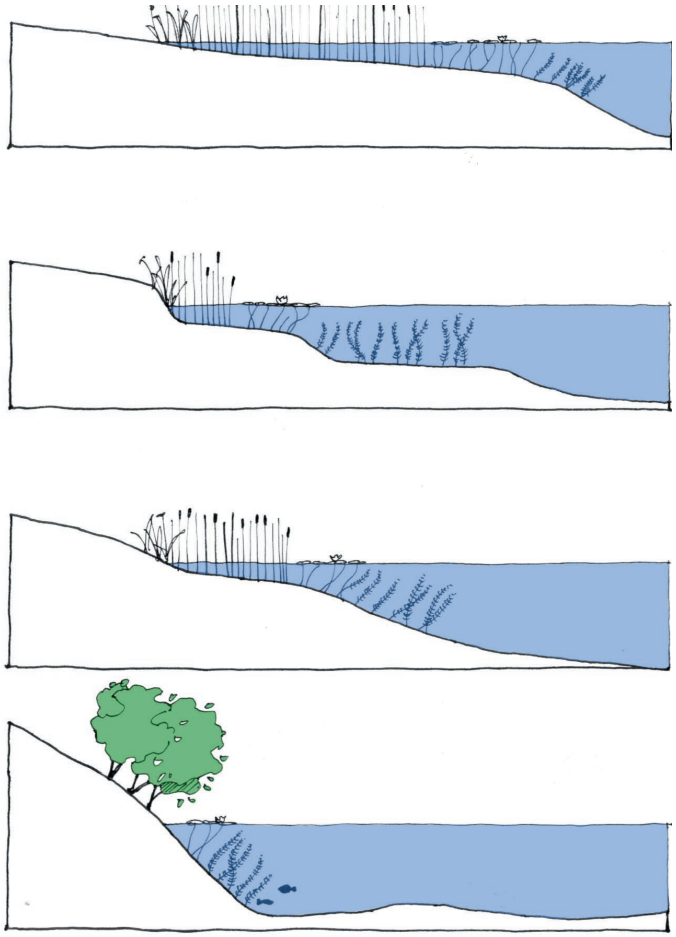


Fig. 132 | A variety of shoreline conditions is cricial for encouraging a diversity of plants and animals.

Sculpting the shoreline creates better potential for diversified biological communities. As well as extending the length of the shoreline, a gradual slope and the widening of nearshore zones is beneficial to wildlife and waterfowl diversity. The ideal slope of 20:1 that is suited to ducklings which cannot easily cope with steep banks (Michalski et al 26) is not possible given the lack of lot depth and unavailability of excess material along the peripheral cottages, but, wherever possible, an extended shoreline zone will be created in order to support "a distribution of plant communities, from wet meadows, through emergent and floating aquatic zones, to the submerged plants of waters 1.5 metres or more deep" (see fig. 17). "Shallows, or nearshore zones up to 1 metre deep, provide habitat for emergent plant growth and insect colonization. Sunlight can penetrate to the bottom and favours high biological productivity"(Michalski et al 22). Wherever there is an abundance of material on the site, the shoreline will be expanded in order to create extensive shallows. On steeper slopes this area will necessarily be compressed and diversity hindered. However, these steep sections of shoreline, especially when planted with overhanging trees that cast shade over the water, provide excellent habitat for fish like bass and trout. Islands will be created where an abundance of material is available. They will be designed to be suitable for loafing waterfowl, and shaped to provide shelter from prevailing winds and an extensive shallow area for dabbling.

Pond bottoms will have a varied topography. To achieve this a variety of substrates, such as boulders or gravel, will be deposited unevenly to create a "mosaic" of underwater habitat and good spawning conditions for certain species of fish such as trout and smallmouth bass (Michalski 32).

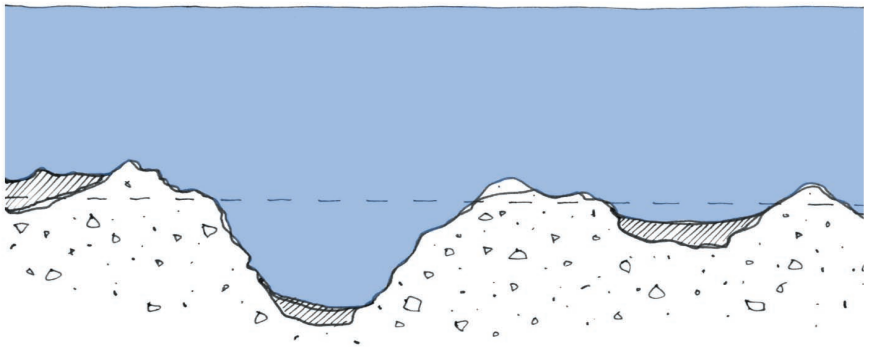


Fig. 133 | Pond bottom topography is varied to allow for a variety of plants and habitats for fish

TYPE B: The flat areas of the embedded zones require minimal landforming, but since the entire area is to become marshland, material that would have remained above water level will be redistributed to create extensive, shallow nearshore zones ideal for waterfowl. These embedded areas were previously central and active areas of the gravel pit, and compaction from heavy machinery would be severe; however, where ploughing or ripping might have been used to allow plant root penetration, the compacted gravel prevents water penetration and should make an ideal foundation for the marsh above it. Channels would be dug along certain pre-determined paths to provide areas of deeper water, so that the marshland will be interspersed with open water to provide access for boats. As in Type A, stockpiled topsoil could be allocated in concentrated piles rather than spread evenly, again to create diversity.

TYPE C: The E.S.P.A.s are unaffected.

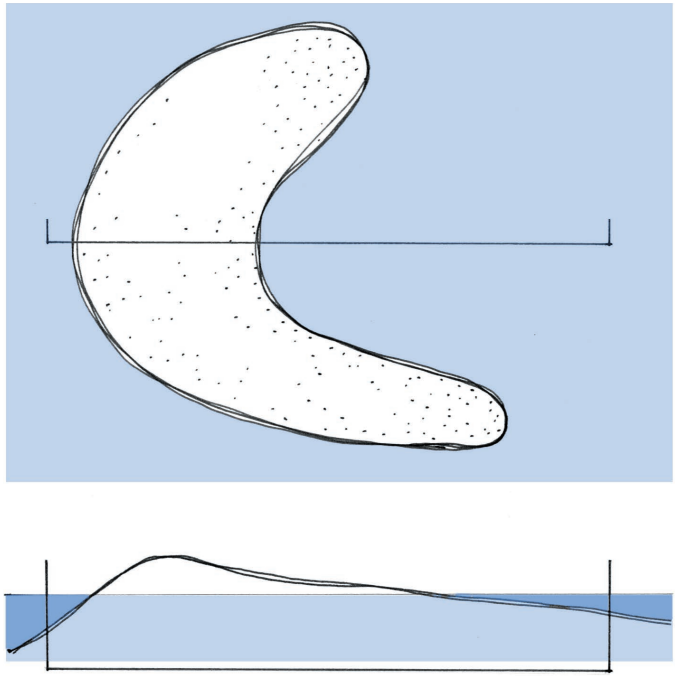


Fig. 134 | Islands are graded to provide shelter for waterfowl and magageable grades for ducklings.

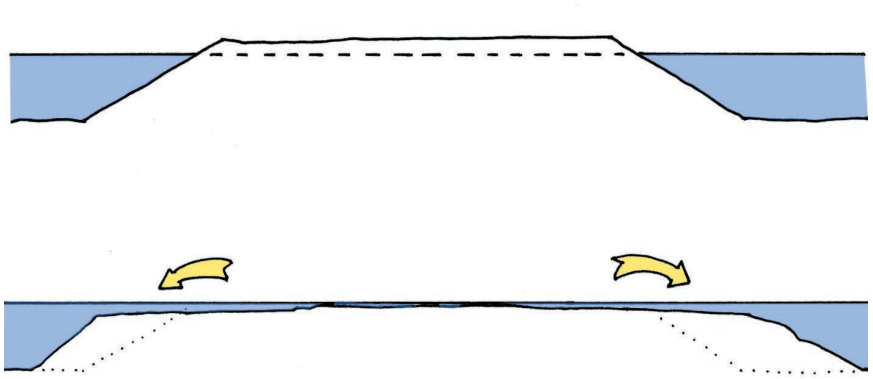
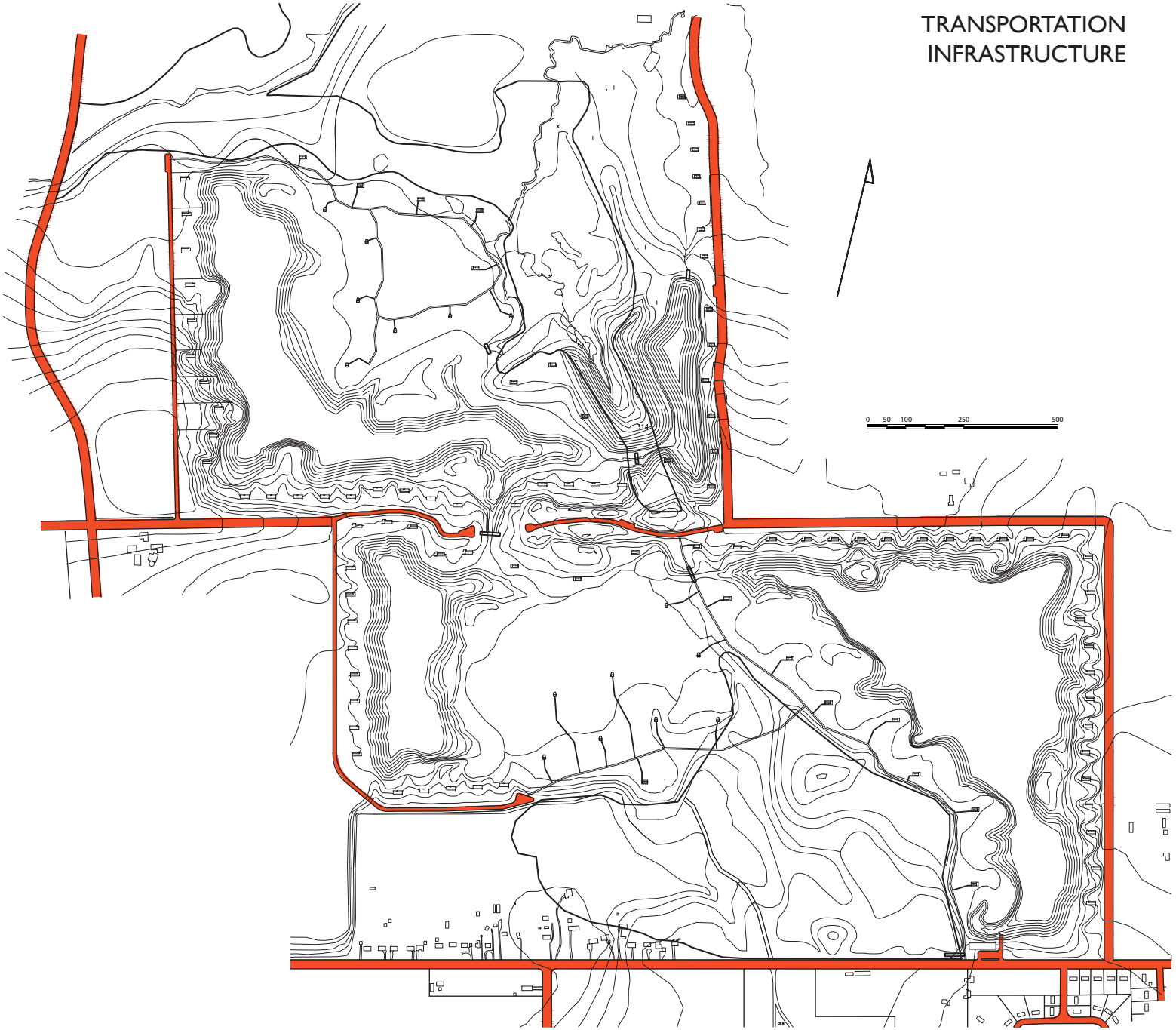


Fig. 135 | Material above waterlever is redistributed to create extensive shallows ideal for waterfowl.

# TRANSPORTATION INFRASTRUCTURE



INFRASTRUCTURE: 12 months

Zone A: New gravel roads are required along lengths of the site perimeter to provide access to peripheral cottages. Parking for cottages will be along the roadside, and a minimal driveway will be provided to ensure that the continuity of vegetation along the perimeter of the site is interrupted as little as possible. Cottages will be accessed by footpaths.

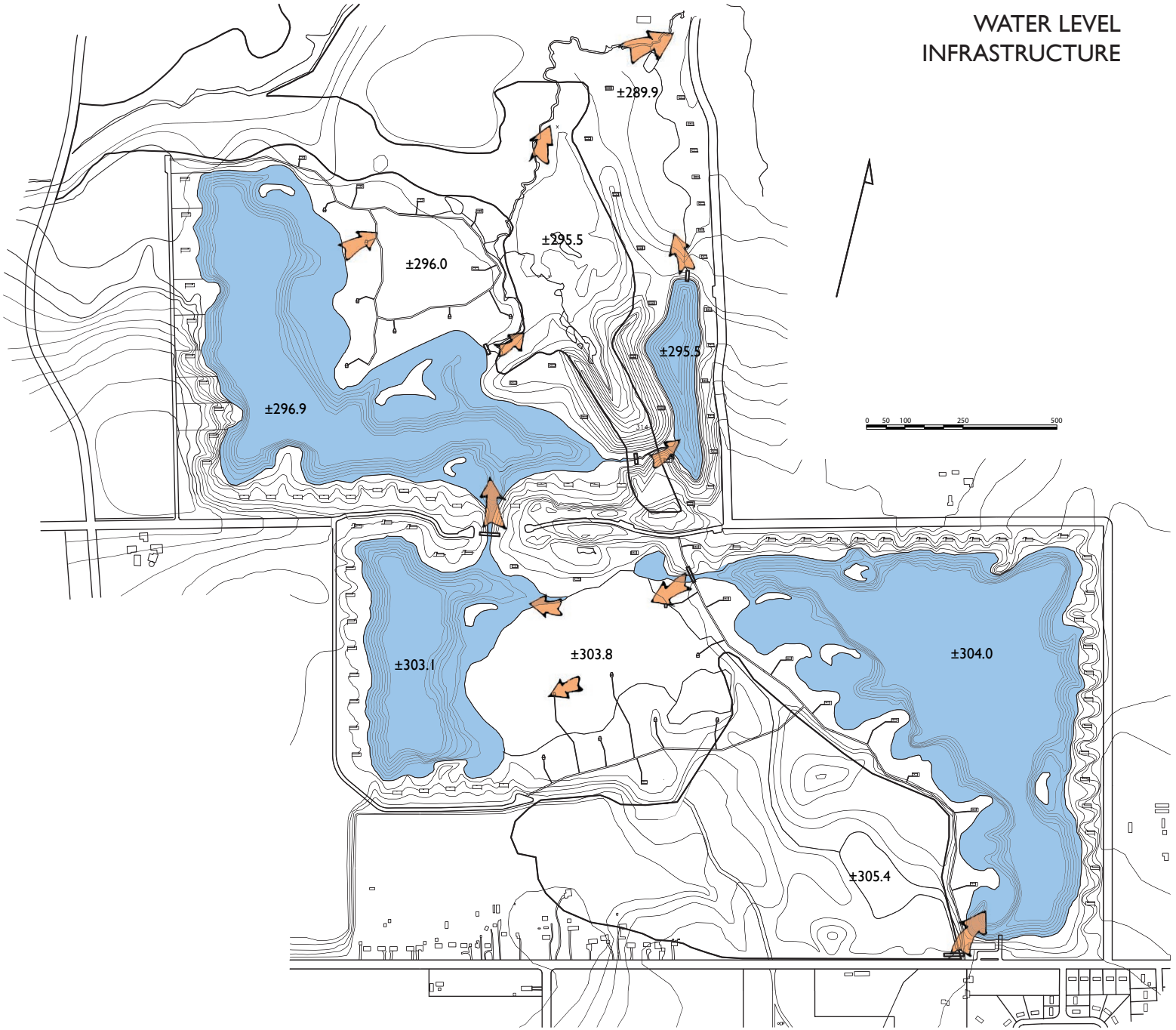
Zone B: Embedded cottages will be accessed on foot, and parking areas will be located at the beginning of paths that encircle the marshland areas. The paths will be wide enough to accommodate a vehicle, should the need arise, but are intended mainly for pedestrian use. These paths will consist of gravel beds raised above the uppermost water lever of the marshland, with submerged pipes buried intermittently beneath the path to allow waterflow.

Boardwalks will be used along more exposed stretches, to prevent paths from impeding the flow of water, fish, and other wildlife.

Zone C: The internal haul route will be removed from the Altrive Lake and Forest E.S.P.A..

Fig. 137 | A network of raised pathways will allow pedestrian circulation through wetland areas and provide access to Embedded cottages.

# WATER LEVEL INFRASTRUCTURE



## WATER LEVEL INFRASTUCTURE

The health of the wetlands is dependant on natural cycles of flooding and low water levels. Groundwater fluctuations follow similar cycles as surface waters, with highest levels in spring and fall, but the degree of fluctuation depends on the character of the aquifer. Annual ranges of up to two metres are not uncommon. It will this be necessary to establish a system of weirs to maintain water levels across the site, and to allow periodic drawdowns of up to two metres. "Drawdowns aerate the sediments in wetlands and aid in the release of essential plant nutrients once the pond is flooded" (Michalski et al 28). It is also essential that a stable water level be maintained during waterfowl breeding seasons (Michalski et al 10). Stoplog water control structures are simple and widely used. Constructed of reinforced concrete, they consist of "U" shaped metal channels that are installed on either side of an opening, where wood or metal logs are stacked to the desired elecation in order to determine the water level (see figure 139) (Hammer 203).

The site slopes naturally downwards to the north. Bechtel Creek linked the E.S.P.A.s at one point, but its flow was interrupted by activity in the pit and the inversion of the site's topography. The rehabilitation plan calls for a redirection of flow, so that water is directed through the new wetland adjacent to the Altrieve Lake and Forest and into the southwest pond, where its flow into the northwest pond will be regulated by a weir. From the northwest pond, it will gradually leave the site after passing either through a new rehabilitated wetland, or into the northeast pond and, thence, into a wet meadow. Through either path, it will eventually rejoin the Bechtel Creek.

Weirs will also act as access points and bridges to the pathways that service the embedded areas of the site. Water levels will be controlled during construction so that the piles for embedded cottages and infrastructure can be set.

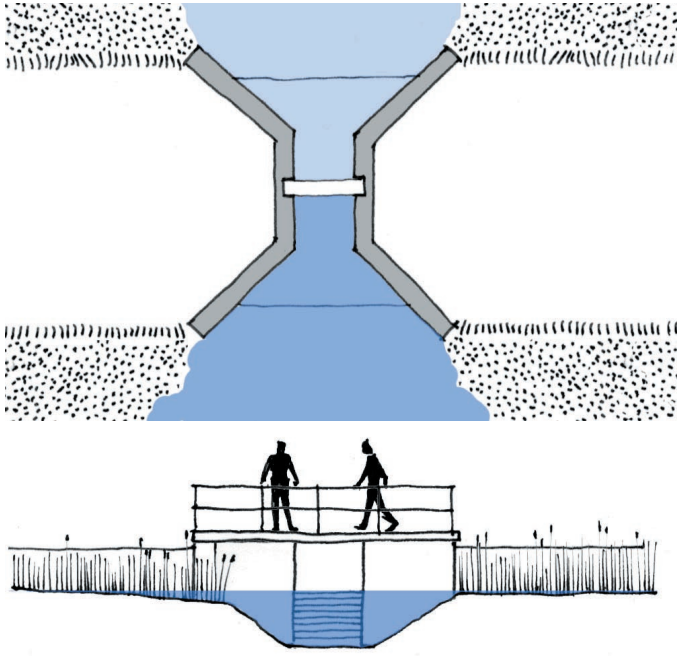
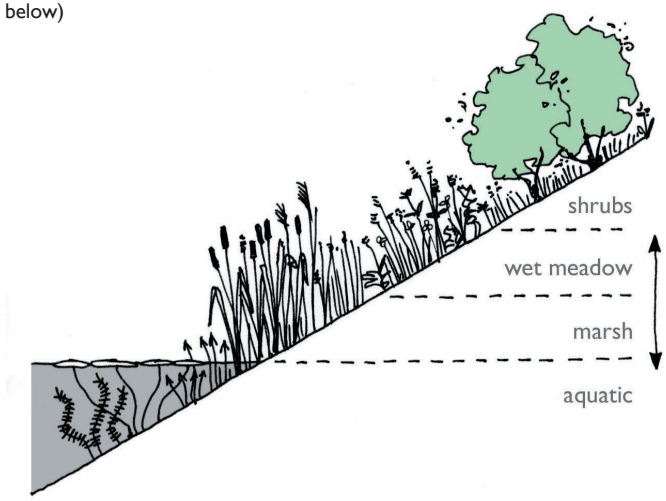


Fig. 139, 140 | Stoplog dams are simple and affordable and allow changesin waterlevel that are required by the various communities in the wetland (see below)



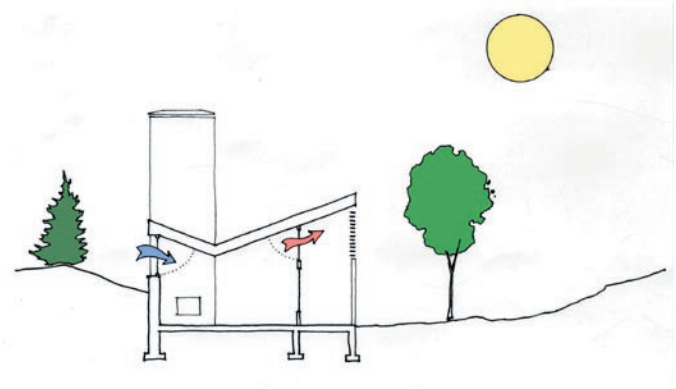


Fig. 141 | Summer shading diagram. Bris-soleil and deciduous plantings on the south side of the cottage provide shade. Generous operable windows allow cross ventilation. Thermal mass created by earth sheltering helps keep the cottage cool

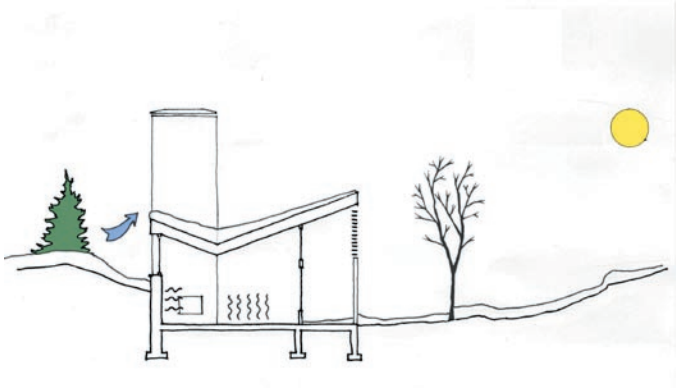


Fig. 142 | Winter heating diagram. The north facing windows can be shuttered and earth sheltering and coniferous plantings help reduce heat loss. Roof pitch corresponds to the end of the cooling season. Deciduous trees drop their leaves and allow low light to penetrate. Thermal mass retains heat from solar gain.

## COTTAGE CONSTRUCTION

The construction of the cottages should take place simultaneously in order to minimize the duration of the impact of the construction process, and to ensure that occupancy can take place as soon as possible. The completion of the construction process will mark the beginning of human participation in the new ecosystem.

### TYPE A - Peripheral Cottages - Design Criteria.

The perimeter of the site is isolated from the protected E.S.P.A. communities, but demands the most ambitious reconfiguration of the topography - the sculpting of individual lots to create areas for cottages, which in turn helps lengthen the shoreline and add a variety of edge conditions. This would encourage the cultivation of a productive shoreline and aquatic ecosystem. Cottages and their immediate surroundings would act as building blocks of the new terrain, whose abiotic qualities enhanced to encourage the succession of certain species. Before construction, each lot is sculpted to create a sheltered area for the cottage. Because the depth of the lots, from the shoreline to the edge of the gravel pit site, is so narrow, human intervention is needed to encourage a wooded environment for the cottages. Deciduous plantings are coordinated to provide summer shade on the south face of cottages, and coniferous trees on the north to add protection from wind in the winter. The chief ecological focus is the shoreline ecosystem, which in turn encourages a rich diversity of species in the lakes.

### TOTAL NUMBER OF COTTAGES: 75

### CRITERIA:

-year round use
-appropriate design for families (2 bedrooms with sleeping for up to 8) (120 s.m. or 1100 s.f.)
-60m / 160ft wide lots.
-vehicular access by common roadway, parking at roadside.
-individual lake access (no motorized watercraft permitted)

-power supply comes from the electrical grid, with an option for supplemental wind and solar power

ARCHITECTURAL PERFORMANCE (interaction of the cottage with its environment):

-earth forming and foundations act as retaining walls to create terraces, encourage water retention, early soil production, and growing conditions for larger, transplanted trees
-rooftop rainwater collection, water to be stored in cistern (see figure 126)
-grey water recycling
-orientation, elevation, and site topography reconcile passive solar heating (storage in thermal mass) with the desire for views of the lake
-extensive natural ventilation
-retaining walls provide habitat for rodents, wasps, etc.
-high-efficiency wood-burning fireplaces
-composting toilets
-electricity from grid with option for supplemental wind or solar power

BIOLOGICAL PERFORMANCE (biotic conditions):

-planting corresponds to winter wind protection and solar gain, and summer shading and cross ventilation
-variation of slope and shoreline for increased fish and wetland habitats
-rainwater collection, recycling of grey water for watering during dry periods
-perforated retaining walls provide habitats

HUMAN PERFORMANCE (human interaction with cottage and environment):

-planting, stewardship, weeding of invasive, foreign species (eg. purple loosestrife)
-surveying and recording of species (birdwatching, noting mammals, fish, amphibians etc., participation of monitoring site [eg: measuring water clarity, pH])
-maintenance of artificial habitat (eg. birdfeeders, nesting boxes, brush piles, etc.)
-composting and mulching
-growing and transplanting seedlings

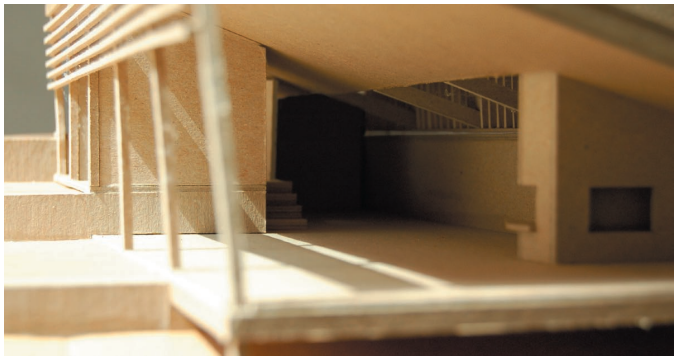


Fig. 143, 144 | Solar study model showing summer shading and winter sunlight penetration

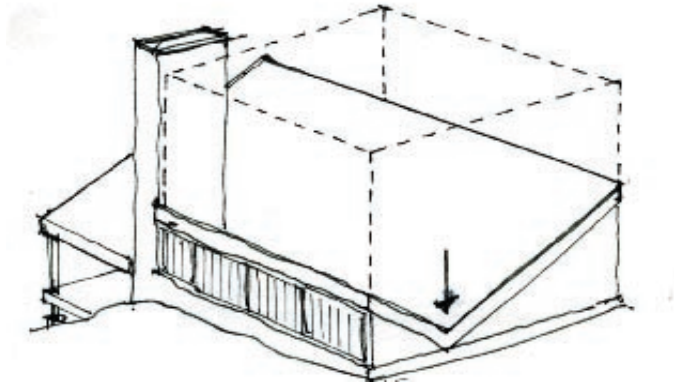


Fig. 145 | Catchment are for rainwater, to be stored in interior cistern

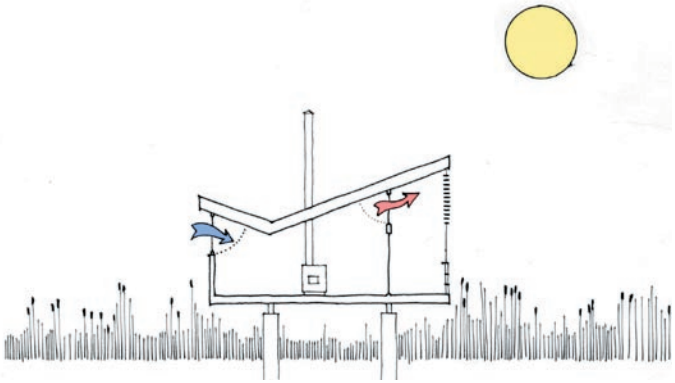


Fig. 146 | Summer shading diagram. Bris-soleil on the south side of the cottage provide shade. Generous operable windows allow cross ventilation.

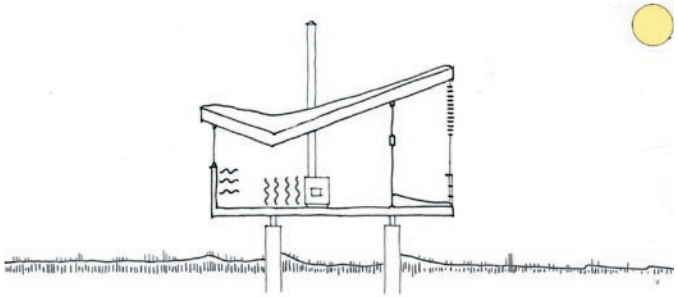


Fig. 147 | Winter heating diagram. The north facing windows can be shuttered to prevent heat loss. Roof slope allows sunlight to penetrate, surfaces absorb heat during the day to be radiated at night.

TYPE B - Embedded Cottages - Design Criteria

Areas adjacent to the E.S.P.A.s will be rehabilitated to create wetlands similar to those found in the Altrieve Lake and Forest. The small size of the wooded area of the Blair Swamp E.S.P.A. means that it is probably in a state of decline (Murphy). The potential productivity of a marshland, in terms of the variety of plant and animal species on the ground as well as a site of migratory birds, makes it a more desirable goal. The porosity and delicacy of this nascent ecosystem would demand sensitive infrastructure. Circulation would be confined to narrow, raised berms that act as pathways across the terrain, with light wooden bridges and boardwalks crossing areas of marshland which are necessarily deeper. Cottages will rise above the landscape on pilotis and avoid as much as possible obstructing the process of succession.

NUMBER OF TYPE B COTTAGES: 34 (regular) + 15 (minimal) = 49
CRITERIA:

-year round use
-2 bedroom cottages (sleeping for up to 6) (72 s.m., 650 s.f.)
-common peripheral parking areas, cottages serviced by pathways (trolleys available) some cottages might also be accessible by canoe or rowboat through channels throughout the wetland.

ARCHITECTURAL PERFORMANCE (interaction of the cottage with its environment):
-minimize contact with the ground in order to not disturb wetland development, and maximize proximity to wetland
-self. contained water, waste, energy
-composting toilet.
-grey water recycling, rainwater collection
-passive solar heating (orientation) – panoramic views (but seasonal solar gain / shading is optimized)
-auxiliary energy from solar panels, wind turbine…
-high efficiency wood stoves
-connected to electrical grid with option for supplemental solar or wind power

BIOLOGICAL PERFORMANCE (biotic conditions):

Wetland to consists of a variety of terrain:
-dry, raised areas
-partially submerged areas
-channels for navigation etc.
-water level controlled by wiers bordering the lake (input) and Blair Creek (output)

HUMAN PERFORMANCE (human interaction with cottage and environment):

-stewardship, planting, seeding (during initial phase) discouraging foreign, invasive species.
-surveying and recording (birds, mammals, fish insects)
-sampling water clarity, pH etc.
-activities include canoeing, boating, birdwatching

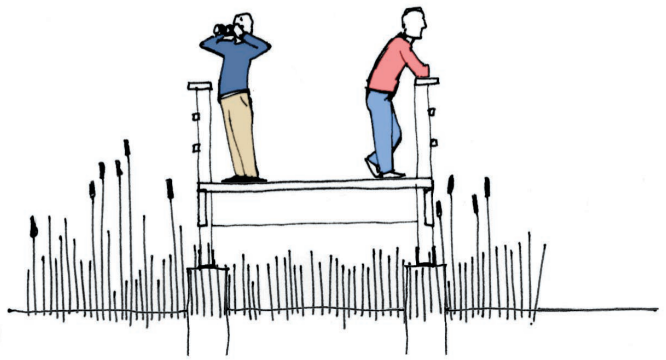


Fig. 148 | Wetlands will be traversed by raised trails and boardwalks

TYPE C - Transitory Zone - Design Criteria

The Environmentally Sensitive Policy Areas will be accessible to visitors, with the infrastructure required to provide this access being designed and constructed so as to reflect the significance of these ecosystems and their function as shelters for wildlife and as essential sources of genetic material for the colonization of the rest of the site. Built structures such as elevated walkways and viewing platforms will reflect this sensitivity and be lightweight and delicate in order to minimize human disturbance. Viewing platforms will be minimal and offer only temporary occupancy, for daytime activities such as hiking, birdwatching, and educational tours. The ecosystems and communities in the Transitory Areas are the models and source of the species that should eventually cover the entire site, so they are be protected.

ARCHITECTURAL PERFORMANCE:

Depending on terrain:

-elevated pathways, bridges over streams, pathways on grade, or pathways on berms.

-access to wiers, along berms where possible
-occassional rest areas, viewing platforms, seating / picnic areas (pack in + pack out)

BIOLOGICAL PERFORMANCE:

-passive / transitory. Observation ….some seed collection., tours with ecologists…painting / photography etc.

HUMAN PERFORMANCE (behaviour):

-confinement to set pathways
-picnic / rest areas (pack in/pack out)

Fig. 149. 150 | The boardwalk and viewing platform at The Sifton Bog, in London, Ontario give an example of the proposed network of pathways

PRIMARY SUCCESSION

- bare gravel
- colonising species like lichens and mosses

- species characterized by small, widely dispersed seeds, high growth rate, small size, fast population growth

PIONEERING SPECIES

- thin soil with low nutrient levels
- annual grasses, legumes, and weeds

- sun-adapted, shade intolerant, fast growing

HERBACEOUS PLANTS AND WEEDS

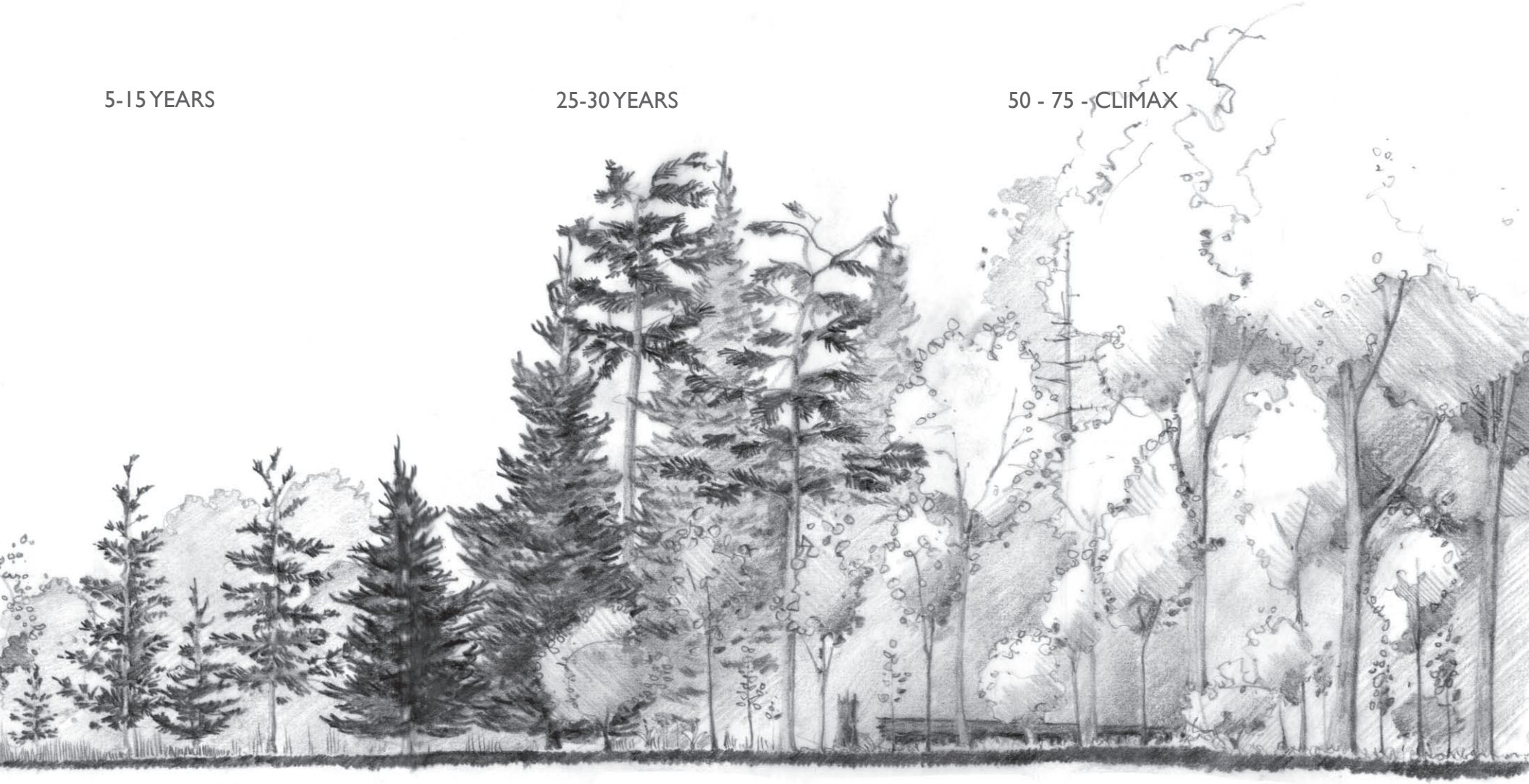
- soil bound by roots and plant cover
- plant cover and humus helps retain water
-biennial plants and grasses, some shrubs

- sun adapted, shade intolerant

5-15 YEARS

25-30 YEARS

50 - 75 - CLIMAX



SHRUBS AND PINE SAPLINGS

- formation of forest canopy; shade excludes sun-loving perrennial herbs and shrub species
- more humid microclimate and soil litter level allows for germination of hardwood species which tolerate lower light levels
- species with longer life span, ability to reproduce several times

YOUNG PINE FOREST

- shade tolerant hardwood species grow in understory
- hardwood species like oak and hickory better-able to replace softwood species, which have a shorter lifespan

MATURE HARDWOOD FOREST

- as softwood dies out gaps are filled by sub-dominant hardwood
- site gradually dominated by species with much longer lifespan, over 100 years

## REVEGETATION

A site-wide strategy will govern the revegetation process and the allocation of specific species. Seeds and nursery stock will be made available to cottage owners, as well as some species transplanted from the E.S.P.A.s. It will be the responsibility of each cottage owner to plant and tend to new trees and shrubs, though assistance would be organize through the site manager and co-operation with other cottage owners.

Zone A: Revegetation will balance natural successional regeneration (see Fig. 150) with active plantings. On its own, successional rehabilitation provides a limited range of plant life, all at a similar stages of an ecosystems development which in turn limits the number of birds and wildlife that will visit an area, described by Street:

"if a gravel pit is left to colonise naturally and is allowed to develop without control, the result is the establishment of a plant community which is dominated by only a few species, with a low floral diversity. It has been shown that the number of bird species an unmanaged gravel pits declines after 5 or 6 years due to the increase in uniformity of vegetation as naturally vigorous plant species become dominant." (quoted in Michalski et al 28)

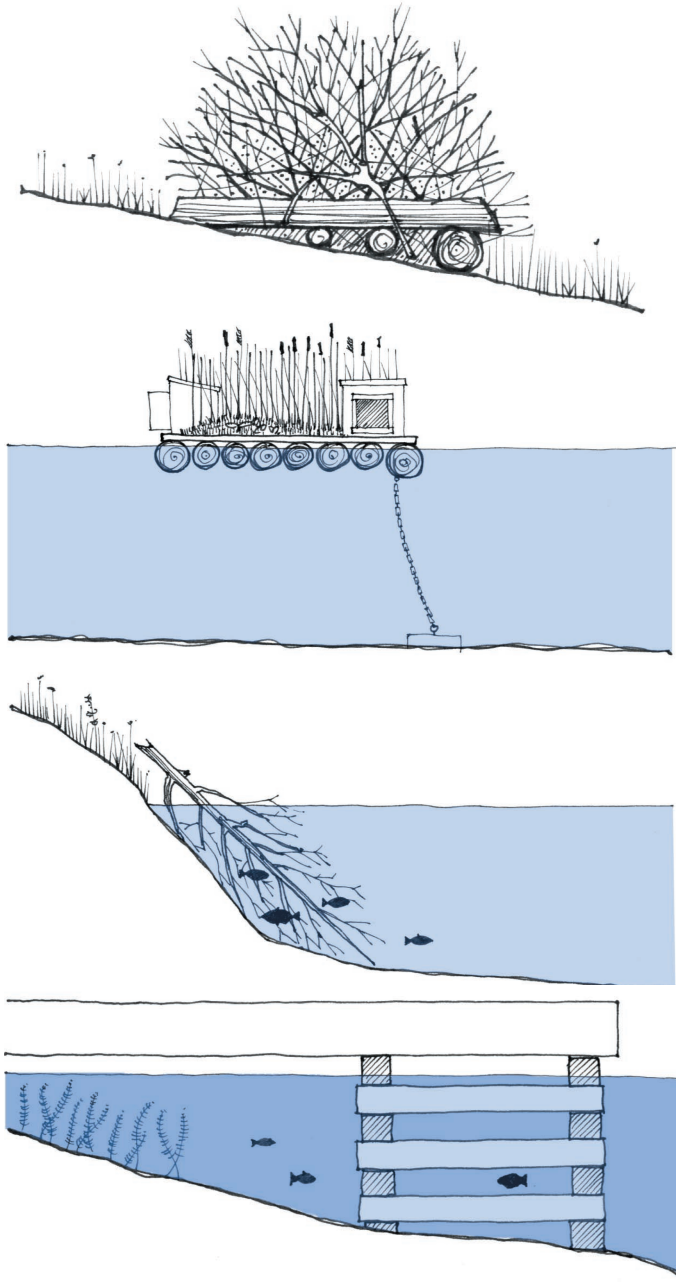
"After a large scale mining operation, the structure, water retention capacity, chemistry and microorganisms in the soil are drastically altered" (Michalski et al 28) The first goal will be to plant species that help prevent erosion and encourage the creation of productive topsoil, namely fast growing grasses, like mustard grass and sedge. Where good topsoil and overburden is available, it should be dedicated to clumps of plantings rather than dispersed evenly across the site, as this provides "patchiness" and increases habitat. "Soil cover should vary in depth, from bare areas to deep topsoil layers. The deeper layers should be placed where trees and shrubs are to be planted. These variations will yield different rates of plant establishment, growth, and succession, and therefore produce a mosaic of plant communities" (Michalski et al 30) "From clumps of initial plantings, natural successional processes will spread across the site." (Michalski et al 31) On peripheral lots, these clumps will coincide with the passive solar heating and cooling of the cottages. More mature deciduous trees will be planted or transplanted on the south side of cottages, to provide shade in the summer and allow sunlight to penetrate cottages when leaves drop in the winter. Clumps of conifers and species that form effective windbreaks should be planted on the northwest side of the cottage, to offer shelter from prevailing winds in the winter, and also provide privacy.

Organic material stockpiled during excavation can also be added to soil for plantings. Composted leaves or muck will increase nutrient accumulation and cycling, water retention and plant root penetration. Timber mulches derived from cleared vegetation can also be distributed to promote soil invertebrates colonization and improve water retention capacity. Fertilizers

should also be applied to redistributed soil to compensate for nutrient losses while it was stock-piled.

Zone B: During the construction phase of embedded cottages, the water level of the pond will be reduced to expose the pit floor so it can be covered with a thin layer of topsoil and seeded with quick growing grasses and legumes. This will provide a root mat, which will help stabilize soil once the area is submerged, and the decomposing grasses will provide nutrients for invertebrates (Michalski et al 35). Once construction is finished, muck - organic soil that contains seedbanks of emergent wetland species - will be distributed systematically across the B areas where wetland plants are desired. Also, clumps of wetland species (cattails, bull rushes etc.) will be transplanted either from the E.S.P.A.s or from off-site, such as Orr's Lake or Barrie's Lake. Cottage owners will participate in this transplanting process.

Zone C: During the revegetation phase, the E.S.P.A.s will play a significant role in providing seeds for distribution in topsoil, as well as more mature species for transplanting. Seed collection and plant transplantation will be managed by ecologists, but cottagers could proceed with seed collection once they have been instructed on practices.



## STEWARDSHIP

Ongoing involvement in the landscape is the essence of the *Villa Canadensis*.

Zone A: The watering and tending to new trees is crucial to their survival in their first few years. Planting of desired species will be ongoing, as will be the fertilizing, mulching, pruning and culling of existing plants. Invasive foreign species should be weeded out regularly. To encourage wildlife diversity, cottagers will engage in creating artificial habitat by distributing brush piles, logs, stumps, boulders, and the like across each lot. These structures provide cover for mammals and insects and offer perching sites for birds. Nesting boxes can be built for birds, and, where desired, floating islands for waterfowl can be installed offshore. Aquatic vegetation will be monitored and managed, and steps may be taken to prevent weed growth, undesirable fish, turbidity, seepage, etc.
As well as monitoring plant species, cottagers will take records of sightings of species birds, mammals, and insects. Fishing will be encouraged, but catch characteristics (volumes, species, lengths, weights) will be recorded to help assess stocking requirements, reproductive success, and the general health of the fish population (Michalski et al 35).

Zone B: Owing to the porous nature of the wetland soils, it will be more difficult to play an active part in ensuring the success of desired species. Additional transplanting will take place if necessary. Cottagers will be able to participate in monitoring bird populations and recording sighting of species, pairs, ducklings, nests, and so on.

Zone C: The health of the E.S.P.A.s will continue to be monitored. The areas will be accessed by trails, but impact will be monitored, kept to a minimum, and periodically suspended if deemed necessary.

Fig. 152 - 155 | Various types of man-made shelter for animals and fish: brush piles, floating islands, trees and branches acting as fish-cover, docks also provide shelter for fish.

# Design Drawings

## INTRODUCTION

The cottage designs fulfill the criteria outlined in the Site Strategy, and suggest a prototypical form for a regenerative cottage. Furthermore, drawings are rendered to show the character of the site after construction and initial rehabilitation is complete, and the process of ecological succession and stewardship is underway.

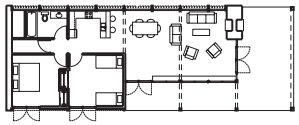
The cottages fall into two main categories, Zone A "Peripheral Cottages" and Zone B "Embedded Cottages." Within those categories each type varies according to orientation and position on the site, as well as usage. There are typical aspects throughout each cottage. The orientation of the cottages maximizes southern exposure and the roof slope is consistent to allow passive solar heating, and corresponds to the beginning and end of the cooling season, from May 15th to September 15th. The south façade of each cottage features bris-soleil that shade porches and the cottage interior, while operable clerestory windows provide cross-ventilation. The north facades are partially buried to provide earth sheltering and reduce heat loss, with operable windows and shutters to provide cross-ventilation in the summer or added insulation in winter months. Strategic plantings of coniferous and deciduous trees along the north and south elevations provide, respectively, shelter from the wind in the winter, and shade in the summer. The organization of rooms provides views of the water while optimizing sunlight penetration into the cottage. The variety of cottage layouts reflects the need to reconcile the demands of optimizing passive solar heating with the demands for views of the landscape, particularly the water, that are an important part of the cottage experience.

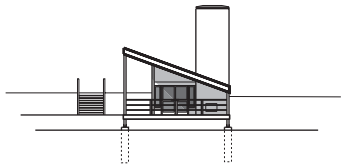
The cottage designs are organized by Type and orientation. Type A – Peripheral cottages include an east / west facing type (whose plans mirror each other, and so are only depicted once), a north facing type and a south facing type. Type B – Embedded Cottages include a Regular cottage intended for a family and traditional use, and a Minimal type that is intended for use by a one or two people for a short period of time.

Each drawing set begins with a portion of shoreline and drawings at a 1:300 scale showing the relationship of cottages to the rehabilitated landscape and to each other. These are followed by detailed plans, sections, and elevations of an individual cottage at a scale of 1:100. The design section concludes with a series of rendered perspectives that show the transformed landscape as it will appear at 5, 10, and 20 year intervals after initial rehabilitation.

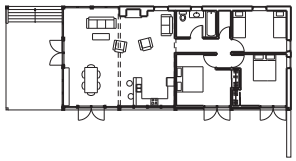
# DRAWING INVENTORY

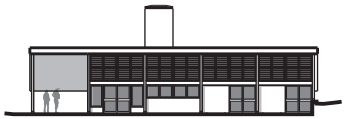
PERIPHERAL EAST/WEST

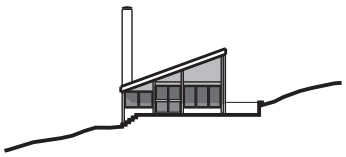




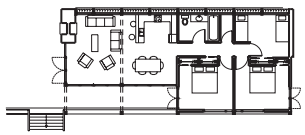
PERIPHERAL NORTH



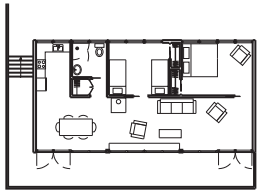


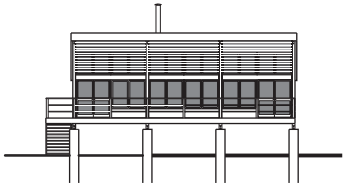


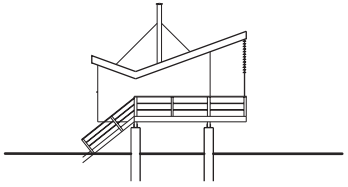
PERIPHERAL SOUTH



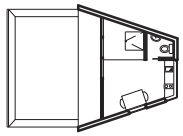
EMBEDDED REGULAR

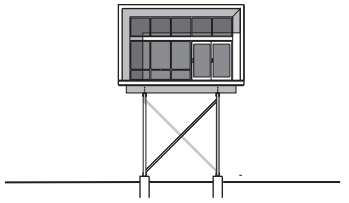


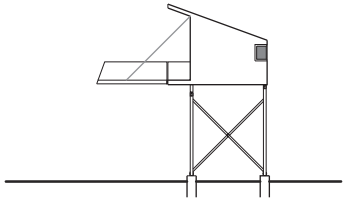




EMBEDDED MINIMAL







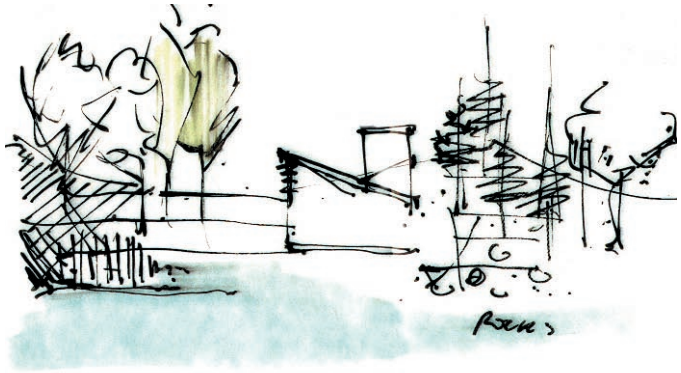
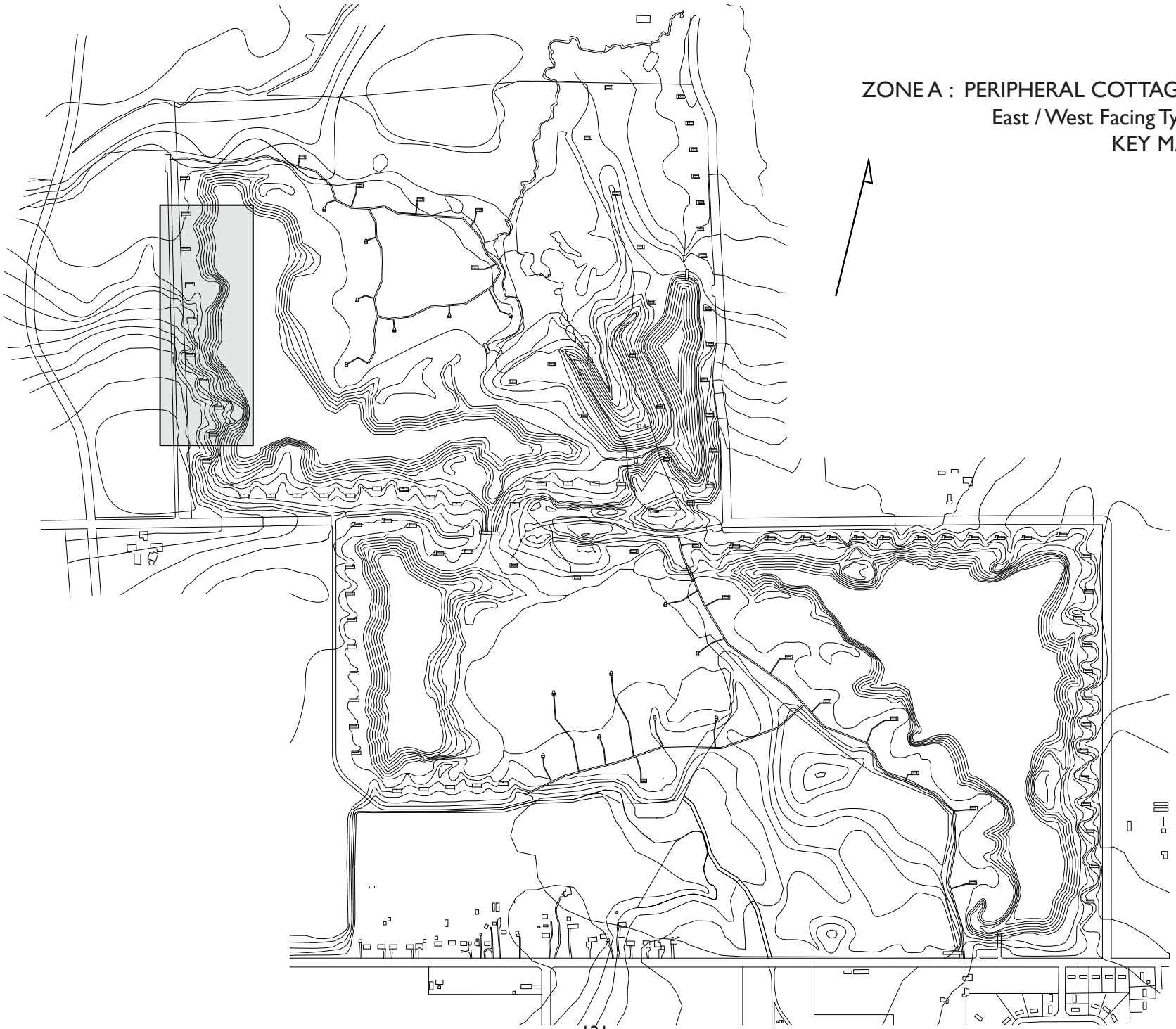


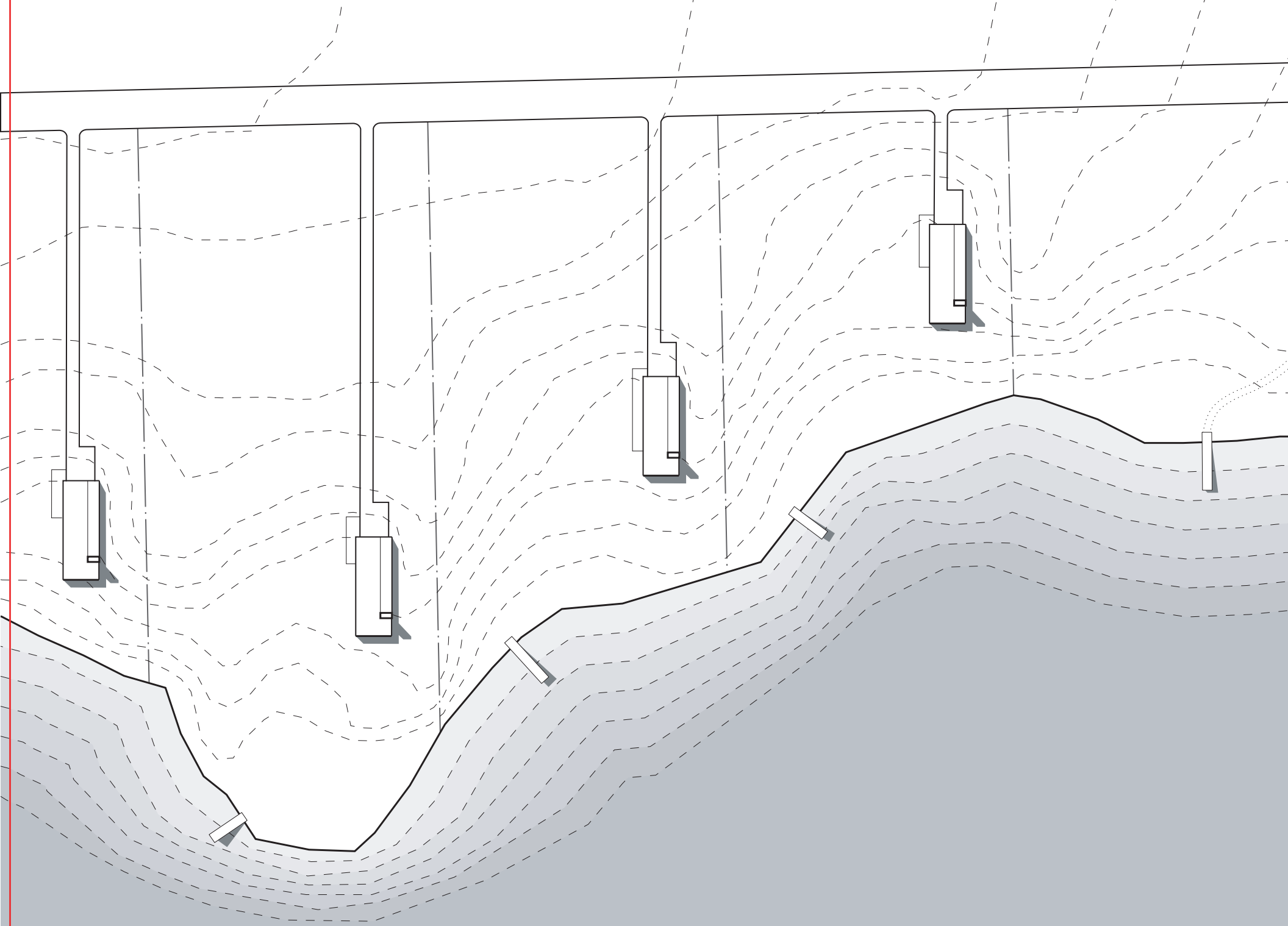
Fig. 156 | Sketch for cottage siting and deciduous and coniferous plantings.

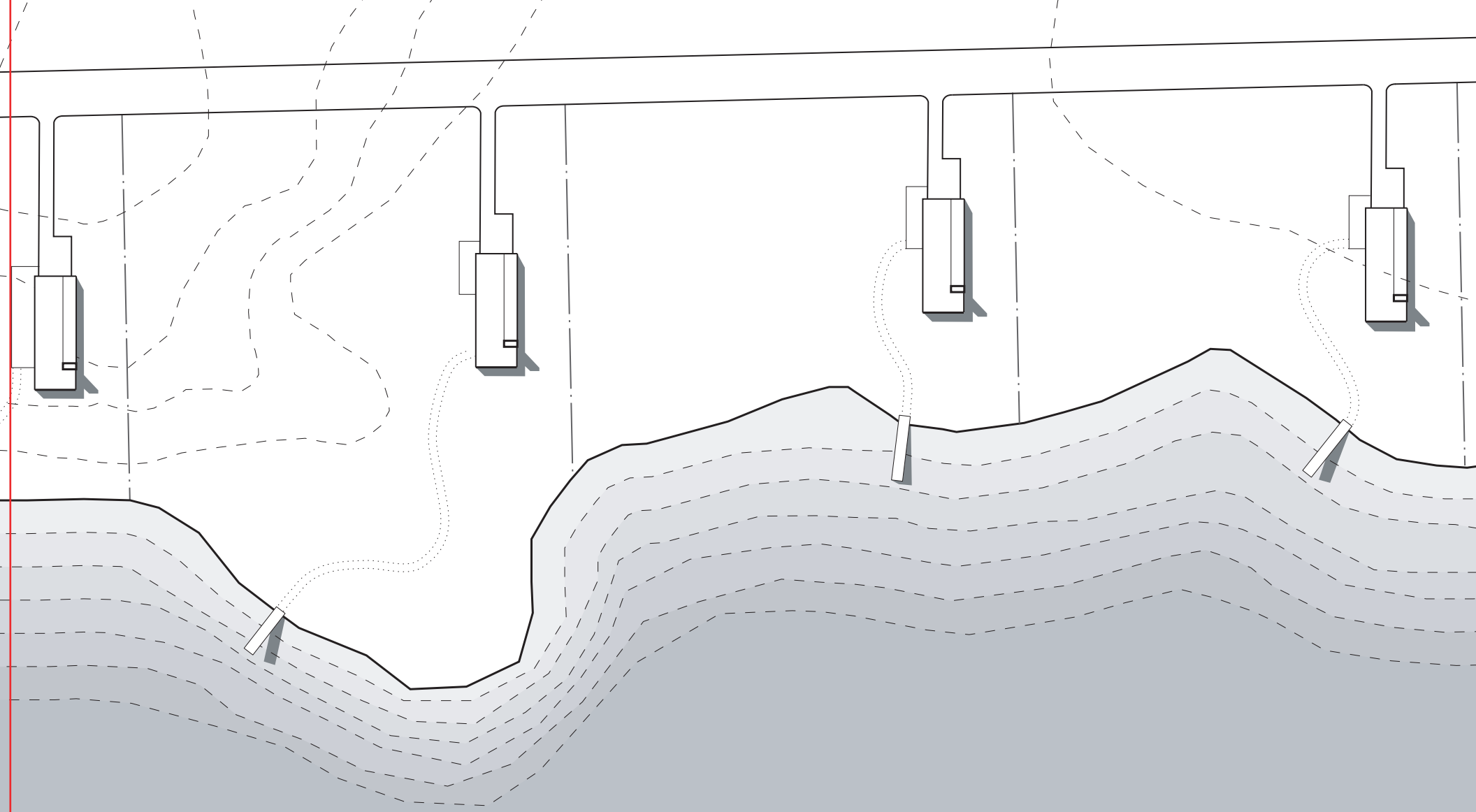
## ZONE A: PERIPHERAL COTTAGE
### East / West Facing Type

Cottages situated on east and west shorelines are oriented to gain southern exposure on the long facade. The south facade features bris-soleil which shade the porch, which wraps around the living and dining room. Half of the north wall is earth-sheltered, the floors and north wall of the cottage act as thermal mass that absorbS solar energy and reduce heating requirements during the heating season. The two bedrooms have double doors that open to the south, and a sliding exterior panel to help reduce heat loss at night. Operable clere-story windows and vents along the top of the interior walls allow cross-ventila-tion. The kitchen and bathroom are located in the north corner of the cottage furthest from the lake. Water collected from the butterfly roof is collected in a cistern inside the cottage and filtered before use.

ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
KEY MAP

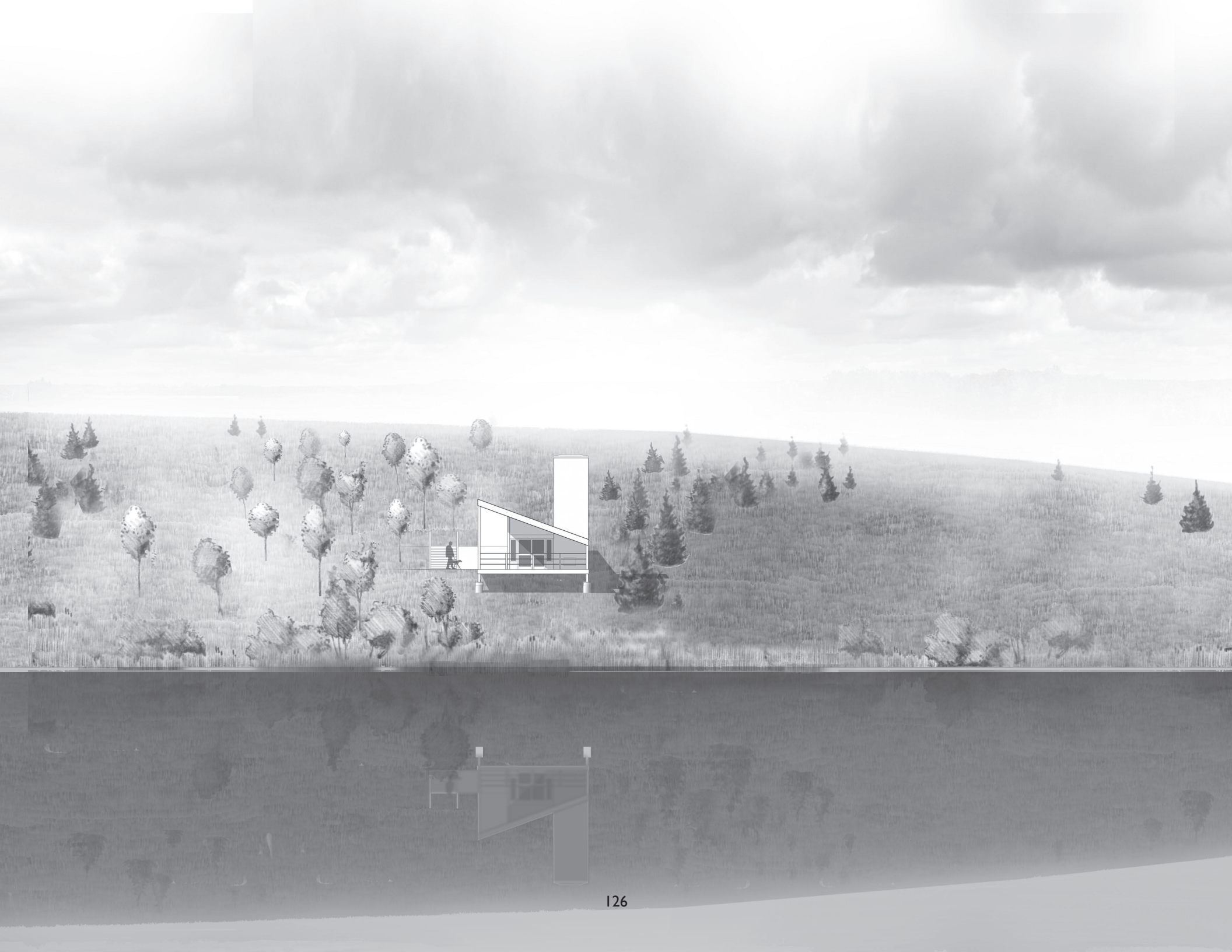


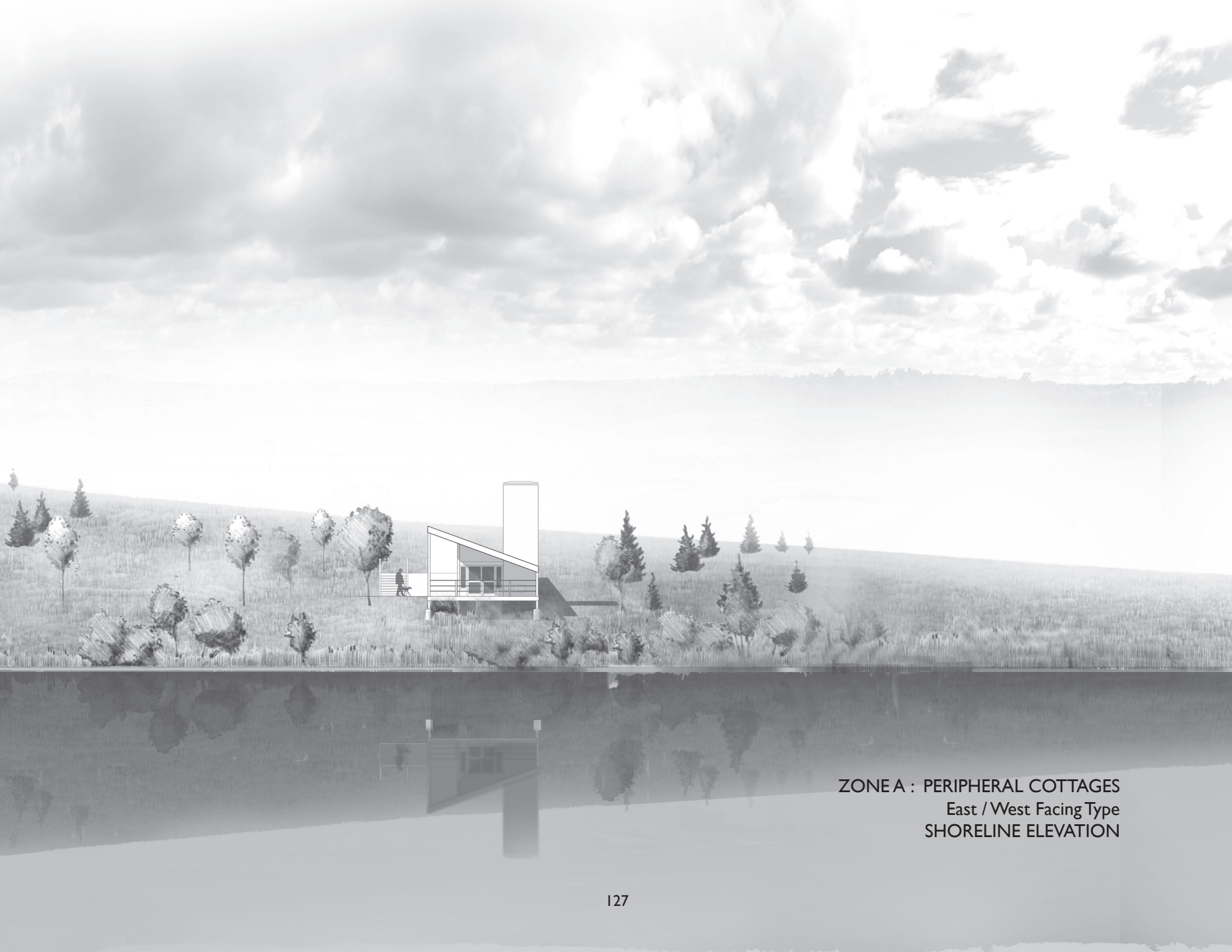




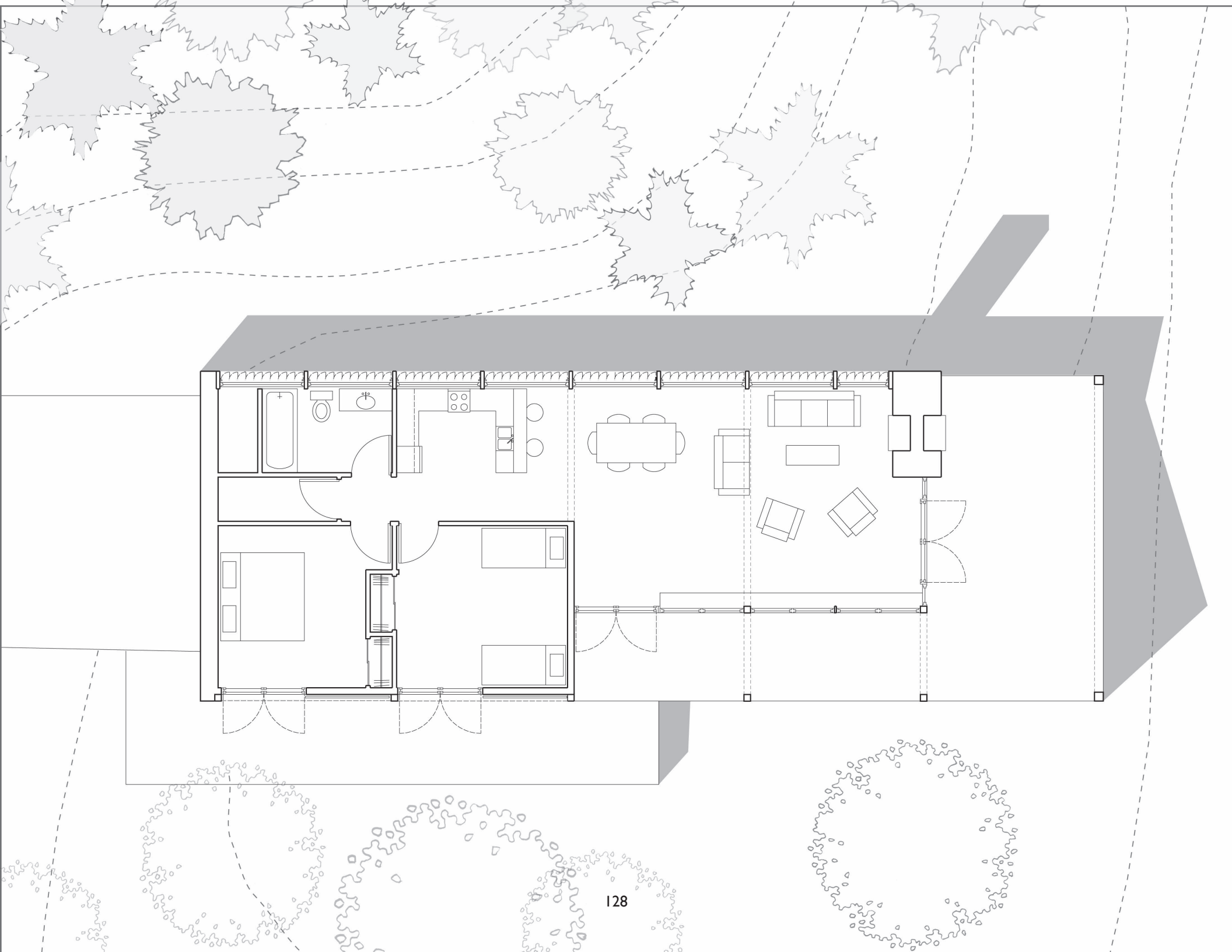
ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
SHORELINE PLAN

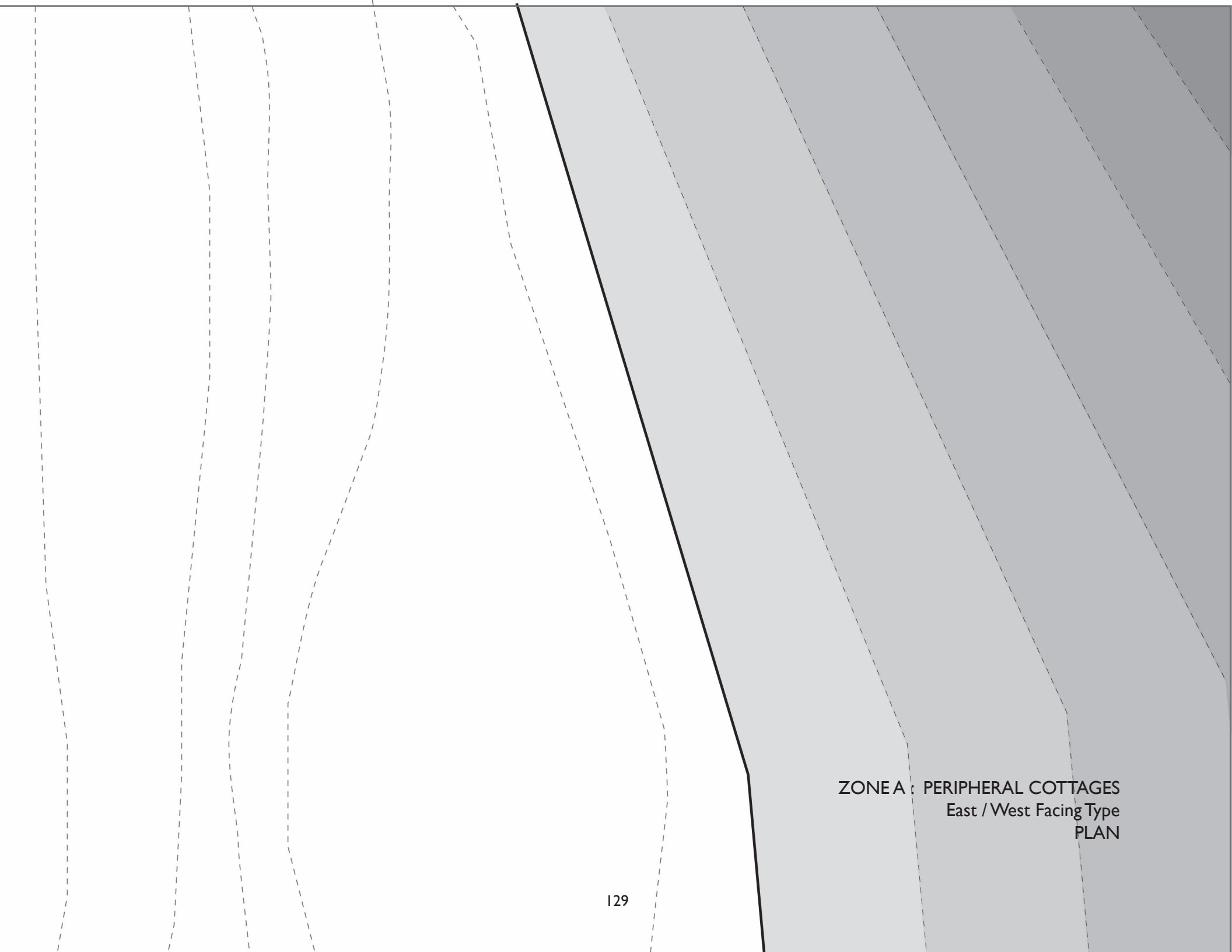
ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
SHORELINE SECTION



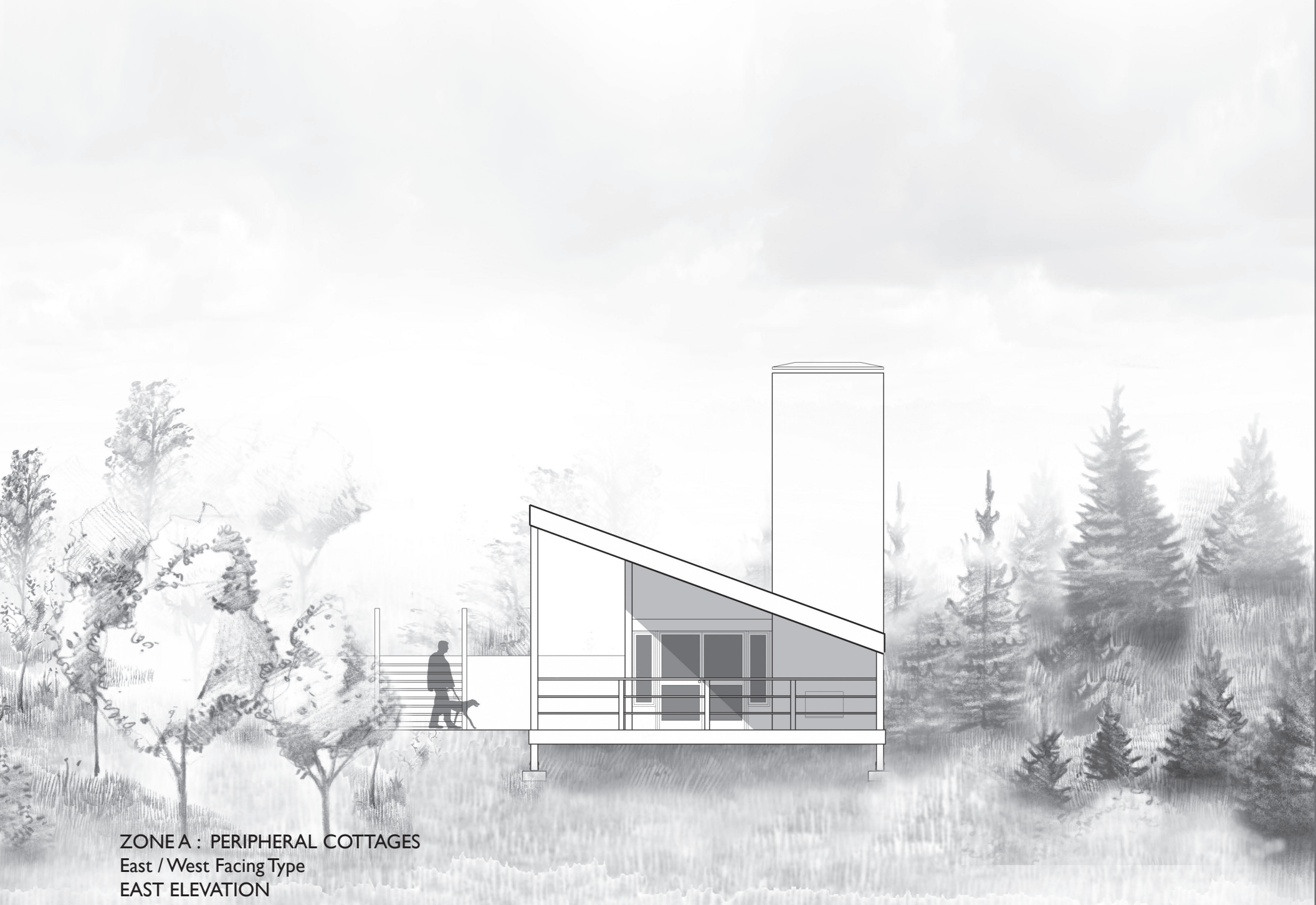


ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
SHORELINE ELEVATION

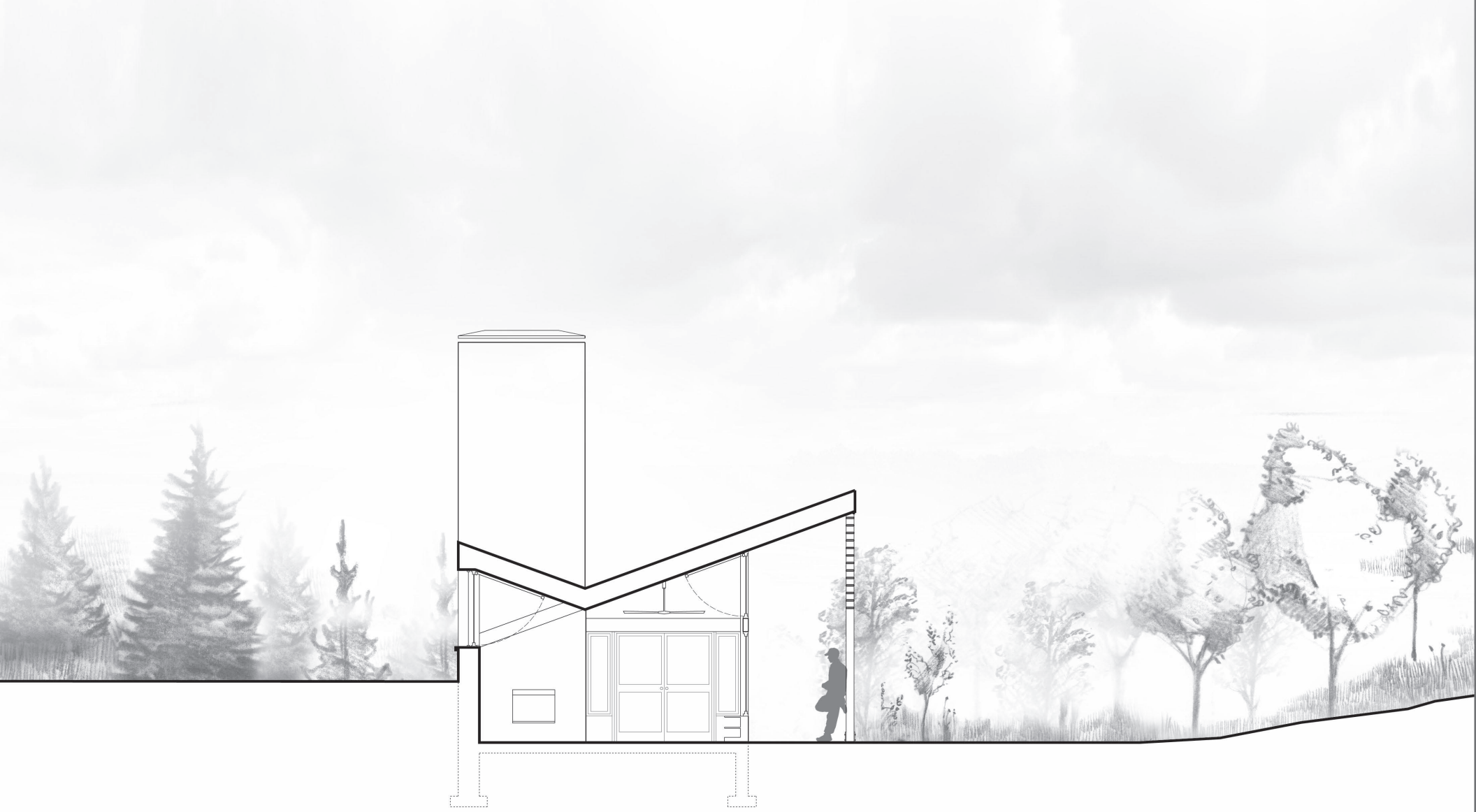




ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
PLAN

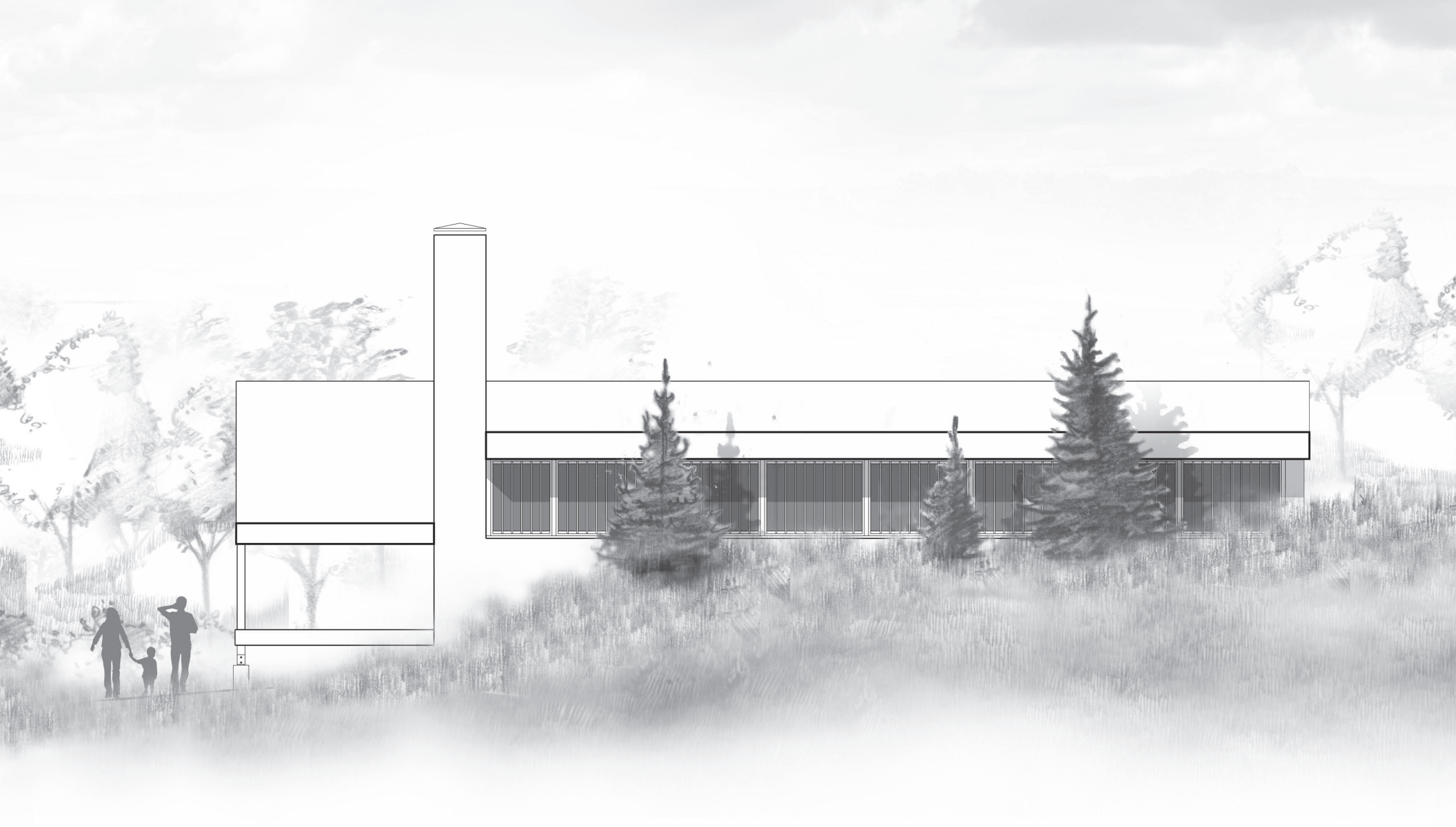


ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
EAST ELEVATION



ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
SECTION

ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
SOUTH ELEVATION



ZONE A : PERIPHERAL COTTAGES
East / West Facing Type
NORTH ELEVATION

Fig. 166 | Sketch for north facing cottage siting

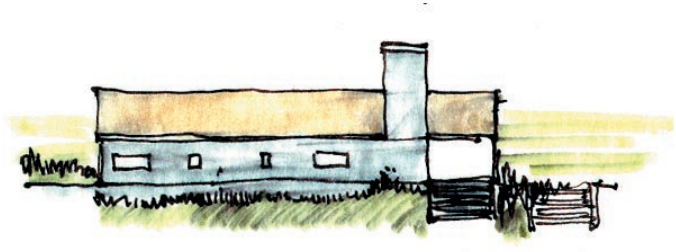
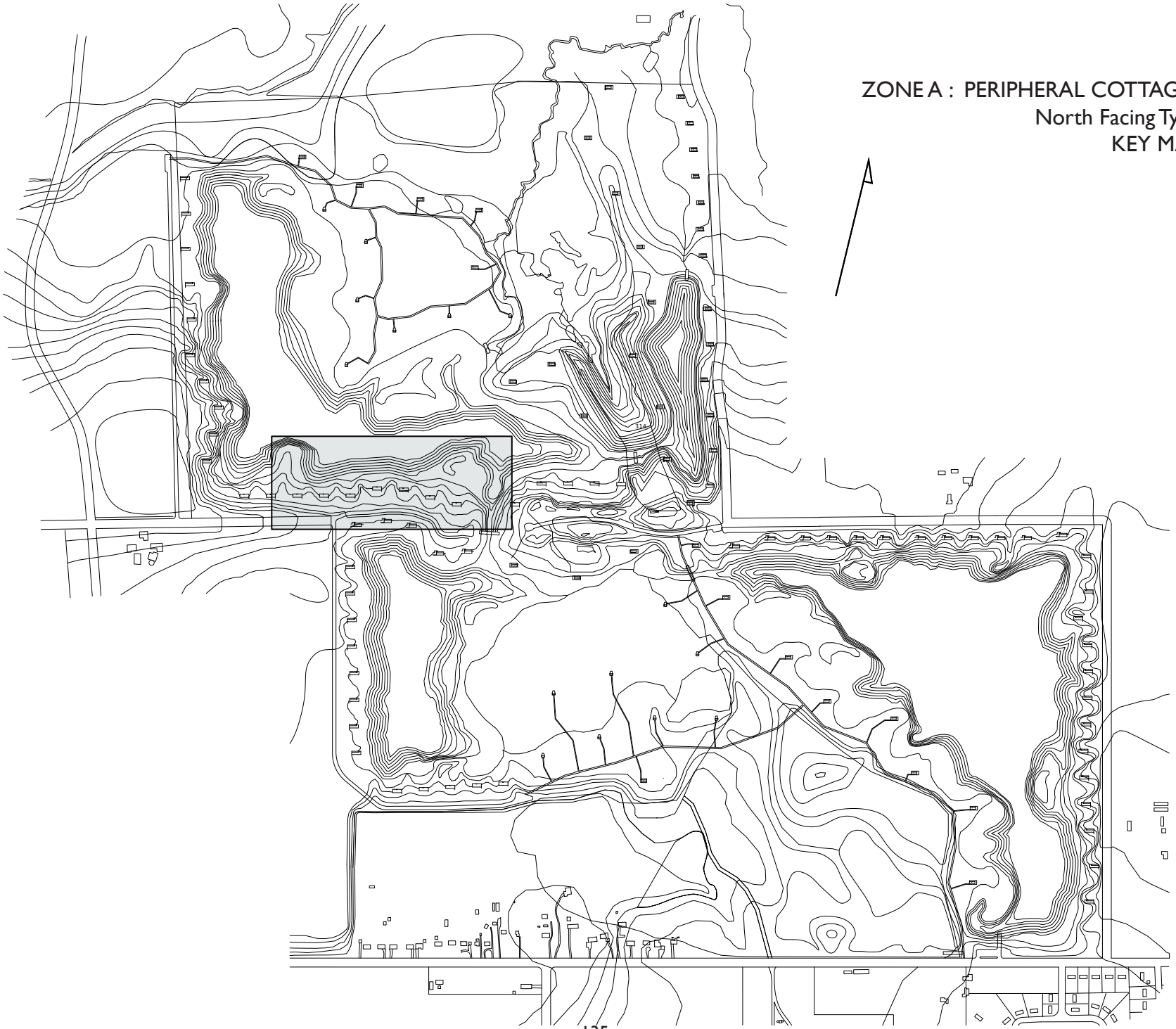


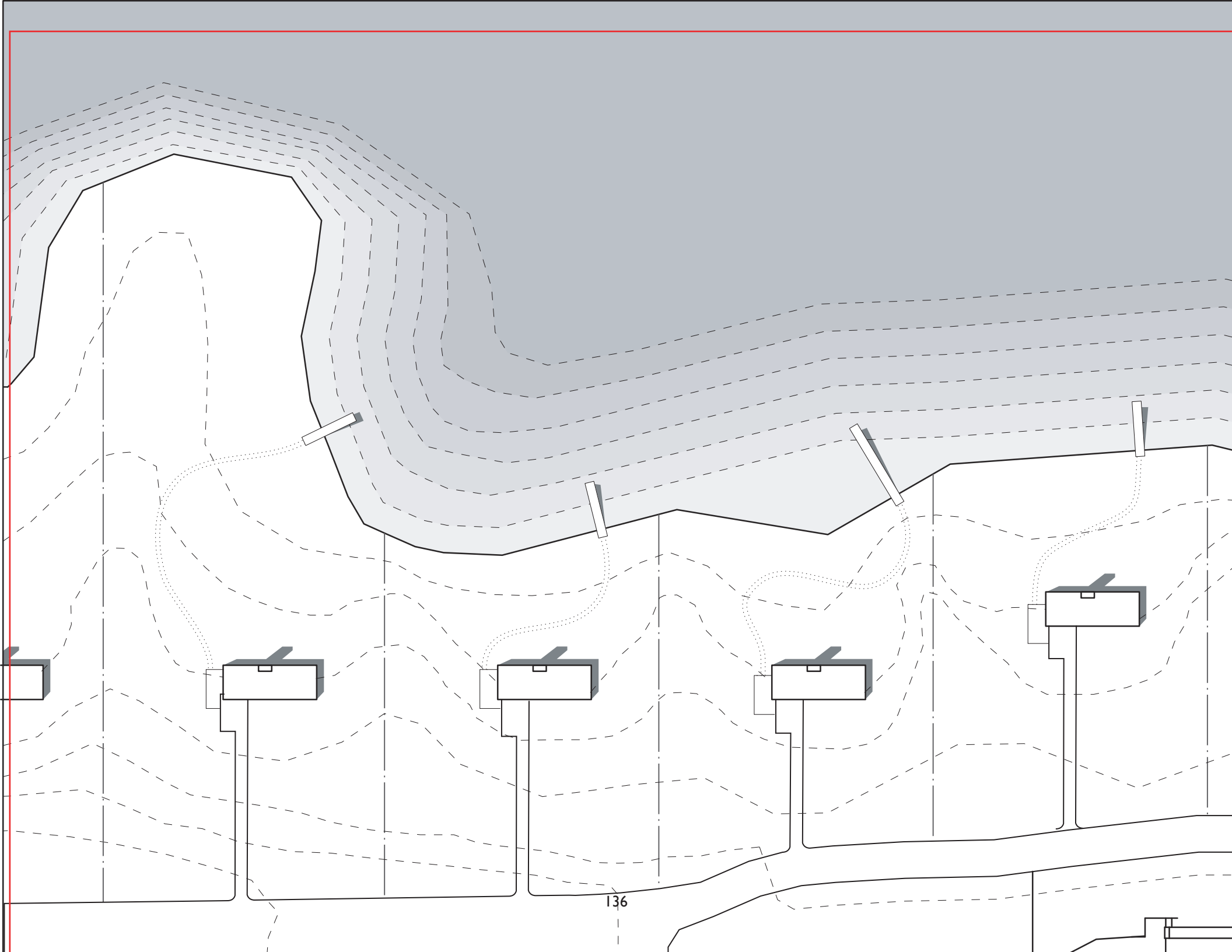
Fig. 167 | Sketch of north facade.

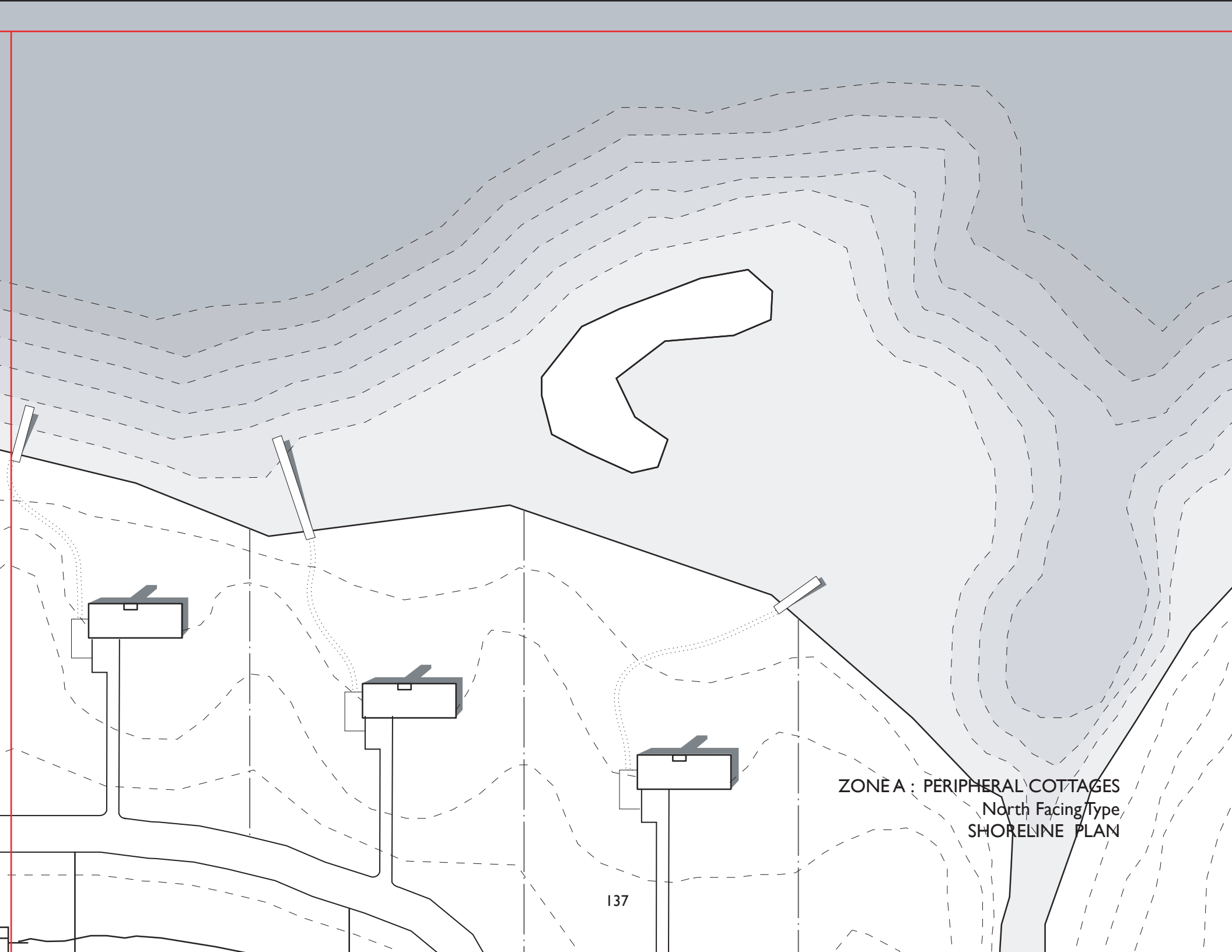
## ZONE A: PERIPHERAL COTTAGE
### North Facing Type

The north facing cottage are sited along the southern edge of the lakes and the more heavily glazed facade faces away from the shoreline. Windows on the north side are small and offer views of the water. The living, dining area, and kitchen area open onto a porch on the west of the building that offers views of the water and sunsets. Bedrooms at the eastern end of the cottage receive morning sun.

ZONE A : PERIPHERAL COTTAGES
North Facing Type
KEY MAP




136

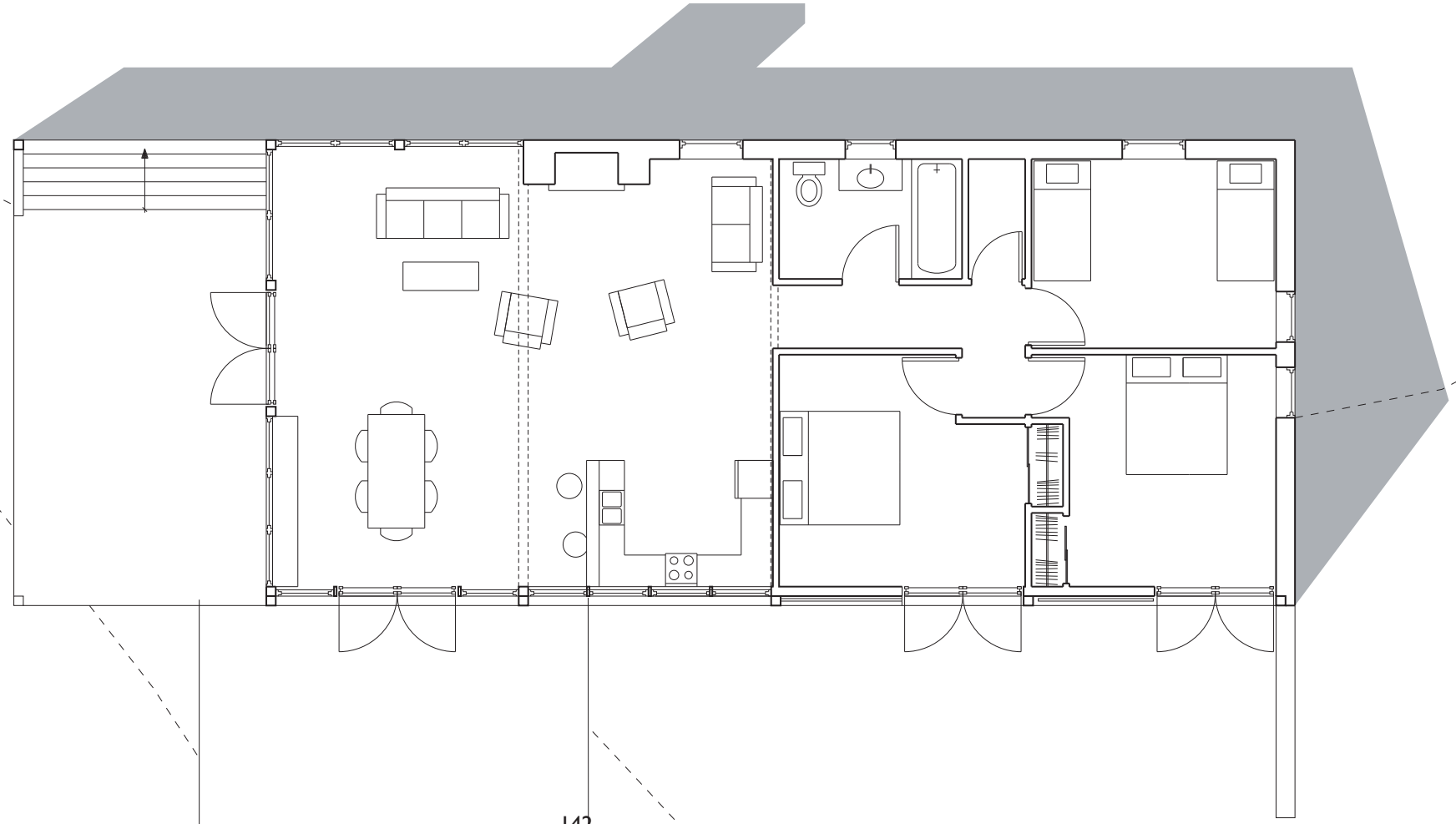


ZONE A : PERIPHERAL COTTAGES
North Facing Type
SHORELINE PLAN

ZONE A : PERIPHERAL COTTAGES
North Facing Type
SHORELINE SECTION

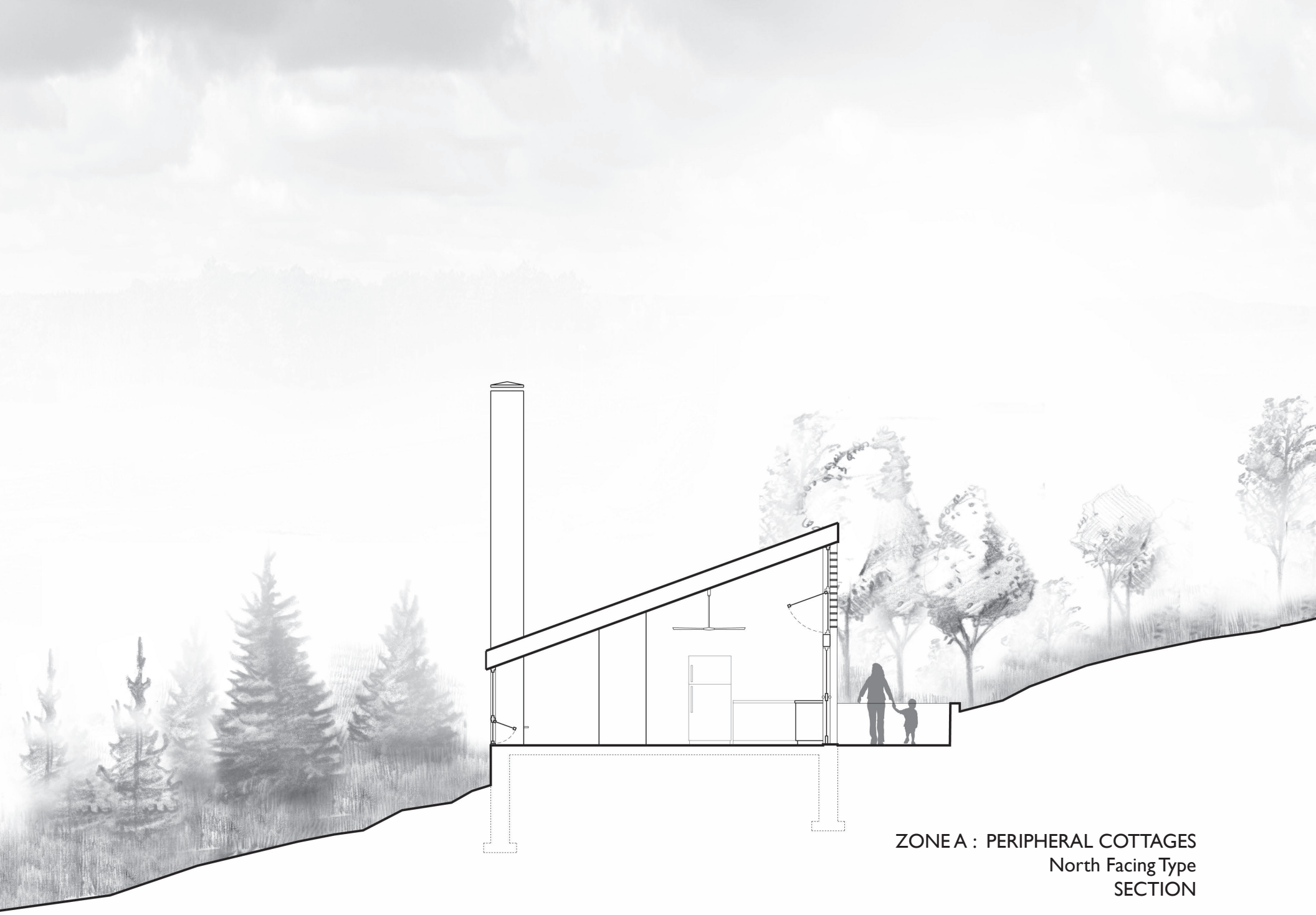
ZONE A : PERIPHERAL COTTAGES
North Facing Type
SHORELINE ELEVATION

ZONE A : PERIPHERAL COTTAGES
North Facing Type
PLAN



ZONE A : PERIPHERAL COTTAGES
North Facing Type
SOUTH ELEVATION

ZONE A : PERIPHERAL COTTAGES
North Facing Type
WEST ELEVATION



ZONE A : PERIPHERAL COTTAGES
North Facing Type
SECTION

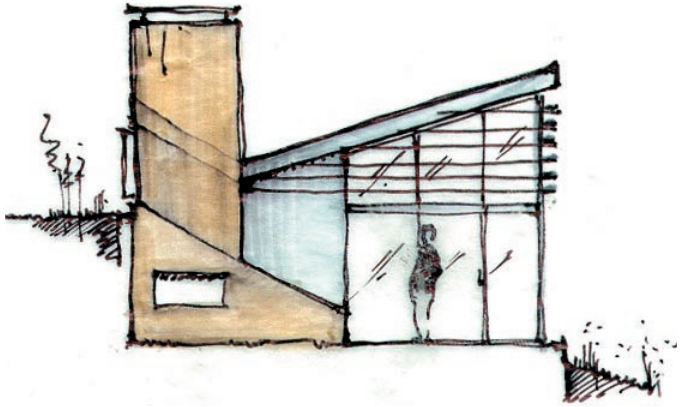
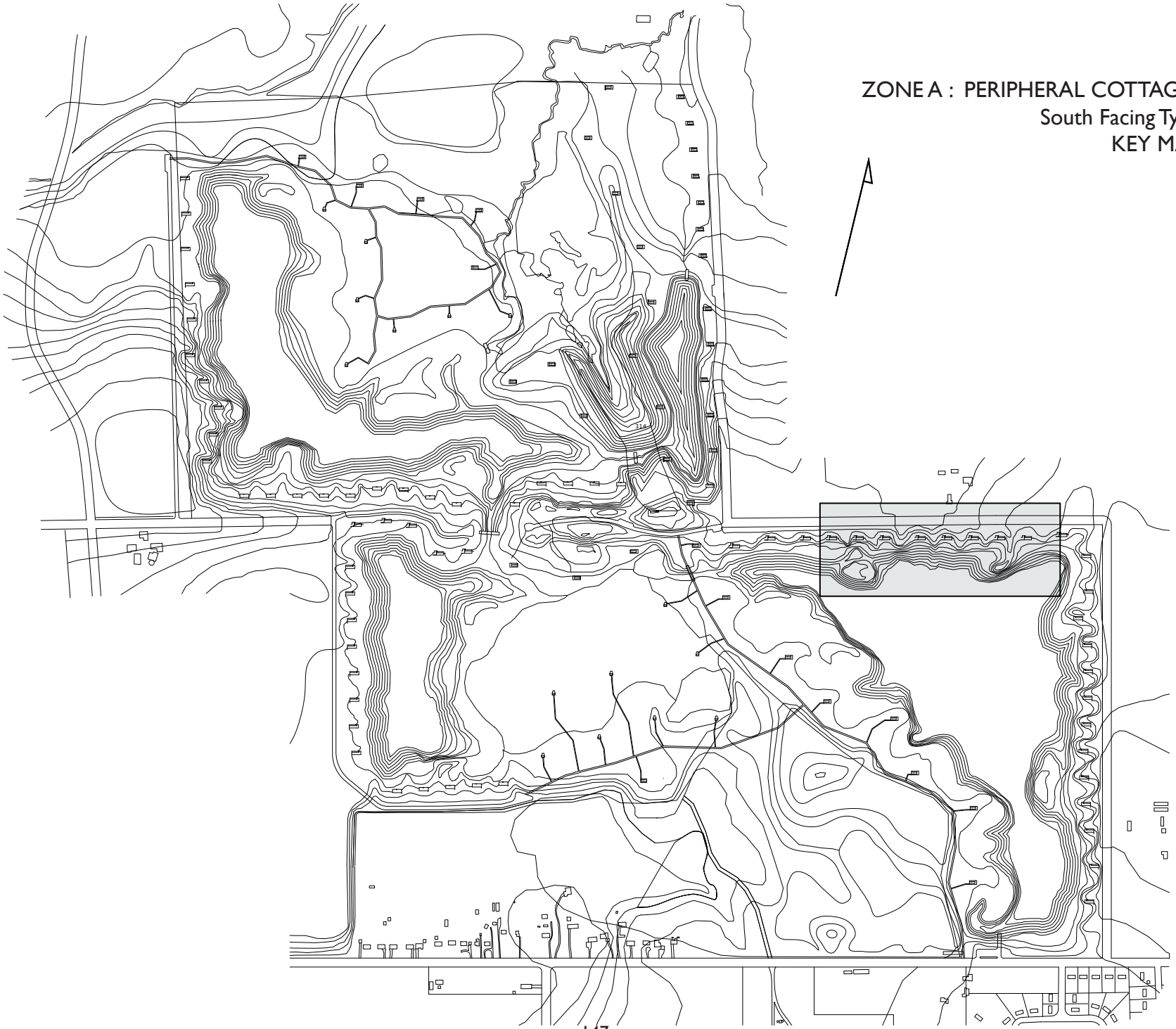


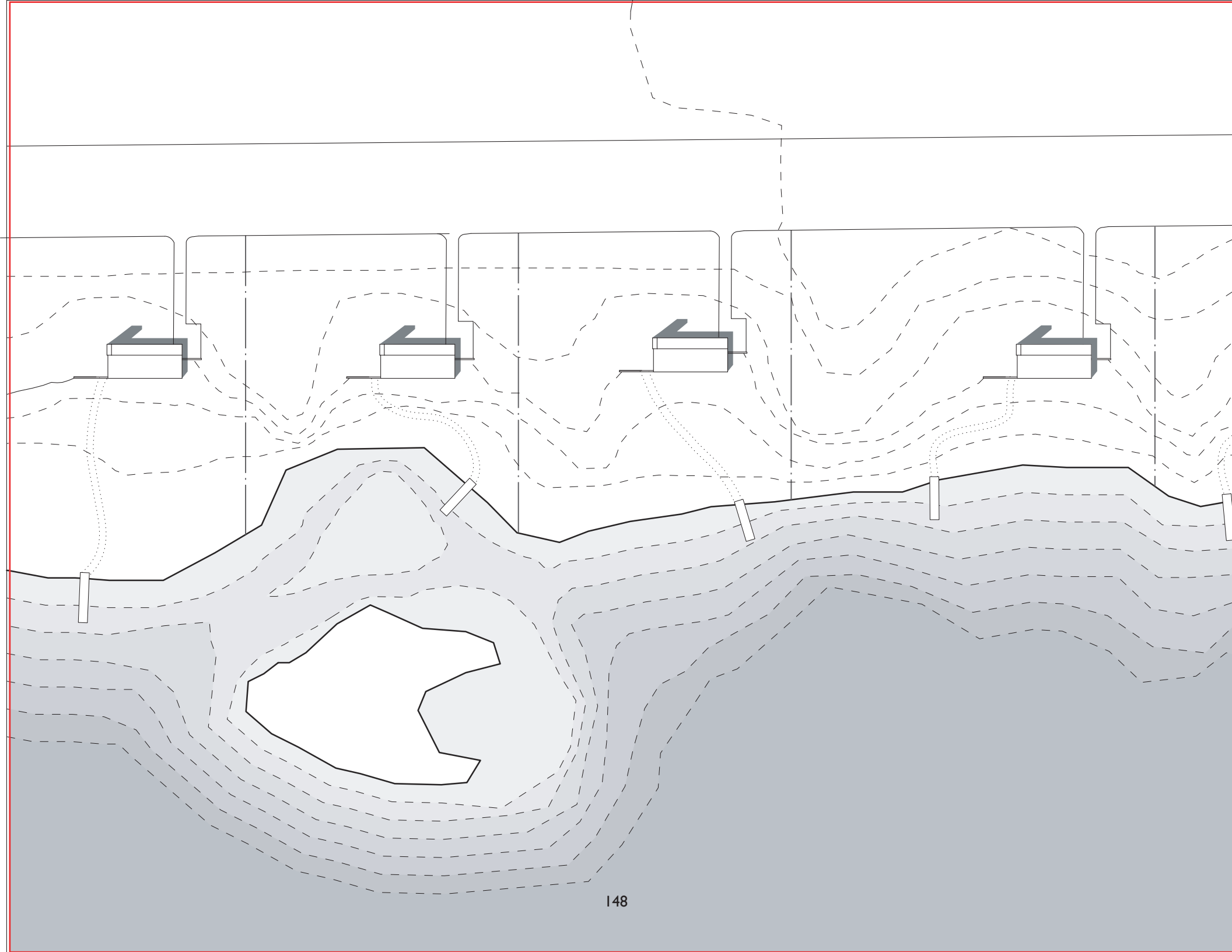
Fig. 176 | Sketch for south facing cottage

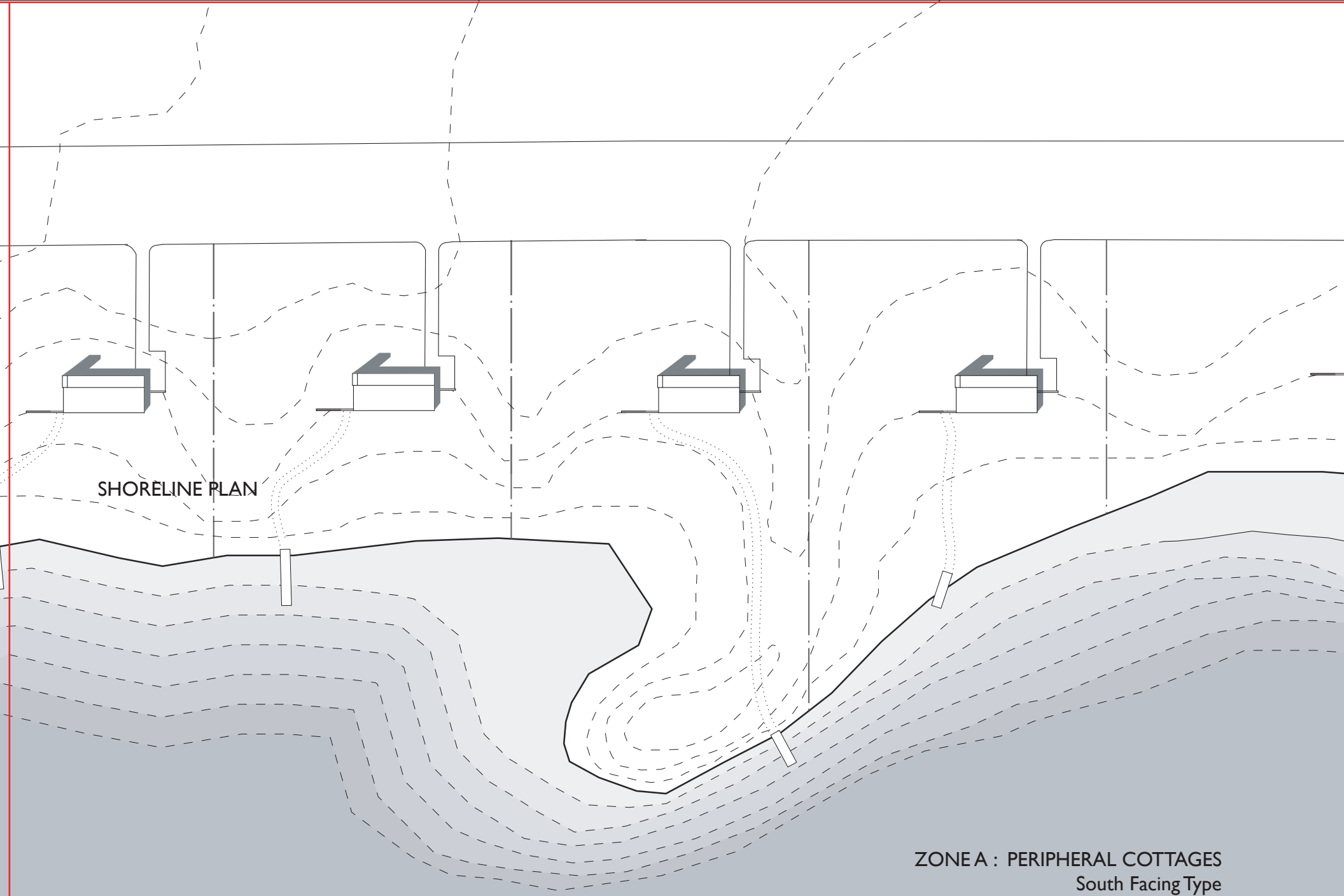
## ZONE A: PERIPHERAL COTTAGES
### South Facing Type

The south facing cottages are situated so that the glazed south facade faces the water. The length of the cottage follows the shoreline. The living and dining area look out over a long covered porch, which also gives access to the master bedroom. Two bedrooms look face the water, a third is at the rear of the cottage and has celerestory lighting.

ZONE A : PERIPHERAL COTTAGES
South Facing Type
KEY MAP

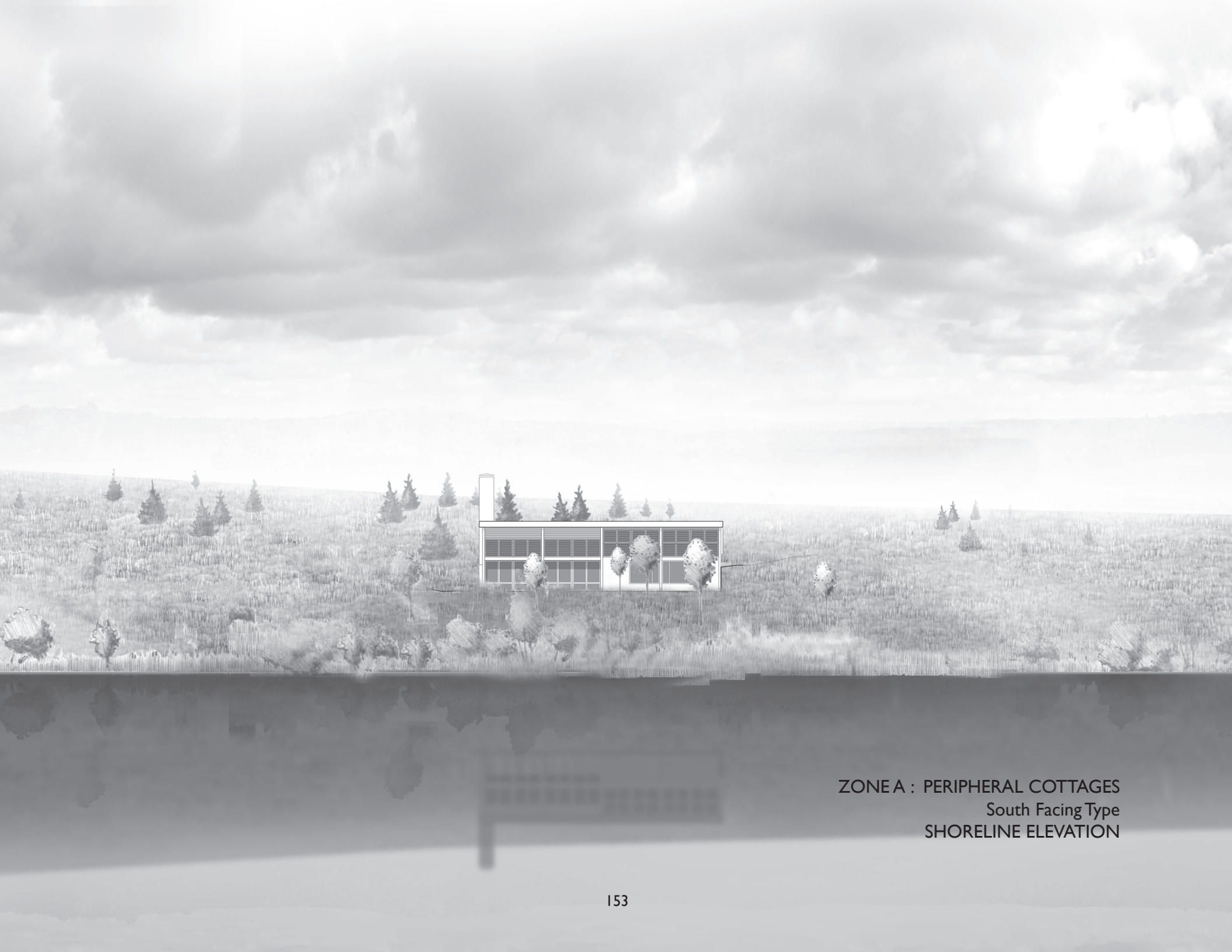




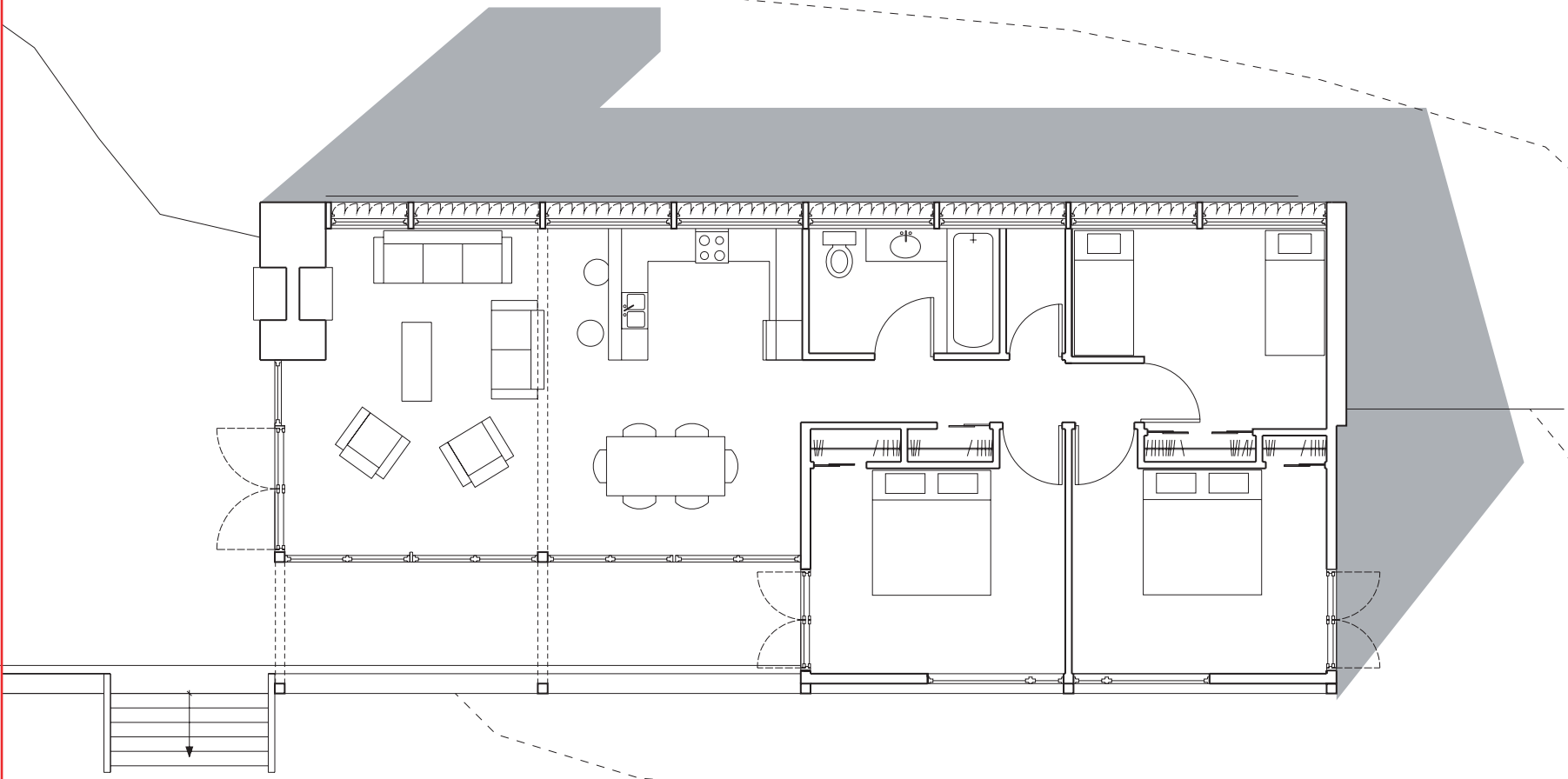



ZONE A : PERIPHERAL COTTAGES
South Facing Type
SHORELINE PLAN

ZONE A : PERIPHERAL COTTAGES
South Facing Type
SHORELINE SECTION

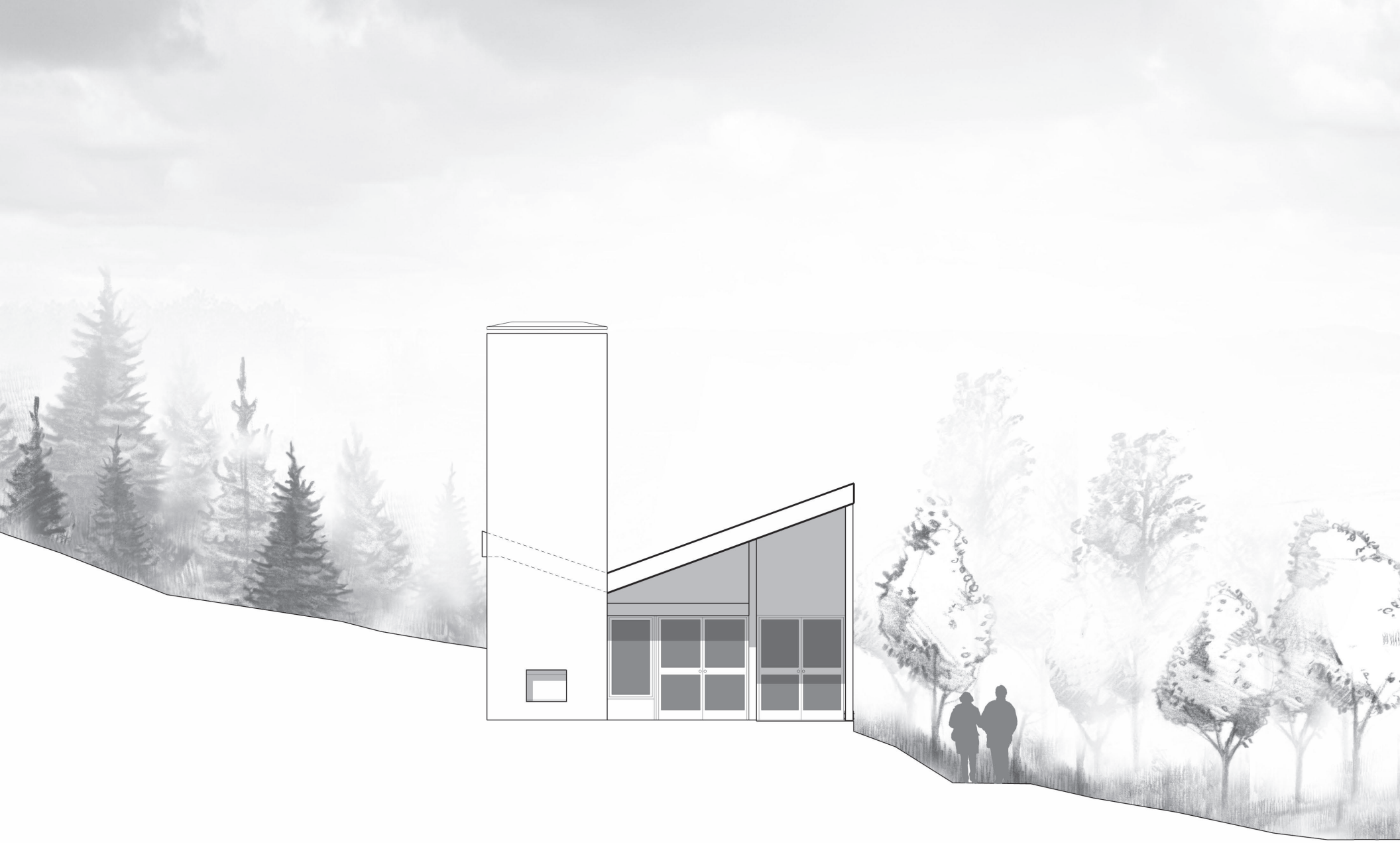


ZONE A : PERIPHERAL COTTAGES
South Facing Type
SHORELINE ELEVATION

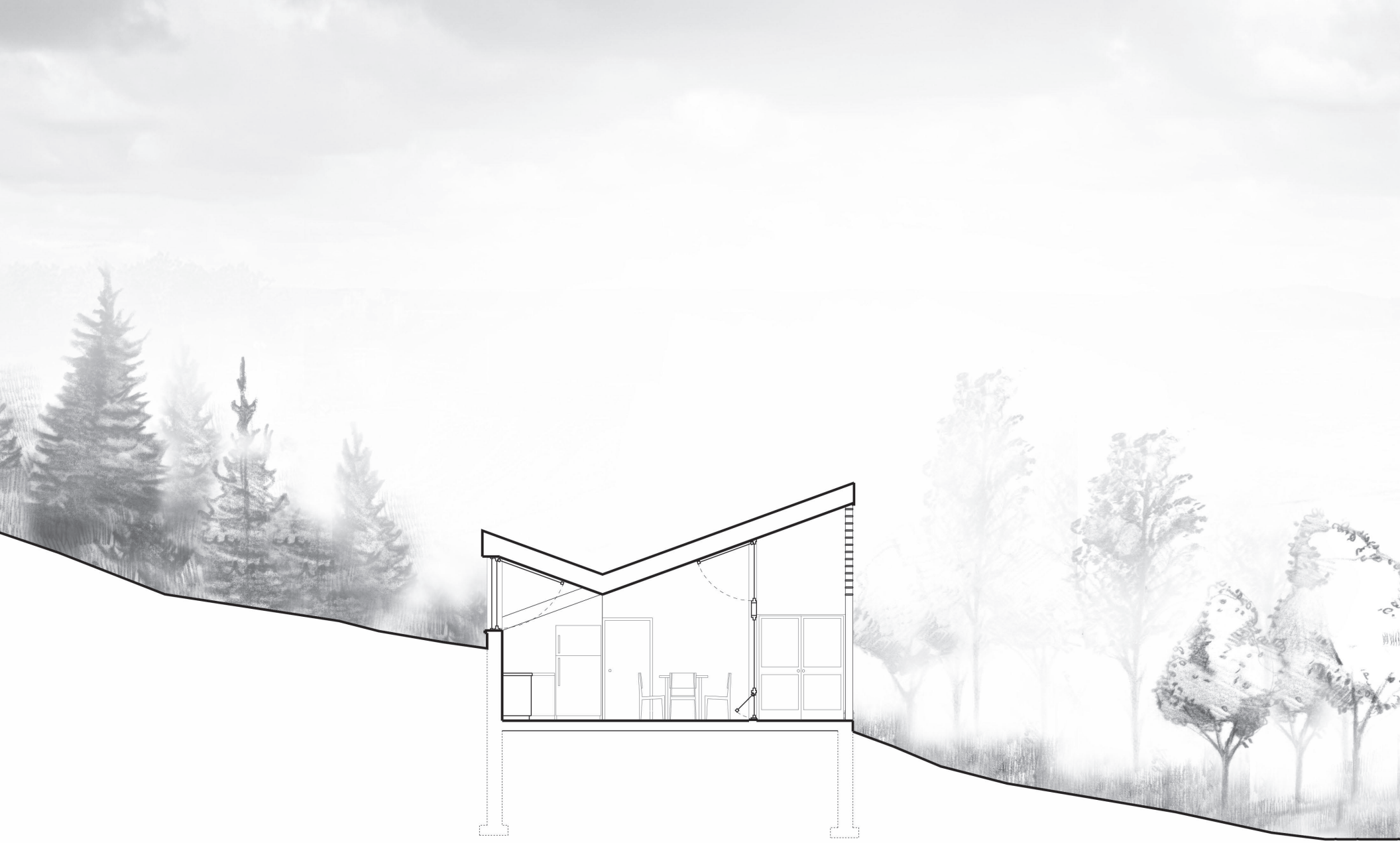


ZONE A : PERIPHERAL COTTAGES
South Facing Type
PLAN

ZONE A : PERIPHERAL COTTAGES
South Facing Type
SOUTH ELEVATION



ZONE A : PERIPHERAL COTTAGES
South Facing Type
WEST ELEVATION



ZONE A : PERIPHERAL COTTAGES
South Facing Type
SECTION

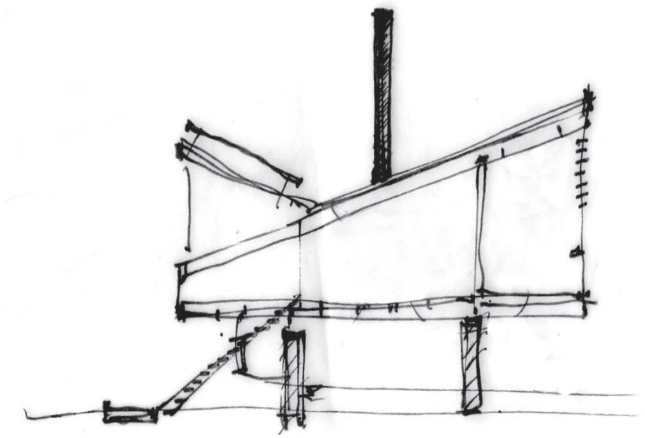


Fig. 185 | Sketch for embedded cottage section.

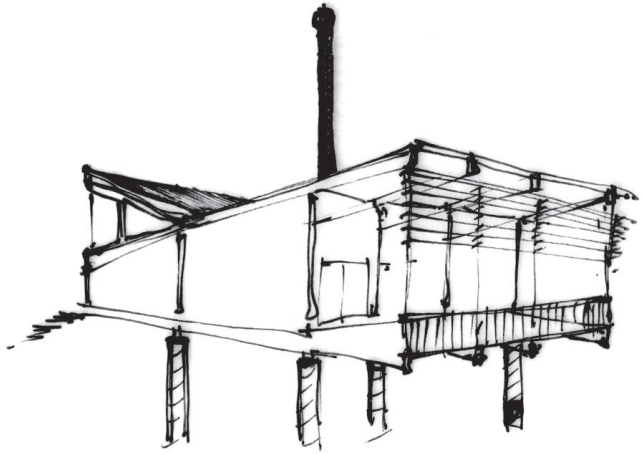


Fig. 186 | Sketch of south facade

## ZONE B: EMBEDDED COTTAGES

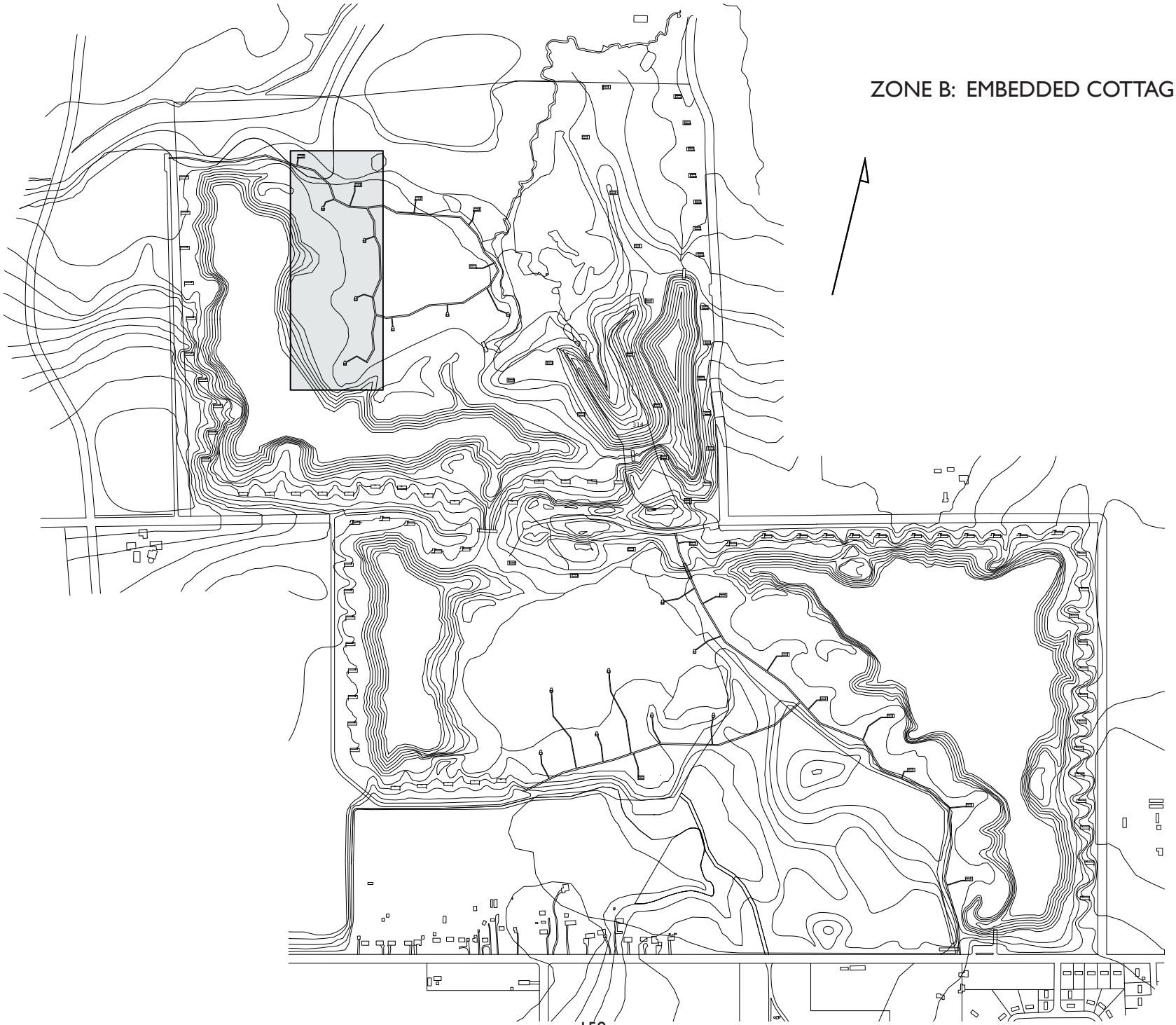
### Regular Type

The regular type closely follows the form of the peripheral cottages, but differs in that it sits above the ground on pilotis, to allow wetland grasses to grow up to and flow underneath the cottage. Cottages are always sited at least one hundred and fifty metres from each other, always facing south to take advantage of southern exposure for passive solar heating. They are more compact than the cottages on shore. The kitchen, bathroom, and two bedrooms occupy the north side of the cottage. They open onto a dining and living space that runs the length of the south facade and has sliding doors at each end, opening onto a shaded porch.

### Minimal Type

The minimal type is intended for more temporary use, and would be particularly appealing to birdwatchers or visiting researchers. They consist of one room with a deck that can be lowered during use or retracted when the cottage is empty. The cottages are raised on stilts, minimizing the shadow cast so that the surrounding wetland can flourish. They would not be used in the winter.

ZONE B: EMBEDDED COTTAGES

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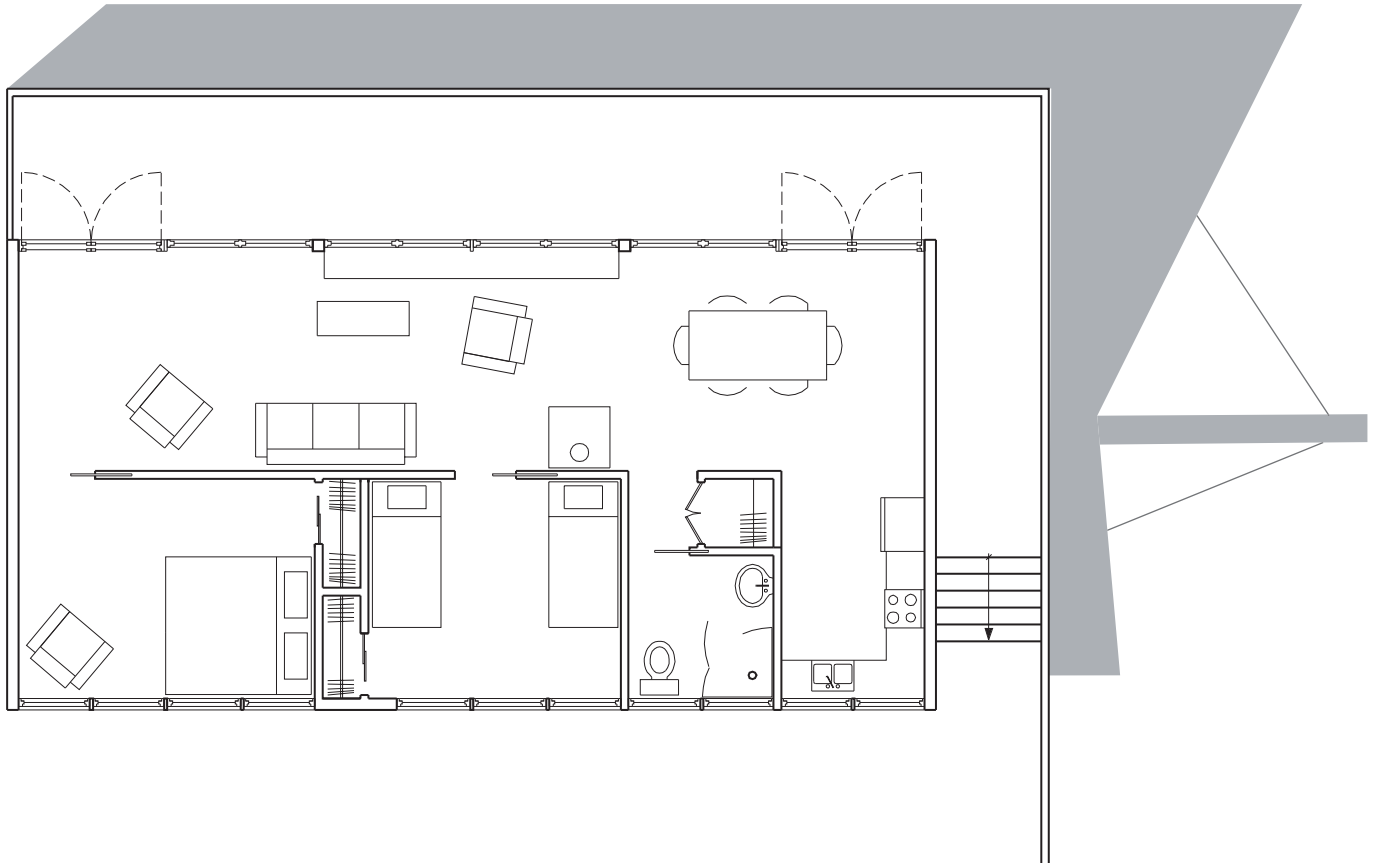
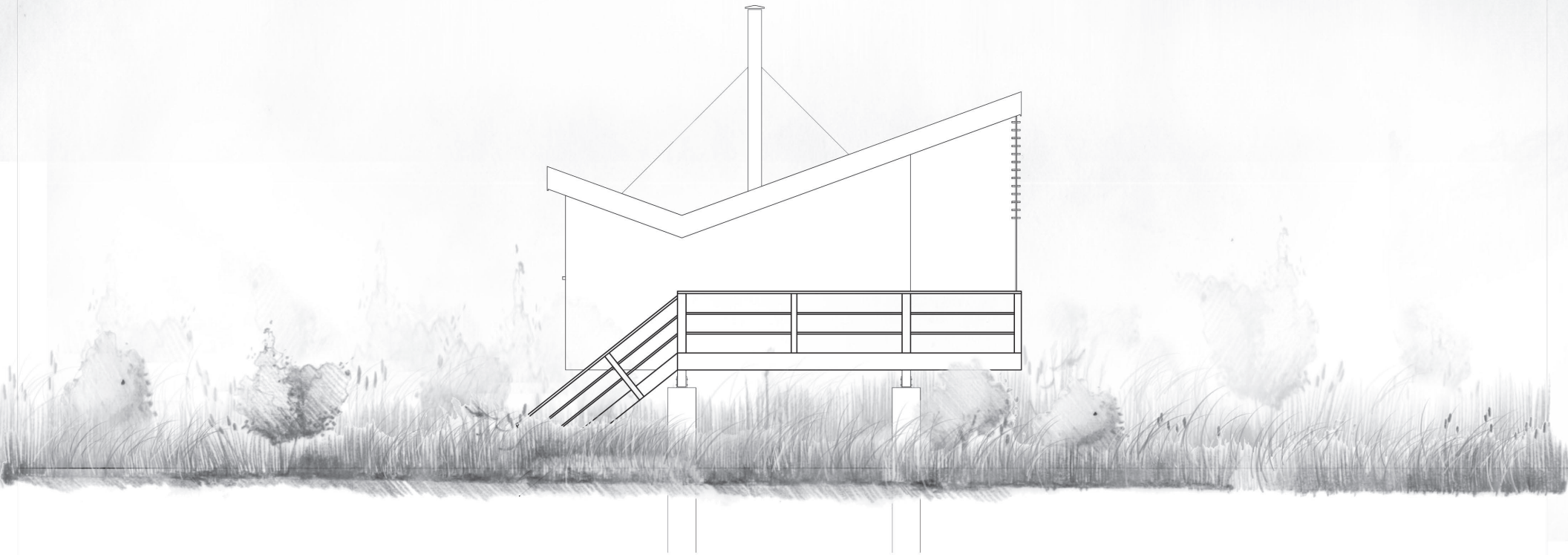
ZONE B: EMBEDDED COTTAGES
SHORELINE PLAN



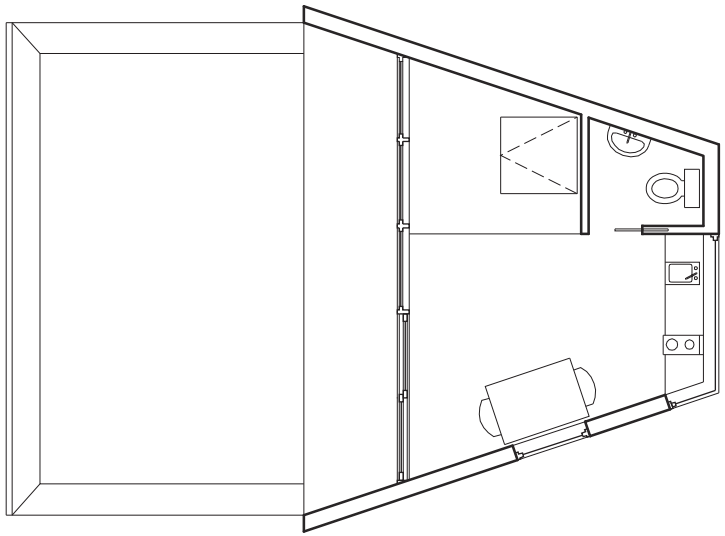
ZONE B: EMBEDDED COTTAGES
Regular Type
PLAN

ZONE B: EMBEDDED COTTAGES
Regular Type
ELEVATION



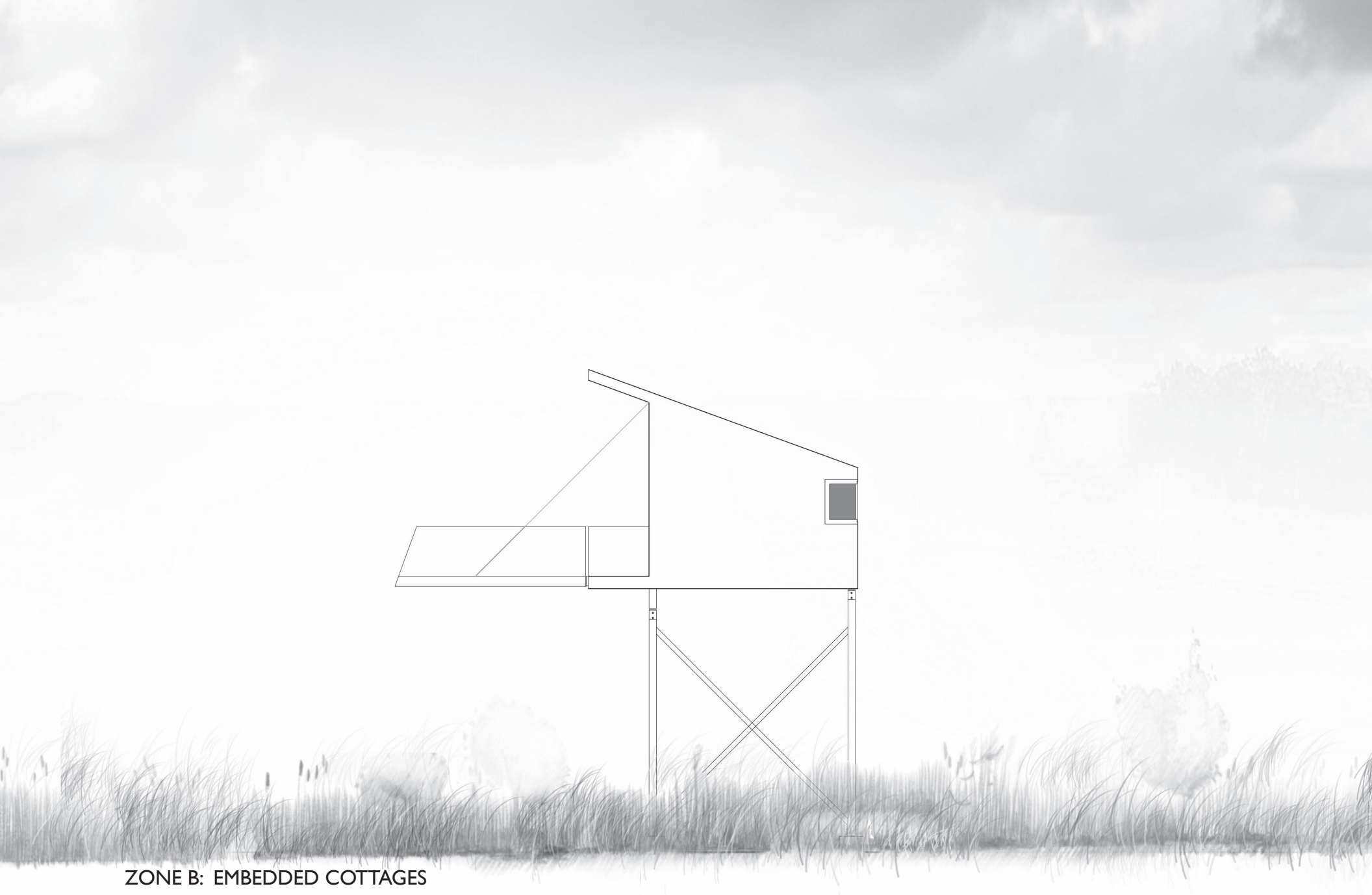
ZONE B: EMBEDDED COTTAGES
Regular Type
ELEVATION

ZONE B: EMBEDDED COTTAGES
Regular Type
SECTION

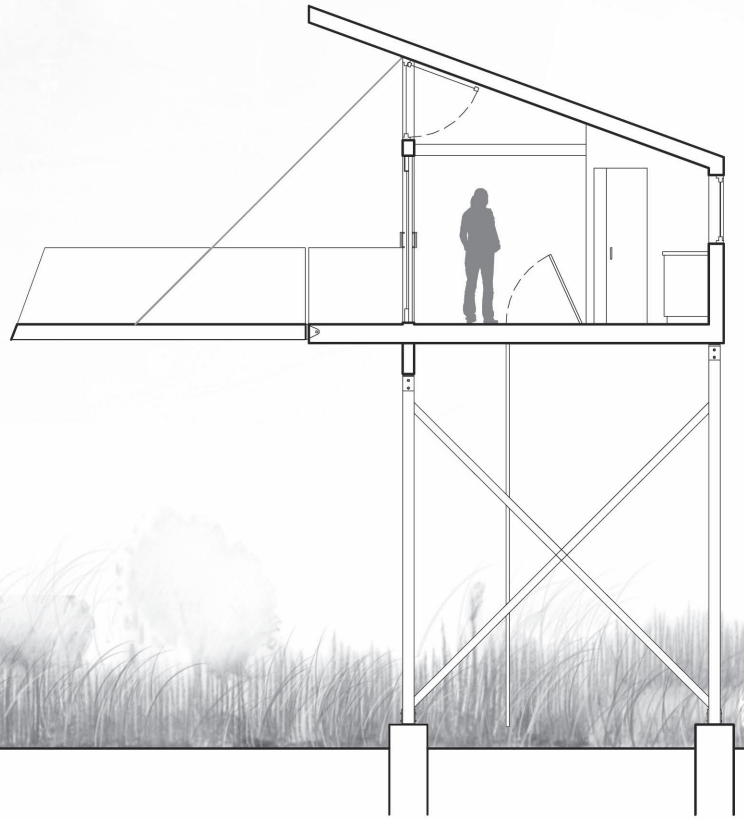


ZONE B: EMBEDDED COTTAGES
Minimal Type
PLAN

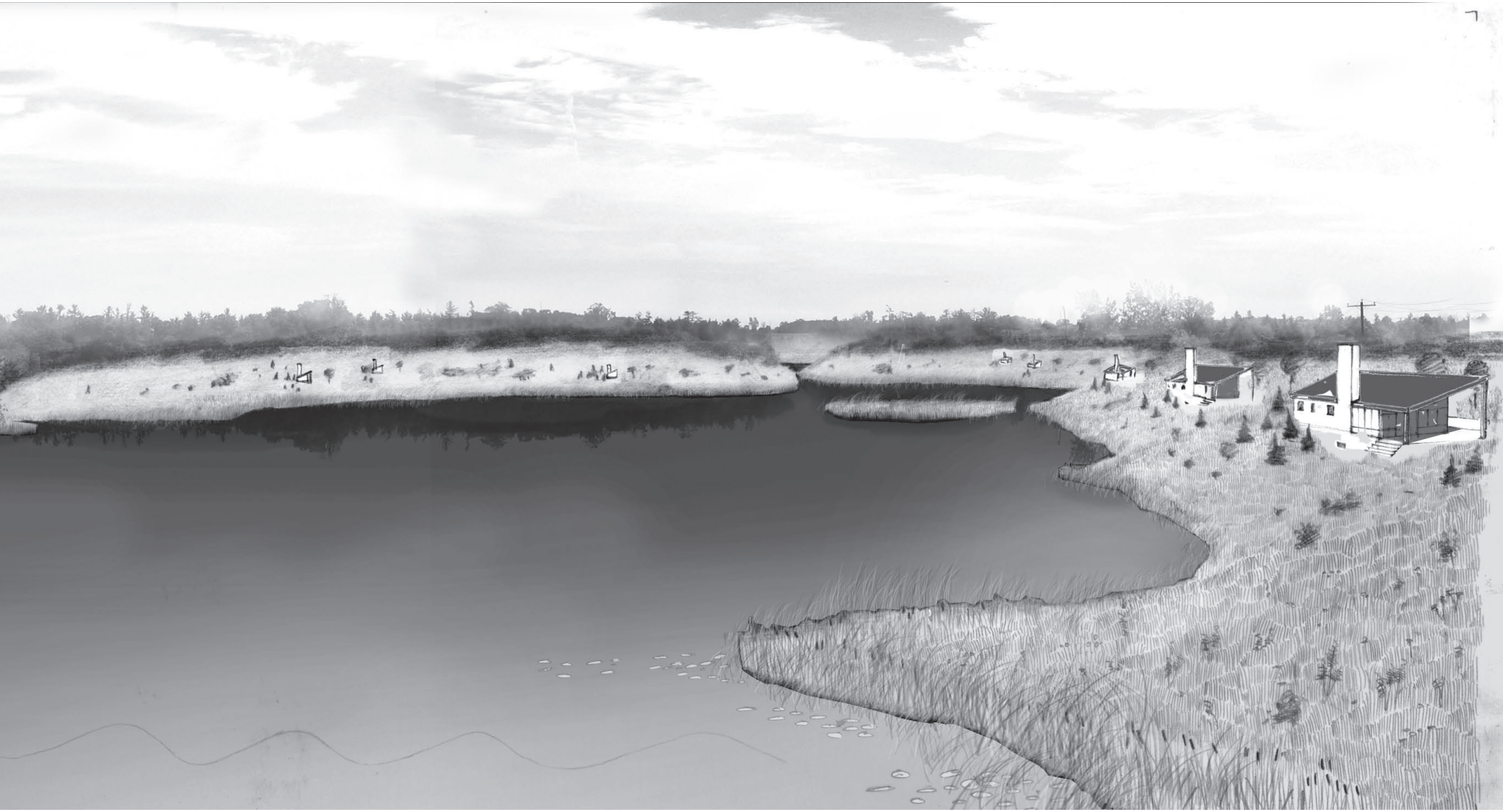
ZONE B: EMBEDDED COTTAGES
Regular Type
ELEVATION



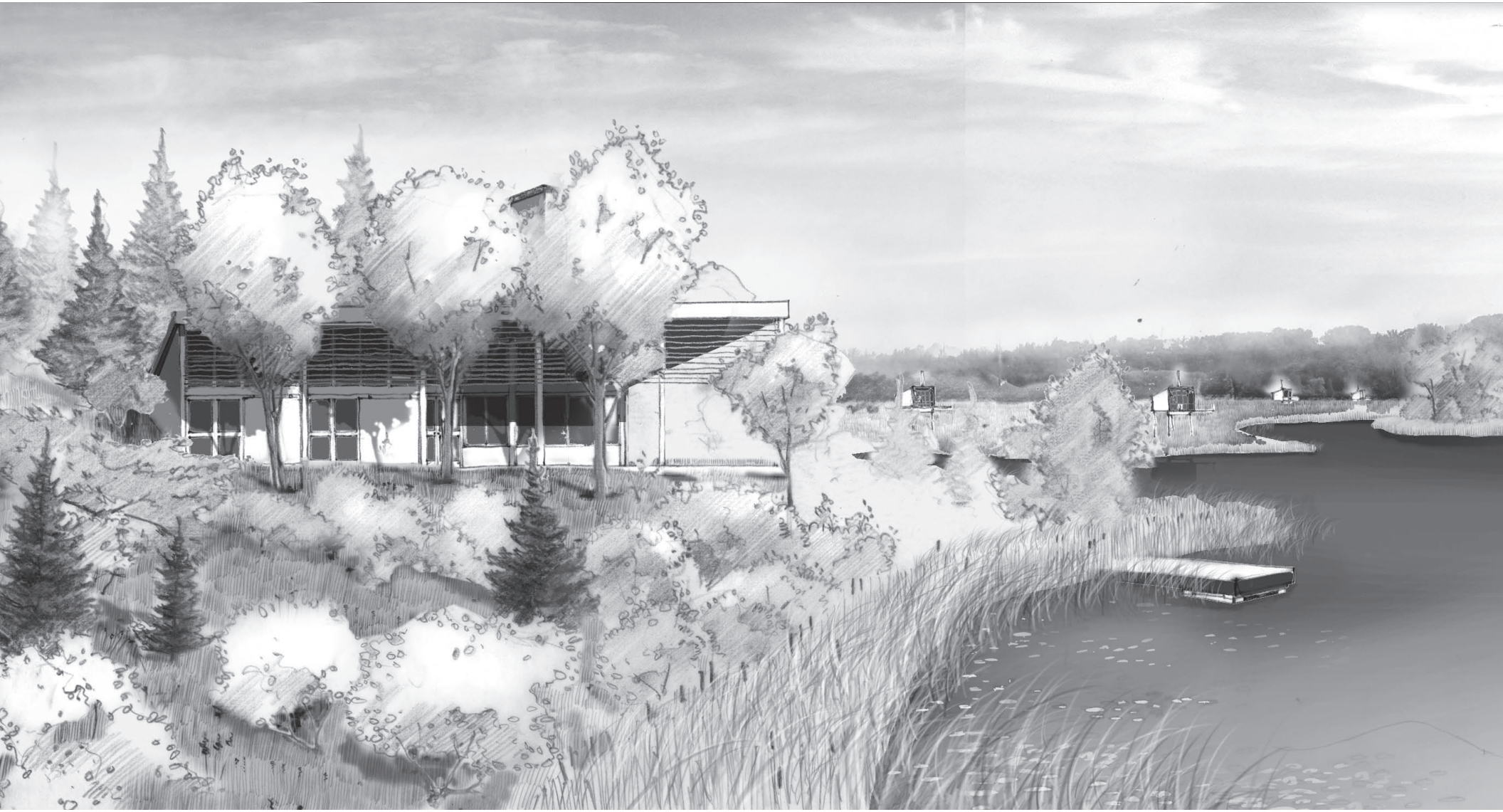
ZONE B: EMBEDDED COTTAGES
Regular Type
ELEVATION

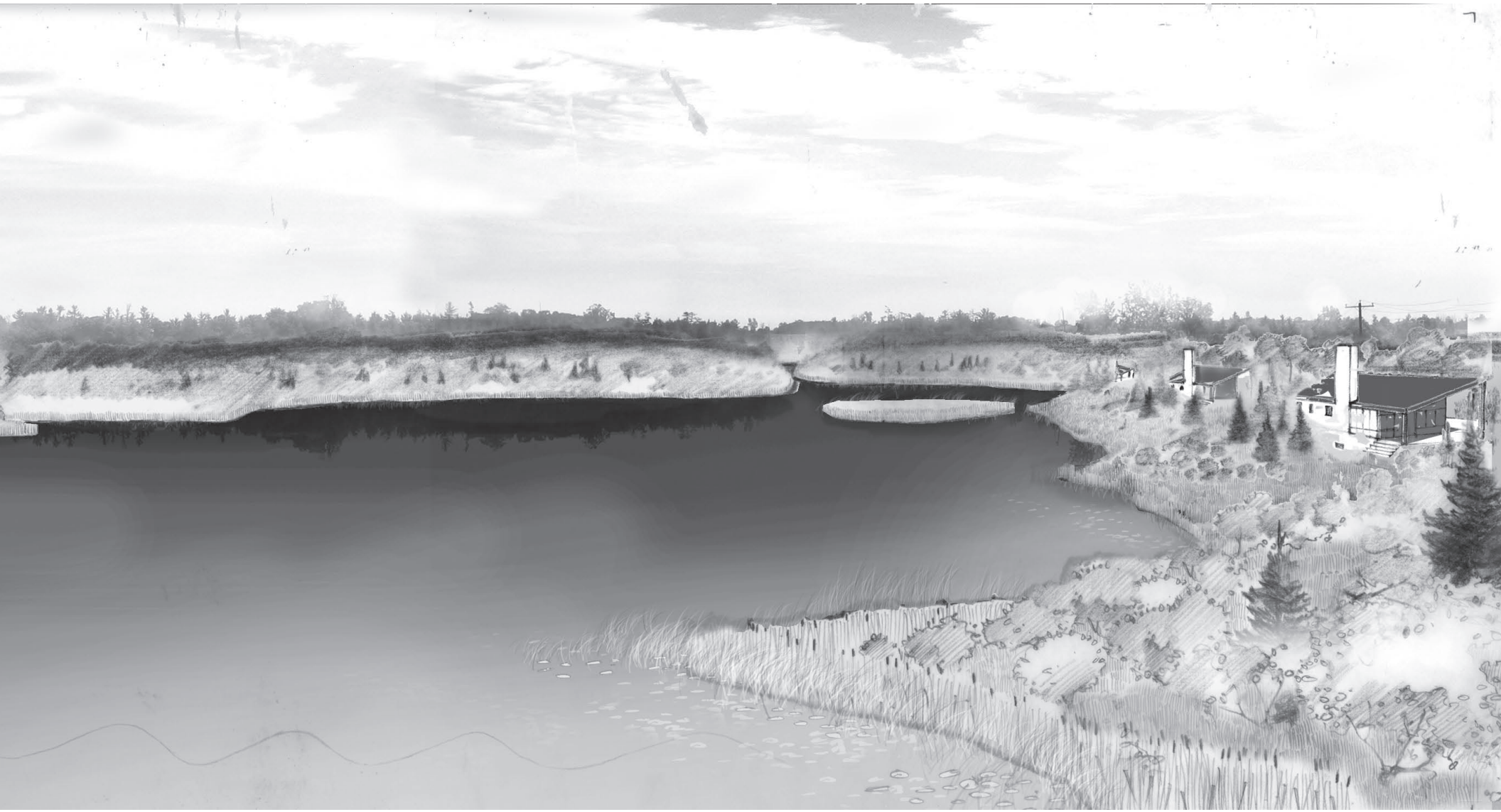


ZONE B: EMBEDDED COTTAGES
Regular Type
SECTION



EAST FACING PERSPECTIVE
2 years after construction





EAST FACING PERSPECTIVE
10 years afte

EAST FACING PERSPECTIVE
20 years after construction

# Conclusion

This thesis began with an investigation of the history of the country house. It uses the example of Castle Frank, the summer house of Governor Simcoe, outside 19th century Toronto, as a link between the European tradition of the country villa and the cottage in the Canadian wilderness. Seeking to establish a direct lineage between the two, the thesis suggests that the acts of cultivation and stewardship that are to be found in the prototypical Roman villas such as those of Pliny the Younger and Horace could inspire a modern day renaissance of such values in the Ontario cottage. It cannot be denied though, that the physical, agricultural aspect of villa life that defined the earliest concept of otium in Republican Rome was quickly superceded by the desire for luxury, amenity, and relaxation. This mirrors a similar tendency in the evolution of the Ontario cottage. Where once visitors to cottage country sought an experience of raw wilderness, encapsulated by the desire to discover moments of the sublime and the picturesque, as ease of access became more readily available and the growing population seeking the wilderness diluted its essence, so too did cottagers turn to increasingly resource consumptive forms of relaxation and recreation as a way of occupying themselves. Our concept of re-creation has kept pace with the acceleration of modern life and activity. Whereas the ethos of early cottage life was associated the opportunity to literally create oneself anew - to allow the fresh air and a relaxed, natural environment to purify one from the contamination and unnaturalness of the city, it now is dominated by activity and entertainment, associated with speedboats, jet skis, and satellite television and video games.

It is unnecessary to reiterate the imperatives of ecological crisis that pervade contemporary media and politics, but it seems logical that in Ontario, a reconsideration of cottage practice could be the leading edge of the move to shift the perception of our relationship with Nature and our interaction with it. As James Ackerman states, the requirement of the country house to fulfill only ideological needs, rather than practical ones, has allowed it to express the avant garde of architectural thought, especially as it pertains to the landscape. While the technology and expertise for sustainable and regenerative architecture is readily available, this thesis contends that the concept of Villa Canadensis, and the connection it suggests with our architectural heritage, could inspire a return to the notion of stewardship and cultivation, whose essence is described in that early concept of otium, that would help manifest those technologies. Furthermore, if visitors to cottages were not merely aware of a desire to escape the city, but instead of a process of returning to an ancient tradition of contemplation and an enhanced awareness of the landscape, they could recognize the timeless, iconographic essence of that weekend ritual, and realize the greater potential for satisfaction to be gained from a more engaged return and interaction with a surrounding natural environment.

This thesis has also suggested a new attitude towards the wilderness, one that replaces the sense of the sublime and the spiritual that inspired early visitors to Muskoka, with a scientific approach that embraces our ability to understand and recreate ecosystems. A further topic of investigation would be to explore the implications of this shift, and the way in which the form and image of the new cottage type would reflect the human involvement in the landscape.

The selection of the Blair Gravel Pit near Cambridge, Ontario as a site for the design proposal illustrates the potential for the new mode of cottage to exact positive ecological change on a large scale. The idea of converting a disused gravel pit into a community of cottages captures the essence of a regenerative ideology. Where the disused Blair Pit, would otherwise remain underutilized, it may be seen as an opportunity to contribute to a new hybrid regenerated natural ecosystem. It is also pragmatic in that the subdivision of the gravel pit into private lots would inspire individual owners to engage in the rehabilitation. The communal effect of such private interest is to create a healthy, diverse wetland community, where a collective of private individual landowners play an active and crucial role in a large scale land reclamation enterprise.
The huge collection of similar gravel pit sites in the Waterloo region and in southwestern Ontario, which number in the thousands, suggests a real potential for similar developments elsewhere. The serendipity that makes the Blair Pit seem so appropriate for cottages - the presence of water on site after excavation - is, unfortunately, atypical of most pits. It is unlikely, given the association of the Ontario cottage with water, that a site without that amenity would be as suitable. Although one could be optimistic and suggest that rehabilitation of dry sites, which could include brownfields or other disused or scarified landscapes, could take place, it is unlikely that such development could be as popular or successful as the former. The attachment to water would therefore be a limitation of the proposed regenerative cottage; to enjoy widespread success, it needs to be constructed on sites where a proximity to water is possible.

The proposed rehabilitation of the Blair Pit and the design of the prototypical cottages suggest the eventual character of landscape and of individual cottages. The design of the cottages relies on elements of sustainable and regenerative architecture that are readily available today. A more thorough analysis of the economics of current cottage practice, contrasted with a similar analysis of the intended function of one of the regenerative cottages depicted in this thesis, might be useful to suggest the shift in attitudes and behaviour that accompany the new regenerative typology. Also, such an analysis would be interesting and useful exercise in understanding the feasibility of converting a disused gravel pit, whose short term economic value has been realized, into a development whose value would increase over time, as the rehabilitation process improved the ecological and aesthetic value of the site. It is the real-life economic potential for the scheme that is especially exciting, and although the new cottage type relies on an optimistic frame of reference, the idea of creating a cottage environment within a few minutes drive of the city, with the added comfort and satisfaction of creating a new ecological community, is a captivating one.
"At the landscape regionalism symposium held at the University of Toronto in 2005, architecture critic Kenneth Frampton asserted that while architecture in many ways has "lost its true objective" or its raison d'etre, landscape design has become increasingly relevant, seeking to explore the relation between objects rather than fetishizing the importance of the object in and of itself (Janzen 16).

Although this thesis takes the form of a landscape project, and utilizes a vocabulary of accepted regenerative design techniques (mono-pitch roofs, bris-soleil, southern exposure, earth sheltering, etc.) it demonstrates that the cottage can be reinvigorated in order to synthesize a responsible attitude towards the environment with an existing tradition. By easing this transition, and demonstrating how a regenerative attitude is in keeping with an ancient tradition of visiting villas, country homes and cottages, a new ideology may finally take root and integrate itself in our collective understanding of our relationship with the natural environment.

# Works Cited


Ackerman, James S. *The Villa: Form and Ideology of Country Houses*. Princeton University, New Jersey, 1985.

Addison, Joseph. *The Works of the Right Honourable Joseph Addison. Vol. III*. (Ed. Richard Hurd) Henry Bohn, London, 1854.

Andrews, Malcolm. *Landscape and Western Art*. Oxford University, New York, 1999.

Attlee, Helena. *Italian Gardens*. Frances Lincoln, London, 2006.

Barber, John. "The Changing Face of Cottage Country." Globe and Mail 4 Sept 1999: A12

Barlow Rogers, Elizabeth. *Landscape Design – A Cultural and Architectural History*, Harry N. Abrams, New York, 2001.

Bentley, D.M.R. *The Confederation Group of Canadian Poets, 1880-1897*. University of Toronto, Toronto, 2004.

Boccaccio, Giovanni. *The Decameron* (trans. Musa, Mark, and Bondanella, Peter) Penguin, New York, 1982.

Bourrie, Andrea (conversation)

Burke, Edmund. *A Philosophical Enquiry into the Origin of our Ideas of the Sublime and Beautiful*. (Ed. Adam Phillips) Oxford University Press, New York, 1990.

Caldwell, Penny. "What Price Paradise?" Cottage Life. Mar, 2001:13.

*The Canadian Atlas: our nation, environment and people*, Douglas & McInyre, Vancouver, 2004.

Coates, Collin M. "Like 'The Thames towards Putney': The Appropriation of Landscape in Lower Canada," Canadian Historical Review, LXXIV, 3, 1993

Downing, Andrew Jackson. *The Architecture of Country Houses*. Dover Publications, New York, 1969.

Doyle, James. "Archibald Lampman and Hamlin Garland." Canadian Poetry: Studies, Documents, Reviews 16 (Spring/Summer 1985): 38-46.

Elliot, Susannah. "Welcome to the "Anthropocene". Online Posting. 27 Aug. 2004 <http://www.innovations-report.de/html/berichte/umwelt_naturschutz/bericht-32845.html>

Frampton, Kenneth. *Labour, Work, and Architecture*. Phaidon, London, 2002.

Frye, Northrop. *The Bush Garden - Essays on the Canadian Imagination*. Anansi, Canada, 1971.

Fryer, Mary Beacock. *Elizabeth Postuma Simcoe, 1762-1850, A Biography*. Dundern, Toronto, 1989.

Girouard, Mark. *Life in the English Country House*. Penguin, New York, 1978.

Guidolotti, Pino. *Andrea Palladio The Complete Illustrated Works*. Universe, New York, 2000.
Hammer, Donald A. *Creating Freshwater Wetlands*, Lewis Publishers, Boca Raton, 1992.

Harris, John. *The Palladian Revival. Lord Burlington, His Villa and Garden at Chiswick*. Royal Academy of the Arts, Yale, London, 1994.

Hunt, John. *Dixon William Kent – Landscape Garden Designer - An Assessment and Catalogue of his Designs*, A. Zwemmer, London, 1987.

Janzen, Malena. "Gaining Ground" Canadian Architect Jul, 2005:vol 50 # 7

Kapelos, George Thomas. *Interpretations of Nature – Contemporary Canadian Architecture, Landscape, and Urbanism*. McMichael Canadian Art Collection, Toronto, 1994.

Kalman, Harold. *A History of Canadian Architecture*, Oxford University Press, Toronto, 1994.

James J. Kay *Some Notes on: The Ecosystems Approach, Ecosystems as Complex Systems and State of the Environment Reporting.*

Keddy, Paul A. *Wetland Ecology – Principles and Conservation*. Cambridge University Press, New York, 2000.

King, Paul. *Cottage Country*. Discovery Books, Toronto, 1991.

Kluckert, Ehrenfried. *European Garden Design – From Classical Antiquity to the Present Day*. Konemann, Cologne, 2000.

Landen, Liz. *Langdon Hall - One Hundred Years of History,* Canada, 1999.

Leacock, Stephen. *Arcadian Adventures of the Idle* Rich. 1916. (Ed. D.M.R. Bentley. Canadian Critical Editions) Tucumseh Press, Ottawa, 2002.

Lees, David. "Subdivide and Conquer" Cottage Life. Mar, 2001:13.

Lyle, John Tillman. *Regenerative Design for Sustainable Development.* John Wiley & Sons, New York, 1994.

Michalski, M.F.P. et al. *Rehabilitation of Pits and Quarries for Fish and Wildlife*, Ontario Ministry of Natural Resources., Land Management Branch, 1987.

Moore, Steven A., Technology and Place – Sustainable Architecture and the Blueprint Farm, University of Texas Press, Austin, 2001

Murphy, Stephen, (conversation)

Palladio, Andrea. *The Four Books on Architecture* (trans. Robert Tavernor and Richard Schofield), MIT, Cambridge, 1997.

Pauli, Lori. *Manufactured Landscapes - The Photographs of Ed Burtynksy*, National Gallery of Canada, Ottawa, 2003.

Reid, Dennis R. *A Concise History of Canadian Painting*, Oxford University Press, Toronto, 1988.

Robertson, J. Ross. *The Diary of Mrs. John Graves Simcoe.* William Briggs, Toronto, 1911.

Ruskin, John. *The Poetry of Architecture*, AMS Press, New York, 1971.

Rybczynski, Witold. *The Perfect House: A Journey with the Renaissance Master Andrea Palladio*. Scribner, New York, 2002.

Scadding, Henry. *Toronto of Old*. Oxford University, Toronto, 1966.

Tobey, George B. A *History of Landscape Architecture - The Relationship of People to Environment.* American Elsevier, New York, 1973.

Virgil. *The Georgics*. (trans. John Dryden) Mid Northumberland Arts Group, London, 1981.

Walpole, Horace. *The Works. Vol II*, Goorg Olms Verlag, New York, 1975.
Varro, Rer Rustica

Watkin, David. *The English Vision – The Picturesque in Architecutre, Landscape and Garden Design*. Breslich and Foss, London, 1982

Willis, Peter. *Charles Bridgeman and the English Landscape Garden*, A. Zwemmer, London, 1977.

E.S.P.A. DOCUMENTS:

Campbell, Craig *Analysis of Forwell Ltd., Vegetation Zones, and Preliminary Flora of Altrieve Lake.* OIKOS Associates, November 23, 1972.

Eagles, Paul and Lamb, Larry. *Memorandum August 5, 1975* (Environmental Assessment Team - University of Waterloo)

Kershaw, P. *Analysis of Forwell Ltd., Vegetation Zones, and Preliminary Flora of Altrieve Lake*. OIKOS Associates, November 23, 1972.

Spicer, Julie - Neal, Shawn. *Ecological Update of E.S.P.A. 37 (Blair Swamp)*. Regional Municipality of Waterloo, August 31, 1994,

Spicer, Julie - Neal Shawn. *Ecological Update of E.S.P.A. 56 (Altieve Lake and Forest)*. Regional Municipality of Waterloo, August 31, 1994.

APPENDIX A:
CLASSIFYING CHARACTERISTICS FOR VEGETATION ZONES WITHIN E.S.P.A.'S (NORTH AND SOUTH SIDE OF SITE)

Ecological Update of E.S.P.A.56 (Altrieve Lake and Forest) and E.S.P.A. 37 (Blair Swamp)

| COMMUNITY TYPE | SITE CHARACTERISTICS |
|---|---|
| Upland Deciduous Forest | Northern portion of Carolinian Zone<br>Dominant tree species: Sugar maple, beech, white ash, shagbark hickory |
| Mixed Forest | Combination of coniferous and deciduous tree species: Hemlock, beech, white ash, red maple, white pine |
| Pine Plantation | Strictly pine tree species planted in uniform rows |
| Cedar thickets | Significant thick stands of cedar trees |
| Successional Growth | Area that has either had past disturbance or is in its natural process<br>Tree species: bucktorn, trembling aspen, dogwoods |
| Edge Vegetation Zone | Outisde disturbance (ie) agricultural land, roads, housing divisions<br>Tree/shrub species: Hawthorn, choke cherry, balsam poplar, trembling aspen, wild grape, elderberry, respberry |

| COMMUNITY TYPE | SITE CHARACTERISTICS |
|---|---|
| Shrub Swamps | Soil waterlogged, often covered<br>Tree species: willows, dogwoods, alders<br>Herbaceous vegetation: cattails, bulrush, sedges |
| Seasonally Flooded | Floodplain, bottom land-hardwoods to herbaceous growth |
| Wooded Swamps | Subcanopy growth tree species: tamarack, yellow birch, silver maple, hummocks of sedges/ ferns/sphagnum |
| Stream Valley | Sloped topography, rich humus soils along with seepage from springs "(artesian well)"<br>*Abundance of skunk cabbage<br>Tree species: yellow birch, red/silver maple, hemlock on drier sites |
| Open Fresh Water | Water less than 4m deep<br>Bordered by emergent vegetation ie: pondweed, naiads, waterlily |
| Fresh Marshes | Soil covered with 15cm to 90cm of water<br>Vegetation: cattails, reeds, bulrush<br>*Principal duck breeding area |

APPENDIX B-1:
SPECIES LIST- BLAIR SWAMP (NORTH SIDE OF SITE)

Ecological Update of E.S.P.A.37 (Blair Swamp) , Species List, 1994

VEGETATION:

| | |
|---|---|
| *Achillea millefolium* | Yarrow |
| *Actaea pachypoda/rubra* | Beneberry (both species present) |
| *Adiantum pedatum* | Maidenhair fern |
| *Agrimonia sp.* | Agrimony |
| *Allium tricoccum* | Wild leek |
| *Amphicarpa bracteata* | Hog peanut |
| *Anemone canadensis* | Canada anemone |
| *Anemone quinquefolia* | Wood anemone |
| *Apocynum adrosaemifolium* | Spreading dogbane |
| *Aquilegia canadensis* | Columbine |
| *Aralia nudicaulis* | Wilde sarsaparilla |
| *Arctium minus* | Common burdock |
| *Arisaema atrorubens* | Jack-in-the-pulpit |
| *Asarum canadense* | Wild ginger |
| *Asclepias incarnata* | Swamp milkweed |
| *Asclepias syriaca* | Common milkweed |
| *Aster corodifolius* | Heart-leaved aster |
| *Athyrium felix-femina* | Lady's fern |
| *Bidens frondosa* | Devil's pitchfork |
| *Btrychium vriginiamum* | Rattlesnake fern |
| *Brassica kaber* | Charlock |
| *Caltha palustris* | Marsh marigold |
| *Carduus nutans* | Nodding thistle |
| *Caulophyllum thalictroides* | Blue cohosh |
| *Chelone glabra* | Turtleead |
| *Chrysanthemum leucanthemum* | Common daisy |
| *Cichorium intybus* | Chicory |
| *Cicuta maculata* | Water hemlock |
| *Circaea quadrisulcata* | Enchanter's nightside |
| *Cirsium arvense* | Canada thistle |
| *Cirsium vulgare* | Bull thistle |
| *Coniioselimun chinense* | Hemlock-parsley |
| *Clytonia caronliniana* | Spring beuty |
| *Coronilla varia* | Crown-vetch |
| *Cypripedium calceolus var parviflorum* | Small yellow lady's slipper |
| *Cysopteris bulbifera* | Bulblet fern |
| *Daucus carota* | Queen Anne's lace |
| *Dentaria diphylla* | Toothwort |
| *Dianthus armeria* | Deptford pink |
| *Dipsacus sylvestris* | Teasel |
| *Dyropteris intermedia* | Intermediate wood fern |
| *Dyropteris marginalis* | Marginal shield fern |
| *Dyropteris spinulosa* | Spinulose wood fern |
| *Ecinocystis lobata* | Wild cucmber |
| *Epifagus virginiana* | Beech drops |
| *Epilobium glandulosum* | Willow-herb |
| *Equisetum arvense* | Field horsetail |
| *Equisetum scirpoides* | Dwarf scouring rush |
| *Equisetum sylvaticum* | Wood horsetail |
| *Erigeron sp.* | Fleabane sp. |
| *Erythronium americanum* | Trout-lily |
| *Eupatorium maculatum* | Spotted Joe Pye-weed |
| *Eupatorium perforatum* | Boneset |
| *Fragaria virginiana* | Common strawberry |
| *Galium mollugo* | Wild madder |
| *Galium triflorum* | Fragrant bedstraw |
| *Geum aleppicum var strictum* | Yellow avens |
| *Geum canadanse* | White avens |
| *Geranium maculatum* | Wild geranium |
| *Geranium robertianum* | Herb robert |
| *Gymoccarpium dryopteris* | Oak fern |
| *Habnaria psycodes* | Small purple-fringed orchis |

| | |
|---|---|
| *Hieracium gronovii* | Hairy hawkweed |
| *Hemerocallis fulva* | Day lily |
| *Hepatica acutiloba* | Sharp-lobed hepatica |
| *Hypericum perforatum* | Common St. Johnswort |
| *Hystrix patula* | Bottle-brush grass |
| *Impatiens capensis* | Jewelweed |
| *Iris pseudacorus* | Yellow iris |
| *Lemna minor* | Duckweed |
| *Leonurus cardiaca* | Motherwort |
| *Lilium michiganese* | Michigan lily |
| *Linaria vulgaris* | Butter-and-eggs |
| *Lobelia inflata* | Indian tobacco |
| *Lobelia siphilitica* | Great lobelia |
| *Lonicera tatarica* | Tartarian honeysuckle |
| *Lonicera canadensis* | Fly honeysuckle |
| *Lotus corniculatus* | Birdfoot trefoil |
| *Lycopus americanus* | Bugleweed |
| *Lycopus virginicus* | Bugleweed |
| *Lysimachia ciliata* | Ciliated loosestrife |
| *Lysimachia nummularia* | Moneywort |
| *Lythrum salicaria* | Purple loosestrife |
| *Maianthemum canadense* | Wild lily-of-the-valley |
| *Matricaria matricarioides* | Pineapple-weed |
| *Medicago lupulina* | Black medick |
| *Melilotus alba* | White sweet clover |
| *Melilotus ojficinalis* | Yellow sweet clover |
| *Mentha arvensis* | Common mint |
| *Mimulus ringens* | Square-stemmed monkeyflower |
| *Mitella diphylla* | Miterwort |
| *Monarda fistulosa* | Wild bergamot |
| *Myosotis scirpoides* | True forget-me-not |
| *Nasturtium officinale* | Watercress |
| *Nepeta cataria* | Catnip |
| *Oenathera biennis* | Common evening primrose |
| *Onoclea sensibilis* | Sensitive fern |
| *Osmunda cinnamomea* | Cinnamon fern |
| *Oxalis monata* | Wood sorrel |
| *Parthenocissus vitacea* | Virginia creeper |
| *Phlox divaricata* | Blue phlox |
| *Phrymaleptostachya* | Lopseed |
| *Plantago lan ceo lata* | Ribgrass |
| *Plantago major* | Plantago |
| *Pedicularis canadensis* | Lousewort |
| *Phryma leptostachya* | Lopseed |
| *Podophyllum peltatum* | Mayapple |
| *Polygala paucijolia* | Fringed polygala |
| *Polygonatum bijlorum* | Gaywings Solomon's seal |
| *Polygonum hydropiperaides* | Mild water pepper |
| *Polygonum pensylvanicum* | Pennsylvania smartweed |
| *Polystichum acrostichoides* | Christmas fern |
| *Potentilla anserina* | Silverweed |
| *Potentilla recta* | Erect cinquefoil |
| *Prenanthes alba* | Rough-fruited White lettuce |
| *Prunella vulgaris* | Heal-all |
| *Prunus virginiana* | Choke cherry |
| *Prunus pensylvanica* | Pin cherry |
| *Pteridium aquilinum* | Bracken fern |
| *Ranunculus acris* | Common buttercup |
| *Rhus radicans* | Poison ivy |
| *Rubus idaeus* | Red raspberry |
| *Rubus occidentalis* | Black-cap raspberry |
| *Rudbeckia laciniata* | Cut-leaved coneflower |

| | |
|---|---|
| *Rudbeckia serotina* | Black-eyed susan |
| *Rumex crispus* | Curled dock |
| *Sambucus canadensis* | American elder |
| *Sambucus pubens* | Red-berried elder |
| *Sanguinaria canadensis* | Bloodroot |
| *Sanicula marilandica* | Black snakeroot |
| *Sagittaria lalifolia* | Broad-leaved arrowhead |
| *Satureja vulgaris* | Basil |
| *Scirpus atrovirens* | Black bulrush |
| *Scutellaria epilobiifolia* | Common skullcap |
| *Senecio aureus* | Golden ragwort |
| *Silene cucubalus* | Bladder campion |
| *Smilacina racemosa* | False Solomon's seal |
| *Smilacina stellata* | Starry false Solomon's seal |
| *Solanum dulcamara* | Nightshade |
| *Solidago caesia* | Blue-stemmed goldenrod |
| *Solidago canadensis var canadensis* | Canada goldenrod |
| *Solidago flexicaulis* | Zig-zag goldenrod |
| *Solidago rugosa var rugosa* | Rough-stemmed goldenrod |
| *Streptopus amplexifolius* | Twisted stalk |
| *Symplocarpus foetidus* | Skunk cabbage |
| *Taraxacum ojficinale* | Common dandilion |
| *Thalictrum dioicum* | Early meadow-rue |
| *Thalictrum polygamum* | Tall meadow-rue |
| *Thelypteris palustris* | Marsh fern |
| *Tiarella cordifolia* | False miterwort |
| *Tragopogon sp.* | Goat's beard |
| *Trientalis borealis* | Starflower |
| *Trifolium pratense* | Red clover |
| *Trilium erectum* | Red trillium/Wakerobin |
| *Trillium erectum* | Red trillium/Wakerobin |
| *Trillium grandiflorum* | White trillium |
| *Tussilago farfara* | Coltsfoot |
| *Typha ongustifolium* | Narrow-leaved cattail |
| *Typha latifolia* | Common Cat-tail |
| *Uvularia sessilifolia* | Wild oats |
| *Verbascum thapsus* | Common mullein |
| *Verbena hastata* | Blue vervain |
| *Verbena stricta* | Hoary vervain |
| *Verbena urticifolia* | White vervain |
| *Vicia cracca* | Common vetch |
| *Vinca minor* | Periwinkle |
| *Viola sp.* | Violet |
| *Viola pubescens* | Downy yellow violet |
| *Vitus riparia* | Wild grape |
| *Waldsteinia fragaroides* | Barren strawberry |
| | |
| *Acer spicatum* | Mountain maple |
| *Acer negundo* | Manitoba maple |
| *Acer rub rum* | Red maple |
| *Acer saccharinum* | Silver maple |
| *Acer saccharum* | Sugar maple |
| *Berberis vulgaris* | Barberry |
| *Betula lutea* | Yetlow birch |
| *Betula papyrifera* | White birch |
| *Carpinus caroliniana* | Blue beech |
| *Carya cordiformis* | Bitternut hickory |
| *Carya ovata* | Shagbark hickory |
| *Celtis occidentalis* | Hackberry |
| *Comus alternifolia* | Alternate-leaved dogwood |
| *Comus rugosa* | Round-leaved dogwood |
| *Comus stolonifera* | Red oiser dogwood |
| *Corylus comuta* | Beaked hazel (Lackie property, near culvert off 71) |
| *Crataegus sp.* | Hawthorn |
| *Fagus grandifolia* | American beech |
| *Fraxinus americana* | White ash |
| *Fraxinus nigra* | Black ash |
| *Hamamelis virginiana* | Witch hazel |
| *Juglans nigra* | Black walnut |
| *Larix laricina* | Tamarack/larch |
| *Lonicera sp.* | Honeysuckle |

| | |
|---|---|
| *Lysimachia ciliata* | Fringed loosestrife (Ciliated loosestrife) |
| *Malus sp. Pyrus?* | Apple |
| *Morus alba* | Mulberry |
| *Ostrya virginiana* | Hop-hornbeam/Ironwood |
| *Physocarpus opulifolius* | Ninebark |
| *Picea glauca* | White spruce |
| *Pinus resinosa* | Red pine |
| *Pinus sylvestris* | Scotch pine |
| *Pinus strobus* | White pine |
| *Populus tremuloides* | Trembling aspen |
| *Populus balsamifera* | Balsam poplar |
| *Prunus pensylvanica* | Pin cherry |
| *Prunus serotina* | Black cherry |
| *Prunus virginiana* | Choke cherry |
| *Quercus macrocarpon* | Bur oak |
| *Quercus rubra* | Red oak |
| *Rhamnus cathartica* | Common buckthorn |
| *Rhamnus frangula* | Glossy buckthorn |
| *Rhus typhina* | Staghorn sumac |
| *Ribes americanum* | Wild Black Currant |
| *Ribes cynosbati* | Prickly gooseberry |
| *Salix discolor* | Pussy willow |
| *Salix sp.* | Willow |
| *Sambucus canadensis* | American elder |
| *Sorbus americana* | Mountain ash |
| *Thuja occidentalis* | White cedar |
| *Tilia americana* | Basswood |
| *Tsuga canadensis* | Eastern hemlock |
| *Ulmus americana* | White elm |
| *Ulmus thomasii* | Rock elm/Cork elm |
| *Viburnum trilobum* | High-bush cranberry |
| *Zanthoxylum americanum* | Prickly ash |

AVIFAUNA:

| | |
|---|---|
| *Agelaius phoeniceus* | Red-winged blackbird |
| *Anas platyrhynchos* | Mallard |
| *Ardea herodias* | Great blue heron |
| *Bonasa umbellus* | Ruffed grouse |
| *Branta canadensis* | Canada goose |
| *Buteo jamaicensis* | Red-tailed hawk |
| *Carduelis tristis* | American goldfinch |
| *Corvus brachyrynchos* | American crow |
| *Cyanocitta cristata* | Blue jay |
| *Dryocopus pileatus* | Pileated woodpecker |
| *Dumtella carolinensis* | Gray catbird |
| *Megaceryle alcyon* | Belted kingfisher |
| *Melospiza melodia* | Song sparrow |
| *Passerina cyanea* | Indigo bunting |
| *Picoides villosus* | Harry woodpecker |
| *Quiscalus quiscula* | Common grackle |
| *Sturnella magna* | Eastern meadowlark |

MOSS:

*Fissidens sp.*

FUNGI:

Aritist's fungus

AMPHIBIANS:

| | |
|---|---|
| *Bufo americanus* | Chorus frog spp. |
| *Hyla chrysoscelis/versicolor* | American toad Gray tree frog |
| *Plethodon cinereus* | Eastern red-backed salamander |
| *Rana sylvestris* | Wood frog |
| *Rana pipiens* | Northern leopard frog |

REPTILES:

| | |
|---|---|
| *Thamnophis sauritus* | Eastern ribbon snake |

FISH:

| | |
|---|---|
| *Salvelinus fontinalis* | Brook trout |

MAMMALS:

| | |
|---|---|
| *Castor canadensis* | Beaver |
| *Marmota monax* | Woodchuck |
| *Mustela vison* | Mink |
| *Ondatra zibethicus* | Muskrat |
| *Procyon lotor* | Raccoon |
| *Sciurus carolinenisis* | Gray squirrel |
| *Tamias striatus* | Eastern chipmunk |

APPENDIX B-2:
SPECIES LIST- ALTRIEVE LAKE AND FOREST (SOUTH SIDE OF SITE)

Ecological Update of E.S.P.A.56 (Altrieve Lake and Forest) , Species List, 1994

VEGETATION:

| | |
|---|---|
| *Achillea millejolium* | Yarrow |
| *Actaea pachypoda* | White baneberry |
| *Actaea rubra* | Red baneberry |
| *Apocynum androsaemijolium* | Spreading dogbane |
| *Apocynum sp.* | Dogbane |
| *Anemone canadensis* | Canada anemone |
| *Anemone quinquejoila* | Wood anemone |
| *Anemonella thalictroides* | Rue anenome |
| *Aquilegia canadensis* | Columbine |
| *Aralia nudicaulis* | Wild sarsaparilla |
| *Arisaema atrorubens* | Jack-in-the-pulpit |
| *Arctium minus* | Common burdock |
| *Asarum canadense* | Wild ginger |
| *Asclepias exaltata* | Poke milkweed |
| *Asclepias incarnata* | Swamp milkweed |
| *Asclepias syriaca* | Common milkweed |
| *Aster macrophyllus* | Large-leaved aster |
| *Athyrium jelix-jemina* | Lady fern |
| *Berberis vulgaris* | Barberry |
| *Botrychium virginianum* | Rattlesnake fern |
| *Caltha palustris* | Marsh marigold |
| *Chichorium intybus* | Chickory |
| *Chrysanthemum leucanthemum* | Common daisy |
| *Circaea quadrisulcata* | Enchanter's nightshade |
| *Convolvulus arvensis* | Field bindweed |
| *Coronilla varia* | Crown vetch |
| *Cysopteris bllibijera* | Bulblet fern |
| *DauClls carota* | Queen Anne's Lace |
| *Desmodium paniculatum* | Panicled tick-trefoil |
| *Dipsacus sylvestris* | Teasel |
| *Dryopteris spinulosa* | Spinulose wood fern |
| *Echinocystis lobata* | Wild cucumber |
| *Echium vulgare* | Viper's bugloss |
| *Epilobium glandulosum* | Northern Willow-herb |
| *Epipaetus helleborine* | Helleborine orchid |
| *Equiserum paillstre* | Horse-tail |
| *Eupatorium maculatum* | Spotted Joe-pye-weed |
| *Galillm mollugo* | Wild madder |
| *Geranium maculatum* | Wild geranium |
| *Geranium robertianum* | Herb robert |
| *Geum aleppicum* | Yellow avens |
| *Hemerocallis fulva* | Day lily |
| *Hepatica americana* | Round-leaved hepatica |
| *Hesperis matronalis* | Dame's rocket |
| *Hypericum perforatum* | Common St. Johnswort |
| *Hystrix patula* | Bottlebrush grass |
| *Impatiens capensis* | Jewelweed |
| *Iris versicolor* | Larger blue flag |
| *Leonurus cardiaca* | Motherwort |
| *Lepidium campestre* | Cow cress |
| *Lespedeza virginica* | Slender bash-clover |
| *Linaria vulgaris* | Butter-and-eggs |
| *Lycopus americanus* | Bugleweed |
| *Lysimachia ciliata* | Fringed loosestrife |
| *Lythrum salicaria* | Purple loosestrife |
| *Medicago lupulina* | Black medic |
| *Mitchella repens* | Partridgeberry |
| *Nepeta cataria* | Catnip |
| *Nuphar variegatum* | Bullhead-lily |
| *Nymphaea odorata* | White water-lily/Fragrant water-lily |
| *Oenothera biennis* | Common evening primrose |
| *Onoclea sensibilis* | Sensitive fern |

| | |
|---|---|
| *Parthenocissus vitacea* | Virginia creeper |
| *Plantago lanceolata* | Ribgrass |
| *Podophyllum peltatum* | Mayapple |
| *Potentilla canaderisis* | Dwarf cinquefoil |
| *Potentilla recta* | Erect cinquefoil |
| *Prenanthes alba* | White lettuce |
| *Pteridium aquilinum* | Bracken fern |
| *Ranunculus sceleratus* | Cursed crowfoot |
| *Rhus radicans* | Poison ivy |
| *Rosa sp.* | Rose |
| *Rubus idaeus* | Red raspberry |
| *Rumex crisp us* | Curled dock |
| *Sagittaria latifolia* | Arrowhead |
| *Sanicula marilandica* | Black snakeroot |
| *Saponaria officinalis* | Bouncing bet |
| *Satureja vulgaris* | Basil |
| *Scutellaria epilobiijolia* | Common skullcap |
| *Smilax herbacea* | Carrion flower |
| *Solanum dulcamara* | Nightshade |
| *Solidago altissima* | Late goldenrod |
| *Solidago canadensis var canadensis* | Canada goldenrod |
| *Solidago graminifolia* | Grass-leaved goldenrod |
| *Solidago X lutescens* | Goldenrod |
| *Sonchus arvensis* | Common sow thistle |
| *Streptopus sp.* | Twisted-stalk sp. |
| *Symplcarpus foetidus* | Skunk cabbage |
| *Trillium erectum* | Wakerobin |
| *Trillium grandiflorum* | White trillium |
| *Triosteum aurantiacum* | Wild coffee |
| *Typha angustifolia* | Narrow-leaved cattail |
| *Typha latifolia* | Common cattail |
| *Urtica gracilis* | Slender nettle |
| *Urticularia vulgaris* | Greater biadderwort |
| *Verbena hastata* | Blue vervain |
| *Verbena stricta* | Hoary vervain |
| *Verbena urticifolia* | White vervain |
| *Viburnum acerifolium* | Maple-leaved viburnum |
| *Vicia cracca* | Common vetch |
| *Vicia americana* | Purple vetch |
| *Vitis riparia* | Wild grape |
| *Waldsteinia fragaroides* | Barren strawberry |
| | |
| *Acer pensylvanicum* | Striped maple |
| *Acer negundo* | Manitoba maple |
| *Acer rubrum* | Red maple |
| *Acer saccharum* | Sugar maple |
| *Acer saccharinum* | Silver maple |
| *Acer spicatum* | Mountain maple |
| *Amelanchier sp.* | Serviceberry |
| *Carpinus caroliniana* | Blue beech |
| *Carya ovata* | Shagbark hickory |
| *Comus altemifolia* | Alternate-leaved dogwood |
| *Comus racemosa* | Gray dogwood |
| *Comus rugosa* | Round-leaved dogwood |
| *Comus stolonifera* | Red oiser dogwood |
| *Corylus comuta* | Beaked hazel |
| *Crataegus crusgalli* | Hawthorn |
| *Fagus grandifolia* | Beech |
| *Fraxinus americana* | White ash |
| *Hamamelis virginiana* | Witch hazel |
| *Juglans nigra* | Black walnut |
| *Larix laricina* | Larch |
| *Ostrya virginiana* | Hop hornbeam |
| *Physocarpus opulifolius* | Ninebark |
| *Pinus strobus* | White pine |
| *Populus balsamifera* | Balsam poplar |
| *Populus grandidentata* | Large-toothed aspen |
| *Populus tremuloides* | Trembling aspen |
| *Prunus seratina* | Black cherry |
| *Prunus virginiana* | Choke cherry |
| *Quercus macrocarpon* | Bur oak |
| *Quercus rubra* | Red oak |

| | |
|---|---|
| *Rhamnus cathartica* | Common buckthorn |
| *Rhamnus frangula* | Glossy buckthorn |
| *Rhus typhina* | Staghorn sumac |
| *Salix sp.* | Willow sp. |
| *Sambucus sp.* | Elder sp. |
| *Sorbus decora* | Showy mountain ash (Sorbus americana?) |
| *Thuja occidentalis* | White cedar |
| *Tilia americana* | Basswood |
| *Ulmus americana* | White elm |
| *Viburnum trilobum* | High-bush cranberry |
| *Viburnum rafinesquianum* | Downy arrow-wood |

AVIFAUNA:

| | |
|---|---|
| *Ardea heradias* | Great blue heron |
| *Branta canadensis* | Canada goose |
| *Dryocopus pileatus* | Pileated woodpecker |
| *Dumetella carolinensis* | Gray catbird |
| *Cardinalis cardinalis* | Northern cardinal |
| *Bombycilla cedrorum* | Cedar waxwing |

MAMMALS:

| | |
|---|---|
| *Castor canadensis* | Beaver |
| *Marmota monaxc* | Woodchuck |
| *Odocoileus verginianus* | Mink |
| *Ondatra zibethicus* | Muskrat |

REPTILES & AMPHIBIANS:

| | |
|---|---|
| *Ambystoma laterale Ambystoma maculatum* | Blue-spotted salamander Yellow-spotted salamander American toad |
| *Bufo americana* | Snapping turtle |
| *Chelydra serpentina* | Eastern red-backed salamander |
| *Plethodon cine reus* | Bullfrog |
| *Rana catesbeiana* | Green frog |
| *Rana clamitans* | Wood frog |
| *Rana sylvatica* | Northern leopard frog |
| *Rana pipiens* | |