Wetland Within Reach

Linking Nature to Culture in the Squamish Estuary Interpretive Gardens

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Submitted in partial fulfillment for the Master of Landscape Architecture
Landscape Architecture Program,
University of British Columbia

Vancouver, BC. Canada
09/20012 - 05/2013

Release Form

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West Barr Log Sort Reconsidered

Abstract

The decline of the forest industry in British Columbia has resulted in deserted former industrial land, no longer useful for logging operations. These spaces, formerly the working hearts of the community, are located in some of the most valued places within the region. This project explores ways in which to create a community outpost from the remains of a soon to be vacant log sort in the center of the Skwelwil'em Squamish Estuary Wildlife Management Area. In a rare opening in a powerful and sensitive landscape, this design seeks to improve the ability of the Squamish community to participate in the estuary environment. Creating a destination at the former log sort will concentrate human activity to a series of programmed gardens, which will facilitate the site's transition from industrial use to civic use, enabling the Squamish community to include this nearby wetland setting in its everyday activities and rituals. By giving this part of the estuary a role within the town, this design aims to ease the division that exists between the natural and cultural realm. In doing so the goal of this project is to improve the knowledge and appreciation that the Squamish community has for the wetland landscape which plays host to its town.

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Project Definition

"Ecological design needs to teach and convey with greater emphasis the possibility, indeed historically, the fact, that the dynamic interaction between humans and the ecological world can be positive and mutually beneficial" Mozingo 1997 p.57

We ask: what does is mean to be connected with nature? What are the sensations and emotions people associate with experiences in the natural world? Landscape design has the ability to shape environmental perceptions and inform the relationship people have with the landscapes they inhabit. This can be achieved in several ways. By mimicking the order of ecological processes, human interventions can be designed to blend in with their natural setting and, as such, should be the only determinate for the form of ecological landscapes (McHargg, 1992). However, this type of design is benign from the point of view of human perception. Alternatively, numerous Landscape Architecture theorists believe that ecological design should strive to set itself apart form its context and endeavour to be an iconic human expression on the land. Louise Mozingo maintains that landscape design should be used to capture an audience, elicit a reaction and stir people into taking notice of the ecological processes that permeate and sustain their lives.

Lukas Holy

Canadians have many opportunities for tangible contact with natural landscapes; landscapes which are still predominantly governed and defined by ecological rather than human processes. Society values this privilege, as underscored by a 2012 Ipsos Reid poll which showed that the Canadian wilderness is this country's most potent symbol of national identity (Boswell, 2012). However, while symbolically significant, it is debatable how involved people actually are in connecting with their natural surroundings. The global population is heading towards an uncertain ecological future, one in which perception and understanding of the natural world will no longer be a privilege, but a necessity. In the United States, a recent National Science Foundation report found that: "in the coming decades the pubic will more frequently be called upon to understand complex environmental issues, assess risk, evaluate proposed environmental plans and understand how individual decisions affect the environment at local and global

scales". Ecological landscape design has a role to play in encouraging the acknowledgment of our natural surroundings, educating the public in ecosystems we depend on, and mitigating the apathy many have towards their habitat. Achieving this should not be an uphill battle, as there are evident benefits to improving one's relationship with nature. For example, it has been shown that time spent in a natural setting can help relieve stress, reduce recovery time and impart other health benefits (Maas, 2009). Evocative ecological landscape design can improve peoples lives.

Participation in nature can reveal the crucial role our environment plays in supporting human existence. Ecosystem loss and habitat degradation are compelling contemporary environmental concerns. In response, landscape conservation efforts aim to protect and enhance the ecological function of ecosystems. However ecological management runs the risk of limiting the human experiential qualities of a landscape. Paul Gobster is critical of such conservation efforts, citing that many have: " pruned the spectrum of otherwise acceptable behaviors down to those of passive appreciative activities that are deemed appropriate for this revised context to ensure minimal degradation of the now fragile environment" (Gobster, 2007 p.105). The challenge for environmental management is to achieve a degree of environmental protection, while still providing opportunities for rich experiences and evocative human involvement. Joan Nassauer identifies landscape design as a mitigating factor, stating that: "If we probe the social language of landscape form and learn the conventions of landscape appearance, we can use these conventions to label ecological function." (Nassauer, 1992 p. 246) Drawing on the work of Mozingo, Nassaur, Gobster and others, this proposal will attempt to articulate a language of landscape form, capable of encouraging human participation in ecological landscapes.

Currently, landscape conservation practices do not effectively utilize human systems to meet their ecological goals. In Squamish BC, the Skwelwil'em Squamish Estuary Wildlife Management Area (WMA) fails to encourage human participation, and in doing so, fails to achieve benefits for both its visitors, and its wildlife habitat conservation mandate. This design proposal will explore ways in which the current access and human involvement in the WMA may be improved, in order to support the goal of wildlife habitat conservation.

The goals of this design proposal are to:

Reveal the environmental processes that shape the estuary landscape.

Enable Squamish residents to engage with the estuary landscape.

Celebrate the WMA's conservation strategies so that Squamish residents can enjoy participating in the estuary landscape.

Useful Terms

Environmental Aesthetics:

A field of philosophy that studies the ways in which humans experience the world through their senses. It is especially concerned with the appreciation of particular objects or environments when they strike the senses in a pleasing manner. (Carlson 1998, 2011)

Aesthetic Experience:

An experience of pleasure that is the result of perceiving one's environment.

Vernacular Landscapes:

Landscape expressions that are the product of local custom, employ a pragmatic adaptation to circumstances and are a reaction to unpredictable mobility (Jackson, 1984).

Wilderness / Nature / Natural Area / Wildland:

An area of open space where the formal qualities are predominantly the result of biotic process, rather than human processes.

Ecological landscape/ Ecological Realm:

An area of open space where humans have prioritized the influence of biotic processes.

Cultural Realm:

An area of open space where the formal qualties are predominantly the result of human processes.

A Landscape Language

Environmental Aesthetics

The second half of the 20th century saw a rise in the public awareness of concern over environmental health, issues of sustainability, and the threat of global climate change. The newly awakened will to do good by the environment, refocused landscape management strategies. Environmental aesthetics, a field of philosophy that deals with human appreciation of the world at large, experienced an ascendance during this time (Carlson 1998, 2011). While human and environmental systems operate at a variety of spatial and temporal scales there is a specific human "perceptible realm" at which people interact with their surroundings (Gobster et al., 2007a). Debates within environmental aesthetics attempt to understand the characteristics of landscape that are perceivable and how their appreciation may inform a person's environmental ethic and environmental action (Ward Thompson and Travlou, 2009).

Theoreticians within environmental aesthetics disagree on the role of cognitive processes in human appreciation of the natural environment. Those that subscribe to the 'non-cognitive' school of though emphasize the role of an affective response in the appreciation of nature. Emotional responses are characterized by a state of multi-sensory immersion which serves to unify the appreciator and the environment being appreciated (Carlson 1998, 2011). Researches who explore the restorative qualities of landscape likewise describe environments that have the power to illicit an affective response. This line of research uses empirical methods to demonstrate the relevance of the affective response in the appreciation of particular environmental stimuli (Kaplan, Kaplan, and Ryan, 1998).

Scenic Aesthetic Controversy

Non-cognitive appreciation of the natural environment is not without its detractors. Critics cite the subjective nature of the affective response to be a "shallow and fleeting" way of appreciating one's environment (Gobster, 1999). The chief criticism is that humans have been conditioned to appreciate a 'naturalist' interpretation of landscape popularized by 17th – 19th century traditions in landscape painting and landscape aesthetics. Consequently affective responses are biased towards environmental patterns that display qualities of picturesque scenery, rather than patterns that are characteristic of healthy ecological function. While the assertion of bias may be apt, advocates of perceptual based appreciation contend that the preference for scenic landscapes is rooted in more than just bygone aesthetic traditions. Parsons and Daniel cite the work of (Appleton, 1975) to advance an evolutionary rationale for the modern day preference of the 'Savanna' landscape, a type of scenery typical of enlightenment era imagery (Parsons and Daniel, 2001). The notion that the savanna landscape played a role in early human evolutionary origin is supported by studies that show similar landscape preferences across a number of different cultures (Parsons and Daniel, 2001). It is likely, therefore, that the perceptual appeal of savanna-like landscapes is a robust quality that has the ability to solicit a positive affective response from a broad range

of people within the population. A problem arises when picturesque landscape qualities do not correlate with healthy environmental function (Gobster 2007a). Consequently, it may be that popular scenic expressions of beauty are being undertaken at the expense of ecologically beneficial landscape alterations.

The Cognitive Experience

Work published by Paul Gobster, Allen Carlson advocates the elaboration of a cerebral approach to environmental aesthetics. Much like a work of art, which can be appreciated by recognizing the artist or particular design traditions, the world at large is replete with information that, if properly interpreted, can elicit a positive aesthetic response (Carlson 1998, 2011). The cognitive approach to nature appreciation requires that appreciator possess adequate knowledge and information about the environmental phenomena they are appreciating (Gobster et al., 2007a). By interpreting such information, the true aesthetic qualities of an environment reveal themselves. This approach may seem exclusionary, because of the emphasis it places on knowledge that may or may not be equitably available. Marcia Eaton contends that, while an update in our perceptual language is important, the abrupt shift to a purely cognitive method is premature and may prove ineffective (Eaton, 1990, Parsons and Daniel, 2001). In describing the way in which people perceive their surroundings Eaton writes: "One can communicate only within an already existent language and cultural sign system." (Eaton, 1990 Pg 2).

The cognitive and non-cognitive approaches to environmental appreciation are not mutually exclusive. In fact the most powerful appreciation of an environment is likely achieved when both feeling and knowing act together (Ward Thompson and Travlou, 2009). How-

The characteristic Savanna Landscape is an open ground plain covered by a low groundcover, punctuated by a water source and the occasional tree or shrub.

Chelem Trail: Squamish Rive Estuary

Photo: Karli Witzke

18th century, Enlightenment Era portrayal of the idyllic 'Picteuresque' landscape.

View of Snowdon from Llyn Nantlle
By Richard Lewis
circa 1766

ever, one must concede that purely scenic, landscape appreciation, can at times lead to behavior that is not supportive of proper ecological function (Gobster et al. 2007). In such instances landscape design can employ our well-established perceptual language to tune human appreciation towards the value of ecological systems. To achieve this, the language cannot be dismissed as 'scenic' or 'picturesque', it must be broken down to its constituent parts so that it may be used to reveal the true nature of ecological landscapes.

Visibility

Little though is invested into making ecological design interventions perceivable by people. The work of an ecological designer is applied, and then assumed to be noticed (Lyle, 1994). Louise Mozingo laments the invisible nature of ecological landscapes, writing that there is: "No coherent landscape language which mediates their ecological language" (Mozingo, 1997, p. 50). Yet, designers posses the ability to display the inherent elegance of ecological processes in visible forms (Lyle, 1994). While there is often a desire to convey the ecological message of a place, as for an example through interpretive signage, design falls short of encouraging people to read the landscape itself. Designed landscape has the capacity to make ecological values visible and culturally significant (Mozingo, 1997). Part of this effort must be to elevate ecological landscapes from the mundane, to the meaningful. By championing ecological landscapes as iconic, designing for ecologi-

Design Principle
Make ecology iconic

cal function can gain a broader acceptance (Mozingo, 1997). Evocative ecological interventions can be designed to be perceived, and to function ecologically.

Access

In discussing perception, the design of ecological landscapes is not dissimilar to the to the design of other elements in physical space. Principles of urban design, for example, can be adapted to encourage the legibility of design work done within the ecological realm. Design of the urban world traditionally weights human processes heavily in helping to determine decisions of form. Finding ways to translate this urban design language to the ecological realm may benefit the visibility of ecological interventions (Mozingo, 1997).

Design Principle
Establish a hierarchy of access to the site

The unparalleled access of many urban and rural landscapes is often an underdeveloped quality of ecological landscapes (Mozingo, 1997). The ease with which a person is able to read a landscape is influenced by the qualities of the pathways available to allow its exploration. The sequences of experiences expressed along such pathways influence the coherence and legibility of the space (Kaplan et al., 1998). Pathways, along which one's line of sight is consistently obscured, are undesirable from a legibility perspective. Equally, pathways that offer consistent unobstructed views of one's route are also unfavorable as they reveal too much of the experience all at once (Kaplan et al,, 1998). A successful pathway is one that allows its users to comprehend the overall structure of the route they are on. As one travels along the route, experiences should reveal themselves in sequence. A path should divulge only that which is necessary at any one point in time.

Design Principle
Create a legible path system

By further drawing on urban design theory, one can begin to flush out the important physical characteristics of paths. These can then be employed in order to visibly express variations in access to ecological landscapes. Kevin Lynch discusses how the consistency, of the formal qualities of a path, helps target it as a unified feature in the mind of the people using it (Lynch, 1960). Furthermore, Lynch emphasized how varying the spatial qualities of paths within a path system, can help establish hierarchies of importance, in the metal image people have of the access available to a particular landscape (Lynch, 1960). Varying qualities such as the width of a path, or continuity of its surfacing can help establish greater legibility of access.

A visual exposed pathway is perceived as important (Lynch, 1960). Seeing movement along a route from an alternate vantage displays its usefulness to those observing it. Similarly, points of exaggerated visibility *from* a path emphasize points along particular routes (Lynch, 1960). As discussed earlier, in the sequences of scenes along a route, vantage points help add variety to the user's experience and, as a result, help bring focus to specific elements within the landscape. The layout of a path system tends to be best identified when the paths involved have defined origins and destinations (Lynch, 1960). However paths in the ecological realm are often circular loops, which lack satisfactory destinations. Loop paths further emphasize the importance of a defined sequence of experiences. Within the sequence, particular experiences can serve as landmarks, which can take the place of a destination.

Scale

Ecological processes and biotic interactions that define landscapes in the ecological realm occur at scales ranging form the microscopic, to the global. There is an assumption that environmental processes are inherently unperceivable by virtue of people's inability to

adequately visualize how they work. Indeed it is often only certain manifestations of ecological processes that are visible to people (Nassaur, 1992). These visible elements are often the only product of ecological processes that people can perceive (Nassaur, 1992). Design work focused on showcasing some of the functional underpinnings of a landscape must focus its efforts on what Gobster and collogues term the 'Perceptible Realm' (Gobster, 2007a). For ecological design to have a human impact, interventions must focus on addressing the physical patterns in relationships that occur at a scale perceptible to humans. This is the scale at which humans intentionally make changes to their landscapes, so it is therefore the relevant scale at which to demonstrate an environment's qualities.

Design Principle
Express processes of unperceivable scale by highlighting their manifestations in the perceptible realm

Contrast

Contrast is at the heart of designed landscape aesthetics. Whether one considers a 'Picturesque' park in the middle of a gridiron city or a multi-acre green roof amongst the densely packed towers of a downtown core, people are captivated by the tension of contrasting juxtaposition. Ecological design, however, tends to employ gradients in favour of expressions of contrast. Designers such as Ian McHarg and Jen Jensen were all too happy to render their interventions indistinguishable from the natural context within which they worked (McHarg, 1969, Mozingo 1997). Yet, invisible interventions do little to help awaken interest in the audience of the ecological realm.

Expressions of contrast can be undertaken at various scales in the ecological domain. This type of expression is useful in revealing the transition between areas of heterogeneous character. For example, transitions between plant communities and habitat types warrant demarcation. Design interventions can be employed to highlight the change in experiential qualities of one character area to another. Kevin Lynch describes an analogous concept when he discusses importance of defining homogenous 'Districts' in order to reinforce a person's conceptual framework of a city (Lynch, 1960). Lynch sees value in emphasizing the contrast of separate character areas because the 'vividness' of well differentiate districts can help people appreciate the order of a place in the face of confounding factors such as a complex circulation system (Lynch, 1960).

Design Principle
Improve site legibility by highlighting the difference between heterogenous areas

The expression of contrast is important in defining the boundaries of a space. Where the urban realm meets the ecological realm, the peri-urban edge is a visible demarcation of a change in spatial quality. The difference across this edge is destined to become more conspicuous over time as the urban density on one side intensifies. The Crosby Arboretum is an example of a conservation area that appears more and more visible as urbanity becomes an ever-closer neighbour (Brzuszek, Clark, 2009). As in the case of many peri-urban wildlands, the position and quality of the peri-urban edge is often the result of the fleeting interaction between economic and ecological forces (Jackson, 1984). John Brinckerhoff Jackson calls for a more purposeful and conspicuous delineation of such edges. Jackson advocates demarcating boundaries in a way that gives visible, corporeal identity to a place (Jackson, 1984).

Design Principle
Establish purposeful site boundaries

Temporality

Static interventions in the ecological realm run counter to variable ecological processes. In fact, ecological function can be considered synonymous with change. Contrary to previously held beliefs, most ecosystems are on a trajectory rather than at a steady state equilibrium (Pollack, 2007). Temporal processes which propel landscapes along this path are difficult to comprehend (Lyle, 1994) Linda Pollack extols the value of differentiating a design site in terms of its relevant concurrent processes (Pollack, 2007) In doing so, a design may enable the perception of a location's shifting identities and habits. (Pollack, 1997). Others believe that the best way to celebrate the temporal characteristics of a place is to provide a permanent construct to serve as a reference (Mozingo, 1997, Brzuszek and Clark, 2009). In the urban realm permanence is prized, allowing for temporal juxtaposition translates a common biotic condition to a human convention.

Design Principle
Allow the temporal variation of site processes to inform the spatial layout of the design

Design Principle
High light temporality with permanent landmarks

Repeating Form:

Ecological landscapes do not exist within a recognizable system of form.The physical patterning in the ecological realm is the result of a biological rationale, an organizational system that is difficult for people to appreciate (Mozingo, 1997). The layering of ecological processes can result in an incredible diversity of form, creating further difficulty for human perception. Joan Nassauer writes that 'nature cannot speak for itself' and warns that: "Ecologically valuable remnant landscapes may not be protected or maintained if the human intention to care for the landscape is not apparent." (Nassauer, 1995 p.161). The term "Nature" is often attributed to a range of landscape types of various degrees of human intervention. The vast majority of landscapes, that a person might encounter, experiences some form of anthropogenic impact. Yet human intention is not always expressed in a way that people can perceive. Nassauer and Mozingo agree that the

interpretation of ecological landscapes can benefit from the physical expression of obvious human imposed redundancies (Mozingo 1997, Nassauer 1995). Formal repetition is comforting in the physical environment, and yet it is rarely experienced in ecological design. (Mozingo ,1997). As the level of landscape complexity rise a corresponding level or redundancy should stand in contrast (Mozingo, 1997). Reiterated form can serve as a universal aesthetic language so that natural landscapes don't have to be continuously reinterpreted (Mozingo, 1997).

Design Principle
Show human intent with repetitive formal arrangements

Cues to Care

Visible cues that show a landscape has been tended to are helpful in labeling ecological function. Joan Nassauer famously put forth the idea of encompassing 'Messy Ecosystems within Orderly Frames' (Nassauer, 1995). Orderly Frames fall into a group design principles intended to showcase human intention within a landscape. These 'Cues to Care' are a means of communication between ecological landscapes and their human audience. The cues represent human intention in a spatial form within the landscape. They connote ownership, responsibility and stewardship (Nassauer, 2011). Their condition and craftsmanship represents neighborliness and civic pride (Nassauer, 2011).

Cues to Care:
Structures in Good Repair
Orderliness
Even surfaces and crisp edges
Boundaries
Signs and ornaments

(Nassauer, 2011)

Metaphor:

More often than not metaphorical content is omitted or underdeveloped in the design of ecological landscapes (Mozingo, 1997). Louise Mozingo laments that the design expression that is the result of this omission is marked by a 'dreary utility' where the landscape lacks meaning beyond that of its ecological performance (Mozingo, 1997). The lack of a place for metaphor in the landscape shuts access to cultural connection and restrains the possibilities for reflection (Mozingo, 1997). Employing a culturally meaningful set of signs and symbols allows a landscape to communicate a conceptual message beyond that of its readily perceivable ecological function (Howett, 1987). Perceptual signs are a result of cultural conditioning; they are a programmed set of associations which infuse content and meaning into a particular culture's experience of a landscape (Howett, 1987). Marcia Eaton goes as far as to suggest

that cultures are, to a certain degree, enslaved by the conditioning that informs their perception of the world (Eaton,1990). However Eaton believes that the clever expression of metaphor in the landscape is precisely the tool necessary to broaden peoples horizons and potentially reveal the many functions that ecological landscapes perform. In her essay, *Systems, Sign, Sensibilities: Sources for a New Landscape Aesthetic*, Catherin Howett invokes the words of Joseph Grange to underscore the importance of expressing cultural meaning in landscape design. Grange writes:
"When a designer looks at an environment, three principles must be foremost in his mind. First, things are meanings, not material objects. Second, these meanings are nodal points of expression that open out into a field of relationships. Third, the goal of environmental design is to knot together these concentrations of meaning so that the participant-dweller can experience the radial unity that binds up these different qualities."
Mining a landscape for cultural meaning provides the fertile ground necessary for landscape expressions that stitch together the realms of the ecological and the cultural.

Design Principle
Express the cultural associations imbedded in landscapes

The Vernacular Landscape

Landscape interventions that have ecological functions are more likely to be understood, accepted and perpetuated if they address local cultural expression (Nassaur, 2011 IFLA). Marcia Eaton writes that successful metaphor can only be communicated within an already existing language and cultural sign system (Eaton, 1990). The Vernacular landscape, as this language is often termed, is the true expression of a particular place. To borrow John Brinckerhoff Jackson's description, the vernacular landscape can be identified with "local custom, pragmatic adaptation to circumstance and unpredictable mobility"(Jackson, 1984 p.xii). Vernacular landscape is a form of expression that is evolutionarily rooted in a specific locale, sometimes even originating from ecological elements (Mozingo, 1997). Successful expression of the vernacular landscape requires that the intended audience is fluent in the local sign language. Indeed expression of an obscure part of the language may lead to a kind of elitism, which excludes too many from the experience (Mozingo, 1997). Therefore when contemplating the breadth of the audience with whom to share the message, a designer must carefully consider the point of departure for his or her metaphorical commentary.

Design Principle
Use metaphors to suggest new associations

Successful Metaphor

Using Metaphor to stretch one's perception of a landscape is achieved by extending old meanings in new directions (Eaton, 1990). Marcia Eaton writes that: " Good metaphors draw attention to some property that we have not noticed before, or they open up a comparison that we have not made before and we find it apt appropriate or amusing. (Eaton,1990 p. 5)
Successful metaphors, the ones that stretch perceptions the most, do not reveal themselves immediately. Instead landscape should reveal itself slowly, obscuring the full breadth of its meaning so as to captivate its audience (Howett, 1987). Nevertheless, a metaphor eventually needs to provide the audience satisfaction of an "aha" moment (Eaton,1990). To avoid obsolescence, expressions of metaphor can utilize the characteristic temporal variation that occurs in ecological design settings. Cyclical temporal change in landscape can repeatedly renew the meaning of a metaphor, maintaining a compelling message. Stale or cliché metaphors should be avoided as they quickly become trivial and forgettable elements in the landscape.
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Context:

The success of human lead ecological design is in establishing a context for appreciation, rather than neglect or apprehension. Certain landscapes, such as wetlands, the subject of this proposal, are faced with an image problem. Cultural aesthetic conditioning has resulted in an aversion for wetland environments. Linda Pollack describes the historic contempt for wetlands as: "dangerous, disease-carrying environments. They became used as dumps because they were perceived to be no better than dumps." (Pollack, 2007 pg.96) Yet the recent ecological veneration of wetlands has inspired new attitudes towards their management. No longer are they avoided out of fear of human injury, they are avoided for fear of their disturbance (Pollack, 2007).

Modern day landscape restoration efforts often assuage feelings of guilt caused by the historic degradation landscape. The restored landscape can become a symbol of common healing for the people represented by it (Pollack, 2007). However that feeling cannot be fully expressed if overzealous management practices close the door to human involvement. A reflective landscape can only be achieved when society moves past a museum like vision of the ecological world (Mozingo, 1997, Gobster, 2007). Louise Mozingo reacts to the way ecological space is: "removed from the everyday life and usurped as a setting for the ritual transitions of human life." (Mozingo, 1997 p.55) The appreciation of nature can be achieved through a variety of human rituals many of which are compatible with ecological values. The separation of nature and people is a myth not generally propagated in the community of interest, Squamish, British Columbia.

Design Principle
Encourage the use of the ecological realm as a venue for everyday human rituals

The culture of outdoor appreciation in Squamish is well developed compared to many other communities. Evidence to this end is the significant popularity of participation in wilderness based leisure activities (SPRMP, 2012). In proposing a set of human based ecological design principles, Louise Mozingo made the fundamental assumption, that: 'humans yearn for a persuasive aesthetic experience in the landscape' (Mozingo, 1997). That assumption is genuinely plausible in Squamish, a community that has been primed for landscape involvement. The process of creating the context for appreciation of a new landscape needs to endow participants with a sense of control (Eaton, 1990). Marcia Eaton quips: "Someone in a burning house will not be likely to enjoy the color or shape of the flames." (Eaton, 1990p. 3) Landscape design can help establish a physical framework to establish control and subsequently stretch the community's perceptual boundaries. Furthermore Eaton suggests that to influence the aesthetic preferences of the public a designer's audience must have certain level of cultural homogeneity. In short, for a design to communicate, enough people must speak

the same language. In Squamish the language is that of 'fun in the outdoors'. Given that Squamish is one of BC's fastest growing communities despite no appreciable growth in employment from the years 1986 – 2001, it is safe to assume that the draw to the community is that of lifestyle (DOS, 2010). Assuming that the Squamish lifestyle is in large part defined by its relationship with the outdoors, the population can be described as exceptionally appreciative of pleasure derived in outdoor leisure. A community literate in the language of outdoor aesthetic experience is likely to respond positively to human based ecological design.

Lukas Holy

Site Description

Economic Landscape

The dominant industries in the British Columbia's economic landscape are rearranging. Accompanying changes in land use will warrant a fresh approach to the way communities, formerly dependent on resource extraction, relate to their resource rich setting. In British Columbia the relative importance of forestry and logging has been in the decline since 1990 (Manufacturing, 2011). The manufacturing industry, which was formerly focused on processing the abundant natural resources harvested throughout the province, is experiencing a transformation. Sawmills and pulpmills, the main vehicle of forest product manufacturing, have seen employment and percent of provincial GDP drop since 1990 (Manufacturing, 2011). In the Squamish Lillooet Regional District (SLRD) this economic evolution is especially poignant, as two such key employment facilities , (Woodfiber Pulp Mill and the Squamish Saw Mill) have closed in the past generation. The economic base of the district has shifted from forestry to tourism, public service, agriculture and service industries (BC Stat, 2012). While the stunning natural beauty is a significant draw to the district, the Sea to Sky corridor is also gaining a reputation for great tourism attractions and destinations. Land use decisions in the SLRD should reflect the changing relationship that local communities have with the hinterland landscape.

The decline in resource based industrial manufacturing has been accompanied by abundant vacancies on land formerly used by relevant facilities and infrastructure. As a result, communities previously dependent on forestry and logging have seen an increase in the amount of vacant, formerly industrial land (Figure 1). Ex-industrial land, also known as brownfield land, represents a valuable resource for communities wanting to grow and restructure. By virtue of their past use, brownfields are usually well situated within the community. They often sit in positions that are well connected to both community centers and the hinterland. As a result, determining the future function of ex-industrial land will be an issue of critical importance to the future development and identity of many communities in British Columbia.

Many communities in British Columbia, including Squamish, are beginning to embrace tourism as the base of their economy. As this trend continues, brownfield development can serve to alleviate some of the pressures that such a transformation can bring about. Rising population coupled with an increase in housing densities and a desire to showcase more natural scenery to visitors will raise the need for wilderness open space access close to town. Ex-industrial sites strategically

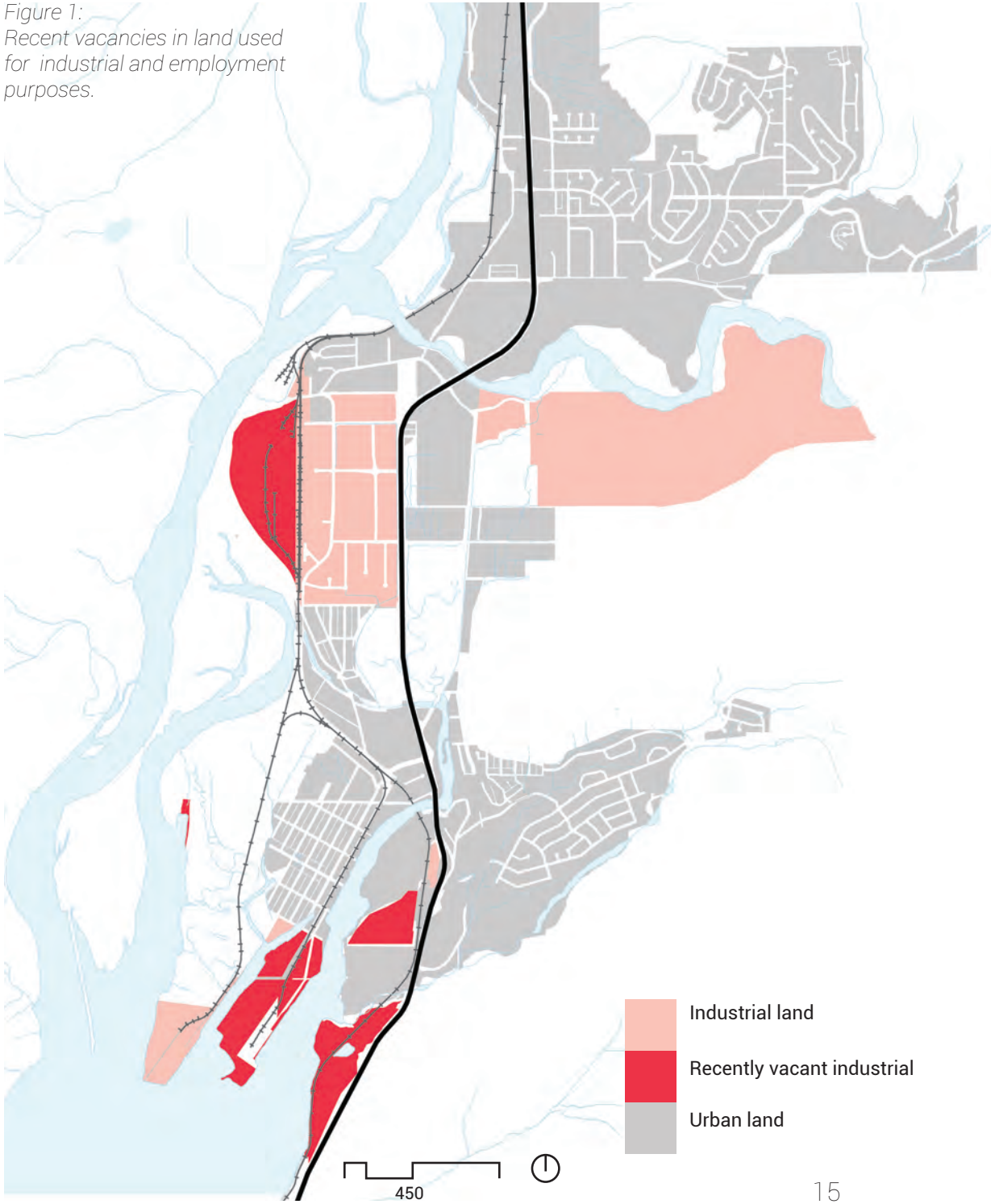


Figure 1:
Recent vacancies in land used for industrial and employment purposes.

located on the urban-wilderness edge can help meet some of this open space demand.

Concurrently, ever-stronger calls for sustainability and resource conservation discourage any brownfield development beyond that of ecological rehabilitation. Many brownfield sites, especially those formerly associated with the logging industry, are located in highly sensitive and ecologically important locations. Waterways and wetlands, in particular, are areas valued for the abundance of ecosystem services that they supply. Brownfields in these areas are often surrounded by highly biologically active landscapes that provide critical habitat for migratory birds, waterfowl and economically important species such as salmon. In addition to maintaining biodiversity, wetlands can help mitigate floods, protect coastal areas from storms, filter water, and recharge ground aquifers. There are those that believe that future brownfield uses in these sensitive areas should exclusively serve the purpose of rehabilitating ecological function.

Demand for Natural Open Space Access

Squamish BC is a growing community experiencing a real estate boom that is the result of its role in hosting the 2010 Winter Olympic games. From 2006 – 2011 Squamish was ranked 1st in percent population growth amongst British Columbia municipalities (French, 2012). The city is projected to growth by nearly 50% over the next twenty years (DOSa, 2010). Recent improvements to the Sea to Sky highway have made Squamish an attractive bedroom community for large parts of the Lower Mainland. Even before the highway project was finished, already 12% of Squamish residents were employed outside of the regional district (DOS, 2010). The town attracts new residents on the merits of its proximity to a range of outdoor recreational destinations in a spectacular setting nestled in BC's

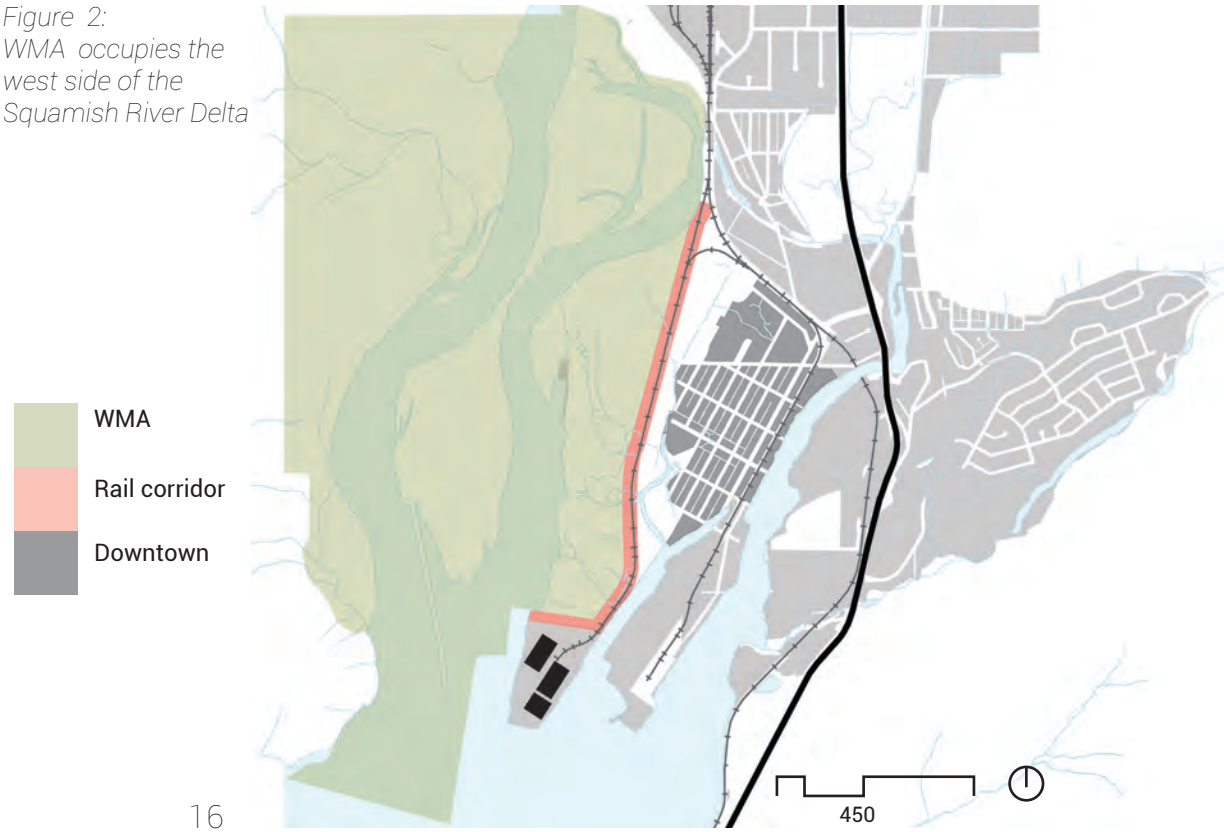
Coastal Mountains at the head of the Howe Sound.

Squamish markets itself as 'The Outdoor Adventure Capital of Canada', a branding strategy that is largely supported by local residents (SPRMP, 2012). Many residents actively participate in sport outside the city with over 40% of the population identifying as mountain bikers (SPRMP, 2012). Consequently, positive experiences through sport in the outdoors define the relationship that many Squamish residents and visitors to the area have with the landscape that surrounds the town. Not surprisingly Squamish is a young community, where approximately 60% of the population falls bellow the age of forty (SPRMP, 2012). Half of the households have children, indicating that many local residents have put down roots and are planning on growing old in the area (SPRMP, 2012). As this large age cohort gets older, Squamish will experience a shift in the way a big part of its population experiences the town's most notable amenity: nearby wilderness. Consequently, the town will need to provide opportunities for its residents to diversify their relationship with the outdoors. Priorities may include natural area access that is suitable for people of impaired mobility.

Densification of the Squamish downtown began in earnest in the lead up to the 2010 Winter Olympic Games. Although slowed by the global economic downturn, and the uncertain economic conditions that followed, 7,900 dwelling units are forecast to be added to the city by 2031 (OCP, 2010). This represents a 130% increase in units from 2006 (OCP, 2010). Much of this increase is forecast to take place in the downtown precinct in the form of apartment and townhouse development (OCP, 2010). The type of urban development anticipated will add unprecedented density and urban character to the town. The projected growth in population will increase the demand for accessible green space proximal to downtown and its neighbouring communities. As a result, a new and untested edge condition will develop between the town and its green setting.

The supply of natural green space directly adjacent to downtown Squamish is plentiful, but access to the area is limited (Figure 2). The closest wilderness open space to the downtown precinct is the provincially administered Skwelwil'em Wildlife Management Area (WMA). This 673 hectare conservation area is composed of the undeveloped and formerly industrial part of the Squamish River delta. Located directly west of the downtown the WMA is separated from developed areas by a narrow corridor of land currently zoned for industrial and commercial purposes. A BC Railway Company line that connects to the Squamish deep-sea terminal runs the length of the corridor and acts as the most prominent feature of separation between the WMA and the

Figure 2: WMA occupies the west side of the Squamish River Delta



city. The corridor is currently undeveloped and is largely populated by an early seral stage riparian forest.

As previously discussed, the Squamish residents are passionate recreationalists. However, while much of Squamish is located in a floodplain, most of the recreational activities that make the city famous occur in the mountains. Only two parks, (Rose Park and Fisherman's Park) within the municipal park system, capitalize on the characteristic features of the floodplain landscape. Judd Beach and the banks of the Mamquam River offer limited access to a floodplain experience in the form of an informal trail system. The Nexen Lands site is the city's most popular waterfront access point, however the area is in a state of flux. While the site currently hosts a waterfront interpretive trail, its character will significantly change under the current area development plan. Visitors looking for a less urban waterfront experience may once again turn to the land now protected within the WMA, a popular waterfront destination prior to the opening of the Nexen Lands.

Although not officially developed for leisure purposes, much of the WMA is used in some kind of recreational capacity (Figure 3). Activities such as windsurfing and kite boarding have grown in popularity in the vicinity of the southern end of the training dyke. Paddling sports such as kayaking, canoeing and paddle boarding are popular along the convoluted coast of the Squamish River delta. The Central Channel and Crescent Slough are especially suited for leisurely paddle, offering shelter from the winds that often agitate the waters of Howe Sound. The tidal channels that perforate the deltaic lowlands are tempting paddling destinations when sufficient water levels allow entry. There are however only a few areas where a person can pull their craft out of the water. Unofficial boat launches dot the cost, but their use is not encouraged due to fear of damage to the fragile shoreline.

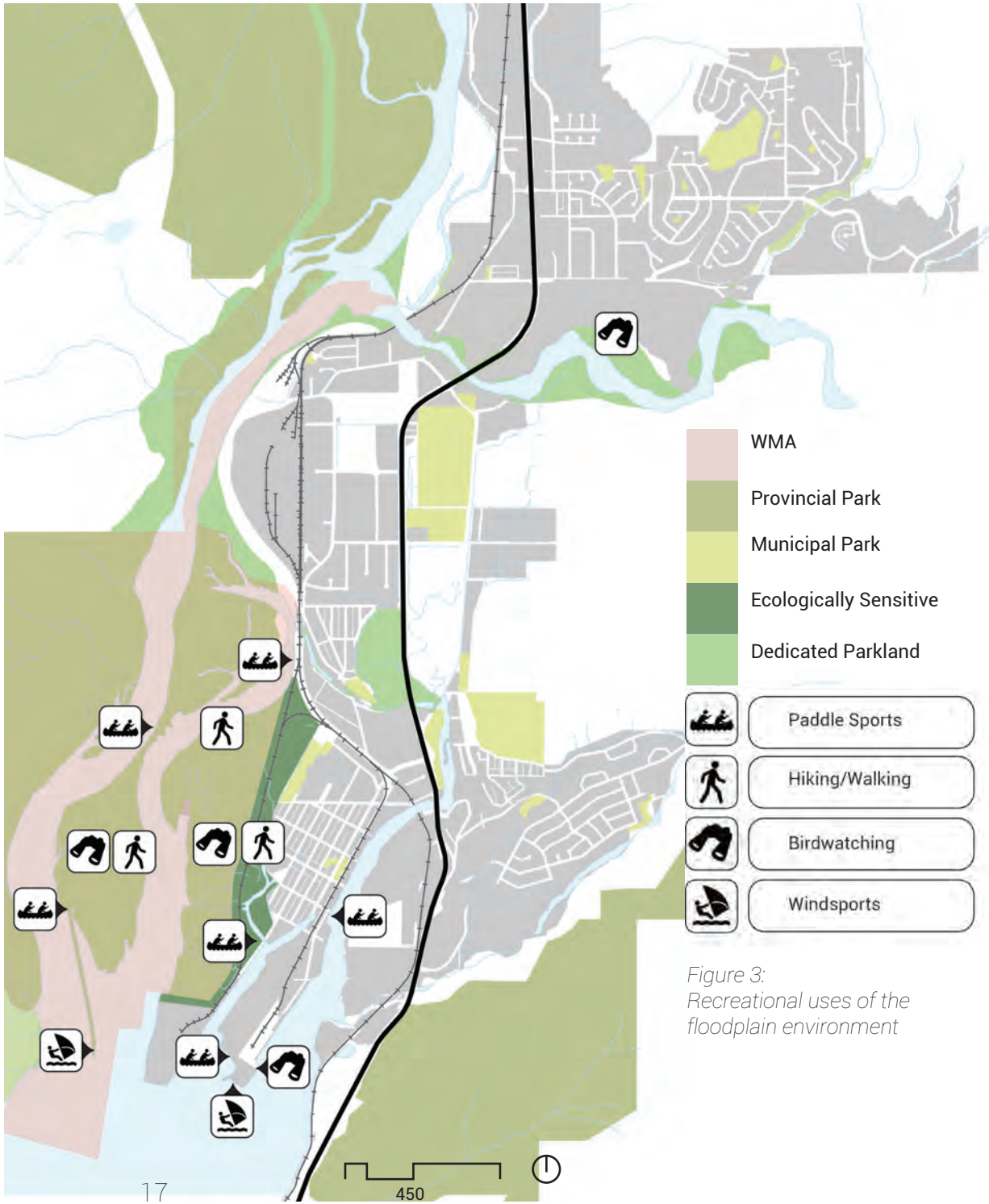


Figure 3:
Recreational uses of the floodplain environment

The eastern half of the WMA is uniquely accessible on foot from downtown, by virtue of its proximity and thanks to the perfectly flat terrain typical of a river delta. The area is currently punctuated by a number of informal pedestrian trails, many of which are maintained solely by local volunteer organizations. Trails in the WMA offer opportunities for nature exploration and wildlife observation. Trails in the areas known as North Fields and Uplands Meadow follow a system of dykes built at the turn of the twentieth century by settlers wishing to drain the estuary land for use as pasture (Joseph, 2012). Currently, the heritage dykes are in poor repair, as they no longer fulfill their function of controlling the flow of water around the former agricultural plots. The heritage dykes have been overtaken by vegetation, their structure compromised by a tangle of roots. As a result, sections of the trail system are discontinuous and trails that were once loops no longer provide undisrupted access. Both the Old South Dyke Trail and the Old North Dyke trail terminate at points on the BCR track right of way. However, use of the railway right of way is not encouraged as part of the trail system.

Human Influence

The delta lands west of downtown Squamish have been heavily modified over the course of human settlement in the Squamish River valley. The most substantial changes occurred over the first half of the twentieth century when the delta seemed destined to become an area of heavy industrial activity. In 1971 a dyke was built along the lower reaches of the Squamish River (SRWS, 2008). The purpose of this structure was to isolate the flow of the river to the western portion of the delta, thereby protecting the Eastern Delta from seasonal water fluctuations (SRWS, 2008). The plan was to build a number of industrial facilities on the newly protected land east of dyke (Dupuis, 2003). However a dip in the economy as well as a crash in salmon stocks in the late 1970s shifted development priorities in Squamish and the full build out was never achieved (Dupuis, 2003). The passing of the Fisheries Act in 1974 lent an increased urgency in the protection and creation of salmon habitat in British Columbia (Dupuis, 2003). Before the training dyke was built, the Squamish River delta played a vital role as habitat for juvenile salmonids and other fish species (SRWS, 2008). However, by severing access to the river, salmon were no longer able to easily enter the central and eastern deltas and benefit from the unique hydrologic conditions important to their development. To encourage a two-way flow of water between the freshwater environment in the Squamish River and the salt water environment in the tidal influenced delta, ten culverts were installed along the length of the Squamish River dyke (SRWS, 2008). Central Channel and Crescent Slough are still disconnected from the major flow of the Squamish River,

however, the mixing of fresh and saltwater has been partially restored and the conditions for salmon survival have improved. The creation and rehabilitation of salmon habitat remains a priority in the WMA, as degradation of upstream salmon habitat is often compensated for by improvements in the delta ((SRWS, 2008). Between the years 2001 and 2006, three tidal channel creation projects were undertaken in the North Fields and Upland Meadows areas of the WMA (SRWS, 2011).

Log Sort

West-Barr Contracting Ltd. Operates the only brownfield facility within the boundary of the WMA. The log sorting and storage area is located on the east bank of the Central Channel in the area of North Fields (Figure 4). The ten acre facility is to be decommissioned when the current lease holder's contract expires in the fall of 2014. Upon clearing the site, a berm at the north end of the site is to be breached, in order to restore two-way tidal flow to the area (BCMEESD, 2007).

The log sort is located in an area formerly occupied by a low lying salt marsh. The surface of the site is composed of compacted fill that sits two to three meters higher in elevation than the surrounding wetland landscape . As a result the site is much drier and less saline than it was prior to its industrial use. Compaction by heavy machinery has caused the surface of the site to become less pervious than its surroundings (Dupuis, 2003). As a result the site sheds water as surface stormwater runoff, which concentrates contaminants and causes erosion to the banks of the Central Channel (Dupuis, 2003). A 'boom pocket' used as water access for machinery moving timber in and out of the water was cut out of the existing coastline. An orthogonal impression on the land is visible topographical evidence of the site's industrial use. The 2007 WMA management plan suggests that at some time in the future, the

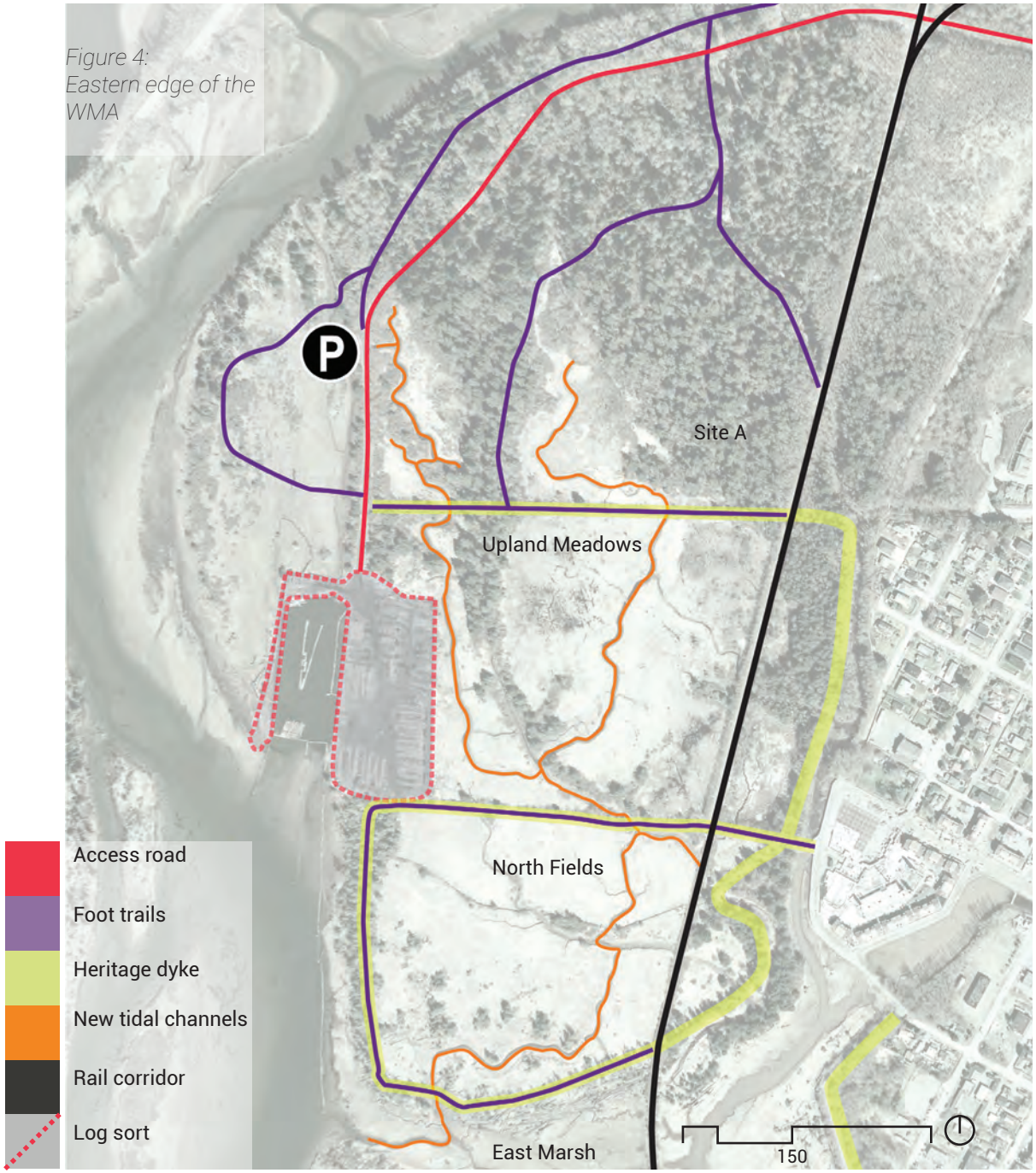


Figure 4: Eastern edge of the WMA

area should be restored to a productive wetland habitat (BCMEESD, 2007).

Recreational uses are not uncommon in areas adjacent to the Log Sort. There is a small parking bay at the end of access road to the site. This 5 car pull out represents one of the few places where public vehicular traffic is tolerated in the WMA. The parking areas provides access to a local fishing spot as well the Swan Trail which runs along the south bank of Crescent Slough. A connection between the North Old Dyke Trail and the South Old Dyke trail has been proposed for the log sort site once it is vacated (Dupuis, 2003).

Conservation Features

The vision of Skwelwil'em Squamish Estuary Wildlife Management Area is to ensure stewardship of fish and wildlife habitat throughout the western half of the Squamish River delta. (BCMEESD, 2007). Human involvement has historically been a key factor in the management of this area. All signs indicate that human systems will continue to play a key role in enacting the WMA vision. The trust of this design proposal will be to champion human systems in forwarding the first two goals of the 2007 Skwelwil'em Squamish WMA Management Plan goals:

1. *Maintain and restore fish and wildlife species and their habitat.*
2. *Use an integrated management approach in managing activities and uses compatible with WMA objectives.*

(BCMEESD, 2007)

Spatial and Temporal Attributes of some key inhabitants of the Squamish River Estuary

The Estuary

Within the Squamish River Delta lays the Squamish River Estuary. The western part of the estuary remains relatively undeveloped despite being an area significantly influenced by humans. The Squamish Estuary is unique in the Puget Trough due to its morphological features, deltaic environment and plant community assemblages (Hutchinson 1988). Confluence of fresh and salt water in one place is the defining characteristic of the estuary environment. Estuaries are considered the transitional areas between the river and the sea. They are special, because they are tidally driven environments, which are sheltered from the full force of the ocean's wind and waves. (Dupuis, 2003).

Estuaries are some of the most biologically productive ecosystems in British Columbia. Important in the lifecycles of two thirds of all fish and shellfish, the Squamish Estuary plays host to a variety of migratory and overwintering birds (Dupuis, 2003). Downtown Squamish residents can also be considered estuary inhabitants, although heavily altered, their habitat is part the estuary environment.

Key Plant Communities

The interplay between topography and hydrological condition is the determining factor in the distribution of plant assemblages and by proxy animal communities throughout the estuary. Moreover, plant community distribution is highly dependent on levels and frequency of saltwater inundation. Distribution of nutrient sources and nutrient cycling also plays an important role in the spatial and temporal organization of the estuary (Dupuis, 2003).

Estuaries are highly fertile ecosystems because they receive nutrient inputs from both marine and freshwa-

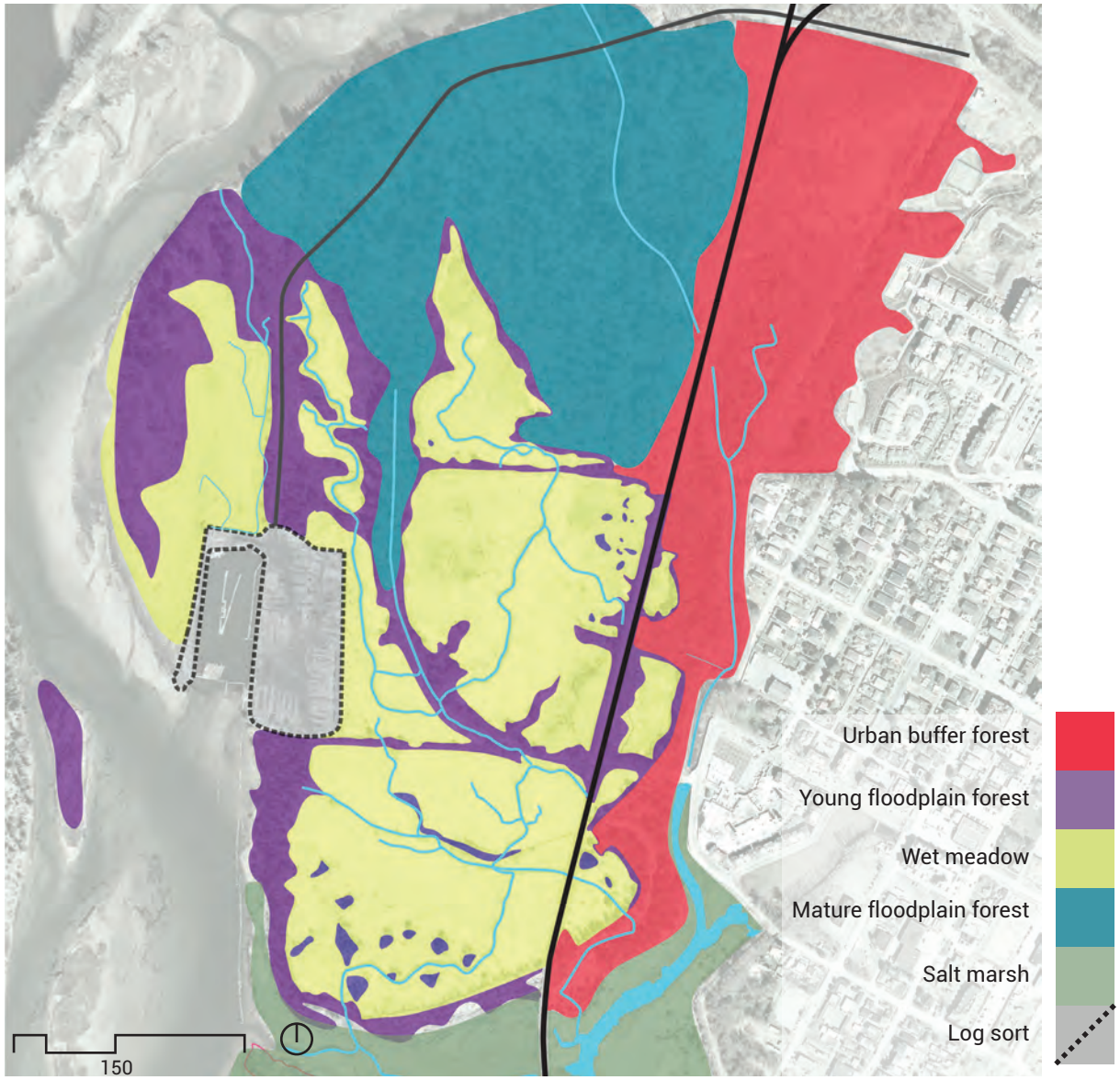


Figure 5:
Key Plant Communities of the eastern edge of the WMA

ter sources. Tidal action helps distribute these nutrients, resulting in a high level of biological productivity. The two primary sources of nutrient flow are the detritus and grazing pathways. Grazing pathways have phytoplankton as their energy base. They are dominant at the lowest estuary elevations, in deep clear seawater along sand and mudflats. (Kennish 2002). Phytoplankton are numerous in the srpring and fall when the combination of sunlight and high nutrient concentration cause a surge in populations. The summer season is less productive as high water turbidity obscures light penetrating bellow the water's surface. (Kennish 2002,) Organic matter originating from vascular plants serves as the energy base in the detritus food pathway. Food webs of this kind are most conspicuous in low elevation areas of frequent tidal inundation such as salt marshes and Eelgrass (Zostera marina) beds (Kennish 2002). The dieback of vascular plants in the fall coincides with yearly high tides, allowing nutrients from low elevations to be deposited in upland meadows (Joseph, 2012).

Benthic algae is also an important nutrient source that populates low laying areas including tidal flat sediments, mudflats, seagrass beds and salt marshes (Dupuis, 2003). Benthic algae is most numerous in the summer and prefers environments with low freshwater input such as areas in the East Delta (Dupuis, 2003). Blooms are most often located around pilings, logs and in soft sediments at low elevations (Dupuis, 2003).

Upland, shrub meadows and forests belong within the Coastal Western Hemlock biogeoclamatic zone (LMRESD, 2007)(Figure 5). Small mammals, their predators, as well as foraging bird species make use of these upland areas especially when daytime tides are at their highest (Dupuis, 2003). In the Gerogia Basin, high estuarine meadow of the scale found in the Squamish Estuary, is unique. However this type of habitat is being reduced as a result of human intervention in the North Fields area of the estuary (Page, 2004).

For over fifty years shrub thicket has been replacing wet meadow habitat due to industrial practices, such as dyke creation and dredge spoils disposal (Page, 2004). Berming, a result of excavated fill placement, at the edges of newly excavated tidal channels is creating strips of elevated land that are susceptible to the spread of shrubby non-wet meadow vegetation (Page, 2004). The built up land sits approximately 2-3 meters

above that of the meadow elevation. This land is drier than its surroundings and it no longer receives periodic seawater inundations.

Mature forest found in Site A in the WMA is beginning to show old growth characteristics such as: canopy gaps, mixed age classes and a diverse species composition (Dupuis, 2003). This forest serves to protect the meadows to the south from north winds and adjacent land uses (Dupuis, 2003). The value of such mature stands in the floodplain environment is particularly pronounced, since valley bottoms are susceptible to deforestation and are therefore over represented with early seral stage woodlands (Dupuis, 2003). Tall coniferous trees accommodate different animals than deciduous trees, or shrubs do. Patches of mature forest provide stepping-stones of connectivity to habitat in the mid and upper parts of the Squamish Valley. This type of mature forest (100-140 years) is particularly uncommon near urban centers (Dupuis, 2003).

Key Fish Communities

The brackish water in the estuary provides an important transition zone between saline and freshwater environments for a number of fish species. Most of these fish frequent the estuary on their journey to spawning areas from feeding grounds in the nearshore ocean (Dupuis, 2003, LMRESD, 2007). The creation of favorable habitat conditions for economically important fish species has been a priority for Squamish Estuary management since the 1970s. Salmon are integral to the estuary food web, providing nutrients during spawning periods as well as a source of food for predators such as bald eagles. Consequently salmon bearing tidal channels have significant ecological value for the lower watershed. Maintenance of these channels in terms of long term water quality, microclimate and habitat attributes is thus important (Dupuis, 2003). Channel banks throughout the Central Basin, (Crescent Slough, Central Channel, North Fields, Upland Meadows and East Marsh) have been classified as sensitive areas by the Department of Fisheries and Oceans (LMRESD, 2007).

Salmon are found in the estuary throughout most of the year. Juvenile salmonids, use the estuary as a rearing ground on their way out into the open ocean in the spring and summer (Dupuis, 2003). The warm nutrient rich waters are vital for their survival (SRWS, 2008) . The most numerous of the estuary's transionary users, salmonids, also take advantage of tidal channels for their abundance of food and protection from predation (Dupuis, 2003, LMRESD, 2007). Chinook utilize the estuary the most of any salmon species (Dupuis, 2003). Their fry spend as long as 3 months in the estuary often inhabiting stream edges and complex microecosytems near log jams (SRWS, 2008, Golder Associates, 2005). Most stream restoration efforts in the WMA are focused on Chinook Salmon (Page, 2004). Nevertheless five different species of salmon pass though the estuary as they migrate up the river from mid summer all the way through winter (Dupuis, 2003).

Other fish species of special concern in the WMA are Bull trout and Stealhead. Bull trout are known to move from fresh to salt water and do therefore use parts of the estuary. Bull trout are a blue listed species. Stealhead have seen a drop in populations due to human induced habitat destruction (Dupuis, 2003).

Although historically and culturally important, herring have seen their numbers dwindle since the construction of the training dyke (Dupuis, 2005). Herring spawn in the spring amongst seagrass beds in tidal mud flats near the delta front (Dupuis, 2005).

Key Bird Communities

The estuary hosts a large diversity of local and visiting bird species (Figure 6). Bird populations play a significant role in the estuary food web by controlling prey populations and altering both terrestrial and aquatic plants (Dupuis, 2003). The Fall and spring migrations see the highest use of the estuary by migrating bird populations, while non-breeding water birds dominate the estuary in the summer months.

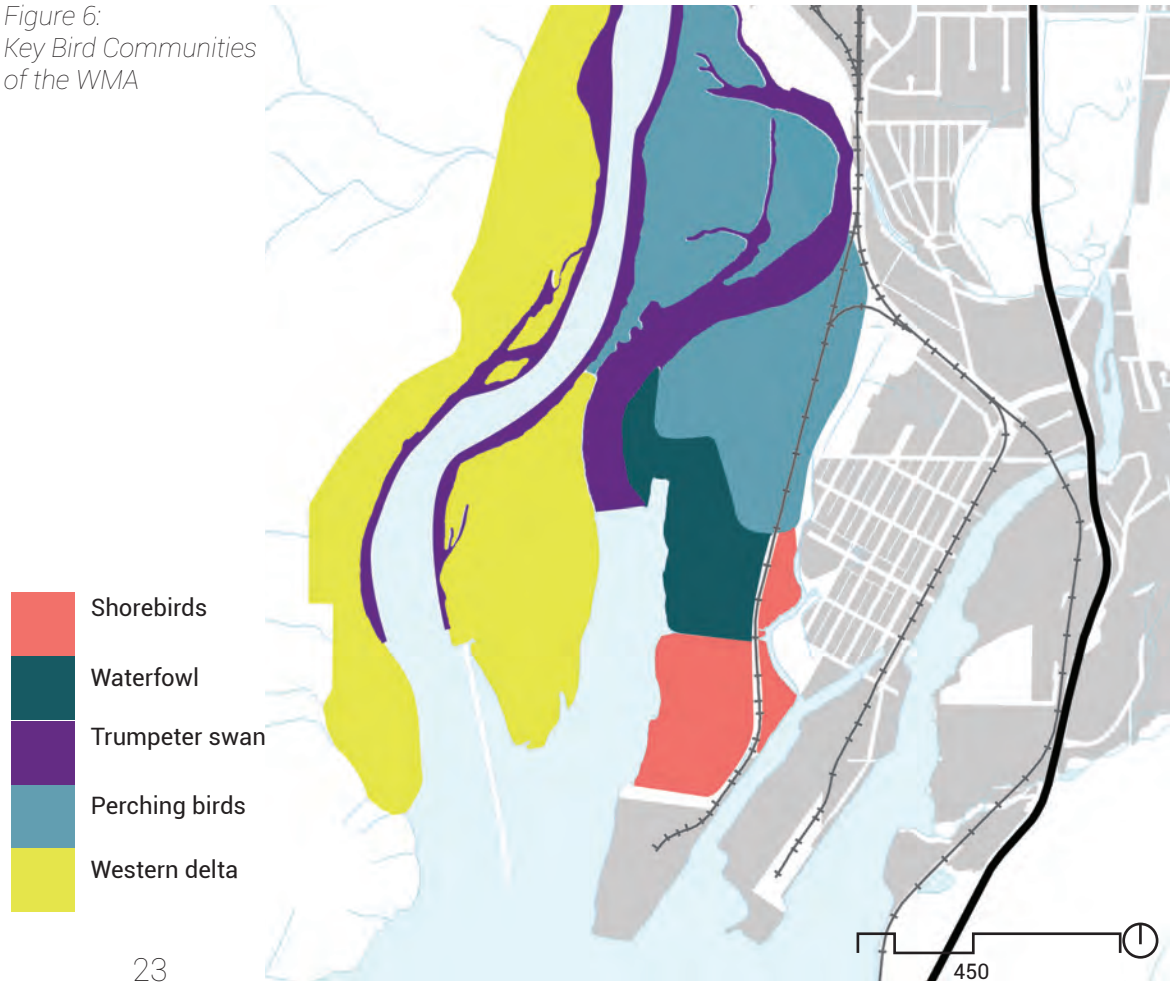
The North Fields area of the WMA is dominated by dabbling waterfowl communities such as Pintails and Teal (Dupuis, 2003). These winter residents navigate in flooded tidal channels in search of food. Dabblers appreciate gradual grade at channel edges to allow a greater variety of movement.

Trumpeter swans have seen a population increase in the last two decades. While they have been known to use Crescent Slough and the north end of the Central Channel, they are often sighted in eddies of the Squamish River.

Migratory shorebird communities are subject to particular conservation interest as their numbers in Squamish are low do to estuary's isolation from similar habitats in the Fraser Delta (Dupuis, 2003). East Marsh and the area east of the WMA known as Bridge Pond are the most important habitats for shorebirds. These types of birds enjoy low intertidal environments with gradual grade to facilitate navigation in their search for food (Dupuis, 2003).

The Pileated Woodpecker is a keystone species of the floodplain forest found in the heart of the WMA (Dupuis, 2003). This species inhabits a contiguous patch of mature forest found in the vicinity of North Fields and Site A . Pileated Woodpeckers require large trees and snags found in forests with oldgrowth attributes (Dupuis, 2003). Their major role in this ecosystem is to provide tree cavities that are used by raptors, wood ducks and mid-sized mammals (Dupuis, 2003). The oldgrowth characteristics of this part of the forest help sustain a high diversity of species.

Figure 6:
Key Bird Communities of the WMA



Ecotones

Ecotones are areas of exceptional species diversity that exist at the confluence of two or more distinct habitat areas. Interactions between plant and animal communities specifically attracted to edge conditions can lead to unprecedented species richness and biological productivity. From the point of view of the human participant, these areas offer the opportunity for exceptionally unique aesthetic experiences. However an ecotone can also constitute a fragile condition, a product of finely balance inputs that can be easily be tipped from equilibrium. Therefore, planning of human interpretation of ecotone areas must consider the outcome of disturbances associated with human participation.

The defining ecotone of the estuary environment is the confluence of freshwater and marine ecosystems. However, ecotones are expressed in variety of scales in the estuary, providing both numerous opportunities and constraints for landscape design.

Bridge Pond

Bridge Pond has the highest bird diversity of any area in Squamish Estuary (BSC data duoted in Dupuis, 2003). Species richness at Bridge Pond can be attributed to the site's position at the confluence of five habitat types[1] , which are bisected by a brackish slough. Benthic algae growth is exceptionally high at Bridge Pond due to the periodic inundation with nutrient rich stormwater runoff which originates downtown. However the area is unprotected, as it lies outside the boundary of the WMA (Dupuis, 2003). Bridge Pond has industrial/ commercial zoning and is under scrutiny for development (Dupuis, 2003).

Bridge Pond

1. low and mid level tidal saltmarshes, high shrub meadows, riparian borders, and interior floodplain forest

Urban Buffer

Urban Buffer

The riparian buffer at the eastern edge of the WMA is a particularly important feature in the transition between the urban and estuary environments. A high degree of vertical stratification in the buffer vegetation allows for visual and auditory barriers between urban and wildlife areas. Deciduous trees in this zone die young and provide rotten wood as habitat and nutrient input into tidal channels (Dupuis, 2003). The area provide important nesting, roosting, and perching habitat for birds foraging in adjacent meadows and marshlands (Green Shores, 2007). Many species seek out this environment for thermal refuge (Dupuis, 2003) .

The riparian zone serves a number of functions including amelioration of the negative effects of stormwater runoff from downtown. Riparian vegetation also provides flood control and helps prevent stream bank erosion. Currently the buffer protecting the eastern side of the WMA is intact, save for a 400m gap near Crescent Slough (Dupuis, 2003). However, the future of the area is in question, as it is being considered for use as a transportation corridor to the Squamish marine terminal (Aldous, 2012).

Water's Edge

The edges of tidal channels are an area of special consideration for conservation (BCMEESD, 2007). The shores of the Main Channel and Crescent Slough, as well as the edges of smaller rearing channels created for juvenile salmonids, showcase the transition from marine to terrestrial environments. Tidal fluctuation result in edge conditions that differ significantly depending on the grade of channel shores. There is a need to establish gradual slopes on the banks of some tidal channels to facilitate their use by water birds (Dupuis, 2003). Careful consideration must be put into the distribution of fill material accrued during restoration work such as stream creation. Creation of riparian habitat associated with berming must be balanced with the retention of continuous tracts of scarce meadow habitat. Other human made structures such as piers and piles can be valuable in that they provide substrate and shelter for epiphytic plants and benthic invertebrates (Green Shores, 2007) However care must be taken to ensure they are not toxic to higher order animals (Green Shores, 2007).

Precedent Study

Project: Tudela (Club Med) Restoration

This deconstruction of a former Club Med Resort, followed by the rehabilitation of its former location, is said to be the largest environmental restoration project on the Mediterranean Coast. Located at Cep de Creus in Eastern Spain, the site is now a highly protected natural conservation area. Restoration efforts in this area achieved several notable goals. First, removal of all exotic invasive species. Second, removal of all 430 former resort buildings. Third, 100% of the construction waste was recycled. Fourth, the site was re-graded, to mimic the natural topography, restore original drainage systems, sediment flows and exchanges between the land and sea. Fifth, design interventions throughout the site focused on human 'discovery' and 'social valorization' of the natural scenery and cultural landscape. (EMF, 2012).

Interventions

The area features a defined hierarchical path system that includes former resort paths and encourages circular routes. The circulation system is split up into three access types. Notable differences between path types include: surfacing material, surfacing continuity, and route selection. Site access differs with path type. Vehicular access is available on the primary system, while the tertiary path type offers a 'travel at your own risk' type of access. The tertiary path is expressed as a trace of movement along the land, demarcated by discontinuous elements such as patches of surfacing.

Design Principle
use a variety of route difficulty to differentiate access and path hierarchy

Distributed along the path system are pictogram silhouettes of rock formations found throughout the landscape. These pictograms remind those who notice them of a rock formation identification game played by kids and fishermen in the area. For those not privy of this cultural context, the cutouts offer a puzzle that begs to be solved.

Design Principle
display abstract representations of the landscape

The materials and formal language used throughout the interventions in this project serve to both connect and contrast with landscape being designed. The clean edges and level surfaces of the path system and viewpoints stand in contrast the excessively gnarled and diverse profiles of the rock formations on site. The

messy patina of Corten steel used throughout the site is often displayed in close juxtaposition to a similar type of patina that occurs naturally in the landscape. In this way, the design reveals normally invisible environmental processes to its visitors, and encourages a deeper understanding and appreciation of the site.

Design Principle
Translate environmental processes into recognizable urban processes


emf.cat


intothelandsape.no

Project: Seljord and the Legends

The "Seljord and the Legends" project was commissioned by the Seljord Municipality in an effort to support and expand the local tourist economy(Consept, 2012). The aim of the project is to use art, architecture, and landscape to celebrate normally hidden, layers of the local cultural fabric (Consept, 2012). The Seljord lakes area has a rich storytelling tradition, including a nationally renowned myth about a lake monster (Consept, 2012). The landscape plays an important part in defining and informing this distinct cultural characteristic. The starting point of the "Into the Landscape" phase of the project was to map all places associated with local stories and legends. Interventions that attempt to spatialize the stories where then applied to the areas identified.

Interventions

Highlighting the setting of local stories are eight, individually designed, 'Viewing Stones'. Each stone frames the view of the location where a story took place and depicts a sculptor's interpretation of an element from that story. This vantage also offers a place to rest and one can listen to the story be told via a phone service.

Design Principle
guide attention to important elements of the landscape

Students from NABA, Politecnico di Milano and Fredrikstad School of Scenography, designed and built several points of interest along the circulation system which accesses Seljord Lake. One of these structures is a bench, shelter and fire pit integrated into the rocky shore of a local fishing spot. The design's minimalist form integrates it well into the landscape, while still providing a functional structure that enhances the experience of a local tradition.

The most visible of the elements of this project is a 15 meter high lookout tower and accompanying boardwalk. The tower, designed by, Rintala Eggertsson Architects, gives a new vantage over the lake famed to house the Seljord Lake Monster 'Selma'. A raised boardwalk, designed by Landscape Architects Feste Grenland, demarcates the lake/land edge and provides an illuminated pathway through a wetland to the tower.

Design Principle
provide unique perspectives of vantage

Project: Crosby Arboretum

The Crosby Arboretum is a pioneer native plant exhibition. The project was developed in the 1980s when bioregionalism was not yet fully accepted as a valid inspiration for landscape design. Nevertheless the vision of the arboretum, from day one, has been to exhibit vegetation patterns and physical process that are found in local plant communities (Brzuszek and Clark, 2009). The 64 acre, former strawberry farm, was redesigned by Edward L Blake Jr, with help from Andropogon Associates Ltd.. Their goal was to develop a holistic approach to interpreting local landscape (Brzuszek and Clark, 2009).

Interventions

The site was split into three thematic exhibits, each characterize of a landscape type typical of the Pearl River Drainage Basin (Brzuszek and Clark, 2009). Guided by a desire to allow the landscape to "express itself", the displays are allowed to evolve along a path typical to that of a natural area (Brzuszek and Clark, 2009). Visitors are confronted with a changing exhibition as the landscapes pass through stages of succession. Over time the grassland-savannah exhibit takes on the characteristics of a woodland in certain parts of the park.

Design Principle
Celebrate the product of managment practices

Design Principle
Allow interpretive program to change with the landscape

Fire is a formative element of the local landscape so the arboretum was compelled to showcase its effects within the exhibition (Brzuszek and Clark, 2009). Every winter prescribed burns make a spectacle of a fire event within the grounds. Burning back the savannah and arresting its advance through succession is revealed to arboretum visitors as the grassland proceeds through cycles of growth and fire.

To contrast the dynamic nature encouraged in the plant exhibits the arboretum is tied together by the permanence and repetition of architectural elements designed by Fay Jones. An iconic interpretive center as well as numerous other structures of a similar style guide and comfort the visitor throughout the site. The style is an abstraction of the formal qualities found in the pine forest setting, allowing the architecture to blend seamlessly into the site. (Hardy, 1996)

Project: Crissy Field

Crissy Field is the site of a 20 acre wetland restoration project located near the base of the Golden Gate bridge. Completed by Hargreaves and Associates, the project is an example of a successful wetland restoration within a public park. Prior to work being done, a majority of the 100 acre site was a military airfield and derelict industrial storage yard (Portter, 2003).

Interventions

To bring the elevation of the brownfield site down to the level of a functional salt marsh 230,000 cubic yards of soil was removed from the restoration area. This fill was then deposited at the former airfield to create a picnic area and other recreational amenities. A grass field constructed with the fill was created in the shape of the historic airfield (Hargreaves Associates).

Design Principle
use waste material to create space for human enjoyment

Some areas of the site, where fill was deposited, were sculpted with undulating landforms, reminiscent of the marks imprinted on the site by wind and tidal action. The forms are sculptural in nature, and stand in sharp contrast to the otherwise flat site (Hargreaves Associates)

Design Principle
use landforms that stand in contrast to the natural form of the site

Zoe Evamy
Interprative
Imagery

Project: Chelem Trail

The Chelem Trail, (also known as Seagrass Trail) was developed as part of ongoing ecosystem restoration work being conducted throughout the Squamish River estuary by Fisheries Renewal BC and the Squamish River Watershed Society. This project is an example of the successful creation of a nature trail within an wetland restoration area. The restoration area was once a dredge spoil site, which was used to store sediment collected from the bottom of the Squamish river during the construction of the Squamish River training dyke (Pope, 2004). The dredge material that was deposited on site, covered and area of 250m^2 (Pope, 2004). Deposition of dredge spoils at the site destroyed the native wetland ecosystem and changed the hydrological conditions such that wetland vegetation could no longer grow there. The purpose of the restoration was to restore the wetland ecosystem in this area.

Design Principle
Use vegetation to faciliate human use of ecological landscapes

Interventions

The majority of the site was reduced in elevation, by 0.6m, to allow for the restoration of an intertidal lowland (Pope, 2004). A 300m berm was left at the original level, creating an elevated land form that meanders through the lowland (Pope, 2004). A hiking/cycle trail was built

Design Principle
use waste material to create space for human enjoyment

Karli Witzke

at the top of this berm. The berm has the form of a loop, which both begins and ends at the training dyke road. The trail has been planted with upland, vegetation that stands in sharp contrast to the vegetation that populates the lowland. The shrubby woodland vegetation serves to screen human visitors of the trail from the wildlife that populates the low land.

The trail offers a unique vantage from which to observe the many bird species that use this part of the Squamish estuary. An interpretive sign system is being developed, to inform visitors of what animals they can hope to see in this environment, . A local artist was employed rendered the sign imagery. Hopefully, the sign system will be a both captivating and educational addition to the restoration site.

Project: Mapelwood Flats

The Maplewood Flats Conservation Area is home to the last undeveloped waterfront wetland on the north shore of Burrard Inlet (Banning-Lover, 2001). The area was a derelict industrial site until local interest groups petitioned to preserve it as a wildlife sanctuary (Banning-Lover, 2001). Maplewood Flats is an example of an ecological restoration project that is inspired by the human desire to be in nature. The goal of the site design was to create a "living classroom" that will benefit the local community (Banning-Lover, 2001).

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Interventions

Maplewood flats was protected to permit the pubic to observe wildlife. Consequently, the area provides unprecedented access to a number of distinctly different bird habitat types. Three kilometers of wheelchair accessible trails wind their way through marsh, forest, meadow and mudflat habitats ((Banning-Lover, 2001).

Design Principle
Celebrate ecotones

Design Principle
provide meaningful access to nature for people with impaired mobility

The site layout at Maplewood Flats caters specifically to people who enjoy to watch birds. Lookouts, viewing platforms and shoreline access allow for different vantage points from which to spend some time birding. Strategically places viewpoints take advantage of species richness present in ecotone areas. At the entry to the site, a stocked bird feeder attracts birds. It is especially active in the winter when food on site is hard to come by. The entry also provides a "Sightings Board", which lets the birding community know what species are currently in the area.

Programming

This design will provide a programmatic framework to help organize the informal human uses which occur along the eastern edge of the WMA. Programming on site will seek to open a floodplain venue for the daily lives of downtown Squamish residents, by drawing people into the WMA and designating space for them to enjoy it.

Cultural Realm = Human Systems

Programming of human use will be prescriptive or open ended, depending on the ecological sensitivity of the setting. Special attention will be given to enabling easy pedestrian and bicycle access to the eastern side of the WMA. A universally accessible trail will encourage human access along a designated route. This route will combine several existing access features along the eastern edge of the WMA. This access route will be composed of the current access road to the West Barr Log Sort, Old South Dyke Trail and the Old Town Dyke Trail. A newly created trail, which will run down the middle of the Log Sort site, will complete the access loop.

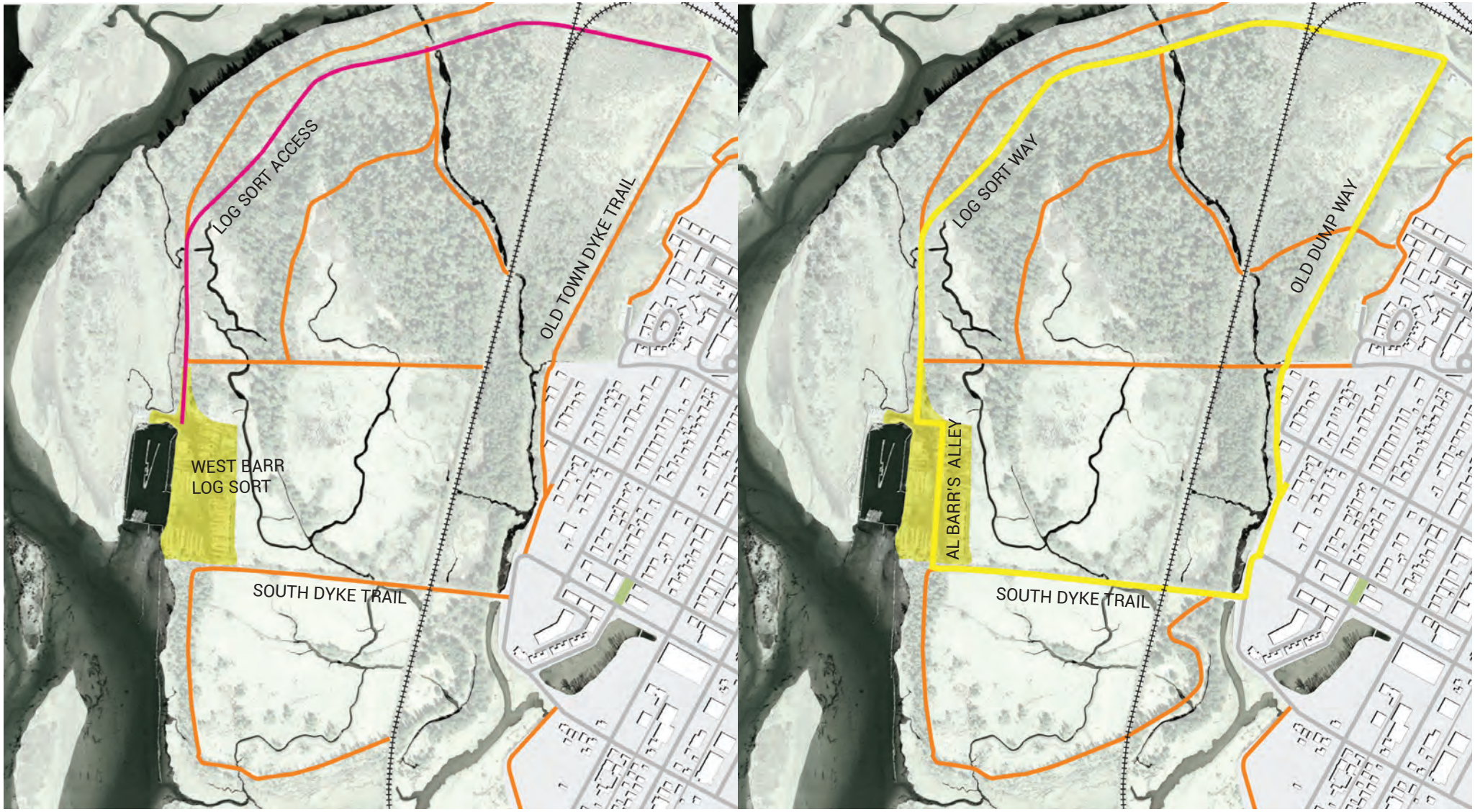
By creating one route along which access to the estuary is encouraged, the WMA will be able to manage and concentrate the ill effects associated with human use of the estuary. Clustering amenities along this route will discourage people from wandering through sensitive areas, which have been relatively unaltered by human influence.

Preliminary Design - Log Sort Restoration

WMA Eastern Edge Access

Existing Derelict Access

Proposed Universal Aceess Loop



trails

universal access trail

West Barr Site

vehicle Access Road

25 175

Ecological Realm = Biotic Systems

Human programming will work within the confines of well defined ecological constraints. These constraints will be determined by the conservation and habitat creation priorities of the WMA. Specific focus will be given to sensitive ecotone areas identified in the site description. In the area of the former log sort, specific attention will be given to providing the conditions for the restoration of salt marsh habitat and restoring a productive shoreline along the Central Channel.

Town Block- West Barr Log Sort Reconsidered

In the context of the ecological restoration of the log sort site, the former industrial area will be reconsidered as a community outpost. As such, the site will take on programmatic qualities reminiscent of the Squamish streetscape. A series of programmed garden rooms will be arranged along the length of the newly created trail, known as Al Barr's Alley. These garden rooms will serve as venues that play host to the wetland analog of program found throughout the Squamish community.

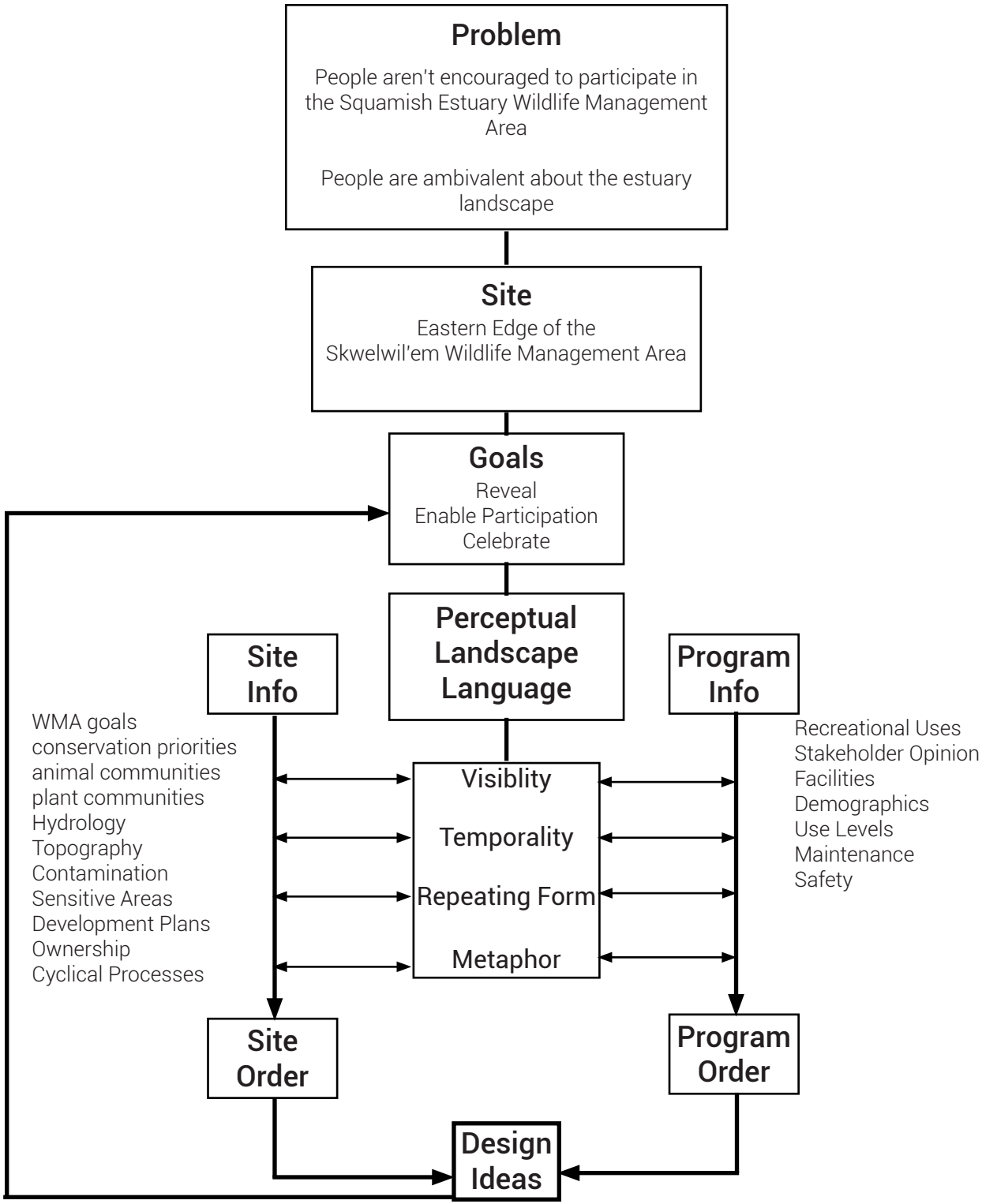
Garden Theme : Proposed Program

Please refer to the Site Plan insert

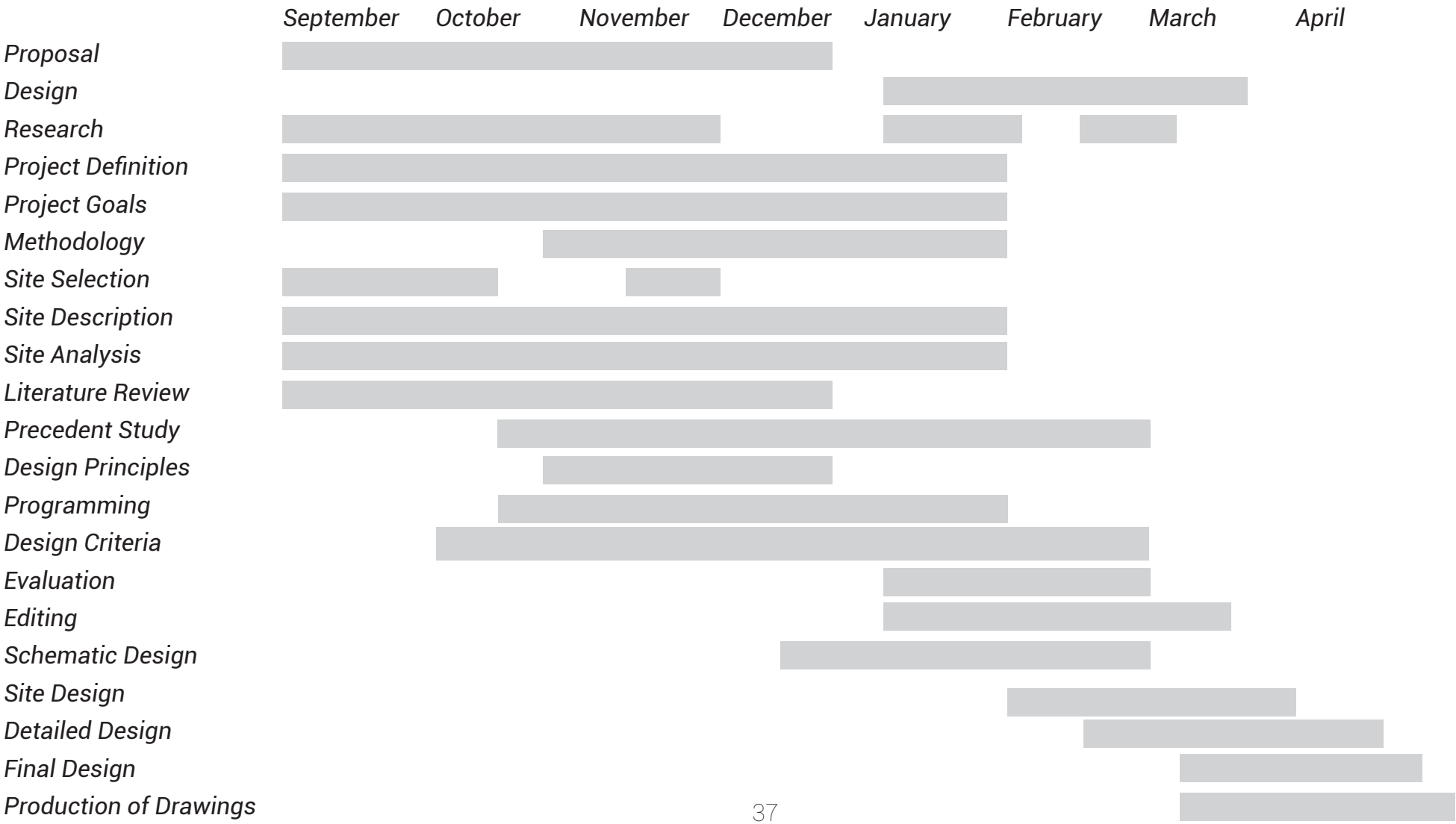
The Dock: Kayak rental/ storage, Swimming, Game of fetch, Seaside dining
The Cellar: Mudflat walks and games
The Indoor Class: Kitchen and WC facilities, Space for classes and functions
The Dining Room: Outdoor long table dining area
The Porch: Wildflower viewing
The Crossing: Wading
The Sidewalk Sale: Temporary garden exhibit space
The Display Case: Temporary garden exhibit space
The Orchard: Estuary harvest festival
The Outdoor Class: Estuary ecology classes, Performance space
The Library: Outdoor floodplain library
The Unkempt Lawn: Space for quiet reflection, Campfire area
The Sandlot: Flexible play
The Studio: Yoga/Fitness
The Chapel: Sacred space, Wedding venue

Design Method

The design method employed will closely mirror the design order proposed by Douglas Patterson. This method is characterized by the collection and analysis of two separate streams of information. One stream pertains to information about the study site, and the other pertains to information about the site program. The crux of this design, will be in finding ways for the programmatic inputs to merge with the inputs derived from the site. This will be achieved by using the design principles derived in the Landscape Language assembled earlier in this proposal.

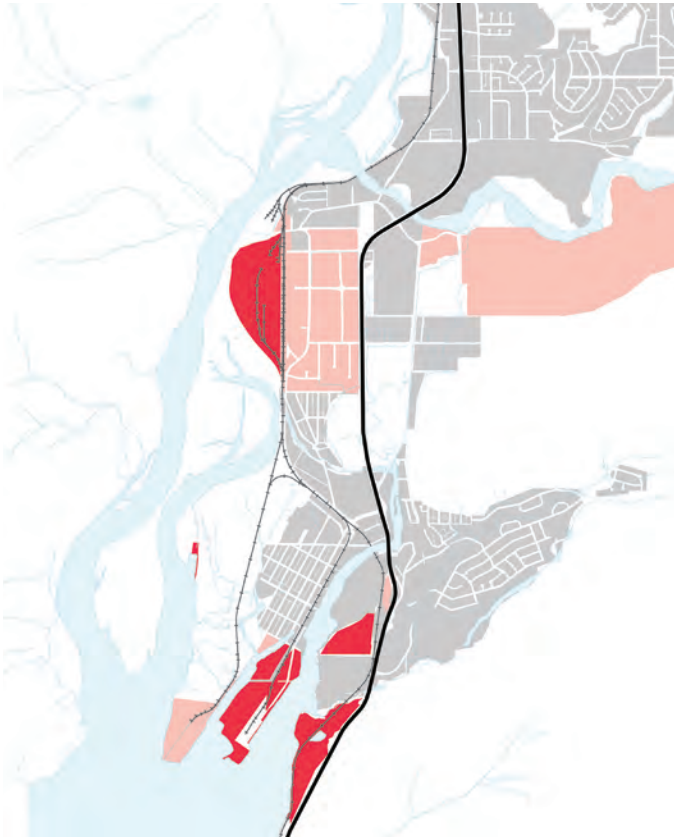


Plan of Work


September
October
November
December
January
February
March
April
Proposal
Design
Research
Project Definition
Project Goals
Methodology
Site Selection
Site Description
Site Analysis
Literature Review
Precedent Study
Design Principles
Programming
Design Criteria
Evaluation
Editing
Schematic Design
Site Design
Detailed Design
Final Design
Production of Drawings

Site Selection

City



Selection Criteria

peri-urban natural open space

Neighbourhood

Selection Criteria

walkable
conservation area
underdeveloped recreational potential

Site

Selection Criteria

brownfield site
currently undergoing change

South West

South East

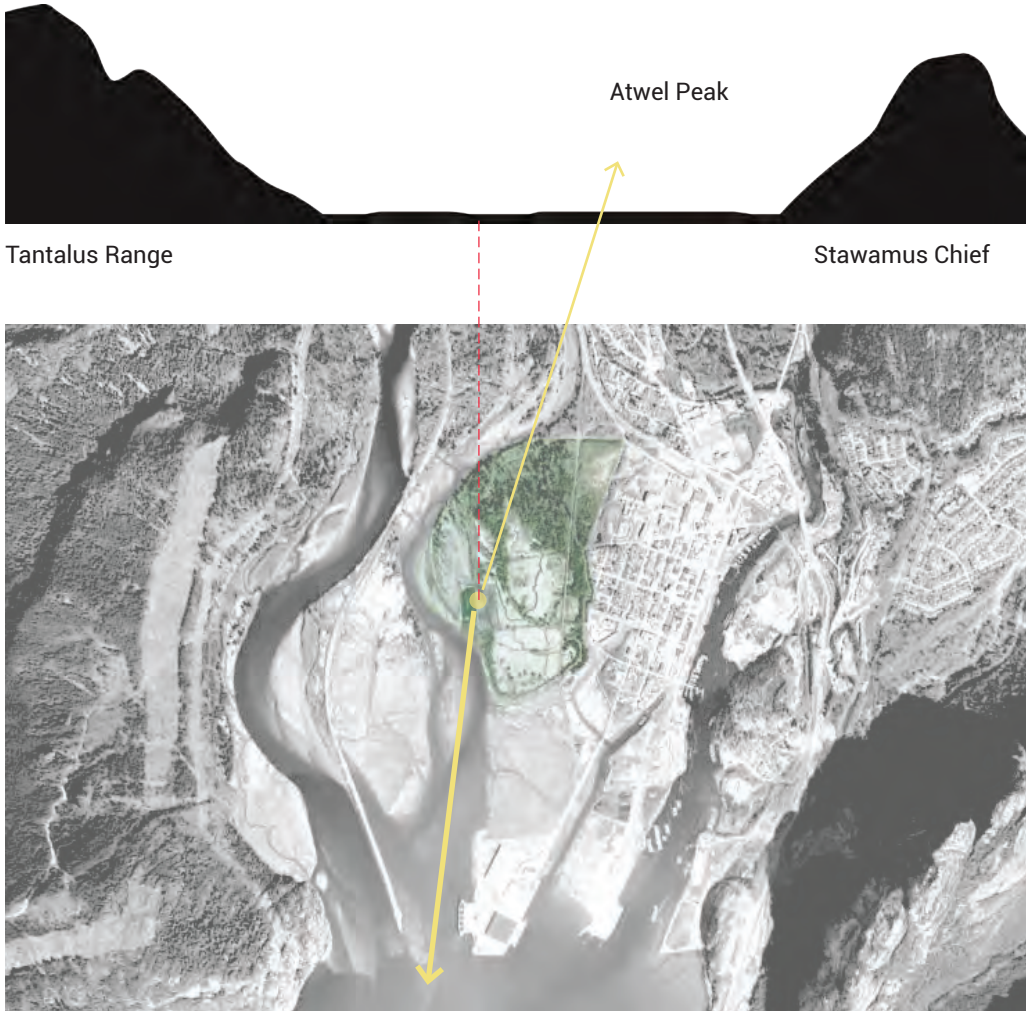
North West

North East

Design Solution

Existing Conditions - A Powerful Sense of Centre

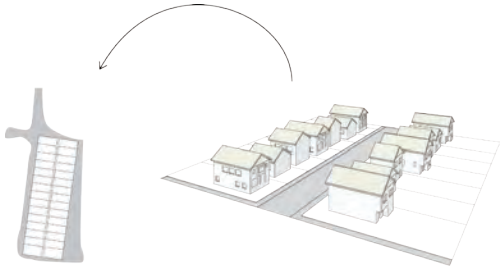
For over 40 years the West Barr log sort has been an industrial heart of the Squamish community. This design solution seeks to strengthen the role of the log sort site in the community even after industry leaves this place. By creating a Community Outpost at the log sort the proposed intervention seeks to capitalize on the powerful sense of centre that can be experienced at the site.



Existing Conditions

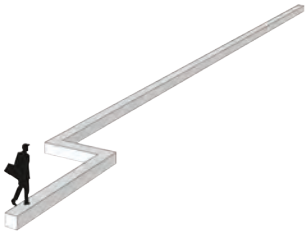
Design Intentions

The goal of this design solution is to liken the log sort site to that of an extension of downtown Squamish. To this end the design elaborates on three design intentions:



Measure

Use the scale of a town block and its constituent lots and lanes to help bring a familiar urban measure to the experience of the estuary.

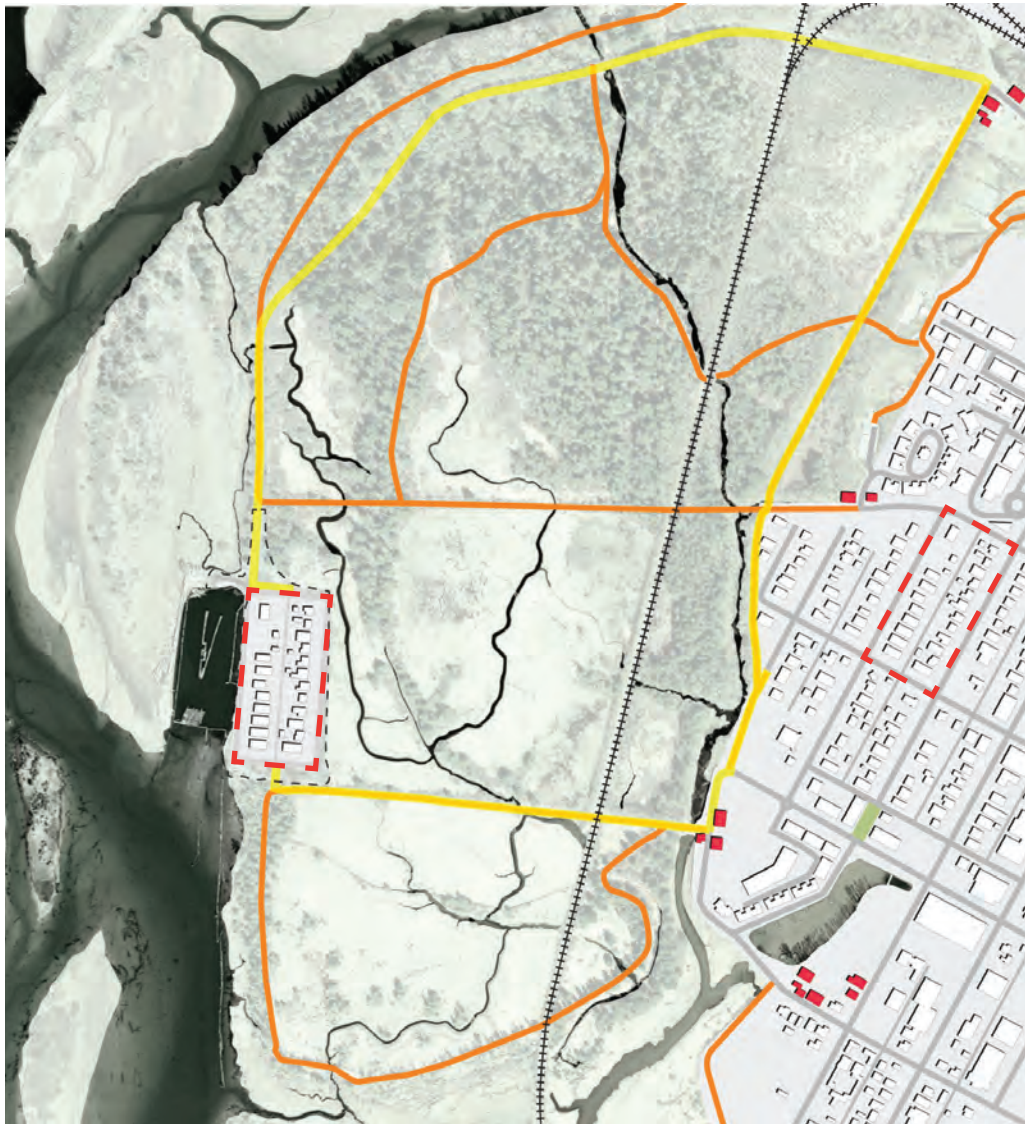


Movement

Enable estuary visitors to break free of the linear movement afforded by conventional dyke paths. Create spaces which allow for a variety of ways to move through and experience the estuary environment.

Meaning

Create venues for everyday rituals, significant to the lives of Squamish residents.



A Community Outpost
in the estuary environment

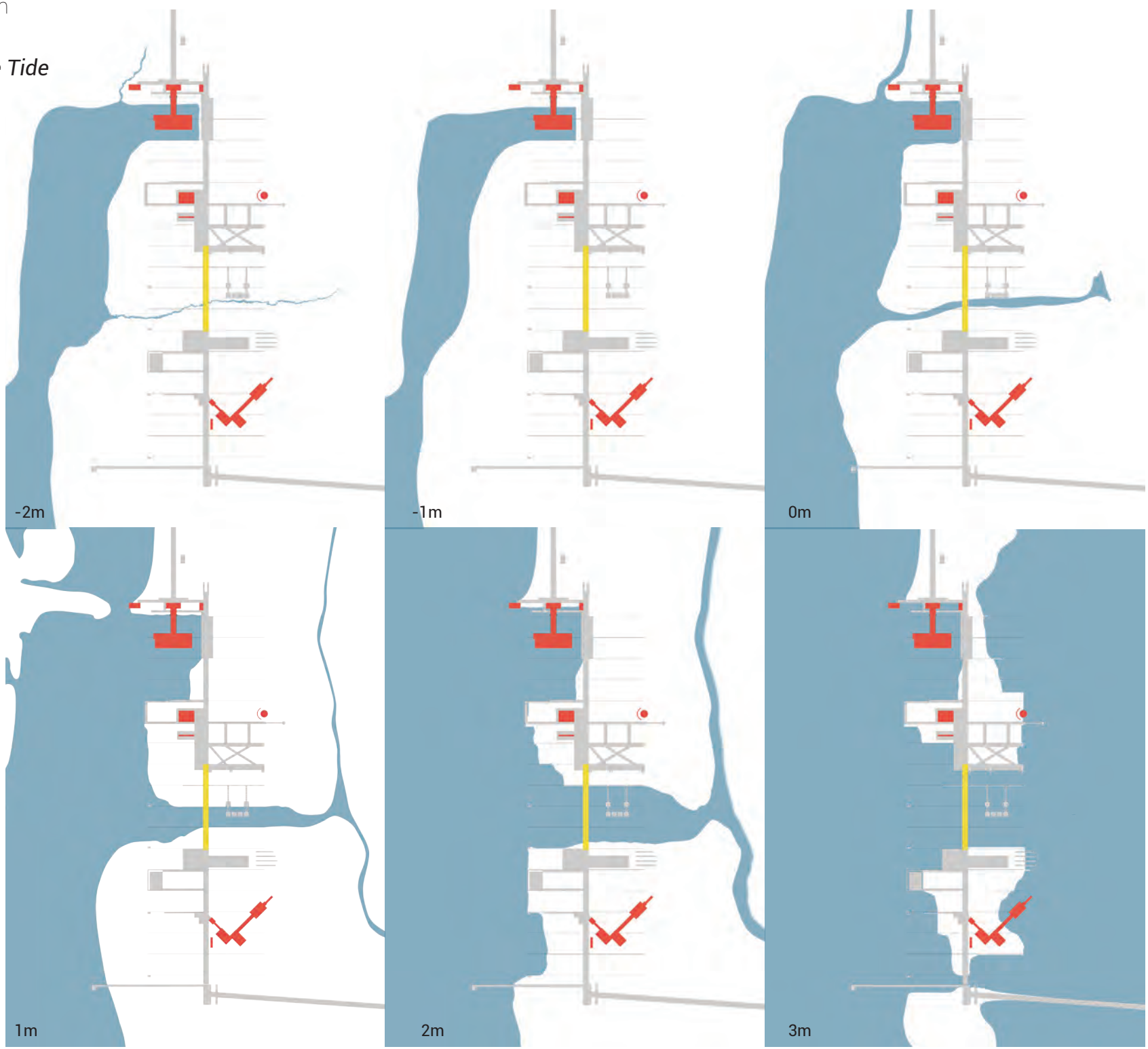
Design Order

By superimposing the skeleton of an average Squamish City block onto the log sort, the site is divided into two columns of 17 lots. Lots differ in elevation, and as a result they are populated by a variety of distinctly organized estuary plant communities. The tidal fluctuation serves to facilitate this plant segregation while also eroding the block structure, especially on the seaward side of the block.

Three distinct programatic themes are distributed along Al Barr's Alley, the main circulation axis on site.

Concept Plan

Shaped by the Tide

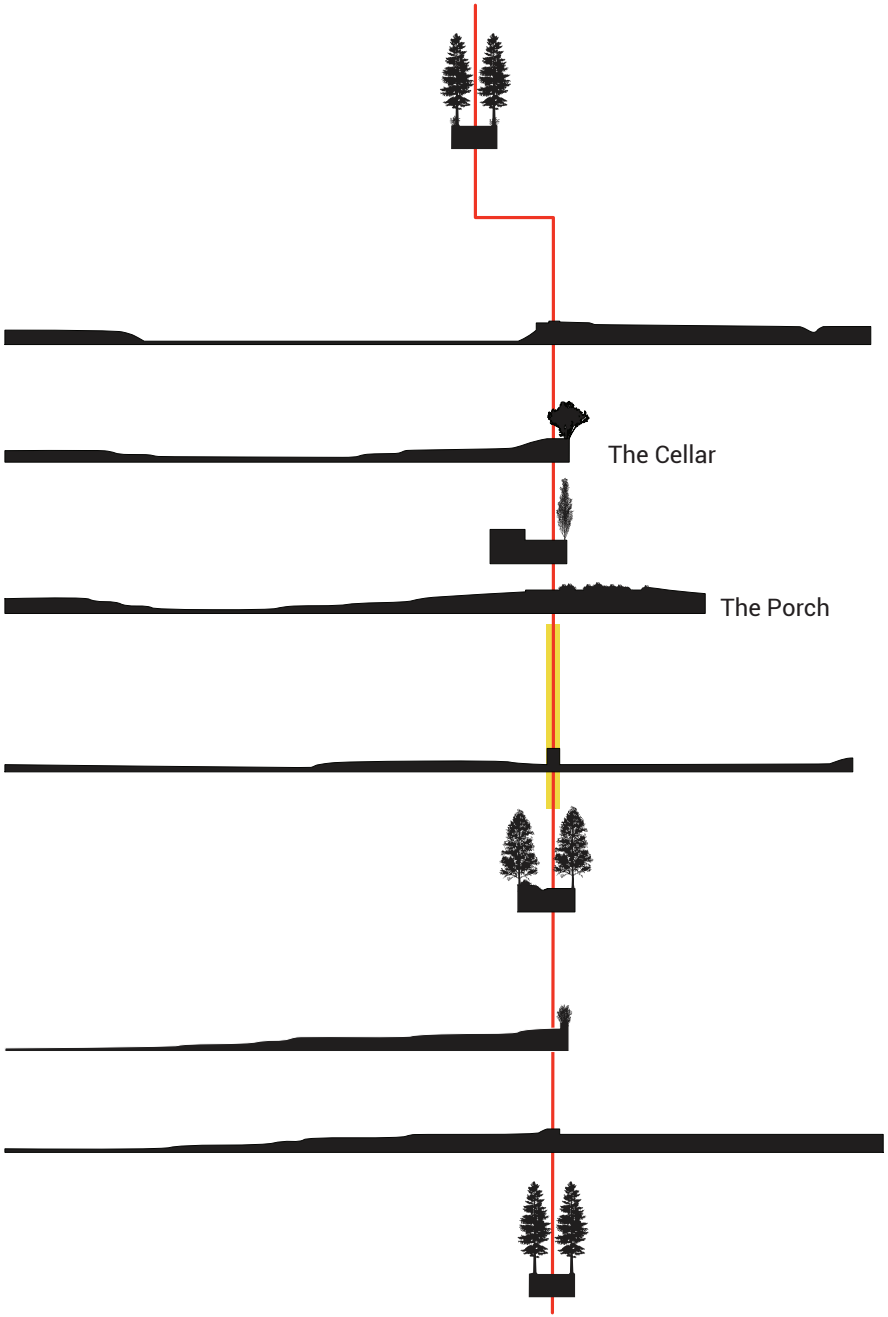


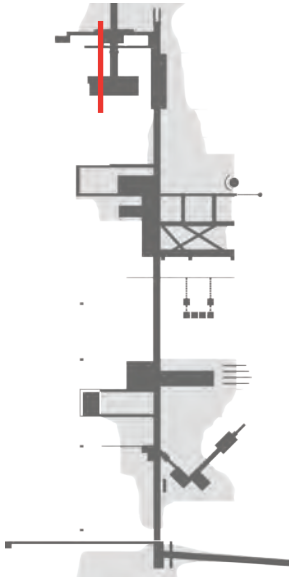
Proposed Experiential Diversity

Landscape rooms of diverse character are arranged along the main axis, creating an experience of movement punctuated by a fluctuation between enclosure and exposure.

The Cellar

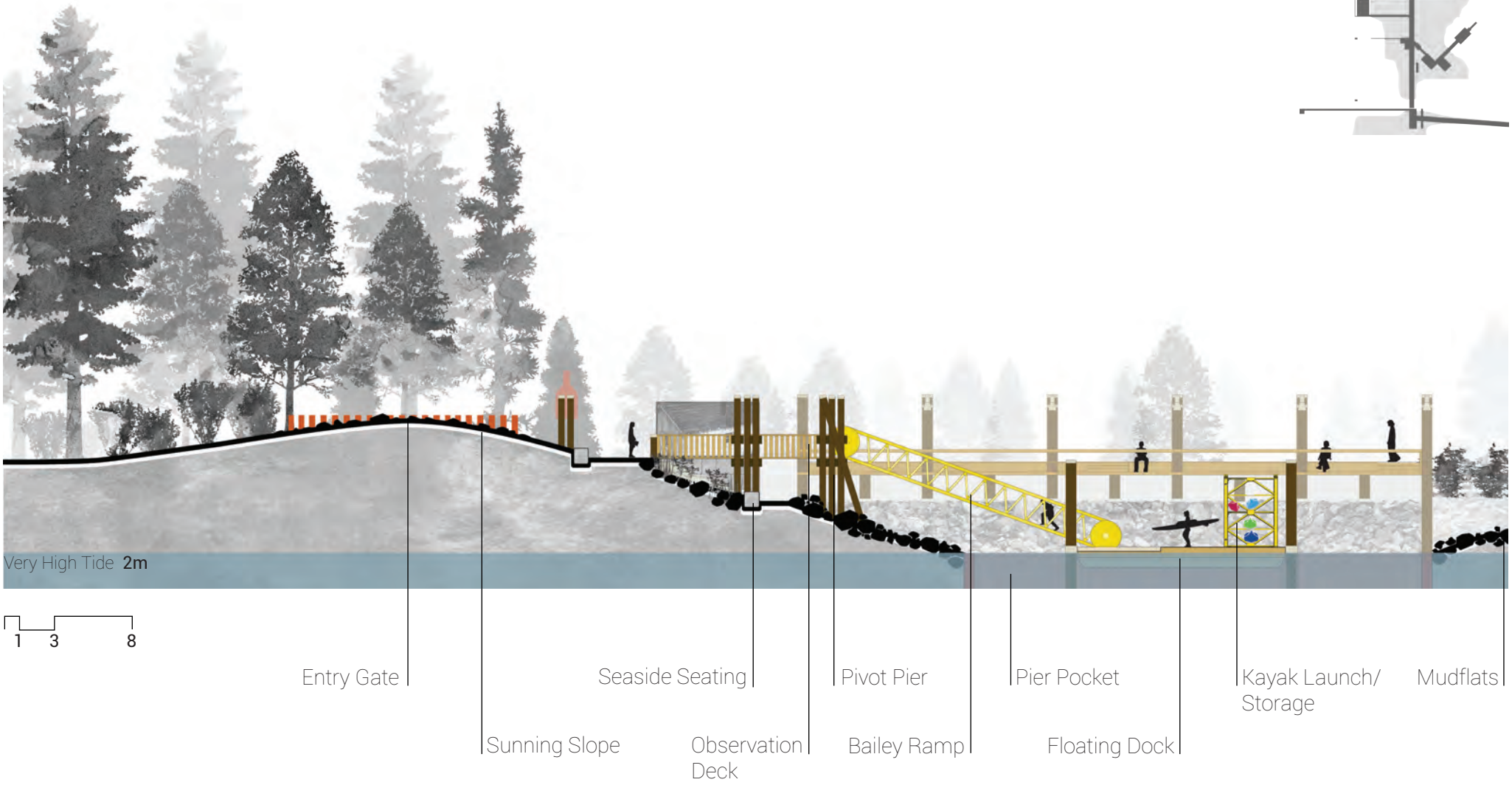
The Porch





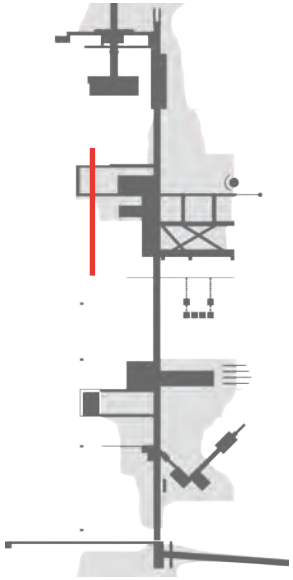
Gateway to Water

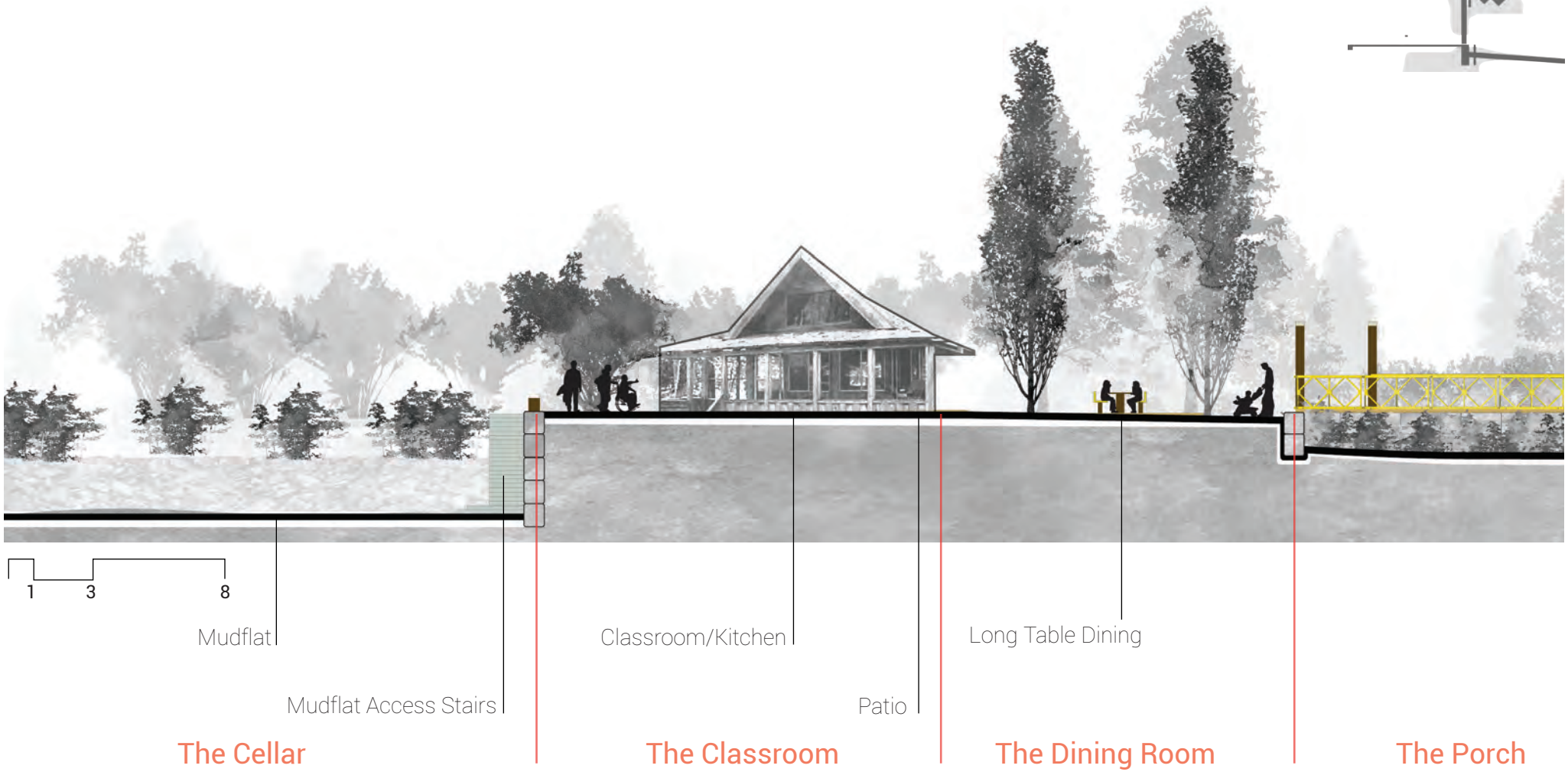
The northern entry into the site is characterized by a stark transition from enclosure by mature forest canopy to an experience of exposure at the water's edge. The entry path culminates in a floating dock which offers access to the water throughout the tidal cycle.



The Discussion Precinct

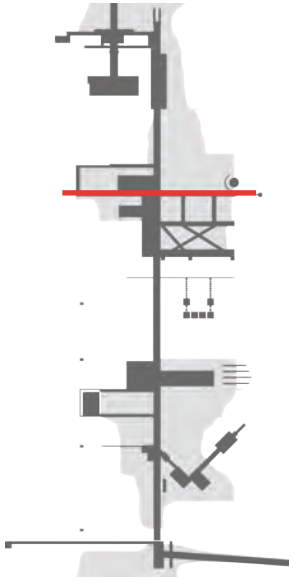
The Discussion Precinct entices visitors to stay and rest a while. The theme of this area is the contemplation of ones surroundings. Amenities such as the Classroom and Long Table make this a destination within a destination.

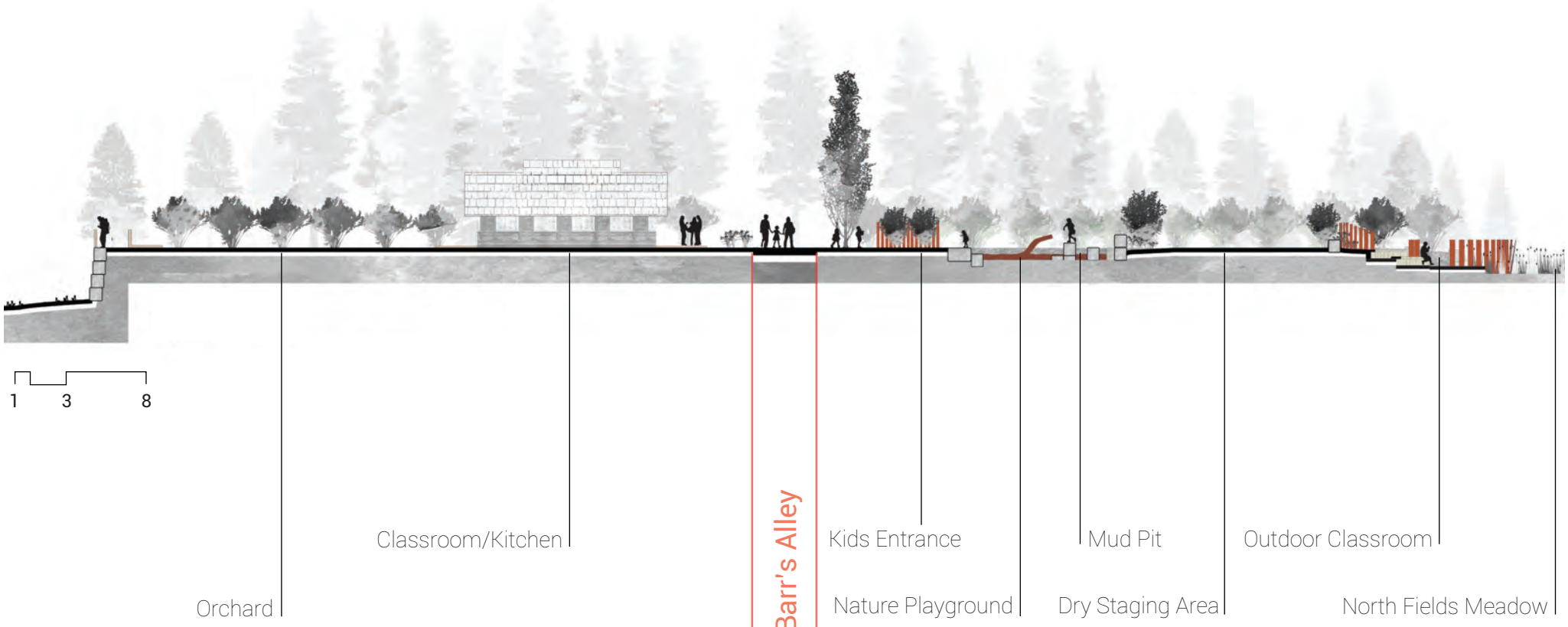




Mudflat to Meadow

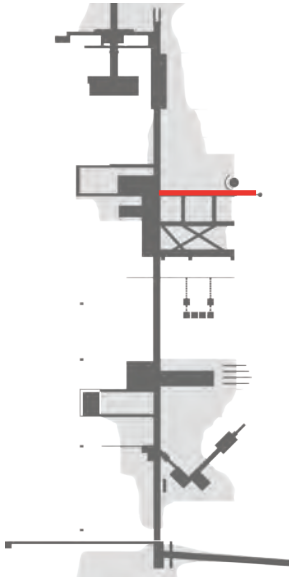
Perpendicular to the main movement axis is a sequence of programmed space that offers a juxtaposition of venues designated for learning and play. Indoor and Outdoor areas for lecture enclose a nature play space.

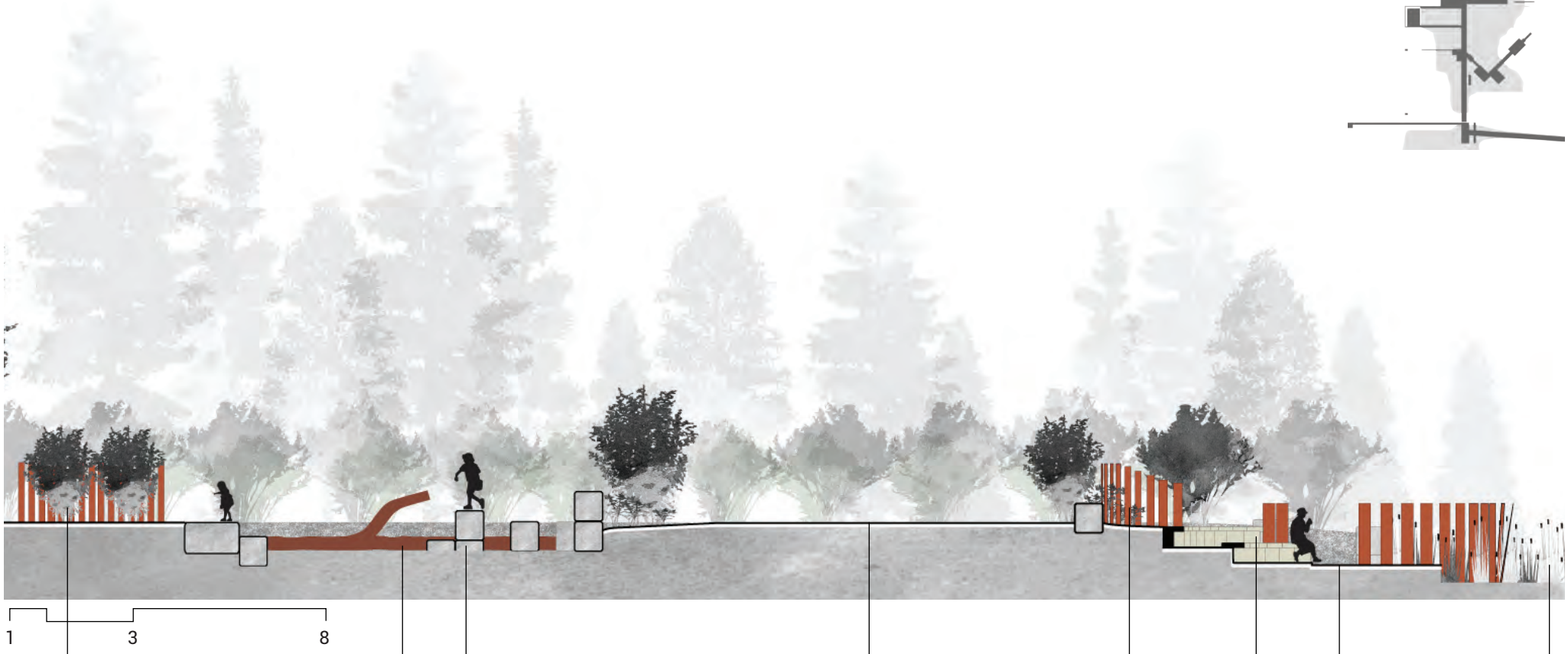




The Learning Nest

This 40 pupil outdoor class perches the act of learning about the estuary at the very edge of the wetland environment. Individually precast concrete seats offer the opportunity for assigned seating in both the classroom and performance setting.



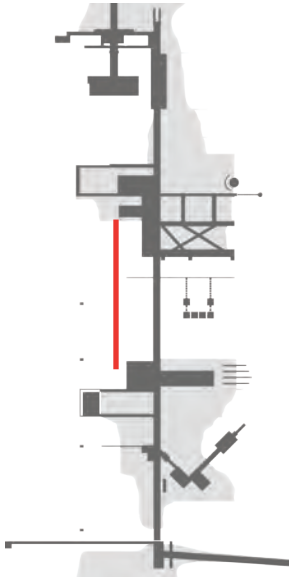


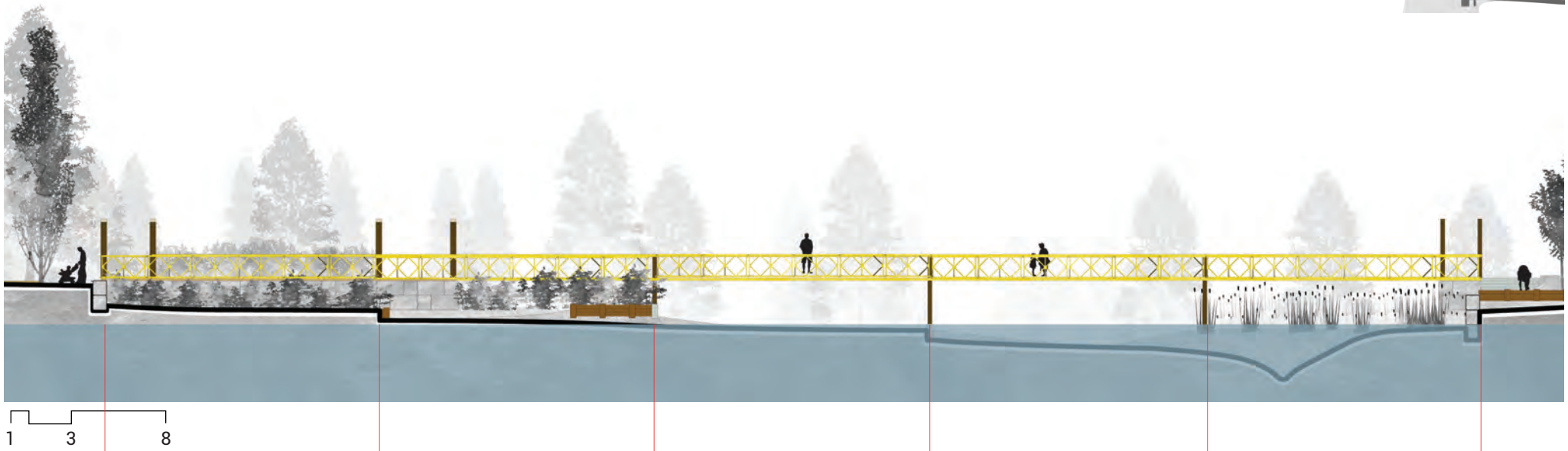
The Learning Nest

The outdoor class pushes the discussion of the estuary out into the larger landscape. Yet the space also partially occludes the larger landscape, to help focus one's attention on the intimate elements of the environment.

The Crossing - West Barr Bridge

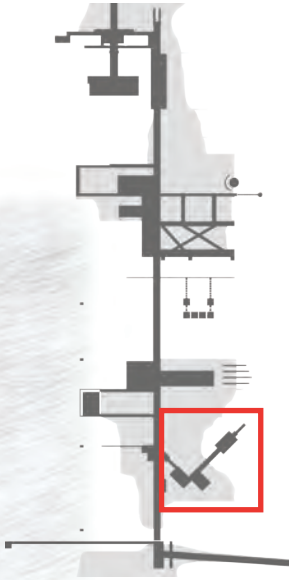
Crossing the West Barr Bridge allows visitors to observe the distinction between plant communities which have organized according to their tolerance of saltwater inundation. Plant communities self organize on terraces which step down into a newly created Salmon rearing channel.

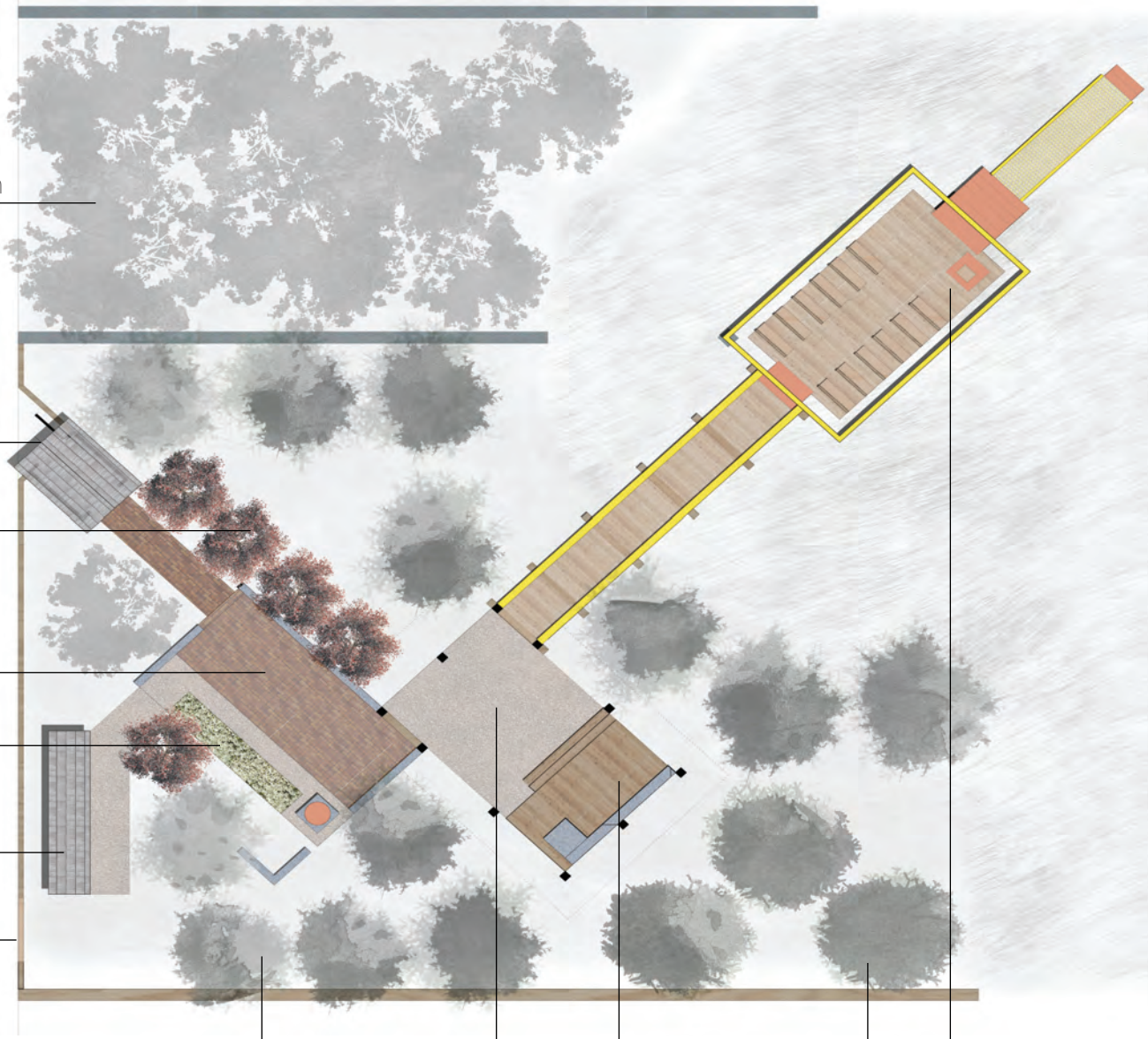


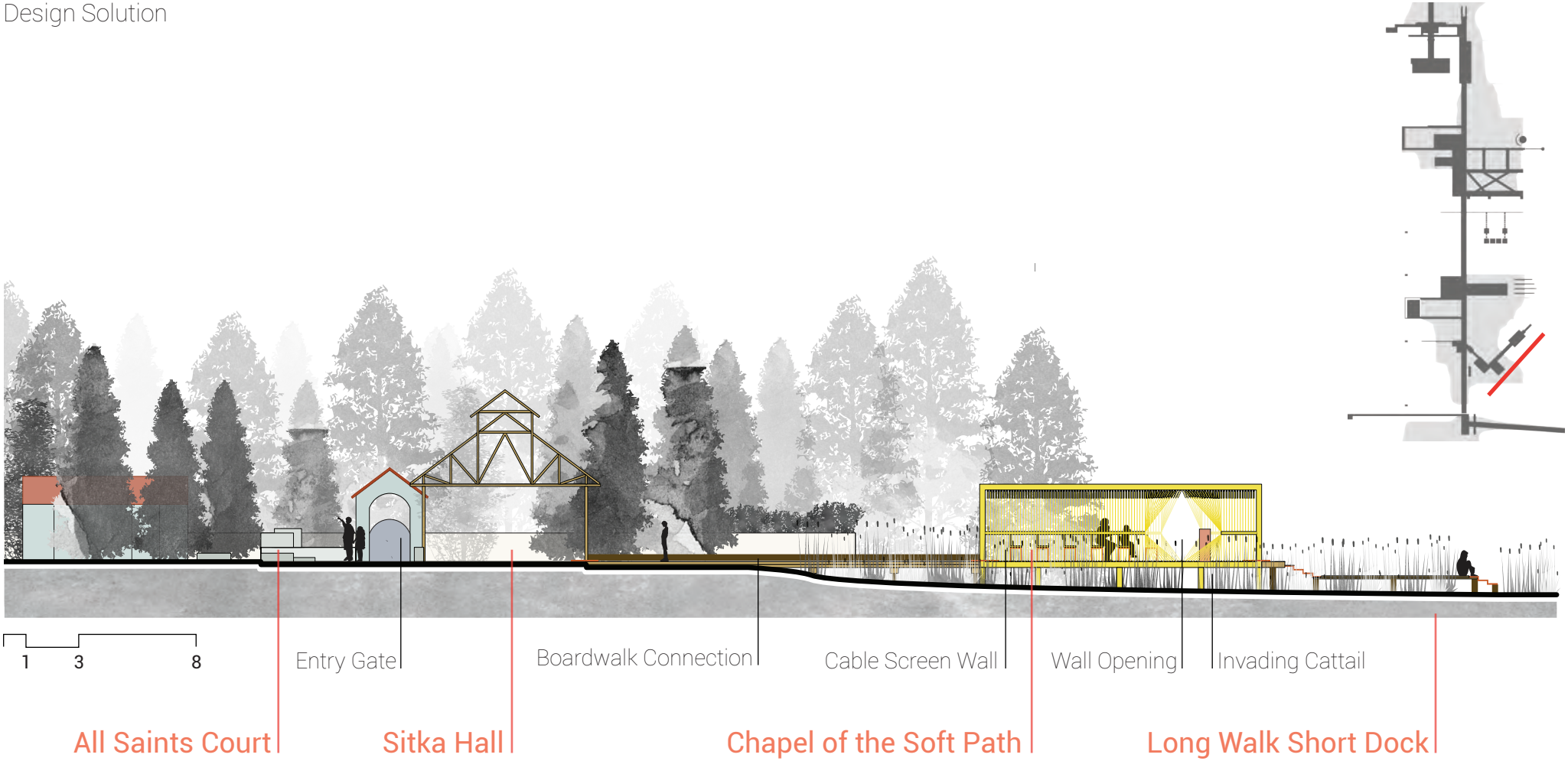


Intertwined estuary experiences

The Sacred Precinct



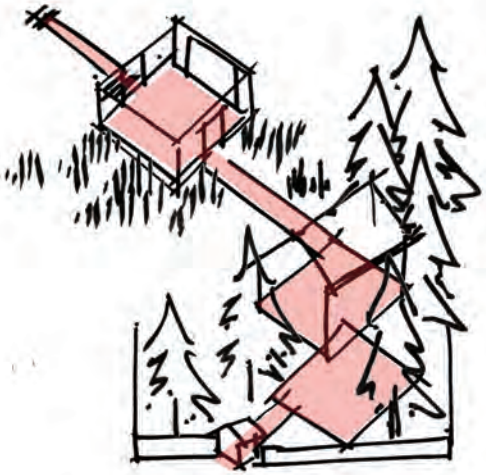




The Sacred Precinct

Inspired my the cross cultural myth of The Great Flood, this sacred space takes the form of a flood affected chapel. The space is composed of: The Gate, The Footings, The Roof and the Frame. The constituent parts of the chapel create spaces along a sacred journey which culminates in a place of worship and contemplation amongst the upland meadow vegetation.

The Chapel of the Soft Path is oriented with views which focus the attention on Atwel Peak and the Chief.



Sacred Journey

The Chapel of the Soft Path

A sacred space in the estuary plays on the notion held by many recreationalists that “landscape is church”.

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Figure Sources

Figures without listed source are attributed to the author

Photo: Chelem Trail	***05*** *(Witzke, 2012)*
Photo: View of Snowdon from Llyn Nantle	***05*** *(Wilson,1766)*
Figure 1: Squamish Industrial Land	***15*** adapted from (DOS, 2010b) (Lees, 2012)
Figure2: Squamish Wildlife Management Area Eastern Edge	***16*** adapted from (BCMEESD, 2007) Google Earth (Lees, 2012)
Figure 3: Squamish Delta Recreational Uses	***17*** adapted from (BCMEESD, 2007) (DOS, 2010c) (Lees, 2012)
Diagram: Squamish Delta Morphology	***18*** adapted from Google Earth
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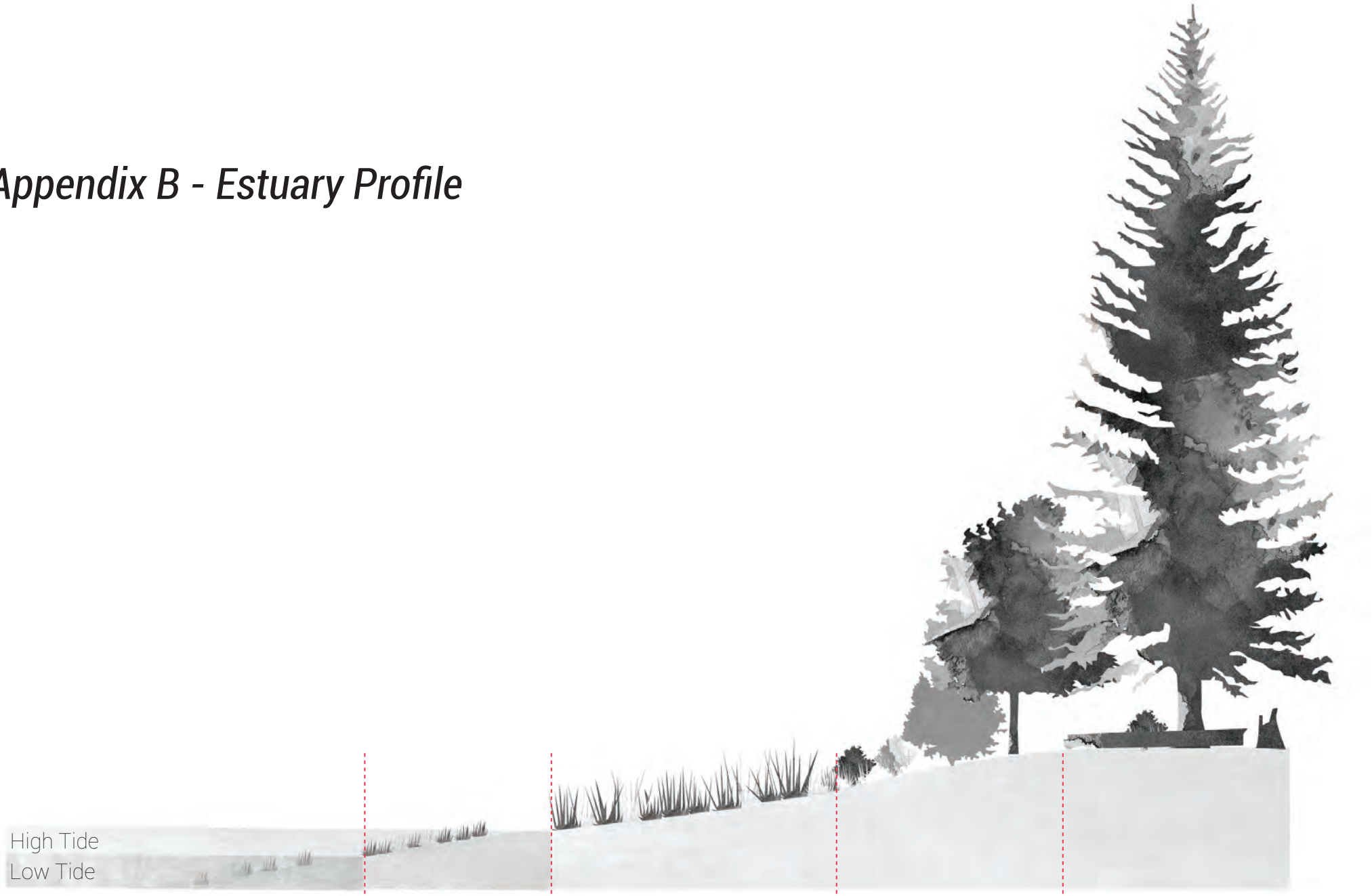
Appendix A - Estuary Time

- Trumpeter Swan Migration
- Dabbler Migration
- Shorebird Migration
- Waterfowl Nesting Season
- Pink Spwan
- Pink Rearing
- Chum Spwan
- Chum Rearing
- Chinook Spawn
- Chinook Rearing
- Coho Spawn
- Coho Rearing
- High Tides and Heavy Rain
- Freshet
- Low Phytoplankton
- Algae Bloom
- Waterfowl Hunting Season
- Windsports
- Paddeling Discouraged

Appendix B - Estuary Profile



Aquatic Environment | **Estuary Environment** | **Terrestrial Environment**

Appendix C - Forest Spreading

Deciduous forest spread along elevated land such as dykes and tidal channel restoration berms

1999

1976

1957

New tidal channels

Rail corridor

Log sort

1m contour lines