Overlooked:
Balancing Habitat and Access in Seattle's Shoreline Street Ends

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Abstract

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With rapidly increasing density, increasingly wealthier residents that prefer waterfront real estate and state laws allowing privatization of the shorelines, rights of way and water access are two critically important facets in the future of Seattle's public open space. The City of Seattle's Shoreline Street Ends Program holds 142 shorelines rights of way in perpetuity as public access points to Seattle's numerous bodies of water. With minimal funding for improvements and maintenance, the City relies on community members to maintain these sites once improved. Improvements to vacant shoreline street ends must abide by the Shoreline Management Plan which requires native plantings and encourage salmon-friendly plantings. While this sounds appealing, the reality is that many improved shoreline street ends appear overgrown, claustrophobic and unwelcoming to many, implying that public access and improved habitat have conflicting resting states; ie the lawn versus the thicket.

A second conclusion is that stewards are not effectively engaging with their local street ends, which due to perceptions of danger in overgrown spaces, creates a self-perpetuating cycle of disinterest, plant growth and associations with crime. Then can future shoreline street end improvements more intentionally address each site's future maintenance through design, so that stewardship becomes more likely? Through analyzing three improved street ends, the results show designs that were well-considered but were altered at the last minute or over time, and lacking in documentation. In addition, plant placement, material choice, and maintenance decisions combined to create less than ideal conditions for stewards to engage with their sites. Guidelines culled from a literature review and the results of three case studies were applied to three unimproved street ends, in an attempt to test the flexibility of the guidelines and showcase the diversity of sites with which program coordinators must contend.

The three resulting street end designs interweave wildlife habitat and public access to the water while seperating both so as to not negatively impact one another. Cumulatively, this suggests that rights-of-way programs such as shoreline street ends, have potential to positively impact humans and wildlife populations. However steps must be taken to reduce the maintenance burden on volunteer stewards. Without designing for these people, our underfunded public spaces will continue to deteriorate.

overlooked

balancing habitat and access in Seattle's Shoreline Street Ends

Credit: (photo from Seattle Department of Transportation)

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introduction

Credit: (photo from Seattle Department of Transporation)

1

introduction

With the rapid and increasingly dense nature of growth in Setle, high real estate values mean that few large additions to Seattle's parks system will be possible. Small right-of-way (ROW) holdings, and in particular ROW holdings with waterfront, will be critical to alleviating the many ill-effects of population growth in the urban environment, such as increased mental stress, fewer views of scenic areas, and ecological pressures on the sensitive aquatic environments that surround and live within our city.

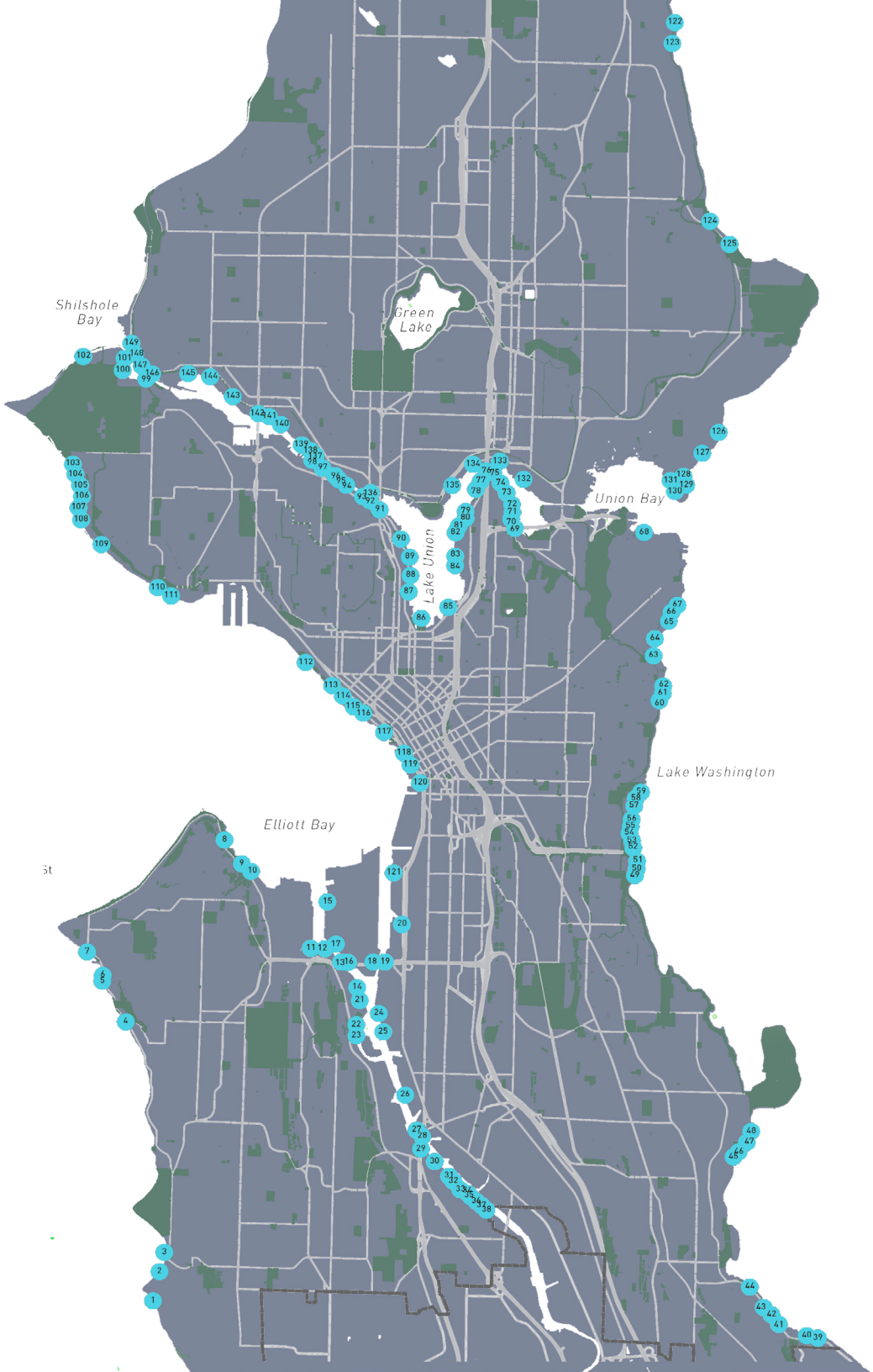
The Shoreline Street End program, under a 1996 City of Seattle ordinance, has set aside 149 waterfront Rights of Way for public access yet has declined to set aside funding to improve the properties. As the Program, under direction by the Seattle Department of Transportation's (SDOT) Public Space Management division, has worked to open new shoreline street ends (SSEs) up for public enjoyment, they have had to fund improvements and minimal maintenance (full-time team of 2) with money made from permits issued to adjacent property owners that seek to encroach with permanent or temporary structures or uses into the ROW. While this creative solution has freed up money for the program to operate, it is not a sustainable arrangement given the intention of the program to be for the public benefit. Collaboration with City of Seattle Parks and Recreation maintenance schedules are effective for certain properties but not for the bulk of remote SSEs. Thus, new solutions are required to keep the improved SSE's maintained and welcoming to the community.

The SSE program relies on community volunteers to maintain improved sites, and encourages them to propose and identity funding for improvements at unimproved street ends. Stewardship of street ends takes on several forms, including a small but dedicated Friends of Street Ends (FOSE) group, private financing of maintenance by an adjacent neighbor or business owner, and work parties organized through the City of Seattle's Tree Ambassadors program, which trains community members in park stewardship. In most cases, mainteance occurs in large pushes a few times per year, with long periods in between.

A handful of SSEs have been vacated for private use, a third have been improved in one way or another, with several having been designed by a landscape architect while the rest remain inaccessible due to dense growth of invasives, unmaintained and underutilized. Still, the potential of these spaces to serve as park space, access to nature and to improve the physical and mental well-being of surrounding communities is vast. While public access has been and remains the main goal of the program, recent revisioning of the program has highlighted the potential of these spaces to also provide improved habitat for diverse wildlife, spanning Lake Washington, Lake Union, Puget Sound and the Duwamish River. Concurrently, shoreline habitat restoration is a stated goal of multiple agencies that partner with SDOT on SSE properties. These agencies include the Department of Ecology, Port of Seattle and Seattle Public Utilities. As most SSE projects involve collaboration with one or more of these agencies and increasing attention is being

given to the future survival of salmon populations, the incorporation of habitat in SSE designs is the new norm. Due to this monumental and often singular focus on endangered salmon by the Washington Dept of Ecology and City of Seattle Dept of Construction and Inspections, the City of Seattle mandates in the Shorelines Management Program Plan that only native plants shall be planted within the riparian zone of any water body, but that public access shall be a tertiary goal.

Native plantings are often misunderstood as maintenance-free, which, in an urban context, is far from the truth. The relentless onslaught of invasive species, particularly Himalayan blackberry, English laurel and English ivy require consistent vigilance to eradicate, and the rapid, dense or free-form growth of many native species requires a trained eye to maintain in an aesthetically pleasing way. Landscape architecture theorists, particularly Joan Iverson Nassauer, have proposed that ecologically productive landscapes must exhibit evidence of human intervention in order to be valued for their aesthetics, and that our society cares most about landscapes that are deemed aesthetically pleasing. Thus, we begin to see the imperative nature, given our deficiencies in public maintenance funding, of designing spaces such as SSEs to be both ecologically valuable and aesthetically pleasing according to conventional societal values, so that they may have a higher likelihood of being stewarded by the various communities that interact with them. This of course, is complicated by the presence of multiple user groups and the fact that different cultures that may use a park may have different conceptions of aesthetic value and expectations of park space. Further, designers using native plants must take into account the general lack of understanding in their maintenance and pruning, and anticipate



Right: Seattle shoreline street ends in relation to city park space. (Source: Seattle Department of Transportation. Map by Evan Boyd)

possible negative outcomes so that vegetation is less likely to negatively impact perceptions of safety within the park.

How would this new design approach(es), reconciling public access and habitat creation, look? Perhaps more importantly, how would this new approach be applied in SSEs that have vastly varying site contexts, potential user groups and even different aquatic ecologies? In the end, how can this new approach be used to conceptualize and communicate the SSE program and its host of social and ecological benefits as a whole, rather than a site by site basis, to a public that typically has tunnel vision goals relevant to their own local contexts?

Note: "Improved" in the context of Shoreline Street Ends means that the site has undergone any degree of intentional design and installation of site features meant to make the site more open and accessible to the public.

methodology

2

Credit: (photo from Seattle Department of Transporation)

methodology

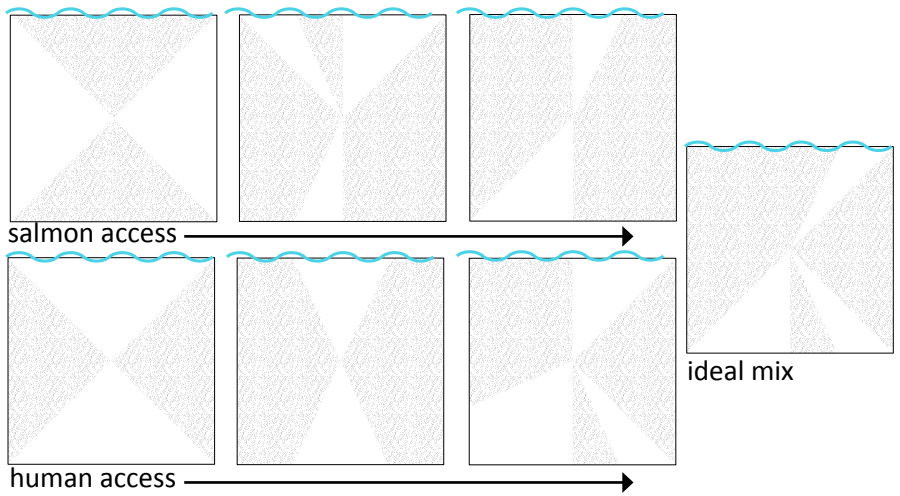
Overview

This thesis was inspired by my work as an intern with the SDOT within the Public Space Management department, from which the Shoreline Street Ends program is administered. As part of my internship, I carried out a survey of 142 shoreline street ends from July to October 2016, thoroughly documenting every accessible site. Extensive information was gathered pertaining to physical conditions including vegetation and maintenance, encroachments from adjacent properties, site amenities and experiential qualities including views and noise. In addition, thorough photo documentation was carried out.

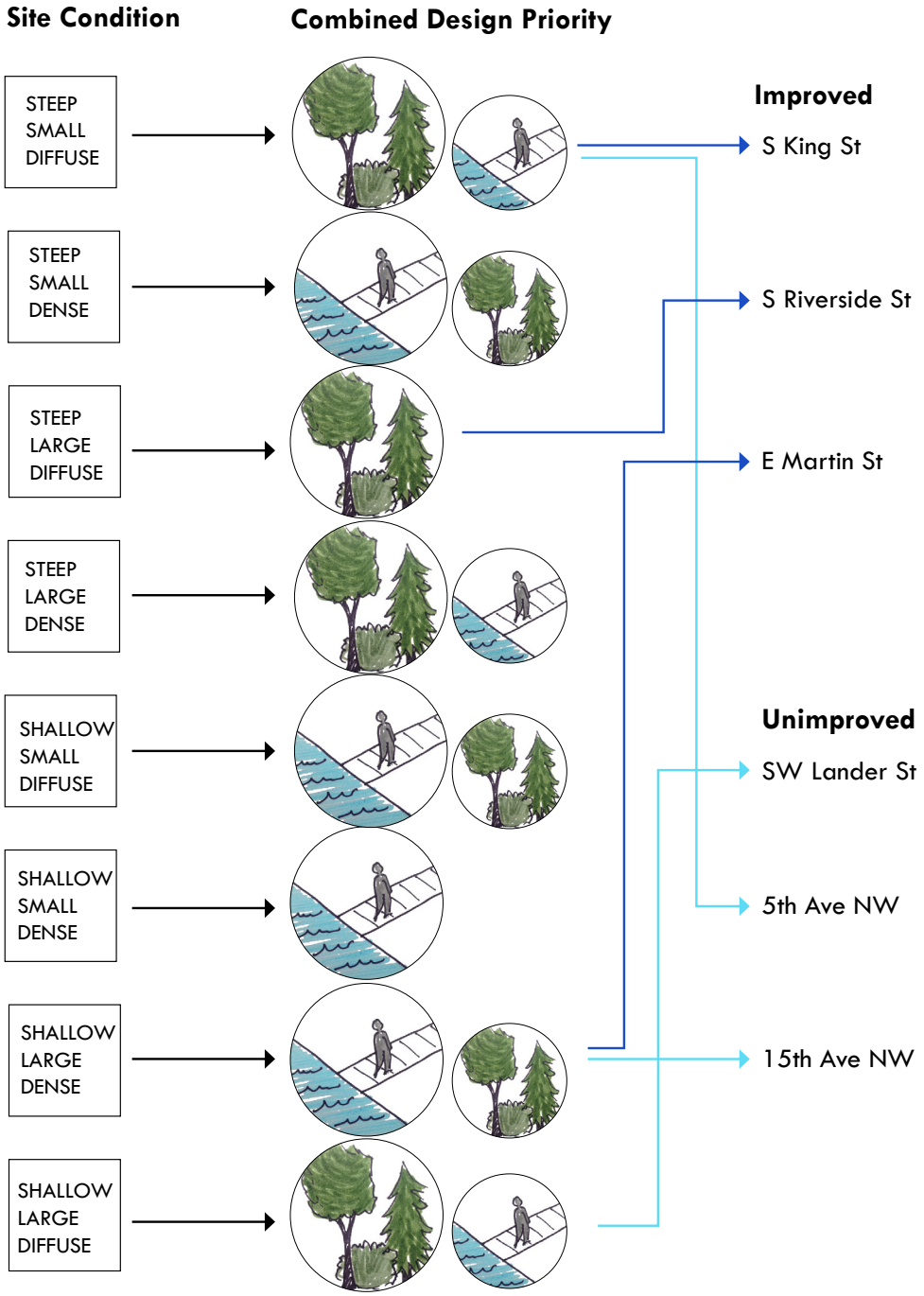
This thesis draws on the information collected during these site visits, conversations that were had with neighbors both over the phone and on-site, as well as prior meeting notes from SDOT-community interactions. After visiting several sites that had been improved, yet now lie in various states of neglect, and being well aware of the budgetary and administrative challenges to running such a sprawling program, I chose to investigate how design and especially planting design for habitat improvements can inform how visitors will use and steward the sites in a more efficient way. A review of current literature on small sites, ecological literacy, stewardship and urban habitat will inform original design of three shoreline street end sites. In addition, the author will examine three "improved" shoreline street ends to evaluate the original designs and how they have changed since installation.

Three unimproved and three improved sites were selected for their diversity in geographic location, size, slope and age of improvements. An initial framework for guiding design in each shoreline street end was necessary to gain insight into the needs of each site. By assigning a primary design focus of either H (habitat) or A (access) to each physical quality (slope, shoreline length, and surrounding residential/worker density), a three-part rating was established for each street end. If the site scored three H's, the site should have a sole focus on habitat. If the site scored two H's and one A, the site should have a primary focus on habitat and a secondary focus on public access. If the site scored two A's and one H, the site should have a primary focus on public access and a secondary focus on habitat. If the site scored three A's then the site should have a sole focus on public access.

While this framework establishes goals, it does not translate these intentions into form. Simple diagrams were created, informed by literature regarding the needs of salmon and the best approaches to designing for safety and aesthetic appreciation, to guide plan-view spatial arrangement of vegetated and non-vegetated areas within the shoreline street ends and to correspond to the design focus established in the aforementioned framework.

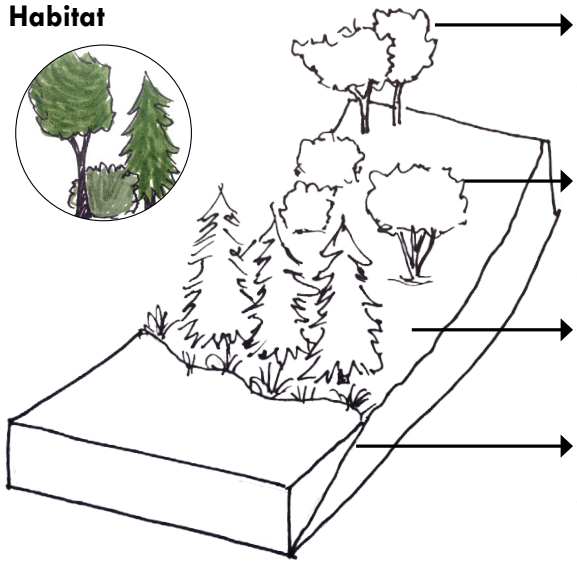


Design framework



Design Foci

Habitat



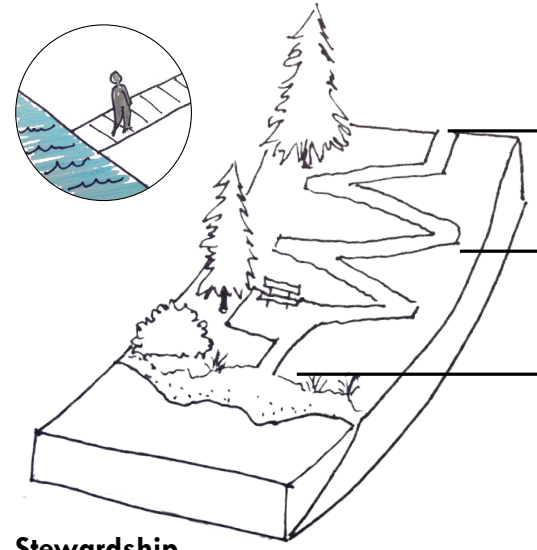
Corridor
Link vegetation with larger open green spaces, consider canopies closer to non-shore border

Birds
Increase edge habitat, snags and deadwood, diversify shrub layer and maximize evergreeen canopy

Insects
Provide flowering plants, allow decomposition

Salmon
Maximize shallow water, especially tidal mud flats, provide overhanging vegetation, remove bulk heads when feasible, reduce overhanging structures

Access



Connectivity
Site should align with existing pedestrian infrastructure

ADA
All city improvements must be as accessible as possible

Saftey/Access
CPTED guidelines are a good framework for analyzing safety measures in small sites where open sightlines are essential and vegetation can be challenging

Stewardship

Community Input

Maintenance

Cues to Care

Branding

literature review

3

Credit: (photo from Seattle Department of Transporation)

In considering and characterizing shoreline street ends, a very particular type of site with a huge diversity of physical and contextual conditions, within the scope of urban space in general, several attributes emerged that link all the sites: small lot sizes (the largest street end is only ¾ acre and over 80% are under ¼ acre), visibility issues associated with high prevalence of adjacent fences and dense vegetation, and policy constraints particularly the need for salmon habitat inclusion and the necessity of steward-led maintenance. Promoting stewardship is related with many of these issues because it's fundamentally about people visiting and valuing the site enough to put physical effort into maintaining it, which begs the question of how to make these sites appealing? Safety, or rather the perception of safety, of course, is critical; Most people will not visit a site that feels unsafe, and thus a site is unlikely to be valued and stewarded if people do not visit the site. Thus examination of people's preferences for green/wild spaces, association of certain spaces with crime, must be carried out in addition to surveying the discourse on the role of small sites in urban ecology.

Perceptions of fear and safety in woodlands and leftover spaces

The urban woodland is a landscape typology that is laden with multiple meanings and impressions/perceptions. While these spaces generally embody larger tracts of land, often in suburban or urban peripheries, their associations with recreational value and fear can show up in smaller properties in denser urban environments as well. For this reason, study of urban woodlands is appropriate as a proxy to the small urban parcels (under 1 acre) that make up the majority of shoreline street ends. Multiple studies stress that these spaces are highly contradictory- and that in addition to being places of mental and psychological rejuvenation (Frumkin, 2001) and highly-valued recreational spaces for walking and dog-walking, they are also places of potential danger, especially for the elderly and elderly women (Jorgensen, 2007). According to Jansson et al (2013), "The very enclosure, seclusion and other worldliness that underpin the positive aspects are also at the root of the fear and uneasiness that people experience when coming into contact with urban woodland (Burgess, 1995). People are afraid of becoming the victims of physical or sexual assault, robbery or bullying and intimidation from groups of young people in the woodland (Burgess, 1995; Bussey, 1996; Burgess et al., 1998; Jorgensen et al., 2007; MacNaghten and Urry, 2000; Ward Thompson et al., 2004); and these fears are compounded by the idea that, if anything were to happen, no-one would come to their aid (Burgess, 1995)" (pg 268).

The contradictory nature of relationships to urban woodlands, of both fear and reverence, shows that a more intentional approach to planting design is needed, as vegetation, followed by grading and programmatic siting) is the characteristic most frequently creating problematic spaces of enclosure and feelings of remoteness (or privacy). The combination of poor lighting and dense understory vegetation or high density create conditions that park users, especially women, avoid (Madge, 1997). Research has shown that formal characteristics, such as residential areas of lawn and trees, may be associated with high perceived safety whereas informal characteristics, such as a wild or natural looks may be seen as frightening (Brugess et al, 1988; Jorgensen, 2004, 2007). In summarizing the dilemma of informing maintenance practices with user preferences, Jorgensen (2007: 128) writes:

> However, aiming for more simple concepts such as lawns and limbed trees risks a reduction of the many benefits of woodland vegetation. Furthermore if vegetation is cut down, increased maintenance problems might emerge. Woodland veg-

> etation, with several layers and free-growing vegetation, is often both preferred and feared (Schroder and Anderson, 1984; Burgess et al, 1988; Bixler and Floy, 1997; Jorgensen, 2004; Jorgensen et al, 2007). Despite completely different green space characters being described as the safest (urban parks) and the most attractive dense forests), it might be possible to combine these two qualities through developing woodland vegetation into more open characters (Schroeder and Anderson, 1984).

While research has demonstrated fear linked with urban woodlands, fear can also stem from personal factors and may not be environmental at all. Still, improved landscape design can only stem from flawed landscape design thus generalized trends of preference are most useful. Users of open space may also deem their surroundings adequately safe based on the spatial relationship between unimpeded visual prospect and opportunities for concealment, from a theory based on human evolutionary defense mechanism known as prospect/refuge theory (Appleton, 1975).

Erin Despard (2012) highlights the ability of plants to communicate connotations related to safety and security as a main reason they are used to affect crime/safety in the landscape, reiterating the soft relationship between plants and crime and the strong relationship between plants and perceptions of crime. The main uses of plants as security measures are by maximizing visibility and making legitimate uses of the site legible and clearly demarcated. Despard (2012: 156) writes:

> Considered in the context of plant-based landscaping strategies, the elimination of opportunities for concealment can be seen as a way of naturalizing practices of social exclusion and effectively inscribing what counts as desirable, or who is an "intended user" into the landscape itself. The familiar combination of high canopy trees with groundcovers or low-growing flowers thus takes on a new, more ominous and paradoxical significance: one in which a physical and symbolic opening of the landscape corresponds with a narrowing of possibilities for use and experience.

Despard is concerned with the elimination of places of concealment,

Above: To enter the street end at S Dearborn St (Leschi), one must pass through tall shrubbery, concealing what lies beyond, particularly at night. (Credit: photos by Seattle Department of Transportation)

finding deeper social implication of "opening" the landscape. While it may be true that marginalized people, such as homeless, depend on the existence of these private spaces and may be negatively impacted by greater visibility, shoreline street ends represent particularly small sites that may be quickly imprinted with a reputation owed to particular unintended uses on site. In other words, shoreline street ends are not to be equated with large parks that offer a large variety of experiences and uses; they are less multipurpose, focusing instead, with limited financial resources, on access to the water for as many people as possible, and marginal habitat improvements at the same time. In this way, planners and designers of these sites must take a stance against the cooption of space by anyone, including marginalized groups, that may quickly define the usage of site in a way that conflicts with the main mission of public access.

CPTED (crime prevention through environmental design) has long been considered a set of design guidelines, emerging from the seminal work of Jane Jacobs (1961), architect Oscar Newman's (1972) studies of defensible space in New York housing projects, and Crime Prevention through Environmental Design by C. Ray Jeffrey in 1971 (Cozens and Love, 2015). The guidelines include seven key design concerns that must be addressed to successfully reduce crime: territoriality, image management, legitimate activity support, target hardening, access control, surveillance and geographical juxtaposition. Second-generation CPTED, "community CPTED", questions the completeness of these factors and stresses social factors including social cohesion, community connectivity, community culture and threshold capacity. There is ample research supporting correlation between environmental design and crime reduction, however there exists strong criticism of the implications of these correlations and lack of academic rigor in concluding causation. In all, given the wide support for CPTED strategies by the US government and the United Nations, for example, shoreline street end design should take CPTED principles into account if only to alleviate fear of crime and perceptions of safety, which may boost site usage and contribute to the program's goal of improving public access to the shoreline.

Unimproved shoreline street ends fall into a category of "leftover spaces", or residual spaces that offer great transformative potential with relatively little investment (Villagomez, 2010). While shoreline street ends are generally linked by one common trait, their adjacency to a body of water, they encompass an enormous diversity of physical traits. Interestingly, they account for all eight typologies with which Villagomez (2010) describes residual spaces: spaces between, spaces around, wedges, redundant infrastructure, oversized infrastructure, void spaces, spaces below, and even rooftops. These spaces are often also characterized by their looseness, or proclivity to hosting varied and often temporary uses that may or may not go against commonly accepted norms of public conduct. In characterizing these leftover spaces, Franck & Stevens (2007) write "These exist beyond the boundaries of organized social space, having no intended use and often lacking conventionally appealing features…. Such spaces may be oddly shaped or difficult to get to, they may lack a name or be secret; yet they become places of expression and occupation-often because of these very characteristics" (pg 8). While some shoreline street ends may well lie beyond outside "the control of regulations and surveillance that comes with the established uses of planned urban spaces" (pg8), there is a spectrum of looseness that characterizes shoreline street end spaces. Even unimproved spaces may be subject to close surveillance by neighbors, however while all shoreline street ends are subject to the same code of conduct, the degree to which this code is enforced varies according to the level of improvements invested into the site.

The extreme diversity in physical traits of shoreline street ends however is not necessarily equaled in diversity by the uses found in unimproved shoreline street ends. The most common uses, according to observation carried out in the summer of 2016, is homeless encampments, dog-walking, littering, illegal dumping, and unpermitted encroachments for private uses by adjacent property owners (typically property extensions and/or materials storage). Drug use was also observed at multiple shoreline street ends, although typically this occurred at sites that were more urban, such as areas near Lake Union. Franck and Stevens (2007) criticize the inordinate tightening of space in response to fears of legitimate crime that may occur in loose spaces while Villagomez (2010) urges the need for local leadership in decision-making about the development of residual spaces. Shorelines

street ends represent unique cases for a few reasons; they are pre-selected for development under City Resolution 29370 (1996) and Ordinance 119673 (1999), they are often difficult to access and thus function as loose space for a very small amount of people, and they are often very indistinct in their perception of publicness. In other words, the looseness that belongs to shoreline street ends is not necessarily as diverse as in more urban contexts, benefiting a very small amount of users and generally leading to a decline in visual appearance and perceptions of safety. In this way, the tightening of these spaces should be viewed as a positive strategy to broadening the appeal to a larger group of users, especially those that may have had difficulty physically accessing the site before.

Preferences, aesthetics and use

How urban green space is used must be taken into account when addressing any urban public space project. In multiple studies of European urban green spaces and woodlands, walking and dog-walking were identified as the two most common activities (Tzoulas, 2010: 126). Indeed, passive recreation seems to be the most popular use of urban green space in woodlands with sports users being the minority of users, and informal activity being more popular (Tzoulas, 2010: 121). Whilst European use of parks may differ slightly from American users, many American parks are closely modeled after European ideals (Byrne, 2009) thus Britain serves as a useful base for researching park preferences and effects on users of the spatiality of parks.

That being said, park users come from a variety of backgrounds and it is critical to remember that culture is intertwined with perceptions and expectation of park space and experience (Byrne,2009). According to Louakitou-Sideris (1995), foreign-born visitors may not be attracted by parks built to European aesthetics, which is important considering the high percentage of foreign-born residents in many Seattle neighborhoods. Racial power differentials and regional racial formations affect park location, facilities, maintenance and opportunities for access (Byrne, 2009; Brownlow 2006b). Given the long relationship in United States history between

Above: Unimproved street end (NE 31st St E in Laurelhurst) includes an open lawn, two chairs, and many invasive shoreline plants. (Credit: photos by Seattle Department of Transportation)

parks and the segregation, exclusion, and use as tools of colonial integration, it is not surprising that people of color in the United States visit parks less frequently and use parks differently than White users (Byrne, 2009).

Among research on race and park use (Byrne, 2009), African Americans enjoy more sociable, formal, sports-oriented urban park settings, seeking organized recreation opportunities. African Americans are also significantly less likely than their counterparts to visit natural areas like parks. Whites focus on individualism and apparently prefer settings that offer secluded nature and nature-based recreation opportunities, seeking solitude and opportunities to exercise. Asians appear to value scenic beauty over recreational functionality, seeking to visit parks with extended family or organized groups, but also to relax and exercise. Latinos are said to desire a more developed environment with good access to group facilities such as parking, picnic tables and restrooms, seeking to socialize with extended family groups, and enjoy the outdoors. While generalizations, these indicate that any

design approach cannot be one-size-fits-all given the variety of local socioeconomic contexts in which shoreline street ends are located.

Parks, especially shoreline street ends are in need of improvement overall, especially given suspected low attendance at many improved sites. If people are going to use parks – especially the socially disadvantaged, a main target of the shoreline street end program, parks must be seen as safe, welcoming, well maintained, physically appealing, catering for a range of activities, and fostering social interaction (French, 1973; Gray, 1973; McDonald and Newcomer, 1973; Byrne, 2009). Byrne (2009), in suggesting user characteristics work in conjunction with park design features, writes "Diverse park visitors may also perceive park landscaping characteristics (eg, type of vegetation or density of planting) as being unwelcoming or even potentially hostile and unsafe, while park design features themselves may mirror cultural and ethno-racial ideologies about the appropriate appearance and use of space" (pg 752).

Dense vegetation provides opportunities for nesting birds and small mammals seeking shelter. Despard (2012) expressed concern over the reduction of dense vegetation in the name of security and visibility, in that these landscapes reliance on high canopy and groundcover result in reduced environmental benefit. In addition, dense vegetation offers experiential benefit to humans. Despard (2012: 156) writes:

> Although dense vegetation provides opportunities for concealment, it can also provide experiences of the urban landscape that are out of the ordinary-in the form, for example, of encounters with birds and animals or a heightened sonic awareness of one's surroundings as external noise is dampened. More generally, dense vegetation provides an experience of enclosure in public and an opportunity to reflect or relax in a secluded setting. It can also enrich the phenomenology of public spaces with the potential to experience suspense or surprise.

Despard's warning against the homogenization of the urban landscape is well taken, however I will argue that places of enclosure are not appropriate for small sites, where you must enter the enclosure in order to access the site at all. To be in an enclosed space should be optional. Users should still be able to access the site and shoreline without being forced in spaces of enclosure that may represent risk for them in a way that may not register for someone else seeking a different experience, such as suspense, surprise, quietude or closeness with nature. Moments of dense vegetation is more appropriate for larger sites such as Central Park, for example. Given that the success of shoreline street ends depends on stewardship, these small sites must appeal to as broad a group of people as possible and thus dense vegetation, while valuable for some, will alienate many others.

Evidence suggests natural scenes in urban landscapes are preferred over scenes that lack naturalness, and that the perception of naturalness may be the most significant factor in determining aesthetic appeal (Ulrich, 1981; Ozguner and Kendle, 2006; Purcell and Lamb, 1998). Within this preference, research also shows that views of scattered trees that lack dense understory are preferred to views that include dense understory (Kaplan and Kaplan, 1989; Ulrich, 1993), with multilayered woodland edges being the least preferred option of woodland edge (Jorgensen et al, 2002; Tzoulas, 2010). In addition, research suggests that urban people may not like living near wild-looking woodland type landscapes, preferring well-kept nearby landscapes and despite preference in visiting wild-looking woodland landscapes (Nassauer, 1995; Tzoulas, 2010). Indeed, research on Birchwood Forest Park in England observed that the local community liked its naturalistic green spaces yet simultaneously viewed it as potentially unsafe and not part of the local identify, which may have been due to the wild appearance being perceived as a sign of neglect as opposed to a symbol of community care (Jorgensen et al, 2007). In other research, dog feces, litter and vandalism are the most commonly cited issues of concern in relation to urban green space and community woodlands (Tzoulas, 2010). While "broken windows theory" is criticized, the connection between perceived disorder, such as litter, and low perceived safety is widely accepted.

Vegetation, maintenance and stewardship

The potential for designed outdoor spaces to influence behavioral change and even an improved environmental ethic is a driving force for landscape architects. Poorly thought-out urban design

Above: The street end at E Hamlin St (Eastlake) is very popular, and the meticulous beds of non-native plants are maintained by a privately-hired gardener. Indeed, this site's non-native planting scheme has been grandfathered in (Credit: photo by Seattle Department of Transportation)

could lead to a loss of community identity, and the inverse can improve a community's sense of place attachment (Matsuoka and Kaplan, 2008). Urban green spaces could serve important roles in promoting community identity if they allow residents to engage with their local ecology through educational activities and improvements (Tzoulas, 2010: 122; Steward et al, 2004). Even more broadly, Nassauer (2011) writes "Our propensity to care for small places and familiar people may extend and aggregate across and beyond landscapes. Bringing the immediacy of aesthetic satisfaction and neighborhood concern to a planetary community of care may be within our reach" (pg 323). The budgetary necessity for shoreline street tends in being as community maintained as possible presents opportunities for regular community engagement.

But how can more people be inspired to be good stewards of these landscapes? According to Joan Nassauer (1995), this question is best addressed by harnessing the responses that people have to landscapes that they already care for. "Cues to care" are defined as the evidence of human intention that is visible in the landscape (Nassauer 1995). The evidence of care in the landscape may also prompt others to better steward other sites, through what Nassauer coined the "halo effect" (Nassauer, 2011), which is highly relevant to the distributed nature of the Shoreline Street Ends program. Ideally, improved stewardship at one shoreline street end could improve stewardship or intent to steward at another shoreline street end.

Much of Nassauer's theory is rooted in the quest for social conformity. The absence of care or presence of neglect in a landspace reflects poorly on its owners (Nassauer, 2011) yet the inverse produces an aesthetic response and prompts curiousity in the viewer about what they are viewing and how it works (Nassauer, 2011;1997). Nassuer (2011: 322-323) writes:

> The aesthetic of care is not a superficial gloss on more fundamental environmental functions; it is a fundamental medium by which people interpret, evaluate, and enjoy the visible world that embodies those environmental functions. Furthermore, the cultural norm to achieve a well-cared for landscape is a strong imperative for landscape development and maintenance, with attendant environmental impacts…If cues to care are aligned with beneficial ecosystems functions by policy and design-integrated in the same overall landscape pattern, the halo effect of the cues helps to ensure the longevity of ecosystem services embedded in that pattern.

The stakes for successful maintenance, then, and initial design become much higher. Whereas successful maintenance may have been epitomized by a weed free landscape, it now takes on new implications that may be determined by aesthetic values and contributing to cultural sustainability. Cultural sustainability promotes "the powerful effect of human perceptions, values, attitudes, and habits on the viability of restored [landscapes] … and… the potential for the public to become watchful caretakers of restored [landscapes] – if they recognize value in the landscape they see" (Nassauer, 2004: 757). In design, programming should respond to subtle intentional markers in the landscape to promulgate the interpretation and enjoyment that may lead to further environmental interest and action.

The concept of "cues to care" may produce reactions based not only in preference, but a reaction based on perceived environmental quality. Research has supported Nassauer's claim that evidence of human intervention in a landscape is associated with a perceived higher quality environment (McCormick, 2015). 'The translation of ecological patterns into cultural language' (Nassauer, 1995: 161) can begin with the repackaging of messy ecosystems and presenting them within orderly frames. The potential for ecological systems to be made legible or at least "palatable" through subtle visual clues is vast (Nassauer, 1995).

Design for ecological learning

How can complicated preferences be easily incorporated into the treatment of landscapes? Given the interrelated and inseparable elements pertaining to vegetation, particularly landscape design, possibilities for overview and control, and vegetation character and maintenance (Jannson, 2013), as well as the complex issues of preference, compromise may be necessary. McCormick (2015: 60) writes:

> [Researchers] note how seemingly scientific concepts such as naturalness, ecological health and integrity are value-laden and socially constructed. Consequently, contentions about what nature to recreate expose the disjuncture between aesthetics and science and gives rise to management questions such as where is the appropriate 'middle-ground' whereby all stakeholders are somewhat satisfied, or whose claims (or values) are strongest and, therefore, ought to be prioritized most highly (Hillman, 2004 and Hillman, 2006).

This is especially applicable to shoreline street ends, where each site has different stakeholders that are involved to different degrees. Design and maintenance, as well does not have to adhere to strict formalities that may be contested by some stakeholders. In fact, design cues that are less overt may increase aesthetic appeal, being smaller and subtle in their marking of human intent, and may include a mown area, the use of words, signage or weed removal (Parkyn and Quinn, 2006; McCormick, pg 60). Intentional educational efforts should also be considered in any effort to improve stewardship. Public perceptions of landscapes are active constructions rather than passive registrations, thus educational initiatives could exploit the relationship between aesthetic preference and design cues (Hodgson and Thayer, 1980, McCormick, 2006).

Landscape mosaics and habitat

The concepts of land mosaics is an important aspect of landscape ecology, and is focused around the fundamental units of patches and corridors that allow the retention and transfer of species in the environment. In the context of shoreline salmon habitat, the shallow water and shore condition and shore plantings constitute the patch, or lack thereof, and the waterbodies constitute the corridors. Since the waterbodies are fixed, the corridors are unchangeable. While corridors

Above: The SW Spokane St street end (West Seattle) is a dedicated restoration site with shallow mud flats and vegetation preferred by migrating salmon. (Credit: photos by Seattle Department of Transportation)

between shoreline street ends and other habitat patches can be made less hazardous to juvenile salmon, this is outside the scope of work achievable in the shoreline street end improvement program. According to Forman (1995), generous debate exists regarding the superiority of fewer large patches versus more numerous small patches; ultimately Forman suggests small patches impart smaller, more supplemental benefits while larger patches provide larger benefits. In this way, larger shoreline street ends and associated habitat improvements should be seen as more favorable than sites with smaller shorelines.

Birds are an important part of urban ecology however they will only partially benefit from sites of sizes typical of shoreline street ends. Often habitat improvements are touted to coax rare species into previously neglected or damaged environments. Pacific northwest songbirds can be divided into interior forest species, those that require large tracts of undisturbed forest, and generalist species which typically evolved as edge species, preferring tree cover and open areas. Interior forest species are absent or rare in Seattle, being found in large patches such as Discovery Park. While they may visit the canopy of a small patch to forage, they are not prone to nesting in small patches preferring sites of at least 28 acres that include higher levels of shrub diversity (Donnelly & Marzluff, 2004). Generalist species are abundant in urban areas, including both native and invasive species. Creating habitat for these species is relatively easy and includes creating dense evergreen tree canopy, and covering at least 23% of sites in evergreen trees, and tree densities of at least 9.8 trees/hectare (Donnelly & Marzluff, 2006: 15). While generalist species are valued by humans for their beauty, creating additional habitat for them is not a primary goal, but an added benefit to improving habitat for other target species, particularly salmon. That being said, shoreline street ends should strive to connect canopies to adjacent tree cover and green space, creating corridors bird, insect and mammal species that, while not threatened currently, may benefit in the future from continuous urban canopy.

Five species of salmon reside in the Puget Sound, migrating along Seattle's shoreline, entering our freshwater rivers and lakes as they return to their spawning grounds. All five species are listed with as threatened under the Endangered Species Act, with Chinook being of particular concern. According to the Duwamish Blueprint Working Group (2014), mudflats, large restoration sites, connective restoration sites, woody debris, riparian trees and diverse plantings and areas of mixed salinity are the most important habitat element needed for salmon, all of which are potentially achievable in shoreline street ends with the exception of large restoration sites. Bulkheads are extremely common shoreline conditions and are particularly harmful to juvenile salmon (smolts) who seek shallow waters and dappled light conditions for camouflaged and refuge from predators.

Dappled light conditions are created by overhanging vegetation, under which salmon's juvenile markings evolved as camouflage. Large structures create denser shade which juvenile salmon avoid and which predator fish seek out. Overhanging vegetation plays another important role for salmon, harboring a multitude of insects that regularly fall in to the water and provide food for the smolts. Leaves and branches that fall into the water create habitat for benthic insect species which are also consumed by smolts. For these reasons, combined with the ease of implementation and minimal public opposition, overhanging vegetation is a valuable design strategy to improve urban salmon habitat (Glowacki, 2012). The challenge is to maximize the size of the vegetation and the degree to which it overhangs; meaning trees are more desirable than shrubs which are more desirable than grasses. An additional threat to salmon is polluted water from stormwater runoff and discharges, particularly copper from road runoff, which disrupts salmon's navigational abilities. Shoreline street ends, which often host CSO outfalls, could potentially be designed to improve water quality through various means.

case studies

4

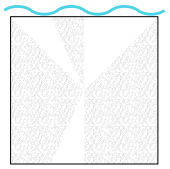
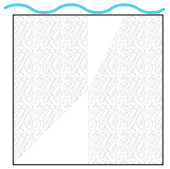
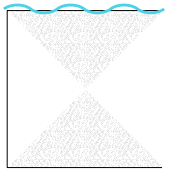
Credit: (photo from Seattle Department of Transporation)

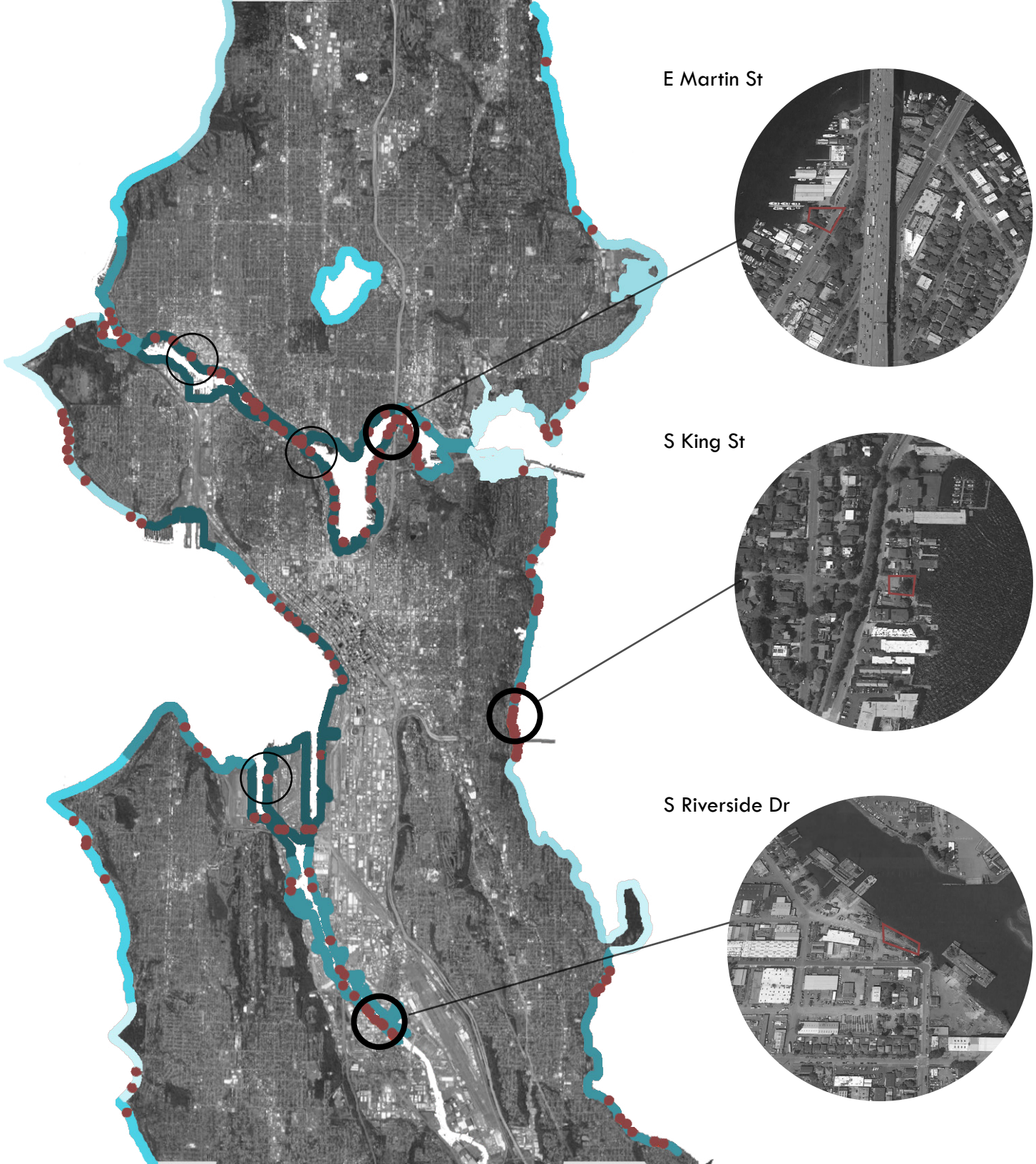
Introduction

Shoreline street ends are extremely diverse not only in physical conditions but also in the quality of care they receive. Because of this, consistency is minimal and legibility of shoreline street ends as a specific place with specific needs and ecological implications is very low. This will be discussed later in the context of program/site branding.

In looking to future program improvements and site-specific improvements, it's essential to reflect on work that's already been completed and take stock of how improved street ends are performing as public space. With so many sites to keep track off, it's critical to not reinvent the wheel and to not create the same problem twice. Without tracking the performance of these sites, creating the same problem twice is easy to do, as even the best intentions can develop and grow in unforeseen ways.

Three improved sites were selected based on their diversity in geographic location, size, slope and age of improvements. In addition to drawing from the survey carried out through the internship, the three sites were revisited on several occasions to gather more detailed information about existing plantings, site attendance and usage. I interviewed two designers of street end improvements, and consulted original design documents to compare with existing conditions.

SSE	Area	Shoreline Width	Overall Slope	Design Priority	Spatial Form (existing)
E Martin St (Eastlake)	13083 ft	90 ft	5%	1. Access 2. Habitat	
S King St (Leschi)	4193 ft	70 ft	11%	1. Habitat 2. Access	
S Riverside Dr (South Park)	15900 ft	230	14.5%	1. Habitat	



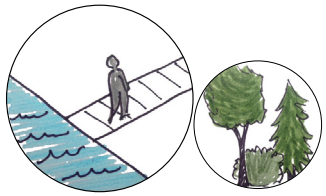
Shoreline Impairment

Most impaired

Least impaired

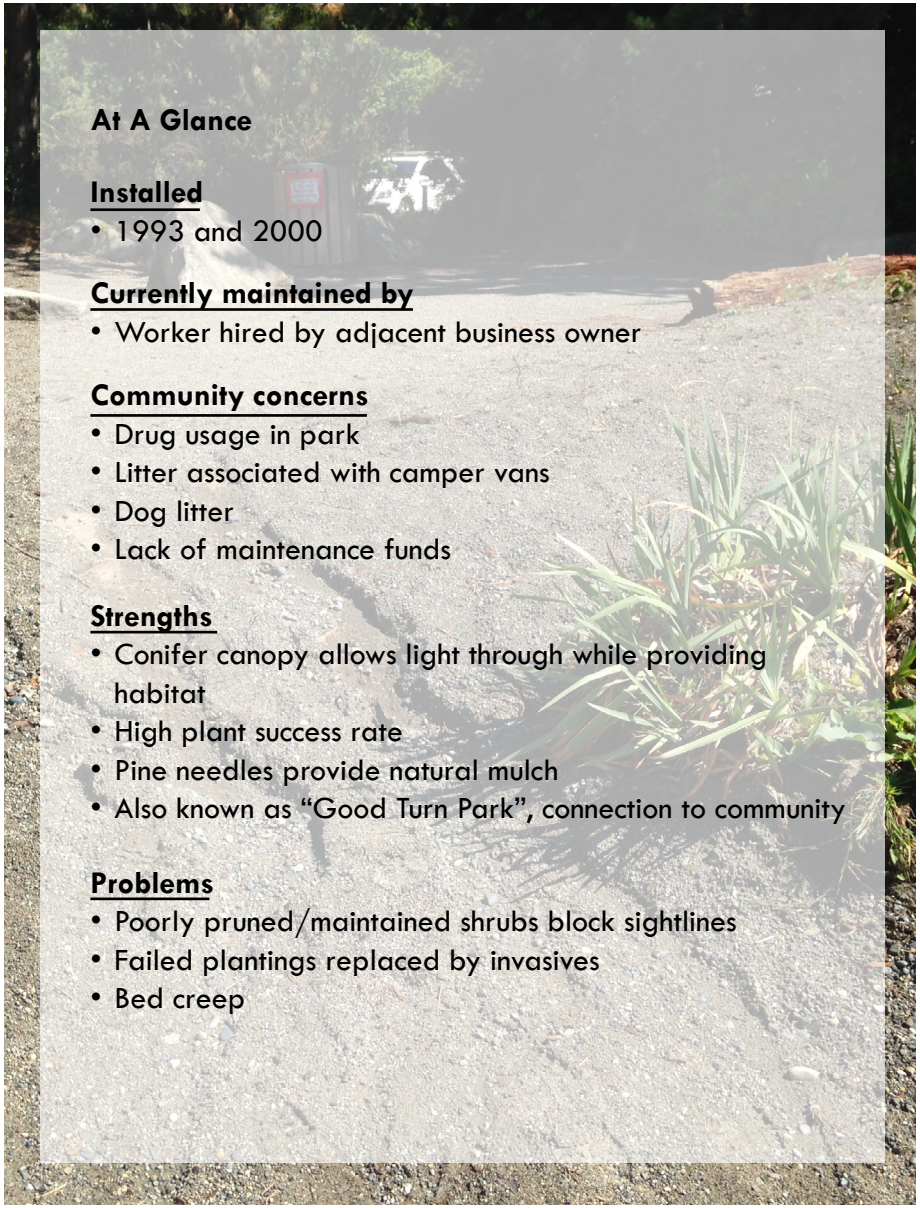
Shoreline street end

E Martin St (Eastlake)



E Martin St lies in the northern tip of the Eastlake neighborhood. The current layout was designed in 1997 by Tom Zachary. The shoreline street end lies in a neighborhood for which a community member serves as a vocal advocate for the improvement of shoreline street ends. The impetus for improvements at E Martin St came from an adjacent building and business owner who wanted to fund public space improvements for the community. A landscape architect was hired to design and install the park, which occurred in two phases, with the shore half of the site installed in 1997 and the land side installed in 2000. Since installation, a community member has paid for private maintenance of the site, which continues to present day. While it is not uncommon to pay professional gardeners to maintain street ends, these workers are not necessarily community members and may lack insight into the needs of the community, for instance in terms of safety and visibility. In addition, the community member who hires the gardener and disseminates tasks to the laborer may not have proper understanding of plants and effective maintenance. All of these issues came to light when analyzing the plantings at E Martin St.

The existing plantings at E Martin differ substantially from the landscape architect's design, and according to Tom Zachary, the undocumented changes were due to planting availability and last-minute planting decisions. Zachary designed the park with a mixture of native and non-native species, as the design occurred before the City of Seattle instituted rules requiring shoreline native plantings. Most notably, Zachary planted stands of black Hungarian pines, a non-native species, near the shore, as well as a stand of Arbutus unedo along the south property line. These two choices have lead to very different outcomes; The pines have matured with continuous yet open canopies high above high level creating plentiful filtered light and still creating canopy for birdlife, while the strawberry trees have grown into a dense light-blocking canopy that dips low to eye-level, blocking



At A Glance

Installed
- 1993 and 2000

Currently maintained by
- Worker hired by adjacent business owner

Community concerns
- Drug usage in park
- Litter associated with camper vans
- Dog litter
- Lack of maintenance funds

Strengths
- Conifer canopy allows light through while providing habitat
- High plant success rate
- Pine needles provide natural mulch
- Also known as "Good Turn Park", connection to community

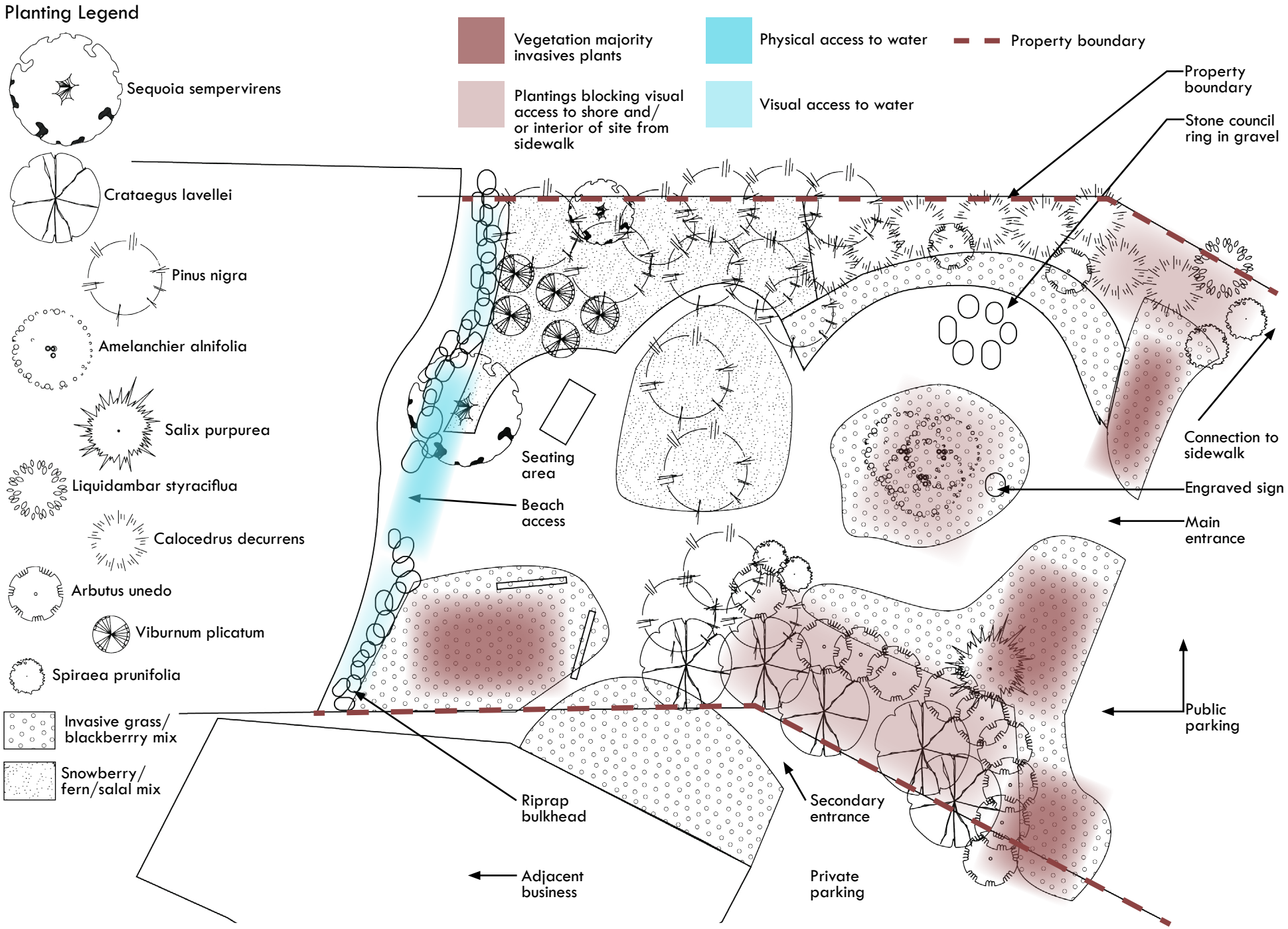
Problems
- Poorly pruned/maintained shrubs block sightlines
- Failed plantings replaced by invasives
- Bed creep

sightlines and casting deep shadows.

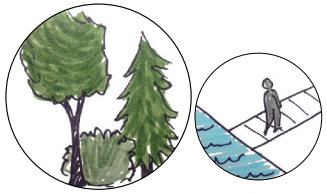
Community concerns about E Martin St include drug use within the space and litter associated with dogs and with camper vans that park in the street end parking area for extended periods. Indeed, the neighborhood, with its close proximity to the University District, Downtown and Capitol Hill means it's a corridor for homeless people, and Eastlake Ave has the feel of a secondary street within an extremely dense neighborhood that feels less trafficked perhaps due to the presence mixed industrial, residential, vegetated ROW slopes and lack of sidewalks. While these issues may not have been as prominent in 1997 and thus not responded to in the initial planting design, fairly simple maintenance solutions could remedy the current design to reduce its attractiveness to drug-users and to increase visibility (see graphics).

Right (top to bottom): Looking north, shoreline vegetation too sparse in non-access areas; Looking west into site from entrance, view to water blocked by vegetation; Filtered light allowed through densely planted trees. (Credit: Photos from Seattle Department of Transportation)

Existing conditions - E Martin St



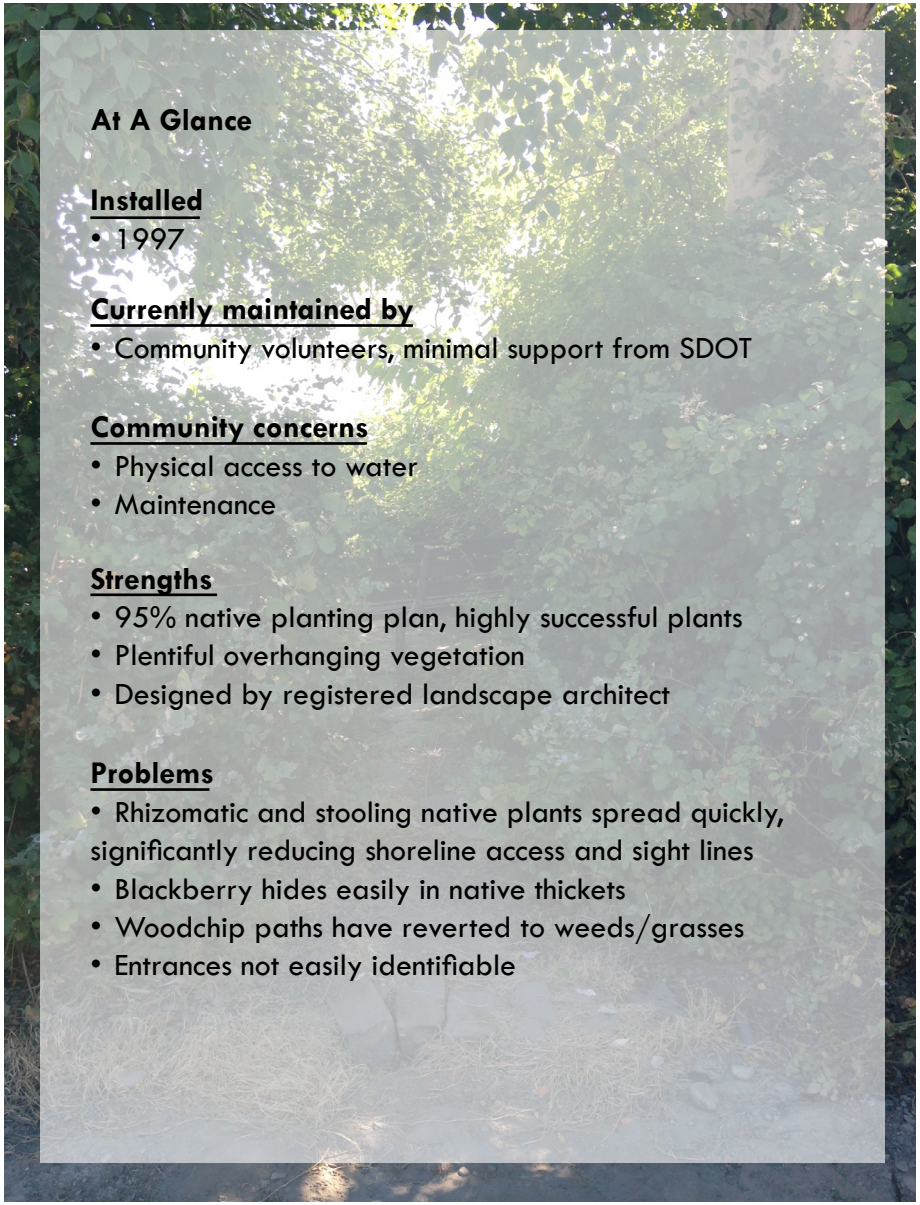
S King St (Leschi)



S King St is in the Leschi neighborhood along Central Seattle's Lake Washington shoreline. Leschi is home to 7 sequential street ends collectively known as the String of Pearls and precedents for the Shoreline Street End program. In 1994, concerned community members pushed for the opening of several street ends that were overgrown and blocked by encroachment's such as fences and sheds built by adjacent property owners. Neighbors opposed this plan based on fear of crime, partying and drug use. With a subsequent court case, the community members won legal support for the opening of these public spaces. Two years later, the City of Seattle City Council created and passed its ordinance creating the Shoreline Street Ends Program.

The improvement trajectory of S King St is similar to that of E Martin St. Community members hired a local landscape architect to draft plans for improvements, however the planting plans are only partially accurate in terms of existing conditions. Similarly to other cases, plantings changed at the last minute and several plantings are not documented. The plants selected for S King St were almost entirely Pacific Northwest natives with the exception of twin weeping birches that flank the main entrance. At first approach, the park is a dense wall of vegetation, and the entrance to the main path is often obscured by parked cars whose drivers may not be parking to visit the street end.

A main problem within this street end is the repetitive planting of large, spreading moisture-loving shrubs such as Spiraea douglasii, Cornus serecea, Rubus parviflorus, and Rubus spectabilis, particularly near shore. These shrubs spread rhizomotously (Spiraea d. and Rubus), and through stooling (Cornus). The effect of these plants growing densely near the shore have slowly reduced visual and physical access corridors to the water, slowly closing in and becoming thicket-like. This has reduced usage of the site, and while it creates peaceful, quiet garden rooms, visitors are entirely unseen from the parking lot or sidewalk. Given that there is no interior lighting, the site is all but



At A Glance

Installed
- 1997

Currently maintained by
- Community volunteers, minimal support from SDOT

Community concerns
- Physical access to water
- Maintenance

Strengths
- 95% native planting plan, highly successful plants
- Plentiful overhanging vegetation
- Designed by registered landscape architect

Problems
- Rhizomatic and stooling native plants spread quickly, significantly reducing shoreline access and sight lines
- Blackberry hides easily in native thickets
- Woodchip paths have reverted to weeds/grasses
- Entrances not easily identifiable

abandoned at night, and is set back far back from the sidewalk due to the parking lot.

Left (top to bottom): Access to shore being reduced by encroaching vegetation; Bench enclosed by vegetation; View to main entrance, with encroaching vegetation. (Credit: Photos from Seattle Department of Transporation)

Existing conditions - S King St

Planting Legend

Betula papyrifera

Acer negundo

Cornus nuttallii

Psuedotsuga menziesii

Oemleria cerasiformis

Cornus sericea

Acer circinatum

Spiraea douglasii

Ligustrum japonicum

Symphoricarpus albus

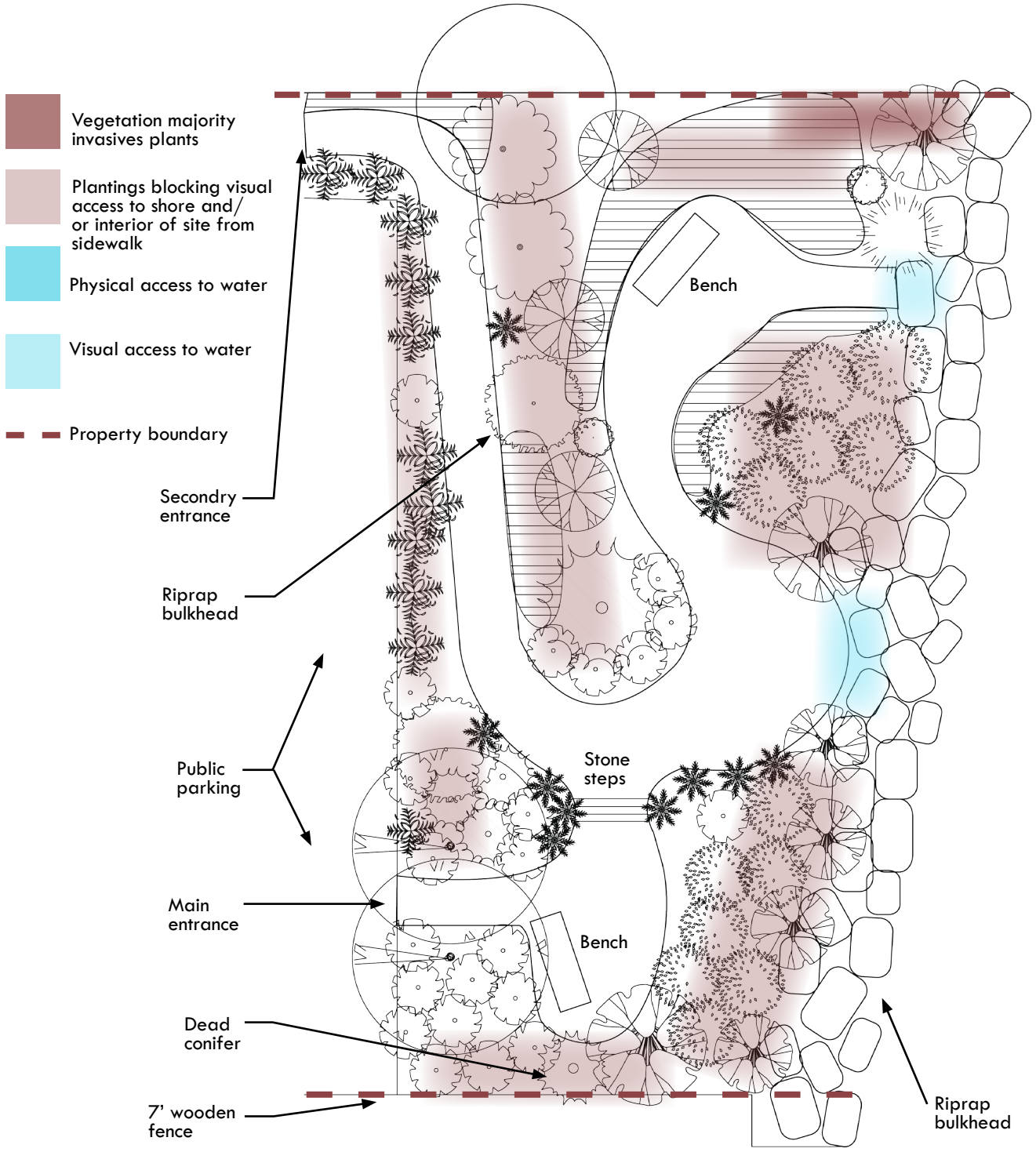
Ribes sanguineum

Mahonia aquifolium

Vaccinium Ovatum

Polystichum munitum

Rubus parviflorus

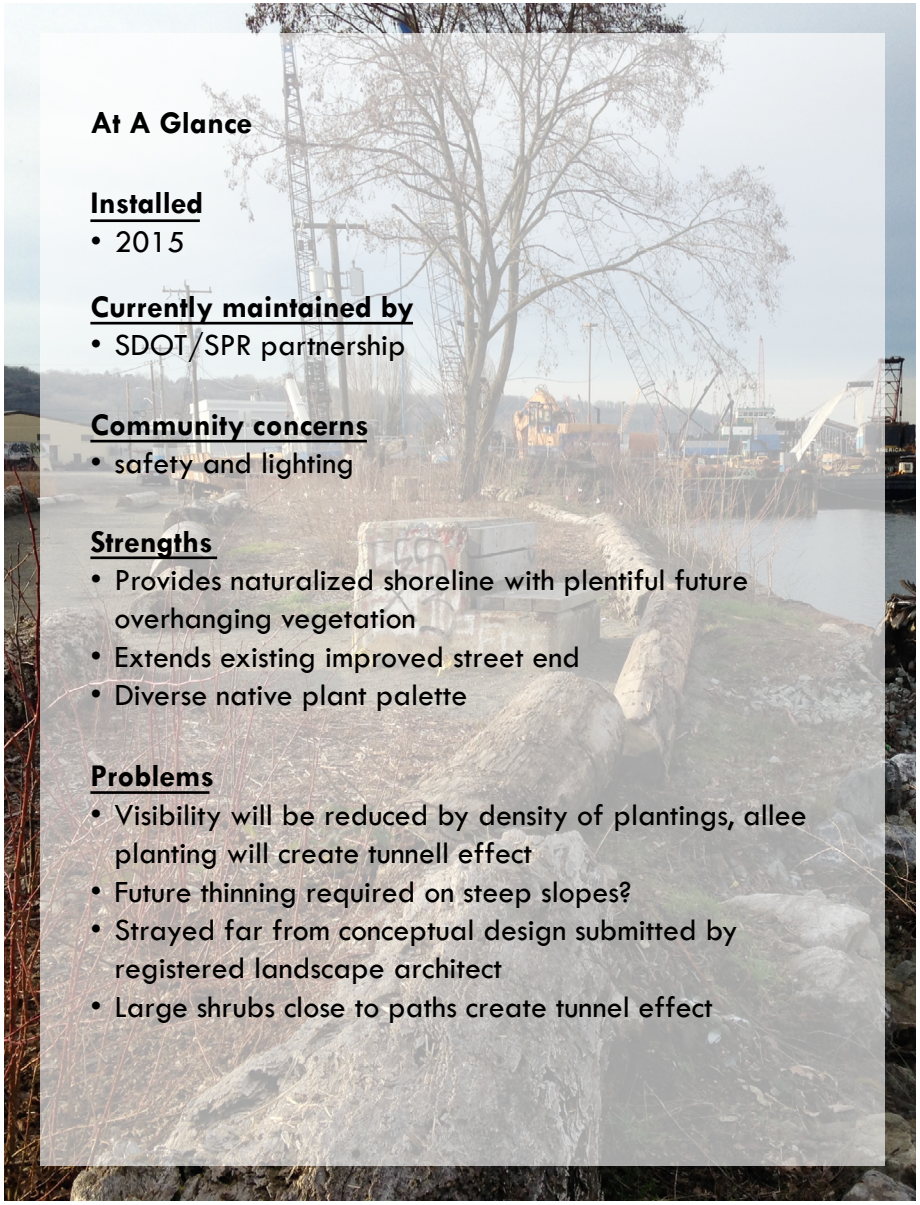


S Riverside Dr (South Park)

S Riverside Drive is a long street end that runs almost parallel to the Duwamish River, creating a wide swath of public shoreline, albeit on a steep bulkhead. The site lies in a heavily industrial area with the neares residence several blocks away. The south end of the street end abuts another shoreline street end, S Portland St, that was previously improved and is a well-used park-like space that features amenities such as benches, public art and stairs descending into the water. With few residences in the area and few eyes on the space at night, there are community concerns about safety and visibility in the area. Camper vans are often parked on the street near the park, densely vegetated areas of the park have been used for human defecation, and vandalism has compromised a rock retaining wall.

These issues influenced the community feedback received around the development of the adjacent S Riverside Dr, which would essentially become an extension of the S Portland St improvements. While S Portland St has frontage on a paved street, S Riverside's entrance faces an unpaved industrial access road with no sidewalks. JA Brennan Associates provided an early conceptual design for the project, naturalizing the shoreline, and designing a narrow marshy swale that would keep people from entering the vegetated areas and setting up encampments. Their vision also included a central node featuring a bench and multiple view points. Seattle Parks Department, with funding from the Parks levy, spearheaded the street end improvements, adapting the firm's ideas into a much simplified design with vastly different plantings based on availability and cost at the time of planting.

While it's not uncommon for planting designs to experience some last minute substitutions, the planting at Riverside Dr was executed as a restoration project, with native plants, including many live stakes, densely planted in massive swaths on either side of a central gravel path. With large species such as cedars, poplars, alders, Douglas firs



At A Glance

Installed
- 2015

Currently maintained by
- SDOT/SPR partnership

Community concerns
- safety and lighting

Strengths
- Provides naturalized shoreline with plentiful future overhanging vegetation
- Extends existing improved street end
- Diverse native plant palette

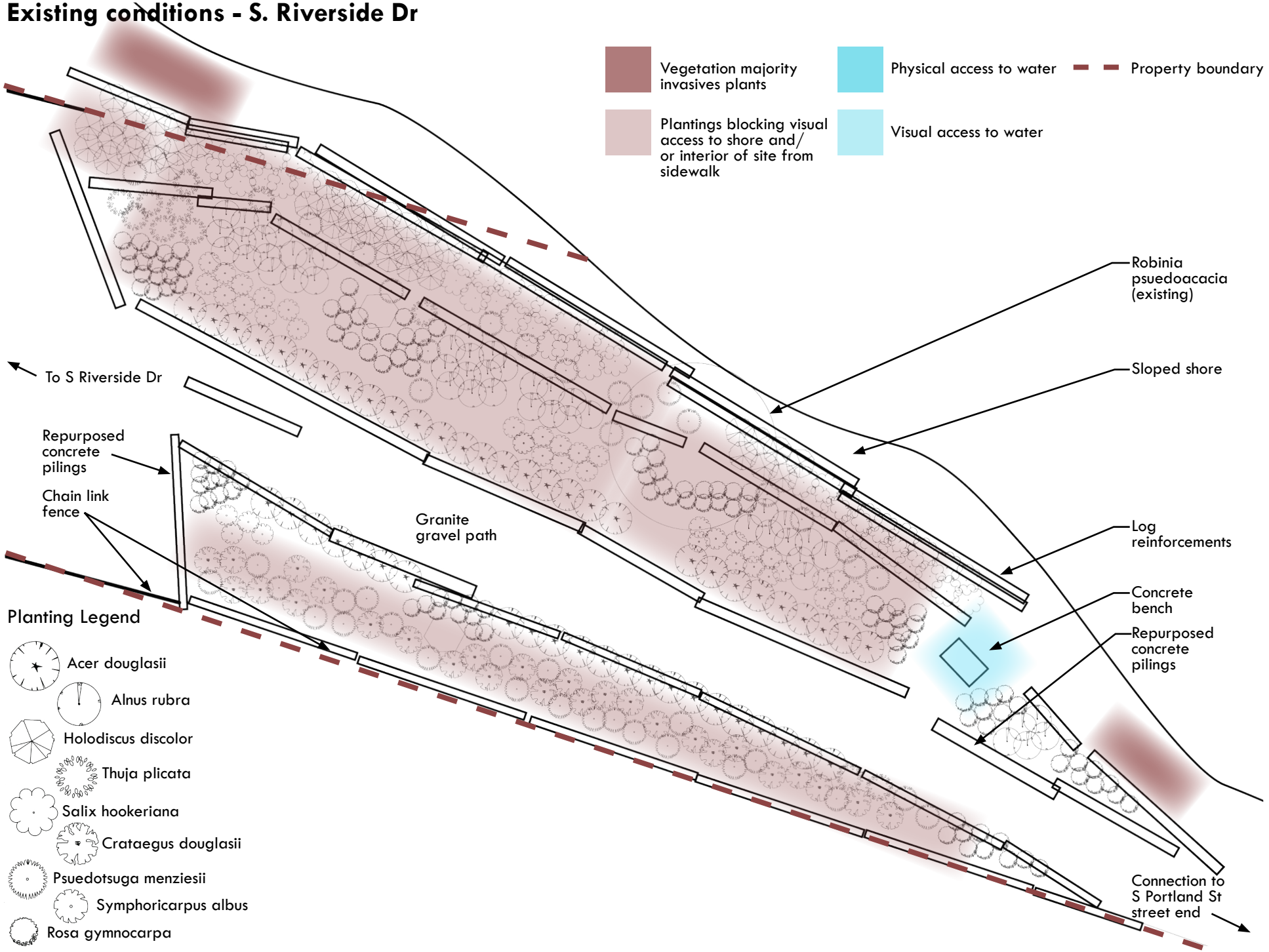
Problems
- Visibility will be reduced by density of plantings, allee planting will create tunnell effect
- Future thinning required on steep slopes?
- Strayed far from conceptual design submitted by registered landscape architect
- Large shrubs close to paths create tunnel effect

and willows planted in groves, and Douglas maples planted in rows on either side of the path, it's not difficult to foresee this public path becoming a dark tunnel through mature trees. This outcome would be counter to the original desires of the community; and while visual access from one end of the site to the other will be maintained by the straight path, little visual access out to the river will be preserved, especially in summer unless major thinning is performed over the years. The restoration-style approach to planting left the community without a documented planting plan to refer to, should a community group have expectations of maintenance that don't match up with the frequency of maintenance performed by SDOT.

The materials selection for the site conforms to the low-cost nature of SPR's improvements. As with the rest of the unpaved S Riverside Dr, 1 -3" concrete rubble was used for the main path through the street end. While visual continuity is created, the rubble is too large to easily remove weeds by the root, thus weeds have grown consdierably throughout the path and along the edges. Weedy walking paths are a major visual cue that a site is uncared for. On a positive note, salvaged concrete pilings were used as bed borders and the pilings, covered in estuarine barnacles, communicate the spirit of the working industrial river.

Left (top to bottom): View into site from main entranc showing weeds in course gravel and repurposed pilings; Bench providing moment of visual access; Live stake plantings running the entire length of sloped shore will grow tall and dense. (Credit: Photos from Seattle Department of Transportation)

Existing conditions - S. Riverside Dr



Conclusion: Designing with Maintenance in Mind

Taken together, these case studies suggest that sites planted with native plants, and any urban site with the presence of blackberry, will develop into thickets that favor non-human species and will become more and more disused if not maintained to a high standard. Again, we come back to the question of the value of enclosure and its effect on people's sense of safety. All shoreline street ends exist in close proximity to urban land use whether it's residential houses just across the property boundary or abandoned industrial yards. One's sense of safety in an urban context is more threatened than in a natural setting such as rural or wilderness area where enclosure is ubiquitous and expected. In this sense, enclosure is avoided because it's associated with refuge for perpetrators of crime that seek out relatively scarce sites of enclosure in the urban environment. While Appleton (1975) has argued that people prefer landscapes with a view to enclosure as a means of potential escape and refuge, later research (Nasar, Jones, 1997) suggests people actually view places of enclosure along paths as potential refuge for criminals, particularly after dark.

Vegetation

The issue of balance thus comes down to maintenance; if sites are thickly planted, they become places to fear and avoid which directly reduces the likelihood that they will be stewarded by community members and increases the rate at which they become overgrown and further unused by the general public. So perhaps the question should be 'how can we increase the likelihood that these sites will be maintained, easily and efficiently by neighbors and community members?'

Materials

Like choosing appropriate, low-maintenance plants, materials selection are also important to potential stewards. Some materials for paths are easier to hand weed, such as finer gravel such as E Martin St, while coarser rock maybe be more difficult to weed due to the larger, more complex crevices created- for example the gravel at S Riverside Dr. Woodchips are a popular, affordable option. However they are quickly invaded by weeds, and through decomposition, have easily eroded and blurred edges.

Edges

Highly legible edges are important to continued maintenance, serving as benchmarks for the intended extent of vegetated areas. The most common form of community stewardship are infrequent work parties with 5+ volunteers and "big cleans" of sites. This means that for long stretches of time, little to no maintenance is performed. Because of this, weed growth can be quite extensive by the time stewards step in. Stewards may not have landscape or gardening experience but must make decisions about where paths should end and vegetation start. Stewards can sometimes have too light a touch, afraid to pull something they shouldn't. This uncertainty leads to "bed creep" where the growing vegetation crowds a path, drops organic matter over path substrate and seeds and weeds collect and germinate, creating a new edge. Plant selection once again becomes important to prevent "bed creep" – designers should select plants that do not sprawl outwards if planting near a path, which occurred significantly with cotoneaster and arctic willow at E Martin St.

Guidelines: Designing with Maintenance In Mind

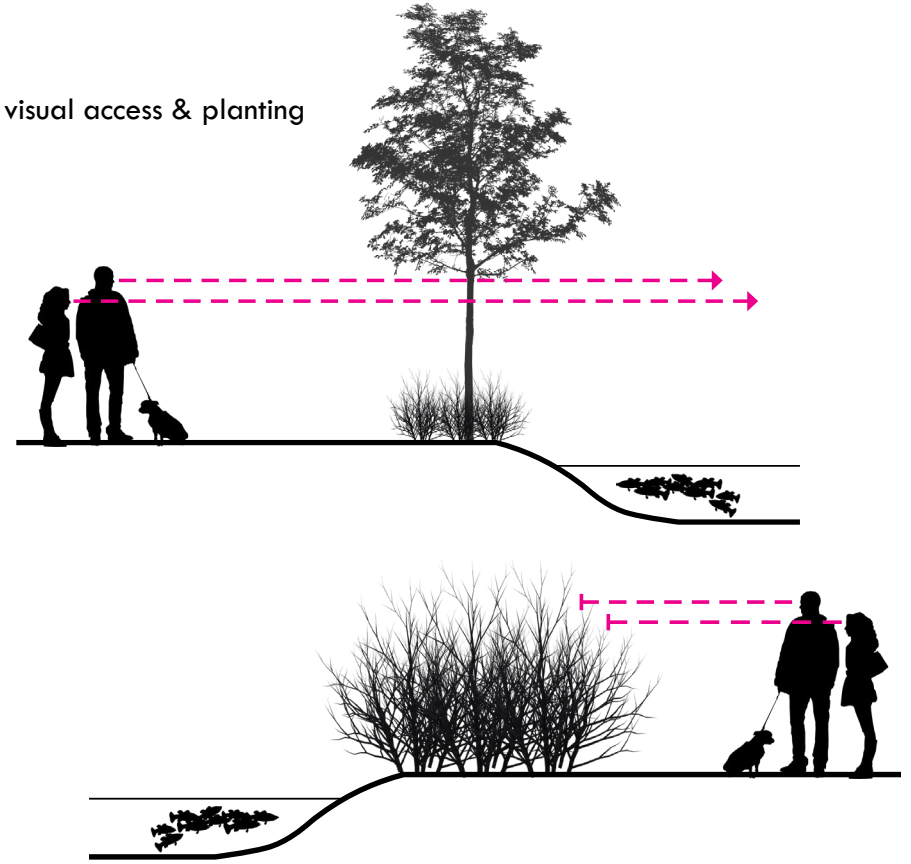
Placement and spacing

- High canopy and low/medium-height ground plantings along the shoreline can satisfy need for salmon habitat and visual access.
- Keep large shrubs away from paths and towards centers of planted areas.
- Filtered light is preferable to dense shade in relation to human perceptions of safety; trees can provide filtered light and create contiguous canopy habitat for non-salmon wildlife with generous spacing and careful tree selection. Closer spacing is acceptable when using trees with more open canopies, such as pines and trees with compound leaves. Futher spacing should be used when using trees with broad, dense canopies such as deciduous and evergreen broadleaf trees and conifers.
- Evergreen trees that drop leaves outside of the typical autumn leaf drop may not be cleaned up immediately and should not be planted above paths, seating areas or highly visible planting beds.
- Maximize views from sidewalk to shore and from the main entrance.
- Keep entrances to street ends open and inviting
- Avoid moments of enclosure that are closed or that have blocked sightlines on more than 2 sides.
- Avoid complex plantings, grouping plants of the same species is more legible for stewards.

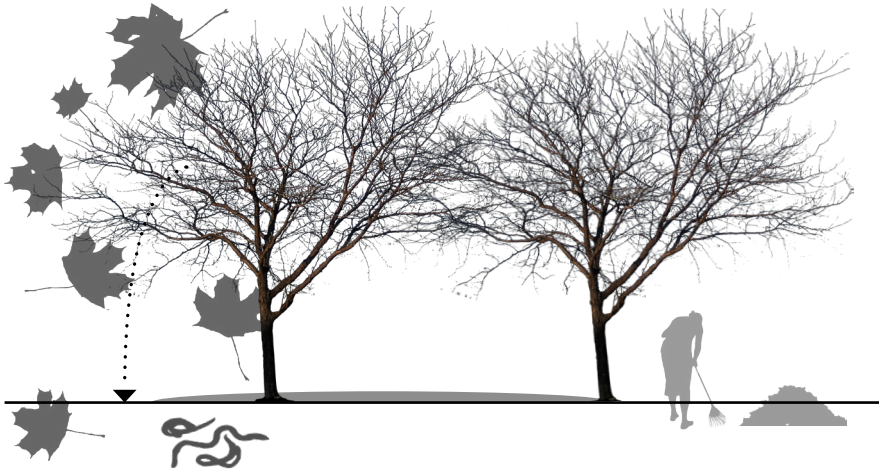
Ecology

- Promote richer benthic ecology by using plants that provide mulch from leaf litter or needles.
- Physical shoreline access can damage aquatic habitat, place access points to the side rather than in the middle of shoreline habitat and/ or create separation using implied barriers rather than fences

visual access & planting



leaf mulch



Choosing the right plants

- Natives have high success rates and should continue to be prioritized even outside of the requisite native plantings within the shoreline setback.
- Drought tolerant non-natives can be incorporated if sited behind the shoreline setback. Plants in the case study sites show they can perform well.
- Sun-loving groundcover is not long-lived and may be overtaken by weeds, thus use sparingly or plan for its temporality
- Use caution in planting the following plants where visibility and/ or public access are highly desired as they are prone to rapid colonization/growth and limit visibility within shoreline street ends:

Native, rhizomotous

Symphoricarpus albus
Rosa sp
Spiarea douglasii
Rubus spectablis
Rubus parviflorus

Native, large

Salix sp.
Cornus sericea
Mahonia aquifolium

Non-native, large

Arbutus unedo
Prunus laurecerasus
Abelia grandiflora
Forsythia intermedia
Photinia x fraseri

Native, rhizomotous

symphoricarpus al. *rosa sp.* *spiraea do.* *rubus sp.* *rubus pa.*

Native, large size

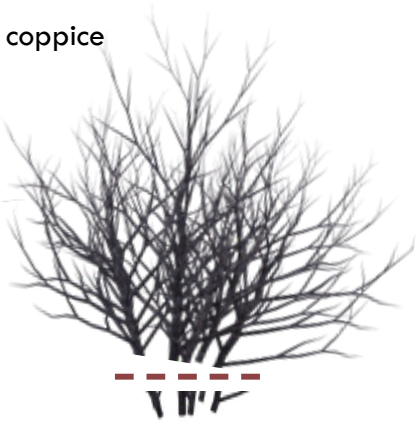
salix sp. *cornus se.* *mahonia aq.*

Non-native, large size

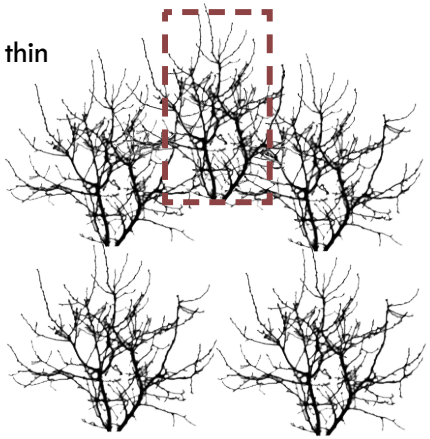
arbutus un. *prunus la.* *abelia gr.* *forsythia in.*

Treatments

coppice



thin



arborize

Signage

- Signage is highly desired by community members, and is sorely lacking in improved shoreline street ends thus should be included in any future improvements.
- Signage is a valuable educational tool to increase stewardship and rewards participants.

Documentation & improving communication with stewards

- Document any alterations to design during installation. This can be a valuable resource for future stewards and efforts to redesign or renovate.
- Community stewards may not have clear/direct communication lines with SDOT. Reduce "telephone effect" in communicating maintenance priorities to stewards by creating maintenance plans for every street end's improvements.

Materials, edges and weeds

- Small gravel is most successful at preventing weeds (E Martin St) as opposed to coarse rock at E Riverside and woodchips at S King St however programmatic, budgetary constraints may prioritize one choice over another
- Hard edges help stewards know the scale of vegetation encroachment and necessary maintenance
- Provide efficient pick-up locations near the street for yard waste produced by community-led work parties

Signage & Branding

The shoreline street end program, as currently exists, relies on community advocates and organizers to press for improvements in specific street ends and also relies on community stewards to maintain the sites once improved. A tension between program administrators and community members centers on the narrow focus of neighbors versus the program focus of shoreline street end program coordinators. Community members, understandably so, view the program in the context of the street end closes to them. If that street end is neglected or overgrown, the reputation of the entire program is tarnished. SDOT staff, however, operates under strict budgetary allocations meaning every street end improvement decision is a vast balancing act that takes multiple factors into account particularly geographic, social and racial equity, and cost. Vocal community members in a wealthy neighborhood may be frustrated that a particular street end remains unimproved or without a street end sign but they are not considering that they have 3 improved street ends within a half mile walking distance whereas neighborhoods in more industrial parts of town have greater need for public green space.

Similarly, if community members were more cognizant of the entire system of street ends and what they are contributing to salmon habitat and public access, a complex understanding granted, they may be less resistant to SDOT plans that prioritize habitat and deemphasize public access in targeted areas. Indeed, vocal community groups have halted SDOT efforts to include public access at a shoreline street end improvement on the north end of Martha Washington Park in Seattle's Rainer Valley neighborhood. In other cases, community members oppose any effort to improve habitat in street ends that don't prioritize public access. Expecting community members to have the same priorities is not a realistic goal, however all parties would benefit from having more perspective of the scale and function of the numerous street ends in Seattle. Thus it is critical to conceive of ways to communicate street

Above: Current signage at street ends (28th Ave NW pictured) is non-descript and utilitarian. (Credit: Photos from Seattle Department of Transportation)
Next page: Like several others, E Roanoke St street end is operated as a city park, which creates an identity problem for the site as shown by the numerous signs present. (Credit: photos by Seattle Department of Transportation)


Cheshiahud Loop
SHORE VIEW
WELCOME TO
ROANOKE MINI PARK
THIS PARK IS FOR ENJOYING
COMMUNITY ACTIVITIES
AS IN ANY PUBLIC PARK
THE FOLLOWING ARE PROHIBITED
•CAMPING
•AMPLIFIED SOUND AND
EXCESSIVE NOISE
•PETS OFF LEASH
•FIRES(Except in designated areas)
•POSSESSION OF ALCOHOL
OR WEAPONS
•OTHER ACTIVITIES PROHIBITED
BY THE S.M.C.18.12.
ROANOKE REEF
Roanoke St.
Mini Park
Park Closed 11:30PM–4AM

ends as a network and/or program as opposed to individual sites, and this can be achieved through design strategies and/or signage.

Standardizing design for street ends is controversial because, as they exist, many street ends have unique characters that often speak to the identity of the neighborhood in which they are located. As far as design goals for urban public spaces, this is and should be highly desirable. In certain rudimentary ways, design standards exist for what you are and aren't allowed to build near the shore as defined by the Seattle Shoreline Management Plan. This shows that guidelines can be enacted that produce spatial conformity, the deep layer, over which additional layers of identity may be overlain, medium and light layers, which can include unique furniture, installations and programming (Gustafson Guthrie Nichol, 2014). I propose that the medium layer be standardized as well, given the negative effects that certain materials can have on the performance of a street end.

These categories have blurry edges and are useful in framing the differences in site elements to a certain degree – for instance, vegetation can be elements of the medium layer, trees and shrubs, and the light layer, shrubs and perennials. While vegetation can exist as an element in medium and light layers, in the context of shoreline street ends, the goal should be to reduce the amount of time that needs to be invested into maintenance thus they should be considered medium layer elements. Standardization of vegetation could require certain plants to be used at entrances for example, to create a consistent "look" of a shoreline street end, however given the vast site-specific conditions including soil, light and moisture; this would not likely be setting street ends up for success. Instead, standardization of vegetation should be more spatial in nature, having to do with visibility and placement in relation to paths, entrances, seating and other plants.

An important part of all urban public spaces is and should be public art. Public art in ROW's, including shoreline street ends, funded through the City's 1% for the Arts ordinance. Past works have included benches, signs and bollards. These functional artworks contribute to the unique identities of shoreline street ends. Like the arts program of the King County Metro bus stops, public art could be a required element of all shoreline street ends, enlivening a standardized marking of the public space, such as entrance bollards or benches. In the instances of bollards, these would also contribute to a problem of recognizing shoreline street ends as public spaces, whereas they can unfortunately sometimes look like overgrown trails into the unknown.

Signage is critically important in shoreline street ends because these spaces so closely abut private property. Signage has the added benefit of pleasing adjacent property owners concerned with park visitors crossing the public/private property boundaries. Most importantly, signage can reduce the need for interpretation, such as in the case of more subtle or abstract design moves, and present information about park program, plantings, wildlife, and especially the street end program itself.

While City-contracted, unionized installation of shoreline street ends at $500/sign is cost prohibitive for all sites, the main existing issue may not necessarily be the signing of every street end, but the quality of sign. Currently, shoreline street end signs, designed by a local artist, are a series of simple blue sings indicating Public Shore, Shore Access or Shore View with three images relating to either Mt Rainier, the Puget Sound or a simple human icon standing near water. None of these official shoreline street end signs include mention of SDOT or the Shoreline Street Ends program. Successful signage would include more clear indication of what this public space is (a shoreline street end as part of a family, not a non-descript public shore/shore access/shore view) and would also include a map of all the street ends in the city and indication of where the viewer stands. This would remind the visitor that this site is part of a network of similar sites that share a common goal; they may look slightly different but they all serve the public and the regional ecology.

Above: Shoreline street end signage styles are not cohesive. (Credit: photos by Seattle Department of Transportation)

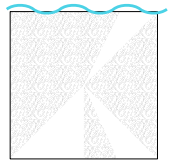
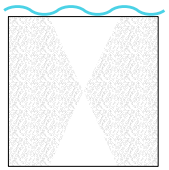
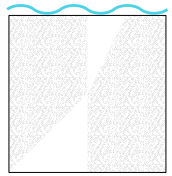
application & design

Credit: (photo from Seattle Department of Transporation)

4

Introduction

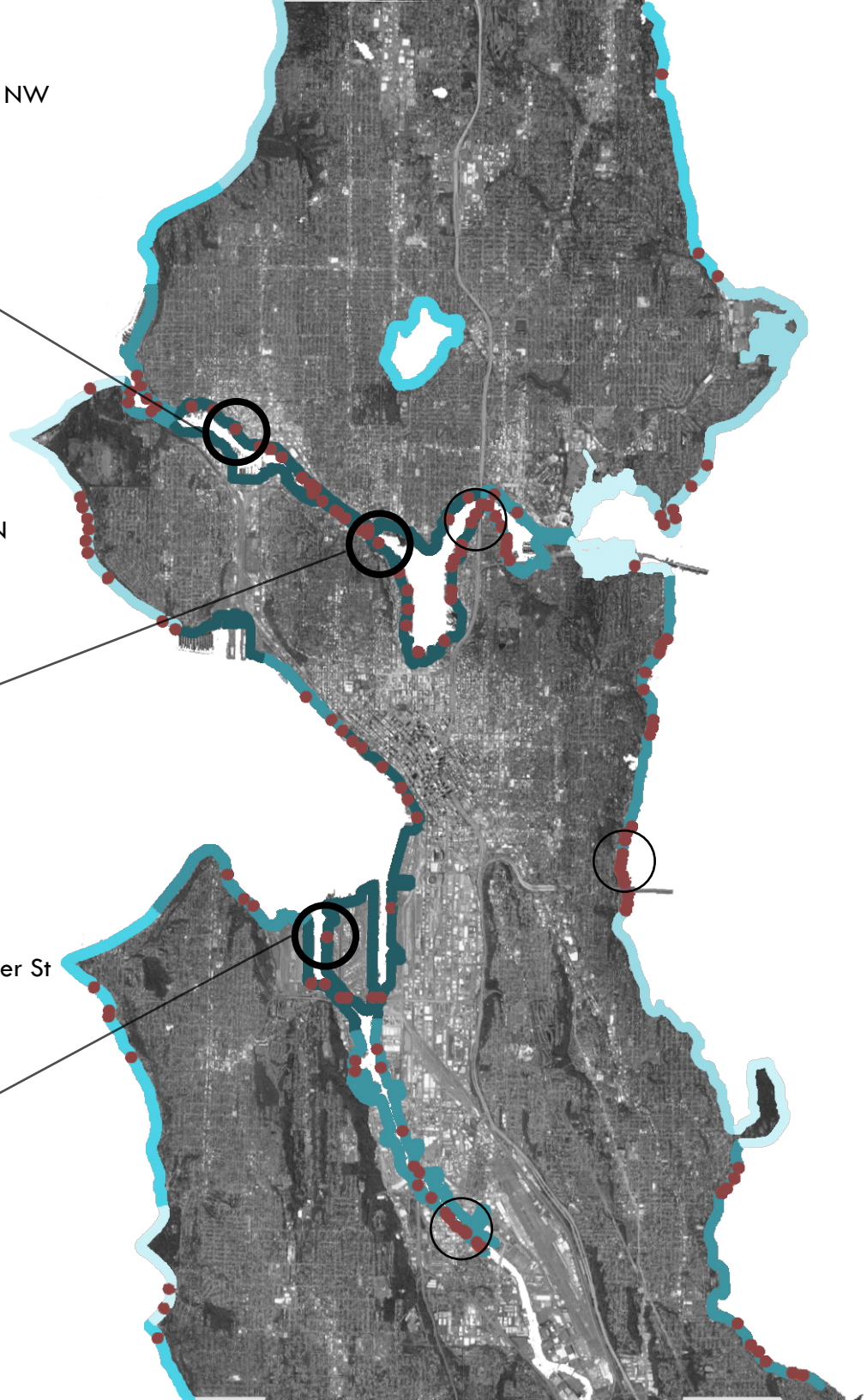
The guidelines culled from the three case studies were applied to three unimproved shoreline street ends. Three unimproved sites were selected based on their diversity in geographic location, size and slope and age of improvements. Sites with no areas with slopes under 10% were not considered due to the low likelihood that these sites would be improved in reality. The purpose of this exercise is multi-pronged: to explore how complex multi-scalar problems that can be solved with relatively simple design solutions, to demonstrate the potential of unimproved shoreline street ends in a realistic, buildable way, and to make a case for more intentional shoreline street end designs. Presently, FOSE (Friends of Street Ends) is urging SDOT to abandon any projects that necessitate major expenses such as soil remediation in lieu of small, simplified improvements such as simple paths and benches. As discussed earlier, underestimating the role that these sites play in our urban ecological system and the role that more careful and intentional design plays in future site attendance and perceptions of safety can be the detriment of the future success of the site and potential stewards on which SDOT and the public relies.

SSE	Area	Shoreline Width	Overall Slope	Design Priority	Spatial Form (proposed)
15th Ave NW (Ballard)	20,038 ft	264 ft	5%	1. Access 2. Habitat	
5th Ave N (Queen Anne)	2,360 ft	60 ft	30%	1. Habitat 2. Access	
SW Lander St (Harbor Island)	13,457 ft	140 ft	7%	1. Habitat 2. Access	

15th Ave NW

5th Ave N

SW Lander St

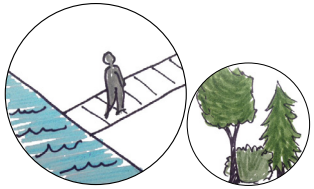


Shoreline Impairment

Most impaired

Least impaired

Shoreline street end



15th Ave NW (Ballard)

The shoreline street end at 15th Ave NW lies on the north shore side of 15th Ave NW under the Ballard bridge. The site is across the street from the proposed Ballard Blocks II development, which will increase the density of an already densely populated neighborhood. The site is positioned along Leary Way, where proponents and bike advocates hope to build the missing link of the Burke Gilman Trail. Thus 15th Ave NW is a very desirable location for a public space with water access. It's also significant that one block east of 15th Ave NW is a shoreline street end with a public boat ramp, built in a partnership between SDOT and the Seattle Parks Department and that this part of Seattle's shoreline lacks green space consistent with its maritime industrial use. Gilman Playground, at .6 miles away, is the nearest green space, not including the heavily paved boat ramp street end at 14th Ave NW.

The design for this street end responds to the overhead bridge span that runs the entire length of the site and continues across the Ship Canal to Interbay. The four-lane bridge, at a height of about 40 feet prevents rain from reaching the ground beneath it. Visitors to the existing site see a certain amount of vegetation in this covered gravel area, particularly Buddleia and other invasive weeds. The growth in this unlikely setting is due to a series of open gutters that funnel bridge run-off onto the ground below the bridge. This water, with virtually no summer water, is enough to sustain vegetation. Many of these gutters are over-water and funnel the polluted rainwater directly into the Ship Canal.

By redirecting this runoff through a marshy swale that runs through the length of the site, the street end provides an additional service of storm water treatment while creating habitat and discouraging people from entering the moist, vegetated area. The design includes a children's play area in the dry interior north portion of the site, near the street end's entrance. This play area is graded

Design goals

- bicyle connectivity
- activation of unconventional space
- overhead structure requires drought tolerant species
- preservation of views

Program

- play space
- bird viewing area
- environmental education

Plant selection

- shade tolerant
- marsh species
- drought tolerant

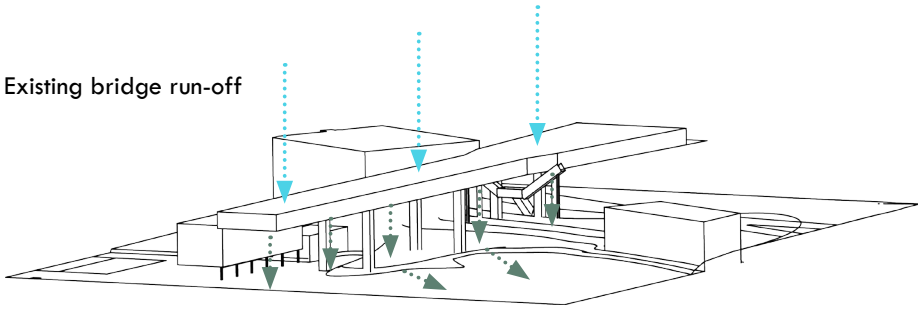
to provide an at-grade approach from the sidewalk, creating a welcoming and clear entry with great views to the rest of the street end park below. A riprap "bulkhead" wraps around the play area, descending to the gentle grade below, and will be a favorite spot for active children to scramble up and down. The program in this street end is intentionally diverse and includes green infrastructure, passive recreation and viewing areas, while the play area attracts children to the site. A variety of programmatic goals will make the site's users more diverse decreasing the ability of any one user group to dominate the space; a common fate in small urban public spaces.

Open views are maintained within the design though the focus on marsh-like plantings with a few small trees and shrubs mostly relegated to the perimeter of the site. This creates a separation between public and private domain while maximizing tree canopy. Some grading is required to eliminate any remnant bulkhead and create the raise play near the site's entrance, and small channels will be dug into the areas adjacent to the swale to allow lake water to enter the site and irrigate the grasses, especially during the high water months.

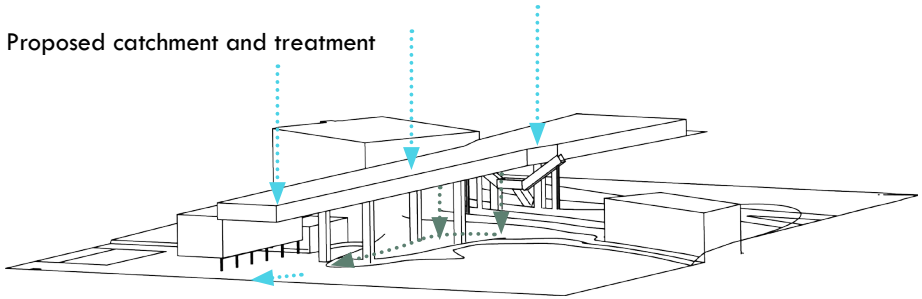
Right, top to bottom: Looking south at entrance to NW 15th St, showing entrance to pedestrian bridge stairway; View north from shoreline towards entrance, showing shore condition, weeds and gravel clearings; View north from shore showing waterfowl and substrate. (Credit: photos from Seattle Department of Transporation)

Proposed Planting Plan and Grading - 15th Ave NW

Existing bridge run-off



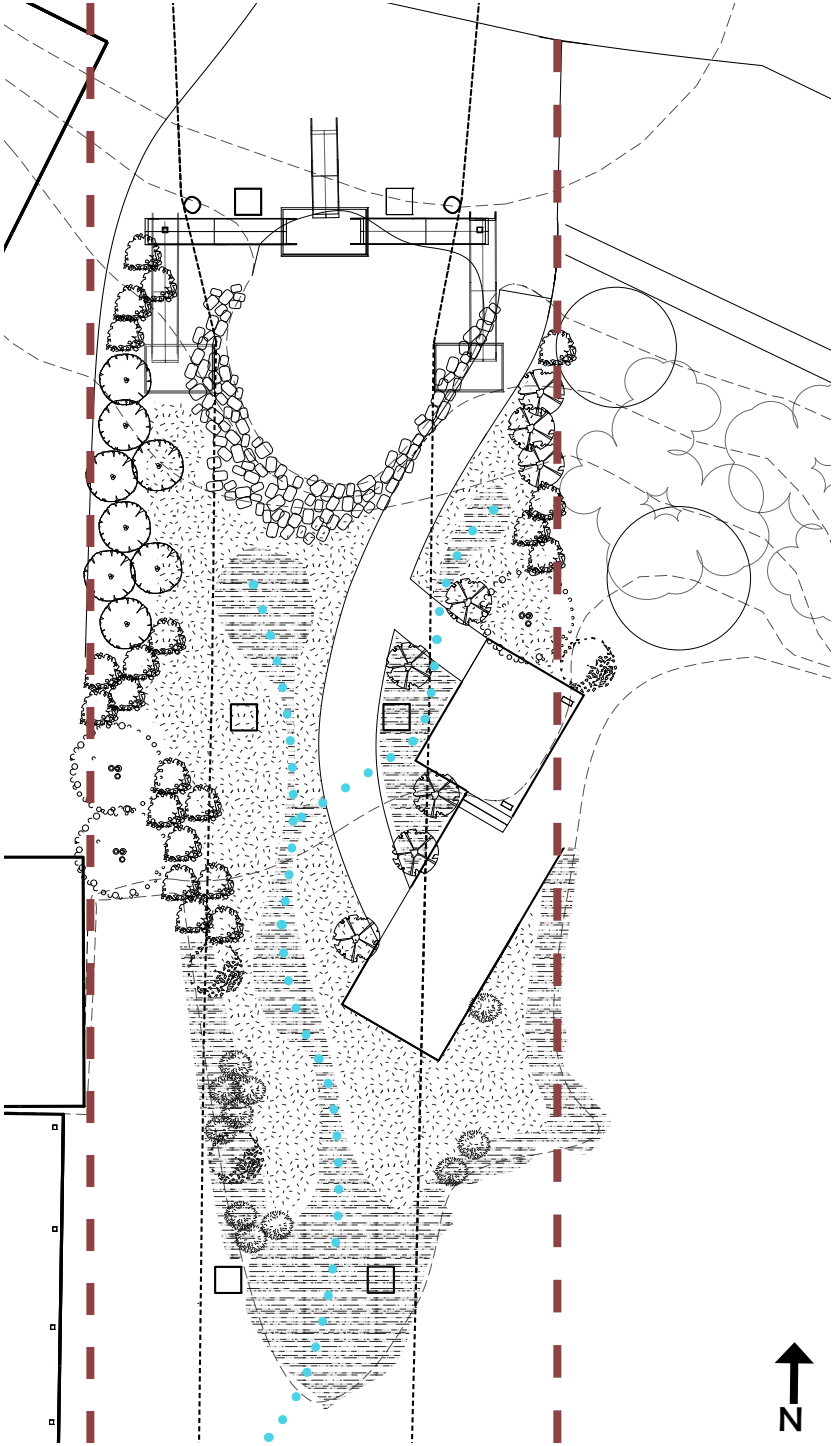
Proposed catchment and treatment



Planting Legend

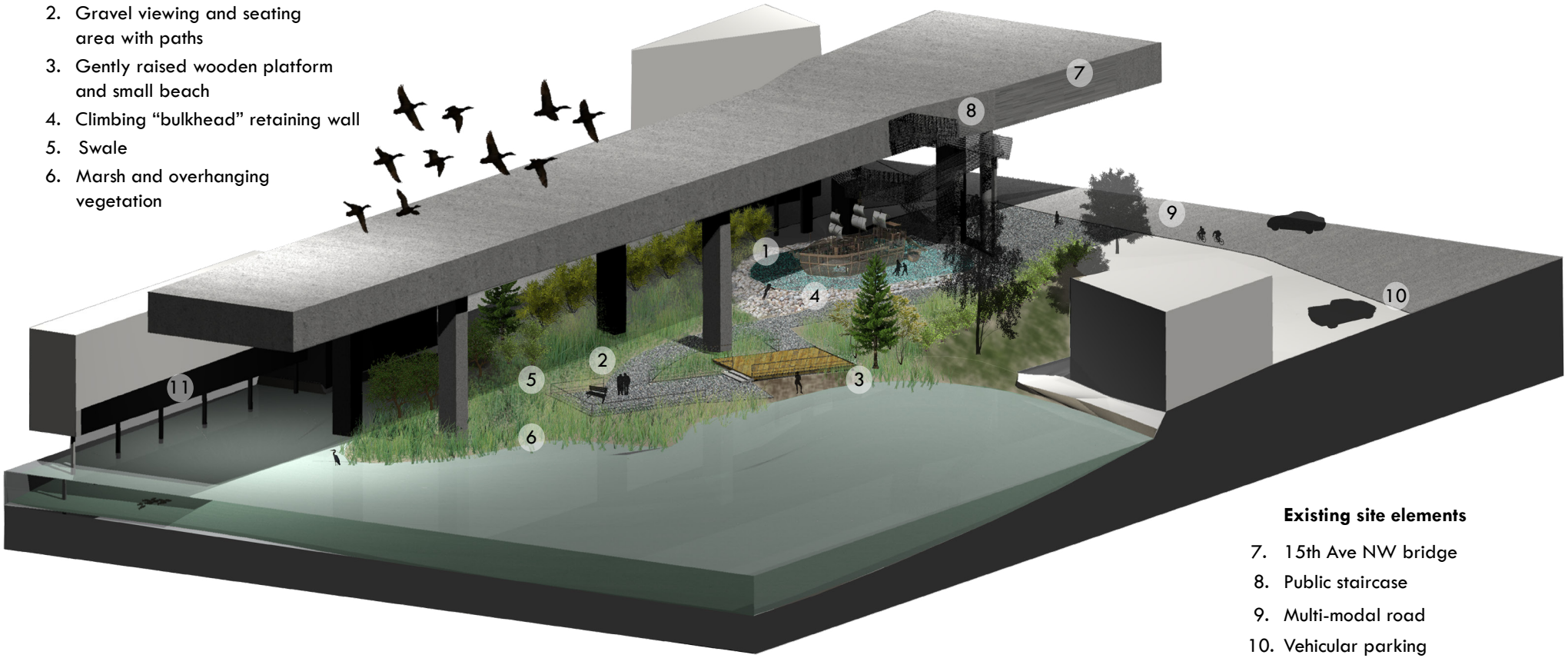
- Viburnum plicatum
- Myrica californica
- Malus fusca
- Acer circinatum
- Cornus sericea
- Salix purpurea “Nana”
- Scirpus microcarpus/carex obnupta mix
- Juncus effusus/carex stipata mix

Property boundary



Proposed site elements

1. Play area with colored play rubber
2. Gravel viewing and seating area with paths
3. Gently raised wooden platform and small beach
4. Climbing “bulkhead” retaining wall
5. Swale
6. Marsh and overhanging vegetation



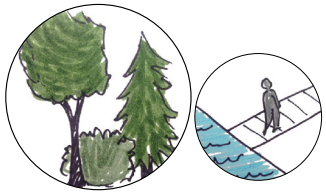
Existing site elements

7. 15th Ave NW bridge
8. Public staircase
9. Multi-modal road
10. Vehicular parking
11. Overwater building

Above: Section elevation, looking west showing grade difference from “bulkhead” retaining wall near play area and gentle slope of marsh.

Above: Looking south from raised play area, showing stormwater marsh, viewing areas, and open character.

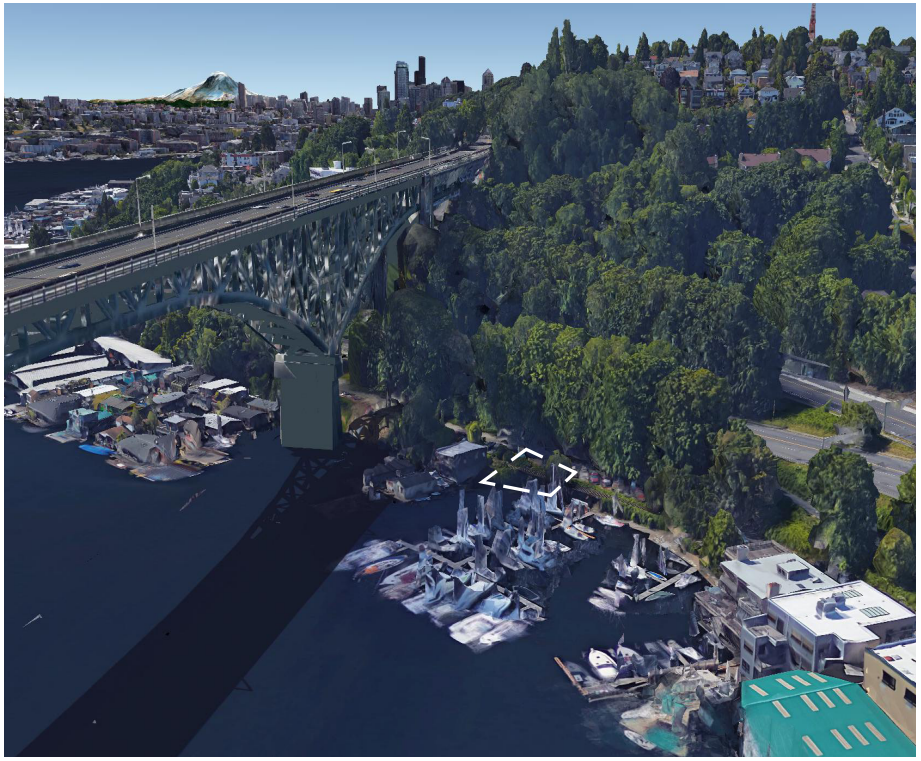
5th Ave N (Queen Anne)



While 15th Ave NW and SW Lander St have large footprints more traditionally associated with urban parks, 5th Ave NW presents a different yet common shoreline street ends trope: a very small developable area. Indeed, with much of the street side of the street end being used for active roadway and the waterward end of the site being an almost vertical slope leading to a small inaccessible beach 10 feet below, 5th Ave N has a usable area between the road and drop-off of only 1,500 square feet.

A train trestle, supported by 10 foot columns, stands independent from the shore yet runs parallel, even with the upper grade of the site but with an open gap of 18 inches between the top of the slope and the trestle. The old railway is a remnant of a spur line of the North Pacific Railway, that operated from 1911 to the mid 1990s with a long period of decline beginning in the 1950's, servicing the Ford Assembly Plant and other businesses around Lake Union with primarily coal (Armbruster, 1999). It ran from Salmon Bay as far as the City Light building at Lake Union's southeast edge. Armbruster (1999: 161) states that James J Hill, head of the Great Northern Railway, declared Seattle's tidelands overcrowded and that the future of Seattle's commercial growth would rely on its inland waters. The track's history is little documented perhaps, because it ran in the middle of the night in its later years. An expansive public art installation, entitled "Spur Line" by Maggie Smith, follows a new bike and pedestrian built on the path of the defunct Lake Union railway. The installation includes quotes from interviews Maggie held with past railway workers, as well as imbedded railway tracks and other art (Lake Union Watershed Blog, 2014).

Today, the trestle's wooden tracks are in state of significant deterioration despite being frequently walked upon by pedestrians and daredevils. Conversations with neighbors during my site visits revealed that the trestle is highly valued by the immediate community



Design goals

- bicycle connectivity
- bank stabilization
- preservation of train trestle
- landmark wayfinding from water

Program

- bicycle rest stop
- trestle overlook

Plant selection

- hearty, native palette
- bank stabilizng
- shade tolerant

members and that they view it as integral piece of the community's identity. The trestle holds significant historical value as well as cultural value, signifiying a remnant of "Old Seattle", a local colloquialism referring to the quirky and unexpected maritime culture that is often erased by current developments. While reconstruction of a mock-walking trestle could also be effective, the costs associated with this would be much higher than the proposed viewing deck

Removal of the trestle would allow for a treatment or grading of the site that may positively impact salmon habitat, which would suit the site's predetermined focus on habitat and secondary public access. However, given public opposition to the removal of the trestle, the design should prioritize the trestle's preservation over habitat improvements.

Considering the four treatments of historic structures (preservation, restoration, rehabilitation, reconstruction), the design proposes preservation as the most feasible and likely treatment considering the associated costs of restoring the structure and the minimal budget of SDOT and community groups alike. To presere the trestle, steps must be taken to prevent pedestrians from walking on its rotting beams, a major liability for the City of Seattle. The design for 5th Ave NW proposes a broad overlook deck with a metal grate floor hovering a few inches above the trestle, giving the user the feeling of being on the tracks.

With no sidewalks along the road and heavy bike usage from the adjoining Ship Canal bike trail, there is little room to provide an entrance thus the site becomes a pull-off from the road for cyclists and pedestrians. A bench and picnic table gives visitors an opportunity to pause and reflect, while the overlook deck invites people to look over the edge into the water and down between the trestle tracks.

To respond to the focus on habitat and secondary public access, the design includes as many trees as possible that will still allow visibility and light at eye-level. With neighbors on one side only, it's

Right, top to bottom: Looking east towards the informal street parking and multi-use road; View north of the train trestle; View south towards site, showing train tresle and shore, slope and shore condition.
(Credit: photos from Seattle Department of Transportation)

critical to allow visibility into the site, especially from the houseboats on the south side. The street end sits at the bottom of a large slope with busy traffic on Westlake Ave N above, buffered by dense stands of big leaf maples which cast near constant shadows over the site. The planting plan includes small trees, shrubs, and conifers with open canopies. In the eastern portion of the site, an existing big leaf maple sapling will be allowed to mature and extend the big leaf maple canopy across the road. Plants and trees are planted close to the edge of the slope to stabilize the 'bulkhead'.

This street end is definitively in the category of 'hard-to-find', as it's invisible from the busy street at the top of the slope. The site's proximity to a marina also makes the case that the site needs to be a landmark, in a sense that it's easily recognizable as a unique public space both from the water and as you pass by. This is addressed by a trio of weeping yellow Alaskan cedars that are planted at the roads edge. These visually striking, tall and narrow trees are cultivars of a West Coast native species. These types of landmark tree plantings are exclamation points along the shoreline and would benefically serve all street ends and the program as a whole.

Right: The "enchancted" Spur Line trestle, looking east towards the shoreline street end. (Credit: Photo from Lake Union Watershed: A Community Blog Site. 2017 Site: http://lakeunionwatershed.com/?cat=8 Accessed: June 1, 2017)

Property boundary

Planting Legend

Acer macrophyllum

Abies grandis

Oemleria cerasiformis

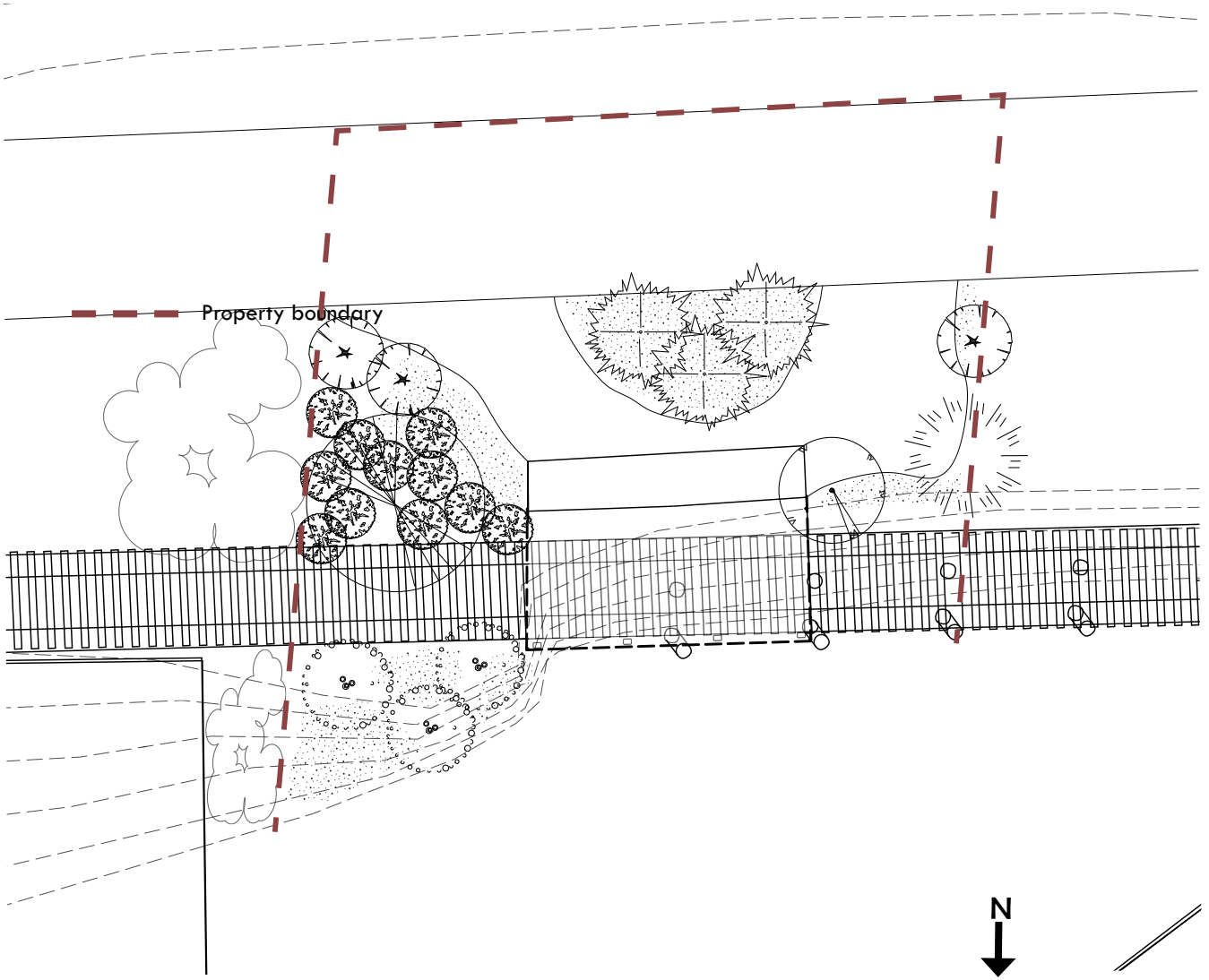
Chamecyparis nootkanensis "Pendula"

Corylus cornuta

Ribe sanguineum

Mahonia aquifolium

Gaultheria shallon/Polystichum munitum mix

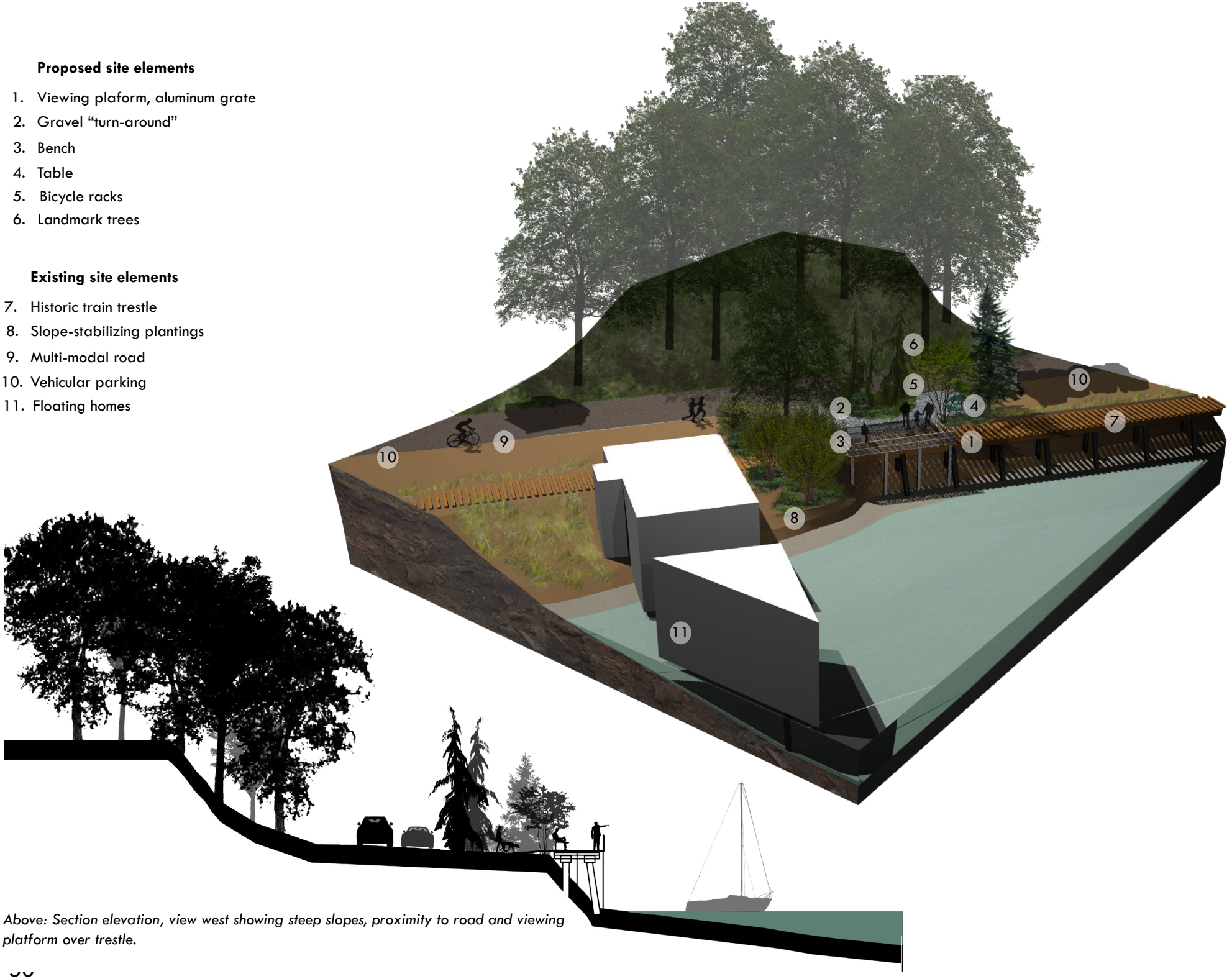


Proposed site elements

1. Viewing plaform, aluminum grate
2. Gravel “turn-around”
3. Bench
4. Table
5. Bicycle racks
6. Landmark trees

Existing site elements

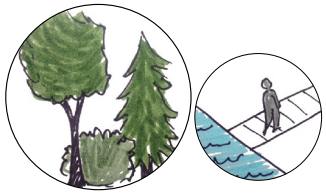
7. Historic train trestle
8. Slope-stabilizing plantings
9. Multi-modal road
10. Vehicular parking
11. Floating homes



Above: Section elevation, view west showing steep slopes, proximity to road and viewing platform over trestle.

Above: Looking north across the viewing platform, with the Aurora Bridge above.

SW Lander St (Harbor Island)



This shoreline street ends is adjacent to a BP oil transfer facility on industrial Harbor Island, where the Duwamish meets Puget Sound. With very low residential density and a fairly low worker density, and with close proximity to a Bluefield Holdings Inc land bank restoration site within a nearby shoreline street end, SW Lander St scored highly for habitat and low for public access. As stated, even restoration sites must have some degree of public access, which for Bluefield Holding Inc.-improved sites typically comes in the form of a viewing area on the periphery of the site, with no access leading through vegetated areas or near shore.

SW Lander Street, like many sites along the Duwamish contains contaminated soils whose disturbance would trigger Superfund requirements mandating removal of the toxic sediment off-site. While there is much to be said for dealing with toxic legacies on-site and in-place, the removal of sediment in this case could satisfy federal requirements and pull the shore back to create more gradual slopes replacing a long continuous bulkhead. The Duwamish Environmental Coalition (Ostergaard et al, 2014) has promoted shallow water mud flats as the single most important habitat type for juvenile salmon habitat along the lower Duwamish River. The site's contribution to salmon can be maximized by creating as much shallow water on-site as possible.

Given the lack of invested neighbors and being less visible to the public, an important question in these types of industrial sites revolves around maintenance and stewardship. While such sites may be likely candidates to add to SDOT's limited maintenance roster, their size requires that design incorporate strategies to reduce long-term maintenance. As with all restoration or native plantings in urban or highly disturbed areas, reversion to invasive-species dominated areas will occur without intervention. Thus for larger street ends like SW Lander St, it's critical to achieve soil coverage and soil shading as soon

Design goals

- maximize salmon habitat
- maintain long open sightlines
- accomodate infrequent visitors

Program

- beach access
- passive recreation and sitting areas with views

Plant selection

- native confierous and shoreline species, shore grassses
- vigorous groundcover to suprress weeds while trees mature

as possible to suppress weeds and weed seed germination.

The planting design for SW Lander St utilizes a succession approach, where a groundcover of coast strawberry is planted on the upland areas and Leymus mollis near shore. These two plants, with correctly-timed planting and minimal irrigation, will spread quickly to suppress weeds and stabilize soils without impacting the growth of young shrubs. Snowberry will colonize the site over the next 5 years, slowly shading out groundcover plants such as strawberry, yet not harming the numerous young shade-tolerant conifers. As conifers mature and begin to shade out snowberry, which may not occur for 10 years, maintenance crews can easily coppice sickly snowberry thickets to allow for the insertion of a shade-tolerant understory plant such as sword fern.

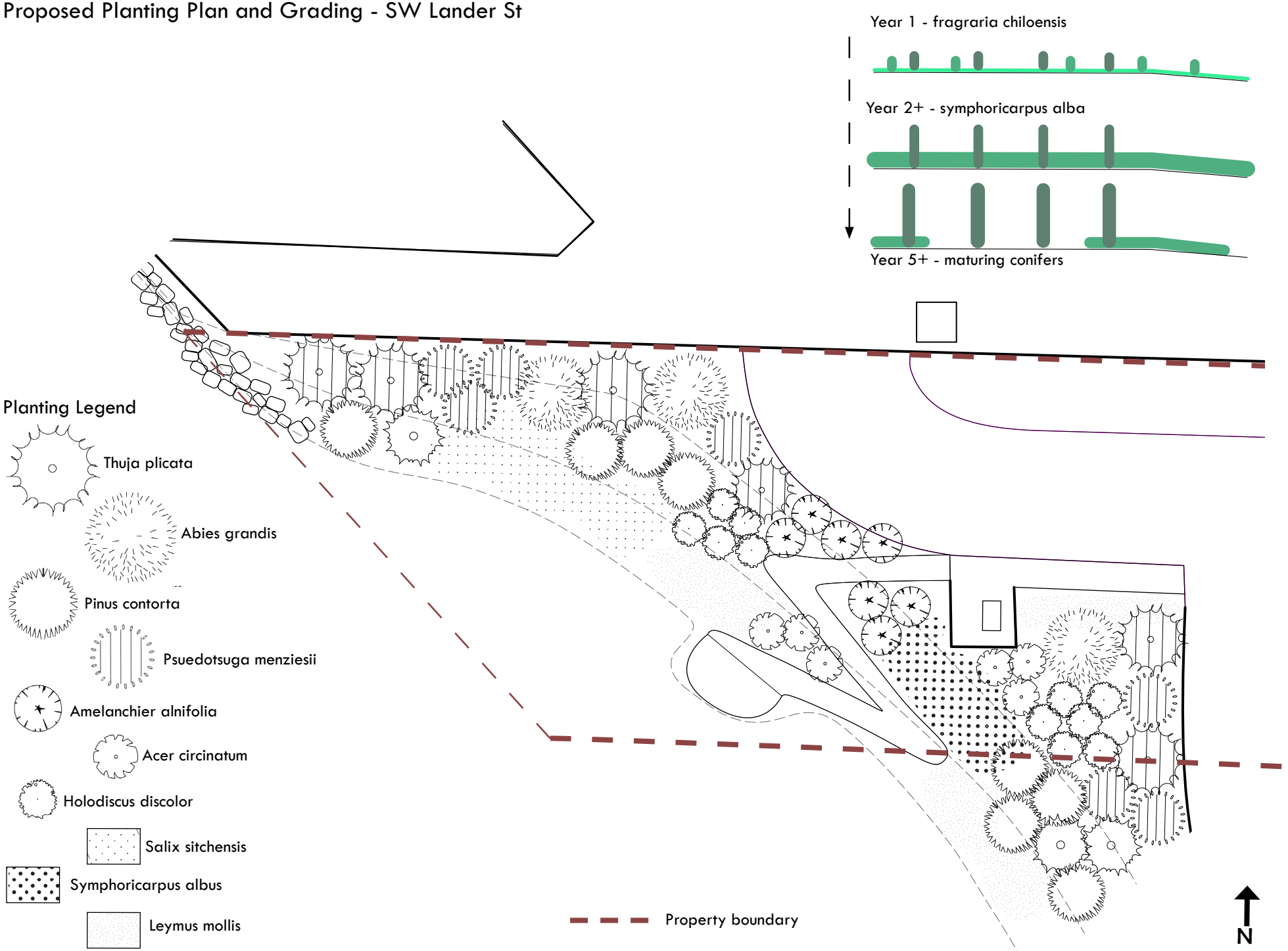
Snowberry is a fantastic choice for a street end park because it grows quite densely, has seasonal interest, can be differentiated easily from blackberry and other invaders, is sturdy and can be managed roughly, is drought tolerant and most importantly, it typically only reaches heights of 5 feet, which allows for overviews, especially when planted on a slope. Other species that could be used include thimbleberry and Rosa gymnocarpa, however thimbleberry should only be used where it won't impact sightlines and invade pathways, while Rosa should be planted in smaller swaths that will not prevent stewards from entering areas for maintenance.

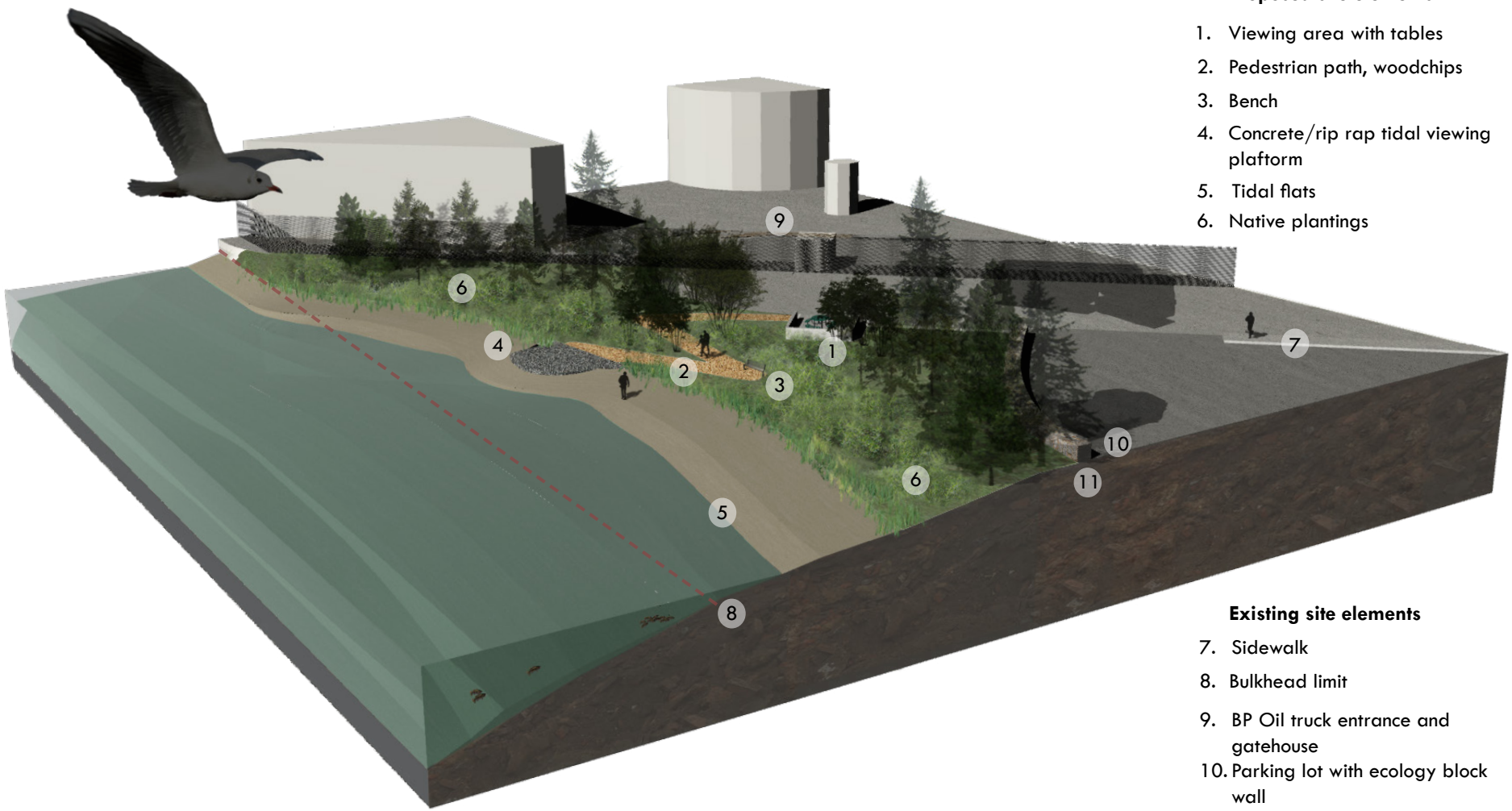
Just south of the SW Lander street end by about 1100 feet lies a small beach that seems public yet has no direct access from sidewalks or public parking. As ecological patch theory goes, the larger the patch the larger the benefits (Forman, 1995) thus to ignore contributions of this neighboring patch of natural shoreline would miss an opportunity to maximize the size of the potential habitat patch. The design borrows property from the adjacent unused and deteriorating parking lot to unpave and naturalize. The property is owned by Port of Seattle who has collaborated with SDOT on several shoreline street end improvements in past projects. While the official shoreline street end has 140 feet of shoreline, linking with this existing beach and removing

Right, top to bottom: Looking west towards shore, showing vast paved areas; Looking east from shore, with entrance to BP refinery on left hand side; Existing shore condition. (Credit: photos from Seattle Department of Transportation)

the unused bulkhead and parking area would create 850 contiguous feet of shallow water and beach, far larger than any shore restoration project in the Harbor Island area.

Proposed Planting Plan and Grading - SW Lander St





Proposed site elements

1. Viewing area with tables
2. Pedestrian path, woodchips
3. Bench
4. Concrete/rip rap tidal viewing plaftorm
5. Tidal flats
6. Native plantings

Existing site elements

7. Sidewalk
8. Bulkhead limit
9. BP Oil truck entrance and gatehouse
10. Parking lot with ecology block wall
11. Contaminated soils

Above: Section elevation, view south showing gradual slope and planting densities

Looking west along new sidewalk and entrance to street end vieiwing area and path, with BP refinery entrance on right.

discussion

6

Credit: (photo from Seattle Department of Transporation)

discussion

Creating a blanket design approach that works for 142 different sites is daunting and undesirable from the perspective of responding to the unique conditions of sites and the needs of different communities and users. Instead, evaluating and learning from past design and avoiding reinventing the wheel is a more appropriate and informed design approach, particularly for a government agency. Seattle's Shoreline Street End program is a difficult system of public spaces to manage, in that the original goal of public access is open to levels of interpretation and expectation and the program is under new pressure to incorporate habitat improvements for salmon. In addition, 142 sites have at least 284 adjacent neighbors whose approval and participation is critical to the success of the sites as public spaces. Ultimately, a design that increases the ease with which stewards can maintain the salmon-friendly vegetation will be the most successful.

Shoreline street ends have historically been commended for their no-frills yet quirky approach to urban public space. Observation has shown that many improved shoreline street ends are neglected and have very low standards of maintenance which has created a cycle of infrequent use and infrequent maintenance. Not only does this tarnish the reputation of the Shoreline Street End program but it could also negatively impact the public opinion of the value of small urban green spaces in general. While community-led improvements are the pride of any city-run parks program, there is much to be gained from the involvement of professional designers to create intentional and lasting spaces that can be maintained with ease for longer, and serve multiple user groups. By contrast, low-cost, improvised and altered designs may create difficult conditions to maintain. Thus it's important that future shoreline street end improvements, even if designed by a community member, are thoroughly vetted by a landscape architect. Currently, designs proposed by community members are vetted for adherence to Shoreline Management Plan requirements but not for other design considerations discussed earlier due to the fact that the City cannot enforce design policy that does not exist as code.

Given the multiplicity of policy and budgetary constraints, balancing the goals of the guidelines with realistic project scale was a design challenge. As a public entity, SDOT's goals often align with simple, buildable designs, and while those goals should not be abandoned, they can become limiting in the context of a design thesis. In addition, with three critiques and three design sites, let alone 142 sites, fully fleshed out site analyses and design processes were difficult to achieve. The multi-site design process also makes it difficult to contend with and communicate the numerous corresponding contextual factors, many of which do not easily fit into tidy categories.

Quality of maintenance is difficult to measure, thus further research is needed into the performance and perceptions of various improved sites, such as post-occupancy evaluations over a longer period, and additional interviews with stewards and neighbors. To test whether a more intentional design approach could be effective, a design that emerges from this research should be installed with the goal of keeping installation costs low as possible. This installation should then be closely monitored to determine public acceptance, and usage by wildlife and humans. This type of in-depth site research is uncommon for large restoration sites let alone a small, minimally funded city program such as the Shoreline Street Ends Program, however this shouldn't reduce its importance. Research is also needed in the usage of restoration sites by juvenile salmon, which is currently lacking due to the difficulty of tracking smolts.

conclusion

7

Credit: (photo from Seattle Department of Transporation)

conclusion

Public access is the original and will remain the primary goal of the Shoreline Street End program as a whole, however habitat creation has become a regular consideration. By creating more consistent spatial layout that includes vegetated areas and public access areas, SDOT can build the brand of shoreline street ends. This branding includes the concept that salmon habitat requires vegetated shorelines and creates consistent expectations about what maintenance in these spaces might entail. Shoreline street ends are in desperate need of guiding consistency. Developing and implementing these would serve the best interest of the program in that Seattle residents would gain more perspective on the priorities of this sprawling but underfunded improvement program. Most importantly, by responding to unique site conditions and community needs, shoreline street ends can maintain uniqueness and community identity while providing vegetated shorelines, continuous canopy, small shoreline access areas or viewpoints and open, visible public space. With an improved design approach, the Shoreline Street Ends Program can become a model for successful small urban public space, too many of which are overlooked, under maintained and underused.

references

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Credit: (photo from Seattle Department of Transporation)

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