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Sustainable Urban Rail-Trails
Designing the Cross Kirkland Corridor

by
Mia Cooledge

Submitted to Scripps College in Partial Fulfillment
Of the Degree of Bachelor of Arts

Readers:
Professor Matt Delmont
Professor Mary Cardenas

December 7, 2012

Acknowledgements

I would like to say thank you to everyone who helped me write this thesis.

First, to my readers, Professors Matt Delmont and Mary Cardenas, for their support and encouragement in this process, and for reminding me at optimal moments that my thesis wasn't about to write itself.

To the unofficial readers who were willing to dive into my paper and provide me useful feedback just to help a friend: Jake, Nina, Amanda, Emily, Mariam, Mom, Tyler, Greg and Rachel. It wouldn't have gotten to this point without your ideas and advice.

To Scott and Jacob, for stress relieving pun breaks, breaded cats, and general suitemate love whenever I needed it.

To Cecily and Josh, because it isn't a party without you.

To Grant, for warding off my writers block and always making me laugh. I'm glad you got over your fear of hurdles, and I hope you can find your watch in time.

To Dave, because even though you weren't around to see me write a thesis, I know you would have been rooting for me the whole way.

And finally, to my parents, not only for believing in me, but reminding me that I have plenty of reasons to believe in myself. Thank you for all of your love and support.

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Introduction

I grew up next to the train tracks in the town of Kirkland, Washington. When I was young, I was lulled to sleep by faint hoots as the train crossed nearby intersections, and chugging as it passed along the edge of my neighborhood around 9:30 each night. If I wanted to get to my best friend's house, I would use an unofficial trail across the tracks to get there – unofficial and undeveloped because the railroad company preferred that people not cross the tracks, for obvious safety reasons. That did not stop anyone, though. The local junior high school was also just across the train tracks, well within walking distance of a large portion of my neighborhood. Every day after school, a number of students would traipse through the woods and cross the tracks on their way home. While people were concerned for the safety of the students, there was nothing anyone could do: to make them walk on the streets would at least triple the time it took to get home, and encouraging more driving is not something that would ever happen in the Northwest, a region which has long been environmentally minded. The children, including many of my friends and me, were left to walk across an active train track, without much knowledge of when trains would go by.

When it became clear that the train tracks, home to the Spirit of Washington Dinner Train (a touristy affair involving dinner and a stop at a local winery) and occasional freight, would be going out of commission in 2008, ideas began to fly regarding what to do with the railroad. Some people fought for a regional light rail or commuter rail system. My family and many people we knew feared this, worrying about the noise and possible pollution. Mostly, however, we worried for the young people on the tracks every day who could be injured or killed by faster, more frequent trains. Not only is our local junior high near the tracks, there are also two elementary schools abutting the tracks.

For these and a number of other reasons, a large number of people supported turning the railroad into a bicycle and pedestrian trail. A group of Seattle Eastside residents gathered together under the name "Eastside Trail Advocates" to fight for turning the entire rail corridor into a regional trail, which would be around 40 miles long. While a trail will not help get a large number of people across large distances more easily, the railway cuts a relatively flat path across an otherwise hilly area, making a cycling or walking commute easier by effectively turning a difficult bike ride up and down hills through the city into an easy casual ride. Because of this, it will be a valuable asset to those who wish to walk and bike across the City of Kirkland, Washington. Hopefully, it will even encourage more people to use these alternative modes of transportation more often.

After much deliberation by the public and inaction on the part of the Port of Seattle, who took ownership of the rail line after it went out of use, Kirkland chose the trail. On December 12, 2011, the Kirkland City Council voted to purchase the 5.75 mile long section of railroad right-of-way through the city and dubbed it the Cross Kirkland Corridor (See Figure 1). Under the leadership of the new city manager Kurt Triplett, who worked on railroad issues during his time as a King County Executive, the City began to map out a vision of what the 100 foot wide railroad corridor would become: a linear park and paved trail “rolled into one”¹. King County is currently considering purchasing the rest of the corridor for the same purpose. If this plan goes through, the trail will become one of thousands of railroads-turned-trails in the United States, a movement which started primarily with the founding of the Rails-to-Trails Conservancy in 1985.²

The founding of the Rails-to-Trails Conservancy followed a 1983 amendment to the National Trails System Act, which created a process known as railbanking³. Railbanking uses land previously occupied by a railroad for an interim purpose, with the eventual possibility of using the land for a railroad again at a much later date. This allows a railroad company to abandon a rail for a period of time and sell off the entire chunk of land occupied by the railroad instead of splitting it up to sell to all the adjacent landowners (which is time consuming and costly for the rail company)⁴. The Rails-to-Trails Conservancy was founded to take advantage of this program and promote the transition of railbanked and otherwise out of use railroads into trails with the hope of eventually connecting all the trails across the nation into an easily walkable and bikeable network. Should the railroad companies decide they want to use the land for railroads again, they can, but for the time being the land can be put to good use. In

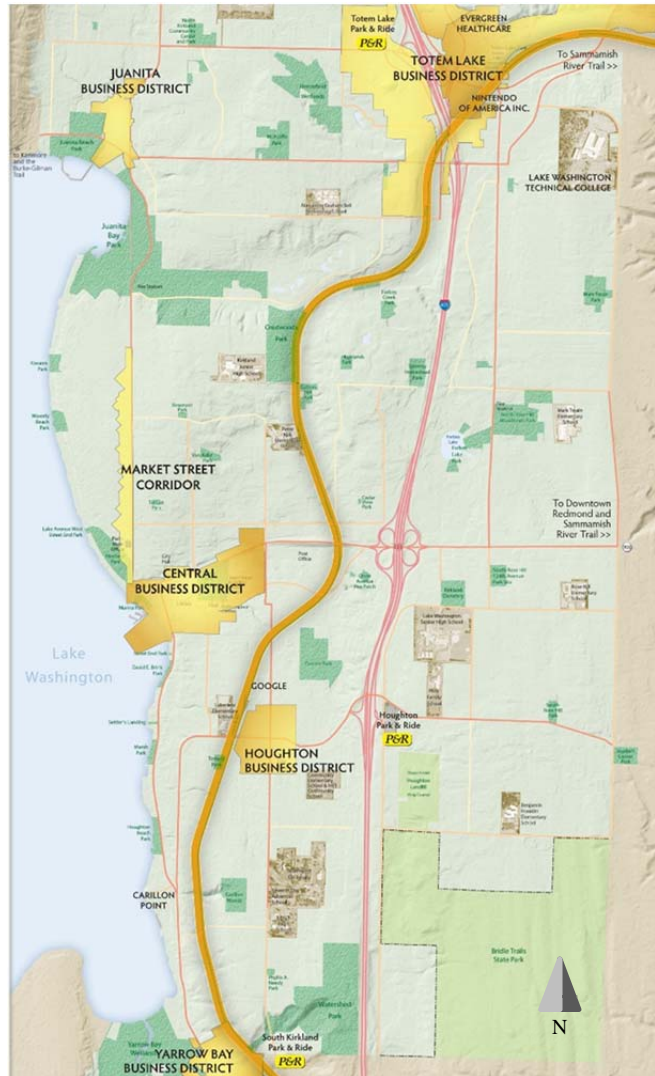


Figure 1: A map of Kirkland. The thick yellow line through the middle of the map is the corridor. Kirkland's segment runs approximately from the North edge of this map to the South edge. For reference, Seattle is to the West, across Lake Washington. Source: City of Kirkland

¹ Ervin, “Kirkland City Manager Stumps for Trail Project Along Old Rail Line.”

² Shulman, “Rails to Trails.”

³ Kayatsky, “High Line Gains Federal Approval.”

⁴ “Railbanking: What and Why?”

1991, the process of converting rails to trails became easier with the passing of the Intermodal Surface Transportation Efficiency Act, which, in part, gives federal matching funds for rail-trail projects.⁵ Thanks to this assistance, there are over 20,000 miles of rail-trail in the US today.⁶

Since there are already myriad rail-trails in existence, there is plenty of evidence to show that rail-trails are beneficial to the cities and towns around them. The National Park Service and the President’s Council on Sustainable Development have found that “the cost to convert and maintain rail-trails nationwide is often offset within a single year” by the increase in human traffic through the region.⁷ In one specific case, the Minuteman trail in Massachusetts, “some restaurants and shops in downtown Lexington [...] attribute as much as a 30 percent increase in business directly to the Minuteman rail-trail.”⁸ Another possible financial benefit of building trails, one which the City of Kirkland could easily take advantage of, comes from partnerships with cable (and related) companies “seeking uninterrupted rights-of-way to bury cable” and willing to pay a reasonable sum to get them.⁹

A rail-to-trail project would fit well in Kirkland, since Washington already has an extensive network of rail-trails, covering most of the state,¹⁰ but also because Kirkland has already invested significant time and resources in becoming more pedestrian friendly. The former and long-time City Manager, Dave Ramsay, was a strong supporter of a walkable Kirkland. Under his direction, the City Council adopted an active transportation plan, titled *More People, More Places, More Often*, on March 3, 2009.¹¹ This plan, which includes plans for prioritizing walkers and cyclists as well as for horse and water trails, serves as part of the guiding framework for the City’s planning of the trail.

While the City has discussed a combined trail and light rail project, the local transit agency, Sound Transit, who would be in charge of developing the light rail, said they would not even be able to start thinking about building a train for the next 30 years. The cost of re-landscaping the right of way to allow room for both a trail and a rail line could be prohibitively expensive, at approximately 12 million dollars.¹² Light rail by itself would still be very expensive, since the current railroad cannot support light rail trains and would need to be entirely rebuilt. It has also been determined that, since the right of way does not pass directly through any downtown region, it likely would not be worth building transit light rail anyways – it would not go to any single location where large volumes of people want to go. For these reasons, there will not be light rail on the corridor any time soon, and it is hardly worth planning for the light rail to show up eventually.

⁵ Shulman, “Rails to Trails.”

⁶ “Rails-to-Trails Conservancy: About Us: History.”

⁷ Shulman, “Rails to Trails.”

⁸ Ibid.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Godfrey, “Active Transportation Plan.”

¹² Triplett, interview.

A trail has a number of benefits which are further arguments against just building a light rail line. First, the corridor is home to a large number of animals which would benefit from keeping the habitat around. Having a trail through the area will both protect the habitat and offer many chances to educate pedestrians about the many kinds of life in the corridor, from interesting plants to entire environments (such as wetlands), to coyotes, deer, and other animals. Additionally, urban trails encourage



Figure 2: Cattails alongside the railroad in the Cross Kirkland Corridor

active lifestyles. Trails “cater to physical activities that can be adopted and adhered to by a broad spectrum of the public,” such as walking, running and biking.¹³ Though these types of activities are possible on streets and sidewalks as well (Kirkland is an incredibly walkable city, with generally yielding cars), trails’ “typical off-street and natural location in parks and greenways provide safe and attractive environments that further encourage use”, since they are preferred paths to walking on the street.¹⁴ Most importantly, however, developing the Corridor as a trail and park, with its nearly 70 acres of land, gives the City a great opportunity to work towards their “citywide goal of restoring more than 400 acres of parkland and natural area by 2029”.¹⁵

At this time, the City is working on placing an interim gravel trail that is suitable for walking and mountain biking and developing a master plan for the final trail project. When I spoke with city manager Kurt Triplett about the project, he made it clear that he wants to build more than just a trail. He wants to build a trail that is truly remarkable in some aspect, a trail people will talk about and a trail people will know Kirkland for.¹⁶ My hope for this thesis is to assist Kirkland in the master planning process by doing an in-depth study of how to build the *most sustainable* trail and park possible, including how to make it both an attractive hangout and a desirable travel method for members of the public who might not otherwise take advantage of it, and how to use this project as a stepping stone to a more sustainable Kirkland.

¹³ Gobster, “Recreation and leisure research from an active living perspective.”

¹⁴ Ibid.

¹⁵ Carlson et al., “Steward Field Guide.”

¹⁶ Triplett, interview.

Chapter 1: Making the trail sustainable

The process of building the trail will start with removing the train tracks and resurfacing, perhaps after some reshaping of the land. Then landscaping of the area around the trail can happen, as well as the installation of any additional features. It is possible to design the trail to be sustainable; however, unlike green buildings, with their LEED certifications, there is no largely defined metric for building a sustainable park. For this reason, the creation of a sustainable park or, similarly, a sustainable trail, will be a process of looking at sustainability guidelines for other project types, as well as looking at the writing of various experts on sustainability and the idea of sustainable parks in order to inform our decisions about the trail. To start off, I am going to look at *The Hannover Principles*, a broad yet timeless set of ideas about how to design almost anything as sustainably as possible.

The Hannover Principles

The theme for the 2000 World's Fair in Hannover, Germany was "Humanity, Nature and Technology," illustrating that the city wanted to "directly address the difficult issue of imagining and encouraging a sustainable future" in the course of planning and putting on the fair.¹⁷ As a part of their planning process, the event organizers asked environmental visionary William McDonough to write *The Hannover Principles*, a set of standards for environmental design that can be used by anyone with an interest in a sustainable world, from city planners to philosophers. In writing the principles, McDonough talked to a number of experts from the fields of philosophy, environment and design, thus creating a truly interdisciplinary set of principles. The principles were also written in such a way that they are fundamental guidelines for any kind of design and can still be used today, even though they were written in 1992. For this reason, I can apply the principles to the Cross Kirkland Corridor.

The principles are as follows:

- 1. Insist on rights of humanity and nature to co-exist** in a healthy, supportive, diverse and sustainable condition.¹⁸

This principle will not be difficult to integrate into the rail-trail project. Since it mainly speaks to not excluding nature from human spaces and vice versa, all we need to do to incorporate it into our project is to make sure that we respect the natural space in and around the corridor, thus making the corridor (especially the sections that go through well-forested areas) into a place where the people walking and biking the trail can be immersed in the natural world. We can further encourage this with our landscaping decisions, choosing to include elements that mesh with the surroundings and encourage them to thrive.

¹⁷ McDonough, Braungart, and Kerry, *The Hannover Principles*.

¹⁸ Ibid.

2. Recognize interdependence. The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognizing even distant effects.¹⁹

The considerations made necessary by this principle are very similar to the first one: we should make sure our plans for the Corridor consider the surrounding environment, both the immediate surrounding environment and the environment of the Northwest as a whole. We should make sure to choose materials and trail elements that are supported by the environment. Further, though, we should make sure our decisions are supporting, not hindering or killing, the natural environment around the Corridor. Some ways to prevent hindering the natural environment would involve eliminating pollution from the corridor (both litter and contaminants in the water and soil), preventing trail users from trampling or otherwise damaging the plant life, and providing a landscape in which plants can flourish, with good soil and clean and ample water.

3. Respect relationships between spirit and matter. Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.²⁰

The building of this trail already considers aspects of community – the plans for its use include a gathering place and a recreational trail. Our plans also hope that it will be used as a method of transportation, thus encouraging industry and trade. By designing the trail to accentuate the landscape around it, we can work to strengthen the connection between these aspects of our daily lives (transportation, recreation) and the world in which we perform these activities. One way of designing the trail as a location that is spiritually beneficial is to make it a beautiful place. The parts of the corridor running through industrial areas especially could use some sprucing up. The parts in nature can be spiritually restorative just as they are – connecting with nature is one of the best spiritual experiences there is.

4. Accept responsibility for the consequences of design decisions upon human well-being, the viability of natural systems and their right to co-exist.²¹

The nature of a large, urban trail is that it encourages human well-being by encouraging people to be active (especially important in our increasingly computer-oriented world). However, we need to be especially mindful of the natural systems surrounding the corridor. A later quote from the Hannover Principles document restates this nicely: “designing for

¹⁹ Ibid.

²⁰ Ibid.

²¹ Ibid.

sustainability requires awareness of the full short and long-term consequences of any transformation of the environment.”²² Already, the building of the train tracks has altered some important natural systems; the corridor bumps up against and even includes a number of wetlands and other fragile habitats. It also cuts across a couple of former salmon runs. The design of the corridor should aim to restore and protect these environments.

5. Create safe objects of long-term value. Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.²³

This principle is very straight-forward in its application to the Cross Kirkland Corridor. We need to make sure that the Corridor is safe for all potential users (including wildlife), and will continue to be safe long into the future even without much (or any) maintenance. The safety priorities of the corridor are two-fold. First, we need to keep the trail users safe. One of the biggest hazards to trail users is road crossings – while some of the streets that the trail encounters are relatively easy to navigate, a few of the crossings are at already busy intersections or streets which cars tend to hurtle down at unreasonably high speeds. It is imperative that these crossings be made safe for trail users, a process which the city is currently researching. There are also a couple of places where the corridor is on a bridge across the street. As a part of the decommissioning process for the railroad, these bridges have been lined with chain link fences to prevent people from falling off the edges of the railroad accidentally. Lastly, it would be good to keep the corridor free of crime. Kirkland is a relatively safe place to live – enough that I, even as a rather paranoid person, am not too worried about the safety of the trail in this respect. However, when I was walking the corridor over the summer, I was well aware that I was alone, especially when exploring side paths through the forest to see where they go. An occasional patrol and some amount of lighting (for the night hours) will be helpful in this respect.

In addition to keeping people safe, we need to plan to keep the wildlife safe from the people using the trail. Most importantly, a lot of the habitats alongside the trail are fragile habitats which can easily be trampled if people walk all over them. Any effort made to remove invasive species from the trail’s edges and replace them with native plants will be made worthless if people wander off the trail. While having defined trail edges will be extremely helpful in this respect, it would also be beneficial to have extra markings along the edges of the trail (or even fences) to keep people and their pets out of particularly sensitive areas and make sure trail users know that the environment around the trail is easily damaged and not to be tread upon.

²² Ibid.

²³ Ibid.

6. Eliminate the concept of waste. Evaluate and optimize the full life-cycle of products and processes, to approach the state of natural systems, in which there is no waste.²⁴

The application of this principle to the Corridor project is two-fold. First, how can we eliminate construction waste, both of products used during construction and of anything removed from the site of the trail? Second, how can we encourage the users of the trail to reduce or even eliminate their waste? To eliminate waste in the project entirely would be amazing but, unfortunately, unlikely. However, to go into the planning process with this concept in mind would be a good idea. Probably the largest amount of waste produced by the trail, initially, will be in materials removed from the trail during the construction process – mostly dirt, gravel, and the old railroad. If at all possible, these materials should not be sent to a landfill. Instead, the city should find ways to reuse or recycle the materials. Perhaps dirt and gravel removed from the corridor can be used as fill for another project, or even in the landscaping of other parts of the corridor. The railroad ties and tracks should also be easily recycled. One fun recycling method would be to use part of the railroad in landscaping or art for the trail, to pay homage to the Corridor’s history as a rail line. New York City’s High Line, an elevated rail to park project, did a very good job of integrating the old railroad into the landscaping. At times the whole railroad is still intact, with plants growing up around it, while at other times the metal rails are visible in the pavement of the trail.²⁵ The railroad could also be used for fencing, benches, or other practical trail needs. This kind of integration is both aesthetically pleasing and a good new life for the old materials, which is preferable to sending the old materials to a landfill.

7. Rely on natural energy flows. Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.²⁶

This principle should be interpreted as a reminder to remember that nature has been successful at what it does for a very long time, while humans, in their human-made designs, have historically failed to consider many of the consequences of their design decisions – see leaded gasoline, lead based paint, asbestos, any number of ideas that seemed good at the time and that we have since found to be incredibly detrimental to the health of both people and the environment. Instead of following the pattern of “act now, discover the consequences later,” this principle urges us to look to nature as a model for our designs. Not only is this the basis for biomimicry, but it can be considered in even the most mundane of design decisions made about the corridor. How water flows through the property, for instance, may best be determined by the natural patterns of water flow. The best plants to include in the landscaping are probably those

²⁴ Ibid.

²⁵ Greenhood, “The High Line.”

²⁶ McDonough, Braungart, and Kerry, *The Hannover Principles*.

native to the landscape. Even aesthetically, we can gather ideas from the natural world - especially in a natural landscape, art which represents nature will fit best.

8. Understand the limitations of design. No human creation lasts forever and design does not solve all problems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.²⁷

This is another principle that will be easier to integrate. It reminds us that nature is a larger force than we are – eventually, it will take over any human creation, from the subtle (tree roots causing cracks in sidewalks) to the drastic (natural disasters). Rather than designing the trail hoping it will last forever and looking for ways to keep nature from taking over, we should look up to nature and its power. As mentioned in the last principle, we can make a lot of design decisions based on nature and therefore improve them. This is a significantly better method of design than trying to make our structures permanent.

One specific case where we could consider this principle is considering fences, benches, and other park elements frequently made of wood. Wood, especially in rainy Washington, is subject to decomposition and does not last forever. Rather than treating the wood with dangerous chemicals so that it will decompose less quickly, we can look to nature for solutions. How is wood preserved in nature? Better yet, are there natural solutions to the problems we are trying to solve with the chemically treated wood? Better ways to keep people away from sensitive areas, better options for seating? Perhaps a well-shaped rock could serve as a bench, and a lattice of young trees could provide a living fence. The possibilities are endless!

9. Seek constant improvement by the sharing of knowledge. Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and re-establish the integral relationship between natural processes and human activity.²⁸

Basically, this principle says that throughout the design process, all people who are involved in or will be affected by the project should be involved in the planning process, and fully informed about what is going on. Kirkland has been doing a decent job of this so far, having a number of community meetings about the trail and an online survey asking people what their primary concerns for the project are, and what they felt the city's priority should be. Based on this principle, it would be best if they continued on this path of informing the public about their plans for the trail, and listening to public input on the matter.

²⁷ Ibid.

²⁸ Ibid.

Based on the Hannover Principles, there are plenty of concrete ideas for making the Cross Kirkland Corridor a very sustainable park. First, we need to respect, preserve and restore the natural space around the corridor in part by preventing trail users from trampling the plant life and choosing landscaping elements that enhance the surrounding environment. We need to make the trail beautiful, looking to nature to assist in our design decisions. We want to eliminate all pollution from the corridor, as well as waste. Using recycled materials, recycling the waste dirt, gravel and railroad parts, and considering the recyclability of the trail elements is imperative. Trail users should be kept safe, perhaps with patrols, lighting and strategic, yet attractive, fencing. Finally, citizen input needs to be considered throughout the planning process.

Cranz and Boland’s “Defining the Sustainable Park”

Galen Cranz and Michael Boland, who both have Ph.Ds in areas related to sustainability, wrote an article describing sustainable parks as having such characteristics as “use of native plants, restoration of streams or other natural systems, wildlife habitat, integration of appropriate technologies or infrastructure, recycling, and sustainable construction and maintenance practices”.²⁹ The Cross Kirkland Corridor is already a good wildlife habitat, and plans are in the works to restore the streams which intersect the corridor. I would like to discuss two of the elements listed here: native plants and appropriate pavement technology.

Invasive Species vs. Native Plants

As with most areas of the world now, the Pacific Northwest has problems with invasive species – the Cross Kirkland Corridor is no exception. An invasive species is any species (plant or animal) which is not native to a region but has been introduced at some point in history. To be considered invasive, the species also has to be better able to thrive in the local environment than the native species for some reason, thus choking out the native plants and animals. Frequently, the introduced species has no predators in the new location and, therefore, is able to overrun the area. While they are sometimes introduced to a region accidentally, there is usually some amount of human agency involved in the introduction process. In fact, invasive species are sometimes introduced to an area on purpose, as an attempt to get rid of another problem species. Unfortunately, allowing these invasive species to persist is unsustainable. The most sustainable forms of landscaping shun invasive species, encourage natives, and also allow natural plant succession to occur. Allowing natural plant succession basically means allowing plants to live out their normal life cycle while other plants show up through natural processes and replace the original plants.³⁰

²⁹ Cranz and Boland, “Defining the Sustainable Park.”

³⁰ Ibid.

The Cross Kirkland Corridor has a number of invasive plant species, including Himalayan Blackberry and Morning Glory, also known as Bindweed (Figure 3). Both are nearly impossible to kill. The blackberries will continue re-sprouting until the entire root system is gone. Morning Glory, like many of the Northwest's invasives, will plant itself wherever any part of the plant lands. The Himalayan Blackberry, through sheer virility, is able to out-compete most plants. Removing them is difficult due to the large, sharp thorns in their stalks and on their leaves. Morning Glory is an entirely different beast – it winds itself around the nearest plants and other structures, often slowly strangling its host and making it hard to remove without damaging the plants it is wrapped around. Thus, the best strategy for removing both is large work parties with lots of clippers and shovels.



Figure 3:
Top: Himalayan Blackberry
Bottom: Morning Glory
Source: Wikipedia users Johann D. Kuntz and DkEgy

My neighborhood, which butts up against the corridor, has had many of these work parties in the adjacent Cotton Hill Park. Sharon Rodman, program coordinator for the Green Kirkland Partnership, has coordinated many of the efforts to revitalize Cotton Hill Park and a number of park restoration programs and work parties for other City parks. Rodman sent me a copy of the City's Steward Field Guide, written by the Green Kirkland Partnership and Seattle area conservation group Forterra. This guide is given to Green Kirkland Stewards, volunteers who help restore parkland in the City. It covers standard procedures for restoring parkland from being heavily covered by invasive species into a "natural space" with mostly native plants. A part of this guide dictates very specific best practices for removing and disposing of the invasive species which are commonly found in Kirkland parks. Volunteers need to be especially careful not to leave roots in the ground or even on the ground in order to prevent re-sprouting. In the case of one weed, Japanese Knotweed, the best method for disposal is to inject herbicide directly into the plant, a process known as "chemical-stem injection". Any attempts at manual plant removal causes more knotweed to grow. Invasive trees are also difficult, since they are large and need all the roots removed in order to prevent seedlings from growing.

Thankfully, not every invasive species needs to be individually removed. A few plants, such as the well-known buttercup, can simply be covered with a thick layer of mulch (or a layer of mulch on top of cardboard) and will eventually die out from lack of sunlight.³¹ Also, for larger areas with very few native plants, hacking is completely acceptable. Not only does this mean that such jobs as Himalayan Blackberry removal are fun for younger folks, but it means some more creative solutions are available. For example, in Cotton Hill Park, a significant area of blackberry bushes was cleared by a hungry team of goats, with the help of some excited volunteers (an added benefit of goats is the natural fertilizer they produce, which can enrich poor

³¹ Carlson et al., "Steward Field Guide."

soil and help in the planting of natives). Goats and work parties could also be used to remediate a large amount of the Corridor's land which has been overgrown by invasive species during the decades without stewardship of the landscape.

Once the invasive species have been removed, a couple of important things need to happen. First, measures to prevent erosion must be taken in sloped areas (almost all of Kirkland is a sloped area). The most important preventer of erosion in nature is plant roots. If all the plants in a section of land are removed, something needs to be placed on the slope to prevent the soil from washing away in the next heavy rain. There are lots of options for this: anything from staked down burlap sacks to woody debris will do.³² Secondly, the land will eventually need to be replanted with native species. Diversity is important here, both to achieve the most natural landscape possible and also to best prevent erosion. Plants should, of course, be chosen based on the area in which they will be planted: amount of sunlight, type of soil, et cetera. The Steward Field Guide provides a chart of plants with their



Figure 4: Douglas Fir
Source: Wikipedia user Walter Siegmund

preferences, but also points out that most parks in Kirkland already have plans for what plants belong. The Cross Kirkland Corridor does not have such a plan yet, so it will be important for whoever is involved in the planning process to make sure there is a careful plan for what plants would be appropriate for the various landscaping situations present in the corridor. Some native plants which might be considered for the corridor include the Bigleaf Maple, which can handle steep slopes as well as a variety of sunlight levels, the Douglas Fir (Figure 4), which is also good for slopes, and the Sitka Willow, a shrub which appreciates wetland conditions.

Pavement Technology

For the trail surface itself, the most significant amount of material that will be used in the construction process, there are a number of environmentally friendly options. First, we need to consider the desires of the city for the trail. The number one requirement is for the trail to be easily walkable – it is surprisingly difficult to walk down a railroad. For this, a mere gravel trail will suffice. However, for the trail to be bikeable and possibly even wheelchair accessible, gravel is unsatisfactory. A more solid surface is required. Finally, while not a requirement of the city, the Hannover principles dictate that it would be best if the surface chosen is safe and low maintenance.

³² Ibid.

One good option is pervious pavement (Figure 5). In essence, pervious pavement is aggregate concrete without the sand. Instead, there are holes where the sand would be, so water can flow through the pavement. This is useful because the natural pattern of water runoff allows water to soak into the ground first and then, once the ground is saturated, the excess water will flow downhill. In most cities, water flows down the pavement into a storm drain system and gets dumped into the nearest body of water. Not only does this prevent the water from replenishing the aquifers, which leads to water deficits, but it can also exacerbate the effects of floods, since the ground's capacity for water is far more significant than any storm drain's capacity for water. As an added benefit, the ground (plant roots and dirt) can act as a natural filter to remove toxins from the water before it reaches a large body of water – this too is lost when ground is paved over.



Figure 5: A demonstration of pervious pavement. Source: Wikipedia user JJ Harrison

Pervious pavement removes many of the detrimental effects of excessive paving by providing a way for water to flow back into the ground. It is the default choice for sustainable pavement. However there are some negative aspects. For one thing, pervious pavement tends to cost more than its non-pervious counterparts.³³ It also is not nearly maintenance free, one of the requirements of the Hannover principles. Rather, the holes get filled easily with dirt and other roadway grit, so pavement will need to be swept at least twice a year. This is an extra cost which the City would incur for as long as the pavement is in place, just for deciding to use it. The City has chosen to use pervious pavement in other locations, including a section of sidewalk behind an elementary school not far from the Corridor, so they might be willing to take on this expense in the effort to make the trail more sustainable. However, since the trail itself will only be a small section of the corridor and will be buffered on each side by dirt and plants that can soak in water, the environmental benefits of pervious pavement in this situation probably won't be significant enough to justify.

Avoiding pervious pavement gives us the opportunity to consider other factors that determine whether or not the paving material is sustainable. These factors include not only the impact on the environment where it is installed, but also the waste and emissions resulting from the production of the paving material. To start, cement manufacturing is responsible for almost five percent of the world's total carbon emissions, and produces a large amount of waste product (known as cement kiln dust).³⁴ This definitely does not help its case as a sustainable material. On the other hand, asphalt, as a very dark material, captures heat from the sun very easily, which consequently keeps the area around the asphalt warmer for longer. This is one of the main causes of the urban heat island effect, where urban areas are several degrees warmer than their non-urban surroundings. Since increased temperatures often cause problems for native species,

³³ "Permeable or Pervious Pavers Costs."

³⁴ Huntzinger and Eatmon, "A life-cycle assessment of Portland cement manufacturing."

especially aquatic species, and easily lead to increased air conditioner use, avoiding the urban heat island effect is preferable. This means that asphalt is also not an ideal choice for a sustainable pavement.

Since cement is one of the main ingredients in concrete, ruling out cement and asphalt as unsustainable seems to leave us without options for pavement. However, there are a number of ways to significantly reduce the environmental impact of cement and the concrete it is used in. For one thing, a portion of the waste cement kiln dust can be recycled back into the initial input stream, which reduces both the waste produced and the raw materials required for cement production.³⁵ The rest of the waste cement kiln dust can still be put to good use instead of being disposed of in a landfill. It can stabilize soil before highway construction (and is more effective at this than quicklime, the industry standard); its absorptive qualities make it useful in waste treatment, especially since it is capable of absorbing heavy metals; it can even be used in glass production.³⁶ To further reduce the amount of cement being produced, it is possible to include natural substitutes, such as volcanic ash, in the final cement mix, even up to 25% substitution by mass, which reduces all of the environmental impacts of the cement by a similar percentage.³⁷

Finally, the method of paving changes the environmental impacts of the pavement. When using concrete for sidewalks, two methods are commonly used. One involves placing slabs onto a bed of concrete, and the other pours the concrete directly into the sidewalk area. Both of these require a large amount of concrete and frequently damage the soil below. However, in an area which will not be subject to motorized vehicles, there is another option – small interlocking blocks of concrete on a bed of sand. Since this method requires significantly less concrete, among other reasons, it has approximately 70% of the environmental impacts of the slab method.³⁸

While these ideas are able to reduce the environmental impacts of standard paving materials, it would be far better if the city can select a paving material that is more groundbreaking in terms of its sustainability – something that rethinks the problem of paving instead of just trying to improve our current solution. There are a number of interesting new paving technologies out there, my favorite being recycled glass pavement.³⁹ Since all colors of glass are usually recycled together and sorting colors is a very expensive process, it is difficult to find a market for recycled glass – most applications want a particular color. In pavement, however, color does not matter as much, so all the glass can be used together. In recycled glass pavement, glass is crushed into pebbles and then bonded with an elastomeric binder (essentially a rubber binding material) to make a surface strong enough for motor vehicle traffic. There is little to no concern that glass will leach any toxic chemicals into the surrounding environment,⁴⁰

³⁵ Adaska and Taubert, “Beneficial uses of cement kiln dust.”

³⁶ Ibid.

³⁷ Huntzinger and Eatmon, “A life-cycle assessment of Portland cement manufacturing.”

³⁸ Oliver-Sola et al., “Environmental optimization of concrete sidewalks in urban areas.”

³⁹ “FilterPave: Porous Paving System.”

⁴⁰ Imteaz, Ali, and Arulrajah, “Possible Environmental Impacts of Recycled Glass Used as a Pavement Base Material.”

and it provides a good use for recycled glass that otherwise has a difficult time finding a purpose. Not only that, but glass pavement completely eliminates cement and its environmental impacts from the trail. For these reasons, I would like the city to consider using recycled glass pavement for the trail surface. Since the paving of the path is such a large part of the creation of the trail, using sustainable paving materials will be one of the best choices the city can make in their quest for a remarkably sustainable trail.

Locating the Trail Hang-Outs

Since the Kirkland Corridor is a relatively forested area, the easiest way to keep the park sustainable is to minimize development.⁴¹ Chances are, the trail can be just as nice a trail if all the natural areas are kept as they are than if they are built out a lot. Much of the railroad already gives a feeling of being in the middle of a large forest, even in the city. To develop this land to make a more “beautiful” manicured park would not only be unsustainable, it would be a tragic loss of a beautiful area of the city.

Rather than developing the relatively untouched areas, the City should work to develop only in already disturbed areas.⁴² Thankfully, this does excuse the building of the trail itself, since the railroad does significantly disturb the land it is placed on. Care should be taken, however, to avoid disturbing the areas along the edges of the corridor which are fully grown natural environments (Figure 6).

In fact, developing only on previously developed land is a common idea in sustainable planning and design. Urban planners (and others) speak of brownfields, greyfields and greenfields. Brownfields are land areas which were previously used for industrial purposes and generally are contaminated, thus requiring remediation before any sort of building can be done. Greyfields are previously developed lands which do not require remediation but still bear obvious scars of development. Greenfields, then, are completely undeveloped lands. It is well recognized that remediation and development of brownfields is the most environmentally friendly way to go – the LEED certification for new construction gives extra points for building on a brownfield.⁴³ Furthermore, the Living Building Challenge, the most prestigious of all green building certifications with only three certified living buildings worldwide, will not even



Figure 6: a stream by the side of the railroad.

⁴¹ Byler, “Designing in the Green: An Approach to Sustainable Park Design.”

⁴² Ibid.

⁴³ “LEED-NC Site Selection.”

consider building projects on greenfields.⁴⁴ Since the Corridor is currently a railroad, it obviously does not count as a greenfield. In fact, since it was often used for industry, and trains carried and occasionally leaked fuel, it might even be a brownfield. There are also areas of the trail which are more disturbed (such as the underpasses and the areas running through industrial areas) and areas which are less disturbed (especially those running alongside parkland). Basically, while planning for development of the Corridor is underway, extra development along the trail should be avoided except in the areas which are already fairly damaged by human existence. The areas which are already developed and damaged should be the areas which become hang-out spots along the trail, the spots where extra landscaping and art installations should go.

⁴⁴ “Living Building Challenge 2.1.”

Chapter 2: Making the trail enjoyable

The trail can be built incredibly sustainably, but if people do not like it, they will not use it, and if people are not using it, there is no reason to build it in the first place. For that reason, it is important for us to design a trail that people will want to use. Studies have been done on existing urban trails, surveying the users to ask what brought them to the trail, and what their priorities are for a trail. It was found that “health-motivated users”, those who are on the trail for exercise, prefer trails safe from cars and crime, while “pleasure-oriented users” like beauty, such as the beauty found in water bodies.⁴⁵ Extrapolating from this, those who use the trail to commute are motivated by some combination of the two, but probably mostly trail safety (at least from cars). However, in general, people are willing to spend more time walking to get somewhere if the walk is interesting.⁴⁶ This means that making the trail a beautiful and aesthetically interesting place will still help encourage a walking and biking commute. Since the trail goes through Kirkland and will therefore mostly be used by its residents, the most successful strategy will probably be to make the trail something that is enjoyable to these residents. To talk about this, I will assume based on my own experience that people who live in Kirkland chose to live there, at least in part, because they like the feel of the city. This means that the easiest way to figure out how to make the Cross Kirkland Corridor into a space that residents of Kirkland will enjoy is to make it into a space that has the same feel as the rest of the city.

Kirkland’s Artistic Culture

One of the things that really stands out about Kirkland is that it has such a strong artistic culture. In addition to a collection of bronze sculptures throughout the city and a handful of small art galleries downtown, the city boasts a population of artists and a number of annual art related events, including a tour of studios of local artists, a couple summer art festivals, and concerts in city parks. This artistic culture is something the City works very hard to cultivate.

When I was in high school, I was a junior member of the Kirkland Cultural Council (now known as the Cultural Arts Commission), a city council elected board which aims to foster the presence of art in Kirkland. The Cultural Arts Commission is responsible for a number of art-related projects in the City, including what is known as a “percent for the arts” program. Under this program, City projects with a capital budget of more than \$500,000 must use 1% of their budget on art.⁴⁷ The building of the Cross Kirkland Corridor, with an estimated cost of at least 3 million dollars, will be above this threshold, which means including some amount of art will be necessary. The Commission also has a short video encouraging private developers to include art in their projects,⁴⁸ though this is not required by law. This video includes the benefits of having

⁴⁵ Gobster, “Recreation and leisure research from an active living perspective.”

⁴⁶ Mouzon, “Walk Appeal.”

⁴⁷ Allen, “Kirkland Arts Master Plan.”

⁴⁸ *Bringing Art to Private Development.*

art in a space, and talks about some of the unique ways to include art in a project. Specifically, it discusses the benefits of integrating art early in the planning process, articulating the strong preference that all elements of a building or space be artistic, and that developers not just insert a sculpture somewhere at the end. The way this is explained to the developers is that having a unique, artistic building makes the entire building something memorable. For this reason, they encourage including non-standard creative details, such as artistic stair rails and door handles.

In the Cross Kirkland Corridor, this attitude can be adopted by asking artists to help design some of the less obvious details of the path – the lighting, for example, or even the pathway itself. In preparation for this idea, the Kirkland Art Center, another art based group in the city, invited a panel of artists and designers to speak about their ideas for the Corridor. The artists presented photographs of large sculptural installations, artistically designed fencing and retaining walls, charming storefronts in commercial areas, and creative pathways, all examples of integration of art and artistic features into trails and boardwalks already in existence around the country. The consensus was, therefore, that there are plenty of ways to integrate art into the Corridor.

Examples of Art for the Trail

There are a lot of examples of fantastic art which could be used in the context of our trail. First, it would be good to think about places in the trail where art could be included in features that need to be installed in the trail. One great example of this is a pedestrian overpass in Phoenix, Arizona.⁴⁹ Most pedestrian overpasses have some sort of chain-link cage over them to keep people from ending up on the road below. The city of Phoenix hired artist Laurie Lundquist to redesign a pedestrian overpass. What resulted was the Mountain Pass Pedestrian Bridge, a practical artwork of chain link fence (Figure 7).



Figure 7: Mountain Pass Pedestrian Bridge. Source: Laurie Lundquist

There is already one small pedestrian bridge on the corridor, which is surrounded by chain link fence. There is also potential for another couple of overpasses at busy intersections along the corridor, to make crossing easier and safer and to keep the corridor from snarling up traffic. This artwork is a great example of how even the overpass chain-link fence cage should

⁴⁹ Lundquist, “Mountain Pass Pedestrian Bridge.”

not be overlooked as an opportunity to integrate artistic design and make a generally ugly structure much more aesthetically interesting.

Another type of public art which would be an attractive addition to the trail is interactive art – art installations that are enhanced by people touching and playing with them. In most cases, this kind of art has an added element of interest because it changes from time to time, meaning that people who walk by on a daily basis never know exactly what to expect from the artwork. I know I would be excited to see what people have done with the artwork since I saw it last, or how people might be interacting with it when I get there again.

One interactive art piece that I really like is an installation in Salt Lake City, Utah called “Sway’d”, which was designed by artist Daniel Lyman.⁵⁰ This installation resembles a field, except it uses tall, thin rods in place of grass or wheat. The purpose of the installation is for people to run through the “field”, which makes the rods sway like wheat in the wind (watching the things people come up with as possible uses for the installation is a lot of fun). While there is not a lot of open space along the corridor where something like this would work, the section of corridor underneath and around Interstate Highway 405 is quite wide and not terribly interesting, except for a bit of graffiti. Developing that area into a hang-out spot with some park-like additions and a larger art installation such as “Sway’d” would turn it into an attractive gathering place. This is preferable to having it be a gathering place for possible criminal activity, since it will feel safer and be a point of interest that people will want to spend time at – something that can draw people to the corridor.

⁵⁰ “Sway’d” - Interactive Public Art Installation in Salt Lake City.

Chapter 3: Connecting to a sustainable city

My dream is to see this project not only be a great example of sustainability in and of itself, but for it to be the first step Kirkland takes towards being a city that takes pride not only in its artsy culture, but also in how well it treats nature. The city government should make it their priority to find ways for the planning of the Cross Kirkland Corridor to connect to the planning of a more sustainable city in general. In fact, one model for sustainable urban parks, emphasizes that it is important that parks connect to the city they are in and play a part in solving sustainability issues which would otherwise remain outside the park's boundaries.⁵¹ For example, some parks are specifically designed to absorb and treat urban runoff, rather than allowing it to pollute the local waterways.⁵² Others work to educate users about sustainability.

Probably the best way to use this project to influence sustainability in the city is to educate the public about the importance of sustainability every step of the way. By prioritizing a sustainable park from the beginning of the planning process, the city has plenty of opportunities to explain to its citizens why it feels that having a "green" trail is a good thing, and, more importantly, what they can do to facilitate the process. Once the trail project is over, Kirkland's residents will hopefully be proud of their environmentally friendly trail and want to make even more of the city fit the same standards. The city can also continue the education process after the completion of the trail through such actions as having informational signs along the trail (such as those about protecting the wetlands alongside the trail) which further urge trail users to be mindful of the impact of their actions on the earth as a whole.

In order to really see the trail as a first step towards a more sustainable Kirkland, the city should decide where its sustainability priorities will lie in the future. A natural extension to the trail project would be for Kirkland to become a city that is not only walkable and bikeable (and transit friendly), but for it to be a city where people actually do regularly walk, bike, or take transit to get where they need to be, whether that is school, work, home, or just a trip to the grocery store. This type of planning will take a number of forms.

The Cross Kirkland Corridor as transportation

A large part of car traffic each day is people commuting to their jobs. People will be far more likely to use the Cross Kirkland Corridor as their commute if they live and work near the Corridor. Alternative modes of transit are usually only considered when they are as convenient as driving, or when driving is not an option. To make the Cross Kirkland Corridor (and, later, other walking and biking routes through the region) a viable commuting method, it would be a good idea to get businesses involved in the planning process. The edges of the Corridor are home to a number of businesses. Probably the most notable of these is Google's Kirkland

⁵¹ Cranz and Boland, "Defining the Sustainable Park."

⁵² Ibid.

campus, though many smaller businesses also reside along the corridor. The city, which already has an incentive program in place to encourage its employees to use alternative transportation to get to work, can encourage businesses alongside the corridor to do the same. Once a viable biking and walking to work route has been created, companies will hopefully be receptive to this idea. If companies are open enough to the idea of having a trail adjacent to their business, they may even be willing to support trail development, or at least the development of the trail section next to their property. This possible merging of public and private space came up at the community meeting about the trail hosted by the Kirkland Art Center – one of the panelists could envision Google using the trail as a “back porch” of sorts, extending their workspace out onto the strip of land, as long as that strip of land remained available for public use.

Secondly, if people are to use the corridor for transportation, it is important that there be places for people to live along the edges of the corridor. Already, it passes through plenty of neighborhoods, so there are plenty of people who have easy access to where the trail will be. Additionally, there is currently a transit oriented development planned for Kirkland’s largest park and ride, which happens to be right next to the south end of the Corridor. When these apartments are built, they will be prime real-estate for those wishing to get around without cars. Not only are they right next to the soon-to-be trail, but the park and ride is host to some great bus routes into downtown Seattle as well as into downtown Kirkland. I can imagine living there and only needing a car to visit friends – grocery shopping, visiting my parents who live next to the trail further north, and commuting would easily be covered.

As one part of extending the trail’s bikeability to the rest of the city, Kirkland could install plenty of bike racks. In Claremont, CA, a city that from my time as a car-less college student I would consider especially bikeable, there are bike racks aplenty. Instead of having large, high-capacity, but infrequent bike racks, there are single, brightly colored ovals, which can handle about 2 bikes, every 15 yards or so. This means that no matter what store a biker is trying to get to, she can probably lock her bike just outside. Bike parking is actually far more



Figure 8: The bike rack in front of Claremont City Hall

convenient than car parking, making biking to the Claremont Village preferable to driving there. Not only that, but Claremont asked its residents what they wanted in bike racks, and the answer, as it likely would be in Kirkland, was overwhelmingly that they wanted creative bike racks, instead of the standard, rather boring, grey metal racks that are usually found. Claremont responded positively to this request, so all the bike racks in the city are brightly colored egg-shapes (Figure 8). Something like this would fit nicely into Kirkland’s artsy culture, and it is a brilliant example of integrated art. Including bike racks at frequent intervals throughout Kirkland’s downtown would make biking to downtown Kirkland favorable to driving, especially since parking is already difficult on busy days (almost any summer weekday, when swim lessons are in session and many nonresidents visit the waterfront downtown). Also, it would be a good

idea to have bike racks at strategic locations along the trail, such as any area designed as more of a hang-out and not just as a trail, to encourage people to ride their bikes in to meet friends.

Encouraging Development Near the Corridor

Another good way to have the trail encourage more sustainability in the City of Kirkland would be to encourage development within walking and biking distance of the trail. The best kind of development to encourage would be mixed-use developments – places to live, work and shop all within a single region. Atwater Crossing, in Los Angeles, California, is a fantastic example of this. It is a community with studio space for artists, some living space, and a restaurant, all located within walking distance of a densely populated area.

There are a few spots near the trail which could support a mixed-use development. The most notable of these is the Totem Lake Mall at the north end of the corridor. This “mall” has been wanting for redevelopment for years, but unable to find an anchor store to make the development happen. Instead, it is a mostly empty lot with a few random small stores, really close to the corridor. Proximity to an important trail and plans for sustainable development could be the push this property needs to finally get redeveloped.

Conclusion

The path towards making the Cross Kirkland Corridor into the Pacific Northwest's most sustainable trail will be a challenging one, but something the City of Kirkland can accomplish if they are willing to commit to it. Even if the City is unable to develop the *most* sustainable trail, it would still be beneficial to implement some of these suggestions. The easiest suggestion for the City to implement would be to avoid disturbing the undeveloped areas of the corridor. A corollary to this, something which Kirkland has already prioritized for other areas of the city, is to remove invasive species from the corridor and replace them with native plants. Once these steps have been completed, the City should then consider the other, somewhat more difficult suggestions, such as recycled glass pavement instead of the more traditional concrete or asphalt, the inclusion of integrated art in the trail, and taking steps to encourage Kirkland to be a more sustainable city in general.

The biggest concerns as to whether or not the city will work towards a sustainable trail are funding and citizen support. Without sufficient funding, none of this can happen. With the support of residents, not only will any legal hurdles to building the trail be easier to clear, it will also be easier to obtain funding: if residents are excited about the plan and want it to happen, they will be willing to support it with slightly increased taxes and/or donations. Luckily, some funding is showing up. Among some other sources, the Puget Sound Regional Council's Executive Board allotted \$1,071,100 of their \$79 billion transportation improvement budget to the Cross Kirkland Corridor.⁵³ Additional funding might be obtained through such sources as grants for rail-trail development and federal matching funds through the Intermodal Surface Transportation Efficiency Act, as mentioned in the introduction. I would like to encourage the City to actively pursue these options in order to reduce the effect lack of funding will have on the ability to build the trail sustainably.

As for the other concern, public support, a survey conducted by the Kirkland Library brings relief. The survey allowed people to submit suggestions, but also to rate and comment on other people's ideas. The top rated suggestion in the survey is to make the Cross Kirkland Corridor into a paved trail for walking and biking, with walking lanes and biking lanes separated. The consensus in the comments on this suggestion is that light rail is unnecessary at this time, and that people want to be able to walk and bike safely. Another highly rated suggestion was to connect the walking and biking corridor with other trails in the area. As the commenter points out, making the trail connect to other area trails would significantly increase the usability of the trails, especially for commuting.⁵⁴ Notably, the highly rated comments all ask for a walking and biking trail. From these comments, it appears that the citizens of Kirkland generally want the Cross Kirkland Corridor to be made into a trail, and are likely to support making the trail into a sustainable park. Based on some concerns about how long it might take to build the corridor,

⁵³ Butcher, "PSRC to Fund Cross Kirkland Corridor to the Tune of \$1,071,100."

⁵⁴ "Ideas — Dialogue App."

especially if it is planned out extensively, I would recommend the city get a trail down quickly so the corridor is usable, and then work on making it more sustainable.

At this time, the city is reviewing proposals for an interim gravel trail so the corridor can be used as a walking trail while the master planning process is in progress. They hope to finish the interim trail by the Spring of 2014. By that point, the master plan will hopefully be well on its way to completion. They are still in the beginning phases of planning – trying to get a rough idea of what they want to do, and researching various aspects of the trail (the history, the environment, etc) in order to get a better idea for how to proceed. If, from the start of the planning process, the City remembers the goal to make the trail sustainable, it is possible for the City to build a trail which is truly remarkable in terms of its sustainability, just as City Manager Kurt Triplett envisions. We could even build the most sustainable trail in the United States. That would be a trail that Kirkland could be remembered for, a trail that we can be proud of.

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