Cultivating the Young

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PART I

Project Proposal

Guatemala: The Mendozas of Todos Santos

Food expenditure for one week: $75.70

Canada: The Melansons of Iqaluit, Nunavut Territory

Food expenditure for one week: $345

http://www.time.com/time/photogallery/0,29307,1645016,00.html

preface.

One day, I was surfing the Internet. There was an interesting title that caught my eye: what the world eats. The article is about a book, *Hungry Planet*, written by Peter Menzel and Faith D'Aluisio. The book profiles 30 families from around the world and offers detailed descriptions of weekly food purchases. These families are different in many ways, such as culture, size and income level. It is quite interesting to find out what and how much food these families consume in one week.

It occurred to me that I never noticed what and how much food I myself consumed in one week. I started to make a list and find out what I was eating. Here is what I listed:

(1) dairy: skim milk from Dairyland (Canada), one dozen of eggs (Canada)
(2) meat: pork (Canada), beef (Canada)
(3) bread: white bread from Superstore (Canada)
(4) rice (Thailand)
(5) vegetables: green onion (China), cabbage (Canada), tomato (USA), mushroom (Canada), carrot (USA), celery (China)

It turns out the food I consume is quite interesting in many ways, such as its produce, origin and nutrition facts. The thing puzzles me the most is that how little I know about my food. My mum used to know everything about her food when she was a child living in a rural neighbourhood back in China. They had a farmers' market every Tuesday. She even had her own piece of land to grow food. She was quite shocked when she found me, her own child who was born in the city, having difficulty distinguishing the plants of corn and wheat. She started to teach me about my food from then on. I learned a lot of things about food for my mum when I went grocery shopping with her. However, it was really difficult for me to learn about food when I was not able to see the whole thing. Thanks to my mum, she planted some vegetables and we raised rabbits, hens and ducks in our backyard.

I moved to Vancouver for my graduate studies a year ago. Everything is still new for me, including food. I decide to find out what food system supplies us. I want to research about the food system and find out what we can do to make the system healthier and more sustainable. Moreover, I want to find out a way to give children living in an urban environment a chance to learn about food they are eating.

project definition.

definitions.

cultivate:
(1) to prepare or prepare and use for the raising of crops; also : to loosen or break up the soil about (growing plants)
(2) to foster the growth of

young:
(1) being in the first or an early stage of life, growth, or development
(2) having little experience

Source: Merriam-Webster Dictionary

project statement.

We cultivate children like flowers. We want children to play happily outside to enjoy the sunshine and explore the world. We want them to learn about nature and life. We want them to be healthy.

Cultivating the young is a project that lets the young (school children) to learn about how to cultivate the young (small edible plants).Cultivating the young is a project that lets children go out, explore, learn about nature and life and be healthy through cultivating vacant space in the neighbourhood.

The idea of cultivating vacant lots dates back to 1893-1897 during the depression period in the United States (Hou, 2009). There has been a rise in people's interest in local food production in many North American cities. Since 1974, the City of Seattle has overseen the P-Patch system of community gardens, which has boasted more than 70 garden sites and 2,000 plot holders (Hodgson et al, 2011).

In Squamish, there are two existing community gardens cultivated by local food activists. The new bylaw in Squamish has permitted the growing of food on any lot (District of Squamish, 2011). These community gardens are often considered a great way to educate people. And many organizations have child- and adult-education programs to teach gardening, recycling, and nutrition (Hou, 2009).

goals.

Local food production in urban landscapes can support part of the need of local residents and increase the diversity in their foods selections. The process of local food production can educate children as well as adults about food they are eating and nature. This process can also teach them food is precious, thus to educate them to cherish their food. Also, working in fields with neighbors and children can bring more social interaction between residents creating a more harmonious community.

The goal of this project is to restore the relationship between people and food. Through local food production, children as well as adults learn more about food, food production as well as nature. And working in the fields together creates more social interaction among residents, which makes the community healthier both mentally and physically.

proposals.

The main idea is to rebuild the relationship between people and food, especially children and food.

So, what to do?
People don't know about their food anymore. It's important for people to know about the food they are consuming, such as what the plants look like and how to grow them. First, I would like to make food and plants easily accessible to people through local food production within community. All the food was used to be organic when we did not use chemicals like pesticides and fertilizers. I was shocked when I was watching a documentary about food and food production, Food Inc. We are losing our relationship with food through industrialized agriculture. I propose to design programs that encourage people to plant and harvest their organic food locally. Also, to promote the awareness on how hard it is to produce food so that people will cherish their food and reduce food waste.

How to do it?
I propose to build:
(1) A community garden, which can produce food locally within community, bring more social interaction with residents and be a good source for children to learn about food and nature.
(2) A compost system, which can reduce garbage transported to landfill, produce organic fertilizer and be a good source for children to learn about natural eco-systems.
(3) Urban food production on streets, which can be accessible to all, increasing awareness of local edible plants, resilient to climate change and educational to children.
(4) Micro-farming in and around the house, which use existing vacant front-yards and back-yards to produce food.
(5) A school garden, which can be a good source for children to learn about agriculture and local food culture.

scope.

This project will:

(1) Locate a community garden with compost system.
(2) Develop a typology of use of different urban spaces for food production within this community.
(3) Design school food garden in order to educate children about local food and food culture.

This project will not:

(1) Design a private yard for food production, because of the concerns in land ownership.
(2) Design a system to decide the type of plants to be planted every season in a community garden.
(3) Design a course related to school food garden.

problems.

Food, Inc.

Industrial agriculture is the dominant paradigm of American agriculture (Ikerd, 2010). Food is seem as a business.

There is a good documentary about food industry, *Food, Inc.*. It reveals some shocking facts of American food industry (Kennedy, 2009):

(1) The food industry is controlled by a handful of multinational corporations, such as Tyson, Monsanto, and Smithfield Farms.
(2) The USDA is allowed to regulate what constitutes organic food and when your milk is past due, but it does not have the authority to shut down a meat plant if they are selling tainted meat.
(3) The average hamburger contains meat from nearly 100 cattle. It gets better. Mass production cows are often raised knee-deep in their own manure. They're butchered so fast that there often isn't enough time to clean them.
(4) Cows are not designed to digest corn, and when they do, their stomachs become breeding grounds for E.coli bacteria. Five days of feeding grass to Bessie would kill nearly all of this bacteria. However, meat plants are "washing" ground beef in ammonia and chlorine before packaging it to sell to grocery stores.
(5) The majority of mass-produced chickens are raised in the dark. Their breasts are so large that they're unable to walk.

The film may be slightly exaggerated. Industrialized agriculture is a good business and able to provide food with lower price. However, chronic and ever increasing food insecurity is an inevitable consequence of industrial agriculture (Ikerd, 2010).

Poster of Food, Inc.. Source: http://www.foodincmovie.co.uk/

Food industrial is like any other industry. Businessmen want to make things working more "efficient" and make the most profit. Instead of getting rid of weeds by hand, herbicide is used. However, herbicide will affect the plants that produce food. Genetically modified plants that is resistant to berbicide is planted. To save time and energy, the same species is planted in vast plantations. However, this process makes the plants attract massive pests. In order to solve this problem, pesticides that contaminate the water, break down soil structure, deplete the soil's fertility, and decimate the soil's natural population of organisms (Ladner, 2011). To make the land productive continuely, fertilizers that contaminate water are applied.

This process is neither sustainable nor efficient. Statistics shows that farmers in British Columbia spent 62.9$ million on heating fuel, 97.2$ million on machinery fuel and 103.0$ on fertilizer and lime, 38.1$ on pesticides (Table 1).

Table 1: *Farm operating expenses and depreciation charges-Agriculture economic statistics-2010*
Source: Statistics Canada

	Newfoundland and Labrador	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
	thousands of dollars										
Gross operating expenses											
Property taxes	365	3,405	3,765	3,607	63,124	120,852	77,880	150,532	109,165	23,449	556,144
Cash rent	186	15,501	5,467	7,648	104,227	345,873	181,187	335,285	344,018	61,756	1,401,147
Share rent	0	240	145	221	2,552	57,973	14,868	114,996	82,288	2,519	275,802
Cash wages, room and board	23,642	66,372	100,723	96,335	841,163	1,436,199	320,261	366,407	623,944	519,547	4,394,593
Family wages	6,880	24,491	32,433	28,900	370,112	486,872	143,797	206,653	305,733	161,579	1,767,450
Non-family wages	16,762	41,880	68,290	67,434	471,051	949,328	176,464	159,753	318,211	357,968	2,627,143
Interest	5,440	24,130	29,319	23,182	407,564	516,364	242,220	320,989	516,836	158,392	2,244,436
Repairs to buildings and fences	2,233	6,672	10,321	8,461	161,358	249,858	63,216	100,151	156,201	61,297	819,769
Electricity	1,973	8,455	10,268	9,941	129,735	278,346	75,555	108,334	165,571	51,240	839,417
Telephone	737	3,123	3,580	3,424	32,152	77,707	30,451	59,397	74,335	18,791	303,697
Heating fuel	1,804	2,510	6,499	4,851	84,433	208,456	39,553	36,214	73,765	62,911	520,995
Machinery fuel	3,419	22,473	20,766	22,974	250,514	420,996	253,838	523,346	505,061	97,176	2,120,562
Machine repairs and other	4,563	27,833	25,539	28,650	338,488	516,395	273,832	556,765	566,163	107,353	2,445,581
Business insurance	1,726	6,361	8,136	8,138	186,286	252,535	61,515	107,495	130,450	44,340	806,982
Custom work	5,654	11,139	14,175	11,100	238,408	258,793	155,002	293,444	43,485	115,093	1,146,293
Stabilization premiums	1	22	63	0	55,449	0	0	0	2,685	0	58,220
Crop and hail insurance	59	6,237	567	3,432	32,171	59,491	110,124	319,748	272,702	5,950	810,481
Fertilizer and lime	2,758	48,330	13,024	26,973	256,324	608,155	522,039	949,093	831,286	102,977	3,360,959
Pesticides	577	34,305	11,591	19,271	118,620	327,211	314,420	762,685	476,095	38,060	2,102,835
Commercial seed	1,740	14,624	11,145	15,197	227,095	507,433	190,278	284,790	239,492	84,809	1,576,603
Irrigation	0	0	0	0	0	0	0	2,471	13,740	3,088	19,299
Twine, wire and containers	2,546	8,083	12,293	9,180	99,449	228,860	18,188	22,034	55,887	82,261	538,780
Commercial feed	36,186	28,356	91,672	75,420	1,302,808	1,154,789	493,632	240,130	1,189,663	380,398	4,993,054
Livestock and poultry purchases	3,617	4,767	6,726	4,466	109,316	246,201	62,278	69,116	773,961	56,004	1,336,451
Artificial insemination and veterinary fees	1,562	5,388	9,482	7,312	170,480	210,075	66,556	65,301	147,751	37,144	721,051
Legal and accounting fees	3,089	9,711	13,040	13,973	150,567	246,751	91,372	144,751	198,238	71,897	943,388
Other	1,183	5,767	8,044	5,757	96,061	192,371	59,010	107,473	157,700	70,407	703,774
Total gross operating expenses	**105,061**	**363,802**	**416,350**	**409,513**	**5,458,342**	**8,521,683**	**3,717,276**	**6,040,946**	**7,750,482**	**2,256,858**	**35,040,314**
Rebates											
Property taxes	0	0	0	0	0	0	30,830	0	0	0	30,830
Cash wages	0	0	0	0	0	2,952	0	0	0	0	2,952
Interest	0	220	498	0	610	0	15	0	1,295	0	2,638
Electricity	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Machinery fuel	0	0	0	0	0	2,196	0	0	0	0	2,196
Fertilizer and lime	0	0	400	0	0	0	0	0	0	0	400
Pesticides	0	0	0	0	0	0	0	0	0	0	0
Artificial insemination and veterinary fees	0	0	0	0	0	0	0	0	2,451	0	2,451
Livestock purchases	0	0	0	0	0	0	0	0	0	0	0
Total rebates	**0**	**220**	**898**	**0**	**610**	**5,148**	**30,845**	**0**	**3,746**	**0**	**41,466**
Operating expenses after rebates	**105,061**	**363,582**	**415,452**	**409,513**	**5,457,732**	**8,516,536**	**3,686,431**	**6,040,946**	**7,746,736**	**2,256,858**	**34,998,847**
Depreciation on buildings	2,994	12,120	26,085	19,221	264,861	463,491	119,015	166,480	313,974	136,095	1,524,337
Depreciation on machinery	5,286	28,807	33,143	34,313	462,059	770,214	417,485	977,919	1,047,933	181,415	3,958,575
Total depreciation	**8,280**	**40,927**	**59,228**	**53,534**	**726,921**	**1,233,705**	**536,499**	**1,144,400**	**1,361,907**	**317,510**	**5,482,912**
Total expenses before rebates	113,341	404,730	475,578	463,048	6,185,263	9,755,389	4,253,775	7,185,345	9,112,390	2,574,367	40,523,225
Total rebates	**0**	**220**	**898**	**0**	**610**	**5,148**	**30,845**	**0**	**3,746**	**0**	**41,466**
Total expenses after rebates	**113,341**	**404,510**	**474,680**	**463,048**	**6,184,653**	**9,750,241**	**4,222,931**	**7,185,345**	**9,108,644**	**2,574,367**	**40,481,759**

Note(s): The data in this table were last revised in November 2011.

food miles.

With globalization in food “industry”, there is food from all parts of the world on our table; and we export food to other countries too. Canadians represented about 0.5% of the global population, produced about 1.5% of the food in the world, and consume about 0.6% of world food production. However, Canada is not self-sustainable. The main foods that Canada produces are cereals and meat. Canadians spend 23,729.0$ million on foods from US, Mexico, China and many other countries in 2007 (Table 2). In British Columbia, it has been estimated that local farmers can produce 48% of all food consumed within the province. However, only small amount of produce was sold locally (BC food self-reliance Report, 2006). Some foods might have to travel between 2,500 and 4,000 kilometers from the farms to our tables (Lazaroff, 2002).

Table 2: *Food imports into Canada, by selected country, 2007*
Source: Statistics Canada

	Total food imports	
	$ millions	%
Total	**23,729.0**	**100.0**
United States	13,542.5	57.1
Mexico	906.6	3.8
China	799.0	3.4
Italy	691.6	2.9
France	686.0	2.9
Brazil	665.1	2.8
Chile	523.1	2.2
Thailand	483.1	2.0
Australia	441.8	1.9
United Kingdom	393.6	1.7

And this is easy to be seem from my persoanl experience. Most of my meat and dairy products are from Canada. Even though I sometimes buy eggs from US when the price is cheaper. However, most of my vegetables are imported from other country.

There is a book written by a couple living in Vancouver, Alisa Smith and J.B. MacKinnon, that makes the issue of food mile more real and believable, *The 100-Mile Diet: A Year of Local Eating*. In this book, the couple wrote about their one year diet, started from March of 2005, on food grown within 100 miles of their residence. They mainly relied on local farmers' market and visits to local farms. Still, they lacked cooking oils, rice and sugar.

The story of the couple shows how unbalanced and unsustainable the food industry is. The market doesn't provide local food so that it is difficult for locavores (people interested in eating locally produced food) that are willing to be sustainble.

obesity.

Some people eat food for pleasure. Some people eat food to release stress. There is a huge problem of obesity in North America.

"The obesity rate in North American countries is among the highest in the world. Obesity is not only prevalent among adults in North America, but children as well. North Americans often neglect nutrition in favor of convenience, leading to poor food choices." (Leigh, 2011)

The obesity rate in Canada is quite high in recent years (Table 3).

Table 3: *Body mass index, overweight or obese, self-reported, youth, by sex*
Source: Statistics Canada

	2008	2009	2010	2011
	number			
Total, 12 to 17 years	**423,996**	**449,945**	**437,956**	**428,787**
Males	**269,327**	**274,229**	**267,719**	**255,710**
Females	**154,669**	**175,716**	**170,237**	**173,077**

Note: Body mass index (BMI) for youths is different from that of adults as they are still maturing. This indicator classifies children aged 12 to 17 (except female respondents aged 15 to 17 who were pregnant or did not answer the pregnancy question) as "obese" or "overweight" according to the age- and sex-specific BMI cut-off points as defined by Cole and others. The Cole cut-off points have been applied to the Canadian Community Health Survey (CCHS) since 2005 and are based on pooled international data (Brazil, Great Britain, Hong Kong, Netherlands, Singapore and United States) for BMI and linked to the internationally accepted adult BMI cut-off points of 25 (overweight) and 30 (obese).

food wasted.

With more technologies, food is much easier to produce. Many people don't appreciate food nature provides anymore. There is large amount of food wasted every year. For example, the estimated value of wasted food in Canada in 2011 is 27.7$ billion (CBC News, 2012).

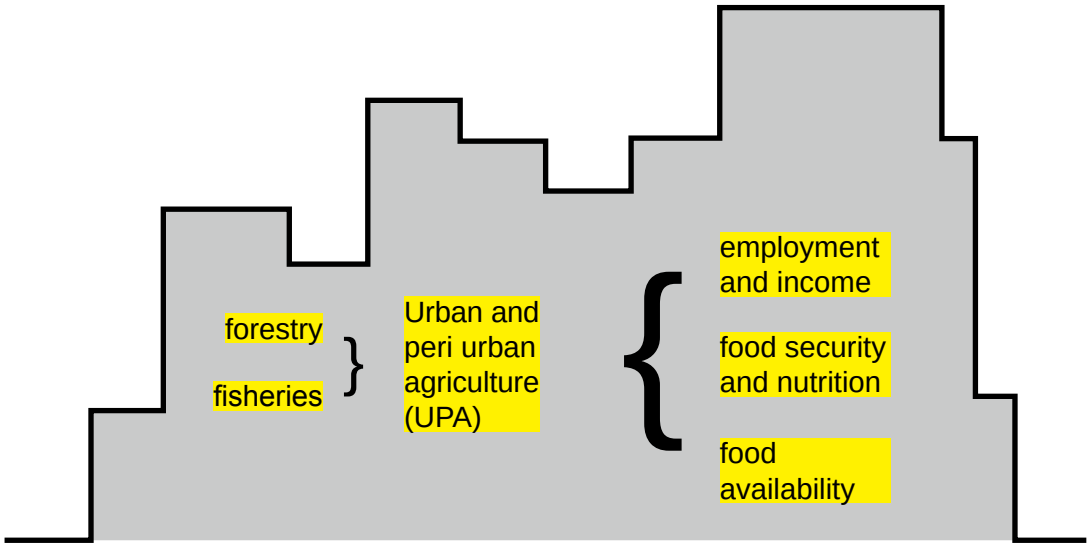
urban agriculture.

definition.

Urban agriculture is typically defined as the production of fruits and vegetables, raising of animals, and cultivation of fish for local sale and consumption (Hodgson et al, 2011).

However, there are many different definition of urban agriculture by different region and country, as well as by field of study. Food and Agriculture Organization of the United Nations established a comprehensive definition of urban agriculture:

"Urban and peri urban agriculture (UPA) contributes to food availability, particularly of fresh produce, provides employment and income and can contribute to the food security and nutrition of urban dwellers . It encompasses a complex and diverse mix of food production activities, including fisheries and forestry, in many cities in both developed and developing countries." (Food and Agriculture Organization of the United Nations)



Definition of Urban Agriculture

history.

Agriculture has been a part of North American cities for centuries. There are about half of the world's population is living in cities (Jansma, 2008). 100 years ago most people are farmers and living in a comparatively natural environment. Today, People are far away from agriculture. Take province of British Columbia as an example. In the year 1861, 100% percent of population lived in rural areas. In 2006, there are 85% of people in BC living in urban environment (Table 4).

Table 4: *Population, urban and rural, by province and territory*
Source: Statistics Canada

	Population	Urban	Rural	Urban	Rural
	number			% of total population	
B.C.					
1851	55,000	0	55,000	0	100
1861	51,524	0	51,524	0	100
1871	36,247	2,270	32,977	6	91
1881	49,459	9,070	40,389	18	82
1891	98,173	37,228	60,945	38	62
1901	178,657	90,179	88,478	50	50
1911	392,480	203,684	188,796	52	48
1921	524,582	247,562	277,020	47	53
1931	694,263	394,739	299,524	57	43
1941	817,861	443,394	374,467	54	46
1951	1,165,210	793,471	371,739	68	32
1956	1,398,464	1,026,467	371,997	73	27
1961	1,629,082	1,181,925	447,157	73	27
1966	1,873,674	1,410,493	463,181	75	25
1971	2,184,620	1,654,405	530,220	76	24
1976	2,466,610	1,897,085	569,520	77	23
1981	2,744,467	2,139,412	605,055	78	22
1986	2,883,370	2,285,005	598,365	79	21
1991	3,282,061	2,640,139	641,922	80	20
1996	3,724,500	3,057,388	667,112	82	18
2001	3,907,738	3,309,853	597,885	85	15
2006	4,113,487	3,511,300	602,187	85	15

Note: The rural population for 1981 to 2006 refers to persons living outside centres with a population of 1,000 AND outside areas with 400 persons per square kilometre. Previous to 1981, the definitions differed slightly but consistently referred to populations outside centres of 1,000 population.

The original settlers in North America were mostly farmers. The planners of warly North American towns gave agriculture a central place (Hodgson et al, 2011). As the technology of agriculture developes, city farmers were unable to compete with large-scale farming outside the city. Cities became more and more crowded with expanded public market place in 19th century. Urban agriculture is less necessary for food production.

In 1894, due to high unemployment in Detroit, there were many urban agriculture programs intended to address poverty and economic need (Hodgson et al, 2011).

During WWI and WWII, due to food shortage problems, victory gardens spouted in US, Canada, and UK. In 1943, more than 20 million gardens sprouted on private land-in front lawns, backyards, and public parks, and on empty lots and rooftops-producing an estimated 9 to 10 million tons of fruits and vegetables, or about 41percent of all vegetable produced that year (Hodgson et al, 2011).

Victory Garden Poster. Source: http://www.beginningfarmers.org/ag-history-victory-garden-picture/

After WWII, there was an economic boom which make the city grow bigger and faster. Agricultural land was pushed away from city. Former agricultural land was replaced different zoning types, such as industrial land, residential land and commercial land.

During the post war decades, people planted community gardens in major city in North America. Community gardens were responses to deindustrialzeion, depopulation, increases in acreage of vacant land , and failure of urban renewal but also to immigration (Hodgson et al, 2011).

Today, people practice urban agriculture all over the world in responses to problems such as increasing population and food safety concerns.

The history of urban agriculture is driven by factors such as policies, economic growth and culture. And it needs good management all the time. Planners and policy makers have to make good regulations and planning to manage the growth of urban agriculture.

types.

There are many different types of urban agriculture. I classify urban agriculture by scale and place.

urban farm.

Urban farms focus on the production of food and selling of food. I

t is big-scale production of food-producing or ornamental plants, bees, fish, poultry or small farm animals located on public or private property that using a variety of growing techniques including in-soil, container, hydroponic, and aquaponic growing systems (Hodgson et al, 2011).

The products are typically sold on- or off-site at a stand, market, or store (Hodgson et al, 2011). In recent years, consumers may join a membership, sign a contract with urban farmers and pay in advance to provide money for urban farmers to buy seeds and fertilizers and protect urban farmers during bad harvesting seasons.

Most urban farm projects are grass-root project. However, it is important to get enough space for different activities for a urban farm:

(1) the design of urban farm should include cultivating area, tool shelter, compost area and food processing area
(2) if there is enough space, a small market
(3) use clean stormwater from roof and directly from sky for irrigation purpose

Chicago Urban Farm. Source: http://zh.wikipedia.org/wiki/File:New_crops-Chicago_urban_farm.jpg

community garden.

Community gardens focus on producing food as well as socializing with people living in the same community.

"Small- to medium-scale production of food-producing and ornamental plants, on contiguous or discontinuous plots of land, located on public or private property in residential areas, gardened and managed collectively by a group. " (Hodgson et al, 2011).

Gardening activites and end products are typically used for consumption or education; however, they may also be sold on- or off-site, depending on local government regulations and the goals of the garden as a collective effort (Hodgson et al, 2011). In addtion, there are many community garden groups give their products to local food bank to feed the poor.

Most community garden projects are grass-root project. However, it is important to get enough space for different activities for a community garden:

(1) the design of urban farm should include cultivating area, tool shelter, compost area, food processing area and space for social activities
(2) if there is enough space, a small market and space for educational activities
(3) use clean stormwater from roof and directly from sky for irrigation purpose
(4) blur boundary of different plots encourages social interaction and gives the place a sense of community
(5) smaller plot that attracts more residents to join in
(6) not far away from residential area

Strathcona Community Garden. Source: Bing Maps

rooftop farm.

Rooftop farming can be run as both urban farm and community garden. What makes it special is that it locates on rooftop. When design this kind of garden , the most important thing is to understand the load of the roof.

Brooklyn Grange.
Source: http://www.nytimes.com/2012/07/12/nyregion/in-rooftop-farming-new-york-city-emerges-as-a-leader.html?_r=0

There is plenty sun on the rooftop. People can do it in different scales for different purposes: private rooftop vegetable garden, community garden that can be rented out to residents living in the building, commercial farm or even greenhouses.

Rooftop Greenhouse
Source: http://gogreenre.tumblr.com/post/25377358102/up-on-the-roof-room-to-grow

public fruit.

People can plant fruit trees in public green space and people can pick up the fruits as they want.

An activist art project called Fallen Fruit mapped out all the public fruit in Silver Lake, Los Angeles. They believe fruit is a resource that should be commonly shared, like shells from the beach or mushrooms from the forest (Knechtel, 2008).

When design a landscape with fruit trees, the following should be considered:

(1) fuit attracts wild animals
(2) fallen fruits create mess
(3) away from pollutions
(4) away from poisonous plants
(5) make it easy for people to pick up fruits
(6) social space and educational space

Sour Orange, Sevilla.
Source: http://localecologist.blogspot.ca/2011/05/eat-street-trees.html

institutional garden.

Institutional gardens focus on educational and social purposes. Also, some institutional focus on solving health issues both physically and mentally.

"Small to large food-producing gardens or orchards located on private or public institutional property (school, hospital, faith-based organization, workplace) in a residential, commercial, or mixed-use area, gardened by an organization or business." (Hodgson et al, 2011).

End products are typically used for donation or consumption (Hodgson et al, 2011). Some products may be sold on- or off-site to support garden's specific activities depending on local government regulations (Hodgson et al, 2011).

The design of institutional garden can be similar to community gardens:

(1) the design of urban farm should include cultivating area, tool shelter, compost area, food processing area, space for social activities and space for educational activities
(2) if there is enough space, a small market
(3) use clean stormwater from roof and directly from sky for irrigation purpose

The Edible Schoolyard, Berkeley.
Source: http://www.flickriver.com/photos/ml_kap/sets/72157625178790638/

private garden.

Private garden can be designed and used in almost every way.

"Private food-producing gardens located in the front or back yard, rooftop, courtyard, balcony, fence, wall, window sill, or basement of a private single-family or multifamily residence, attended to by an individual or gardening bisiness." (Hodgson et al, 2011).

End products are typically used for personal consumption (Hodgson et al, 2011). Some products may be sold in the case of attended by gardening business.

When designing a private garden for food production, the following things should be considered :

(1) the design should include cultivating area, tool shelter
(2) compost attracts wild animals
(3) use clean stormwater from roof and directly from sky for irrigation purpose

Backyard farming
.
Source: http://data3.tennessean.com/projects/reader-photos/tag/vegetable%20gardens

Private Food Garden.
Source: http://www.genomicon.com/tag/backyard-farming/

precedents.

Strathcona Community Garden.

Location: Strathcona, Vancouver
Date Designed/Planned: 1985
Area: 3.34 acres

Strathcona Community Garden was started by volunteer-managed public green space on 1.35 hectares (3.34 acres) of city land in Vancouver Eastside. City Farmer started the community garden on a piece of vacant land Prior St and Hawks Ave in 1985. In 2005, the Park Board signed a 25 years with the Strathcona Community Gardeners Society, which is a non-profit charitable organization that members join each year to renew their garden plots.

The idea of this garden was to (Strathcona Community Garden Association):
(1) Provide space for area residents to grow their own organic food, herbs and flowers.
(2) Offer rare inner city habitat space for wildlife.
(3) Educate gardeners and community on organic food techniques, composting and other urban ecological skills.
(4) Maintain an urban oasis for all residents and visitors to enjoy.

There is a garden committee that holds monthly meetings to plan the mandatory work parties and discuss issues including the revision of policies and procedures, the resolution of grievances and any other topics of interest to the gardeners. Gardeners are encouraged to attend these meetings to voice their opinions and to participate in the decision making process (Strathcona Community Garden Association).

Strathcona Community Garden. Source: Bing Maps

Garden plots are approximately 5 X15' and are assigned to an individual gardener/couple/family. A maximum of 4 plots can be allocated to an individual gardener/couple/family. Plots may not be traded, sublet or registered to someone "in name only" while a friend or relative uses the space. All plots assignments are made solely by the Garden Coordinator.
The charge is very affordable. The plot annual rental fee is $5.00. And annual membership fee is $10.00. Rules and regulations for the use of the garden implemented. Gardeners may have their memberships terminated for:

(1) Not paying membership/plot fees
(2) Taking produce, tools or other material from another gardener's plot or the common areas without authorization
(3) Being involved in unlawful activity at the garden
(4) Not tending to their assigned plot
(5) Not joining the mandatory work parties

In addition, all agriculture process in this community garden should be organic (Strathcona Community Garden).

Strathcona Community Garden. Source: strathconagardens.ca

Village Homes.

Location: Davis, California
Date Designed/Planned: 1973–1975
Area: 60 acres

introduction.

Village Homes is located in a university town, Davis, California. It is a sixty-acre, 242-unit mixed-use residential “garden village” (Corbett and Corbett, 2000). It was started in 1974 with a group of graduate students and construction of the initial phase was completed in 1982. The idea was to address ecological and social problems at that time. It was designed to encourage both the development of a sense of community and the conservation of energy and natural resources (Village Homeowners Association). It was an effort of the 1970s toward sustainable development inspired by the garden city. Designers used a lot of different methods to make the community more sustainable, for example, all homes were facing south to maximize the sun for heating (Corbett and Corbett, 2000).

For the plan, it was obvious that all streets are curving and trend east west. And all lots are oriented north south. This orientation (which has become standard practice in Davis and elsewhere) helps the houses with passive solar designs make full use of the sun's energy (Village Homeowners Association). The designers identified six elements as the main site planning innovations of Village Homes, which include community, energy, walking and bicycling, a “design closer to nature”, neighborhood agriculture and natural drainage (Francis, 2002).

Village Homes Plan. Source: michaelcorbettmasterbuilder.com

Table 5. *Assumptions of Sustainable Development. (Corbett and Corbett, 2000)*

1. Every living thing survives by numerous and subtle relationships with all living things and with the inanimate environment.
2. Ecosystems and parts of ecosystems composed of a wide variety of species tend to adapt better to environmental changes or human tampering than do those composed of fewer species.
3. Part of the ecosystem is a complex system of energy transfers that depends ultimately on energy input.
4. In the long run, everyone of the humanity's physical needs must be satisfied either without the use of nonrenewable resources or through recovery and reuse of those resources.
5. Although humans seem to be the most adaptable of living things, we still have certain inherent physical and psychological needs that must be met by the ecosystem, the human-made physical environment, and the social environment.
6. Humans are for the most part genetically adapted to the environment that existed about 200 to 20,000 years ago. This adaptation involves not just the physical makeup but also the modes of perception and behavior and relates to the social environment as well as the physical environment.
7. The relationship between people and the environment goes both ways: humanity shapes and is shaped by its environment.
8. Humans can adept to a wide range of environmental conditions, but the results of the adaptation to inhospitable conditions is temporary or chronic stress.

community.

What residents live in Village Homes like the most is that this place gives residents a sense of community. Some students participated in the design of their own homes, and few even served as owner-builders. Multi-family homes give low-income families an opportunity to live in this neighbourhood, which gives this community more diversity. The narrow streets allow a greater sense of community ownership to develop for the residents (Corbett and Corbett, 2000). The community has two big parks and some smaller common areas for residents to socialize.

energy.

The community builds energy-efficient homes with use solar water heater.

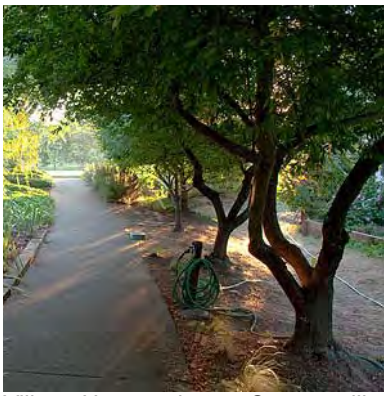
walking and biking.

All roads in Village Homes are all narrow, curving cul-de-sacs; they are less than twenty-five feet wide and generally aren't bordered by sidewalks (Village Homeowners Association). The idea was to use narrow widths minimize the amount of pavement exposed to sun in the long, hot summers to make surrounding area cooler. The curving lines of the roads give residents and visitors the look of village lanes, and slow down car traffic. Also, narrow streets allow a greater sense of community ownership to develop because residents perceive the space as belonging to them rather than being a no-man's-land (Corbett and Corbett, 2000).

With narrower street and slower traffic, the community is more pedestrian/bike friendly. And the streets have an extensive system of pedestrian/bike paths, running through common areas that exhibited a variety of landscaping, garden area, play structures, statuary, and so on. Most houses face these areas rather than the streets to provide a sense of pedestrian/bike friendly community (Village Homeowners Association).

a "design closer to nature".

They have seventeen acres of the land Village Homes to agriculture; the east side of the community is bordered by a ring of 300 almond trees, and numerous smaller orchards are tucked between houses and along bike paths (Corbett and Corbett, 2000). More than thirty varieties of fruit trees were originally planted, and as a result some fruit is ripe and ready to eat nearly every month of the year (Village Homeowners Association). There are 70 acres of land on the western side of the development for residents to grow vegetables. A group of residents pick up almonds during the annual Village Homes almond harvest festival. However, the income from the almonds has offset only a small portion of the maintenance costs in 1990 (Corbett and Corbett, 2000). Residents who maintain their own vegetable gardens in addition to harvesting the agricultural products grown in the community report that they purchase little or on additional produce (Corbett and Corbett, 2000).



Village Homes photos. Source: villagehomesdavis.org

neighbourhood agriculture.

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natural drainage.

The common areas are too consisted of Village Homes' innovative natural drainage system, a network of creek beds, swales, and pond areas that allowed rainwater to be absorbed into the ground rather than carried away through storm drains (Village Homeowners Association). This system allows storm water absorbed by soil.

limitations.

The project is successful and pioneering. However, there are many problems of Village Homes. One major limitation is that many residents living in Village Homes often have strong environmental and social values, so it is difficult for other communities to achieve the same success (Francis, 2002). And with the rising price of properties, the community becomes less diverse where it’s difficult for low-income family to afford.

Village Homes photos. Source: villagehomesdavis.org

Agromere.

Location: Almere, Flevoland, Netherland
Date Designed/Planned: 2009
Area: 617.76 acres (250 hectares)

introduction.

Almere is the youngest city in the Netherlands: the first house was finished in 1976, and Almere became a municipality in 1984. In 2009, Almere specified in its Concept Structure Vision (Almere 2.0) that urban agriculture is one of the major aspects of the Almere Oosterwold neighbourhood to be developed on the northeastern side of the city. In January 2010, the Dutch government gave the green light to the execution of this Structure Vision.

Almere is expected to expand to 350,000 inhabitants by 2030 (and become the fifth largest city of the Netherlands), because of the growing need for new housing in the Amsterdam area and the absence of locations on which to build (Jansma, 2011).

design principles.

The plan intend to make Almere grow while still being ecologically, socially and econonmically sustainable. The design principles are following (the city of Almere): cultivate diversity, connect place and context, combine city and nature, anticipate change, continue innovation, design healthy systems and empower people to make the city.

Design Principles (Jansma, 2011):
(1) Nutrient cycles both within the farming systems and the urban systems have to be closed.
(2) Energy must be produced locally, resulting in a climate neutral or an energy-producing district.
(3) For the calculation of the different farming systems we assumed that 50 percent of the produced food and food products could be consumed in the district.
(4) The district will not be an autarky for human food or animal feed.
(5) Traditionally in any new district, a large part is reserved for public green areas and public services like schools, shopping malls, elderly care and etc. In the Agromere approach, the public area will be used for urban agriculture. Therefore, urban agriculture has to provide these facilities.
(6) Housing and agriculture are integrated in this concept. Production and processing of food is therefore located directly next to the area’s inhabitants, leading to the assumption that organic farming is more appropriate to Agromere.
(7) Since the farms exchange material, the consequence of principle 6 is that all farming systems should be organic.
8. Farms are commercially healthy enterprises exploited by entrepreneurs.

Agromere was designed as a city district of 250 hectares with an area of 70 hectares for houses and infrastructure, and 180 hectares for agricultural activities (Jansma, 2011). They designed four different urban farms based on the households' needs for food and other products (Jansma, 2011).

The four farms were designed as follows (Jansma, 2011):

(1) Vegetables and fruits, with chicken and cereals
(2) Greenhouses, with community service
(3) Arable farming with beef cattle
(4) Dairy and community services

Agromere
Source: http://www.wageningenur.nl/en/show/Agromere-an-inextricable-bond-between-urban-farming-and-a-neighbourhood.htm

The Edible Schoolyard project.

Location: Berkeley, California, USA

"The mission of the Edible Schoolyard Berkeley is to teach essential life skills and support academic learning through hands-on classes in a one-acre organic garden and kitchen classroom. The Edible Schoolyard curriculum is fully integrated into the school day and teaches students how their choices about food affect their health, the environment and their communities.

The Edible Schoolyard Berkeley is a one-acre organic garden and kitchen classroom for urban public school students at Martin Luther King, Jr. Middle School. This model program for edible education is fully funded by the Edible Schoolyard Project. At ESY, students participate in all aspects of growing, harvesting, and preparing nutritious, seasonal produce during the academic day and in after school classes. Students' hands-on experience in the kitchen and garden fosters a deeper appreciation of how the natural world sustains us and promotes the environmental and social well-being of our school community.

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The Edible Schoolyard kitchen is an experiential learning classroom
where students accompany their humanities teachers to experience culture, history, language, ecology, and geography through the preparation of food. Warm, bright, and cheerful, the kitchen is a backdrop for enthusiastic students who view the garden through the north-facing windows–making the tacit connection between seasonality, plants, and food.

Students cook together with freshly harvested produce from the Edible Schoolyard garden and eat a freshly prepared dish, sharing the fruits of their labor around a communal table. As they harvest, cook, and eat their way through the school year, students' experience lessons that support academic learning in the classroom.

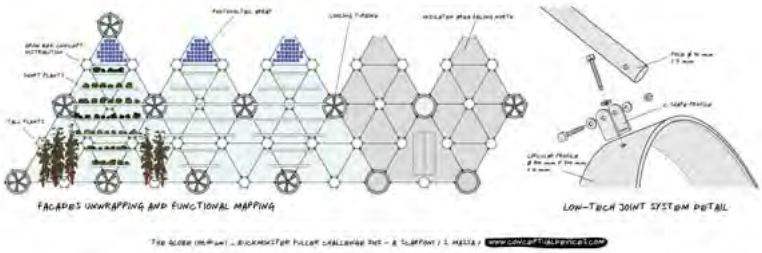
The Edible Schoolyard Berkeley engages the wider community of King by extending programming to evening and weekends. Families participate in three Saturday work days, helping to maintain the garden and sharing lunch together. Parent and families also participate in evening classes held in the ESY kitchen. These classes give students an opportunity to share lessons learned with their families and provide tools for families to cook fresh meals."

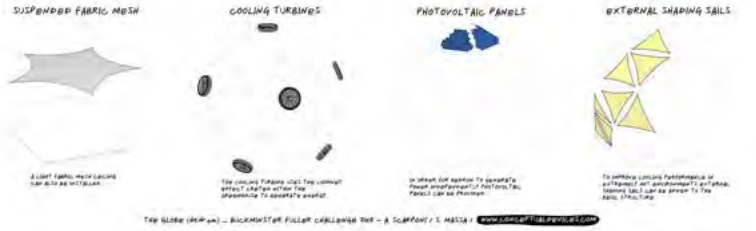
Source: http://edibleschoolyard.org/berkeley

GLOBE (hedron).

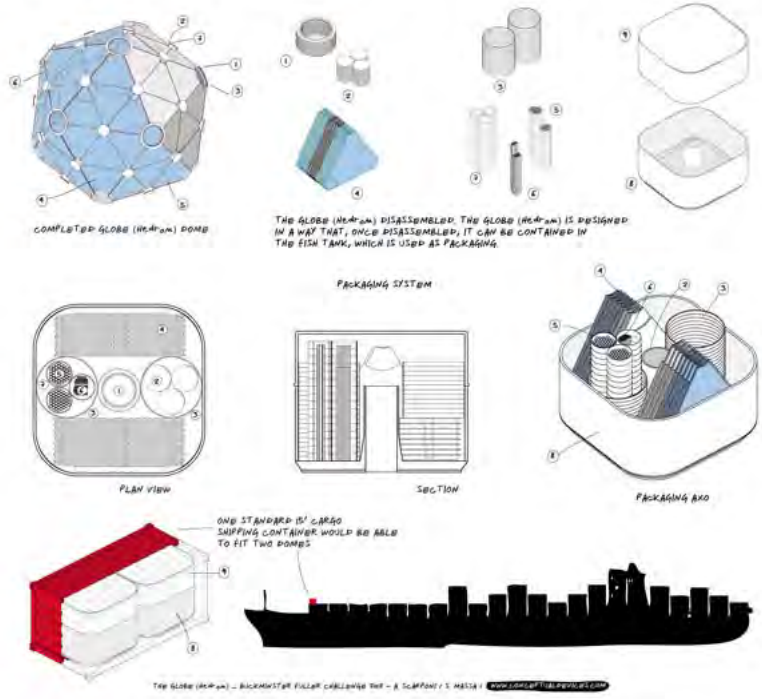
GLOBE (hedron) is a unique geodesic rooftop farm design structure which is built using natural, renewable materials such as bamboo for its central structural elements.

Source: http://www.indiegogo.com/HEDRON

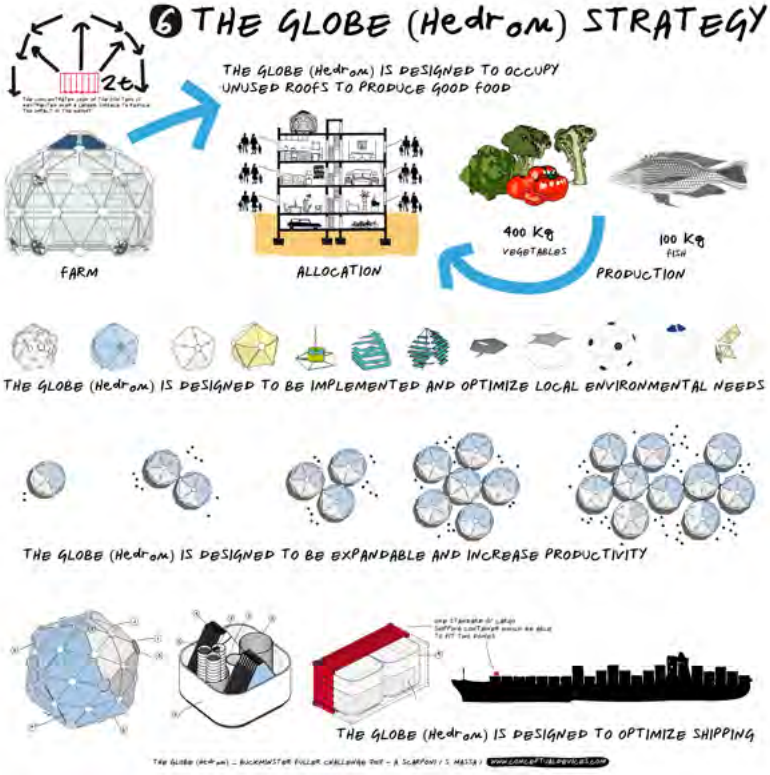




5 THE GLOBE (Hedrom) TRANSPORTABILITY

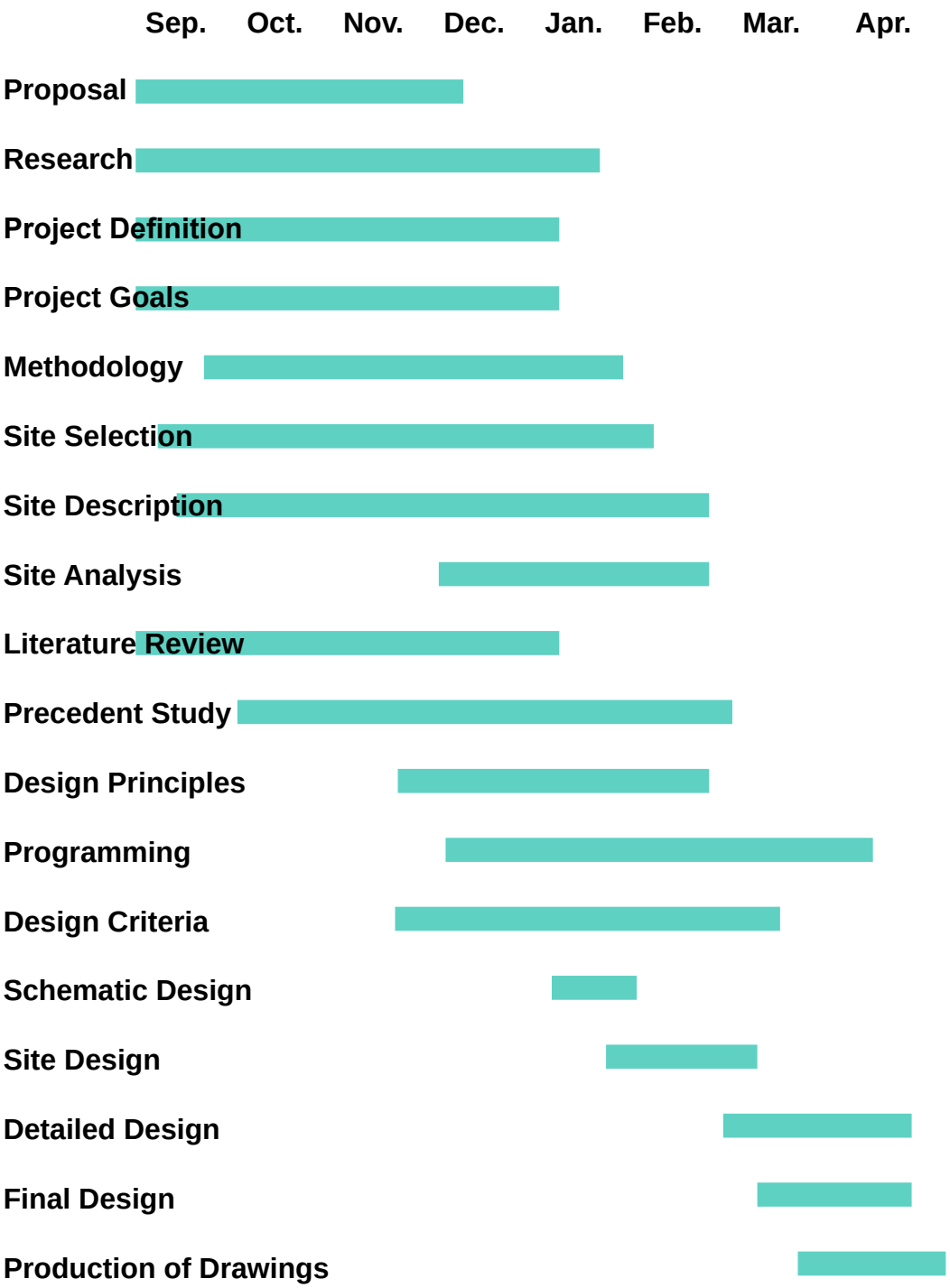


6 THE GLOBE (Hedrom) STRATEGY



Source: http://www.indiegogo.com/HEDRON

plan of work.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Proposal
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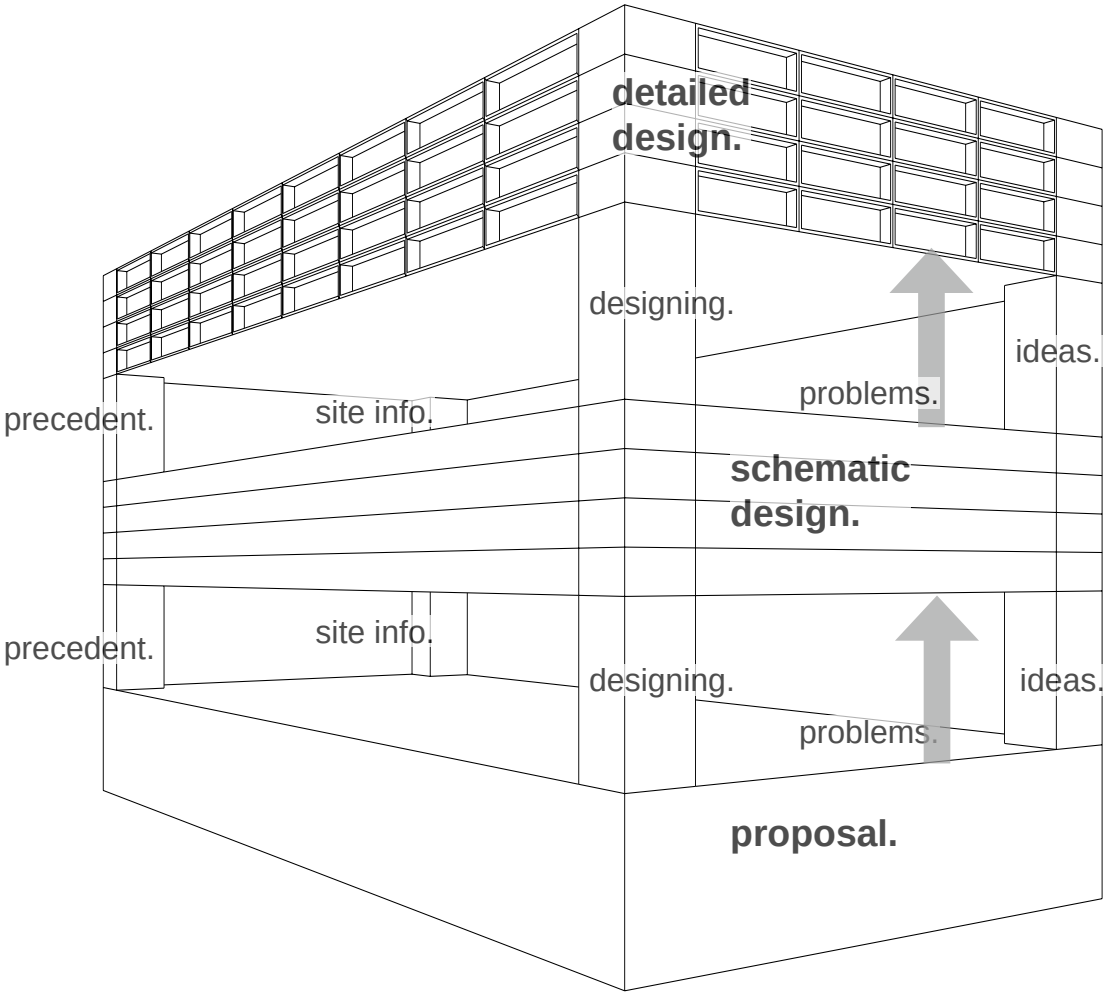
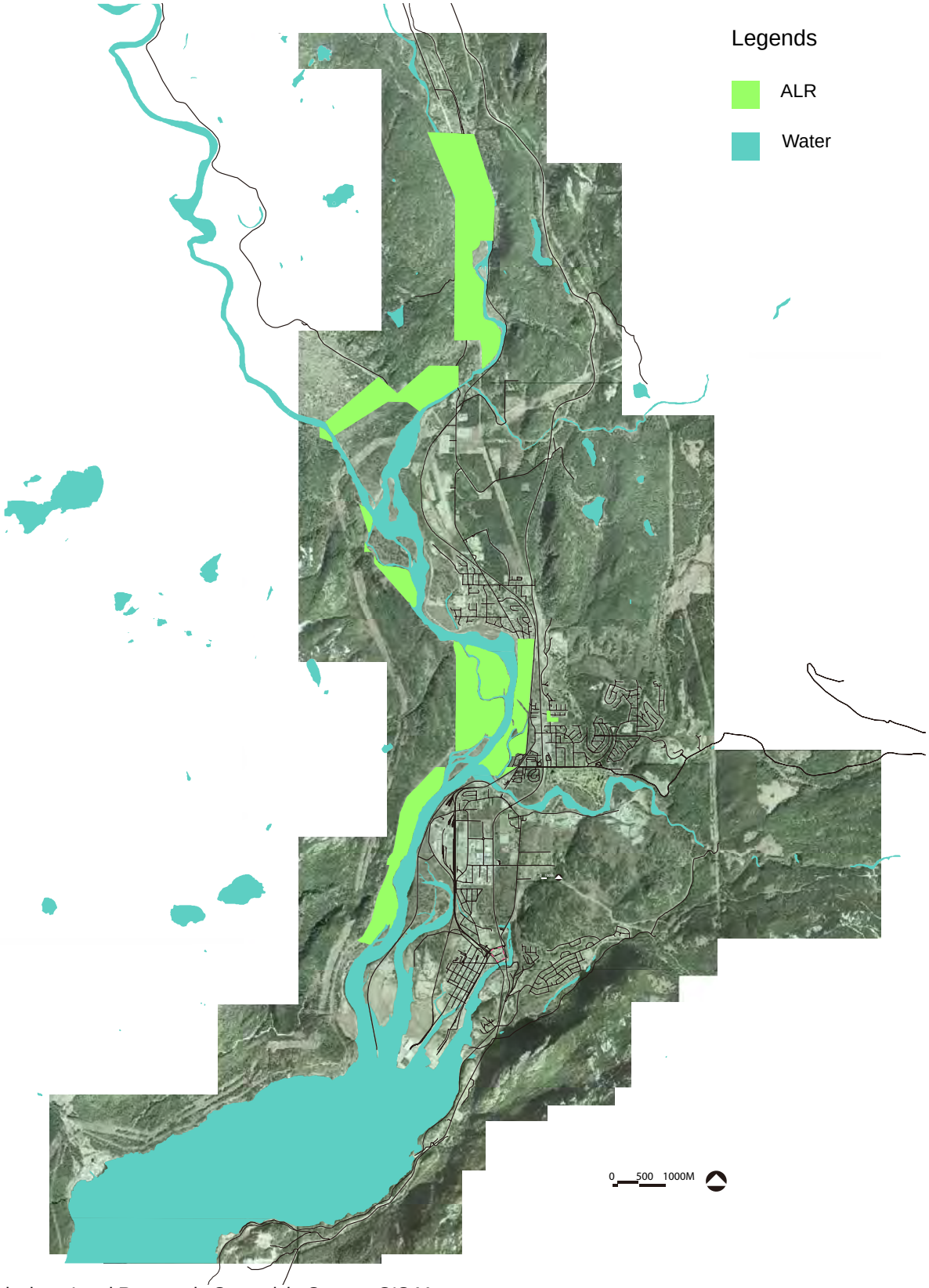
Project Definition
Project Goals
Methodology
Site Selection
Site Description
Site Analysis
Literature Review
Precedent Study
Design Principles
Programming
Design Criteria
Schematic Design
Site Design
Detailed Design
Final Design
Production of Drawings

design process.



The design process is like the process of building up a building floor by floor. Precedent study, site information, ideas and designing are the poles to make this struction stady and safe. And these four major poles are to solve the problems that come out when moving to the next step.



Agriculture Land Reserve in Squamish. Source: GIS Map

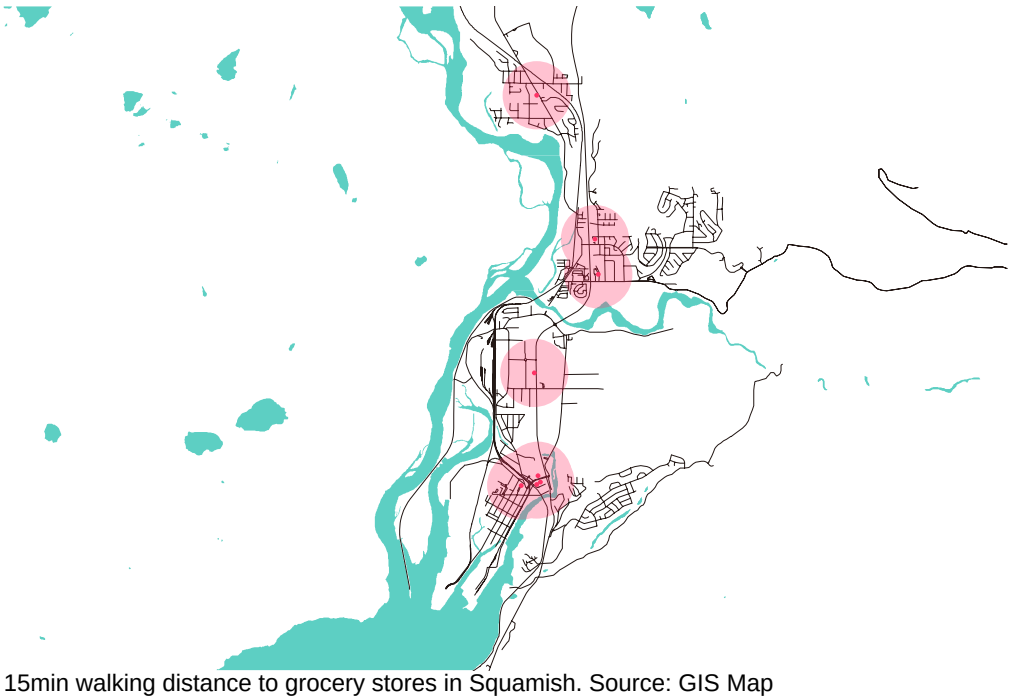
site selection.

agricultural land and grocery stores.

When choose land for agriculture, appropriate soil and climate conditions are very important. Most of Canada's land is not suitable for agriculture. Only about 7% of the total land area in Canada is used for agriculture, and soil and climate conditions are such that most agricultural land is concentrated in the southern portion of the country (Statistics Canada, 2009). So protect agriculture land is very important.

Squamish, BC, has a rich agriculture heritage. In early 1890s, the town site of Squamish began as an agricultural settlement and trading post (McLane, 2006). Now, Squamish-Lillooet Regional District, including District of Lillooet, Village of Pemberton, District of Squamish and Resort Municipality of Whistler, has Agricultural Land Reserve of 25,141 hectares by Jan 1, 2010. However, Squamish have been making evolutions, including urban and suburban development. The agricultural land in Squamish is “diminishing”. Most of them are no longer in the use of cultivation.

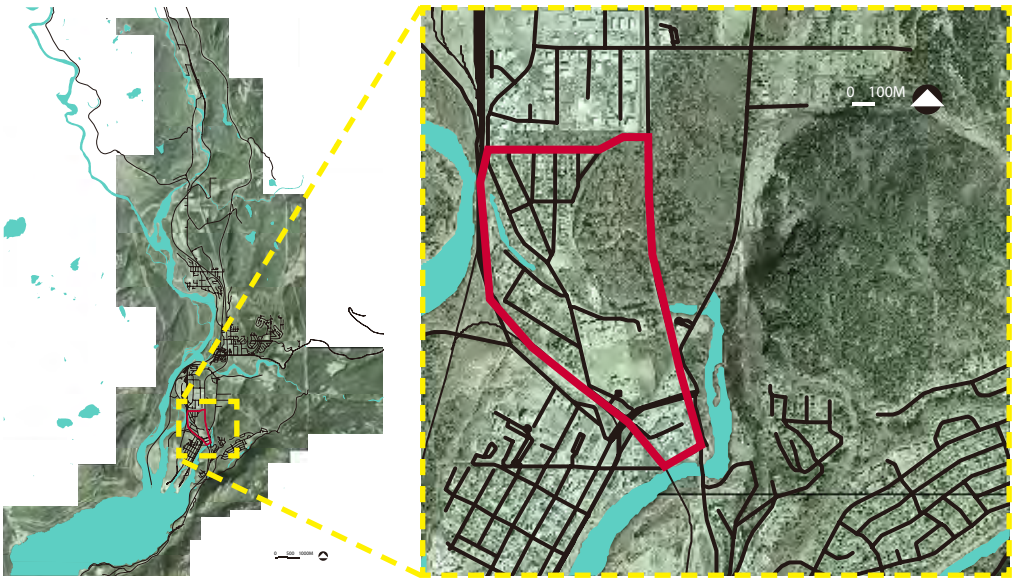
Today, Squamish residents rely on foods that are imported from all over the world (Design Center for Sustainability at UBC, 2005). Squamish people get their groceries in international supermarket chains, for example, Walmart, local grocery stores as well as local farmers' market.



15min walking distance to grocery stores in Squamish. Source: GIS Map

The idea is to bring food production back to community to rebuild the relationship between residents and their food focusing on building a relationship between food and children. This idea can be applied to many potential sites in Squamish.

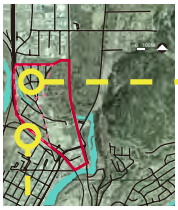
The targeted site is near by Magee Street and Pemberton Avenue, from the north to the south, respectively, and by west coast railway and Sea-to-Sky highway (Figure 3). This site is a community with both single-family and multi-family homes in the northwest, woods in the northeast, a secondary school (Howe Sound Secondary School), an elementary school (Squamish Elementary School), a university (Capilano University) and commercial area in the south where residents could enjoy their afternoon tea and buy groceries.



Chosen Site. Source: GIS Map

residential area.

The reThere are many single-family houses with big under-utilized yards (Figure 4). These yards are typical dominated by an empty lawn area and large driveways. Also, there are multi-family homes with green under-utilized green space.



residential area. Source: Google Street View

wood.

The woods areas are highly vegetated with a stream, which is polluted by industrial area to the north.

woods area

schools.

There are three schools in this area.

Squamish Elementary School enrolls 333 students in kindergarten through grade seven. Their attendance area includes Furry Creek, Britannia Beach, Stawamus Reserve, Downtown Squamish, Dentville and Northyards, extending north to the Mamquam River. There are garden boxes at school constructed by Rotary Club of Squamish.

Howe Sound Secondary School offers grades 11 and 12. They have a Howe Sound Secondary Climate Action Network (HSS CAN!) with 8 students and a few staff members. Their Food Group has planned and created a small organic vegetable garden that was constructed this spring in their bus loop (Figure 9). In addition, they have a professional cooking program in partnership with Vancouver Community College.

institutional area

planting boxes in Squamish Elementary School
Source: http://www.squamishrotary.com/

planting boxes in Howe Sound Secondary Scholol
Source: http://www.squamish-gardeners.com/hsscan.html

Capilano University
Source: Google Street View

Capilano University campus offers programs in wilderness Leadership, Destination Resort Management, Business Fundamentals, Applied Business Technology Online as well as a variety of preparatory and arts and sciences courses. They have one single-floor building with a big parking lot.

commercial area.

Separated by busy four-lane road, this commercial area in the south of the community have large parking space. There are daily services for residents, such as bank, supermarket, cafe and restaurant (Figure 10).

commercial area. Source: Google Street View.

summary.

Firstly, the site I choose is a community with different land types for urban agriculture with different scales. Secondly, this neighourhood has large junior population with elementary and secondary schools. Also, there is natural stream travel through the site, which can be used for irrigation once cleaned. And there is local interest in urban agriculture within the community and schools.

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PART II

Design Summary

Abstract

Currently Industrial agriculture is neither sustainable nor efficient and has become disconnected from our daily lives. This has resulted in enormous waste both economically and in terms of wasted product, food, while also contributing heavily to the current obesity epidemic. The project proposes the installation of a series of educational and community agricultural space at the Squamish elementary school. The design will allow the cultivation of organic food making it easily accessible to the community. Through this process food production will be seen on a daily basis by children as well as adults allowing for opportunities to educate about food and produce local food. Through community engagement in growing food, the project addresses a holistic approach to both mentally and physically healthier communities.

Problems

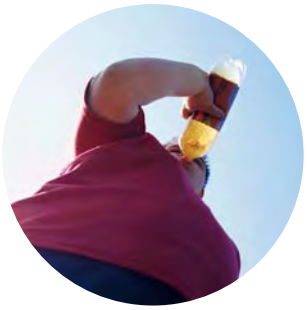
There are a lot of problems about food and eating habit today both globally as well as in Squamish.

Currently industrial agriculture is the dominant paradigm of American agriculture. This process is neither sustainable nor efficient. Large amount of money is spent on machinery fuel, fertilizer and lime. Food travels long distance to our table. Canadians spend 23.73$ billion on food from US, Mexico, China and many other countries in 2010. There is the problem of overweight. According to statistics Canada, more than 30% of children and adolescents have overweight or obesity problems (Statistics Canada). Also, there is large amount of food is wasted.

Food, Inc.

Food Miles

Overweight



Food Wasted

Figure 1: images that illustrate problems of food

In Squamish, there is limited local food production. There is a large area is categorized as Agriculture Land Reserve. However, most of the land is not used as agriculture land right now.

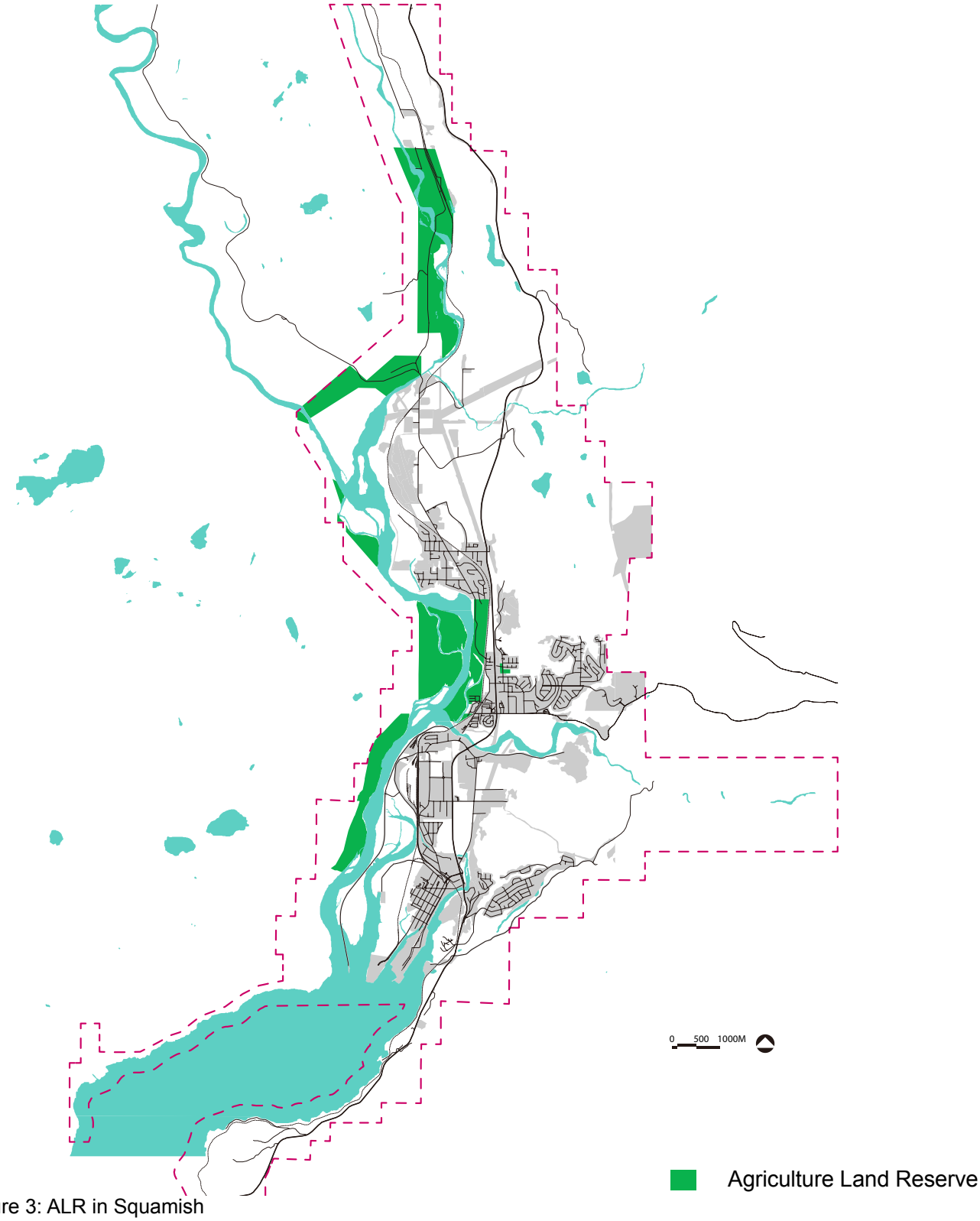


Figure 3: ALR in Squamish

Food is not easily accessble for residents in Squamish through pedestrian.

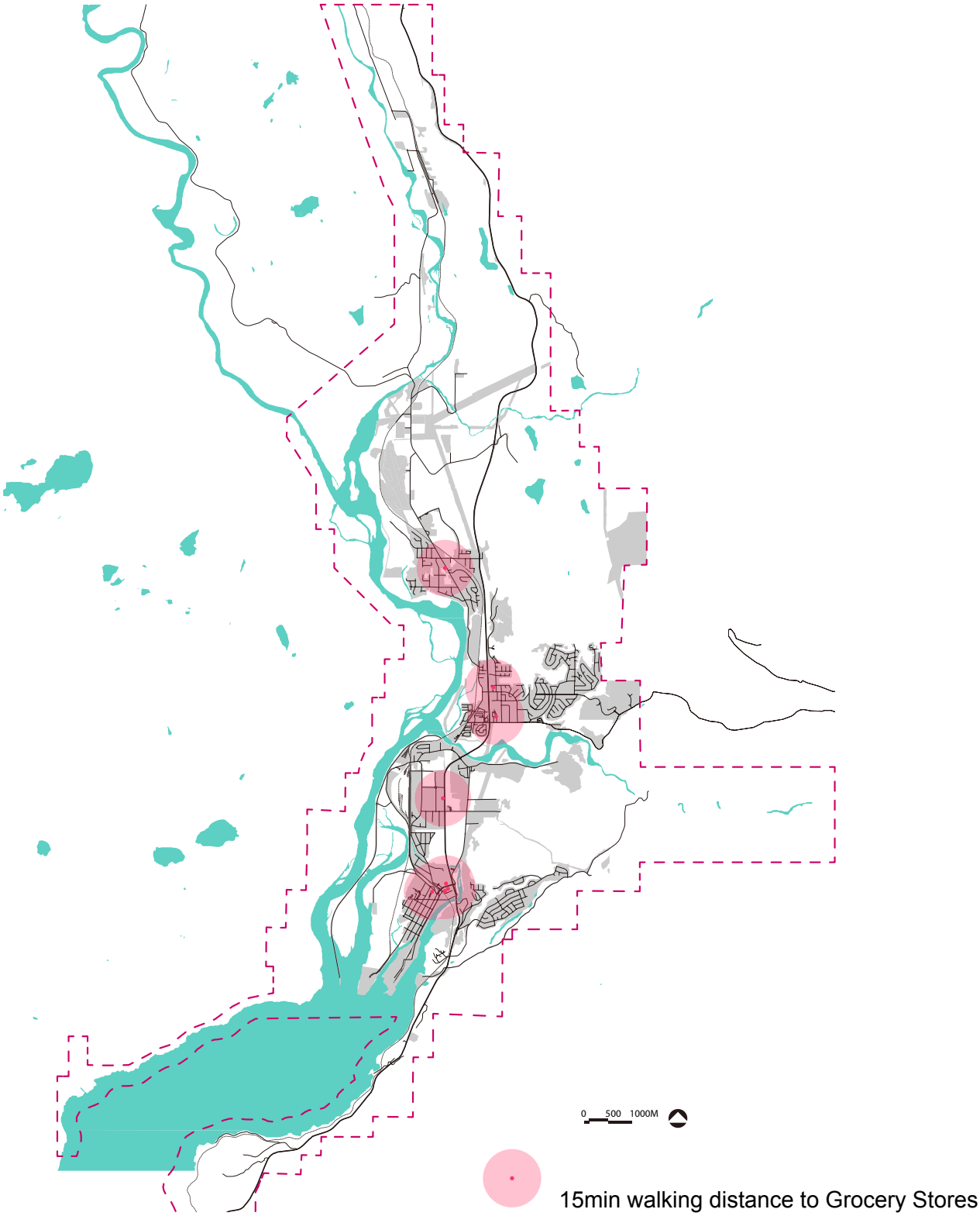


Figure 4: 15min walking distance to Grocery Stores

Food in Squamish

The municipality as well as local groups are doing things to help local food production.

New bylaw allows to grow food in any lot. The municipality is running the Village Greenway garden plots at Eagle Wind Housing Development (District of Squamish). Squamish Nation Education Department (SNED) is working on the project of reintroducing traditional foods back into the Squamish Nation diet.

There are many local groups are also trying to help local food production.

Squamish Climate Action Network (CAN)
Squamish Climate Action Network (CAN) operates community gardens located on Main Street between Cleveland Avenue and Second Avenue.

The Squamish Rotary Club
The Squamish Rotary Club offers garden plots available to the public on Mamquam Road at Highway 99. Squamish Rotary Club also donated garden plots on school site of Squamish Elementary School.

Get Bear Smart Society
Get Bear Smart Society have Bear Aware Fruit Tree Picking project to protect bear as well as helping local food bank to get food source.

However, there is some problems about food situation in Squamish.

Food Bank
Nearly 4000 people were helped last year. About 1/3 of those are children, 90 percent of the food is purchased.

Goals

(1) bring local food production to community

(2) improve pedestrian connectivity to food

(3) increase knowledge of school children of food

Figure 2: harvest in school garden

Urban Agriculture Types

There are many urban agriculture types that can be applied to school according to Evergreen.

Containers can be used directily on concrete or asphalt. Conntainers gardens can thrive almost anywhere, bringing diversity to the most barren setting. They can also be easily constructed and maintained at minimal cost.

Trellises can be used to grow grapes and provide shade for outdoor play.

Greenhouse can provide food in cold winter as well as place for play in winter.

Orchard can provide large amount fruit as well as space for outdoor play.

Also, small **animals** such as chicken and ducks can provide food. And children can play with them and learn about nature.

Figure 5: images that illustrate different types of urban agriculture

containers

trellis

greenhouse

planting fields

orchard

animals

Planting Types

There are many planting types that can be applied to school sites. Crops can be planted on garden plots for seasonal food production. There are many choices for crop types. Fruiting trees and shrubs can be planted on school site for food production as well as providing a more natural landscape for children. There are also traditional food source of first nation. For example, big leaf maple can be used for maple syrup production. And chocolate lily roots can be eaten fresh or dried.

Crops | **Fruiting Trees and Shrubs** | **First Nation Food Source**

Figure 6: images that illustrate different types of plants

Plot	1st Year	2nd Year	3rd Year	4th Year
A	Roots	Potatoes	Onions & legumes	Brassicas
B	Brassicas	Roots	Potatoes	Onions & legumes
C	Onions & legumes	Brassicas	Roots	Potatoes
D	Potatoes	Onions & legumes	Brassicas	Roots

Figure 7: Garden Plots Planting Example. Source: evergreen.ca

School Site

There are six public elementary schools, two secondary schools and one post-secondary education in Squamish, these schools are all close to residential area. I choose this site of one elementary school and one secondary school because both of the schools on site have existing agricultural programs.

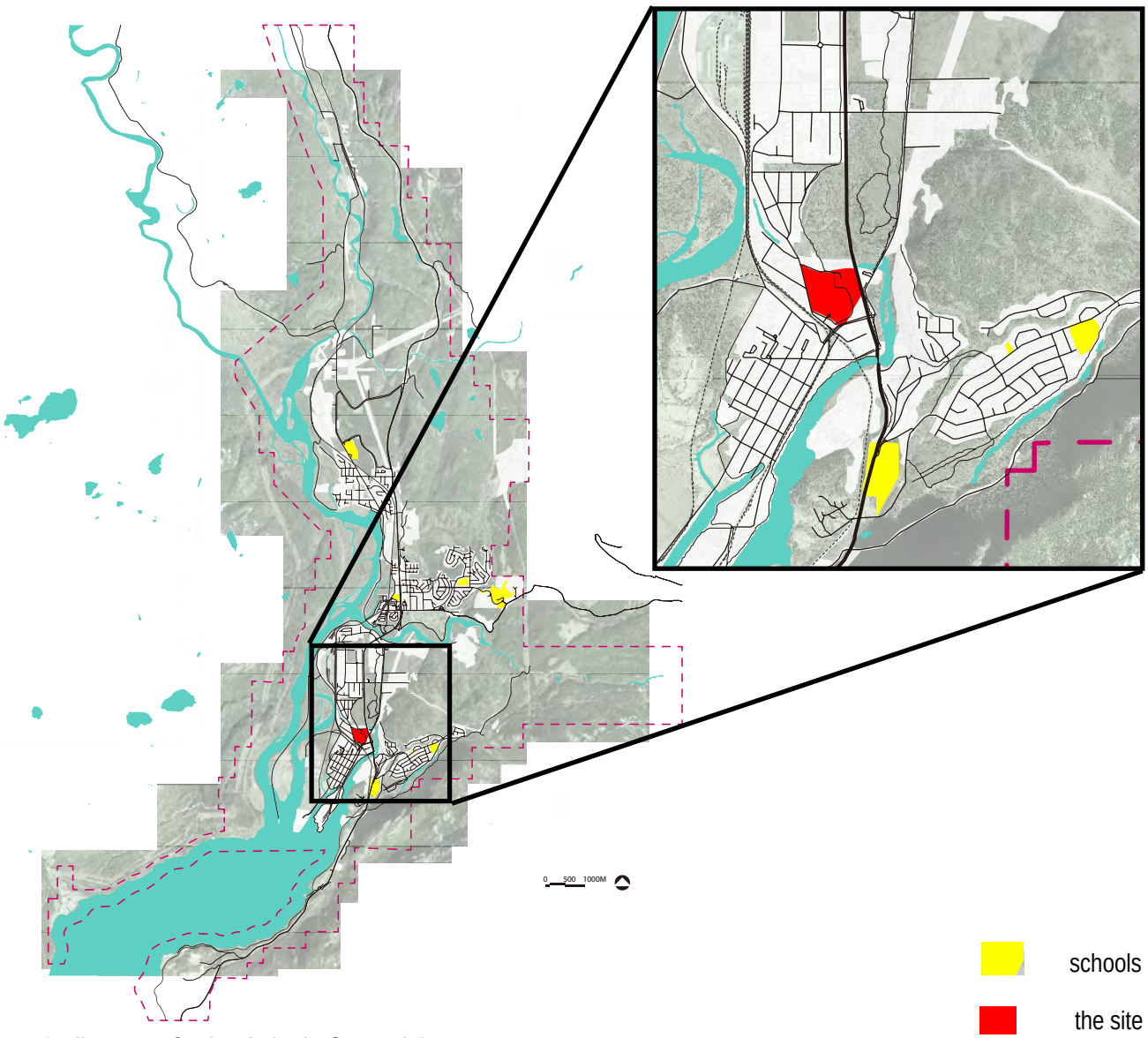


Figure 8: diagram of school site in Squamish

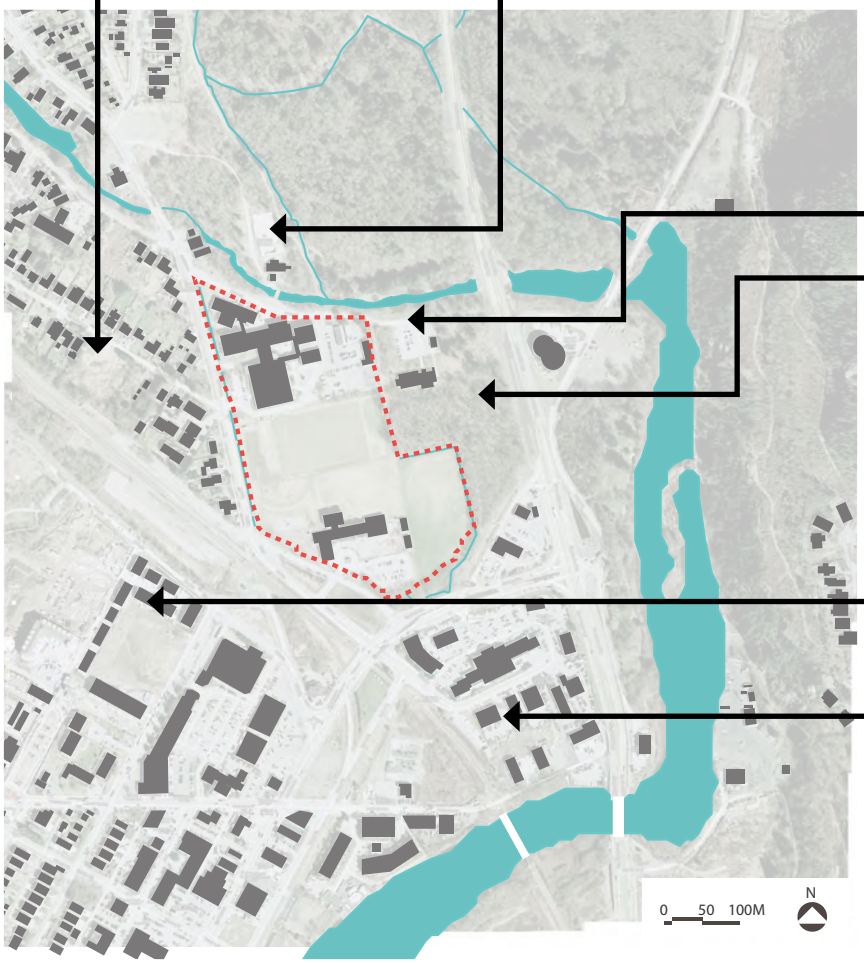
Surrounding Environment

The site is at the south of Denville and on the north of Downtown. The school site is surrounded by single-family residential, multi-family residential, commercial and forested area.

Single-Family Residential

Skateboard Park

Capilano University



Forested Area

Multi-Family Residential

Commercial Area

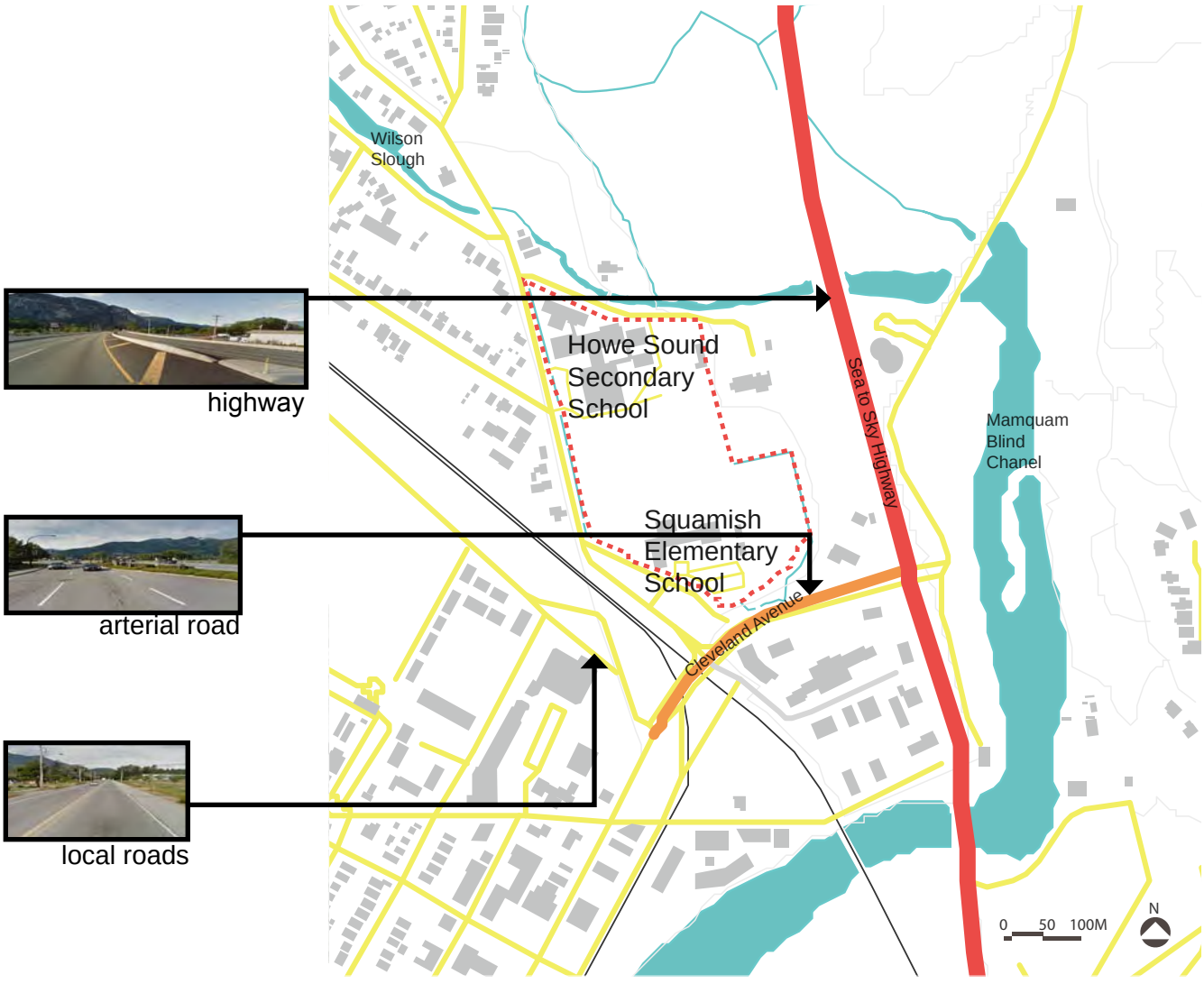
Figure 9: diagram that shows site surrounding condition

Circulation

The site is near Sea to Sky Highway and Cleveland Avenue which is main entrance of Squamish.

Howe Sound Secondary School is at the North of the site while Squamish Elementary School is at the South.

Figure 10: circulation diagram



Site Condition

Howe Sound Secondary School

Squamish Elementary School

Figure 11: site photos

Flood Zone

The site is on flood plain, a large area on east side is easily to be flooded both from Wilson Slough and Mamquam Blind Chanel. Also, this area is easily to be flooded during major storm events.

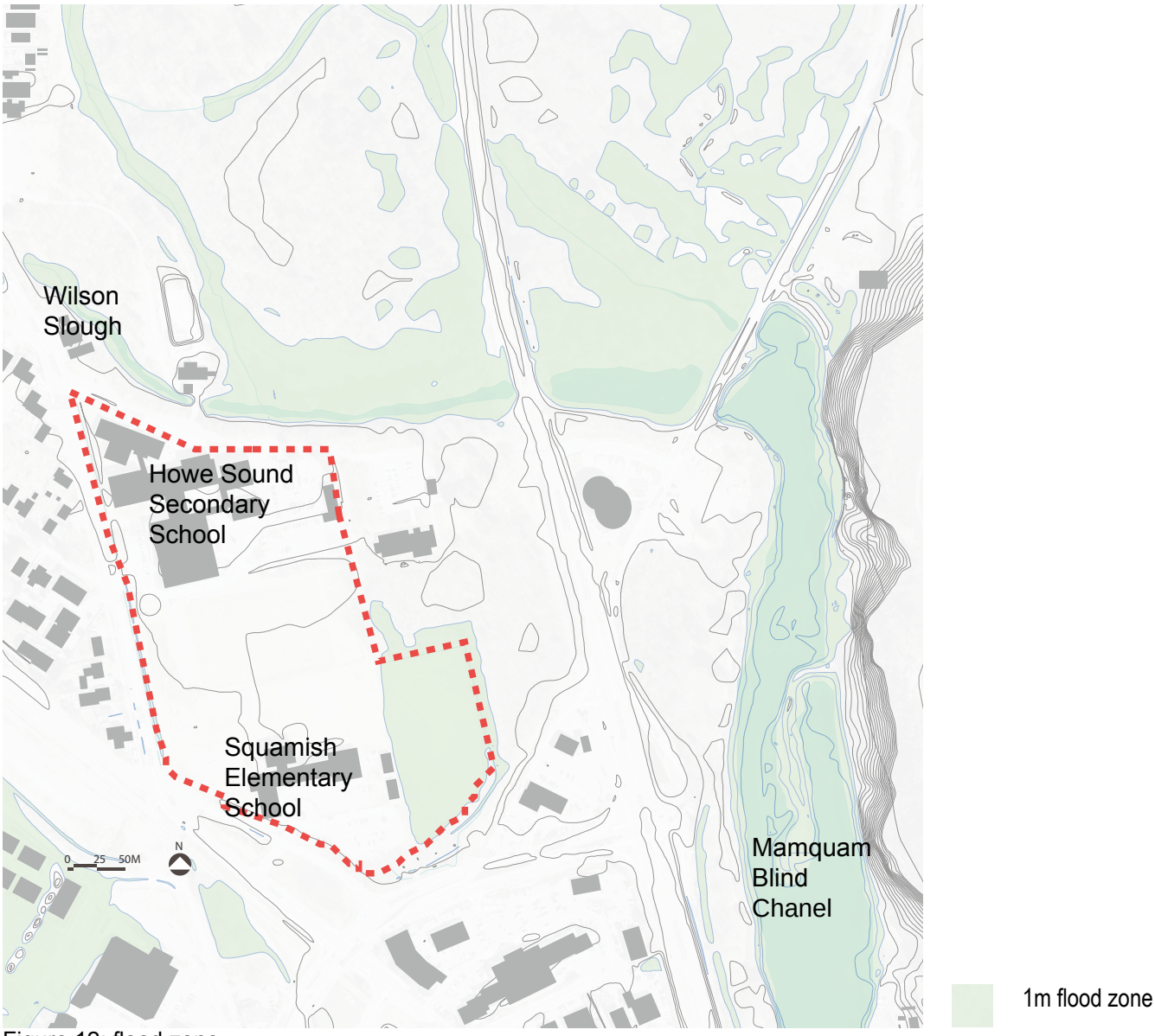


Figure 12: flood zone

Existing Programs

There are parking, sports field, garden plots and playground on the site. The garden plots on the South are donated by Squamish Rotary Club.

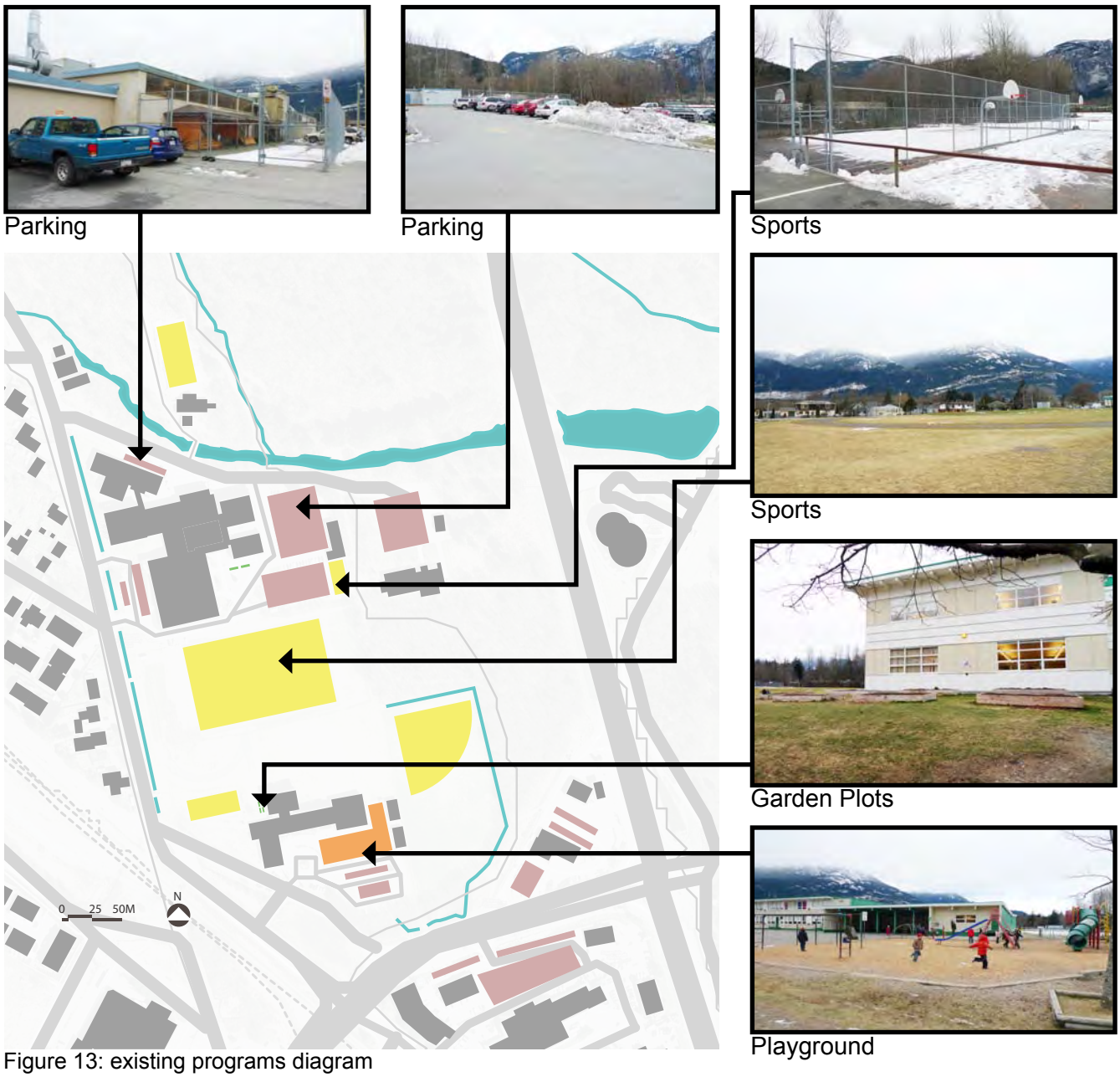


Figure 13: existing programs diagram

Opportunities

I find there are opportunities of improved pedestrian connectivity, improved car access, food production, play with view and outdoor sitting on this site.

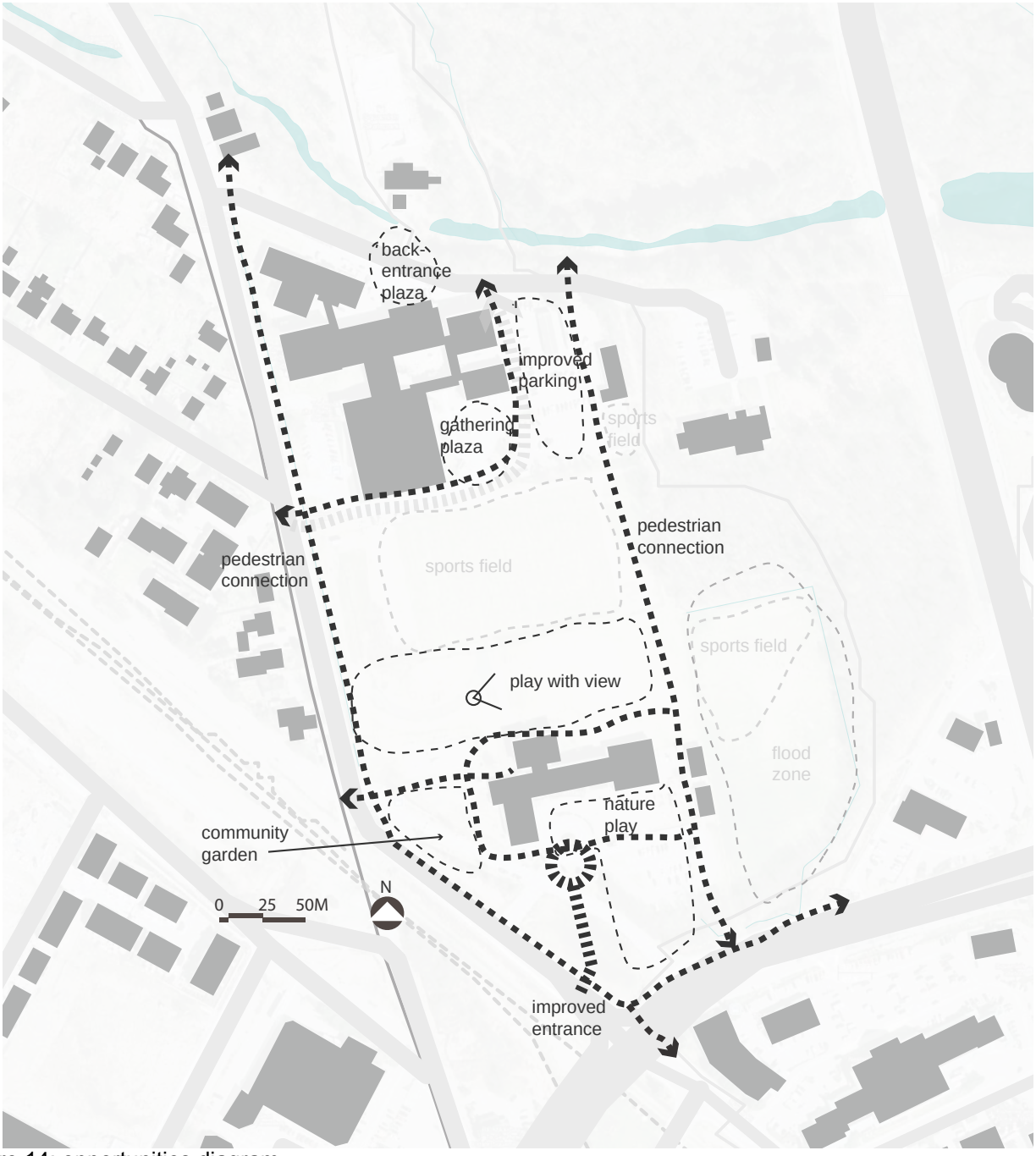
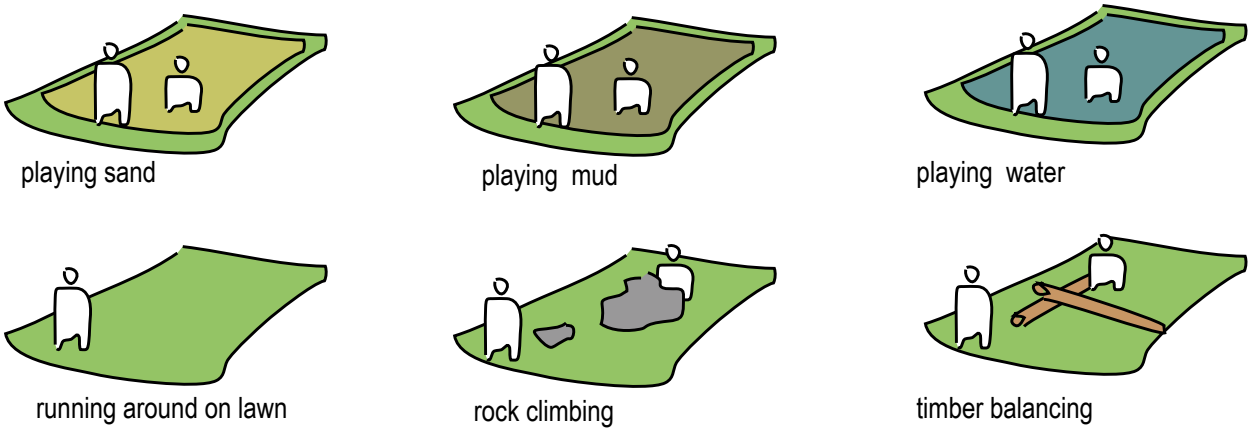


Figure 14: opportunities diagram

Proposed Programs

The existing program for children is basically running on the lawn and traditional playground equipment. I proposed a series of programs of agriculture and play for children to enjoy their daily life in school.

Play



Agriculture

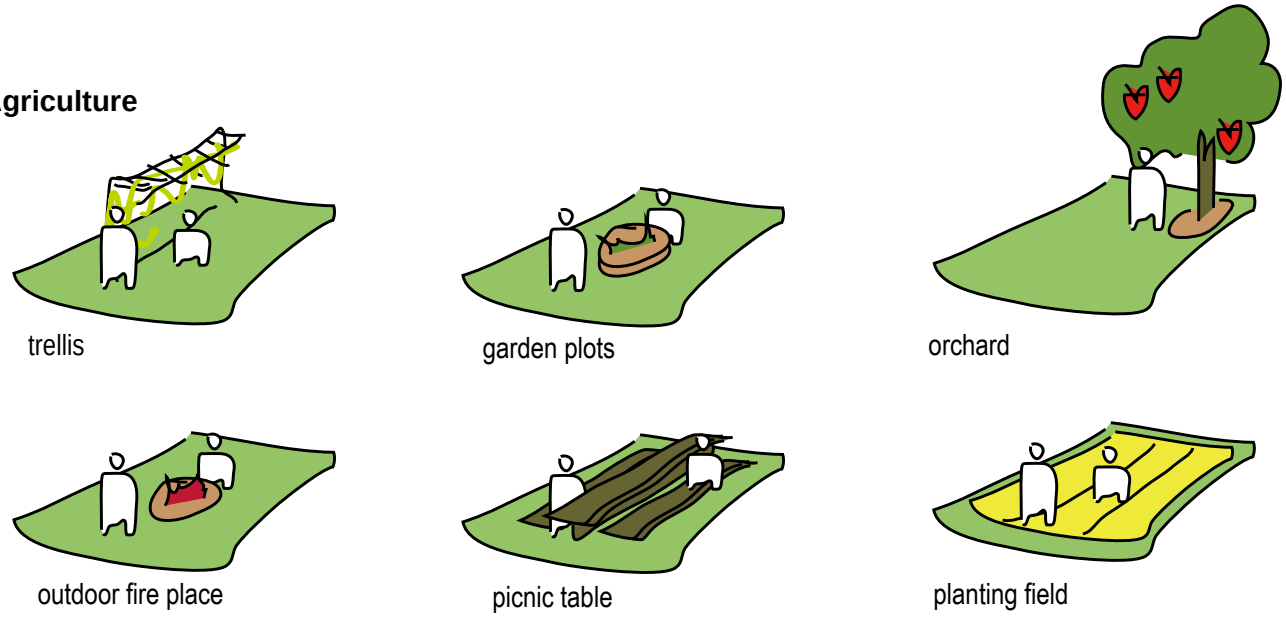


Figure 15: proposed program diagram

Schematic Plan

The design improves the school ground by creating spaces from agricultural purposes as well as outdoor play and sitting.

Figure 16: schematic plan

The site is also improved by more efficient parking and circulation.

One big move for circulation is two pedestrian connection from north to south connecting the two schools as well as the neighboring area. Then make space for school kid for outdoor play and sitting with views of mountains nearby. The design also creates spaces for food production.

The stormwater on site will go through a series of vegetated swales and go to the existing lower area on the east and to Wilson slough on the North.

Circulation

Figure 17: proposed circulation diagram

Water

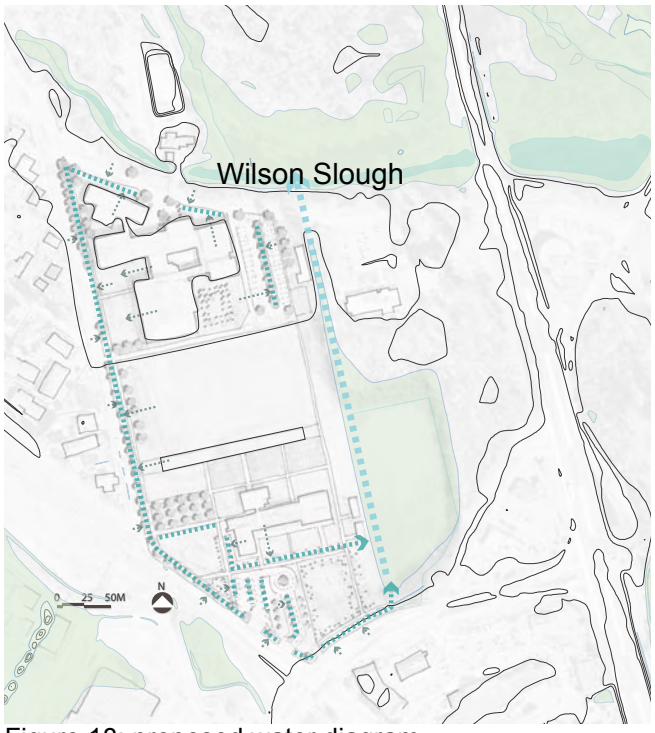


Figure 18: proposed water diagram

A 200-meter-long running track is one meter higher than the surrounding area. This design can provide area for school kids to view the beautiful mountain around the school as well as sitting area for them to watch soccer games on the field.

Play field with first nation food source, camas and chocolate lily, is natural and interesting for children to explore.

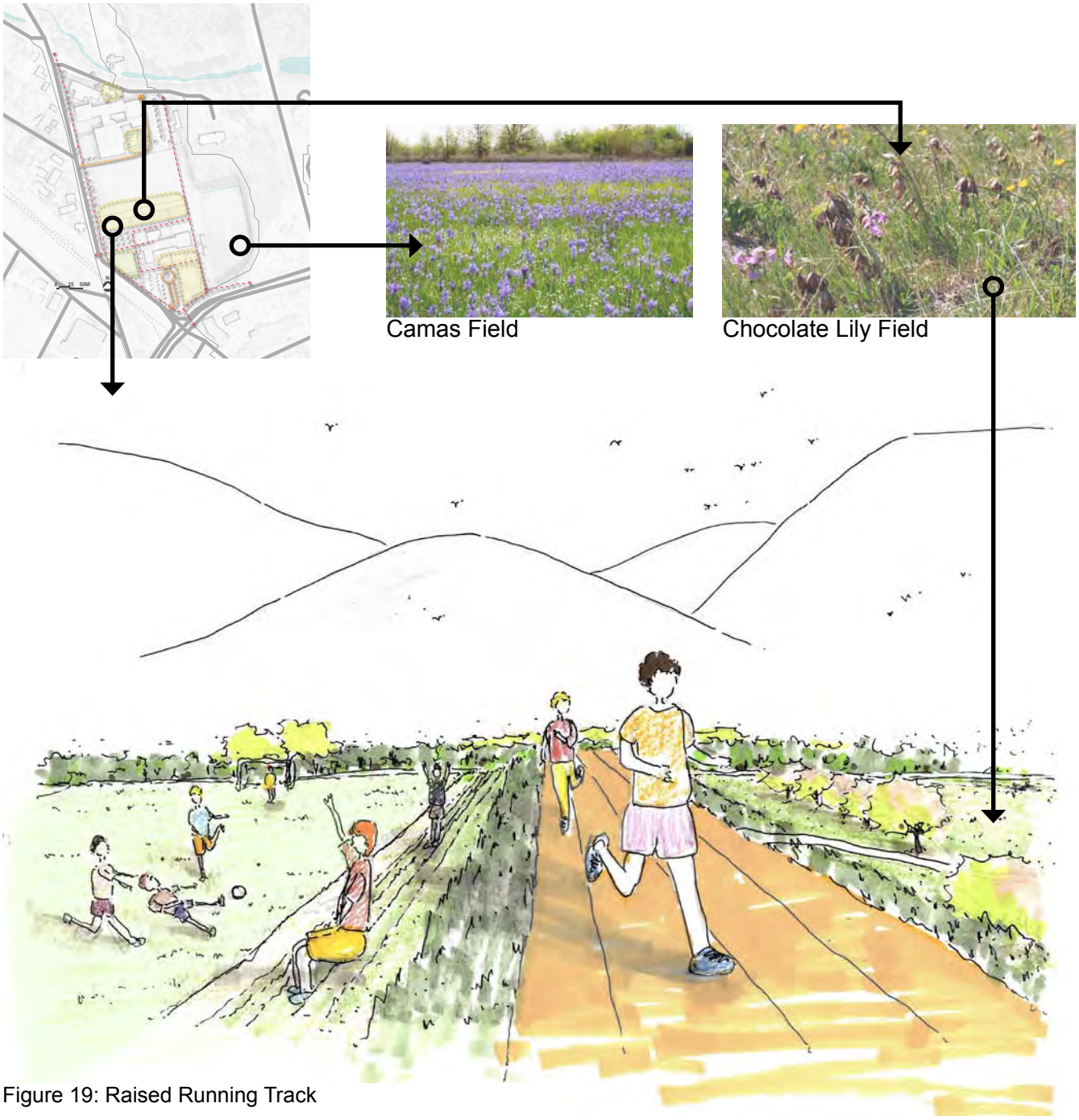


Figure 19: Raised Running Track

South of Squamish Elementary School

I take up the wasted space to make place for agricultural and playing programs for school.

The **community garden** is on the west side of school building because it is close to the single-family and multi-family residential area.

Nature play area on the south of school building making it easily accessible for kids during short recesses.

Play field is built from existing parking area. This field provides enough space for children to run and chase around. The south side of the field is buffered by dwarf fruit trees to separate the school with public pedestrian.

Car access and parking space is improved to a more efficient and sustainable space.

Figure 20: South of Squamish Elementary School Plan

South of Squamish Elementary School (Existing Condition)

I choose to focus on the design of south area of squamish elementary school because it is near to single-family residential and multi-family residential area and there are existing garden plots donated by Squamish Rotary Club. Also, there is opportunity for improved circulation. Large area is used for parking on this site and this road in the middle area is not used right now. And the space between the roads is wasted.

Figure 21: South of Squamish Elementary School Existing Condition

Circulation is improved by a more efficient system. The experience of entering the school is like entering an orchard with lines of tress and beautiful shades.

There are three categories from plants, one is crops that planted in garden plots. The second one is fruiting trees and shrubs. Another type is native plant species that can produce food.

crops

fruiting trees and shrubs

first nation food

Figure 22: Circulation Diagram, Squamish Elementary

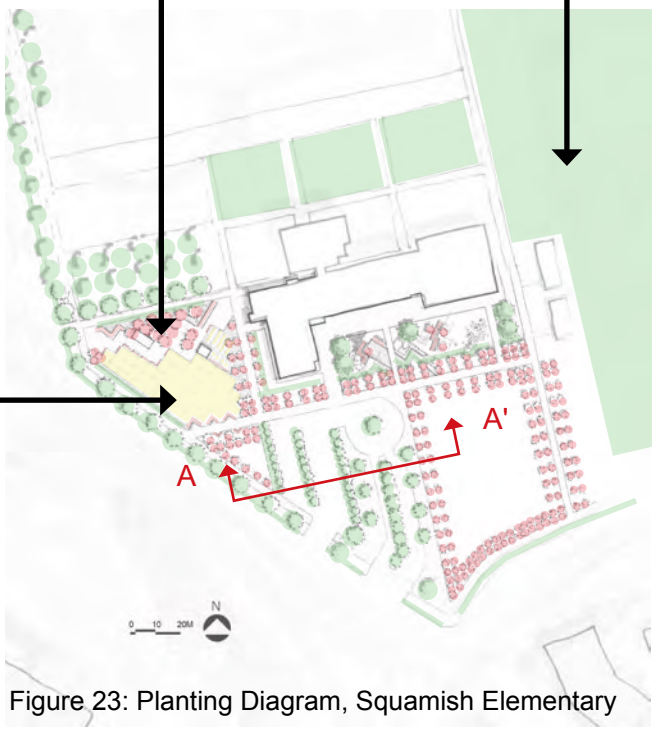
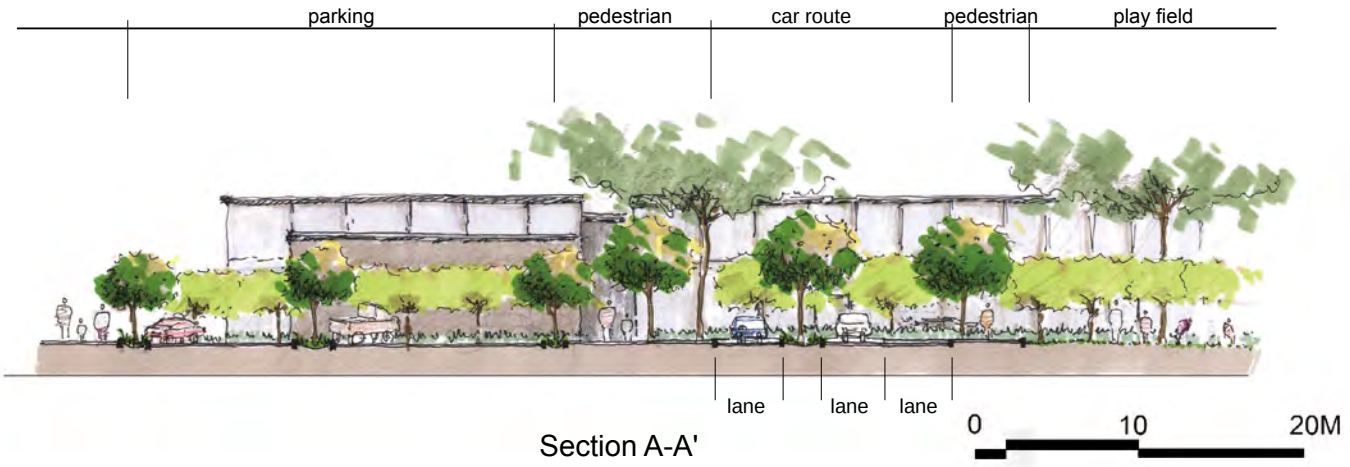


Figure 23: Planting Diagram, Squamish Elementary



Section A-A'

Figure 24: Section, Main Entrance, Squamish Elementary

Plant Types

There are many plants can be used in this site. Fruiting trees and shrubs can first nation food source, for example big leaf maple sap can be used for production of maple syrup.

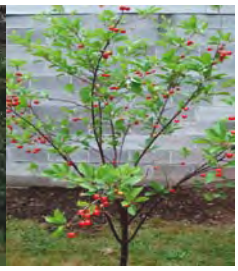
Figure 25: images shows plants that can be used on site, Squamish Elementary

Fruiting Trees and Shrubs


apple


pear


plum


cherry


raspberry


blueberry


grape

First Nation Food Source


big leaf maple


chocolate lily


camas


salal berry


salmon berry

Source: Squamish CAN

Community Garden Design

The design of community garden provides space to grow crops both for the school and the community nearby. And the design creates social space for both school and community to use separately or together. The community garden can be run by a local group or municipality.

Figure 26: Community Garden Plan, Squamish Elementary

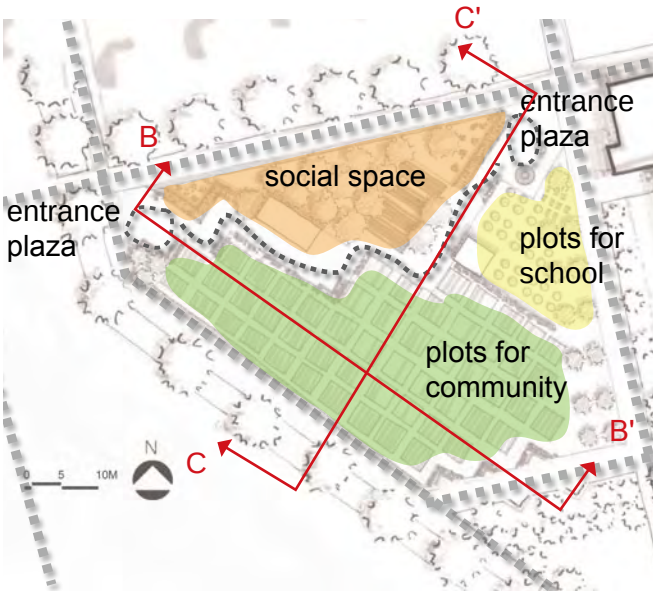
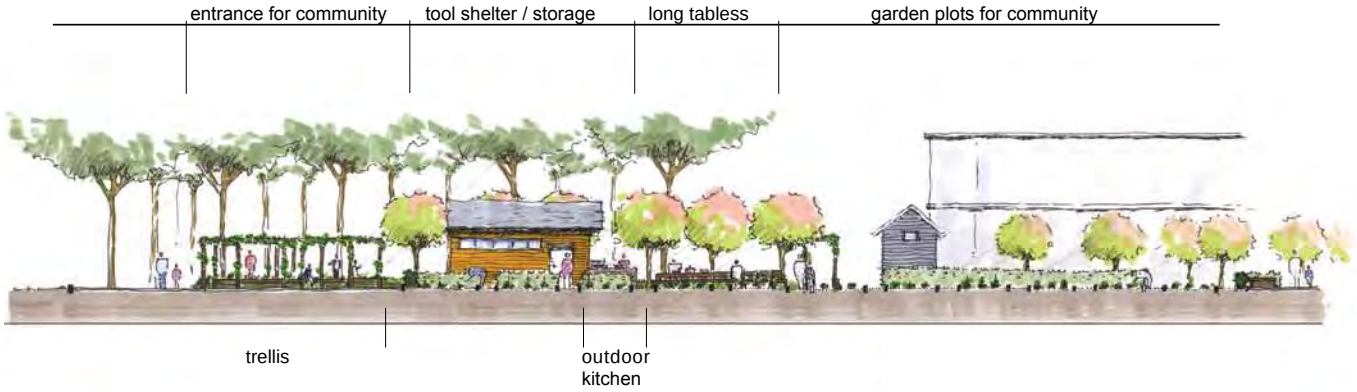


Figure 27: Community Garden Circulation Diagram, Squamish Elementary

For circulation, there are entrance plazas with diagonal road to the central area both at the community side and school side. The social space can be used for social events both for school as well as community.

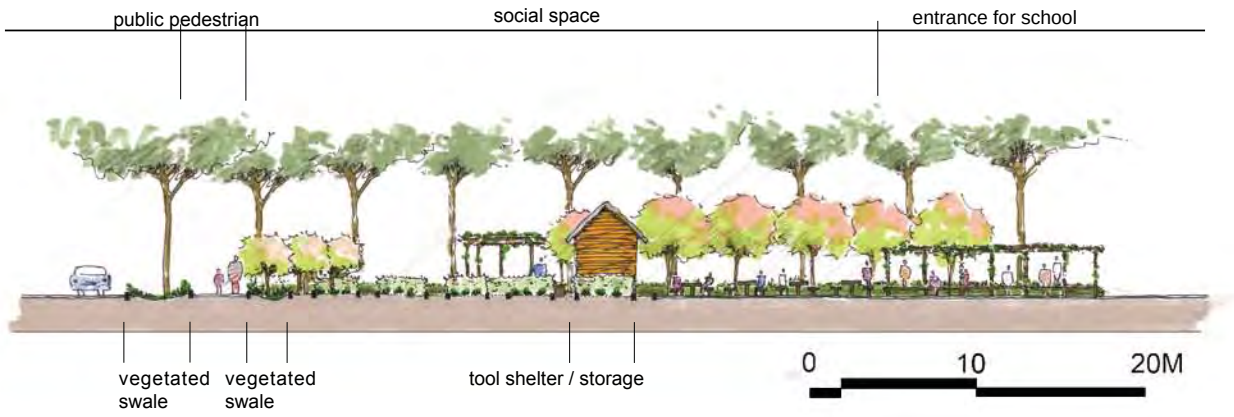
Section A-A' shows different space in community garden. There is trellis for people to sit, tool shelter and storage for tools and seeds, long tables for events or as outdoor classroom.

Section B-B' shows different spaces in the community garden. And how the community garden separates from public pedestrian by vegetated swales.



Section B-B'

Figure 28: Community Garden Section, Looking Northeast



Section C-C'

Figure 29: Community Garden Section, Looking Northwest

The perspectives show different use of different space in community garden.

For materials, I choose materials that are easy to obtain and maintain for community garden.

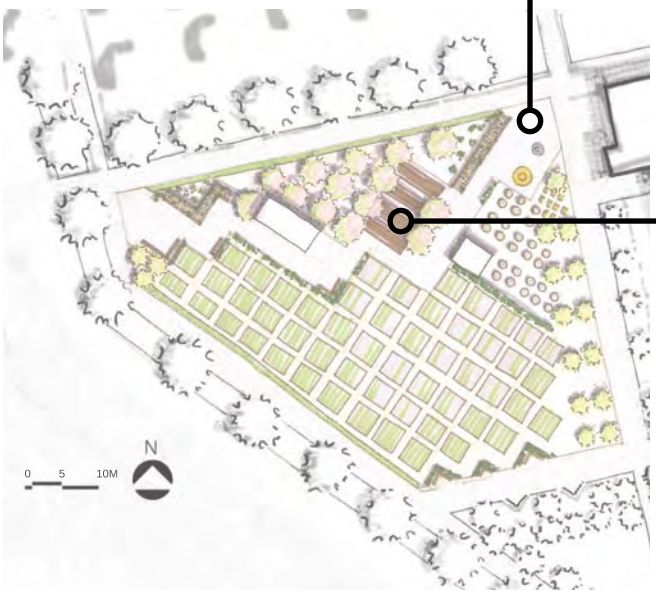


Figure 30: pespective, entrance plaza for school, concept

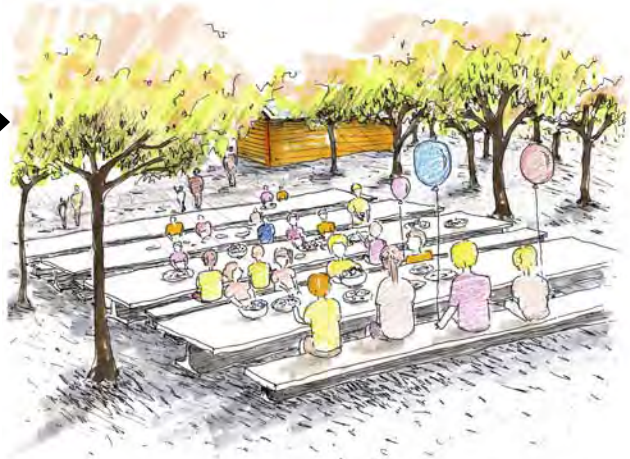


Figure 31: pespective, long tables, concept

Materials

Figure 32: images that shows materials for community garden

Nature Play

The design of south of school building is a play area for children to play with natural elements, such as mud, sand, water and rocks.

The south area is a vegetated swale that creates a boundary which is easier for teachers to keep an eye on younger kids. The trellises separate the space into three level of difficulties. Esay level is timber playground with mud pond, challenging level is sand play and water play with challenging timber playground, difficult level is timber playground as well as rock climbing slide.

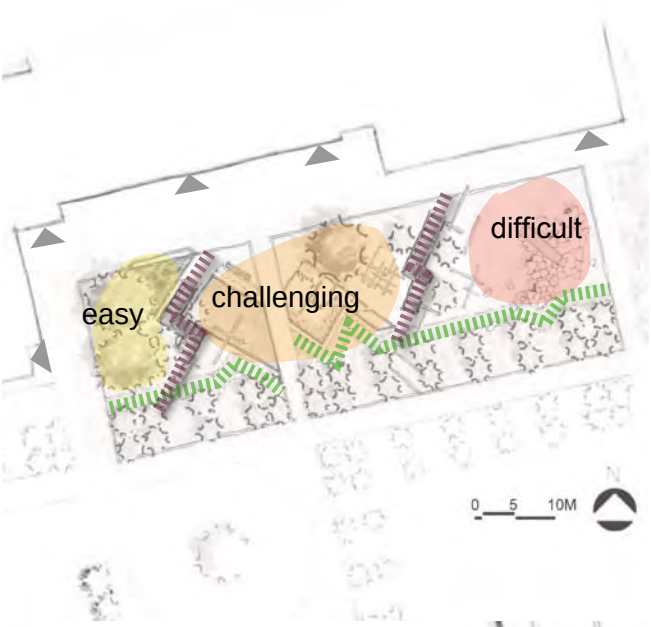


Figure 33: Nature Playground Plan

The perspectives shows different space in nature play area.

Section D-D' show different spaces in the playground, easy, challenging and difficult.

For materials, I choose materials that is easy to maintain and obtain. And they have to be safe for children.

Figure 34: wood chips, material for playground

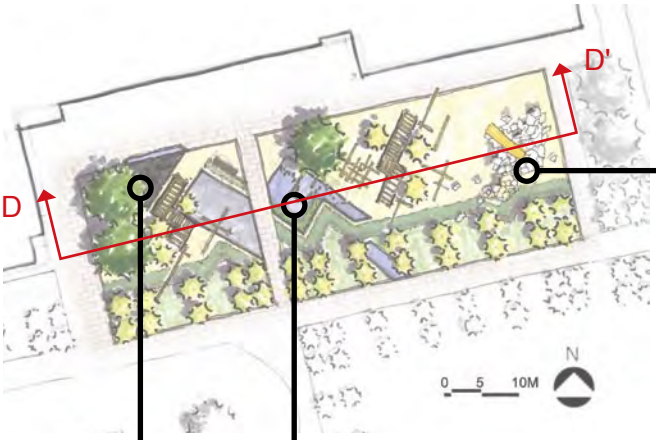
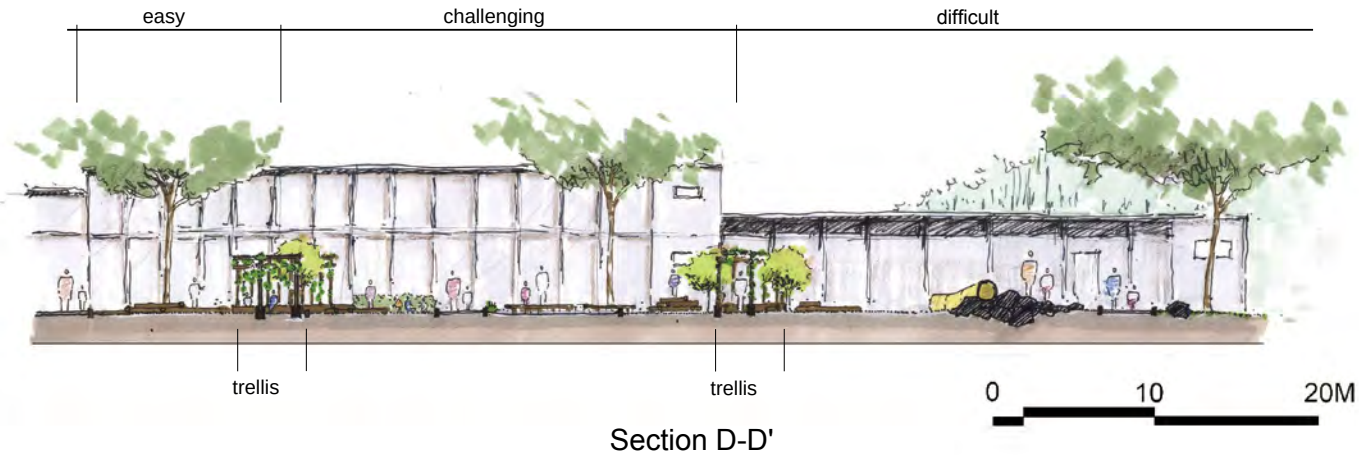


Figure 35: perspective, rock climbing slide, concept

Figure 37: perspective, mud pond, concept

Figure 36: perspective, water pond, concept



Section D-D'

Figure 38: section, nature playground, looking North

Conclusion

The goal of this project is to bring food production to the community, improve pedestrian connectivity to food and increase knowledge about food of school children.

The project can be achieved in corporation with local groups as well as food companies. Some food produced on site can be donated to food bank.

The project also improves school ground by creating different space for children to play with natural elements and remove contaminants of stormwater with vegetated swale system.

Hopefully, the children grow up with knowledge about food can understand the importance of local food production, cherish their food and have a healthier diet.

Figure 39: Perspective, Community Garden, Concept

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http://www.wbdg.org/resources/playground.php
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Figures