Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

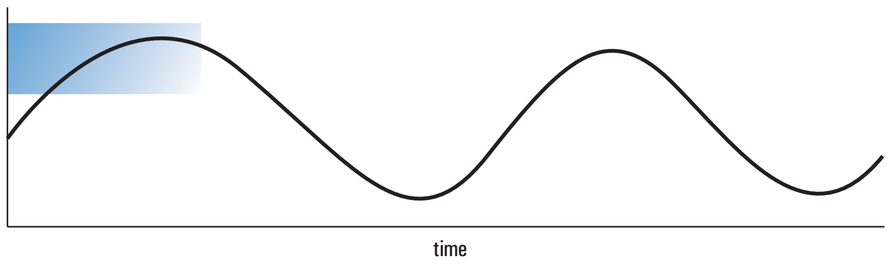
AJDW '08 | BUILDING RESILIENCY | PRINCIPLES

Self-Sufficiency + Connectivity = Resilience

Tama New Town's population shrinkage demonstrates the limitations of an inflexible, single-use, monocular community. Because of its proximity to Tokyo and the significant existing built infrastructure, Tama cannot be abandoned. To give Tama longevity, the population must be consolidate and its physical footprint reduced.

Community resilience comes from self-sufficienct land uses, where the neighborhood can work to support its own food and energy consumption habits. Improved connectivity, along with mixed-use industry, garden allotments, and a community-supported agriculture farm yield the resources that can be flexibility employed regardless of population size.

Demographic Analysis

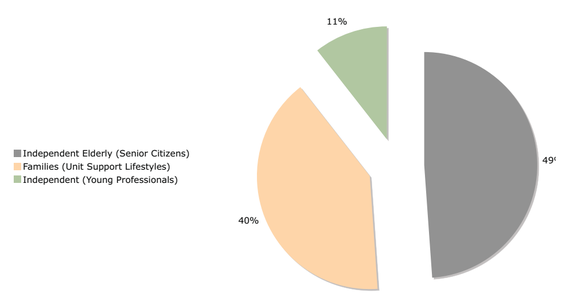


Tama New Town with a shorterm vision of rapid and continuous growth. By recognizing the unpredictability of population size it is possible to create a framework that can accomodate growth or shrinkage, and demographic shifts in Tama's population.

Lifestyle Analysis

The demographic imbalance in Tama New Town is caused as much by national population trends as by a built environment that is obsolete.

Understanding the different interests and physical needs of different lifestyles is necessary knowledge for building a community that will continue to appeal to a broad spectrum of residents.



Despites its convenience to Tokyo, relatively few young professionals are choosing to locate in Tama. Those that do live in Tama tend to reside in newer apartment buildings that are convenient both to the highway system and the train station.

Young professionals prefer to live in neighborhoods that are culturally active. Always seeking variety, young professional find choice extremely appealing, and are always looking for new people to meet and new paths to explore.

Families that reside in Tama tend to inhabit relatively new single family homes. These tend to convenient to the highway system, and inconvenient to the mass transit system. Proximity to strong schools and safe parks are extremely important.

Although they are heavy users of community resources (parks and schools) it is easy for families to become isolated from their neighbors because most of their interests are insular.

Elderly people make of the majority of the population inTama New Town. They tend to live in the older apartment complexes (the ones they raised their own children in) which are both inconvenient to mass transit and the highway. Few live here by choice.

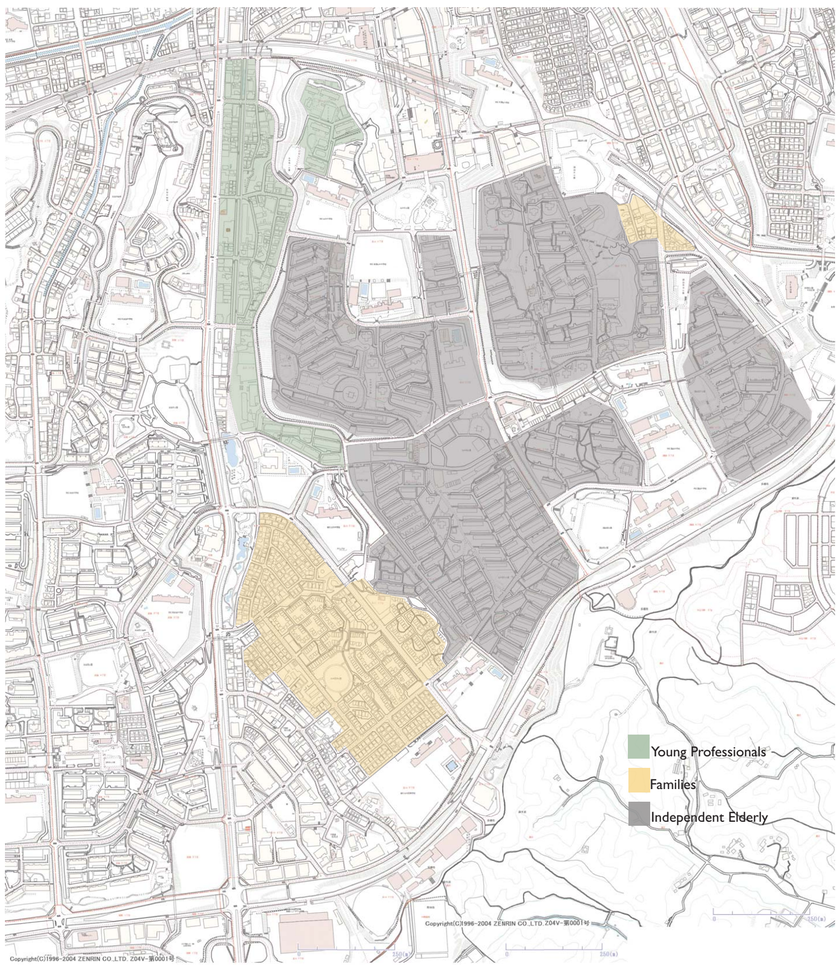
Because few elderly persons work, they need a variety of spaces for social and recreational activities to keep their days full and engaged, however, they strongly value convenience.

Existing Building Types and Population Distribution

The diagram above illustrates that the majority of housing in Suwa and Nagayama is apartment complexes built in the 1970s.

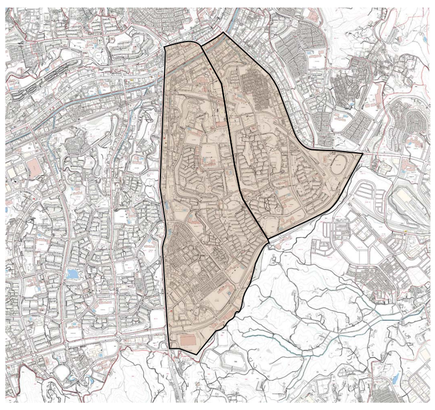
The diagram below illustrates the current spatial distribution of lifestyle groups. These same 1970s structures house a disproportionately large number of elderly people. Because of accessibility issues, these dwellings make it difficult for elderly residents to interact with their community, and this housing form is not popular with families or young professionals who are able to chose where they live. The high vacancy rates and few connections further isolate the elderly from the rest of Tama.

The result of this spacialized lifestyle distribution is an unbalanced neighborhood that cannot sustain itself.



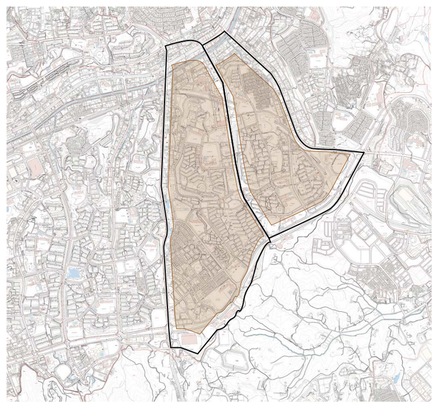
Density Analysis

In times of population shrinkage, density buffers the community against shocks. Confining the population of Suwa and Nagayama to a dense mixed-use core will help create a close knit residential community that is walkable and humane as the population shrinks. Reducing the physical imprint of Tama's residential community makes it possible to put significant tracts of land towards agricultural production and also towards wild life restoration. Use, maintenance and governance of community resources are simplified by the increased physical proximity. Relocating elderly residents to more appropriate housing types will alleviate social and physical conditions.



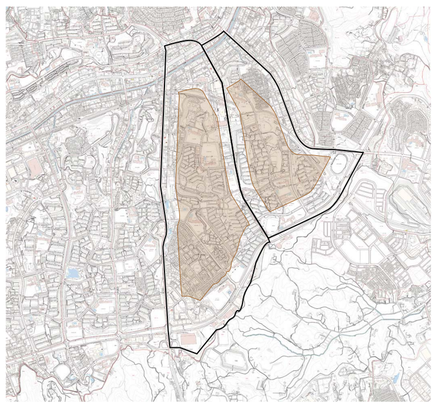
Density:
Nagayama: 9130.2
Suwa: 8669.8

Area:
Nagayama: 1.82
Suwa: 1.26



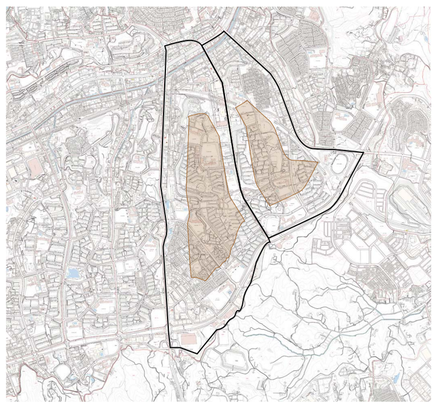
Density (people/km^2):
10,452 (New York City)

Area (km^2):
Nagayama: 1.82 --> 1.59
Suwa: 1.26 --> 1.04



Density (people/km^2):
13,500 (Kichijyouji Honcho; Shibuya)

Area (km^2):
Nagayama: 1.82 --> 1.23 (Suwa)
Suwa: 1.26 --> .81



Density (people/km^2):
17,000 (Shinjuku)

Area (km^2):
Nagayama: 1.82 --> .98
Suwa: 1.26 --> .64

Advanced Japan Design Workshop Fall 2008

SEKISUI HOUSE

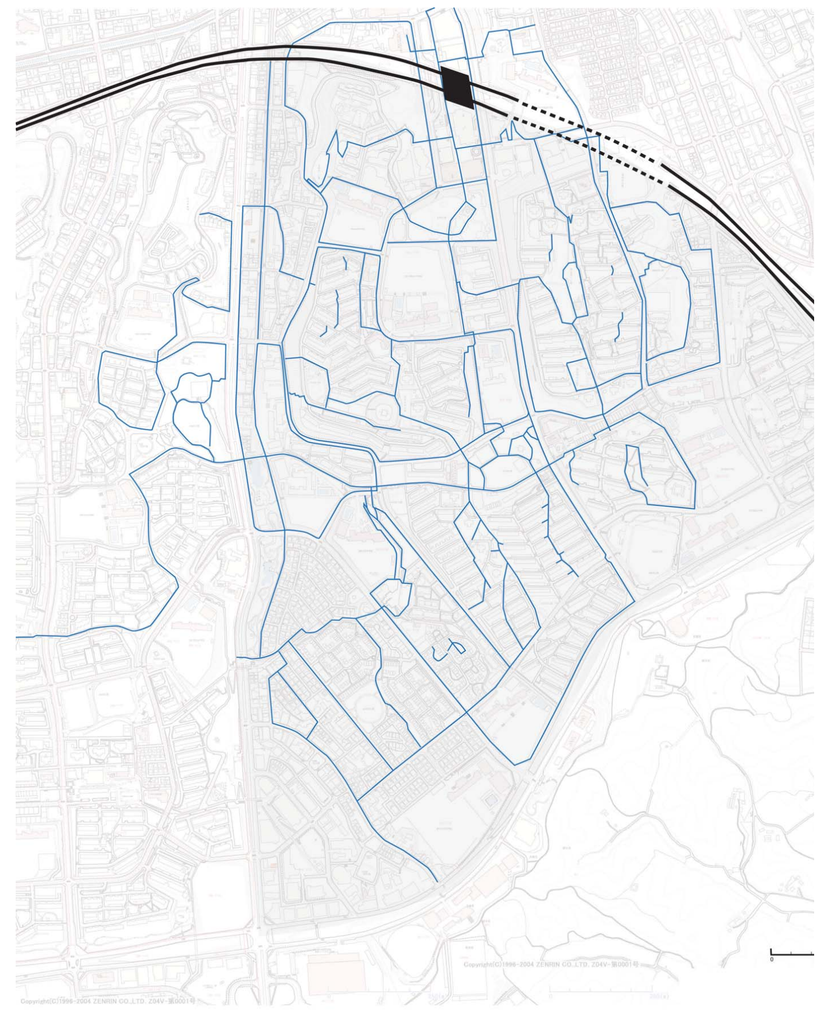
Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

Recognizing Topography

The system proposed addresses the cumbersome topography of the district by creating an urban core, with a streetcar system with frequent stops convenient to residences. This system emphasizes mass transportation over individual automobile use, envisioning that a more sustainable future will be one with fewer individual cars.

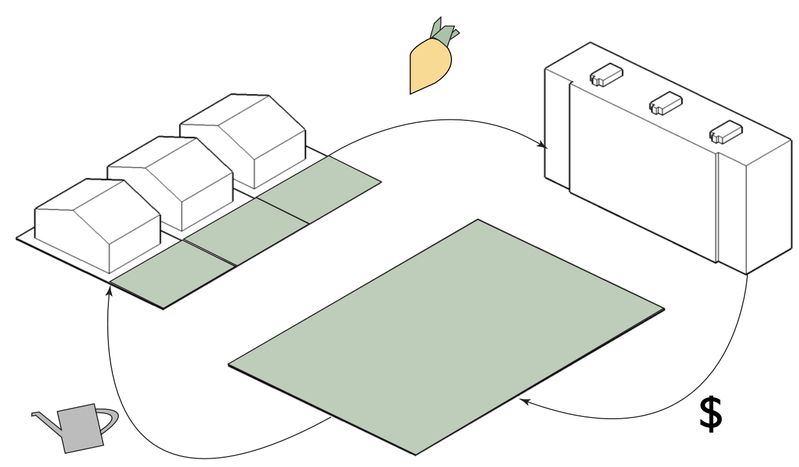
Physical Connectivity



Building a vibrant community of the future, regardless of population size, requires a system of connectivit mobility possible for every resident. By limiting the location of the population, and suggesting a pattern f and growth, connective tissue (a new greenway, walking paths, roads, a street car system) will allow th thrive as the population and its commuting habits shift.

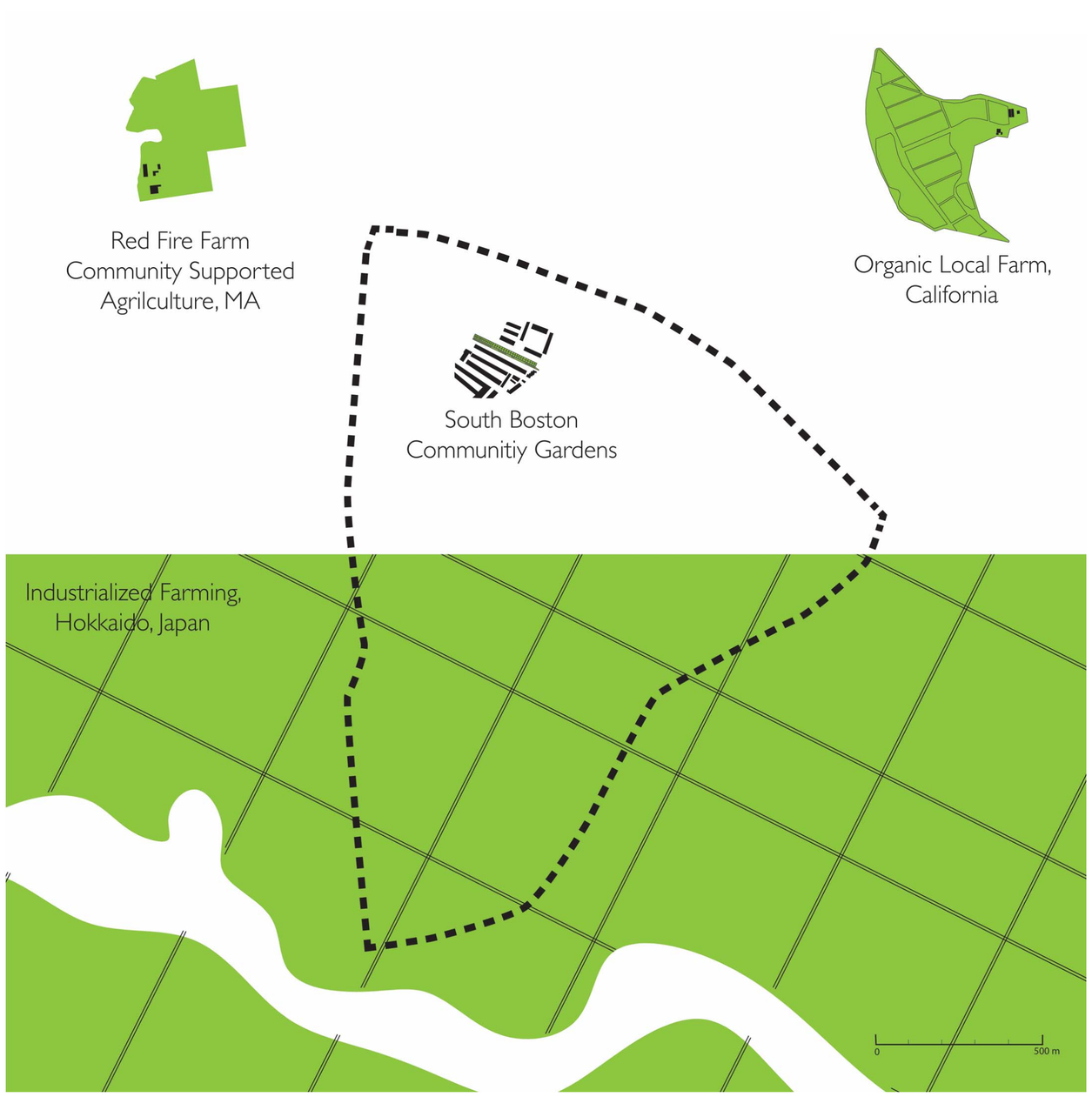
Self-Sufficiency through Food Production

Melding urban and agrarian uses will promote economic and social security through self-sufficiency. Urban food and energy production can provide greater security at the time of an escalating global crisis. Interjecting this land use with urban infrastructure will create a more environmentally sustainable and civic-minded live-work structure within Tama. Different types of agricultural use (a CSA farm and an allotment community garden) create an opportunity for residents of different ages to contribute the efficiency to food production and community action.



Community Connections through Food Production

By coordinating residential cultivation plots with the community's CSA, residents can benefit from larger economies of scale, and greater variety in produce. Because residential plots can be incorporated into a larger framework of agricultural production, residents become more civicly engaged, while the comunity at large becomes more attentive to all of its members.



SEKISUI HOUSE

Building Resiliency

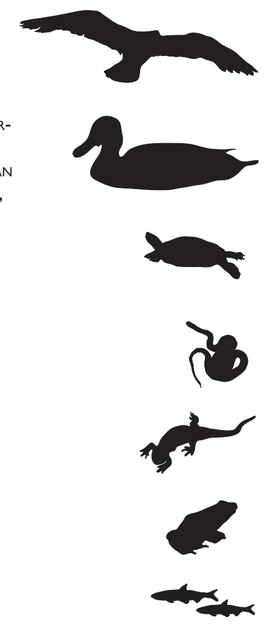
Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

Ecological Responsibility

RESTORING A NATURAL WATER AND WILDLIFE SYSTEM TO TAMA NEW TOWN WILL REDUCE THE ENERGY INPUTS REQUIRED TO SUPPORT THE COMMUNITY WHILE ALSO RESTORING BIO-DIVERSITY. BY CONNECTING SUWA AND NAGAYAMA WITH AN EXISTING NATURAL LANDSCAPE, AND BECOMING A REGIONAL CENTER FOR NATURAL SYSTEMS, TAMA CAN BECOME A MODEL COMMUNITY THAT COMBINES RESIDENTIAL, COMMERCIAL, INDUSTRIAL, AND NATURAL USES.

Reasons To Preseve Ecology And Biodiversity

"First, exploding human populations are degrading the environment at an accelerating rate, especially in tropical countries. Second, science is discovering new uses for biological diversity in ways that can relieve both human suffering and environmental destruction. Third, much of the diversity is being irreversibly lost through extinction caused by the destruction of natural habitats."
Source: Wilson, E.O. *The current state of biological diversity.*



Re-establish Natural Resources

- Habitat
- Hydrology

Current Habitat Issues:

1. There are no habitat corridors through Tama, isolating biological diversity.
2. Non-native plant species exist.

Current Water Management Issues:

1. Water treatment is energy intensive.
2. Flow speed in increased due to piping, leading to flood risk.
3. Stormwater is not used productively.
4. People are disconnected from the source and treatment of water.

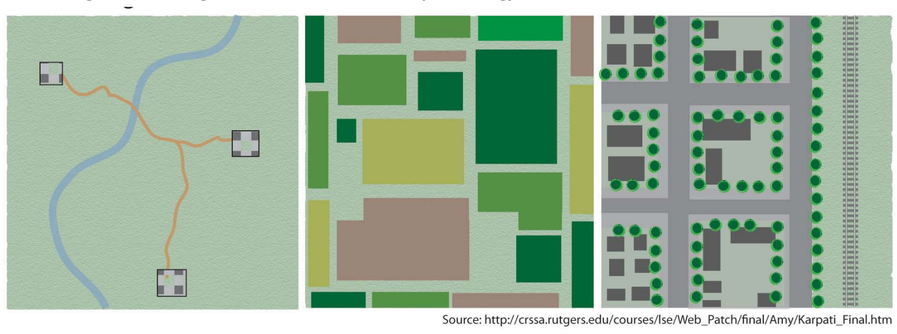
Current Habitat Solutions:

1. Design and plan for future habitat corridors in conjunction with future growth and decline strategies.
2. Design and remediate habitat with only native vegetation material.

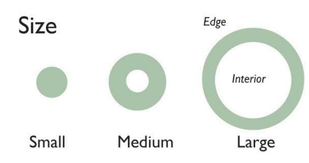
Current Water Management Solutions:

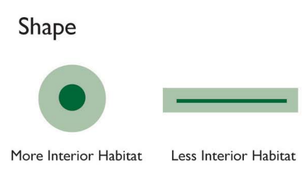
1. Treat naturally using landscaping techniques.
2. Slow the speed of the stormwater with natural, non-canalized paths.
3. Collect stormwater for productive uses: irrigation of landscaping and agricultural spaces, cooling systems, and attractive design features.
4. Reconnect community to water through innovative landscaping, collection, and irrigation techniques.

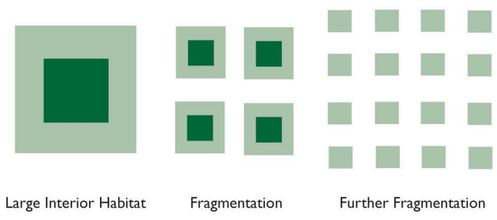
Confronting Habitat Fragmentation With Landscape Ecology



Source: http://crssa.rutgers.edu/courses/lse/Web_Patch/final/Amy/Karpati_Final.htm

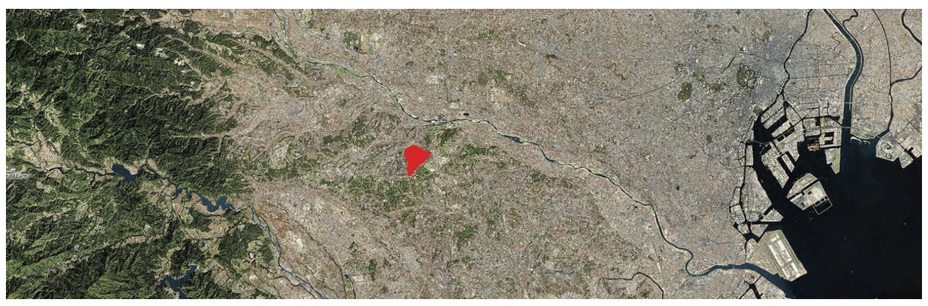




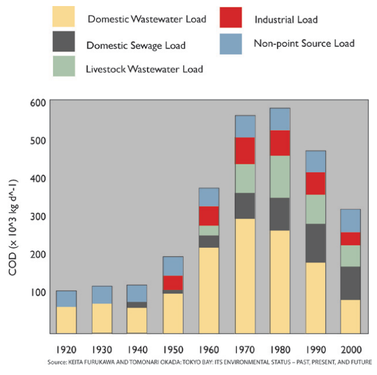


Soruce: http://danr.ucop.edu/ihrmp/oak52.htm

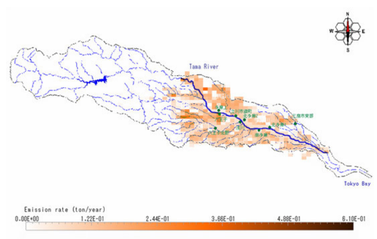
Suwa And Nagayama In The Tokyo Bay Context



Pollution Levels in Tokyo Bay



Toxic Emissions in Tama River



Landscape ecology

Habitat fragmentation:
The process by which contiguous large blocks of habitat are broken or sliced into progressively smaller pieces by housing and industrial development, intensive agriculture, roads, and other development activities.

Patch:
A surface on the landscape differing in appearance from its surroundings. Patches may be due to natural (e.G., Soil type) or anthropogenic (human-caused; e.G., Housing development) factors. Areas of oak woodland, chaparral, or residential development are examples of patches within a landscape.

Edge habitat:
The outermost band surrounding a patch that has an environment significantly different from the interior of a patch. Edges can be a few to several hundred feet wide depending on environmental factors.

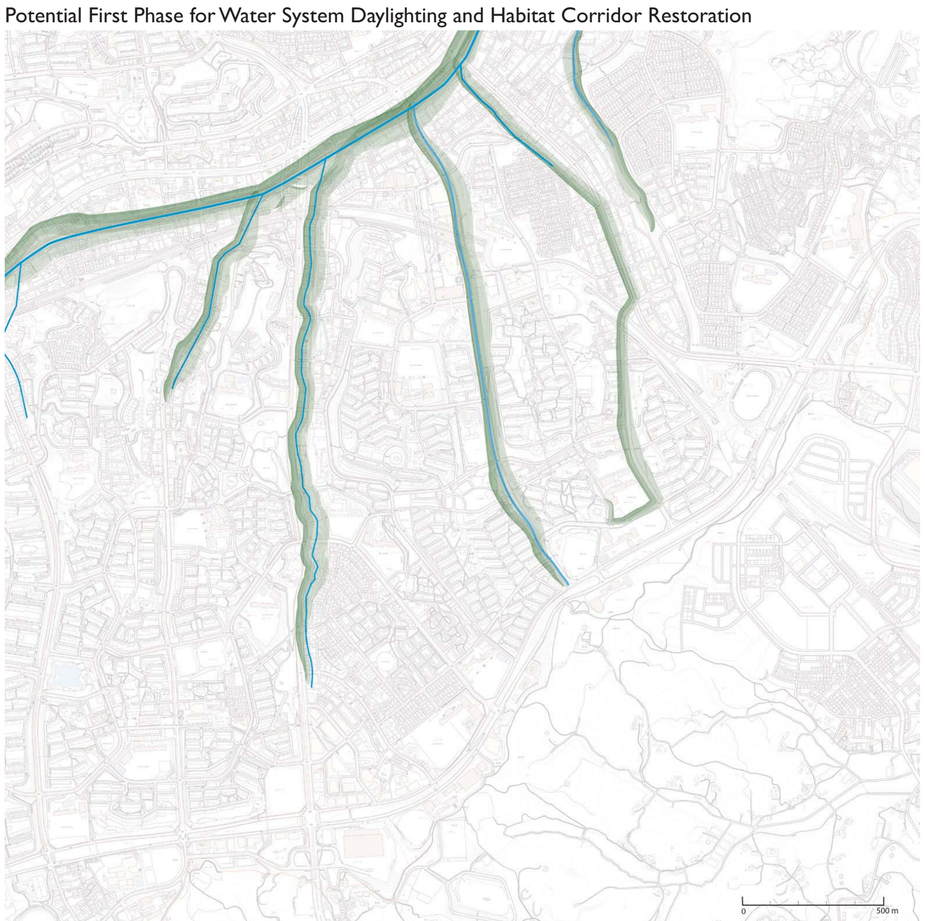
Interior habitat:
Habitat within the interior of a patch that is removed from edge habitat. Interior habitat is necessary for certain oak woodland species, providing insulation from edge effects such as noise, wind, solar radiation, and increased predation.

Corridor:
A strip of land that differs from the surrounding area on both sides. The strip of habitat along a stream or road, a wind break, or railroad right-of-way are examples of natural and human-designed corridors that may function as habitat connections between patches.

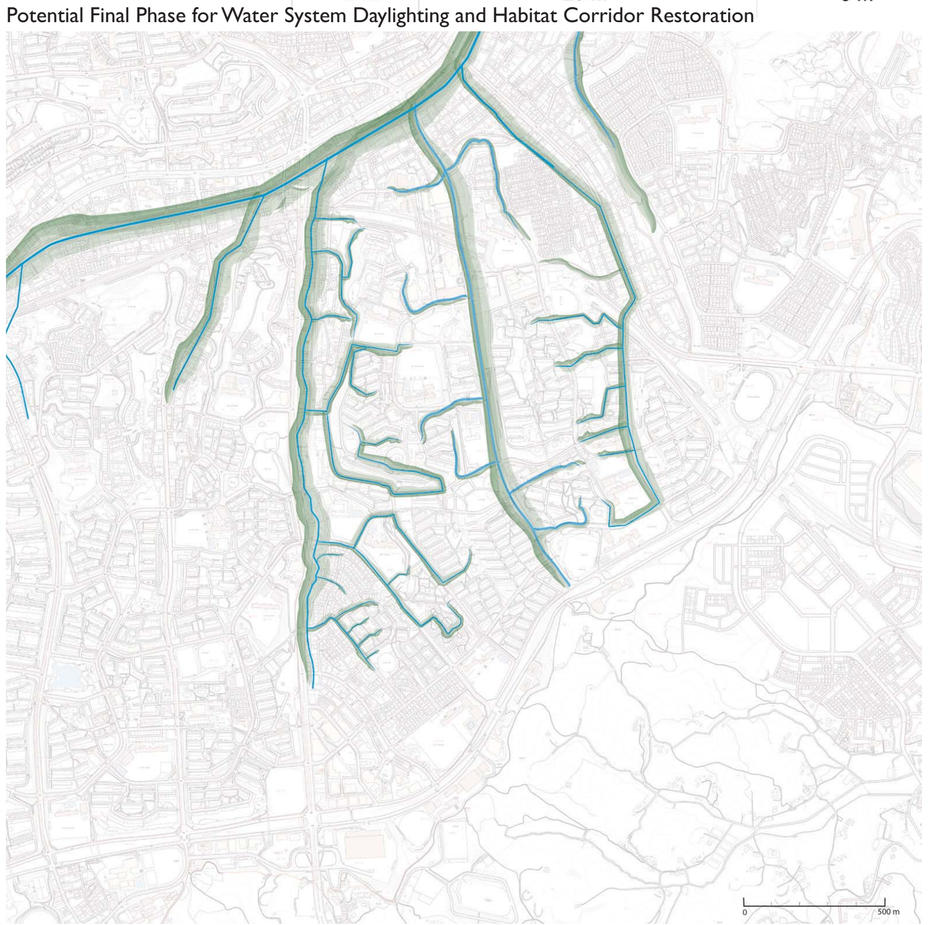
Source: http://danr.Ucop.Edu/ihrmp/oak52.Htm

Stream Bottom | Zone 1 5 m | Zone 2 20 m | Zone 3 6 m

Potential First Phase for Water System Daylighting and Habitat Corridor Restoration



Potential Final Phase for Water System Daylighting and Habitat Corridor Restoration



Advanced Japan Design Workshop Fall 2008

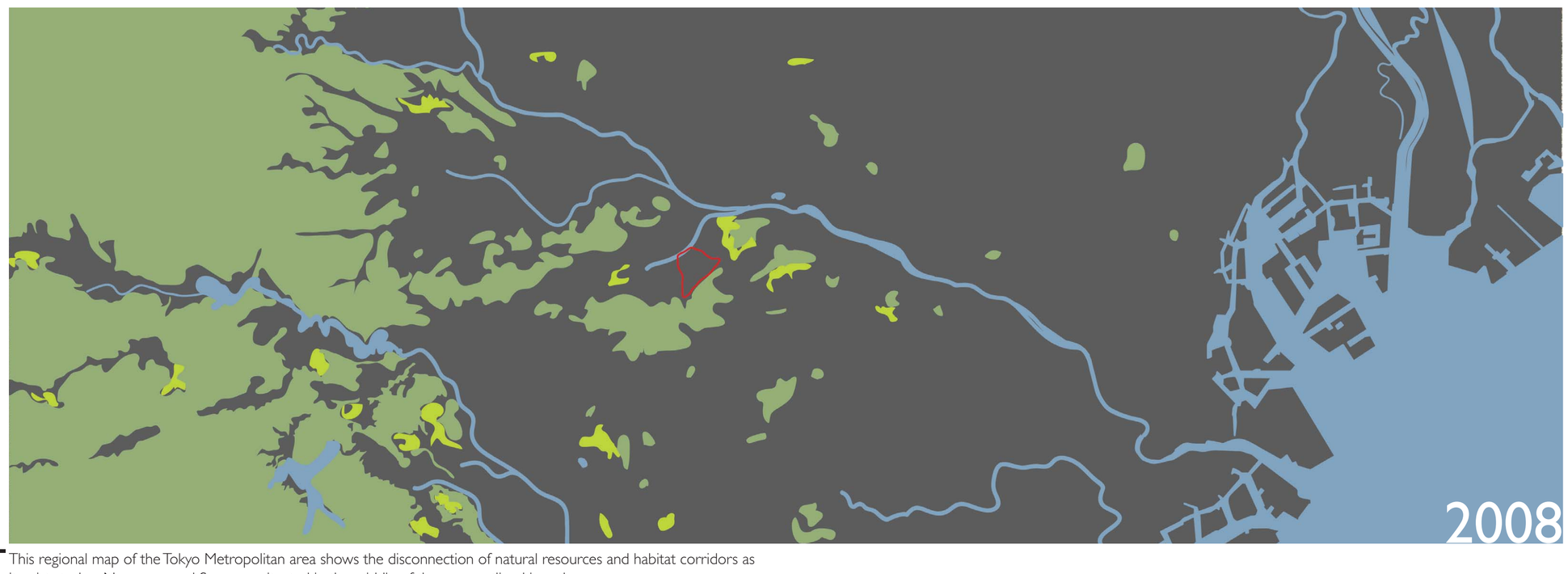
SEKISUI HOUSE

Building Resiliency

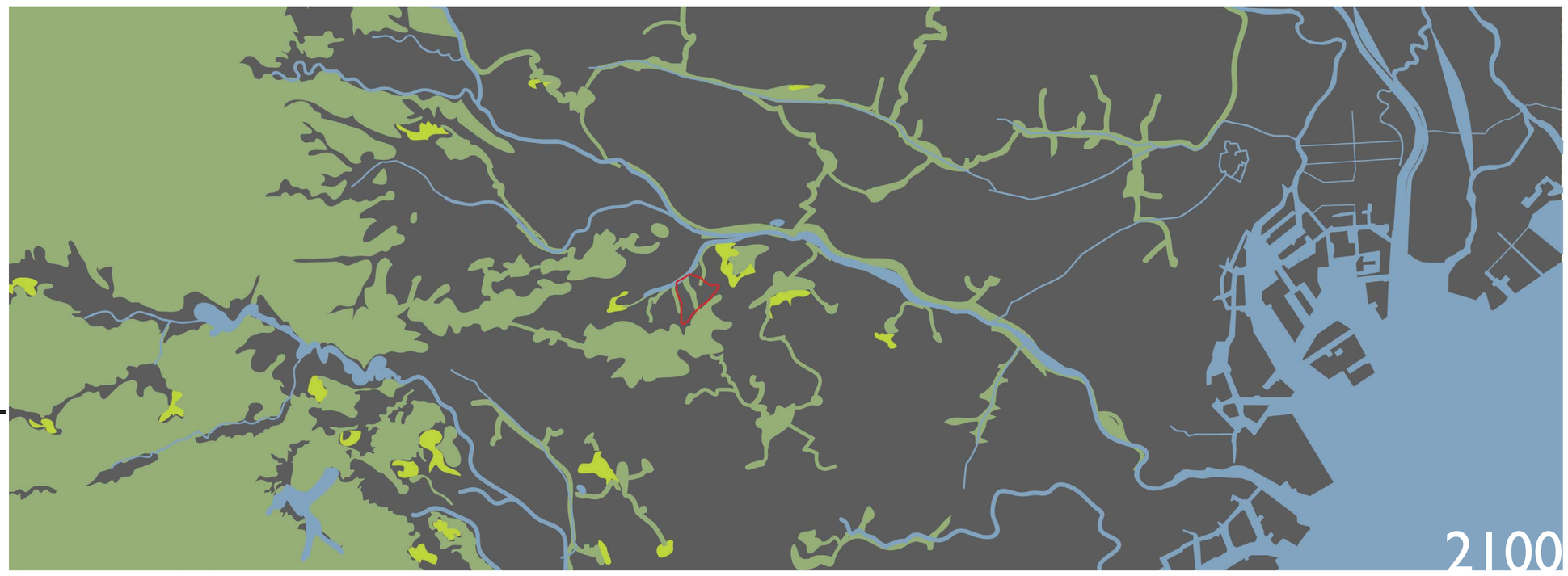
Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

HABITAT CORRIDOR AND WATER SYSTEM RESTORATION

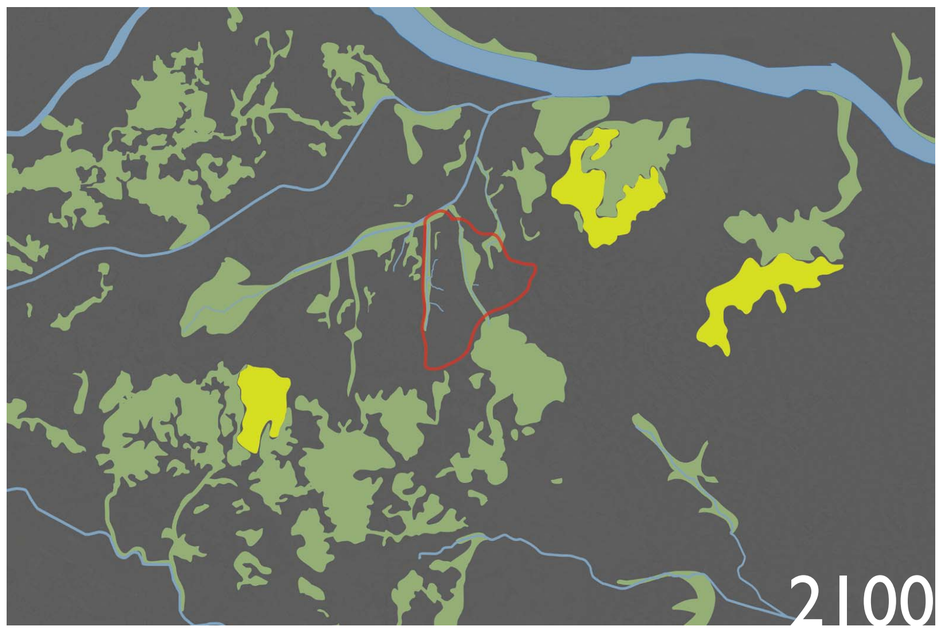
Urban Landscape
Water
Natural Forested Areas
Golf Courses



This regional map of the Tokyo Metropolitan area shows the disconnection of natural resources and habitat corridors as it exists today. Nagayama and Suwa are situated in the middle of the map, outlined in red.



This map shows the possibilitiy for more natural connections in the future. The movement of water through natural landscapes creates important connections between terrestial and hydro-based ecological systems,



SEKISUI HOUSE

Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

AJDW '08 | BUILDING RESILIENCY | CORE STRATEGIES

Existing Conditions

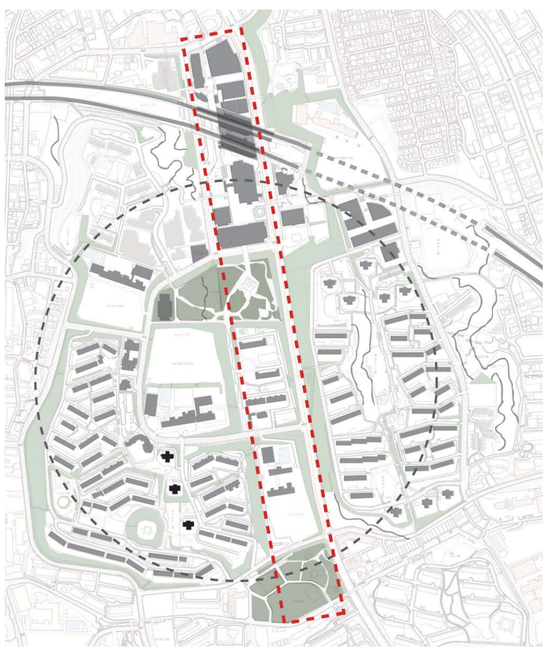
The proposed Nagayama Core area extends from Nagayama Station in the North of the research area.

It consists of two of the original developments in Tama New Town, as well as three underutilized schools and a difficult topography.

Transit Corridor Extending from Regional Transit Hub

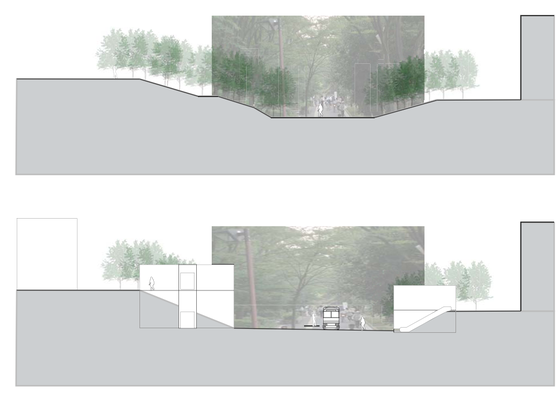
The first strategy aims at providing better connectivity through Nagayama by extending a public transportation line from Nagayama Station through Nagayama Core.

Stops are spaced 400 meters apart, meaning that a shuttle stop is rarely more than 10 minutes by foot, even given the difficult terrain.

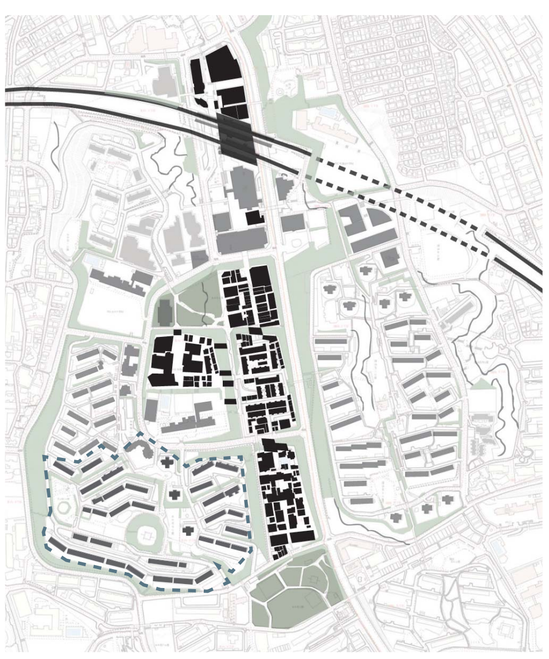


400m Radius Walkable Neighborhood and Identifiable Urban Form

Transit Corridor Structures
Compact Neighborhood

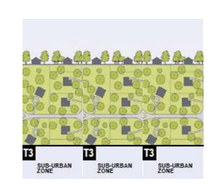


The transit corridor that extends down Nagayama Core is widened slightly to accomodate a hybrid bus or streetcar line. It becomes a main pedestrian corridor as civic, commercial, and service buildings are built on the hillside. These public buildings have the added function of providing better access between elevations.

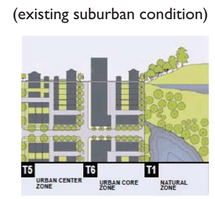


Dense Mixed Use core area and flexible peripheral areas

Biodiversity Corridor and Recreation Escape



Indistinct Land Use
(existing suburban condition)



Distinct and differentiated land use

Preemptive Historic Preservation

Though the housing blocks that make up Tama New Town are problematic, it cannot be denied that the Tama New Town project holds historical value. By preserving the very first development in Tama New Town historical and cultural significance is added to the site. When Nagayama becomes a new sustainable community, the preserved buildings can act as an educational tool in the narrative of Tama New Town's progress.

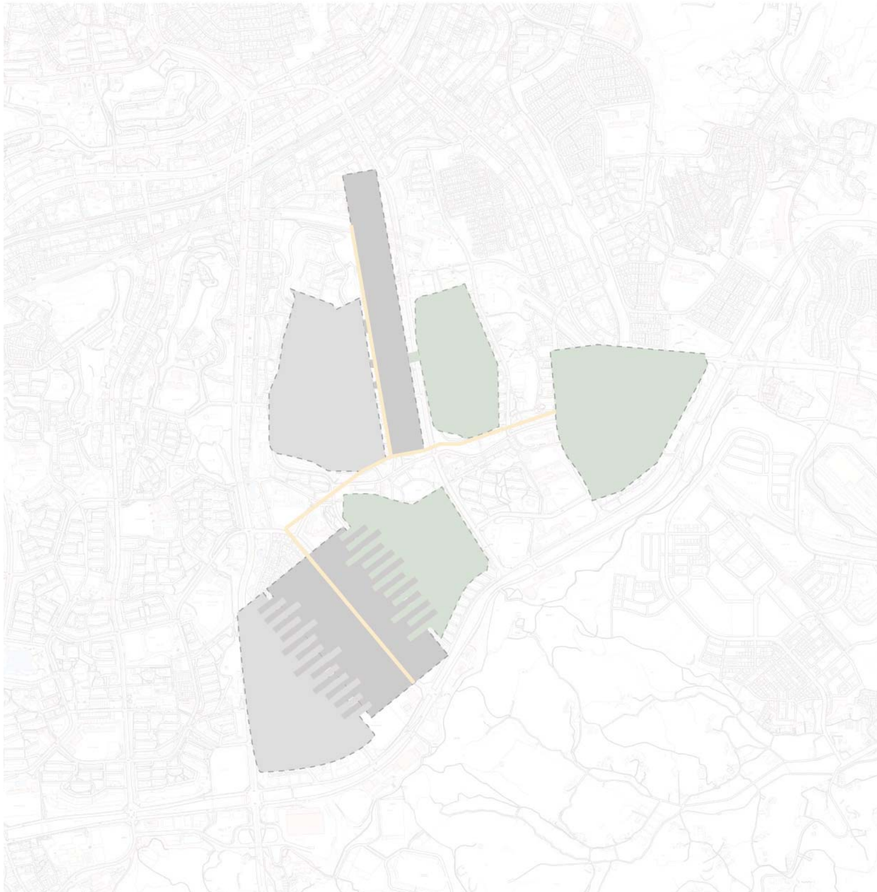
Green Space Size Comparison

Advanced Japan Design Workshop Fall 2008

SEKISUI HOUSE

Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider



Site Diagram

The Nagayama-Suwa resilient city plan is made up of two main neighborhoods. One is primarily connective in nature, extending a transit corridor from the regional train station. Its center and its edges are made clear and legible, providing a sense of orientation and identification for the residents who reside there. The other neighborhood is primarily self-sufficient. It is connected to the greater region by Nagayama Core but provides much of its own sustenance through resident food production. A third main element to the plan is a productive landscape that serves the system as a whole. This takes shape as a Community Supported Agriculture plot. By creating two distinct neighborhoods, residents of Nagayama-Suwa can choose from a variety of supported lifestyles.

2008 Existing Condition

The existing site is full of disconnected green areas and a homogenous building type. This lead to undifferentiated spaces that are unidentifiable and difficult for residents to orientate themselves within.

2030

By 2030 a public transit line efficiently connects the two changing neighborhoods to each other and the greater region. A CSA at the east corner of the site provides food to both neighborhoods, creating a small food based economy and offsetting Nagayama_Suwa's reliance on external resources. Densification begins near the station.

2050

In 2050, the changes implemented for a sustainable community in Nagayama-Suwa have attracted new lifestyle groups, creating a socially diverse community. The two neighborhoods, while still distinct in character and identity, begin to operate as a unified system, bolstering its self-sufficiency and resilience. The urban agriculture lifestyle and large recreational nature reserve, attract people from both inside and outside the metropolitan region. Density around the station and by new eco-industry to the South supoprt an efficient transportation system.

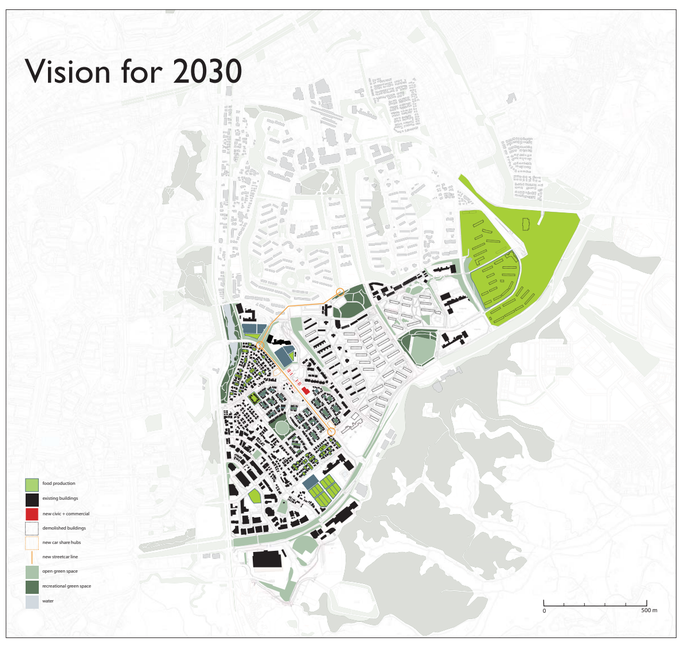
SEKISUI HOUSE

Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

AJDW'08 | BUILDING RESILIENCY | SELF-SUFFICIENT AGRICULTURAL CITY

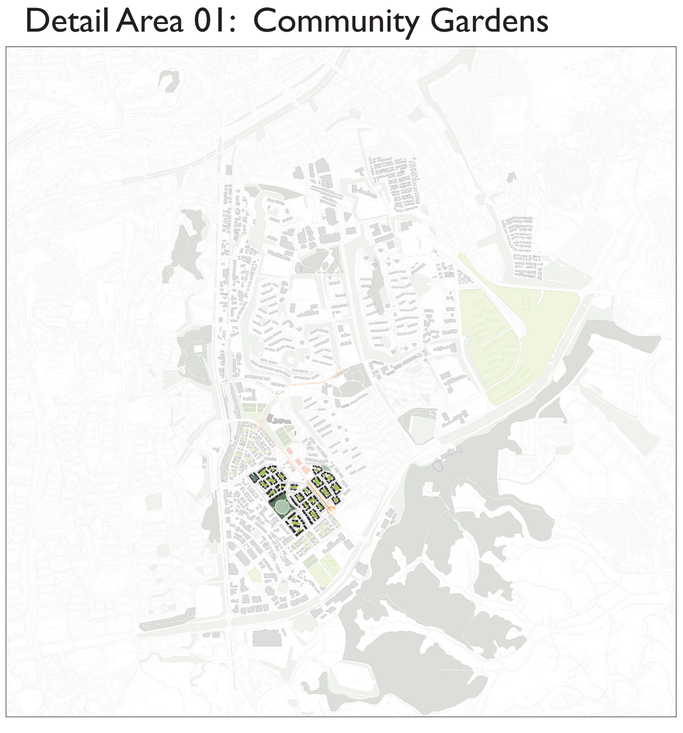
Vision for 2030



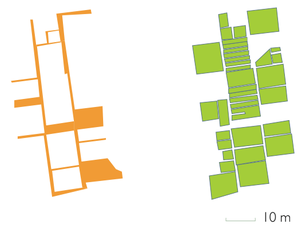
type	size	location	# of people	use of crops	yield
allotments	250 m^2	urban or peri-urban	one person or family	to supply cultivator or family	
community garden plots	less than 1000 m^2	urban or peri-urban, vacant lots, unexploited area within educational or health facilities. state owned or private.	one person or family	to supply cultivator or family	1996: 1-2 kg/ m^2-yr 2000: 8-12 kg/ m^2-yr
community gardens (intensive cultivation)	1000 m^2 - 3000 m^2	urban or peri-urban, stae owned or private.	one person or family, several families or cooperative	feed. producers and for trade.	1996: 1-2 kg/ m^2-yr 2000: 8-12 kg/ m^2-yr
urban community gardens	2000 m^2 - 5000 m^2	vacant urban sites, not suitable for direct agriculture use, require imported soil and containers	groups of individuals formed into a collective. institutional technical support and advice.	produce for trade and small-scale consumption by producers	1996: 3 kg/ m^2-yr 2000: 20 kg/ m^2-yr
high yield urban gardens	10000 m^2	government alloted vacant urban sites, not suitable for direct agriculture use, soil and containers for growing brought in	commercially viable work centres or cooperatives	produce for sale to the population and tourist sector	1994: 312kg/ m^2-yr 2000: 20 kg/ m^2-yr

above examples from London, UK and Havana, Cuba [Viljoen 2005]

Detail Area 01: Community Gardens



community shared plots



a network of overlaid paths and shared space fosters social interaction within the community sharing the garden.

[Viljoen 2005]

precedent:

south end, boston

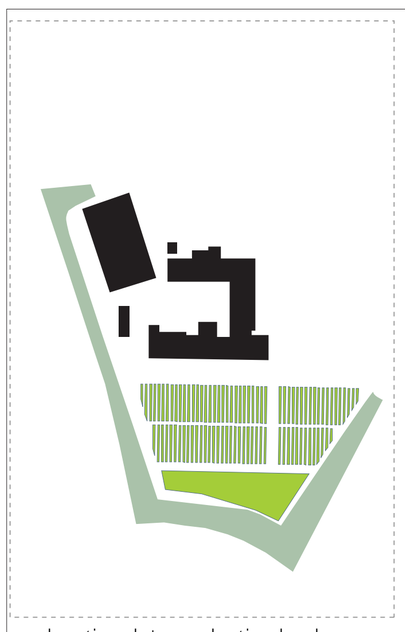
characteristics: shared small plots
community identity
neighborhood value
small plots

public but intimate, community gardens are open to the greater world, but cared for by a cohesive groupof individuals. food production is encouraged, and thus flexibility in size also exists. throughout boston, 180 community gardens exist, and are managed by local and non-profit organizations.

crops: aloes, mint, pumpkins, lettuce, spinach, parsley, beans, beetroot, tomatoes, carrots, coriander, potatoes, peppers, etc.

materials: wooden posts, lockers, shared garden supplies

Detail Area 02: Educational Farms



educational + productive landscape

precedent:

organiponico
gastronomica playa
municipio playa, havana

characteristics: plateau
shared resource
a space between
boundary and edge
urban carpet
educational resource
embankment to pavement

"playa organoponico serves a predominantly residential area. it is defined by being constructed on an artificial plateau sited on sloping ground. pedestrians walking around its perimeter experience a constantly changing relationship with urban agricultural surface. sited between a single storey junior school and a multi-storey high school, it is seen as a carpet from one and an edge to the other."

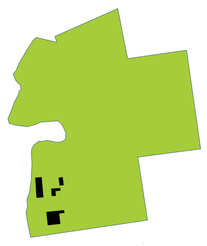
crops: tomatoes, lettuce, parsley, cabbage, chives, leeks, onions, rocket, peppers, aubergines, beans, cauliflower, pumpkin

materials: stone, concrete test cores, concrete rubble, corrugated cement sheet, chain link fence, earth

[Viljoen 2005]

Detail Area 03: Community-Supported Agriculture

community-supported agriculture



precedent:

red fire farm
granby, ma

a 50 acre farm, red fire currently is able to grow and sell 25 shares per-acre, with one share being for 2-4 people, at 10 lbs of food per week. one acre can feed 50-100 people, and at maximum, red fire could feed as many as 5000 people, though they only serve 830 at the present.

red fire farm produces vegetable shares, fruit shares, as well as flower shares, and can make deliveries via tricycle trucks (new amsterdam project). most people opt for in-city pickup locations, one a week for 24 weeks out of the year.

work exchange is available for those who would like to have fresh, organic, local food delivered, but may need financial assistance.

crops include over 300 different varieties of vegetables, berries, plants and flowers.

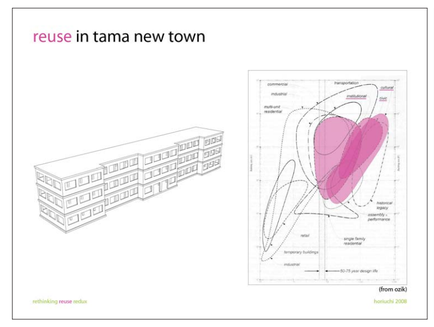
Advanced Japan Design Workshop Fall 2008

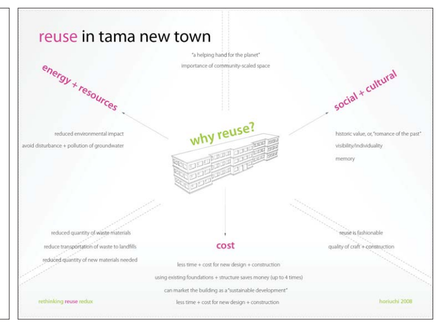
SEKISUI HOUSE

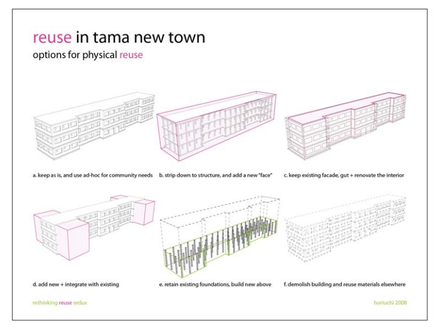
Building Resiliency

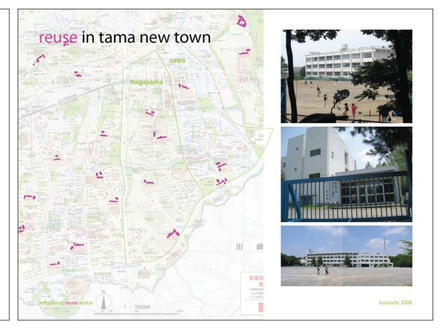
Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

AJDW'08 | BUILDING RESILIENCY | SELF-SUFFICIENT AGRICULTURAL CITY

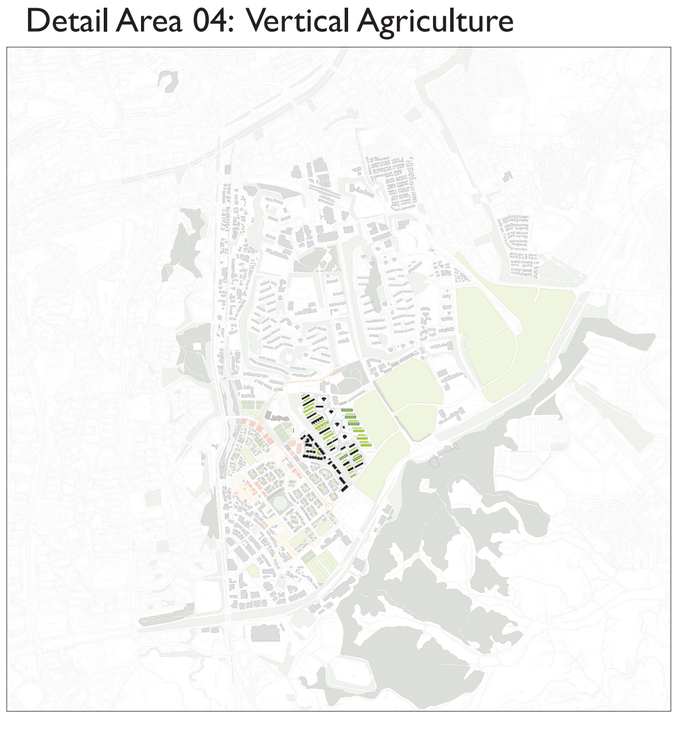


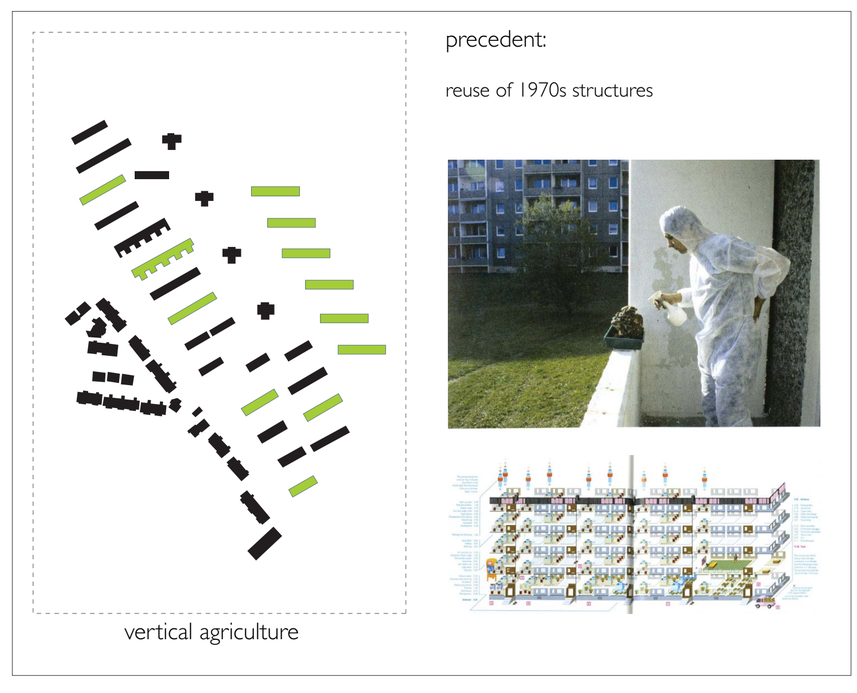


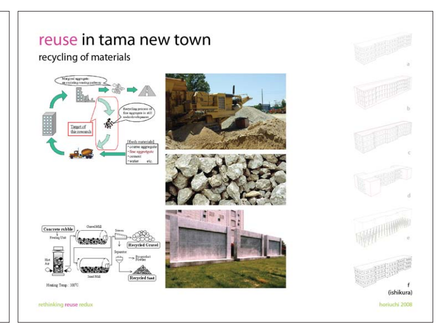




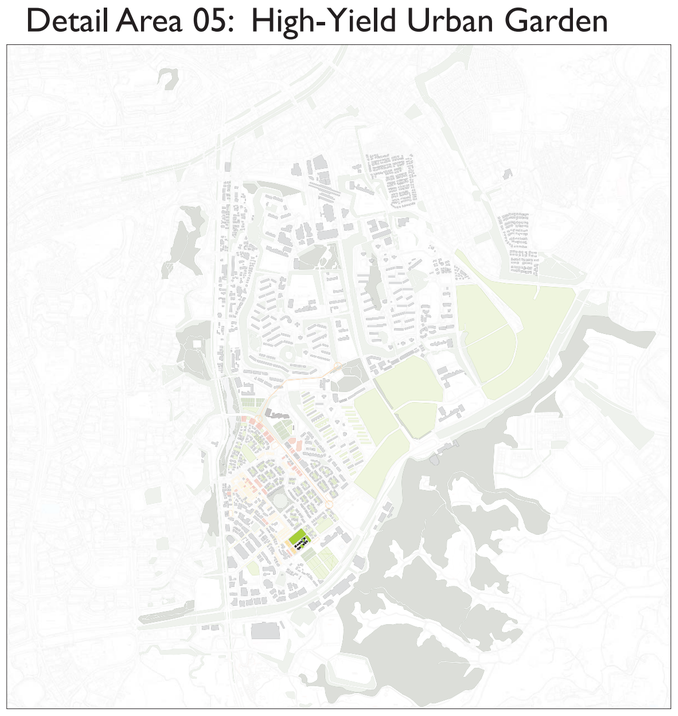
Detail Area 04: Vertical Agriculture

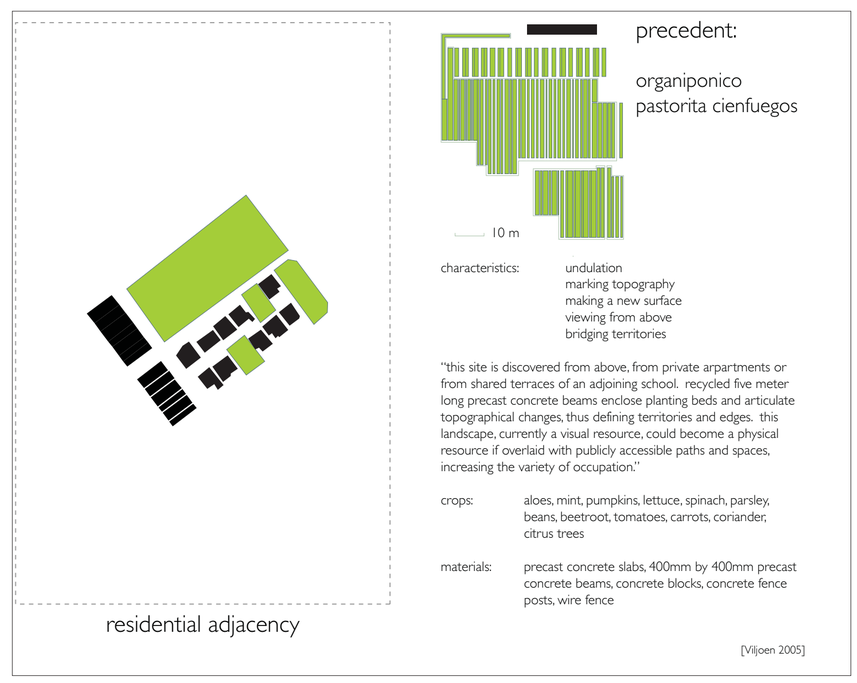






Detail Area 05: High-Yield Urban Garden





Advanced Japan Design Workshop Fall 2008

SEKISUI HOUSE

Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

Advanced Japan Design Workshop Fall 2008

SEKISUI HOUSE

Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

Advanced Japan Design Workshop Fall 2008

SEKISUI HOUSE

Building Resiliency

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

Advanced Japan Design Workshop Fall 2008

SEKISUI HOUSE

Christopher Guignon, Haruka Horiuchi,
Deborah Morris, Sarah Snider

Specific Policies

With the vision for Tama and 7 driving principles, below are some specific program, policy and design implementation ideas for the site.

Zero carbon deined for Flexible Adaptable Tama:

1. All buildings, city operations and serveices, onsite generate all energy used within the building (or, in the case of city services, from city energy farms) from renewable, noncarbon emitting sources.

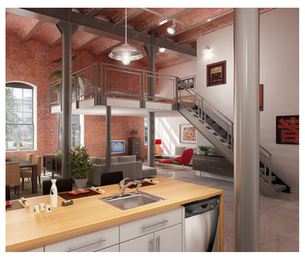
2. Local materials must be used as much as possible, i.e., new buildings or structures can used reclaimed materials from demolished structures.

3. Exempt from “zero carbon” are goods and services that are not able to be produced within Tama. Over time, a majority of these goods and services will either be sourced in Tama, or their source areas will also become zero carbon.

These following ideas match up to Tama’s 7 principles:

Construction bids must include measures for reducing pollution and alternative energy. New innovations, such as hybrid excavators, must be incorporated.
(Zero carbon)

All students receive a bicycle, as part of their admission, to encourage bicycling. Innovative bicycles, such as a solar powered electric bicycle (to help tacke Tama’s hills!) can also be given, will help promote new ideas in sustainability.
(Zero carbon, Education)



Buildings designed with flexible interiors,
to be reused over time,
as needs change.
(Flexible buildings)

Incentive zoning for mixed use,, semi intensive retail along main spine in Tama.

Shops and housing can use similar footprints, with flexible interiors.

Incentives for producing local goods.

Natural “stopping points” along spine, allow flexibility for growth.

Incentives for package reduction.

(Concentrated Retail, Flexible buildings, Education)

Initiaitves for personal energy generation (solar panels, green roofs, etc)

More visible and attractive recycling and composting areas.

Bioswales throughout Tama to help stormwater.

Planting of native species to reduce maintenance, increase pride, boost local ecosystem.

(Zero carbon, Micromeasures, Waste Processing Education)

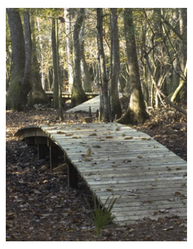
Schools and universities work together to educate students and community memners.

AI energy consumed is measured, for citizen awareness.

CIty sponsors community groups to form volunteer organizations to assist in community needs.

(Education, Zero carbon, Micromeasures)

Building demolition, CSA or natureal prserve implementaion, if population falls below a certain point. Paths and street “ghosts” preserved onsite for future development. *(Back to nature)*



Bioswales and green roofs, living machines to treat sewage.
(Waste processing)

Advanced Japan Design Workshop Fall 2008

SEKISUI HOUSE