the greenweb

THOMAS BOERMAN
MASTER'S PROJECT 2010



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ILLINOIS PAST ECOSYSTEMS

ENDANGERED AND THREATENED SPECIES

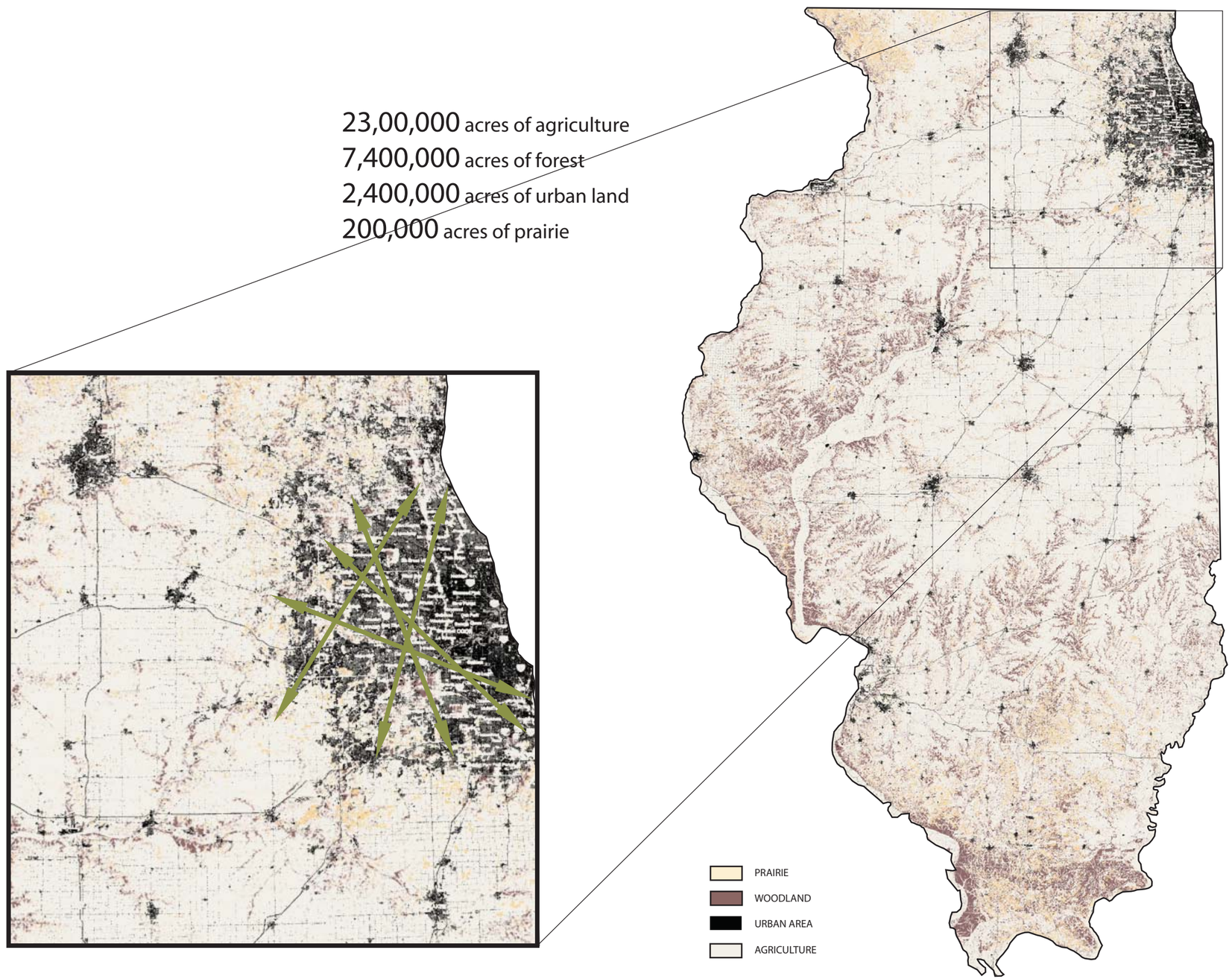
* Ictinia mississippiensis--Mississippi kite --E
* Pseudacris streckeri subsp. illinoensis--Illinois chorus frog--T
* Circus cyaneus--Northern harrier --E
* Tympanuchus cupido--Greater prairie-chicken --E
* Coturnicops noveboracensis--Yellow rail --E
* Laterallus jamalcensis--Black rail --E
* Grus canadensis--Sandhill crane --E
* Bartramia longicauda--Upland sandpiper --E
* Tyto alba--Common barn owl --E
* Asio flammeus--Short-eared owl --E
* Lanius ludovicianus--Loggerhead shrike --T
* Ammodramus henslowii--Henslow's sparrow --E
* Botarurus lentiginosus--American bittern--E
* Buteo swainsoni--Swainson's hawk--E
* Catharus fuscescens--Veery--T
* Euphagus cyanocephalus--Brewer's blackbird--T
* Phalaropus tricolor--Wilson's pharlarope--E
* Thryomanes bewickii--Bewick's wren--E
* Atrytone arogos--Arogos skipper--E
* Hesperia metea--Cobweb skipper--T
* Hesperia ottoe--Ottoe skipper--T
* Papaipema eryngii--Eryngium stem borer--E
* Agalinis skinneriana--Pale false foxglove--T
* Agropyron subsecundum--Bearded wheat grass--E
* Andropogon ternarius--Silver broom sedge--E
* Artesemia dracunculus--False taragon, Dragon wormwood--E
* Asceplias lanuginosa--Woolly milkweed--E
* Asclepias meadii--Mead's milkweed--E
* Asclepias ovalifolia--Oval milkweed--E
* Asclepias stenophylla--Narrow-leaved green milkweed--T
* Astragalus crassicarpus var. trichocalyx--Large ground plum--E
* Astragalus tennesseensis--Tennessee milk vetch--E
* Beckmannia syzigachne--American slough grass--E
* Besseya bullii--Kittentails--T
* Betula populifolia--Gray birch--E
* Boltonia decurrens--Decurrent false aster--T
* Boltrychium multifidum--Northern grape fern--E
* Botrychium simplex--Dwarf grape fern--E
* Bumelia lanuginosa--Wooly buckthorn--E
* Calopogon tuberosus--Grass pink orchid--E
* Camassia angusta--Wild hyacinth--E
* Carex aurea--Golden sedge--E
* Carex crawei--Sedge--T
* Carex heliophila--Sedge--E
* Carex lucorum--Sedge--E
* Carex tonsa--Sedge--E
* Castilleja sessiliflora--Downy yellow painted cup--E
* Ceanothus ovatus--Redroot--E
* Cirsium hillii--Hill's thistle--T
* Compronia peregrina--Sweetfern--E
* Corydalis curvisiliqua var. grandibracteata--Corydalis--T
* Cyperus grayioides--Umbrella sedge--T
* Cypripedium calceolus var. parviflorum--Small yellow lady's slipper--E
* Cypripedium candidum--White lady's slipper--E
* Cypripedium reginae--Showy lady's slipper--E
* Drosera intermedia--Narrow-leaved sundew--T
* Eriophorum viridi-carinatum--Tall cotton grass--E
* Erythronium mesochoreum--Prairie trout-lily--E
* Filipendula rubra--Queen-of-the-prairie--T
* Fimbristylis vahlii--Vahl's fimbristylis--E
* Heliotropium tenellum--Slender heliotrope--E
* Hexalectris spicata--Crested coralroot orchid--E
* Hudsonia tomentosa--False heather--E
* Hypericum kalmianum--Kalm's St. John's wort--E
* Isoetes butleri--Quillwirt--E
* Juncus alpinus--Richardson's rush--E
* Juncus vaseyi --Vasey's rush--E
* Lactuca ludoviciana--Western wild lettuce--E
* Lechea intermedia--Pinweed--E
* Lespedeza leptostachya--Prairie bush clover--E
* Lesquerella ludoviciana--Silvery bladderpod--E
* Lycopodium clatatum--Running pine--
* Lycopodium dendroideum--Ground pine--E
* Lycopodium inundatum--Bog clubmoss--E
* Melanthium virginicum--Bunchflower--T
* Microseris cuspidata--Prairie dandelion--E
* Mirabilis hirsuta--Hairy umbrella wort--E
* Oenothera perennis--Small sundrops --E
* Opuntiafragilis--Fragile prickly pear--E
* Orobanche fasciculata--Clustered broomrape--E
* Orobanche ludoviciana--Broomrape--E
* Panicum boreale--Northern panic grass--E
* Penstemon grandiflorus--Large-flowered beard tongue--E
* Petalostemon foliosum--Leafy prairie clover--E
* Phacelia gilioides--Phacelia--E
* Phlox pilosa subsp. sangamonensis--Sangamon phlox--E
* Platanthera ciliaris--Orange fringed orchid--E
* Platanthera clavellata--Wood orchid--E
* Platanthera flava var. herbiola--Tubercled orchid--E
* Platanthera leucophaea--Prairie white fringed orchid--E
* Platanthera psycodes--Purple fringed orchid--E
* Pogonia ophioglossoides--Snake-mouth--E
* Polanisia jamesii--James' clammyweed--E
* Polygala incarnata--Pink milkwort--E
* Polygonum careyi--Carey's heartsease--E
* Populus balsamifera--Balsam poplar--E
* Potentilla millegrana--Cinquefoil--E
* Ranunculus rhomboideus--Prairie buttercup--T
* Rubus setosus--Bristly blackberry--E
* Rudbeckia missouriensis--Missouri orange coneflower--E
* Rumex hastatulus--Sour dock--E
* Sabatia campestris--Prairie rose gentian--E
* Salvia azurea subsp. pitcheri--Blue sage--T
* Sanguisorba canadensis--American burnet--E
* Silene regia--Royal catchfly--E
* Silphium trifoliatum--Rosinweed--E
* Sisyrinchium atlanticum--Eastern blue-eyed grass--E
* Sisyrinchium montanum--Mountain blue-eyed grass--E
* Sphaeralcea angusta--Globe mallow--E
* Spiranthes lucida--Yellow-lipped lady's tresses--E
* Spiranthes vernalis--Spring lady's tresses--E
* Stylisma pickeringii--Patterson bindweed--E
* Talinum calycinum--Fameflower--E
* Thismia americana--Thismia--E
* Tomanthera auriculata--Ear-leafed foxglove--T
* Tradescantia bracteata--Prairie spiderwort--E
* Triadenum virginicum--Marsh St. John's wort--E
* Trifolium reflexum--Buffalo clover--E
* Trillium viride--Green trillium--T
* Viola primulifolia--Primrose violet--E
* Viola viarum--Plains violet--E
* Zigadenus glaucus--White camass--E
* Clemmys guttata--Spotted turtle--E
* Kinosternon flavescens--Illinois mud turtle--E
* Heterodon nasicus--Western hognose snake--T
* Sistrurus catenatus--Eastern massasauga—E

14,600,000 acres of prairie
19,400,000 acres of forest



ILLINOIS CURRENT ECOSYSTEMS

The changes made to land use in Illinois over the last 300 years have been immense. The majority of the praries have been converted to farmland, due to their fertile soils. Urban areas have been introduced and expanded greatly. These ecosystems are barriers to biodiversity, as they do not allow many species. Agricultural land eliminates all plantlife and introduces a single species in its place. Urban systesms generally lack the habitat and connections for the progagation of diverse species. The Chicago area is not particularly short on green space, but it does have signifigant barriers to movement between them. To encourage the health of these green spaces along the green belt surrounding the city, corridors for movement need to be planned into the urban fabric to allow for all manner of organisims to remain viable in this harsh environment.



URBAN PLANNING PRECEDENTS

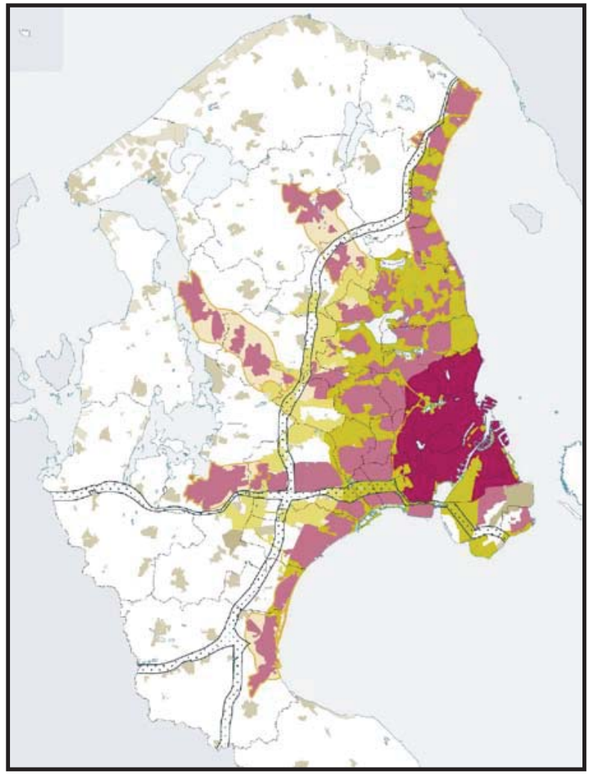
GREENWAY

A greenway is a linear green space that runs through an urban environment. They serve as recreational, and to a lesser extent wildlife conservation spaces. Shown below is the Boston greenway.



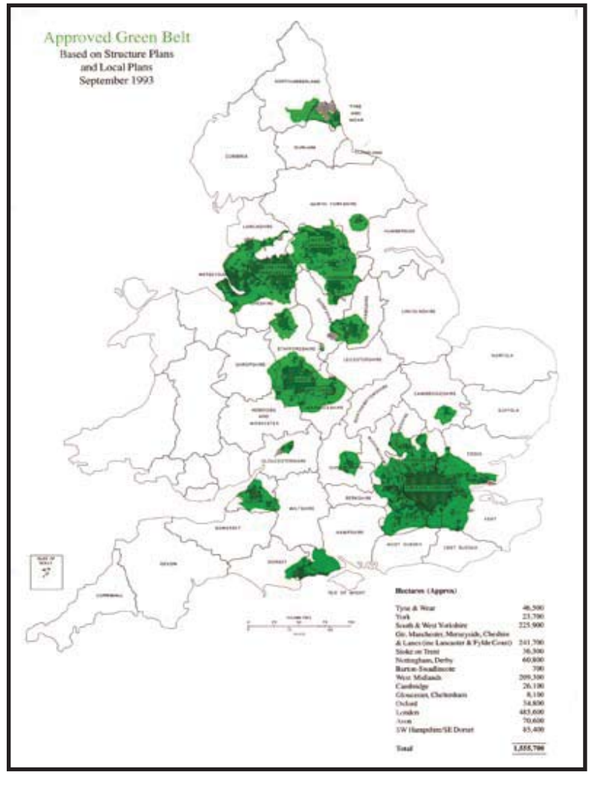
GREENWEDGE

A greenwedge (also called a greenfinger) is an urban planning concept that separates urban development into linear strands radiating from the city. Green spaces are used to separate development, as well as bring wildlife into the urban environment. The planning strategy of Copenhagen is shown below.



GREENBELT

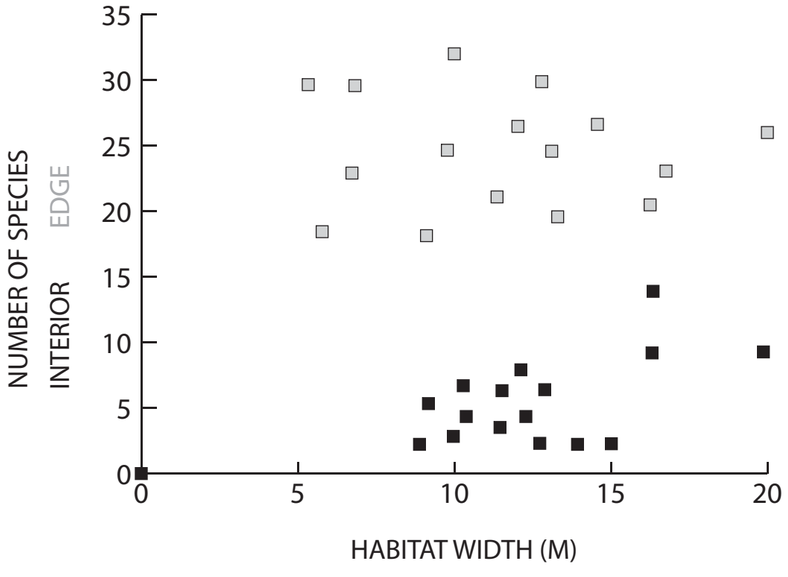
A greenbelt is a grouping of green space around an urban area. They usually serve wildlife conservation purposes, as well as being barriers to development to prevent sprawl. Shown below is the greenbelt around London.

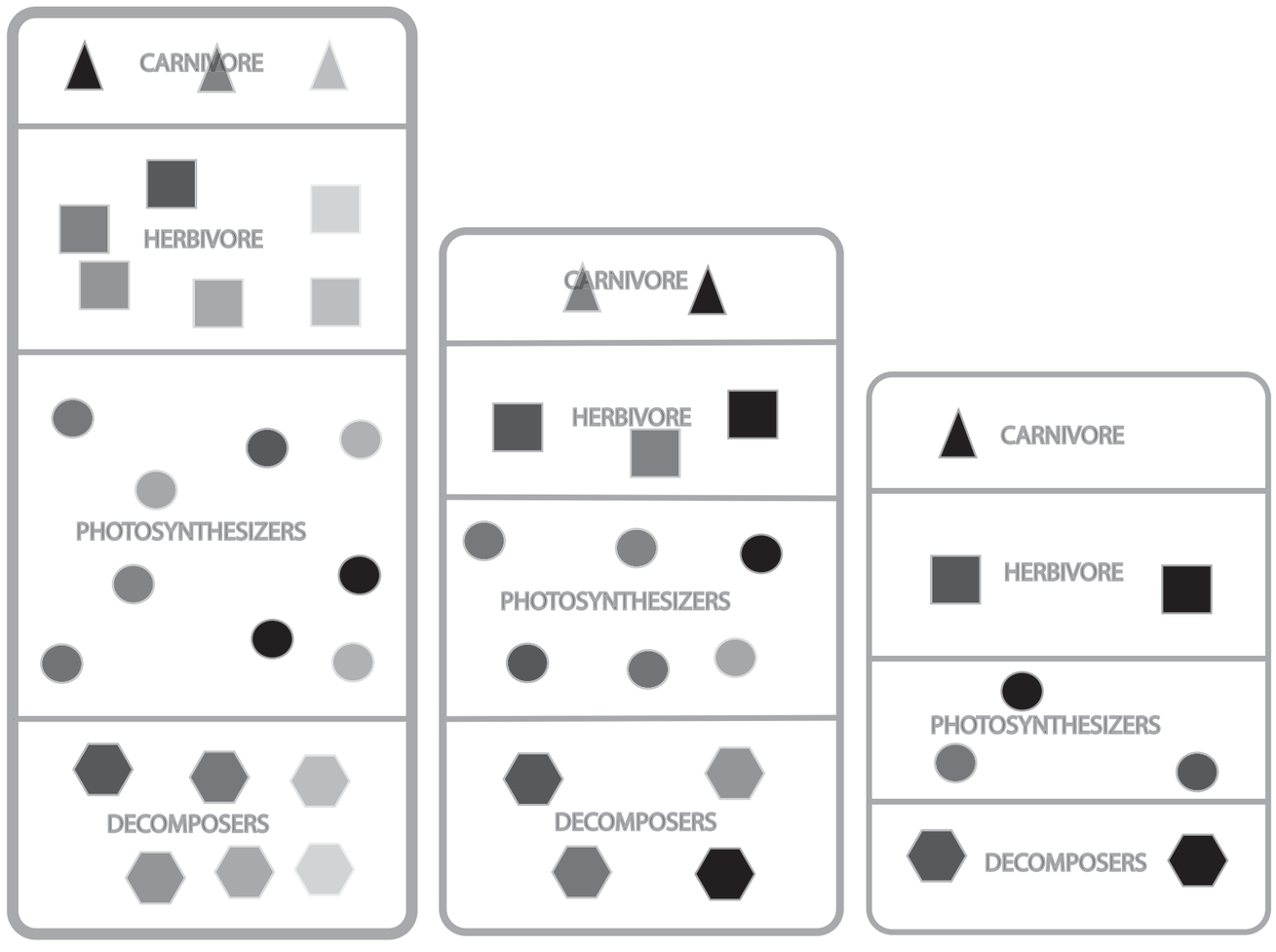


"We should preserve every scrap of biodiversity as priceless while we learn to use it and come to understand what it means to humanity"

- O.E. Wilson

BIODIVERSITY is the variation and frequence of organisms within a given area. Biodiversity is the common measure of health for biological systems. Ecosystems are incredibly complex, with each species contributing to the viability of life in the area. While these systems are often redundant- if a certain species is lost others will fulfill its role- the niche of a lost species will be filled to a lesser extent. Increasing habitat, width of habitat (see graph below), and connection to other habitats (for mating, feeding, territorial concerns, and seed spread), among other factors help to increase this variation and frequence of organisms. By preserving biodiversity we not only help the animal kingdom, but ourselves as well by making sure all the plants and animals we depend on can survive. We also allow ourselves a chance to study the chemical and medical uses of the known species and those we have yet to discover.





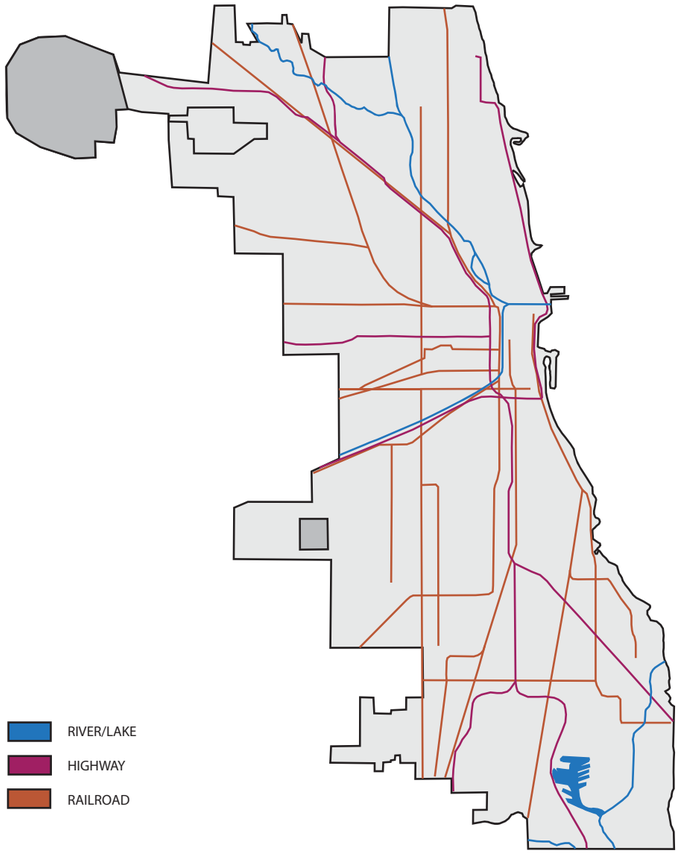
HIGH BIODIVERSITY

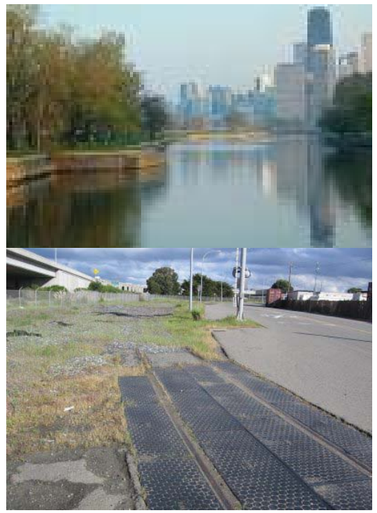
MEDIUM BIODIVERSITY

LOW BIODIVERSITY

CURRENT CITY PLAN/ GREEN NETWORK

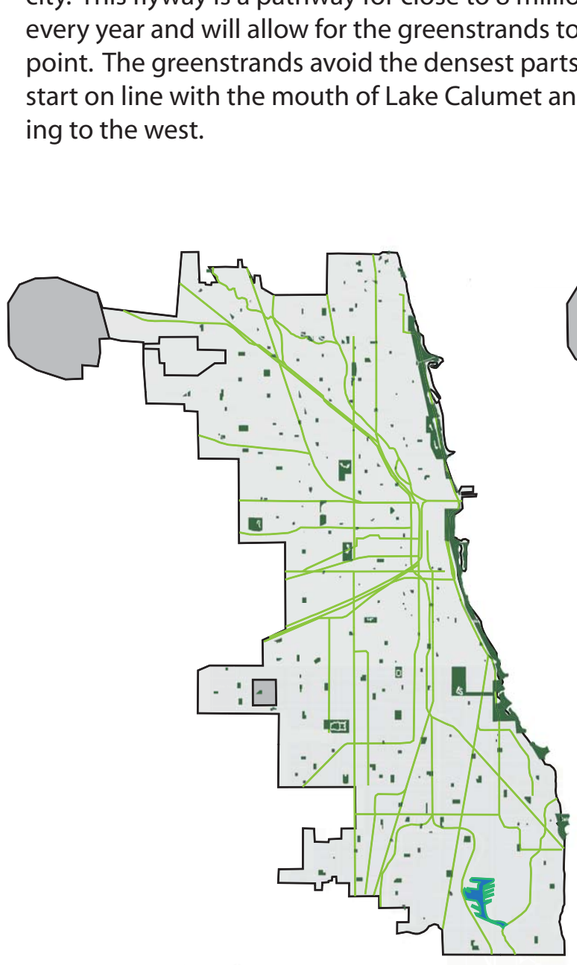
The city of Chicago has a network of 7,300 acres of parks that are spread throughout the city. It also has miles of reclaimed greenways that run along highways, rivers, and railroads in the city. These are important spaces for a network that makes connections through the city, but they rarely make connections themselves. A new layer of information must be added to the city to connect these spaces for them to best function as spaces for the diversification of biological life.

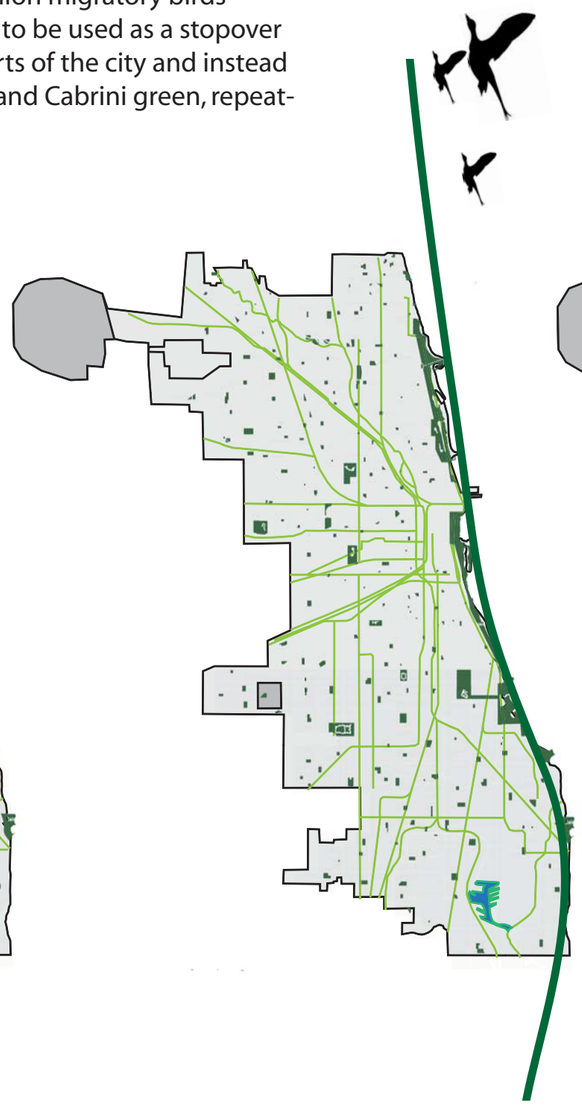


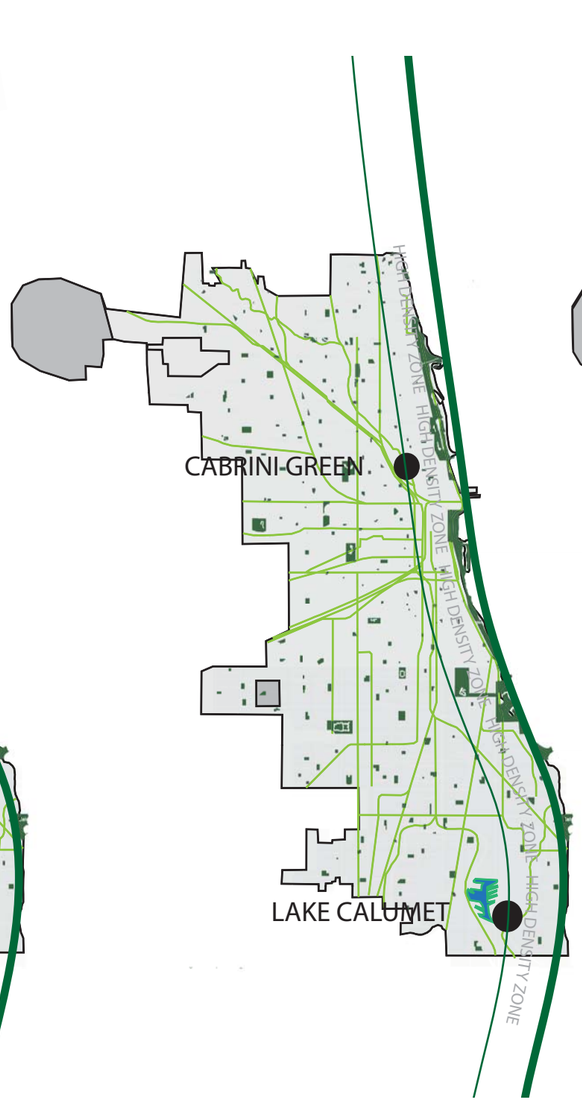


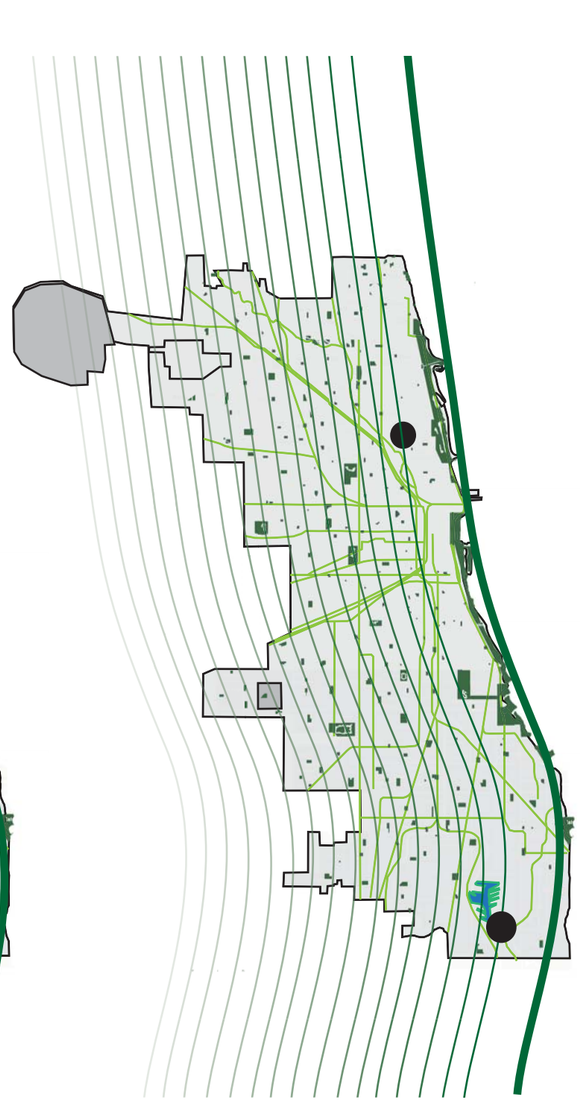
GREENSTRAND CONCEPTUAL PLACEMENT

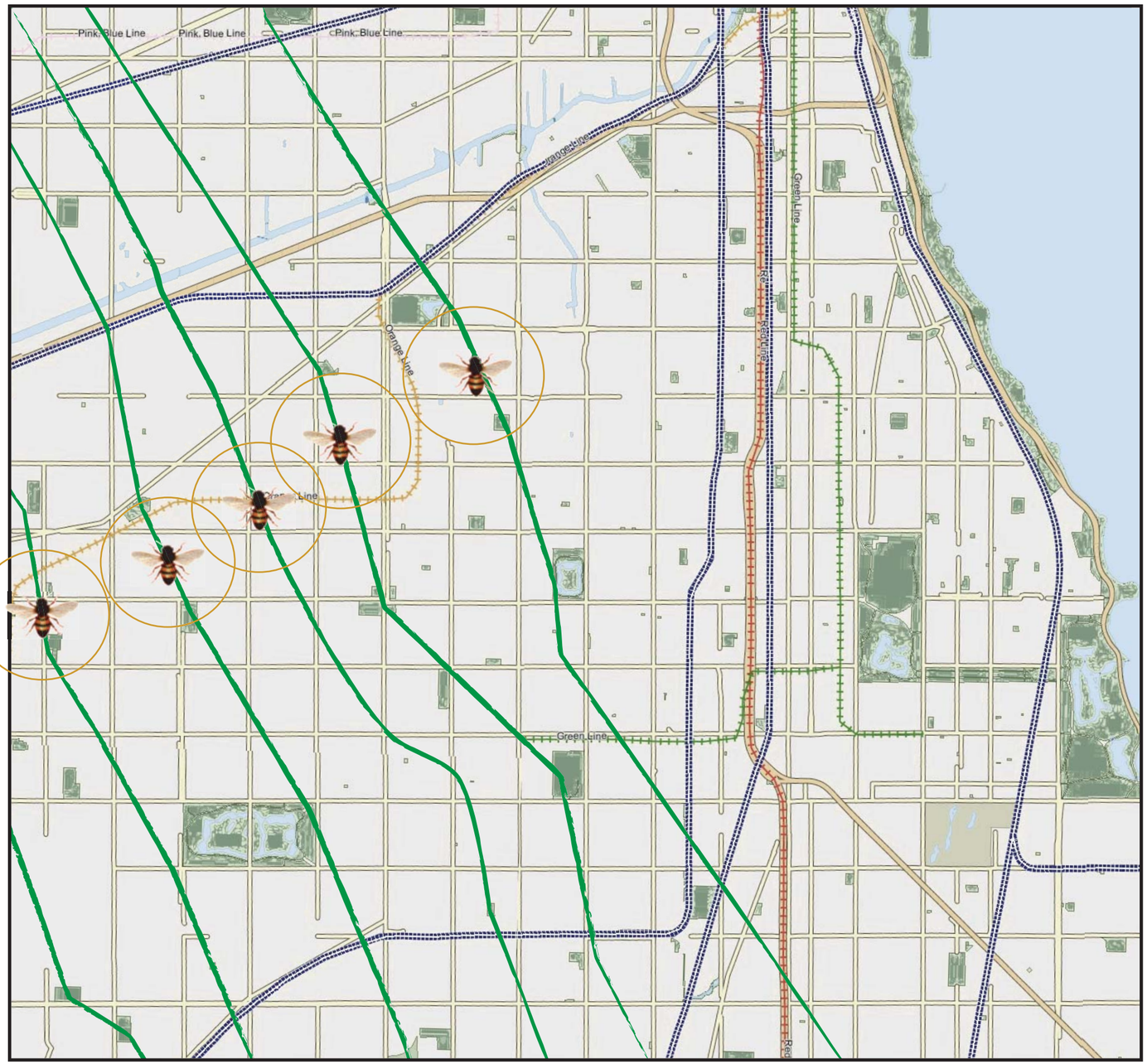
To place the greenstrands that connect the other elements of the greenweb, the line of the Mississippi Flyway was followed through the city. This flyway is a pathway for close to 8 million migratory birds every year and will allow for the greenstrands to be used as a stopover point. The greenstrands avoid the densest parts of the city and instead start on line with the mouth of Lake Calumet and Cabrini green, repeating to the west.





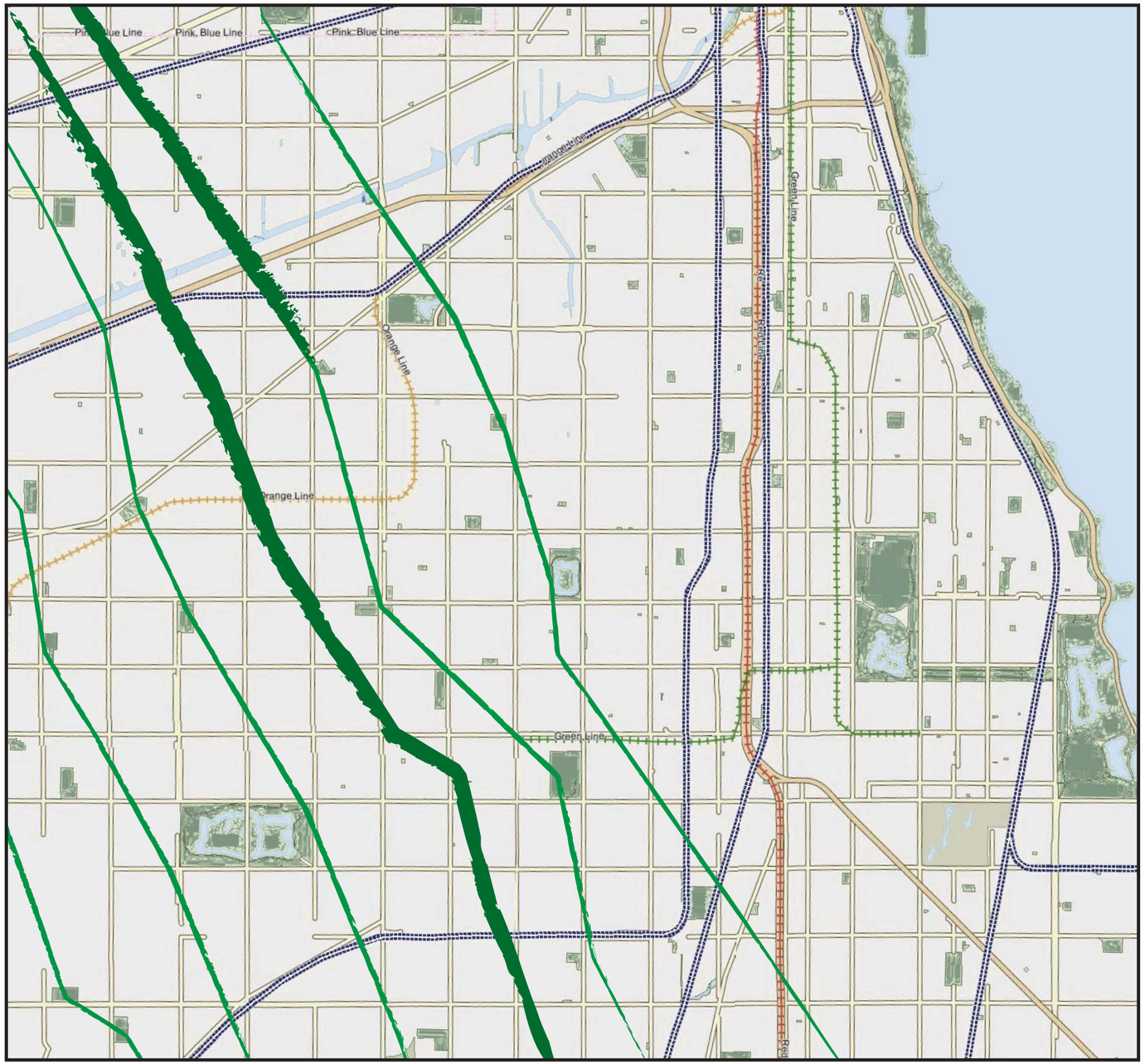








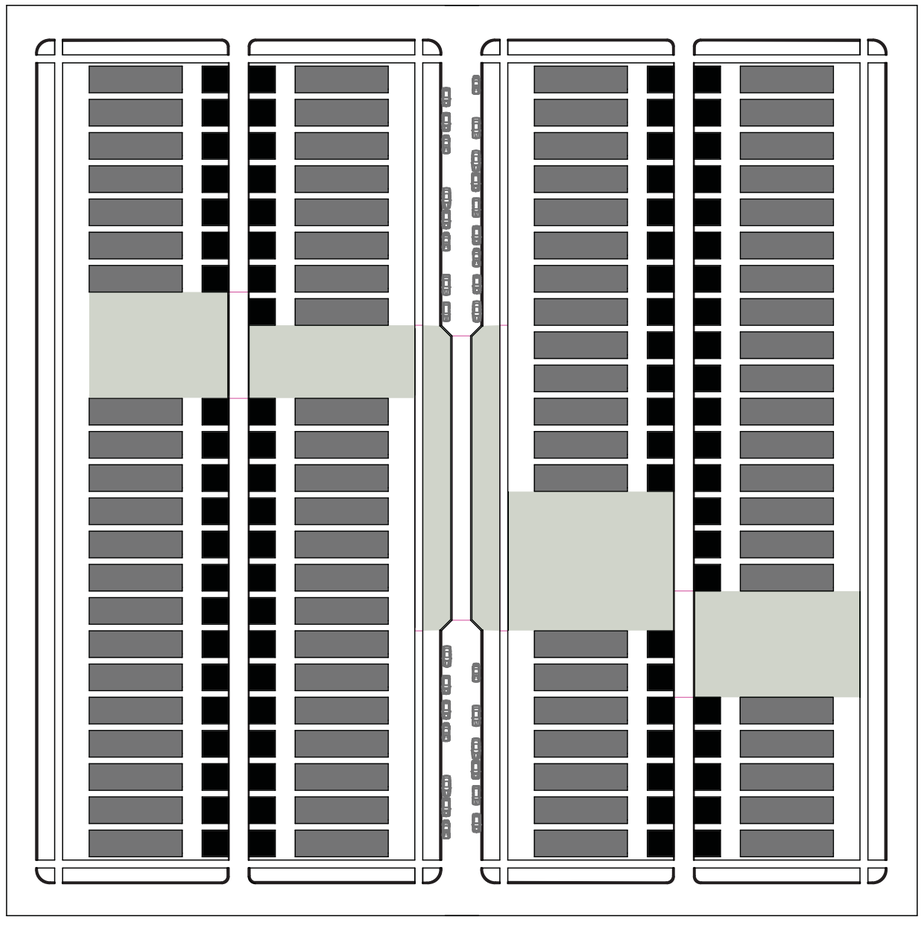
The greenstrands must stray from the lines of the flyway slightly to connect with the different green spaces that create the greenweb. In doing this, the greenstrands begin to undulate, but are always maintaining a distance between relative to the pollination of the honey bee. The honey bee's range is approximated at one half mile, thus the paths are spread apart by a mile. They then make adjustments to connect with parks, railroads, and other green spaces. This ensures that the vegetation on and between the greenstrands has the most opportunity to be pollinated.

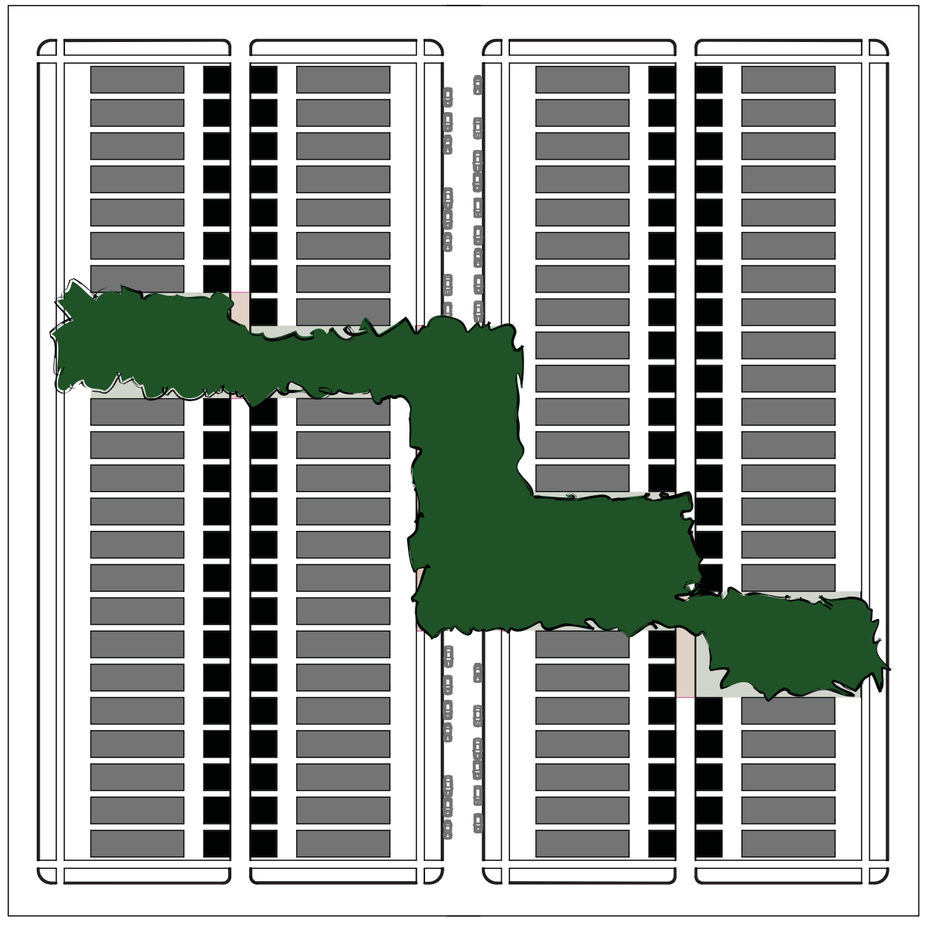




As the greenstrands move, they form major and minor parts of the path, depending on where they intersect the other infrastructure. In parts that cannot connect with park spaces on in many locations, the paths become larger and incorperate park spaces into the program of the path.

RESIDENTIAL BLOCK PLAN





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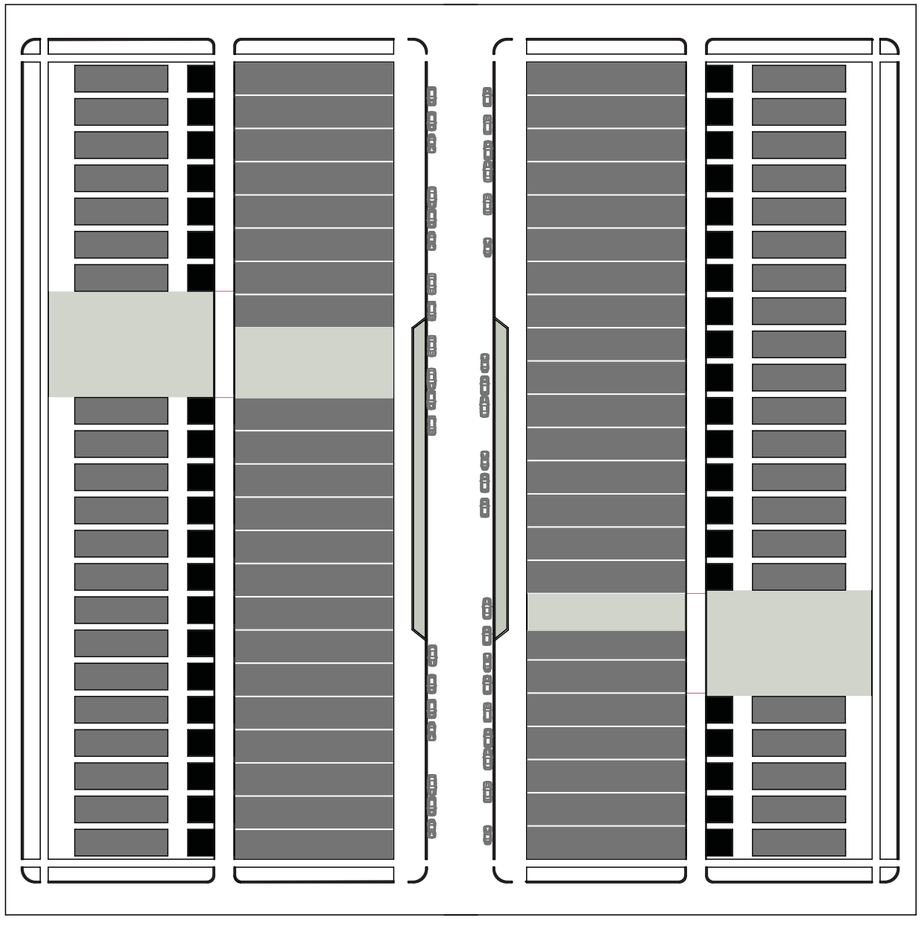
the greenweb
COMMERCIAL BLOCK PLAN



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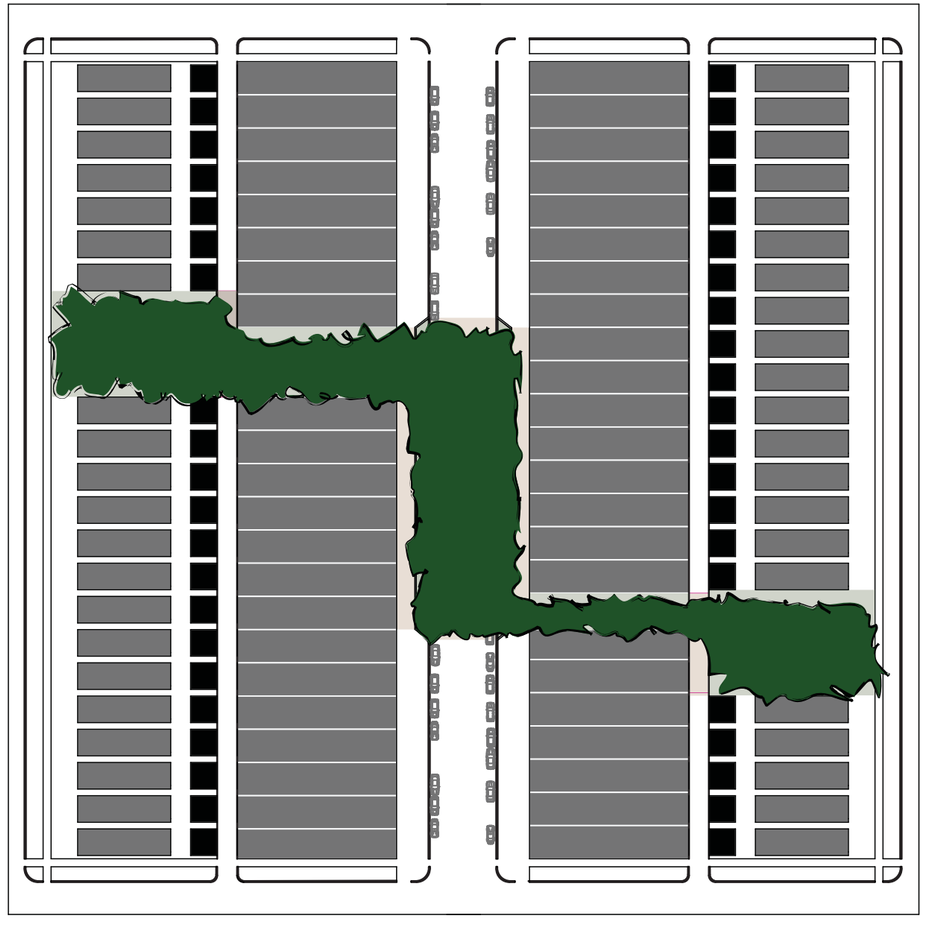


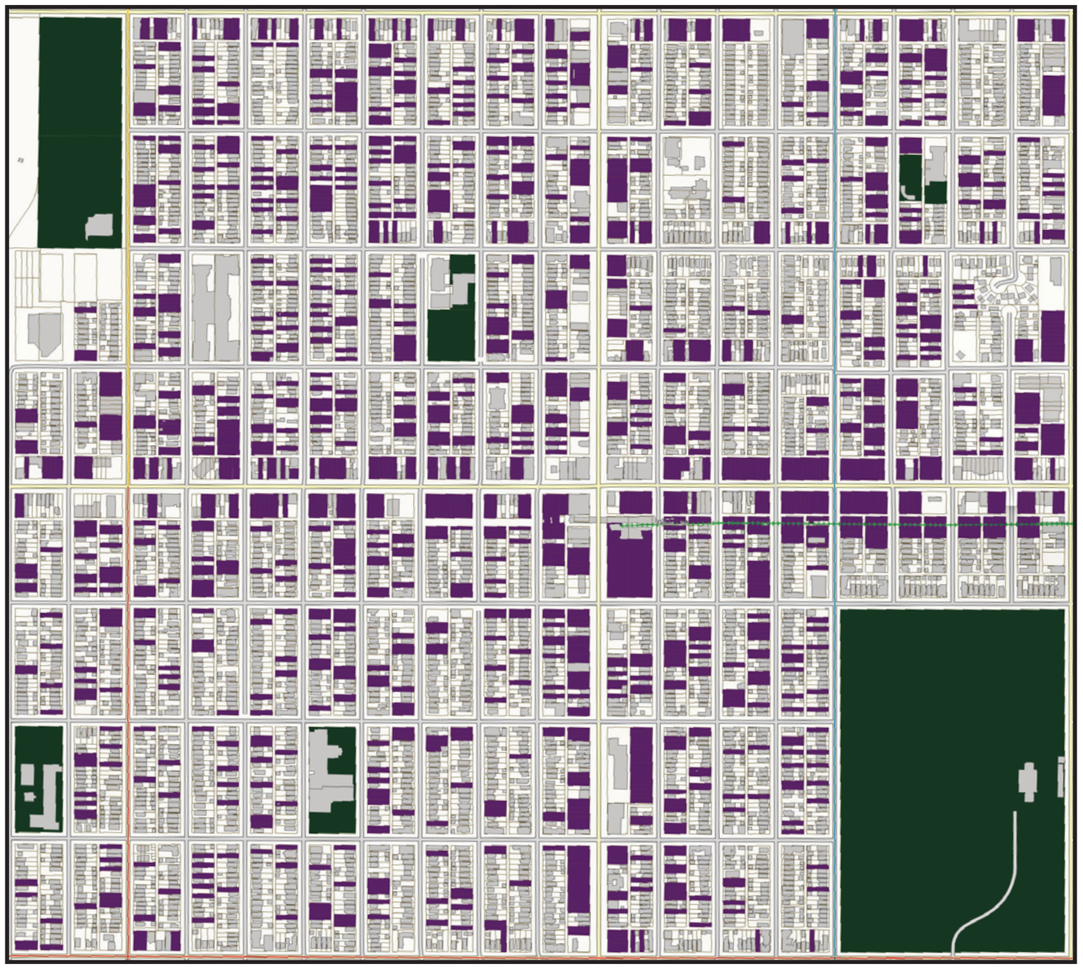
BLOCK PERSPECTIVE



PLANNING DIAGRAMS - WEST ENGLEWOOD

West Englewood is a community on the southwest side of Chicago with 45,000 residents. The area has a reported 487 vacant buildings, and many more empty lots. In areas such as this, the greenstrand can be introduced using vacant and empty lots, and begin to expand from its self into the surrounding area.

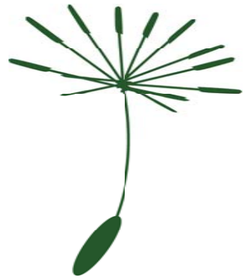
PARKS
EMPTY LOT



GREENSTRAND
PARKS
EMPTY LOT



PLANNING DIAGRAMS - WEST ENGLEWOOD



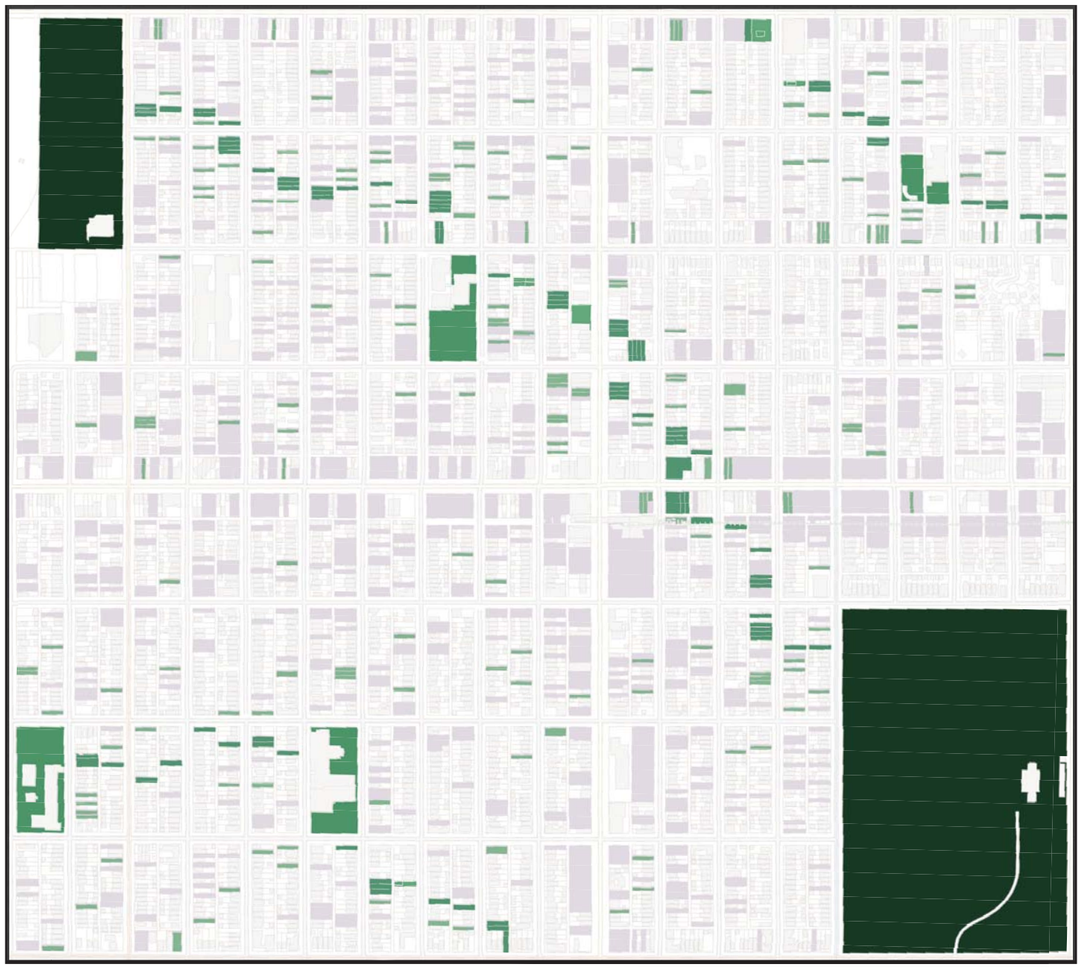
Once the greenstrand has been implemented in a neighborhood, the plants quickly spread to the nearby sites as the seeds propogate. This creates more habitat, as well as filling out the empty lots with lush greenspaces.

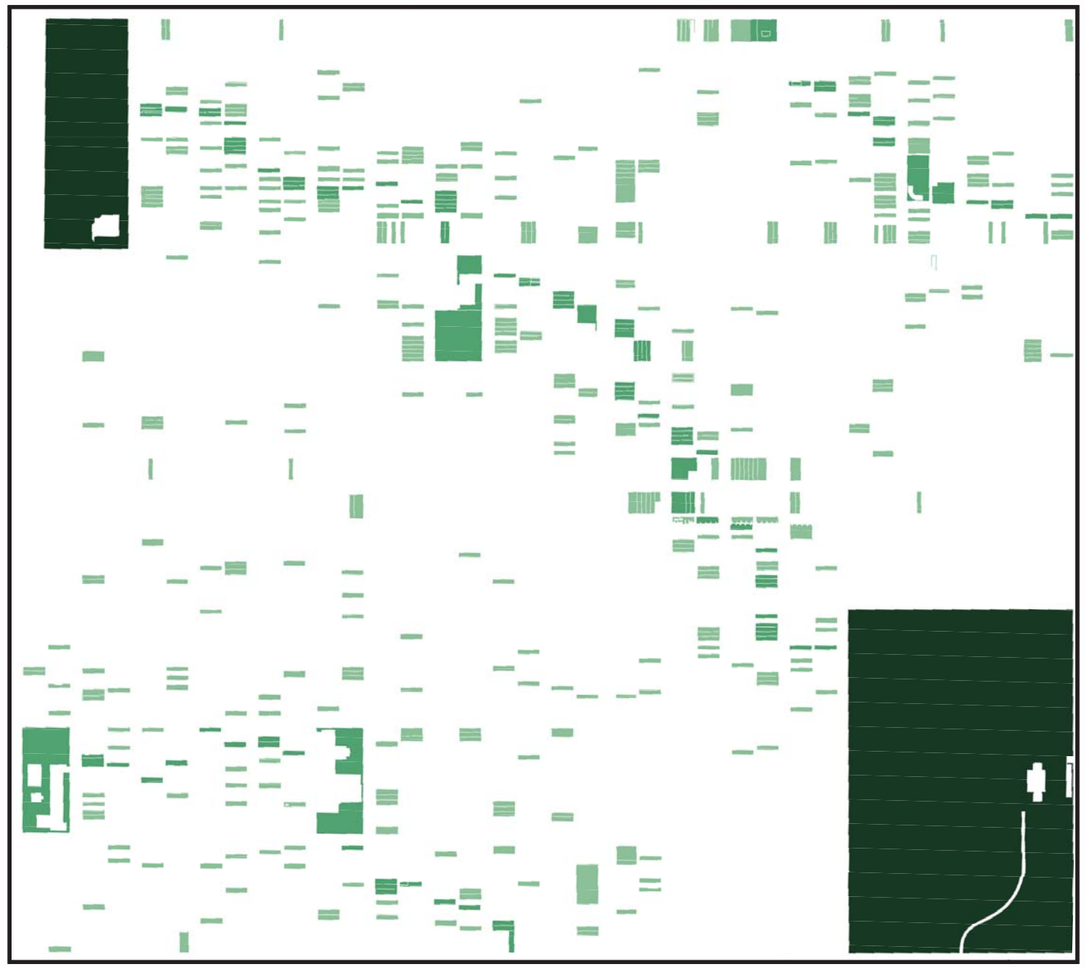
GREENSTRAND EXPANSION
GREENSTRAND
PARKS
EMPTY LOT





PLANNING DIAGRAMS - WEST ENGLEWOOD

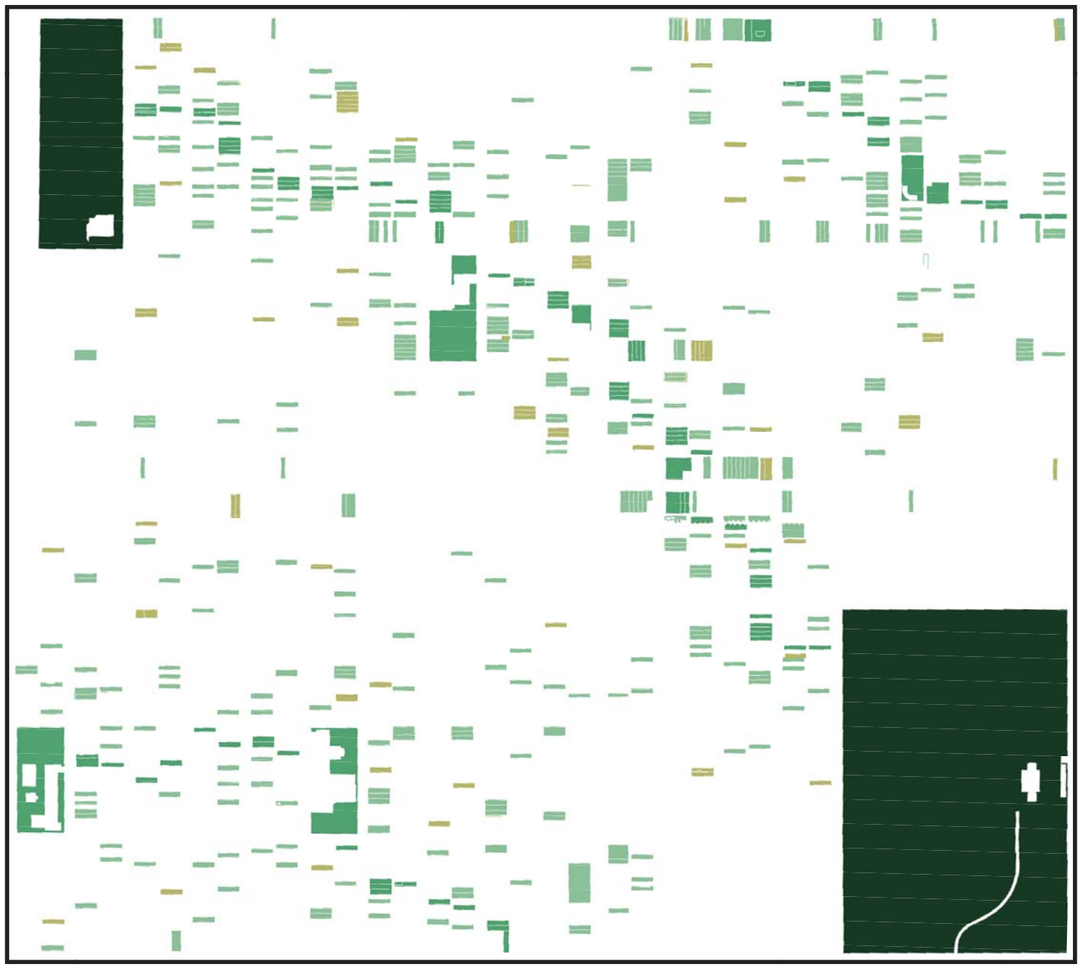


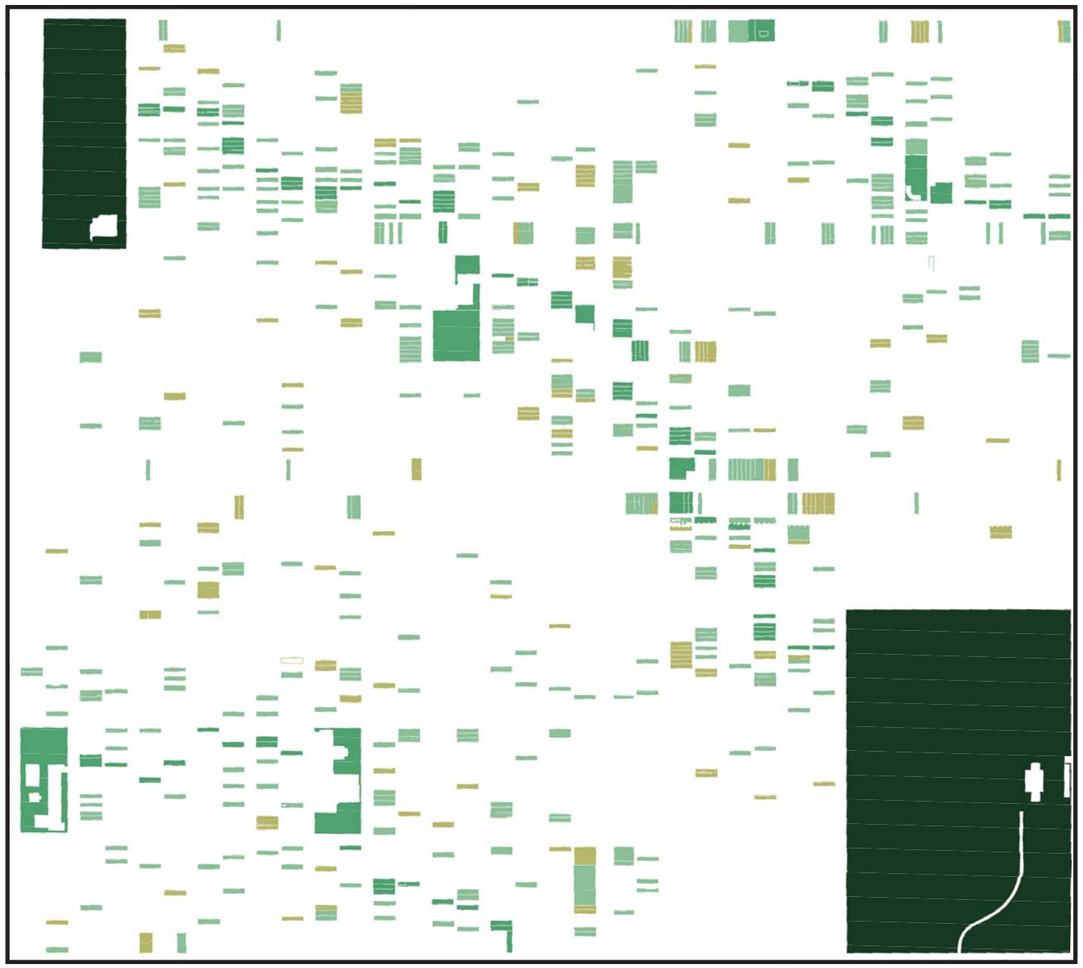


PLANNING DIAGRAMS - WEST ENGLEWOOD

Just as the greenstrands being to expand, the community its self will being to expand from the green paths. This expansion will encompass community programs that are started along the green path and taken into the nearby lots, as well as development of the community as the value of this green space is realized.

COMMUNITY EXPANSION
GREENSTRAND EXPANSION
GREENSTRAND
PARKS
EMPTY LOT





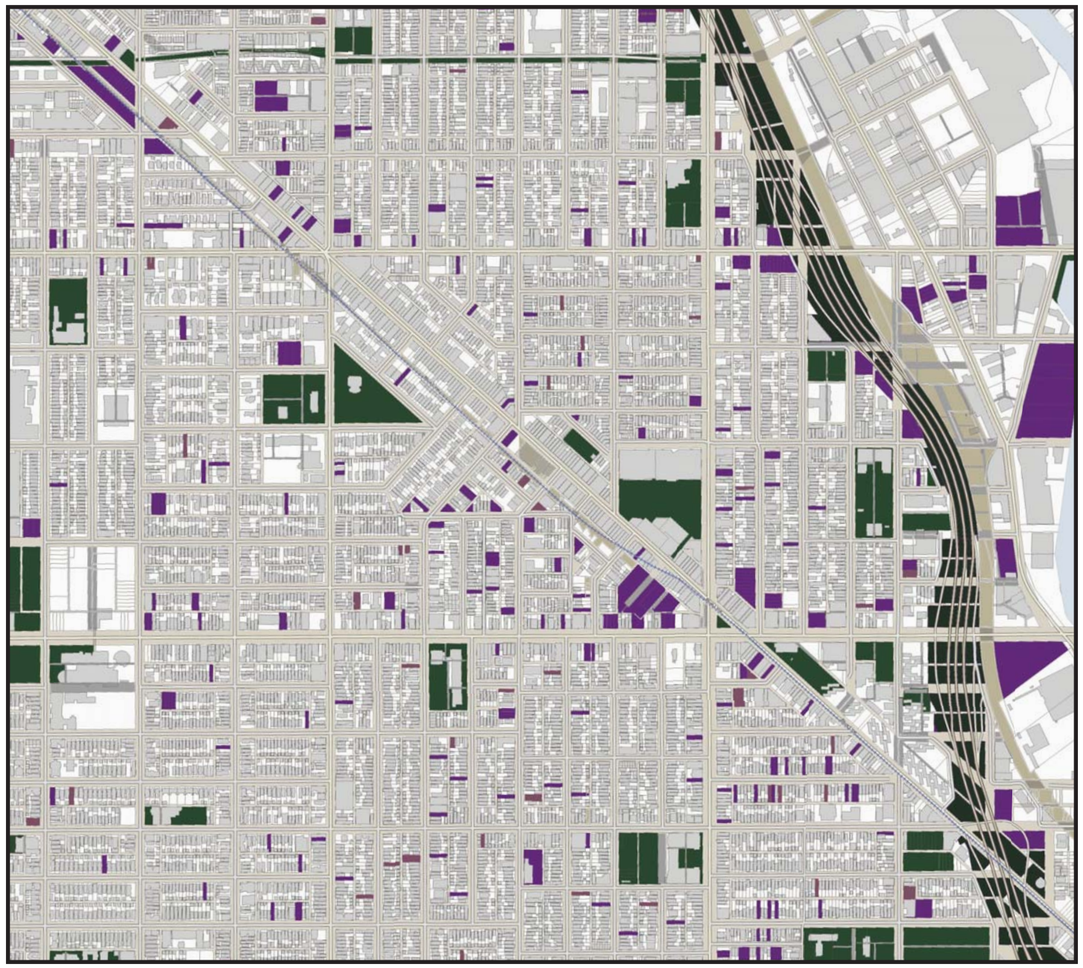
PLANNING DIAGRAMS - WEST TOWN

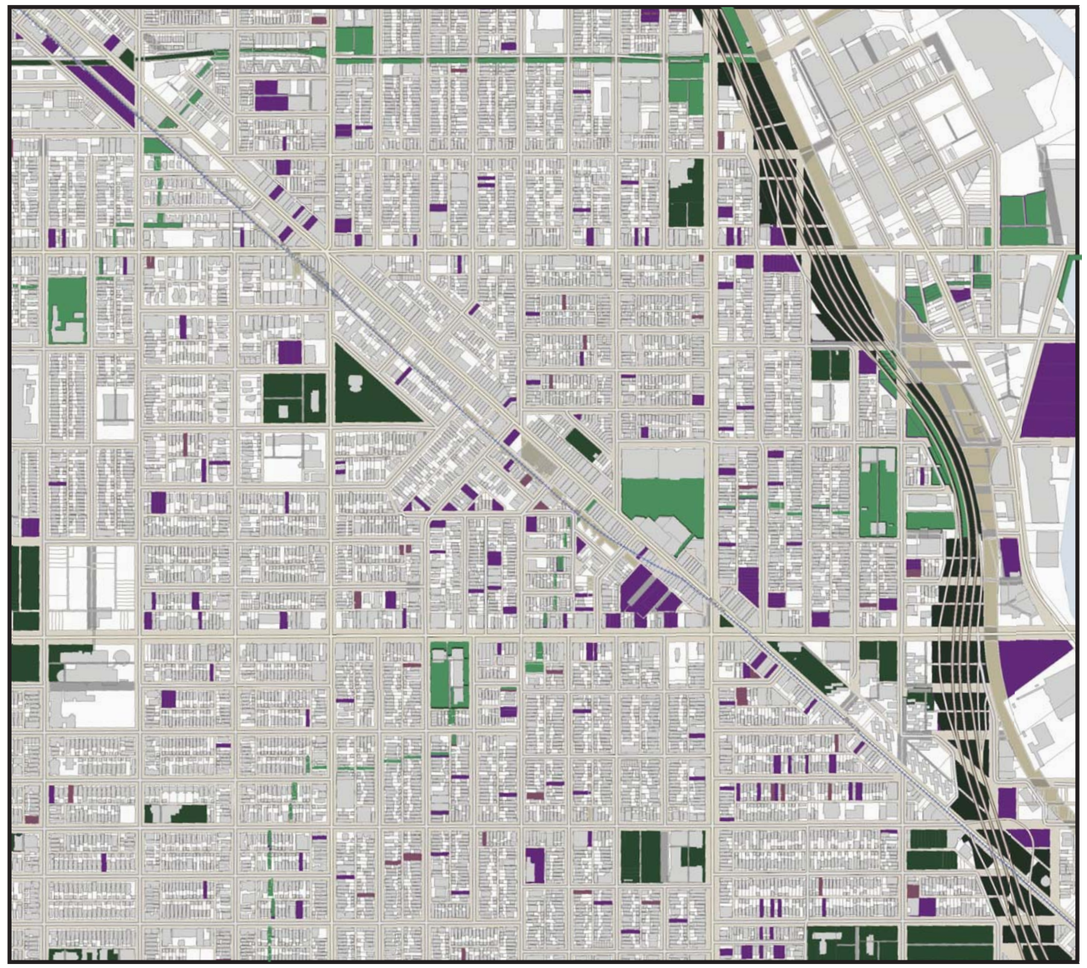
West Town is a community on the northwest side of Chicago with 87,000 residents. The proportion of empty lots is much smaller in this area, so the greenstrands find smaller paths through the city. They rely more on current elements of the greenweb, including abandoned railroad tracks and areas along the highway, as well as incentivised development to make connections.

GREENSTRAND

PARKS

EMPTY LOT

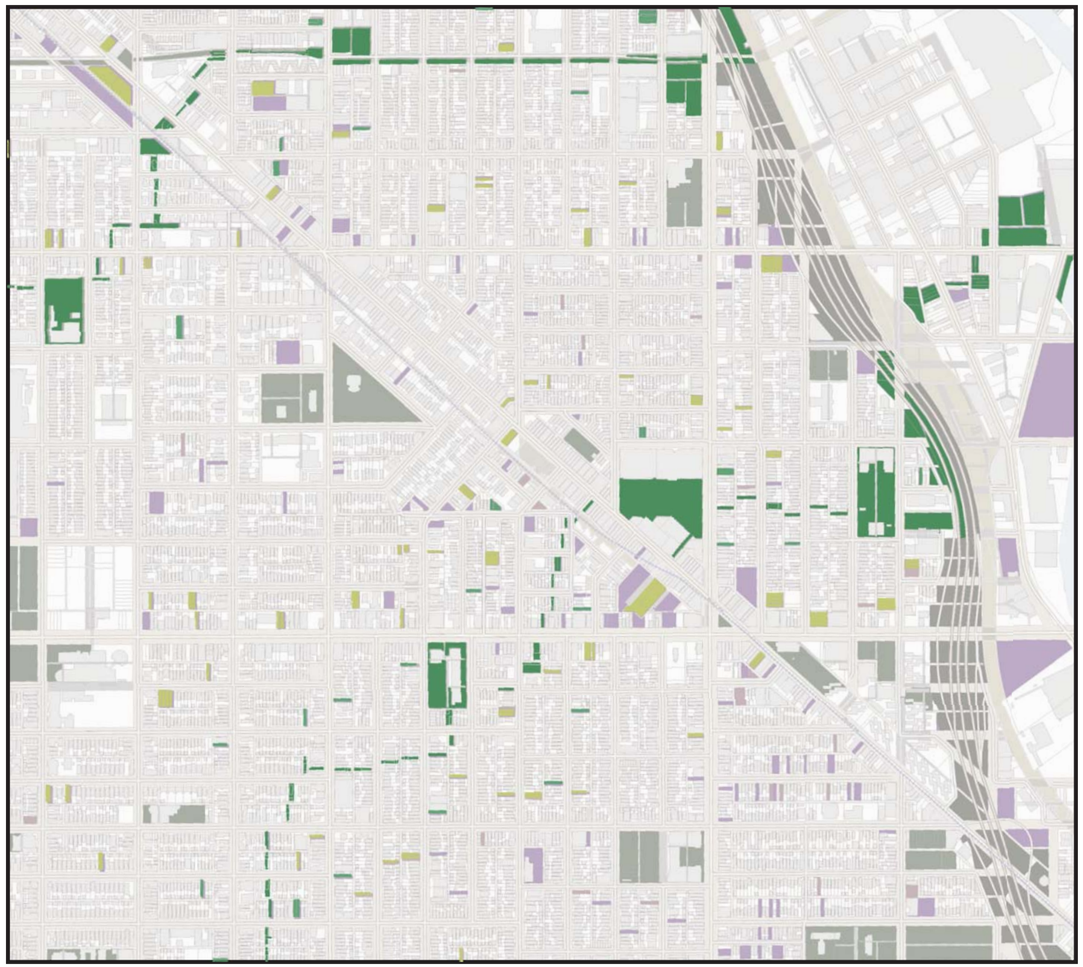


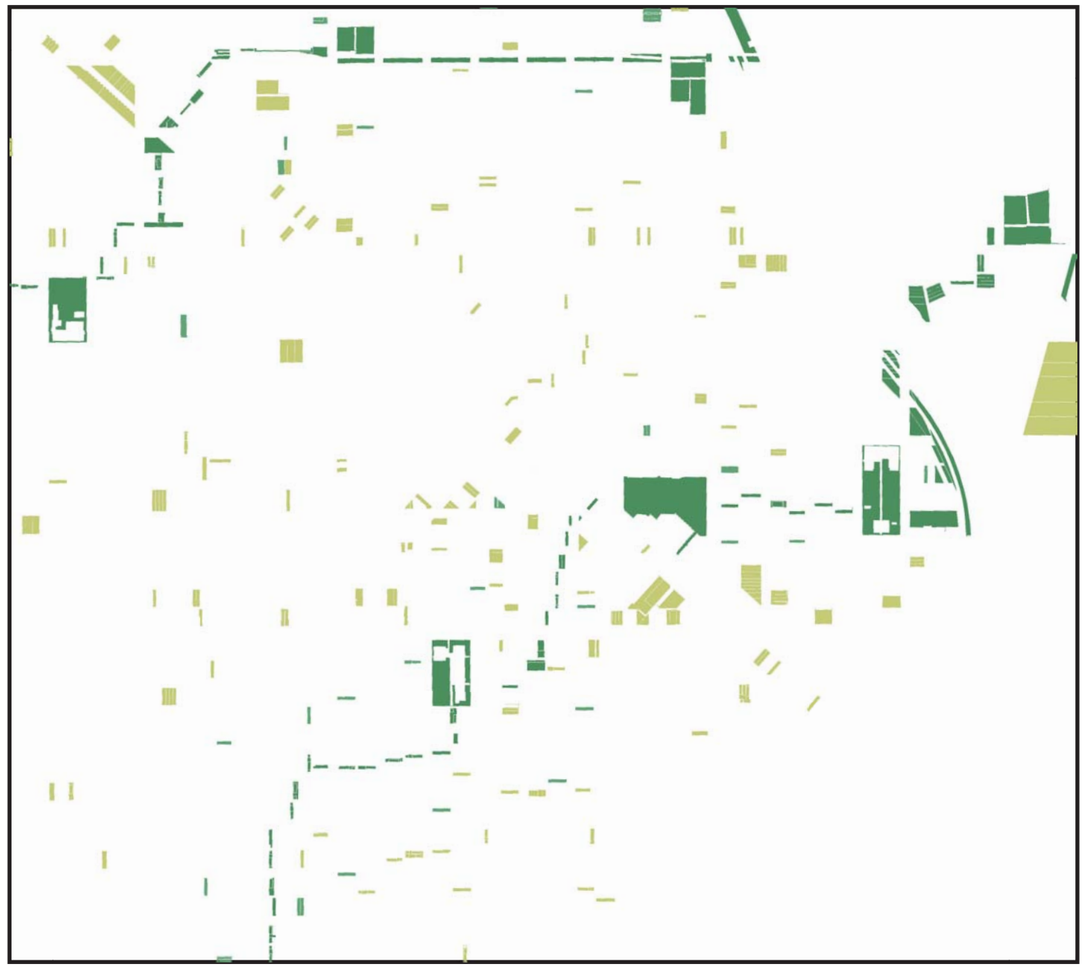


PLANNING DIAGRAMS - WEST TOWN

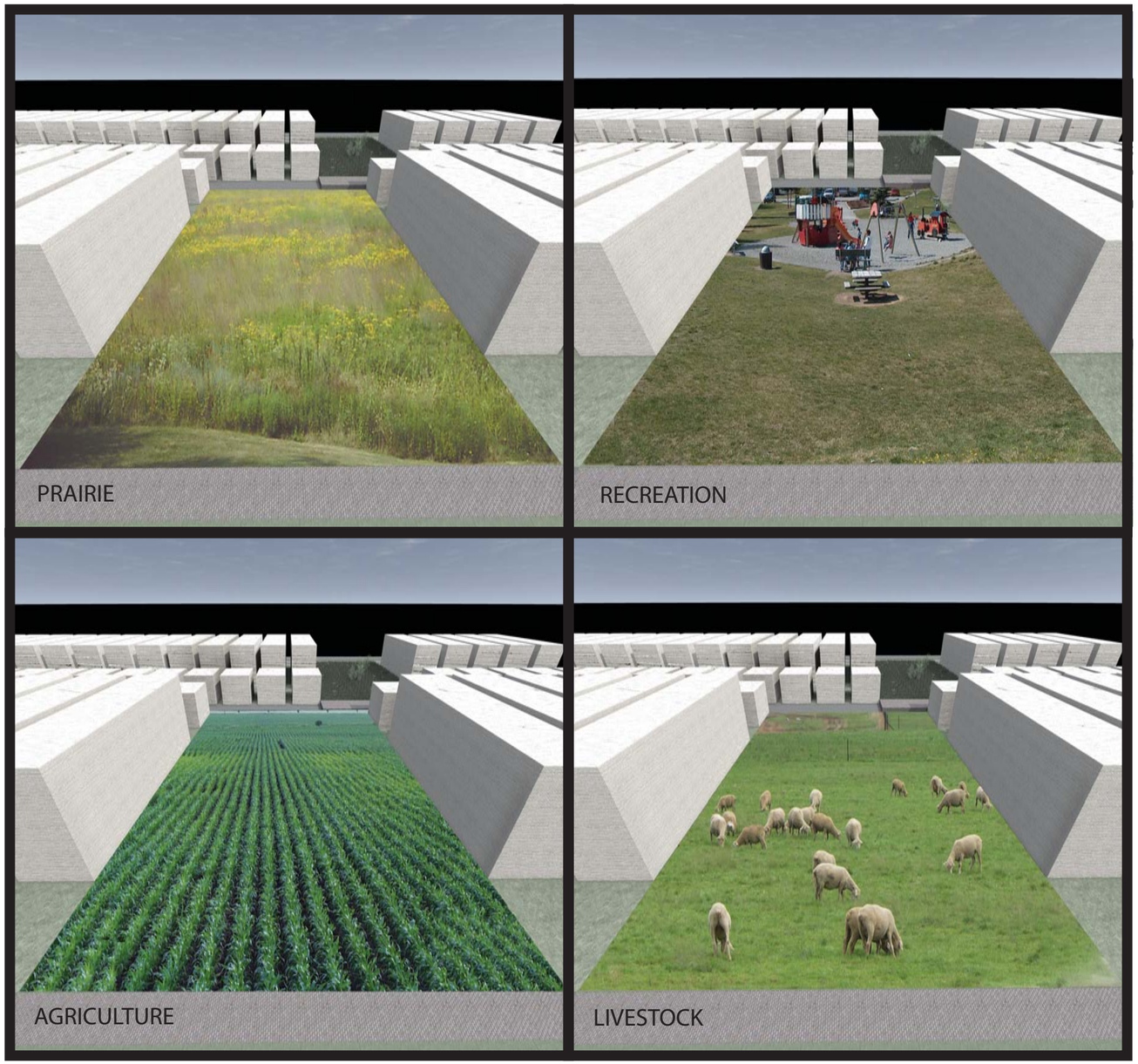
The community surrounding the greenstrand leaves little room for the program to expand from to nearby lots, so the expansion is mostly in the form of the built environment. The incentives for creating the greenstrands, as well as the added amenity to the community drive changes in the build environment.

COMMUNITY EXPANSION
GREENSTRAND EXPANSION
GREENSTRAND
PARKS
EMPTY LOT





One of the challenges of the greenweb is to find the balance of the spaces within to both encourage biodiversity through the paths, as well as meet the needs of the community served. Different spaces support a varying amount of biological life, and finding a balance with the surrounding area will be one of the biggest tasks in maintaining the system. Recreational facilities, which tend to support lower levels of biodiversity, will need to be placed close to natural prairie and forest patches along the network. These relationships will change over the life of the greenweb, and will need to be monitored and analyzed as the path continues its development.



CURRENT URBAN AGRICULTURE INITIATIVES

GROWING POWER

Teach leadership and entrepreneurial skills, as well as organic agriculture, to school age children while providing access to healthy food for all communities.

WINDY CITY HARVEST

Grow on unused laEnd on south and west side, while providing job education to young adults.

CITY FARM

Provide after school programs and summer programs to students to learn business, agriculture, and other life skills.

GROWING HOME

Grow food to feel the homeless and low-income individuals, while providing transitional employment opportunities.

GINKO ORGANIC

Urban farmers that grow and donate food to local non-profits.

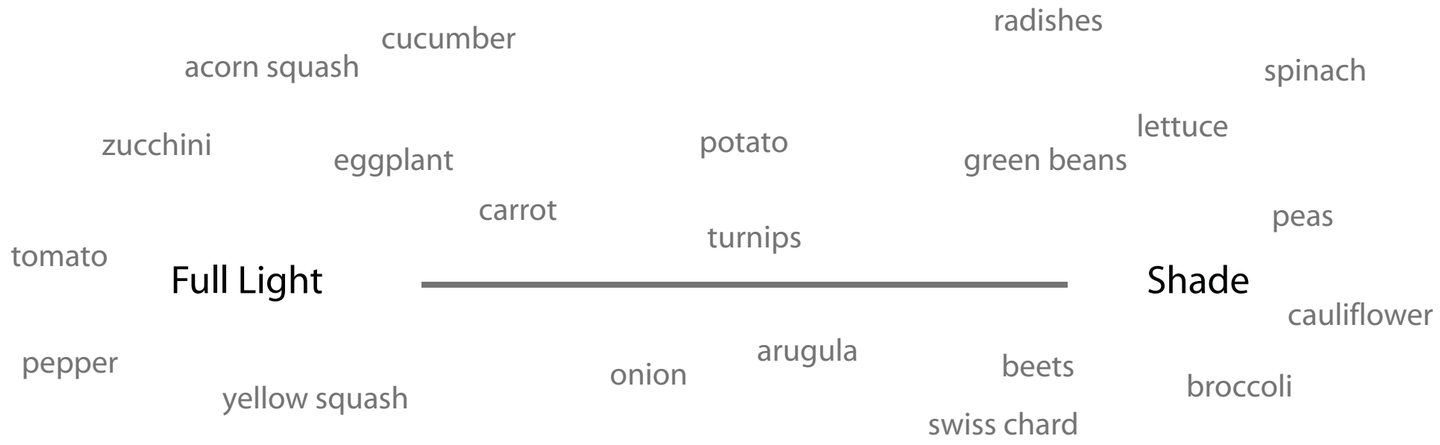


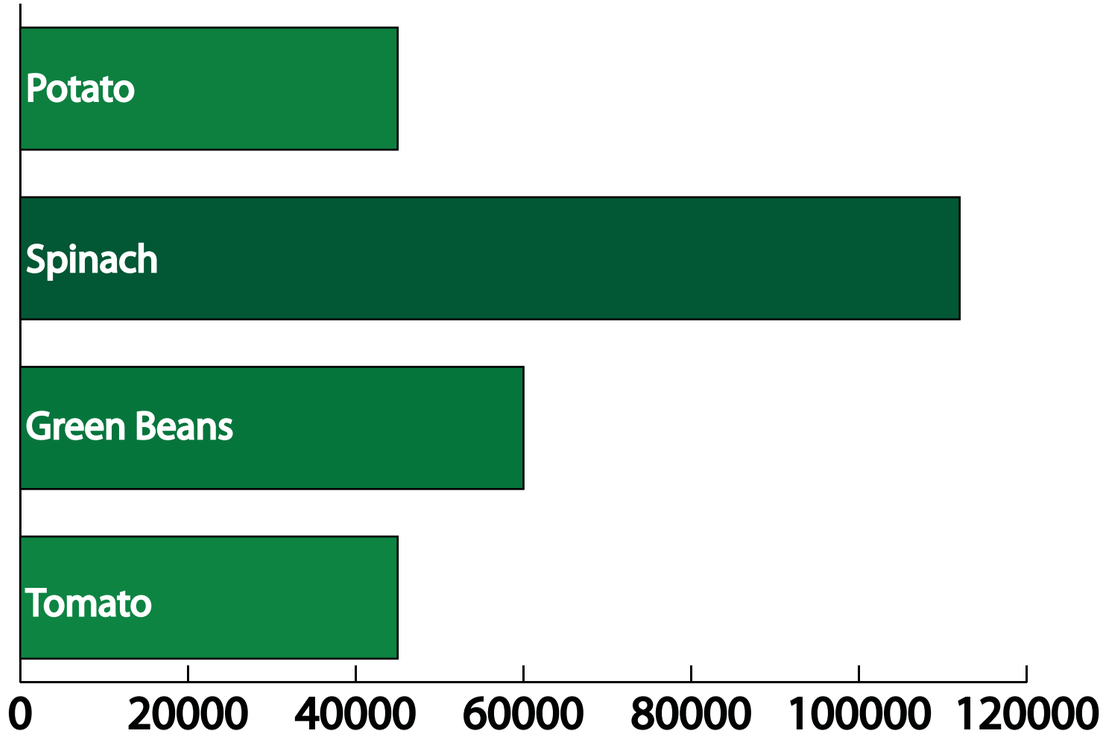







URBAN AG: 7,500 - 20,000 lbs per acre
RURAL AG: 2,000 - 40,000 lbs per acre


radishes
cucumber
acorn squash
spinach
lettuce
zucchini
eggplant
potato
green beans
carrot
peas
turnips
tomato
Full Light
Shade
cauliflower
pepper
arugula
onion
beets
broccoli
yellow squash
swiss chard

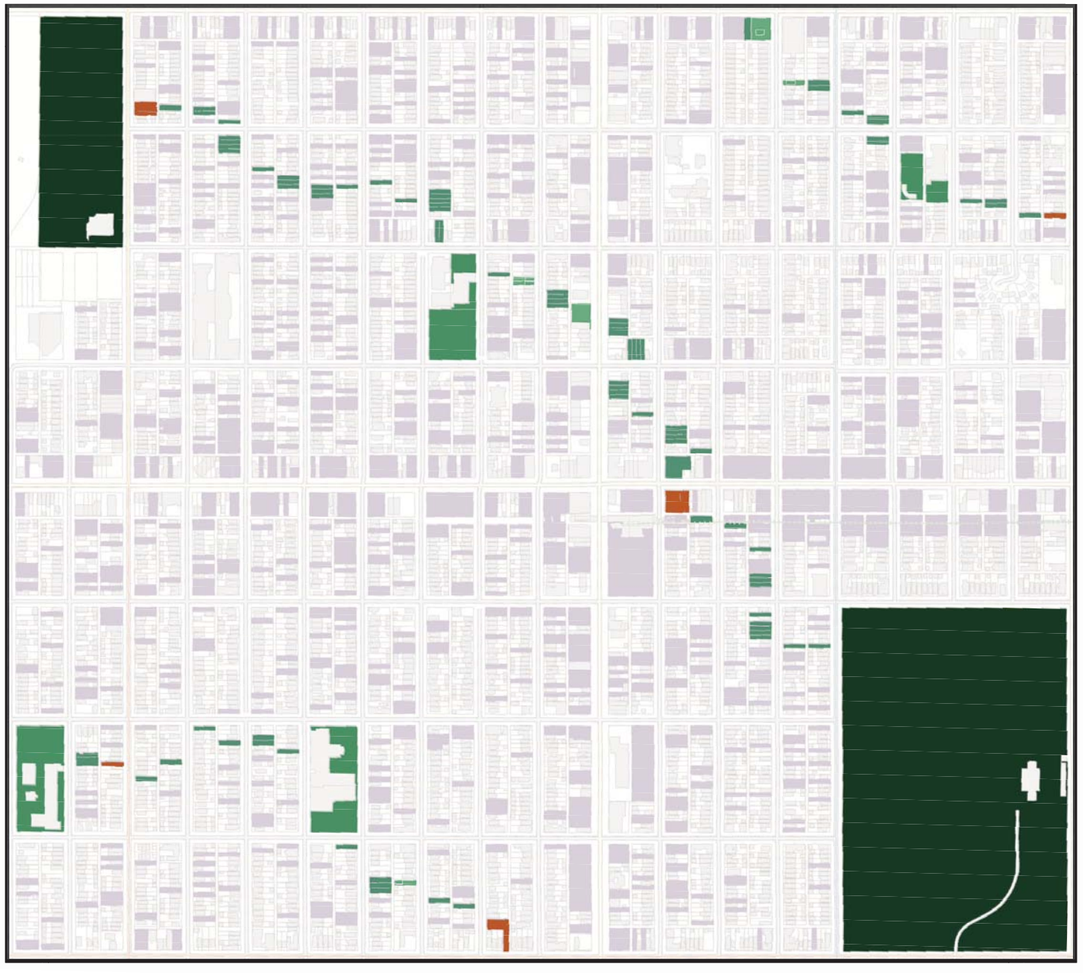

SERVINGS PER ACRE
Potato
Spinach
Green Beans
Tomato
0
20000
40000
60000
80000
100000
120000

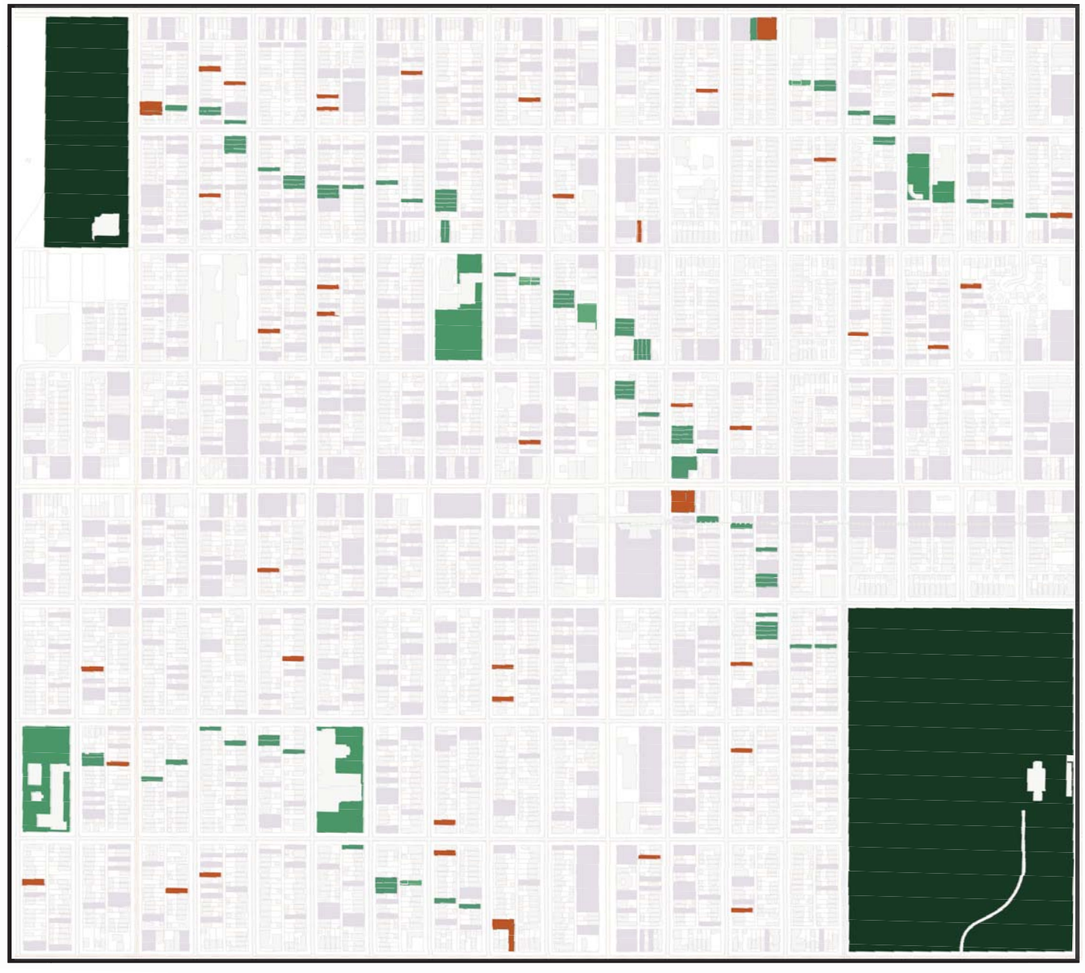

For 10% of strands being agriculture:
70 acres
.04% of the land in Chicago
5,200,000 servings of vegetables

AGRICULTURE NODES

Once agriculture organizations start operations on the green-strand, the operations expand into the empty lots in the surrounding area, both under the care of the organization and started independently with the help of these groups.

AGRICULTURE





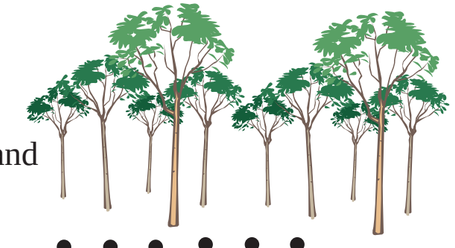




CHICAGO DEPARTMENT OF URBAN ECOLOGY
HORTUS PER URBS
ESTABLISHED 2010

To administer the greenweb infrastructure, a new city department called the Chicago Department of Urban Ecology will be created. This department will maintain and guide the development of the infrastructure as it grows. At full size, this department is estimated to be 150 people strong with 900 acres under its control. The controlling entity will be the board of directors, who will appoint the superintendant and lead officials of the department.

900 acres of land



150 employees





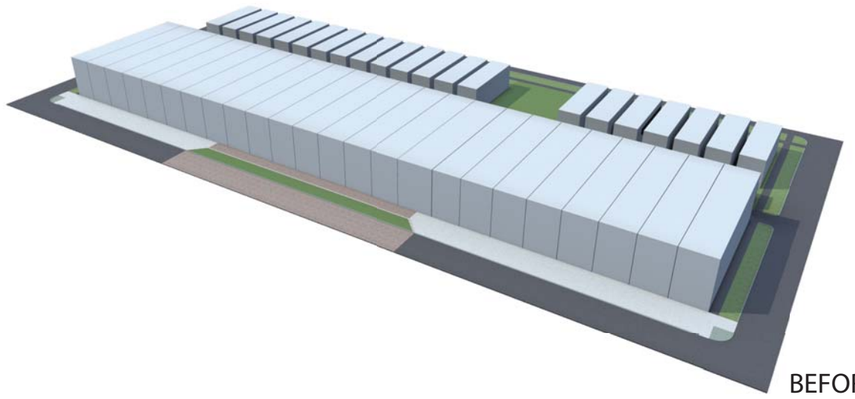
ALDERMAN

Brings community proposals to the board, as well as working with community members on proposals within the greenweb master plan.

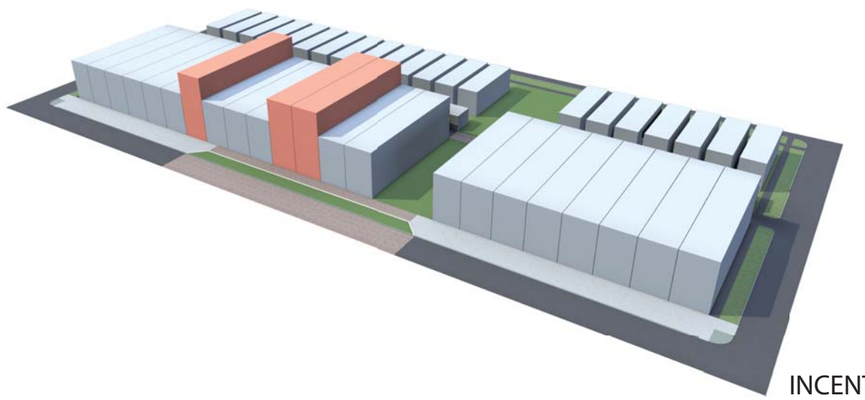
BOARD OF DIRECTORS

The board of directors creates and maintains a master strategy for the greenweb network. This plan is updated at regular intervals as the program deviates from the plan. The board is also responsible for making decisions about the direction of the greenweb, based on research from the department and outside sources. A vote is called for by the board when a proposal outside of the greenweb strategy is presented by an alderman.

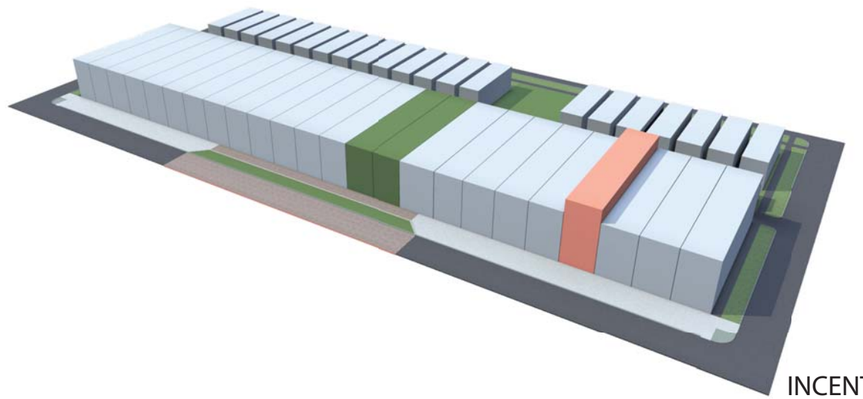
DEVELOPMENT PLAN



BEFORE REDEVELOPMENT



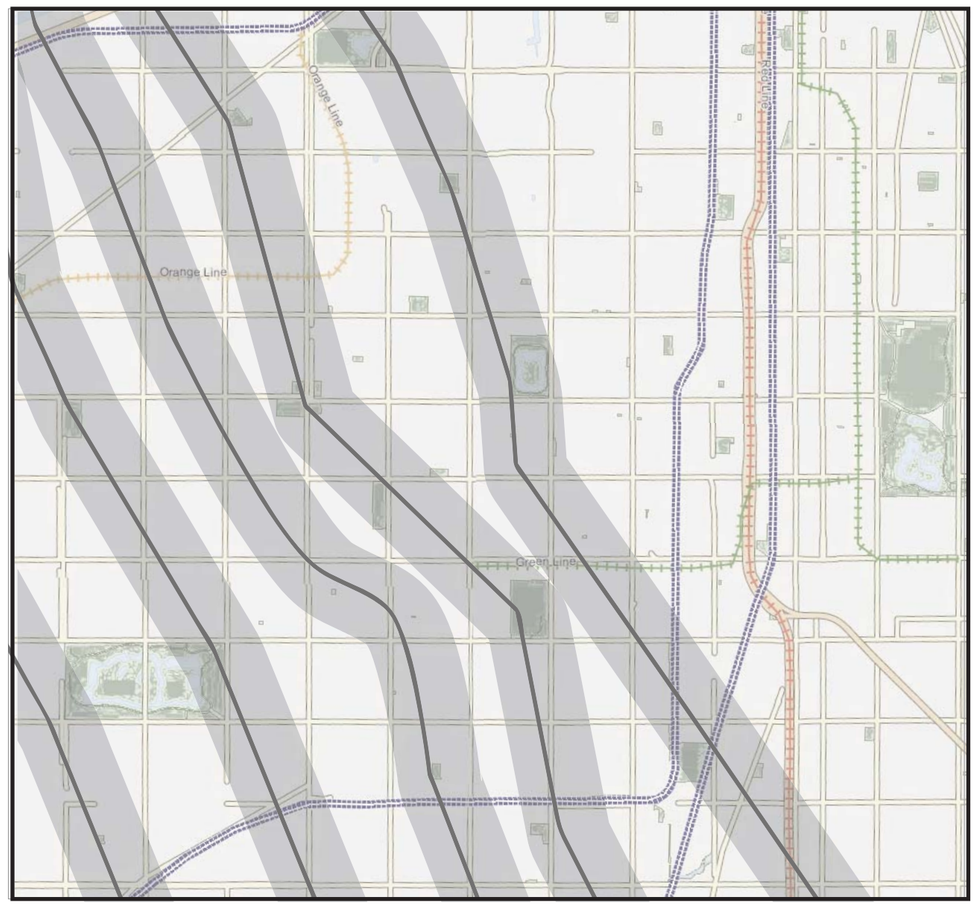
INCENTIVE SCENARIO A



INCENTIVE SCENARIO B

In dense areas the city will need to work with private ententies to develop strategies for the implementation of the greenstrands. FAR bonuses will be given (see diagrams left) for redevelopment of sites into conforming uses. This FAR bonus can be used within a half mile range of the greenstrand that is contributed to.

ZONE FOR TRANSFER OF FAR



DEPARTMENT OFFICIALS

SUPERINTENDANT: Appointed by the board. Responsible for the oversight of the Greenweb system, and management of the department. Acts as head of the board and votes only when there is a split vote from the rest of the board.

ACQUISITIONS OFFICER: In charge of the acquisition of land to add to the greenweb and future greenweb sites. Oversees the growth strategy for the organization. Negotiates with private parties for incentivised development involving greenweb land.

PRESERVATION OFFICER: Runs the maintenance and upkeep of the resources under control of the department. Makes sure the lands are safe, healthy, and supportive of their individual tasks.

ECOLOGY& HABITAT OFFICER: In charge of research on the greenwebs. Collects data on the natural environment to analyse health and diversity of the lands under control of the Department of Urban Ecology. Also coordinates the research of outside institutions.

EDUCATION & INFORMATION OFFICER: The marketing of the greenweb is very important to it's success. This officer is in charge of working with schools to integrate the study of the greenweb into the school curriculum. They will also be in charge of marketing and community group organization for the greenweb.

BOARD MEMBERS

CHICAGO DEPARTMENT OF NATURAL RESOURCES HEAD

ILLINOIS DEPARTMENT OF NATURAL RESOURCES HEAD

CHICAGO DEPARTMENT OF THE ENVIRONMENT HEAD

UIC BIOLOGY DEPARTMENT HEAD

ILLINOIS CONSERVATION POLICE CHIEF

CHICAGO HIGH SCHOOL FOR AGRICULTURE SUPERINTENDANT

CHICAGO DEPARTMENT OF URBAN ECOLOGY

WANTED: GREENWEB SPECIALIST

OUR MISSION is to provide for the integration of urban life and our natural resources. We nurture this relationship through our "Greenweb" system in Chicago that connects the natural and semi-natural spaces in the city. These connections allow for movement of the species throughout the city to enhance biodiversity and support a thriving ecosystem.

OPEN PERIOD: 5/1/2010 - 6/1/2010
POSITION INFORMATION:
SALARY: DOE

SKILLS REQUIRED:
- Knowledge of native Illinois species and ecosystems
- Experience with invasive species management
- Management experience a plus
- Botanical Survey knowledge a must
- Proven track record of natural resources management

EDUCATION:
- B.S. in Biology, Ecology, or related field





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