The **APA Sustainable Communities Division supports planners** who are committed to planning for **sustainable communities** by **integrating all aspects of sustainability** into our work through the combined **economic, social, and ecological factors** that shape our communities.

# SUSTAINABLE COMMUNITIES DIVISION

APA

Sustain

# Thank you to the 2016-2017 Sustainable Communities Division Sponsors!













# Division Contact Information

- **Official Website**: planning.org/divisions/sustainable
- **Blog** (sign up for e-bulletin): www.sustainableplanning.net
- **LinkedIn**: APA Sustainable Communities Division
- **Facebook/Twitter**: APASCD
- **Scott Turner, SCD Chair**: APASCD@gmail.com
- **Jenny Koch, SCD Secretary-Treasurer**: Jennifer.K@Rhodeside-Harwell.com

SUSTAINABLE COMMUNITIES DIVISION

APA Sustain

# Today – Regenerative Urbanism Rising: Next-Generation Practice

- **Scott T. Edmondson, AICP** – Strategic Sustainability Planner-Economist, San Francisco Planning Department, CA
- **Joshua Foss** – President at The Ecala Group, Minneapolis, MN
- **Charles Kelley, AIA** – Associate Partner at Zimmer Gunsul Frasca (ZGF) Architects, LLP, Portland, OR

SUSTAINABLE COMMUNITIES DIVISION

APA Sustain

# Regenerative Urbanism Rising
# NEXT GENERATION PRACTICE


*P*

*planning webcast series*

*July 15, 2016 (click)*

**Scott T. Edmondson, AICP** | SF Planning
**Joshua Foss** | The Ecala Group
**Charles Kelley** | ZGF Architects LLP

*A By-right Session | Sustainable Communities Division | APA National Conference 2016*

# Agenda

- Introduction
- The Necessary Sustainability "Pivot"
- Planning Restorative, High-Performance Places
- Implications for Planning
- Discussion

# Team

**Scott T. Edmondson, AICP** | SF Planning

- A strategic sustainability planner-economist
- Planning urban systems sustainability

**Joshua Foss** | The Ecala Group

- A restorative urban development strategist
- “Making” a market to go beyond best-practices

**Charles Kelley** | ZGF Architects LLP

- An architect and urban design innovator
- 30-year pioneer designing high performance districts

# APA

## National — Sustaining Places Initiative

- Context
- Focus: Sustainable ”Comp” Plans
  - PAS 578 — Best Practices

## Sustainable Communities Division (SCD)

- Members? Join!
- SCD’s Mission: An Integrative Approach
  - Planning “as” sustainability, not a separate silo
  - Need to develop that Integrative Framework

# Today we hope to illuminate…

**The Challenge** | Restore the planet *AND* prosper

**The Need** | "Pivot" from "less bad" to "good"

**Planning's** emerging "regenerative" response

**Our Method** | Recognize, Pivot, Amplify!

**Our Value Proposition—Leapfrog to sustainability**

- Lead sustainability with better places, *what people value*
- Enabled by and paid for with regenerative design
- The built environment as key part of sustainable economy

# This session arose . . .

**From a search** for effective approaches for SF

**Options were limited:**

- Codifications of traditional planning/good enviro.
- Ad-hoc greening, often focused on strategic econ devel
- One Planet Framework
- Living Building Challenge
- Living Cities Green Roof/Walls
- The Natural Step's ICSP & Neighborhoods programs
- The *exploding* EcoDistricts approach.

**Found** Josh and Charles work, recognized the theme of regeneration, and started exploring the potential.

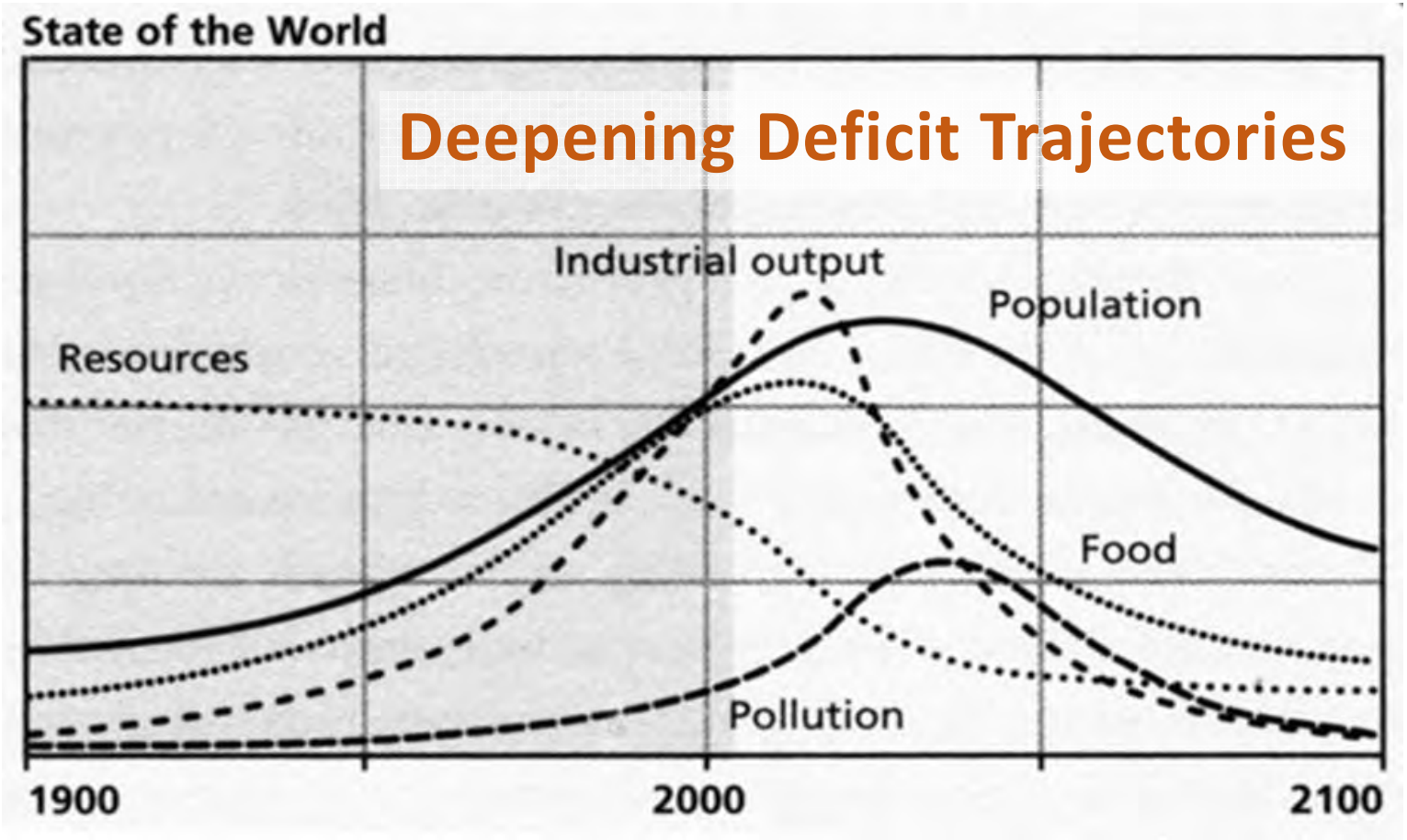
**Invite you** into that exploration with this session.

# The Necessary Sustainability Planning "Pivot"

## From Net Negative Mitigation to Net Positive Regeneration

# Reality is Clear

## FACING END-OF-INDUSTRIAL AGE CHALLENGE



# 5 Key Trends

## END-OF-INDUSTRIAL AGE CHALLENGE

1. **Unprecedented Population Growth & Level**
   - 50% in 50 years
   - 6B to 9B+ by 2050
   - Current economy supports only 20%

2. **An Economy in Ecological "Overshoot"**
   - 1.5 earths now
   - 3 by 2050
   - Can't happen

# 5 Key Trends

## END-OF-INDUSTRIAL AGE CHALLENGE

3. **Crashing Global Ecosystems**
   - Liquidating Natural Capital calling it net profit

4. **Catastrophic BAU Climate Trajectory**
   - +0.3–4.8$^{o}$C global warming by 2100+

5. **Fraying Society & Growing Inequality**

**These trends will affect all local communities *directly or indirectly*.**

**Therefore, need to respond, prepare.**

# Trends Cannot Continue

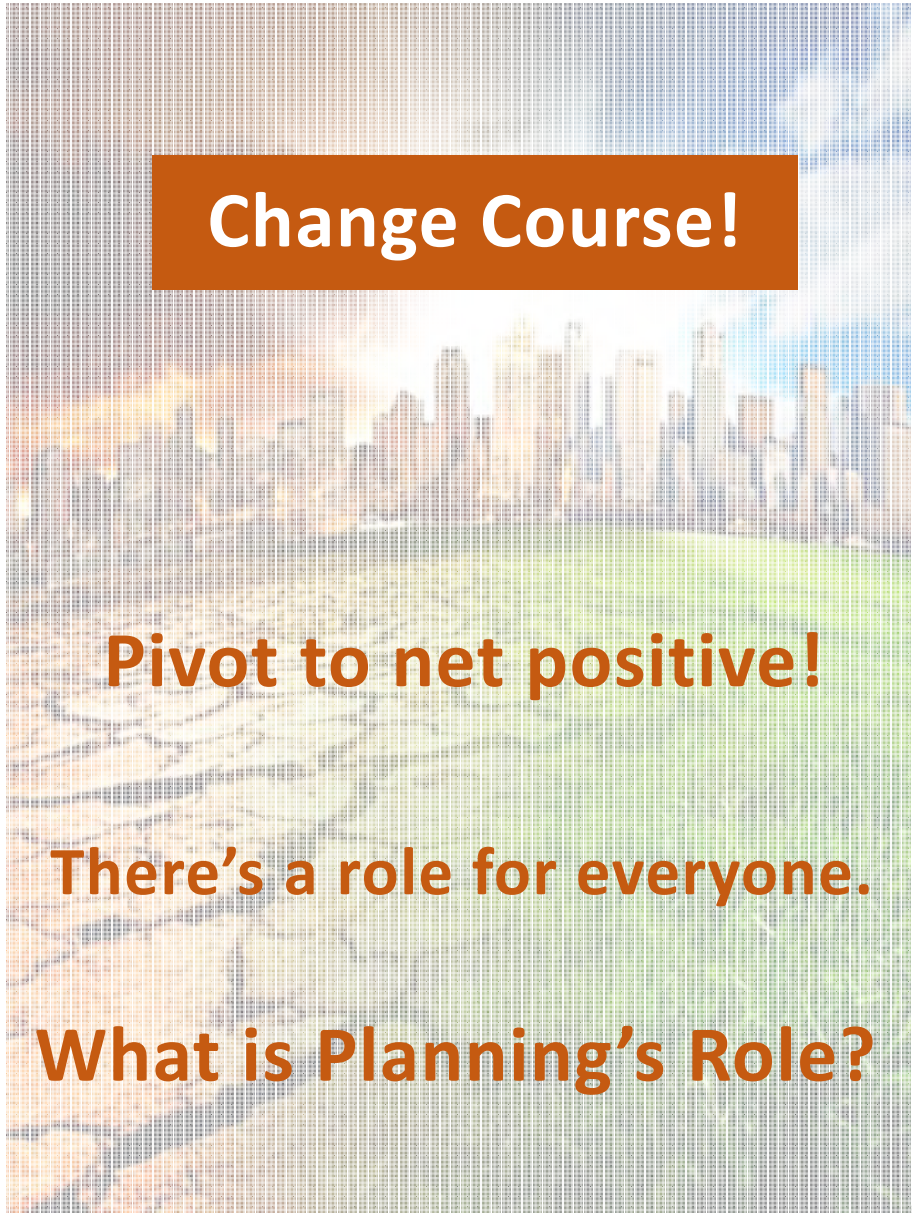
## WITHOUT CRASHING THE BIOSPHERE

### What to do? Address the *SOURCE* of the problem!

Need to ***INVENT*** an ecological economy

- In 20 years
- x5+ greater productivity
- Environmentally decoupled
- No negative impacts
- Abundance for all

New minimum standards?



# Planning's Role
## LEADERSHIP TO CAPTURE THE NEW VALUE

**With innovation for regenerative urbanism**

**that is also a key component of an ecological economy**

**AND, more importantly, the TRANSITION to it.**

**A new "integration" moment**

- **Nature + nurture**
- **Planning + (built) enviro. + economy EQUALS a new "eco"-prosperity!**

**Merge 4.8B years of nature's learning + 7,000 years of human learning**

**From unintentional to intentional**

**Create better *great* places, communities and "eco"-prosperity through regenerative planning & design that also creates the new ecological econ.**

**PLANNERS ROLE: Enable this invention—the tools and approaches—and convene new conversations.**

# Planning's End-of-IA Agenda

**Create regenerative urban systems as a core component of creating the ecological economy & sustainability.**

- Build 1 new "*regenerative*" city of 1M/week for 50+ years
- Restore aging infrastructure
- Re-sculpt existing land use patterns for sustainability
- Refashion, enhance , activate great urban places
- Create Oases: "Harden(?!)" "regenerative" cities for new climate-extreme "normal" (comms., econ., built enviro.)
- Catalyze ecological (e.g., "*regenerative*") economic development & economy through planning
- Restore (*invest in*) natural capital (*nature*) lost over 200 years of industrialization and 10,000 years of agriculture.

# But How to “do” it? To Respond?

## LOTS OF INNOVATION, IDEAS & FRAMEWORKS

**Confusing?**

**Which to choose?**

**Why?**

# Definition Matters

## MANY DEFINITIONS IN USE

- **Always present—implicit/explicit**
- **Defines ("frames") the problem & solution**
- **Unexamined, may not lead to sustainability**
- **Therefore, know which definition is in play**
- **Develop the definition you need!**

# Only Two Real Differences

## UNDERSTAND CONSEQUENCES & REQUIREMENTS

| PREVALENT APPROACH | EMERGING APPROACH |
|---|---|
| **Net negative** (pathogenic) | **Net Positive** (salutogenic) |
| Do **less damage** | Do **"good"** |
| **Reduce** Negative; **CONTINUES increasing systematically** | **Eliminate** Negative; **STOPs systematic increase** |
| **Tinker** with "**end-of-pipe**" | **Design out** "**upstream**" at source |
| **Efficiency** | **Effectiveness** |
| **Subsystem** Optimization | **Whole** Systems Optimization |
| **"Siloed"** Planning & Design | **Integrated** Planning & Design |
| **Physics** Model | **Biology** "Ecosystems" Model |
| **"False-Positive"** Prosperity Scenario | **Authentic** Prosperity Scenario |
| ***DEGENERATIVE*** | ***REGENERATIVE*** |
| **On Auto Pilot** | **Requires Invention** |

# How to choose?
## MATCH DEFINITION & METHOD TO PURPOSE

- Understand *your* definition?
- Which definition for regenerative urbanism?
- What are you trying to accomplish?
- Does definition point in the right direction?
- Does it lead to a flexible platform for future?
- Is the "SYSTEMS" ROI > than the "SILO" ROI?

# Theme of Regeneration Emerging
## ACROSS THE PLANNING, DESIGN, AND BUILD PROFESSIONS

**Planning** | High-performance EcoDistricts, Cities, and Regions; Biophilic Design & Planning, Health & Land Use

**Urban Design** | Add water and habitat for next-generation place making (biophilia)

**Architecture** | 2030 Challenge, Living Buildings/Walls/Roofs, Passive House

**Landscape Architecture** | From ornamentalism to habitat cultivation (Biodiversity)

**Utilities** | Shift from gray to green is underway, and even to living infrastructure, new concept of urban metabolism

# Theme of Regeneration Emerging
## ACROSS THE PLANNING, DESIGN, AND BUILD PROFESSIONS

### Hidden CROSS-SILO Potential

- Passive House energy efficiency standard (80-90%)
- Enables on-site renewables
- Enables no carbon economy when scaled
- Adds 2nd function to the built environment
  - energy production
- Dramatically enhances the value of building energy efficiency.
- Dramatically changes the value proposition
- Won't choose without it being visible.

# What are the Prospects
## FOR A REGENERATIVE URBAN PLANNING?

***Not*** **fully formed**

**Emerging theme has many threads**

**Needs to be *invented***

# Will *we* enable it?

**We explore two "threads," or cases today that *pivot* from net negative to net positive.**

# As you listen, think about…
## ADVANCING THIS "WORK IN PROGRESS"

The **challenge** of **pivoting**?

The **theme of regeneration** in **your city**?

What's ***do-able*** and what's **not** (why & when)?

**How** we could ***do*** the "impossible"?

**What would you like to do**?

# PLANNING & DESIGNING RESTORATIVE, HIGH-PERFORMANCE PLACES

## Practice Cases

1. **Restorative Urban Development**
   Josh Foss | The Ecala Group
2. **High-Performance Districts**
   Charles Kelley | ZGF Architects

# IMPLICATIONS FOR PLANNING?

## Engage—*and LEAD*—this "work in progress"

- Learn.
- Do our regulatory "business" differently.
- Raise the bar.
- Enable "routine" innovation for regeneration
  - ***as "routine," expected*** part of project development, review, approval.
- Convene the new conversations.

# PLANNING'S ROLE – Leadership

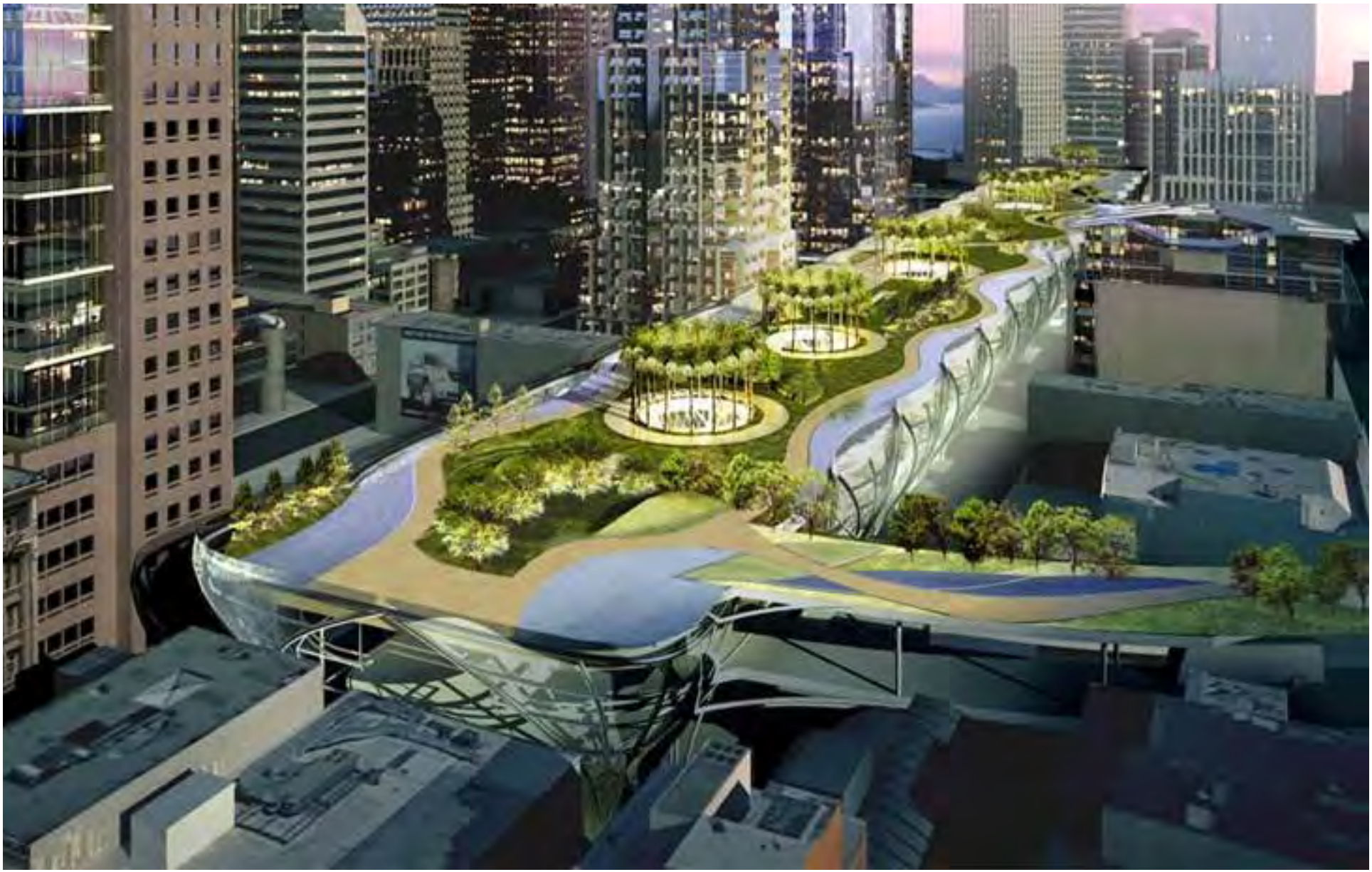
## CREATE NEW VALUE & NEW "REGENERATIVE" ECONOMY

1. Understand regenerative system performance imperatives & establish related goals.
2. Develop policy support for regenerative performance.
3. Convene cross sector collaboration as needed.
4. Identify "investment" opportunities with high public regenerative development value.
5. Innovate routinely with research & demo projects.

# ACTIONS

1. Prepare a strategic city action plan figure out how to achieve restorative whole city system performance.
2. Reflect regenerative principles in RFPs/RFQs.
3. Approve projects based on regenerative performance, not prescriptive standards.
4. Create higher value by working across multiple scales.
5. Use the off-the-shelf innovations proved elsewhere.

# Buy Off-the-Shelf Sustainability?



# Today *DID* we illuminate…

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**Planning's** emerging "regenerative" response

**Our Method** | Recognize, Pivot, Amplify!

**Our Value Proposition—Leapfrog to sustainability**

- Lead sustainability with better places, *what people value*
- Enabled by and paid for with regenerative design
- The built environment as key part of sustainable economy

# Discussion Ideas
## VISION: ECO-PROSPERITY?

1. Resonate? (how or why not)?
2. Your experience of “regenerative” urbanism?
3. Degree of interest & engagement?
4. Key opportunities, barriers, “moves?”
5. What do differently “back at the office?”
6. How could we/APA/SCD support you?

# THANK YOU | CONTACT

**APA SCD WEBSITE for follow up and resources**

- https://apascd.wordpress.com/
- http://norcalapa.org/sustainability-blog/regenerative-urbanism-rising/

**Scott.Edmondson@sfgov.org**

**Joshua@ecalagroup.com**

**charles.kelley@zgf.com**

# PIVOT PRACTICE CASE No. 1

## Restorative Urban Development

**JOSHUA FOSS, THE ECALA GROUP**

**Public Interest Mission:** Shifting urban innovation from net-negative incremental greening to net-positive transformational regeneration

**Approach:** Systems-based, integrated, circular, and distributed for high performance, restorative communities

# Ellen MacArthur Foundation CE100

MISSION: *Accelerate the transition to a Circular Economy*

**EMF invited Ecala to be a CE100 Program Emerging Innovator.**

## A Circular Economy (CE) is:

- Restorative and regenerative ***by design***
- Keeps materials at their highest value at all times
- Distinguishes between technical and biological cycles

**The CE100 Program:** A pre-competitive incubation and collaboration program to accelerate innovation.

# A Turnkey Approach to
## RESTORATIVE CITY PLANNING, DEVELOPMENT & FINANCE

### Design, Build & Operate

nexus™
UTILITY HUB

+

Integrated Utility System


### Finance

+Restorative
Infrastructure Fund™

### Plan & Manage

ecala Insights™

# Nexus Integrated Utility Hub (IUH)
## A NEIGHBORHOOD SUSTAINABILITY CENTER

### Inputs = Waste

1. Municipal solid waste
2. Wastewater
3. Agriculture waste

### Outputs = Resilience

1. Pure drinking water
2. Renewable energies
3. Ultra-fresh seafood & veg
4. Nutrient-rich fertilizer
5. Recycled materials
6. High quality urban places


# Nexus Integrated Utility Hub (IUH)
## TECHNOLOGIES ENHANCE PERFORMANCE

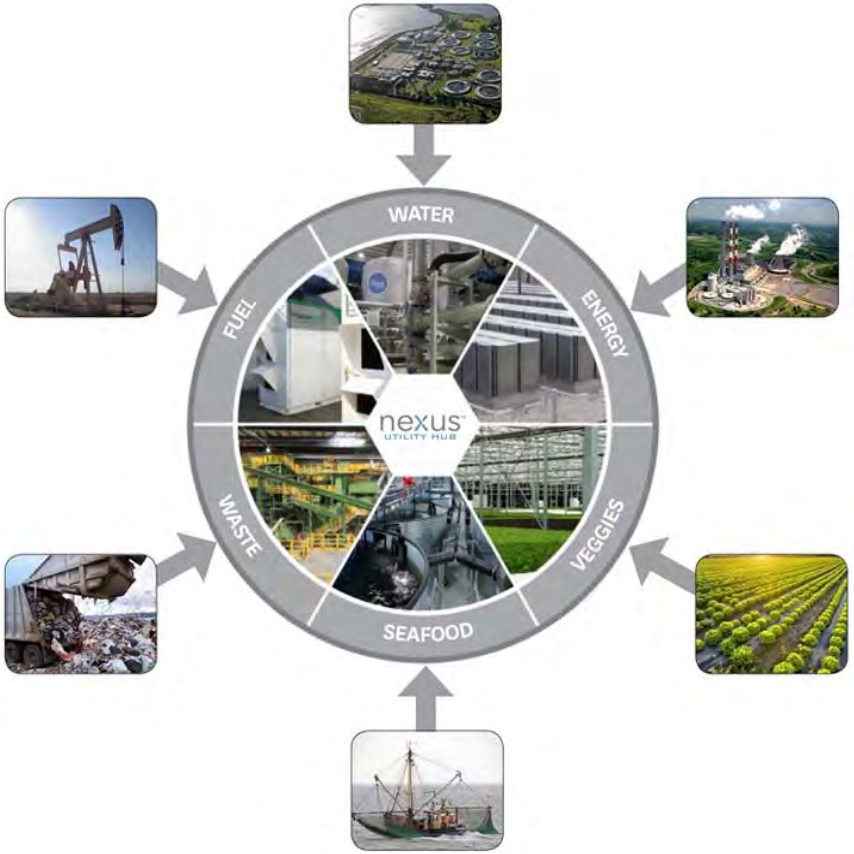
### Tech Vetted Per:

### 1. Integration
- Work within closed-loop, circular model

### 2. Performance
- Industry leading
- Market-tested

### 3. Siting
- Urban core/mixed use
- Small footprint, zero pollution

# Nexus Integrated Utility Hub (IUH)
## A 21ST CENTURY INFRASTRUCTURE BUSINESS MODEL

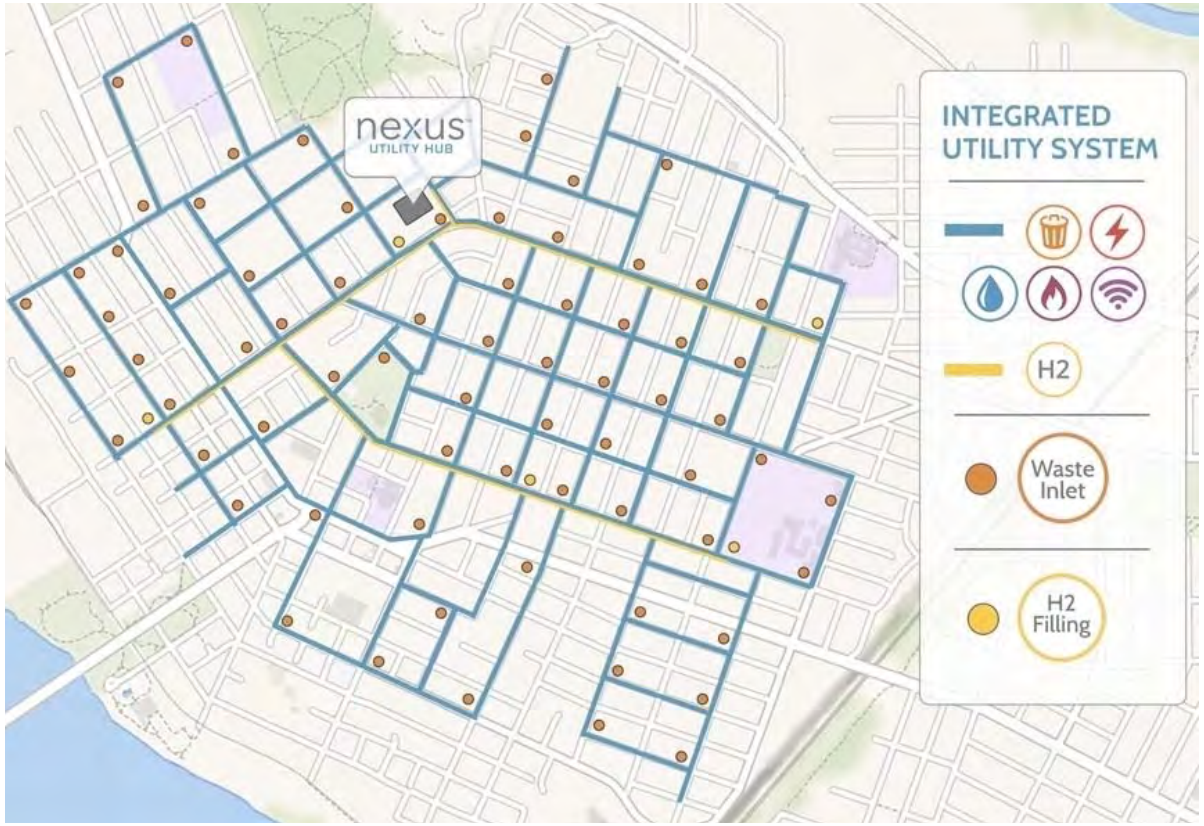


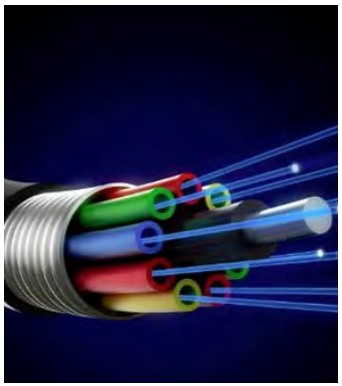

**SINGLE FACILITY INTEGRATES MULTIPLE PROCESSES TO PRODUCE GREATER BENEFITS THAN BAU**

- Recycling center & transfer stations
- Organic waste processing facility
- Wastewater treatment plant
- Water supply & treatment plant
- Power station
- Vegetable farm
- Ocean fishing vessel
- Food market, offices, labs

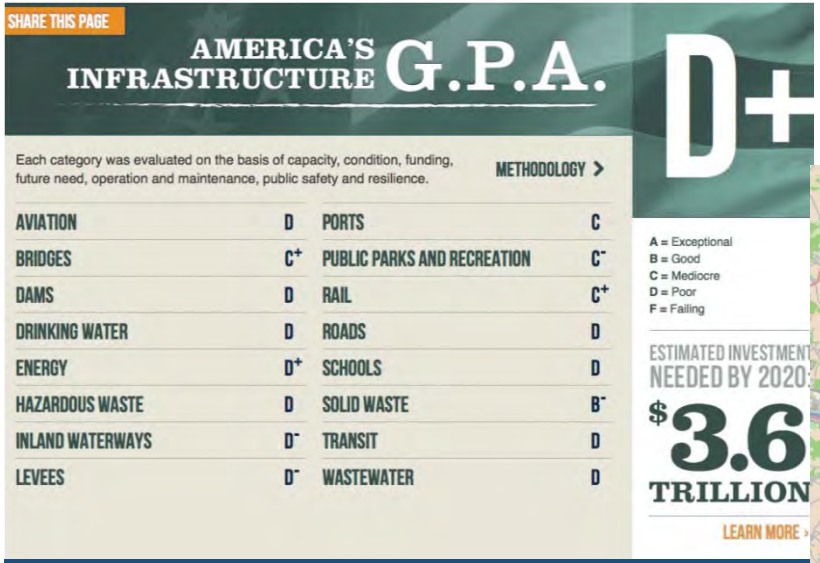
# The HUB + GRID = IUS (Integrated Utility System)
## OPTIMIZING VALUE AT A DISTRICT SCALE

- Connects Nexus to local grid
- Optimizes energy, water, waste, IT & mobility at district scale
- Powers Smart City
- Coordinated installation and management
- Resilience & systems-wide cost savings




# Pivoting From the Conventional Model
## A FAILING INFRASTRUCTURE BUSINESS MODEL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AMERICA'S INFRASTRUCTURE G.P.A.

D+

Each category was evaluated on the basis of capacity, condition, funding, future need, operation and maintenance, public safety and resilience.

METHODOLOGY >

| | | | |
|---|---|---|---|
| AVIATION | D | PORTS | C |
| BRIDGES | C+ | PUBLIC PARKS AND RECREATION | C- |
| DAMS | D | RAIL | C+ |
| DRINKING WATER | D | ROADS | D |
| ENERGY | D+ | SCHOOLS | D |
| HAZARDOUS WASTE | D | SOLID WASTE | B- |
| INLAND WATERWAYS | D- | TRANSIT | D |
| LEVEES | D- | WASTEWATER | D |

A = Exceptional
B = Good
C = Mediocre
D = Poor
F = Failing

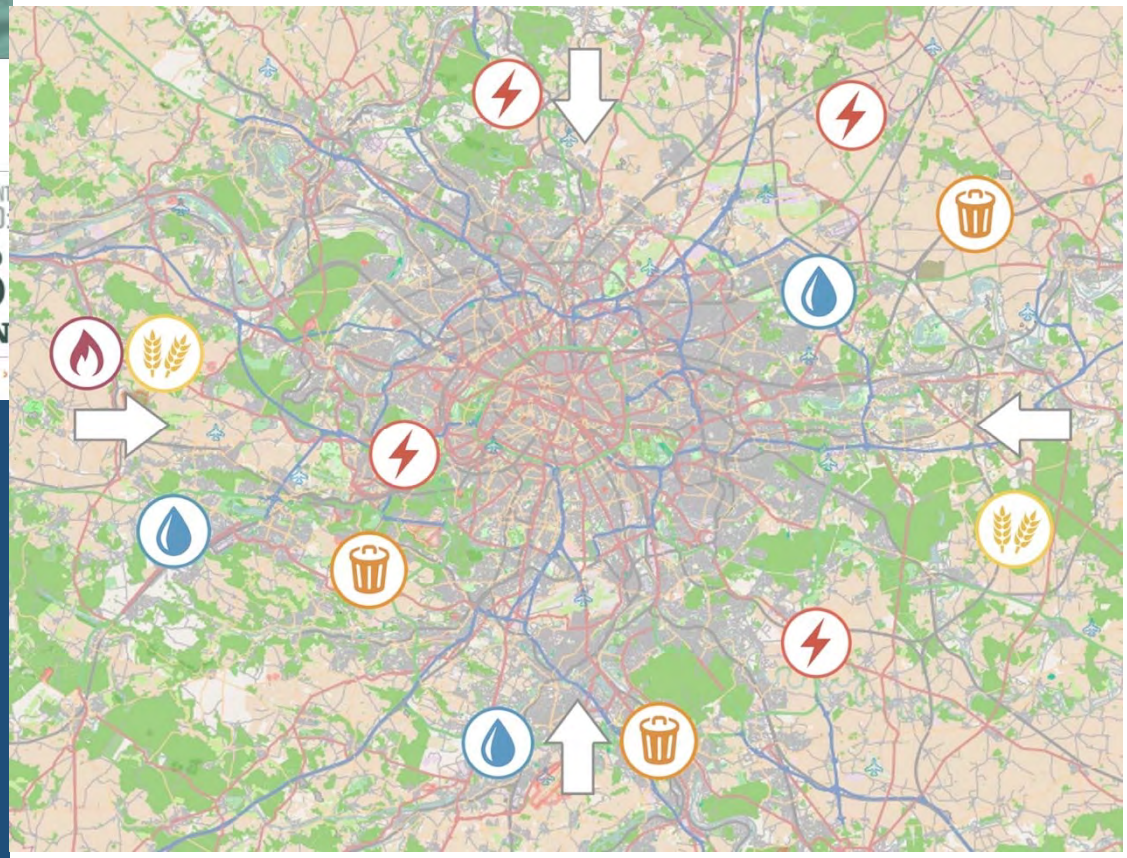
ESTIMATED INVESTMENT NEEDED BY 2020

$3.6 TRILLION

LEARN MORE >

## CHARACTERISTICS

- Linear 'take, make, waste' resource management
- Single-function & dispersed utilities
- 'Siloed' city management
- Sunk costs / depleting capital

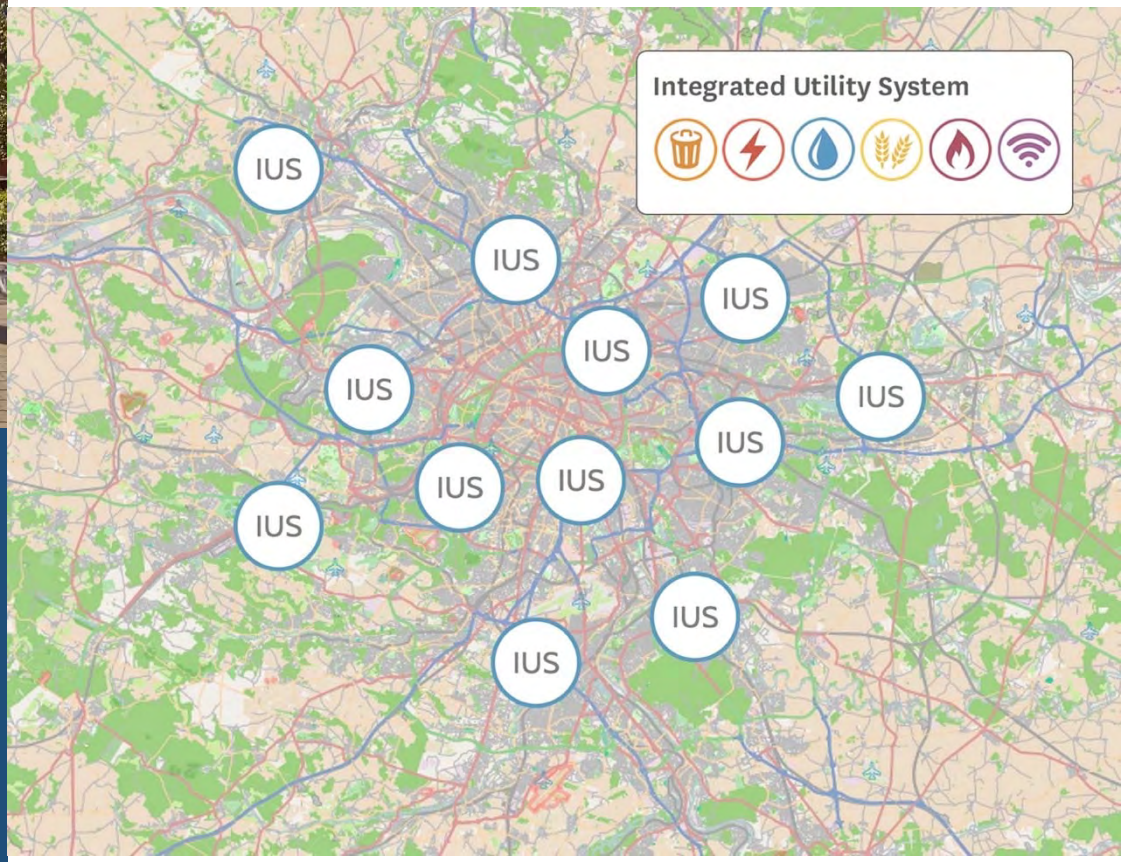


***City converts natural resources into waste***

# Pivoting Towards a Restorative Model
## INTEGRATED, CIRCULAR & NET POSITIVE

## CHARACTERISTICS

- Circular resource management
- Distributed, localized and integrated utilities
- Strong public-private partnerships
- Quality of life / place based




***City is resource secure and resilient***

# Financing Restorative Infrastructure Projects

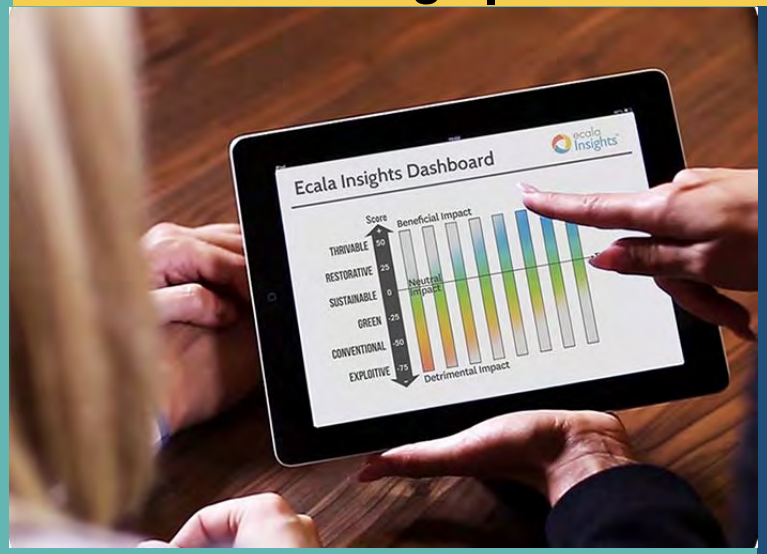
## THE RESTORATIVE INFRASTRUCTURE FUND

+Restorative Infrastructure Fund™

- Public / Private equity fund
- Federal loan guarantee program
- EB-5 Centers
- Carbon markets, RECs, stormwater credits
- Leverages local, state and federal grants and incentives
- 40% Capex reduction

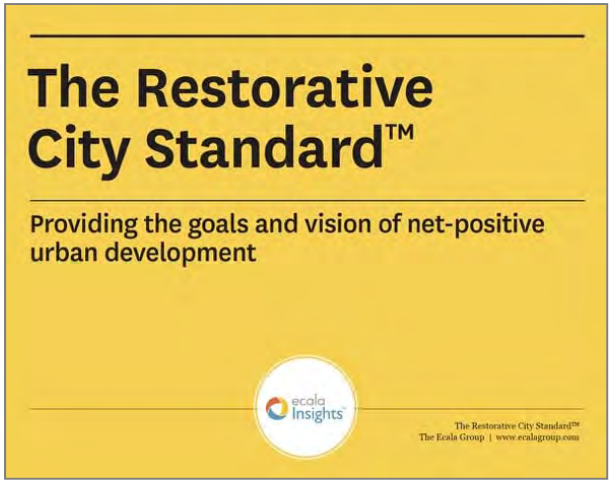
# ECALA INSIGHTS
# A Restorative City Planning Platform

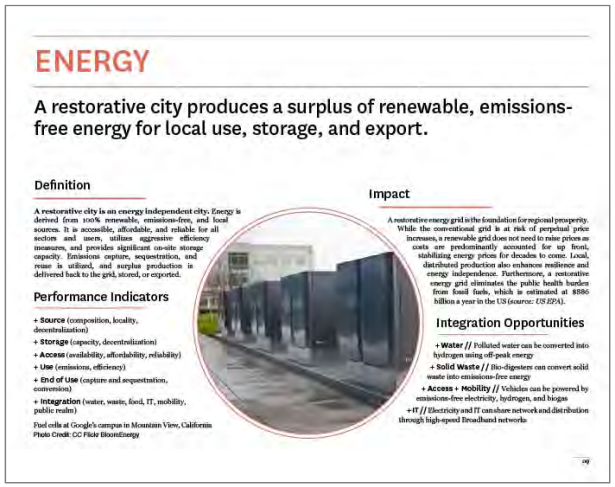
**Benchmarking | Assessment | Strategy | Management**




- Assesses a city's ability to become restorative
- Provides custom implementation pathways
- Manages long-term progress

# The Restorative City Standard
## PROVIDING NET POSITIVE VISION & IMPERATIVES



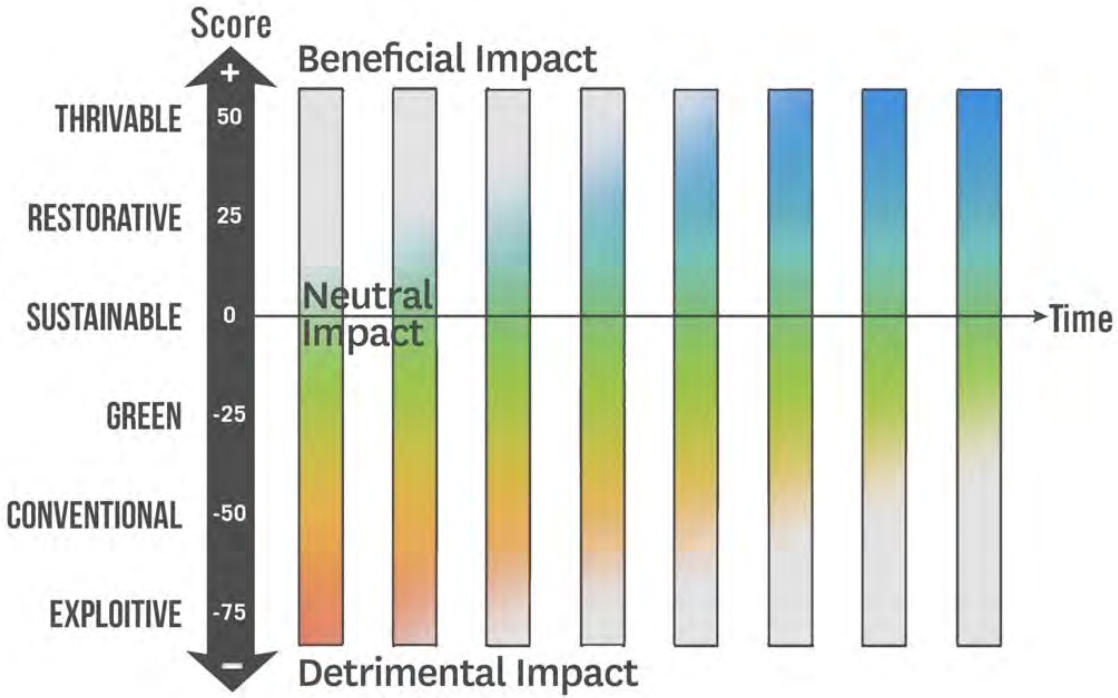


### Creating a Virtuous Cycle

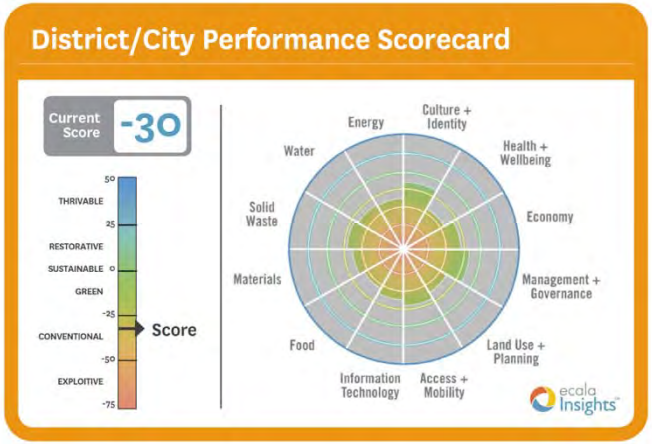
- Resources and Assets
- Management of Assets
- Quality of Life
- Identity of Place

# Performance Benchmarking & Analysis

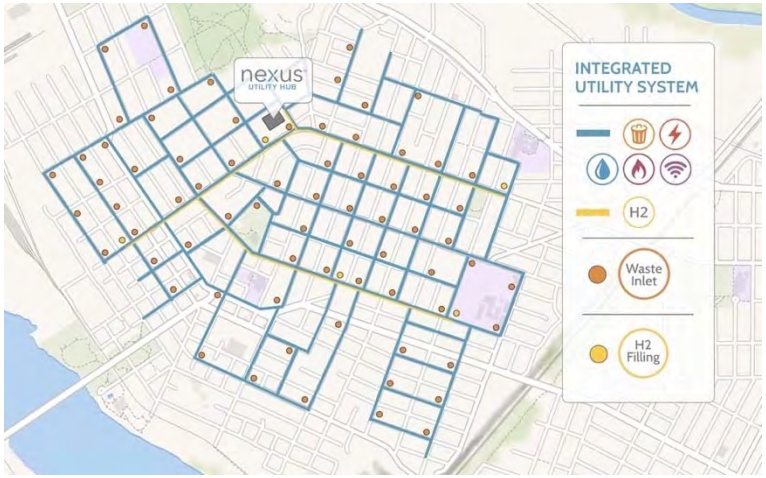
## BRIDGING CURRENT PERFORMANCE & RESTORATIVE GOALS





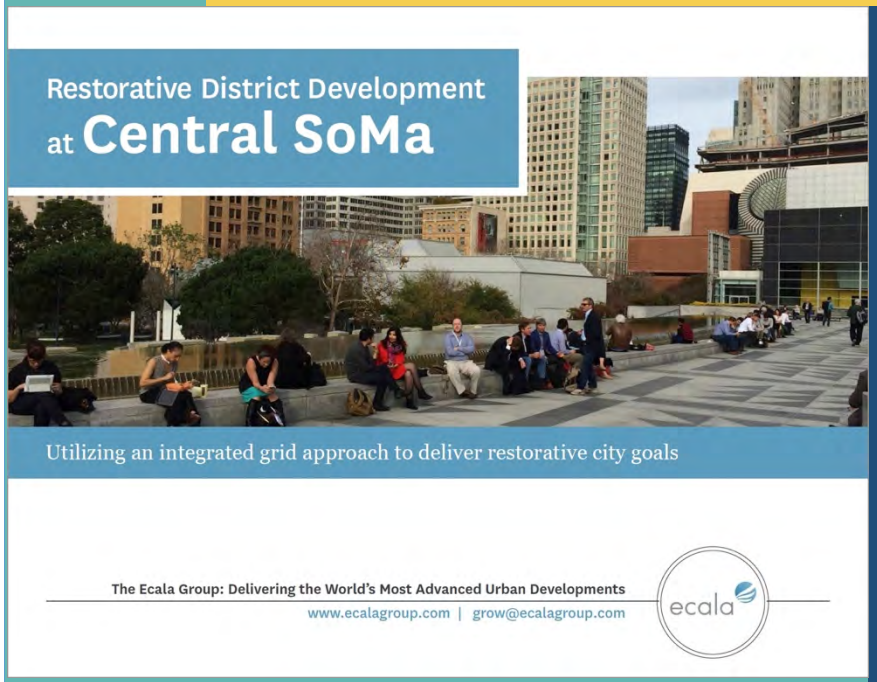


# Integrated Reporting & Implementation
## CUSTOMIZED ROADMAPS FOR RESTORATIVE SUCCESS


# CASE STUDY:
# Central SoMa EcoDistrict
# San Francisco, CA

**Insights Assessment + Customized Nexus Hub**




**260-acre district on edge of downtown**

**By 2040, will support:**

- 20,000 new residents
- 80,000 new jobs

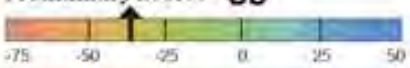
**GOAL: Be the first regenerative neighborhood in San Francisco**

# Central SoMa Performance
## BASELINE PERFORMANCE SCORE

### ENERGY

**Overview:** Central SoMa's energy is part of a citywide grid that is derived from 40% renewable sources (including large hydro) with the remaining 60% a combination of nuclear, fossil fuels, and additional market purchases. The vast majority of energy for the transport sector is petroleum and gas, and majority of energy is generated and processed in centralized facilities 50-500+ miles away. Energy costs are high (42% above national average), yet efficiency codes and ordinances help reduce energy consumption across all sectors. There is very little renewable production, energy storage, or integration of energy with waste, water, and IT within the district.

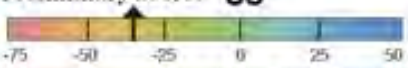
**Preliminary Score: -35**




### WATER

**Overview:** All of Central SoMa's water is sourced from snowmelt and collected within a regional reservoir system that is at 54% of capacity (as of May 2015). Water and sewer rates are high (37% more than average major US city) and are expected to more than double over the next 10 years to pay for system upgrades. Strong conservation and efficiency measures enable SF residents and businesses to have the lowest water use in CA. There is little to no water storage or reclamation within Central SoMa. All wastewater is collected within a combined sewer system, treated locally at the Southeast Treatment Plant, and discharged into the Bay.

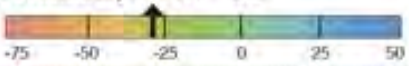
**Preliminary Score: -33**




### SOLID WASTE

**Overview:** Central SoMa currently generates 43k tons of solid waste a year. Waste is collected within a citywide three-cart system that is supported by a mandatory recycling and composting ordinance. All waste is managed regionally by a sole entity, Recology. The average family household spends $408 a year for waste collection (1.75x the national average), while waste tipping fees are $147/ton (3x the national average). Across its entire waste stream, SF's landfill diversion rate is 62%, and waste not recycled or composted is sent to a landfill 50+ miles outside of the city.

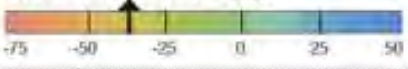
**Preliminary Score: -28**




### MATERIALS

**Overview:** Central SoMa does not employ specific material procurement policies, yet falls within city and statewide programs that promote responsible material sourcing. San Francisco enforces an Environmentally Preferable Purchasing (EPP) Ordinance across its 80 departments that must purchase commodities from an Approved Alternatives List. A state Safer Consumer Products (SCP) program has banned several harmful chemicals, while the vast majority of products on the market are permitted. Within the built environment, the city has adopted a Green Building Ordinance that mandates low-emitting materials.

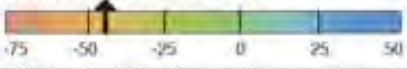
**Preliminary Score: -35**




### FOOD

**Overview:** There is very little food production within Central SoMa, and access to affordable, healthy food within the district is low. According to the SF Department of Public Health, the index of unhealthy to healthy food sources is 92% to 8% in the South of Market neighborhood and none of the food stores meet the Neighborhood Food Store Quality standards. 22% of residents within District 6 (of which Central SoMa is within) are at the highest risk for food insecurity based on income below 100% of the poverty level. A citywide Healthy and Sustainable Food Directive is advancing nutrition standards, urban agriculture, farmers markets, food security, and local food businesses.

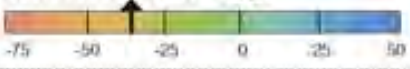
**Preliminary Score: -42**




### IT

**Overview:** There are several IT providers within Central SoMa offering numerous performance and pricing options. The average cost for residential internet (6Mbps, unlimited data, cable/ADSL) is $47.40/month, which is slightly above the national average of $46.95. 80Mbps speed for business customers average $150/month. Free wi-fi hotspots are offered in public parks, plazas, and open spaces, and all parking meters in Central SoMa are smart, as are digital water meters for homes and businesses. In addition, electric and gas SmartMeters are provided for all PG&E residential and business customers within Central SoMa.

**Preliminary Score: -35**



# Central SoMa Performance
## BASELINE PERFORMANCE SCORE

### ACCESS + MOBILITY

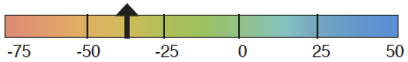
**Overview:** More than 4 out of 5 trips within Central SoMa are made by walking, biking, or using a transit system that includes BART, Caltrain, Muni Metro, and numerous bus lines. Pedestrian infrastructure is poor as most sidewalks in the district do not meet minimum city standards, marked crosswalks are few, and many crosswalks at major intersections are closed to pedestrians. Additionally, there are few transit-only lanes on Central SoMa streets, and the ratio of bike path and lane miles to all road miles is .37. Numerous electric vehicle charging stations are provided within district either for free as a city-run service or at a cost when offered privately.

**Preliminary Score: -28**


### LAND USE + PLANNING

**Overview:** Central SoMa features a diverse mix of building typologies, uses, and densities. Housing, offices, industry, retail, and cultural institutions are located within close proximity of each other, with no single use predominating. Land use however is dominated by impervious surfaces (90% of district footprint), and the tree canopy in Central SoMa is one of the lowest in San Francisco. Only 4.7% of land cover is open space, natural, or green, compared to 22.8% throughout San Franciso. Ecosystem services and habitat function are therefor low, placing significant strain on a combined sewer system that manages stormwater runoff.

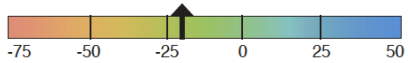
**Preliminary Score: -36**




### MGMT + GOVERNANCE

**Overview:** District planners and city government leaders have established aggressive goals for resource use, emissions reduction, and land use in Central SoMa and San Francisco, yet existing policies are only moderately capable of delivering determined goals. Conventional development and management approaches remain default options while cross-sectorial collaboration, public-private partnerships, and systems-level, integrated planning strategies are not effectively employed. City data, laws, and performance is reported within SF Open Data Portal, a publicly accessible website that improves government services and transparency.

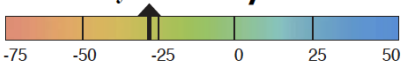
**Preliminary Score: -21**




### ECONOMY

**Overview:** Central SoMa's economy is booming through new construction and a high-tech sector in SF that has grown 45% since 2010. Subsequently, increasing density and higher real estate values are generating strong tax revenues for the city. This economic boom however is not all-inclusive, as District 6 has the lowest median income by household in SF and highest rates of residents in poverty. To afford a market rate 1 bedroom apartment in Central SoMa, one would have to earn $35/hr, which is 2.85x higher than the current minimum wage ($12.25). Central SoMa however retains 94% employment, and contains 15% of city's minority and women owned local businesses.

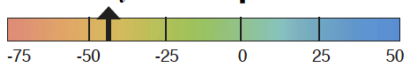
**Preliminary Score: -27**




### HEALTH + WELLBEING

**Overview:** Due to poor land use planning, unsafe pedestrian infrastructure, and socio-economic disparity, Central SoMa is not supportive of many core health and wellbeing indicators. In addition to high levels of poverty and resource insecurity, 97% of the district's population is exposed to average outdoor noise levels above 60DB and 13% to unsafe levels of suspended particle pollution. There are 70 severe/fatal traffic accidents per 100 roadway miles compared to an average of 21 throughout San Francisco, and the lack of green and open spaces prohibit residents and visitors from realizing biophilic and recreational benefits.

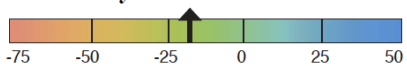
**Preliminary Score: -41**



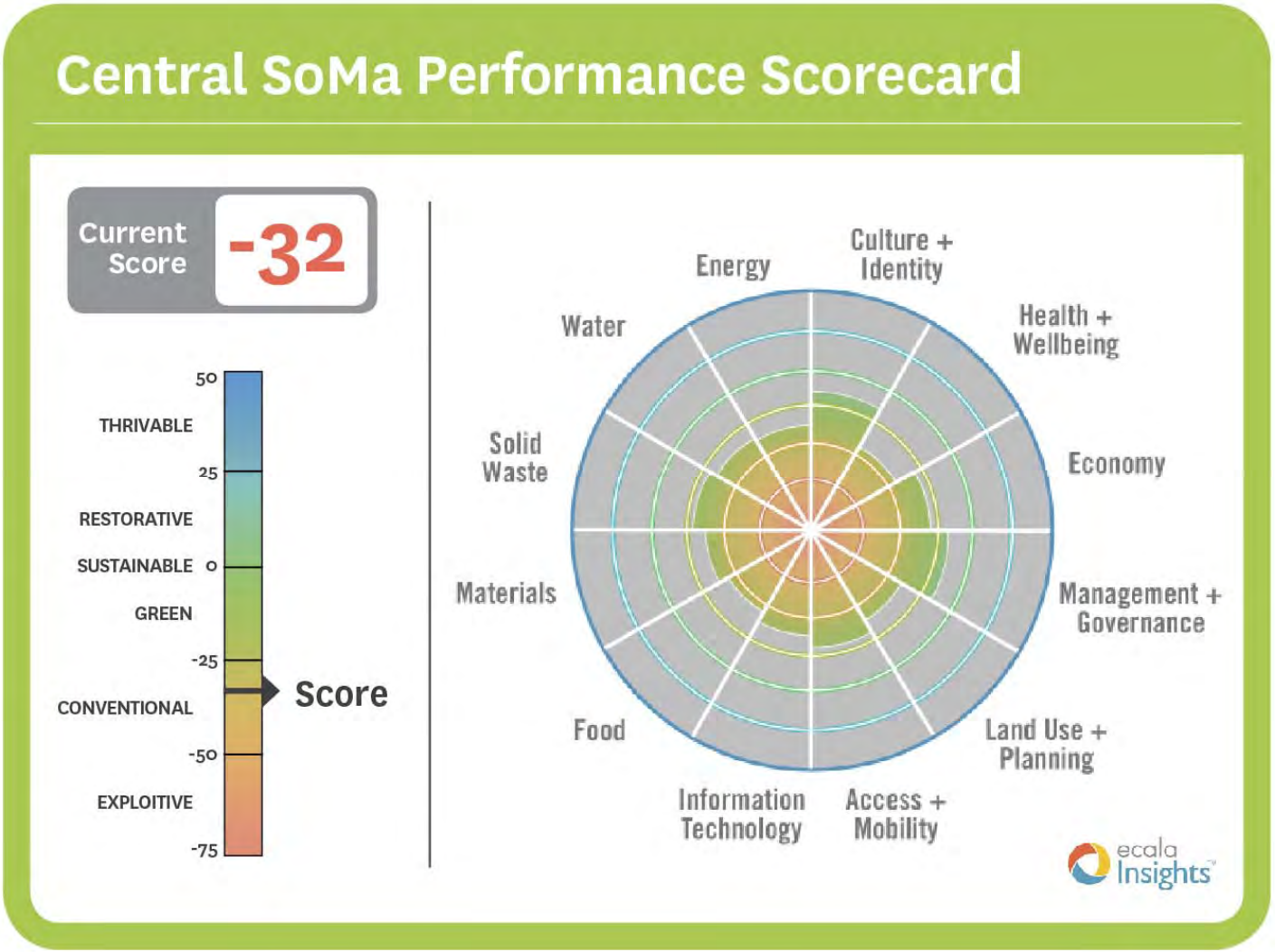

### CULTURE + IDENTITY

**Overview:** Central SoMa has an eclectic mix of commerce, industry, residential, and civic spaces. Within the district, there are several historic and cultural landmarks on preservation lists, as well as modern institutions that anchor San Francisco's $10+ billion a year tourism industry (Moscone Center, SFMOMA). New development and high tech industry presence in Central SoMa are shaping a 21st century district identity that is attractive for density, housing, jobs, and investment opportunities. This identity however is in flux with a diverse socio-economic population (48% residents white, 33% Asian, and 9% black) that is increasingly at risk of being displaced.

**Preliminary Score: -18**



# Central SoMa Performance
## BASELINE PERFORMANCE SCORE



# Central SoMa Nexus Hub
## CUSTOMIZED FOR COMMUNITY'S UNIQUE NEEDS

**Optimized for District Water**
- 5MGD treatment and supply

**Supplemented w Organic Solids**
- 150 tons/day

**Renewable Energy Generation**
- 12MW clean electricity
- Generates H2 for 7.5k vehicles

**Local Food Production**
- 1M lbs/seafood & 4M heads/lettuce

**Public Amenities**
- Incorporates food market + offices & exhibition spaces

*Sited on 2 acres (or within mixed-used development)*


# Central SoMa Nexus Hub
## FINANCIALS

### STRONG ROI THROUGH CIRCULAR RESOURCE MANAGEMENT

**System Cost | $183M**

**Accumulated Profits | Year 10 - $60 Million**
**Year 20 - $377 Million**

*Amortized in 10 years
**Grants and incentives not included

### Component Cost Breakdown

BUILDING
$20M

BIODIGESTER
$15.5M

GENSET
$17.2M

HYDROGEN
$20.5M

WATER
$53M

FOOD
$11.5M

# Central SoMa IUS Opportunities
## EXTENDING VALUE THROUGHOUT DISTRICT

- **Street Repair Program** over next 20 years
- **Purple recycled water pipes already connected** to many district buildings
- **Regenerative neighbor-hood planning frame-work** and zoning under development


# Ecala's Pivot Contributions
## SUMMARY

### A New Multiple-Benefit Profitable Utility Business Model (repl. current failing BAU)

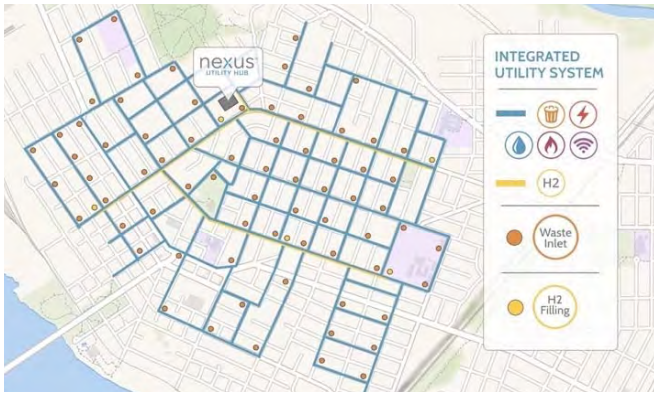
- Nexus Hub as a Neighborhood Center
- IUS as smart, renewable, resilient, 'good' grid
- Makes aggressive development goals achievable with less effort

### Net Positive Change Management Platform

- ***Insights*** platform uniquely designed to guide communities to restorative success

### Off the Shelf and Ready for Primetime!

- Pilot next-generation circular planning and development model at little risk or cost
- Seeking partner cities and developments




# PRACTICE CASE 2

## Planning & Designing High-Performance Districts

**CHARLES KELLEY, ZGF ARCHITECTS**

*Leading with great places that people want, enabled by and paid for with regenerative design.*

# High-Performance Districts
## INTEGRATED DESIGN

ECO nomy


X

ECO logy

# Regenerative
## MANAGING THE UNSEEN FORCES

WEBUILD GREENCITIES
PORTLAND

LIFESTYLE / CULTURE
COMMUNITY SERVICES

TECHNOLOGY
INFRASTRUCTURE
REAL ESTATE

Visible

Invisible

Goals

Configurations

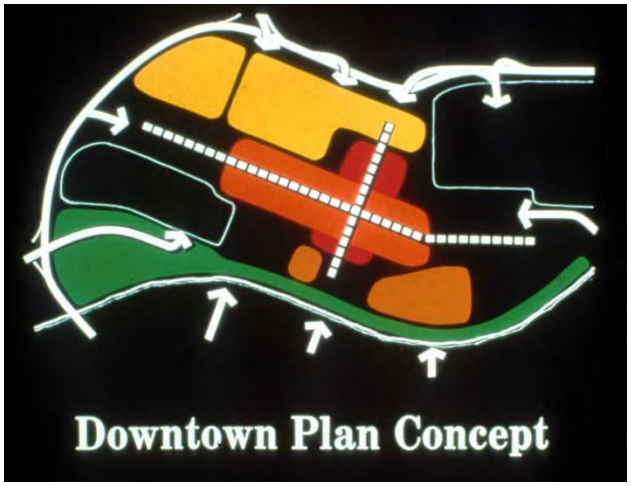
Governance

# Catharsis: New Goals

## Improving Air and Water Quality through Redevelopment

# Enable New Configuration
## FIXING THE PROBLEM

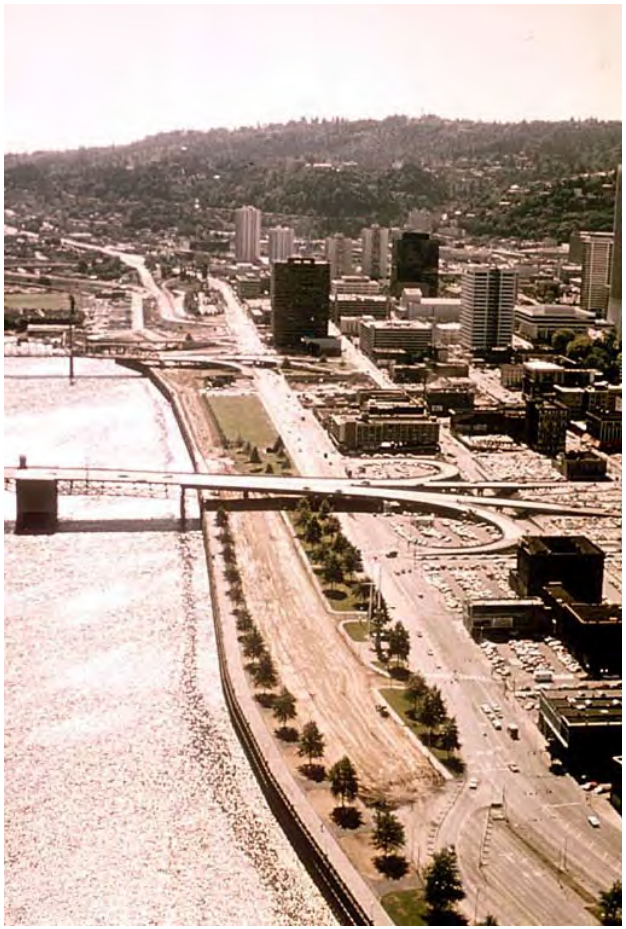
**Implementing a Central City Plan & Building the Transit Mall**




**By 1972**

# Enable New Configurations
## BUILDING WHERE CARS WERE

### Removing the Harbor Freeway & Building Waterfront Park



# Establish a Governance Structure
## BUSINESS ORGANIZATIONS

PEARL DISTRICT
NEIGHBORHOOD ASSOCIATION
EST. 1991


# District Scale Planning
## LEVERAGING INVISIBLE & VISIBLE STRATEGIES

### Goals (BHAGs)

Set Big Hairy and Audacious Goals


### Configurations

High Performance with Visual Benefit

### Governance

Cost Sharing

$$\frac{\text{COST}}{\text{BENEFICIARIES}} = \text{DESIRABLE CHANGE}$$

# GOALS

## Common to All Successful Neighborhoods

**Foundational Tools:** Community Engagement

**New Tools :** Complete Streets

**Regenerative Tools :** Jobs to Housing Ratio

# Foundational: Community Engagement
## INTEGRATED DESIGN

**Public Relations** | **Public Involvement** | **Public Engagement**

# New: Complete Street (Smart Street)

## 10TH STREET SW—From Low to High Performance Street

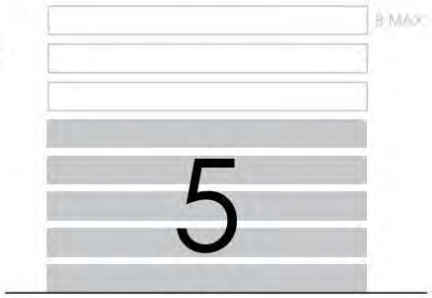
# Regenerative: Occupant Based

## 4:1 JOBS TO HOUSING—Balance Day/Night Loads

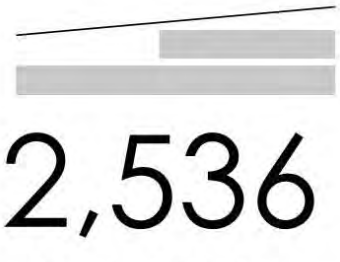
## OPTION 3: GREENWAYS

### INDICATORS

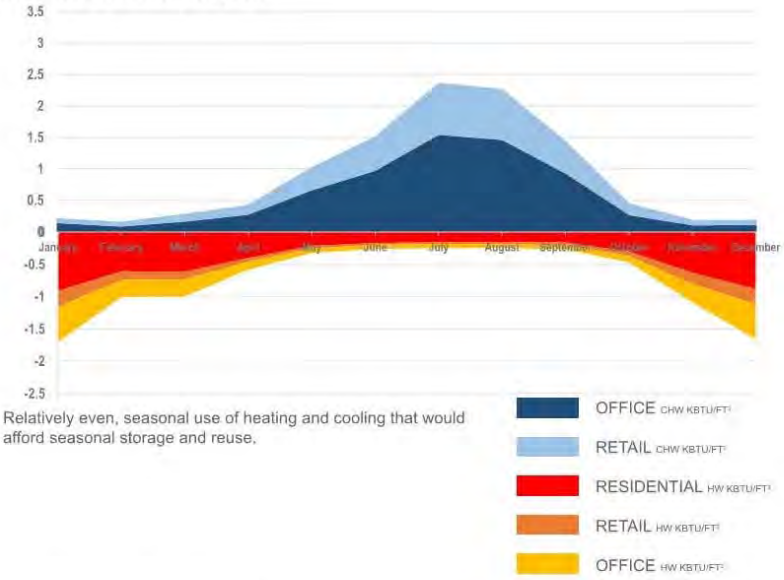
Like Option 2, Option 3 has a mix of office and residential uses having the capacity to manage parking demand on-site and reducing the impact on the surrounding traffic system. It also has the ability to catalyze and expand a low temperature energy and recycled water system. The mix of uses creates a balance in jobs to housing, supporting day and evening use of community-oriented services.





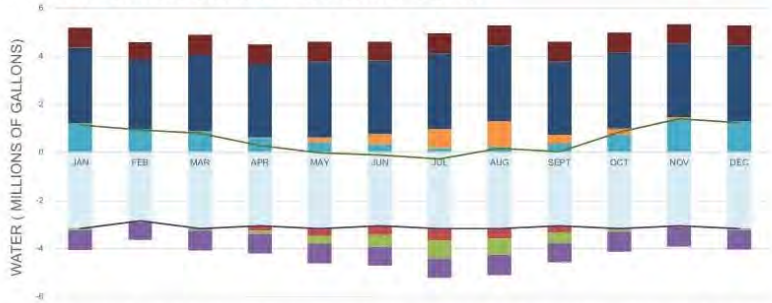



### ENERGY BALANCE




Relatively even, seasonal use of heating and cooling that would afford seasonal storage and reuse.

### WATER BALANCE: 52 M GAL/YEAR




Relatively higher demand for potable water. Non-potable water demand can be met by recycled waste-water.

- BLACKWATER SOURCE
- GREYWATER SOURCE
- CONDENSATE RECAPTURE SOURCE
- RAINWATER SOURCE
- NON-POTABLE DEMAND
- HVAC WATER DEMAND
- IRRIGATION DEMAND
- POTABLE DEMAND
- WATER BALANCE (ASSUMES BLACK/GREYWATER TO POTABLE ONLY)
- WATER BALANCE (ASSUMES BLACK/GREYWATER TO NON-POTABLE ONLY)

# GOVERNANCE

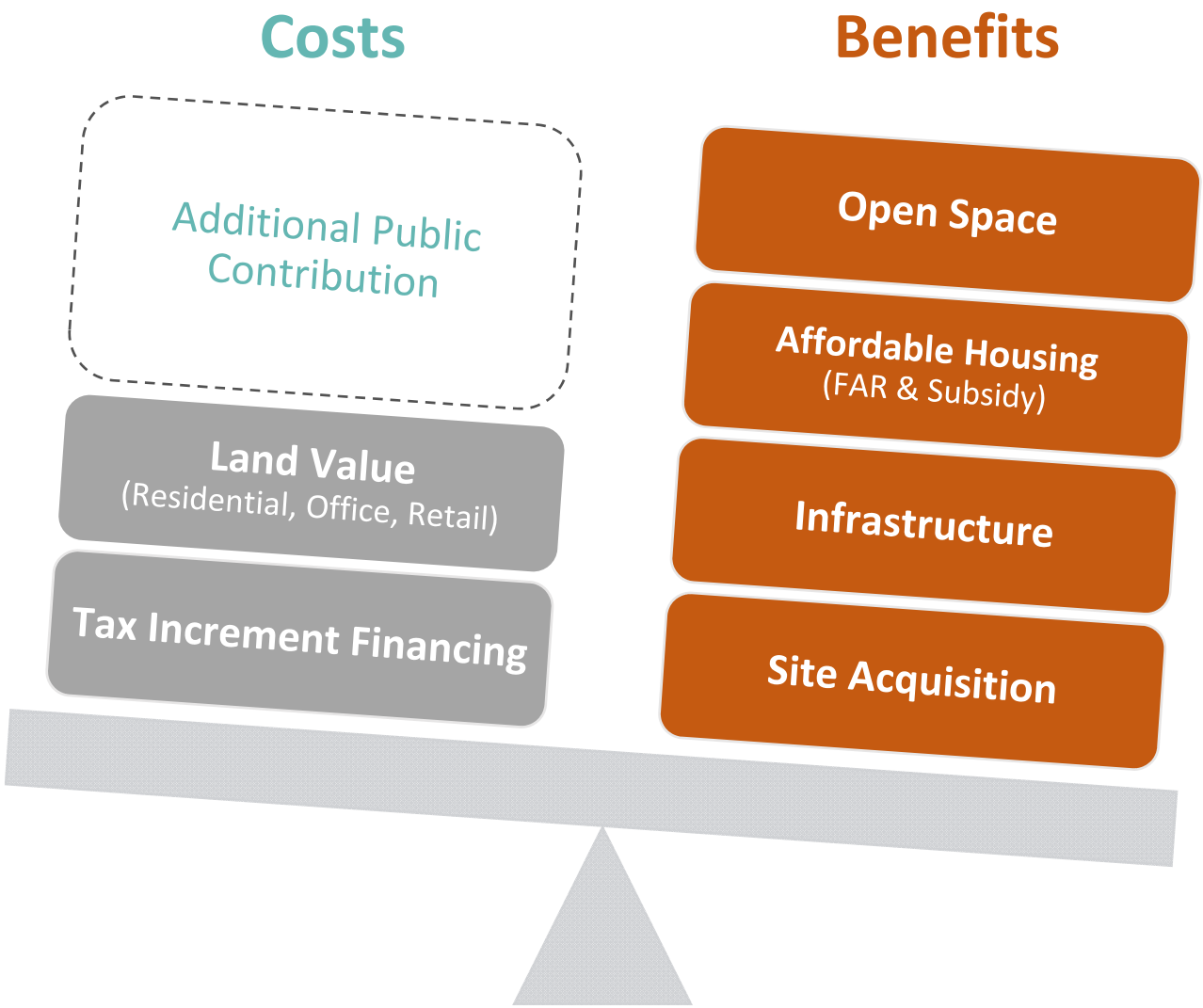
## Community Stewardship

**Foundational Tools:** Sharing Costs

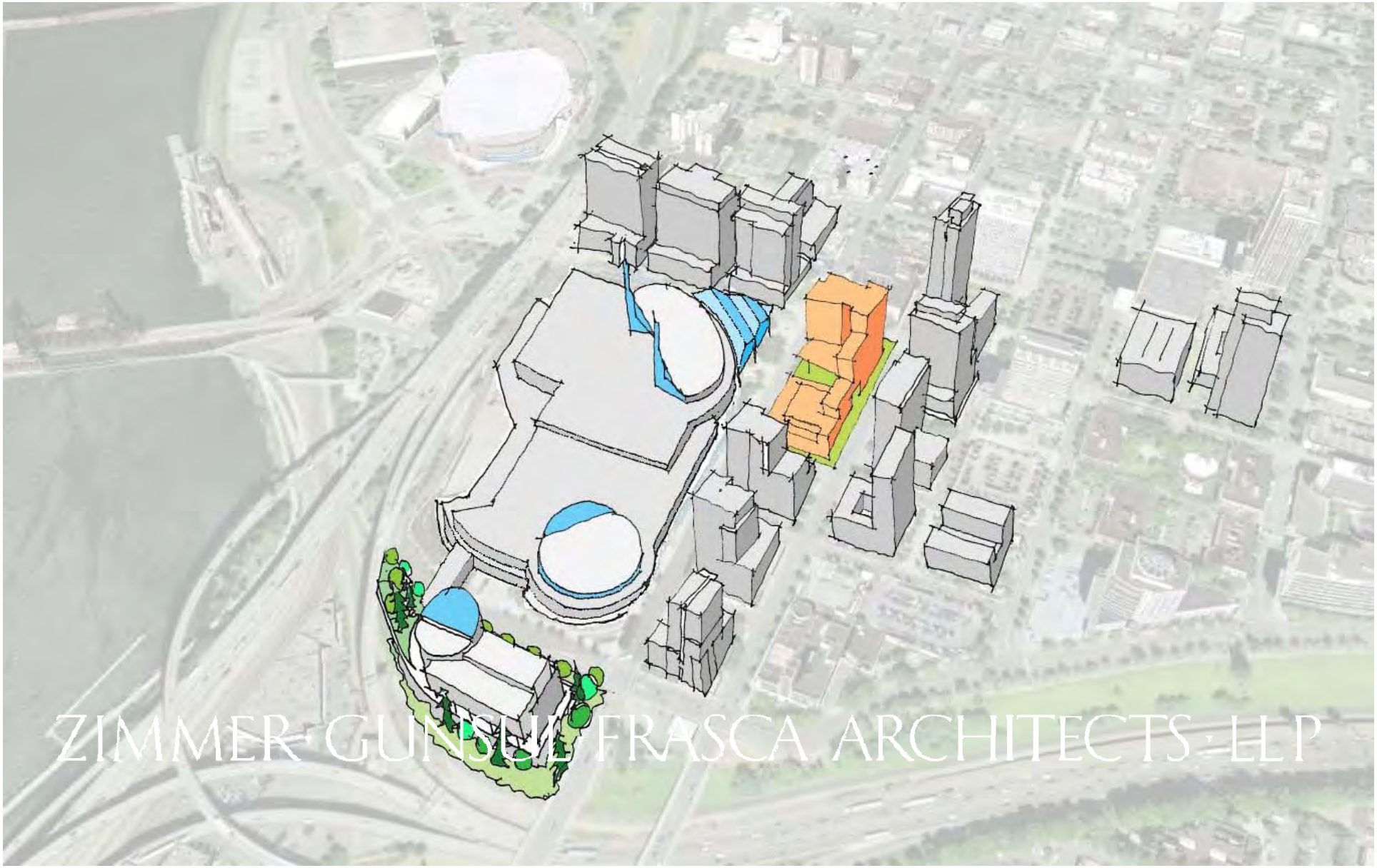
**New Tools:** Scale Jumping

**Regenerative Tools:** Internet Technology

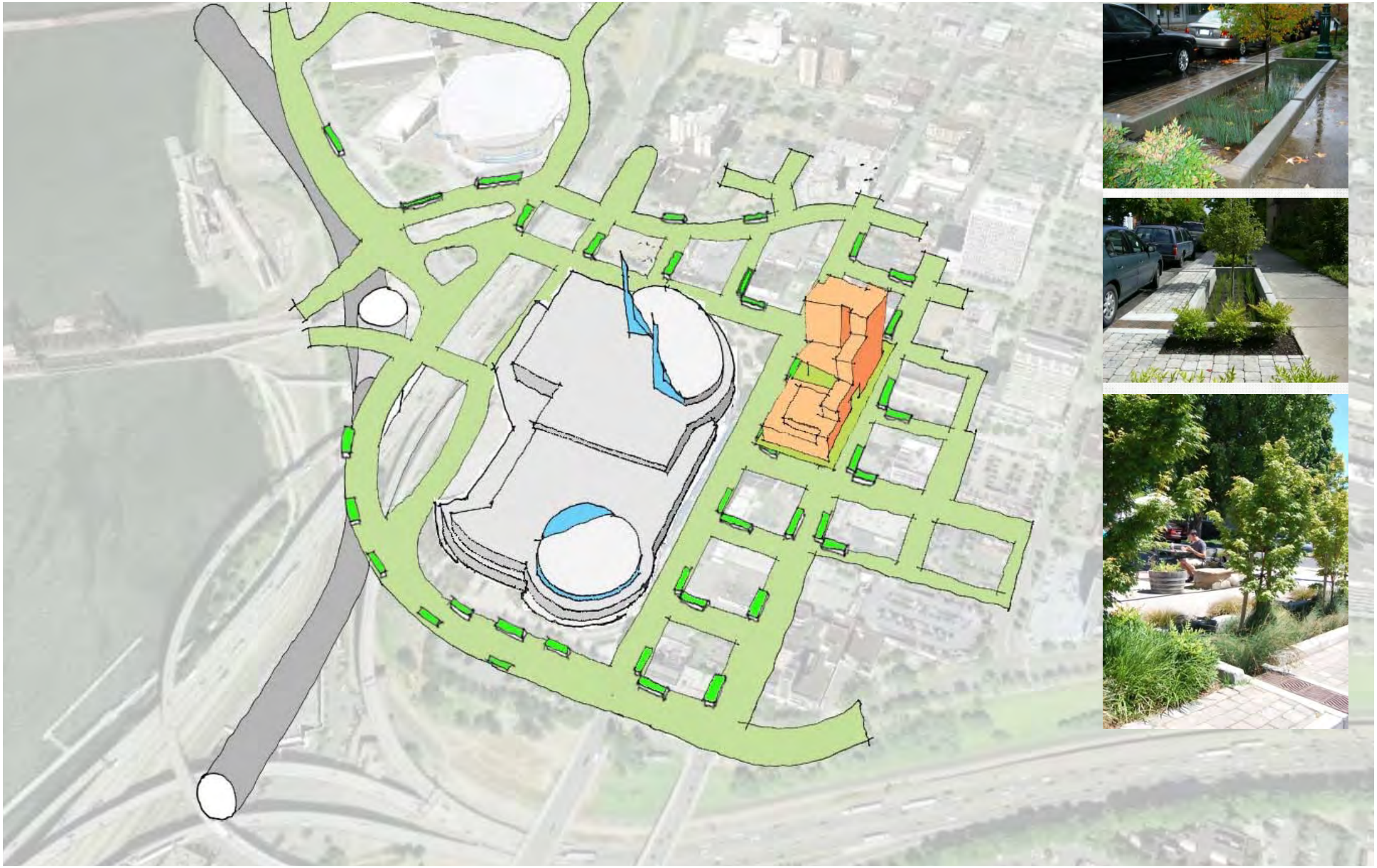
# Foundational: Sharing Costs
## FINDING VALUE BY SHARING COSTS



# New: Scale Jumping
## MORE THAN SINGLE BUILDINGS



# New: Scale Jumping
## GREEN STREET FLOW-THROUGH PLANTERS



# New: Scale Jumping
## OPEN SPACE & HABITAT CORRIDORS

# New: Scale Jumping
## PURPLE PIPE NON-POTABLE REUSE SYSTEM

# Regenerative: Internet Technology

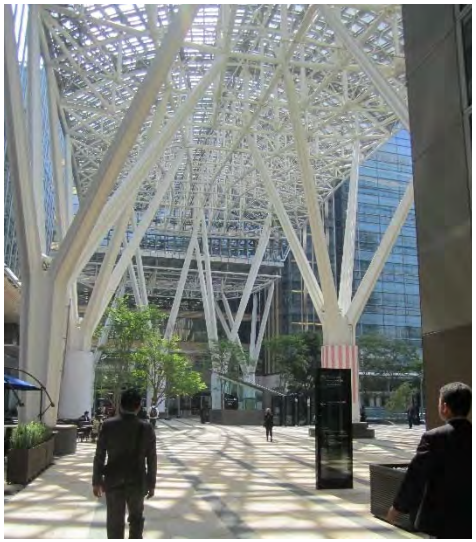
## SENSING & MODIFYING HUMAN BEHAVIOR

Occupant

Building

Block

District



Information must be applied at a scale that makes the most impact.

# CONFIGURATION

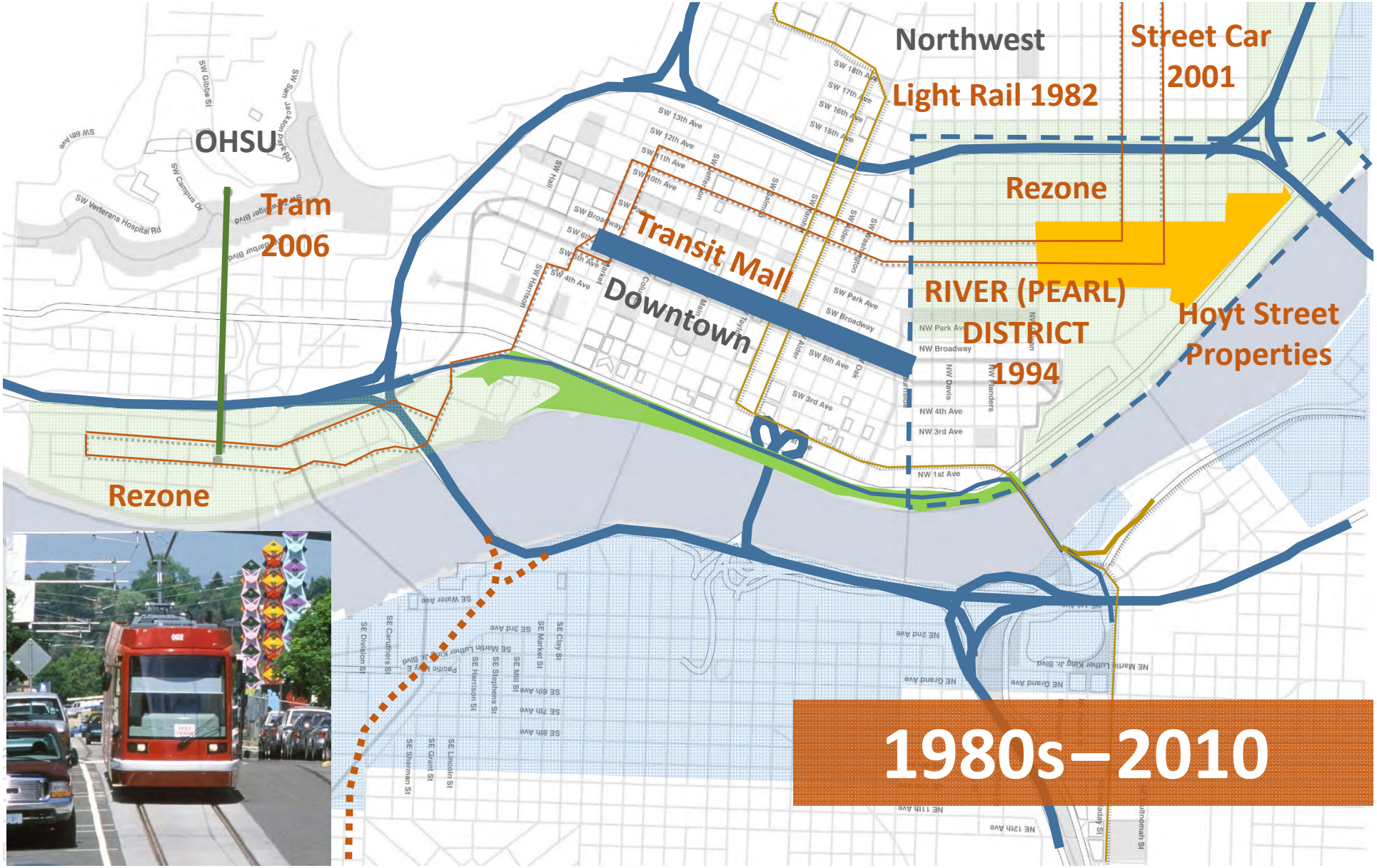
## Integrated Design

**Foundational Tools : Pearl**
(Public Private / Partnership)

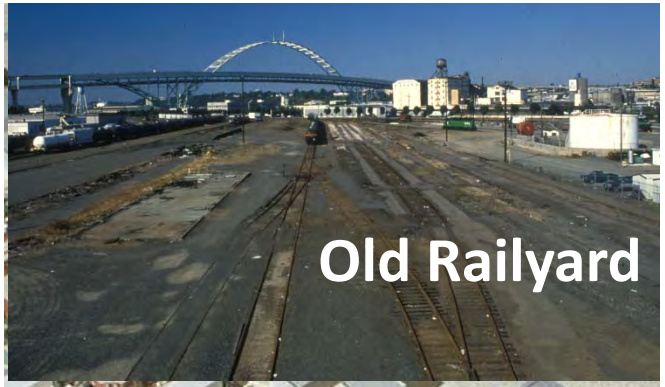
**New Tools : SWECO (SW Ecodistrict Wash. DC)**
(High Performance District)

**Regenerative Tools : Kashiwa-no-ha**
Resilience Planning

# Foundational: Public Private Partnership
## MORE ALTERNATIVE MODES



# Foundational: Public Private Partnership
## PEARL DISTRICT PLAN


**(1 Job / 3 . 5 Resident)**

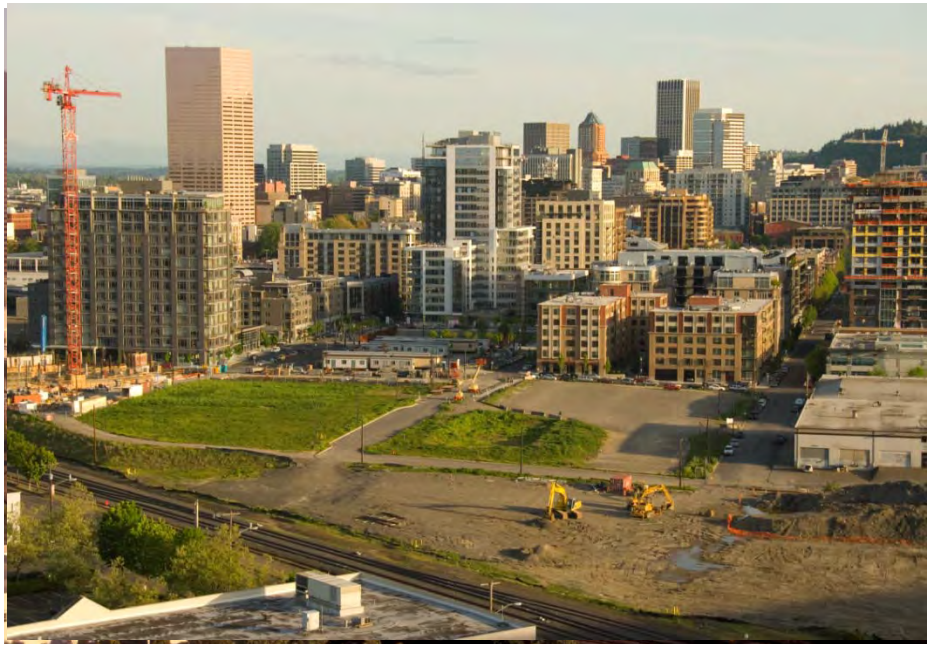
**SIZE:** 100,000 SM

**USES:** 85 % RESIDENTIAL

10% COMMERCIAL & RETAIL

5% COMMUNIITY SERVICES

# Foundational: Public Private Partnership
## Partnerships and Agreements

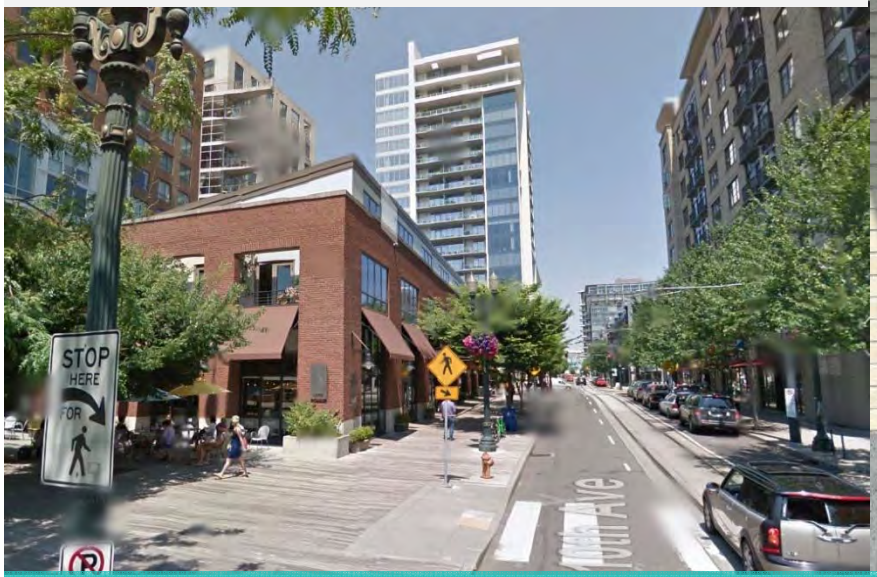



Developer Contribution (131 Du/Acre, Land Dedication, and participation in LID)

| | |
|---|---|
| Existing Zone | From 14 Du/Acre |
| Removal of the Love Joy Ramp | to 87 Du/Acre |
| Construction of First Neighborhood Park | to 109 Du/Acre |
| Street Car | to 131 Du/Acre |

City Contribution
($150,000,000 in Tax Increment Financing and Urban Renewal District Grants)

# High Performance
## Focus Areas for Community Activities





Pearl District Master Plan, Portland, OR

# New: SW ECODISTRICT WASHINGTON D.C.

## National Capital Planning Commission

ZGF AKIP HR&A

**(15 Jobs / 1 Resident)**

**SIZE:** 1,400,000 SM

**USES:** 15 % RESIDENTIAL

77% COMMERCIAL & RETAIL

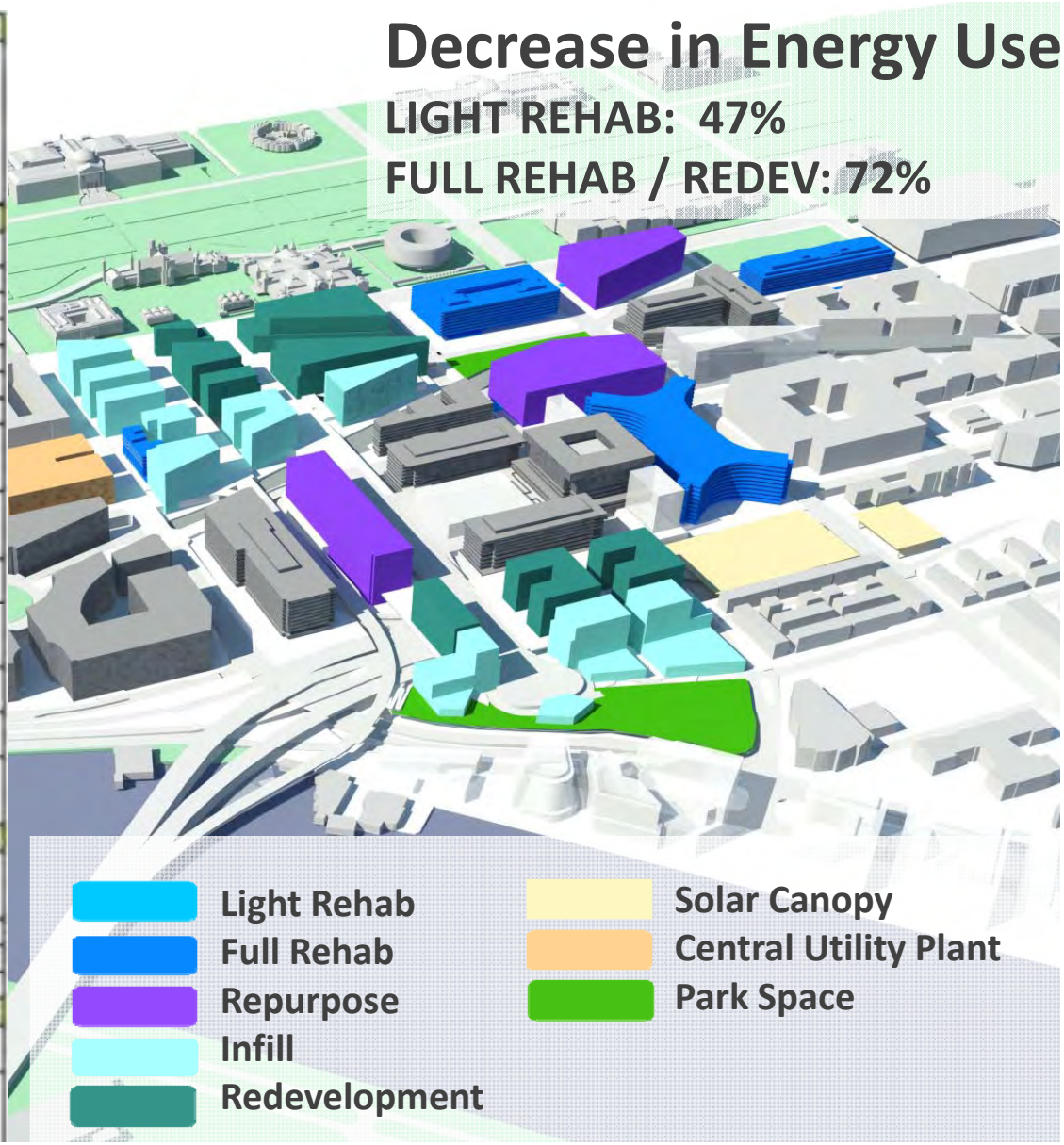
8% COMMUNIITY SERVICES

# New: SW Ecodistrict Washington, D.C.

## THE PATH TO SUSTAINABILITY

# New: SW Ecodistrict Washington, D.C.
## MULTIPLE DEVELOPMENT STRATEGIES

| | Building Strategy | | | | |
|---|---|---|---|---|---|
| | Light Rehab | Full Rehab | Repurpose | Infill | Redevelop |
| **Energy** | | | | | |
| **Tenant Improvement** | | | | | |
| Lighting System Upgrade | X | X | X | X | X |
| Plug Load Reduction | X | X | X | X | X |
| Sustainable and Certified Materials | X | X | X | X | X |
| Radiant Heating and Cooling | | X | X | X | X |
| Low Volume Air Distribution | | X | X | X | X |
| **Core and Shell** | | | | | |
| Upgrades to building systems during natural cycle of obsolescence | X | | | | |
| New Mechanical and Electrical System - Hydronic thermal energy distribution | | X | X | X | X |
| High performance building envelope | | X | X | X | X |
| Maximize the use of renewable energy resources (PV) and shared energy technology | | X | X | X | X |
| Maximize building energy use efficiency | | X | X | X | X |
| Capitalize on Ground Source Heat Below Building Site | | | | X | X |
| Capitalize on Ground Source Heat Below Open Space and Streets | | | | | X |
| **Water** | | | | | |
| Replace plumbing existing fixtures with high efficiency fixtures | X | X | X | | |
| Install high efficiency fixtures | | X | X | X | X |
| Collect rainwater | | X | X | X | X |
| Install non-potable water system | | X | X | X | X |
| **Waste** | | | | | |
| Provide waste sorting stations at point of use locations | X | X | X | X | X |
| Reclaim, recycle, and compost the majority of waste (solid and organic) generated within the area | | X | X | X | X |



# New: SW Ecodistrict Washington, D.C.

## SETTING GOALS TO ACHIEVE RESULTS.


**62% Reduction**

**70% Reduction**

**80% Reduction**

**75% Reduction**

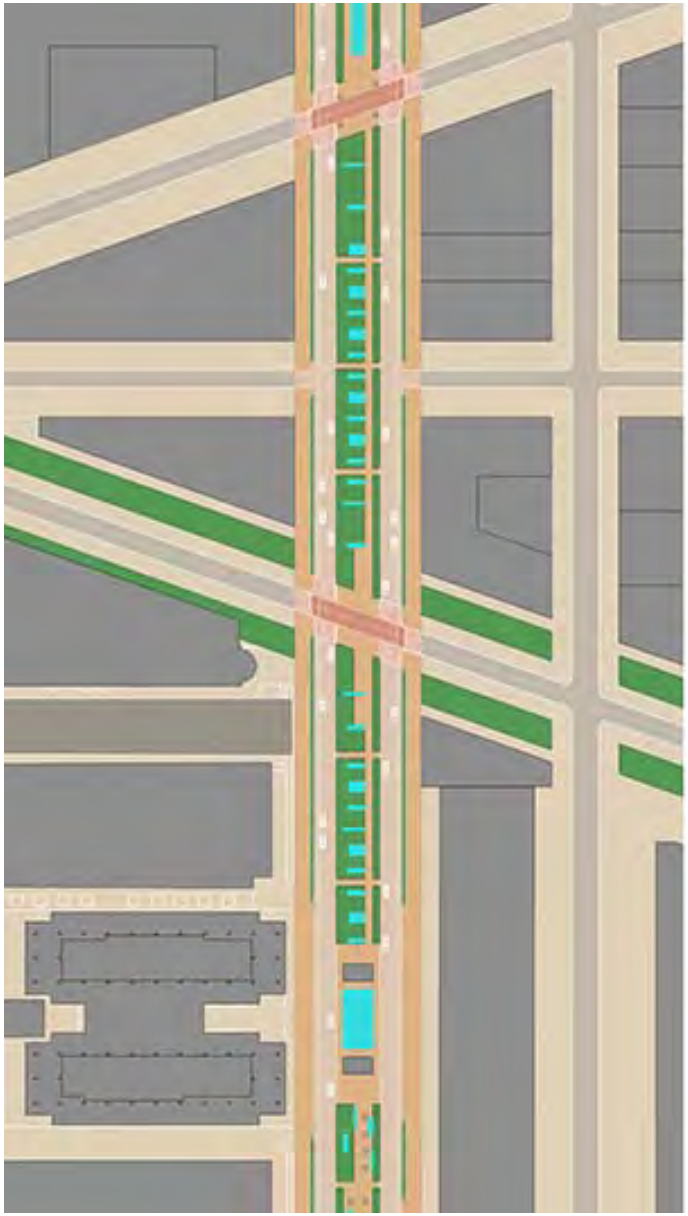

**33% Increase**
Employees & Residents


**7% Increase**
New Metro & Auto Trips


**21% Increase**
In GSF, including new residential, hotel, cultural and commercial

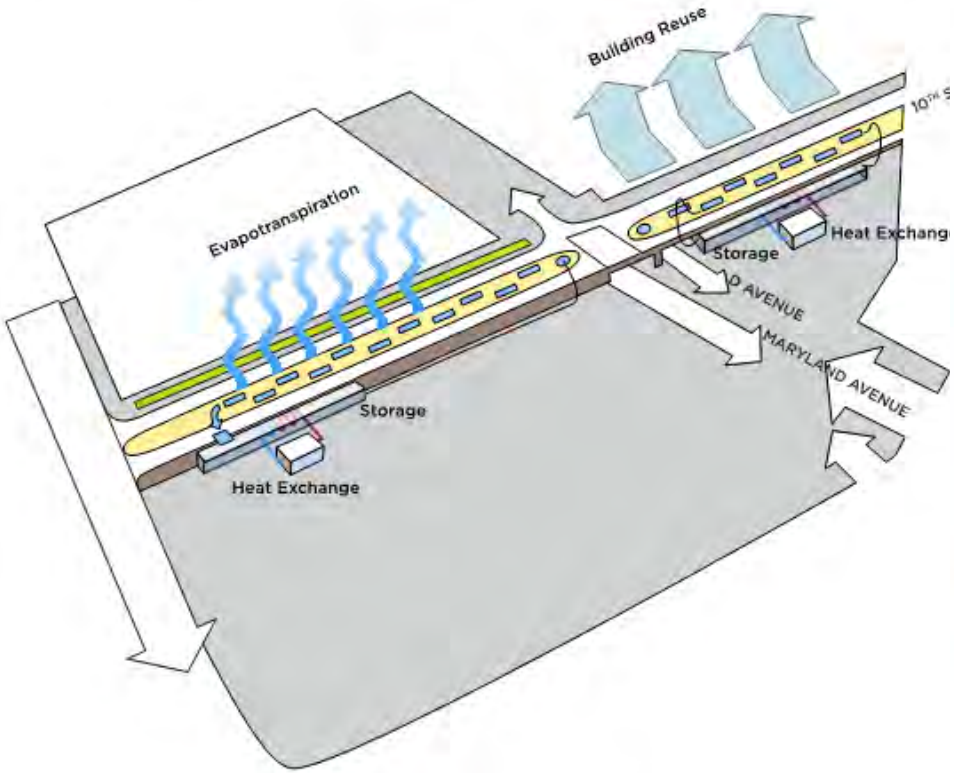
# New: SW Ecodistrict Washington, D.C.

## 10TH STREET SW — A HIGH-PERFORMANCE STREET

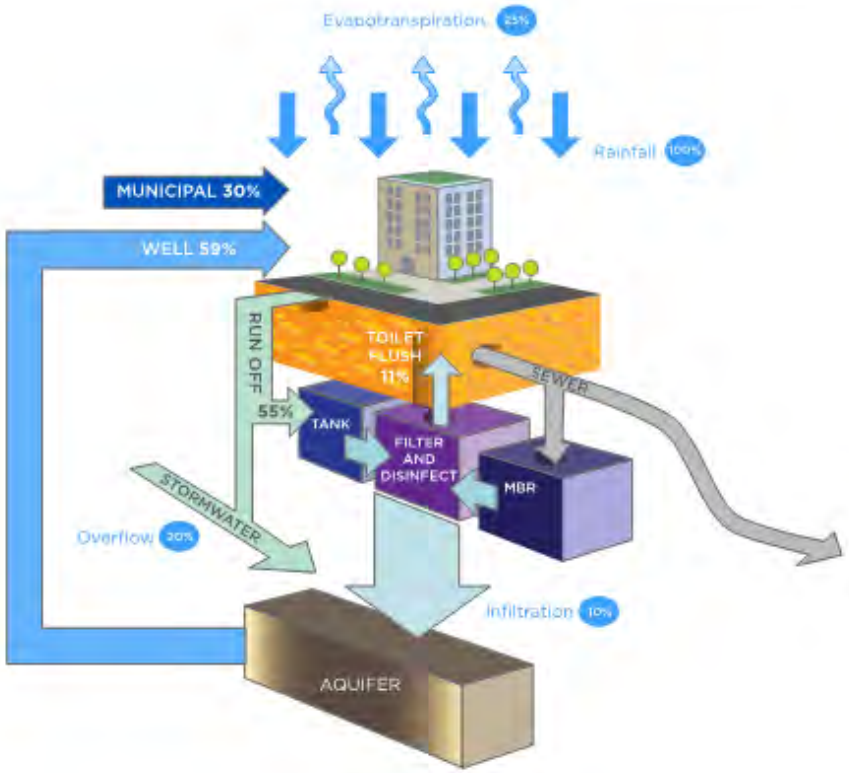


# New: SW Ecodistrict Washington, D.C.
## 10TH STREET SW — A HIGH-PERFORMANCE STREET

10th Street Water Resources

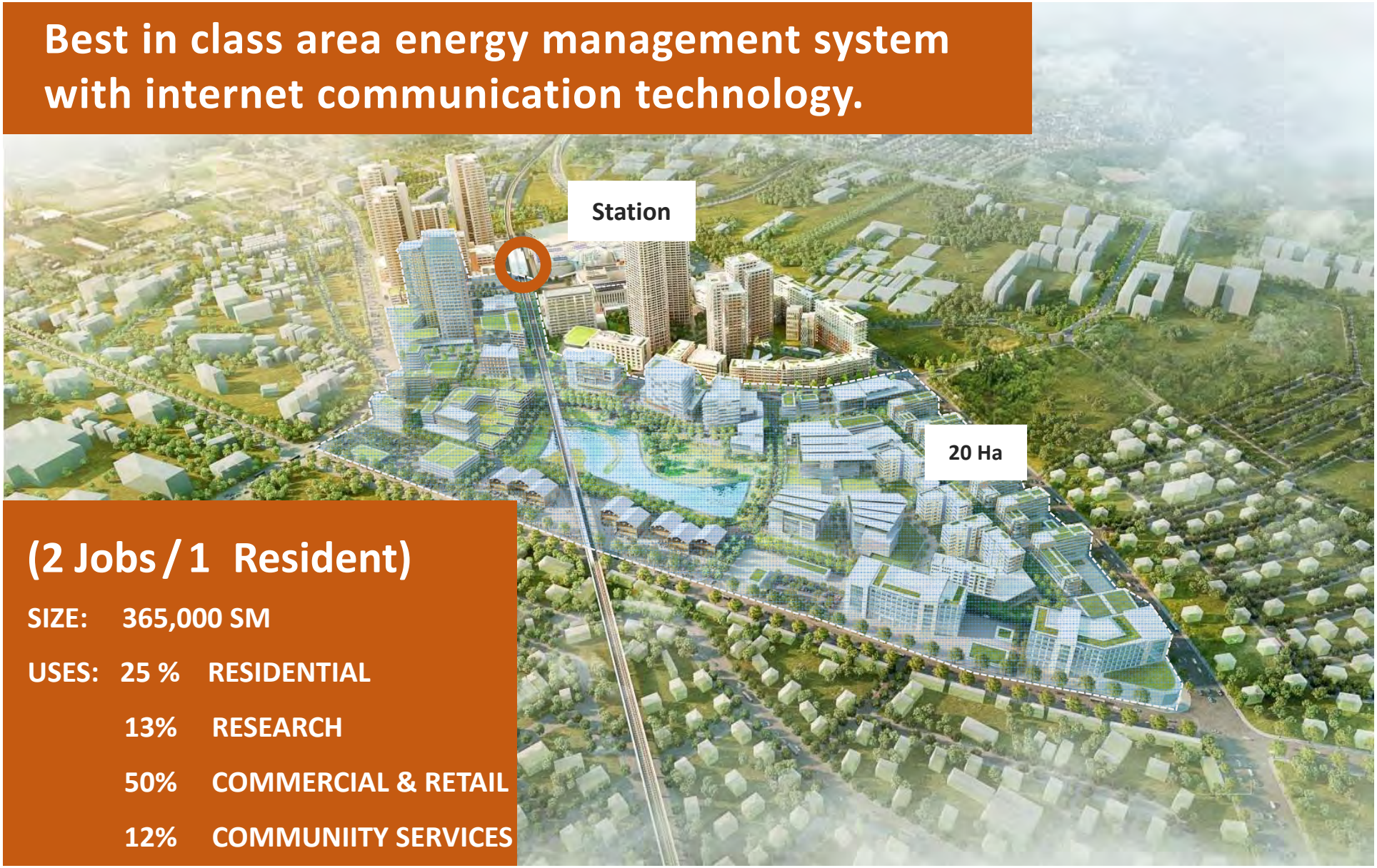



Treating Waters to Close the Gap:
Meeting a 30% Municipal Water Target



# Regeneration: Kashiwa-no-ha
## SMART CITY NEIGHBORHOOD/INNOVATION CAMPUS

**Best in class area energy management system with internet communication technology.**

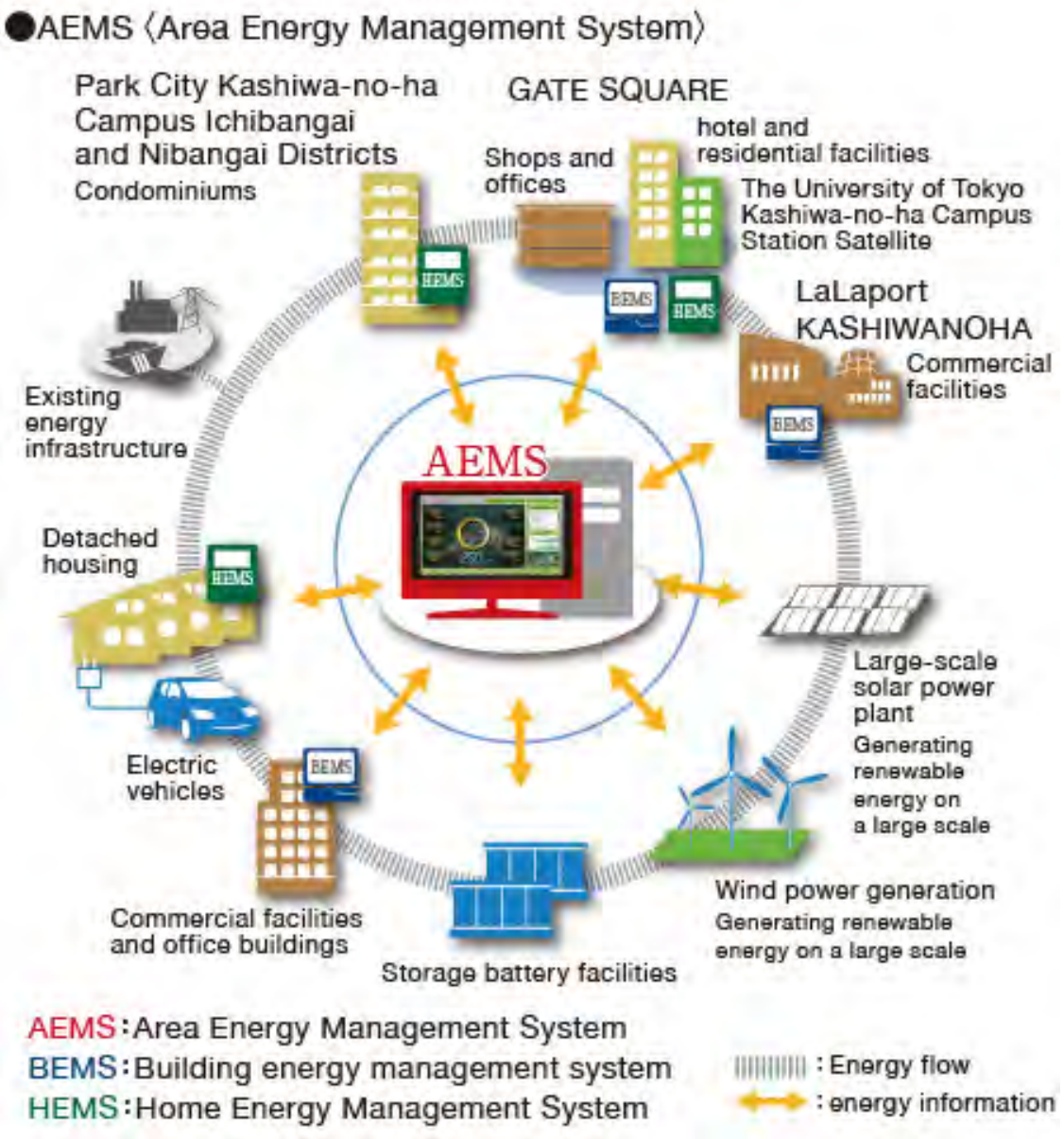



**(2 Jobs / 1 Resident)**

**SIZE:** 365,000 SM

**USES:**
- 25 % RESIDENTIAL
- 13% RESEARCH
- 50% COMMERCIAL & RETAIL
- 12% COMMUNIITY SERVICES

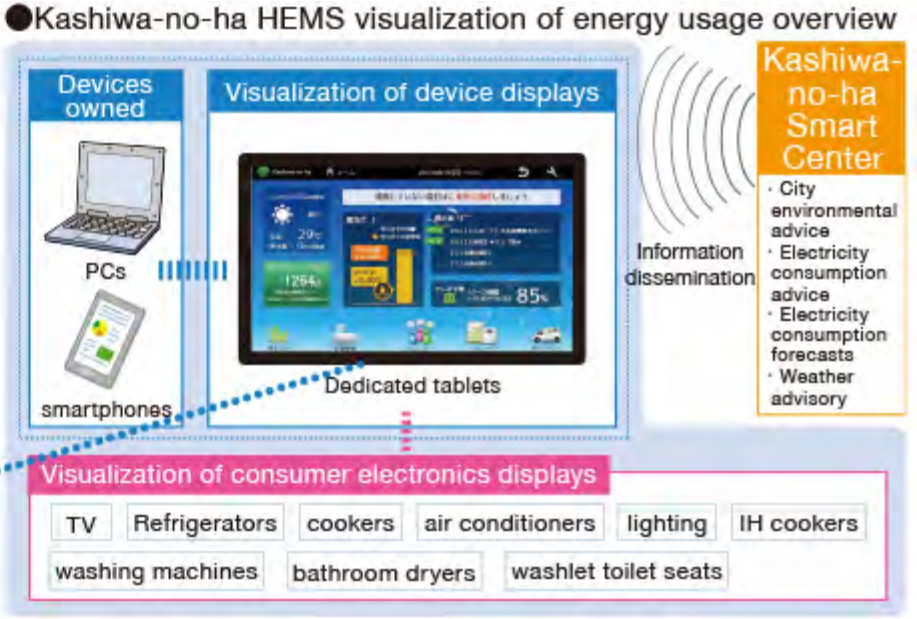
# Regeneration: Area Energy Management
## CONNECTING DISTRICT AREA RESOURCES



# Regeneration: Resilience
## SOCIAL COHESION

●Kashiwa-no-ha HEMS/ Screen image


●Kashiwa-no-ha HEMS visualization of energy usage overview





# Regeneration: PUBLIC ENGAGEMENT

## Kashiwa-no-ha Urban Design Center (UDCK)

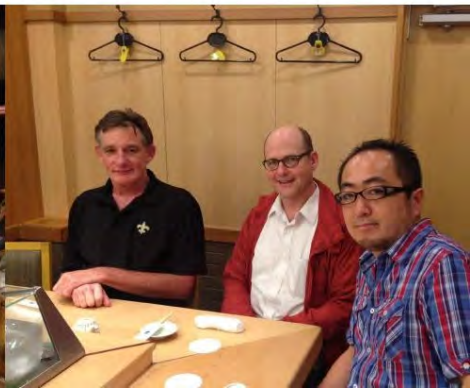



**Drawing Ideas for the Community**





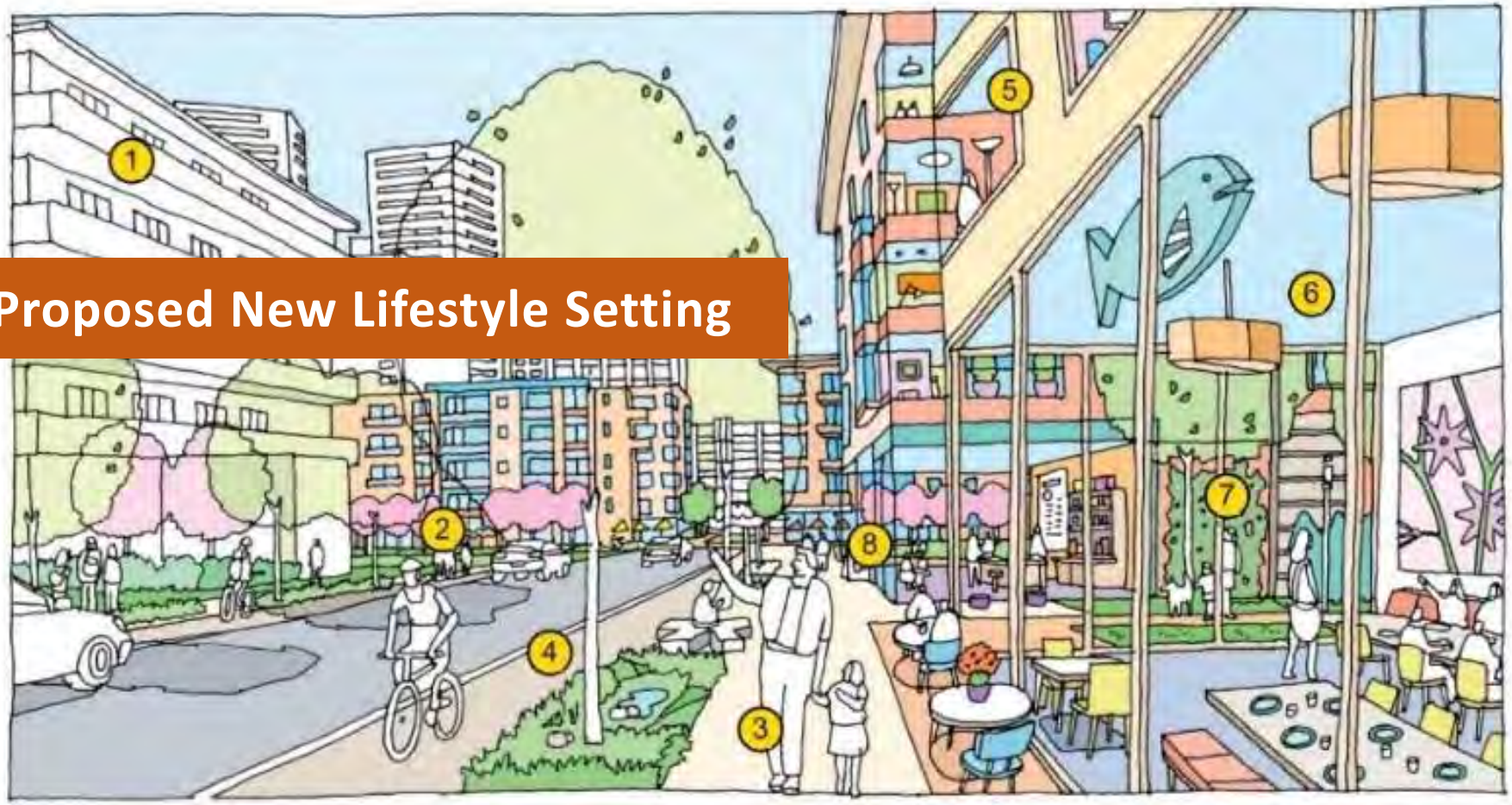




# Regeneration: New Equation
## PROPOSED NEW LIFESTYLE SETTING


# Regeneration: Passive Urban Design
## GROUND LEVEL ACTIVITIES

**Proposed New Lifestyle Setting**

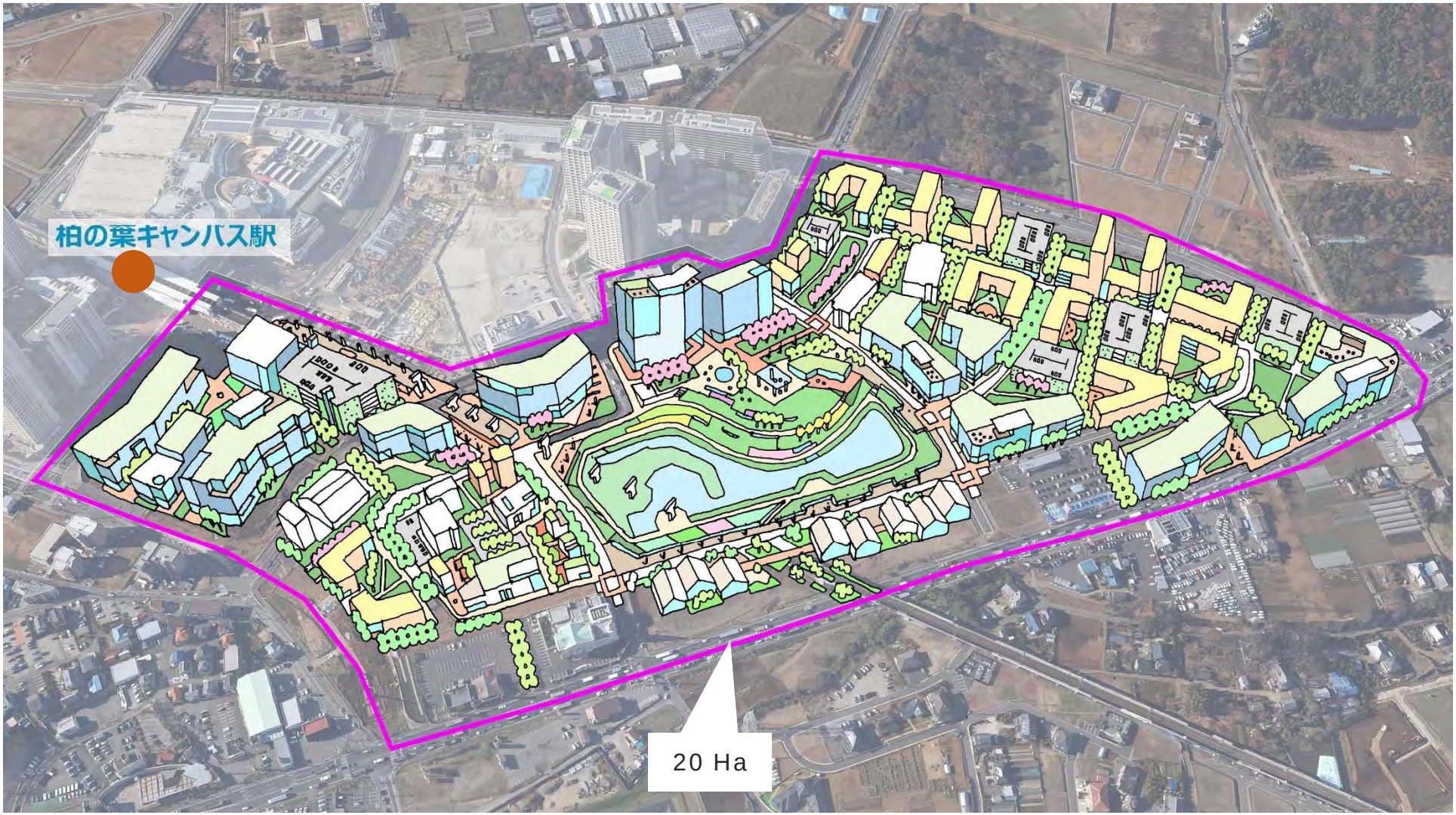



# Regeneration: Mixed-Use
## CONTINUITY

Residential

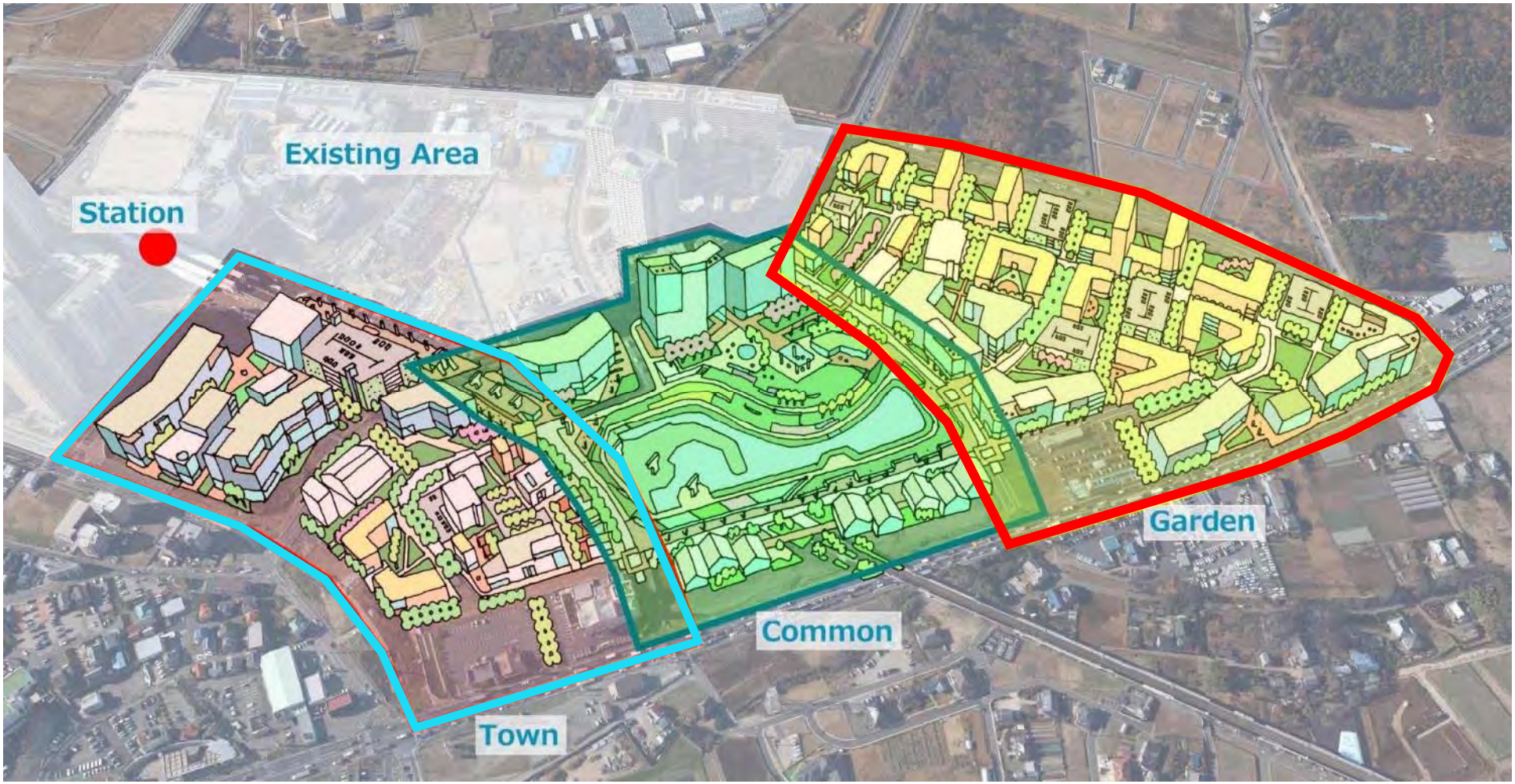
Lab & Office

Commercial



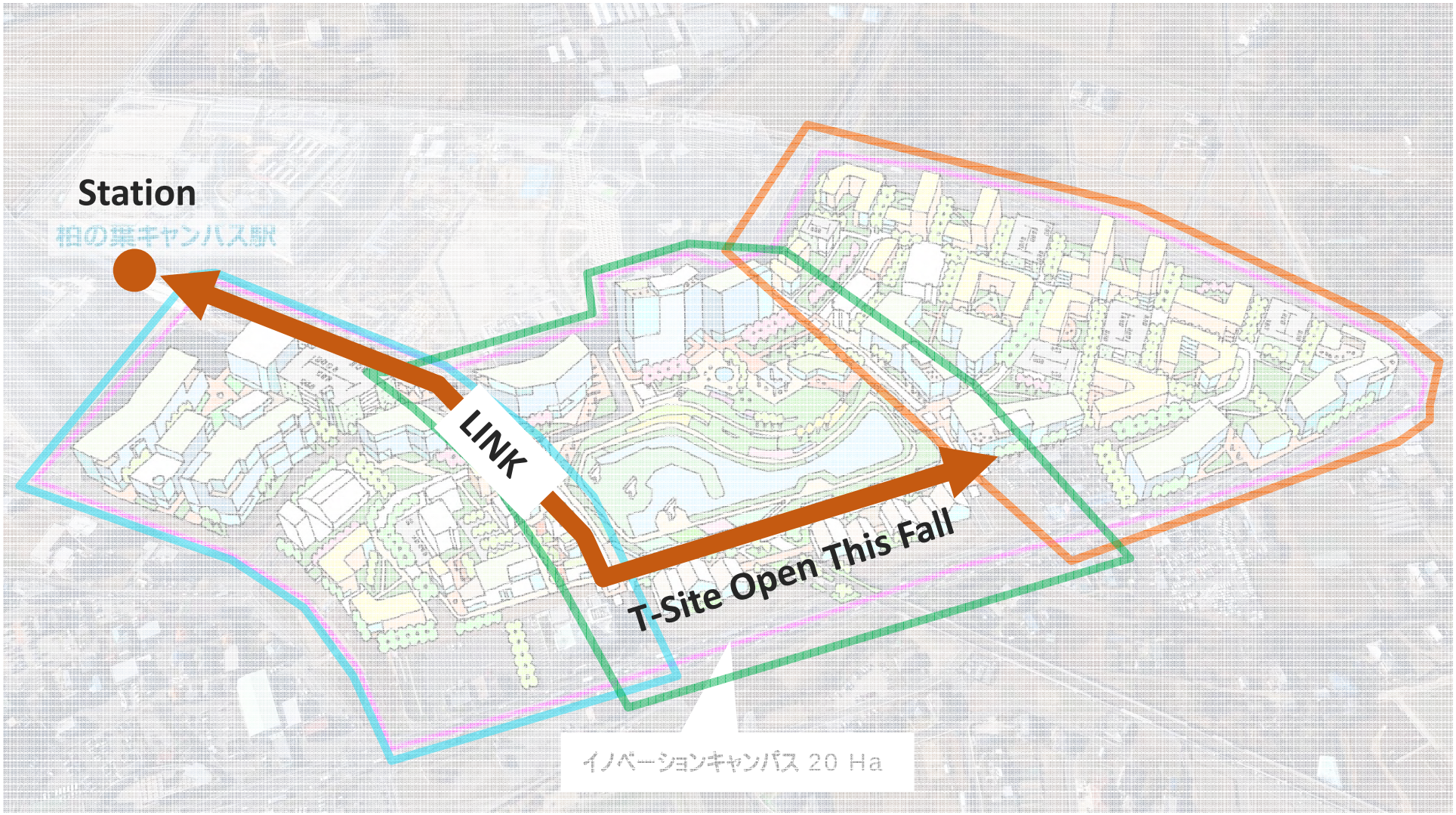
# Regeneration: Diverse Neighborhoods
## CHARACTER

Town  Common  Garden



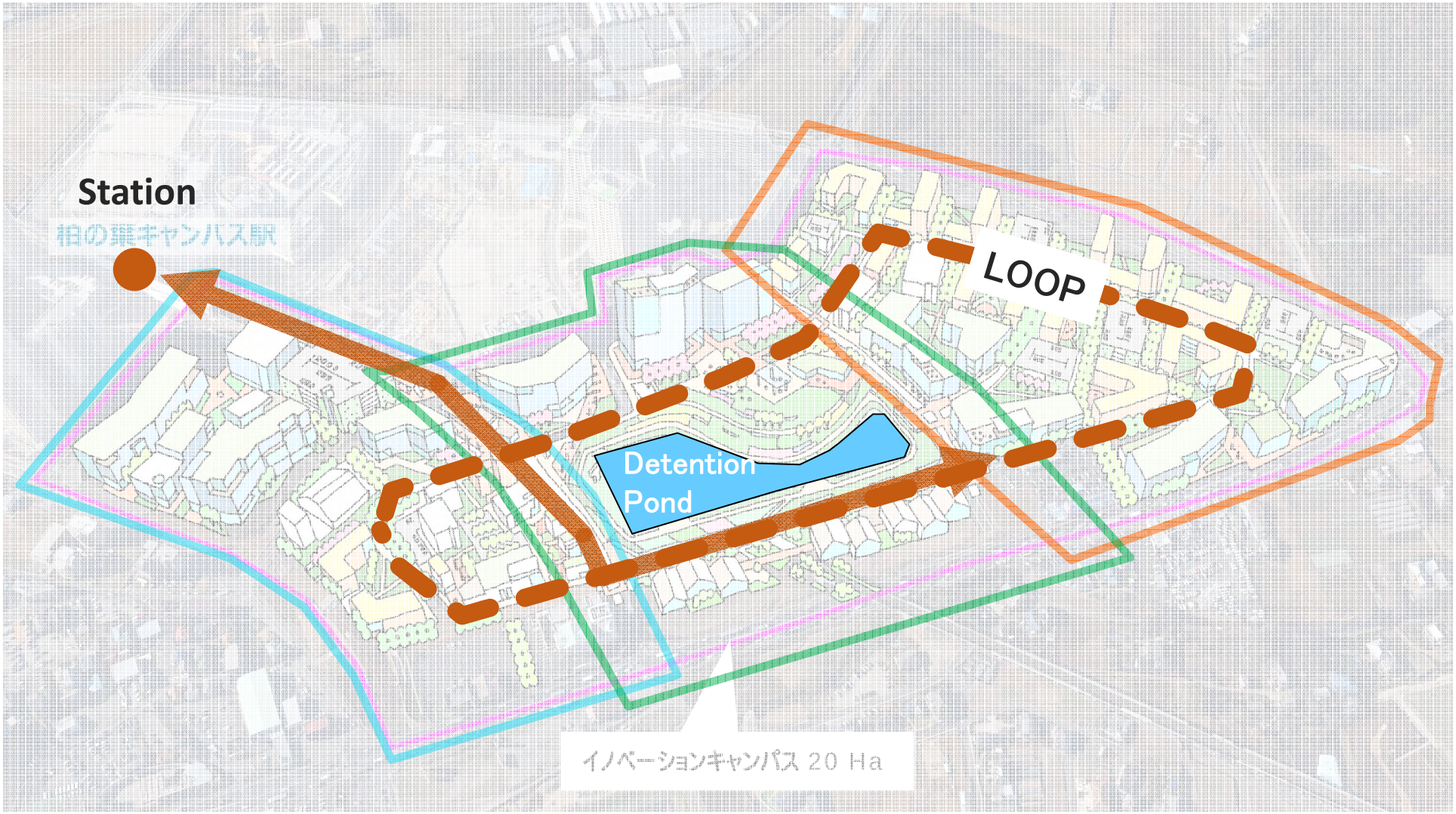
# Regeneration: Connecting Communities
## CONNECTIONS

Town  Common  Garden

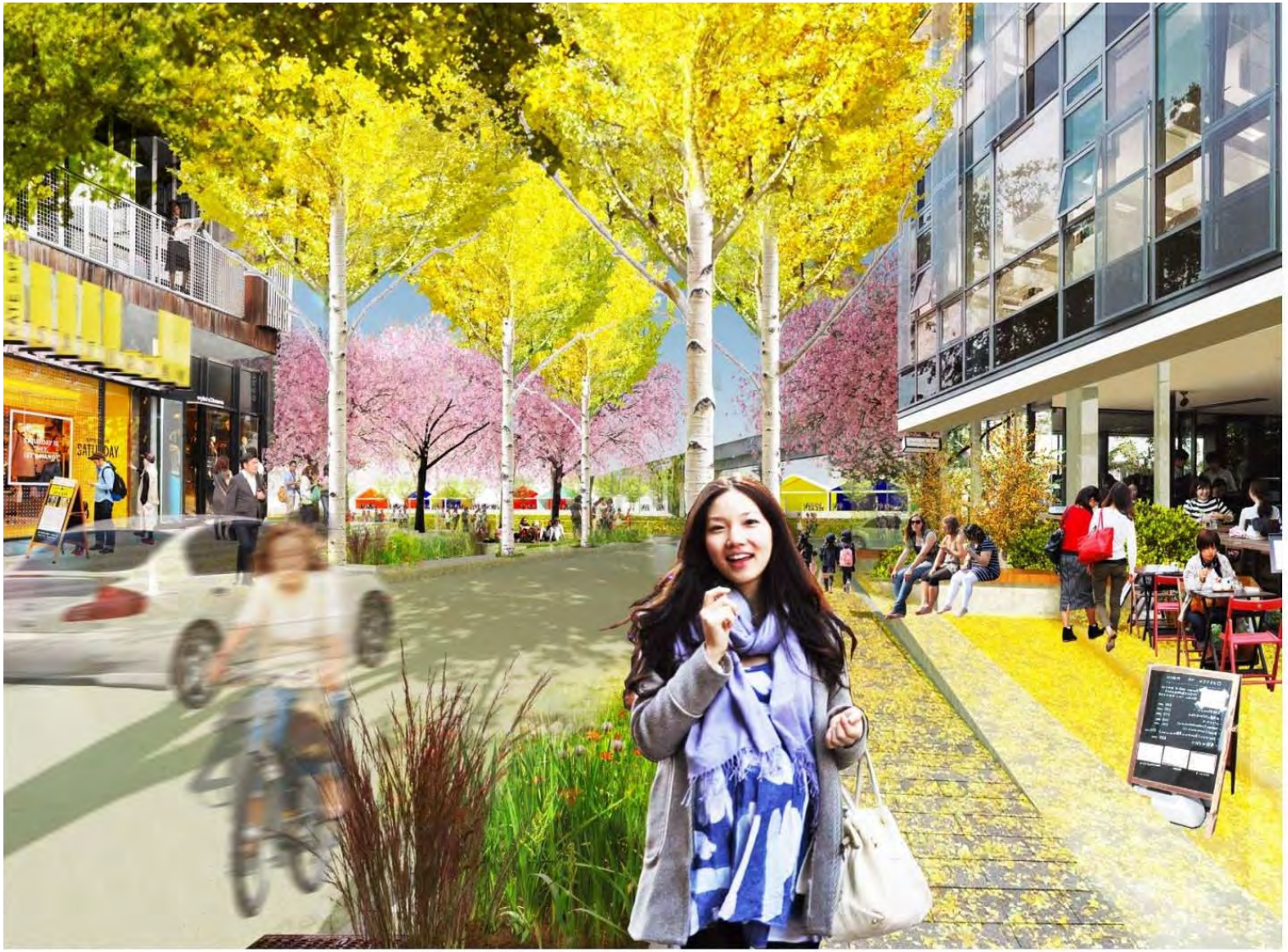


# Regeneration: Connecting Communities
## CONNECTIONS

Town  Common  Garden



# Regeneration: Activities on the Streets
## PARKWAY



アフター/After



ビフォー/Before

# Regeneration: Activities on the Streets
## LINK

アフター/After



ビフォー/Before

# Meaningful Benefits
## WE BUILD GREEN CITIES

WE BUILD GREEN CITIES PORTLAND

## MAKING VISIBLE BENEFITS

90%

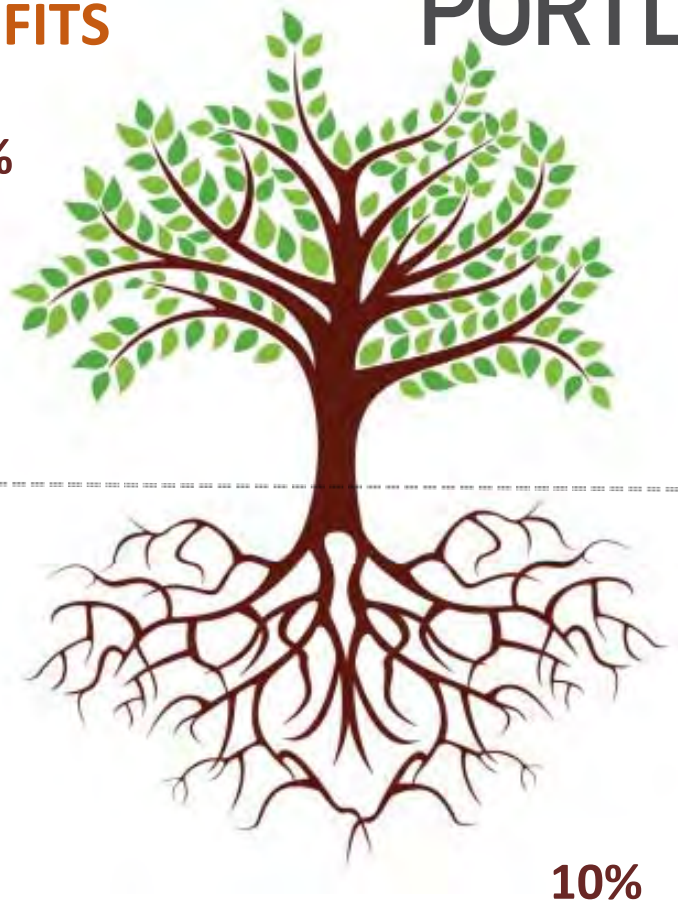
LIFESTYLE / CULTURE

COMMUNITY SERVICES

TECHNOLOGY

INFRASTRUCTURE

REAL ESTATE



10%

**Community Organizations**
**Tenants/Residents**

Unique Cost Sharing Opportunities

PUBLIC-PRIVATE PARTNERSHIPS

**Business Districts**
**Utilities**
**Public Safety**

**Goals** **Configurations** **Governance**

# Community Benefits

## GREAT PLACES | REGENERATIVE NEIGHBORHOODS