HOUSTON COMMUNITY SUSTAINABILITY

The Quality of Life Atlas

Environmental Development

RICE

LESTER KING, PhD.


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Houston Community Sustainability:

The Quality of Life Atlas

by

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Theme - Atmosphere

Sub Theme - Air Quality

Indicator - Ambient concentrations of air pollutants

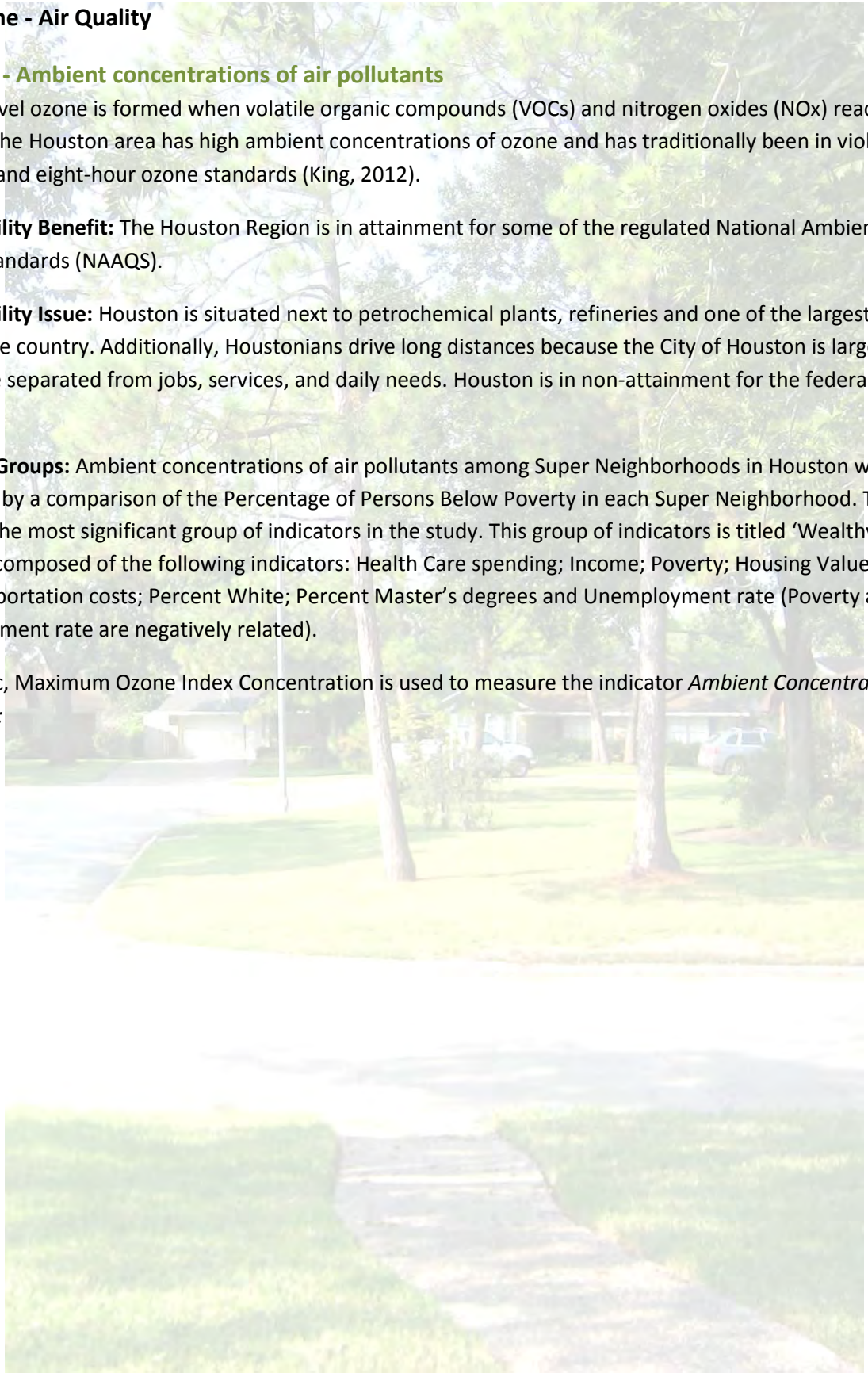
Ground-level ozone is formed when volatile organic compounds (VOCs) and nitrogen oxides (NOx) react in sunlight. The Houston area has high ambient concentrations of ozone and has traditionally been in violation of one-hour and eight-hour ozone standards (King, 2012).

Sustainability Benefit: The Houston Region is in attainment for some of the regulated National Ambient Air Quality Standards (NAAQS).

Sustainability Issue: Houston is situated next to petrochemical plants, refineries and one of the largest industrial ports in the country. Additionally, Houstonians drive long distances because the City of Houston is large and homes are separated from jobs, services, and daily needs. Houston is in non-attainment for the federal ozone standard.

Indicator Groups: Ambient concentrations of air pollutants among Super Neighborhoods in Houston was measured by a comparison of the Percentage of Persons Below Poverty in each Super Neighborhood. This metric is part of the most significant group of indicators in the study. This group of indicators is titled 'Wealthy Group' since it is composed of the following indicators: Health Care spending; Income; Poverty; Housing Value; Housing and Transportation costs; Percent White; Percent Master's degrees and Unemployment rate (Poverty and Unemployment rate are negatively related).

The metric, Maximum Ozone Index Concentration is used to measure the indicator *Ambient Concentration of Air Pollutants:*



Ranking of Super Neighborhoods by ozone concentration			
1	BRAEBURN	45	GREATER INWOOD
2	GULFTON	46	INDEPENDENCE HEIGHTS
3	SHARPSTOWN	47	FAIRBANKS / NORTHWEST CROSSING
4	MEYERLAND AREA	48	WASHINGTON AVENUE COALITION / MEMORIAL PARK
5	MID WEST	49	MEDICAL CENTER AREA
6	SPRING BRANCH WEST	50	SOUTH PARK
7	SOUTH ACRES / CRESTMONT PARK	51	NEAR NORTHWEST
8	GREATER FONDREN SOUTHWEST	52	ELDRIDGE / WEST OAKS
9	WESTWOOD	53	OST / SOUTH UNION
10	ADDICKS PARK TEN	54	GOLFCREST / BELLFORT / REVEILLE
11	IAH / AIRPORT AREA	55	GREATER HEIGHTS
12	MEMORIAL	56	LAKE HOUSTON
13	MINNETEX	57	PECAN PARK
14	GREATER UPTOWN	58	NEARTOWN - MONTROSE
15	GREATER GREENSPOINT	59	GULFGATE RIVERVIEW / PINE VALLEY
16	SPRING BRANCH NORTH	60	PARK PLACE
17	WESTBURY	61	SOUTH BELT / ELLINGTON
18	WILLOW MEADOWS / WILLOWBEND AREA	62	LANGWOOD
19	WILLOWBROOK	63	MACGREGOR
20	WESTCHASE	64	MUSEUM PARK
21	WESTBRANCH	65	LAWNDALE / WAYSIDE
22	BRIARFOREST AREA	66	MEADOWBROOK / ALLENDALE
23	BRAESWOOD PLACE	67	HARRISBURG / MANCHESTER
24	CENTRAL SOUTHWEST	68	FOURTH WARD
25	CARVERDALE	69	NORTHSIDE VILLAGE
26	CLEAR LAKE	70	MAGNOLIA PARK
27	SOUTH MAIN	71	MIDTOWN
28	FORT BEND / HOUSTON	72	CLINTON PARK TRI-COMMUNITY
29	HIDDEN VALLEY	73	GREATER THIRD WARD
30	SPRING BRANCH CENTRAL	74	EDGEBROOK AREA
31	FONDREN GARDENS	75	GREATER EASTWOOD
32	SUNNYSIDE	76	NORTHSHORE
33	GREENWAY / UPPER KIRBY AREA	77	SECOND WARD
34	AFTON OAKS / RIVER OAKS AREA	78	DENVER HARBOR / PORT HOUSTON
35	ALIEF	79	HUNTERWOOD
36	NORTHSIDE/NORTHLINE	80	GREATER FIFTH WARD
37	ASTRODOME AREA	81	DOWNTOWN
38	ACRES HOME	82	PLEASANTVILLE AREA
39	EAST LITTLE YORK / HOMESTEAD	83	KASHMERE GARDENS
40	KINGWOOD AREA	84	GREATER HOBBY AREA
41	LAZY BROOK / TIMBERGROVE	85	EL DORADO / OATES PRAIRIE
42	EASTEX - JENSEN AREA	86	EAST HOUSTON
43	SPRING BRANCH EAST	87	TRINITY / HOUSTON GARDENS
44	UNIVERSITY PLACE	88	SETTEGAST

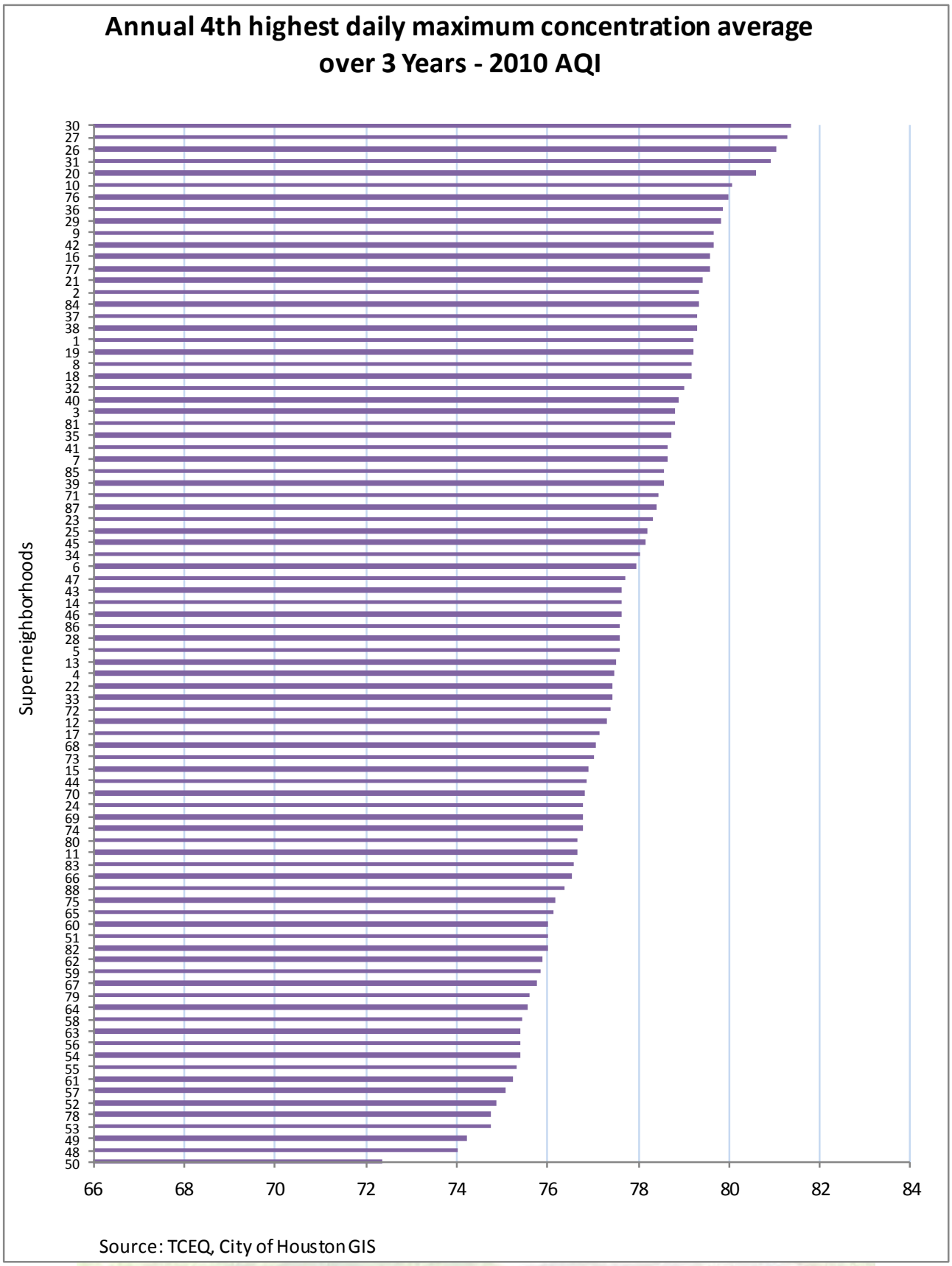


Figure 34: Maximum Ozone Index Concentration

- The neighborhoods of Sharpstown, Gulfton and Braeburn showed the highest record for ozone concentrations, while the Settegast neighborhood showed the lowest ozone concentration.

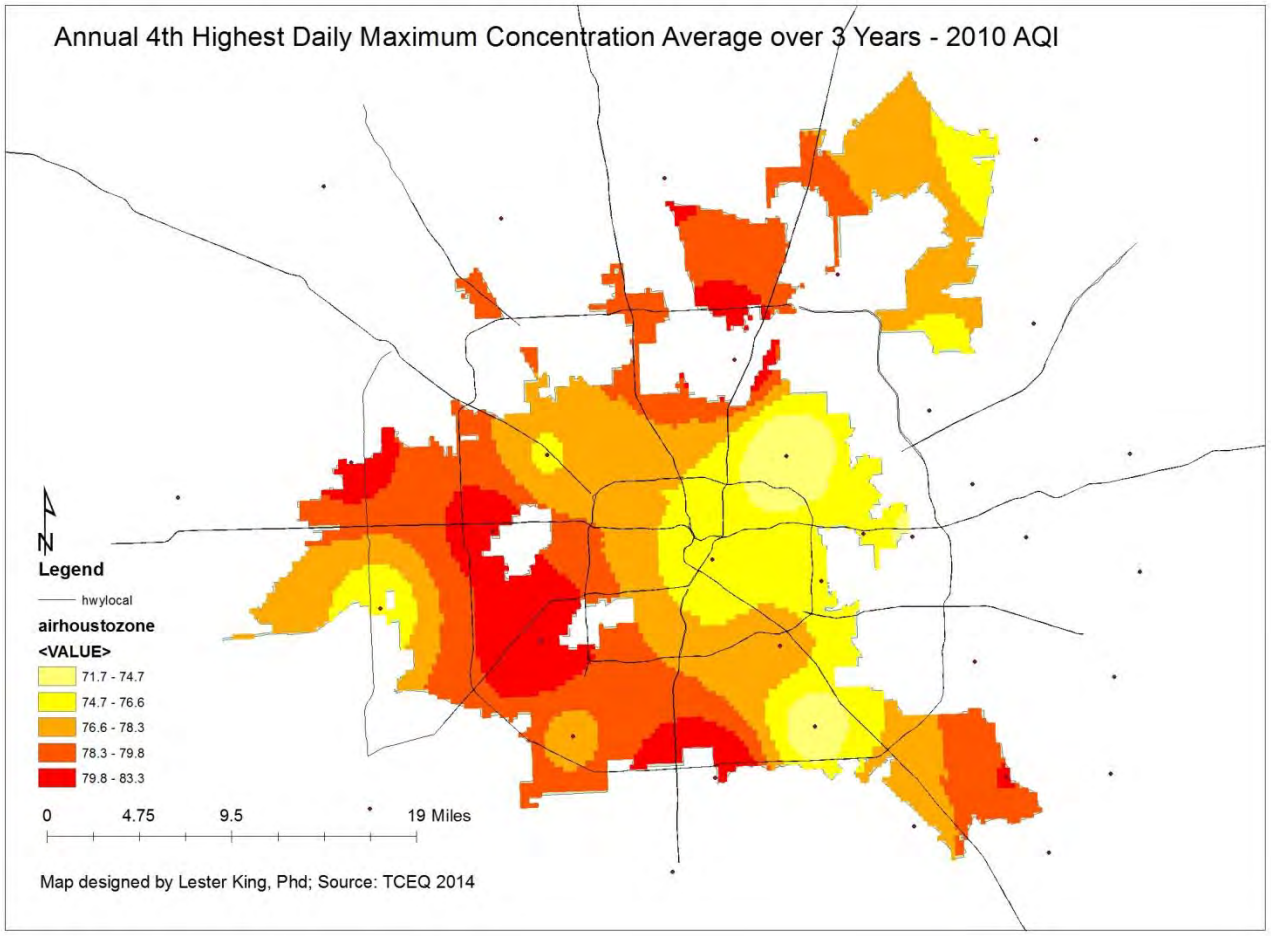


Figure 35: Houston Ozone Concentration

- The above map shows an estimated concentration of ozone in Houston based on known readings from 44 monitors illustrated as black dots on the map.
- The map shows an ozone concentration range from 71.1 to 83.3 across the city. This is the equivalent of a 'Moderate Health Concern' according to the Air Quality Index developed by the Environmental Protection Agency (EPA).
- Under 'Moderate', air quality is acceptable; however, people who are unusually sensitive to ozone may experience respiratory symptoms.

Theme – Freshwater

Sub Theme - Water Demand

Indicator - Water Use

In 2006 the City of Houston Municipal water use was 346,393 acre-feet per year. Harris County excluding Houston used approximately 250,000 acre-feet that year for municipal purposes (Region H Water Planning Group, 2010). The City of Houston is the largest water supplier in the region and is responsible for supplying customers in Harris County and portions of the surrounding 7 counties. This complicates issues for drought response management since Houston water needs do not establish hierarchical preference between needs of customers within the city limits versus those outside of the city limits. As a result most reports and policies projecting Houston water needs are regionally focused without ability to identify the specific needs of users within the city limits.

Sustainability Benefit: Water use per capita has decreased over time.

Sustainability Issue: Large quantities of water, treated to drinking standards, are used for lawn irrigation in Houston. Lawn irrigation strains the capacity and infrastructure of the water distribution service and can account for as much as 60% - 70% of a typical residential customer's water usage in the summer months (Texas Agricultural Experiment Station, 2002).

Indicator Groups: Water use among Super Neighborhoods in Houston was measured by a comparison of the **Household water use** in each Super Neighborhood. This metric is not part of any significant group of indicators in the study.

The following metric was chosen to measure the indicator *Water Use*:

Figure 36: Household Water Use by Neighborhood

Ranking of Super Neighborhoods by household water use			
1	ALIEF	45	SOUTH PARK
2	GREATER UPTOWN	46	BRAEBURN
3	SHARPSTOWN	47	EDGEBROOK AREA
4	ELDRIDGE / WEST OAKS	48	NORTHSHORE
5	CLEAR LAKE	49	FAIRBANKS / NORTHWEST CROSSING
6	MID WEST	50	TRINITY / HOUSTON GARDENS
7	GREATER FONDREN SOUTHWEST	51	LAZY BROOK / TIMBERGROVE
8	KINGWOOD AREA	52	UNIVERSITY PLACE
9	BRIARFOREST AREA	53	EAST HOUSTON
10	GREATER HEIGHTS	54	GREATER HOBBY AREA
11	MEMORIAL	55	GREATER THIRD WARD
12	CENTRAL SOUTHWEST	56	SOUTH ACRES / CRESTMONT PARK
13	NEAR NORTHWEST	57	WILLOW MEADOWS / WILLOWBEND AREA
14	SOUTH BELT / ELLINGTON	58	MAGNOLIA PARK
15	NEARTOWN - MONTROSE	59	DENVER HARBOR / PORT HOUSTON
16	GOLFCREST / BELLFORT / REVEILLE	60	PECAN PARK
17	NORTHSIDE/NORTHLINE	61	ADDICKS PARK TEN
18	GREATER GREENSPOINT	62	INDEPENDENCE HEIGHTS
19	GULFTON	63	KASHMERE GARDENS
20	WESTCHASE	64	GREATER EASTWOOD
21	WASHINGTON AVENUE COALITION / MEMORIAL PARK	65	SECOND WARD
22	GREATER INWOOD	66	MIDTOWN
23	GREENWAY / UPPER KIRBY AREA	67	LAWNDALE / WAYSIDE
24	BRAESWOOD PLACE	68	GULFGATE RIVERVIEW / PINE VALLEY
25	FORT BEND / HOUSTON	69	DOWNTOWN
26	ACRES HOME	70	IAH / AIRPORT AREA
27	SPRING BRANCH EAST	71	PARK PLACE
28	MEYERLAND AREA	72	MEDICAL CENTER AREA
29	SPRING BRANCH WEST	73	SOUTH MAIN
30	WESTWOOD	74	WILLOWBROOK
31	LAKE HOUSTON	75	CLINTON PARK TRI-COMMUNITY
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34	SPRING BRANCH CENTRAL	78	LANGWOOD
35	WESTBURY	79	FOURTH WARD
36	ASTRODOME AREA	80	CARVERDALE
37	GREATER FIFTH WARD	81	HIDDEN VALLEY
38	EASTEX - JENSEN AREA	82	HARRISBURG / MANCHESTER
39	OST / SOUTH UNION	83	SETTEGAST
40	MEADOWBROOK / ALLENDALE	84	PLEASANTVILLE AREA
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42	EAST LITTLE YORK / HOMESTEAD	86	HUNTERWOOD
43	AFTON OAKS / RIVER OAKS AREA	87	FONDREN GARDENS
44	SPRING BRANCH NORTH	88	WESTBRANCH

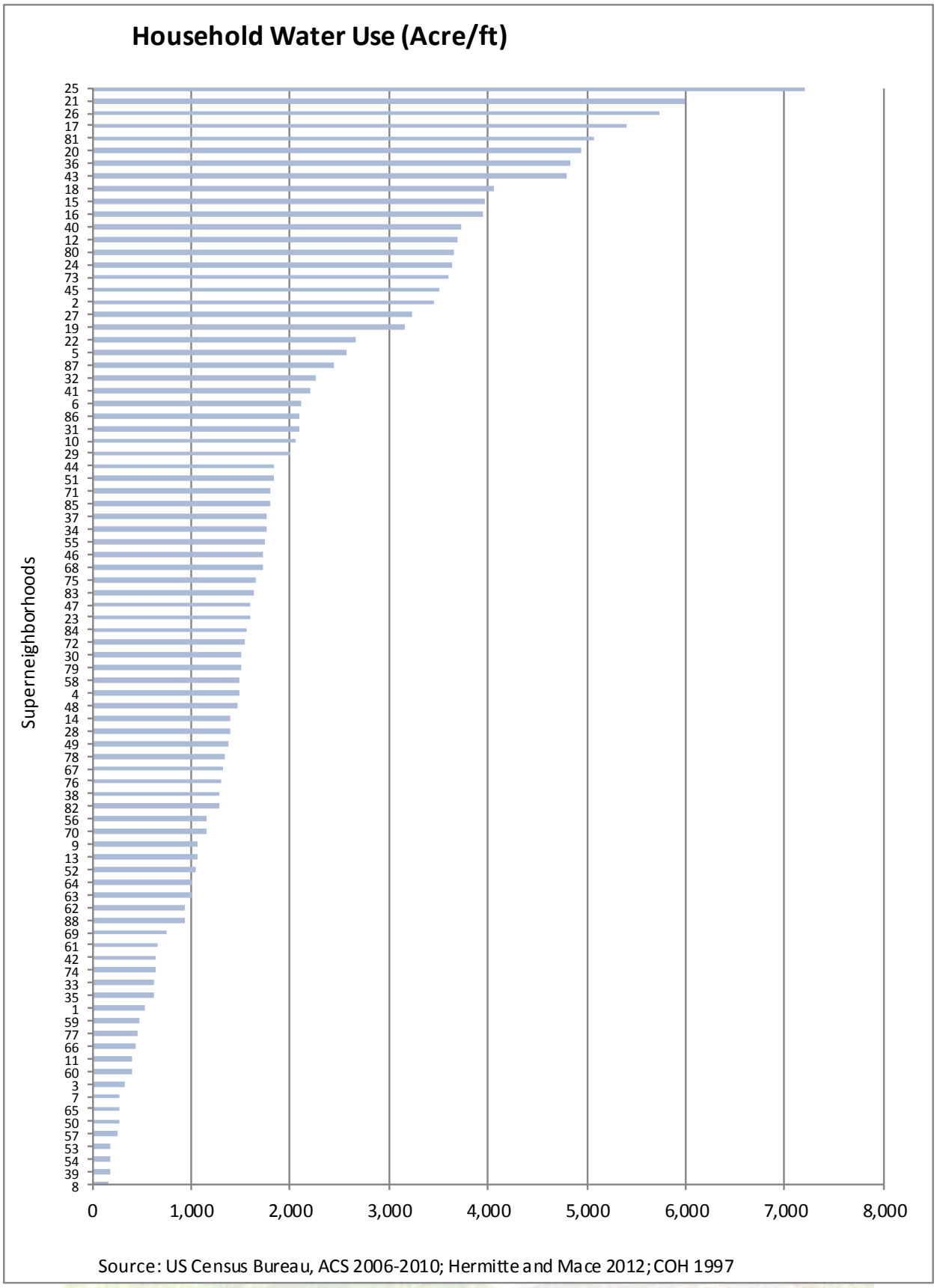
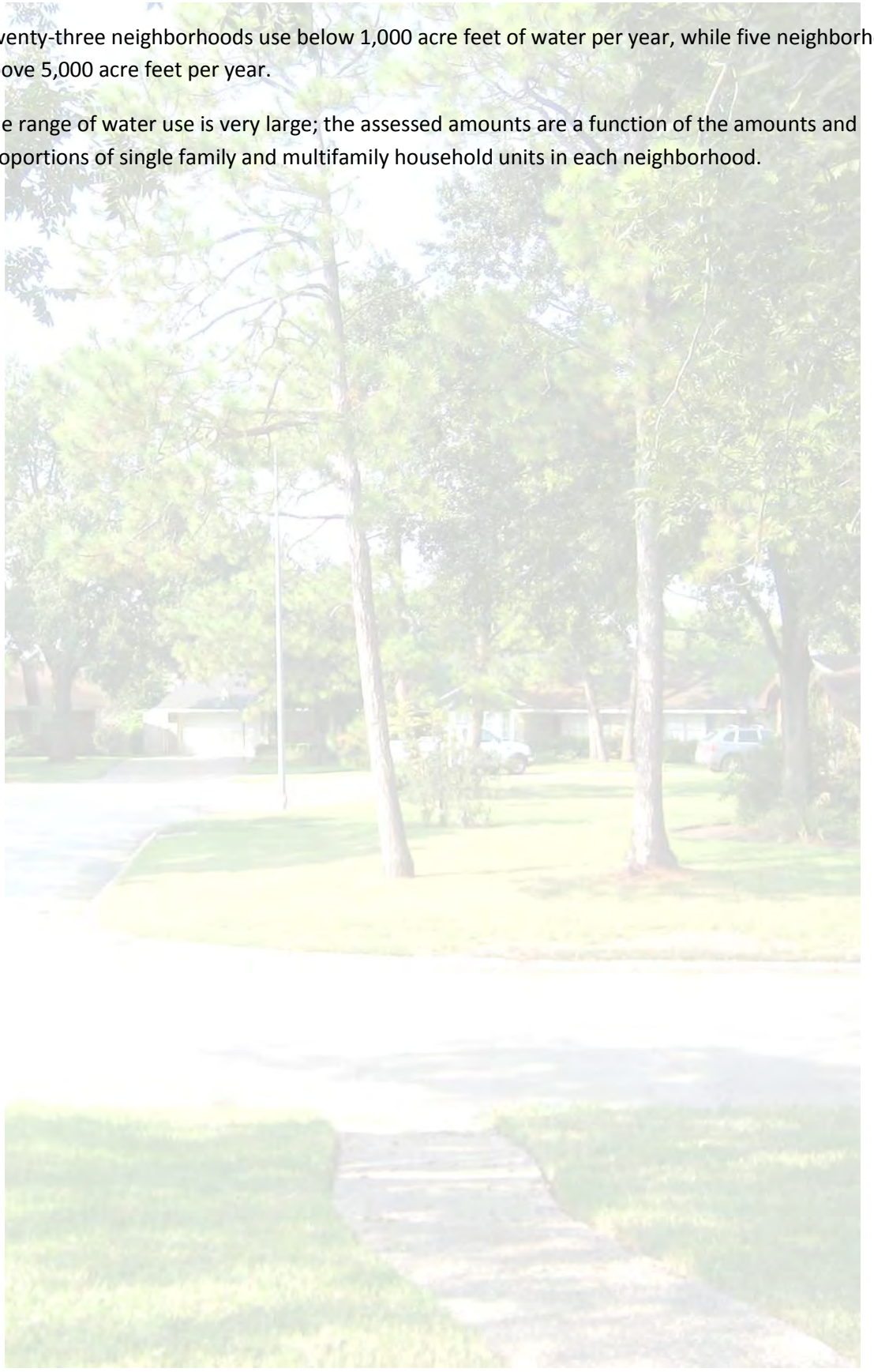


Figure 36: Household Water Use by Neighborhood

- Households in this analysis represent a total of 52% of the total amount of water consumed in Houston.
- Twenty-three neighborhoods use below 1,000 acre feet of water per year, while five neighborhoods use above 5,000 acre feet per year.
- The range of water use is very large; the assessed amounts are a function of the amounts and proportions of single family and multifamily household units in each neighborhood.



Theme - Land

Sub Theme - Flooding

Indicator – Flood Plain Expansion

Flooding in Houston is a critical issue regarding resilience of the city to natural hazards. Resiliency efforts focus on either mitigation efforts or adaptation efforts, which together articulate strategies for hazard reduction or impact response respectively. Mitigation strategies are citied as those proactive solutions to reduce the impacts of natural hazards before they occur and hence are promoted as the best course of action for sustainability (Schwab & Topping, 2008). Mitigation actions for urban areas to reduce flooding focus mainly on increasing development regulations in the floodplains and abandonment of developments in the floodplain (White, 2008). Floodplain mapping helps in the effort to find solutions for flooding mitigation, however according to the Harris County Flood Control District (HCFCD), 65% of the area in Harris County that flooded during Tropical Storm Allison was outside of the mapped regulatory floodplain (Harris County Flood Control District, 2004).

Sustainability Benefit: The delineation of the 100-year floodplain is the first step in targeting areas for flood mitigation strategies

Sustainability Issue: Stormwater detention and retention and efficient conveyance into the bayous in addition to development restrictions in the floodplain, must be increased to significantly combat flooding in Houston.

Indicator Groups: Flood plain expansion among Super Neighborhoods in Houston was measured by a comparison of the **Percentage of persons within the 100 year flood zone** in each Super Neighborhood. This metric is not part of any significant group of indicators in the study.

The following metric was used to measure the indicator *Flood Plain Expansion*:
Figure 37: Population within 100 Yr Floodplain

Ranking of Super Neighborhoods by percentage of population in flood zones			
1	MEYERLAND AREA	45	EAST LITTLE YORK / HOMESTEAD
2	BRAEBURN	46	BRAYS OAKS
3	ADDICKS PARK TEN	47	WILLOWBROOK
4	KASHMERE GARDENS	48	WESTCHASE
5	BRAESWOOD PLACE	49	EAST HOUSTON
6	ELDRIDGE / WEST OAKS	50	SOUTH ACRES / CRESTMONT PARK
7	LAKE HOUSTON	51	DOWNTOWN
8	ALIEF	52	NORTHSIDE/NORTHLINE
9	LANGWOOD	53	FOURTH WARD
10	KINGWOOD AREA	54	GOLFCREST / BELLFORT / REVEILLE
11	GREATER INWOOD	55	GULFGATE RIVERVIEW / PINE VALLEY
12	INDEPENDENCE HEIGHTS	56	MEMORIAL
13	EDGEBROOK AREA	57	IAH / AIRPORT AREA
14	GREATER GREENSPOINT	58	UNIVERSITY PLACE
15	WESTWOOD	59	MAGNOLIA PARK
16	MEDICAL CENTER AREA	60	SPRING BRANCH NORTH
17	HUNTERWOOD	61	ACRES HOME
18	HARRISBURG / MANCHESTER	62	MEADOWBROOK / ALLENDALE
19	FAIRBANKS / NORTHWEST CROSSING	63	BRIARFOREST AREA
20	LAZY BROOK / TIMBERGROVE	64	FONDREN GARDENS
21	PLEASANTVILLE AREA	65	AFTON OAKS / RIVER OAKS AREA
22	NORTHSHORE	66	SECOND WARD
23	CENTRAL SOUTHWEST	67	DENVER HARBOR / PORT HOUSTON
24	HIDDEN VALLEY	68	GREATER UPTOWN
25	EL DORADO / OATES PRAIRIE	69	NORTHSIDE VILLAGE
26	MACGREGOR	70	CLEAR LAKE
27	GREATER HOBBY AREA	71	WESTBRANCH
28	SHARPSTOWN	72	GREATER FIFTH WARD
29	EASTEX - JENSEN AREA	73	NEARTOWN - MONTROSE
30	PARK PLACE	74	SETTEGAST
31	GREATER HEIGHTS	75	SPRING BRANCH EAST
32	SOUTH BELT / ELLINGTON	76	FORT BEND / HOUSTON
33	CARVERDALE	77	MID WEST
34	WESTBURY	78	PECAN PARK
35	SOUTH PARK	79	SPRING BRANCH WEST
36	SUNNYSIDE	80	ASTRODOME AREA
37	TRINITY / HOUSTON GARDENS	81	GREATER THIRD WARD
38	WILLOW MEADOWS / WILLOWBEND AREA	82	CLINTON PARK TRI-COMMUNITY
39	CENTRAL NORTHWEST	83	GREENWAY / UPPER KIRBY AREA*
40	MINNETEX	84	OST / SOUTH UNION*
41	LAWNDALE / WAYSIDE	85	GREATER EASTWOOD*
42	GULFTON	86	MIDTOWN*
43	WASHINGTON AVENUE COALITION / MEMORIAL PARK	87	MUSEUM PARK*
44	SPRING BRANCH CENTRAL	88	SOUTH MAIN*
• - 0% population in flood zones			

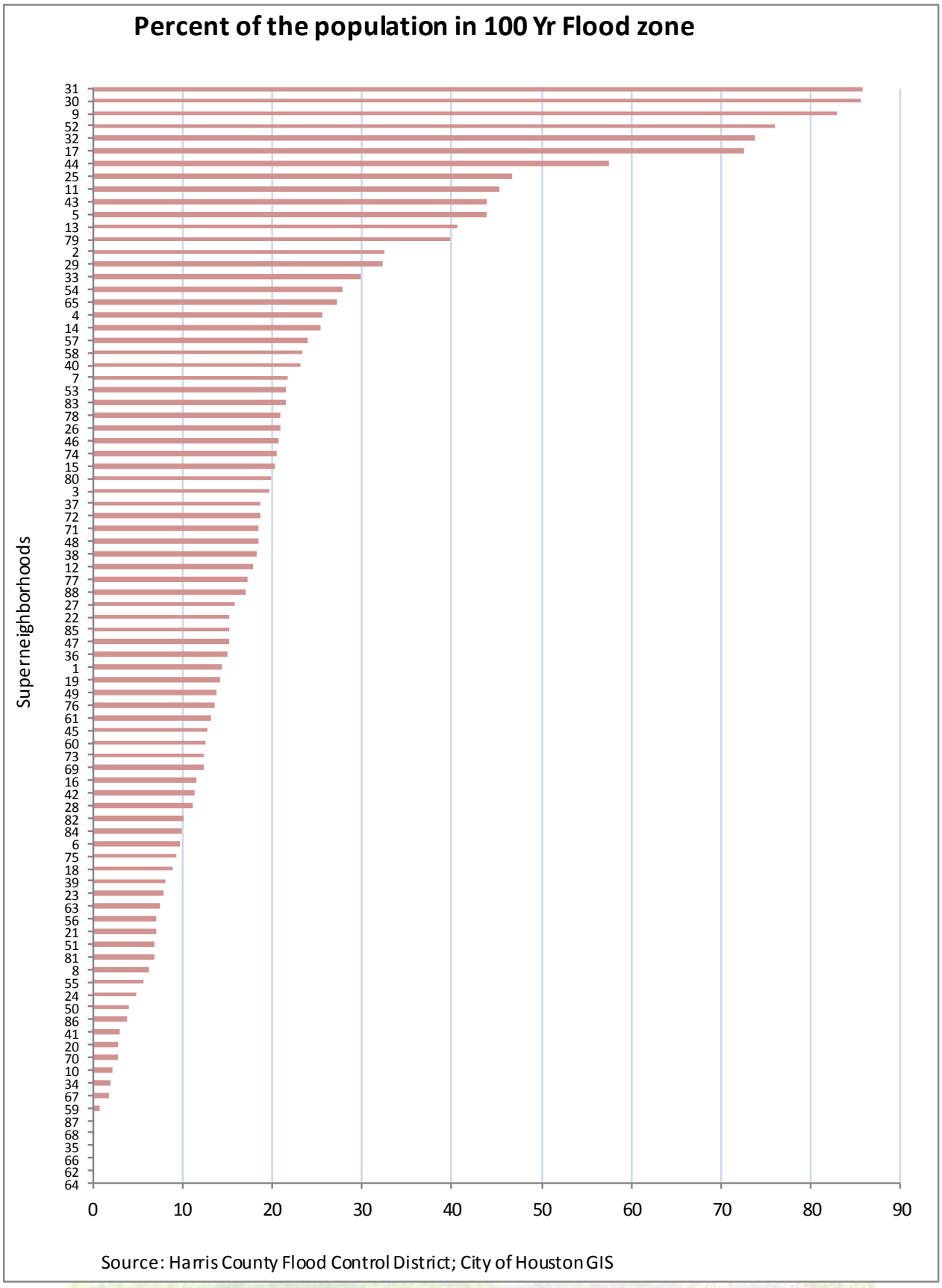


Figure 37: Population within 100 Yr Floodplain

- The above figure shows the tremendous variance of persons vulnerable to flooding disasters in Houston.
- Thirty neighborhoods have less than 10% of persons in the 100 year flood plain. Of those thirty neighborhoods six have no persons in the 100 year flood plain.
- Four Neighborhoods have more than 75% of persons in the 100 year flood plain. Those neighborhoods are Kashmere gardens, Addicks Park Ten, Braeburn, and Meyerland Area.

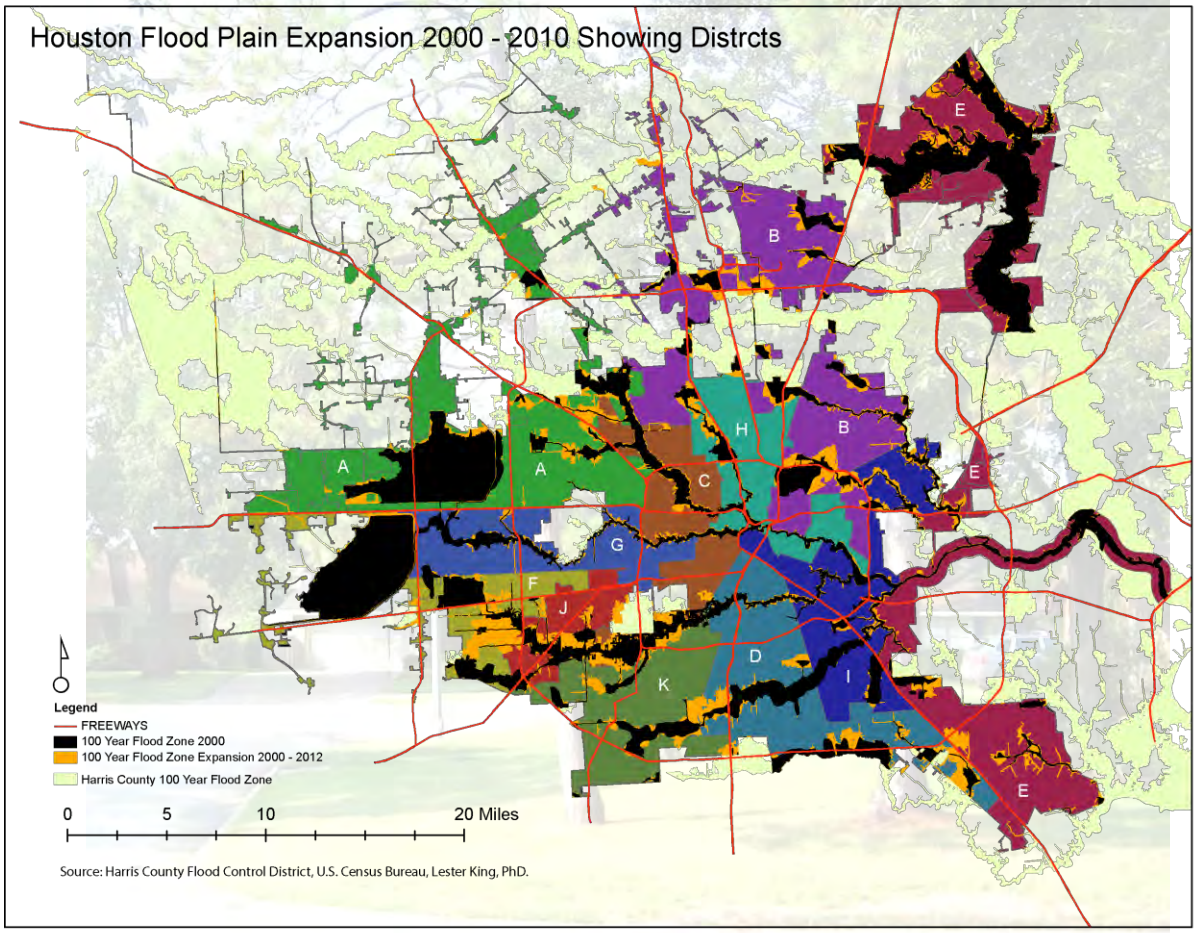


Figure 38: Houston floodplain expansion 2000 - 2012

- The 100 year floodplain expanded by 11,375 acres to cover 26% of the City of Houston, between 2000 and 2012.
- An estimated 17% of Houstonians and approximately 149, 000 housing units are in the 100 year floodplain (King, 2012).

Theme - Land
Sub Theme - Land Cover

Indicator - Land Cover Change

During the period 2000 to 2025, if development practices remain the same, the United States is expected to lose 7 million acres of farmland and 7 million acres of ecologically fragile lands to real estate development (Burchell, Downs, McCann, & Mukherji, 2005). Houston is considered a real estate developer friendly city with few development regulations. It is also considered one of the more sprawling cities in the country. This sprawl can be defined by low density, low accessibility, poor continuity, low centrality, low concentration, and absence of mixed land uses (Cutsinger & Galster, 2006). Since development is not focused in targeted areas, most lands in the city are technically available for real estate development, the resulting land coverage is primarily low density development. As a result of this type of development practice, a significant amount of natural land and habitat has been converted to developed areas. Analysis shows there has been a loss of 25% of Big Thicket, 14% of Coastal Marshes, 21% of Columbia Bottomlands, 31% of Piney Woods, 16% of Post Oak Savannah, 40% of Coastal Prairie, and 11% of Trinity Bottomlands ecosystems in the wider Houston region (Blackburn, 2011). Sixteen percent of the land in Houston is used for High intensity development. These are areas that have impervious surfaces representing 80% to 100% land cover. High intensity development would support greater economic activity and as a result the challenge for Houston would be to minimize the percentage of high intensity development, while increasing economic activity to a level of sustainability.

Sustainability Benefit: Houston is a large city capable of absorbing a lot of growth and development.

Sustainability Issue: Growth and development in Houston does not maximize land utility since most development in the city is comprised of single story buildings. As a result more open space and natural areas are developed, commuting distances increased and the city's overall carbon footprint is increased.

Indicator Groups: Land cover change among Super Neighborhoods in Houston was measured by a comparison of **High intensity development** in each Super Neighborhood. This metric is part of the second most significant group of indicators in the study. This group of indicators is titled 'Inner City Group' since it is composed of the following indicators: **Vehicle Miles Travelled, Street Intersection Density, Percent of open Space, Population close to parks, Housing units close to business centers, Poor Streets, High development land use, population close to bus stops, Population in food deserts** (**Vehicle miles travelled** and **Percent of open space** are negatively related).

The following metrics were used to measure Land Cover Change:

Figure 39: High intensity development by neighborhood

Ranking of Super Neighborhoods by percentage of high intensity development			
1	DOWNTOWN	45	SPRING BRANCH CENTRAL
2	GULFTON	46	CLINTON PARK TRI-COMMUNITY
3	MIDTOWN	47	EL DORADO / OATES PRAIRIE
4	ASTRODOME AREA	48	MEMORIAL
5	GREENWAY / UPPER KIRBY AREA	49	OST / SOUTH UNION
6	SECOND WARD	50	BRAESWOOD PLACE
7	WESTWOOD	51	GREATER FONDREN SOUTHWEST
8	DENVER HARBOR / PORT HOUSTON	52	NORTHSHORE
9	MID WEST	53	GREATER HOBBY AREA
10	GREATER EASTWOOD	54	LANGWOOD
11	PLEASANTVILLE AREA	55	EDGEBROOK AREA
12	MAGNOLIA PARK	56	EASTEX - JENSEN AREA
13	GULFGATE RIVERVIEW / PINE VALLEY	57	PARK PLACE
14	SPRING BRANCH EAST	58	ALIEF
15	SHARPSTOWN	59	GREATER INWOOD
16	SOUTH MAIN	60	MACGREGOR
17	NEARTOWN - MONTROSE	61	WESTBRANCH
18	MUSEUM PARK	62	WILLOW MEADOWS / WILLOWBEND AREA
19	GREATER GREENSPOINT	63	IAH / AIRPORT AREA
20	WESTCHASE	64	NEAR NORTHWEST
21	FAIRBANKS / NORTHWEST CROSSING	65	BRIARFOREST AREA
22	GREATER FIFTH WARD	66	MEYERLAND AREA
23	LAZY BROOK / TIMBERGROVE	67	AFTON OAKS / RIVER OAKS AREA
24	KASHMERE GARDENS	68	FONDREN GARDENS
25	MEDICAL CENTER AREA	69	TRINITY / HOUSTON GARDENS
26	WASHINGTON AVENUE COALITION / MEMORIAL PARK	70	SPRING BRANCH NORTH
27	HIDDEN VALLEY	71	SOUTH BELT / ELLINGTON
28	WILLOWBROOK	72	WESTBURY
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31	GREATER UPTOWN	75	SUNNYSIDE
32	CARVERDALE	76	EAST HOUSTON
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34	FOURTH WARD	78	CENTRAL SOUTHWEST
35	PECAN PARK	79	ACRES HOME
36	GREATER THIRD WARD	80	EAST LITTLE YORK / HOMESTEAD
37	NORTHSIDE/NORTHLINE	81	SETTEGAST
38	UNIVERSITY PLACE	82	MINNETEX
39	BRAEBURN	83	FORT BEND / HOUSTON
40	INDEPENDENCE HEIGHTS	84	SOUTH ACRES / CRESTMONT PARK
41	GREATER HEIGHTS	85	KINGWOOD AREA
42	GOLFCREST / BELLFORT / REVEILLE	86	ADDICKS PARK TEN
43	MEADOWBROOK / ALLENDALE	87	HUNTERWOOD
44	LAWNDALE / WAYSIDE	88	LAKE HOUSTON*
• - 0% high intensity development			

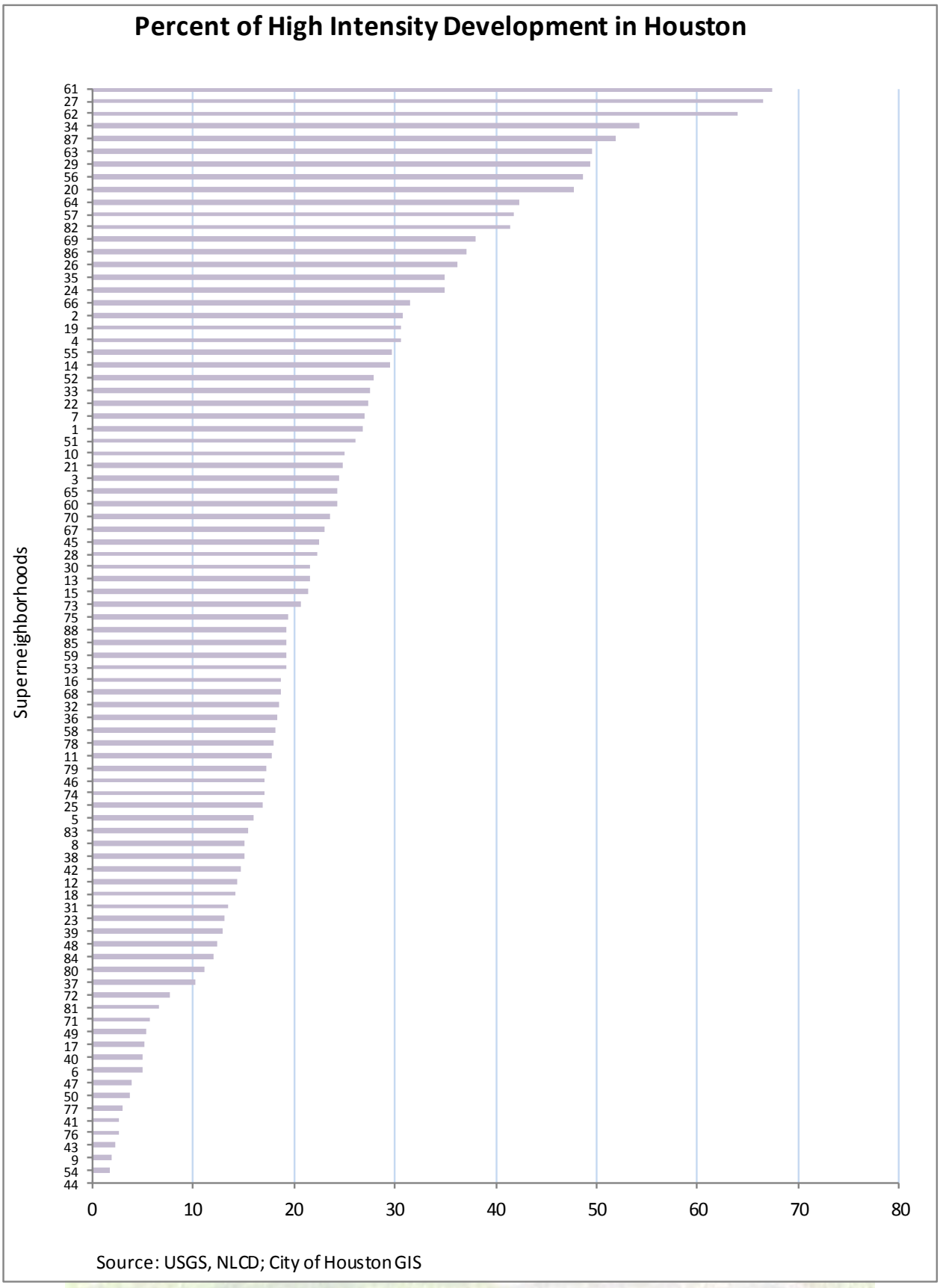
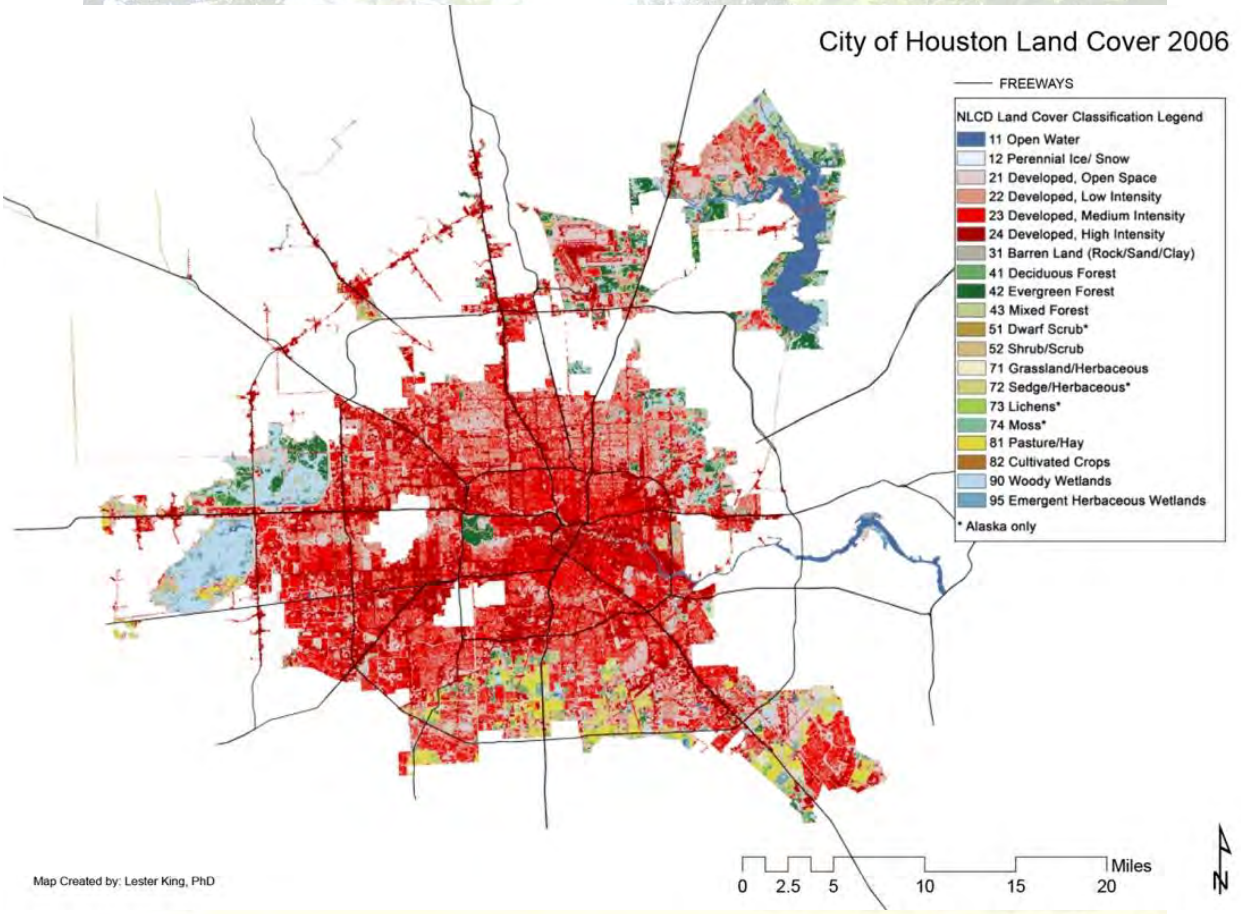


Figure 39: High intensity development by neighborhood

- High Intensity development is defined as highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
- Seventeen neighborhoods have less than 10% of land cover in the High Intensity Development category.
- Six neighborhoods have more than 50% of land cover in the High Intensity development category. These neighborhoods are Second Ward, Greenway/ Upper Kirby, Astrodome Area, Gulfton and Downtown.



Source: US Department of the Interior – USGS

Figure 40: City of Houston Land Cover 2006

- The 2006 land cover map shows the newly annexed areas to the north-west and west of the city as being areas of predominately high to medium intensity development.
- The city is primarily covered by low – medium development.

Theme - Land

Sub Theme - Land Use

Indicator - Land Use Mix

Land Use Mix is an important indicator for sustainable development since it addresses the availability of services and activity destinations in proximity to living spaces. The pattern of growth can be considered as more important than the amount of growth, since the pattern determines such things as resource efficiency and traffic management (Roseland, 1998). The major contemporary ideas in planning include increasing land use mix as an objective or goal (U.S. Green Building Council, 2009).

Sustainability Benefit: Since Houston does not have the statutory zoning authority, the process of achieving more mixed-use developments would be easier to accomplish. Most contemporary planners do not advocate for Euclidean zoning since it leads to separation of land uses (Schindler, 2012).

Sustainability Issue: Socio-cultural historical norms in Houston have established a precedent for separation of single family housing from other land use types, especially multifamily housing. This practice is very similar to what occurred in the state of Ohio in the 1920s and gave impetus to the development of the practice of land use zoning as a means of preventing mixing of land uses (Power, 1989). In Houston this practice of separation of single family from multifamily developments is even without regard for the market segment the multifamily development will target (Sarnoff, 2013).

Indicator Groups: Land use mix among Super Neighborhoods in Houston was measured by a comparison of an **Index of land use mix** in each Super Neighborhood. This metric is not part of any significant group of indicators in the study.

The following metrics were used to measure Land Use Mix:

Figure 41: Land Use Mix in Houston

Ranking of Super Neighborhoods by land use mix			
1	FORT BEND / HOUSTON	45	OST / SOUTH UNION
2	ADDICKS PARK TEN	46	EDGEBROOK AREA
3	PLEASANTVILLE AREA	47	GREATER HOBBY AREA
4	IAH / AIRPORT AREA	48	SECOND WARD
5	ELDRIDGE / WEST OAKS	49	MINNETEX
6	CLINTON PARK TRI-COMMUNITY	50	GREATER UPTOWN
7	CARVERDALE	51	LAWNDALE / WAYSIDE
8	FOURTH WARD	52	WILLOW MEADOWS / WILLOWBEND AREA
9	MEYERLAND AREA	53	UNIVERSITY PLACE
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23	CLEAR LAKE	67	GREATER FIFTH WARD
24	BRAEBURN	68	MACGREGOR
25	GOLFCREST / BELLFORT / REVEILLE	69	SPRING BRANCH WEST
26	EL DORADO / OATES PRAIRIE	70	WESTCHASE
27	EAST HOUSTON	71	MID WEST
28	SOUTH ACRES / CRESTMONT PARK	72	PARK PLACE
29	HIDDEN VALLEY	73	ASTRODOME AREA
30	GREATER INWOOD	74	WESTBRANCH
31	WASHINGTON AVENUE COALITION / MEMORIAL PARK	75	SHARPSTOWN
32	SPRING BRANCH NORTH	76	GULFGATE RIVERVIEW / PINE VALLEY
33	SPRING BRANCH CENTRAL	77	WESTWOOD
34	MEADOWBROOK / ALLENDALE	78	GREENWAY / UPPER KIRBY AREA
35	GREATER HEIGHTS	79	ALIEF
36	MAGNOLIA PARK	80	KINGWOOD AREA
37	EASTEX - JENSEN AREA	81	MIDTOWN
38	INDEPENDENCE HEIGHTS	82	GREATER EASTWOOD
39	CENTRAL SOUTHWEST	83	HARRISBURG / MANCHESTER
40	LAZY BROOK / TIMBERGROVE	84	GREATER GREENSPOINT
41	NORTHSIDE/NORTHLINE	85	FONDREN GARDENS
42	WILLOWBROOK	86	MUSEUM PARK
43	SETTEGAST	87	LAKE HOUSTON
44	DENVER HARBOR / PORT HOUSTON	88	DOWNTOWN

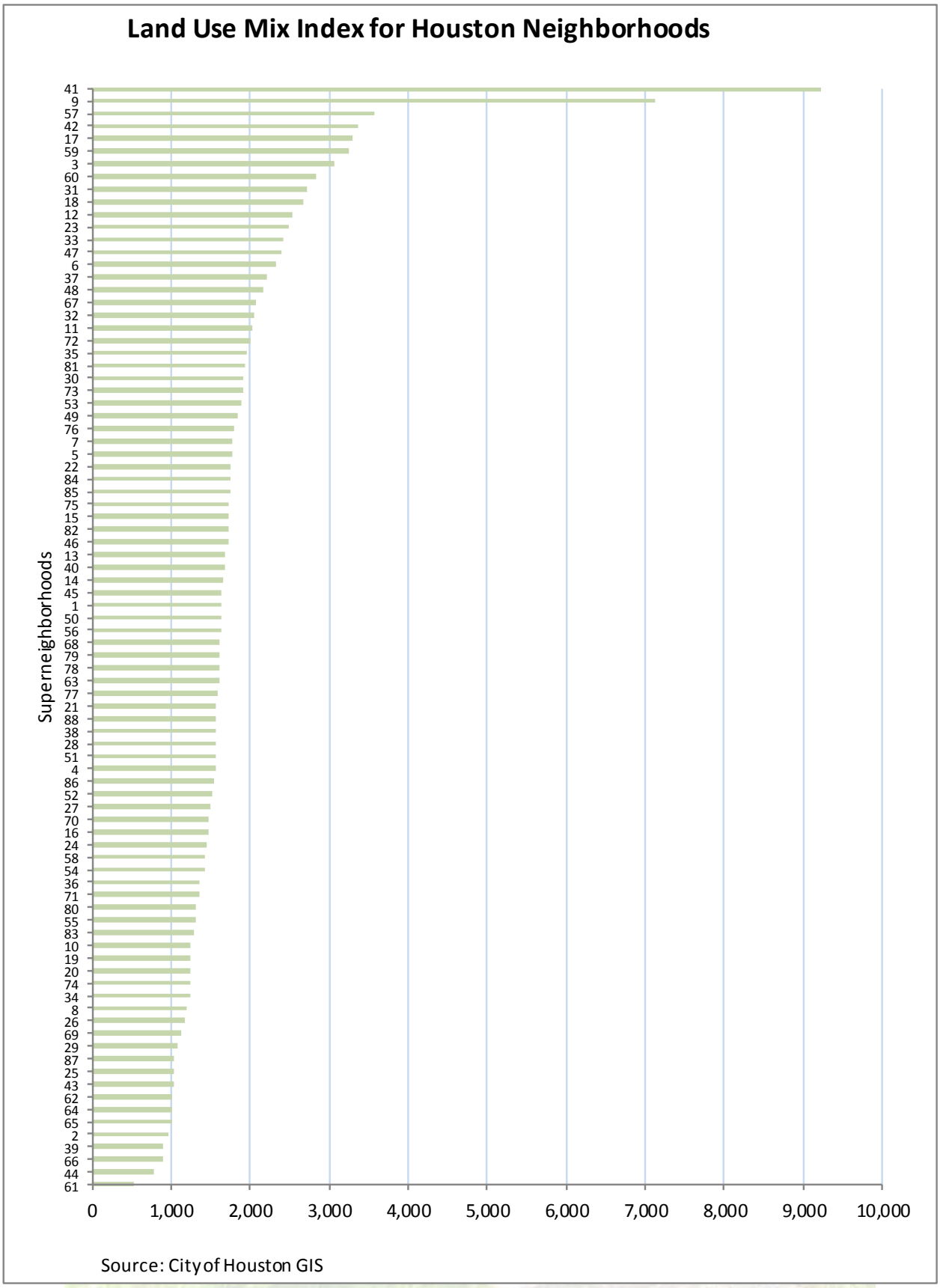
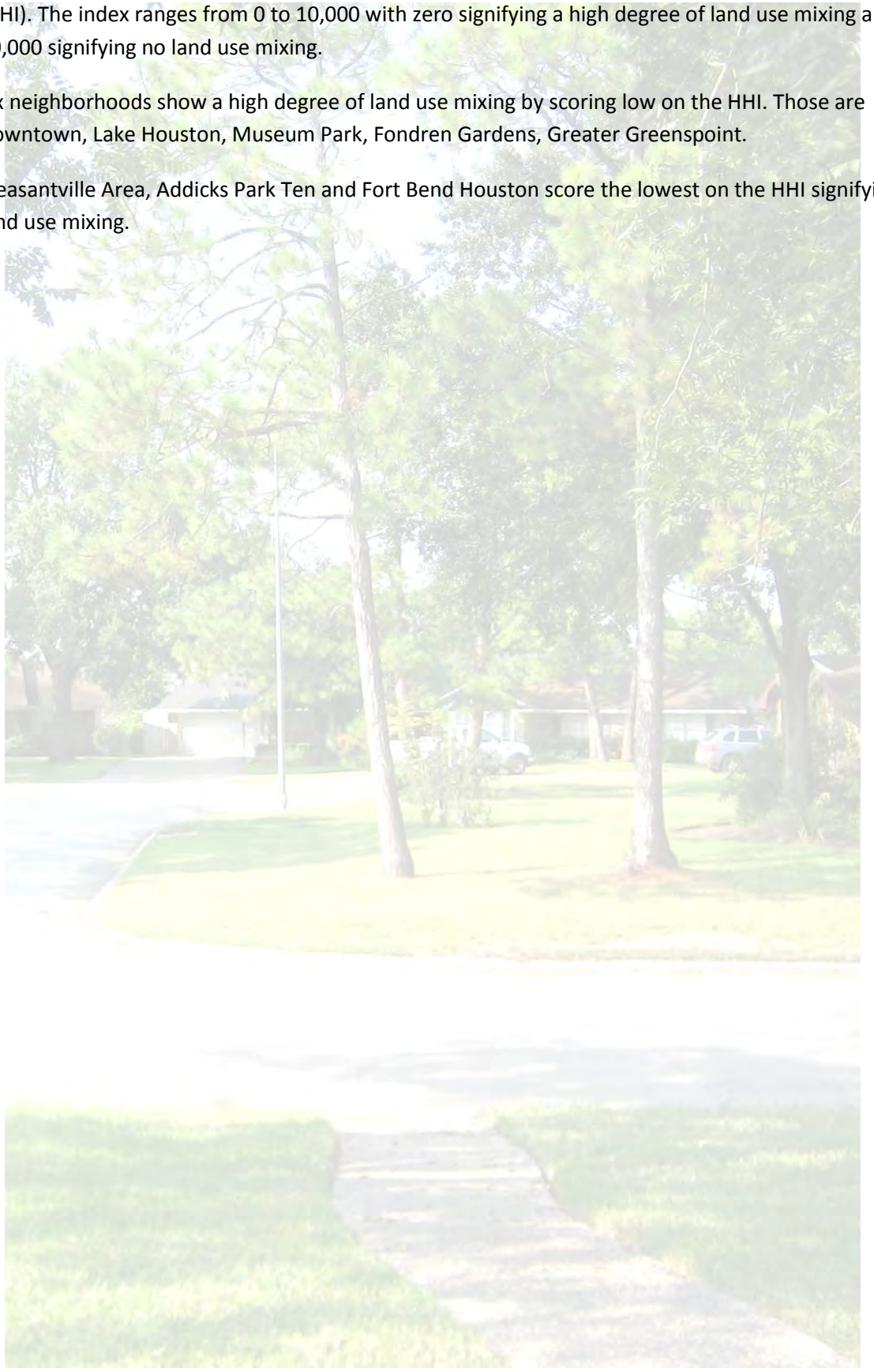


Figure 41: Land Use Mix in Houston

- The above figure shows the degree of land use mix in Houston using the Herfindahl-Hirschman Index (HHI). The index ranges from 0 to 10,000 with zero signifying a high degree of land use mixing and 10,000 signifying no land use mixing.
- Six neighborhoods show a high degree of land use mixing by scoring low on the HHI. Those are Downtown, Lake Houston, Museum Park, Fondren Gardens, Greater Greenspoint.
- Pleasantville Area, Addicks Park Ten and Fort Bend Houston score the lowest on the HHI signifying little land use mixing.



Environmental Development Policy Recommendations

THEME – Atmosphere

Sub Theme – Air Quality: Indicator – Ambient Pollutants

- Expand the air quality monitoring network.
- A Gulf Coast Mobility Plan is needed for coastal cities since the efficient delivery of logistics reduces air pollution generated from this sector.
    - Citizens can help with the following:
        - Organize citizen monitoring projects.
        - Report incidents and odors.
        - More citizen representation on regional planning for air pollution.
    - Local government can contribute the following:
        - Improve toxics monitoring.
        - Determine seamless coverage for monitoring network.
        - Improve regional governance for air quality.
    - Non-profit groups can contribute the following:
        - Organize public meetings for educational and involvement purposes.
        - Organize citizen monitoring efforts.

THEME – Fresh Water

Sub Theme – Water Demand: Indicator – Water Use

- A strong Drought Contingency Plan is needed along with a public education campaign.
- Need better assessment of end user water demand such as landscape irrigation.
- Need to establish a city Water Vulnerability Tax.
    - Local governments can contribute the following:
        - Improve education of users on water reduction strategies.
        - Improve regulation of irrigation systems.
    - Businesses can contribute the following:
        - Market opportunity for alternative water conservation and delivery system.

THEME – Land

Sub Theme – Flooding: Indicator – Floodplain Expansion

- Need to accelerate conversion of property in floodplains to open space.
- Eliminate development in the floodplain.
    - Local government can contribute the following:
        - Establish a Transfer of Development rights fund to reduce development in the floodplain.
    - Non-profit groups can contribute the following:
        - Advocacy for elimination of floodplain development.

Sub Theme – Land Cover: Indicator – Land Cover Change

- Stronger policies for green space acquisition are needed.
    - Local government can contribute the following:
        - Develop a green space acquisition plan.
        - Convert properties in the Land Assemblage program to greenspace.
        - Collaborate with school for shared use of playgrounds.
    - Non-profit groups can contribute the following:
        - Studies on the benefits of greenspace expansion to business and the community.

Sub Theme – Land Classification: Indicator – Jobs/Housing Balance

- Development codes are not robust enough to increase livability in the city.
- The development codes should include elimination of minimum lot sizes or setbacks; complete streets; encouraging housing closer to job centers etc.
    - Local government can contribute the following:
        - Improve infrastructure efficiencies
        - Implement fee for service based on proximity to job centers.
    - Non-profit groups can contribute the following:
        - Study on local versus suburban costs.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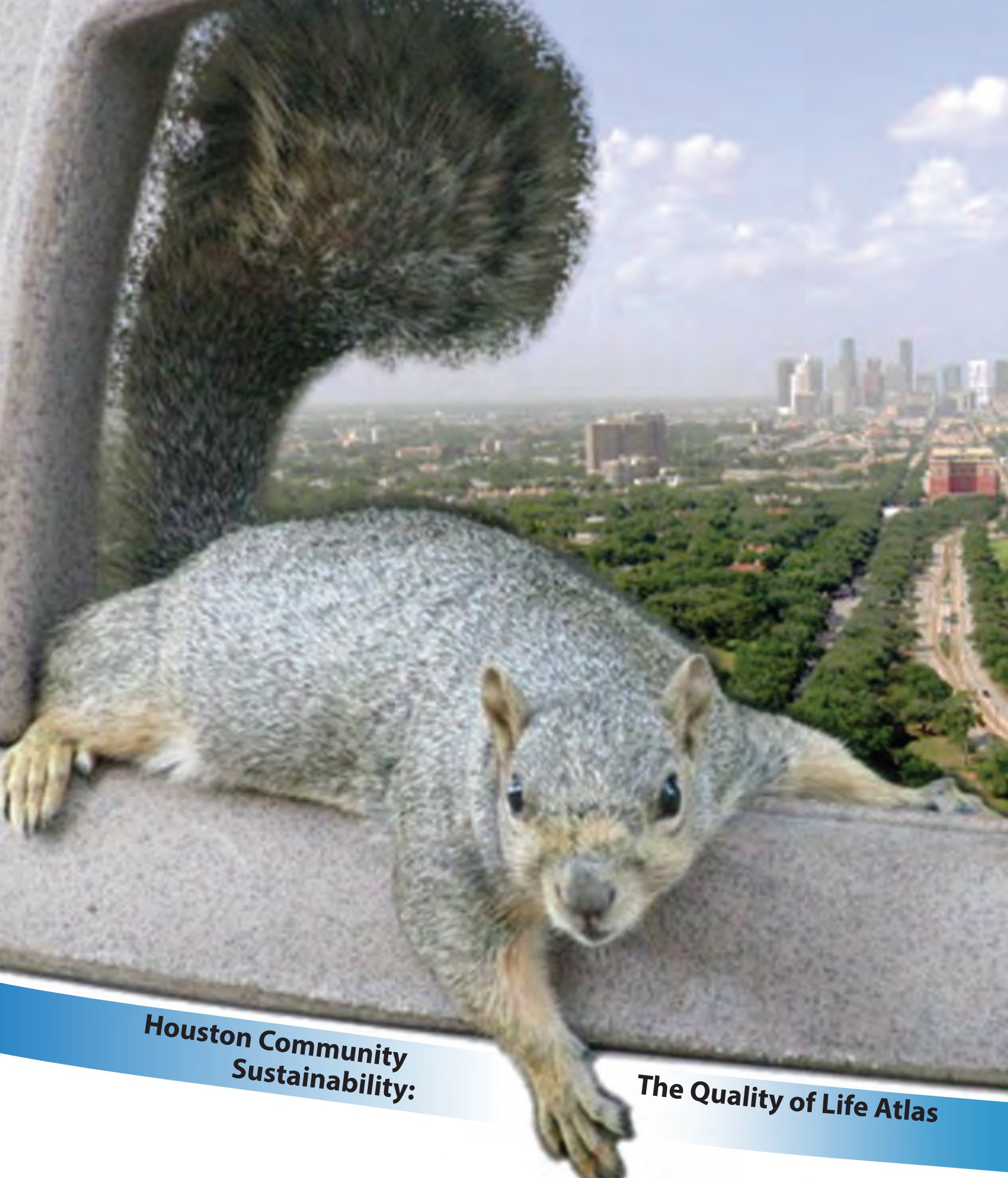

Houston Community Sustainability: The Quality of Life Atlas

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