Urban Forest Potentials in Dense Landscapes

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Context
Inform
Design
Assess

Priorities

Climate Change

Health

Habitat

. . .

Scales
Yard

Street

Park

Neighbourhood

City

Densifying Environments

~45% Canopy
10% Impervious

16% Canopy
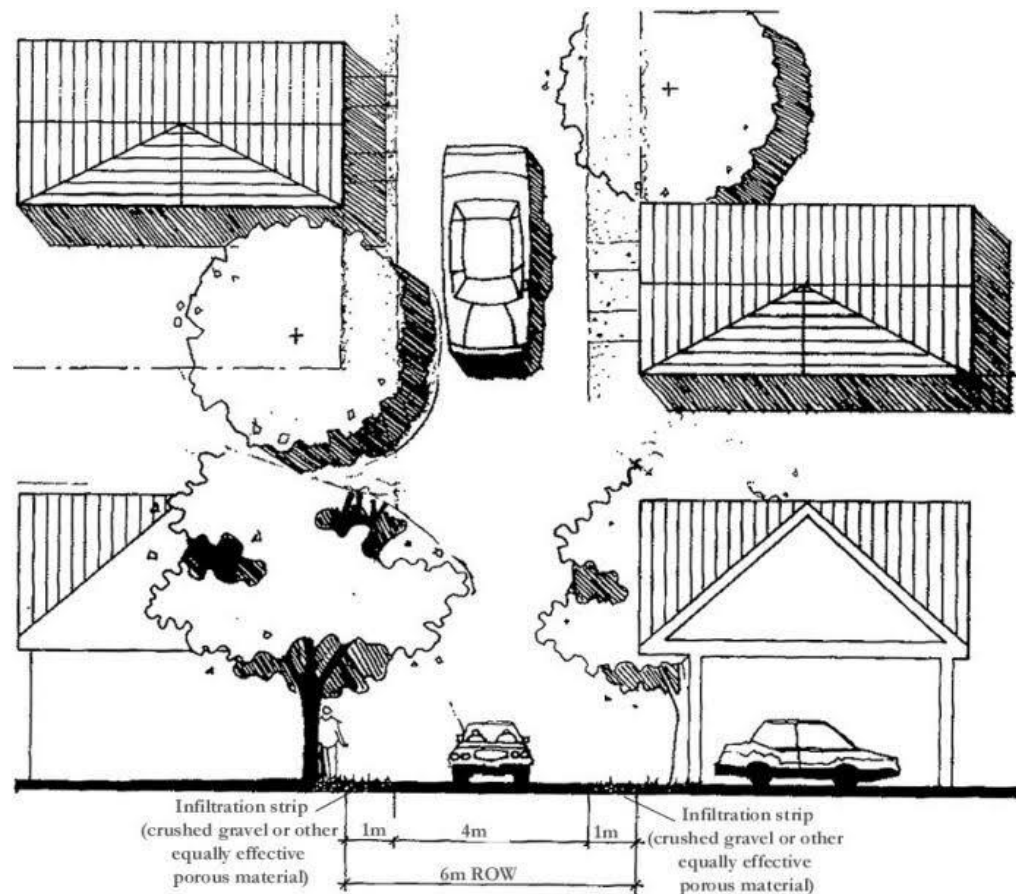65% Impervious

Case study: East Clayton, Canada

Infiltration strip (crushed gravel or other equally effective porous material) | 1m | 4m | 1m | Infiltration strip (crushed gravel or other equally effective porous material)

6m ROW

Diagram of rear lanes to be integrated into community.

Community parks	Riparian protection	Street landscapes	Stormwater ponds	School sites	Utility ROW	Vacant lots	Private yards
14.4 ha	5.0 ha	4.9 ha	4.2 ha	9.9 ha	1.3 ha	14.6 ha	67.8 ha
8.6%	29.9%	2.9%	2.5%	5.9%	0.8%	8.7%	40.6%

Green space types

Community parks	Riparian protection	Street landscapes	Stormwater ponds	School sites	Utility ROW	Vacant lots	Private yards
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Green space types

Priority indicators

ACADEMICS & PRACTITIONERS:

Urban Tree Diversity
Physical Access to Nature
Canopy Cover
Stormwater Control
Habitat Provision
Air Quality Improvement
Visual Access to Nature
Available Growing Space
Greenhouse Gas Sequestration and Storage
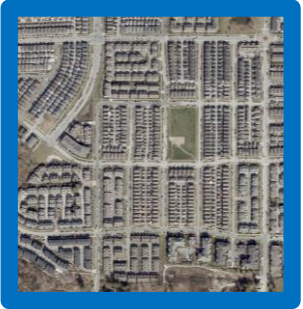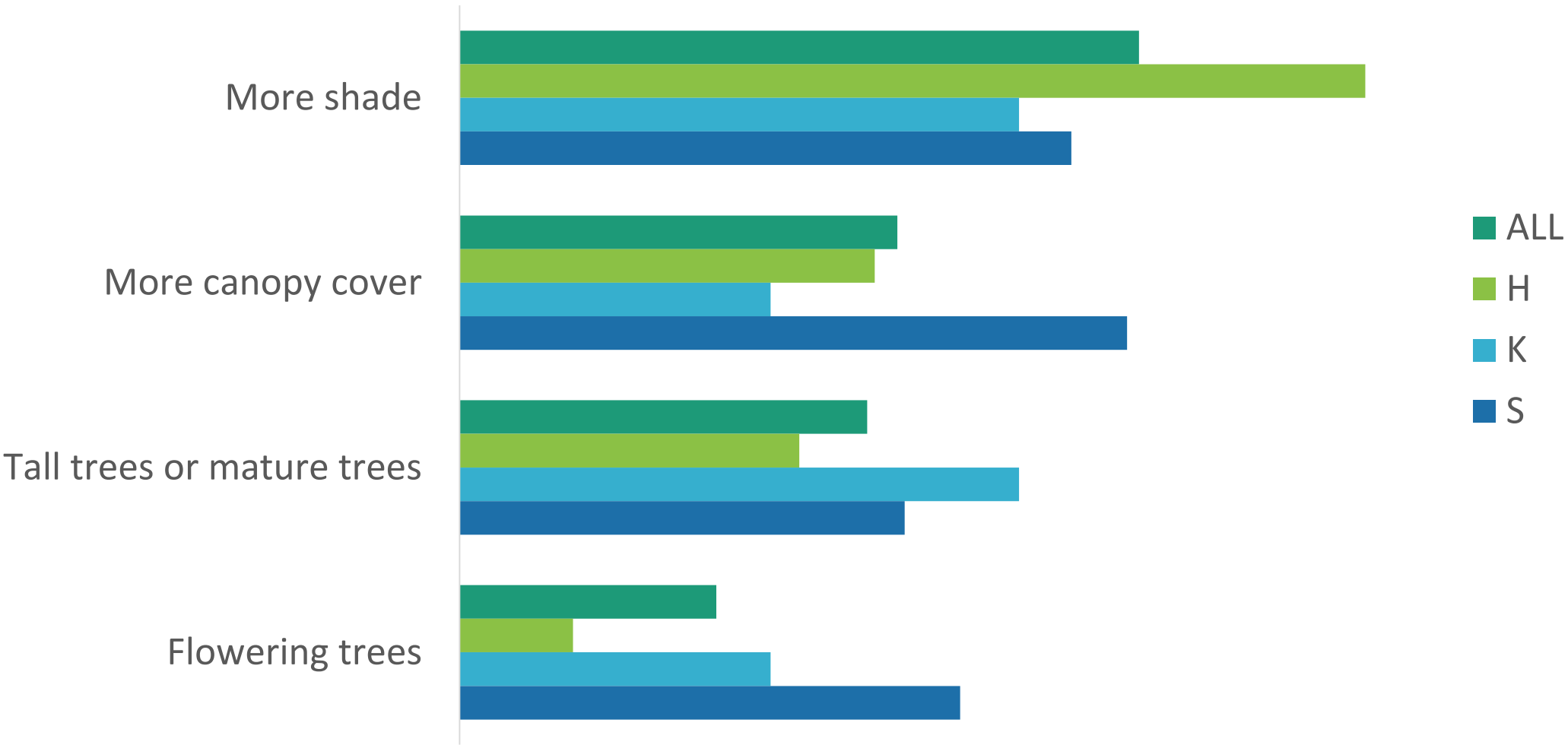
Local resident priorities

| Local priorities	Local preferences
1. Access to natural spaces	provision of privacy, sense of refuge from city life, established trees, sensory (smell, sound)
2. Near home greenspace	buffer, feeling of space when looking at distant trees, greenspace connectivity
3. Social aspects of greenspace	sense of community, social interaction, knowing neighbours
4. Greenspace aesthetics	colours, seasonality, psychological impact, place attachment, poetic moments, visual diversity natural/messy aesthetic
5. Mature and iconic trees	tree size, local species, canopy coverage
6. General neighbourhood characteristics	connectivity, walkability, convenience, affordability

Local resident priorities

Local resident priorities

Starr Park Diagram
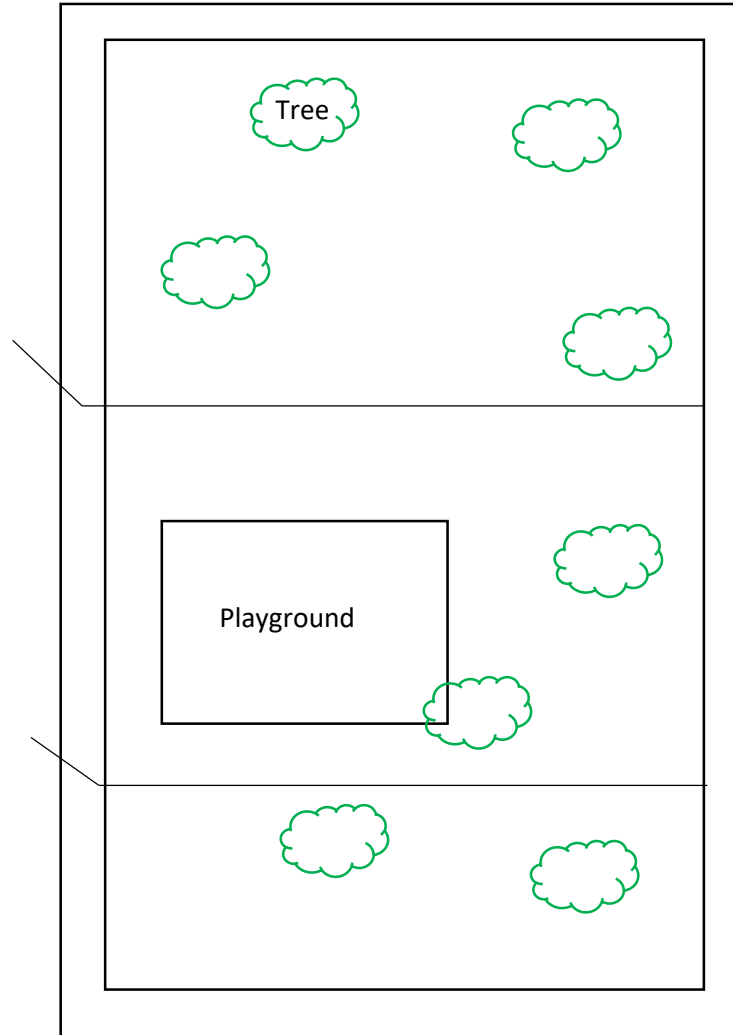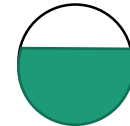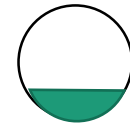

Use level

Field
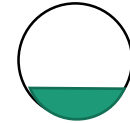
Playground

Path & field

"you know you have made it, you have arrived"
when you live in a community with mature trees. Participant A

Climate Retrofit

Suburban Savannah

No Policy change
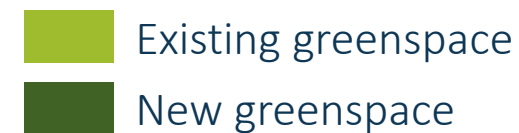
Re-Wild

DESIGN: Preliminary visualization

No Policy change

Climate Retrofit

Re-Wild

Suburban Savannah

Existing greenspace
New greenspace

DESIGN: Community scale forest

Climate Retrofit

Re-Wild

Savannah
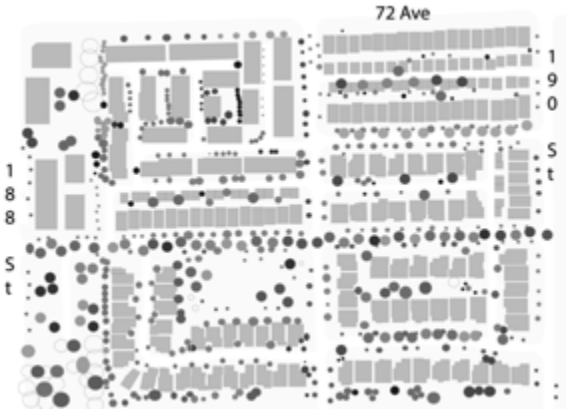
DESIGN: Sandbox
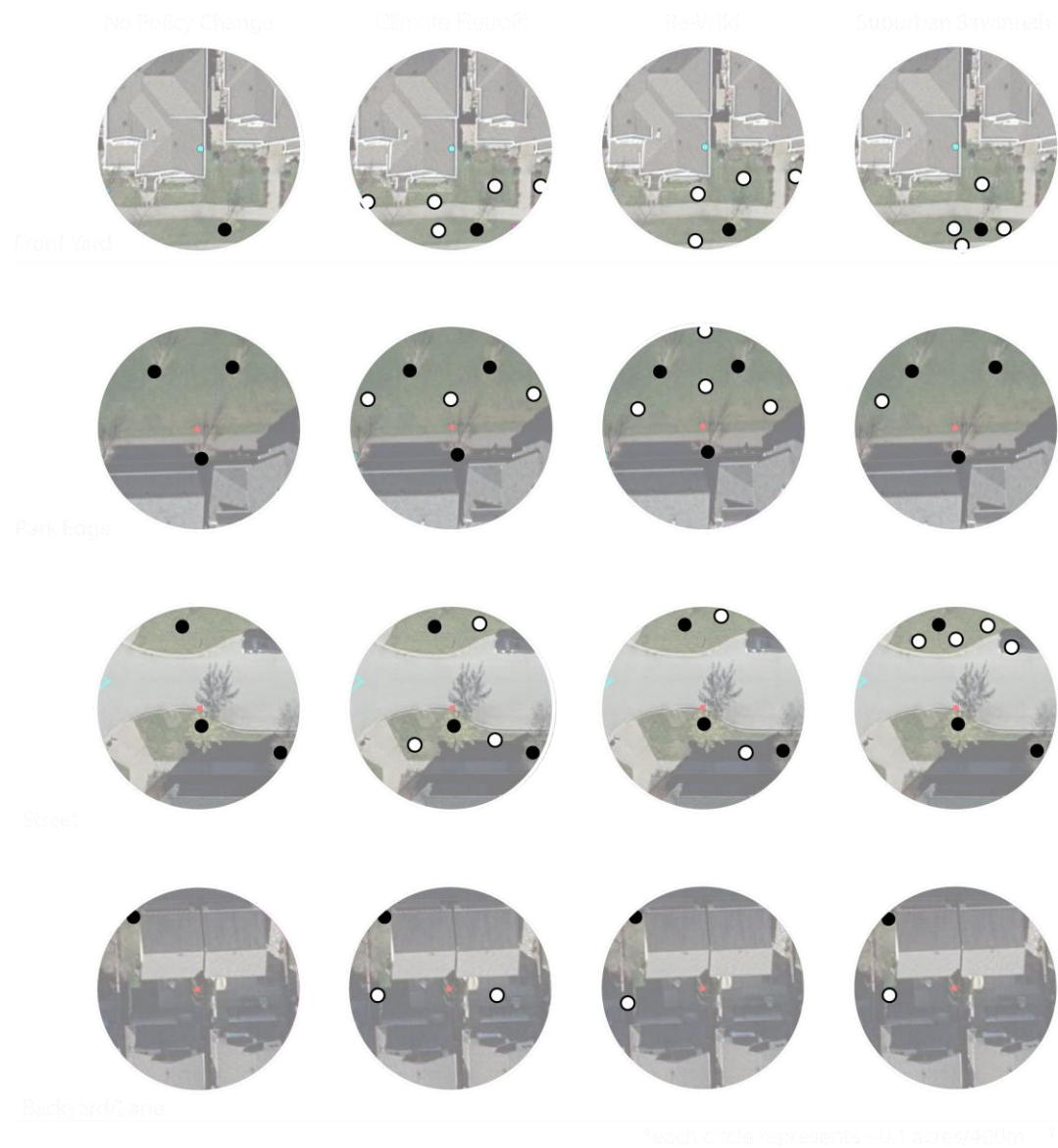
	Sample plot trees added	Total trees	% new trees
No policy change	0	13,600	59
Climate Retrofit	305	30,650	74
Re-Wild	209	27,190	70
Suburban Savannah	164	24,520	69

DESIGN: Sample plots

i-Tree

Trees: 14,890
Canopy Cover: 16%
Stormwater: 5,860 m3/year
Air Quality: 0.9 t/year
GHG sequestration: 60 t/year
GHG storage: 4000 t by 2050

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Spatial Analysis & Habitat measurement

	No Policy Change	Climate Retrofit	Re-Wild	Suburban Savannah
Physical Access to Nature	78%	78%	87%	94%
# units	4170/5300	4170/5300	4655/5300	5025/5300
Visual Access to Nature	28%	28%	43%	89%
# buildings in close visual proximity	574/2048 buildings	574/2048 buildings	878/2048 buildings	1826/2048 buidlings
Habitat	15%	15%	26%	21%
Potential Habitat (not accounting for quality)	35 ha	35 ha	63 ha	50 ha
Building for Birds – Breeding and Winter Score	78	78	183	79
Breeding For Birds – Forest Fragments as Migrant Stopover Sites	93	93	212	174

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Visual Assessment

ASSESS: multiple methods

No policy change

Trees: 14,890

Canopy Cover: 16%

Diversity: High species

Stormwater: 5,860 m3/year

Habitat: low

Air Quality: 0.9 t/year

GHG sequestration: 60 t/year

Physical Access: 78% residential units

Visual Access: 28% buildings

Climate Retrofit

Trees: 30,650

Canopy Cover: 44%

Diversity: High species & size

Stormwater: 14,070 m³/year

Habitat: medium

Air Quality: 2.4 t/year

GHG sequestration: 135 t/year

Physical Access: 78% residential units

Visual Access: 28% buildings

Re-Wild

Trees: 27,190

Canopy Cover: 28%

Diversity: High age & structural

Stormwater: 9,830 m³

Habitat: high

Air Quality: 1.6 t/year

GHG sequestration: 107 t/

Physical Access: 87% residential units

Visual Access: 43% buildings

Suburban Savannah

Trees: 24,520

Canopy Cover: 29%

Diversity: High size

Stormwater: 10,060 m³/year

Habitat: medium

Air Quality: 1.7 t/year

GHG sequestration: 99 t/year

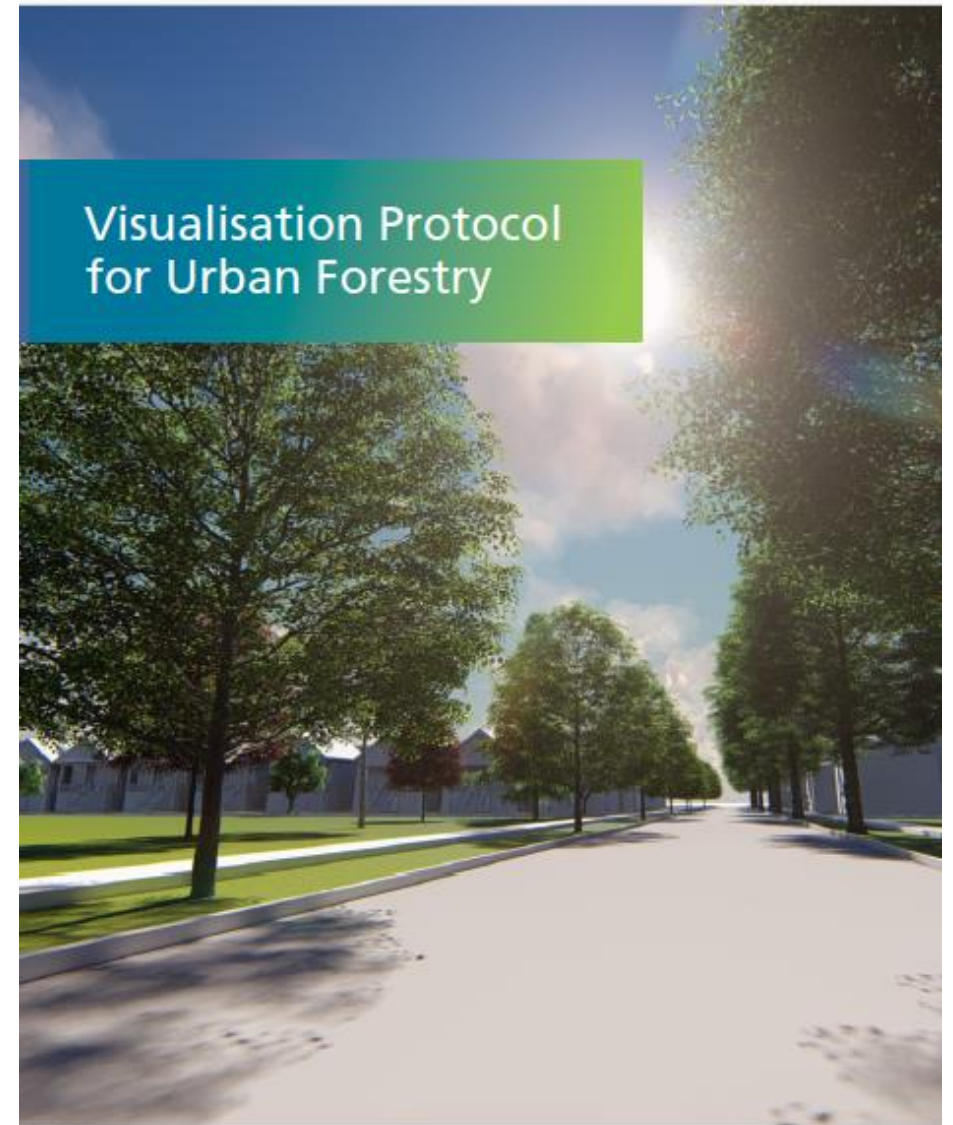Physical Access: 94% residential units

Visual Access: 89% buildings

Visualisations Protocol for Urban Forestry

A Visualisation Protocol for Urban Forestry has been developed in association with public realm and planning tree officers/managers and urban forestry researchers. It aims to provide tree officers with an understanding of the planning and production process for using visualisations.

Ana Macias
Stephen Sheppard

https://www.ltoa.org.uk/news/404-visualisations-protocol-for-urban-forestry

Visualisation Protocol for Urban Forestry

LTOA   UBC CALP   arbocity

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Visual Access to Nature	28%	28%	43%	89%
# buildings in close visual proximity	574/2048 buildings	574/2048 buildings	878/2048 buildings	1826/2048 buildings
Habitat Potential (% of total land area)	15%	15%	26%	21%
Building for Birds Breeding & Winter Score	78	78	183	79
Canopy Cover 2016	16%	44%	28%	29%
Air Quality 2016	.89	2.4	1.63	1.65
2016 Carbon sequestration t/year	60	135	107	99
Carbon storage 2050 (total tonnes)	4,022	9,659	5,335	5,314

Thank you!

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