Integrating Green Infrastructure into the Built Environment

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Auckland's Green Infrastructure

- Macro scale – Over 40,000 ha Regional Parks
  - protecting biodiversity, natural and historic sites
  - providing recreational and tourism opportunities
  - delivering pollution prevention, resource management and improvement in human wellbeing
- Medium-small scale
  - Local parks
  - Corridors
  - Wetlands
  - Community gardens
  - Green roofs/walls
  - Bioswales
  - Street trees

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Auckland Issues

- Air pollution from home heating and transportation contributes to approximately 730 premature deaths per year and 1.6 million lost working days
- Stormwater management has 'lowered water quality and ecological function within catchments and degraded coastal receiving environments'
- Significant areas of Auckland are subject to soil erosion and degradation
- Flooding, storm surge and landslips are significant natural hazards for Auckland

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Auckland
The World's Most Liveable City

- Fair, safe, healthy
- Green
- Prosperity, opportunity
- Well connected, accessible
- Beautiful
- Culturally rich, creative
- Strong Maori identity

Goal 2 - Strongly commit to environmental action and green growth

Goal 4 - Radically improve the quality of urban living

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Green Infrastructure Functions

Ecosystem biodiversity and conservation

Tourism, recreation, education

Flood and erosion control

Improve air quality, moderate temperature

Mitigate stormwater runoff quality/quantity

Moderate building energy requirements

Reduce noise

Traffic calming

Water reuse/recycling

Carbon sequestration

Food production

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GI Quantifiable Benefits

Constructed wetlands

- 80% removal faecal coliform
- 80% removal organic material/ suspended solids
- 50 - 90% removal metals
- 60% removal nutrients

Street trees per tree

- 1100-8200 L rainwater
- 130-400kg C sequestered
- 0.18-0.5kg NO_x
- 0.1 – 0.3 kg SO_2
- 0.07-0.13 kg O_3
- 0.08-0.016 kg PM10

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GI Non-quantifiable Benefits

- Recreation, enjoyment and health benefits
- Community development and cohesion
- Provision of space for public art, concerts, etc.
- Non-motorised transport systems
- Exposure to nature and increased awareness of environmental issues.
- Education and training
- Visual screening of unsightly buildings or infrastructure
- Heritage preservation and cultural expression

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GI Non-quantifiable Benefits

- Biodiversity protection/restoration
- Enhancement of habitat and species – preserving ecosystems
- Landscape restoration and the regeneration of degraded sites
- Protection of significant ecological/geological sites

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GI Non-quantifiable Benefits

- High-quality environment to attract and retain a quality workforce.
- Boosts to the local economy.
- Links between town and country
- Increased resilience to natural disasters

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GI Cost Benefits

- 4 million m^3 stormwater runoff diverted from sewers, reductions of 1.37 million KWh in energy, 990 tonnes CO_2 and savings of US$108,000 per annum from installations of green infrastructure in Aurora, Illinois;
- Savings of US$2.846.4 million for Philadelphia, Pennsylvania from implementation of a city wide 50% LID green infrastructure system;
- Savings of US$100,000 per city block from installation of green infrastructure in Seattle, Washington

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GI Cost Benefits

Property values

- 2-10% increase with street plantings
- 3.5-5% increase for properties adjacent to LID green infrastructure
- Increased value often difficult to determine

Difficulty in defining the specific environmental/cost benefit from NZ native species and installed GI due to lack of information

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Auckland Green Infrastructure Plan

- Strong commitment from the Council, Council employees, support from industry, developers, architects, engineers, planners and local communities.
- Will require specific objectives and outcomes aimed at the various audiences
- Collaboration and engagement with business and local communities
- Demonstration projects

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Auckland Policy on Green Infrastructure

- Establishes a priority for green infrastructure
- Identifies key priority areas
  - key stream/wetland/coastal areas,
  - poor income and degraded neighbourhoods,
  - areas at high risk of flooding or storm surge,
  - areas of poor air, surface and ground water quality,
  - transportation corridors,
  - new developments
- Collaboration among and engagement with Council, businesses and local communities
- Development of a robust life cycle cost benefit assessment tool

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Auckland Green Infrastructure – Local Plans

- Plans will provide the details and timeframes of the various green infrastructure systems which will address local issues
- Incorporate an incentive mechanism into the consent process
- Providing workshops and educational material outlining good practice in designing, constructing and maintaining green infrastructure
- Expand good practice guidelines for homeowners and builders

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Summary

- There are significant social, environmental and economic benefits to incorporating green infrastructure into urban environments.
- Quantifiable and non-quantifiable benefits of green infrastructure are being demonstrated but further research is needed on NZ native species and on NZ green infrastructure
- A Green Infrastructure Plan would enable Auckland to meet the goals of the Auckland Plan

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Eye on Auckland – vision for the future

Thanks to Sydney at www.eyeonauckland.com