

North Ryde Station Precinct, M2 Site, State Significant Development

Ecologically Sustainable
Development Report

59914111



Prepared for
UrbanGrowth NSW

July 2014



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Executive Summary

Cardno (NSW/ACT) Pty Ltd (Cardno) was engaged by UrbanGrowth NSW (UGNSW) to prepare an Ecologically Sustainable Development (ESD) Report for the North Ryde Station Precinct, M2 Site, State Significant Development. This report has been prepared in response to the Director General's Requirements (DGRs) dated 19 February 2014 in support of the North Ryde Station Precinct (High Density Residential and Mixed Use Sub-Precincts) Stage 1 Preliminary Works State Significant Development (SSD-5093) Application (SSDA).

The proposed works are referred to as 'M2 Site works' and would include superlot subdivision, civil infrastructure and public domain works which will enable the future development of the superlots. The SSDA seeks approval for M2 Site works only and as such, the sustainability initiatives outlined in this report are tailored to the subdivision of superlots and the associated enabling infrastructure.

Suitable sustainability initiatives that may be employed throughout the design, construction and ongoing operation of M2 Site of the proposed development have been divided into the categories as follows:

- > Management;
- > Energy and emissions;
- > Transport;
- > Water;
- > Materials and waste;
- > Land use and ecology; and
- > Social and community.

In accordance with the DGRs the proposed development would meet the principles of ESD throughout the design, construction and ongoing operation of the M2 Site works, provided the sustainability initiatives identified in this report are implemented.

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Glossary and Abbreviations

BASIX	Building Sustainability Index
BAT	Best Available Techniques
Cardno	Cardno (NSW/ACT) Pty Ltd
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
DGR	Director General's Requirements
DP&I	NSW Department of Planning and Infrastructure
DCP	Development Control Plan
ECRL	Epping to Chatswood Rail Link
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	NSW <i>Environmental Planning and Assessment Regulation 2000</i>
EMP	Environmental Management Plan
EMS	Environmental Management System
ESD	Ecologically Sustainable Development
GFA	Gross Floor Area
IWMP	Integrated Water Management Plan
LEP	Local Environment Plan
MATS	Macquarie University to Riverside Corporate Park Active Transport Spine
NRSP	North Ryde Station Precinct
POEO Act	<i>Protection of the Environmental Operations Act 1997</i>
SEPP	State Environmental Planning Policy
SRD SEPP	<i>State Environmental Planning Policy (State and Regional Development) 2011</i>
SSD	State Significant Development
SSDA	State Significant Development Application
TOD	Transit Orientated Development
UGNSW	UrbanGrowth NSW
VENM	Virgin Excavated Natural Material
VMP	Vegetation Management Plan
WMP	Waste Management Plan
WSUD	Water Sensitive Urban Design

1 Introduction

1.1 Scope of Report

Cardno (NSW/ACT) Pty Ltd (Cardno) was engaged by UrbanGrowth NSW (UGNSW) to prepare an Ecologically Sustainable Development (ESD) report for the North Ryde Station Precinct, M2 Site, State Significant Development, Stage 1 Preliminary Works. This report has been prepared in response to the Director General's Requirements (DGRs) dated 19 February 2014 in support of State Significant Development SSD-5093 including superlot subdivision, civil infrastructure and public domain works and other associated works on the M2 Site.

This report details how ESD principles, as defined in clause 7(4) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, will be incorporated in the design, construction and ongoing operation phases of Stage 1 of the proposed development.

1.2 Site Description

The North Ryde Station Precinct comprises the Station Site North, Station Site South and the M2 Site and is divided by the M2 Motorway and Delhi Road. The subject site (the site of the SSDA) is principally the M2 Site (refer **Figure 1-1**). The subject site is owned by UGNSW.

The M2 Site is legally described as Lot 101 DP 1131776. The M2 Site is bounded by the M2 Motorway to the east, Epping Road to the south west, Delhi Road to the south and by Wicks Road to the north. Access to the site for construction of the Epping to Chatswood Rail Link (ECRL) was established via a construction access point from the M2 on ramp and an access driveway from Wicks Road. The M2 Site has a total site area of approximately 91,530m². The land generally slopes downward to the north, towards Wicks Road. The northern portion of the site also contains a small creek known as Porters Creek.

1.3 Project Description

The overall project involves the redevelopment of vacant lands in the North Ryde Station Precinct into a transit-oriented and mixed-use development including approximately 2000-2500 residential apartments, retail and commercial development in proximity to North Ryde Station.

North Ryde Station is located on the Epping to Chatswood Rail Link (ECRL) connecting Macquarie Park to the metropolitan City Rail network. Since its completion in 2009, North Ryde Station has been operating below capacity due to its low connectivity with existing residential areas in the Ryde area. The project seeks to improve station connectivity through the development of the surrounding vacant lands.

The proposed works as part of the SSDA are referred to as the Stage 1 Preliminary Works. This SSDA seeks approval for the Concept Proposal and Stage 1 works that would enable the future development of the superlots that would house the residential apartments and related development.

The Concept Proposal for the development of the M2 Site includes:

- > Subdivision of the site into 13 development lots, 4 public open space lots and 2 public road lots (refer **Appendix A**);
- > Allocation of maximum gross floor area on the development lots of 238,919sqm with the buildings to be the subject of the subsequent detailed applications for consent; and
- > Allocation of maximum GFA of 2500sqm for a community facility on public open space Lot 103 with the building to be the subject of a subsequent detailed application for consent.

In summary, the Stage 1 works include:

- > Site preparation works including:
 - Demolition and site clearing and vegetation removal;
 - Remediation works;
 - Bulk earthworks and grading; and

- Protection of exposed soils following earthworks via seeding / planting.
- > Works associated with roads and intersections:
 - Signalised intersection of Waterloo Road and Wicks Road including pedestrian crossing;
 - Extension of Waterloo Road through the M2 Site to Epping Road to create a Spine Road; and
 - A left-in intersection for the M2 Site on Epping Road.
- > Construction and upgrade to pedestrian pathway and cycleway networks, including:
 - Pedestrian/cycle bridge across Delhi Road to the North Ryde Station. The colour of the bridge is to be resolved during detailed design; and
 - Shared ways for pedestrian and cycleway connectivity along the Spine Road and around the central open space from Wicks Road to the pedestrian/cycle bridge.
- > Establishment of the following areas of open space on the Public Land open space lots:
 - Northern Bushland Park;
 - Community Linear Park;
 - Central public open space; and
 - Plaza space.
- > The enabling works for the subsequent construction of a community facility building.
- > Drainage and Water Sensitive Urban Design (WSUD) works, including:
 - Stormwater drainage and water quality infrastructure;
 - Porters Creek culvert; and
 - Rehabilitation of riparian zone along the Porters Creek within the Northern Bushland Park.
- > Public domain works, including:
 - Civil works, trenching in road corridors with provision of utility infrastructure for electricity, gas, potable water, sewer and telecommunications;
 - Open space embellishment;
 - Street planting and installation of furniture;
 - Street lighting along all new roads; and
 - Public art installation.
- > Location of signage on the pedestrian bridge on the Public Land.

The project also includes the following associated works:

- > Delhi Road footpath connection and landscape works to the site frontage;
- > Epping Road footpath upgrade and landscape works to the site frontage;
- > Wicks Road footpath upgrade and landscape works to the site frontage, intersection upgrade and stormwater and drainage augmentation works at the Wicks/Waterloo road intersection;
- > Water main from the M2 Site, under Epping Road and along Ryrie Street to connect to Cox's Road;
- > Sewer main from the Wicks and Waterloo Roads intersection along Wicks Road;
- > An electricity feeder main from Macquarie Park substation along Waterloo Road into the M2 Site; and
- > Electricity feeder main/s from Top Ryde substation along a number of local roads into the M2 Site.



North Ryde Station Precinct

SITE LOCATION

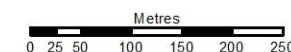
Legend

- M2 Site
- Cadastre



FIGURE 1-1

1:7,500 Scale at A4



Map Produced by <Division> (<BU>)
 Date: 2014-05-23
 Coordinate System: GDA 1994 MGA Zone 56
 Project: NA<Job Number>_<commission>
 Map: Locality Map.mxd 01

2 Reference Documents

The documents listed in **Table 2-1** have been used in the preparation of this ESD report.

Table 2-1 Reference documents

Title	Author	Revision	Date
North Ryde Station Precinct Development Control Plan	Department of Planning and Infrastructure	Final	December 2013
Director General's Environmental Assessment Requirements	Department of Planning and Infrastructure	N/A	19 February 2014
Construction Assessment Acoustics and Air Quality	SLR Consulting	Draft 1	April 2014
Preliminary Geotechnical Investigations M2 Site	Douglas Partners	Draft	April 2014
Remediation Action Plan M2 Site	Douglas Partners	Draft	April 2014
Bulk Earthworks Sheet 1 of 2 North Ryde M2 Site Development Approval	Robert Bird Group	Draft	May 2014
Pavement Layout Plan Sheet 1 of 2 North Ryde M2 Site Development Approval	Robert Bird Group	Draft	May 2014
Sketch Plan of Subdivision North Ryde M2 Site Development Approval	Robert Bird Group	Draft	May 2014
Stormwater Management Plan North Ryde Station Precinct, M2 Site	Robert Bird Group	Issue A	May 2014
Civil Design Report	Robert Bird Group	Issue A	May 2014
Archaeological Assessment, Excavation and Monitoring Methodology	Artefact Heritage	Draft	April 2014
Ecological Impact Assessment for SSDA, M2 Site	EcoLogical Australia	Draft	May 2014
North Ryde Station Precinct – M2 Site Traffic and Transport Impact Assessment	Arc Traffic and Transport	Draft 1	May 2014

3 Sustainability Principles and Objectives

This report focuses on the Stage 1 Works for the M2 Site within the North Ryde Station Precinct. The regulatory frameworks applicable to the proposed development are outlined below.

3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the overarching development and planning control for the North Ryde Station Precinct development. One of the objects of the Act is to encourage ecologically sustainable development (ESD).

3.2 Environmental Planning and Assessment Regulation 2000

In accordance with the DGRs, this report has been prepared with reference to the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) Schedule 2, Clause 7(4), (a)-(d) inclusive.

The principles of ESD as set out in the EP&A Regulation, and the approach to incorporating these principles in the project design, construction and operation, are as follows:

- a. The **precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
 - i. Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - ii. An assessment of the risk-weighted consequences of various options,
- b. **Inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
- c. **Conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
- d. **Improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:
 - i. Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - ii. The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - iii. Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

ESD principles have been incorporated into the design, construction and ongoing operation of the development of the Precinct, as articulated in this report.

3.3 State Environmental Planning Policies

The North Ryde Station Precinct Lands are identified in Part 12 of Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Schedule 2 of the SRD SEPP states:

Development on land identified as being within the North Ryde Station Precinct Site on the State Significant Development Sites Map if the development is for the purposes of:

(a) a principal subdivision establishing major lots or public domain areas, or

(b) the creation of new roadways and associated works.

As the M2 Site forms part of the North Ryde Station Precinct and the proposed works include subdivision, public domain works and creation of new works, the application constitutes State Significant Development under SRD SEPP.

The following SEPPs also currently apply to the site:

- > *State Environmental Planning Policy (Major Development) 2005*;
- > *State Environmental Planning Policy (Infrastructure) 2007*; and
- > *State Environmental Planning Policy 55 – Remediation of Land*.

3.4 Local Environment Plan

The *Ryde Local Environment Plan 2010* (LEP) was developed in accordance with section 33A of the EP&A Act. The aims of the plan are:

- > To create a broad framework of controls for the future development of all land in Ryde;
- > To encourage the management and development of land to provide a range of land uses, employment activities and housing types that respond to the welfare of the citizens of Ryde;
- > To conserve items and places in Ryde that are of natural, indigenous, cultural, social and historical significance; and
- > To manage development of Ryde to create a better environment.

The objective of Clause 6.9 of the Ryde LEP (2010) is to ensure that development within the North Ryde Station Precinct occurs in accordance with a site-specific development control plan (DCP). Application of the principles of ecologically sustainable development must be provided for in the DCP as listed in Clause 6.9, 4(g). Details of the DCP prepared for the North Ryde Station Precinct is provided in **Section 3.5**.

3.5 Development Control Plan

The *North Ryde Station Precinct Development Control Plan (DCP) 2013* (Department of Planning and Infrastructure (DP&I), 2013) was prepared pursuant to section 74(c) of the EP&A Act and in reference to the Ryde LEP (2010) to ensure orderly, efficient and environmentally sensitive development with the precinct.

The vision for the North Ryde Station Precinct is to create a Transit Oriented Development (TOD) with direct access to North Ryde Station to encourage greater use of the public transport network. The vision for the development is to (DP&I, 2013):

- > Maximise public transport patronage through the appropriate placement of compatible land uses and improvements in accessibility and connectivity through the Precinct and to North Ryde Station;
- > Represent 'place making' through activation of the space, creation of a destination and creation of identifiable landmarks, including an appropriate mix of uses and community facilities;
- > Create communities that are well connected to employment areas via public transport, pedestrian and bicycle links;
- > Create integrated open space and public domain spaces encouraging their use and activation by key buildings;
- > Create liveability through innovation, leading edge design and sustainability; and
- > Provide a logical extension of urban areas for employment, residential, retail and commercial land uses.

The DCP outlines controls for development within the precinct to achieve this vision of a vibrant community and as a place to live, work and visit including;

- > Urban structure (urban structure and layout, circulation networks for pedestrian, cycle and vehicular movements, maximise the use of public and creation of open spaces);
- > Public domain (streets, pedestrian and cycle network, pedestrian and cycle station link, stormwater management, street tree planting, street furniture and lighting, public art, safety);

- > Built form (building height, set-backs, depth and bulk, mixed use buildings, building design and materials, overshadowing, landscape design);
- > Pedestrian amenity (active street frontages, awnings, signage);
- > Access, parking and servicing (vehicular access, car and bicycle parking, site facilities and services, work place travel plan, accessible design); and
- > Environmental management (environmental performance, flooding, wind mitigation, air, noise and vibration, waste management, vegetation management, soil management, site contamination, heritage and archaeology).

The Environmental Performance Objectives for the Precinct as set out in Section 8 of the DCP are as follows:

- > Reduce the necessity for mechanical heating and cooling;
- > Reduce reliance on fossil fuels;
- > Minimise greenhouse gas emissions; and
- > Reduce environmental impact over the life cycle of the building.

The majority of controls outlined in the DCP to meet the environmental performance objectives primarily relate to the residential, commercial and retail buildings proposed within the Precinct. These controls include Green Star Buildings, BASIX, NABERS and NatHERS rating requirements which would be addressed in any future applications for developments that involve buildings, whereas this application focuses on subdivision and enabling infrastructure for that development.

4 Sustainability Initiatives

The sustainability initiatives outlined in this section are strategies that will be employed during the design, construction and ongoing operation of the M2 Site works to address the principles of ESD (refer **Section 3.2**). The initiatives are directly relevant to the scope of works as described in **Section 1.3**, namely, subdivision and enabling infrastructure works for the M2 Site.

The sustainability initiatives have been divided into categories as follows:

- > Management – **Section 4.1**;
- > Energy and Emissions – **Section 4.2**;
- > Transport – **Section 4.3**;
- > Water – **Section 4.4**;
- > Materials and Waste – **Section 4.5**;
- > Land Use and Ecology – **Section 4.6**; and
- > Social and Community – **Section 4.7**.

4.1 Management

Sustainability is one of UGNSW's three corporate values and is intrinsic to their operations. UGNSW's approach to sustainability is defined by their sustainability strategy and their willingness to submit to open review of their business operations each year against a suite of sustainability performance indicators. Sustainability indicators endorsed by UGNSW are across all phases of project delivery. UGNSW's Sustainability Strategy and Sustainability Indicators are provided in **Appendix B**.

The management and implementation of sustainability initiatives during the design, construction and ongoing operational phases of the proposed development is an important aspect of ESD.

ESD has been managed within the design phase by consideration of both the UrbanGrowth sustainability strategy as well as seeking to minimise or manage environmental impacts in accordance with the requirements of the DGRs and associated state legislation and policy which is inherently directed towards the achievement of ESD in development projects.

The use of a contractor that operates under an ISO 14001 Environmental Management System (EMS) will enable the application of ESD principles in a consistent, integrated manner throughout the construction process. The implementation of a comprehensive Construction Environmental Management Plan (CEMP) prior to commencement of construction works would ensure that environmental mitigation and improvement strategies are in place throughout the development works. The CEMP would outline monitoring and reporting requirements to ensure that implemented measures are effective.

A Waste Management Plan (WMP), which would be a sub-plan of the CEMP, outlining targets for the diversion of construction and demolition waste, would be implemented during the construction phase of the development to divert waste from landfill.

An environmental protection licence (EPL) under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act) would be required as the proposed works are defined as a scheduled activity under Schedule 1 of the POEO Act (Land based extractive activity involving the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials). The requirement for an EPL is consistent with the polluter pays principle of the ESD principle (refer **Section 3.2**).

Sustainability Initiatives

- > Use of ISO 14001 EMS contractors;
- > Prepare and implement a CEMP; and
- > Prepare and implement a WMP (a sub-plan of the CEMP).

4.2 Energy and Emissions

The overall design and purpose of the development is to reduce the future resident's reliance on fossil fuels and minimise greenhouse gas emissions by creating a Transit Oriented Development (TOD). The provision of pedestrian and bicycle networks and limiting the number of private vehicle parking spots would reduce local greenhouse gas emissions and exhaust fumes.

Construction is an energy intensive industry. Bulk earthworks have been minimised for the development to limit excavation to that necessary to meet grading requirements and the requirements of minimising the off-site disposal of waste or relocation of re-usable materials, therefore minimising fuel consumption for excavation equipment and transport vehicles for the disposal of waste or beneficial reuse of materials elsewhere. Further details can be found in **Section 4.5**.

Construction activities would produce emissions that would potentially affect the air quality of the local area. These emissions include:

- > Dust emissions;
- > Emissions of combustion products from plant and machinery;
- > Fugitive emissions associated with storage, handling and accidental spillage of fuels, and
- > Odorous emissions of ground contaminants, especially during excavation activities.

Strategies to reduce energy consumption and emissions would be implemented throughout the detailed design and construction of the proposed development.

Where possible, low emissions fuels can be used to reduce local carbon dioxide emissions and pollution control devices can be fitted to work vehicles to reduce the amount of particulate matter exhausted. Re-use of materials on-site should also be implemented where practicable to reduce the energy required to transport materials.

Suitable measures to control emissions would be detailed in CEMP. These measures may include: dust and air quality monitoring at neighbouring residences; dust suppression measures (e.g. dampening of hardstands and haul roads); and storage of hydrocarbons and other chemicals in bunded areas.

During construction, workers would be encouraged to commute via public transport or to car pool to reduce emissions produced by private vehicles. The use of low carbon and energy efficient products during construction works would also help to reduce the carbon footprint of the development.

On an operational scale, energy usage within the M2 Site works for the M2 Site would most likely be dominated by lighting usage. Lighting for the roads and public open space areas would be in accordance with Council standards. The North Ryde Precinct DCP 2010 refers to the Macquarie Park Public Domain Technical Manual (2008) for lighting requirements in the public domain.

All lighting poles would be Smart poles or equivalent. A smart pole is designed to be multifunctional to reduce street clutter and may incorporate street lights, signs, banners, and traffic lights. Lighting would also be incorporated into raised edges and furniture in public domain areas such as Linear Park, Central public open space and Plaza space. Bollard lights along park sidewalks would prevent light spilling into apartments, and pedestrian scale lighting would be provided in the plaza, parks and along sidewalks (Aspect Studio, 2014). All public lighting would comply with AS/NZS 1158: Lighting for roads and public spaces.

Sustainability Initiatives

- > Development of a Transit Oriented Development (TOD) would reduce future residents' reliance on fossil fuels and encourage the use of low emissions transportation;
- > Minimise cut to fill earthworks in the design;
- > Minimise off-site disposal of materials to minimise transport emissions;
- > Maximise beneficial re-use of any excess materials to minimise energy usage associated with treatment or reprocessing of those materials;
- > Prepare and implement a CEMP;
- > Use of low emissions fuels and low embodied carbon materials where practicable;

- > Implement dust suppression measures such as water sprays;
- > Fitting construction vehicles with pollution control devices to reduce emissions of particulate matter;
- > Locating plant as far from residential receptors as practicable;
- > Trucks and other machinery would be properly maintained and not be left idling when not in use;
- > Use of bunded areas to store fuels, oils, chemicals, flammable and combustible liquids;
- > Provision of spill kits at hydrocarbon storage and handling areas;
- > Regular environmental inspections of work areas; and
- > Encourage workers to commute to work via public transport or carpooling.

4.3 Transport

The development would function as a Transit Oriented Development (TOD) designed around the North Ryde Station with access to the CityRail metropolitan network. Pedestrian and cycle paths feature prominently in the site design.

As a TOD, the precinct would have limited private car parking to minimise traffic congestion. The objectives of the precinct are to create a safe and high quality pedestrian and cycle network that maximises connections with public transport and regional cycling routes. The design provides for a pedestrian/cycle bridge across Delhi Road linking the M2 Site to North Ryde Station.

In addition the bicycle and pedestrian network would create links between the residential communities and places of employment including the Riverside Corporate Park and places of study such as Macquarie University (refer **Figure 4-1**), as well as links to retail areas within the precinct. Pedestrian and cycle infrastructure outside of the precinct would also be improved. A new pedestrian footpath along the northern side of Epping Road and a signalised intersection would be provided at Wicks Road / Waterloo Road to enable cyclists to cross.

Future links and connection options would be considered in the design to ensure that the development can be integrated with the surrounding areas. A map of the indicative pedestrian and cycle ways showing links to North Ryde Station and bus stops on Epping Road is provided in **Figure 4-2**.

The construction of the pedestrian and cycle network within the M2 Site would form part of the Macquarie University to Riverside Corporate Park Active Transport Spine (MATS). The pedestrian and cycle paths would complete MATS and maximise pedestrian and cycle connectivity to, through and from the North Ryde Station Precinct. Once complete, a continuous cycle path would connect Macquarie University, Macquarie Centre, the M2 Site, North Ryde Station and Riverside Corporate Park.

A Construction Traffic Management Plan (CTMP) would be prepared for the site. The CTMP would provide details of the construction schedule, staff numbers, vehicle numbers, travel routes, traffic and parking management strategies, and traffic management plans for key works including the shared pedestrian bridge and the construction/upgrade of intersections into site (Arc Traffic and Transport, 2014).

Sustainability Initiatives

- > Development of site as a Transit Oriented Development (TOD);
- > Construction of a Shared Bridge linking the M2 Site to North Ryde Station;
- > Create pedestrian and cycle links with North Ryde Station and Epping Road bus routes;
- > Create pedestrian and cycle links with surrounding area including Riverside Business Park, Macquarie University and retail areas;
- > Development of mixed use zones and buildings to reduce travel required for residents;
- > Provision of bicycle parking at North Ryde Station and within development; and
- > Development of a detailed CTMP.



Figure 4-1 Indicative transport links to surrounding areas (Source: Arc Traffic and Transport, 2014)

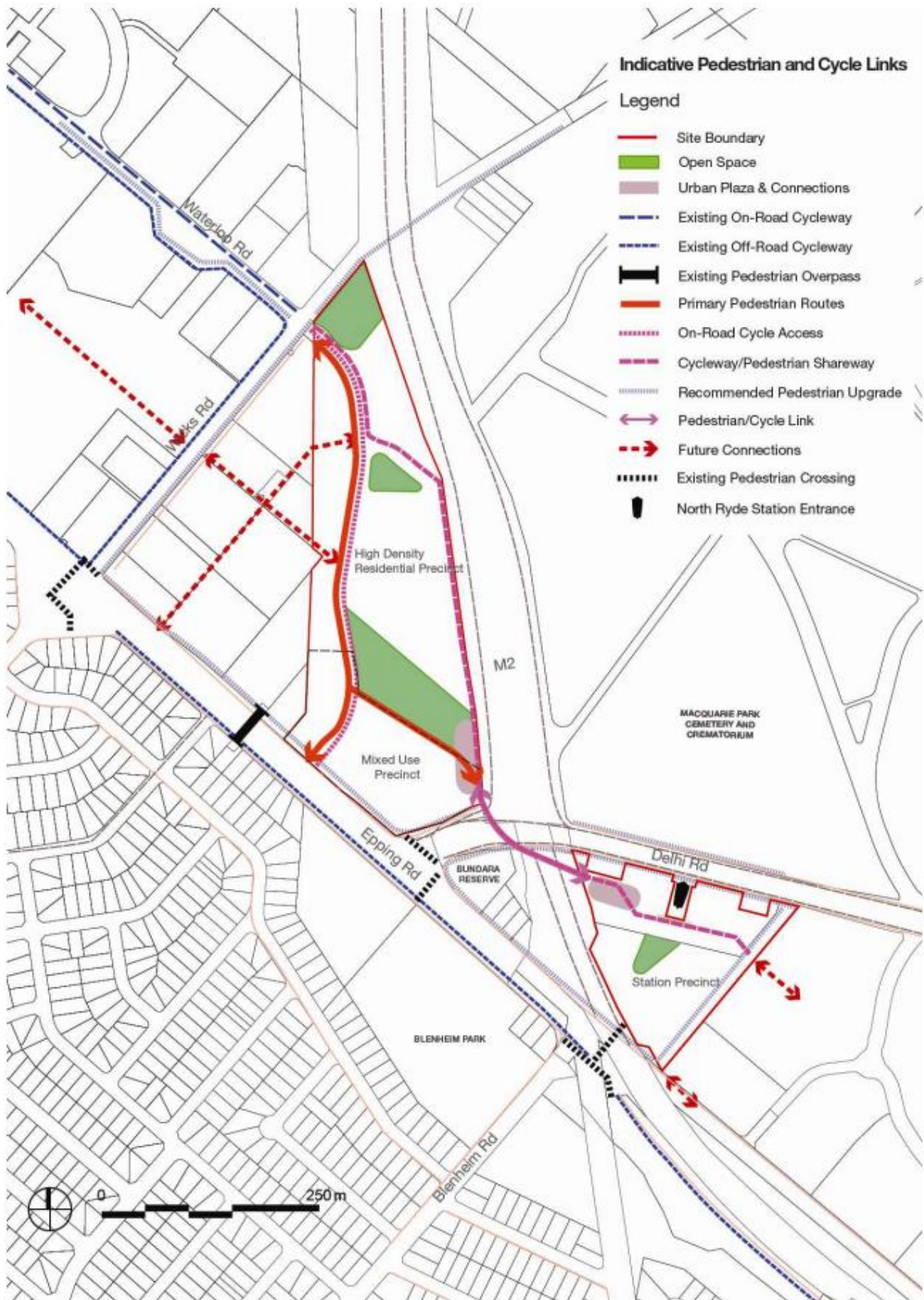


Figure 4-2 Indicative Pedestrian and Cycle Paths (Source: DP&I, 2013)

4.4 Water

For the M2 Site works, the key issues for water relate to:

- > Stormwater management (quantity and quality) (within the design, construction and operational phases); and
- > Dust suppression and other construction-related water uses (within construction phase).

The stormwater management objectives outlined in the North Ryde Precinct DCP (refer **Section 3.5**) aim to reduce stormwater discharge from the site, improve stormwater quality and reduce water consumption through the implementation of water sensitive urban design (WSUD). An Integrated Water Management Plan (IWMP) has been developed for the public domain within the M2 Site as part of the WSUD measures (Robert Bird Group, 2014c).

A 'Precinct-wide' approach to stormwater management will be developed with the preparation of a whole of site drainage plan to reduce stormwater discharge, improve stormwater quality and minimise water consumption through the implementation of water sensitive urban design measures (Robert Bird Group, 2014c). The plan incorporates the use of stormwater treatment devices such as bioretention 'rain gardens' and gross pollutant traps to minimise pollutant discharge into receiving waters.

As part of the M2 Site works, 'rain gardens' or 'tree pits' would be incorporated into primary road infrastructure. **Figure 4-3** shows the indicative locations of bioretention tree pits along the main Spine Road (refer **Appendix A** for location of bioretention pits throughout the whole site). Drainage paths would be established to direct water to the northern end of the site. WSUD measures including bioretention tree pits and proprietary gross pollutant traps are designed to ensure that WSUD objectives to protect receiving water quality are met.

Prior to construction commencing, a Water Management Plan including erosion and sediment control would be implemented (Robert Bird Group, 2014c). Sedimentation fences would be constructed, stormwater discharge quality would be monitored, disturbed areas would be stabilised, and site personnel would be instructed on the sediment and erosion control measures. During construction, there would be regular inspection and maintenance of erosion control measures, and potential water quality impacts would be monitored.

Low water-use plant species would be used in public open spaces to reduce the need for irrigation once the plants have been established. In addition, the Porters Creek riparian corridor would be rehabilitated. Revegetation of exposed soils and a buffer zone around the riparian corridor would protect the creek from pollution and sedimentation.

Sustainable water practices should be addressed in the CEMP and water usage should be monitored during construction to ensure water reduction targets can be met. Collected stormwater (as part of erosion and sediment control measures, such as temporary basins) may be reused on site for dust suppression or irrigation of landscaped public domain or open space areas if it is safe to do so.

Sustainability Initiatives

- > Implement a whole of site drainage plan;
- > Incorporation of WSUD measures into the public domain design;
- > Rain gardens and bioremediation swales incorporated into primary road infrastructure;
- > Develop and implement an erosion and sediment control plan;
- > Monitoring potable water consumption during construction;
- > Reuse of wastewater for dust suppression or irrigation;
- > Minimise erosion through seeding and planting; and
- > Rehabilitation of the riparian zone alongside Porters Creek.

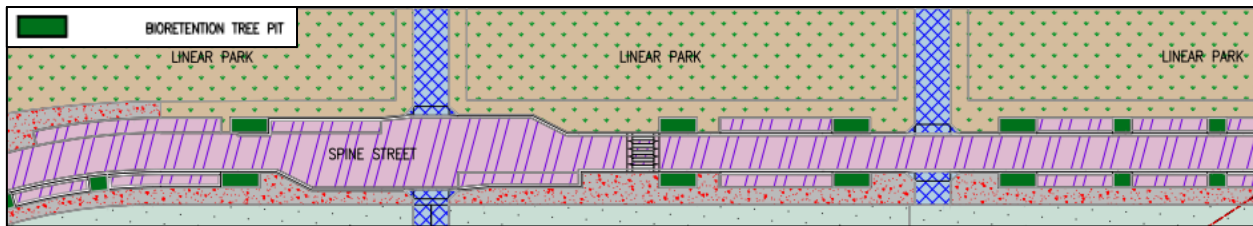


Figure 4-3 Stormwater treatment devices – indicative layout of bioretention tree pits along Spine Road (Source: Robert Bird Group, 2014b)

4.5 Materials and Waste

The M2 Site works would require the use of a variety of construction materials, the major items include:

- > Granular materials, asphalt, concrete and masonry / stone pavers for roads, cycleways, and footpaths;
- > Conduits, cables, wires and pipes for the electricity, gas, potable water and telecommunication infrastructure;
- > Materials associated with the stormwater drainage infrastructure (pits, pipes, kerb and gutter); and
- > Landscaping materials.

The proposed works have the potential to generate excess waste material including excess spoil from bulk earthworks, pavement construction and services excavation, green waste from vegetation clearing and litter and general waste from construction work areas. A Waste Management Plan (WMP) would be developed and implemented as part of the CEMP during construction works to reduce waste disposed of offsite, including waste sent to landfill and promote the re-use of materials on-site where possible.

Preliminary bulk earthworks volume estimates are provided in **Table 4-1**. Subject to waste classification, an excess spoil volume of 33,650m³ of Virgin Excavated Natural Material Natural (VENM) would require transport from site for re-use elsewhere to other construction sites with a shortfall of material. It is not proposed that the excess spoil be sent to landfill.

During earthworks operations, topsoil, filling and natural soils should be separated. In regards to reusing material on-site, topsoil may be used for landscaping purposes; existing site fill materials and VENM and excavated rock may be used as engineered filling (though some sorting or crushing may be required) subject to waste classification. The sustainability targets applicable to earthworks are summarised in **Table 4-2** (Douglas Partners, 2014).

Cleared vegetation would be reused on site wherever possible for landscaping works or transferred to a green waste processing facility. Centralised recycling bins would be provided at construction sites and toolbox talks would be implemented for construction workers to encourage recycling on-site.

Sustainability Initiatives

- > Minimise cut to fill earthworks in the design;
- > Use of sustainably sourced materials where raw materials are required;
- > Resale of VENM to divert waste from landfill;
- > Implement a WMP during the construction phase of works in accordance with the resource recovery principles of the *Waste Avoidance and Resource Recovery Act 2001*;
- > Reuse of suitable waste material on-site where possible;
- > Centralised recycling areas and waste bins on construction site; and
- > Toolbox talks for construction workers to encourage recycling and good waste management practices.

Table 4-1 Preliminary bulk earthworks volumes (Source: Robert Bird Group, 2014a)

Bulk earthworks	Volume (m ³)
Cut	55,850
Fill	22,200
Spoil	33,650

Table 4-2 Materials and waste sustainability targets (Source: after Douglas Partners, 2014)

Targets	Actions
100% of usable spoil to be beneficially reused	In-situ soils deemed suitable for reuse will be used in filling. Ideally usable soil will be used on site, or alternatively on other project sites.
Work with other Government agencies projects to import and/or reuse clean spoil (VENM) as required	To be addressed in preconstruction stages to identify opportunities
Reuse crushed masonry from on and/or off site sources as road base	Use of recycled materials will be promoted and allowed for in construction specifications. Recycled road base material will need to meet IPWEA (NSW) Specification for Supply of Recycled Material, 2010.

4.6 Land Use and Ecology

The site was used as a staging area during the recent M2 Motorway expansion works. The redevelopment works provide an opportunity to transform the brownfield site into a development that would benefit the wider community and have a positive effect on the surrounding environment. Vegetation removal has been minimised during design and an area of bushland in the northern portion of the site is to be retained as part of the project.

Four public open spaces would be constructed during the M2 Site works. From south to north, these open spaces include the Plaza, Central Park, Linear Park along the Spine Road, and the Northern Bushland Reserve (refer **Appendix A**). Northern Bushland Reserve is an area of about 4,400m² that would provide a natural landscape of restored bushland and create a buffer to surrounding roads (DP&I, 2013). A site specific Vegetation Management Plan would be developed for this area to guide the management of the Reserve and aid in the rehabilitation and regeneration of the vegetated riparian corridor along Porters Creek..

The precinct is located in close proximity to Lane Cove National Park, a major open space asset. The development would establish links with the national park through tree planting and the consolidation of vegetation corridors. Landscaping and tree planting along roads, footpaths and cycleways and buffer vegetation along the M2 corridor would occur. Street trees and vegetation in open spaces would incorporate indigenous species to contribute to the ecological diversity and habitat of the area.

The CEMP would outline mitigation measures and ecological management procedures for implementation during pre-construction, construction and operational phases of the development. Suitable mitigation measures and management procedures are summarised in **Table 4-3** (modified from EcoLogical Australia, 2014).

Sustainability Initiatives

- > Creation of open space/landscaped areas within a brownfield site;
- > Minimise vegetation removal during design;
- > Consolidate vegetation corridors and links to Lane Cove National Park through street tree planting;
- > Planting of indigenous species to contribute to the ecological diversity of the area and create habitat for local species;
- > Vegetation Management Plan for the Northern Bushland Park and rehabilitation of the Porters Creek riparian corridor; and
- > Implementation of CEMP including ecological management and mitigation measures.

Table 4-3 Suitable mitigation measures and ecological management procedures (modified from EcoLogical Australia, 2014)

Item	Mitigation measure/ ecological management procedure
Site specific environmental induction	> All staff to undertake site-specific environmental induction to ensure understanding of site environmental procedures, and the sensitivity of riparian areas
Identification of clearing limits	> Clearly mark out clearing limits > Install protective fencing around sensitive trees close to work sites
Pre-clearing survey	> Qualified ecologist to conduct pre-clearing survey
Nest boxes	> Construct and place six nest boxes in the riparian corridor > Boxes should be designed for use by micro-chiropteran bats
Management of erosion and sediment control	> Minimise erosion through seeding and planting > Undertake dust suppression where required
Riparian areas	> Demarcate riparian areas from construction areas with fencing > Ensure all works in close proximity to riparian zones have appropriate erosion and sediment control devices > No storage of chemicals or vehicles within creek buffer zone.
Stormwater Management	> Installation of stormwater management devices to remove gross pollutants to minimize impacts on downstream receiving waters (Lane Cove River)
Weed Management	> Implement a hygiene protocol for vehicles entering the site to minimize spread of weeds
Monitoring	> Develop construction monitoring program to ensure all mitigation measures have been completed.

4.7 Social and Community

The proposed development would incorporate sustainability design features to enhance the social and community benefits of the development. Two of the guiding design principles for the precinct as set out in the North Ryde Station Precinct DCP 2013 (DP&I, 2013) are:

- > "North Ryde Station Precinct is a Next Generation project - The Precinct will be developed over a 10-15 year period - embodying new ideas and new ways of living and working"
- > "North Ryde Station Precinct is a Community - The Precinct will offer the services and support that makes it a complete and desirable community".

These design objectives would be achieved through the provision of open space, community areas and public art. An open space and a public domain network throughout the M2 Site would provide future residents and workers with high quality amenity areas for active and passive recreation. Public open spaces would receive direct sunlight and building heights have been designed to reduce overshadowing.

During the construction phase of the development, the impact on the environmental quality of surrounding communities would be minimised through a number of mitigation measures outlined in the CEMP. Workers would be encouraged to commute via public transport, either to North Ryde Station or the bus routes along Epping Road thereby reducing local traffic during peak periods. Pollution control equipment would be fitted to work vehicles to reduce the amount of particulate matter exhausted and internal haul routes would be used where possible to reduce truck movement along public roads.

The pedestrian and cycle network as outlined in **Section 4.3** would enhance the environmental quality of both the precinct and surrounding community during the operational phase of the development by minimising the use of private transport and encouraging the use of mass public transport (trains and buses) to reduce local traffic and improve air quality.

An archaeological assessment of the M2 Site was undertaken to identify any Aboriginal and non-Aboriginal heritage items. A cistern/well located on the site has some local significance. To ensure that knowledge of this artefact is not lost for future generations, a monitoring program and archaeological investigation would be conducted to record the structure and collect samples and artefacts.

Sustainability Initiatives

- > Encourage use of mass public transport by workers to reduce local traffic and exhaust emissions from construction works;
- > Minimise reliance on private transport through provision of a pedestrian and cycle network and encourage use of mass public transport;
- > Provide public open spaces and high quality amenities for active and passive recreation;
- > Provide community areas and public art;
- > Encourage development of mixed used buildings to promote lively streets and community areas;
- > Minimise overshadowing of public spaces and existing residential areas through design of building layout and height restrictions; and
- > Archaeological investigation of well/cistern heritage item.

5 Conclusion

Cardno was engaged by UGNSW to prepare this ESD Report to accompany the SSDA (SSD-5093) for North Ryde Station Precinct M2 Site (High Density Residential and Mixed Use Sub-Precincts) Stage 1 Preliminary Works State Significant Development. This report was prepared in response to the DGRs issued for the project.

This report outlines suitable strategies to address the principles of ESD. It demonstrates that through the implementation of suitable mitigation techniques and management plans, the ESD principles can be incorporated into the design, construction and ongoing operational phases of the proposed development.

6 References

Arc Traffic and Transport (2014) Traffic and Transport Impact Assessment. Prepared for UrbanGrowth NSW. Prepared May 2014.

Aspect Studio (2014) Landscape Development Application Package. M2 Site, North Ryde. Prepared for UrbanGrowth NSW. Prepared May 2014.

Department of Planning and Infrastructure (2013) *North Ryde Station Precinct Development Control Plan*. Prepared 4 December 2013.

Douglas Partners (2014) Report on Preliminary Geotechnical Investigation. M2 Site. Prepared for UrbanGrowth NSW. Prepared April 2014.

EcoLogical Australia (2014) Ecological Impact Assessment for SSDA, M2 Site. Prepared for UrbanGrowth NSW. Prepared 1 May 2014.

Transport for NSW (2011) North Ryde Station Precinct Project Transit Oriented Development. State Significant Development Application. Supporting Document. Prepared 10 December 2011.

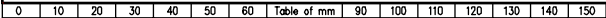
Robert Bird Group (2014a) Bulk Earthworks Sheet 1 of 2. North Ryde M2 Site Development Approval. Prepared 9 May 2014.

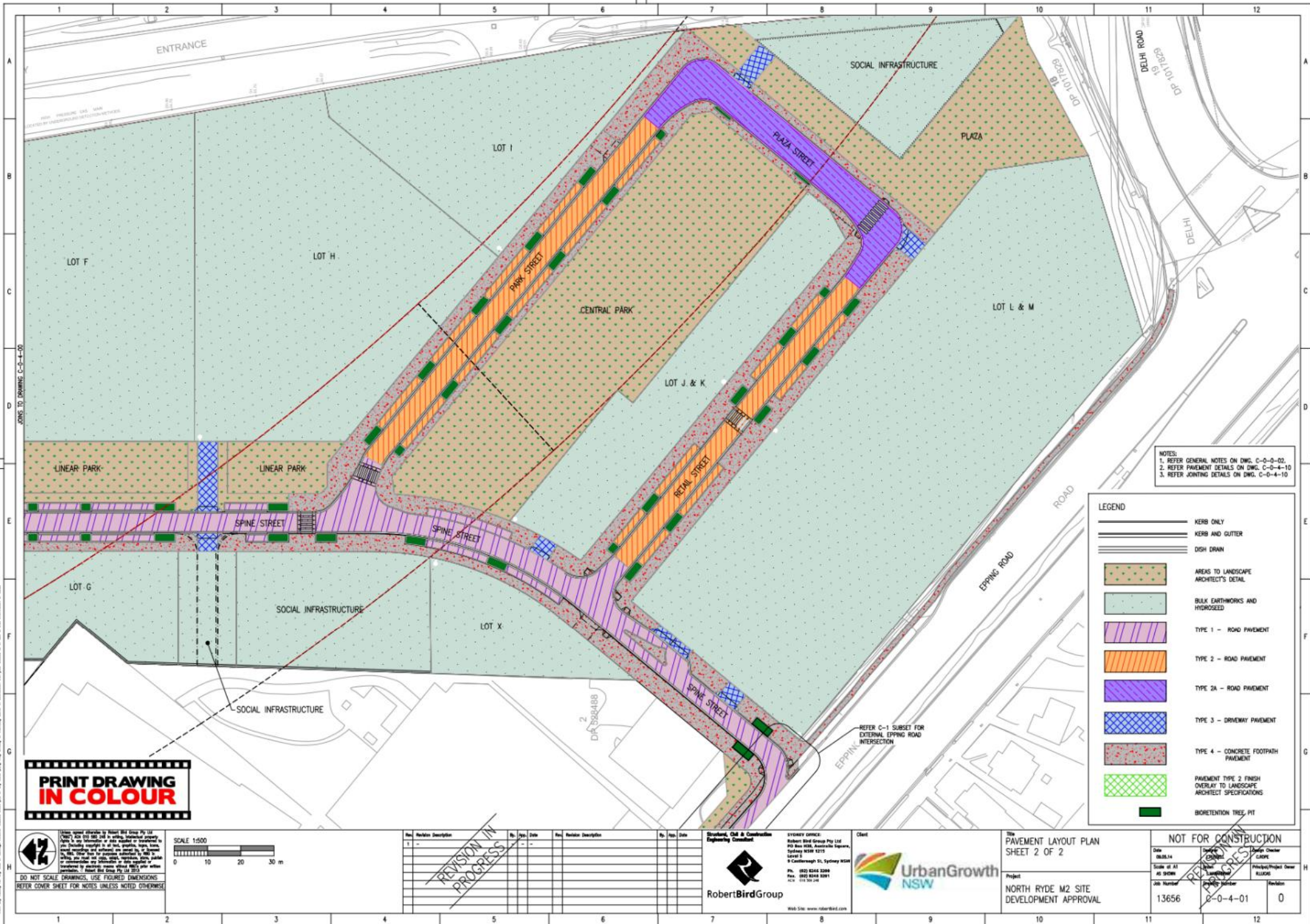
Robert Bird Group (2014b) Pavement Layout Plan Sheet 1 of 2. North Ryde M2 Site Development Approval. Prepared 9 May 2014.

Robert Bird Group (2014c) Stormwater Management Plan. North Ryde Station Precinct. Prepared for UrbanGrowth NSW. Prepared 19 May 2014.

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Development Report

APPENDIX A
SITE LAYOUT





NOTES:
1. REFER GENERAL NOTES ON DWG. C-0-0-02.
2. REFER PAVEMENT DETAILS ON DWG. C-0-4-10
3. REFER JOINTING DETAILS ON DWG. C-0-4-10

LEGEND

- KERB ONLY
- KERB AND GUTTER
- DISH DRAIN
- AREAS TO LANDSCAPE ARCHITECT'S DETAIL
- BULK EARTHWORKS AND HYDROSEED
- TYPE 1 - ROAD PAVEMENT
- TYPE 2 - ROAD PAVEMENT
- TYPE 2A - ROAD PAVEMENT
- TYPE 3 - DRIVEWAY PAVEMENT
- TYPE 4 - CONCRETE FOOTPATH PAVEMENT
- PAVEMENT TYPE 2 FINISH OVERLAY TO LANDSCAPE ARCHITECT SPECIFICATIONS
- BIORETENTION TREE PIT

PRINT DRAWING
IN COLOUR



Scale 1:500
0 10 20 30 m

Rev	Revision Description	By	App. Date	Rev	Revision Description	By	App. Date
1							



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PAVEMENT LAYOUT PLAN
SHEET 2 OF 2
Project
NORTH RYDE M2 SITE
DEVELOPMENT APPROVAL

NOT FOR CONSTRUCTION

Date	08.05.14	Drawn	David Clarke	Project/Project Owner	
Scale of A1	AS SHOWN	Checked		Revision	
Job Number	13656	Project Number	C-0-4-01	Revision	0

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APPENDIX B

NSW URBAN GROWTH SUSTAINABILITY

EMS: Sustainability Strategy

URBANGROWTH NSW'S SUSTAINABILITY STRATEGY

Sustainability is not a static concept for UrbanGrowth NSW. The Corporation recognises that a culture of sustainable practice must be integrated into all of its business decision-making processes – from buying computers for administrative use to developing major suburbs. As an organisation, UrbanGrowth NSW is committed to legal compliance and continual improvement of its environmental performance.

UrbanGrowth NSW's Corporate Plan is an important tool for the delivery of the organisation's vision and mission, forming a bridge between the commitment to social, environmental and economic sustainability and the planning required for the day-to-day delivery of its products and services. Sustainable development and sustainability performance reporting are among the Corporation's "top ten" corporate priorities, emphasising the fact that UrbanGrowth NSW's commitment to sustainable outcomes is not simply rhetoric.

While sustainability reporting alone does not guarantee sustainable outcome, it facilitates the integration of sustainability criteria into UrbanGrowth NSW's decision-making by enabling the Corporation to observe the real social, environmental and economic outcomes of its decisions. Importantly, it facilitates continual improvement to ensure that UrbanGrowth NSW adheres to its sustainable development commitment.

Accordingly, UrbanGrowth NSW adopts the following four key sustainability guiding principles which go beyond minimum regulatory compliance:

1. Deliver a sustainable quality of life.
2. Conserve resources.
3. Protect biodiversity.
4. Minimise pollution.

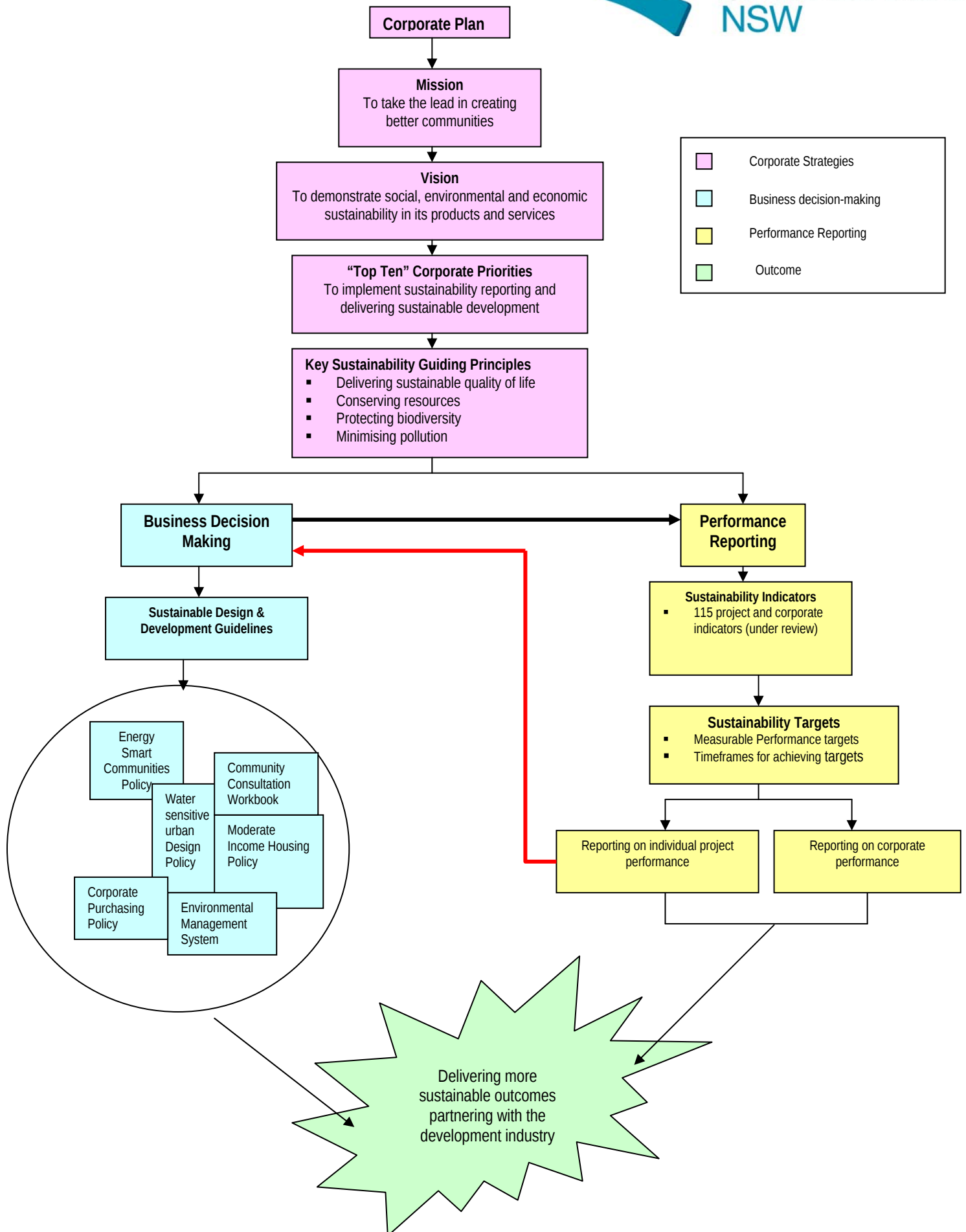
UrbanGrowth NSW's objective is to achieve the sustainability targets which have been developed from these guiding principles.

Sustainability performance criteria and targets based on the guiding principles are compulsory requirements in all tender specifications for the selection of builders and developer partners. They are also part of the formal evaluation of tender bids. For service providers such as project managers, civil works and landscape contractors, sustainability criteria are part of a pre-qualification process, ensuring that only those organisations with acceptable sustainability experience and credentials are included in the tender process.

UrbanGrowth NSW's entire sustainability strategy follows on from the four key guiding principles. For example, sustainable design and development criteria are developed for design consultants, builders and developer partners such as the *Energy Smart Communities Policy*, the *Water Sensitive Urban Design Policy*, *Moderate-Income Housing Policy* and *Community Consultation Workbook*.

Since 2002 each UrbanGrowth NSW project has been monitored against sustainability criteria and performance targets through the sustainability reporting programme. The public reporting of UrbanGrowth NSW's performance against these goals will make the Corporation more accountable by allowing stakeholders to question results, to better understand the constraints that UrbanGrowth NSW faces and to challenge the Corporation to strive harder.

UrbanGrowth NSW's journey to sustainability reporting has focused the entire organisation not only on its performance, but also on its commitment to sustainability. Sustainability reporting has made sustainability an integral component of every project and therefore a key factor in the evaluation of UrbanGrowth NSW's performance as well as that of its consultants, contractors, builders and developer partners.



INDICATORS ENDORSED FOR 2013 SUSTAINABILITY REPORT

Corporate	Project Identification	Developing a Vision	Planning and Design	Delivery	Marketing and Sales
1. Leadership integrating the core values and environmental, economic and social sustainability 2. Total revenue 3. Sales margin 4. Return on sales 5. Earnings before interest and tax (EBIT) 6. Return on equity 7. Return on total operating assets 8. Debt to equity ratio 9. Dividend and tax equivalent returned to NSW Government 10. Total jobs generated 11. Total economic output generated 12. paper purchased recycled content 13. Volume co-mingled recycled 14. 5 star NABERS tenancy for the head office 15. Water efficiency of the head office 16. Employee satisfaction 17. Stakeholder management	To be developed over 2013-2014 18. % PDAs and/or agreements that include tailored non-financial measures	To be developed over 2013-2014 19. % projects with social due diligence 20. % projects with social plan	21. % projects with WSUD 22. % projects that use PRECINX to develop project specific objectives * 23. % area of native vegetation retained within developable area * 24. % area impacting threatened species * 25. % area of retained native vegetation that is protected within developable area * 26. % retained native vegetation that is restored or regenerated (including waterfront land) * 27. % waterfront land (including riparian corridors) protected within developable area * 28. % waterfront land (including riparian corridors) restored or rehabilitated *	29. % reduction in Nitrogen 30. Percentage recovery (reuse and recycling) of waste from civil works and building construction * 31. Exceeding BASIX for water (best performer highlighted) * 32. BASIX 55 for energy (best performer highlighted) * 33. % Public open space irrigation by non-potable water 34. % of total yield that is sold for Moderate Income Housing 35. % recovery (reuse and recycle) of waste from civil works and building construction * 36. % civil works and builder contracts that have WHS and environmental audits done every six months * 37. % of audits for civil works and builder contracts that have non conformances * 38. % of public space and civil works contracts let that advance sustainable products and/or processes *	39. % projects with community program and the financial value * 40. Financial value of the community facilities in the project 41. Financial value of community sponsorships

*denotes revised and re-worded indicators