

Shoreline, Redlands Water Sensitive Urban Design Preliminary Advice

DesignFlow

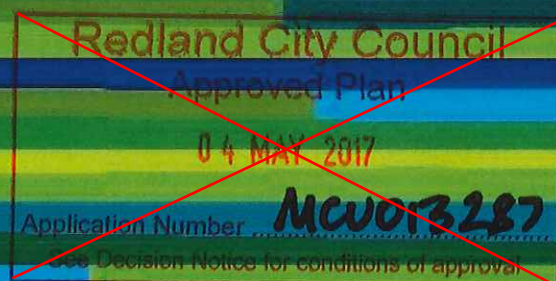
Version 6 - 30 November 2016

REDLAND CITY COUNCIL
Approved Plan

06/03/2019

Application No. MCU18/0220

See Decision Notice for conditions of approval



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SITE APPRAISAL

Depressions/dams in coastal zone.

Waterways across the site are generally clear of significant vegetation other than the regional ecosystems marked. Revegetation and integration of waterways with stormwater management possible to reduce size of stormwater treatment systems (i.e. revegetate waterways and get water quality credit).

Circular reservoir - Turkeys next water supply reservoir. Significant and impressive element in the landscape. Potential to retain and integrate within landscape.

Regional ecosystem vegetation.

Waterway - nice little waterway with riparian veg

Regional ecosystem vegetation.

Slopes are generally 2-8% throughout site which supports all potential stormwater management options.

Intertidal zone comprising mangrove and salt marsh along coastline. Width of intertidal zone varies.

Not part of this application

Western draining catchments enter either private property or Council land. Assume no-worsening of flows.

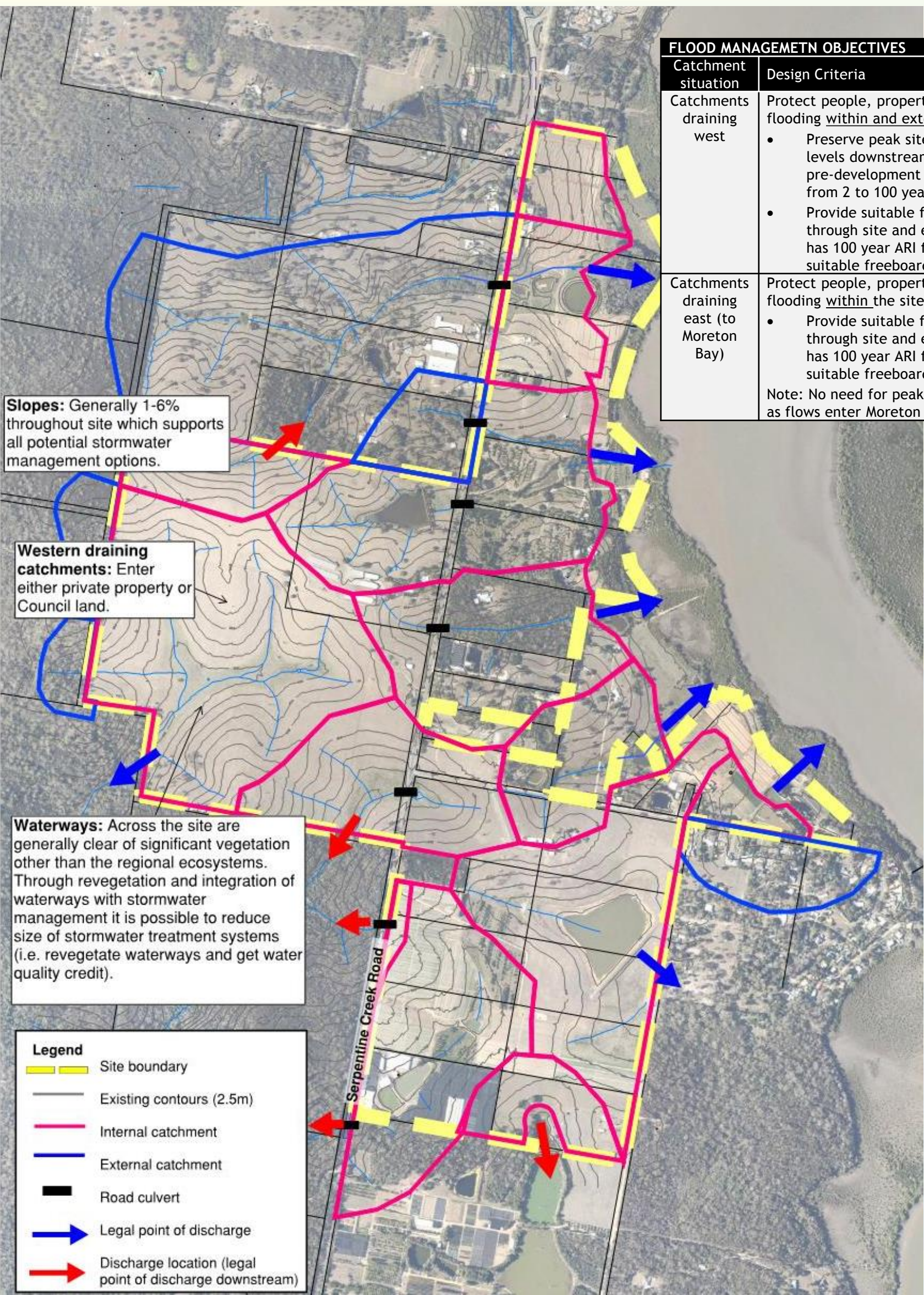
Depressions/dams in coastal zone. Opportunity for stormwater management in this zone

Flatter grades

Significant vegetation and habitat downstream of site

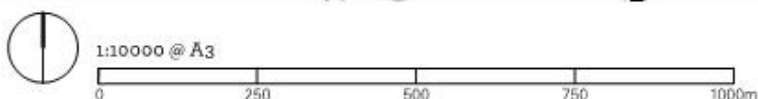
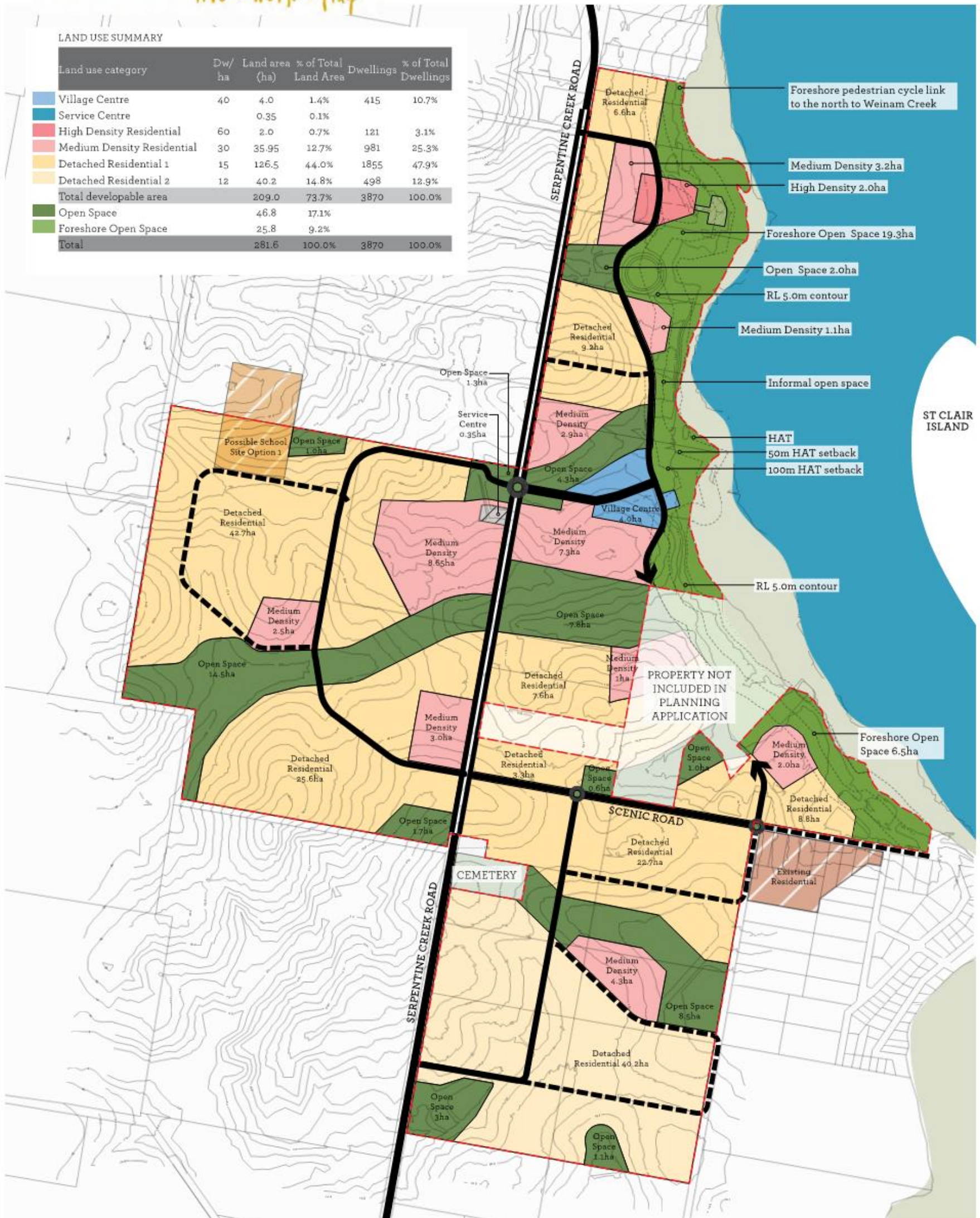
Significant regrowth vegetation

CATCHMENT DISCHARGES & OBJECTIVES



shoreline
live • work • play

Land use category	Dw/ ha	Land area (ha)	% of Total Land Area	Dwellings	% of Total Dwellings
Village Centre	40	4.0	1.4%	415	10.7%
Service Centre		0.35	0.1%		
High Density Residential	60	2.0	0.7%	121	3.1%
Medium Density Residential	30	35.95	12.7%	981	25.3%
Detached Residential 1	15	126.5	44.0%	1855	47.9%
Detached Residential 2	12	40.2	14.8%	498	12.9%
Total developable area		209.0	73.7%	3870	100.0%
Open Space		46.8	17.1%		
Foreshore Open Space		25.8	9.2%		
Total		281.6	100.0%	3870	100.0%



WSUD OBJECTIVES

Objectives are consistent with the State Planning Policy.

Stormwater quality

- TSS 80% reduction in post development load
- TP 60% reduction in post development load
- TN 45% reduction in post development load
- Gross pollutants 90% reduction in post development load

Waterway stability

- Preserve the 1yr ARI flows downstream of the site
- Minimise risk of erosion for internal waterways (keep flow velocity to 1m/s where possible and stabilise in areas where velocity is greater than 1m/s with vegetation or scour protection)

Flooding

- Preserve the peak flood flows exiting the site to private property
- Does not apply to catchments draining to Moreton Bay directly from site

CONCEPTUAL SIZING

Waterway re-vegetation will occur in all reaches of the waterway corridor which are clear of vegetation at the moment. Additionally existing dams will be decommissioned and the waterway re-established. This provides an opportunity for stormwater treatment to occur within the waterways (i.e. the re-vegetated waterway provide treatment of nutrients and fine sediment) and for stormwater treatment system to be located in waterway corridors as well provided they do not block fauna movement.

Note where the waterways are to form part of the treatment system, all coarse sediment, litter and some fine sediment will be removed prior to stormwater entering the waterways. Coarse sediment represents the largest quantity of pollution from urban catchments ($0.6\text{m}^3/\text{ha}/\text{yr}$) which is an order of magnitude greater than fine sediment and nutrients.

Stormwater treatment based on a average size of treatment Redland rainfall in MUSIC:

RESIDENTIAL

- Bio = 0.9-1.0% of catchment
- Wetland = 5% of catchment

COMMERCIAL

- Bio = 1.1-1.2% of catchment
- Wetland = 5% of catchment

When combining the treatment systems with waterway rehabilitation, the sized can decrease by up to 50% due to the treatment provided by the waterway.

Flood storage requirement to preserve downstream flows 1yr to 100yr is approximately $400\text{-}500\text{m}^3/\text{ha}$ of development (depending on % impervious cover). This is subject to flood modelling.

Flood depths with flood storage should be retained to 20yr = 1.2m and 100yr = 1.5m. These depths are also subject to discussion with Council and QUDM (Queensland Urban Drainage Manual) allows deeper flooding provided risk management is incorporated into the design to warn of the risk and restrict access to deeper flooding.

Total footprint area

The treatment sizes described above do not allow for batters, embankments, sediment basins and hydraulic structures. To properly assess the spatial requirements of the stormwater management systems, these elements need to be considered when defining the total footprint. The total footprint factor relative to the required treatment area has been defined based on extensive experience in delivered bioretention and wetland systems in Queensland:

Wetlands

- Treatment Area is 500 m^2 to $5,000\text{ m}^2$ then Footprint = 350% x treatment area
- Treatment Area of $6,000\text{ m}^2$ to $10,000\text{ m}^2$ then Footprint = 300% x Treatment Area
- Where Treatment Area of $10,000\text{ m}^2$ and greater then Footprint = 200% x Treatment Area

Bioretentions

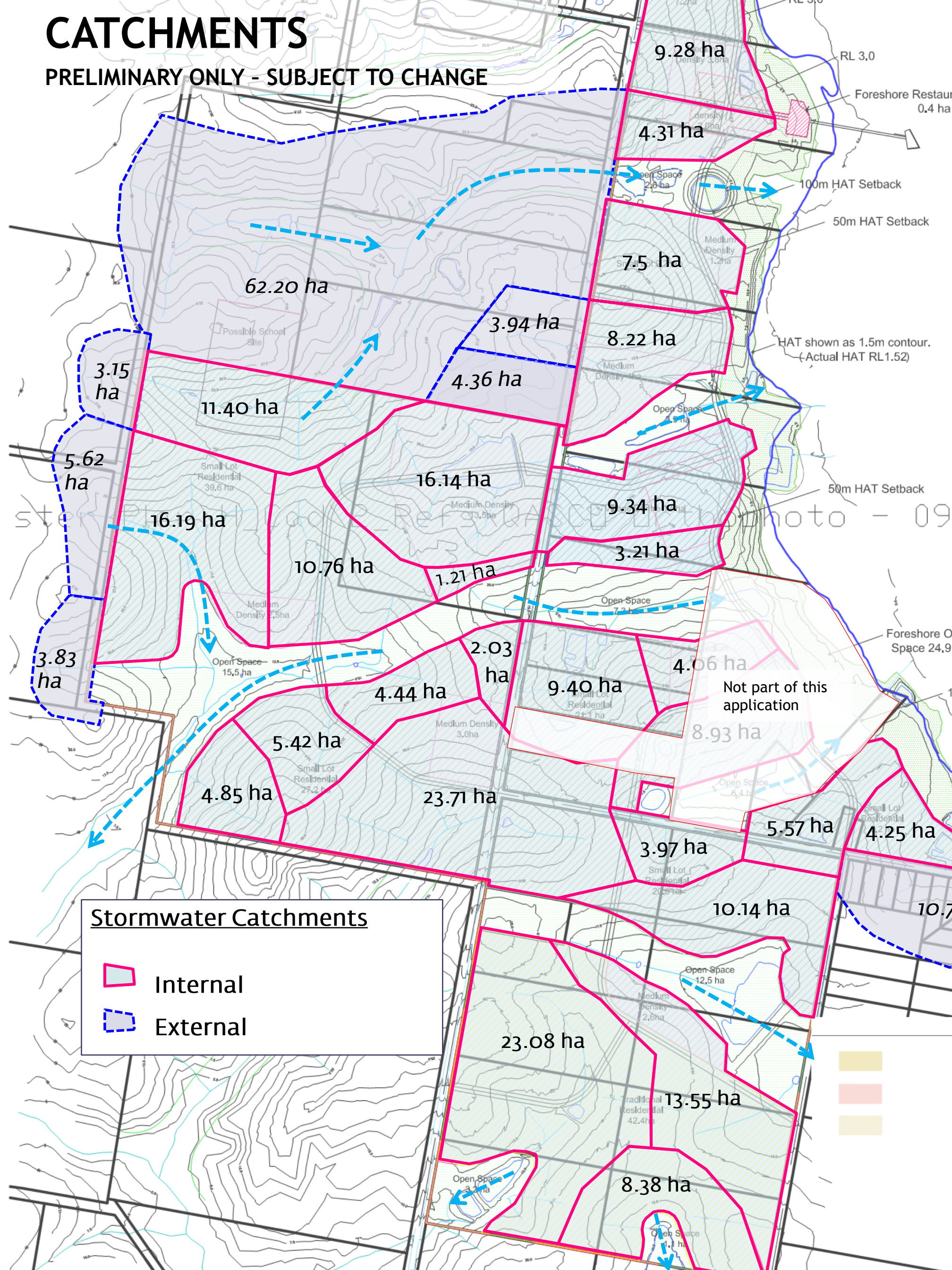
- Bioretention treatment only (no flood storage) then Footprint = 300% x Treatment Area

Flood storage

- Flood storage is 100 m^3 to $2,000\text{m}^3$ then Footprint area (m^2) = 200% of Flood storage
- Flood storage is $2,000 - 10,000\text{m}^3$ then Footprint area (m^2) = 170% of flood storage
- Flood storage is greater than $10,000\text{ m}^3$ then Footprint area (m^2) = 150% of flood storage

The structure plan design has allowed for the total footprints. Further consideration of the total footprint will be required as part of future technical work or development assessment for reconfiguration of lot to ensure that adequate land is retained for stormwater management during urban design phases.

PRELIMINARY ONLY - SUBJECT TO CHANGE



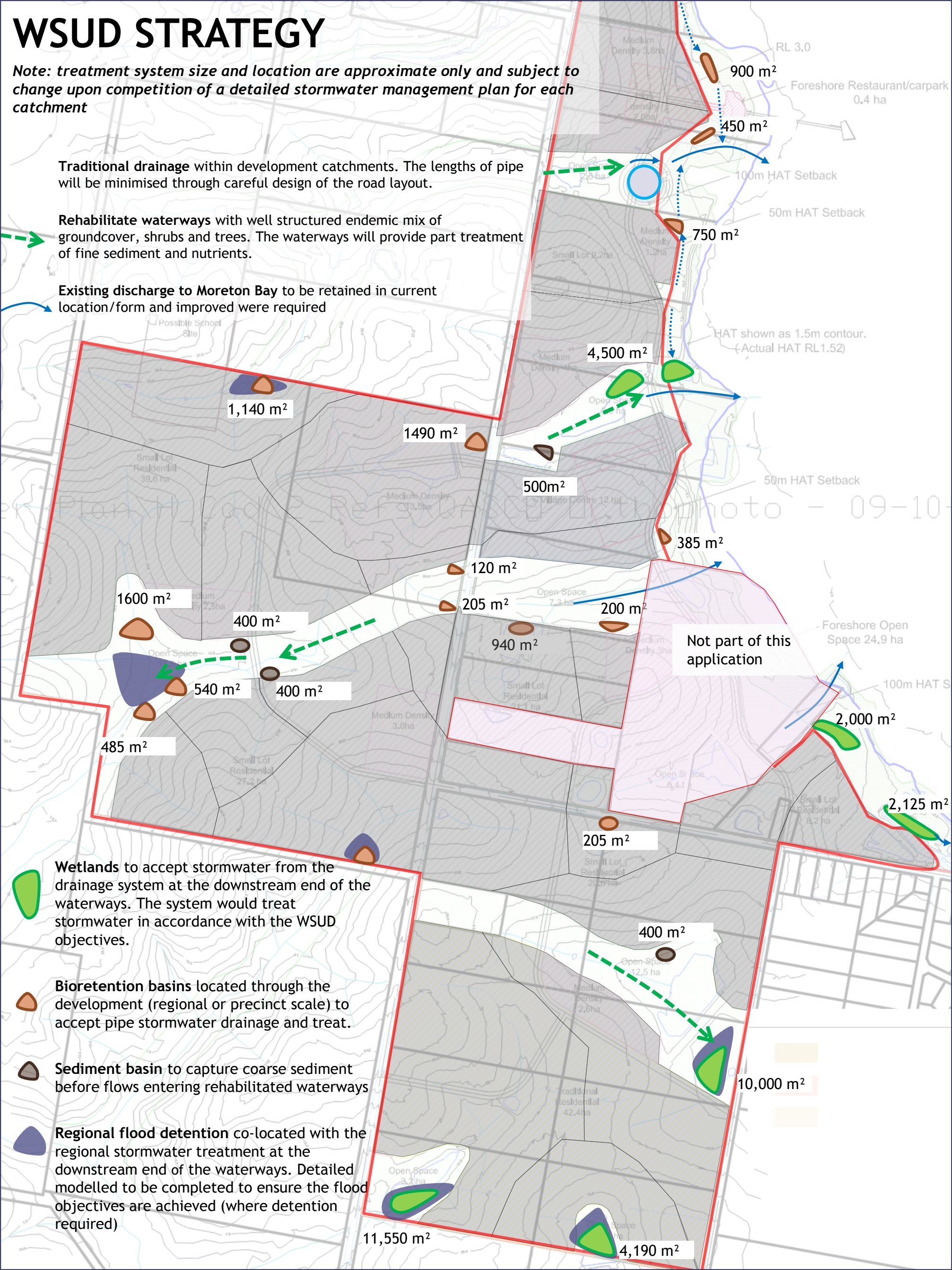
WSUD STRATEGY

Note: treatment system size and location are approximate only and subject to change upon completion of a detailed stormwater management plan for each catchment

Traditional drainage within development catchments. The lengths of pipe will be minimised through careful design of the road layout.

Rehabilitate waterways with well structured endemic mix of groundcover, shrubs and trees. The waterways will provide part treatment of fine sediment and nutrients.

Existing discharge to Moreton Bay to be retained in current location/form and improved were required



Wetlands to accept stormwater from the drainage system at the downstream end of the waterways. The system would treat stormwater in accordance with the WSUD objectives.

Bioretention basins located through the development (regional or precinct scale) to accept pipe stormwater drainage and treat.

Sediment basin to capture coarse sediment before flows entering rehabilitated waterways

Regional flood detention co-located with the regional stormwater treatment at the downstream end of the waterways. Detailed modelled to be completed to ensure the flood objectives are achieved (where detention required)

10,000 m²

10,000 m²





