



Stormwater Management Practice Note NSC 02: Calculating Site Imperviousness

This practice note has been developed to promote consistency when calculating site imperviousness. It has been developed for use with District Plan Rule 8.4.7 and is relevant to all Residential, Business and Structure Plan areas of the city but excluding Long Bay.

2.1 Impervious Area Limits

Rule 8.4.7 sets the following limits on total site imperviousness:

Table 2.1 : Maximum Impervious Area Limits

SMA	Residential & Structure Plan Zones (excluding Mixed Use Overlay Area*)	Business Zones & Structure Plan Zone Mixed Use Overlay Area*
1	50%	80%
2	60%	90%
3	60%	90%
4	70%	100%
5	70%	100%

Note: This table is derived from Table 8.2 in the District Plan

2.2 Definitions

The following District Plan definitions are relevant:

Impervious Area

Means any part of a site which is covered in a surface constructed of materials which are resistant to water passing through them and includes any area which:

- Falls within the definition of building coverage
- Is paved with concrete, asphalt, pervious paving, roofed areas and decks
- Provide driveways and parking areas (including unpaved and metalled surfaces)
- Is occupied by swimming pools

But does not include:

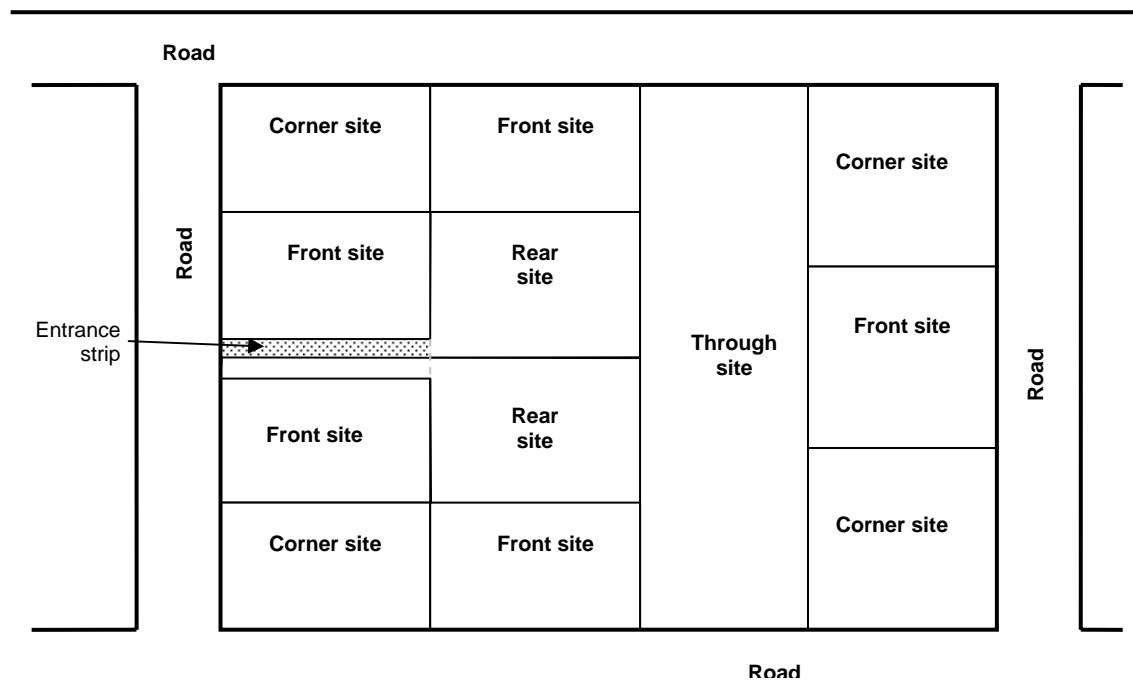
- Paths and paving stones less than 1 metre in width provided they are separated from other impervious areas by at least 1 metre (including strip driveways with 0.5 metres between strips)

- Retaining or garden walls within garden / lawns
- Rain tanks up to 5m² in area

Note: Pervious paving, green roofs, uncovered wooden slated decks and swimming pools are counted as impervious area in terms of the calculation of total site imperviousness. However, the perviousness of these structures will be taken into account when calculating mitigation of stormwater runoff under Rule 8.4.8.

Net Site Area

In relation to a rear site means the difference in area between the total area of the site (gross area) and the area of its entrance strip. In relation to a front, corner or through site, net site area, gross site area and area shall have the same meaning.



Permeable Area

Means any part of a site which is grassed or planted in trees or shrubs and is capable of absorbing water. It does not include any area which falls within the definition of impervious area.

Self Mitigating Surfaces

Means surfaces which while counted as impervious in terms of total site impervious area are able to mitigate stormwater runoff to an acceptable level, and include pervious paving, green roofs, uncovered slated wooden decks over natural ground and swimming pools.

2.3 Impervious Areas not Requiring On-site Stormwater Mitigation

The following areas are not required to provide on-site stormwater mitigation but *are included* in the calculation of total site imperviousness and may not cause site imperviousness to exceed the maximum impervious threshold in Table 2.1 above (see Rule 8.4.7.1 Table 8.2).

- Small additions and accessory buildings – including paved areas, up to an aggregate area of 25m². It was decided to allow minor additions of impervious area, (less than 25m²) to proceed without the need for on-site mitigation. Note that this is not an allowance but a threshold above which the rule kicks in. If an impervious area exceeds 25m² then the whole area is to be mitigated.
- Pervious paving
- Uncovered slatted timber decks over natural ground
- Swimming pools
- Green Roofs

Note that stormwater runoff from these areas still needs to be disposed of in a manner which complies with Clause E1 of the Building Code and does not create a nuisance to neighbouring properties.

2.4 Site area for measuring Total Site Imperviousness

The way in which total site imperviousness is calculated will differ depending on whether the development is on a delineated area or a separate title, and also whether the lot is a rear lot, front lot, corner lot, through lot or access lot.

Separate Title

For a separate title the measurement of total site imperviousness shall be based on the net site area. Rear lots will therefore exclude the access strip.

Cross Lease

In the case of a cross lease, the covenant area or delineated area shall be counted as the site area for the purposes of rule 8.4.7 and 8.4.8. Where clear delineated areas are not shown, or unclear, the parent site shall be used.

Unit Title

In the case of a Unit Title subdivision the impervious area for a multi-unit development, where individual titles have not yet been created will be calculated on the area of the parent site. Any later modifications involving individual units will be on the Unit entitlement and Unit area and exclude any area of the common property.

Jointly Owned Access Lots (JOAL)

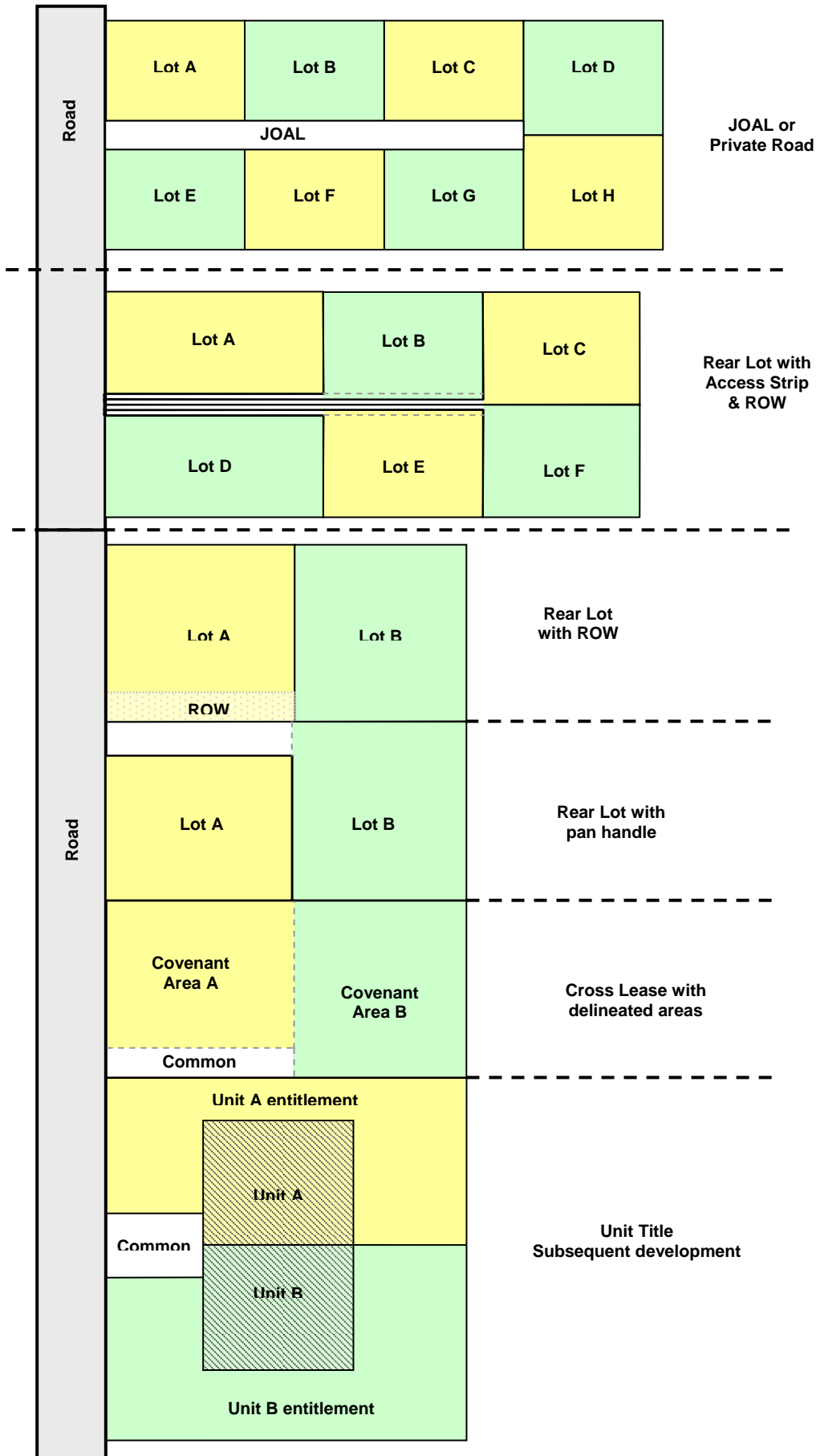
In the case of JOAL's or private roads, these are not included in the calculation for total site imperviousness, they are to be considered as roads and are therefore not subject to Rule 8.4.7 or 8.4.8, however appropriate stormwater mitigation is required at subdivision stage.

Right of Way (ROW)

Where a ROW has been created for access purposes to a rear lot then the area of the ROW is included in the parent site area.

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Only the coloured area on the figure below needs to be used for calculating total site imperviousness and any on-site stormwater mitigation requirements.



2.5 Measuring Total Site Imperviousness

Table 2.2 : Areas Included or Excluded from Total Site Imperviousness

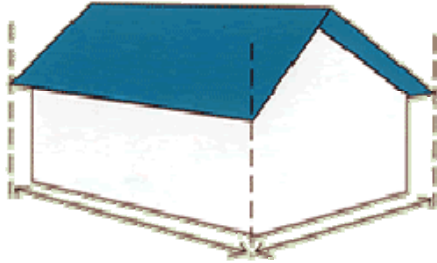
Type of Area	Included	Condition or Comment
Roof Areas	Yes	The roof area and not the building footprint must be measured.
Green Roofs	Yes	Self Mitigating Surface. <i>See below.</i>
Paved Areas	Yes	All paved areas not exempt below.
Wooden Decks	Yes	Self Mitigating Surface. <i>See below.</i>
Pervious Paving	Yes	Self Mitigating Surface. <i>See below.</i>
Unpaved Parking / Metalled Driveway	Yes	These areas with metal or shell are highly compacted and do not allow soakage.
Garden Sheds	Yes	<i>See below.</i>
Swimming Pools	Yes	Self Mitigating Surface. <i>See below.</i>
Rain Tanks	No	If less than 5m ² in area.
Paths less than 1m Wide	No	As long as there is at least 1 metre of permeable area on both sides.
Strip Driveways	No	As long as there is at least 1 metre of permeable area on both sides and 0.5 metre in middle.
Grassed and Garden Areas	No	
Pebble Gardens	No	Provided the areas are not used for parking or traffic access.

Paved Areas

All paved areas not exempted by the above definitions must be taken into account when calculating total impervious areas.

Roof Area

The total roof area including eaves is to be measured – not just the building footprint.



For existing roofs, measure the plan area of the roof at ground level below the edges of the roof (including eaves). For proposed buildings, the area can be calculated from the roof plan drawings (not the wall floor plan dimensions) as these include the additional area of the eaves.

Green Roofs

Green roofs are measured in the total impervious area calculation but are considered to be a mitigation method so is accounted for in achieving the required mitigation. These are classified as self mitigating surfaces and do not require additional mitigation. This is only if the green roof has been designed and constructed to the required standards (see *Stormwater Management Practice Note NSC 12*).

Wooden Decks

Wooden decks are counted as impervious as there is little chance for vegetation to grow beneath the deck. They are classified as self mitigation surfaces if they are slatted/allowing water to pass through and located above natural ground and you are not required to provide any additional mitigation for these areas.

Pervious Paving

Pervious paving is measured in the total impervious area calculation but is considered to be a mitigation method so is accounted for in achieving the required mitigation. These areas are classified as self mitigating surfaces and do not require additional mitigation. This is only if the pervious paving has been designed and constructed to the required standards (see *Stormwater Management Practice Note NSC 11*).

Unpaved Parking / Metalled Driveways

Unpaved parking areas with compacted ground, metal or shell etc are considered as impervious and must be included in the impervious area calculation.

Rain Tanks

Rain Tanks with a plan surface area of less than 5m² can be excluded from the total site imperviousness calculation.

Garden Sheds

Garden sheds or ancillary buildings with a roof area of less than 10m² are included in the impervious area calculation, but may not be required to provide stormwater mitigation if constructed or installed at a later date.

Paths less than 1m Wide

Paths of less than 1 metre in width with vegetation on both sides may be excluded from the total impervious area calculation, (unless they are within 1 metre of other impervious areas).

Swimming Pools

The area of a swimming pool is considered as impervious because the water is unable to infiltrate into the ground, but is not required to provide mitigation because of the storage volume provided between the normal pool level and the overflow level. A paved area of no more than 1 metre in width surrounding the swimming pool may be considered as part of the pool.

Strip Driveways

Strip driveways may be excluded from the total site imperviousness calculation as long as the strips are less than 1 metre wide and there is at least 0.5 metre of grass between the strips. There must also be at least a 1 metre width of vegetated area on both sides of the driveway.

2.6 Measurement of Impervious Areas in Relation to Rain Tanks

Roof Area Connected to a Rain Tank

This is the area that is used to determine the size of the rain tank and refers to those areas which drain to gutters that discharge into the rain tank. Make sure that only the area of roof that will be connected to the tank is measured. The area refers to the plan area of the roof. Decks should not be connected to the rain tank.

Additional Area

The additional area refers to a portion of the total impervious area on the site which may be provided without additional mitigation if a rain tank is provided. The rain tank is deemed to provide mitigation for these areas.

For single purpose tanks of 3m³ in residential areas and for a dual purpose rain tanks sized according to Table 8H.1 in residential areas the allowable additional area is an area equivalent to 25 per cent of the roof area connected to a rain tank.

For business areas the allowable additional area is varied depending on the amount of water use likely in the building. This is based on the roof area (connected to the rain tank) per occupant and assumes a rain tank sized according to Practice Notes NSC 08 and NSC 09. Table 2.3 below shows you how much additional impervious area is deemed to be mitigated by a rain tank in this situation.

Table 2.3 : Additional Impervious Area Mitigated by Rain Tank

Roof Area per Occupant	Additional Area Deemed to be Mitigated by Rain Tank
Less than or equal to 7m ²	An area equivalent to 35% of the connected roof area
> 7m ² – 10m ²	An area equivalent to 25% of the connected roof area
> 10m ² – 16m ²	An area equivalent to 15% of the connected roof area
Greater than 16m ²	No additional area

Note: This table is derived from Table 8H.2 in the District Plan

Roof Areas Not Connected to a Rain Tank

Roof areas not connected to the rain tank are considered as other impervious area on the site and may form part of the Additional Area.