



# City of Ryde

## STORMWATER DRAINAGE PLANS

### Submission Details

Plans and calculations of the proposed property drainage system must be submitted to Council prior to the issue of a Construction Certificate. It is preferred to have as much detail as possible submitted with the Development Application to assist in determining this approval.

The plans, prepared at a 1:100 scale, shall include all the following items:

- the location of all buildings, driveways, and impervious surfaces;
- the location, trunk diameter and canopy size (drip line) of any significant trees that may have roots that will be affected by the drainage system, whether or not they are on the subject property;
- the location of all downpipes, surface channels, kerbs, pits, pipes, and sub-surface drainage;
- the size and class of all pipes and the size of all pits;
- the invert levels of all pipes and pits;
- the grades of all pipelines;
- finished surface levels of all pits;
- finished levels of any catch drains or swales;
- finished surface levels of paved areas, unpaved areas, buildings and garages;
- contours at ½ metre intervals of the existing ground levels to Australian Height Datum (AHD);
- the path taken by overland flow during storm events where the capacity of the piped drainage system is exceeded or the system is blocked;
- cross section details of any swales or catch drains proposed;
- a clear indication of the location of easements; the location, size and depth of any Council trunk drainage or interallotment drainage pipelines; and the location of any watercourses passing through the property;
- location of existing buildings or hard paving on the property not being removed as a consequence of the development, and the size and location of all drainage pipes and pits associated with the existing site improvements; and

- details of the connection to Council's drainage system -

if disposal to the kerb	Show the location and levels at the point of discharge into the kerb
if connection to a Council or interallotment drainage pit	show location, size, invert level and surface level of the pit along with the location and size of all pipes entering and leaving the pit.
if slope junction to a Council or interallotment pipeline	show the location, size at level of the pipe at the point of connection, invert and surface levels of pits upstream and downstream from the point of connection and a 1:20 detail of the manner or connection.
Discharge to a natural watercourse	show the location and level of the top and base of the creek banks, levels along the creek bed and a 1:20 detail of the outlet structure.

Where detention storage is required, plans shall include:

- details of the storage facility;
- the path taken by overland flow during storm events when the capacity of the system is exceeded or the system blocked.

If below ground storage is proposed details shall include:

- the location and size of the facility
- detailed information about the facility including the dimensions of the structure, the floor level, the slope on the floor, the level of the roof, the top water level, the surface level of any access man-holes, the invert level of all inlet pipes, the invert level and diameter of the outlet pipe.
- full construction details of the tank or facility, certified by a practising structural engineer as being able to withstand all likely service loads. The details shall include wall, floor and roof slab thickness, reinforcement details, footing details and details of all pit openings.

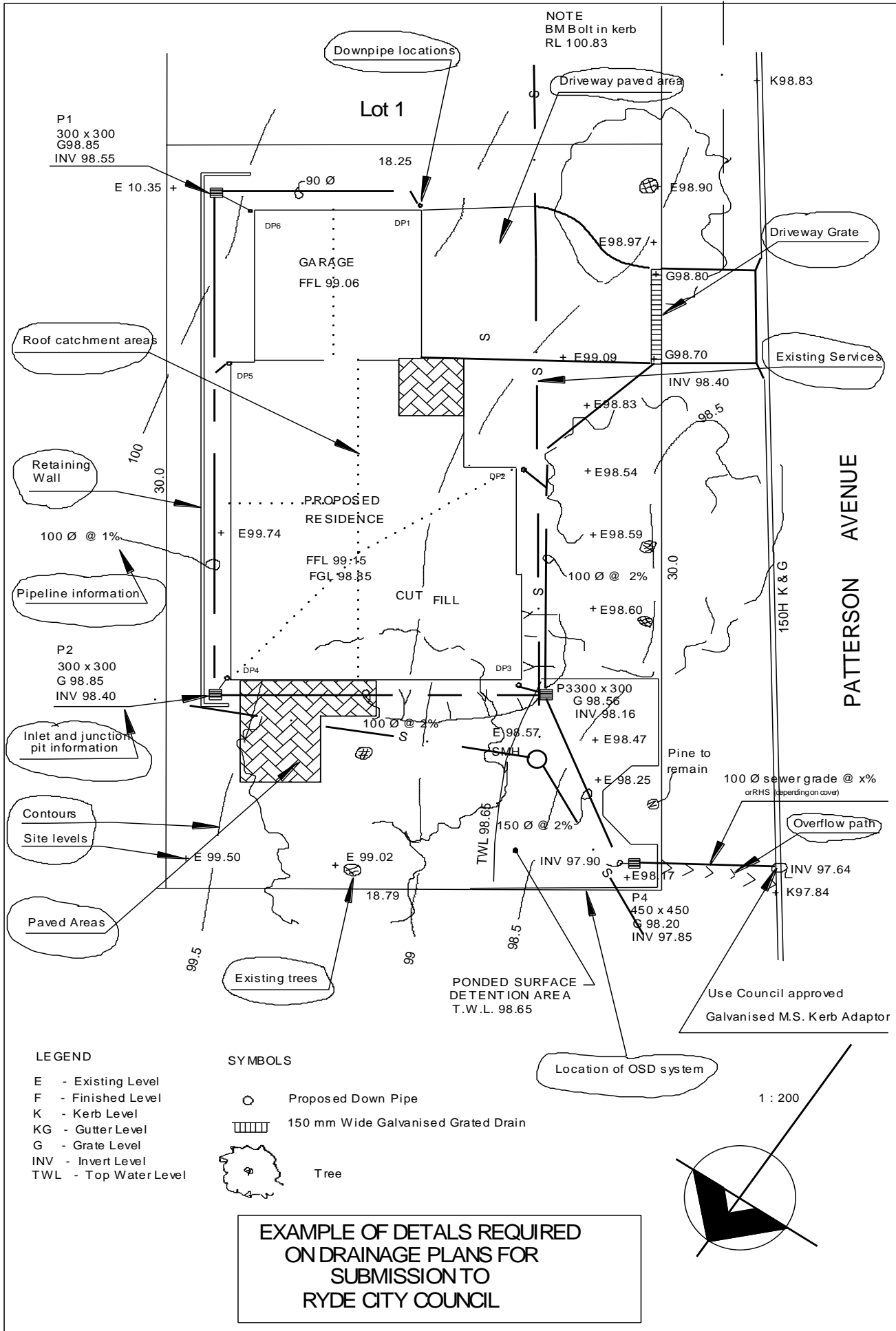
If above ground storage is proposed details shall include:

- sufficient details of finished ground levels within the basin to enable an accurate check of the storage volume provided;
  - an elevation showing the outlet control pit and including its invert level, surface level and the top water level; and
  - details of the basin overflow provisions.
- 
- details of any orifice outflow control including the plate size, material and thickness, the orifice diameter, the exact location of the orifice on the plate, the exact position of the plate over the outlet pipe, the method for fixing the orifice over the outlet pipe,
  - details of any debris screens including their dimensions, the material used to make to screen, their location, the method for fixing the screen in place,
  - the location, size and proposed construction materials and reticulation system of any rainwater tanks,
  - details of the sediment control sump and the means of allowing the sump to drain dry,
  - the location and type of any pollution control valves if required,
  - the calculated permitted site discharge (PSD), the storage volume required and the storage volume proposed.

The calculations submitted for roof and site drainage are to be based on a 20 year return interval for a 5 minute storm duration ( 195 mm/hr zone 1 and 186 mm/hr in zone 2) shall include:

- A catchment plan and calculation sheet detailing the area and surface type of the sub- catchment for each collection point, the quantity of flow in the pipe, and the design capacity.
- A hydraulic grade line analysis for all pipes in excess of 225 mm diameter.
- Full details of input variables and calculations used for the design of the on site detention system, including the selection of the permitted site discharge, the sizing of the storage facility and the design of the outlet control. NOTE; completion and submission of the attached calculation sheet will be sufficient to satisfy this requirement.

Note: An offset of a reduction in the volume of the OSD storage is available where a rainwater storage tank is used. See clause 3.1.8 of DCP 2010 Part 8.2. for details



NOTE  
BM Bolt in kerb  
RL 100.83

P1  
300 x 300  
G98.85  
INV 98.55

P2  
300 x 300  
G 98.85  
INV 98.40

P3 300 x 300  
G 98.56  
INV 98.16

P4  
450 x 450  
G 98.20  
INV 97.85

GARAGE  
FFL 99.06

PROPOSED  
RESIDENCE  
FFL 99.15  
FGL 98.85

PONDED SURFACE  
DETENTION AREA  
T.W.L. 98.65

Roof catchment areas

Retaining Wall

Pipeline information

Inlet and junction pit information

Contours

Site levels

Paved Areas

Downpipe locations

Driveway paved area

Driveway Gate

Existing Services

PATTERSON AVENUE

150H K & G

100 Ø sewer grade @ x%  
or RHS (depending on cover)

Overflow path

Use Council approved  
Galvanised M.S. Kerb Adaptor

Location of OSD system

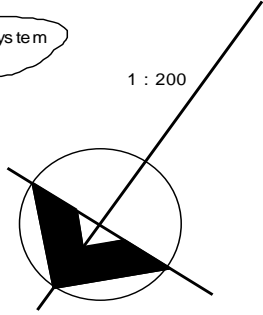
LEGEND

- E - Existing Level
- F - Finished Level
- K - Kerb Level
- KG - Gutter Level
- G - Gate Level
- INV - Invert Level
- TWL - Top Water Level

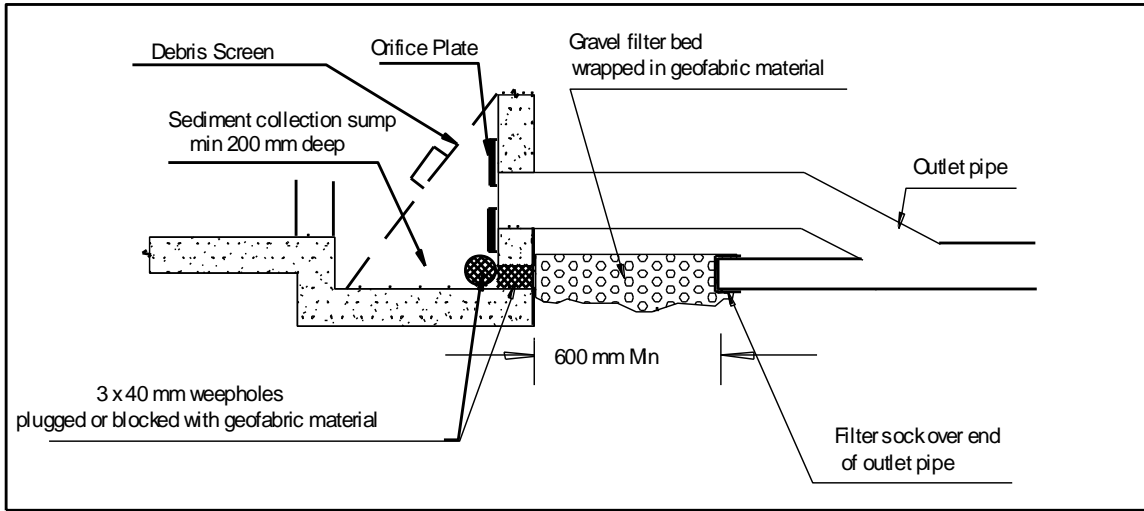
SYMBOLS

- Proposed Down Pipe
- 150 mm Wide Galvanised Grated Drain
- Tree

1 : 200



EXAMPLE OF DETAILS REQUIRED  
ON DRAINAGE PLANS FOR  
SUBMISSION TO  
RYDE CITY COUNCIL



**SEDIMENT COLLECTION SUMP WITH DRAINAGE FILTER  
TYPICAL DETAIL OF AN OUTLET CONTROL PIT/SUMP  
WITH SIDE DRAINING SEDIMENT COLLECTION SUMP**

Note the filter medium between the weepholes and the connection to the outlet pipeline

**Sample catchment analysis sheet for a residential development**

CATCHMENT AREAS						PIPELINE DESIGN				
Description	Area Sq m	Runoff Coeff.	Effective Area Sq m	Time Of Conc	Rainfall Intensity Mm/hr	Dischge L/sec	Accum. Pipe Dischge.	Pipe Size mm	Grade %	Accum Capacity L/sec
DP1 to P1 Roof	18	1	18	5	195	1	1	90	2	7
DP6 to P1 Paving	18 20	1 0.9	18 18	5 5	195 195	1 1	1 1	90	1	4
P1 to P2 Roof DP5	30	1	30	5	195	1.6	5.6	100	1	8
P2 to P3 Roof DP4	35	1	35	5	195	1.9				
Paving	15	.9	13.5	5	195	1	8.5	100	2	12
G1 to P3 Driveway	40	0.9	36	5	195	2				
Garden	20	0.75	15	5	195	0.8	2.8			
Roof DP2	20	1	20	5	195	1.1	3.9	100	2	12
P3 to P4 Roof DP3	42	1	4	5	195	2.3	12.5	150	2	28
P4 to Kb Garden	144	.75	108	5	173	5.2	Control 10.7	100	4	18

# CITY OF RYDE

## ON-SITE DETENTION CALCULATION SHEET

DEVELOPMENT TYPE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

Catchment Zone	(Zone 1)	(Zone 2)	(Eastwood)	
Site Area			_____	m <sup>2</sup> (A)
65% Site Area			_____	m <sup>2</sup>
Total <b>Proposed</b> Impervious Area (roofs, driveways, hardstand etc)			_____	m <sup>2</sup> (B)
% of site impervious			_____	%
Impervious area draining to the Storage Facility			_____	m <sup>2</sup> (C)
Pervious area draining to the Storage Facility			_____	m <sup>2</sup> (D)
Total area draining to the Storage Facility (impervious and pervious areas)			_____	m <sup>2</sup> (E)
Pervious area bypassing the Storage Facility			_____	m <sup>2</sup> (F)
Impervious area bypassing the Storage Facility			_____	m <sup>2</sup> (G)
			$\frac{(C)+(G)}{(C)} =$	1. _____ (L)

**must not be greater than 1.25.**

### Permitted Site Discharge (PSD) rate per m<sup>2</sup>

Catchments in Zones 1 & 2

If (G)=0 then PSD = 0.0265 l/sec/m<sup>2</sup>  
 If (G)≠0 then PSD = 0.0265x(L)<sup>-1.37</sup> l/sec/m<sup>2</sup>

Eastwood Catchment

If (G)=0 then PSD = 0.0210 l/sec/m<sup>2</sup>  
 If (G)≠0 then PSD = 0.0210x(L)<sup>-1.37</sup> l/sec/m<sup>2</sup>

\_\_\_\_\_ (J)

**PERMITTED SITE DISCHARGE** (E) x (J) \_\_\_\_\_ x \_\_\_\_\_

**l/s**

### Storage Volume per m<sup>2</sup>

- (K) = 0.0275 m<sup>3</sup>/m<sup>2</sup> for zone 1 or
- (K) = 0.0255 m<sup>3</sup>/m<sup>2</sup> for zone 2 or
- (K) = 0.0300 m<sup>3</sup>/m<sup>2</sup> for Eastwood Catchment

\_\_\_\_\_ (K)

**SITE STORAGE REQUIREMENT** ((E) + (G)) x (K)x(1.2)<sup>\*</sup> \_\_\_\_\_ + \_\_\_\_\_ x \_\_\_\_\_ (x1.2)<sup>\*</sup> \_\_\_\_\_

**Allowance for Rainwater Tank offset** (5000 litre Max, see clause 3.1.8)

- \_\_\_\_\_

**NOTE** \* If OSD is provided in a landscaped surface basin the volume must be increased by 20%

**m<sup>3</sup>**

### OUTLET CONTROL - using a Sharp Edged Orifice Plate

Height Difference between top water level and Centre of Orifice (m) \_\_\_\_\_

\_\_\_\_\_ (H)

**ORIFICE DIAMETER** (mm) =  $21.9 \sqrt{\frac{PSD}{\sqrt{(H)}}}$

**mm**

Should pipe and pit losses be used to control outflow, the calculations are to be attached.

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CITY OF RYDE

ON-SITE STORMWATER DETENTION CERTIFICATION SHEET

Address .....

DA Number .....

Catchment Zone .....

Required Volume .....m<sup>3</sup>

Permissible Site Discharge .....l/sec

Type of System

Tank

Description Rainwater tank, concrete
Drainage Cell, Brick or block wall
Other .....

Dimensions Length .....m Width ..... m
Depth ..... m

If over 1 m deep are step irons provided yes/no
Access to tank grate lid other .....
(can it be easily lifted) ..... yes/no
Adequate grade on base
of tank to drain to outlet ..... yes/no

Actual Volume Attained .....m<sup>3</sup>

Overflow type: Pipe Weir Surface grate
Where is it directed.....

Outlet Stainless Steel orifice .....mm dia

Control Galvanised plate orifice.....mm dia
Other .....mm dia

Depth from centre of orifice to overflow.....mm

Outflow Attained .....l/sec

Outlet Pipe: Where is it directed, kerb, pipe
Other.....

Is connection in accordance with Council

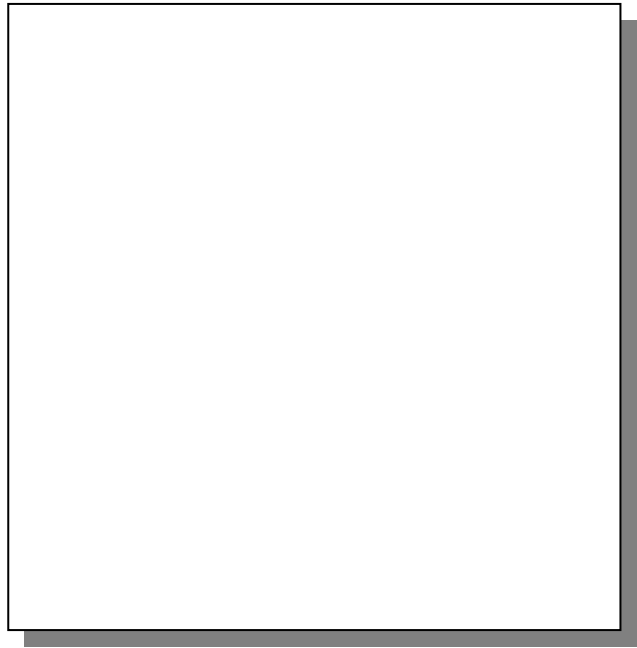
Requirements ..... yes/no

Surface Basin

Description, Grassed, Landscaped, Paved,
Retaining walls:- sleeper, brick, pine log, fill
Other .....

Average length .....m Av Width .....m
Average Depth .....m Max Depth .....m

Has adequate fencing been provided yes/no



LOCATION SKETCH

Debris Screen Maximesh Is a handle provided yes/no
Other..... Is it readily removable without tools yes/no

Is screen fitted exclusively over outlet yes/no

Silt Trap Dimensions Wide .....mm; Long .....mm Deep .....mm Weepholes yes/no

Has subsoil drainage been provided to outlet line ..... yes/no

Is there any uncontrolled flow from the impervious areas on the site . yes/no if yes .....m<sup>2</sup>
Can access be easily gained to the system for inspection purposes yes/no

COMMENTS .....

I HEREBY CERTIFY THE ABOVE ON-SITE DETENTION STORAGE FACILITY HAS BEEN
CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS

NAME :.....SIGNATURE. :.....DATE .....



# City of Ryde

## On-Site Stormwater Detention (OSD) Checklist

This form is to be used to determine if OSD will be required for residential developments and must be completed and submitted with any Application. Please read the reverse side of this form carefully.

**Part A. Address and type of proposed development**

Street No ..... Street Name ..... Suburb.....

Lot..... SP/DP.....

Type of development (tick relevant box)

- |  |  |                                      |
|--|--|--------------------------------------|
| <input type="checkbox"/> Single Residential Building # | <input type="checkbox"/> Extensions    | <input type="checkbox"/> Garage      |
| <input type="checkbox"/> Duplex Residential Building # | <input type="checkbox"/> Swimming Pool | <input type="checkbox"/> Other ..... |

**Part B. Possible Exemption for discharge directly to Parramatta and Lane Cove Rivers**

Is the site within the designated exclusion zone along the foreshore of the Parramatta or Lane Cove River?

- No  Yes (Please check with Council)

If yes, OSD may not be required. If No, go to part C

**Part C. Possible Exemption for Inundation Affected Areas**

Is the site of the development located totally within an established 100 year inundation path and the site also subject to inundation in lesser storm events? (tick one only)

- No  Yes (Please check with Council)

If yes, OSD may not be required. If No, go to part D

**Part D. Possible Exemption for minimum allowable size of site impervious area**

Refer to the back of this page for definitions and explanations.

- |   |                |
|---|----------------|
| (a) Site Area .....   | m <sup>2</sup> |
| (b) Existing Impervious area to be removed (see note over, only applicable for small extensions)..... | m <sup>2</sup> |
| (c.) Existing impervious area to be retained .....  | m <sup>2</sup> |
| (d) Proposed new impervious area:   |                |
| (d1) Roof area .....  | m <sup>2</sup> |
| (d2) Driveways .....  | m <sup>2</sup> |
| (d3) Other paved area .....   | m <sup>2</sup> |
| (d4) Supplementary areas .....  | m <sup>2</sup> |
| (e) Total proposed NEW impervious area (d1) + (d2) + (d3) + (d4) - (b) = .....                        | m <sup>2</sup> |
| (f) Total post development impervious area (c) + (d1) + (d2) + (d3) + (d4) = .....                    | m <sup>2</sup> |
| (g) Post development impervious area (f) x 100/(a) = .....  | %              |

OSD may not be required if one or more of the following are satisfied,

- (g) is less than 35% of site area  
 (d) is less than 80 m<sup>2</sup> increase in site cover  
 (e) is less than or equal to (b)+ (c) i.e. the existing site cover.

However OSD will generally be required in cases where there is any increase in the site cover and the impervious area of a site is greater than 65% of the total site area

**Part E Special consideration**

Where the applicant believes that special consideration should be given for exemption from OSD, even though Parts A, B, C, or D are not satisfied, they may request exemption from OSD under Special Consideration. Consideration will only be given on reasonable grounds that demonstrate the site will not increase or overload the existing drainage system in accordance with Council's Stormwater Management Development Control Plan.

**Notes:**

Developments which are generally covered by this form are extensions to single dwelling residential buildings and works which involve driveways and hardstand areas, or the construction of garages, outbuildings and swimming pools. New single occupancy, dual occupancy, commercial and multiple occupancy developments generally are not exempt from OSD. However concessions may be given for exemption where it can be proven that the receiving drainage system is not adversely affected.

# Generally these developments are not exempt from OSD requirements.

**Definitions**

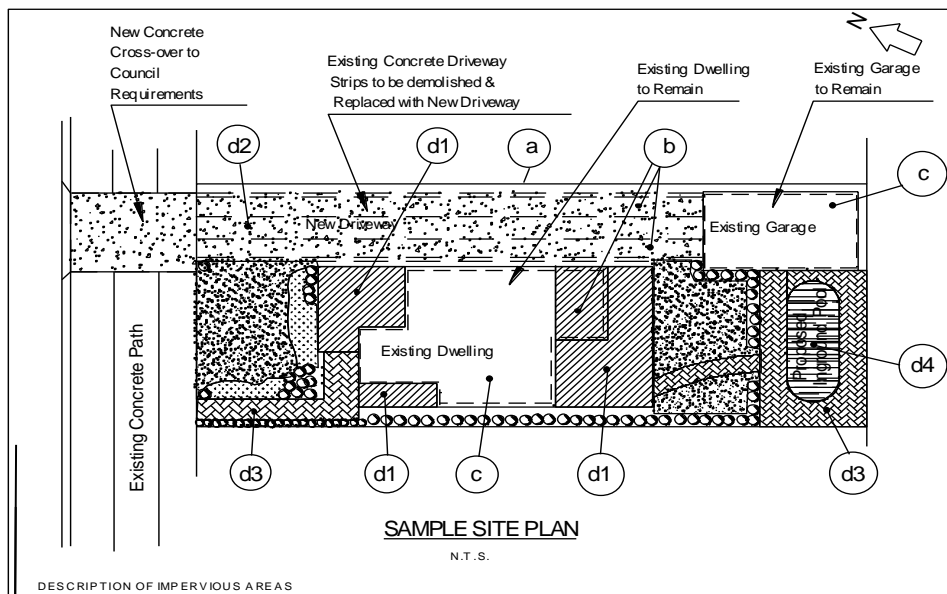
**Site Area:** This is the total area of the site for which the development is proposed. For residential developments, the total site area is taken to be the area shown on the Deposited Plan (DP). Where the site for the development is proposed is significantly large, that is, where the site area exceeds 1200m<sup>2</sup>, and where the proposed development on that site is only a small proportion of the overall site area (less than 35%), the site area to be considered shall be calculated as the footprint of the proposed development.

**Existing impervious area:** This refers to all of the impervious areas within the site of the development, prior to any proposed works. This includes, calculated in plan view, all of the existing roofed areas, paved surfaces, hardstand areas, garages swimming pools and outbuildings as indicated on the plan below.

**Existing impervious area to be removed:** Where a dwelling or other structure is totally demolished, the area removed is not included or allowed for in calculations for site cover. **This is only included for calculation purposes for small extensions.**

**Existing impervious areas to be retained:** This refers to the existing impervious areas of the site which will not be removed or demolished as part of the proposed works but will remain after the proposed works have been carried out. If a building is to be altered internally, that is, works involving only the removal /demolition of internal non-structural members/walls within the footprint of the building, then the retained impervious area shall be calculated as the total area of the building.

**Proposed impervious area:** This includes all new impervious areas created as part of the proposed development and includes, calculated in plan view, all proposed roofed, paved, garages, outbuildings, hardstand areas and supplementary areas ( e.g. in-ground swimming pools) etc. This does not include internal alterations as referred to in 'Existing impervious areas to be retained'. Internal alterations, as defined above, will not be considered as *proposed impervious area*



**Post-development impervious area:** This includes all of the impervious areas within the site which are to remain after the development is completed, that is, the finished works, and includes all of the *retained, existing and proposed impervious area*.