Part 3 Stormwater Quantity, Quality and Floodplain Management

This section outlines the stormwater quality objectives that developments must achieve within the Ipswich local government area for:

i. stormwater quantity management;
ii. stormwater quality management; and
iii. flood and floodplain management.

3.1 Stormwater Quantity Management

Development must provide on-site appropriate detention measures to achieve the following at the boundary of the development site:

a. no increase in peak flow rates from the development site for all events up to the PMF;
b. no increase in peak velocities; and
c. no external impact either from redirection and/or concentration of flows.

Where online detention is proposed, pre and post-development comparison must be carried out for all events up to the DFE starting from the local catchment critical duration to the upstream contributing catchment critical duration to ensure the performance of online detention basin.

For small-scale development, any alternative stormwater quantity management strategy needs to be consulted and agreed with Council.

3.2 Stormwater Quality Management

Developments must satisfy or exceed the following design objectives for stormwater quality by limiting the quantity (load) of stormwater pollutants discharged into the receiving water from development:

a. Gross pollutants (>5 mm) – 90% reduction in mean annual load;
b. Total suspended solids (TSS) – 80% reduction in mean annual load;
c. Total phosphorus (TP) – 60% reduction in mean annual load; and
d. Total nitrogen (TN) – 45% reduction in mean annual load.

The design of all stormwater treatment devices must be undertaken in accordance with Council's Standard Drawings, *Healthy Waterways* (2006 or current version) *Water Sensitive Urban Design – Technical Guidelines for South East Queensland* or in the case of bio-retention systems the Water by Design (2012) *Bioretention Technical Design Guidelines*. Design calculation summaries, design checklists and conceptual design drawings must be provided.

Proprietary stormwater treatment devices may be approved for use in private property applications where these devices are endorsed through SQIDEP protocol.

Proprietary products will not be accepted in cases where stormwater infrastructure is to be dedicated to Council.

Stormwater Quality Treatment Design Requirements

The following requirements apply for stormwater quality management within the Ipswich local government area where development meets or exceeds the thresholds outlined in Table 3.1:

a. Private treatment devices may be approved in circumstances where improvements in water quality can be achieved when compared to alternatives. Where private treatment is used, any proprietary products are endorsed through SQIDEP protocol.
b. A Municipal treatment device (infrastructure to be dedicated to Council) does not include proprietary products.
c. Developer Contributed Assets
   Stormwater treatment measures should not be located in unlined waterways with a stream order of 1 to 8 (based on South East Queensland Healthy Waterways' mapping) including declared riparian corridors. Additionally, treatment areas should be positioned to satisfy the following assessment criteria:
   - duration of complete vegetation inundation for the critical 5% AEP storm event must be less than seven days;
   - duration for inundation of the surface of bio-retention filter media by the critical 1 Exceedance per Year (EY) storm event must be less than two days; and
   - where bio-retention basin is proposed within a large 'regional or sub-regional' scale, open channel or retardation basin, the surface of bio-retention filter media must be above the peak 1 year AEP flood level; Velocities over the bio-retention area for all storm events up to and including peak 5% AEP must be less than 1m/s. For storm events with AEP greater than 5% and up to 1%, velocities over the bio-retention area must be less than 2m/s;
d. Gross Pollutant Pre-treatment
   Any stormwater discharge pipe that is greater than 525mm diameter must have some form of suitable above-ground Gross Pollutant Trap (GPT) eg trash rack, with sediment forebay which incorporates the provision of a constructed maintenance access track and hardstand area;
   Note: Where upstream catchments contain sufficient gross pollutant and coarse sediment treatment measures, the Gross Pollutant Trap may not be required.

e. Maintenance Access
Maintenance access tracks and hardstand areas (including ramp to bio-basin base where access into the bio-basin is required) must extend from the street to the device and must have a minimum width of 4m with longitudinal grade maximum of 1V:6H, be constructed from reinforced concrete, have a hardstand area with a maximum slope of 1V:10H and suitable bearing capacity to support standard maintenance machinery (eg excavator, vacuum truck). Where a minor gross pollutant pre-treatment is provided (ie pipe discharge <=525mm) in conjunction with a stormwater treatment measure, a free-draining reinforced turf access (eg grassed gravel track) extending from the street to the concrete access ramp to the device must be provided for maintenance access with a maximum 1:6 grade;

f. Batter Slopes
The following minimum requirements must be satisfied in relation to batter slopes for stormwater quality treatment measures with either permanent water or extended detention (including sedimentation basins or forebays, wetlands and bio-retention systems):
   i. for water depths (including permanent water and extended detention depths) greater than 150mm and maximum slope of 1V:5H or less, no fencing is required. This maximum slope should extend at least 3m (horizontally) from the extended detention level (away from the measure) and/or at least 3m (horizontally) from the permanent water edge (towards the device invert); and
   ii. for water depths (including permanent water and extended detention depths) greater than 150mm and maximum slope > 1V:5H, fencing is required.

Table 3.1 — Thresholds for Stormwater Quality Management

Development Type	Threshold
Material change of use for urban purposes	a. Includes newly constructed road (previously unformed road) exceeding 30m in total length(1). b. Greater than 2500m^2 of land(2). c. 6 or more additional dwellings (attached or unattached). d. Located within an identified sensitive receiver area. e. Consists of 300m^2 or more uncovered(3) impervious car park area including parking bays and circulation driveways for high pollutant generators such as Business Use - Fast Food Premises and Business Use - Service Station. f. Consists of 600m^2 or more uncovered(3) impervious car park area including parking bays and circulation driveways for all other uses.
Reconfiguration of a lot for urban purposes	a. Includes newly constructed road exceeding 30m in total length(1). b. Would result in 6 or more residential allotments or that provides for 6 or more dwellings. c. Involves greater than 2500m^2 of land(2) and will result in six or more lots. d. Located within an identified sensitive receiver area. e. Is associated with operational work disturbing greater than 2500m^2 of land(2).
Operational works for urban purposes	a. Disturbing greater than 2500m^2 of land. b. Located within an identified sensitive receiver area.

Note:
1. Where a terminating road with no potential for further extension.
2. Where Land means areas to be disturbed as well as the balance area.
3. A carpark is deemed covered where the carpark is integral to a permanent structure (for example a basement carpark) and not directly exposed to rainfall or runoff. Covered carpark excludes semi-permanent shade type structures.

Voluntary Stormwater Quality Offset Payment

For small-scale redevelopment sites (up to 2500m^2) excluding any sensitive receiving water environment, Council may consider a voluntary payment in lieu of providing nutrient on-site water quality treatment. The voluntary payment is to be calculated based on the charge rate per square metre of water quality treatment area (bio-retention filter area) that would otherwise be required by the development.

The bio-retention filter area is to be determined in accordance with Table 3.2. The voluntary payment rate is as specified in Council's Register of General Charges. Where a voluntary payment is elected to be made the management of gross pollutants in accordance with this policy will also be required for the development.

Note: Further guidance on the circumstances for acceptance of payment in lieu of works (and voluntary stormwater quality offsets) can be found in Guideline XX Voluntary payments in lieu of works.

Table 3.2 — Filter Area Determination Percentages for Residential Development

Proposed Residential Density (dwellings/ha)	Percentage of Contributing Catchment
Large Lot Residential	0.25%

Less than 15 (excluding large lot)	0.8%
15 to < 20	1.0%
20	1.1%
>20 to < 40	Range between 1.1 to 1.5%(1)
> 40	1.5%

Note[1] Linear interpolation is to be used to establish the percentage.

Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Modelling and Reporting

Model for Urban Stormwater Improvement Conceptualisation (MUSIC) models where required as a component of the Stormwater Management Plan (SMP) must be undertaken and prepared in accordance with Water by Design MUSIC Modelling Guidelines as applied to Ipswich local government area, unless otherwise specifically stated as follows:

a. Infiltration Systems
   The infiltration node must be used for non-vegetated infiltration systems. Any proposed vegetated 'infiltration system' must be modelled as bio-retention systems with a maximum filter depth of 2m (or less if groundwater is anticipated at shallower depths), with filter media properties representative of measured soil conditions (either in-situ or imported) at the site of the proposed infiltration system;
b. Gross Pollutant Traps
   Council will only support removal efficiencies (up to the predicted design flow-rate for the GPT, which is typically the Q3-month peak flow rate) of:
   i. 90% for gross pollutants (ie input 100, output 10);
   ii. 10% for total suspended solids (ie input 100, output 90);
   iii. 0% removal for total nitrogen; and
   iv. 20% total phosphorus.
   Council will only accept pollutant load removal rates above the values stipulated within the GPT node where the GPT has undergone the "Evaluation Protocol for Stormwater Quality Treatment Devices" (SQIDEP)) and gained a Verification Certificate from Stormwater Australia.,
   Unless information is available that is likely to be more accurate than the cost estimates provided within MUSIC, 'expected values' should be used for acquisition, annual maintenance, annualised renewal and decommissioning costs;
c. Life Cycle Costing
   Unless information is available that is likely to be more accurate than the cost estimates provided within MUSIC, 'expected values' should be used for acquisition, annual maintenance, annualised renewal and decommissioning costs;
d. Non Structural Measures
   MUSIC modelling must assume that non-structural measures (eg education, signage) will not result in any reduction in pollutant loads.

3.3 Flood and Floodplain Management

Flood impact assessment is required where the proposed development is constrained by flood prone land and urban catchment flow paths (refer Planning Scheme Map OV12).

Council's policy on floodplain development is that no earthworks shall occur within the 5% AEP flood extents unless directly related to riparian rehabilitation or approved prescribed tidal works. Compensatory earthworks may be acceptable between the 5% AEP event and the Adopted Flood Regulation Line, however, modelling is required to determine the likely flood impacts including flood storage. Where no information is currently available regarding these extents, modelling shall be undertaken. Where there is a risk of loss of life and/or significant damage to property and infrastructure, the Probable Maximum Flood (PMF) shall also be modelled.

Where works are proposed as part of any development proposal within the floodplain must demonstrate 'no adverse impact' considering no loss of floodplain storage. It is expected that a wide range of AEP's and storm durations flood modelling would be required to ensure no external impacts resulting from the proposed cut/fill on the subject site. The developer must provide details of the proposed earthworks used in the flood modelling in relation to the proposed development works including cut/fill depths, batter slopes, retaining wall heights and typical cross-sections.

To ensure sustainable development works within the floodplain the a minimum of the following requirements must be satisfied:
• no loss of flood plain storage;
• no increase in flood levels for all events up to 1% AEP;
• minimise flood hazard and flood risk;
• no negative impact due to any increase in peak flood velocities;
• no morphological impact resulting from flow characteristic changes;

Written consent from any affected owners should also be submitted to Council for consideration should there be an adverse impact from the proposed development works.

Placement of fill (including structures such as levees or basins) within a floodway or within flood storage areas will not generally

be accepted.

Flood Evacuation and Emergency Management Plan

Any development subject to flood inundation during regional and/or local catchment flooding must provide an independent flood evacuation and risk management plan to mitigate any flood risk/damage identifying, as a minimum, the following:

- flood warning mechanism;
- necessary refuge area within or outside of the development;
- critical evacuation route(s) if no flood free access is available;
- owner/body corporate responsibilities;
- communication strategy; and
- specific design requirements.

3.4 Municipal Detention and Retention Basins Design Requirements

Detention or retention basins should generally be designed and constructed in accordance with *Queensland Urban Drainage Manual (QUDM)* excepting:

a. batters shall not exceed 1 in 4 unless otherwise agreed by Council;
b. woody vegetation (trees and shrubs) planting on water retaining embankments is not permitted;
c. a maximum of 1m earth retaining structure is allowed for difficult sites;
d. incorporation of 4m wide concrete maintenance access strip extending between the road pavement and either the trash rack/inlet sediment forebay or a screened outlet structure;
e. the basin floor shall have a minimum 1.5% fall from inlet to outlet or includes the provision of a low flow capture system such as an invert sub-drainage infiltration system coupled with collection pipes. Notwithstanding the floor grade, the immediate area surrounding the outlet shall include the provision of a low flow capture and disposal system;
f. a basin length/width ratio within desired range of 3 to 10;
g. basins must be modelled to determine performance over the full spectrum of possible flooding events up to 1% AEP event. This modelling must check for sensitivities to parameter selection and consequences.

3.5 Other Considerations

3.5.1 Asset Handover

Stormwater treatment infrastructure handover to Council must be in accordance with 'Transferring Ownership of Vegetated Assets' (if the asset is not to be handed over to Council, to the party responsible for the ongoing maintenance of the device).

As a minimum, the following information must be provided to Council (or, if the asset is not to be handed over to Council, the party responsible for the ongoing maintenance of the device) for all stormwater treatment measures prior to 'Off Maintenance' inspections:

a. as-constructed information, ie drawings and digital models;
b. certification letter stating that (if correct) the given stormwater treatment measure has been constructed in accordance with the approved design drawings;
c. completed 'Asset Transfer Checklists' as included in Healthy Waterways (2006 or current version). If an item receives an 'N' (or 'No') in satisfactory criteria then appropriate actions must be specified and delivered to rectify the issue before final inspection sign-off is given;
d. maintenance plans and records of maintenance performance;
e. copies of all required permits (both constructional and operational);
f. proprietary information (if applicable); and
g. digital files (eg location plan, other drawings, survey, models).

3.5.2 Waterway Considerations

The importance of maintaining natural flow paths is fundamental to flood plain management and should be preserved. Where open artificial channels are proposed these must be designed and constructed in accordance with Ipswich City Council Waterway and Channel Rehabilitation Guidelines and *QUDM.*

The following specific methodology applies to any hydraulic waterway design undertaken for projects within the Ipswich local government area:

a. Flood Celerity
   The reconstruction of a waterway must not affect the flood celerity to the detriment of upstream or downstream sections of the watercourse.
b. Staged Channel Construction
   Construction of new channels or the reconstruction of existing channels should incorporate the principals outlined in QUDM and Ipswich City Council Waterway and Channel Rehabilitation Guidelines. This should be aligned with phases and timing determined through the development process.
c. Earth Retaining Structures
   Such structures are not preferred adjacent to waterways, but where accepted must, amongst other matters, be designed as

a structural wall (excluding gravity type structures) capable of withstanding flood (including rapid drawdown), debris and lateral earth loading and include wall toe scour protection.

d. Riparian Vegetation Considerations
Riparian corridor space as defined by the Waterway Health Strategy, is to be rehabilitated/revegetated in accordance with the Ipswich City Council Riparian Corridor Revegetation Guideline. It must be noted that this guideline does not override the planning scheme requirement for provisions of riparian vegetation to a prescribed width on either side of a waterway. Areas retained for stormwater treatment devices must be detailed and it must be demonstrated that stormwater treatment areas are external to the required Riparian Corridor.

3.5.3 Erosion and Sediment Control Plan

During the construction phase, the Consultant should have inspection systems in place to ensure that the works are constructed in accordance with the approved Engineering Drawings and Specifications. The 'Concept Erosion and Sediment Control Plan' and 'Construction and Establishment Plan' documented in the SMP must be implemented and adhered to. Erosion and sediment control plans are to be designed and implemented in accordance with *International Erosion Control Association (IECA) standards and SC6.2 Part 5 – Earthworks.*

3.5.4 Qualified Persons

Any SMPs or FMPs must be prepared and reviewed by a suitably qualified person for engineering aspects is defined as someone having status as a Registered Professional Engineer of Queensland (RPEQ) and has relevant experience and knowledge.

3.6 Booval On-site Detention Strategy

General

The Booval On-site Detention Strategy (OSD Strategy) provides for the mitigation of potential stormwater and flooding impacts arising from intensification and infill residential development in the Booval catchment.

The OSD Strategy objectives are to:
- reduce the need for the preparation and lodgement of individual stormwater management plans for each development application;
- provide a coordinated catchment scale on-site detention strategy for Medium Density Residential development consistent with QUDM;
- ensure the existing stormwater network and urban catchment flow path capacities are maintained; and
- improve flooding outcomes and efficiencies in the catchment.

Booval Catchment

The Booval catchment is approximately 200 hectares, of which the combined medium density residential areas represent approximately 56 hectares (28%) of the total catchment.
The upper Booval catchment has two distinct parallel urban catchment flow paths to the east and west, which merge downstream of the railway line. The catchment generally flows in a north/north easterly direction before joining Bundamba Creek.

Booval On-site Detention Strategy

a. OSD Strategy Application
The OSD Strategy applies to all Material Change of Use (MCU) applications in the Booval catchment proposing medium density residential development (MD development) on a site of 2,500m^2 or less in the Medium Density Residential Zone or the Character Mixed Density Zone that results in additional impervious area (refer to Figure 2 – Booval Catchment and Applicable Land).
The OSD strategy is designed to mitigate the 1 and 2 year AEP events to pre-development levels.
For medium density residential development on a site greater than 2,500 m^2, a separate stormwater management plan (SMP) is required to be provided.
This SMP is required to detail a detention scheme that demonstrates catchment wide non-worsening of stormwater management and flooding.
Council may request that non-worsening be demonstrated at locations of interest for a range of AEP's and durations consistent with QUDM.

b. OSD Strategy Requirements
On-site stormwater detention details are required to be provided with each applicable MCU application consistent with this section.
The applicant must determine the required minimum detention volume using the Volume / Discharge Equation (refer clause 3.11(4). The applicant must also demonstrate that the proposed OSD arrangement provides the corresponding storage / discharge relationship consistent with Figure 3 – Volume / Discharge Requirements.
It is recognised that it may not be possible to exactly match the storage / discharge curves and a tolerance of 10% for flows may be used in determining compliance with this OSD strategy. The selection of a detention system type will be at the engineer(s) discretion as identified in Note 3.11.

The OSD strategy assumes 80% of the site runoff is captured by on-site detention. Where a smaller fraction is captured, the storage is required to be increased to account for the difference in accordance with the Volume / Discharge Equation.
The minimum capture rate permissible is 60%.
Stormwater management of medium density residential development on a site greater than 2,500 m^2 should also use the catchment scale critical storm duration of 60 minutes as adopted in the Booval Catchment Study, rather than using on-site critical duration. The SMP for such development will also need to consider other durations as required by Council, consistent with QUDM.

c. OSD Strategy Design
The required storage volume and outlet configuration for applicable medium density residential development (with allowance for capture rates and existing case impervious fraction) is to be calculated using the Volume / Discharge Equation.
The design details are to be provided as supporting information with each applicable MCU application consistent with the Volume / Discharge Equation.

Volume / Discharge Equation

$$OSD\ Volume\ Requirement\ (m^3) = A \times B \times Site\ Area\ (m^2) \times 0.024$$

Where *A* is the correction for low rates of capture and is given by:

$$A = \frac{80\%}{Capture\ Percentage}$$

and, *B* is the correction for varying existing case of impervious fraction and is given by:

$$B = \frac{(90\% - Impervious\ percentage\ for\ Existing\ Case)}{55\%}$$

Note 3.11B:
1. Variable A is to have a maximum value of 1.

Figure 1 Booval Catchment and Applicable Land

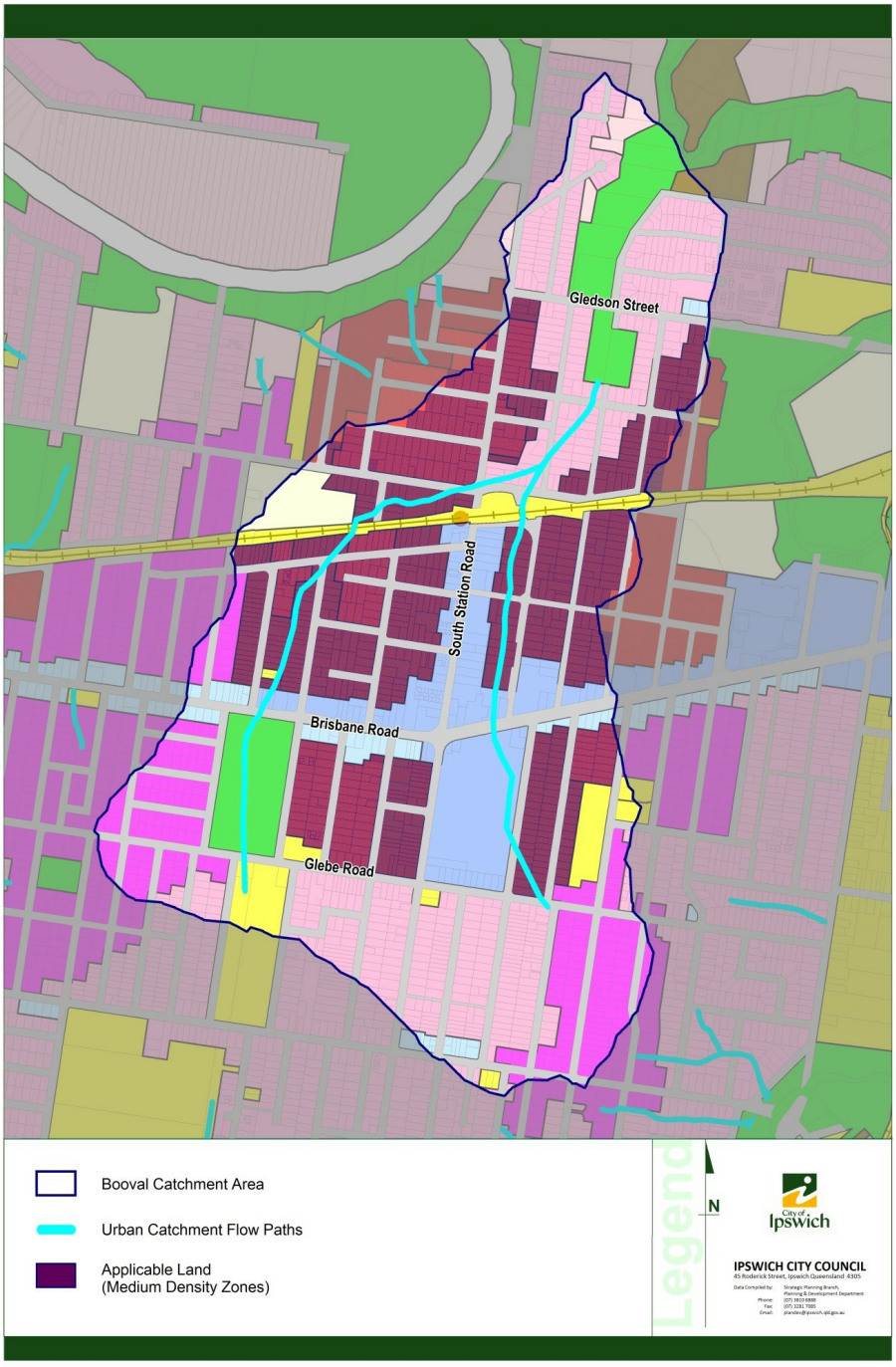
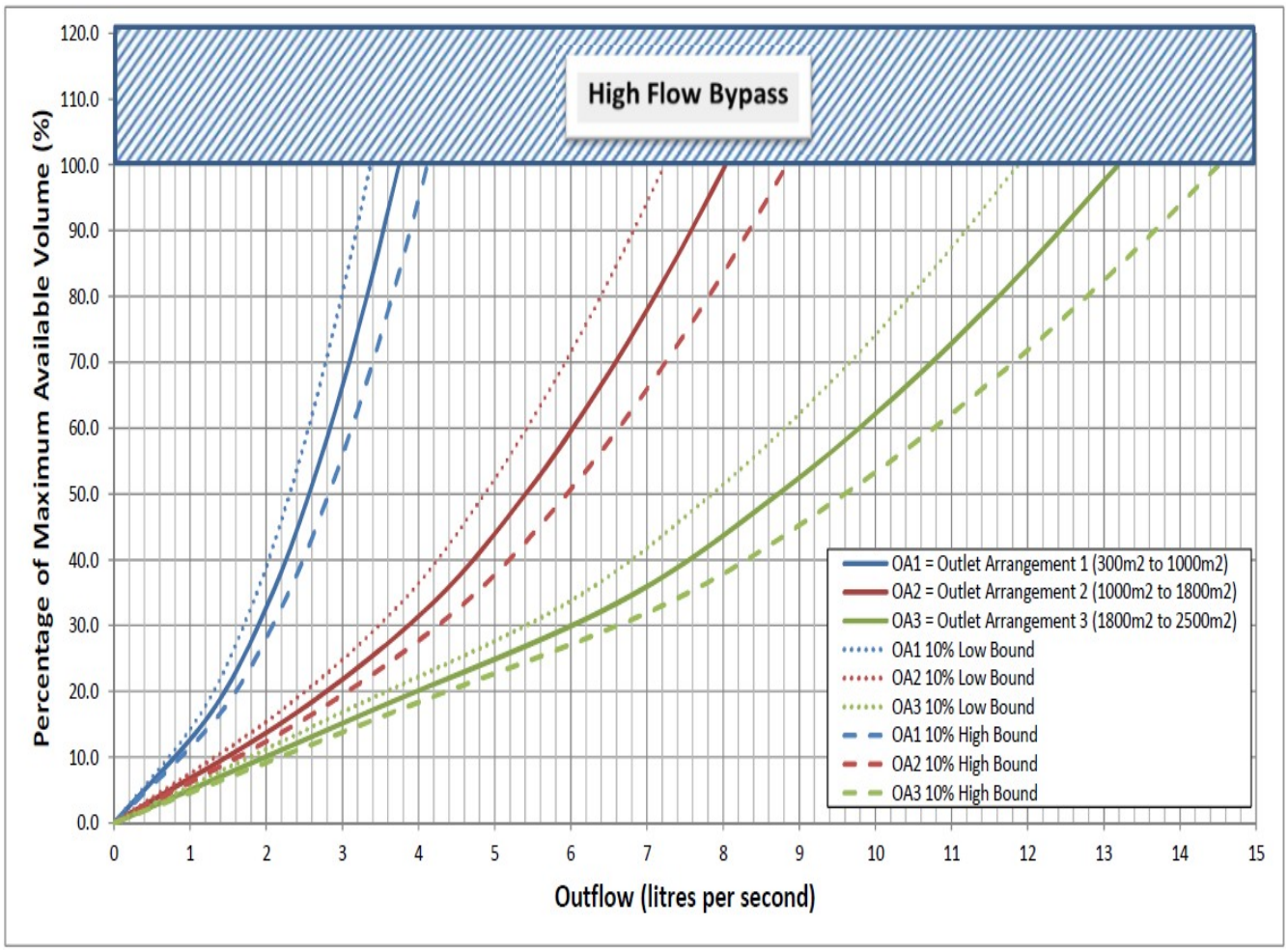


Figure 2 Volume / Discharge Requirements



You have reached the end of the page.