

Policy 11: Land Development Guidelines

Section 8

8.0 Engineering Drawings and Document Presentation

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8.1 Introduction

These Guidelines indicate the minimum standards required for the submission of Engineering Drawings and associated documentation for Council approval.

It is anticipated that compliance with the Guidelines will save considerable time to Consultants and Council staff. In addition it is envisaged that it will assist in the implementation of procedures to be installed for checking by approved Third Party Certified Consultants.

8.2 Engineering Drawings and Document Presentation

8.2.1 General Requirements

Consultants are expected to have systems in place to adequately assure the quality of Engineering Drawings, random reports, and documents that they produce. Council will only carry out checks to ensure that the design presented broadly conforms with Council's Standards. It is not necessarily a compliance check of calculations and all Engineering Drawings.

Note: *In keeping with the above aim, the Consultant shall complete the Engineering Drawings Application Checklist (refer Appendix A) and take full responsibility for errors and omissions in the Design Drawings submitted.*

8.2.2 Survey Control

All Survey for the Development shall be based on the **Australian Map Grid (AMG)** and **Australian Height Datum (AHD)**.

All reduced levels shall be related to Council's **Permanent Survey Marks (PSM)**. The value of the **PSM** should be obtained from Council and/or Department of Lands. Attention is drawn to the **Standard Electronic Format for As Constructed Data – Jan 1995 – Survey Control Network p17**.

It is Council's policy that the Developer's Registered Surveyor use the Council coordinate/ level system at the start of the sub divisional design process.

8.2.3 Engineering Drawings

Engineering Drawings prepared by the Consultant shall be submitted for all earthworks, roadworks, stormwater drainage (including inter-allotment drainage), water supply, sewerage reticulation and other works associated with the Development. Generally, Drawings will consist of the following:

a) Earthworks, Roadworks and Stormwater Drainage

- Locality Plan;
- Subdivision Layout/ Staging Plan and North Point;
- Earthworks Plan;
- Roadworks and Drainage Plan;
- Longitudinal Section of each Road;
- Typical Road Cross-Sections;
- Bridges as Major Culvert Structures (where applicable);
- Cross-Sections of each Road;
- Details of all Intersection Gradings;
- Longitudinal Section and HGL of each drain line;
- Inter-allotment Drainage Details;
- Landscape Plan – if required;
- Drainage Calculations, and Catchment Plan;
- Sediment and Erosion Control Plan.

b) Water Reticulation

- Water Reticulation Plan;
- pipe size, type and class;
- water main alignments;
- valve, hydrant and other fittings locations;
- longitudinal sections for 300mm mains;
- water supply pump station details;
- minor reservoir details;
- live connection requirements and associated details;
- conduits;
- property services and location of reticulation mains connection point;
- easement location.

c) Sewerage Reticulation

- Sewer Reticulation Plan;
- pipe size, type and class;
- sewer main alignments;
- manhole locations, type, drop and lid type;
- house connection type and level;
- longitudinal sections of each line;
- sewer pump station details;
- live connection requirements and associated details;
- equivalent populations, flow and design capacity;
- easement location.

d) Road Bridge and Major Culvert Structures

- borehole locations and logs with design parameters;
- serviceability flood, velocity and level, existing ground or riverbed profile, allowable excavation or scour depths at each pier and abutment;
- serviceability wind speed, design traffic loading and design dead loads on deck;
- design bearing pressures and pipe capacities;
- design maximum and minimum temperatures;
- exposure classification of the structure;
- replacement or repair procedures for elements, which have theoretical life less than 100 years.

Note: *The above details shall include the maintenance requirements of the structure and form part of the drawing submissions.*

e) Street Lighting and Electrical Reticulation

- street lighting and electrical reticulation plan;
- demonstrate that services (including pillars) do not conflict.

Note: *A separate layout plan is required as part of the application submission, indicating all services as indicated above.*

f) Waterfront Development

- locality plan and lot description;
- typical cross sections of the waterway profile showing HAT, MHWS, MLWS, LAT, and 100 year ARI Flood Level where appropriate;
- plan view of the lot layout showing waterfront building setback line, waterway regulation line and quay line;
- plan view, elevations and sectional details for any structural revetment walls (concrete or rock protection);
- plan view of the waterway layout showing existing riparian vegetation and proposed soft foreshore treatments, which were identified in any impact assessment statements;
- details associated with maintaining flood conveyance and flood storage within the waterway in accordance with any relevant hydraulic flooding reports.

Note: *The Consultant's attention is drawn to Council's Standard Drawing N° 03-04-004 where additional Council requirements are shown for waterway development. This standard drawing will also assist in providing guidance to Consultants for preparation of engineering drawings related to submission of details listed above.*

8.2.4 Checking of Drawings Prior to Submission

All Engineering Drawings submitted to Council for approval shall be checked and signed by the Consultant. Council does not provide a comprehensive checking service for checking Drawings in detail and it is the Consultant's responsibility through its Quality Assurance procedures to ensure that Drawings are in accordance with State Government and Council's Standards, Acts, By-Laws and Regulations.

8.2.5 Engineering Drawing – Application Checklist

The **Engineering Drawing – Application Checklist** (refer **Appendix A**) shall be completed and included in the original submission. This checklist summarises Council's minimum requirements. It is intended that this checklist will assist in the preparation of the required Engineering Drawings.

8.2.6 Design Calculations

Council requires that the Consultant's Engineering Design be fully documented and include appropriate calculations to allow interpretation of the design decisions.

Generally, calculations will include:

- Stormwater Drainage Calculations as established in **Section 3.5 – Design Requirements – Stormwater Drainage** of these Guidelines (including any computer software output);
- any structures associated with the Development;
- Water Supply or Sewerage Pump Stations;
- Water Reservoir;
- water quality;
- flood conveyance and storage calculations where required.

8.2.7 Submission of Engineering Drawings/ Job Specification

Engineering Drawings/ Job Specification shall be lodged with Council and include:

- i) **Engineering Drawing Application Checklist Form** fully completed (refer **Appendix A**);
- ii) **Application for Approval of Engineering Drawings For Subdivision Works Form** fully completed (refer **Appendix B**);
- iii) Two (2) copies of each Engineering Drawing and one (1) copy of the Job Specification. The Engineering Drawings should be one A1 size and one A3 size;
- iv) Any relevant supporting documentation;
- v) Details of any non-conforming design and reasons for proposing its use;
- vi) Live connection design details for water supply and sewer reticulation. The details shall be sufficient to enable early costing by Council for the connection.

Note: *In accordance with the Integrated Planning Act, an Operational Works Application Form fully completed shall be submitted with the above.*

8.2.8 Re-Submission of Engineering Drawings and Job Specification

Where Engineering Drawings and/or Job Specification are **Not Approved**, they require re-submission, which shall include:

- i) Covering letter quoting Council's file reference and reference to previous submission;
- ii) Two (2) copies of each Amended Engineering Drawing and one (1) copy of the Amended Job Specification with amendments clearly identified. The Engineering Drawing size shall comply with **Section 8.2.7 iii**);
- iii) Any relevant supporting documentation;
- iv) Details of any non-conforming design and reasons for proposing its use;
- v) Relevant fees paid.

8.2.9 Approvals Subject to Amendments

Where Engineering Drawings and/or Job Specification are **Approved Subject to Minor Amendments**, Council may request the following:

- i) Two (2) copies of each amended Engineering Drawing with amendments clearly identified. The Engineering Drawing size shall comply with **Section 8.2.7 iii**);
- ii) Any relevant supporting documents.

8.2.10 Approved Engineering Drawings

Following the stamping by Council of the Engineering Drawings as approved, one (1) copy will be retained by Council and one (1) copy forwarded to the Consultant.

The only Engineering Drawings to be used for construction shall be those based on the Council stamped and approved copy forwarded to the Consultant.

Council shall provide a quotation for work associated with water supply and sewerage reticulation live connections as detailed on the approved Engineering Drawings. This quotation shall remain firm for 60 days.

8.2.11 Prior to Commencement of Any Site Works

Before Site Works commence the following written approvals from Council shall be obtained:

- i) Approval of the Engineering Drawings/ Job Specification;
- ii) Approval of the Erosion and Sediment Control Management Plan (if required by Council);
- iii) Approval of Vegetation Management Plan (if required by Council) (refer **Appendix C**);
- iv) If applicable, Landscape Plans must have been submitted and approved;
- v) Acceptance of a construction program to minimise environmental impact and in particular environmentally sensitive areas in accordance with **Section 9** of these Guidelines;
- vi) The Developer shall conform to the requirements of **Section 5.0 of Water Resources Commission Sewerage Guidelines** and where necessary be responsible for the submission in Council's name of an application for a licence to discharge sewerage pump station overflows.

8.3 Engineering Report Submissions

8.3.1 General

This section is not intended as an outline of Council's development policies in relation to the submission of engineering reports. However, where development proposals are located in drainage problem areas, flood plain areas and/or steep slopes for example, Council may require that Developers and their Consultants address these matters and present such details in the form of an engineering report for Council's approval.

These reports, if required, would be submitted either as part of the development application and assessment stage, or in response to a condition of development approval. Advice regarding these matters should be sought from a suitably qualified and experienced Consulting Engineer and/or Council.

8.3.2 Hydraulic Reports

Where development proposals involve drainage works, earthworks in floodplains or waterways, and/or construction of canals or marinas, applicants may be required to submit to Council a hydraulic study involving assessment of:

- i) Minimum fill and habitable floor levels required within the site;
- ii) Effects of filling on flood levels external to the site;
- iii) The proposed change in flood storage volume within the site;
- iv) Increases in peak flow rates downstream of the site;
- v) Other effects as required by Council.

Hydraulic reports and associated information detailing the Developer's proposal, should be presented in the form of an hydraulic report, engineering plans, earthworks calculations and certifications as detailed in Council's policy document, **Hydraulic Report Submissions** and submitted by a suitably qualified and experienced Consulting Hydraulic Engineer.

8.3.3 Geotechnical Reports

Where development proposals involve development on steep slopes (greater than 20%) and/or unstable slopes (greater than 15%) or involving bulk earthworks creating steep slopes or retaining structures, applicants may be required to submit to Council a geotechnical report demonstrating that the proposed works:

- do not decrease the safety and structural stability of existing buildings and infrastructure, either within or external to, the site;
- will ensure that the proposed works are safe and comply with all relevant geotechnical policies, codes and standards;
- other objectives as required by Council.

This information should be presented in the form of a report, plans, earthworks calculations and certifications as detailed in Council's policy document **Geotechnical Report Submissions**, and submitted by a suitably qualified and experienced Geotechnical Engineer.

8.3.4 Report Submission – Waterways (Canals, Lakes, Tidal Waters, Creeks, Rivers and Other Waterways)

Where development proposals involve development of waterways, fronting waterways or that may direct impact on the function of a water body, applicants may be required to submit to Council a Waterways Report demonstrating that the proposed works allow for the ongoing sustainability of the water body over the next 120 years. Such detail should be presented in the form of a report including sub plans, calculations and certifications as outlined below and submitted by a suitably qualified and experienced Consulting Hydraulic Engineer.

The following components of the development should be fully described:

- depth of waterways;
- slope of foreshores;
- type and position of foreshore protection (if proposed);
- position and dimensions of access channels (where connection to navigation channels is proposed);
- position of future pontoons, jetties, boat ramps and other foreshore structures (where proposed);
- position of future waterfront dwellings (where proposed);
- acceptable types of construction between waterfront dwellings and water (eg. side fencing, BBQs, pools, podiums, decks, landscaping);
- the position of riparian vegetation (where proposed to be established and/or retained and enhanced).

The report should demonstrate the sustainability of these components in regards to at least the following considerations:

- the conveyance of flood flows;
- the conveyance of tidal flows;
- the maintenance of water quality;
- the stability of foreshores;
- navigation along the waterway;
- equitable mooring of future vessels within the waterway;
- ecology of the waterway and its foreshores;
- conservation of physical processes such as littoral drift of sand along foreshores;
- amenity of the Waterscape (views, etc).

In addition, the report should provide detail for the ongoing sustainability of the water body including documenting the estimates for the water body of at least the following:

- geomorphologic evolution of the water body (meandering, etc);
- sea level rise;
- boat wake (consider growth in future boating usage);
- changes to tidal prism;
- increased runoff from catchment;
- wave generation within water body;
- changes to water body due to expected floods and tides over next 120 years;
- littoral systems (changes to supply and sinks);
- midge populations;
- rates of sediment entering and leaving the water body;
- water quality within the water body;
- water levels within the water body;
- impact of water body on other water bodies;
- foreshore usage (swimmers, fishers, walkers).

The report should include the following sub plans when required to demonstrate the overall sustainability of the water body:

- Foreshore Structure Sub Plan;
- Waterway Maintenance Sub Plan;
- Foreshore Protection Sub Plan;
- Waterfront Development Control Sub Plan;
- Riparian Vegetation Sub Plan;
- Water Quality Sub Plan.

8.3.4.1 Foreshore Structure Sub Plan

The simplest form of this sub plan is simply a quay line distance for the outside edge of all future pontoon and jetty structures. With such a description the waterway allocation will be calculated by simply projecting the side boundaries of waterfront property out to the quay line. Some waterway development requires more sophisticated foreshore structure planning to ensure sustainability. In these cases positions for waterway allocation should be more fully described. An example is along a mangrove-lined foreshore typically the positions of future walkways need to be carefully controlled to protect the mangroves along the foreshore. Another example is a proposal to allow battle-axe mooring of vessels. Such complex waterway allocation needs to be fully described and demonstrated to be sustainable. Where locks or other navigation aids are necessary to ensure sustainable vessel access then these elements and their ongoing maintenance should be described in this sub plan.

8.3.4.2 Waterways Maintenance Sub Plan

For some waterways, a future regime of maintenance may be necessary to ensure ongoing sustainability. If the development proposed will impact on the necessary future maintenance for a water body, then a waterways maintenance sub plan should be produced. This sub plan should include a description of what future maintenance activities will be necessary to ensure sustainability. An example of a maintenance activity that might be described by this sub plan would be the dredging of an access channel to ensure continuing navigable depth of -2.5m AHD . The plan should also identify the frequency that these maintenance activities need to be completed, a feasible method of completing the maintenance, the costs of completing these activities and any approvals that will be necessary to allow the maintenance to proceed.

Note: *If it is unlikely that the approval can be achieved in the future for the necessary maintenance, then it will be considered that the proposed development is not sustainable.*

This maintenance sub plan shall deal with all aspects of sustainability of the water body including at least the following:

- continued flood conveyance;
- continued tidal flushing;
- continued navigation access;
- continued foreshore stability;
- continued ecological function.

8.3.4.3 Foreshore Protection Sub Plan

The preferred method of ensuring foreshore sustainability is to provide an adequately sized riparian buffer zone to waterways that will allow natural processes to continue over the next 120 years. For many water bodies such a large buffer zone may not be desirable and so alternate structural revetment or foreshore protection schemes can be proposed. The foreshore protection sub plan should fully describe the method of foreshore protection proposed for every part of the foreshore. Structural revetment walls should be fully described on an engineering drawing and be certified as stable in compliance with Council's foreshore structure policy. Certification of the revetment wall design and construction shall be included. Anchor rods shall not form part of structural revetments.

The foreshore protection sub plan should clearly demonstrate the sustainability of the foreshore protection proposed including consideration of at least the following factors:

- continued flood conveyance;
- continued tidal flushing;
- continued navigation access;
- continued foreshore stability;
- continued ecological function.

8.3.4.4 Waterfront Development Control Sub Plan

The report should clearly identify the position along all waterways impacted by the development of the following:

- Quay Lines;
- Revetment Regulation Line;
- Waterfront Building Setback Line.

On acceptance of the position of these alignments they will be incorporated into the Whole of City waterfront development control maps to ensure future development near this water body continues to comply with the criteria necessary for sustainability demonstrated by this report. The simplest requirements for these lines are as shown on Council's **Standard Drawing N° 03-04-004**. Where different controls on structures are required then what is shown on Council's **Standard Drawing N° 03-04-004** to ensure sustainability then the report shall clearly identify what these requirements are. The report should examine the ability for future regulatory agencies to achieve the necessary controls to demonstrate sustainability. If it is not reasonable for future regulatory agencies to achieve such controls, then it will be considered that this development proposal is unsustainable. Care should be taken to ensure that the waterway development control plan is consistent with the waterways maintenance plan. The report should clearly deal with:

- habitable structures to be built on the landward side of the Waterfront Building setback line;
- landscaping structures such as pools, side fences and BBQs that may be built within the waterfront setback area;
- foreshore structures to be built between the revetment and the quay line.

8.3.4.5 Riparian Vegetation Sub Plan

The retention of foreshore vegetation is strongly encouraged as a method of ensuring sustainability of the foreshore. Where areas of riparian vegetation are proposed as part of the sustainability plan then the position of these areas should be clearly identified. The riparian vegetation plan should deal with areas of riparian vegetation on public, private and unallocated lands. The plan should include an intent statement for the riparian vegetation identifying information about whether the riparian area has been included as a sacrificial zone. The riparian vegetation plan should also include information like list of the acceptable species that can be established into this zone in the future and recommendations of the type of maintenance (if any) that should be undertaken along this zone.

8.3.4.6 Water Quality Sub Plan

Where pipes or mechanical systems are necessary to achieve a sustainable water quality within the water body then the function of these elements should be described in this sub plan. The water quality goals should be clearly outlined and any mechanisms, flow paths or other criteria necessary to achieve the water quality should be described including ongoing maintenance plans for the elements of the water quality control systems (eg. pumps, pipes, weirs, fountains, chemical treatments, mechanical harvesting, dredging, siltation pond desilting). The ongoing costs of any water quality control mechanisms or activities should be identified in the report.