APPENDIX A

ENGINEERING DESIGN PLANS

GUIDELINES FOR THE PREPARATION OF DEVELOPMENT & ENGINEERING DESIGN PLANS

1. PLANS

Plans shall be presented in a professional manner to normal industry standards and generally in accordance with AS1100. Any plan sets submitted to Council shall be clearly marked with an issue/revision number, together with the associated date on each sheet.

DWG files shall be provided to Council. All hardcopy plans shall be presented on A1 drawing size.

2. SCALES

Roads and drainage	1:500 minimum or as required for clarity
Site plans	1:1000 min.
Long sections	1:500 horizontal & 1:100 vertical
Cross sections	1:100 natural or 1:200
Catchment plans	1:1000 or sufficient to cover area and provide clarity
Kerb profiles	1:200 H and 1:20 V

3. DETAILS TO BE SHOWN ON PLANS

The plan set should have the following information:-

- Property description.
- Owner/developer.
- Surveyor/engineer/designer and contact details
- Scale, benchmark and datum.
- Plan number and sheet number (sequential).
- Description of works on each sheet.
- Panel for signature of designated Council officer or Accredited Certifier.
- Plans shall show the location by survey or by service authority plans of all utility services.
- General, or Construction notes must include the following statement:

All works shall be carried out in accordance with the approved plans, subject to Maitland City Council's "Manual of Engineering Standards"

Other notes such as the following are recommended for inclusion.

3.1. SURVEY

All levels shall be obtained from established benchmarks to Australian Height Datum (AHD).

3.2. TRAFFIC

Traffic control measures shall be in accordance with the RMS document "Traffic Control at Worksites"

3.3. TREES

All trees within the allotments and reserves (other than road reserves) shall be retained, unless otherwise nominated by an approved landscape plan.

Removal of trees for the establishment of fire-breaks shall be carried out in consultation with the Fire Control Officer and/or Council's Environmental Officer.

3.4. UTILITIES

Points of conflict between new construction and existing utility service mains shall be identified, exposed and reported to the Project Manager prior to construction.

Service conduits shall be laid in positions as approved by the relevant authority.

3.5. ADJOINING ACCESS

Provision shall be made for suitable protection of the existing road pavement, kerb and gutter and footpath formation.

Vehicular access and all services to adjoining properties affected by construction works, shall be maintained at all times.

3.6. SOIL/GRASS

Topsoil, 150mm thick shall be applied to all footpaths and filled areas. Where turf is not requested, all exposed topsoil shall be seeded immediately upon completion of the soil spreading operation.

A turf strip shall be placed along each side of concrete pathways, drainage structures, driveways, pedestrian/cycleways and at rear of all kerbs.

3.7. EROSION CONTROL

All silt control measures shall be placed prior to commencement of earthworks. Such measures shall be subject to further additions or alterations, where considered necessary, as directed by the Project Manager or Council, during the progression of works.

All final erosion prevention measures including establishment of grass shall be completed prior to the "final" inspection.

3.8. SUBSOIL DRAINAGE

Subsoil drains shall be provided as shown on the plans. Additional drains shall be provided where considered necessary, by Council or a geotechnical engineer.

3.9. MATERIALS & TESTING

All materials and products for installation and construction shall comply with Australian Standards.

Monitoring testing ("string-line" and "roll") where specified by Council's Manual of Engineering Standards, to be performed by Council, shall be arranged 24 hours in advance. Where a Council officer is not available, a geotechnical engineer may perform such tests.

4. PLANS

4.1. LAYOUT PLANS

Road plans as a minimum shall contain the following:-

- Locality sketch.
- Site location.
- Centreline chainages as pegged.
- The chainage shall be aligned with the long section and run left to right across the plan for plans and long section.
- North point
- Location and description of benchmarks (BM's) to AHD or other appropriate datum.
- Subsoil drainage location and a typical section.
- Existing road names and proposed road names, (determined prior to release of engineering plans).

- Proposed lane widths and types of kerbs.
- Dimensions of all linemarking.
- All existing services to location and level.
- All drainage and structures with pipe and lintel sizes.
- Kerb radii.
- Existing drainage and road feature and their levels.
- Existing and proposed contours at 0.5 metre interval or 0.2 metre in flat terrain.
- The determined High Flood Level (HFL).
- Cut and fill batter limits and road reserve boundaries.
- Major trees or natural features affected by the design.
- Intersection and cul-de-sac details including lot boundaries, streetsign location, pram ramps, pits, vehicular crossings, pipe crossing locations and contours (for abnormal complex shapes).

4.2. LONGITUDINAL SECTIONS

The chainage should run left to right across the page and shall include:-

- Chainages.
- Natural surface levels on pegged centreline or design control line.
- Design surface levels.
- Vertical alignment details.
- Grade lines, vertical curves and lengths, high points (HP), low point (LP) and RL of intersection points (IP).
- Datum of long section.
- Chainage, conduit size and location of public utilities.

4.3. CROSS SECTIONS

Cross sections shall be shown generally at no more than 20 metre intervals and at all key points for design purposes, i.e. access, intersection or kerb service locations. Where appropriate for level control designs may require cross sections down to 5 metre intervals.

Cross sections shall be laid out from left to right, bottom to top, on sheets sequentially numbered with the appropriate chainage shown in the title block.

Cross sections shall extend for the full width of the road reserve or sufficient to detail batters and shall show enough detail to transition to existing works such as grades, distances, etc. and crossfalls to such new works shall be generally within the range of 2% to 7%.

Details on cross sections shall include:-

- Road centreline.
- Offset chainage.
- Existing surface RL and design surface RL.
- Design crossfall in % batter slope ratio and access grades.

- Design centreline shift, offset crown or transitions if applicable.
- Public utility location for offset distance and RL.
- Existing and proposed road reserve boundaries and levels.

A Typical Cross Section shall be included and shall show (in addition to the points above):

- Crossfalls & batter slopes.
- Subsoil drainage.
- Footpath and/or cyclepath.
- Turfing (strip & full).
- Road pavement details including a table of pavement parameters, with design CBR and ESA details.
- Dimensioned widths.

5. KERB RETURN PROFILES AND PLANS

Each profile should have a kerb return number (e.g. KR1) corresponding with a KR1 number shown on the plan view. The profile chainages should follow the flow of traffic direction.

The details to be shown include:-

- The horizontal and vertical scale.
- Chainage. The running face of kerb chainage related to the profile, together with the chainage related to the road centrelines, generally tangent points (TPs).
- Design level, specifying either top of kerb or lip of gutter.
- Existing kerb levels where appropriate.
- The applicable road/street names/numbers leading into the profile.
- An extension of a minimum of 15 metres beyond the tangent points to ensure a smooth profile is achieved.
- Show location and number of proposed drainage structures.
- Datum RL of kerb return.

Kerb or pavement profiles should be provided for traffic islands etc. at large, complex intersections and roundabouts to provide additional level control.

6. STORMWATER

The stormwater detail sheets shall show catchment plans including areas outside of the development, calculations, pit sub-catchments numbered or referenced, and overland flow paths for the 100 year ARI storm event including flow path capacity calculations.

Stormwater plans shall include the following:-

- North point.
- Numbering of drainage lines.
- The pit/structure nomenclature.
- The location of any pit utility mains/services crossing influenced by the pipeline or pit.
- The location and centreline chainage of any applicable drainage structure.
- Note referring to type of bedding.
- Location and width of existing or proposed drainage easements.
- Overland flow paths, typical sections and capacities.
- The 100-year flood contour/line, whether from the Hunter River or the local catchment.

Drainage longitudinal section sheet shall show the chainages running left to right across the sheet starting at the upstream end of the system.

Details on the longitudinal section shall include:-

- Consecutive centreline chainages and finished surface levels.
- Pipe design invert level, grade and existing surface level.
- Inverts of existing drainage open channels where necessary.
- Pipe size, class and type and hydraulic grade line.
- Public utilities affected.
- Pit structure, type and reference number.
- Datum RL to AHD.
- Capacity and design flow.
- Bulkheads, trench stops and any bedding requirements.

7. ENGINEERING SURVEY

Engineering survey of the proposed development/subdivision shall accurately show landform and features. Prior to any layout design all physical features that may affect design and construction shall be located, levelled and plotted on the plan including:-

- Rock outcrops.
- Trees, their diameter and canopy spread.
- Watercourses, dams, springs, etc.
- Any man made structures, drainage, kerb and gutter, buildings, property access etc.
- Existing utilities and services.
- Top and bottom of banks, gullies, etc.
- Contours to 0.5 metre intervals (or 0.2 metre in flat terrain).

7.1. DATUM / BENCH MARKS

Bench marks related to Australian Height Datum (AHD), shall be located clear of any proposed works with a maximum spacing of 150 metres. Bench marks shall be clearly shown on the plans with origin of levels and datum. Road pegging shall commence at zero at the centreline of any intersecting road. The centreline shall be approximately indicated and labelled at each chainage.

Unless adequately justified, all survey shall be related to Australian Height Datum (AHD) and the appropriate grid, in accordance with Survey Practise Regulations.

7.2. CROSS SECTIONS

Cross sections shall be located at 20 metre (max.) intervals on straights and 15 metre (max.) on curves. Cross sections shall also be located at tangent points (TP) of curves and to superelevation widening transitions. The above spacings are a maximum and additional cross sections may be necessary in difficult terrain or unusual features.

Cross sections shall be provided at least 60 metres along any existing intersecting roads to assist a satisfactory design match.

7.3. LONGITUDINAL SECTIONS

Longitudinal sections shall extend a minimum of 60 metres along any intersecting roads to assist a satisfactory design match. The long section for cul-de-sacs shall be carried 20 metres beyond the kerb or to the recovery peg on the centreline prolongation.

Long sections on offset cul-de-sac heads shall be along a curve between the TP and centreline and shall also extend beyond the kerb a minimum of 20 metres. Hammerhead turning areas shall be treated similarly.

8. EROSION & SEDIMENT CONTROL PLANS

These plans shall be clear and legible and show the location and type of each structure or device.

Details on sediment control plans shall show:-

- Capacity of structures.
- Batter slopes and lengths.
- Maintenance access – fences, spillways.
- Proposed staging of restoration/vegetation works.
- Stockpile sites and treatment.
- Construction entry/exits.
- Details of type of control (sketch).

9. TRAFFIC MANAGEMENT PLANS (& TRAFFIC CONTROL PLANS)

Traffic/Pedestrian Management Plans shall be provided where the works impact on public roads and footpaths, in accordance with AS 3742.3 or RMS Traffic Control at Worksites.

The plan shall be certified by an approved designer and shall include (but not be limited to) the following:-

- Total area of works and management features.
- Constructional stages resulting in changed provisions.
- Pedestrian movements and safe barriers.
- Detailed signposting, barricading, linemarking, lighting or any temporary works of such nature.
- Construction Zone speed restrictions including traffic control signals and signposting will necessitate liaison with the RMS for approval.
- Partial or full road closures (if permitted) will require liaison with Council and/or the RMS through Traffic Committee. Any advertising or public notification of such requirements will require adequate lead-time.

The Traffic Management Plan, may be amended by Council's engineer, (or the RMS or Police where necessary), at any time during construction, as the need arises. No works shall commence prior to Council or RMS concurrence to the plan.

10. MISCELLANEOUS

Sufficient survey, design and drawing detail to define all works on the plan of the proposed development or subdivision shall be shown. These details shall include:

- Site regrading (cut and fill).
- Batters.
- Retaining walls and structures, heights, structural design details.
- Drainage transitions/connections.
- Limits of works.
- Terraced areas including long sections and typical cross sections.
- Treatment of trees to be retained.
- Restoration or transition of new works to existing infrastructure.
- Pathways and overland flow routes.
- Detention basins/gross pollutant traps.
- Battleaxe handle, access grades and transitions/connections.