

Work- As-Executed Drawings Requirements for works carried out in Lismore City Council

*Modified from Northern Rivers Local Government Development Design and Construction Manuals
Development Construction Specification C101 - General*

C101.11 WORK-AS-EXECUTED DRAWINGS

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| <p>1. Work-as-Executed Drawings are certified plans showing details of work as actually constructed. They also identify departures, additions and deletions from approved design plans. Data for preparing work-as-executed drawings is obtained by measurement and survey as and/or after works are completed. Two categories of Work-as-Executed Drawings as detailed in this specification are to be submitted to Council with a Work-As-Executed Certification Report, being</p> <p>(a) Amended Design Work-as-Executed Drawings; and</p> <p>(b) Summary Work-as-Executed Drawings.</p> <p>2. Deleted</p> | <p>Submission</p> |
| <p>3. Amended Design Work-as-Executed Drawings are certified copies of all approved design plans with as constructed departures, deletions and additions clearly noted and detailed on the plans.</p> | <p>Amended Design
WAE Drawings</p> |
| <p>4. Amended Design Work-as-Executed Drawings are to be submitted to Council in the following formats:-</p> <p>(a) PDF format (true or digitally created), at the same scale and format as the approved design plans, but, marked appropriately for as-constructed information and with signatures; and</p> <p>(b) AutoCAD DWG or DXF format and provided to Council on USB or by file transfer</p> | |
| <p>5. Summary Work-as-Executed Drawings are to be prepared on a background plan of lot layout and kerb lines with a set of separate plans for each of the following.</p> <p>(a) Stormwater Drainage</p> <p>(b) Sewerage</p> <p>(c) Water supply</p> <p>(d) Site Works</p> <p>(e) Road Works</p> <p>(f) Parks & Open Space</p> | <p>Summary WAE
Drawings</p> |
| <p>6. Summary Work-as-Executed Drawings are not required in a rural subdivision where only roads were constructed and there are no drainage structures.</p> | |
| <p>7. Summary Work-as-Executed Drawings are to be submitted to Council in the following formats:-</p> <p>(a) PDF format (true or digitally created) to the drawing requirements provided in Section D1.06 of this specification and with signatures.</p> <p>(b) Electronic copy of the above in AutoCAD DWG or DXF format and provided to Council on USB or file transfer. The AutoCAD (DWG or DXF) files are to be spatially referenced to MGA Zone 56.</p> | <p>Spatially
Referenced to
MGA Zone 56</p> |

8. Amended Design Work-as-Executed Drawings are to be generally in accordance with the format and quality indicated on the Sample Drawings of this specification and shall include:

Sample Drawings

- (a) Copies of all approved design plans, certified as being a true representation of works as constructed, and endorsed with distinguishable notations showing any as constructed alterations, geometric departures, deletions or additions to the approved plans marked-up in red.
- (b) Approved design plans include:
 - (i) all plans of electrical circuits, switchboards, control, mechanical and process plans associated with pumping stations, reservoirs, treatment facilities and other water and sewerage works.
 - (ii) street lighting, signage, traffic control devices, linemarking
 - (iii) all plans of structures, bridges, culverts, drainage structures, retaining walls etc.
 - (iv) all plans of pollution control devices and permanent erosion and sedimentation control devices.
 - (v) water supply, sewerage and drainage works.
 - (vi) landscape plans.
- (c) Geometric departures (level, location, dimensions, gradient etc) from approved design plans must be noted in all circumstances where the works or part of the works as constructed, fail to meet the tolerances of this specification.

9. Summary Work-as-Executed Drawings are to be legible and comprehensible and comply with the requirements of relevant SAA standards.

Presentation

Plans are to be clearly marked up (red-lined) showing all variations from design including changes to levels, alignments and material types. Drawings are to be clearly stamped "Work as Executed" and noted as the WAE version in the revision title block.

They are to be generally in accordance with the format and quality indicated on the Sample Drawings of this specification. Text sizes must be selected to ensure there is clear definition of pipes etc. compared with property boundaries. Sewerage and drainage pipeline plans may contain complex sections where it is difficult to clearly show details. In these cases information boxes or separate detail plans are required. Information boxes to present specific pipeline sizes, inlet/outlet levels etc. must have leader-lines/arrow heads to connect information boxes with the section of pipe line.

10. Summary Work-as-Executed Drawings shall be to the following general requirements:

General Requirements

- (a) All information is to be retained within the borders of the sheet.
- (b) Northpoint to be shown on all plans
- (c) All information to be to the drawing requirements provided in Section D1.06 and DQS of this specification. The scale chosen must be sufficiently large to enable all required information to be clearly marked and legible. Catchment plan scales may be selected as appropriate for the site.
- (d) All levels shall be to AHD and shall be shown on plans in italics or sloping text.
- (e) Each plan is to be uncluttered with no other irrelevant information on the plan.

- (f) Each plan is to be on a background plan showing lot boundaries, lot numbers, rights of way, easements and other cadastral details, kerb lines, retaining walls, structures and other significant features.
- (g) Lot numbering is to be correct in accordance with the final plan of subdivision.
- (h) Future lots are not to be displayed. Should services be provided for future lots then limited dimensions are required to locate lines, pits, fittings, manholes etc. This is to avoid confusion when future lot layouts and numbers change.
- (i) All information is to be captured by accurate survey including location of pipelines, structures, headwalls, pits, inlets, manholes, sidelines, junctions, fittings (valves, hydrants, scours, thrust blocks), kerb lines.
- (j) Any complex arrangements or unusual fittings are to be detailed on the plans.
- (k) All services are to be fully detailed including existing and newly installed.
- (l) Drainage, water supply and sewerage summary WAE drawings are to show the horizontal location of all other underground services and utilities (including, electricity, telecommunications and gas). Dimensioning is required for the horizontal location of all these services and associated pits and structures, distances from lot boundaries are required where lines are parallel to boundaries, in other circumstances ties may be necessary. Depths from finished surface level and levels (AHD) are to be shown on all these services in the following locations - below kerbs, at changes of grade and direction, dead ends, where they cross the horizontal location of other services.
- (m) Signed Certifications are to be completed on each and all pages of the submitted drawings by the Registered Surveyor certifying the locational accuracy with regard to physical features and assets, cadastral information, contours, levels and the applicable survey datum information.

11. Summary Work-as-Executed Drawings for stormwater drainage shall be to the following requirements:

**Stormwater
Drainage**

- (a) Plot accurately on plans all underground drains, open drains, interallotment drains, subsoil drains, pits, manholes, grates, entries, headwalls, junctions, branches, drainage structures, footbridges, pollution control devices, permanent erosion and sedimentation control devices.
- (b) Plot minimum of 2 downstream/ upstream existing manholes or pits.
- (c) Show sizes, type and class of all underground drains. Show dimensions and cross sections of all open drains. Show dimensions and type of drain lining or revetment. Number each drainage line on layout plan and long-section.
- (d) Plot and show details of all interallotment drainage including location of pits, branches and junctions. Interallotment drainage (IAD) to be clearly marked to differentiate from public drainage.
- (e) Plot and show details and dimensions of scour protection, riprap, energy dissipaters etc.
- (f) Show centreline distances along drains between pits, inlets, outlets, junctions and other structures.
- (g) Provide invert levels for all underground drains at pit inlets and outlets, headwalls, outfalls, inlets, changes of grade and at intervals of not less than 20m.
- (h) Show gradients on all sections of open and underground drains.
- (i) Provide invert levels for all open drains at inlets, outlets, junctions, changes of grade and at intervals of not less than 20m.
- (j) Dimensioning is required for the horizontal location of all pits, inlets, outlets, headwalls and structures. Distances from lot boundaries may be acceptable

where lines are parallel to boundaries. In other circumstances ties may be necessary.

- (k) Provide catchment plans of all contributing areas to the constructed system. Show catchment areas contributing to each inlet.
- (l) Provide manufacturer and model number of any proprietary drainage structures such as GPTs.
- (m) Provide details of stormwater detention basins, retention basins and constructed wetlands, including physical features, levels, inlet and outlet structure details and storage capacity.

12. Summary Work-as-Executed Drawings for sewerage shall be to the following requirements:

Sewerage

- (a) Plot accurately on plans all sewers, manholes, sidelines, junctions, pumping stations, valve pits, rising mains. Provide line numbers on all sewer mains.
- (b) Show all pipe sizes and type (It is acceptable to include a note on plan to the effect:- All sewer pipes are 150mm unless specified otherwise).
- (c) Show all sewer invert levels at manholes (upstream and downstream) and dead ends.
- (d) Show manhole location and invert levels.
- (e) Show sewer junctions serving allotments. The distance of all junctions is to be measured from the nearest downstream manhole and shown on the plan. The depths of sewer junctions to finished surface level is to be accurately determined and shown adjacent to the sewer junction information.
- (f) The location and length of sidelines (house branch lines) is to be measured, plotted and dimensioned on the plan. The ends of sidelines are to be located on the plan by distances from boundaries or ties.
- (g) The horizontal location of all sewers, manholes, rising mains and pumping stations is to be unambiguously shown on the plan by suitable dimensioning. Distances from lot boundaries may be acceptable where lines are parallel to boundaries. In other circumstances ties are required.

13. Summary Work-as-Executed Drawings for water supply shall be to the following requirements:

Water Supply

- (a) Plot accurately on plans all water mains, hydrants, stop valves, reflux valves, air valves, scours, any other significant fittings, thrust blocks, pumping stations, reservoirs, services and conduits. Symbols are to be in accordance with Lismore City Council standards.
- (b) Show all pipe sizes and types (It is acceptable to include a note on plan to the effect:- All water mains are 100mm unless specified otherwise). Outside diameter (OD) is to be used for PE pipe. Internal diameter (ID) to be used for PVC and copper pipe.
E.g. DN125 PE100 SDR11 PN16
DN100 PVC-M PN16
- (c) The horizontal location of all mains, fittings, structures, services and conduits is to be unambiguously shown on the plan by suitable dimensioning. Distances from lot boundaries are required where lines are parallel to boundaries. In other circumstances ties are required.
- (d) Show distances to buried fittings (e.g. bends) from visible above-ground fittings such as hydrants or valves.
- (e) Show water services. Layout, type and diameter of all services is to be shown.
- (f) Depths of all road crossings (service lines and mains) are to be shown.

- (g) Show where mains or service connections under roads are laid within an encasing pipe.
- (h) Clearly identify existing mains to be abandoned or decommissioned.

14. Summary Work-as-Executed Drawings for site works shall be to the following requirements:

Site Works

- (a) Plot accurately on plans finished levels and contours. Maximum horizontal spacing for contours is to be 10 metres. Contour information is to extend a minimum 10 metres past all new allotment boundaries including 10 metres into existing adjoining allotments or land.
- (b) Appropriate spot levels are to be surveyed to fully represent the as constructed surface. A 5 metre grid may be required on flat allotments to determine any low points. Changes of grade, open drains and other formations are to be fully surveyed and detailed.
- (c) Plans are to show areas of filling, depth of fill, and pre-existing surface levels.
- (d) Plot and provide spot levels, and verify dimensions (widths / heights etc.) as appropriate, of all features including kerb and gutter, road crown, pathways, cycleways, park furniture, retaining walls, revetments, wharves, jetties, public transport facilities and other structures. Spot levels taken on kerbs and road crowns shall include all tangent points and sag points, and match original design chainages where possible. Identify sections of pathways/cycleways/concrete works that have special strengthened vehicle crossing segments.
- (e) Plot location of all streetlights, linemarking, signage and traffic control devices.

15. Work-as-Executed Drawings for roads shall be to the following requirements:

Roads

- (a) Show pavement extents including start/end chainages for each road segment
- (b) Show pavement material types and thicknesses (subgrade, sub-base, base)
- (c) Show seal type and date of sealing
- (d) Show kerb type
- (e) Provide location of laybacks and kerb ramps
- (f) Show geometric design features including kerb returns, cul-de-sacs, turning heads, roundabouts.
- (g) Provide footpath details including material, thickness, length and width.
- (h) Provide road furniture details, including location, manufacturer and model numbers (if applicable)
- (i) The Drawings shall be certified by a suitably qualified engineer.

16. Work-as-Executed Drawings for Bridgeworks and major culverts shall show in red ink all changes to the approved Drawings, including variations to levels, dimensions, concrete, reinforcement, prestressing and other materials, all non-conformances accepted without rectification, suppliers and model numbers of bearings and proprietary joints and type of barrier railings installed where both steel and aluminium alternatives are detailed. The Drawings shall be certified by a suitably qualified engineer with documented experience in bridge construction.

Bridgeworks

Work-as-Executed Drawings for Bridges and Major Culverts shall include the following details:

- (a) Structure location coordinates (MGA Zone 56 – GDA2020)
- (b) Purpose of the Bridge (Road / Rail / Pedestrian / Road-Ped)
- (c) Function of the Bridge (Over Land / Over Water / Over Road)
- (d) Overall structure dimensions (length / width, in metres)

- (e) Bridge material: Primary construction material (e.g. steel, timber, concrete, or composite/combination)
- (f) Vehicular load capacity: Bridge design standard and design load rating (e.g. SM1600) and any sign posted load limits applied
- (g) Pedestrian facilities: Presence of pedestrian path or shared path (Yes / No).
- (h) Number of traffic lanes and individual lane widths (m).
- (i) Minimum Trafficable Clearance
The vertical distance between the structure's deck surface and any overhead obstruction, defining the maximum allowable vehicle height
- (j) Minimum Clearance Envelope (Under-Structure)
The vertical distance from the highest point of any road, path, or watercourse under the structure to the lowest point of the bridge superstructure overhead
 - a. If a road or pathway is beneath the bridge, measure from surface to underside of structure to determine lowest clearance limit.
 - b. If no road/path, measure from ground or high tide water level to underside of structure to determine height from lowest ground point to bridge.
- (k) Foundation type and material (e.g. driven pile, spread footing)
- (l) Pile or column material
- (m) Abutment type and material (gravity, cantilever, etc.)
- (n) Number of spans
- (o) Span lengths (m)
- (p) Wearing surface material (e.g. spray seal, asphalt, concrete)
- (q) Wearing surface depth (mm)
- (r) Deck type (e.g. solid slab, orthotropic)
- (s) Deck material (e.g. prestressed concrete)
- (t) Total deck area (m²)
- (u) Girder/beam Type (e.g. I-beam, box girder, plate girder)
- (v) Girder/beam Material (e.g. steel, concrete, composite, timber)
- (w) Quantity of Beams/Girders
- (x) Barrier type and kerb type (if applicable)
- (y) Environment exposure classification, based on location and severity, e.g. low / moderate / severe)
- (z) Watercourse name, if the structure spans a named creek, river, or water body.

17. Works-as-Executed Drawings for parks and open spaces to include layout, dimensions, materials and details of hardscape and softscape elements including:

Parks & Open Space

- (a) Playground and gym equipment
- (b) Paved surfaces and footpaths
- (c) Boardwalks and bridges
- (d) Softfall and mulch
- (e) Gardens
- (f) Fencing
- (g) Water, irrigation and drainage
- (h) Furniture (seating, drinking fountains, shelters, bins, BBQs)
- (i) Retaining walls
- (j) Electrical
- (k) Lighting
- (l) Signage
- (m) Public artworks

Include manufacturer and model details of any proprietary products.