CAPRICORN MUNICIPAL DEVELOPMENT GUIDELINES

SITE REGRADING

D6

DESIGN GUIDELINES

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Keeping the Capricorn Municipal Development Guidelines up-to-date

The Capricorn Municipal Development Guidelines are living documents which reflect progress of municipal works in the Capricorn Region. To maintain a high level of currency that reflects the current municipal environment, all guidelines are periodically reviewed with new editions published and the possibility of some editions to be removed. Between the publishing of these editions, amendments may be issued. It is important that readers assure themselves they are using the current guideline, which should include any amendments which may have been published since the guideline was printed. A guideline will be deemed current at the date of development approval for construction works.

GENERAL

D06.01. SCOPE

D06.01.01. This Design Guideline sets out requirements for the site regrading involved in land development and subdivision.

D06.01.02. The scope of this Guideline assumes that the Designer is familiar with requirements cited in the various construction specifications, specifically those related to earthworks, clearing and grubbing, erosion and sedimentation. Additionally the Designer needs to make reference to the associated design guidelines related to stormwater drainage design, geometric road design and erosion control and stormwater management.

Familiarity with other Specifications Required

D06.01.03. The following order of priority for interpretation of documents will apply: (Please note that reference to a Guideline or Standard, is reference to the latest version of the relevant document, unless specifically a version number is specifically stated)

Order of Priority

1. CMDG D6 – Site Regrading Design Specification
2. AS 4678 Earth-retaining structures
3. AS 3798 Guidelines on earthworks for commercial and residential developments
4. AS 2870.1 Residential slabs and footings - Construction.
5. MRTS03 Drainage, Retaining Structures and Protective Treatments
6. Queensland Urban Drainage Manual (QUDM)

D06.02. OBJECTIVES

D06.02.01. This Guideline aims to assist the Designer in achieving:

- efficient and economical design — ***Efficient***
- enhancement of the environmental character of the site whilst maintaining the natural features of the site — ***Environmentally Sound***
- provision of safe conditions for construction commensurate with the proposed purpose of the development — ***Safe for Construction***
- a minimal impact on adjoining properties and developments. — ***Impact on Adjoining Properties***

D06.03. REFERENCE AND SOURCE DOCUMENTS

(a) CMDG Specifications

Construction Specifications

C211 - Control of Erosion and Sedimentation
C212 - Clearing and Grubbing
C213 - Earthworks

Design Specifications

D1 - Geometric Road Design
D5 - Stormwater Drainage Design
D7 - Erosion Control and Stormwater Management

(b) Australian Standards

AS 3798 - Guidelines on earthworks for commercial and residential developments
AS 2870.1 - Residential slabs and footings - Construction.
AS 4678 - Earth-retaining structures

(c) Others

Department of Transport and Main Roads -
MRTS03 - Drainage, Retaining Structures and Protective Treatments

Department of Housing and Public Works -
- Queensland Development Code

Department of Energy and Water Supply
- Queensland Urban Drainage Manual (QUDM), Third Edition

D06.04. SITE REGRADING CONCEPT

D06.04.01. Areas of a site proposed for building or recreational purposes may not be suitable in their natural state for their intended function without improvement works to:

(a) Alleviate flooding of low-lying ground
(b) Fill gullies or create emergency flowpaths after underground stormwater piping has been installed
(c) Allow improved runoff from flat ground
(d) Regrade excessively steep slopes that would preclude economical construction of dwelling foundations
(e) Allow effective recreational use or give reasonable access

D06.04.02. The Designer shall review the natural surface contours and where necessary shall design finished surface levels that ensure the land is suitably prepared

D06.04.03. Where practical, areas should be regraded to minimise the necessity for underground drainage systems with surface inlet pits, and allow surface water to flow naturally to roads or drainage reserves without excessive concentration. ***Drainage***

D06.04.04. The Designer shall consider the implications of site regrading in relation to the existing natural environment. Generally, site regrading shall be minimised in heavily treed areas. ***Natural Environment***

D06.04.05. Care shall be taken to provide depressions for overland flow from low points and over major drainage lines, to direct stormwater for storms up to 1% AEP flood levels (1 in 100 years), unless otherwise noted in LGA planning schemes, *D5 – Stormwater Drainage* or *D1 – Geometric Road Design*. ***Overland Flow***

D06.04.06. The design of site regrading areas in conjunction with the design of roadworks shall be considered with the objective of balancing cut to fill, achieving an economic development, and minimising haulage of imported fill or spoil to and from the development site. Bulk haulage should always be considered to have an adverse effect on adjacent development, and infrastructure. ***Minimal Road Haulage***

D06.05. SPECIAL TREATMENT OF PARTICULAR AREAS

D06.05.01. Areas abutting flooding or nuisance drainage sites shall be site regraded to a minimum level of 0.5 metres above the 1% AEP Flood levels. The site shall be identified on the design plans with appropriate notation of site specific requirements. ***Flooding***

D06.05.02. In the event that an area is known to be affected by or inundated by local stormwater flows, the Designer shall investigate the existing conditions as they relate to the proposed development and advise the Developer in the preliminary design report on all data obtained in the investigation and recommend appropriate contour adjustments. The report should normally be accompanied by sketch plans to clarify recommendations. ***Inundation Areas***

D06.05.03. The finished surface of filled areas shall be designed to levels allowing an adequate cover depth over the pipeline (if piped) and permitting surface stormwater flow to be guided to inlet pits if depressions are retained in the finished surface contouring. ***Piped Gullies or Depressions***

D06.05.04. The location of dams and water courses shall be clearly defined on the site regrading plans. A geotechnical report specifying the site-specific preparation and compaction requirements will be required to be incorporated with the site regrading plan. A description of the minimum acceptable quality of the fill shall also be specified on the plans, supported by geotechnical recommendations. All documentation necessary from various authorities to support the filling of dams and watercourses shall be supplied with the design plans. ***Dams and Water Courses***

D06.05.05. The finished surface of filled areas shall be designed to levels allowing an adequate cover depth over underground services. If the proposed landform increases the depth of cover over existing underground services these services shall be relocated/reconstructed if necessary, as determined by the applicable Local Government Authority (LGA), to ensure cover is not excessive. The continuity of access to all existing services shall be maintained internal to the development site and at the external boundary of the development site. ***Cover of Services***

D06.05.06. The finished level of any building area shall be designed to ensure a desirable surface grading of 1.5% (1% minimum) oriented in the direction of the drainage system designed to cater for its catchment. ***Flat Ground***

D06.05.07. Building areas containing natural ground slopes of an excessively steep nature, i.e. greater than 15% shall require a report from a Geotechnical Engineer on slope stability and construction issues. Specific requirements shall be noted on the design plans. ***Steep Slopes***

D06.06. GENERAL STANDARD OF LOT PREPARATION

D06.06.01. Special requirements will apply where necessary but generally lots are to be cleared of low scrub, fallen timber, debris, stumps, large rocks and any trees which in the opinion of the Local Government Authority are approaching the end of their functional life or are dangerous or will be hazardous to normal use of the development. Prior consultation with the Local Government Authority is necessary. Such requirements shall be shown on the design plan. ***Clearing***

D06.06.02. All timber and other materials cleared from lots shall be removed from the site. All roots, loose timber, etc. which may contribute to drain blockage shall be removed. Such requirements shall be shown on the design plan. ***Disposal***

D06.06.03. Selected trees shall be preserved by approved means to prevent destruction normally caused by placement of conventional filling or other action within the tree drip zone. The Local Government Authority shall be consulted for advice and all specific requirements noted on the design plans. ***Preservation of Trees***

D06.06.04. Controlled fill certification by a Registered Professional Engineer of Queensland (**RPEQ**) responsible for the works or by qualified persons in accordance with AS 3798 Guidelines on earthworks for commercial and residential developments - Level 1 Certification is to be provided where there is potential for future construction of a building (topsoil placement up to 150mm is excluded). ***Certification of Filling***

D06.07. STANDARD OF FILL FOR LOTS

D06.07.01. The following notations are to be incorporated in the design plans. "Filling is to be of sound clean material, reasonable standard and free from large rock, stumps, organic matter and other debris." "Placing of filling on the prepared areas shall not commence until the authority to do so has been obtained from the Local Government Authority".

D06.07.02. All work shall be in accordance with Construction Specification C213 - Earthworks and AS 3798 Guidelines on earthworks for commercial and residential developments. ***Fill Quality***

D06.07.03. Fill comprising natural sands or industrial wastes or by-products will be accepted by Local Government Authority only in approved locations and will be subject to specific requirements determined by prevailing conditions. ***Restricted Fill***

D06.07.04. It is essential that prior advice be given of intended use of such materials mentioned in D06.07.03. It should be noted that failure to obtain Local Government Authority approval may lead to an order for removal of any material considered by the Local Government Authority or other relevant authorities as unsuitable or in any way unfit for filling. ***Prior Approval***

D06.07.05. All areas where filling has been placed are to be dressed with clean arable topsoil, fertilised and sown with suitable grasses. ***Top Dressing***

D06.08. STANDARDS OF RETAINING WALLS

D06.08.01. Pre-development levels must be preserved at external (perimeter) boundaries of the development site, unless written owners' permission from the neighbouring allotment is provided.

Location

D06.08.02. Retaining walls benefitting private land are not to be located on Local Government Authority controlled land or land that is to enter LGA or State ownership (e.g. road reserves, parks and drainage reserves).

D06.08.03. Retaining walls benefitting Local Government Authority controlled land or land that is to enter LGA or State ownership (e.g. road reserves, parks and drainage reserves) must be wholly located within land under LGA control.

D06.08.04. The location of a retaining wall must not adversely impact on other land, persons, existing services, potential future service corridors or roads.

D06.08.05. Retaining wall/s, including footings and associated drainage measures, shall be designed and constructed to be located wholly within the boundaries of the development site, unless the owners' written permission from the affected allotment is provided for construction access and future maintenance easement requirements. Any retaining structure external to the development site will form part of the development approval.

D06.08.06. Where a retaining wall is to be located on street frontage the wall, including footings, is to be located wholly within the allotment.

D06.08.07. Where there is an inter-allotment drainage system adjacent to a retaining wall the design of the retaining wall is to address how the flows in excess of the drainage network capacity are to be safely controlled without damaging the retaining wall, adjoining land or buildings or cause a health risk.

Services

D06.08.08. Retaining walls must not impose loads on underground services within allotments or external to allotments. Retaining walls' design must allow for the installation and maintenance of these services particularly with regard to workplace health and safety acts and regulations.

D06.08.09. Where road reserve or services are located within or below the retained soil (as determined by the internal friction angle of the soil being retained) the retaining walls are to be freestanding (such that excavation for maintenance of these services does not impact on the stability of the wall).

D06.08.10. New services adjacent to retaining walls are not to be located within the zone of influence or their stipulated clearance. Adequate protection to the retaining wall must be provided where excavation for maintenance of these services is required where it could potentially influence the wall stability. Proposed treatment must be signed off by a structural RPEQ.

D06.08.11. All retaining walls must meet the requirements of Queensland Development Code, MP1.4 – Building over or near relevant infrastructure.

Approvals

D06.08.12. Building Approval for retaining walls will be required in addition to any Local Government Authority approvals unless noted in clause D06.08.13.

D06.08.13. In general, a building application is not required for retaining walls if all of the following requirements are met:

- There is no surcharge loading (e.g. driveway) over the zone of influence for the wall; and
- The total height of the wall and of the fill or cut retained by the wall is no more than 1 metre above the wall's natural ground surface; and
- The wall is no closer than 1.5m to a building or another retaining wall.

D06.08.14. An RPEQ shall complete appropriate inspections during the construction process to ensure compliance with AS4678.

Design

D06.08.15. Retaining walls are to be designed by appropriately qualified and experienced RPEQ in accordance with the design criteria in AS 4678 (as amended) and the following:

a) The design life of retaining structures is to be at least sixty (60) years.

b) Retaining walls must be designed and constructed so that filling or excavation does not cause ponding on the site or on nearby land.

c) The design of retaining structures adjacent to property boundaries are to safely withstand the impact of a 1.8m high solid fence constructed along the top of the retaining structures. Fence loadings are to include dead, live and wind loads.

d) To minimise service conflicts and provide measures to ensure retaining wall integrity and service protection where they do occur as outlined in previous clauses.

Drawings

D06.08.16. Detailed design drawings for retaining structures submitted to the Local Government Authority shall include sufficient details to allow for review and construction including but not limited to the following:-

a) Location, type and material of all retaining structures.

b) Structural Design Parameters:
   - Structure Classification
   - Design surcharge
   - Soil design parameters
   - Earth pressure coefficients
   - Design life
   - Design level for hydrostatic pressures

c) Sufficient levels at top and bottom of retaining structures and retaining structure footings/foundations to clearly demonstrate the profile of retaining structures and finished surface levels.

d) The extent of retained soil.

e) Sections demonstrating that all works, including backfill, seepage drains and construction requirements are clear of adjacent property boundaries. Offset from property boundary to be shown.

f) Swale drain at top of structure and seepage drains behind structures including details of outlets to a Lawful Point of Discharge.

g) Locations of services behind retaining structures.

h) Details of services crossings under retaining structures including proposed treatment and protection.

i) Fencing to the top of retaining structures.

D06.09. BATTER SLOPES

D06.09.01. Embankment slopes in cut or in fill must comply with the fundamental criteria of:

- public safety
- protection of property / land stability, and
- protection of the environment

Batter Slopes

D06.09.02. Public access, land slip, slope stability and long term sustainable erosion and scour protection measures are salient factors that must be addressed in the design of embankment slopes. The criteria of sustainability include maintainability and ongoing maintenance costs.

D06.09.03. Vegetated Cut or Fill batters within private land shall generally be no greater than 4 horizontal to 1 vertical and shall provide safe access to mowing and vegetation management activities. Where batter slope is steeper than 4 horizontal to 1 vertical, the Designer is to provide evidence of compliance of Clause D06.09.01 above.

D06.09.04. In Local Government Authority controlled land batter slopes shall preferably be maximum 6 horizontal to 1 vertical but 4 horizontal to 1 vertical is permitted for short distances.

D06.10. CARTAGE OF SOIL

D06.10.01. The Designer shall refer to the Local Government Authority for acceptable haul roads with applicable load limits. This detail shall be required to be shown on the site regrading plan. The payment of a Bond may be required by the developer/contractor where the Local Government Authority has some concern about the ability of a haul road to sustain the loads without undue damage or maintenance requirements.

Possible Bond Requirement

D06.10.02. Unless specific application is made to the Local Government Authority and approval obtained, the plans will be annotated as follows: "All topsoil shall be retained on the development site and utilised effectively to encourage appropriate revegetation."

Topsoil

D06.11. CONCURRENCE WITH THE DEPARTMENT OF ENVIRONMENT, SCIENCE AND INNOVATION

D06.11.01. The Designer is recommended to refer to the Department of Environment, Science and Innovation with regard to any items requiring specific consideration when preparing a site regrading plan. Such plans may need to incorporate sediment/siltation/erosion control devices with specific reference to the stage at which these are to be provided. The responsibility shall rest with the Designer/Developer to make enquiries with the Department of Environment, Science and Innovation and subsequently obtain Local Government Authority approval to proposed measures.

Specific Considerations

D06.12. PERMIT TO ENTER TO DISCHARGE STORMWATER/CONSTRUCT

D06.12.01. Where it is proposed to divert, or direct the flow of stormwater into adjoining property, it shall be done in accordance with Queensland Urban Drainage Manual (QUDM). A written agreement shall also be required to carry out construction work on adjoining property and such agreement also presented to the Local Government Authority. Any identified work external to the development site will form part of the development approval.

Permit Required

D06.13. AS CONSTRUCTED PLANS

D06.13.01. The designer shall annotate on the site regrading plan, the site-specific detail to be shown on the As-Constructed plans must be in accordance with the requirements of the applicable Local Government Authority. Such detail must include geotechnical report certifying the works to be suitable for the intended purpose and any other certifications, testing and survey data, as required in this specification.

D06.13.02. A certificate from an RPEQ must be submitted with the "As Constructed" documentation certifying that the retaining walls (as constructed) are compliant with AS 4678 and this document.

Certification

D06.13.03. Refer to CMDG Construction Procedures - CP1 for further details on as constructed requirements.