

8.1 **DA 2010/962 - Highway Service Centre - Section 96 Amendment**

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Applicant	Sj Connelly CCP Pty Limited (on behalf of Ballina HSC Pty Ltd)
Property	Lot 11 DP 1011575 River Street (Old Pacific Highway) West Ballina
Proposal	Application under Section 96 (1A) of the EP&A Act to Modify Development Consent DA 2010/962 – Highway Service Centre
Effect of Planning Instrument	The land is zoned part RU2 under the provisions of the Ballina LEP 2012 and part 2(a) Living Area Zone under the provisions of the Ballina LEP 1987

Introduction

Council, at its Ordinary Meeting of 23 June 2011, resolved to grant deferred commencement conditional consent to the Construction of a Highway Service Centre comprising Service Station, associated Fast Food Restaurants, Auto Repair Centre, associated Vehicular Accesses (including a round-about intersection on the existing Pacific Highway alignment), Car and Truck Parking, Infrastructure Works, Filling, Landscaping, Earthworks and Advertising Structures upon Lot 11 DP 1011575, Pacific Highway (now known as No. 565-589 River Street, West Ballina) and a Two (2) Lot Subdivision (Lot 1 – Highway Service Centre & Lot 2 – Agricultural Residue).

This report seeks Council determination of an application under Section 96 (1A) of the Environmental Planning & Assessment Act 1979 (Amendment Application No 10) to amend the following conditions:

- No. 2.1 relating to the revised flood report prepared by BMT WBM
- No. 3.4 relating to the size and number of floodway culverts to be established under River Street (the "Old Pacific Highway")
- No. 2.9 which requires that no additional fill be imported to the site until the flood culverts under River Street and the internal spine road are completed
- Nos. 4.28 & 4.29 relating to flood proofing the development and
- Nos 10.10, 10.11, & 10.12 relating to the finished floor heights as proposed in the above amended conditions 4.28 & 4.29.

Council has determined a number of other applications under Section 96 (1A) of the *Environmental Planning and Assessment Act 1979* in relation to the subject development consent. The following applications to modify the consent have been determined:

Amendment No.1 – Consented to 23 February 2012 (Council)

- *To amend the amount of developer contributions payable under Condition Nos. 5.23 & 5.24 and specified in Schedule 1 of the Consent.*

Amendment No.2 – Consented to 21 February 2012 (Delegated authority)

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- To amend conditions 1.10, 3.7, 4.2, 4.11, 4.12, 4.13 & 5.1, to accord with the expert advice from geotechnical consultants, Coffee Geotechnics in relation to detailed specifications for site settlement.

Amendment No.3 – Consented to 7 February 2012 (Delegated authority)

- To amend condition No. 1.14 to extend the period of compliance with the deferred commencement conditions of consent from twelve months from the date of consent to twenty four months of the date of consent.
- To amend condition No. 3.3(i) in relation to terms (j) and (k). Both these items were amended to enable the construction of an asphaltic concrete road pavement in relation to road works on River Street as opposed to a concrete road pavement.

Amendment No.4 – Withdrawn 17 October 2013

Amendment No.5 – Consented to 7 February 2013 (Delegated Authority)

1. To amend the description of the development by deleting reference to the two lot subdivision.
2. Revised conditions of consent relating to;
 - Change in reference from RMS to Council, as Council will be the approval authority under Section 138 Roads Act approvals in relation to Off-site construction activities;
 - Change reference to Principal Certifying Authority as opposed to Council for certification of works;
 - Delete duplicated conditions;
 - Delete generic conditions relating to approvals for works that are already stipulated within other Acts & Regulations, Australian Standards . i.e. POEO Act, WorkCover, Roads Act, BCA, EP&AAct, Local Government Act etc.

Amendment No.6 – Refused 8 March 2013 (Council)

- To amend the provisions of Condition 3.3(ii) of DA 2010/962 in relation to the construction of a shared footpath/cycleway on the northern side of River Street and the reduced construction standard of the footpath from concrete to bitumen.

Amendment No.7 – Withdrawn 17 October 2013

Amendment No. 8 – Approved 22 August 2013 (Council)

- To amend the Section 94 contributions for the roads contribution levy associated with the development.

Amendment No. 9 – Approved 11 July 2013 (Delegated Authority)

1. To delete conditions relating to;
 - deferred consent conditions that have already been complied with;

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- provision of a dewatering plan for approval to the Principal Certifying Authority prior to the issue of the Construction Certificate; and
 - the provision of preload settlement reports to the Principal Certifying Authority indicating compliance with the Coffey geotechnical report "Interim Geotechnical Design for Preload Works: Ballina Highway Service Centre, West Ballina" dated 30 September 2010 (pp 14-15).
2. To amend the conditions:
- by deleting the words from relevant conditions "applicable at the time of construction" and "(as current at the time of construction)", "This will require a pavement design which includes a minimum 40mm asphaltic concrete wearing surface" and "(as current at the time of construction works commencing)";
 - to refer to the installation of underground fuel tanks as opposed to the incorrect reference to the culvert banks; and
 - relating to the application of the differential settlement standard of 100mm as opposed to the originally required 25mm settlement for all buildings on-site.

Reportable Political Donations

Details of known reportable political donations are as follows:

- Nil (or state otherwise if this is not the case)

Report

In determining this application to modify DA 2010/962 (Amendment No. 10), Council must assess the proposed modifications against the heads of consideration as contained in Sections 79C and 96 (1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as are of relevance to the application.

Council may grant consent to modify this consent under Section 96 (1A) if:

- (a) *it is satisfied that the proposed modification is of minimal environmental impact, and*
- (b) *it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all).*

The original consent for DA 2010/962 granted approval for the Construction of a Highway Service Centre comprising Service Station, associated Fast Food Restaurants, Auto Repair Centre, associated Vehicular Accesses (including a round-about intersection on the existing Pacific Highway alignment), Car and Truck Parking, Infrastructure Works, Filling, Landscaping, Earthworks and Advertising Structures upon Lot 11 DP 1011575, Pacific Highway (now known as No. 565-589 River Street, West Ballina) and a Two (2) Lot Subdivision (Lot 1 – Highway Service Centre & Lot 2 – Agricultural Residue).

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The proponents have been methodically working through the consent requirements in order to determine the viability of the project and a timing sequence for commencement of works on the subject lands.

During the preconstruction stage a number of requests have been received for amendments to be made to conditions of consent.

The amendment under Section 96 (1A) of the Environmental Planning & Assessment Act 1979 (as amended) that is the subject of this report is to reassess the floodway design, fill sequence, fill height and floor height conditions.

In support of their requested amendment, the proponents have submitted reports from Molino Stewart – Environment & Natural Hazards consultants and BMT WBM detailing a Flood Risks Assessment for the proposed development of the Highway Service Centre.

The Molino report indicated that placement of additional fill on the subject land would have a flood impact on the catchment, however both the Molino and BMT WBM reports concluded that the impact would not be as significant as first assessed.

Upon review of the submitted reports, Council commissioned BMT WBM (as Council's consultant) to review the overall flood impact resulting from the filling of Lot 1 DP 238009. This engagement has resulted in the formulation of the West Ballina Flood Relief Optimisation Study (the 'study') (copy attached). The study outlines the mitigation works required for the floodway that runs from north to south through the site and under River Street to Emigrant Creek. The design aspects of the flood relief have been identified in the study and include floodway levels, culvert dimensions and the provision of floodgates to restrict tidal intrusion.

The original development proposal included modeling which determined the preliminary number of culverts (10) and sizing for the culverts (BMT WBM – Flood Impact Assessment for Lot 1 DP 238009 – January 2009). Subsequent modeling conducted in the study for this development site identified that two culverts were required to mitigate the effects of the proposed filling of Lot 1 DP 238009, the Ballina Highway Service Centre (BHSC) site. The ultimate scenario of up to 10 culverts under River Street would need to be considered at a later date when further modeling and assessment is undertaken with reference to the pattern and timing of other development in the catchment.

It is important for Council to be aware that River Street is a public road and the infrastructure will remain a public asset.

Any future works to upgrade the access road culverts (the spine road) should not be at the expense of the public, as this development is proposing a private access road across the floodway and the access road will become a road on private land which crosses the easement containing the floodway.

The study has considered both local and Richmond River dominated floods for the 20 year and 100 year ARI magnitudes.

The outcomes of the study are as follows:

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- Peak flood level impacts caused by complete site filling can be compensated using a two cell culvert arrangement for the River Street culverts (two cells of 1.2m high by 3.6m wide), with an invert level of 0m AHD.
- Culverts for the internal access road should have a maximum invert level of 0.5m AHD to allow for future excavation of the floodway reserve. To minimise afflux associated with these culverts, the soffit should be above the 100 year ARI flood level (i.e. minimum of 2.0m AHD).
- A 40m wide floodway reserve at natural ground level must be maintained upstream from the access road culverts to connect with the floodplain to the north of the site.
- There is a significant benefit in lowering the upstream floodway (from the access road culverts to the northern property boundary) to its ultimate design level of 0.6m AHD.
- A minimum 40m wide floodway must be provided between the River Street and access road culverts. The invert level of the floodway is to match the invert levels of the upstream and downstream culverts.
- A drop structure is required at the upstream face of the access road culverts. The form of the drop structure is preferred to be a batter with rock protection.
- Backflow prevention is required in the form of hinged floodgates fitted to the downstream side of the River Street culverts

Regardless of the number of culverts at River Street, the 40m wide floodway north from the River Street culverts is to remain unrestricted at all times to enable the efficient flow of flood waters. The proposed access road over the floodway (located entirely on private property) is to be designed such that it does not impede the ultimate design capacity of the 40 m wide floodway.

The following existing conditions of consent will ensure the integrity of the floodway:

Spine Road Construction

- 4.23 The size of the Spine road culverts crossing the floodway corridor are to be constructed such that they convey the 100yr design flows (as identified in the BMT WBM Flood Impact Assessment for Lot 1 DP 238009 dated January 2009) with a 300mm freeboard to the soffit/obvert of the culvert. Details and hydraulic analysis is to be submitted to and approved by Principal Certifying Authority prior to issue of the applicable On-site Construction Certificate.

Flooding

- 4.24 **Floodway Corridor Construction**
The construction of the floodway corridor and all associated infrastructure is to be at the full cost of the developer, and to be designed such that the 100yr design flows (as identified in the BMT WBM Flood Impact Assessment for Lot 1 DP 238009 dated January 2009) are contained and conveyed within the floodway corridor with a 300mm freeboard to the discharge point and do not flow outside the floodway as a result of scour or meandering. Details are to be

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submitted to and approved by Principal Certifying Authority prior to issue of the On-site Construction Certificate.

Amendment No. 10 (being the subject of this report)

This amendment application under Section 96 (1A) of the Environmental Planning & Assessment Act 1979 is to amend the following conditions:

- No. 2.1 relating to the revised flood report prepared by BMT WBM
- No. 2.9 which requires that no additional fill be imported to the site until the flood culverts under River Street and the internal spine road are completed
- No. 3.4 relating to the size and number of floodway culverts to be established under River Street (the "Old Pacific Highway") and the internal access road to be constructed over the proposed floodway
- No's. 4.28 & 4.29 relating to flood proofing the development and
- No's 10.10, 10.11, & 10.12 relating to the finished floor heights as proposed in the amendments to conditions 4.28 & 4.29.

Condition 2.1 (existing)

Development being carried out generally in accordance with the plans and associated documentation lodged by or on behalf of the applicant, including Drawing No.'s A04.01DA & A00.02DA Issue B Dated 1/3/11, A-A&G-06.01DA Issue A, A-B & C – 06.01DA Issue A, A-E&F- 06.01DA Issue A, A60.01DA Issue A Dated 2/11/2010 and Drawing No. 6151-001 revision A, drawing 6151-006 revision A, drawing 6151-007 revision A dated 18/03/11 prepared by Cardno Eppell Olsen, BMT WBM Flood Impact Report dated Jan 2009 and associated document dated 13/9/10, Coffey Geotechnical Report & plans "Interim Geotechnical Design for preload works: Ballina Highway Service Centre dated 30 September 2010, and Landscape Plan prepared by Jackie Amos, except as modified by any condition in this consent, and by the reports/details & plans to be carried out in accordance with the deferred commencement conditions of this consent.

Condition 2.1 (proposed)

Development being carried out generally in accordance with the plans and associated documentation lodged by or on behalf of the applicant, including Drawing No.'s A04.01DA & A00.02DA Issue B Dated 1/3/11, A-A&G-06.01DA Issue A, A-B & C – 06.01DA Issue A, A-E&F – 06.01DA Issue A, A60.01DA Issue A Dated 2/11/2010 and Drawing No. 6151-001 revision A, drawing 6151-006 revision A, drawing 6151-007 revision A dated 18/03/11 prepared by Cardno Eppell Olsen, *as modified by Cardno drawings "Floodway Culvert Schematic sketches B1009/23", sheet 7 Rev B, sheet 8 Rev C, sheet 9 Rev B & sheet 10 Rev B - dated July 2013*, BMT WBM Flood Impact Report dated January 2009 and associated document dated 13/09/10, *BMT WBM report entitled "West Ballina Flood Relief Optimisation Study" dated 1st December 2013*, Coffey Geotechnical Report & plans "Interim Geotechnical Design for preload works: Ballina Highway Service Centre dated 30 September 2010, and Landscape Plan prepared by Jackie Amos, except as modified by any condition in this consent, and by the reports/details & plans to be carried out in accordance with the deferred commencement conditions of this consent.

Comment

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The BMT WBM West Ballina Flood Relief Optimisation Study dated December 2013 has made recommendations about the floodway design including the levels required for the culvert structures and floodway. The applicant's consultant Cardno has produced revised drawings titled Floodway Culvert Schematic sketches B1009/23", sheet 7 Rev B, sheet 8 Rev C, sheet 9 Rev B & sheet 10 Rev B dated July 2013 which are consistent with the requirements of the study.

Condition 2.9 (existing)

No site filling (*other than utilising the existing stockpiles on the subject land*) or associated works are to occur on proposed Lot 1 (the Highway Service Centre Site) until all works associated with the construction and establishment of the flood culverts under the Pacific Highway (Off-site), the associated highway works and the establishment of a construction access to the site, the floodway and the spine road culvert/bridge(On-site), have been completed in accordance with the design criteria as specified within the BMT WBM Flood Impact Assessment Report and associated documents, to the satisfaction of the *Roads & Traffic Authority, Industry & Investment NSW* and Council.

Condition 2.9 (proposed)

No site filling or associated works are to occur on proposed Lot 1 (the Highway Service Centre Site) until all works associated with the construction and establishment of the flood culverts under *River Street* (Off-site), the associated *River Street* works and the establishment of a construction access to the site, the floodway and the spine road culvert/bridge(On-site) have been completed in accordance with the design criteria as specified within the BMT WBM Flood Impact Assessment Report for Lot 1 DP 238009 dated January 2009, *BMT WBM West Ballina Flood Relief Optimisation Study dated December 2013* and associated documents to the satisfaction of Council and *NSW Department Primary Industries (Fisheries)*. *Alternatively if the filling of the site is to be carried out in conjunction with the construction of the culverts, a Flood Gap Strategy Report is to be submitted to and approved by Council prior to the issue of the Construction Certificate for on-site works or the issue of the Section 138 Certificate for the off-site works.*

Comment

The purpose of this amendment is to assist with timing for the development and to enable both the culvert sites and the service centre site to be filled concurrently and to ensure no worsening of flooding will occur by requiring the culverts under River Street and the access road to be in place prior to site filling. If filling on-site and off-site is proposed to occur concurrently, the applicant must prepare and submit a 'Flood Gap Strategy Report'.

This Flood Gap Strategy Report is a risk assessment and management plan which describes when, how much and by what method sufficient fill can be removed should a flood event occur. This strategy considers rainfall data, issued flood warnings and a corresponding action plan to remove the specified section of preload fill at a certain time. A similar strategy was developed and implemented by Ballina Bypass Alliance for a section of filling works associated with the Ballina Bypass project.

Condition 3.4 (existing)

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The size of the floodway culverts (including tide flaps) under River Street (the 'Old' Pacific Highway) are to be constructed such that they convey the 100yr design flows (as identified in the BMT WBM Flood Impact Assessment and reports for Lot 1 DP 238009) with a 300mm freeboard to the soffit/obvert of the culvert. The invert level is to be above mean high water level (MHWL) of the connecting channel/outlet but low enough to drain completely. Details and hydraulic analysis is to be submitted to and approved by Council prior to issue of the Section 138 Roads Act approval.

Condition 3.4 (proposed)

The size of the floodway culverts (including tide flaps) under River Street (the 'Old' Pacific Highway) are to be constructed *in accordance with Cardno drawings Floodway Culvert Schematic sketches B1009/23, sheet 7 Rev B, sheet 8 Rev C, sheet 9 Rev B & sheet 10 Rev B dated July 2013. Detailed construction plans* are to be submitted to and approved by Council prior to issue of the Section 138 Roads Act approval, and/or the issue of the Construction Certificate.

Comment

The number and size of the culverts under River Street has been addressed in the BMT WBM West Ballina Flood Relief Optimisation Study dated December 2013 and details are shown on the above mentioned plans by Cardno. The ultimate scenario of the up to 10 culverts under River Street, as identified in the BMT WBM Flood Impact Assessment Report for Lot 1 DP 238009 dated January 2009, would need to be considered at a later date when further modeling and assessment is undertaken with reference to the pattern and timing of development in the catchment.

Condition 4.28 (existing)

The Highway Service Centre site west of the floodway (inclusive of the spine road) must be filled to a minimum level of RL 2.7 metres AHD except where floodway hydraulics and environmental hazards prevail. Masonry retaining walls and dish gutters shall be constructed, and wholly contained, within side and rear boundaries of the site, such that no stormwater is discharged from the site onto the adjoining properties. The adjoining properties shall be drained at the common boundary with the site via a concrete dish drain such that no water ponds on any neighbouring properties due to filling of the site. The stormwater drainage shall be discharged to Council's drainage system. Details are to be submitted to and approved by Principal Certifying Authority prior to the issue of the On-site Construction Certificate.

Condition 4.28 (proposed)

The Highway Service Centre site west of the floodway (inclusive of the spine road) must be filled to a minimum level of RL 2.4 m AHD and the Highway Service Centre buildings, underground fuel tanks and fuel bowser areas shall have a minimum fill level of 2.7m AHD and the finished floor level of the buildings shall be RL 2.9 m AHD except where floodway hydraulics and environmental hazards prevail. Masonry retaining walls and dish gutters shall be constructed, and wholly contained, within side and rear boundaries of the site, such that no stormwater is discharged from the site onto the adjoining

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properties. The adjoining properties shall be drained at the common boundary with the site via a concrete dish drain such that no water ponds on any neighbouring properties due to filling of the site. The stormwater drainage shall be discharged to Council's drainage system. Details are to be submitted to and approved by Council prior to the issue of the On-site Construction Certificate.

Condition 4.29 (existing)

The portion of the allotment associated with the Highway Service Station, underground fuel tanks, and fuel sales must be filled to a minimum level of RL (3.2) metres AHD. Details are to be submitted to and approved by Principal Certifying Authority prior to the issue of the On-site Construction Certificate.

Condition 4.29 (proposed)

The portion of the allotment associated with the Highway Service Centre buildings, underground fuel tanks and fuel bowser area must be filled to a minimum level of RL 2.7m AHD. Details are to be submitted to and approved by the Principal Certifying Authority prior to the issue of the on-site Construction Certificate.

Comment

This request to Council is to reduce the minimum fill levels for the site.

The current condition 4.28 requires a minimum fill level for the whole site of 2.7m AHD. It should be mentioned the reference to the fill level in condition 4.29 as per the original consent of 3.2m AHD, should read 2.7m AHD.

The request is to reduce the minimum fill level for the car parking and vehicular access areas to 2.4m AHD and the minimum fill level under buildings, fuel bowser, fuel delivery and fuel storage areas to remain unchanged at 2.7m AHD.

The request is also to reduce the minimum floor level to 2.9m AHD.

Applicant's Contention

The applicant is requesting a variation to the minimum fill level and floor level requirements as stipulated within Ballina Shire Development Control Plan 2012 Chapter 2b – Flood Plain Management.

Council's current DCP identifies the site as vacant rural zoned land and requires a minimum fill level of 2.7m AHD. The request to vary this minimum fill level to 2.4m AHD for the carpark and access road areas of the site is consistent with how the policy is interpreted for these types of areas.

Further to this, Council's recently exhibited Draft DCP "Flood Risk Management" (not adopted by Council) did provide some discussion about contemporary fill requirements for commercial developments of this nature.

The Draft DCP requirements were as follows:

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1. The minimum surface level of open car parking spaces shall be as high as practical, and not below FPL2 (being the 50 year ARI for 2100 Climate Change model). Therefore minimum car park level can be 2.4m AHD.
2. The minimum floor level shall be equal to or greater than FPL 4 (being the 100yr ARI for 2100 climate change being 2.7m AHD plus 0.2m freeboard). Therefore the minimum floor level can be 2.9m AHD.

The draft policy suggested the minimum fill requirements remain, however the freeboard requirement of 500mm may be reduced to 200mm for commercial/industrial developments. This suggestion acknowledges commercial and industrial developments are non habitable, generally constructed from more flood compatible materials, property and goods are generally stored off the floor on shelving and racks and the 500mm freeboard can be more cost effective to achieve in commercial and industrial developments.

Comment

It is acknowledged that the reduction in minimum floor level from 500mm to 200mm freeboard above the minimum fill level for commercial/industrial developments has merit due to the following:

- size and nature of the building types for commercial/industrial developments
- the internal construction and fit out of a commercial/industrial developments are more flood compatible than residential buildings
- reduced development costs and
- ease of pedestrian access to the building

Discussions with Council's Civil Services Group indicated that the proposed Draft Flood Risk Management DCP that is to be placed on public exhibition in 2014 will include provisions for reducing the minimum floor level requirements for non-residential developments.

Council in its deliberations over this proposed amendment should consider whether it is reasonable to vary Ballina Shire Development Control Plan 2012 Chapter 2b – Flood Plain Management to permit the departure from the 500mm freeboard to permit the proposed amendment to the consent.

Condition 10.10 (existing)

The whole allotment is to be filled to a minimum level of RL 2.7 m AHD with the finished floor height of the building at RL 3.2 metres AHD. A Surveyor's Certificate verifying compliance with this requirement is to be submitted to the Principal Certifying Authority at completion of footings/slab formwork (prior to concrete pour) or completion of the timber floor.

Condition 10.10 (proposed)

The whole allotment is to be filled to a minimum level of RL 2.4 m AHD and the Highway Service Centre buildings, underground fuel tanks and fuel bowser area shall have a minimum fill level of 2.7m AHD and a finished floor height of the buildings at RL 2.9 m AHD. A Surveyor's Certificate verifying compliance

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with this requirement is to be submitted to the Principal Certifying Authority at completion of footings/slab formwork (prior to concrete pour) or completion of the timber floor.

Condition 10.11 (existing)

All site filling shall be to a minimum fill level of RL 3.2 m AHD for the service station and fuel tank portion of the development and shall be in compliance with the requirements of Level 1 geotechnical testing for:

AS 2870 – 1996 Residential Slabs and Footings Code
AS 3798 – 1996 Guidelines on Earthworks for Commercial and Residential Developments.

Condition 10.11 (proposed)

All site filling shall be to a minimum fill level of RL 2.7 m AHD for the service station, underground fuel tank and fuel bowser portion of the development and shall be in compliance with the requirements of Level 1 geotechnical testing for:

AS 2870 – 1996 Residential Slabs and Footings Code
AS 3798 – 1996 Guidelines on Earthworks for Commercial and Residential Developments.

Condition 10.12 (existing)

The finished floor height of buildings (other than those referred to in condition No.10.11) are to be constructed at a minimum RL of (3.2) metres AHD. A Surveyor's Certificate verifying compliance with this height is to be submitted to the Principal Certifying Authority at completion of slab formwork stage, prior to concrete pouring, or upon completion of the timber floor prior to work proceeding beyond this stage. Where filling is utilised to raise the slab level and extends to the outside of the building, such filling is to be adequately retained and drained to the stormwater drainage system, to ensure stormwater is not directed onto adjoining properties.

Condition 10.12 (proposed)

The finished floor level of buildings *are to be constructed at a minimum RL of 2.9 m AHD*. A Surveyor's Certificate verifying compliance with this height is to be submitted to the Principal Certifying Authority at completion of slab formwork stage, prior to concrete pouring, or upon completion of the timber floor prior to work proceeding beyond this stage. Where filling is utilised to raise the slab level and extends to the outside of the building, such filling is to be adequately retained and drained to the stormwater drainage system, to ensure stormwater is not directed onto adjoining properties.

Comment

These conditions provided certification that minimum levels have been obtained during construction works and are to be amended to reflect the changes to conditions 4.28 & 4.29.

Conclusion

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The Section 96(1A) Application currently before Council for consideration to amend Development Application DA 2010/962 (The Highway Service Centre) for the amendment to the land filling, the finished floor levels and the reduction in the number of flood culverts required should be supported on the following grounds:

- The proposal results in a development that is substantially the same as that approved by the Council
- The revised culvert configuration is consistent with the latest flood modeling and
- The revised minimum fill levels are consistent with Council's implementation of the current policy in relation to commercial/industrial development within the Shire.

RECOMMENDATIONS

That the Application under S96 (1A) of the Environmental Planning and Assessment Act to amend the provisions of Conditions 2.1, 2.9, 3.4, 4.28 & 4.29, 10.10, 10.11 & 10.12 of DA 2010/962 in relation to the land filling, the finished floor levels and the reduction in the number of flood culverts be **APPROVED** subject to compliance with the specified amended conditions as set out below:

- 2.1 Development being carried out generally in accordance with the plans and associated documentation lodged by or on behalf of the applicant, including Drawing No.'s A04.01DA & A00.02DA Issue B Dated 1/3/11, A-A&G-06.01DA Issue A, A-B & C – 06.01DA Issue A, A-E&F – 06.01DA Issue A, A60.01DA Issue A Dated 2/11/2010 and Drawing No. 6151-001 revision A, drawing 6151-006 revision A, drawing 6151-007 revision A dated 18/03/11 prepared by Cardno Eppel Olsen, as modified by Cardno drawings "Floodway Culvert Schematic sketches B1009/23", sheet 7 Rev B, sheet 8 Rev C, sheet 9 Rev B & sheet 10 Rev B dated July 2013, BMT WBM Flood Impact Assessment Report dated January 2009 and associated document dated 13/09/10, BMT WBM report entitled "West Ballina Flood Relief Optimisation Study" dated 1st December 2013, Coffey Geotechnical Report & plans "Interim Geotechnical Design for preload works: Ballina Highway Service Centre dated 30 September 2010, and Landscape Plan prepared by Jackie Amos, except as modified by any condition in this consent, and by the reports/details & plans to be carried out in accordance with the deferred commencement conditions of this consent.
- 2.9 No site filling or associated works are to occur on proposed Lot 1 (the Highway Service Centre Site) until all works associated with the construction and establishment of the flood culverts under River Street (Off-site), the associated River Street works and the establishment of a construction access to the site, the floodway and the spine road culvert/bridge(On-site) have been completed in accordance with the design criteria as specified within the BMT WBM Flood Impact Assessment Report for Lot 1 DP 238009 dated January 2009, BMT WBM West Ballina Flood Relief Optimisation Study dated December 2013 and associated documents to the satisfaction of

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Council and NSW Department Primary Industries (Fisheries). Alternatively if the filling of the site is to be carried out in conjunction with the construction of the culverts, a Flood Gap Strategy Report is to be submitted to and approved by Council prior to the issue of the Construction Certificate for on-site works or the issue of the Section 138 Certificate for the off-site works.

- 3.4 The size of the floodway culverts under River Street (the 'Old' Pacific Highway) and the internal access road are to be constructed in accordance with Cardno drawings Floodway Culvert Schematic sketches B1009/23, sheet 7 Rev B, sheet 8 Rev C, sheet 9 Rev B & sheet 10 Rev B dated July 2013. Detailed construction plans are to be submitted to and approved by Council prior to issue of the Section 138 Roads Act approval.
- 4.28 The Highway Service Centre site west of the floodway (inclusive of the spine road) must be filled to a minimum level of RL 2.4 m AHD and the service station, underground fuel tank and fuel bowser areas shall have a minimum finished fill level of 2.7m AHD and a minimum finished floor level of RL 2.9m AHD except where floodway hydraulics and environmental hazards prevail. Masonry retaining walls and dish gutters shall be constructed, and wholly contained, within side and rear boundaries of the site, such that no stormwater is discharged from the site onto the adjoining properties. The adjoining properties shall be drained at the common boundary with the site via a concrete dish drain such that no water ponds on any neighbouring properties due to filling of the site. The stormwater drainage shall be discharged to Council's drainage system. Details are to be submitted to and approved by Council prior to the issue of the On-site Construction Certificate.
- 4.29 The portion of the allotment associated with the Highway Service Centre buildings, underground fuel tanks and fuel bowser area must be filled to a minimum level of RL 2.7m AHD. Details are to be submitted to and approved by the Principal Certifying Authority prior to the issue of the on-site Construction Certificate.
- 10.10 **Minimum fill and floor levels**
The whole allotment is to be filled to a minimum level of RL 2.4 m AHD and the Highway Service Centre buildings, underground fuel tanks and fuel bowser area shall have a minimum fill level of 2.7m AHD and a finished floor height of the building at RL 2.9 metres AHD. A Surveyor's Certificate verifying compliance with this requirement is to be submitted to the Principal Certifying Authority at completion of footings/slab formwork (prior to concrete pour) or completion of the timber floor.
- 10.11 All site filling shall be to a minimum fill level of RL 2.7 m AHD for the service station, underground fuel tank and fuel bowser portion of the development and shall be in compliance with the requirements of Level 1 geotechnical testing for:

AS 2870 – 1996 Residential Slabs and Footings Code
AS 3798 – 1996 Guidelines on Earthworks for Commercial and Residential Developments.

8.3 DA 2010/962 - Highway Service Centre - Section 96 Amendment.DOC

8.1 DA 2010/962 - Highway Service Centre - Section 96 Amendment

10.12 The finished floor level of buildings are to be constructed at a minimum RL of 2.9 m AHD. A Surveyor's Certificate verifying compliance with this height is to be submitted to the Principal Certifying Authority at completion of slab formwork stage, prior to concrete pouring, or upon completion of the timber floor prior to work proceeding beyond this stage. Where filling is utilised to raise the slab level and extends to the outside of the building, such filling is to be adequately retained and drained to the stormwater drainage system, to ensure stormwater is not directed onto adjoining properties.

Attachment(s)

1. West Ballina Flood Relief Optimisation Study



Our Ref: : L.B20176.004.docx

5 December 2013

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Attention: Paul Busmanis

Dear Paul

RE: WEST BALLINA FLOOD RELIEF OPTIMISATION STUDY

Following assessment of the impacts associated with the development of three parcels of land in West Ballina (ref. L.B20176.003.docx (BMT WBM, 12 July 2013)) and a subsequent meeting with the Ballina Highway Service Centre developers (ref. M_B20176_001_Meeting_Minutes_130819.doc (BMT WBM, 19 August 2013)), BMT WBM has been commissioned to undertake an 'optimisation study' relating to the implementation of mitigation works associated with the development. The mitigation works, referred to as the West Ballina Flood Relief, comprise a floodway from north to south through the development site to a set of culverts beneath River Street in West Ballina. Since the 1990's, these mitigation works have been included in Ballina Shire Council's flood mitigation scheme. The previous modelling work, undertaken to assess the impacts of the development, identified that two (2) of the ultimate 10 culvert cells would be sufficient to mitigate the impacts of the West Ballina development (Lot 1 DP238009). At a later stage, as the need arises, Council would then be able to upgrade the culverts to the ultimate configuration. Additional to the culverts under River Street, there will be a set of culverts across the upstream floodway to provide an access road to the proposed development. Refer to Figure 1 for locality and Figure 3 for schematic layout of culverts.

This letter report describes the outcomes from an 'optimisation study' for the West Ballina Flood Relief. The focus of the study has been the immediate mitigation works (i.e. two cell culverts or equivalent). However, consideration has also been given to the future expansion of the culverts.

For this study, a matrix of 42 scenarios has been developed to identify the design required to achieve optimum performance of the West Ballina Flood Relief. The following design aspects have been assessed:

- Culvert dimensions – the size and number of cells required to mitigate the impacts of the West Ballina developments
- Floodway invert and cross section
- The need for backflow prevention (such as a weir or floodgates) to prevent tidal inundation of the floodplain

For complete assessment, both local catchment and Richmond River dominated floods have been considered, as well as floods of different magnitudes (20 year and 100 year ARI).

The outcomes from the assessment are described below.

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A part of BMT in Energy and Environment

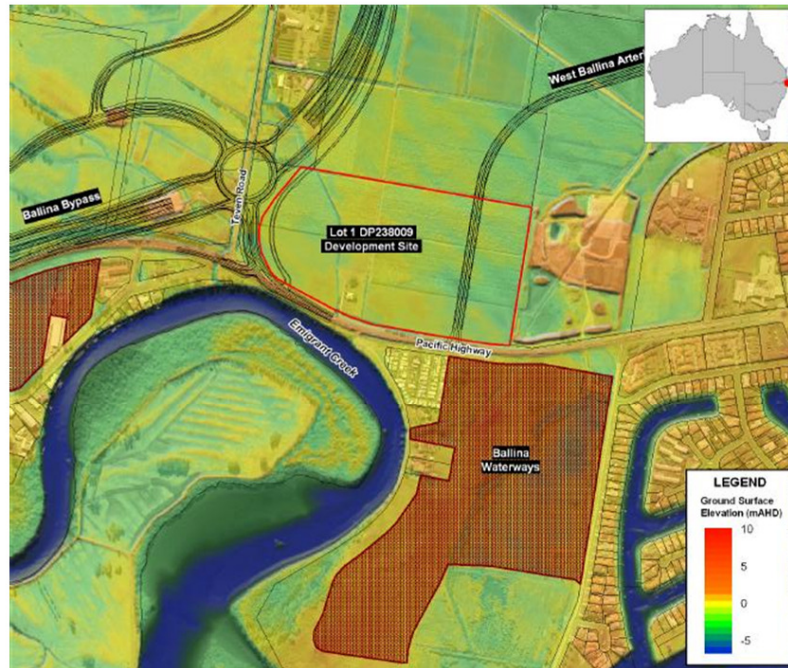


Figure 1 Lot 1 DP238009 development site and locality

Culvert Dimensions and Floodway Invert

To fit beneath the existing road embankment, culverts are set at 1.2m high. Culvert cell width has been set at 3.6m to minimise blockage potential. Due to site constraints (road level, tide levels and constructability) the culvert invert level has been set at 0m AHD as per previous reports. For this study, culverts configurations of 1, 2, 3, 4, 6, 8 and 10 cells have been modelled.

The floodway connecting the culverts to the floodplain has previously been modelled with invert levels of 0.65m and 1.0m AHD, base width of 40m and side slopes of 1:3. The natural ground levels along the floodway alignment are between 0.8m and 1.1m AHD. The floodplain at the northern end of the floodway is at approximately 0.6m AHD. For this study, floodway invert levels of 0.6m, 0.8m and 1.0m AHD have been modelled.

The matrix of simulations to assess the number of cells and the floodway invert level is presented in Table 1.

Table 1 Simulation matrix for culvert cells and floodway invert level

Number of cells	Floodway Invert Level (m AHD)		
	0.6m	0.8m	1.0m
1	100 year		100 year
2*	20 and 100 year	20 and 100 year	20 and 100 year
3	100 year		100 year
4	100 year		100 year
6	100 year		100 year
8	100 year		100 year
10*	20 and 100 year	20 and 100 year	20 and 100 year

* The Richmond River and local catchment dominated events have been modelled for the 2 and 10 cell culvert configurations

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Results of the assessment are presented in Figure 2 for the 100 year ARI local catchment event.

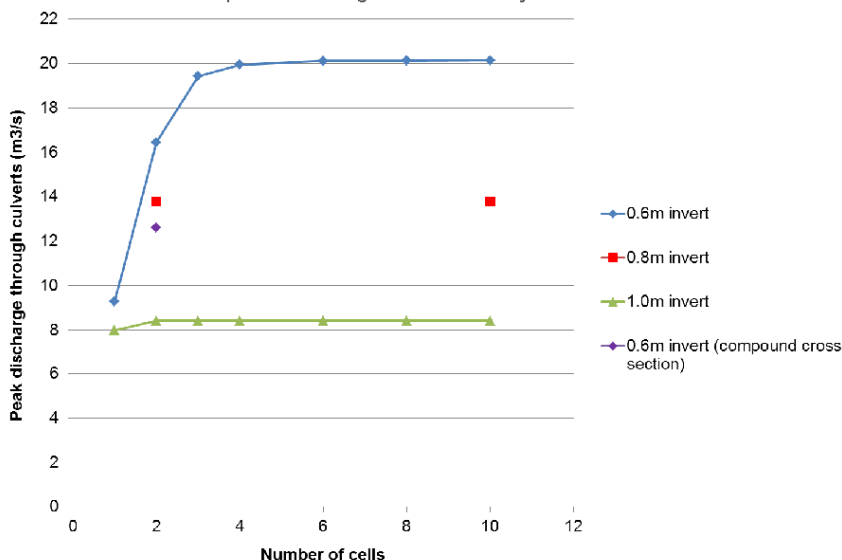


Figure 2 Peak discharge for various culvert cell and floodway invert combinations (100 year ARI local catchment event)

The results presented in Figure 2 indicate that for the 0.6m AHD floodway invert scenario, more than four culvert cells does not provide any significant improvement to peak discharge rates. The volumetric discharge is, however, greater with the larger number of cells due to high early discharge associated with wider culverts. This results in marginally lower peak flood levels and shorter inundation duration with more cells. The inundation duration has not been quantified as part of this optimisation study, however, will be undertaken as part of the future expansion of the culverts.

For a 1.0m AHD floodway invert, there is little difference in peak discharge rates above when more than 2 cells are used. Again, the volumetric discharge will be marginally greater with more than 2 cells.

Similar results are experienced during the Richmond River dominated floods and during the 20 year ARI event, although optimisation of the number of culverts was not undertaken (only 2 and 10 cells were modelled for events other than the 100 year ARI local catchment flood).

The reason for the minimal improvement above a certain number of cells is that the floodway becomes the hydraulic control (i.e. flow is restricted by the capacity of the floodway, not the culverts). The results of this assessment highlight the sensitivity of the floodway invert. By reducing the floodway invert from 1.0m to 0.6m AHD, the discharge through the West Ballina Flood Relief more than doubles. This is evident in all event sources (Richmond River and local catchment) and event magnitudes (20 year and 100 year ARI) that have been assessed.

Compound Cross Section

A compound cross section has also been assessed. The cross section assumed natural ground levels along the floodway, although cutting a 10m wide channel along the length to an invert level of 0.6m AHD. The peak discharge for a 2 cell configuration is shown in Figure 2. This shows that use of a low flow channel can significantly improve the floodway efficiency.

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Need for Backflow Prevention

The need for floodgates or a weir to prevent tidal intrusion (backflow prevention) during high tides and to limit the back flooding of the floodplain during elevated Richmond River levels has been identified in the previous studies. The highest astronomical tide at Ballina is 1.1m AHD; this is projected to increase with sea level rise. Therefore, a mechanism to prevent water backing up the West Ballina Flood Relief is essential.

Three options have been considered as part of this assessment:

1. Floodgates on the outlet of the culverts;
2. Weir in the upstream channel, perpendicular to the centre line of the floodway; and
3. Weir in the upstream channel, 45 degrees to the centre line of the floodway.

The weir crest has been set at 1.2m AHD in the model simulations.

As expected, the use of floodgates provides the greatest efficiency. This is due to the ability for the floodway to operate at lower water levels. For the weir scenarios, the West Ballina Flood Relief will only operate when upstream flood levels exceed the height of the weir, in this case 1.2m AHD. At this stage, there would already be up to 0.6m of inundation across the floodplain.

Mitigating the Impacts of the West Ballina Development

As discussed in the previous assessment (ref. L.B20176.003.docx (BMT WBM, 12 July 2013)), a two cell arrangement provides sufficient flood mitigation to compensate for complete site filling. The previous modelling assumed a floodway invert of 0.65m AHD. The optimisation simulations have indicated adequate flood mitigation using a two cell arrangement and a 1.0m floodway invert (or natural ground level). This is valid for the 20 year and 100 year ARI events. Should the floodway also be lowered to 0.6m AHD, additional peak flood level reduction will occur.

Refer to Figure B20176-23 for peak flood level impacts associated with the recommended 2 cell culvert arrangement. Flood damages have been re-calculated for the undeveloped, unmitigated scenario and the developed, mitigated scenario. The analysis has shown an overall improvement is expected, with average annual damages reducing from \$12,104,286 to \$12,065,151.

Summary

The following points summarise the outcomes from the optimisation study for the West Ballina Flood Relief (refer to Figure 3 for schematic layout and Table 2 for specification):

- Peak flood level impacts caused by complete site filling can be compensated using a two cell culvert arrangement for the River Street culverts (2 cells of 1.2m high by 3.6m wide), with an invert level of 0m AHD.
- Culverts for the internal access road should have a maximum invert level of 0.5m AHD to allow for future excavation of the floodway reserve. To minimise afflux associated with these culverts, the soffit should be above the 100 year ARI flood level (i.e. minimum of 2.0m AHD).
- A 40m wide floodway reserve at natural ground level must be maintained upstream from the access road culverts to connect with the floodplain to the north of the site.
- There is significant benefit in lowering the upstream floodway (from the access road culverts to the northern property boundary) to its ultimate design level of 0.6m AHD.
- A minimum 40m wide floodway must be provided between the River Street and access road culverts. The invert level of the floodway is to match the invert levels of the upstream and downstream culverts.
- A drop structure is required at the upstream face of the access road culverts. The form of the drop structure is preferred to be a batter with rock protection.
- Backflow prevention is required in the form of hinged floodgates fitted to the downstream side of the River Street culverts.

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Figure 3 Schematic layout for the partial implementation of the West Ballina Flood Relief

Table 2 Specification for the partial implementation of the West Ballina Flood Relief

	Minimum requirements	
	For mitigation of Lot1 DP238009 development	Ultimate West Ballina Flood Relief arrangement
Upstream floodway width	Min. 40m	
Upstream floodway invert	Natural ground - approx. 1.0m AHD (can be excavated to ultimate level of 0.6m AHD for full 40m width or partial width as a low flow channel)	0.6m AHD
Access road culverts	Cells of 3.6m wide by 1.5m high	Up to 10 cells of 3.6m wide by 1.5m high
Access road culvert invert	Max. 0.5m AHD	
Access road culvert soffit	Min. 2.0m AHD	
Width of floodway between access road and River Street culverts	Min. 40m	Min. 40m
Invert of floodway between access road and River Street culverts	Constant grade from access road culvert invert to River Street culvert invert	
River Street culverts	2 cells of 3.6m wide by 1.2m high	Up to 10 cells of 3.6m wide by 1.2m high
River Street culvert invert	0.0m AHD	
River Street culvert floodgates	Floodgates to downstream side	
Slopes for all batters	Minimum to satisfy safety and maintenance	

Should you require any additional information or wish to discuss the contents of this letter, please feel free to contact the undersigned on 07 3831 6744.

Yours faithfully

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BMT WBM Pty Ltd



Ben Caddis

Associate, Senior Flood Engineer

cc Toong Chin (NSW Office of Environment and Heritage)

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