



DARRYL ANDERSON CONSULTING PTY LTD

TOWN PLANNING & DEVELOPMENT CONSULTANTS

**ENVIRONMENTAL ASSESSMENT UNDER PART 3A OF THE
ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979
(AS AMENDED)**

MAJOR PROJECT APPLICATION NO. 09_0166

**PROPOSED 321 LOT SUBDIVISION
(COMPRISING 317 RESIDENTIAL LOTS, 2 PUBLIC RESERVE LOTS,
1 DRAINAGE RESERVE LOT & 1 COMMUNITY ASSOCIATION LOT)
OF LOT 1 DP 304649, LOT 1 DP 175235, LOT 1 DP 781687,
LOT 2 DP 778727, LOT 1 DP 781697, LOT 1 DP 169490 &
LOTS 40 & 43 DP 254416, FRASER DRIVE, TERRANORA
(TWEED LOCAL GOVERNMENT AREA)**

PREPARED FOR:

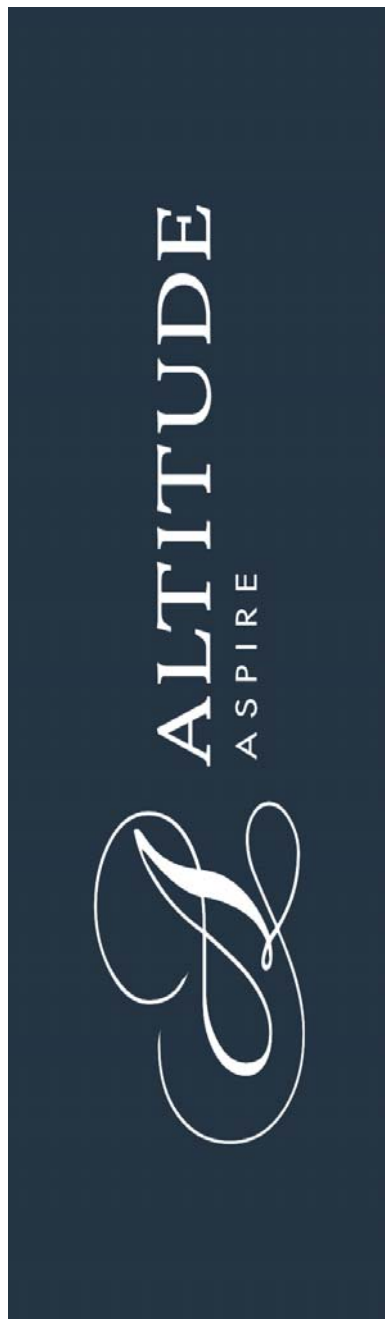
METRICON QLD PTY LTD



PREPARED BY:

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**SEPTEMBER 2010
REVISED DECEMBER 2010**



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**DRAFT ENVIRONMENTAL ASSESSMENT UNDER PART 3A
OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979 (AS AMENDED)
APPLICATION NO. 09_0166**

EXECUTIVE SUMMARY

On 23 September 2009 the Department of Planning advised that the Deputy Director General (as delegate of the Minister) has formed the opinion (on 15 September 2009) that the proposal is a project to which Part 3A of the Environmental Planning and Assessment Act applies.

Subsequently, on 23 November 2009 the Department of Planning issued the Director General's Environmental Assessment Requirements for the project.

In response to the Director General's Environmental Assessment Requirements Metricon (QLD) Pty Ltd has instructed Darryl Anderson Consulting Pty Ltd to prepare this Environmental Assessment Report in respect of the Major Project Application seeking project approval for a proposed 321 lot residential subdivision including bulk earthworks, opening and construction of roads and provision of all normal urban infrastructure, together with a Community Recreation Club and temporary Sales Office/Display Home.

The site is located within Tweed Shire Council's Terranora Urban Release Area E which is located approximately 6 kilometres southwest of Tweed Heads and approximately 6 kilometres south of the Gold Coast Airport. Known as Altitude Aspire (formerly known as Altitude 1), the project is within the Tweed Local Government Area and is located at the suburb of Terranora.

Tweed Local Environmental Plan 2000 Amendment No. 10 was gazetted on 26 October 2007 pursuant to which the land was rezoned to 2(c) Urban Expansion with a small area of 7(a) Environmental Protection on the northern part of the site. The residential allotments are confined to that part of the site zoned 2(c). The site is within the existing urban footprint under the Far North Coast Regional Strategy 2006 – 2031 and is also identified as an urban area in the Tweed Shire Council's 1991 Residential Development Strategy.

Altitude Aspire is located within the Area E Urban Release Area which is bounded by Fraser Drive, Terranora Broadwater, Mahers Lane and Terranora Road. Approximately 183 hectares of the release area is zoned 2(c) Urban Expansion which is likely to yield approximately 5000 persons, subject to finalisation of the Draft Development Control Plan for the area by Tweed Shire Council. Altitude Aspire will yield 317 residential allotments, 2 public reserve lots, 1 drainage reserve lot and 1 community association lot (total 321 lots) and will contribute a population within the release area of approximately 720 persons. Altitude Aspire is located on the eastern fringe of the urban release area with frontage to Fraser Drive. This is a logical location to commence development within the release area as it is in close proximity to existing services and infrastructure and enables efficient and timely development to proceed. Logically, development will proceed from east to west as demand and infrastructure extensions dictate.

Development of the subdivision is proposed under the Community Land Development Act, 1989. Proposed Lot 711 will comprise the only Community Association property, on which will be constructed a Community Recreation Facility for use by the residents of Altitude Aspire. All roads, drainage reserves and public reserves will be dedicated to the public and will be under the care, control and management of Tweed Shire Council.

In real property terms, the site is described as Lot 1 DP 304649, Lot 1 DP 175235, Lot 1 DP 781687, Lot 2 DP 778727, Lot 1 DP 781697, Lot 1 DP 169490 and Lots 40 and 43 DP 254416 having a total area of 35.74 hectares. The site ranges from approximately RL 87m AHD adjacent to Parkes Lane to approximately RL 1m AHD in the northern part of the site adjacent to the 7(a) wetland. Improvements comprise agricultural machinery sheds which will be demolished together with fencing and other agricultural improvements. The site (including Lot 1 DP 169490 being a closed road) has previously been used for agricultural cropping and is currently used for cattle grazing.

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Adjoining Lot 1 DP 798633, also being a closed road, is currently used for rural residential purposes including a dwelling house (see **Annexure 4**). Lot 2 DP 709021 is owned by Tweed Shire Council as operational land and is used for drainage purposes.

Lot 1 DP 175235 is burdened by a right of carriageway (DP 843665) benefiting the adjoining Lot 1 DP 175234. Lot 1 DP 304649 is burdened by an easement for transmission lines (DP 642269) (see **Annexure 6**).

Immediately adjoining land to the north comprises relatively large lot residential development and a State Environmental Planning Policy No. 14 wetland, to the west the land comprises grazing land which will be developed at a later date and the land generally to the south comprises the Parkes Lane/Market Parade rural residential precinct. Land to the east of Fraser Drive comprises predominantly single, detached dwelling houses on lots of approximately 600m to 1000m in area.

An existing natural watercourse through the site drains the upper catchment areas adjacent to Terranora Road and discharges into the State Environmental Planning Policy No. 14 Wetland and ultimately Terranora Broadwater to the north. Site gradients are in excess of 25% in parts, particularly adjacent to the natural watercourse (see **Annexure 6**).

The site presents a number of development opportunities including appropriate zoning, minimal environmental constraints and availability of key infrastructure in, or adjacent to, the site subject to normal augmentation and extension.

Relative site constraints include bushfire hazards, existing land gradients, the central watercourse, the proximity of the State Environmental Planning Policy No. 14 Wetland to the north and the generally established low density, detached dwelling character of the existing neighbourhoods to the east of Fraser Drive.

Finalisation of the subdivision layout reflects the key site opportunities and constraints and is informed by the specialist reports and studies contained in the Annexures including:

- Cultural Heritage Assessment
- Acoustic Report
- Soil Contamination Assessment
- Stormwater Management Assessment
- Ecological Assessment (Flora and Fauna)
- Acid Sulphate Soils Assessment
- Engineering Assessment
- Geotechnical Assessment
- Visual Impact Assessment
- Biting Insects Assessment
- Bushfire Assessment

Having regard to these assessments, this Environmental Assessment concludes that the project is sustainable and compliant with relevant planning controls.

1.1 Director General's Environmental Assessment Requirements

The Director General's Environmental Assessment Requirements are reproduced in Table 1. The table indicates where each of the relevant matters is addressed in this Environmental Assessment.

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
Project No. 09_0166	
321-lot residential at the southern end of Fraser Drive, Terranora (known as Altitude I), and provision of infrastructure and dedication of open space areas. Key elements of the project include: ♦ opening and construction of all proposed roads; ♦ construction of a temporary intersection to Fraser Drive; ♦ provision of underground services (water, sewer, stormwater, power and telephone); and ♦ bulk earthworks to establish final landforms.	
Location	
Lot 1 DP 304649, Lot 1 DP 175235, Lot 1 DP 781687, Lot 2 DP 778727, Lot 1 DP 781697, Lot 1 DP 169490, and Lots 40 and 43 DP 254416 at the southern end of Fraser Drive, Terranora, Tweed LGA	
Proponent	
Meticon QLD Pty Ltd	
Date of Issue	
Received by DAC 24 November 2009	
General Requirements	
The Environmental Assessment (EA) for the Project Application must include:	
1. An executive summary;	Pages 7 and 8
2. A detailed description of the project including the:	Section 2.0
3. A thorough site analysis including constraints mapping and description of the existing environment;	Section 3.0
4. Consideration of any relevant statutory and non-statutory provisions and identification of any noncompliances with such provisions, in particular relevant provisions arising from environmental planning instruments, Regional Strategies (including draft Regional Strategies) and Development Control Plans;	Section 4.0
5. Consideration of the consistency of the project with the objects of the Environmental Planning and Assessment Act 7979;	Section 5.0
6. Consideration of impacts, if any, on matters of National Environmental Significance under the Commonwealth Environment Protection and Biodiversity Conservation Act 7999;	Section 6.0
7. An assessment of the potential impacts of the project and a draft Statement of Commitments, including a description of mitigation and management options that will be used to prevent, control, abate or mitigate identified environmental impacts associated with the project and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented;	Sections 7.0 and 8.0
8. The plans and documents outlined in Attachment 2;	See Annexures
9. A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading; and	Annexure 1
10. An assessment of the key issues specified below and a table outlining where in the EA these key issues have been addressed.	Section 8.0
Key Issues	
The EA must address the following key issues:	
1. Strategic Planning	Section 8.1
1.1 Justify the proposal with reference to relevant local, regional and State planning strategies. In particular provide justification for any inconsistencies with these planning strategies.	
1.2 Provide an assessment of how the proposal aligns with development of the Terranora E urban release area as a whole.	

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
2. Subdivision Design, Layout and Desired Future Character	Section 8.2
2.1 Provide an assessment of the Proposal against the provisions of the Tweed Local Environment Plan 2000 (TLEP), in particular Clause 53D of the TLEP relating to the Terranora E urban release area.	
2.2 Demonstrate the consistency of the proposed subdivision design and layout with the North Coast Urban Design Guidelines, Coastal Design Guidelines for NSW, NSW Coastal Policy 1997 and SEPP 71 - Coastal Protection.	
2.3 Identify the type of subdivision proposed across the site i.e. community title, Torrens, strata. A draft community management statement should be provided if any community title is proposed.	
2.4 Demonstrate that the proposal provides for the establishment of a suitable neighbourhood character for the area. Provide details of potential building envelopes, built form, potential housing typologies, aesthetics, energy and water efficiency, public safety, any proposed design quality controls and the means for implementing them, and identify opportunities to orientate allotment configurations and shapes to maximise solar access, aspect and views.	
2.5 Demonstrate that slope sensitive building design initiatives have been considered in the subdivision design to ensure there is a suitable access gradient and minimal cut and fill.	
2.6 Provide details of any staging (for the subject site and the overall Terranora E area) that demonstrates the lots will be released in an orderly and coordinated manner, including the release of allotments for sale, the installation of services and infrastructure.	
2.7 Outline the long-term management and maintenance of any areas of open space or conservation including ownership and control, management and maintenance funding, public access, revegetation and rehabilitation works and bushfire management.	
2.8 Investigate the opportunity for passive and active recreational open spaces.	
2.9 Assess the potential for land use conflicts between with neighbouring property and provide suitable buffers (or other mitigation measures) where appropriate to mitigate these impacts. This is particularly relevant where development is proposed to adjoin or be close to land that is used for agriculture.	
3. Visual Impact	Section 8.3
3.1 Demonstrate that the subdivision design and layout of the dwellings is able to preserve the scenic values of the area, in particular the integrity of the ridgelines, and the views and environmental qualities of Terranora Broadwater and the adjacent SEPP 14 Wetland.	
4. Infrastructure Provision	Section 8.3
4.1 Identify existing capacity of, and requirements for the provision of all appropriate services and infrastructure, including: sewerage, water, stormwater, electricity, waste disposal, telecommunications, gas, open space, roads and transport, pedestrian and cycle-friendly infrastructure, community facilities and social infrastructure, and State Infrastructure. Undertake consultation with relevant agencies and provide evidence of this consultation. Identify and describe staging, if any, of proposed infrastructure works.	
4.2 Provide an assessment of how the provision for services and infrastructure required at both a State and local level will be managed (refer to submissions from agencies at Attachment 4). Consult with relevant agencies and include an outline of the program of works for such services and infrastructure, and provide estimates of cost, timing of works, and sources of funding.	
5. Transport and Accessibility	Section 8.3
5.1 Prepare a transport and accessibility impact study in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments.	
Alternative Modes of Transport	
5.2 Address how the Proposal is consistent with the objectives and principles of the NSW Government's Integrating Land Use and Transport Policy package and the NSW Planning Guidelines for Walking and Cycling.	
5.3 Identify measures to manage travel demand and increase the use of public and non-car transport modes.	

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
5.4 Outline any proposed cycleways and ensure connectivity with existing cycleways in the area, especially Fraser Drive.	
5.5 Identify the likely transport infrastructure and recurrent servicing costs for Government in proceeding with the development.	
5.6 It is noted the subject site is located outside the Tweed Heads bus contract region and is not serviced by public transport. Residential developments outside of the bus contract regions are generally only provided with local school bus services. Boundaries of bus contract regions are subject to review every five years following the census. Please contact Mr. Phil Sullivan, Manager - Northern Region on (02) 4928 8701 or email phil.sullivan@transport.nsw.gov.au regarding the process for potential allocation of bus services to the proposal.	
Traffic and Roads	
5.7 Demonstrate that the proposed road layout can achieve a high degree of pedestrian and cycle access, and can support future bus access in accordance with the NSWTI bus planning guidelines for regional areas. Also identify and address how staging of the development will impact on accessibility across different transport modes.	
5.8 Demonstrate that the proposed internal road layout maximises connectivity within the development, to the broader Terranora Area E urban release area, and to the surrounding environment.	
5.9 Analyse the impacts of an expected increase in traffic on the existing road network surrounding the site, and provide measures to ensure that traffic impacts on the existing and future local road network are minimised. Address how the proposed temporary access to Fraser Drive will affect the amenity of local roads	
5.10 Provide an assessment of the feasibility and environmental impacts of the proposed temporary access to Fraser Drive. Including: • Provide justification for the proposed location and design of the temporary access and its suitability; • identify the expected life of the temporary access and any staging of works and/or construction of the permanent road alignment; • identify how the temporary intersection is proposed to be controlled; • provide an assessment of the safety and capability of the proposed temporary intersection; and • address any potential adverse environmental effects (including noise, amenity etc ...) for adjacent landowners.	
5.11 Provide an assessment of how the future permanent alignment of Broadwater Parkway and Fraser Drive is anticipated to work in terms of timing, payment and constraints (refer to Tweed Shire Council's comments on Infrastructure, Roads and Access in Attachment 4).	
5.12 Ensure environmental objectives are not significantly compromised by the design and layout of the proposed road network, including the proposed Broadwater Parkway's interaction with the SEPP 14 wetland.	
5.13 Investigate the opportunity for road alignments to follow existing land contours. The objective is to minimise cut and fill, preserve the integrity of the existing topography, and take advantage of existing overland drainage opportunities.	
Public Access	
5.14 Ensure public access to and along the adjacent SEPP 14 wetland and Terranora Broadwater is not compromised, and provide new opportunities for controlled public access and disabled access where appropriate.	
6. Hazard Management and Mitigation	Section 8.4
Contamination	
6.1 Identify any deep soil, surface water and groundwater contamination on site and assess appropriate mitigation measures and monitoring program necessary in accordance with the provisions of SEPP 55 - Remediation of Land.	

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
Acid Sulfate Soils	
6.2 Identify the presence and extent of acid sulfate soils (ASS) and potential acid sulphate soils (PASS) on the site and, where relevant, provide appropriate mitigation measures for the development's construction and operational stages. Identify the need for an Acid Sulfate Management Plan and prepare if necessary (prepared in accordance with ASSMAC Guidelines).	
Bushfire	
6.3 Address the requirements of Planning for Bush Fire Protection 2006 (RFS) and ensure that any proposed Asset Protection Zones do not adversely effect environmental objectives (e.g. buffers) and provision is made for their appropriate management into the future.	
Geotechnical	
6.4 Provide an updated assessment of any geotechnical limitations that may occur on the site and if necessary, appropriate design considerations that address these limitations.	
Flooding	
6.5 Provide an updated assessment of any flood risk on site (for the full range of floods including events greater than the design flood, up to probable maximum flood; and from coastal inundation, catchment based flooding or a combination of the two) and having consideration of any relevant provisions of the NSW Floodplain Development Manual 2005, the NSW Sea Level Rise Policy Statement (DECCW, 2009), the Draft Flood Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments (DECCW, 2009), and the Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise (DoP, 2009). The assessment should determine: the flood hazard in the area; address the impact of flooding on the proposed development, address the impact of the development (including filling) on flood behaviour of the site and adjacent lands; and address adequate egress and safety in a flood event.	
6.6 Assess the potential impacts of sea level rise and increases in rainfall intensity on the flood regime of the site and adjacent lands.	
7. Earthworks	Section 8.5
7.1 Provide a detailed site survey showing existing and proposed contours, levels and quantities of cut and fill earthworks, and provide details of the source of fill including types of material and soils.	
7.2 Outline all erosion and sediment control measures proposed during works, and provide for the appropriate management and discharge of stormwater onsite. Ensure riparian areas, waterways, and the SEPP 14 wetland adjacent to the site are not adversely affected by the proposed development.	
8. Stormwater	Section 8.5
8.1 Address stormwater quality and quantity, including lawful points of discharge. A comprehensive stormwater management plan should be provided for the whole site, in conjunction with the wider Area E and contributing external catchments. This plan must provide for the appropriate management of stormwater and ensure there are no adverse environmental impacts as a result of the proposal. The plan must also include a conceptual design layout for the preferred stormwater treatment train showing location, size and key functional elements of each part of the system and identify the anticipated effect of each element.	
8.2 Address and outline measures for Integrated Water Cycle Management based on Water Sensitive Urban Design principles which addresses impacts on the surrounding environment, drainage and water quality and quantity controls for the catchment, so that there is no water pollution resulting from the development.	
8.3 Provide an assessment of the proposal against the provisions of the following: ♦ the Tweed Urban Stormwater Quality Management Plan 2000; ♦ Tweed Shire Council's Terranora Broadwater Management Plan 2004; and ♦ The Draft Cobaki and Terranora Broadwater Catchment Management Plan (currently on exhibition).	

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
9. Water Supply	Section 8.5
9.1 Address the issue of provision of a sustainable water supply for the development site. Ensure there is adequate water supply for the development. If an alternative other than town water supply is proposed then provide an assessment of the water requirements. The assessment should include Water Management Plans detailing how a sustainable and efficient water supply can be sourced and implemented with minimal reliance on accessing valuable surface and groundwater resources.	
10. Surface Water	Section 8.6
10.1 In accordance with the correspondence from the NSW Office of Water and DECCW (refer to Attachment 4), provide an assessment of any impacts on surface water as a result of the development, including any impacts on quantity, quality and the hydrological regime.	
10.2 Provide an assessment of measures to ensure the following water quality objectives for the proposal are met:	
- There is no pollution of waters during the construction and operational phases; - There is no inconsistency with any Statement of Joint Intent established by the Healthy Rivers Commission; and - Ensure the proposal is not inconsistent with the relevant River Flow Objectives and Water Quality Objectives for the area.	
10.3 Provide an assessment of the proposal against the provisions of the draft <i>Tweed River Area Unregulated and Alluvial Water Sources Water Sharing Plan</i> , if relevant.	
Water Management Structures/Dams	Section 8.7
10.4 Identify any water management structures on site (dams, sediment basins etc) and provide an assessment of their management as part of the proposal (refer to the letter from NSW Office of Water in Attachment 4 for further details).	
Riparian Areas	Section 8.7
10.5 Identify all riparian areas on site including any creeks, wetlands, drainage lines etc. and outline the intended management, protection and restoration of these areas, including monitoring and mitigation measures. The protection and restoration of riparian zones will maintain and improve the ecological functions of watercourses and forms a key part of ensuring appropriate water quality is achieved. If any works are proposed within the riparian areas (such as bridges, culverts, stormwater outlets, walking tracks etc ...) then this should be identified.	
In addition to sections 10.1 and 10.3 above, provide the following:	
- Identify the sources of surface water. - Details of stream order (using the Strahler System). - Details of any proposed surface water extraction, including purpose, location of existing pumps, dams, diversions, cuttings and levees. - Detailed description of any proposed development or diversion works including all construction, clearing, draining, excavation and filling. - An evaluation of the proposed methods of excavation, construction and material placement. - A detailed description of all potential environmental impacts of any proposed development in terms of vegetation, sediment movement, water quality and hydraulic regime. - A description of the design features and measures to be incorporated into any proposed development to guard against long term actual and potential environmental disturbances, particularly in respect of maintaining the natural hydrological regime and sediment movement patterns and the identification of riparian buffers. (See note below) - Details of the impact on water quality and remedial measures proposed to address any possible adverse effects.	
Note: Recommended Core Riparian Zones:	
- Minimum of 10m for any intermittently flowing 1st order watercourse 20m for any permanently flowing 1st order or any 2nd order watercourse 20m-40m (merit based assessment) for any 3rd order or greater watercourse	

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
11. Groundwater	Section 8.8
11.1 In accordance with the correspondence from the NSW Office of Water (refer to Attachment 4), provide an assessment of groundwater issues associated with the development, the location of the water table, the nature and profile of the groundwater regime, if any works will intercept the water table, any potential contamination issues, any proposed use of groundwater resources, any associated impacts on registered bores, any works that may result in increased groundwater discharge, impact on the stability of potential acid sulfate soils in the vicinity, or affect groundwater dependent native vegetation, and any impacts on the quantity and quality of groundwater.	
12. Heritage and Archaeology	Section 8.9
12.1 Identify whether the site has significance to Aboriginal cultural heritage and identify appropriate measures to preserve any significance. The assessment must address the information and consultation requirements of the draft Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation (DEC 2005) and the Part 3A EP & A Act Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation (Department of Planning and DEC, 2007).	
12.2 Carry out a detailed heritage assessment by a suitably qualified consultant that includes consultation undertaken with the relevant Local Aboriginal Land Council/s and Aboriginal community groups. The assessment should include: - Up to date surveys by suitably qualified archaeological consultants and include evidence of consultation with traditional Aboriginal custodians; - Identification of the nature and extent of impacts on Aboriginal Cultural Heritage values across the project area. If impacts are proposed as part of the final development, clear justification for such impacts should be provided; - A description of the actions that will be taken to avoid or mitigate impacts of the project on Aboriginal Cultural Heritage values. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented; - An assessment of the archaeological and Aboriginal significance of the site's Aboriginal Cultural Heritage values. If impacts on Aboriginal cultural values are proposed as part of the final development, an assessment of the regional significance of the values to be impacted, the extent to which these values are protected elsewhere in the landscape and consideration of the proposed impacts in the context of 'intergeneration equity' should be undertaken; and - Evidence that effective community consultation with Aboriginal communities has been undertaken in assessing impacts, developing options and making final recommendations. DECCW supports broad-based Aboriginal community consultation and as a guide the 'Interim Community Consultation Requirements for Applicants' provides a useful model to follow.	
12.3 Identify any items of non-indigenous heritage significance and, where relevant, provide measures for the conservation of such items.	
13. Flora and Fauna	Section 8.10
13.1 Provide a up-to-date assessment of any potential direct and indirect impacts of the development on flora and fauna, taking into consideration impacts on any threatened species, populations, ecological communities and/or critical habitat and any relevant recovery plan in accordance with the draft Guideline for Threatened Species Assessment (Part 3A) and Threatened Species Assessment Guideline: The Assessment of Significance. Describe the actions that will be taken to avoid or mitigate impacts or compensate unavoidable impacts, where relevant.	
13.2 A field survey of the site should be conducted as part of this assessment in accordance with DECCW's Threatened Biodiversity Survey and Assessment Guidelines.	
13.3 Likely impacts on threatened species and their habitat need to be assessed, evaluated and reported on. The assessment should specifically report on the guiding principles for threatened species assessment at section 1.2 of the draft Guideline for Threatened Species Assessment (Part 3A). Identify measures to protect remaining native fauna and flora on the site where appropriate.	

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
13.4 Provide an assessment of the proposal that ensures (if possible) adverse impacts on identified areas of ecological significance are avoided or mitigated (including the adjacent SEPP14 wetland, Endangered Ecological Communities, threatened species habitat etc ...)	
13.5 Outline measures for the conservation of existing wildlife corridor values and/or connective importance of any vegetation on the subject land. Address measures to protect and manage the riparian corridor and adjacent aquatic habitats.	
13.6 Provide appropriate buffers and habitat protection measures for known significant ecological habitats as identified in the constraints map contained in Figure 3.4 of the Tweed Area E Local Environment Study (Parsons Brinckerhoff, 2004).	
13.7 Assess the need for artificial wetlands to assist in the rehabilitation of the adjacent SEPP 14 Wetland and managing the overall water quality of the development.	
13.8 Provide a detailed Vegetation Management Plan (VMP) for that area of the site zoned 7(a) Environmental Protection (Wetlands and Littoral Rainforests) and for future dedication to the Tweed Shire Council. As a minimum the VMP should incorporate scoped and appropriate performance requirements for any habitat/wetland rehabilitation works (e.g. in relation to the diversity and density of plantings, seedling survival and growth rates, cumulative crown coverage, and the abundance and diversity of weed species) referenced to appropriate benchmarks (such as comparable, undisturbed vegetation communities).	
14. Biting Insects	Section 8.11
14.1 Address the potential for an increase in the impact of biting insects on the amenity of the area, in particular salt marsh mosquitoes. The assessment should address impacts on future residents, and potential increases in mosquito borne disease. Undertake consultation with Council and the NSW Area Health Authority and provide for measures to control and ameliorate their effects, including measures to minimise their breeding habitat. Prepare a biting insect management plan if the problems are considered severe.	
14.2 Provide evidence of consultation with Tweed Shire Council regarding a recently submitted project entitled 'Fish Move In, Mosquitoes Move Out', and discuss the implications of this project for the development within the assessment.	
15. Noise	Section 8.12
15.1 Assess any potential noise impacts resulting from, and impacting on, the development. In particular the potential impacts from road traffic noise for future residents. Outline appropriate mitigation measures to mitigate noise impacts.	
16. Socio-economic Impacts	Section 8.13
16.1 Provide a social impact assessment for the development. Address the social and economic context of the development in terms of infrastructure requirements, public transport, community services and facilities (including schools and medical services). Identify the need for any additional and/or augmentation of social and community infrastructure and resources. In particular explore the potential and methods for a new educational facility to be provided for.	
16.2 Identify opportunities to incorporate affordable housing into the proposal.	
16.3 Provide an assessment of the future potential cumulative impacts of the development on the LPMA's Tweed Coast Regional Crown Reserve No. 101 21 91 that encompasses Terranora Broadwater to the north-west and the Tweed River to the south. In particular address the effects the future residential population may have on the Reserve through the likelihood of increased visitation and recreational use (refer to the LPMA letter in Attachment 4).	
17. Planning Agreements and/or Developer Contributions	Section 8.14
17.1 Address and provide details on the likely scope of any planning agreement and/or developer contributions with Council and/or any Government agencies.	
17.2 Provide an assessment of any land proposed to be dedicated to public authorities and outline how this will be managed and funded into the future.	
Consultation	Section 9.0
You should undertake an appropriate and justified level of consultation with the following agencies during the preparation of the environmental assessment:	

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
(a) <i>Agencies or other authorities</i> ♦ Tweed Shire Council; ♦ Department of Environment, Climate Change and Water; ♦ NSW Office of Water; ♦ Department of Housing; ♦ Northern Rivers Catchment Management Authority; ♦ NSW Rural Fire Service ♦ Land and Property Management Authority – especially in relation to Crown roads and owners consent issues; ♦ Department of Transport and Infrastructure; ♦ Roads and Traffic Authority; ♦ Department of Health ♦ Department of Education and Training.	
(b) <i>Public</i> Document all community consultation undertaken to date or discuss the proposed strategy for undertaking community consultation. This should include any contingencies for addressing any issues arising from the community consultation and an effective communications strategy.	Section 9.0
The consultation process and the issues raised should be described in the Environmental Assessment.	
ATTACHMENT 2	
Plans and Documents to accompany the Application	
Plans and Documents of the Development	
The following plans, architectural drawings and diagrams of your proposal as well as the relevant documents will be required to be submitted for your application:	
1. The existing site survey plan is to be drawn to 1 :500 scale (or other appropriate scale) and show: ♦ the location of the land, the measurements of the boundaries of the land, the size of the land and north point; ♦ the existing levels of the land in relation to buildings and roads; ♦ location and height of existing structures on the site; and ♦ location and height of adjacent buildings and private open space.	Annexure 3
2. An aerial photograph of the subject site with the site boundary superimposed.	Annexure 4
3. A Site Analysis Plan must be provided which identifies existing natural elements of the site (including all hazards and constraints), existing vegetation, property, footpath crossing levels and alignments, existing pedestrian and vehicular access points and other facilities, slope and topography, natural features such as watercourses, rock outcrops, utility services, boundaries, orientation, view corridors and all structures on neighbouring properties where relevant to the application (including windows, driveways etc.).	Annexure 6
4. A locality/context plan drawn to 1:500 scale (or other appropriate scale) should be submitted indicating: ♦ significant local features such as parks, community facilities and open space, water courses and heritage items; ♦ the location and uses of existing buildings, shopping and employment areas; ♦ traffic and road patterns, pedestrian routes and public transport nodes; and ♦ The existing site plan and locality plan should be supported by a written explanation of the local and site constraints and opportunities revealed through the above documentation.	Annexure 5

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS	
REQUIREMENT	SECTION
5. A zoning plan must be provided which shows the existing zoning overlaid with the proposed development layout. An extract of the land use table or relevant clauses from the subject LEP is required.	Annexure 2 and Section 4.2
6. Subdivision plans are to show the following:- ♦ The location, boundary dimensions, site area and north point of the land, and names of roads fronting the land; ♦ Title showing the description of the land with lot and DP numbers etc; ♦ Existing and proposed subdivision pattern including all measurements and sites areas of existing and proposed allotments; ♦ Location and details of all proposed roads and footpaths; ♦ Location of all structures proposed and retained on site; ♦ Location and details of access points to the subdivision; ♦ Existing vegetation on the land and vegetation to be retained; ♦ Location of services and infrastructure, and proposed methods of draining the land; ♦ Any easements, covenants or other restrictions either existing or proposed on the site; ♦ Type of subdivision proposed (Torrens, strata and/or community title). ♦ Cross sections of roads, including gradients, widths, road names, footpaths, etc. ♦ Existing and proposed finished levels in relation to roads, footpaths and structures; ♦ Riparian zones, including any creeks, wetlands, drainage lines etc. ♦ Landforming plan showing all areas of cut and fill, including pre and post development levels and associated drainage and retaining structures.	Annexure 7
7. Stormwater Management Plan - illustrating the concept for stormwater management from the site and must include details of any major overland flow paths through the site and any discharge points. Where an on-site detention system is required, the type and location must be shown and must be integrated with the proposed landscape design. Site discharge calculations should be provided;	Annexure 14
8. Landscape Concept Plan - showing planting design and plant/tree species to be used, listing botanical and common names, mature height and spread, number of plants to be utilised in relation to the treatment of communal/public open space areas, footpaths, driveways and the public domain including details of street trees, furniture, signage, lighting and surface treatments (i.e. pavers).	Annexure 8
9. Site Management Plan - to avoid, remedy or mitigate adverse effects on the surrounding environment during the undertaking of earthworks. ♦ a list of buildings, structures and roads to be demolished and removed; ♦ details of bulk earthworks proposed (including volumes, locations, stockpiles, and any other relevant matter) ♦ proposed measures to avoid adverse impacts on Aboriginal heritage; ♦ traffic management measures; ♦ acoustic and vibration management measures; ♦ stormwater management measures; ♦ description and plan of erosion and sediment controls measures to be utilised; ♦ methods for dust management; ♦ material recycling measures; ♦ hazardous substances (e.g. asbestos, lead based paint) report and works plan; ♦ redundant services to be removed; ♦ vegetation to be cleared; ♦ site fencing and security;	Annexure 30

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TABLE 1 – DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

REQUIREMENT	SECTION
♦ waste management and disposal measures; ♦ a delegated liaison officer for consultation with adjacent property owners; ♦ emergency and complaint contacts; ♦ proposed sequencing of activities on site; and ♦ any other measures required to avoid, remedy, or mitigate any adverse impacts of the activity.	

1.2 Project Team

TABLE 2 – PROJECT TEAM

TASK	CONSULTANT
Proponent and Project Management	Metricon (QLD) Pty Ltd
Town Planning	Darryl Anderson Consulting Pty Ltd
Surveying	B & P Surveys Pty Ltd
Landscaping	Form Landscape Architects
Urban Design Guidelines	MPS Architects
Cultural Heritage	Everick Heritage Consultants Pty Ltd
Acoustic	TTM Consulting Pty Ltd
Soil Contamination	Gilbert and Sutherland Pty Ltd
Stormwater Management	Gilbert and Sutherland Pty Ltd
Ecological Assessment and Vegetation Management	James Warren and Associates Pty Ltd
Acid Sulphate Soils	Gilbert and Sutherland Pty Ltd
Civil Engineering	Brad Lees Consulting Pty Ltd
Geotechnical Engineering	Morrison Geotechnic Pty Ltd
Visual Impact Assessment	LVO Architecture
Biting Insects	HMC Consulting Pty Ltd
Bushfire Assessment	Bushfire Safe (Aust) Pty Ltd
Traffic and Transport Assessment	Bitzios Consulting
Site Management Plan	Brad Lees Consulting Pty Ltd
Community Facility	BDA Architecture
Community Consultation	CPR Group
Community Management Statement	Stewart Silver King and Burns

1.3 Statement of Validity of this Environmental Assessment

The Statement of Validity of the Environmental Assessment signed by Darryl Anderson of Darryl Anderson Consulting Pty Ltd is contained at **Annexure 1**. Darryl Anderson certifies that the information contained in this Environmental Assessment is neither false nor misleading to the best of his knowledge.

2.0 DESCRIPTION OF THE PROPOSAL AND SUBDIVISION TYPE

Project approval is sought to develop the site as a community title subdivision under the Community Land Development Act, 1989 comprising the creation of 317 residential lots, 1 community association lot (Lot 711), 2 public reserves (Lots 436 and 710) and 1 drainage reserve lot (Lot 630) resulting in a total of 321 lots and the provision of all normal urban infrastructure. Key elements of the project include:

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-
- Opening and construction of all proposed roads and dedication as public roads;
 - Construction of a temporary intersection access to Fraser Drive;
 - Provision of underground reticulated water supply;
 - Provision of underground reticulated sewerage;
 - Provision of underground reticulated stormwater drainage and stormwater management facilities;
 - Provision of underground power and telephone services;
 - Carrying out of bulk earthworks to establish final land forms;
 - Demolition of the three existing agricultural sheds located on the site;
 - Creation of proposed Lot 711 and construction of a Community Recreation Facility on this lot;
 - Dedication of the public reserves and drainage reserve;
 - Establishment of a temporary Sales Office/Display Home on proposed Lot 1103 with a temporary driveway access to Fraser Drive;
 - Creation of 317 residential lots in 11 stages with areas ranging from 464m² to 1443m²;

Details of the proposal are contained in the plans and specialist reports annexed to this Environmental Assessment.

The proposed Subdivision Layout and Staging is shown on **Figure 1**.

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2.1 Property Description

The land to which this Major Project Application relates is described as Lot 1 DP 304649, Lot 1 DP 175235, Lot 1 DP 781687, Lot 2 DP 778727, Lot 1 DP 781697, Lot 1 DP 169490, Lots 40 and 43 DP 254416 Fraser Drive, Terranora. The total area of the site is 35.74 hectares. Fraser Drive forms the eastern boundary of the site which also has frontage to Parkes Lane and Market Parade. Cadastral and topographic information relating to the development site is contained in **Annexure 3**.

Lot 1 DP 175235 is burdened by a right of carriageway (DP 843665) benefiting the adjoining lot 1 DP 175234. Lot 1 DP 304649 is burdened by an easement for transmission lines (DP 642269) (see **Annexure 6**).

3.0 SITE ANALYSIS

Figure 2 indicates the regional context of the site in relation to the NSW coast, the town of Tweed Heads and the town of Murwillumbah.



Figure 2 – Regional Context
Source: Far North Coast Regional Strategy 2006 – 2031, Department of Planning 2006

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In summary, the Tweed Heads town centre is located approximately 4 kilometres to the east of the site and the NSW/Queensland border is located approximately 4 kilometres to the north of the site.

Insofar as the local context is concerned, **Figure 3** shows the spatial relationship between the site and surrounding development. The site is located on the western edge of the wider Tweed Heads conurbation and has access to Fraser Drive, Parkes Lane and Market Parade. Fraser Drive connects the site to the Pacific Highway via Terranora Road and the residential street network (ie. Amaroo Drive, Darlington Drive).

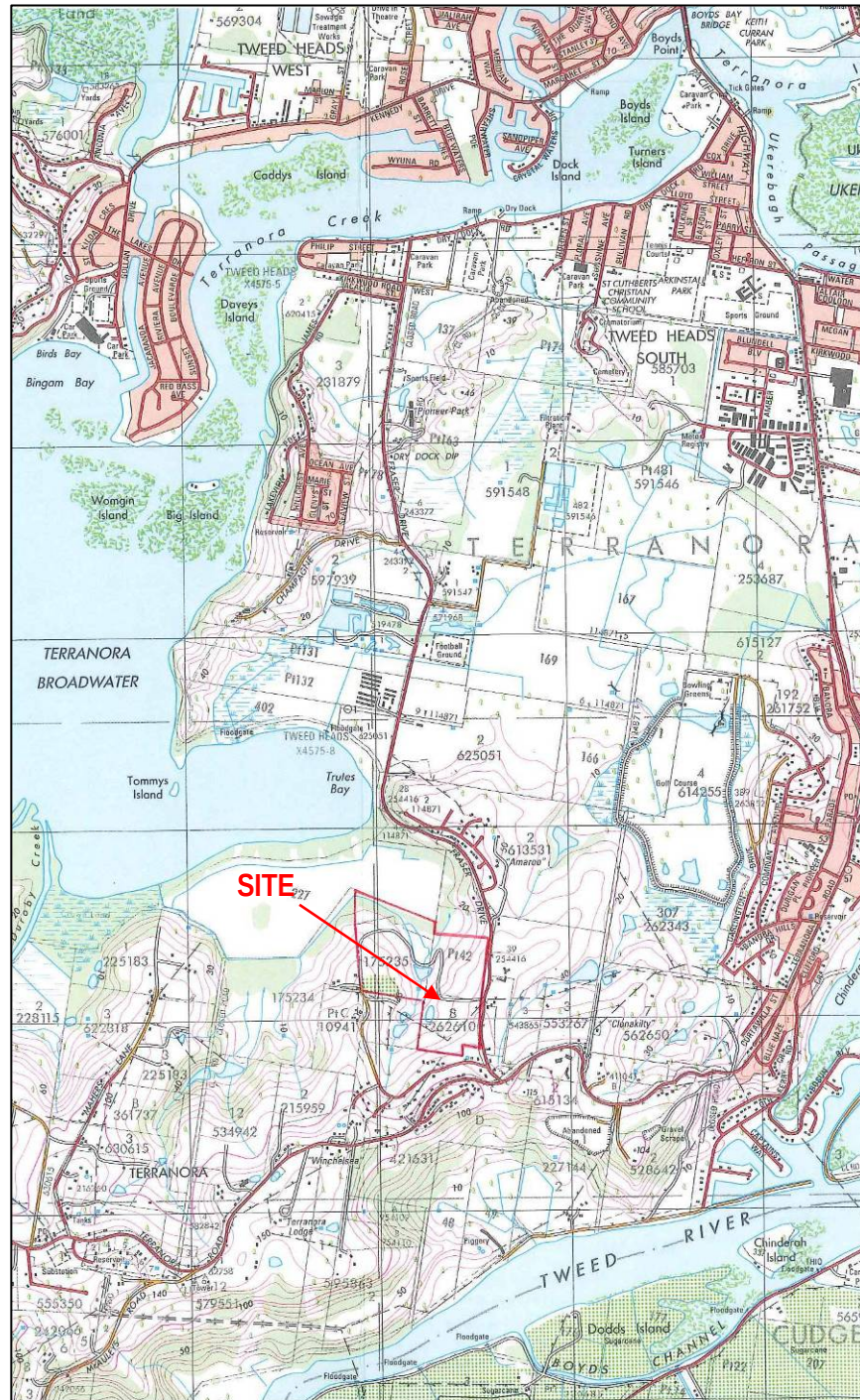


Figure 3 – Local Context
Source: Catchment Management Authority 2006

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Annexure 5 also comprises a Locality Context Plan showing the relationship between the development site and surrounding urban and residential development.

The existing environment is described on the Site Analysis Plan at **Figure 5**. In summary, the elevated parts of the site adjacent to Parkes Lane range in height from approximately RL 87m AHD to approximately RL 1m AHD adjacent to the northern boundary of the site. Gradients are in excess of 25% in parts, particularly adjacent to the natural watercourse.

The site contains remnant native vegetation with the key communities shown on **Figure 4**.

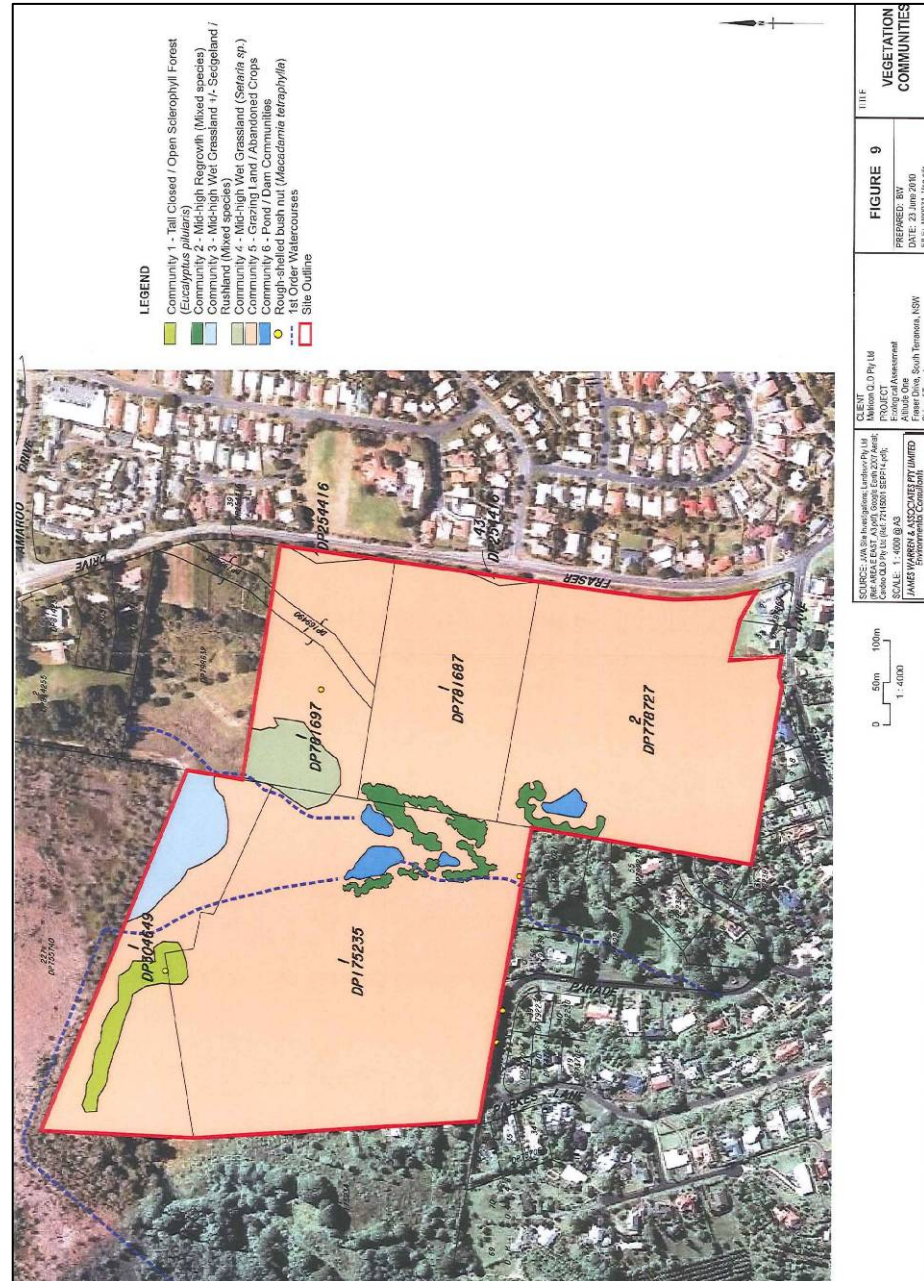


Figure 4 – Vegetation Communities
Source: James Warren and Associates, June 2010

The site (including Lot 1 DP 169490 being a closed road) has previously been used for agricultural cropping and is currently used for grazing of cattle.

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Adjoining Lot 1 DP 798633, also being a closed road, is currently used for rural residential purposes including a dwelling house (see **Annexure 4**). Lot 2 DP 709021 is owned by Tweed Shire Council as operational land and is used for drainage purposes.

A major watercourse traverses the approximate centre of the site adjacent to which are located several farm dams and remnant vegetation. The watercourse discharges to the wetland immediately adjoining and to the north of the site which is also mapped as State Environmental Planning Policy No. 14 Wetland No. 23. The wetland then drains to Terranora Broadwater via a network of existing natural watercourses (see **Figure 5**).



Figure 5 – Site Analysis Plan
Source: B & P Surveys 2010

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In summary, the site contains six vegetation communities and two heavily degraded endangered ecological communities comprising lowland rainforest and freshwater wetlands (see Figure 10 of **Annexure 15**). The majority of the site comprises grazing land/abandoned crops which is of very low conservation value.

Climate

Predominant wind direction in the summer is from the northeast and in the winter is from the southwest.

Rainfall

Annual average rainfall for this area is 1722 mm. The monthly minimum of 60mm occurs in September and the monthly maximum of 270mm occurs in March.

Temperature

The November summer maximum is 30°C and the summer minimum is 15°C. In winter, the maximum in August is 23°C and the minimum in July is 5°C.

Transport

Fraser Drive is a two lane, sealed road which is classified as a distributor road under Tweed Local Environmental Plan 2000. Fraser Drive links Terranora Road in the south to Minjungbal Drive in the north (via Dry Dock Road) and comprises a bus route for part of its length. Council proposes to widen Fraser Drive to four lanes for the section from Amaroo Drive to Kirkwood Road (when extended to Fraser Drive with funding to be provided by way of Section 94 Plan No. 4 Tweed Road Contribution Plan) and provide an off road cycleway/walkway for the section from Amaroo Drive to Terranora Road (to be funded from Section 94 Plan No. 22).

Terranora Road is also a two lane, sealed distributor road which connects the Pacific Highway at Sexton Hill to Tweed Valley Way at Tumbulgum.

The site also has access to local streets being Market Parade and Parkes Lane which provide separate linkages to Fraser Drive.

Figure 6 shows the location of Altitude Aspire in relation to the existing transport network.

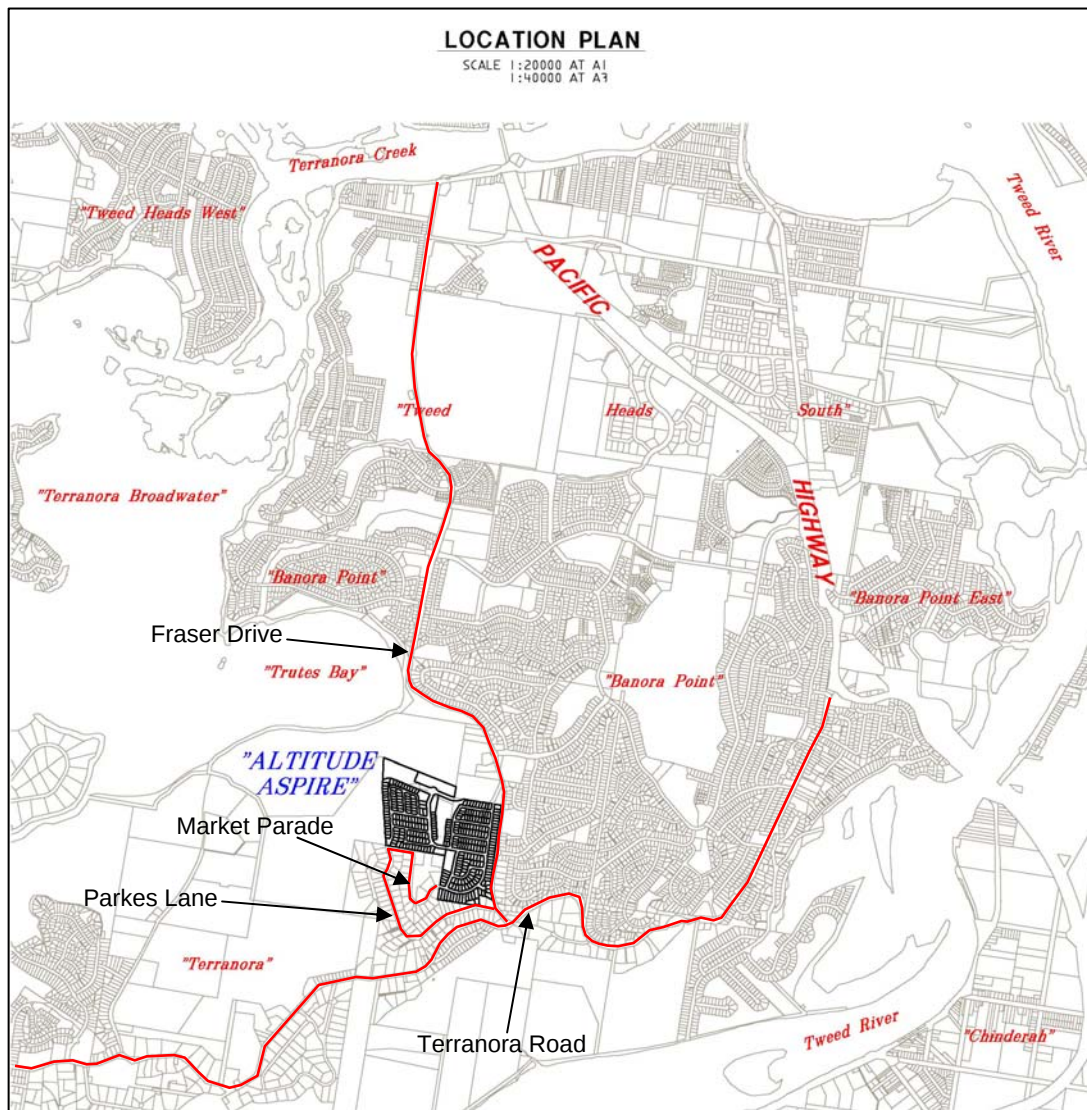


Figure 6 – Transport Network
Source: B & P Surveys 2010

All normal infrastructure is available in proximity to the proposed lots including reticulated water, reticulated sewer, power and telephone services. There are no significant capacity constraints insofar as infrastructure is concerned.

Geology and Soils

The regional geology of the Site comprises the Neranleigh-Fernvale Beds, which are capped by the Lamington Volcanics. The Neranleigh Fernvale Beds are undifferentiated but thought to have been formed in the Silurian to Carboniferous Geological Time Period and comprise greywacke, argillite, quartzite, chert, shale, sandstone and greenstone (Murwillumbah 1:100 000 Geological Series. 9541). The Lamington Volcanics are thought to have been formed in the Tertiary Geological Time Period and comprise basalt with members of rhyolite, trachyte, tuff, agglomerate and conglomerate (Tweed Heads 1:100 000 Geological Series, SH 56-3).

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4.0 STATUTORY PLANNING CONTEXT

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy No. 71 – Coastal Protection

The land to which this Major Project application relates is within the coastal zone as defined under the provisions of this Policy and as the development involves a subdivision of greater than 25 residential lots a Development Control Plan would normally be required pursuant to Clause 18 of the Policy. However, as Part 3A of the Act applies a Development Control Plan is not required.

In addition, Clause 8 of the Policy requires various criteria to be considered in assessing any development application. The relevant matters for consideration in Clause 8 are addressed in Section 8.0.

4.1.2 State Environmental Planning Policy (Major Development) 2005

On 23 September 2009 the Department of Planning advised that the proposal is a project to which Part 3A applies.

4.1.3 State Environmental Planning Policy No. 44 – Koala Habitat Protection

James Warren and Associates have undertaken an assessment of the project against the provisions of State Environmental Planning Policy No. 44 and concluded that there is no requirement for the preparation of a Plan of Management for identified core Koala habitat on the basis that core Koala habitat is not present at the site. A copy of the report from James Warren and Associates is contained at **Annexure 15**.

4.1.4 State Environmental Planning Policy No. 55 – Remediation of Land

In summary, Clause 7 of this Policy provides that the consent authority must not consent to the carrying out of any development on land unless it has considered, among other things, whether the land is contaminated, based on a preliminary investigation of the land carried out in accordance with the Contaminated Land Planning Guidelines.

The Contaminated Land Planning Guidelines (Department of Urban Affairs and Planning, Environment Protection Authority, 1998) provide information relating to preliminary contamination investigations. In addition, Council has adopted a Contaminated Land Policy which contains details of the information required to be submitted with applications for development.

A Soil Contamination Assessment has been completed (**Annexure 13**). Field work included appropriate sampling and testing of soils together with a site history. In summary, the Contamination Assessment concludes that the site is suitable for the development. A more detailed assessment relating to site contamination is contained in Section 8.4.1 of this Environmental Assessment.

4.1.5 State Environmental Planning Policy No. 14 – Coastal Wetlands

State Environmental Planning Policy No. 14 Wetland No. 23 occurs immediately adjacent to the northern boundary of the site, as shown on **Figure 7**. No development is proposed within the mapped wetland.

4.1.6 State Environmental Planning Policy No. 26 – Littoral Rainforest

The land to which this Major Project application relates is not affected by the provisions of this State Environmental Planning Policy. The nearest mapped Littoral Rainforest under the provisions of this Policy is located approximately 3 kilometres to the east of the site as shown on **Figure 8**.

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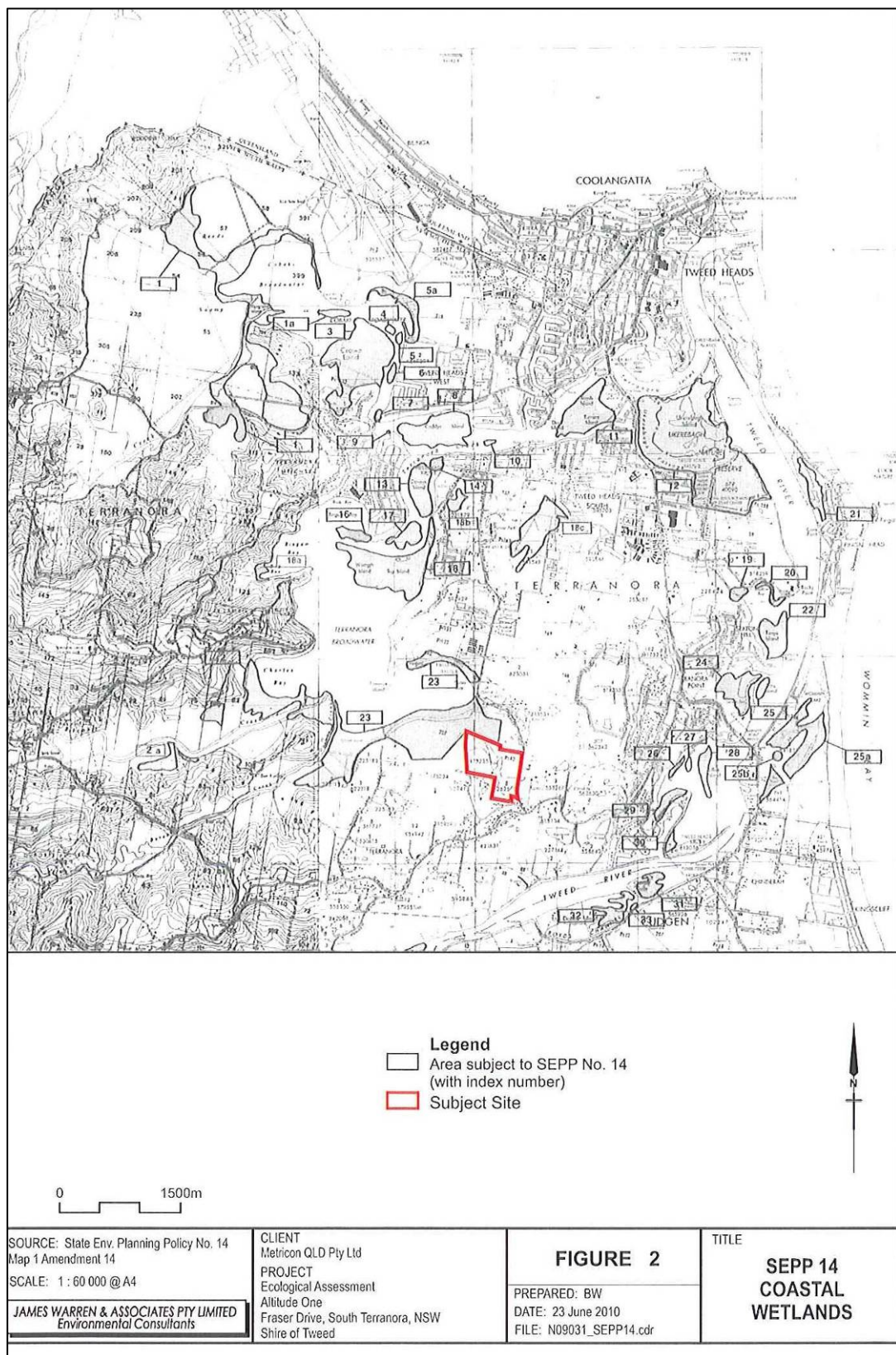


Figure 7 – SEPP14
Source: James Warren and Associates, June 2010

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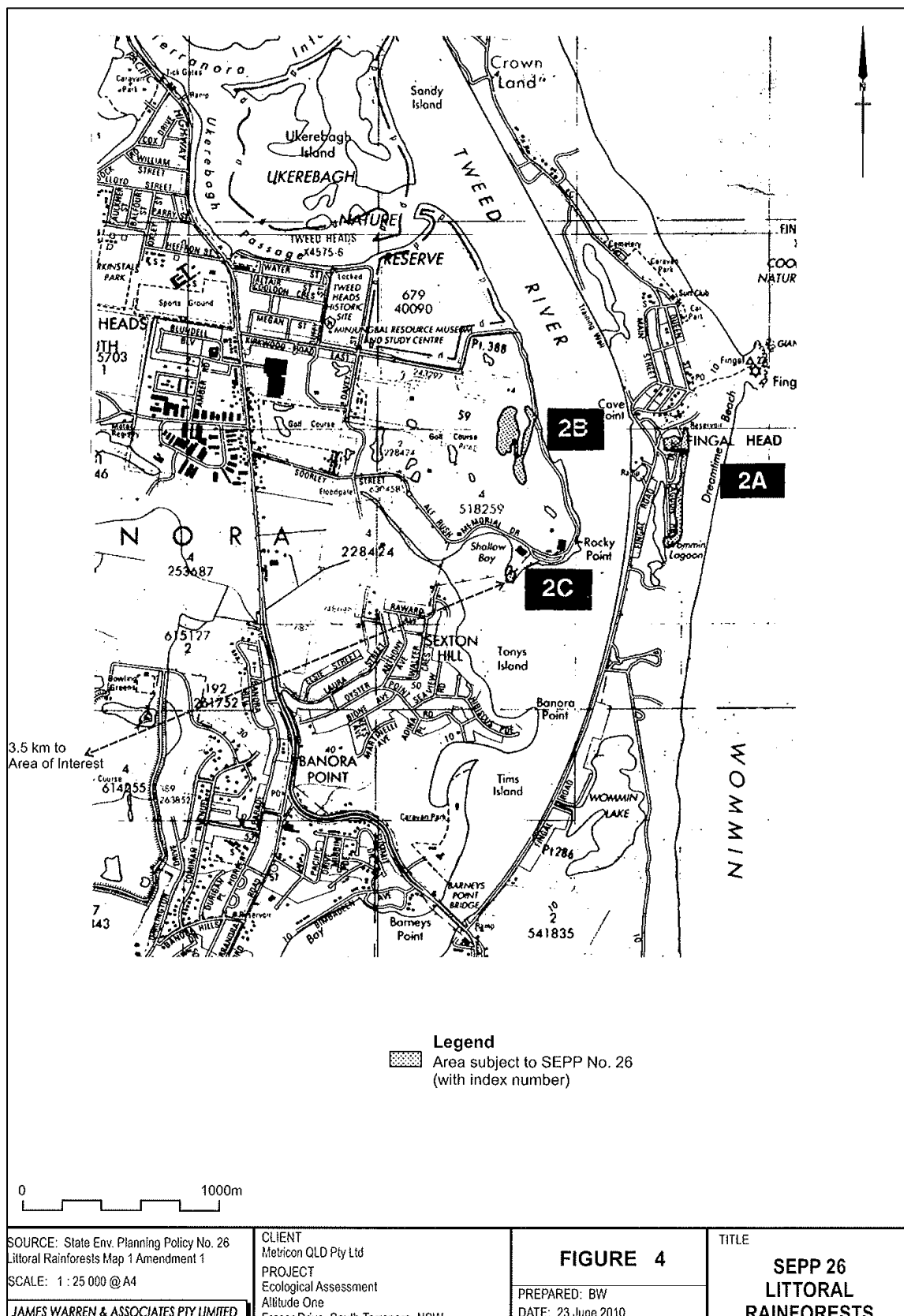


Figure 8 – SEPP26
Source: James Warren and Associates, June 2010

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4.1.7 State Environmental Planning Policy (Infrastructure) 2007

Clause 104 of this Policy provides that certain developments specified in Column 1 of the Table to Schedule 3 of the Policy requires referral to the Roads and Traffic Authority and the consent authority must take into account any submission that the Roads and Traffic Authority may provide within a prescribed timeframe. Schedule 3 includes subdivisions of land involving 200 or more allotments and apartment or residential flat buildings involving 300 or more dwellings, among other things.

Therefore, as this proposal involves 320 lots, referral to the Roads and Traffic Authority for comment is required under this Policy.

A Transport Assessment Report for the project is contained at **Annexure 24**.

4.1.8 State Environmental Planning Policy (North Coast Regional Environmental Plan 1988)

The key provisions of this Policy are addressed in the following sections:

Clause 15 – Development Control – Rivers, Streams and Wetlands

This Clause seeks to ensure that development proposals do not adversely impact on the water quality and habitat values of downstream water bodies.

The Stormwater Management Plan (**Annexure 14**) includes detailed measures for the control of water quality both during the construction and operational phases such that the objectives of this Clause are complied with.

Clause 32B - Coastal Lands

Relevant provisions of this Clause are addressed in the following table.

TABLE 3 – COASTAL LANDS	
PROVISION	COMMENT
1) <i>"In determining an application for consent to carryout development on land to which the Coastal Policy applies, the Council shall take into account –</i> <i>a) The NSW Coastal Government Policy;</i> <i>b) The Coastline Management Manual; and</i> <i>c) The North Coast Design Guidelines</i>	The Relevant matters for consideration in this Policy are addressed at Section 8.2 of this report. The land is not affected by coastal processes. The key guidelines will be included in the design of the future buildings, particularly in relation to the building form, cladding materials, solar access and energy efficiency.
2) <i>The Council shall not consent to the carryout of development which would impede public access to the foreshore area;</i>	The proposal will not affect public access to the Terranora Broadwater foreshore.
3) <i>The Council shall not consent to the carrying out of development –</i> <i>a) on urban land at Tweed Heads, Kingscliff, Byron Bay, Ballina, Coffs Harbour or Port Macquarie, if carrying out the development would result in beaches and adjacent open space being overshadowed before 3 pm mid-winter (standard time) or 6.30 pm mid-summer (daylight saving time); or</i> <i>b) Else where in the region, if carrying out the development would result in beaches or waterfront open space being overshadowed before 4 pm mid-winter (standard time) or 7 pm mid-summer (daylight saving time)."</i>	Not applicable.

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Clause 43 – Development Control – Residential Development

This Clause provides that consent to development for residential purposes shall not be granted unless the consent authority is satisfied that the density of the dwellings have been maximised without adversely affecting the environmental features of the land and that road widths are not excessive.

The proposed layout achieves 316 residential allotments which results in a yield of approximately 8.8 lots per gross hectare. The North Coast Urban Planning Strategy 1995 identifies a target yield of fifteen dwellings per hectare.

Without significantly impacting on landforms and the established character and amenity of the area and because of the need to preserve and buffer the natural watercourse within the approximate centre of the site, it is not feasible to achieve the target densities. Having regard to the site analysis contained in this report it is concluded that the proposed yields are optimal and consistent with this Clause.

Clause 66 – Development Control – Adequacy of Community and Welfare Services

This Clause provides that before granting consent for the subdivision of land intended for residential purposes, the consent authority shall consider the adequacy of community and welfare services.

The site is conveniently located in relation to the town of Tweed Heads which provides all necessary requirements in terms of community services and facilities. In addition, as indicated in Section 4.6.10 of this report, Council requires contributions to be paid in respect of a range of community facilities likely to be required by future residents.

4.2 Tweed Local Environmental Plan 2000

Tweed Local Environmental Plan 2000 is the principal planning instrument controlling development within Tweed Shire generally and the subject land in particular. Under the provisions of this Plan, the land is zoned part 2(c) Urban Expansion and part 7(a) Environmental Protection (Wetlands and Littoral Rainforests).

The aims of the Local Environmental Plan are as follows:

"The aims of this plan are:

- (a) *to give effect to the desired outcomes, strategic principles, policies and actions of the Tweed Shire 2000+ Strategic Plan which was adopted, after extensive community consultation, by the Council on 17 December 1996, the vision of which is:*

"The management of growth so that the unique natural and developed character of the Tweed Shire is retained, and its economic vitality, ecological integrity and cultural fabric is enhanced", and

- (b) *to provide a legal basis for the making of a development control plan that contains more detailed local planning policies and other provisions that provide guidance for future development and land management, such as provisions recommending the following:*

- (i) that some or all development should be restricted to certain land within a zone,*
- (ii) that specific development requirements should apply to certain land in a zone or to a certain type of development,*
- (iii) that certain types or forms of development or activities should be encouraged by the provision of appropriate incentives, and*

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-
- (c) *to give effect to and provide reference to the following strategies and policies adopted by the Council:*

*Tweed Heads 2000+ Strategy
Pottsville Village Strategy, and*

- (d) *to encourage sustainable economic development of the area of Tweed compatible with the area's environmental and residential amenity qualities."*

Based on the Assessment at Section 4.6.3 it is concluded that the project is generally consistent with aim (a) relating to the Tweed 2000+ Strategic Plan and the subsequent Tweed Strategic Plan 4/24.

In addition, the project is consistent with aim (d) in the it achieves Council's urban land release objectives by providing additional housing choice to accommodate the continuing population growth within Tweed Shire.

The objectives of the zones are as follows:

2 (c) Urban Expansion

Primary objective

- to identify land for urban expansion (which will comprise mainly residential development focused on multi-use neighbourhood centres) and to ensure its optimum utilisation consistent with environmental constraints and the need to minimise residential landtake.*

Secondary objectives

- to allow associated non-residential development which meets the recreation, shopping, commercial, employment and social needs of future residents.*
- to ensure that sensitive environmental areas within and outside the zone are protected from any adverse impacts of development.*
- to enable planning flexibility to achieve the other objectives of the zone by means of detailed guidelines in a development control plan.*

7 (a) Environmental Protection (Wetlands and Littoral Rainforests)

Primary objectives

- to identify, protect and conserve significant wetlands and littoral rainforests.*
- to prohibit development which could destroy or damage a wetland or littoral rainforest ecosystem.*

Secondary objectives

- to protect the scenic values of wetlands and littoral rainforests.*
- to allow other development that is compatible with the primary function of the zone.*

It is submitted that the proposal is consistent with the zone objectives for the following reasons:

2(c) Zone

The proposal comprises a conventional residential subdivision which will ultimately be served by the neighbourhood centre located to the west of the site as proposed in Draft Tweed Development Control Plan 2008, Section B17 – Terranora Area E.

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The site is conveniently located to the existing neighbourhood shopping centre at Tweed Heights which is located approximately 500m from the centre of the site.

In addition, the sensitive environmental areas including the natural watercourse and the coastal wetlands to the north of the site will be preserved and protected by appropriate zonings and reservations. In summary, it is therefore submitted that the proposal is consistent with the objectives of the 2(c) zone.

7(a) Zone

Development for the purposes of "environmental facilities" (ie. stormwater/sedimentation ponds) is permissible, with consent, as an Item 2 use.

Development for the purposes of roads and public utility undertakings is permissible, with consent, as an Item 3 use in the 7(a) zone.

The Local Environmental Study which informed Tweed Local Environmental Plan Amendment No. 10 in respect of the Area E Release Area foreshadowed the use of the outer 50m of the 7(a) buffer for the purposes of roads, utility installations and urban stormwater facilities. The proposal is consistent with the provisions in the Local Environmental Study.

In addition, it should be noted that the provisions of the Local Environmental Plan are not mandatory when the Minister assesses as Project Application. In the circumstances, it is therefore submitted that the proposal is consistent with the 7(a) zone objectives, particularly as reflected in the provisions contained in the Local Environmental Study.

The following Clauses of the Plan are relevant to this application:

Clause 8(2) – Consent Considerations

This Clause applies insofar as that part of the site zoned 7(a) is concerned in respect to the permissibility of roads, public utility undertakings and urban stormwater facilities. The following table (**Table 3**) addresses the relevant provisions of the Clause.

TABLE 4 – Clause 8(2) CONSENT CONSIDERATIONS	
CLAUSE	COMMENT
(2) The consent authority may grant consent to development specified in Item 3 of the Table to clause 11 only if the applicant demonstrates to the satisfaction of the consent authority that: (a) the development is necessary for any one of the following reasons: (i) it needs to be in the locality in which it is proposed to be carried out due to the nature, function or service catchment of the development,	The alignment of Broadwater Parkway and related water and sewer infrastructure and stormwater management facilities is constrained by the existing topography and the need to provide a perimeter road to buffer the urban development to the adjacent SEPP14 Wetland. The terrain imposes a significant constraint in achieving compliant road gradients and consistent with the forward planning incorporated into the Local Environmental Study which underpins Tweed Local Environmental Plan 2000 Amendment No. 10, locating this infrastructure within the outer 50m of the 100m 7(a) zoned buffer to the SEPP14 Wetland is necessary in this case for the foregoing reasons.

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TABLE 4 – Clause 8(2) CONSENT CONSIDERATIONS	
CLAUSE	COMMENT
(ii) it meets an identified urgent community need,	Not applicable.
(iii) it comprises a major employment generator, and	Not applicable.
(b) there is no other appropriate site on which the development is permitted with consent development (other than as advertised development) in reasonable proximity, and	For the reasons discussed in relation to Item (a) above, and having particular regard to topographic constraints there is no other appropriate site on which this infrastructure can be sited in reasonable proximity.
(c) the development will be generally consistent with the scale and character of existing and future lawful development in the immediate area, and	Given that the adjoining land is zoned 2(c) Urban Expansion and that development of that land for residential purposes is clearly contemplated by that zoning, the construction of Broadwater Parkway and mainly underground infrastructure will be consistent with the future lawful development and character of the area.
(d) the development would be consistent with the aims of this plan and at least one of the objectives of the zone within which it is proposed to be located.	The development would be consistent with Aim 4(a) of Tweed Local Environmental Plan 2000 in that it gives effect to the Tweed 2000+ Strategic Plan and it would also be consistent with Aim 4(d) in that it will facilitate economic development of the Area E Release Area consistent with Council and State Government strategic urban release policies. Insofar as the 7(a) zone objectives are concerned, the proposal is consistent with the secondary objective which seeks to allow other development in the zone that is compatible with the primary function of the zone. By siting this infrastructure in the outer 50m buffer to the actual wetland it is submitted that it is consistent with the primary objective which seeks to identify, protect and conserve significant wetlands and littoral rainforests.

Clause 11 – Land Use Table

The Land Use Table for the 2(c) zone requires a minimum lot size for dwelling houses of 450m². All proposed lots comply.

Clause 15 – Availability of Essential Services

All normal urban services are available to the site.

Extensive studies have been undertaken on behalf of Tweed Shire Council identifying the infrastructure requirements for the overall development of Terranora Area E.

Council's Local Environmental Study (LES) by Parson Brinckerhoff (March 2004) identified the major sources of water supply to the Area E as being a 600dia Duroby main to the north of the site as fed from the North Tumbulgum Reservoir, and a secondary 150mm main along Terranora Rd to the south. A study by GHD (GHD 1999) attributed the capacities of these two sources as 3000EP and 1000 EP respectively (Parson 2004).

For the ultimate servicing of Area E, a new 3ML reservoir is proposed for construction as part of the Altitude 3 site development (adjacent to Terranora Road and Mahers Lane) which will provide the internal reticulation of Area E.

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Supply to this 3ML reservoir will be via a pipe connection to the existing 600mm dia Duroby pipeline along Mahers Lane. Due to the 'uncontrolled' alignment of the existing 600mm dia Duroby Main, provision has been made for the relocation of this trunk main via the construction of a new 600mm dia trunk main along the proposed Broadwater Parkway alignment. The decommissioned main would be plugged and left in place to ensure minimal disturbance within Environmental Zone.

The proposal for the interim water supply for the development of the Altitude Aspire site is for a temporary connection to the 600dia main (including PRV as required) and a co-current connection to an existing 100dia main on Fraser Drive to service the higher level allotments.

The Banora Point Sewerage Study Report (TSC Sept 1999) identifies the requirement for a Terranora Regional Pump Station in the development of Area E. Until such time as the ultimate pump station is constructed, an interim proposal for sewer reticulation allows stages 1-6 of Altitude Aspire to discharge into a temporary pump station located in the northeastern corner of the site. An interim 150mm sewer rising main is to be laid within an easement as shown, which will discharge flows into the existing gravity sewer network along Fraser Drive.

Stormwater treatment and management systems are to be implemented in accordance with recommendations by Gilbert & Sutherland – hydraulics consultants. Treatment and Management of stormwater conveyance, including roofwater collection, is proposed via a suitable piped network system within the subdivision, with outlets to treatment basins located at the low point of the Altitude Aspire development adjacent to Broadwater Parkway and treated prior to discharge to SEPP14 wetlands. Upstream catchments, external to Altitude Aspire development, are conveyed through the site (via the Central Open Drain) without the need to pass through the treatment basin.

The Tweed Area E Local Environmental Study (Parsons Brinckerhoff March 2004) identifies the development requirements for Gas, Electrical and Telecommunications. All relevant service providers will determine existing capacity of respective networks and supply design proposals in accordance with Councils standards at operational works phase. It is envisaged preliminary services will be obtained from both Fraser Drive and via Terranora Road corridors.

Clause 16 – Height of Building

A three storey height limit applies to this site. The proposed Community Building (maximum two storeys) and the proposed temporary sales office/display home (one storey) comply. Any future residential buildings on the proposed allotments will also comply with this requirement.

Clause 17 – Social Impact Assessment

In accordance with the provisions of this Clause and Tweed Development Control Plan 2008, Section A13 a Socio-Economic Impact Assessment would normally be required to accompany a Development Application. However, as this is a Major Project Application a Socio-Economic Impact Statement is not required. Nevertheless, information relating to social and economic issues is provided in Section 8.15 of this Environmental Assessment Report.

Clause 19 – Subdivision General

This Clause provides that development consent is required to subdivide land.

Clause 31 – Development Adjoining Waterbodies

As indicated on the Locality Context Plan at **Annexure 5**, the development site does not abut Terranora Broadwater however it is adjacent to the State Environmental Planning Policy No. 14 wetland which separates Terranora Broadwater from the development site. Therefore, the relevant provisions of Clause 31 are addressed in the following **Table 4**.

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TABLE 5 – DEVELOPMENT ADJOINING WATERBODIES	
CLAUSE	COMMENTS
(1) Objectives - to protect and enhance scenic quality, water quality, aquatic ecosystems, bio-diversity and wildlife habitat and corridors. - to provide adequate public access to waterways. - to minimise the impact on development from known biting midge and mosquito breeding areas.	The Draft Development Control Plan for Tweed Area E proposes rehabilitation of the wetland. Appropriate stormwater mechanisms will be implemented to ensure that water quality within the wetland and Terranora Broadwater is not diminished (see Annexure 14). Ultimately, the construction and dedication of Broadwater Parkway on the northern boundary of the site will facilitate improved public access to the wetland and foreshore area. This issue is addressed in the report at Annexure 22.
(2) This clause applies to land that adjoins the mean high-water mark (or the bank where there is no mean high-water mark) of a waterbody.	Not applicable – the site does not adjoin the mean high water mark of Terranora Broadwater.
(3) Consent must not be granted to development on land to which this clause applies, within such distance as is determined by the consent authority of the mean high-water mark or, where there is no mean high-water mark, the top of the bank or shore of a stream, creek, river, lagoon or lake unless it is satisfied that: (a) the development will not have a significant adverse effect on scenic quality, water quality, marine ecosystems, or the bio-diversity of the riverine or estuarine area or its function as a wildlife corridor or habitat, and (b) adequate arrangements for public access to and use of foreshore areas have been made in those cases where the consent authority considers that public access to and use of foreshore areas are appropriate and desirable requirements, and (c) the development is compatible with any coastal, estuary or river plan of management adopted by the Council under the <i>Local Government Act 1993</i> that applies to the land or to land that may be affected by the development, and (d) the development addresses the impact of increased demand from domestic water supply on stream flow; and (e) the development addresses the likely impact of biting midge and mosquitoes on residents and tourists and the measures to be used to ameliorate the identified impact.	See above – the development footprint was identified by Local Environmental Plan Amendment No. 10 which fixed the 7(a)/2(c) zone boundary and the development proposal is consistent with that zone boundary. It should be noted that the Local Environmental Study foreshadowed the construction of Broadwater Parkway and appropriate infrastructure within the outer 50m of the 100m buffer to the SEPP14 wetland within the 7(a) zoned land. The site does not have frontage to the foreshore. Not applicable. The development will be connected to the Tweed water supply system. See Annexure 22.

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TABLE 5 – DEVELOPMENT ADJOINING WATERBODIES	
CLAUSE	COMMENTS
(4) The consent authority may require as a condition of consent to any development that the following be carried out: (a) the rehabilitation of land adjoining the waterbed to create a vegetated riparian zone or wetland, (b) works to stabilise the bank or shoreline of a waterbed.	Rehabilitation of the wetland and the buffer is proposed as part of the Area E Draft Development Control Plan. This issue is further addressed in the Landscaping Concept at Annexure 8. Stabilisation works are not required.
(5) In determining a distance for the purposes of this clause, the consent authority shall have regard to: (a) the preservation of the scenic quality of foreshores, and (b) minimising the risk of pollution of waterways, and (c) the protection of foreshore ecosystems, and (d) the intended or planned use for the foreshore.	See comments above. See comments above. See comments above. The site does not directly abut the foreshore of Terranora Broadwater and given that the land between the site and the foreshore comprises a high conservation value wetland, there are limited opportunities for physical use of this foreshore area.

Clause 32 – Aircraft Noise

The site is not located on land within the 20 or higher ANEF contour and therefore this Clause is not applicable.

Clause 34 – Flooding

The design flood level for this area is RL 2.9m AHD, the climate change design flood level is RL 2.9m AHD and the probable maximum flood level is RL 5.8m AHD.

The following table addresses the key matters contained in Clause 34.

TABLE 6 – FLOODING	
CLAUSE	COMMENTS
(1) Objectives - to minimise future potential flood damage by ensuring that only appropriate compatible development occurs on flood liable land. - to minimise the adverse effect of flooding on the community.	As indicated on the Application Plans at Annexure 7 the proposed lots on the northern side of the site are at or above RL 8m AHD and are therefore above the design flood level and above the PMF level. That part of the site on which Broadwater Parkway will ultimately be construct (but which does not form part of this application) is partly flood prone.
(2) Where, in the consent authority's opinion, land is likely to be subject to flooding, then it must not grant consent to development on that land unless it has considered: (a) the extent and nature of the flooding hazard affecting the land, and	See comments above and Annexure 14 which indicates that minor filling for the future Broadwater Parkway will have inconsequential impacts in terms of loss of flood storage and have no measurable impact on flood levels.

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TABLE 6 – FLOODING	
CLAUSE	COMMENTS
(b) whether or not the development would increase the risk or severity of flooding of other land in the vicinity, and (c) whether the risk or severity of flooding affecting the development could be reasonably mitigated, and (d) the impact of the development on emergency services, and (e) the provisions of Section A3 - Development of Flood Liable Land of <i>Tweed Development Control Plan</i> .	

Clause 35 – Acid Sulphate Soils

In summary, this Clause provides that a person must not, without development consent, carry out works on land shown as being Class 1, 2, 3, 4 or 5 land on the series of maps held in the office of the Council and marked Acid Sulphate Soil Planning Map.

Council's Acid Sulphate Soils Planning Maps indicate that the site contains mainly Class 5 land with a relatively small area of Class 2 in the northern part of the site. Therefore, an Acid Sulphate Soils Management Plan is required pursuant to this Clause. An Acid Sulphate Soils Management Plan is contained at **Annexure 18**.

Clause 39 – Remediation of Contaminated Land

See comments under State Environmental Planning Policy No. 55.

Clause 39A – Bushfire Protection

The land is mapped as bushfire prone and accordingly compliance with the publication "Planning for Bushfire Protection 2006" must be demonstrated.

Annexure 23 comprises a Bushfire Assessment Report addressing compliance with Planning for Bushfire Protection 2006. In summary, the report concludes that:

"The proposed development will comply with the minimum requirements for:

- 1) Asset Protection Zones detailed in Table A2.5 Minimum Specifications for Asset Protection Zones for Residential and Rural Residential Subdivision Purposes (for class 1 & 2 buildings) in FDI 80 Fire Areas in the Planning for Bushfire Protection manual (RFS, 2006);*
- 2) Access in accordance with section 4.1.3-2 (Property Access) in the Planning for Bushfire Protection manual (RFS, 2006); and*
- 3) Development of the Residential Precincts satisfies the aims of PBP 2006 and will therefore comply with the provisions for Fire Safety under the Building Code of Australia."*

Clause 44 - Development of Land Within Likely or Known Archaeological Sites

No archaeological sites or potential archaeological sites have been identified on the land. The Cultural Heritage Report at **Annexure 11** concludes that the potential for cultural heritage sites is low.

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No known non Aboriginal sites of heritage significance have been observed on the development site or identified in the Tweed Local Environmental Plan 2000 or North Coast Regional Environmental Plan 1988 (see **Annexure 11**).

Clause 45 - Development In The Vicinity of Heritage Items, Heritage Conservation Areas, Archaeological Sites or Potential Archaeological Sites

No heritage items, heritage conservation areas, archaeological sites or potential archaeological sites exist on the development site based on the provision of Schedule 2 of Tweed Local Environmental Plan 2000; Schedules 1 and 2 of the North Coast Regional Environmental Plan 1988 and the findings of the Preliminary Cultural Heritage Assessment at **Annexure 11**.

Clause 53D – Specific Provisions for Terranora Urban Release Area E

TABLE 7 – CLAUSE 53D – SPECIFIC PROVISIONS FOR TERRANORA URBAN RELEASE AREA E	
OBJECTIVE	COMMENT
(1) This clause applies to the land known as Terranora Urban Release Area (Area E), as shown edged heavy black and coloured on the map marked (Amendment No 10)". "Tweed Local Environmental Plan 2000	
(2) The object of this clause is:	
(a) to ensure a development control plan has been developed for the land to which this clause applies to avoid ad hoc development, and	This issue is addressed in detail at Section 4.5 of this Environmental Assessment Report. On behalf of the Terranora Area E Landowners Group, Darryl Anderson Consulting Pty Ltd completed the Council's Draft Development Control Plan and submitted it to Council in February 2008 for assessment, public exhibition and adoption. However, to date Council has not finalised the Development Control Plan. This Project Application is generally consistent with the Draft Development Control Plan submitted to Council.
(b) to ensure that issues relating to contaminated land are dealt with to a sufficient level to meet the requirements of State Environmental Planning Policy No 55 - Remediation of Land, and	See Contamination Report at Annexure 13 . The Report concludes that the land is not contaminated and is suitable for the proposed development.
(c) to ensure that any wetlands in the area are restored and protected and breeding habitat for salt water mosquitoes and biting midges is minimised, and	The Draft Development Control Plan submitted to Council contains a Wetland Rehabilitation Plan. This Project Application does not involve any works within the mapped SEPP14 Wetland only within the buffer area as contemplated by the Local Environmental Study which informed Draft Local Environmental Plan Amendment No. 10 being the instrument which rezoned the whole of Area E for urban purposes.
(d) to ensure that the management of urban stormwater is consistent with the Tweed Urban Stormwater Quality Management Plan adopted by Council, and	A Stormwater Management Plan accompanies this Environmental Assessment at Annexure 14 .
(e) in respect of subclause (5), to require assistance towards the provision of the following infrastructure, facilities and services to satisfy needs that arise from development on land to which this clause applies, but only if the land is developed intensively for urban purposes:	
(i) regional transport infrastructure,	Normal contributions apply pursuant to Tweed Section 94 Plan No. 4 – Tweed Road Contribution Plan including local area contributions towards the construction of Broadwater Parkway which will link Mahers Lane to Fraser Drive.

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TABLE 7 – CLAUSE 53D – SPECIFIC PROVISIONS FOR TERRANORA URBAN RELEASE AREA E	
OBJECTIVE	COMMENT
(ii) education facilities and services provided by the State, (iii) health facilities and services provided by the State, (iv) facilities and services provided by the State for the purposes of emergency services.	Consultations with the Department of Education indicate that existing school facilities are adequate (see Annexure 29). Tweed Heads Hospital has recently been upgraded and no contributions are considered to be applicable. Existing facilities including Police, Fire, Ambulance and State Emergency Services are available in Tweed Heads and are considered to be adequate.
(3) The consent authority must not consent to development on land to which this clause applies unless it is satisfied that: (a) a development control plan has been prepared for the land, and (b) any contaminated land has been identified to the extent necessary to allow for the appropriate location of sensitive land uses, and (c) any wetland on the land will be restored and managed to the consent authority's satisfaction to restore freshwater wetland values and minimise breeding habitat for saltwater mosquitoes and biting midges, and (d) the development will generally comply with the Tweed Urban Stormwater Quality Management Plan as adopted by the Council on 19 April 2000.	Draft Development Control Plan, B17 – Tweed Area E was submitted to Tweed Shire Council on 21 February 2008 pursuant to Section 74D of the Environmental Planning and Assessment Act, on behalf of the Terranora Area E Landowners Group. It should be noted that Council has not made the Development Control Plan and therefore, in accordance with Section 74D(5a), the owners are entitled to make a Development Application despite the requirements of the Environmental Planning Instrument requiring the preparation of a Development Control Plan. Given that Council has had over two years to finalise the Draft Development Control Plan it is submitted that the fact that a Development Control Plan has not been finalised is not an impediment to the determination of this Project Application. See comments above and Annexure 13. See comments above. The Draft Development Control Plan submitted to Council contains a Wetland Rehabilitation Plan. See the Conceptual Stormwater Assessment and Management Plan at Annexure 14 which is generally consistent with the Tweed Urban Stormwater Quality Management Plan.
(4) The consent authority is not to consent to subdivision of land to which this clause applies or to other development on that land unless the consent authority is satisfied that: (a) any likely contaminants within the soil, surface water and groundwater as a result of previous land uses have been identified, and (b) an effective testing regime has been implemented, that takes into account the hydrology of the land, to identify hotspots of contamination in accordance with any relevant guidelines issued by a government department or public authority, and (c) appropriate thresholds and criteria have been used in the assessment of any potential contamination, and	See the Soil Contamination Assessment at Annexure 13 which does not identify any contaminants. As above. As above.

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TABLE 7 – CLAUSE 53D – SPECIFIC PROVISIONS FOR TERRANORA URBAN RELEASE AREA E	
OBJECTIVE	COMMENT
(d) any contamination of the land does not pose a significant threat to human health or the environment, and	As above.
(e) if contamination has been identified, an adequate monitoring program will be implemented in relation to the contamination of the land.	As above.
Note: Clause 7(1) of State Environmental Planning Policy No 55 - Remediation of Land sets out other matters that must be taken into account by a consent authority.	
(5) Despite any other provision of this plan, the consent authority must not grant consent to the subdivision of land to which this clause applies, that is within Zone No 2(c), if the subdivision would create a lot smaller than the minimum lot size permitted on the land immediately before the commencement of this clause, unless the Director-General has certified in writing to the consent authority that satisfactory arrangements have been made to contribute to the provision of infrastructure, facilities and services referred to in subclause (2)(e) in relation to that lot.	The applicant has not been advised by the Director General of the Department of Planning in relation to contributions required for the provisions of infrastructure.
(6) Subclause (5) does not apply: (a) to any lot within a special contributions area within the meaning of Division 6 of Part 4 of the Act, or (b) to any lot identified in the certificate as a residue lot, or (c) to any lot that is proposed in the development application to be reserved or dedicated for public open space, public roads, public utilities, education facilities, or any other public purpose, or (d) to a subdivision for the purpose only of rectifying an encroachment on any existing allotment.	Noted.
(7) State Environmental Planning Policy No 1 - Development Standards does not apply to development for the purposes of subdivision on land to which this clause applies.	Noted.
(8) Nothing in this clause affects the application of State Environmental Planning Policy No 55 -Remediation of Land to land to which this plan applies.	Noted, the provisions of State Environmental Planning Policy No. 55 are addressed in Section 4.14 of this Environmental Assessment.

4.3 Exhibited Draft Tweed Local Environmental Plan 2010

This Draft Plan was publicly exhibited between January 2010 and April 2010. Under the provisions of the Draft Plan, it is proposed to zone the current 2(c) Urban Expansion land to R1 General Residential. The current minimum lot size of 450m² will be retained and the proposed building height is 13.6m with a floor space ratio of 2:1.

The development proposal is not inconsistent with the exhibited Draft Plan.

That part of the site currently zoned 7(a) is proposed to be zoned E2 Environmental Conservation.

Development for the purpose of roads (and ancillary drainage/water quality structures) together with environmental protection works are permitted in the proposed E2 zone.

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4.4 Development Control Plans

4.4.1 Tweed Development Control Plan 2008, Section A1 – Residential and Tourist Code

This Plan includes development standards relating to the design and siting of dwelling houses on residential lots. As indicated on the Plan of Proposed Subdivision at **Annexure 7** the size and shape of the lots are adequate to enable compliant dwellings to be constructed on each lot.

The proposed future dwellings on each allotment will generally comply with the standards contained within Section A1 however because of topographic constraints and the need to provide for an integrated subdivision and built form design, the Living Design Guidelines at **Annexure 9** propose some variations to the normal standards. In the circumstances it is therefore proposed that in the event of an inconsistency between the Living Design Guidelines and Tweed Development Control Plan 2008, Section A1 the provisions of the Living Design Guidelines will prevail.

4.4.2 Tweed Development Control Plan 2008, Section A2 – Site Access and Car Parking Code

The car parking rates specified by Tweed Development Control Plan 2008 indicate that on site parking is to be provided in accordance with the following table:

TABLE 8 – CAR PARKING							
Land Use	Public Transport, Bus Stop Seating	Bicycle Parking	Delivery, Service Vehicle Parking (50% must be truck size)	Resident/ Visitor Parking	Staff Parking	Customer Parking	Proposed Parking
Dwelling House	Nil	Nil	Nil	1 per dwelling + provision for driveway parking for another vehicle	Nil	Nil	See 1 below.
Place of Assembly (Community Recreation Facility)	Nil	1/10 customer car parks		2/dwelling	See Table 1 of Annexure 24		20 See 2 below.
Display Home		1			1	3	3 See 3 below.

1. Dwellings
Council's Code also requires one on street car park (for visitors). Allowing for a 3m wide driveway penetration and a 6m parallel car park results in a requirement for a minimum kerb frontage of 9m. All lots comply with the exception of Lots 430, 431, 809, 810, 1019, 1020, 1103, 1104 and 1106.

An on site visitor car park is proposed on these lots and in addition a Section 88B Instrument creating a restriction as to user on each of those lots requiring the provision of the on site visitor car park will be created.
2. There is no directly applicable car parking category for a Community Facility. Given the nature of the facility (which is not open to the general public) and which is highly accessible by cycleways/walkways, a total of 20 on site spaces is considered reasonable and appropriate. Justification for the proposed 20 spaces is contained in the Parking Report at **Annexure 24**.
3. The plans at **Annexure 28** show 3 on site spaces which substantially complies. Adequate area is available on site for informal parking.

4.4.3 Tweed Development Control Plan 2008, Section A3 – Development of Flood Liable Land

See comments at Section 4.2 and **Annexure 14**.

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4.4.4 Tweed Development Control Plan 2008, Section A5 – Subdivision Manual

Section A5.3 of this Development Control Plan provides planning and design information relating to subdivisions. Relevant provisions are addressed in the following tables.

TABLE 9 – SUBDIVISION REQUIREMENTS	
PROVISION	COMMENTS
A5.3.1 – Master Plans	
The subject site is located within the coastal zone and involves more than 25 lots and therefore a Development Control Plan would normally be required under the provisions of State Environmental Planning Policy No. 71. However, as this is a Major Project to which Part 3A applies a Development Control Plan is not required under State Environmental Planning Policy No. 71.	A Development Control Plan is not required as this is a Part 3A Major Project Application. See below in relation to Draft Development Control Plan 2008, Section B17 for Area E.
However, this Section of the Development Control Plan provides that a Master Plan is still required for more than 25 lots and, where the urban pattern (street and open space network, neighbourhood structure, etc.) is not determined by: • Development and street/neighbourhood development patterns; or • An existing site specific section that determines the general street and neighbourhood layout.	As above. Draft Development Control Plan 2007, Section B17 – Tweed Urban Release Area (Area E) was prepared by Darryl Anderson Consulting Pty Ltd on behalf of the Terranora Area E Landowners Group and submitted to Tweed Shire Council in February 2008. Council is currently finalising the Development Control Plan. This Major Project Application is generally consistent with the Draft submitted to Tweed Shire Council.
A5.3.4 – Subdivision Design	
Site investigation, survey and analysis	See Section 3.0 and Annexures.
Statutory and Council requirements	Integrated development provisions do not apply to Part 3A Major Projects.
Subdivision design trial layouts and optimisation	A Detailed Site Analysis has been undertaken to identify the key site opportunities and constraints following which a number of layout options were developed to identify optimal yields, appropriate disposition of casual open space areas and suitable connectivity and access requirements. The proposed layout is considered to achieve the best outcome balancing all relevant planning and commercial considerations.
Pre-application consultation	See Development Assessment Panel Minutes at Annexure 29 .

Urban Design Guidelines and Development Standards

The following **Table 10** summarises the key guidelines contained in this part of Section A5.

TABLE 10 – DESIGN GUIDELINES	
PROVISION	COMMENTS
A5.4.3 – Physical Constraints	
In summary, this section provides that prior to detail Master Planning of a site, the physical constraints of the site must be identified, mapped and constraint issues resolved.	Constraints relating to slope, geotechnical stability, bushfire, contamination and threatened species have been identified in the various plans and annexures and the subdivision layout reflects those constraints and the site's opportunities.

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TABLE 11 – LAND FORMING	
PROVISION	COMMENTS
A5.4.5 – Land Forming	
- Public infrastructure in land to be regraded shall be preserved and if necessary for its continued viability be reconstructed to suit the new landform. Public infrastructure continuity shall be preserved at external boundaries. - Alteration of the locations of cross boundary stormwater drainage/watercourse discharge should be avoided. If alterations are proposed, then the written agreement of all effected downstream landowners is required. (b) Perimeter levels; Pre development levels must be preserved at external (perimeter) boundaries of a subdivision, preferably without the use of boundary (or within 3m of the boundary) retaining walls exceeding 1.2m in height. The application of this criteria may be varied in infill subdivisions in flood liable areas where there is general filling to provide flood immunity.	
B. Mass Landform Change Criteria 1. Residential, includes residential subdivisions in Village, Urban Expansion and Rural Living zones. The proportion of a subdivision site (plan area) that contains cut or fill areas with finished surface levels that depart from natural surface levels by more than 5m shall not exceed 10%. Variations up to 15% of site area may be considered if such variations have a demonstrated environmental benefit (eg. avoidance of importing borrowed fill off site). 2. Industrial, Business and Mixed Use Subdivision, includes industrial, business and mixed use subdivisions in Village and Urban Expansion zones. The proportion of a subdivision site (plan area) that contains cut or fill areas with finished surface levels that depart from natural surface levels by more than 8m shall not exceed 20%. For the purpose of this Section "subdivision site" includes the parcels of land created for private sale and formal parks, and does not include undeveloped areas, areas retained for environmental purposes, roads, or residual allotments. If a subdivision contains a mix of urban and rural/rural residential uses, the rural/rural residential areas must be excluded from the urban areas for the purposes of complying with this Clause.	These matters are addressed in the Civil Engineering Report at Annexure 19.
C. Shape/Surface Criteria 1. Residential and Rural Living Subdivision, includes residential subdivisions in Village and Urban Expansion zones: - The finished landform shape (concave/convex, rolling, stepped etc) of the subdivision site should mimic existing and local surrounding natural topography. - Except as provided in Note 1 below, no sharp changes of gradient (eg associated with batters or retaining walls) are permitted at or near inter lot boundaries or within lots. - Batters and retaining walls are not permitted for the purpose of creating terraced lots. - Sharp changes of gradient are permitted at road and public land boundaries. - See Figure 4.2.2.	These matters are addressed in the Civil Engineering Report at Annexure 19.

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TABLE 11 – LAND FORMING																																								
PROVISION				COMMENTS																																				
A5.4.5 – Land Forming																																								
Note 1: A retaining wall or batter of maximum "combined height" (as defined in Section E) of 1.2m at or adjacent to inter lot boundaries may be permitted to ease lot gradients, where lot longitudinal or cross gradient would exceed 10% in the absence of such retaining wall or batter. 2. Industrial, Business and Mixed Use Subdivision, includes industrial, business and mixed use subdivisions in Village and Urban Expansion zones: ♦ Terraced lots with sharp changes of gradient associated with retaining walls or batters are permitted. Sharp changes of gradient (ie. associated with batters or retaining walls) are permitted at or near lot, road and public land boundaries. Sharp changes of gradient are permitted within lots.				See above.																																				
D. Plans Criteria Site regrading proposals must be accompanied by the plans specified in Development Design Specification D13 – Engineering Plans (Subdivisions) clause D13.03 5(a)				These matters are addressed in the Civil Engineering Report at Annexure 19.																																				
E. Retaining Walls and Batters Criteria 1. Definitions: "retaining wall" is defined as a structure required to retain soil, rock and other materials. It includes retaining and revetment structures as defined in clause 1.1 of AS 4078 - 2002. "batter" is defined as the sloping surface of artificial cuttings and embankments that have a gradient exceeding 25%. It excludes natural slopes. "Combined height" is defined as the vertical height difference at or adjacent to the boundary between top of batter or retaining wall and bottom of batter or retaining wall. Adjacent to a boundary includes any batters or retaining walls that lie either wholly or partly within a distance of 5m measured horizontally from the allotment boundary. 2. Criteria (a) The combined height of retaining walls or cut/fill batters on an allotment boundary shall not exceed the following				These matters are addressed in the Civil Engineering Report at Annexure 19.																																				
<table><tr><th colspan="5">MAXIMUM PERMISSIBLE COMBINED HEIGHT OF RETAINING WALLS OR BATTERS</th></tr><tr><th rowspan="3">Type of Subdivision</th><th rowspan="3">Perimeter boundary of subdivision</th><th colspan="3">Boundaries of lots created within subdivision</th></tr><tr><th rowspan="2">Side and Rear Boundaries</th><th colspan="2">Street Boundary</th></tr><tr><th>Above Street Level</th><th>Below Street Level</th></tr><tr><td>Residential</td><td>1.2</td><td>1.2 see Note 1 of Table A5-3(C)(1)</td><td>1.8</td><td>2.4</td></tr><tr><td>Industrial</td><td>1.2</td><td>5</td><td>2.5</td><td>5</td></tr><tr><td>Business</td><td>1.2</td><td>5</td><td>1.2</td><td>2.4</td></tr><tr><td>Rural Living</td><td>1.2</td><td>Nil</td><td>1.2</td><td>2.4</td></tr></table>					MAXIMUM PERMISSIBLE COMBINED HEIGHT OF RETAINING WALLS OR BATTERS					Type of Subdivision	Perimeter boundary of subdivision	Boundaries of lots created within subdivision			Side and Rear Boundaries	Street Boundary		Above Street Level	Below Street Level	Residential	1.2	1.2 see Note 1 of Table A5-3(C)(1)	1.8	2.4	Industrial	1.2	5	2.5	5	Business	1.2	5	1.2	2.4	Rural Living	1.2	Nil	1.2	2.4	
MAXIMUM PERMISSIBLE COMBINED HEIGHT OF RETAINING WALLS OR BATTERS																																								
Type of Subdivision	Perimeter boundary of subdivision	Boundaries of lots created within subdivision																																						
		Side and Rear Boundaries	Street Boundary																																					
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Residential	1.2	1.2 see Note 1 of Table A5-3(C)(1)	1.8	2.4																																				
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Rural Living	1.2	Nil	1.2	2.4																																				

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TABLE 11 – LAND FORMING	
PROVISION	COMMENTS
A5.4.5 – Land Forming	
(b) Where retaining walls or batters are utilised to create a level difference between adjacent allotments or an allotment and a road and the retaining wall is located in the lower allotment, the top of batter or top of retaining wall shall be located a minimum 0.5m horizontally from the boundary	

TABLE 12 – STORMWATER MANAGEMENT	
A5.4.6 – Stormwater Runoff, Drainage, Waterways and Flooding	
PROVISION	COMMENTS
Water Sensitive Urban Design	This issue is addressed in the Conceptual Stormwater Assessment and Management Plan at Annexure 14 .
Erosion and Sedimentation Control	This issue is addressed in the Conceptual Stormwater Assessment and Management Plan at Annexure 14 .
Permanent Stormwater Quality Facilities	This issue is addressed in the Conceptual Stormwater Assessment and Management Plan at Annexure 14 .
Drainage (lawful point of discharge)	This issue is addressed in the Conceptual Stormwater Assessment and Management Plan at Annexure 14 .
Riparian Buffer Widths	See Section 8.7.1 and Annexures 14, 15 and 16 .

The following table summarises the key principles applicable to urban structure.

TABLE 13 – SECTION A5.4.7 – URBAN STRUCTURE	
Requirement	Compliance
No more than 15% of lots fronting cul-de-sac.	Complies – 2% of lots will front a cul-de-sac.
Maximum cul-de-sac length 100m serving no more than 12 dwellings with clear view for full length of cul-de-sac.	Complies – cul-de-sac is 50m long and serves six dwellings.
Linking access for pedestrians and cyclists.	Complies – see Annexure 24 .
Bus route/stops should be located at an average spacing of 300 – 400m.	Complies – see Annexure 24 .
Street design to achieve target street speeds.	Complies – width and alignment designed to discourage high speeds (see Annexures 19 and 24).
Cycleway network required.	Normal contributions under Section 94 Plan No. 22 will be applicable (see also Annexure 24).
Dedication of environmentally sensitive areas.	The central drainage corridor and the 7(a)/SEPP14 land will be dedicated (see Annexure 7).
Casual parks – 1.13 hectares/1000 population (11.3m ² /person). Desirable minimum area 2500m ² – 4000m ² .	Complies – based on 317 residential lots and 2.4ppd results in a requirement for 8600m ² of usable casual open space. 10587m ² is proposed to be dedicated and embellished (see Annexure 8) in total (Lots 436 and 710). In addition to the dedication and embellishment of Lots 436 and 710, Lot 711 having an area of 3647m ² will be created as community association property and will include the following recreational facilities:

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TABLE 13 – SECTION A5.4.7 – URBAN STRUCTURE	
Requirement	Compliance
	• 25m lap pool • Gymnasium • Children's playground • Floodlit tennis court • Barbeque facilities • 2 x resident's lounges The facilities will be managed and maintained by the community association.
95% of residences within 400m walking distance of casual parks.	Complies – all lots are within 400m walking distance (see Layout Plan).
Land form of casual park – slopes less than 8%.	Complies – see Annexure 19 .
Access from more than one local road.	Complies – see Annexure 7 .
Road frontage – 50% of perimeter.	Complies – see Annexure 7 .
Embellishment.	Complies – the local parks will be embellished in accordance with Table A5-8.2.1 of Section A5.
Sports playing field – 1.7 hectares/1000 persons (structured or active open space).	Contribution in lieu is applicable in accordance with Draft Section 94 Plan No. 27 – Terranora Area E.
Minimum residential lot size of 450m ² and 10 x 15m building envelopes for dwellings.	Complies lots range from 464m ² – 1443m ² .
Dual occupancy lots minimum 900m ² or 1000m ² for corner lots.	Not applicable.
Solar access – 70% of lots oriented from 340° to 20° or 70° to 120°.	Complies – see Annexure 7 .
Generally rectangular shaped lots.	Complies – see Application Plans at Annexure 7 .
East – west lots must have a minimum width of 14m.	Complies – see Application Plans at Annexure 7 . All lots generally 15m to 17m wide.

TABLE 14 – SECTION A5-10 – SUBDIVISION INFRASTRUCTURE REQUIREMENTS			
Infrastructure Required	Where Required	Standard of Infrastructure	Comments
Sealed road frontage with kerb and gutter both sides	All lots for private occupation, community facilities lots and public open space lots.	See Development Design Specification D1.	Complies see Annexure 19 .
Landform			Generally complies see Annexure 19 .
Water Supply	All lots for private occupation, community facilities lots, sports fields, parks, play areas, other utility facilities (pump stations etc.).	See Development Design Specification D11.	Complies see Annexure 19 .
Sewerage	As above.	See Development Design Specification D12.	Complies see Annexure 19 .

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TABLE 14 – SECTION A5-10 – SUBDIVISION INFRASTRUCTURE REQUIREMENTS			
Infrastructure Required	Where Required	Standard of Infrastructure	Comments
Electricity	As above.	Must be underground and provided in accordance with suppliers and Australian standards. Verge service location is to comply with Development Design Specification D1.	Complies – internal reticulation will be underground.
Telecommunications	All lots for private occupation, community facilities lots and sports fields. As required for other utility facilities).	As above, service must be such that standard connection is available to local/national/ overseas networks.	Complies – telecommunication facilities will be provided underground.
Gas	Optional	As above.	Not applicable.
Drainage system	Must provide Q100 local flooding immunity for all lots for private occupation and community facilities. Major/minor system required, roads public open space may (subject to other development standards) be used for Q100 overland flow paths.	See Development Design Specifications D5 and D7.	Complies see Annexure 14.
	Must be equipped with stormwater treatment facilities to meet Chapter 3, PC7.15 standards.		
Flood Immunity	All lots for private occupation must have surface levels above the Q100 level for regional creek/river flooding. See section 4.26 of this chapter for public open space standards.	See Section A3 - Development of Flood Liable Land for detailed requirements.	Complies see Annexure 14.
External Connections and/or upgrades	The subdivider must provide all external connections required to connect subdivision infrastructure and upgrade external infrastructure to cater for the additional subdivision load. See also D1, D5, D7, D11, D12.		Complies see Application Plans and Annexure 19.

4.4.5 Tweed Development Control Plan 2008, Section A13 – Socio-Economic Impact Assessment

Section A13.5.1 of this Development Control Plan nominates development and land use types for which any application must be accompanied by a formal Socio-Economic Impact Assessment. Development for the purposes of a residential subdivision creating more than fifty lots is included in Section A13.5.1 and therefore a formal Socio-economic Impact Assessment is normally required.

As this is a Major Project Application, a Socio-Economic Impact Statement is not required, however socio-economic impacts are addressed at Section 8.15 of this Environmental Assessment as required by Item 16 of the Director General's Environmental Assessment Requirements.

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4.5 Draft Tweed Development Control Plan 2007, Section B17 – Terranora Urban Release Area (Area E)

In terms of the strategic context of the broader Terranora Area E Urban Release Area, it should be noted that Area E is designated for urban development in the Tweed Residential Development Strategy, 1991 and the Far North Coast Regional Strategy, 2006 – 2031. Area E is a key release area in terms of the Far North Coast Regional Strategy objective of providing an additional 19100 additional dwellings in Tweed Shire by 2031. Altitude Aspire will contribute a total of 317 dwellings and the broader Area E land will contribute approximately 2000 dwellings.

The statutory process for developing the planning framework underpinning urban release of Area E generally commenced in January 2003 with the preparation of the *Tweed Area E Local Environmental Study* (LES) (Parsons Brinckerhoff, March 2004) and amendment (No. 10) to the Tweed Local Environmental Plan (LEP) 2000 which was published in Government Gazette No. 156 on 26 October 2007.

Clause 53D(3) of Tweed Local Environmental Plan 2000 (as amended by Local Environmental Plan A10) provides that:

"The consent authority must not consent to development on land to which this clause applies unless it is satisfied that:

- (a) a development control plan has been prepared for the land, and*
- (b) any contaminated land has been identified to the extent necessary to allow for the appropriate location of sensitive land uses, and*
- (c) any wetland on the land will be restored and managed to the consent authority's satisfaction to restore freshwater wetland values and minimise breeding habitat for saltwater mosquitoes and biting midges, and*
- (d) the development will generally comply with the Tweed Urban Stormwater Quality Management Plan as adopted by the Council on 19 April 2000."*

The Local Environmental Study, Draft Local Environmental Plan and a preliminary Draft Development Control Plan for Urban Release Area E were funded by the Terranora Landowners Group. However, as the Draft Development Control Plan had not been completed following gazettal of Tweed Local Environmental Plan 2000 Amendment No. 10, the Terranora Landowners Group (with the agreement of Tweed Shire Council) engaged Darryl Anderson Consulting Pty Ltd to finalise the Draft Development Control Plan and prepare a Draft Section 94 Contribution Plan.

On 21 February 2008, in accordance with the provisions of Section 74D of the Act, Draft Tweed Development Control Plan 2007, Part B17 (Terranora Urban Release Area E) was submitted to Council.

Following several meetings with Council Officers, further information relating to the Draft Development Control Plan was submitted to Council on 18 December 2008, including concept Site Grading Plans, a Stormwater Quality Report, a Habitat Restoration Plan and a Wetland Restoration Plan.

A Draft Section 94 Contribution Plan was submitted to Council on 5 February 2009.

Council Officers have been assessing the Draft Development Control Plan (and additional information) for many months, however adoption of the Plan has not occurred to date.

As discussed at the meeting with Departmental Officers on 26 August 2009, Metricon has settled on the Altitude Aspire site (and other properties in Area E) and for commercial reasons is not in a position to further delay approvals to enable lots to be created. In this regard we note that the Minister is not bound by the provisions of a Local Environmental Plan.

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In summary, the Draft Development Control Plan contains a Preliminary Structure Plan which identifies the majority of the Altitude Aspire site as low density residential precinct with a small retirement precinct, a child care centre and a medium density precinct.

A copy of the Preliminary Structure Plan is contained at **Figure 9**.

Based on detailed investigations, it is not proposed to pursue the child care centre, retirement precinct and the medium density precinct principally because of topographic constraints and the need for relatively level land for those forms of development. The whole site is therefore proposed as low density residential for which the Draft Development Control Plan foreshadows a yield of approximately ten dwellings per hectare. Based on a yield of 317 residential lots and a total site area zoned 2(c) of approximately 35.74 hectares equates to a yield of approximately 8.8 dwellings per hectare which is generally consistent with the projections contained in the Draft Development Control Plan.

Retirement living, medium density and child care development would be more appropriately located in the Village Centre Precinct approximately 400m west of Altitude Aspire as the northern part of the Village Precinct is relatively level, more accessible to the likely future bus route on Broadwater Parkway and closer to future neighbourhood, shopping and community facilities.

The Draft Development Control Plan also provides for Broadwater Parkway within the 7(a) zone immediately north of the site and the project Application Plans provide for the design of the proposed Parkway together with appropriate connections thereto.

The final design, alignment and construction of Broadwater Parkway does not form part of this application and is to be funded by way of local area contributions under Section 94 Plan No. 4 following finalisation of the connection point to Fraser Drive by Tweed Shire Council and appropriate acquisition of properties which are not owned by Metricon.

In accordance with the provisions of the Draft Plan, active open space playing fields are proposed adjacent to the existing sports fields in the adjoining Terranora Village Estate to the west of Area E. This site has been agreed to, in principle, by Council Officers for sports fields. Appropriate contributions would normally be applicable towards the provision of those sports fields, subject to the \$30,000.00 cap on contributions.

The draft Development Control Plan also provides a Preliminary Infrastructure Plan showing indicative cycleways, walkways and services. The proposed project is generally consistent with the provisions of that plan.

The Draft Development Control Plan also provides for a stormwater management strategy addressing the whole catchment, however as the Plan has not been finalised by Council and as the Altitude Aspire site is within a discrete catchment, stand alone water quality control facilities have been included to achieve the required water quality targets within the downstream wetland and therefore reliance on the scheme for the whole of Area E is not necessary.

The Draft Development Control Plan also proposes a temporary intersection with Fraser Drive which is consistent with the Altitude Aspire proposal.

Council's consultants (Parsons Brinkerhoff) prepared a basic Draft Development Control Plan to inform the Draft Local Environmental Plan and explore implementation of some Local Environmental Study recommendations, including the need for larger lots between the existing Parkes Lane/Mahers Lane rural residential precinct and the Area E residential lots. Larger "buffer" lots are not required by the Draft Development Control Plan submitted to Tweed Shire Council in February 2008 for the following reasons:

1. The Altitude Aspire Subdivision Plan proposed relatively large lots (820m² to 1443m² – average 1059m²) abutting Parkes Lane (ie. Lots 501 to 515) which achieve the buffering objective; and
2. Existing and proposed public reserves and public roads (Market Parade) provide buffers to the remaining perimeter of Altitude Aspire with the exception of a small frontage (Lots 516 to 520 and Lots 701, 702 and 801 to 804). These lots only front two existing rural residential lots on which dwellings exist well clear of the common boundaries. Given the juxtaposition of existing and proposed lots it is considered that the buffering objectives are also achieved for this part of the Altitude Aspire site.

In summary, the Project Application is generally consistent with the Draft Development Control Plan with those variations made being driven by more detailed investigations and market research, particularly in relation to the provision of the aged persons facilities and child care centre, in the north western corner of the Altitude Aspire site.

Given the history of the Area E Development Control Plan it is submitted that the proponent has taken all reasonable steps to achieve a final Development Control Plan and in the circumstances general compliance with the Draft is considered to be consistent with the provision of Section 74D of the Act and the objectives of requiring a Development Control Plan.

In any case finalisation and adoption of a Development Control Plan for Area E is not considered to be an essential prerequisite for approval of Altitude Aspire for the following reasons:

- Commencing urban development on the eastern edge of Area E is logical as key urban infrastructure (roads, sewer, water, power, etc.) exist in and adjacent to Fraser Drive, which forms the eastern boundary of the site.
- Based on detailed investigations relating to the site's opportunities and constraints (see Annexures) the most appropriate use of the Altitude Aspire site is low density residential, compatible with adjoining residential development to the south and east.

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- Suitable temporary vehicular access can be provided from the site to Fraser Drive until such time as the final alignment of Broadwater Parkway is determined and acquired by Tweed Shire Council.
- The efficient use and disposition of the subject land and other land within Area E will not be compromised because the planning process is sufficiently advanced to enable informed decisions to be taken.

4.6 Legislation and Policies

4.6.1 Tweed Shire Council Residential Development Strategy, 1991

Figure 11 of this Strategy includes the development site in Urban Release Area E.

4.6.2 Far North Coast Regional Strategy, 2006 – 2031

The Strategy was adopted by the Minister on 17 January 2007. The site is identified as a proposed future urban release area on Sheet 1 of the Town and Village Growth Boundary Map contained in the Strategy. The project is therefore consistent with the Strategy.

4.6.3 Tweed 2000+ Strategic Plan and Tweed Strategic Plan 4/24

Following lengthy community consultation, Tweed Shire Council adopted the Tweed 2000+ Strategic Plan in December 1996.

Insofar as the Tweed Strategic Plan 2004/2024 (adopted by Council September 2004) is concerned, Section 1 indicates that the Tweed 04/24 is a new whole of Shire whole of Council Strategy to replace the Tweed Shire 2000+ Strategic Plan prepared a decade ago. It sets forward directions for the next two decades and provides a framework for more detailed plans and policies. The previous Strategic Plan (Tweed 2000+) was heavily concerned with managing urban expansion. The Tweed 04/24 retains the framework of the Tweed 2000+ Strategic Plan but places greater emphasis on sustainability and locality planning.

The following table summarises and comments on the key provisions of this Strategic Plan.

TABLE 15 – TWEED STRATEGIC PLAN 4/24		
ELEMENT	STRATEGY	COMMENTS
Sustainability	Retain the special character of the Tweed. Sustainability as an over-arching, guiding principle for all decision-making. Introduce sustainability indicators and a new annual 'State of the Shire' report.	Future dwellings will comply with BASIX and NatHERS requirements in terms of energy efficiency and water consumption.
Triple Bottom Line	Balance economic, social and environmental objectives. A leadership role for Council in tackling the full range of issues facing the Tweed.	It is considered that this project achieves the objectives of this element in that it will deliver a range of housing types to satisfy continuing growth and demand for dwelling houses in this locality. The project also incorporates contemporary environmental management and impact mitigation measures and ensures that all necessary social infrastructure is provided (or contributions in lieu paid) for a development of this type.

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TABLE 15 – TWEED STRATEGIC PLAN 4/24		
ELEMENT	STRATEGY	COMMENTS
Community Values	Reflect the needs and values of the existing community. Safeguard quality of life and the character of towns and villages. Stability and consistency in policies and decision-making. Effective community involvement in planning.	The character of the existing area has been identified and the design, density and layout of the proposed subdivision are compatible with the existing and desired future character and urban form of the locality.
Economic Growth	A concerted program to generate more local jobs, tackle youth unemployment, offset the decline in rural industries, and balance the population mix by attracting residents in the 30-55 age groups. Link economic growth to education and to the Tweed's environmental quality.	The project will implement the Government's Far North Coast Regional Strategy and provide jobs during the construction and operational phase.
Environmental Quality	Continued improvements in environmental management, including establishment of a Regional Open Space System. Strengthen coastal zone management.	The development footprint will not significantly impact on existing areas of native vegetation and threatened species will also be conserved. Appropriate management measures are planned to mitigate potential adverse impacts and contributions will be paid by way of Section 94 towards the regional open space system subject to the \$30,000 contribution cap.
Water Resources	Conserve water resources. Maintain and improve water quality in rivers and estuaries. Complete Integrated Water Cycle Management Study and promote use of recycled and 'grey' water. Upgrade Clarrie Hall dam.	Stormwater management measures during both the construction and operational phases will be implemented to ensure that water quality objectives are achieved. An Integrated Water Cycle Management Strategy also accompanies this application. Future dwelling houses will incorporate water efficiency devices including rainwater tanks.
Rural Change	A 'Rural Partnership' to address problems associated with the decline of rural industries. A Rural Settlement Strategy to guide rural subdivision and expansion of villages, consistent with protecting landscape values.	Not applicable.
Social Support	A new Social Plan. Greater emphasis on the needs of the elderly, disabled, youth and Indigenous people. A stronger framework for social planning and integrated provision of community services.	Development of this site as proposed is not inconsistent with Council's social objectives insofar as it implements the Tweed Residential Development Strategy 1991 and the Far North Coast Regional Strategy 2006-2031. It will provide a range of housing choices together with all normal urban infrastructure required by a project of this type.
Housing Affordability	New measures to provide more housing for both purchase and rental within the reach of lower and middle income groups.	The project involves a range of lot sizes to enable housing choice and greater affordability to be provided for prospective purchasers.

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TABLE 15 – TWEED STRATEGIC PLAN 4/24		
ELEMENT	STRATEGY	COMMENTS
Urban Development	Implement current plans for urban expansion including Cobaki and Bilambil Heights. Complete assessments of Terranora 'Area E' and Kings Forest. Retain green belts or buffers between settlements.	The project is entirely consistent with this provision as it implements the Far North Coast Regional Strategy 2006 – 2031 and Tweed Local Environmental Plan 2000 Amendment No. 10.
Land Use Structure Plan and Urban Design Framework	A new Structure Plan to set out more detailed proposals for urban and rural land use. Revised guidelines to promote the highest possible standards of urban and landscape design.	It is understood that Council has not completed this Structure Plan.
Infrastructure	A new Tweed Community Infrastructure Program and other measures to ensure adequate provision of infrastructure to both new and existing areas. Minimise the cost to government of servicing new development.	It is understood Council has not completed the new Community Infrastructure Program.
Locality Plans	Detailed plans for local areas prepared in conjunction with the community to guide physical, economic and social development, environmental management, infrastructure and services.	Council has commenced preparing some locality plans however the Terranora area has not yet been commenced.
Partnerships	Council to form partnerships with government agencies and other parties to tackle priority issues eg. Tweed Heads revitalisation. Expert Advisory Panels to help implement key components of the strategy	Not applicable.
Regional Links	Closer integration with planning for the Gold Coast and South East Queensland. Continued involvement with the Northern Rivers Region and Premier's Department coordination group.	Not applicable.
Council Management	Strategic Directions and Four Year Priorities to be pursued through Council's Management Plan and budget. Further adjustments where necessary to Council's organisation structure.	Not applicable.

4.6.4 Threatened Species Conservation Act

The Ecological Assessment at **Annexure 15** addresses relevant threatened species under the Threatened Species Conservation Act 1995 and generally concludes that subject to certain mitigation measures, the project will not impact significantly on threatened species. Details of mitigation measures are provided in Section 8.10.

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4.6.5 Native Vegetation Act, 2003

Section 5 of this Act provides that the Act does not apply to land described in Part 3 of Schedule 1. Schedule 1, Part 3, Paragraph 14 provides that land within a zone designated "residential" under an Environmental Planning Instrument is excluded from the operation of the Act. The residential development is proposed on land zoned 2(c) Urban Expansion which is coloured pink and has the residential prefix 2. It is therefore considered that the zone has the "*substantial character*" of a residential zone.

It should also be noted that Section 75U of the Environmental Planning and Assessment Act provides that an authorisation referred to in Section 12 of the Native Vegetation Act, 2003 does not apply to a Major Project Application.

4.6.6 Roads Act, 1993

Section 138 of this Act requires approval to be obtained for certain works and access connections to a public road. However, Section 75V of the Environmental Planning and Assessment Act provides that an approval under Section 138 must be consistent with any Part 3A approval granted by the Minister.

4.6.7 Rural Fires Act, 1997

This Act requires an authority from the Rural Fire Service for certain development types including subdivisions to be used for residential purposes and aged persons housing. These forms of development would normally also be integrated development under the provisions of Section 91 of the Environmental Planning and Assessment Act. However, Section 75U provides that a Bushfire Safety Authority under Section 100B of the Rural Fires Act is not required in respect of a Major Project Application.

4.6.8 Water Management Act, 2000

Approvals would normally be required under this Act for certain activities including dewatering however, Section 75U of the Environmental Planning and Assessment Act provides that a Water Use Approval under Section 89, a Water Management Work Approval under Section 90 or an Activity Approval under Section 91 of this Act is not required in respect of a Major Project Application.

4.6.9 Commonwealth Environmental Protection and Biodiversity Conservation Act, 1999

The Ecological Assessment at **Annexure 15** concludes that the proposed development does not give rise to a requirement for any approvals under the Commonwealth Environmental Protection and Biodiversity Conservation Act, 1999.

4.6.10 Development Contributions

Tweed Shire Council has adopted a number of Shire wide Section 94 Contribution Plans which may apply to the project. In addition, Council has adopted Water and Sewer Headworks Charges for the Tweed Local Government Area.

Table 15 summarises development contributions per residential lot. On site casual open space will be dedicated and embellished in accordance with the standards in Tweed Development Control Plan 2008, Section A5 – Subdivision Manual. No site specific Section 94 Plans apply but the following Shire wide plans are relevant:

TABLE 16 – CONTRIBUTIONS (SECTION 94 PLANS)			
PLAN NO.	PLAN NAME	QUANTUM OF CONTRIBUTION (per lot)	PURPOSE
4	Tweed Road Contribution Plan	\$13527.00	This Plan enables the Council to collect contributions towards upgrading of the distributor road network to accommodate additional traffic resulting from population growth and urban expansion. It includes a local area contribution component for the acquisition of the corridor and construction of Broadwater Parkway from Mahers Lane to Fraser Drive.
11	Library Facilities	\$792.00	This Plan enables the Council to levy contributions towards the cost of upgrading and improving existing library facilities at Tweed Heads, Murwillumbah and Kingscliff.
12	Bus Shelters	\$60.00	This Plan enables Council to levy contributions towards the cost of constructing public bus shelters on roads and streets in accordance with normal Surfside Bus route requirements.
13	Eviron Cemetery/Crematorium Facility	\$120.00	This Plan enables Council to levy contributions towards the cost of providing and expanding the existing Eviron Cemetery and Crematorium facility to meet additional demand generated by population growth.
18	Council Admin Offices and Technical Support Facilities	\$1759.90	This Plan enables Council to levy contributions towards the cost of alterations and additions to the Council offices at Tweed Heads and Murwillumbah and the Council's Technical Support facilities (Works Depots) to meet the additional demand generated by growth.
22	Cycleways	\$447.00	This Plan enables Council to levy contributions towards the cost of providing cycleways in accordance with Council's Cycleway Strategy, throughout the Shire.
26	Shire Wide Regional Open Space (Structured)	\$3619.00	This Plan enables Council to levy contributions towards the cost of providing a new regional sporting facility at Arkinstall Park, to meet demand for active open space activities in addition to those normally require at sports fields (see Section 94 Plan No. 5)

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TABLE 16 – CONTRIBUTIONS (SECTION 94 PLANS)			
PLAN NO.	PLAN NAME	QUANTUM OF CONTRIBUTION (per lot)	PURPOSE
26	Shire Wide Regional Open Space (Casual)	\$1031.00	This Plan enables Council to levy contributions towards the cost of regional casual open space such as beach foreshore areas, river foreshore areas and the like to meet the demand generated by growth, in addition to casual open space parks which might be dedicated and embellished on a particular development site.
TOTAL		\$21355.90	

In addition to the contributions normally applied under the Plans referred to in Table 15, Darryl Anderson Consulting Pty Ltd on behalf of the Terranora Area E Landowners Group prepared and submitted to Tweed Shire Council on 5 February 2009 a Draft Section 94 Contribution Plan No. 27 – Terranora Area E. The following table (**Table 16**) summarises the contributions applicable under the Draft Plan.

TABLE 17 – DRAFT SECTION 94 PLAN NO. 27 – TWEED SHIRE URBAN RELEASE AREA E			
PLAN NO.	ELEMENT	RATE PER LOT	PURPOSE
27	Active Open Space	\$2584.40	To enable land to be acquired and embellished on a fair and equitable basis to benefit all landowners within the urban release area.
27	Casual Open Space	Nil	Not applicable to Altitude Aspire as casual open space will be dedicated and embellished on site.
27	Wetland	\$1154.84	To enable the State Environmental Planning Policy No. 14 Wetland to the north of the site to be acquired and rehabilitated on a fair and equitable basis funded by all development within the release area.
27	Habitat	\$483.21	To enable the habitat area to be acquired and rehabilitated on a fair and equitable basis funded by all development within the release area.
27	Community Buildings	Nil	Not applicable. A community recreation facility is proposed on the project site.
27	Cycleway	\$335.47	To enable an integrated network of cycleways to be provided benefiting all future residents on an equitable and fair basis.
27	Stormwater		Not applicable as Altitude Aspire will provide independent stormwater management facilities on site.
	SUBTOTAL	\$4557.92	

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Tweed Shire Council is currently reviewing Section 94 Plan No. 4 (Tweed Road Contribution Plan) and Council anticipates a substantial increase in the contribution rates which could take total contributions beyond the current \$30,000.00 cap.

It is a matter for the Department of Planning and Tweed Shire Council as to how the contributions are applied to comply with the current \$30,000.00 cap imposed by the Minister for Planning.

However, Metricon (Qld) Pty Ltd is prepared to negotiate a Planning Agreement with Tweed Shire Council for contributions in excess of the \$30,000.00 cap. Appropriate provision has been included in the Draft Statement of Commitments in relation to negotiating a Planning Agreement.

Section 64 Headworks Contributions

Sewer

The current contribution is \$5295.00 per equivalent tenement. One equivalent tenement is nominally equivalent to one lot. The contributions are required to fund conveyance, treatment and disposal of sewerage generated by the project.

Water

The current contribution is \$11020.00 per equivalent tenement. One equivalent tenement is nominally equivalent to one lot. The contributions are required to fund storage, treatment and conveyance of water supply required by the development.

4.6.11 Capital Investment Value

The capital investment value of the project has been determined at \$22,122,684.00. A copy of the Quantity Surveyor's Report is contained at **Annexure 25**.

4.6.12 NSW Coastal Policy 1997

The maps accompanying the Coastal Policy indicate that the site falls within the area to which the Policy applies.

Table 2 of the Coastal Policy contains a number of strategic actions relevant to development control. Section 8.2 of this Environmental Assessment Report addresses Coastal Policy provisions.

5.0 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 (AS AMENDED) OBJECTS

The following table (**Table 17**) identifies the objects of the acts and demonstrates how the project is consistent with those objects.

TABLE 18 – ENVIRONMENTAL PLANNING AND ASSESSMENT Act OBJECTS	
OBJECT	COMMENTS
(a) to encourage: (i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,	That part of the site which is the subject of the proposed residential footprint has been highly modified by agricultural activities over many years including intensive cropping. Apart from the natural watercourse in the centre of the site, which will be preserved as a drainage corridor, the site does not have any significant natural values and that is reflected in the recent rezoning to residential.

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TABLE 18 – ENVIRONMENTAL PLANNING AND ASSESSMENT Act OBJECTS	
OBJECT	COMMENTS
(ii) the promotion and co-ordination of the orderly and economic use and development of land,	Development of the site in accordance with the residential zoning and as proposed in this Environmental Assessment would be entirely consistent with the site's physical capabilities and constraints, relevant statutory planning controls and would achieve compliance with the Far North Coast Regional Strategy, 2006 – 2031.
(iii) the protection, provision and co-ordination of communication and utility services,	All necessary urban infrastructure is generally located on the eastern side of the site adjacent to Fraser Drive and subject to normal augmentation and payment of contributions the provision of utility services can be provided in an efficient and equitable manner.
(iv) the provision of land for public purposes,	This application proposes the dedication of land on site for casual open space together with a drainage reserve to cover the existing watercourse.
(v) the provision and co-ordination of community services and facilities, and	Payment of appropriate contributions or the provision of an on site community facility is proposed.
(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and	The various assessments undertaken to underpin this Project Application have not identified any significant environmental constraints with the exception of the natural watercourse through the centre of the site and the 7(a) mapped wetland to the north. The Project Application achieves appropriate protection of these natural features.
(vii) ecologically sustainable development, and	Threatened species will be retained and protected.
(viii) the provision and maintenance of affordable housing, and	The layout provides for a range of lot sizes and is consistent with affordable housing objectives.
(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and	The Minister for Planning is the consent authority for this Major Project Application and Tweed Shire Council has been consulted in preparing this Environmental Assessment Report.
(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.	The application will be advertised and notified by the Department of Planning.

6.0 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The Environment Protection & Biodiversity Conservation (EPBC) Act (1999) was passed by Commonwealth Parliament in June 1999 and came into force on 16 July, 2000. A person must not, without an approval under the Act, take an action that has or will have, or is likely to have, a significant impact on a matter of National Environmental Significance (NES).

These matters are listed as:

- (a) the world heritage values of a declared World Heritage property;
- (b) the ecological character of a declared Ramsar wetland;
- (c) a threatened species or endangered community listed under the Act;
- (d) a migratory species listed under the Act; or
- (e) the environment in a Commonwealth marine area or on Commonwealth land.

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The Act also prohibits the taking, without an approval under the Act, of:

- (a) a nuclear action; or
- (b) an action in a Commonwealth marine area or on Commonwealth land that has or will have, or is likely to have, a significant impact on the environment.

An action includes a project, development, undertaking or an activity or series of activities. An action does not require approval if it is a lawful continuation of a use of land, sea or seabed that was occurring before the commencement of the Act. An enlargement, expansion or intensification of a use is not a continuation of a use.

The EPBC Act (1999) does not require Commonwealth approval for the rezoning of land. It does, however, suggest that when rezoning land, planning authorities should consider whether to allow actions that could significantly affect NES matters or the environment of Commonwealth land.

Matters of NES in NSW are:

- (a) Declared World Heritage Areas;
- (b) Declared Ramsar Wetlands;
- (c) Listed Threatened Species (Schedule 1 and 2 of Commonwealth Endangered Species Protection Act 1992);
- (d) Listed Ecological Communities in Queensland; and
- (e) Listed migratory species (JAMBA and CAMBA).

Occurrence of Matter of NES on Subject Site

Background

A Commonwealth Assessment will be required for proposed activities on the Subject Site if they affect a matter of NES. Matters of NES in NSW were identified in the previous section. There are no declared World Heritage Areas or Ramsar Wetlands in the locality, study area or Subject Site.

Listed Threatened Species

No Commonwealth Threatened flora species were recorded on the Subject site.

No Commonwealth Threatened fauna species were recorded on the Subject site, however, one such listed fauna species is considered a possible occurrence on the site over time - Grey-headed flying-fox (*Pteropus poliocephalus*) – Vulnerable.

Listed Ecological Communities

No Commonwealth Threatened Ecological Communities were recorded on the Subject site.

Listed Migratory Species

Listed migratory species in Queensland are considered predominantly in the Japan- Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA).

No migratory species as listed within schedules of the EPBC Act (1999) were recorded on site or are considered as possible occurrences on site.

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Assessment against EPBC Act Principal Significant Impact Guidelines

Background

The Assessment against the EPBC Act is made using Principal Significant Impact Guidelines 1.1 (DEH 2006). The guidelines outline a self-assessment process to assist in determining whether an action should be referred to the Department of Environment Water Heritage and the Arts (DEWHA) for a decision on whether Commonwealth assessment and approval is required under the Act. The following sections assess the proposed development (the action) against these guidelines.

Vulnerable Species

Significant Impact Criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

Assessment of Proposed Action

The Grey-headed flying fox, listed as vulnerable within schedules of the EPBC Act (1999), is considered a possible occurrence on the subject site. It is considered that the proposed development will not result in any of the above impacts on the Grey-headed flying-fox.

It is considered that the subject site does not support an important population of any species listed in the *EPBC Act (1999)* and a significant impact on these species will not be incurred.

Requirement for Commonwealth Referral

Based on the assessment provided above, Referral to the Commonwealth Department of Environment Water Heritage and the Arts (DEWHA) is not required. The proposed action is unlikely to result in a significant impact on any matter of NES. It is concluded that Commonwealth Assessment is not required for the proposed development of the subject site.

7.0 ASSESSMENT OF POTENTIAL IMPACTS AND DRAFT STATEMENT OF COMMITMENTS

Key potential issues and impacts are addressed in Section 8.0. Appropriate management and mitigation measures are contained in the Draft Statement of Commitments at Section 7.1.

In particular, issues relating to contamination, acid sulphate soils, bushfire hazards, geotechnical constraints, flooding impacts, cultural heritage issues, impacts on wetlands and aquatic habitats, impacts of mosquito breeding areas and the relationship of the development with Terranora Broadwater and the adjacent State Environmental Planning Policy No. 14 Wetland are addressed in detail. That assessment does not identify any significant constraints on the creation of the proposed 320 allotments on that part of the site which is zoned 2(c) Urban Expansion.

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Key issues can be suitably managed and appropriate mitigation measures can be implemented to address potential adverse impacts. The design of the subdivision itself achieves significant mitigation measures by precluding any residential development within or adjacent to the natural watercourse and by providing appropriate management and preservation of the 7(a) wetland area to the north of the site.

In summary, it is concluded that the project will not have any significant adverse impacts and potential impacts relating to bushfire, buffering of endangered ecological communities, rehabilitation of existing vegetation communities, provision of appropriate infrastructure and protection of threatened species are adequately addressed in the Draft Statement of Commitments at Section 7.1.

7.1 Draft Statement of Commitments

The following table comprises a Draft Statement of Commitments designed to manage and mitigate potential adverse impacts during the construction and operational stages.

TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
1. Erosion and Sediment Control (Construction Phase)	1.1 Minimise the escape of wind-borne particles by complying with the Erosion and Sedimentation Control Plan	1.1.1 Minimise disturbance area 1.1.2 Promptly rehabilitate disturbed areas 1.1.3 Regularly water disturbed areas of the site	To ensure that air pollution does not exceed DECC standards	Ongoing during the construction phase	Any complaints to be recorded in the Complaints Register and valid claims to be acted on within one hour. Details to be provided in the quarterly Compliance Report. Responsibility: Project Manager or his/her Nominee (PM or N).
	1.2 Minimise mobilisation of sediments by complying with the Erosion and Sedimentation Control Plan	1.2.1 Erect sedimentation fences, inlet filters, hay bale barriers and diversion drains in accordance with the Erosion and Sedimentation Control Plan. 1.2.2 The controls shall be maintained during the construction phase and defects liability period. 1.2.3 Comply with the provisions of the Conceptual Stormwater Assessment and Management Plan, Gilbert and Sutherland, May 2010 (Annexure 14).	To ensure that water quality in receiving waters is not decreased in quality by sediment and nutrient loads	All sediment and erosion control measures to be in place prior to commencing site work or demolition.	Visual monitoring shall be carried out on a weekly basis and after each storm event. Details to be contained in the quarterly Compliance Report. Responsibility: PM or N.
2. Site Safety	2.1 Minimise risk of injury to construction workers and members of the public by generally complying with the Safety Management Plan	2.1.1 The principal contractor shall prepare a Health and Safety Plan and submit the Plan to the Project Manager for approval. The contractor shall comply with the approved Plan.	To ensure that Occupational Health and Safety Act 2000, Occupation Health and Safety Regulation 2001 and relevant Codes of Practice are complied with.	Prior to commencing any work on the site.	Monitoring and reporting incidents to be recorded in the Incident Register and details to be included in the quarterly Compliance Report. Work Cover to be notified in appropriate circumstances. Responsibility: PM or N.

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TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
		2.1.2 The principal contractor shall prepare a Traffic and Pedestrian Plan for approval by the Project Manager.	To ensure that traffic and pedestrian management during the construction phase complies with the RTA Traffic Control Worksite Manual and AS1742.3	Prior to commencing work on site.	As above.
3. Acid Sulphate Soil	3.1 Minimise disturbance of acid sulphate soils by limiting excavations in accordance with Acid Sulphate Soils management principles.	3.1.1 Comply with the provisions of the Acid Sulphate Soils Manual (ASSMAC, 1998) and Acid Sulphate Soil Management Plan at Annexure 18 .	To ensure that significant volumes of acid sulphate soils are not disturbed.	During the excavation phase.	Monitor excavation and address compliance in the quarterly Compliance Report. Responsibility: PM or N.
4. Construction of Subdivision	4.1 Minimise noise, dust, vibration and amenity impacts by generally complying with the Construction Management Plan and the Safety Management Plan to be prepared prior to construction commencing.	4.1.1 Limit work hours to 7.00am to 6.00pm Monday to Saturday. 4.1.2 Limit noise levels to 5dBA above background at the nearest residential receivers. 4.1.3 Comply with the Site Management Plan at Annexure 26 .	To mitigate adverse construction impacts.	During construction.	Address compliance in quarterly Compliance Report. Responsibility: PM or N.
5. Landscaping and Embellishment	5.1 Achieve improved aesthetics and useability of the site.	5.1.1 Carry out the embellishment and landscaping works in accordance with Landscape Concept Plan (Annexure 8).	To soften the appearance of the building and hardstand areas and provide a more attractive pedestrian environment and car parking area.	Prior to the issue of a final Subdivision Certificate.	Address compliance in quarterly Compliance Report. Responsibility: PM or N.
	5.2 Soften the visual impact of the future buildings and surrounding hardstand areas	5.2.1 Carry out site landscaping in accordance with the Landscape Concept Plan (Annexure 8).	As above.	Prior to the issue of a Subdivision Certificate.	As above.

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TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
6. Land Forming	6.1 Limit major landform changes to those shown on Annexure 19 subject to detailed engineering design to accompany the Construction Certificate.	6.1.1 Minimise landform changes to achieve desirable road gradients.	To minimise visual impacts on the landscape and changes in hydrology and comply where possible with Tweed Shire Council Landforming Policy.	Ongoing during the construction phase.	Certification to be provided by the Consulting Engineer prior to the issue of the Subdivision Certificate. Responsibility: Consulting Engineer.
7. Threatened Species Protection	7.1 Protect all threatened species of flora as identified in the James Warren and Associates Report (Annexure 15).	7.1.1 Comply with the Vegetation Management and Rehabilitation Plan at Annexure 16 .	To ensure compliance of the Threatened Species Conservation Act, 1995 and mitigate potential adverse impacts.	Prior to the issue of a Subdivision Certificate.	Monitoring and reporting incidents to be recorded in the Incident Register and details to be included in the quarterly Compliance Report. Responsibility: PM or N.
8. Aboriginal Cultural Heritage	8.1 Avoid disturbing any areas of Aboriginal Cultural Heritage.	8.1.1 Comply with Recommendations 1 to 4 contained in the Cultural Heritage Assessment, Everick Heritage Consultants, March 2010 (Annexure 11) (see below).	To ensure compliance with the National Parks and Wildlife Act 1974.	Ongoing during the construction phase.	Monitoring and reporting incidents to be recorded in the Incident Register and details to be included in the quarterly Compliance Report. Responsibility: PM or N.
Recommendation 1: Aboriginal Human Remains It is recommended that if human remains are located at any stage during construction works within the Subject Lands, all works must halt in the immediate area to prevent any further impacts to the remains. The Site should be cordoned off and the remains themselves should be left untouched. The nearest police station, the Tweed Byron LALC, and the DECCW Regional Office, Coffs Harbour are to be notified as soon as possible. If the remains are found to be of Aboriginal origin and the police do not wish to investigate the Site for criminal activities, the Aboriginal community and the DECCW should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all notified parties, provided it is in accordance with all parties' statutory obligations. It is also recommended that in all dealings with Aboriginal human remains, the proponent should use respectful language, bearing in mind that they are the remains of Aboriginal people rather than scientific specimens. Recommendation 2: Aboriginal Cultural Material It is recommended that if it is suspected that Aboriginal material has been uncovered as a result of development activities within the Subject Lands: (a) work in the surrounding area is to stop immediately;					

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TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
(b) a temporary fence is to be erected around the site, with a buffer zone of at least 10 metres around the known edge of the site; (c) an appropriately qualified archaeological consultant is to be engaged to identify the material; and (d) if the material is found to be of Aboriginal origin, the Aboriginal community is to be consulted in a manner as outlined in the DECCW guidelines: <i>"Interim Community Consultation Requirements for Applicants"</i> (2005). Recommendation 3: Notifying the DECCW It is recommended that if Aboriginal cultural material is uncovered as a result of development activities within the Subject Lands, it is to be registered as a Site in the Aboriginal Heritage Information Management System (AHIMS) managed by the DECCW. Any management outcomes for the site will be included in the information provided to the AHIMS. Recommendation 4: Conservation Principles It is recommended that all effort must be taken to avoid any impacts on Aboriginal cultural heritage values at all stages during the development works. If impacts are unavoidable, mitigation measures should be negotiated between the Proponent and the Aboriginal community.					
9. Maintaining Asset Protection Zones	9.1 Achieve adequate asset protection zones.	9.1.1 Compliance with the Bushfire Assessment Report at Annexure 23 .	To ensure compliance with the Rural Fires Act and Regulations and Planning for Bushfire Protection, 2006.	Ongoing during the operational phase.	Following registration of the Plan of Subdivision, Tweed Shire Council and the Rural Fire Service.
10. Adjacent Land Uses	10.1 To minimise conflicts between the proposed urban development and adjacent non-urban uses.	10.1.1 Limit construction times to 7.00am to 6.00pm Monday to Saturday. 10.1.2 Implement sedimentation and erosion control during the construction phase in accordance with the Erosion and Sedimentation Control Plan. 10.1.3 It is recommended that a stock and dog-resistant fence be constructed at the back boundary of the allotment adjoining the western boundary of the proposed site.	To minimise conflicts and adverse impacts between potentially incompatible land uses.	Ongoing during construction.	Monitoring and reporting incidents to be recorded in the Incident Register and details to be included in the quarterly Compliance Report. Responsibility: PM or N.

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TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
11. Plan of Proposed Subdivision	11.1 The project to be carried out under the Community Land Development Act, 1989 and generally in accordance with the Plan Ref 18053B, Rev F, B & P Surveys, 24.09.10.	11.1.1 Plans of Subdivision to be lodged for registration shall be generally in accordance with the Plan of Proposed Subdivision.	To ensure that the lots comply with the proposal plan.	In conjunction with registration of the Plan of Subdivisions in the Land Titles Office.	Responsibility: PM or N.
12. Traffic and Transport	12.1 Ensure that sufficient physical and environmental capacity exists in the local road network.	12.1.1 Construction of a temporary intersection with Fraser Drive with such intersection to be removed within three months of completion of permanent connection to Broadwater Parkway on the northern side of the site.	To ensure that appropriate accessibility and connectivity is provided.	Prior to release of the final Plan of Subdivision.	Monitoring and reporting incidents to be recorded in the Incident Register and details to be included in the quarterly Compliance Report. Responsibility: PM or N.
13. Water Supply	13.1 Ensure that an adequate potable water supply is provided to the development.	13.1.1 Provide water supply to each lot in accordance with the Preliminary Engineering Report at Annexure 19 .	To ensure that an adequate potable water supply is provided.	Prior to release of the final Linen Plan of Subdivision.	Responsibility: PM or N and Tweed Shire Council.
14. Sewerage	14.1 To provide a reticulated sewer system to the estate.	14.1.1 Provide sewer supply to each lot in accordance with the Preliminary Engineering Report at Annexure 19 .	To ensure that a public standard reticulation system is provided and minimise potential adverse impacts arising from pollution events on local water bodies.	Prior to the release of the final Linen Plan of Subdivision.	Responsibility: PM or N and Tweed Shire Council.
15. Contributions	15.1 Ensure that appropriate contributions are paid based on the demands generated by the subdivision.	15.1.1 Payment of relevant Section 94 and Section 64 Contributions.	To achieve the objectives of the Environmental Planning and Assessment Act in relation to the levying of contributions and comply with Tweed Shire Council policies.	Prior to the issue of a Subdivision Certificate.	Responsibility: PM or N and Tweed Shire Council.
16. Architectural Design Guidelines	16.1 Achieve a high standard of built form for the development.	16.1.1 Comply with the Living Design Guidelines at Annexure 9 .	To establish appropriate design controls and achieve contemporary urban design outcomes.	Ongoing.	Responsibility: PM or N and Design Review Panel (DRP).

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TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
17. Mosquito Management	17.1 Mitigate impacts of mosquitoes on future residents.	17.1.1 Comply with the recommendations contained in Section 8 of the Biting Insect Management Plan, HMC, June 2010 (Annexure 22).	To comply with the Tweed Development Control Plan 2008, Section A6 Biting Midge and Mosquito Control.	Prior to the issue of a Subdivision Certificate.	Responsibility: PM or N.
18. Planning Agreement	18.1 Ensure that adequate infrastructure is provided.	18.1.1 Negotiate a Planning Agreement with Tweed Shire Council for contributions in excess of the \$30,000 cap.	To comply with Draft Section 94 Plan No. 27.	Prior to the issue of a Subdivision Certificate for civil works.	Responsibility: PM or N and Tweed Shire Council.
19. Architectural Design Guidelines	19.1 To achieve a high standard of urban design and sustainable outcomes.	19.1.1 Future dwellings on the proposed lots will comply with the Altitude Aspire Living Design Guidelines at Annexure 9 . The Guidelines shall prevail over Tweed Development Control Plan 2008 in the event of an inconsistency.	To ensure that a high standard of architectural form and urban design and sustainability objectives are achieved.	Prior to the issue of a Subdivision Certificate and ongoing.	Responsibility: PM or N and Tweed Shire Council.
20. Acoustic Impacts	20.1 To mitigate potential traffic noise impacts on those lots abutting Fraser Drive.	20.1.1 The acoustic barrier, as shown in Figure 2 of Annexure 12 should be minimum 2.4m high relative to the height of Fraser Drive. Based on the proposed earthworks, the pad level of lots along the eastern boundary should be lower than the RL of Fraser Drive. Acoustic barriers should be of material with a surface mass greater than 12.5kg/m2. Suitable materials include earth mound, lapped timber palings, fibre cement sheet, plywood, masonry, glass, Perspex, or a combination of materials if desired. Care should be taken to ensure that no gaps or holes are evident.	To mitigate adverse noise impacts.	Prior to the issue of a Subdivision Certificate for those lots abutting Fraser Drive.	Responsibility: PM or N and Tweed Shire Council.

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TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
		20.1.2 Noise affected lots will require individual noise assessments to ensure that future dwellings are designed in accordance with Australian Standard AS 3671:1989 'Acoustics - Road Traffic Noise Intrusion - Building Siting and Construction' to achieve the internal noise objectives listed in Australian Standard AS 2107:2000 'Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors'. We recommend that habitable rooms of noise affected dwellings achieve the maximum internal noise limits as follows; • 40 dB(A) Leq, for bedrooms. • 45 dB(A) Leq, for living areas Based on the predicted noise levels, the lots which would require individual house assessments are listed in Table 5 of Annexure 12.			

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TABLE 19 – STATEMENT OF COMMITMENTS					
Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
21. Groundwater	21.1 To manage and minimise potential groundwater impacts.	21.1.1 The identified potential impacts are readily anticipated and manageable. At the detailed design phase for the development detailed groundwater study should be undertaken to refine the understanding of the site and aid in the development of specific groundwater management plans for the site.	To mitigate potential groundwater impacts.	Prior to the issue of a Construction Certificate.	Responsibility: PM or N.
22. Geotechnical	22.1 Ensure lots are stable and suitable for dwellings.	22.1.1 Comply with the recommendations of the Geotechnical Report at Annexure 20 (see below).	To achieve geotechnical stability and suitable dwelling sites.	Prior to the issue of a Subdivision Certificate.	Responsibility: PM or N.

Earthworks

The proposed earthworks designs, which includes filling the lower portions of the site (Units 3, 4 and 5) and cutting the upper portions of the site (Units 1 and 2), will reduce the slope gradients and therefore reduce the risk of slope instability at the site. Significant earthworks and remediation works will be required prior to the placement of fill material. This includes removing all areas displaying instability and implementing appropriate drainage prior to the placement of fill.

Drainage Issues and Implications of Instability

Properly designed and constructed and maintained surface and subsurface drainage is critical for the long term performance of the site in terms of slope stability and preventing, slips, soil creep and erosion at the site. Minimising the ingress of surface and subsurface water into sloping terrain and fill platforms is of significant importance as saturation of these materials can result in creep movements, erosion, slips and landslides. Controlling emergent groundwater seepage along the contact between the volcanic soil and the Neranleigh Fernvale geology, which is the major trigger of landslips at the site, and all other wet zones is also critical in terms of the long term slope stability of the site.

From a review of the earthworks plans it appears that the southern portion of the main drainage channel in Unit 5 and the drainage gully displaying active instability in the far northern portion of Unit 4 will be filled. Adequate drainage provisions must therefore be implemented at the base of these drainage features prior to the placement of fill. Surface contour drains must also be installed to intercept and divert sheet flows of surface water from the typically planar slopes. In areas where active instability is associated with the contact zone between the volcanic soil and the underlying Neranleigh Fernvale geology (typically the eastern side of the main drainage channel between RL15m and RL20m), site specific drainage provisions will apply.

Failure to remove all areas of instability and implement adequate drainage prior to earthworks will result in saturation and weakening of the natural soils and fill, creating further instability in the form of slips, soil creep, erosion and soil consolidation. The drainage recommendations provided in the Morrison Geotechnic (**Annexure 20**) report and outlined in the 'Recommendations for Site Development' below must be implemented to reduce the risk of slope instability and ensure the long term performance of the site.

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Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
<u>Recommendations for Site Development</u> <u>Earthworks Recommendations</u> Broad recommendations for filling and excavations are as follows:- - In areas which are to be filled, all trees, grass, weed zones, uncontrolled fill, rocks and debris must be removed from the existing ground surface to expose the very stiff to hard, natural clay soil or weathered rock. Tree root matter typically extends to a depths ranging between 0.20m and 0.4m below the existing natural ground surface. - No filling or residential development should take place within any surface irregularities such as landslips, scarps, washouts or erosion features. If filling or development is to occur in these areas, surface irregularities must be removed prior to development and appropriate drainage provisions must be implemented in accordance with the recommendations described in Section 8.0 of this report. The unstable areas are typically limited to the main drainage channel in Unit 5, the drainage gully in the northern portion of Unit 4 and the lower portions of the Units 3 and 4. - If filling or residential development is to take place within the gullies or the main drainage channel in Unit 5, properly designed and constructed drainage systems or structures must be implemented. Prior to development within the drainage gullies or channels, the drainage feature should be dewatered and all soft/loose soil and slopewash soil should be removed from the base to spoil. Appropriate drainage measures must then be installed at the base of the drainage feature to maintain positive drainage. The drainage feature can then be filled by placing suitable fill materials in thin layers with each layer compacted to 95% SMDD for residential Lots and 100% SMDD below pavements. The above recommendations for the drainage features also apply to the dams in the southern portion of the main drainage channel in Unit 5, if this area is to be developed. - The fill behind the retaining walls and used in the construction of the batters is placed and compacted to 95% Standard Maximum Dry Density and is "Controlled Fill" in accordance with A.S. 2870 (Clause 6.4.2 (a)) – "Residential Slabs and Footings" and A.S. 3798. - Filling should be benched into the sloping ground surface and supported by engineered retaining walls over the steeper slopes in Units 1 to 4. Fill slopes should be no steeper than 2(H):1(V) or 26° and be over-constructed and trimmed back to ensure compaction in the outer zones. Natural soil slope should also be no steeper than 2(H):1(V) or 26°. Vertical heights of natural soil and fill batters should preferably not exceed 5.0m. - All permanent excavations exceeding 1.0m must be supported by adequately engineered retaining walls incorporating drainage or battered at appropriate angles stated in the dot point above. Retaining walls should also found in the natural soils or rock below all fill, colluvium and slopewash surficial soils prone to movement. - All retaining walls must be individually designed to have a factor of safety of at least 1.5 with respect to internal stability, including sliding and overturning. A global stability assessment of the proposed retaining wall sections should be carried out when detailed design for the retaining walls is finalised. - Earthworks should take account of the sloping terrain and be limited to cuts and fills which can be adequately constructed by medium sized civil contractors without resorting to specialised contractors. Excavations for the proposed development to the required depths which range up to at least 4.0m to 5.0m should be achievable using conventional earthmoving equipment, such as medium sized tractors and excavators. However, due to the presence of large boulders throughout the volcanic clay soil, the use of large excavators fitted with rock buckets is recommended. The exposed clay soils will result in traffickability problems during and after rain periods.					

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Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
<u>Drainage Recommendations</u> The following drainage recommendations must be implemented to reduce the risk of slope instability and ensure the long term performance of the site:- • Prior to any earthworks on site, an open drain should be constructed through the centre of the slip in the far northern portion of Unit 4 to dry out the wet swampy areas around the slip. This drain should extend back to the upper most slipped area and should lead to an approved outlet. After the wet areas have been mostly dried out, the colluvial material associated with the slipped area must be removed and the exposed residual soil benched and battered to appropriate angles and subsurface drains installed. These drains should form a permanent herringbone shaped drainage scheme with slotted pvc pipes lined with geofabric material and backfilled with gravel. The drains should extend beyond the backscarp of the slip and should intersect the contact between the volcanic soil and the Neranleigh Fernvale Geology. • The above drainage system should also be implemented along the main drainage channel in Unit 5 where emergent groundwater seepage is expected or in areas which display evidence of instability associated with the contact between the volcanic soil and the Neranleigh Fernvale geology. These areas of instability are expected to be typically encountered within the banks of the main drainage channel on the eastern side where access and visibility was limited. More detailed geotechnical investigation would be required to make an accurate assessment of the drainage requirements and the areas which require these provisions. • In areas where the roads traverse drainage features the installation of conduits such as pipes and culverts at the base of the fills may be required. In these areas soft soils, boulders and high water flows can be expected requiring appropriate design considerations. • The existing drainage lines should be maintained by installing conduits such as pipes and culverts at the base of the fills within the drainage corridors. Modification of the drainage corridors is acceptable providing positive drainage is maintained. • Lined surface contour drains must be constructed upslope of each lot to intercept and divert surface water flows into the stormwater system. This will reduce infiltration into the slopes and the potential for soil creep and erosion. For some Lots the road drainage system will be adequate. • Subsurface drains should be installed above all repaired landslip areas and gullies and along both sides of all on-grade road formations and cuttings. • Drainage must be implemented behind the crest of all cut and fill batters as well as behind retaining walls to reduce surface water flow over or into structural fills. • Drainage filter rock (footing to surface) is to be provided behind all retaining walls with a seepage pipe outlet to nominated gully pits. • Drainage filters are to be separated from the insitu clay or fill using the appropriate geofabric. • Stormwater and sewer pipe trenches should include a separate drain in the bedding medium leading to a defined outlet. • All lot runoff and roof water must be discharged into stormwater systems via a system of pipe conduits or lined drains to minimise water infiltration into the slopes. Alternatively roof water can be discharged into water tanks for storage. After stripping the unstable slopewash soils and existing slip areas to expose the residual soils in areas to be filled, the foundation should be inspected to assess the requirements, if any, for subsoil trench drains. These may be required to maintain low groundwater conditions in areas of groundwater or surface water concentrations.					

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Project Component	Environmental Outcome (Commitment)	Measure (Commitment)	Purpose of Measure	Timing for Completion	Responsibility for Each Commitment, Monitoring and Reporting
<u>Residential Development Recommendations</u> Guidelines for residential development are as follows:- - This office must be actively involved on-site during the repair of all landslips and other areas of instability. - Vegetation clearing must be kept to a minimum, in small section at a time, with revegetation commencing immediately after the completion of earthworks to minimise future erosion. - The footings of the retaining walls must be founded in the rock or residual soils with a minimum allowable bearing pressure of 150kPa, rather than on colluvial soil. - All footings shall found in the residual soil, weathered rock or structural fill, below all non structural fill, colluvium and slopewash soil and below a line extending up from the toe of all retaining walls at 300. - Where the geological contact zone is shallow, all footings must found within the Neranleigh Fernvale geology, below the contact. - No development should take place within any surface irregularities such as slips, scarps, washouts. erosion features or elongated rock mounds. If development is to occur in these areas, surface irregularities must be removed and repaired prior to development and the drainage improved. - No residential development should take place below the Council regulated design flood levels (Q100 Flood Level). - In all Topographic Units the Guidelines for Development and the attached Guidelines for Hillside Engineering (Appendix D) must be followed. - Slope sensitive residential design and construction, which minimises earthworks should be adopted for all Lots located on slopes with a surface gradient of greater than 15o. Slope sensitive design for housing includes conventional pole houses, concrete framed houses with suspended floors which overly the natural contours and split level on-grade raft slab floors and/or suspended floors. All footings should found in the residual soils or weathered rock below the soils which are suspect to downslope creep movement, and the structural design should ensure stiffness in the downslope direction eg. strip footings, slab beams or bearers aligned up and down the slope. <u>Suitability and Feasibility of Proposed Development</u> From results of the broad geotechnical assessment it is assessed that the site is considered to be suitable and feasible for the proposed development providing the recommendations stated in the Morrison Geotechnic report, including the recommendations for the repair of landslip areas and the guidelines for hillside construction are followed. Prior to the commencement of earthworks a more detailed investigation along the contact between the two geological units is recommended to more accurately identify the orientation, thickness and extent of the contact and therefore provide more detailed recommendations with regards to the remediation works required including drainage provisions within these areas. Due to the presence of soft to firm volcanic clay soil at depth within Topographic Unit 2 (upper sloping terrain on the western side), Odometer tests should be carried out to assess the potential for consolidation of these weaks soils. The sensitivity of this site to potential slope movement requires care in construction. Earthworks operations should not be carried out without geotechnical engineering supervision. This includes carrying out:- - Regular site attendances by a geotechnical engineer or engineering geologist who is familiar with the constraints of the site and design and landslip remediation issues. - Level 1 earthworks supervision as defined in Australian Standard AS3798-2007.					

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8.0 KEY ISSUES

8.1 Strategic Planning

8.1.1 Justification of Proposal in Relation To Local, Regional and State Planning Strategies

Relevant Environmental Planning Instruments and the Far North Coast Regional Strategy are addressed in Section 4 of this Environmental Assessment. In summary, it is submitted that the Project Application is consistent with all relevant local, regional and state planning strategies or alternatively where there are inconsistencies they are relatively minor and justified in the circumstances.

8.1.2 Assessment of How the Proposal Aligns With Terranora Urban Release Area E

This issue is addressed at Section 4.5 in relation to Draft Development Control Plan 2008 – B17 Terranora Urban Release Area (Area E).

8.2 Subdivision Design, Layout and Desired Future Character

A number of factors influence the Proposed Subdivision Layout (**Annexure 7**) including:

- Tweed Development Control Plan 2008, Section A5 - Subdivision Manual which adopts the principles of new urbanism involving walkable neighbourhoods; high levels of connectivity and permeability within the street network and orientation of lots in a generally east/west or north/south direction.
- Achieving compliant road gradients and allotment access in circumstances where existing site gradients pose relative constraints.
- Achieving suitable allotment landform and a range of lot sizes to satisfy purchaser's requirements.
- Retaining and enhancing the central watercourse.
- The need to connect to Parkes Lane and Market Parade to the new streets (to improve permeability and connectivity of these streets).
- Tweed Shire Council's policy of generally avoiding culs-de-sac.
- Minimising road widths and lengths.

The proposed layout has due regard for these factors by:

- Limiting the number of culs-de-sac to one (servicing 5 lots) and providing a "grid iron" street network to improve neighbourhood accessibility. This requirement together with the need to optimise lot yields inevitably results in a number of proposed streets traversing perpendicular to the natural contours.
- The majority of lots are oriented from 340° to 20° and 70° to 120° thus achieving solar access objectives for future dwellings, including in particular, BASIX compliance.
- The majority of proposed streets are "double stacked" with lots to minimise the area of land devoted to roads and minimise the ultimate cost of lots.

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- Pedestrian pathways have been integrated into the design to link key elements such as public reserves and the community facility, as shown on Figure 3 of **Annexure 8**. Footpaths and cycleways will be located within the road reserves and drainage reserve and will connect to the external network at Fraser Drive and the future Broadwater Parkway.

In summary, the Proposed Subdivision Layout achieves a viable and sustainable balance between the site's opportunities and constraints and relevant design standards.

8.2.1 Consistency With Coastal Design Guidelines

The following tables demonstrate the consistency of the subdivision design and layout with the Coastal Design Guidelines for NSW, February 2003, NSW Coastal Policy 1997 and State Environmental Planning Policy No. 71 – Coastal Protection and North Coast Urban Design Guidelines, 2008.

Coastal Design Guidelines for NSW, 2003

Section 1.1 of the Coastal Design Guidelines applies to coastal cities (which includes Tweed Heads). Coastal cities are defined as large centres with more than 20,000 people. The population of these centres is generally increasing because they provide easy access to the ocean, rivers, beaches and other natural areas. Access to jobs, services, employment and housing choice is also available. Terranora Area E Release Area and the Altitude Aspire site generally are part of the larger urban conurbation of Tweed Heads which has a population in excess of 20,000 people and generally meets the descriptors contained in Section 1.1 of the Guidelines. It is therefore considered that the Altitude Aspire Project Application should appropriately be assessed under the Coastal Cities provisions of the Guidelines.

The following table (**Table 20**) addresses those Guidelines.

Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
PART 1 – HIERARCHY OF SETTLEMENTS		
1.1 –Coastal Cities		
1	Relationship to the environment.	
(a)	The relationship of a city to the coast is improved by: - planning to minimise expansion of city edges - extending, connecting and improving the open-space network and the public domain throughout the whole city for conservation, recreation, access and water management - protecting Aboriginal and European cultural places and relics and allowing interpretation, where appropriate - maintaining the pattern of settlement relating to the original geography, the foreshore and other natural features - ecological links between the coast and the hinterland - negligible impacts on water quality in water bodies and sustainable water and waste water systems	The proposal is consistent with the Far North Coast Regional Strategy 2006 – 2031 and the contemporary Local Environmental Plan Amendment No. 10 which rezoned the land for urban purposes. The proposal will retain the existing State Environmental Planning Policy No. 14 Wetland and the natural watercourse as environmental and public open space. The Cultural Heritage Assessment at Annexure 11 does not identify any Aboriginal or European heritage values on the site. The design of the proposed subdivision achieves a reasonable balance between the need to create marketable lots and minimising landforming changes. The adjacent State Environmental Planning Policy No. 14 Wetland to the north of the site provides appropriate ecological links. The Conceptual Stormwater Management Plan at Annexure 14 achieves appropriate water quality outcomes in the surrounding natural watercourses.

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Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
	- ensuring soil areas on sites and within public land are maintained for water percolation and mature tree growth - protecting existing areas of indigenous vegetation within the city for environmental, education and recreational purposes - enhancing micro-climatic conditions through landscaping and street trees.	Appropriate deep soil zones will be provided for on individual allotments. Appropriate measures have been incorporated into the proposal to protect existing vegetation within the wetlands, where possible within the drainage corridor, and by relocating one threatened species (see Annexure 16 Vegetation Management and Rehabilitation Plan). Appropriate landscaping of public roads and open space areas together with landscaping of residential allotments in conjunction with future dwelling construction will achieve the objectives of this provision (see Annexure 8 Landscape Concept and Annexure 16 Vegetation Management and Rehabilitation Plan).
2	Visual Sensitivity	The Visual Impact Assessment Report at Annexure 21 addresses visual impacts of the development generally in detail. This issue is further addresses in Section 8.4.1 of this Environmental Assessment Report.
(a)	a. The visual character of cities is protected and consists of: - views of public reserves and conservation areas - views and vistas from and to the coast, rivers and other water bodies and coastal vegetation - views and vistas of headlands, escarpments and mountains and other natural features - vistas of the surrounding scenic rural and natural lands.	
(b)	Views from public places are retained and reinstated, where they have been lost through inappropriately located development. The visual quality of the settlement is designed as part of an overall desired future outcome or vision.	
(c)	The retention of private views is not to the detriment of native vegetation.	
3	Edges to the water and natural areas in new coastal settlements.	The development site does not frontage to the water's edge but in any case is separated from Terranora Broadwater by an extensive State Environmental Planning Policy No. 14 Wetland and the proposed future Broadwater Parkway. The site does not have frontage to the coast and foreshore.
(a)	A variety of edge conditions exist between the city and the coastline.	
(b)	Access to and along the coast and the foreshore is optimised and designed to allow cultural and social opportunities.	
4	Streets	This is a greenfield site but in any case the subdivision layouts reflect contemporary urban design principles in relation to connectivity and permeability and the road hierarchy is consistent with the provisions of Draft Tweed Development Control Plan 2007, Section B17 – Terranora Area E.
(a)	Coastal cities have a full range of street types including: • cultural and urban streets connecting to public places • main social, retail and commercial streets • streets that reveal important vistas of and through the settlement to the coast, and focus on natural features • the original and historic subdivision street pattern • streets that define public open spaces, such as parks, squares, conservation areas and the flood line • streets located to manage bush fires • major roads (arterial, sub-arterial and collector) • residential street and laneways	

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Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
	- pedestrian and cycle routes. - Responds to pedestrian and cycle distances and connects to a local and regional network.	
(b)	Adequate services are provided for older people retiring to the coast, such as public transport and medical facilities.	Fraser Drive is a bus route and it is anticipated that in the longer term Broadwater Parkway will also become a bus route thus providing convenient accessibility to facilities required by older people located at Tweed Heads South and Tweed Heads.
(c)	Sustainable transport options are provided.	See above.
(d)	Emphasis is given to increasing use and provision of public transport.	See above.
(e)	Public streets or pedestrian pathways mark the boundary between urban development and all open spaces, dunes, beaches, rivers, wetlands and coastal foreshores.	Perimeter roads have been provided to public areas where possible and in particular to the wetland areas to the north of the site.
5	Buildings	
(a)	New development avoids urban sprawl and ribbon development.	The proposal is consistent with the Far North Coast Regional Strategy and the contemporary Local Environmental Plan Amendment No. 10 which rezoned the land to 2(c) Urban Expansion.
(b)	Gated developments are rejected in favour of neighbourhood-oriented development.	The subdivision will not be a gated community.
(c)	Higher density development reinforces the city centre.	The site is approximately 4 kilometres from the city centre and the densities reflect those in adjacent established residential neighbourhoods and the key site opportunities and constraints.
(d)	Industrial areas are located appropriately within the urban, environmental and visual context.	Not applicable.
(e)	Industrial, commercial and retail areas are located and integrated with the transport network and housing.	Not applicable.
(f)	Development builds upon the original historic street pattern.	The site is a greenfield site however it does provide appropriate linkages to Parkes Lane, Market Parade and Fraser Drive.
(g)	Within the city building types may include: residential flats; mixed-use commercial; retail and residential; commercial office or retail buildings; heritage buildings and townhouses.	Not applicable.
(h)	Suburban areas include shop-top housing, detached, semidetached and terrace housing and small apartment buildings.	The subdivision design provides for predominantly detached dwelling houses compatible with the established character of urban areas to the east.
(i)	Suburban centres may include all the building types in city centres but smaller in scale and height.	See above.
6	Height	A statutory three storey height limit applies under Tweed Local Environmental Plan 2000 and building heights will be determined by the Altitude Aspire Living Design Guidelines (see Annexure 9).
(a)	Locations close to the foreshore or sites visible from beaches and important public areas are not appropriate for tall buildings.	
(b)	Taller buildings are best located closer to the city centre.	
(c)	Generally buildings in city centres are up to seven storeys.	
(d)	Generally buildings in suburban centres are up to three storeys.	
(e)	Generally buildings close to foreshore edges are up to three storeys.	

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Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
(f)	Heights are subject to place-specific urban design. New development is appropriate to the predominant form and scale of surrounding development (either present or future), surrounding landforms and the visual setting of the settlement. Buildings avoid overshadowing of public open spaces, the foreshore and beaches in city centres before 3pm midwinter and 6.30pm Summer Daylight Saving Time. Elsewhere buildings avoid overshadowing of public open spaces, the foreshore and beaches before 4pm midwinter and 7pm Summer Daylight Saving Time.	The site does not have frontage to the beach or a coastal foreshore and therefore overshadowing by future buildings is not considered to be an issue.
PART 2 – DESIGN PRINCIPLES FOR COASTAL SETTLEMENTS		
2.1 – Defining the Footprint and Boundary		
Expanding the Boundary of a Settlement		
1	Where a settlement structure plan is needed to identify sites for development and subdivision both within the existing settlement and on its edges, it is essential to: a. enhance natural and heritage features and views b. retain existing vegetation and ecology c. reinforce and continue existing open-space networks and greenbelts, through and between settlements d. reinforce and continue the urban structure of the existing settlement and its centre or main street e. utilise existing services, infrastructure and co-locate facilities f. optimise under-utilised infrastructure, such as public transport, shops and community facilities, and retail and commercial areas g. provide a permeable block and lot pattern in sympathy with the topography and land uses h. relate higher density housing to the pattern of built form within the existing settlement i. design blocks, lots and buildings together to ensure the efficient use of land j. provide or retrofit to achieve water-sensitive urban design initiatives locally and on sites k. achieve walking and cycling distance to places of importance within the settlement or provide new local centres within the catchment of residential areas.	The site does not have any significant natural and heritage features other than the existing natural watercourse which will be preserved and improved. Existing vegetation and ecology will be retained where possible (see Annexures 15 and 16). The existing natural watercourse will be retained and incorporated into the "open space" network together with the State Environmental Planning Policy No. 14 Wetland to the north of the site. Not applicable. The project will involve extension of existing services and infrastructure available within established urban areas to the east of the site. The development will optimise the use of existing infrastructure including roads, neighbourhood shopping centres and schools. The subdivision layout reflects the topographic constraints applicable to the site and achieves, where possible, contemporary urban design outcomes relating to connectivity and permeability. Higher densities are not considered to be appropriate given the established character of adjoining areas, the topographic constraints imposed by the site and the relationship of the site with higher order retail, service areas and public transport. See Living Design Guidelines at Annexure 9. Compliance with these Guidelines will achieve integrated design of the residential lots and future buildings. Water sensitive urban design principles will be adopted (see Annexure 14). Appropriate cycleways and walkways will be incorporated into the development in accordance with the Draft Development Control Plan for the area and contributions will be paid towards the external cycleway network in accordance with relevant Section 94 plans subject to the \$30,000 cap and negotiated contributions beyond the cap (see Section 4.6.10).

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Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
2.2 - Connecting Open Spaces		
Design Guidelines for the Open Space Network		
1	Locate and connect new and existing open spaces which protect and maintain:	
(a)	nature reserves, conservation areas, parklands and environmental protection areas.	The natural watercourse will be linked to the State Environmental Planning Policy No. 14 Wetland and will provide appropriate connections.
(b)	the natural and rural setting of the settlement including the scenic values of the visual catchment	As above.
(c)	remnant native vegetation.	Remnant native vegetation will be protected where possible (see Annexures 15 and 16).
2	Establish continuous ecological corridors to incorporate existing remnant vegetation by connecting reserves and conservation areas from the hinterland or surrounding mountains to the coastal edge.	The natural watercourse will provide a continuous ecological corridor and vegetation will be retained and rehabilitated where possible (see Annexure 16).
3	Provide setbacks to protect property from the effects of coastal erosion, flooding and bushfire.	Appropriate asset protection zones and buffers to the State Environmental Planning Policy No. 14 Wetland will be provided (see Annexure 23 and Annexure 10).
4	Locate open-spaces to build on the special attributes of an area for long-term public amenity and identity of the place. An open-space network may include hill tops, river frontage, mature trees, places with panoramic views, rocky outcrops and remnant vegetation.	The passive open space areas comply with Tweed Development Control Plan 2008, Section A5 – Subdivision Manual in relation to their spatial location, size and embellishment details. They also provide appropriate linkages where possible in accordance with this Clause.
5	Where feasible preserve settings for places of cultural heritage within the open-space network.	Not applicable.
6	Provide areas within the open-space network sufficient to detain and cleanse stormwater runoff and avoid impacting sensitive ecologies.	The existing natural watercourse will be appropriately embellished to achieve improved stormwater quality outcomes.
7	Establish edge open spaces with street and pedestrian pathways. These are best located within the development footprint of the settlement rather than in an open space zone.	Where possible open space areas are bounded by a public street network.
8	Provide pedestrian and cycle access that: • does not compromise the ecological values of high conservation areas • connects important places throughout the settlement • connects residential areas to commercial and retail locations without compromising the visual, aesthetic or ecological values of the foreshore.	See comments above.
9	Provide a variety of large and smaller open spaces to serve a range of different active and passive recreational roles, eg: • playing fields; • playgrounds and small pocket parks; • walking and cycling connections;	Contributions in lieu are proposed as playing fields will be provided and embellished off site in accordance with the Draft Tweed Development Control Plan 2007, Section B17. Appropriately located and embellished casual open space areas will be provided on site in accordance with Tweed Development Control Plan 2008, Section A5. See comments above.

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Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
	♦ places and activities for people with physical disabilities.	Where possible casual open space areas will be compatible with access for the disabled however this presents a number of challenges given the difficult topography of the site.
10	Co-locate recreational facilities with shops, schools and other community facilities to reduce parking and minimise walking distances.	Co-location of active open space sports fields is proposed adjacent to the Terranora Village sports fields in accordance with Council's preferences.
11	Landscape design of open spaces should reflect the different qualities of the location and their functions.	See landscape concept details at Annexure 8 .
2.3 – Protecting the Natural Edges		
Design Guidelines for the Natural Edge		
1	Define the key characteristics and functions of public spaces along the foreshore with particular regard for sites of significant social and cultural importance.	The site does not have frontage to the foreshore.
2	Maintain foreshore areas and setbacks in public ownership	As above.
4	Provide pedestrian access to and along the foreshore with provision for those with less mobility.	As above.
8	Design and locate foreshore facilities such as car parks, toilet blocks and picnic areas to reduce their visual intrusion on the foreshore, view corridors and vistas.	As above.
6	In new areas provide edge roads (or unformed pedestrian pathways) between all urban areas, foreshore reserves and orient streets to provide: a. direct pedestrian access to the foreshore b. views to the foreshore as well as distant views and vistas.	As above.
13	Setbacks are designed to protect ecosystems and reserves covered under SEPP 14 wetlands, SEPP 26 littoral rainforest, SEPP 53 koala habitat as well as salt-marsh and mangrove communities, riparian vegetation, frontal dunes and headlands, national parks, protected areas and reserves.	A 100m buffer is designed for the State Environmental Planning Policy No. 14 Wetland in accordance with the findings of the Local Environmental Study which informed Draft Local Environmental Plan Amendment No. 10. The Local Environmental Study also foreshadowed roads and other urban infrastructure within the outer 50m of the buffer as is proposed in this application.
2.4 – Reinforcing the Street Pattern		
Design Guidelines for Reinforcing the Street Pattern		
1	Building on the original and established street and block patterns in terms of the pattern of circulation, access to lots and uses.	This is a greenfield site which connects with existing street networks on Fraser Drive, Parkes Lane and Market Parade and incorporates contemporary urban design principles.
2	Ensure the settlement is easily navigable and logical in terms of access and location of uses.	See comments above.
3	Optimise the number of connections within the street hierarchy. The traditional grid provides high accessibility and permeability for pedestrians and vehicles.	See comments above.
4	Recognise or design streets in response to the topography and other natural features by ensuring a predominance of streets that relate to the original landform.	See comments above.
5	Protect streets that provide access and views to the coast, foreshores and headlands, other significant natural features and places of public importance.	See comments above.

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Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
6	Allow for changes on private land whilst valuing the qualities of individual streets including: a. their order within the hierarchy b. access and street address c. carriageway, footpath and reserve alignments, building setbacks d. street trees which will offer filtered views of the coast e. vistas and view corridors.	See comments above.
7	Minimise road crossings over waterways and water bodies.	One internal road crossing only is proposed within the natural watercourse together with the future Broadwater Parkway on the northern side of the site.
8	Encourage grass swales and pervious surfaces to increase stormwater infiltration.	Grass swales will be incorporated into the natural watercourse where appropriate.
	The street hierarchy can be strengthened by:	
9	Protecting the rural and natural character of the main access roads by restricting development fronting onto them.	The natural character of the site incorporating the natural watercourse will be retained.
10	Reinforcing main streets as the commercial and social heart of the settlement	Not applicable.
11	Developing public edge roads around the settlement to provide separation between urban areas and sensitive ecologies and open-space areas. This provides asset protection zones for bushfire management and access to open spaces, foreshores and headlands.	Where possible public roads will edge the open space areas and the wetland areas.
12	Limiting fast moving through traffic in residential streets.	The geometric design of the internal streets discourages high traffic speeds.
13	Protecting laneways in residential and commercial areas from being built into or over.	Not applicable.
14	Establishing a system of pedestrian pathways throughout the settlement and between settlements	Appropriate pedestrian and cycleway networks will be provided within the estate suitably linked to the wider cycleway footway network.
15	Reinforcing streets with appropriate street vegetation planting.	Appropriate plantings will be undertaken in accordance with Annexure 8 – Landscape Concept Plan.
2.5 – Appropriate Buildings for a Coastal Context		
Design Guidelines for Appropriate Buildings in a Coastal Context		
Built Form Guidelines for all Sites		
2	Reinforce the clarity of the settlement structure with new buildings that are appropriate in terms of location, uses, scale, height and site configuration.	Site specific Architectural Design Guidelines are incorporated into the Altitude Aspire Living Design Guidelines at Annexure 9 . Those Guidelines have been prepared having due regard to the topography of the site, the site's key opportunities and constraints and the established built form and urban character of surrounding land.
3	Reinforce the desired future character of the settlement.	As above.
4	Consider the appropriateness of new buildings within the whole streetscape rather than each building as a stand-alone object.	As above.
5	Maintain consistent street setbacks and street edge configurations.	As above.

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Table 20 – COASTAL DESIGN GUIDELINES		
PART	GUIDELINE	COMMENT
6	Ensure buildings address the street by providing direct and on-grade entries to the street for residential, commercial and retail purposes.	As above.
8	Protect views from public places and streets by maintaining consistent setbacks along streets and not placing buildings in view corridors.	As above.
9	Protect local views and vistas throughout and surrounding the settlement from public places by relating new buildings to the topography, reducing heights to maintain views of the surrounding landscape and maintaining consistent height, bulk and scale with the street and local context	As above.
10	Ensure that controls are coordinated to produce the desired building form and site configuration for developments. These controls include uses, building height, building depth, building separation, street setbacks, side and rear setbacks, and floor space ratio.	As above.
11	Ensure development and neighbouring properties have: ♦ access to daylight ♦ access to natural ventilation ♦ visual privacy and acoustic privacy ♦ private open space ♦ a pleasant micro-climate	As above.
12	Achieving amenity relates to the design of individual buildings and, in particular to: ♦ building orientation depth; ♦ the size of the lot; ♦ open space location, size and connection with the inside of the building; ♦ car parking location and access; ♦ pedestrian access from the street; ♦ street edge configuration and building separation; ♦ mature trees, vegetation and soil areas.	As above.
Along the Settlement Edge		
1	Prevent the privatisation of public open space by ensuring development adjacent to the edge maintains public access. Generally the boundary between public and private land may be defined with pedestrian pathways, public laneways or public streets that connect to the street hierarchy. The transition from private to public uses should be designed to consider security and privacy for residential uses.	Where possible open space areas are edged by public roads.
2	Provide adequate building setbacks to allow for asset protection zones for bushfire management.	Appropriate asset protection zones have been included (see Annexure 20).
3	Design buildings to address open spaces and edge roads.	See Altitude Aspire Living Design Guidelines at Annexure 9 .

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The following **Table 21** addresses relevant matters in the NSW Coastal Policy, 1997.

TABLE 21 – NSW COASTAL POLICY 1997		
STRATEGIC ACTION NO.	SUMMARY PROVISION	COMMENT
Natural Environment		
1.1.6	Voluntary conservation agreements.	Not applicable.
1.1.7	Seagrass, mangroves, saltmarsh and other wetland associated species.	A search of the Tweed Local Government Area showed no record of any threatened fish species. No mangrove, saltmarsh or other wetland associated species will be removed or impacted by the proposal.
1.2.3	Fish habitat modification or alienation.	As above.
1.2.5	Threatened Species Conservation Act.	An Ecological Assessment has been completed (Annexure 15) which concludes that the proposed development is not likely to have a significant effect on threatened species.
1.3.1	EPA licensing of STP and other point source discharges.	Not applicable.
1.3.2	Non-point source pollution.	Appropriate stormwater management measures will be implemented during the construction phase and the operational phase to ensure that water quality in the adjacent wetland is not diminished.
1.3.7	Waste water discharge limits.	Not applicable.
1.3.8	Contaminated stormwater.	Appropriate stormwater management measures will be implemented during the construction phase and the operational phase to ensure that water quality in the adjacent wetland is not diminished.
1.3.12	Vessel sewage pumpout facilities.	Not applicable.
1.3.13	Re-use of treated biosolids and effluent.	Not applicable.
1.4.5	Assessment of coastline development proposals.	Not applicable.
1.4.7	Assessment of estuarine development proposals.	This Environmental Assessment addresses all relevant site opportunities and constraints applicable to estuarine development and concludes that the proposed subdivision is entirely consistent with relevant statutory planning considerations and will not have significant impacts on the ecological values of the site and surrounds subject to appropriate mitigation measures.
Natural Processes and Climate Change		
2.1.3	Physical and ecological processes to be considered when assessing development applications.	All relevant issues are addressed in this Environmental Assessment Report.
2.1.4	Acid sulphate soils – environmental studies; DLWC mapping and EPA guidelines; requirement for EIS; monitoring and restoration works; management plans.	See Acid Sulphate Soils Assessment at Annexure 18 .
2.2.2	Sea level change.	This issue is addressed in Annexure 14 .
Aesthetic Qualities		
3.2.1	North and South Coast Design Guidelines and Guidelines for Tourism Development along the NSW Coast.	Future dwellings will generally comply with the principles contained in the North Coast Design Guidelines (see site specific Altitude Aspire Living Design Guidelines at Annexure 9).
3.2.4	Design and locational principles for development applications.	The development is not inconsistent with the key design and locational principles.

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TABLE 21 – NSW COASTAL POLICY 1997		
STRATEGIC ACTION NO.	SUMMARY PROVISION	COMMENT
3.2.5	Siting of navigational aids, marine communication towers, warning signs and moorings.	Not applicable.
Cultural Heritage		
4.2.3	Coastal sites of Aboriginal heritage significance.	The Cultural Heritage Assessment Report at Annexure 11 concludes that the development is not likely to impact on items of Aboriginal cultural heritage.
Ecologically Sustainable Use of Resources		
5.1.11	Ecotourism developments and Guidelines for Tourism Developments Adjacent to Natural Areas.	Not applicable.
5.3.3	Aquaculture procedures, permits and guidelines.	Not applicable.
5.3.4	Development consent for mining.	Not applicable.
Ecologically Sustainable Human Settlement		
6.1.4	Canal estate developments.	Not applicable.
Public Access and Use		
7.1.5	Tourism development and public foreshore access.	Not applicable.
7.2.3	Coastal developments and surf life saving facilities.	Not applicable.
7.2.4	Surf life saving facilities and Section 94 levies.	Surf lifesaving facilities exist at Duranbah Beach, Kingscliff Beach and southern Gold Coast beaches. Council has repealed the Section 94 Contribution Plan No. 16 relating to surf lifesaving facilities.

The following **Table 22** addresses relevant matters in Clause 8 of State Environmental Planning Policy No. 71 – Coastal Protection.

TABLE 22 – STATE ENVIRONMENTAL PLANNING POLICY NO. 71 – CLAUSE 8 CONSIDERATIONS	
MATTERS FOR CONSIDERATION	COMMENT
a) The aims of this Policy set out in Clause 2.	The proposal is consistent with the aims of this Policy particularly as the site is some 4kms from the nearest beach/foreshore.
b) Existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved.	The site does not have access to the coastal foreshore.
c) Opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability.	As above.
d) The suitability of development and its type, location and design and its relationship with the surrounding area.	The development is consistent with the zone objectives and is compatible with the existing and desired future character of the locality.
e) Any detrimental impact that the development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore.	The site is not located adjacent to the coastal foreshore.
f) The scenic qualities of the NSW coast, and means to protect and improve these qualities.	As above.

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TABLE 22 – STATE ENVIRONMENTAL PLANNING POLICY NO. 71 – CLAUSE 8 CONSIDERATIONS	
MATTERS FOR CONSIDERATION	COMMENT
g) Measures to conserve animals (within the meaning of the Threatened Species Conservation Act, 1995) and plants (within the meaning of that Act) and their habitats.	The Ecological Assessment at Annexure 15 identifies appropriate means to manage and mitigate potential impacts on threatened species.
h) Measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act, 1994 and marine vegetation within the meaning of that part) and their habitats	As above.
i) Existing wildlife corridors and the impact of development on these corridors.	This issue is addressed at Section 3.9 of Annexure 15 .
j) The likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards.	The site is not subject to coastal processes.
k) Measures to reduce the potential for conflict between land based and water based coastal activities	No impacts are likely as.
l) Measures to protect the cultural places, values, customs, beliefs and traditional knowledge of aboriginals.	No items of Aboriginal cultural heritage significance have been identified in the Cultural Heritage Assessment at Annexure 11 .
m) Likely impacts of development on the water quality of coastal water bodies.	Subject to the implementation of water quality management measures as proposed no significant adverse impact on water quality is likely
n) The conservation and preservation of items of heritage, archaeological or historic significance.	No items of European heritage or archaeological significance have been identified on the site.
o) Only in cases in which a Council prepares a draft Local Environmental Plan that applies to land to which this policy applies, the means to encourage compact towns and cities.	Not applicable.
p) Only in cases in which development application in relation to proposed development is determined;	
i) The cumulative impacts on the proposed development on the environment;	No other known developments are occurring in this locality which would result in cumulative impacts.
ii) Measures to ensure that water and energy usage by the proposed development is efficient.	Normal water and energy saving devices will be installed in all future dwellings in accordance with BASIX requirements.

North Coast Urban Design Guidelines 2008

These guidelines have been developed to provide a region wide response to the existing urban design character and various settlement types. The guidelines will supplement the Coastal Design Guidelines previously released by the Coastal Council and will provide a broader response to design outcomes across the varying landscapes within the region. They should be used in conjunction with these and other design publications.

Tweed Heads is identified as a regional centre in the Guidelines.

Part 1 of the Guidelines is intended to assist in identifying the existing positive attributes of existing settlements in order to maintain the character of the settlement.

Part 2 of the Guidelines contains principles and strategies for managing sustainable settlement growth. The following table addresses relevant principles and strategies.

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TABLE 23 – NORTH COAST URBAN DESIGN GUIDELINES	
GUIDELINE	COMMENT
Principles to apply to all future development	
Ensure local and regional transport connectivity.	Fraser Drive (south of Leisure Drive) is a bus route and it is anticipated that the future Broadwater Parkway will also be a bus route (see Figure 6.1 of Annexure 24 for existing bus routes).
Street hierarchy developed in accordance with required size and function; topography and natural features determine lot and street layouts.	The street hierarchy reflects the topographic features of the site, Council's Urban Design and Engineering Guidelines for Subdivisions and the opportunities for connectivity to existing street networks.
Plan services and infrastructure to accommodate future growth strategies and ensure development is located for cost effective service provision.	The various infrastructure required has been designed to integrate with development of the wider Area E urban release area.
Establish a development scale and density which is supportive of public transport, cyclist and pedestrian use; provide pedestrian and cycle routes that connect key community facilities, parks and open spaces.	The scale and density of the development reflects the site's opportunities and constraints, infrastructure capacity and the established character of adjacent and adjoining residential developments.
In new subdivisions, continue the established city grid and maintain direct physical and visual connections, avoid car-dependent, cul-de-sac development.	The subdivision layout reflects contemporary urban design principles relating to connectivity and permeability and only incorporates one cul-de-sac. Appropriate cycleways/walkways also are proposed to minimise motor vehicle use.
Ensure that street patterns provide maximum physical and visual connectivity, offer a choice of routes and allow for double sided blocks such that development is oriented towards the street frontage.	See comments above.
In multi-dwelling development, provide a street entry for each dwelling, avoid battle-axe, villa-style development and design appropriately to topography, climate and aspect.	Not applicable, the proposal is for conventional detached dwelling lots.
Reinforce original subdivision patterns and streetscapes that characterise the settlement, maintain consistent setbacks from front and rear of lots in low density areas and continuous street and awning edges along core streets/perimeters of major blocks.	This is a greenfield site however it will address the existing Fraser Drive, Parkes Lane and Market Parade street networks and appropriate built form guidelines are proposed (see Annexure 9).
Encourage deep soil zones to centre of blocks to allow the cultivation of large trees with large canopies and to permit infiltration of rainwater to the watertable.	See Altitude Aspire Living Design Guidelines at Annexure 9 .
Maintain axes with views and vistas towards watercourses and surrounding natural landscape, enhance and maintain river, coastal and landscape edge treatments, whilst minimising risk of flooding.	The existing natural watercourse will be visible from the proposed street network where physically possible. The State Environmental Planning Policy No. 14 Wetland areas will also remain highly visible together with the Terranora Broadwater from the elevated lots within the development.
Maintain and protect any local heritage, natural or manmade, of physical, social or cultural significance in the community to establish an understanding of the collective past.	No indigenous or european cultural heritage values have been identified on the site however the natural watercourse and the State Environmental Planning Policy No. 14 Wetland will be preserved and embellished where appropriate.
Define public open spaces and parks with consistent carriageway treatment and landscaping along the urban/ natural edge.	Proposed casual open space areas will be defined by public roads where possible.

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TABLE 23 – NORTH COAST URBAN DESIGN GUIDELINES	
GUIDELINE	COMMENT
Streetscape – Greenfield	
Maintain consistent setback from street.	See Altitude Aspire Living Design Guidelines for proposed street setback arrangements which will provide for some flexibility to achieve better streetscape outcomes.
Small scale retail, public plaza and community centre with public off-street parking.	A small scale public community centre is proposed within the wider urban release Area E on land to the west of the development site.
Maintain public access and view corridors to natural landscape.	Public access will be maintained to the central drainage corridor and the State Environmental Planning Policy No. 14 Wetland.
Encourage deep soil zones in the centre of blocks permitting large trees to mature.	Deep soil zones will be incorporated into each site in accordance with the Living Design Guidelines at Annexure 9 .
Encourage siting garages at rear to reduce impact on streetscape.	See Living Design Guidelines at Annexure 9 .
Allow for on-street parking.	All lots will provide for one on street car park with the exception of those lots identified in Section 4.4.2 of this Environmental Assessment. In those cases an on site visitor car park will be provided.
Encourage regular shaped blocks and building address to street frontages.	All lots are of regular shape where possible having regard to cultural and topographic constraints.
Maintain street planting, formed footpaths, kerbs and guttering.	Appropriate plantings will be incorporated in accordance with the Landscape Concept Plan and Annexure 8 .
Principles to apply to all housing types	
Encourage elevated, lightweight construction in response to climate and breezes.	This Principle is achieved by the Living Design Guidelines at Annexure 9 .
Provide flexible sun-shading devices, louvres and natural ventilation systems to allow passive environmental control.	As above.
Provide semi-sheltered outdoor spaces of usable dimensions to mediate between indoors and outdoors.	As above.
Establish building orientation towards street front in keeping with the local settlement pattern with consistent scale, materials and setbacks, whilst maintaining built form diversity and contributing to the settlement character.	As above.
Allow for wide gutters to handle heavy rainfall.	As above.
Ensure building elements are integrated into the design of the façade and overall form.	As above.
Amalgamation and subdivision of lots may be necessary to accommodate a desired change in density of development.	Not applicable this is a new development on a greenfield site.
Allow zones for street-side planting to provide shade for pedestrians and parked cars and provide screening and enhanced privacy of residential lots.	Appropriate road reserve widths are proposed to accommodate on street plantings.
Maintain generous footpaths separated from street by a grassed or landscaped median strip.	As above.
Install services in a discreet way; place major cables underground in preference to overhead wires in areas of higher density.	All services will be appropriately placed underground in accordance with Council's normal services corridor requirements.

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8.2.2 Subdivision Type

It is proposed that the development will be undertaken as a Community Title Subdivision under the Community Land Development Act, 1989, with all public roads, drainage reserves and open space to be dedicated to Council and all infrastructure to be vested in Council.

The only Community Association property will be proposed Lot 711 which will contain the Community Recreation Facility.

8.2.3 Neighbourhood Character

The proposed subdivision will largely take on the character of the site which for the most part is characterised by varying degrees of slope.

In that regard the proposed site works have taken into account how to capitalise on site slope to maximise views and to reinforce the hillside character.

Built form will also reflect the varying site slope with some houses of an elevated and multi-level character and others of more conventional single-level form on lesser sloping sites.

This diversity of built form character reflects the diverse housing types in the vicinity which include houses built on larger sites on the hillside ranging down to more modest houses on smaller sites in the Flame Tree Estate to the north of the site.

It is not intended to mandate a specific style of character or restrictions on materials as these can be counter-productive in terms of encouraging individuality and innovation.

However the built form elements which produce neighbourhood character will be promoted by design guidelines specific to the estate and will be managed by a Design Review Panel (DRP).

Those elements are as follows:

- Site works
- Site setbacks
- Building height
- Facade articulation
- Location of garage doors
- Roof type and eaves

In broad terms the built form should celebrate the diversity and individuality of the residents and take advantage of the diversity of slope, lot size and aspect. It is fair to say that the surrounding suburban character conforms to this objective and that Altitude Aspire will be an extension of what exists now albeit in contemporary form.

In addition to the built form the streetscape has a very important role in the development of neighbourhood character.

Our concept here is towards a structured streetscape with road geometry and street planting consistent with the nearby Flame Tree Estate.

The following table (**Table 24**) addresses built form issues generally and identifies appropriate measures to achieve sustainable outcomes. The measures are reinforced by the Altitude Aspire Living Design Guidelines at **Annexure 9**.

The Living Design Guidelines are intended to prevail in the event of an inconsistency with Tweed Development Control Plan 2008 on the basis that they comprise a comprehensive and integrated approach to built form controls specifically tailored to achieve the desired neighbourhood character based on proposed finished landform.

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The Living Design Guidelines will be implemented by a Design Review Panel and enforced by way of appropriate Title Restrictions requiring future lot owners to obtain approval from the Design Review Panel.

The Living Design Guidelines include the following key elements:

- Quality standards – relating to the scale and construction material for dwellings.
- Site works for flat slope sites – including cut/fill limits and retaining wall heights.
- Site works for gentle and steep slopes – including cut/fill limits, retaining wall height and appropriate building typologies.
- Streetscaping and building siting – including setbacks.
- Built form – including key building elements and articulation.
- Landscaping – including landscaping principles.
- Residential amenity – including outdoor living and solar access.
- Fencing and privacy – including fence height limits and construction materials.
- Attachments and services – including controls on solar panels, aerials and the like.
- Environmental standards – including energy efficiency and BASIX requirements.

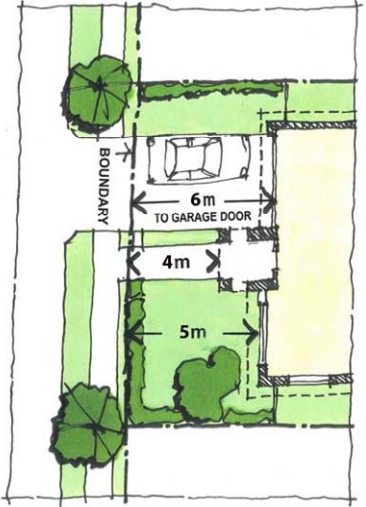
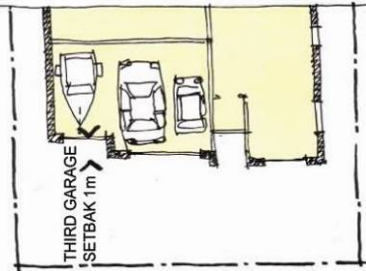
TABLE 24 – BUILT FORM DESIGN STANDARDS		
Subject	Objective	Response
Potential Building Envelopes	To ensure that lot size and geometry are suitable for house designs.	Each site can accommodate a 10 x 15m building envelope in accordance with Council's subdivision code.
	To ensure quality design outcomes on sloping sites.	- Building allotments have been engineered to create workable design parameters which are reinforced in the design guidelines. - Sites slopes are categorised as flat (<12%), gentle (12-20%) and steep (20-25%). - Refer to Appendix A (of Annexure 9) for typical design solutions.
	To encourage interesting streetscapes and to minimise the effect of garage doors.	- Adopt three-tier setback controls. - Permit 'translucent' elements forward of the general building line such as verandahs, porches and pergolas. - Ensure that garage door is set back to permit a car to park within the site. - Refer to 'Built Form' below for suggested setback controls and justification. Note that this would be a variation to Council's controls in Part A Design Control 3a.
Built Form	To encourage contemporary Australian architecture and building designs that will enhance the streetscape.	- Indicative design guidelines: <i>Building designs shall have a contemporary sub-tropical aesthetic as opposed to historical styles such as Federation, Georgian, Colonial, Italianate and Tudor.</i> <i>Roof pitches under 20 degrees, excluding verandahs, are permitted only if approved by the DRP.</i> 
	To ensure interesting front facades the building design should incorporate a combination of plan articulation, colours, façade details and feature materials.	- Indicative design guidelines: <i>The front facade should incorporate a combination of at least two (2) of the following components:</i> <i>Plan profile stepped a minimum 0.5m</i> <i>Interesting details such as balconies, porches, pergolas, window margins, sunhoods and screens.</i> <i>Two or more distinctly different but complementary wall colours.</i> <i>Incorporation of a feature material such as stained timber, stone or steel or other approved materials.</i> 

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TABLE 24 – BUILT FORM DESIGN STANDARDS

Subject	Objective	Response
	To encourage varied front setbacks resulting in an interesting articulated façade and streetscape.	- Indicative design guidelines: 1. <i>The general front setback is 5 metres measured to the external wall. Eaves and sunhoods may extend within this setback up to 1 metre. Eaves are an important part of the requirements for Built Form.</i> 2. <i>The garage door must be set back 6 metres from the front boundary to ensure that a car parked on the driveway can be fully contained within the boundaries of the site and that the garage does not dominate the appearance from the street.</i> 3. <i>Translucent elements such as porches and verandahs soften the perception of the façade and are encouraged. Minimum setback of translucent elements is 4 metres to outermost point (eave).</i> 
	To ensure that the garage door does not dominate the façade and to ensure that visitor parking in front of a garage door does not transgress into the footpath reservation.	- Indicative design guidelines: 1. <i>The garage door width must not exceed 50% of the length of frontage to reduce visual dominance from the street.</i> 2. <i>Where the design incorporates a triple (or greater) garage the third garage door must be set back a further 1 metre.</i> 
	To encourage house designs which are appropriate to their region in terms of the climate and are less dependent upon air-conditioning for comfort.	- Indicative design guidelines: 1. <i>Eaves or similar DRPhitectural shading devices are desirable to provide shading of walls and windows and are mandatory on pitched roofs.</i> 2. <i>Eaves must be a minimum 450mm wide.</i>
	To encourage innovative solutions on steep (slope category) sites which relate to the natural contours and are attractive when viewed from below.	For indicative design guidelines refer to Appendix A.
Housing Typologies	To encourage the broadest range of house designs and appropriate design responses to steep (slope category) sites and lifestyle sustainability principles.	- Conventional slab-on-ground housing up to the maximum site possibilities has been factored into the site profiling for flat and gentle (slope category) sites. Refer to Appendix A (of Annexure 9). - Steep (slope category) sites have many design options. Refer to Appendix A (of Annexure 9). - The majority of houses will be sited on flat and gentle (slope category) sites and will suit single level living which is preferable for lifestyle sustainability in an ageing society. The predominant demographic in this area is relatively mature.
Aesthetics	To ensure that houses on steep (slope category) sites are attractive when viewed from beneath.	For indicative design guidelines refer to Appendix D (of Annexure 9).

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TABLE 24 – BUILT FORM DESIGN STANDARDS		
Subject	Objective	Response
Energy & Water Efficiency	To encourage environmentally sustainable housing which conserves energy, water and materials.	▪ Indicative design guidelines: 1. <i>Principal living areas should orientate to a northerly and/or easterly aspect.</i> 2. <i>Large windows on the western façade should be avoided to minimise excessive heat gain.</i> 3. <i>Roofs should have eaves or shade devices to shade walls and windows (including ground floor).</i> 4. <i>House design should encourage crossflow ventilation to take advantage of summer breezes to cool house in summer.</i> 5. <i>House design should incorporate a covered outdoor living space.</i> 6. <i>Landscaping should incorporate predominantly water-sensitive species to minimise demand for irrigation.</i>
	To encourage houses which are naturally comfortable through climatically-responsible design and less reliant on air-conditioning.	
Public Safety	To maintain reasonable levels of passive surveillance of public places in the interests of public safety.	▪ Indicative design guidelines: 1. <i>Fencing forward of the building alignment is not permitted.</i> 2. <i>There must be at least one habitable room facing the street.</i> 3. <i>CPTED principles are generally to be incorporated into house designs.</i>
Proposed Design Quality Controls	To guarantee Council and future residents that design principles will be applied and maintained.	▪ A set of design guidelines will apply for all house designs at Altitude One. ▪ The design guidelines will become part of a covenant or similar device relating to Altitude One. ▪ A Design Review Panel (DRP) managed by the Estate Architect. ▪ The Estate Architect will review all plans in terms of compliance with the design guidelines and will issue certificates of compliance to be forwarded to the building certifier.
Allotment Orientation	To ensure preferable orientation of allotments to facilitate better house designs.	▪ Conventional lots are mainly orientated on east-west streets and smaller lots on north-south streets to achieve optimum orientation of principal living spaces. ▪ The design guidelines incorporate principles for the orientation of principal living spaces for optimum comfort and solar access. ▪ Sustainability issues with regard to taking advantage of sunshine, daylight and crossflow ventilation are embodied in the design guidelines.

Proposed Lot 710 is intended to be dedicated as a public reserve and embellished in accordance with the Landscape Master Plan at **Annexure 8**. Lot 710 is located on the corner of the future Broadwater Parkway and a new internal street. It also has frontage to a new secondary internal street.

Natural surface grades on Lot 710 are approximately 10%, which assists in achieving Council's desirable maximum gradient of 8% for the useable area. The corner location also achieves Council's requirements for 50% street frontage and provides an opportunity for an "entry statement" and appropriate landscaping for the Estate together with passive surveillance.

"The proposed development minimises the impact of the sites topography constraints and provides connections to all roads surrounding the site including, Fraser Drive, Market Parade, Parkes Lane and the future planned Broadwater Parkway. Where applicable, the internal road network has been designed in accordance with the requirement set out within Section A5 of the Tweed DCP 2008. Specifically, the internal road network has been design to take into consideration the topography constraints to meet the following objectives:

- *provide acceptable levels of safety, convenience and amenity for all street users and adjacent residents in accordance with the roads hierarchical status;*
- *ensure that each road is conducive to the wider road network with a clear distinction between functional classes of streets;*

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- provides amenity for public transport permeability and connectivity to existing and future services; and
- provides a safe and convenient network for pedestrians and cyclists.

The Road Hierarchy Map as shown within Section 3 of **Annexure 9** demonstrates the proposed developments integration with the surrounding road network.

8.2.4 Slope Sensitive Building Design

Matters relating to slope sensitive building design are addressed in the previous section relating to building envelopes, built form and housing typologies. Appropriate development standards and management measures are incorporated into the Altitude Aspire Living Design Guidelines at **Annexure 9** to address this issue. In summary, those Guidelines limit the amount of cut and fill, retaining wall heights and building styles.

8.2.5 Staging

As indicated on the Staging Plan at **Annexure 7**, it is proposed to undertake the development in eleven stages. Stage 1 will comprise the temporary access and allotments adjacent to Fraser Drive with Stages 2 and 3 comprising a northward extension of Stage 1. Stages 4 and 5 then follow as a southerly extension of Stage 1. This represents a logical sequence given that access and services will have to be extended from or adjacent to Fraser Drive. Development of that part of the site comprising Stages 6 to 10 west of the existing natural watercourse will follow Stage 5 and again in a logical sequence to facilitate the efficient extension of services and infrastructure.

Stage 11 comprises seven lots which will be completed when the temporary access to Fraser Drive is removed.

The Department is requested to structure any Part 3A Approval to enable a Construction Certificate for bulk earthworks to be issued over the whole or any part of the site prior to approval of a Construction Certificate for all civil works.

8.2.6 Management and Maintenance of Open Space and Conservation Land

- Ownership

It is proposed to dedicate Lots 436 and 710 to the public as public reserve. Council will be responsible for the day to day care, control and management of those reserves.

It is also proposed to dedicate Lot 630 as a drainage reserve. This lot incorporates the existing natural watercourse and future water quality control mechanisms and again will be vested in the control of Council for management purposes (see **Figure 1**).

The future alignment of Broadwater Parkway will also be dedicated to Tweed Shire Council and this will facilitate the future construction of Broadwater Parkway.

- Management

Routine management of the public reserves, drainage reserves and public roads would be undertaken by Council in accordance with its normal obligations under the Local Government Act. Funding will be provided through normal rate revenue and general purpose grants.

On 11 November 2010 an email was forwarded to Tweed Shire Council as follows:

"This application proposes dedication and embellishment of public reserves, construction and dedication of public roads, construction and dedication of drainage reserves, in accordance with Tweed Development Control Plan 2008, Section A5 – Subdivision Manual.

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The Department of Planning has requested us to obtain confirmation from Council that Council is amenable to accepting the care, control and management of the reserves and roads (ie. accepting dedication).

To enable us to finalise and lodge the Environmental Assessment as soon as possible, your early response would be greatly appreciated."

On 15 November 2010 Council responded as follows:

"I don't believe we can give a categorical answer on this one. It depends on whether the land and associated infrastructure provided is in accordance with Council's strategic infrastructure plans, DCP, development standards and recommended conditions of consent.

The Department has a record of not always following Council standards and/or Council's recommended conditions of consent relating to dedication of land and provision of associated infrastructure (the Bilambil Village Part 3A consent is a recent example). In such case, Council reserves the right to refuse the care, responsibility and dedication of the land."

A copy of the emails are contained at **Annexure 30**. A meeting was held with Council Officers on 24 November 2010 during which Council Officers advised that Council would make a decision on open space, drainage reserves and roads after they have completed a merit assessment of the application and prepared consent conditions.

- Maintenance

As above.

- Public access

Public access to the casual open space areas will be available, however limited access may be available to the drainage reserve depending on Council's management strategies.

- Revegetation and Rehabilitation

A Vegetation Management and Rehabilitation Plan (VMP) (**Annexure 16**) has been prepared outlining proposed revegetation and rehabilitation works on the subject site (JWA 2010). The VMP includes details of the long-term management of the conservation areas and recommendations regarding public access, including the following:

*"The area of the subject site proposed for conservation purposes is shown in FIGURE 4 (of **Annexure 16**). This area is intended to provide a buffer between the proposed development and the SEPP 14 Wetland which occurs adjacent to the northern site boundary.*

No recreation is proposed within the Conservation Area. The primary focus within this area will be the retention and protection of existing native vegetation and the rehabilitation of degraded areas.

Vehicular access to Open Space areas will restricted to maintenance vehicles. Public access to this area will be prohibited. Access will be restricted through the use of bollards or similar fauna-friendly structures and a locked gate will be provided for maintenance vehicles."

Maintenance funding and bushfire management will ultimately be provided by Tweed Shire Council by way of normal rate revenue.

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- Bushfire Management

The Bushfire Assessment Report at **Annexure 23** indicates that an asset protection zone will be located within the most westerly allotments. This asset protection zone will be managed by individual landowners.

The proposed asset protection zone within the future Broadwater Parkway corridor will be managed by Tweed Shire Council as part of its normal maintenance regime.

8.2.7 Open Space Opportunities

The proposed casual open space parks to be dedicated on site comply with Tweed Shire Council's requirements in relation to location, area and embellishment standards for the population of Altitude Aspire.

In accordance with the provisions of Draft Tweed Development Control Plan 2008, Section B17 – Terranora Area E, a contribution in lieu towards the acquisition and embellishment of active open space (sports fields) is proposed, particularly as the topography of the Altitude Aspire site is not suitable for sports fields without significant earthworks.

The proposed drainage reserve could also act as an informal recreational space, however its dominant purpose is drainage and water quality management.

8.3 Land Use Conflicts

Annexure 10 comprises an Agricultural Buffers Assessment specifically addressing this issue. In summary, the Assessment concludes as follows:

"With respect to the buffers to protect agricultural activities from the proposed development due cognisance was taken of the reports and guidelines outlined below:

- Northern Rivers Farmland Protection Project
- Tweed Shire Council's Development Control Plan (Subdivision Manual).
- Tweed Area E Local Environmental Study.
- North Coast Living and Working in Rural Areas handbook.
- Queensland Planning Guidelines.
- NSW Agricultural Land Classification.

*The layout of the proposed development is shown on Gilbert & Sutherland Drawing No. GJ0901.6.BASE3 (attached at **Annexure 10**) and its location within Terranora Area E Urban development area is shown on the attached (at **Annexure 10**) Drawing No. GJ0901.6.1. The eastern and southern boundaries of the proposed development are adjacent to existing urban development. The northern boundary is adjacent to SEPP14 wetland (Terranora Broadwater) and associated environmental zones. The western boundary of the proposed development is located within the Area E development footprint.*

The western boundary is adjacent to a grazing block with significant regrowth of trees and shrubs. The current condition of the block suggests the site is not used for agricultural purposes at present. However, there may be some potential for the site to be used for low intensity grazing (class 4). Given that the area is wholly contained within the proposed urban development area of Tweed Area E and the potential low intensity grazing, a vegetated or open space buffer is not justified as a protection measure for the short term and interim agricultural land use. A risk assessment⁸ for grazing enterprises is outlined in Table 25 below.

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TABLE 25 – RISK ASSESSMENT					
<i>Hazard</i>	<i>Mitigating factors</i>	<i>Control strategy</i>	<i>Consequence</i>	<i>Likelihood</i>	<i>Rating</i>
Noise	No cattle or stock yards within 200m of boundary		Negligible (3)	Unlikely (b).	Rating 13 (3c) acceptable
Odour	No cattle or stock yards within 200m of boundary Low intensity grazing with minimal odour		Negligible (3)	Unlikely (b)	Rating 13 (3c) acceptable
Spray drift	No spray race or other infrastructure that may be used for spraying		Negligible (3)	Unlikely (b)	Rating 13(3c) acceptable
Erosion & sediment	Boundary on crest of ridge line -water runoff sheds within the prospective land use areas (urban water remains in urban area, grazing land water remains in grazing land)		Negligible (3)	Unlikely (b)	Rating 13(3c) acceptable
Domestic animals (dogs)		Stock and dog resistant fence to be erected on western boundary	Moderate (2) nuisance impact on cattle	Unlikely (b)	Rating 17 3(B)acceptable

It is recommended that a stock and dog-resistant fence be constructed at the back boundary of the allotment adjoining the western boundary of the proposed site.

8.3.1 Visual Impact

Annexure 21 contains a Visual Impact Assessment for the project.

The report was prepared to respond to item 2.2 and item 3.1 of the Director General's Environmental Assessment Requirements (DGEARs) (dated 23 November 2009), which are copied below.

Item 2.2

Demonstrate the consistency of the proposed subdivision design and layout with the North Coast Urban Design Guidelines, Coastal Design Guidelines for NSW, NSW Coastal Policy 1997 and SEPP 71 - Coastal Protection.

The parts of these guidelines and policies relevant to the scope of the report are principally concerned with the following (refer Appendix B of **Annexure 21**):

- i. that the character of the surrounding area is maintained through appropriate subdivision layout, building height and scale, setbacks and streetscapes, and retention of views to significant landscape feature;
- ii. that the scenic values of the local area are maintained through the location of new and existing open space; and
- iii. that quality views and vistas from streets and public places are protected by avoiding obstruction from built form and relating buildings to topography.

Item 3.1

Demonstrate that the subdivision design and layout of the dwellings is able to preserve the scenic values of the area, in particular the integrity of the ridgelines, and the views and environmental qualities of Terranora Broadwater and the adjacent SEPP 14 Wetland.

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In response to these DGEARs, the report found:

- i. The visual qualities of the site which contribute to the scenic values of the local area are a result of:
 - the varied topography;
 - the rural landscape values existing on the site;
 - and some stands of vegetation on the site.
- ii. The extent of impact that the proposed development could have on the scenic values of the local area would be limited because:
 - the site has a limited visual catchment
 - the zoning of the majority of the site for residential development means an informed resident would reasonably expect some form of residential development on the site
- iii. There are no ridgelines on the site that make a significant contribution to the scenic values of the area.
- iv. The proposed development seeks to maintain the topographical qualities of the site by limiting the alteration of the landform to ensure it retains the same general structure and appearance.
- v. From most vantage points that take in views of the site and surrounding landscape, the future built form on the subject site will appear as a logical extension of existing residential development, and will not encroach upon the natural landscape elements of the local area.
- vi. The open space designations incorporated into the proposed development will aid in breaking up the future built form, maintain visual continuity of natural landscape elements, and maintain scenic values of the local area.
- vii. The controls that will be implemented through the Living Design Guidelines and statutory planning instruments will ensure that future built form on the site will be of a scale, layout, and appearance consistent with surrounding residential development, and will thus be consistent with the character of the local area.
- viii. The only views that would potentially be obstructed or limited by the proposed development would be views enjoyed by travellers and residences along Fraser Drive, Parkes Lane and Market Parade. With regard to views from residences along Fraser Drive, it is unlikely that any fences, walls, or future built form on the site would affect views from these residences in any significant way. The proposed development would affect views of travellers along Fraser Drive, who currently enjoy an open view across the site as this view would be obstructed by fencing and future built form along the Fraser Drive boundary of the site. However, this loss of views would be consistent with what would be likely to occur from any typical residential development of the site. This is deemed to be an appropriate view sharing outcome and so the proposal can be seen to comply with the relevant planning provisions and guidelines.
- ix. Views from the local area to significant landscape features (such as the ridge to the south of the site, or the Broadwater, will be maintained.

For these reasons, the proposed development can be seen to satisfy the provisions raised in DGEARs 2.2 and 3.1 in so far as it relates to visual impacts. In addition to the assessment of the proposal against the provisions of DGEARs, the report assessed the proposed development against the relevant planning instruments and found that the proposal would satisfy those provisions relating to scenic amenity, character, and views.

Figures 10 to 13 show the approximate extent of the visual catchment together with aerial views from Tweed Heads, Bilambil Heights and Terranora.

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Figure 10 – Approximate extent of visual catchment of the Altitude Aspire site

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Figure 11 – Aerial view from Tweed Heads, towards the site



Figure 12 – Aerial view from Bilambil Heights, towards the site

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Figure 13 – Aerial view from Terranora, towards the site.

The Visual Assessment at **Annexure 21** found that the proposed development, whilst it will result in the conversion of a rural landscape, will ensure that the other elements which contribute to the scenic amenity are maintained.

Given the zoning of the site, the visual impacts resulting from the conversion of the rural landscape would be expected from any development of the site.

As a consequence of the measures taken the proposed development represents a contextually responsive design outcome that would satisfy the requirements of the applicable planning provisions and guidelines relating to matters of visual amenity, as it would:

- Protect and enhance scenic amenity;
- Reinforce local character; and
- Maintain quality views.

The report at **Annexure 21** shows that the proposed development would not impact on the scenic values of the area, integrity of the ridgelines, or the views and environmental qualities of Terranora Broadwater and the adjacent SEPP 14 Wetland.

Ultimately, this development, is part of the larger Altitude development area, and in its own right, is a sensitive development which respects the qualities of the site through appropriate landform modification and by confining development to the least sensitive parts of the site.

8.3.2 Infrastructure Provisions

Extensive studies have been undertaken identifying the infrastructure requirements for the overall development of Area E and accordingly were referenced in the preparation of this response.

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Conceptual schematics have been prepared for both sewerage and water supply infrastructure to service the development proposal, consistent with the current regional planning provisions. Requirements in relation to both external services and internal reticulation have been addressed.

Detail design will be completed in accordance to Tweed Development Control Plan 2008, Section 5 - Subdivision Manual and relevant Development design specifications.

a) Water Reticulation

Parson Brinckerhoff (March 2004) identified the major sources of water supply to the Area E as being a 600dia Duroby main to the north of the Site as fed from the North Tumbulgum Reservoir, and a secondary 150mm main along Terranora Rd to the south. A study by GHD (GHD 1999) attributed the capacities of these two sources as 3000EP and 1000 EP respectively (Parson 2004)

For the ultimate servicing of Area E, a new 3ML reservoir is proposed for construction as part of the Altitude 3 Site development which will provide the internal reticulation of Area E. Supply to this 3ML reservoir will be via a pipe connection to the existing 600mm dia Duroby pipeline.

A series of PRVs and pumps will ensure adequate service to the future Precincts of Area E.

The proposal for the interim supply for the development of the Altitude Aspire site is for a temporary connection to the 600dia main (including PRV as required) and a co-current connection to an existing 100dia main on Frazer Drive to service the higher level allotments.

A detailed network analysis and documentation will be prepared at the operational works phase of the development to confirm the use of, and number of booster pumps and pressure reducing valves required to ensure adequate daily service and subsequent Fire Demand requirements for the Site.

Further to the supply of water to the development of Area E, and due to the 'uncontrolled' alignment of the existing 600mm dia Duroby Main, the provision has been made for the relocation of this trunk main via the construction of a new 600mm dia trunk main along the proposed Broadwater Parkway alignment. Connection points to the existing main would be subject to Councils instruction and approval. The decommissioned main would be plugged and left in place to ensure minimal disturbance within Environmental Zone.

Refer to Appendix 8 (Water Layout Plan of **Annexure 19**) for proposed preliminary Water reticulation Plan.

b) Sewer Reticulation

Reference is made to the Banora Point Sewerage Study Report (TSC Sept 1999) which identifies the requirement of a Terranora Regional Pump Station in the development of Area E. Discussion with Council has identified the need for additional studies to be carried out on the existing reticulation between Area E and the Banora Point Treatment Plant. This should establish ultimate capacity and upgrade requirements. Council is to confirm details and timing of studies accordingly.

For the Interim proposal, the schematic design shown in Appendix 8 Sewer Layout Plan (of **Annexure 19**) outlines the proposed sewerage reticulation servicing Altitude Aspire.

The proposal is for the sewer reticulation for stages 1-6 to discharge into a temporary pump station (PS1) located in the north-eastern corner of the site. An interim 150mm sewer rising main, to be laid within an easement as shown, will discharge flows into the existing gravity sewer network along Fraser Drive.

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Furthermore, Council has identified the requirement within Area E for the construction of the Terranora Regional Pump Station (TRPS) to service the region. Subsequent to this requirement the proposal is for the construction of pump station 2 (PS2) as the Terranora Regional pump station which will service the full development of Area E together with the future sewer reticulation works of the existing development off Parkes Lane as per Council's planning guidelines.

It is proposed that PS2 will be constructed concurrent to the Stage 7 works and the construction of the Broadwater Parkway. The proposed new rising main is to be constructed along the Broadwater Parkway alignment for discharge into the existing sewer reticulation north of the site along Fraser Drive.

According to discussions with Council, and in reference to the Banora Point Sewerage Strategy Study (TSC Sept 1999) the receiving sewer reticulation along Fraser Drive has been earmarked for future upgrade works. It would be envisaged that these upgrade/rectification works would be completed by Council prior to the full development of Area E and the ultimate commissioning of PS2/TRPS.

The proposal for pump sizing and duty flows for PS1 will be relative only to the Altitude Aspire flow requirements. Ultimate regional flows and respective pump upgrades are to be carried out subject to the completion of Council upgrades to existing reticulation network.

Council would need to confirm these works accordingly.

c) Stormwater

Stormwater treatment and management systems are to be implemented in accordance to recommendations by Gilbert & Sutherland – hydraulics consultants (**Annexure 14**).

Stormwater conveyance, including roofwater collection is proposed via a suitable piped network system with outlets to treatment basins in accordance to relevant stormwater management plans. A detailed hydraulics design and flood analysis will be carried out as part of the operational works submission and will confirm the conveyance of the Q100 rainfall surface runoff within the proposed road reserve and flow paths.

A preliminary stormwater network is shown in Appendix 8 (Stormwater Layout Plan) of **Annexure 19**.

Required Stormwater treatment and conveyance of upstream catchment is proposed via a Central Open Drain. Ultimate design for the open drain will be carried out in accordance with design and consultation by Gilbert & Sutherland P/L (project Hydraulic Consultants **Annexure 14**).

Preliminary proposal plans for the Central Open Drain are shown in Appendix 9 of **Annexure 19** as follows;

- Swale Plans
- Swale Long Section Plans
- Swale Cross Sections Plans

In accordance to Council's Environmental requirements for waters discharged into the SEPP14 parcel, the proposed treatment basins and drains will ensure quality and quantity levels are measureable and maintained accordingly. Please refer to report by Gilbert & Sutherland P/L for additional information/recommendations (**Annexure 14**).

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d) Gas, Electrical and Telecommunication Services

Reference is made to the Tweed Area E Local Environmental Study (Parsons Brinckerhoff March 2004) which identifies the development requirements for Gas, Electrical and Telecommunications. All relevant service providers will determine existing capacity of respective networks and supply design proposals in accordance to Councils standards at operational works phase. It is envisaged preliminary services will be obtained from both Fraser Drive and via Terranora Road corridors.

e) Roadworks

The Concept Plan for the development proposal provides for an integration of the development with the SEPP 14 Wetland to the north of the site. The road layout as proposed emphasises the north-south aspect of the lots in accordance with recommendations by development and building guidelines. This layout also maximises the visual aspect of the allotments with views towards the Terranora Broadwater.

Further detail regarding road network together with pedestrian and cycle network will be provided under separate cover by MPS Architects (**Annexure 9**) and Form (Landscape Architects **Annexure 8**). Refer to Appendix 4 of **Annexure 19** for overall road layout plan including footpath layout.

In relation to consultations with relevant service agencies, DGEAR 4.2 provides that:

Provide an assessment of how the provision for services and infrastructure required at both a State and local level will be managed (refer to submissions from agencies at Attachment 4).

Consult with relevant agencies and include an outline of the program of works for such services and infrastructure, and provide estimates of cost, timing of works, and sources of funding. "

Consultation with TSC occurred on several occasions as follows:-

- (a) 17th March 2010 - meeting Bradlees Civil Consulting and TSC Water Unit to discuss strategies for both ultimate and temporary servicing of water and sewer.
- (b) 19th March 2010 - Email from TSC to Bradlees Civil Consulting advising of trunk water main hydraulics grade line details.
- (c) 26 March 2010 - DAP Meeting with TSC officers to discuss a range of matters including water and sewer servicing, TSC advised contrary to earlier advice to Bradlees on 17 March 2010 the offer of temporary water supply from the existing 600mm dia trunk main was withdrawn because of vulnerability to failure. Council advised the only satisfactory option was construction of the 3ML reservoir and pump station in the first instance. Ultimate and temporary servicing for sewer were canvassed. Temporary strategies included local temporary pump station and rising main to existing gravity systems although, these temporary strategies would require further investigation.
- (d) 8 April 2010 - Meeting at TSC with Council Officers to discuss further, issues related to Broadwater Parkway and land acquisition. Issues related to water and sewer confirmed Council's position advised in DAP meeting on 26 March 2010.
- (e) 4 May 2010 - Email TSC to Bradlees Civil Consulting regarding preliminary analysis of receiving sewer system for an interim sewer supply to Fraser Drive.
- (f) 7 June 2010 - Email from Bradlees Civil Consulting to TSC regarding Water and Sewer Servicing requesting an update in relation to previous meetings.
- (g) 14 October 2010 - Email from TSC to Bradlees Civil Consulting advising of Council's current investigations to find suitable interim service solutions for water and sewer.

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The investigations are ongoing and outcomes are yet to be advised, however, possible solutions canvassed include:-

2ML reservoir at Chambers Reservoir of which one third (113) capacity would be for Altitude Aspire and balance for future densification within the Chambers Zone.

Booster pump station for upper levels of site and several pressure reducing valves for the lower levels.

Possible temporary sewer rising main injecting into existing pressure sewerage mains with the extreme situation of a new sewer rising main to Banora Point WWTP inlet works.

Existing gravity sewer sections still require further assessment.

- (h) 25 November 2010 - Email from TSC to Bradlees Stand Alone Sewer and Water Strategy.
This email is in response to a meeting with Council officers on 24 November 2010 at which issues related to Broadwater Parkway alignment and servicing for water and sewer were discussed. Council tabled some strategies related to water and sewer servicing which were consistent with previous strategies outlined in paragraph (g) above and included some sketch drawings for "Stand Alone" strategies. Further analysis of these strategies will be required to confirm the extent of works necessary.
- (i) 1st December 2010 - Meeting at TSC with Council officers.
This meeting was convened to further discuss Broadwater Parkway alignment. A preliminary alignment from Council's design unit was tabled for discussion showing a staggered intersection arrangement with Fraser Drive and Amaroo Drive. This intersection arrangement is shown indicatively on our sketch drawing SK2753 (Appendix 11).

There are no State services or infrastructure.

The Proponent anticipates construction to start within six (6) months of receiving approval and ongoing construction subject to market demands.

Preliminary Project Development costs have been provided in the amount of \$22,122,684 excl GST. Sources of funding will be a combination of commercial lending arrangements and Section 94 Contributions.

8.3.3 Transport and Accessibility

Annexure 24 contains a Transport Assessment Report which addresses the Director General's Environmental Assessment Requirements in relation to traffic and transport issues. Relevant provisions of the report are summarised as follows:

DGEAR 2.4 Proposal provides for the establishment of a suitable neighbourhood character for the area.

The proposed development minimises the impact of the sites topography constraints and provides connections to all roads surrounding the site including, Fraser Drive, Market Parade, Parkes Lane and the future planned Broadwater Parkway. Where applicable, the internal road network has been designed in accordance with the requirement set out within Section A5 of the Tweed DCP 2008. Specifically, the internal road network has been design to take into consideration the topography constraints to meet the following objectives:

- provide acceptable levels of safety, convenience and amenity for all street users and adjacent residents in accordance with the roads hierarchical status;
- ensure that each road is conducive to the wider road network with a clear distinction between functional classes of streets;

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- provides amenity for public transport permeability and connectivity to existing and future services; and
- provides a safe and convenient network for pedestrians and cyclists.

The Road Hierarchy Map at **Figure 12** demonstrates the proposed developments integration with the surrounding road network.

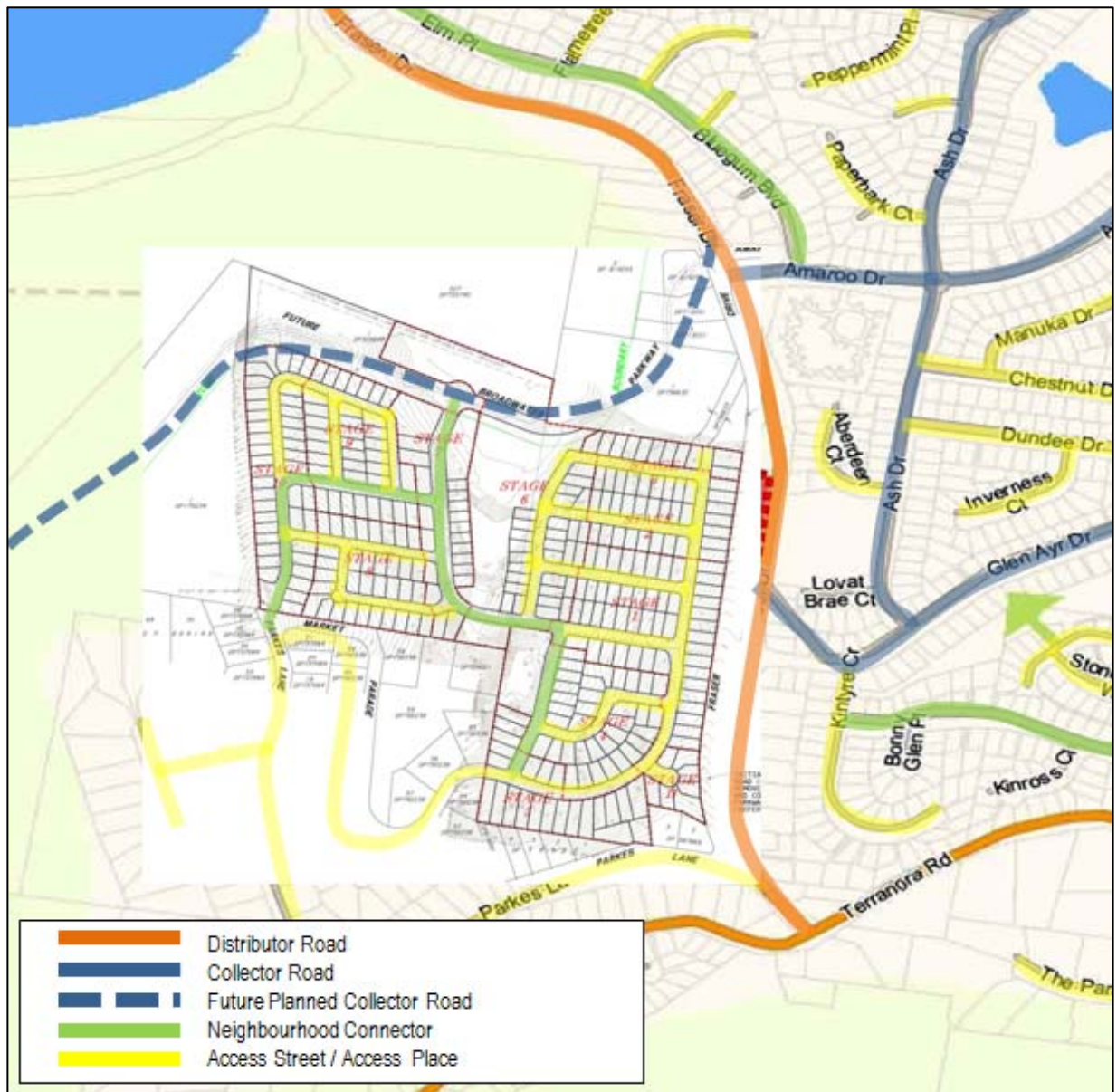


Figure 14- Proposed Altitude Aspire Road Hierarchy
Source: Bitzios Consulting, December 2010

DGEAR 5.1 Prepare a transport and accessibility impact study in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments.

This Traffic Impact Assessment Report has been developed in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments (see Appendix A of **Annexure 24** for Table 2.1 Checklist).

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As sections of the subject site require detailed works such as substantial earthworks, environmental consideration and are dependent on the timing for construction of the future planned Broadwater Parkway, the proposed development is to be constructed over two development phases. Phase 1 shall comprise of the development and release of residential Stages 1 to 5 and the construction of a temporary priority controlled (give-way) intersection onto Fraser Drive located approximately 100 metre north of Parkes Lane. Phase 2 will comprise of remaining residential Stages (6 to 11) and is scheduled to coincide with the construction and opening of Broadwater Parkway from Fraser Drive to Mahers Lane.

The traffic assessment has determined that all surrounding intersections perform within capacity with the inclusion of Phase 1 development traffic during AM and PM peak periods. Upon full development and with the inclusion of Broadwater Parkway, all intersections continue to perform within capacity to 2025 design horizon.

As Council's has not yet finalised planning and timing for Broadwater Parkway, assessment of the temporary access to Fraser Drive has been undertaken with full development traffic generation. As such, the temporary site access intersection can cater for full development traffic volumes in the event that construction of Broadwater Parkway is delayed beyond release of the second phase of the development. In addition, surrounding intersections will not be adversely impacted and continue to perform within capacity as a result of the increased traffic volumes at the temporary site access intersection.

DGEAR 5.2 Address how the Proposal is consistent with the objectives and principles of the NSW Government's Integrating Land Use and Transport Policy package and the NSW Planning Guidelines for Walking and Cycling.

The proposed development's pedestrian network has been designed to minimise the topography constraints of the site in order to meet the objectives in accordance with NSW Planning Guidelines for Walking and Cycling as detailed below:

- **walking and cycling neighbourhood** – Improves walkability and cycleability by providing pathways along site contours and connect to surrounding pathways, public transport routes and nearby local trip attractors such as Tweed Heights Shopping Centre.
- **street pattern** – The proposed developments street pattern minimises the impacts of the sites undulating terrain and provides permeability to existing road network. The street pattern generally provides a grid layout with a circulating collector street that connects to Market Parade and Broadwater Parkway.
- **mixed use neighbourhoods** – The inclusion of the community facility in the centre of the proposed development aims to promote healthy living and recreational activities within walking distance to the entire development.
- **connection to local walk and cycle networks** – Footpaths and cycleways within the development integrate to both existing and future planned walk and cycle routes along Fraser Drive and Broadwater Parkway.
- **security and safety** – Footpaths are provided both along residential streets as well as connecting directly through the developments open space providing visually continuous pathways and avoiding areas of concealment.
- **design within road reserve** – Footpaths are provided along all streets within the proposed development. Pedestrian crossings are located are primary desire lines and within clear view of adjacent intersections. Footpaths are provided with disability kerb ramps for all road crossings. Intersections include paved areas to promote slow travel speeds.
- **parks and open space** – Open spaces areas include both circulating pathways as well as direct footpaths that follow desire lines and site contours to promote direct and convenient routes.

Where applicable, the proposal has been developed by following the objectives within the NSW Governments Integrating Land Use:

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-
- improving access to housing, jobs and services by walking, cycling and public transport;
 - increasing the choice of available transport and reducing dependence on cars;
 - reducing travel demand including the number of trips generated by development;
 - reduce the distances travelled, especially by car;
 - supporting the efficient and viable operation of public transport services, and
 - providing for the efficient movement of freight.

Section 6 of **Annexure 24** provides details on how the proposed development has been developed to promote the use of alternate travel modes.

DGEAR 5.3 Identify measures to manage travel demand and increase the use of public and non-car transport modes.

The proposed Altitude development has provided improvements to the existing level of alternate travel modes for this section of Western Banora Point and Terranora. Recent residential, retail and educational development on Fraser Drive has increased the level of accessibility by walk, cycle and public transport. As a result, the proposed development aims to integrate into existing bus services as well as promote the use of future planned road corridors such as Broadwater Parkway.

Further details are provided within Section 6 of **Annexure 24** and in the following section.

DGEAR 5.4 Outline any proposed cycleways and ensure connectivity with existing cycleways in the area, especially Fraser Drive.

The proposed development maximises the available connections to the surrounding cycle routes including direct connections to Fraser Drive, Parkes Lane and the future planned Broadwater Parkway linking to Mahers Lane as detailed within Section 6.3 of **Annexure 24**.

These connections are in line with key desire lines to cycle routes for leisure, employment/education and sport cyclists and aims to minimise the surrounding topography constraints of the area.

Liaison with Tweed Shire Council has been undertaken to determine the connectivity of the site to future proposed cycleways in proximity to the development.

Figure 15 shows the proposed footpath network within Altitude Aspire and **Figure 16** shows how the network will connect to the external cycleway network.



Figure 15 - Footpath Network
Source: Bitzios Consulting, December 2010

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Figure 16- Connectivity to Cycle Network
Source: Bitzios Consulting, December 2010

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DGEAR 5.5 Identify the likely transport infrastructure and recurrent servicing costs for Government in proceeding with the development.

The proposed development is located approximately 4kms from the state-controlled road network, namely the Pacific Highway at Sextons Hill. Current construction of the Sextons Hill Bypass as part of the Federal Governments Nation Building Program and takes into account forecast traffic data for future growth in the Tweed Shire and will provide increased capacity to the state-controlled road network. Traffic generated from the proposed development will be distributed throughout the local road network primarily along Fraser Drive, Leisure Drive and Terranora Road. As such, the level of development traffic reaching the state-controlled road network will be negligible and not result in any additional government infrastructure or increase in servicing or maintenance costs to state roads.

In addition, Kirkwood Road / Pacific Highway interchange has recently been announced as a short term future upgrade jointly funded by Tweed Shire Council and the Roads and Traffic Authority (RTA). This upgrade shall include a southbound off-ramp and on-ramp and is expected to reduce the traffic dependence on the southern section of Minjungbal Drive at the Sextons Hill bypass. Subject to planning and approvals, the construction of Kirkwood Road / Pacific Highway interchange is expected to start in 2011.

Future road network upgrades within proximity to the development include the following:

- Kirkwood Road / Pacific Motorway interchange upgrade and extension to Fraser Drive
- Fraser Drive upgrade including 4 laning between Broadwater Parkway and Kirkwood Road; and
- Terranora Road upgrade between Mahers Lane and Fraser Drive.

In accordance with the Section 94 Contributions Plan, the proposed development shall pay contributions to road network upgrades (including the above-mentioned planned upgrades) based on the level trips generated by the development as outlined within Council's Tweed Road Contribution Plan version 5.2.

DGEAR 5.6 Potential allocation of bus services to the proposal

The NSW Department of Transport and Infrastructure has indicated that the allocation of future bus services is done by liaison with the service provider (currently Surfside Buslines) and based primarily on a 'current demand' basis. As a result, it is recommended that the NSW Department of Transport together with Surfside Buslines look to update Bus Route 607 to serve the proposed development following construction of residential lots and production of potential public transport demand over time. The extension of Broadwater Parkway will provide an additional opportunity for bus routes to service future developments and extend to the existing residential areas located at Mahers Lane. Timing of allocation of bus services will be prioritised based on development of residential lots over time.

Section 6.1 of **Annexure 24** contains further details on bus service recommendations for the proposed development. **Figure 17** shows existing bus routes and **Figure 18** shows proposed bus routes.

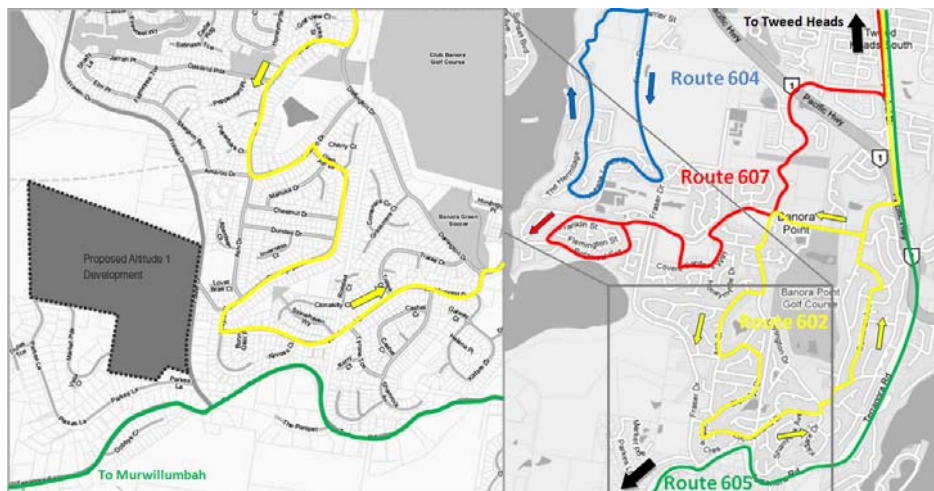


Figure 17 - Existing Bus Routes
Source: Bitzios Consulting, December 2010

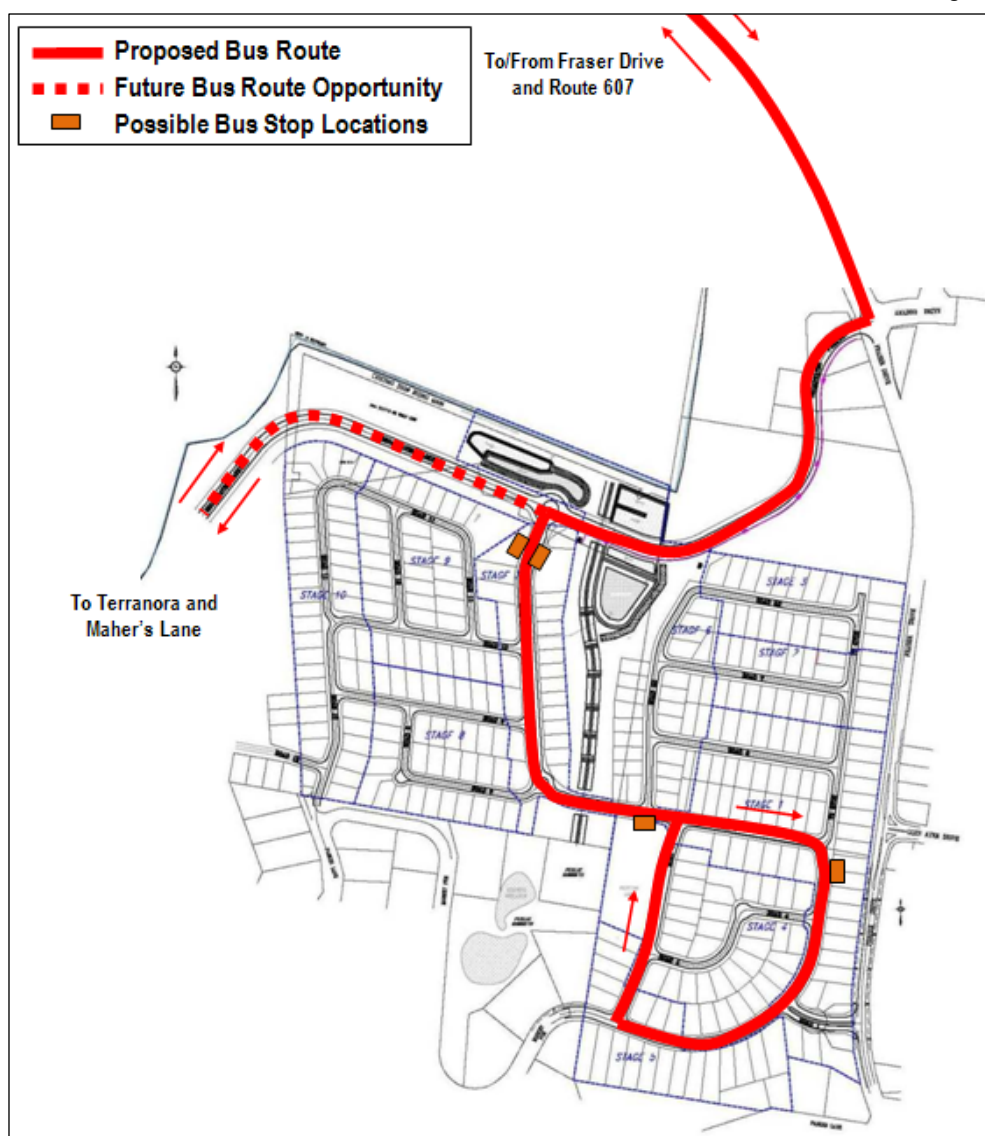


Figure 18 - Proposed Bus Route 607 Extension
Source: Bitzios Consulting, December 2010

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DGEAR 5.7 Demonstrate that the proposed road layout can achieve a high degree of pedestrian and cycle access, and can support future bus access in accordance with the NSWTI bus planning guidelines, including during Staging

The proposed development has been designed to minimise the impacts on walk and cycle travel modes associated with the topography constraints of the site. As such, the proposed development provides a high level of permeability to the existing and future planned surrounding road network. Proposed bus stop locations comply with standard bus stop design practices by providing a maximum walking distance of 400 metres between stops and dwellings within the proposed development.

Staging of the proposed development prior to the construction of Broadwater Parkway will be limited to Stages 1 to 5 and as a result, access to the proposed development is limited to the temporary priority controlled intersection with Fraser Drive. The temporary access to Fraser Drive will provide the primary access point to the development as well as improve the existing walk, cycle and public transport accessibility for existing Parkes Lane residents by creating a more direct link to Fraser Drive and onto the existing bus services at Glen Ayr Drive.

Further details of how the proposed development has maximised walk, cycle and public transport accessibility is detailed within Section 6 of **Annexure 24**. **Figures 15, 16, 17 and 18** show cycleway and bus routes.

DGEAR 5.8 Demonstrate that the proposed internal road layout maximises connectivity within the development, to the broader Terranora Area E urban release area, and to the surrounding environment.

The proposed development minimises the impact of the sites topography constraints and provides connections to all roads surrounding the site including, Fraser Drive (temporarily), Market Parade, Parkes Lane and the future planned Broadwater Parkway.

The proposed developments primary access is via Broadwater Parkway, which is the future planned collector street for Terranora Urban Release Area E. In addition, the western extent (Stage 10) provides a future road connection opportunity to future development areas of the Terranora Urban Release Area E, specifically on Lot 1DP175234.

Figure 12 shows the existing and proposed road network.

DGEAR 5.9 Analyse the impacts of an expected increase in traffic on the existing road network surrounding the site, and provide measures to ensure that traffic impacts on the existing and future local road network are minimised. Address how the proposed temporary access to Fraser Drive will affect the amenity of local roads

In accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments, a traffic impact assessment has been undertaken to determine what impacts the proposed development is expected to have on the surrounding road network.

The proposed development is expected to generate 145 peak hour trips for release stages prior to the construction of Broadwater Parkway and, 264 peak hour trips for full development of all stages. All surrounding intersections for the proposed development perform within capacity within each of the AM and PM peak periods both prior to and after the construction of Broadwater Parkway out to the design horizon of 2025 with full development traffic.

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The proposed developments temporary access configuration to Fraser Drive prior to the construction of Broadwater Parkway will perform within capacity with full development of the available Stages 1 to 5. In addition, the temporary access intersection will perform within capacity with full development (all stages) should planning and construction of Broadwater Parkway be delayed by Council.

The proposed location for the temporary site access intersection is the most suitable along the western section of Fraser Drive in regards to meeting Austroads Standards for Intersections at Grade as well as consideration for adjacent residential driveway crossovers. Assessment of the site access configuration demonstrated that it will comply with Austroads standards in regards to approach gradients, intersection spacing, site distances and vehicle acceptance gaps.

Further details into assessment of traffic impacts are within Sections 4 and 5 of **Annexure 24**.

DGEAR 5.10 Provide an assessment of the feasibility and environmental impacts of the proposed temporary access to Fraser Drive

As mentioned above, the proposed location for the temporary site access intersection is the most suitable along the western section of Fraser Drive in regards to meeting Austroads Standards for Intersections at Grade as well as consideration for adjacent residential driveway crossovers. Assessment of the site access configuration demonstrated that it will comply with Austroads standards in regards to approach gradients, intersection spacing, site distances and vehicle acceptance gaps.

As the intersection is only temporary and given the existing traffic volumes and speed environment (60kph) on this section of Fraser Drive, impacts on adjacent residential properties and traffic safety generally are not expected to be significant providing an Austroads compliant intersection is constructed. The temporary intersection will be removed when Broadwater Parkway is constructed and the entry area will be rehabilitated.

Refer to Section 5 of **Annexure 24** for further information.

Impact on Property Access

There are currently six property access driveways along the eastern side of Fraser Drive opposite the site access intersection. As such, the intersection has been designed to incorporate provisions to allow vehicles to access/egress each of the driveways.

Driveways for properties 14 and 16 Fraser Drive are located south of the intersection area of influence and therefore will continue to be able to access/egress in both directions along Fraser Drive.

Property No. 22 Fraser Drive is located directly opposite the proposed site access approach to the intersection. The medians have been set back to allow the driveway full access to both directions along Fraser Drive.

The right turn pocket and central median limits access to Property No. 26 Fraser Drive from the northbound traffic lane. As such, the site access central median has been set back so as to allow vehicles exiting Property No. 26 to use the right turn pocket and perform a u-turn to travel northbound. In order to allow vehicles to access the property from the northbound traffic lane, an access clearway is proposed in the centre of the Glen Ayr Drive approach at Fraser Drive intersection. This will allow vehicles to perform a u-turn using a turning lane to travel south on Fraser Drive.

To maintain vehicle access/egress for both directions to Property No. 30, a separation area is provided within the chevron markings.

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Assessment of permanent Broadwater Parkway alignment and Fraser Drive (timing, payment, constraints)

The future alignment of Broadwater Parkway adjacent to Altitude Aspire is constrained by topographic constraints and the need to site the alignment within the outer 50m of the 100m 7(a) zoned buffer to the State Environmental Planning Policy No. 14 Wetland. This location is consistent with the provisions of the Local Environmental Study which informed Local Environmental Plan Amendment No. 10 relating to Area E. preliminary design works have been undertaken to inform the Altitude Aspire layout as shown on the Application Plans.

Similarly, preliminary investigations have also been undertaken in preparing Draft Tweed Development Control Plan 2007, Section B17 – Area E in relation to the alignment of Broadwater Parkway from Altitude Aspire to its connection point with Mahers Lane.

Preliminary work has also been undertaken in relation to the various route options to connect from Altitude Aspire to Fraser Drive with an alignment adjoining at the Amaroo Drive intersection being feasible from a geometric point of view however, the alignment does pass through two properties not in the ownership of the applicants.

Tweed Shire Council would need to formally acquire this corridor or an alternative route to their satisfaction to enable Broadwater Parkway to be constructed and connected to Fraser Drive. Preliminary discussions have been undertaken with Council Officers in this regard and it is expected that when Council finalises the Area E Development Control Plan, the final alignment and timing issues will be resolved.

Payment for construction of Broadwater Parkway is funded by Section 94 contributions pursuant to Section 94 Contribution Plan No. 4 (Tweed Road Contribution Plan). Where an adjoining developer constructs the road in accordance with the Contribution Plan, normal contribution credits would apply.

In summary, the absence of a final alignment for Broadwater Parkway is not an impediment to enabling Altitude Aspire to proceed as a temporary intersection as proposed is entirely consistent with Council's practice in respect of a number of other estates abutting Fraser Drive which have developed over the last twenty years, including Banora Gardens and Flame Tree Park Estate to the north of the site.

In the event that the owners of the properties to the northeast of Altitude Aspire do not agree to dedication of Broadwater Parkway and Council is not prepared to compulsorily acquire the alignment, then Broadwater Parkway cannot be constructed.

On 11 November 2010 an email was forwarded to Council as follows:

"The Draft Environmental Assessment has been forwarded to the Department of Planning for a Test of Adequacy following which the Department has requested us to "provide details of likelihood/timing of Council acquiring the Broadwater Parkway corridor through the four properties to the northeast of the site or an alternative route; and timing for final Area E Development Control Plan and final alignment of corridor."

As you will recall temporary access is proposed direct to Fraser Drive and this will be removed when Broadwater Parkway alignment is determined and acquired and when sufficient lots have been released to justify its construction.

Also could you please advise on the timing of exhibition of amended Section 94 Plan No. 4 (TRCP) as the Department require advice in relation to the contributions for Broadwater Parkway and whether or not upgrading of Fraser Drive to four lanes from Terranora Road north is still proposed.

To enable us to finalise and lodge the Environmental Assessment as soon as possible, your early response would be greatly appreciated".

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On 15 November 2010 Council responded as follows:

"It is not possible to answer the Department's request on timing of the Broadwater Parkway as this is dependant on the actions of the Area E landowners (including your client). Our design office has produced a plan and long section of the preferred route and forwarded it to Planning Reform Unit for incorporation into the DCP. I understand Vince Connell will be shortly arranging a meeting to discuss and update you on these matters and the DCP."

Subsequently, a meeting was held with Council Officers on 22 November 2010 during which Council Officers advised that a Draft Development Control Plan and Section 94 Plan for the whole of Area E should be completed in about March 2011 for land holder consultations, following which the Drafts will be publicly exhibited.

A further meeting was held with Council Officers on 1 December 2010 at which agreement was reached with Council's Design Unit on the alignment of Broadwater Parkway. The agreed Broadwater Parkway alignment has been included in the revised plans. The revised alignment only affects two properties to the northeast of Altitude Aspire.

Acquisition of the Broadwater Parkway corridor and construction costs are funded by way of Local Area Contributions under Section 94 Plan No. 4 – Tweed Road Contribution Plan.

Subject to the \$30,000 cap and negotiations with Tweed Shire Council in relation to contributions in excess of the cap, the developer will pay the Local Area Contribution which is currently \$3601.00 per lot (ie. $317 \times 3601 = \$1,141,517.00$).

Ensure environmental objectives not compromised by design, layout of road network including interaction with SEPP14 wetland

The Local Environmental Study which informed Draft Tweed Local Environmental Plan 2000 Amendment No. 10 for Area E foreshadowed the use of the outer 50m of the 100m wide buffer to the State Environmental Planning Policy No. 14 Wetland for roads and infrastructure.

The proposed layout is consistent with this requirement and in this regard the future Broadwater Parkway will provide a defined hard edge to the actual wetland to assist in management and maintenance and minimise edge effects.

The SEPP 14 Wetland number 23 occurs immediately adjacent the northern boundary of the Subject site. Land zoned as Environmental Protection (7a), associated with this wetland area, extends south into the Subject site by approximately 100m (Figure 11 of **Annexure 15**). The 100m strip of land between the edge of the residential lots and the boundary of the SEPP 14 will include the proposed Broadwater Parkway and a transmission line easement. However, this area will also include:

- retained native vegetation (i.e. Sclerophyll forest and Freshwater wetland) (JWA 2010);
- rehabilitating and enhancing the remaining areas of disturbed vegetation (JWA 2010); and
- a stormwater treatment area (Figure 8 of **Annexure 15**).

The vegetated areas including the stormwater treatment areas will act as a buffer to the SEPP 14 Wetlands. On the subject site, there is currently no buffer to the majority of the SEPP 14 Wetland (i.e. the vegetation has been cleared for agriculture). The proposed development will significantly enhance the buffering capabilities of the land adjacent to the SEPP 14 wetland by the implementation of the VMP (ie. providing a dense screen of vegetation).

Investigate road alignment follow land contours. Minimise cut and fill, preserve existing topography, take advantage of existing overland drainage

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This issue is addressed in **Annexure 19**. In summary, road alignments have been designed to minimise landform changes, comply with Tweed Shire Council's Geometric Road Design Standards and achieve a balance of cut and fill on the site where possible.

Broadwater Parkway and the SEPP 14 Wetland

DGEAR 5.12 is in the following terms:

“Ensure environmental objectives are not significantly compromised by the design and layout of the proposed road network, including the proposed Broadwater Parkway's interaction with the SEPP 14 wetland”

Five (5) vegetation communities were recorded on the Subject site (see **Figure 4**) including two (2) heavily degraded EECs (i.e. Lowland Rainforest and Freshwater wetlands) and five (5) stems of the Threatened Rough-shelled bush nut (*Macadamia tetraphylla*). A SEPP 14 Wetland is also located to the north of the Subject site. **Figure 19** illustrates the impacts of the proposed development on the environmental values of the site.

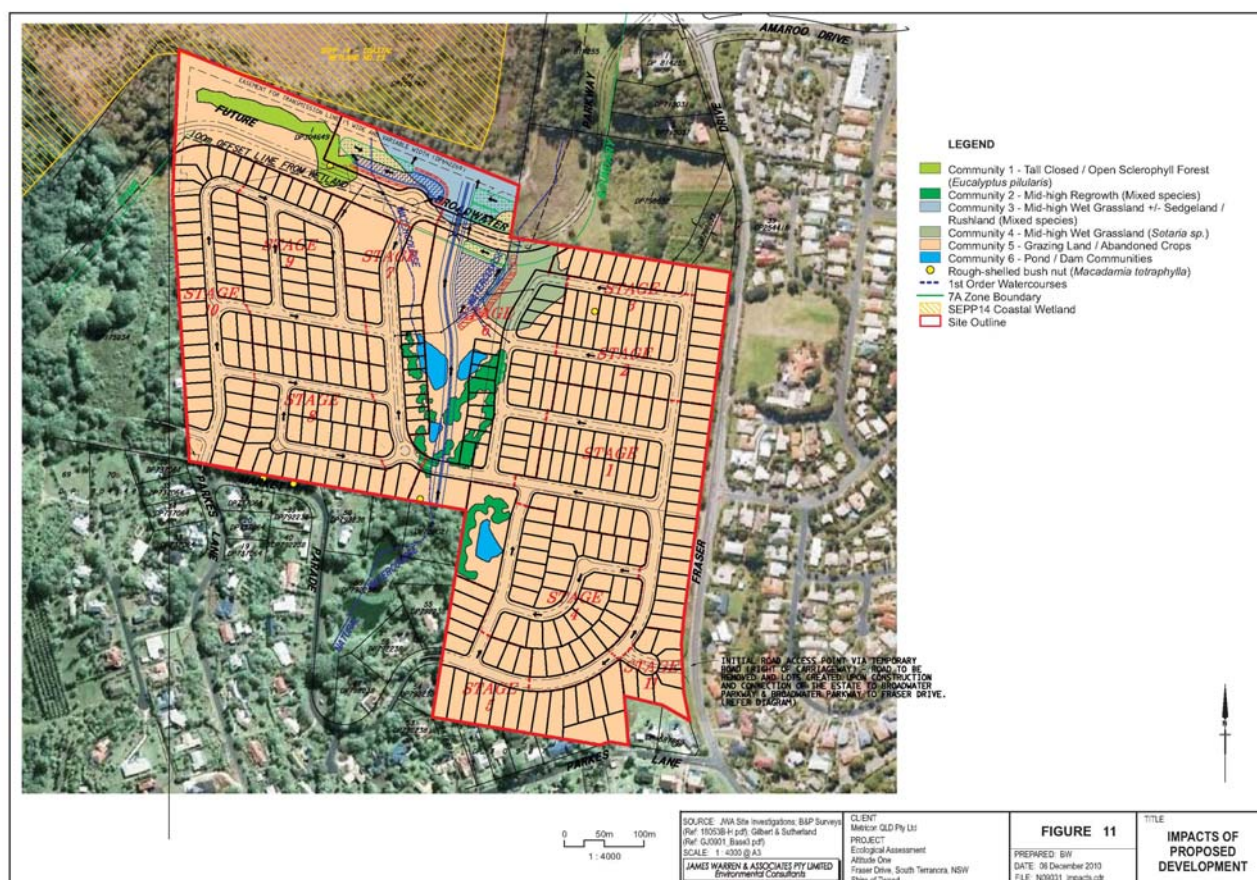


Figure 19 – Impacts of Proposed Development
Source: James Warren and Associates, December 2010

Environmental objectives, of the proposed development, include avoid and mitigate direct and indirect impacts, and enhance the significant environmental values of the site and the surrounding area.

The following section will discuss these objectives in the context of the internal road network and the proposed Broadwater Parkway.

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Internal Road Network

The proposed internal road network avoids most areas of significant native vegetation and is primarily within areas of degraded agricultural land (**Figure 19**). However, the road network will impact on the Subject site in the following ways:

- Removal of a small amount of quality native vegetation (i.e. Freshwater Wetland and Rainforest);
- Earthworks during construction may increase soil erosion; and
- Constructed road network will increase stormwater runoff.

The subject site currently shows some evidence of soil erosion. A number of factors may have contributed such as: the steepness of the site, the alluvial soils, high rainfall, and past land management practices. Earthworks will potentially increase soil erosion and soil dispersal, alter the habitat and microclimatic conditions for flora and fauna, and alter the water quality of aquatic habitats down stream from the Subject site. Mitigation measures devised to prevent/reduce erosion during construction should be implemented (see **Annexure 14**). Such devices should include: silt fences, surface drains and temporary sedimentation ponds.

Upon construction, the internal road network will increase stormwater water runoff. To mitigate against this impact, a Stormwater Management Plan (at **Annexure 14**) incorporates the following objectives:

- Prevention of erosion and sedimentation into the riparian areas on site and the SEPP 14 Wetlands;
- Prevention of nutrient transport;
- Prevention of poor quality water flowing into the riparian areas on site and the SEPP 14 Wetlands;
- Prevention of gross pollution entering the waterways;
- Management of the flow of stormwater to mimic the natural hydrological regime; and
- Protect water levels in the riparian areas and freshwater wetlands.

Broadwater Parkway

The SEPP 14 Wetland number 23 occurs immediately adjacent the northern boundary of the Subject site. Land zoned as Environmental Protection (7a), associated with this wetland area, extends south into the Subject site by approximately 100m (**Figure 19**). The 100m strip of land between the edge of the residential lots and the boundary of the SEPP 14 will include the proposed Broadwater Parkway and a transmission line easement.

However, this area will also include:

- retained native vegetation (i.e. Sclerophyll forest and Freshwater wetland);
- rehabilitating and enhancing the remaining areas of disturbed vegetation; and
- a stormwater treatment area (Figure 8 of **Annexure 15**).

On the subject site, there is currently no buffer to the majority of the SEPP 14 Wetland (i.e. the vegetation has been cleared for agriculture). A buffer will be created with the implementation of the VMP by providing a dense screen of vegetation and a storm water treatment area. The proposed development will significantly enhance the buffering capabilities of the land adjacent to the wetlands resulting in a positive impact on the SEPP 14 Wetlands to the north of Subject site.

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DGEAR 5.14 is in the following terms:

"Ensure public access to and along the adjacent SEPP 14 wetland and Terranora Broadwater is not compromised, and provide new opportunities for controlled public access and disabled access where appropriate."

Currently there is no legal or practical access from the development site to the State Environmental Planning Policy No. 14 Wetland or Terranora Broadwater.

Broadwater Parkway, when constructed, will provide opportunities for public (pedestrian) access on an informal basis to the wetland, however access is impeded by an existing relatively deep perimeter drain, dense vegetation and regular high water levels.

Annexure 16 comprises a Vegetation Management and Rehabilitation Plan. The Management Plan indicates that the conservation area north of the future Broadwater Parkway (see **Figure 20**) will provide a buffer between the development and the wetland. Access to the conservation area (and the State Environmental Planning Policy No. 14 Wetland) will be restricted to maintenance vehicles only, by way of bollards and locked gates.

Notwithstanding the above, informal pedestrian access to the wetland will be available from the future Broadwater Parkway, however formalised and disabled access is not considered to be appropriate given the difficult terrain.



Figure 20 – Management Intent
Source: JWA Vegetation Management Plan, November 2010

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DGEAR 5.13 requires the following:

"Investigate the opportunity for road alignments to follow existing land contours. The objective is to minimise cut and fill, preserve the integrity of the existing topography, and take advantage of existing overland drainage opportunities. "

Various allotment and road layouts have been investigated by Metricon Pty Ltd to determine a suitable yet functional road network within the steep site.

These key elements underpin the basis of the subdivision layout design as follows:-

- a) Tweed Shire Council (TSC) requirement that all access be provided via Broadwater Parkway.
- b) All internal roads will, as a consequence of (a) above access the site, from the lowest areas of the site.
- c) Access to the higher areas of the site will of necessity have to cross the central drainage channel.
- d) The road layout design has adopted the principles of TSC new urbanism for connectivity throughout the development.
- e) The maximum road grade provided is 16%
- f) Balanced cut and fill earthworks, so that no import of material along existing roads from external to the site is necessary.
- g) Provide a range of lot grades and sizes to facilitate a variety of house design and residential product for marketing purposes.

8.4 Hazard Management and Mitigation

8.4.1 Contamination

The results of this Soil Contamination Assessment confirm that the concentration of agricultural substances within the surface soils of all investigated properties were below the relevant health investigation levels adopted by NSW EPA. This finding is based on the recovery of 1323 samples from the investigated properties and analysis of the 328 combined representative composite samples.

Twelve (12) composite samples initially analysed exhibited concentrations of arsenic equivalent to or greater than the adjusted HIL of 25mg/kg. These samples were recovered from the surface soils (maximum depth 150mm depth) from the following properties:

Lot 2 DP 785420 (C2, C3, C12, C13 & C14),
Lot 1 DP 962558 (C7, C8 & C9),
Lot 1 DP 225183 (C11),
Lot 12 DP 534942 (C28) and
Lot 4 DP 582842 -site B (C14 & C25)

Analysis of the forty-eight (48) samples that formed these twelve (12) composite samples for arsenic, later confirmed that all forty-eight of the samples were below the HIL of 100mg/kg for arsenic. All other agricultural substances were below the HIL's for all investigated properties.

Based on the required number of samples recovered within the areas of the subject properties used for agriculture, no potential hot spots exceeding an approximate diameter of 25m could be detected. This is based statistically on a 95% confidence level in accordance with the relevant guidelines.

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As no contamination hot spots were encountered, no additional sampling or analysis appears to be required. In relation to soil contamination issues, the subject properties are therefore suitable for residential development.

Contamination issues are addressed in more detail in the Soil Contamination Assessment at **Annexure 13**.

8.4.2 Acid Sulphate Soils

No detailed acid sulphate investigations have been undertaken on the site. However, the area associated with the alluvial infill in the northern section of the site and adjacent to the SEPP 14 wetland (Terranora Broadwater) is identified as a Class 2 acid sulphate soil area. The implications of Class 2 land is that any works by which the watertable is likely to be lowered will require an acid sulphate management plan. In addition, the Tweed Shire Area E Local Environment Study (LES)' identified any disturbance of land with an elevation below 5m Australian Height Datum (AHD) would require an acid sulphate soil management plan under the Acid Sulphate Soils Management Advisory Committee (ASSMAC) guideline.

The extent of the anticipated ASS and PASS is shown on **Figure 21**. The landward boundary of the ASS/PASS area is aligned with the 5m contour. The identified area will be subject to the provisions of the Acid Sulphate Management Plan at **Annexure 18**.

Lots potentially impacted by acid sulphate soils include:

Stage 7 – Lot 710, proposed public reserve
Stage 7 – Lot 711, proposed community recreation facility lot
Stage 7 – Lots 712 and 713, proposed residential lots
Stage 6 – Lot 630, proposed drainage reserve

These lots and the northern boundaries of Stages 3, 9 and 10 where the future Broadwater Parkway is proposed and the gully between Stages 6 and 7, where stormwater treatment measures (constructed wetland) are proposed, will be subject to the provisions of the Acid Sulphate Soils Management Plan.

The provisions proposed within this Acid Sulphate Soils Management Plan for the identification, treatment and overall management of the site reflect best practice management of acid sulphate soil material.

Soils excavated from below 5mAHD in the identified areas will be tested in accordance with Table 2.2 of the ASSMP (**Annexure 18**) to determine appropriate liming rates. If necessary, soils will be treated in bunded treatment pads to neutralise their acid generation potential (AGP). Treated material will be subject to validation testing in accordance with Table 2.3 of the ASSMP. Any groundwater movement related to plastic deformation of material underlying fill areas will also be monitored and treated as per recommended guidelines shown in ASSMAC, as part of the measures described in Table 2.5 of the ASSMP.

Acid sulphate soil issues are addressed in more detail in the Acid Sulphate Soils Management Plan at **Annexure 18**.



Figure 21 – Acid Sulphate Soils
Source: Gilbert and Sutherland, April 2010

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8.4.3 Bushfire

Annexure 23 comprises a Bushfire Assessment Report addressing compliance with Planning for Bushfire Protection 2006.

For the purposes of the Bushfire Assessment the site has been divided into Precincts 1 and 2 as shown on **Figure 22**.

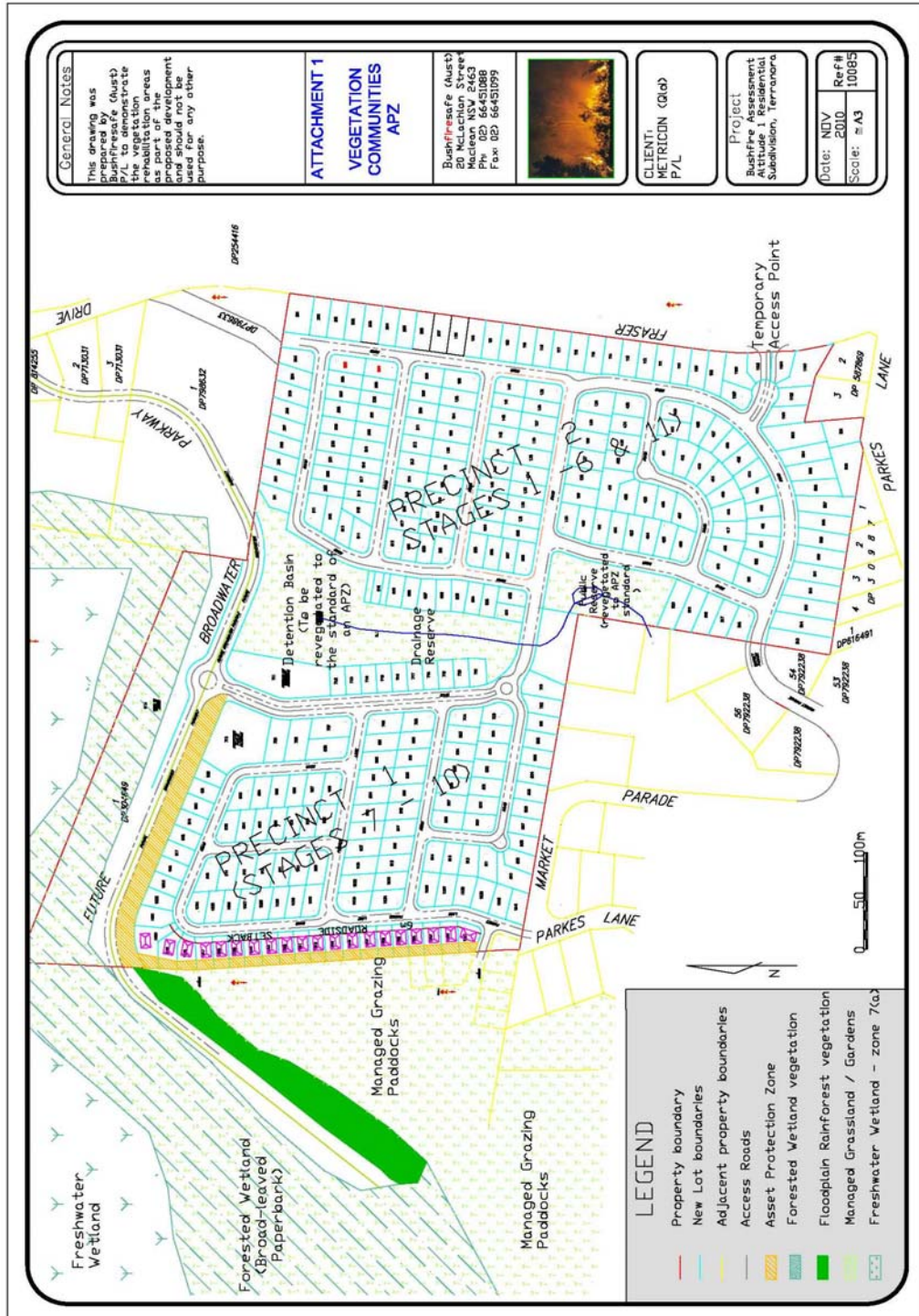


Figure 22 – Bushfire Precincts
Source: Bushfire Safe Australia, November 2010

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This Bushfire Risk Assessment was conducted through an on-site inspection undertaken on 8th December, 2009 using the methodology set out in Planning for Bushfire Protection manual (RFS,2006). The on-site assessment included traversing the subject property and all lands within 140 metres from the proposed subdivision.

Due to the large area proposed for the development and for easier comprehension of the bushfire assessment, the subdivision has been divided into two (2) precincts for bushfire purposes; precinct 1 will consist of stages 7 – 10 and precinct 2 will consist of stages 1 – 6 & 11. Precinct 1 (Stages 7 – 10) is located to the west of the proposed drainage reserve in the cleared portion of the property (Lot 1 DP 304649 and Lot 1 DP 175235). This will comprise approximately 122 residential Lots, a public reserve and the community lot (124 lots total) and include cul-de-sacs and internal roads connecting with the proposed Broadwater Parkway collector road that forms the northern boundary. This area is separated from Precinct 2 by a north-south trending green belt of open space, landscaped areas and the stormwater detention basin. Precinct 2 (Stages 1 – 6 & 11) is located to the west of the proposed drainage reserve adjacent to Fraser Drive and includes Lot 1 DP 781687, Lot 2 DP 778727, Lot 1 DP 781697, Lot 1 169490 and Lots 40 and 43 DP 254416. Development shall comprise of approximately 195 residential Lots, a public reserve and a drainage reserve (197 lots total) with an internal road network connecting to Broadwater Parkway.

Figure 22 shows the location of Precincts 1 and 2.

Based on the assessment of the vegetation communities and slopes present on and adjacent to Precincts 1 & 2, and in accordance with Appendix 2 Table A2.5, Planning for Bushfire Protection (RFS 2006), this bushfire risk assessment recommends that Asset Protection Zones (APZ), Inner Protection Area (IPA) and Outer Protection Area (OPA) should be established as listed in Table 26.

TABLE 26 – ASSET PROTECTION ZONES FOR PRECINCT 1 & 2					
Aspect	Vegetation	APZ (m)	IPA (m)	OPA (m)	Compliance with PBP
Precinct 1					
North	Forested Wetland	15	15	0	Yes, included in Broadwater Parkway road reserve
East	Not bushfire prone veg	-	-	-	Yes
South	Existing Residences	-	-	-	Yes
West	Grassland	10	10	0	Yes
Precinct 2					
North	Forested Wetland	15	15	0	Yes, included in Broadwater Parkway road reserve
East	Not bushfire prone veg	-	-	-	Yes
South	Existing Residences	-	-	-	Yes
West	Not bushfire prone veg	-	-	-	Yes

The APZ required from the Forested Wetland along the northern boundary is achieved by the road reserve for the Broadwater Parkway collector road.

The drainage reserves will have a rock lined watercourse down the middle with a concrete bicycle path down one side and low vegetation within the remainder of the reserves; the assessment concluded that the drainage reserves shall comply with the standards as required in Planning for Bushfire Protection 2006; therefore, asset protection zones would not be required along these areas.

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10 x 15m building footprints shown on lots 1001 – 1020 (see **Figure 22**) are used to illustrate that the lots impacted by the 10m Asset Protection Zone can achieve appropriate building footprints and a 6m roadside setback; the building footprints are for illustration purposes and should not be considered the final designated location of house sites.

Access to the proposed Precincts will be via a temporary connection to Fraser Drive until the Broadwater Parkway collector road can be constructed. Once the Broadwater Parkway is available, both Precincts will feed into this road with an upgraded connection to Fraser Drive opposite Amaroo Drive.

There will be a reticulated water supply to the property. The water supply to this subdivision must use a ring main system with the perimeter road. The fire hydrant spacing, sizing and pressure of this reticulated water supply must comply with AS 2419.1 (2005). Fire hydrants are not located on any carriage way and shall be delineated with blue pavement markers. All above ground water and gas service pipes are metal, including and up to any outside taps. Electrical transmission lines will be underground.

The Bushfire Risk Management assessment undertaken in relation to the proposed subdivision concluded that the construction standard in accordance with AS 3959 (2009) Construction of Buildings in Bushfire Prone Areas (Standards Australia, 2009) will be assessed and nominated when development applications are submitted for the construction of dwellings on the approved allotments.

In summary the Bushfire Assessment concludes that:

The proposed development will comply with the minimum requirements for:

- 1) Asset Protection Zones detailed in Table A2.5 Minimum Specifications for Asset Protection Zones for Residential and Rural Residential Subdivision Purposes (for class 1 & 2 buildings) in FDI 80 Fire Areas in the Planning for Bushfire Protection manual (RFS, 2006);
- 2) Access in accordance with section 4.1.3-2 (Property Access) in the Planning for Bushfire Protection manual (RFS, 2006); and
- 3) Development of the Residential Precincts satisfies the aims of PBP 2006 and will therefore comply with the provisions for Fire Safety under the Building Code of Australia.

The drainage reserves will have a rock lined watercourse down the middle with a concrete bicycle path down one side and low vegetation within the remainder of the reserves; the assessment concluded that the drainage reserves shall comply with the standards as required in Planning for Bushfire Protection 2006; therefore, asset protection zones would not be required along these areas.

Figure 22 demonstrates that a compliant building envelope can be achieved on Lots 1001 to 1020 based on a 6m street setback and a 10m rear asset protection zone.

8.4.4 Geotechnical

The Geotechnical Report at **Annexure 20** addresses stability and mass movement issues in detail.

The broad geotechnical investigation report contains information to address the geotechnical component (Section 6.4) of the Director General's Environmental Assessment Requirements (DGEAR). It requires an assessment of the geotechnical limitations of the site and the appropriate design considerations that address these issues. This includes identifying the main geotechnical constraints which would impact on the future development and recommendations to overcome these constraints. Broad recommendations for filling and excavations are also provided as well as information and recommendations regarding Acid Sulfate Soils (ASS).

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For the purpose of the investigation, the site has been divided into five distinct topographic units which are shown on the Topographic Unit Map (at **Figure 23**) and identified below.



Figure 23 – Topographic Unit Map and Bore Hole Location
Source: Morrison Geotechnic, 2 February 2010

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-
- Topographic Unit 1 (Upper Sloping Topography – Western Side)
 - Topographic Unit 2 (Upper Sloping Topography – Eastern Side)
 - Topographic Unit 3 (Lower Sloping Topography – Western Side)
 - Topographic Unit 4 (Lower Sloping Topography – Eastern Side)
 - Topographic Unit 5 (Drainage Channel and Floodplain Area – Central Portion)

Each Topographic Unit comprises characteristics including geotechnical constraints or issues which are confined to each Unit. A description of each Topographic Unit including the subsurface conditions encountered in each Unit is outlined in the Morrison Geotechnic Report.

Geotechnical Issues and Constraints

The investigation indicates that the existing geotechnical issues and constraints which are expected to impact on the proposed development are as follows:-

- Existing and recent past slope instability.
- Emergent groundwater seepages.
- Moderate and steep sloping terrain.
- Active drainage features.
- Cobbles and boulders within volcanic soil.
- Soft compressible soils typically within Unit 5.
- Acid Sulphate Soils within Unit 5.

Existing and Recent Past Slope Instability

The site contains several areas displaying evidence of small and large scale movements of soil in a short duration event such as a slip or landslide. This instability appears to be confined to the areas within and adjacent to the main drainage gully, encompassing Units 3, 4 and 5, as well as the drainage gully in the far northern portion of Unit 4 where there is a distinct contact zone between two geological units identified as the volcanic clay soils and the underlying Neranleigh Fernvale geology.

The contact zone between the two geological units can yield a thin layer of blue grey clay which can absorb and transmit groundwater. If wet and subjected to hydrostatic pressure, this contact unit can lose strength and with an excess amount of overlying soil, can form an active slip surface, particularly if the contact is dipping at a steep angle. This thin blue grey contact layer appears to daylight out of the existing ground surface at levels ranging between RL15.0m and RL 20.0m and appears to be more prominent on the eastern side of the main drainage channel than the western side. This contact zone is assessed to be the major trigger of the active landslips and instability at the site.

Most active instability such as landslips, which are evident at the northern end of Unit 4 as well as the banks of the main drainage channel, display several defining common characteristics which appear to be attributes of slope instability. These defining characteristics include the following:-

- Concave sloping terrain such as the drainage gullies and channels.
- Slope gradients of typically greater than 20°.
- The existence of the relatively shallow distinct blue grey volcanic soil/Neranleigh Fernvale contact zone.
- The presence of groundwater seepage along the contact zone and frequently within the red brown volcanic soil immediately above the contact zone.

Most of the sloping terrain on the western side of the main drainage channel (Units 1 and 3) does not contain any evidence of the distinct thin blue grey contact zone between the volcanic soil and the underlying Neranleigh Fernvale geology due to the presence of typically planar and convex slopes. The contact on these planar and convex slopes is less abrupt, and comprises a gradual orange brown silty clay interface between the volcanic clays and the Neranleigh Fernvale geological units. No major instability is evident on the western side of the main drainage gully with the exception of the banks of the drainage channel in Unit 5 and the lower portion of Unit 3.

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Creep movement of the surficial soil is typically evident in Unit 3 and 4 where slopes are typically greater than 15° and vegetation has been removed (agricultural fields) or limited to a covering of grass. There is also evidence of minor instability in the form of erosion relating to surface water runoff along the elongated rock mounds and access tracks in Units 3 and 4.

The above types of instability are not expected to impact on the proposed development providing the recommendations of the Morrison Geotechnic report and the 'Recommendations for Site Development' outlined below are followed. The guidelines for hillside construction (attached in Appendix D of the Morrison Geotechnic report at **Annexure 20**) must also be followed.

Emergent Groundwater Seepage

Emergent groundwater seepages are evident within the drainage gully in the far northern portion of Unit 4 as well as the banks of the main drainage channel adjacent to the dams within Unit 5 (and possibly encroaching into Units 3 and 4). These areas display active instability and appear to be related to the contact between the volcanic clays and Neranleigh Fernvale geology. It is envisaged that these areas will require all instability to be removed and drainage provisions implemented to intercept and divert these seepages into dedicated drainage easements. More detailed investigations would be required to be carried out to provide a more detailed remediation plan to stabilise these areas prior to filling.

Moderate and Steep Sloping Terrain

The moderate and steep sloping terrain which generally ranges between 15° and 25° appears to typically be limited to Units 3 and 4 and the banks of the main drainage channel in Unit 5. This includes the gully in the far northern portion of Unit 4 where active instability is evident. Providing the recommendations of the Morrison Geotechnic report and the 'Recommendations for Site Development' outlined below are followed, which includes removing all unstable areas including the active landslide areas, the proposed earthworks will reduce the slope gradients at the site and therefore reduce the risk of slope instability at the site to a tolerable level.

Active Drainage Features

The active drainage features at the site include the main drainage channel in Unit 5, the drainage gully in the far northern portion of Unit 4 and the elongated rock mounds in Units 1 and 2 which intercept and redirect surface water sheet flows into the main drainage channel downslope. Most of these drainage features display evidence of instability which must be addressed to reduce the risk of instability at the site. Recommendations to reduce the risk of instability within these active drainage features whilst retaining positive drainage at the site are provided in the Morrison Geotechnic Report and in the 'Recommendations for Site Development' below.

Presence of Cobbles and Boulders

The presence of cobbles and boulders within the volcanic clay soils can pose problems relating to construction as well as during the earthworks stage. Foundations for structures such as buildings or retaining walls may encounter basalt boulders up to 1.5m in size creating problems for the installation of footings such as bored piers, driven piles or screw piers. The presence of these basalt boulders may also pose problems during earthworks particularly for final trimming of house pads and roads.

Soft Compressible Soils

Soft to firm clay soils were encountered at depth in boreholes BH4 and BH5 (Unit 2) as well as BH6 (Unit 4). It is anticipated that these weak soils would not impact on the proposed development, including the proposed earthworks, as these soils are encountered at depth and are expected to have consolidated over time from the surcharge of the overlying competent soils. Problems may, however, be encountered where significant cuts are proposed and the weak soils are exposed or directly underlie the ground surface.

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These problems include possible settlement of the exposed weak soil and foundation problems for roads, buildings and retaining structures. Further investigations and testing of these soft or weak subsurface soils would be required to properly identify the extent of these weak soils and provide more detailed and appropriate recommendations. The soft soils encountered at the surface in the large flat floodplain forming the northern portion of Unit 5 are expected to be removed as part of the site preparation recommendations described in the Morrison Geotechnic Report at **Annexure 20**.

Recommendations for the above mentioned 'Geotechnical Issues and Constraints' are outlined in the Morrison Geotechnic report and in the 'Recommendations for Site Development' below.

Earthworks

The proposed earthworks designs, which includes filling the lower portions of the site (Units 3, 4 and 5) and cutting the upper portions of the site (Units 1 and 2), will reduce the slope gradients and therefore reduce the risk of slope instability at the site. Significant earthworks and remediation works will be required prior to the placement of fill material. This includes removing all areas displaying instability and implementing appropriate drainage prior to the placement of fill.

Drainage Issues and Implications of Instability

Properly designed and constructed and maintained surface and subsurface drainage is critical for the long term performance of the site in terms of slope stability and preventing, slips, soil creep and erosion at the site. Minimising the ingress of surface and subsurface water into sloping terrain and fill platforms is of significant importance as saturation of these materials can result in creep movements, erosion, slips and landslides. Controlling emergent groundwater seepage along the contact between the volcanic soil and the Neranleigh Fernvale geology, which is the major trigger of landslips at the site, and all other wet zones is also critical in terms of the long term slope stability of the site.

From a review of the earthworks plans it appears that the southern portion of the main drainage channel in Unit 5 and the drainage gully displaying active instability in the far northern portion of Unit 4 will be filled. Adequate drainage provisions must therefore be implemented at the base of these drainage features prior to the placement of fill. Surface contour drains must also be installed to intercept and divert sheet flows of surface water from the typically planar slopes. In areas where active instability is associated with the contact zone between the volcanic soil and the underlying Neranleigh Fernvale geology (typically the eastern side of the main drainage channel between RL15m and RL20m), site specific drainage provisions will apply.

Failure to remove all areas of instability and implement adequate drainage prior to earthworks will result in saturation and weakening of the natural soils and fill, creating further instability in the form of slips, soil creep, erosion and soil consolidation. The drainage recommendations provided in the Morrison Geotechnic (**Annexure 20**) report and outlined in the 'Recommendations for Site Development' below must be implemented to reduce the risk of slope instability and ensure the long term performance of the site.

Recommendations for Site Development

Earthworks Recommendations

Broad recommendations for filling and excavations are as follows:-

- In areas which are to be filled, all trees, grass, weed zones, uncontrolled fill, rocks and debris must be removed from the existing ground surface to expose the very stiff to hard, natural clay soil or weathered rock. Tree root matter typically extends to a depths ranging between 0.20m and 0.4m below the existing natural ground surface.

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- No filling or residential development should take place within any surface irregularities such as landslips, scarps, washouts or erosion features. If filling or development is to occur in these areas, surface irregularities must be removed prior to development and appropriate drainage provisions must be implemented in accordance with the recommendations described in Section 8.0 of this report. The unstable areas are typically limited to the main drainage channel in Unit 5, the drainage gully in the northern portion of Unit 4 and the lower portions of the Units 3 and 4.
- If filling or residential development is to take place within the gullies or the main drainage channel in Unit 5, properly designed and constructed drainage systems or structures must be implemented. Prior to development within the drainage gullies or channels, the drainage feature should be dewatered and all soft/loose soil and slopewash soil should be removed from the base to spoil. Appropriate drainage measures must then be installed at the base of the drainage feature to maintain positive drainage. The drainage feature can then be filled by placing suitable fill materials in thin layers with each layer compacted to 95% SMDD for residential lots and 100% SMDD below pavements. The above recommendations for the drainage features also apply to the dams in the southern portion of the main drainage channel in Unit 5, if this area is to be developed.
- The fill behind the retaining walls and used in the construction of the batters is placed and compacted to 95% Standard Maximum Dry Density and is "Controlled Fill" in accordance with A.S. 2870 (Clause 6.4.2 (a)) – "Residential Slabs and Footings" and A.S. 3798.
- Filling should be benched into the sloping ground surface and supported by engineered retaining walls over the steeper slopes in Units 1 to 4. Fill slopes should be no steeper than 2(H):1(V) or 26° and be over-constructed and trimmed back to ensure compaction in the outer zones. Natural soil slope should also be no steeper than 2(H):1(V) or 26°. Vertical heights of natural soil and fill batters should preferably not exceed 5.0m.
- All permanent excavations exceeding 1.0m must be supported by adequately engineered retaining walls incorporating drainage or battered at appropriate angles stated in the dot point above. Retaining walls should also be founded in the natural soils or rock below all fill, colluvium and slopewash surficial soils prone to movement.
- All retaining walls must be individually designed to have a factor of safety of at least 1.5 with respect to internal stability, including sliding and overturning. A global stability assessment of the proposed retaining wall sections should be carried out when detailed design for the retaining walls is finalised.
- Earthworks should take account of the sloping terrain and be limited to cuts and fills which can be adequately constructed by medium sized civil contractors without resorting to specialised contractors.

Excavations for the proposed development to the required depths which range up to at least 4.0m to 5.0m should be achievable using conventional earthmoving equipment, such as medium sized tractors and excavators. However, due to the presence of large boulders throughout the volcanic clay soil, the use of large excavators fitted with rock buckets is recommended. The exposed clay soils will result in traffickability problems during and after rain periods.

Drainage Recommendations

The following drainage recommendations must be implemented to reduce the risk of slope instability and ensure the long term performance of the site:-

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- Prior to any earthworks on site, an open drain should be constructed through the centre of the slip in the far northern portion of Unit 4 to dry out the wet swampy areas around the slip. This drain should extend back to the upper most slipped area and should lead to an approved outlet. After the wet areas have been mostly dried out, the colluvial material associated with the slipped area must be removed and the exposed residual soil benched and battered to appropriate angles and subsurface drains installed. These drains should form a permanent herringbone shaped drainage scheme with slotted pvc pipes lined with geofabric material and backfilled with gravel. The drains should extend beyond the backscarp of the slip and should intersect the contact between the volcanic soil and the Neranleigh Fernvale Geology.
- The above drainage system should also be implemented along the main drainage channel in Unit 5 where emergent groundwater seepage is expected or in areas which display evidence of instability associated with the contact between the volcanic soil and the Neranleigh Fernvale geology. These areas of instability are expected to be typically encountered within the banks of the main drainage channel on the eastern side where access and visibility was limited. More detailed geotechnical investigation would be required to make an accurate assessment of the drainage requirements and the areas which require these provisions.
- In areas where the roads traverse drainage features the installation of conduits such as pipes and culverts at the base of the fills may be required. In these areas soft soils, boulders and high water flows can be expected requiring appropriate design considerations.
- The existing drainage lines should be maintained by installing conduits such as pipes and culverts at the base of the fills within the drainage corridors. Modification of the drainage corridors is acceptable providing positive drainage is maintained.
- Lined surface contour drains must be constructed upslope of each lot to intercept and divert surface water flows into the stormwater system. This will reduce infiltration into the slopes and the potential for soil creep and erosion. For some lots the road drainage system will be adequate.
- Subsurface drains should be installed above all repaired landslip areas and gullies and along both sides of all on-grade road formations and cuttings.
- Drainage must be implemented behind the crest of all cut and fill batters as well as behind retaining walls to reduce surface water flow over or into structural fills.
- Drainage filter rock (footing to surface) is to be provided behind all retaining walls with a seepage pipe outlet to nominated gully pits.
- Drainage filters are to be separated from the insitu clay or fill using the appropriate geofabric.
- Stormwater and sewer pipe trenches should include a separate drain in the bedding medium leading to a defined outlet.
- All lot runoff and roof water must be discharged into stormwater systems via a system of pipe conduits or lined drains to minimise water infiltration into the slopes. Alternatively roof water can be discharged into water tanks for storage.

After stripping the unstable slopewash soils and existing slip areas to expose the residual soils in areas to be filled, the foundation should be inspected to assess the requirements, if any, for subsoil trench drains. These may be required to maintain low groundwater conditions in areas of groundwater or surface water concentrations.

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Residential Development Recommendations

Guidelines for residential development are as follows:-

- This office must be actively involved on-site during the repair of all landslips and other areas of instability.
- Vegetation clearing must be kept to a minimum, in small section at a time, with revegetation commencing immediately after the completion of earthworks to minimise future erosion.
- The footings of the retaining walls must be founded in the rock or residual soils with a minimum allowable bearing pressure of 150kPa, rather than on colluvial soil.
- All footings shall found in the residual soil, weathered rock or structural fill, below all non structural fill, colluvium and slopewash soil and below a line extending up from the toe of all retaining walls at 300.
- Where the geological contact zone is shallow, all footings must found within the Neranleigh Fernvale geology, below the contact.
- No development should take place within any surface irregularities such as slips, scarps, washouts, erosion features or elongated rock mounds. If development is to occur in these areas, surface irregularities must be removed and repaired prior to development and the drainage improved.
- No residential development should take place below the Council regulated design flood levels (Q100 Flood Level).
- In all Topographic Units the Guidelines for Development and the attached Guidelines for Hillside Engineering (Appendix D) must be followed.
- Slope sensitive residential design and construction, which minimises earthworks, should be adopted for all Lots located on slopes with a surface gradient of greater than 15°. Slope sensitive design for housing includes conventional pole houses, concrete framed houses with suspended floors which overly the natural contours and split level on-grade raft slab floors and/or suspended floors. All footings should found in the residual soils or weathered rock below the soils which are suspect to downslope creep movement, and the structural design should ensure stiffness in the downslope direction eg. strip footings, slab beams or bearers aligned up and down the slope.

Suitability and Feasibility of Proposed Development

From results of the broad geotechnical assessment it is assessed that the site is considered to be suitable and feasible for the proposed development providing the recommendations stated in the Morrison Geotechnic report, including the recommendations for the repair of landslip areas and the guidelines for hillside construction are followed. Prior to the commencement of earthworks a more detailed investigation along the contact between the two geological units is recommended to more accurately identify the orientation, thickness and extent of the contact and therefore provide more detailed recommendations with regards to the remediation works required including drainage provisions within these areas. Due to the presence of soft to firm volcanic clay soil at depth within Topographic Unit 2 (upper sloping terrain on the western side), Odometer tests should be carried out to assess the potential for consolidation of these weak soils.

The sensitivity of this site to potential slope movement requires care in construction. Earthworks operations should not be carried out without geotechnical engineering supervision. This includes carrying out:-

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- Regular site attendances by a geotechnical engineer or engineering geologist who is familiar with the constraints of the site and design and landslip remediation issues.
- Level 1 earthworks supervision as defined in Australian Standard AS3798-2007.

8.4.5 Flooding

Based on advice from Tweed Shire Council (TSC), the climate change design flood level (DFL) of RL2.9m AHD is applicable for greenfield residential developments in this area, as specified in TSC's DCP - A3. The climate change DFL includes an allowance for sea level rise of 0.91m and for a 10% increase in rainfall intensity. The Probable Maximum Flood (PMF) level is RL5.8m AHD.

Part of the site is below the DFL, however this area is to be used for stormwater runoff treatment in constructed wetlands, roads and open space. The proposed Broadwater Parkway is intended to have a minimum design level of RL3.0m AHD, which is above the DFL. While part of the site below the DFL is to be filled to facilitate the construction of the wetlands and Broadwater Parkway the amount of filling and consequent loss of flood storage is inconsequential and would have no measurable impact on flood levels in the Terranora Broadwater or elsewhere.

All of the lots in the proposed development are above the PMF flood level and access would be available via Fraser Drive or Market Parade during these events when the Broadwater Parkway would be inundated.

Local catchment flows would be managed using a stormwater drainage system designed in accordance with Tweed Shire Council's requirements (Development Design Specification D5). This system would cater for minor flows (flows up to and including 5 year ARI storm events) by means of a network of underground pipe drains and inlet pits. Runoff from storm events greater than 5 year ARI would be managed by a major flows system comprising overland flow paths on roadways and in open channels. Accordingly the central open channel and the culvert under the Broadwater Parkway would be designed to convey Q100 (ie. a flood event with an average recurrence interval of 1 in 100 years) flows to the outlet. Flows in roadways would be managed in accordance with the requirements of Queensland Urban Drainage Manual (QUDM) 2008 so that flow depths and velocities would be acceptable.

It is intended that further details for the central open channel, the stormwater drainage system and the constructed wetlands would be provided as part of a submission for a Construction Certificate approval.

Flooding has been addressed in Section 6 of the Conceptual Stormwater Assessment and Management Plan (**Annexure 14**) and in the July 20, 2010 letter attached to that report. Both assessments were undertaken in accordance with Tweed Shire Council's Development Control Plan (DCP) – A3 (Development of Flood Liable Land), which implements the provisions of the NSW Floodplain Development Manual (April 2005). Assessments were also made with reference to the NSW Sea Level Rise Policy Statement (DECCW, 2009), the Draft Flood Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments (DECCW, 2009) and the Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise (DoP, 2009).

Based on advice from Tweed Shire Council (TSC), the climate change design flood level (DFL) of RL2.9m AHD is applicable for greenfield residential developments in this area, as specified in TSC's DCP - A3. The climate change DFL includes an allowance for sea level rise of 0.91m and for a 10% increase in rainfall intensity. The Probable Maximum Flood (PMF) level is RL5.8m AHD (as depicted on Drawing No. GJ0901.5a of **Annexure 14**).

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Part of the site is below the DFL, however this area is to be used for stormwater runoff treatment in constructed wetlands, roads and open space. The proposed Broadwater Parkway is intended to have a minimum design level of RL3.0m AHD, which is above the DFL. While part of the site below the DFL (approximately 3.6ha) is to be filled to facilitate the construction of the wetlands and Broadwater Parkway, the amount of filling and consequent loss of flood storage is inconsequential in terms of the regional flood storage and levels, and would have no measurable impact on flood levels in the Terranora Broadwater or elsewhere.

All of the lots in the proposed development are above the PMF flood level and access would be available via Fraser Drive or Market Parade during these events when the Broadwater Parkway would be inundated.

Local catchment flows would be managed using a stormwater drainage system designed in accordance with Tweed Shire Council's requirements (Development Design Specification D5). This system would cater for minor flows (flows up to and including 5 year ARI storm events) by means of a network of underground pipe drains and inlet pits. Runoff from storm events greater than 5 year ARI would be managed by a major flows system comprising overland flow paths on roadways and in open channels.

Potential overland flow paths are identified on Drawing No. GJ0901.1.4 of **Annexure 14**. Sufficient space is available within the present design to provide adequate overland flow paths. Details of flow depth and velocity in these overland flow paths would be prepared as part of the detailed design process.

Accordingly the central open channel and the culvert under the Broadwater Parkway would be designed to convey Q100 (the anticipated 100 year annual recurrence interval) flows to the outlet. Flows in roadways would be managed in accordance with the requirements of the Queensland Urban Drainage Manual (QUDM) 2008 so that flow depths and velocities would be acceptable.

It is intended that further details (including timing of construction) for the central open channel, the stormwater drainage system and the constructed wetlands would be provided as part of a submission for a Construction Certificate approval

8.5 Earthworks

The plan at **Annexure 3** comprises a Detailed Site Survey Plan showing all cultural and topographic features of the site.

DGEAR 7.1 requires the following:

"Provide a detailed site survey showing existing and proposed contours, levels and quantities of cut and fill earthworks, and provide details of the source of fill including types of material and soils."

Detailed site survey plans showing existing and proposed contours are provided in the Engineering Plans at **Annexure 19** and indicate the extent of earthworks for the site.

Earthworks volume calculations indicate a cut volume of approximately 521,800 cubic metres and a fill volume of approximately 496,100 cubic metres. Allowing for volume losses during the earthwork operation it is anticipated there will be a balance of earthworks for the site and no material will be imported.

Due to the topography, it is expected approximately 18% of the site will require earthworks at greater than 5m depth, however this is predominantly within the central open drain where the natural gully has been raised.

The regional geology of the site comprises the Neranleigh Fernvale Beds, which are capped by the Lamington Volcanics.

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Generally the local geology comprises red brown volcanic clay soil of typically high plasticity on the eastern and western areas of the site with a sparse covering of basalt boulders and cobbles across the surface in most areas.

Underlying the volcanic clay soils are silty clay soils with alluvium materials located in the flat, lower sections of the site predominantly of moist, stiff and very stiff, silty clay soils of high plasticity. Acid sulphate soils are present within the lower central floodplain area below RL 5.0m AHD. Erosion and Sedimentation Control measures are addressed at Section 8.5.1 and the Conceptual Stormwater Assessment and Management Plan at **Annexure 14**.

Geotechnical issues and recommendations are addressed at Section 8.4.4 and **Annexure 20**.

Stormwater management measures are described in detail in Annexure 14. In summary, the proposed stormwater treatment train comprises a combination of constructed wetlands and lot-based rainwater tanks. A number of Integrated Water Cycle Management (IWCM) strategies have also been examined.

The development includes substantial areas of open space, providing a buffer to the SEPP14 wetland area. The effects of climate change have been accommodated by the elevation of Broadwater Parkway and the artificial wetlands to ensure long-term protection of the SEPP14 area. Appropriate water quality monitoring requirements are detailed in the stormwater management plan (**Annexure 14**).

The proposed development and incorporated stormwater treatment areas, the cessation of impacts from grazing and agricultural uses and the stabilisation and rehabilitation of open space areas are consistent with the objectives of the draft Cobaki and Terranora Broadwater Catchment and Estuary Management Plan, August 2009 (CTBCEMP).

The rehabilitation and enhancement by Tweed Shire Council of the SEPP14 area and wetland species directly meets the objectives of the CTBCEMP.

Similarly, the proposed integrated management of stormwater runoff from the site meets the CTBCEMP objectives for reduced nutrient and sediment input from the catchment

8.5.1 Stormwater

Annexure 14 comprises a Conceptual Stormwater Assessment and Management Plan addressing stormwater quality and quantity. It includes a Stormwater Management Plan together with appropriate monitoring provisions. In summary, the Conceptual Stormwater Assessment and Management Plan contains the following conclusion:

Stormwater management measures would be installed as described in Section 5 of **Annexure 14**. Provided these are properly designed, installed and maintained, the quality of the stormwater runoff from the site during the operational phase will be acceptable.

Careful management will be required to ensure that the projected quality levels are achieved and maintained particularly during the construction phases. These details are considered in the Stormwater Management Plan, which is included as Attachment 1 of **Annexure 14**.

The owners of the structures on the individual allotments should also be encouraged to implement the principles of 'Water Sensitive Urban Design' in their developments to ensure a two phase treatment system is in place to complement the proposed stormwater management measures.

Details of the proposed stormwater treatment measures are conceptual and the final location and size of the treatment measures described in this application are intended to be the subject of further detailed design and assessment during the preparation of engineering drawings in support of applications for each required Construction Certificate.

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The key conclusions and recommendations contained in the Stormwater Management Plan at **Annexure 14** are as follows:

Stormwater management measures would be installed as described in Section 5 of **Annexure 14**. Provided these are properly designed, installed and maintained, the quality of the stormwater runoff from the site during the operational phase will be acceptable.

Careful management will be required to ensure that the projected quality levels are achieved and maintained particularly during the construction phases. These details are considered in the stormwater management plan, which is included as Attachment 1 of **Annexure 14**.

The owners of the structures on the individual allotments should also be encouraged to implement the principles of 'Water Sensitive Urban Design' in their developments to ensure a two phase treatment system is in place to complement the proposed stormwater management measures.

8.5.2 Integrated Water Cycle Management

IWCM Concept

Integrated Water Cycle Management (IWCM) describes a way of managing water in which all components of the water system (water supply, wastewater, stormwater and groundwater) are integrated to optimise the use of the resource. Sound IWCM means the community's water needs are met, whilst minimising environmental impacts and maximising the efficient use of this finite resource.

IWCM can involve the integration of a large number of concepts for re-use, reduction and recycling. These options may include (but are not limited to):

- demand management – use of water efficient appliances
- rainwater (roof runoff) collection and re-use (household or community scale)
- stormwater collection and reuse
- aquifer storage and recovery
- effluent recycling (sewer mining)
- Water Sensitive Urban Design (WSUD) measures for water quality improvement.

The optimum IWCM solution for any community will typically involve a combination of these options, based on existing infrastructure, local climate and site-based constraints. Economic and social factors may also contribute to the selection of appropriate IWCM options.

The IWCM approach aims to provide feasible integrated solutions for the management of water supply, wastewater, stormwater and groundwater throughout the site. A number of potential water management measures (including use of water efficient appliances and fittings, rainwater collection and reuse, greywater systems and wastewater treatment and reuse) were identified for further investigation prior to the preparation of a detailed IWCM Plan for the site following approval of the project application.

A preliminary assessment of potential IWCM options for the development was undertaken to identify individual components that may be appropriate to the site. These include:

- Promotion of rainwater tanks to service dual reticulation for toilet flushing, laundry cold water and outdoor use in accordance with both BASIX requirements and Tweed Shire Council's Rainwater Tank Policy.
- Communal rainwater tanks for use in landscape and open space irrigation.
- The inclusion of infiltration systems, porous pavements, grassed filter strips, vegetated swales and bioretention systems into the treatment train. However in this instance it is expected that the site slopes (which are generally greater than 10%) will preclude these options.

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- Installation of WELS Scheme rated water-efficient devices for each allotment (including taps, showerheads, toilets, dishwashers and washing machines) to further reduce demand across the development.
- Source options for dual reticulation, with potential to utilise a recycled water supply following construction of a new Council water treatment plant.
- Overflow from rainwater tanks and stormwater runoff to be treated by means of constructed wetlands within each sub-catchment. The wetlands would ideally be elevated to minimise the disturbance of acid sulphate soils and the operational phase groundwater drawdown.
- Diffuse stormwater discharge would be provided for the freshwater systems through the construction of under-drained swales with level-spreader devices.
- Previous agricultural drainage works, particularly along the southern edge of the SEPP14 wetland area may require additional levelling, filling and limited excavation to ensure the highest ecological benefit from the rehabilitated areas. For this reason, the proposed SEPP14 area rehabilitation should take a staged approach, allowing for adjustment, revision and ongoing consultation with stakeholders.
- The effects of climate change have been accommodated by the elevation of Broadwater Parkway and the wetlands to ensure long-term protection of the SEPP14 area.

These issues are addressed in detail in **Annexure 14**. To minimise the potential for impact to receiving environments during the construction and operational phases of the development, provisions have been included in the management plan for erosion and sediment control, dust minimisation and water quality monitoring of permanent and temporary treatment measures.

8.5.3 Assessment Against Relevant Management Plans

Tweed Urban Stormwater Quality Management Plan 2000 (TUSQMP)

The designs presented in this report have been undertaken in accordance with Tweed Shire Council's Development Design Specifications;

- D5 Stormwater Drainage Design and
- D7 Stormwater Quality.

Paragraph D7.01.2 of D7 states '*This specification complements the TUSQMP by detailing standards and prescribed water quality treatment measures that are deemed to comply with the TUSQMP.*' Consequently further reference to TUSQMP is unnecessary.

Tweed Shire Council's Terranora Broadwater Management Plan 1994

It is to be superseded by the '*Draft Cobaki and Terranora Broadwater Catchment and Estuary Management Plan*', August 2009. The details provided in the next section are therefore relevant to this section also.

The proponent's proposals to cease grazing and agricultural activities, and stabilise or otherwise rehabilitate the presently degraded areas without adversely impacting the Terranora Broadwater are consistent with the management plan's objectives.

Draft Cobaki and Terranora Broadwater Catchment Management Plan

The draft Cobaki and Terranora Broadwater Catchment and Estuary Management Plan, August 2009 (CTBCEMP), contains detailed objectives and management strategies for the management and rehabilitation of the ecosystems within and adjacent to the Cobaki and Terranora Broadwaters and the catchments of their tributaries.

Key catchment actions identified for proposed urban development in Area E are reproduced below in *Italic* text together with our comments:

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-
- *Enforce erosion and sediment control plans and management of construction sites*

Detailed erosion and sediment control plans will be prepared during the detailed design process to accompany an application for a Construction Certificate. The auditing process included in the management plan would ensure that the construction of the proposed development would therefore satisfy this requirement.

- *Amend DCP D7 to include pollutant discharge targets for the Broadwater catchment*

The average annual load targets specified in TSC's Design Specification for Stormwater Quality, D7 are intended to ensure that appropriate water quality objectives as specified in TSC's TUSQMP are achieved. The quality of runoff to be discharged from the proposed development into the SEPP14 area (where further polishing would occur before release to the Broadwater) is considered acceptable.

- *Develop site specific Stormwater Management Plans for all new developments with tighter requirements*

This document constitutes the recommended site-specific stormwater management plan and satisfies all current and draft requirements.

- *Investigate impacts of soil acidification and potentially contaminated runoff discharged from surface drains at Tugun Bypass site*

Not applicable to this site. However appropriate management measures will be implemented to manage potential impacts resulting from the disturbance (if required) of acid sulfate soils. Refer to the 'Acid Sulfate Soil, Management Plan, Altitude 1 Terranora Area E' prepared by Gilbert & Sutherland, dated April 2010.

- *Continue Ecosystem Health Monitoring Program (EHMP) throughout system*

Appropriate monitoring requirements are detailed in the stormwater management plan attached.

The proposed development and incorporated treatment areas, the cessation of impacts from grazing and agricultural uses and the stabilisation and rehabilitation of open space areas are consistent with the objectives of CTBCEMP.

The rehabilitation and enhancement by Tweed Shire Council of the SEPP14 area saltmarsh and wetland species directly meets the objectives of the CTBCEMP.

Similarly, the proposed integrated management of stormwater runoff from the site meets the CTBCEMP objectives for reduced nutrient and sediment input from the catchment. Best practice in wetland design would be implemented to manage biting midge and mosquito populations.

Draft Tweed River Area Unregulated and Alluvial Water Sources Water Sharing Plan

As no extraction of ground or surface water is proposed in this development, the draft plan is not applicable to this application. Also, appropriate legislation and procedures exist to manage the potential future installation of bores by landowners on this development.

Refer to the report titled 'Groundwater impacts of Altitude 1 proposed development, Tweed Shire, Terranora Area E, Concept Plan' by Gilbert & Sutherland, dated April 2010 (**Annexure 17**).

The Conceptual Stormwater Assessment and Management Plan at **Annexure 14** addresses these issues in more detail.

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8.5.4 Water Supply

DGEAR 9.1 requires the following:

"Address the issue of provision of a sustainable water supply for the development site. Ensure there is adequate water supply for the development. If an alternative other than town water supply is proposed then provide an assessment of the water requirements.

The assessment should include Water Management Plans detailing- how a sustainable and efficient water supply can be sourced and implemented with minimal reliance on accessing valuable surface and groundwater resources."

The Tweed Area E Local Environment Study by Parson Brinckerhoff (March 2004) identifies the availability of water to the Area E Region and quantifies the provision of water to the proposed development.

The Parsons Brinckerhoff report provides a strategy of bulk water supply for up to 160,000 population in the Shire and includes options for raising Clarrie Hall Dam to increase storage capacity and the construction of an additional dam at Byrrill Creek.

The water supplied in the vicinity of Area E comes from Clarrie Hall Dam via the Bray Park filtration plant through to north Tumbulgum Reservoir.

The Duroby main is a 600mm trunk water main that traverses the northern boundary of Area E and is supplied from the North Tumbulgum Reservoir.

TSC have identified the 600mm Duroby main as the preferred water supply for Area E and a pipeline connecting the proposed 3ML reservoir near Mahers Lane and Terranora Road, with the 600mm Duroby main. There is sufficient capacity from the North Tumbulgum reservoir to service Area E, provided a reservoir is constructed on site.

Council's most recent advice via emails dated 14th October 2010 and 25th November 2010, indicates that they are currently investigating alternative strategies which include potentially a 2 ML reservoir at Chambers Reservoir of which one third (113) capacity would be for Altitude Aspire and the balance for future population densification within the existing Chambers Zone.

8.6 Surface Water

8.6.1 Assessment of Impacts on Surface Water

These issues have been addressed in the Conceptual Stormwater Assessment and Management Plan (CSWAMP) attached as **Annexure 14**.

The proposed development includes elements of Water Sensitive Urban Design (WSUD) such as constructed wetlands and rainwater storage tanks that will form part of a stormwater treatment train. The provision of the WSUD elements will meet Council's requirements specified in Development Control Plan 2008, Section B5 - Subdivision Manual and D7. As the proposed stormwater management devices have been designed in accordance with Council's design guidelines, the water quality objectives and peak flows are deemed to comply.

In addition, as the proposed stormwater management devices have been designed in accordance with Tweed Shire Council's Design Guidelines, the water quality objectives from peak flows are deemed to comply. This issue is further addressed in **Annexure 14**.

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8.6.2 Assessment of Impacts on Water Quality Generally

Providing the recommended water quality management measures are properly designed, installed and maintained, the water quality of runoff from the proposed development would achieve Council's desired objectives during the operational phase of the development.

During the construction phase, works would be controlled by the provisions included in the management plan in Annexure 14. This plan addresses contractor management, erosion and sediment control and surface water monitoring. Whilst **Annexure 14** includes a Conceptual Erosion and Sediment Control Plan (ESCP), further ESCPs would also be prepared during the detailed design process to accompany an application for a Construction Certificate. The management, auditing and reporting provisions included in these management plans will help to minimise potential off-site impacts during the construction phase.

Further information is provided at Section 8.5.1 and **Annexure 14**.

8.6.3 Assessment against Draft Tweed River Area Unregulated and Alluvial Water Sources Water Sharing Plan

As no extraction of ground or surface water is proposed in this development, the draft Tweed River Area Unregulated and Alluvial Water Sources Water Sharing Plan is not applicable to this application. Also, appropriate legislation and procedures exist to manage the potential future installation of bores by landowners on this development.

This issue is further addressed in the Conceptual Groundwater Impact Assessment at **Annexure 17**.

See comments at Section 8.5.1 in relation to stormwater management generally and in particular Section 9 of **Annexure 14**.

8.6.4 Additional Surface Water Matters

- Identify sources of surface water
- Details of stream order (using Strahler System)
- Details of water extraction (purpose, location of existing pumps, dams, diversions, cuttings and levees)
- Details description of development or diversion works including (construction, clearing, draining, excavation, filling)
- Evaluation of methods of excavation, construction and material placement
- Detailed description of any potential environmental impacts of development in terms of vegetation, sediment movement, water quality, hydraulic regime.
- Description of design features and measure incorporated into development to guard against long term actual or potential environmental disturbances particularly re maintaining natural hydrological regime and sediment movement patterns and identification of riparian buffers (see note)
- Details of impact on water quality and remedial measures proposed to address possible adverse effects.

These issues are also addressed in Sections 8.6.1 to 8.6.3, 8.7 and in the Stormwater Management Plan at **Annexure 14**. In summary, all watercourses on the subject land are classified as first order watercourses. Buffers having a minimum width of 10m have been provided, as requested.

8.7 Water Management Structures/Dams

There are three existing farm dams on the site as shown on Drawing No. GJ0901.1.3 of **Annexure 14**. The northern most pair of dams are to be used as a temporary sedimentation basins during construction works.

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Following completion of the construction phase, these dams will no longer perform their function but will be reengineered to perform as wetlands as part of the stormwater treatment train. The southern most dam may be retained as a water feature in the proposed park (proposed Lot 436). The stormwater management regime is presented in **Annexure 14**.

The approximate elevation of the land ranges from RL0m Australian Height Datum (AHD) to RL85m AHD. Runoff from this development flows in a north-easterly or north-westerly direction towards a central ephemeral gully that traverses the site from south to north. Runoff from this gully discharges onto the SEPP 14 area which is essentially flat, semi-tidal and drained by a number of agricultural drains that discharge into the Terranora Broadwater. Terranora Broadwater adjoins the Tweed River, which discharges into the Pacific Ocean at Tweed Heads.

Strahler stream order Strahler's (1952) stream order system is a simple method of classifying stream segments based on the number of tributaries upstream. A stream with no tributaries (headwater stream) is considered a first order stream. A segment downstream of the confluence of two first order streams is a second order stream. Thus, a n^{th} order stream is always located downstream of the confluence of two $(n-1)^{\text{th}}$ order streams.

As noted above, one watercourse traverses the site. It does not permanently flow and the site is near its source. There are no other watercourses that flow into or join the watercourse within or upstream of the site. The watercourse is therefore a 1st order watercourse (as defined by the Strahler stream ordering method) for the full length of its course through the site.

Water quality objectives for runoff from new urban developments are detailed in the Tweed Urban Stormwater Quality Management Plan Table 5.3 in the form of average annual loads for key pollutants. Surface water monitoring being undertaken by Gilbert & Sutherland aims to establish a more reliable background data across the site before starting construction. Site-specific water quality criteria will be determined from the results of this monitoring.

Overall, care should be taken to ensure that there is no worsening of the water quality in the receiving waters resulting from this development, during the construction or operational phases.

The majority of the site has been extensively cleared, drained and used for agricultural and or grazing purposes. There are several dwellings and farm sheds on the site.

The proposed development involves the construction of a system of roads to provide access to 317 residential lots. The balance of the site would be dedicated to open space, a constructed wetland and land zoned environmental protection.

The proposed development, as shown on Drawing No. GJ0901.1.2 (of **Annexure 14**), has a total area of approximately 36ha. The Altitude Aspire Concept Plan proposes the creation of a residential community that will form part of and be integrated into the Terranora Area E Urban Land Release. The development would be completed in stages and would include substantial areas of open space, providing a buffer to the SEPP14 wetland area.

The proposed development would comprise the construction and/or installation of the following components:

- site earthworks
- roads
- stormwater drains
- sewer reticulation mains
- water reticulation mains
- underground electricity distribution cables
- telecommunication cables
- other ancillary services
- dwellings
- landscaping

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Once the development has been completed, all disturbed portions of the site will be rehabilitated or covered by some form of improvement protecting the soils from erosion, hence minimising the transport of suspended solids from the site. These improvements will include structures, paved areas, lawns and landscaping.

A review of aerial photographs of the site, confirmed by site inspection, indicates the site has been severely disturbed by previous clearing and farming activities.

A catchment plan for the site is provided in Drawing No. GJ0901.1.4 of **Annexure 14**.

8.7.1 Riparian Areas

DGEAR 10.5 is in the following terms:

"Identify all riparian areas on site including any creeks, wetlands, drainage lines etc., and outline the intended management, protection and restoration of these areas, including monitoring and mitigation measures. The protection and restoration of riparian zones will maintain and the ecological functions of watercourses and forms a key part of ensuring appropriate water quality is achieved. If any works are, proposed within the riparian areas (such as bridges, culverts, stormwater outlets, walking tracks etc...) then this should be identified".

Note: Recommended Core Riparian Zones:

- Minimum of 10m for any intermittently flowing 1st order watercourse
- 20m for any permanently flowing 1st order or any 2nd order watercourse
- 20m-40m (merit based assessment) for any 3rd order or greater watercourse

Riparian areas on the subject site can be categorised as follows:

- SEPP 14 Wetland No. 23 adjacent to the northern portion of the subject site;
- Degraded Freshwater wetlands/wet grassland in the northern portion of the site;
- Constructed drainage lines (i.e. first order streams); and
- Constructed farm dams.

SEPP Wetland Number 23

The protection and restoration on the SEPP 14 Wetland adjacent to the Subject site is discussed in the previous section of this report.

Freshwater Wetlands

A portion of the degraded Freshwater wetland/wet grassland will be retained within a proposed Conservation Area. Works including earthworks, road construction, services etc. are proposed within the remainder. The areas to be affected are highly degraded and currently grazed by cattle. The removal of this area is not considered a significant impact due to the degraded nature of this vegetation.

Constructed Drainage Lines

Constructed drainage lines on the Subject site are considered to represent first order streams in accordance with the Strahler stream classification system however, it should be noted that these drainage lines have been constructed to convey water away from areas previously utilised for crops. Very little native vegetation is associated with these drainage lines with the exception of some clumps of regrowth and scattered mature trees in the southern portion of the subject site (see **Figure 4**). It is proposed to retain and buffer portions of the drainage lines on the subject site. Drainage lines over the remainder of the site will be impacted by the proposed development.

This issue is addressed also in the Stormwater Management Plan at **Annexure 14** and the Vegetation Management and Rehabilitation Plan at **Annexure 16**. In summary, the natural watercourse through the centre of the site will be preserved, appropriately buffered and embellished as a water quality control and drainage corridor.

The State Environmental Planning Policy No. 14 Wetland to the north of the site will be maintained and appropriately buffered by a 100m buffer within which the outer 50m will incorporate the future Broadwater Parkway and appropriate infrastructure.

8.8 Groundwater

This matter is addressed in the Conceptual Groundwater Impact Assessment at **Annexure 17**. In summary the Assessment found that:

- In general the earthworks program on the hillside areas during construction would require:
- Seepage and drainage control plans for works that intercept water tables (especially in the Basalt land unit)
- Erosion and sediment control plans to control run-off during rainfall events and longer-term interflow drainage after rainfall.
- Batters stabilisation as per assessment and advice from a qualified geotechnical engineer.
- The deeper basalt related water table is separated from the development site by a low permeability clay layer and will not be affected by the development proposal in terms of recharge, quality and potential contamination.
- The alluvial infill land adjacent to The SEPP14 wetland has a shallow water table that would require a ground water management plan or acid sulphate soil management plan.
- The proposed development contains no potentially contaminating industries. Stormwater quality treatment devices will be separated from the groundwater by compacted clay barrier. However, a groundwater-monitoring program should be undertaken to validate the integrity of the water treatment structures.
- The proposed development does not intend to use the groundwater on the site.
- The recharge of the alluvial infill land unit will remain unchanged.
- There will be no impact on the GDE within the SEPP 14 wetland as a result of the development impacts on groundwater.
- The location (different catchments) and depth of the surrounding registered bores near the site suggest there will be no impacts on these bores.
- The underlying basalt based water table is separated from the proposed development activities by its overlying low permeability soil layer and no changes in groundwater quality are expected.
- The identified potential impacts are readily anticipated and manageable. At the detailed design phase for the development detailed groundwater study should be undertaken to refine the understanding of the site and aid in the development of specific groundwater management plans for the site.

Relevant conclusions and recommendations pertaining to surface water riparian areas and groundwater are contained in **Annexure 14** (Conceptual Stormwater Assessment and Management Plan), **Annexure 15** (Ecological Assessment), **Annexure 16** (Vegetation Management and Rehabilitation Plan), **Annexure 19** (Preliminary Engineering Report) and **Annexure 26** (Site Management Plan). The key conclusions and recommendations include:

Erosion and sediment control during the construction phase will be the subject of a detailed Erosion and Sedimentation Control Management Plan to accompany the Construction Certificate.

The control measures detailed in this Erosion and Sedimentation Control Plan would be developed to minimise impacts on the environment and achieve the following objectives:

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- Minimise soil erosion and exposure.
- Minimise transportation of eroded soil by air and water.
- Limit suspended solids concentration in stormwater runoff to not more than 50mg/L.
- Limit/minimise the amount of site disturbance.
- Isolate the site by diverting clean upstream 'run on' water around the development.
- Control runoff and sediment at its source rather than at one final point.
- Stage ground disturbance/earthworks and progressively revegetate the site where possible to reduce the area contributing sediment.
- Retain topsoil for revegetation works.
- Locate sediment control structures where they are most effective and efficient.

Stormwater management during the operational phases will include:

- Construction of stormwater management devices within the existing watercourse and west of the future Broadwater Parkway (see Drawing GJ0901.1.50 of **Annexure 14**).
- Rainwater tanks will be installed with future dwellings (BASIX).
- Maintain a 100m wide buffer to the State Environmental Planning Policy No. 14 wetland.
- Rehabilitate the State Environmental Planning Policy No. 14 wetland buffer and the existing watercourse through the site in general accordance with the Vegetation Management and Rehabilitation Plan at **Annexure 16**.
- Limiting public access to the State Environmental Planning Policy No. 14 wetland.
- Ensuring that no physical development occurs north of the alignment of the future Broadwater Parkway other than infrastructure and rehabilitation.

8.9 Heritage and Archaeology

8.9.1 Aboriginal Cultural Heritage

Heritage issues are addressed in detail in the Cultural Heritage Assessment Report at **Annexure 11**.

The report presents the results and outcomes of a cultural heritage assessment for Indigenous and non-Indigenous heritage items for the MP09-0166 development footprint for the proposed 'Altitude Aspire' Development ('Subject Lands') at Terranora, Northern NSW.

As part of a desktop study, Everick undertook searches of the relevant Aboriginal and historic heritage registers. A search of applicable historic heritage registers identified no items of cultural heritage significance within the Subject Lands. A search requested on 5 October 2009 of the Department of Environment, Climate Change and Water ('DECCW') Aboriginal Heritage Information Management System ('AHIMS') identified 40 recorded sites for the broader search area. None were recorded within the Subject Lands. There are no Indigenous places within the Subject Lands listed in other heritage registers.

The Subject Lands are within the area administered for Aboriginal cultural heritage purposes by the Tweed Byron Local Aboriginal Land Council ('LALC'). A survey for Aboriginal and historic cultural heritage was carried out by Cyril Scott, the Tweed Byron LALC Sites Officer, and the consultant on 22 September 2009. The majority of the Subject Lands were highly disturbed. Field survey was impeded by low surface visibility. The Land Council supported the recommendations in this assessment, noting that the likelihood of Aboriginal objects being located within the Subject Lands is 'very low.'

As part of this assessment Everick engaged in consultation with the Aboriginal community of the Tweed and surrounding regions in accordance with the DECCW's Draft Interim Community Consultation Guidelines for Applicants (2005). This involved the identification of Aboriginal persons who held an interest in the cultural heritage values of the Subject Lands. No secret or sacred sites were identified by the Aboriginal stakeholders within the Subject Lands.

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The registered Aboriginal stakeholders informed Everick that Altitude and the surrounding Terranora lands were known to be a pathway that connected the lands in the south up to Bilambil Heights and then over the top to Campbell's Hill and on to Cobaki. It was also mentioned that this was an area of trade prior to European settlement. These were statements of a general nature, and did not relate to specific paths or trade areas. The purpose of these statements was to demonstrate that although no physical remnants are located within the Subject Lands, the general area was used by Aboriginal people and therefore is significant to the Registered Stakeholders.

The Cultural Heritage Assessment Report contains the following recommendations:

Recommendation 1: Aboriginal Human Remains

It is recommended that if human remains are located at any stage during construction works within the Subject Lands, all works must halt in the immediate area to prevent any further impacts to the remains. The Site should be cordoned off and the remains themselves should be left untouched. The nearest police station, the Tweed Byron LALC, and the DECCW Regional Office, Coffs Harbour are to be notified as soon as possible. If the remains are found to be of Aboriginal origin and the police do not wish to investigate the Site for criminal activities, the Aboriginal community and the DECCW should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all notified parties, provided it is in accordance with all parties' statutory obligations.

It is also recommended that in all dealings with Aboriginal human remains, the proponent should use respectful language, bearing in mind that they are the remains of Aboriginal people rather than scientific specimens.

Recommendation 2: Aboriginal Cultural Material

It is recommended that if it is suspected that Aboriginal material has been uncovered as a result of development activities within the Subject Lands:

- (a) work in the surrounding area is to stop immediately;
- (b) a temporary fence is to be erected around the site, with a buffer zone of at least 10 metres around the known edge of the site;
- (c) an appropriately qualified archaeological consultant is to be engaged to identify the material; and
- (d) if the material is found to be of Aboriginal origin, the Aboriginal community is to be consulted in a manner as outlined in the DECCW guidelines: Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010).

Recommendation 3: Notifying the DECCW

It is recommended that if Aboriginal cultural material is uncovered as a result of development activities within the Subject Lands, it is to be registered as a Site in the Aboriginal Heritage Information Management System (AHIMS) managed by the DECCW. Any management outcomes for the site will be included in the information provided to the AHIMS.

Recommendation 4: Conservation Principles

It is recommended that all effort must be taken to avoid any impacts on Aboriginal cultural heritage values at all stages during the development works. If impacts are unavoidable, mitigation measures should be negotiated between the Proponent and the Aboriginal community.

8.9.2 Non-Indigenous Heritage

Non indigenous heritage issues are addressed in detail in the Cultural Heritage Assessment Report at **Annexure 11**.

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The Heritage Survey identified numerous crop terraces that were considered items of potential local heritage significance (Figures 20-21 of **Annexure 11**). These have been assessed against the criteria provided in the New South Wales Heritage Manual.

The bulk of the land under assessment was owned by James Buchanan during the 1870s and 1880s. The majority of early selections at Terranora were cleared for the purpose of sugar cane cultivation under contracts to the CSR. A "Travelling Correspondent" 1906 wrote..."The bulk of the cane at Terranora is grown by white labour and just the kanakas and other coloured races are having a particularly hard time of it as the bounty regulations prevents their employment." (Keats 1996:118).

Construction of stone walls was a common method of land clearing without the expense of fencing.

The following information was provided by Grahame Abernathy whose property comprised the bulk of Precinct 1. My grandfather farmed the property in 1913, dairying with bananas and a bit of sugar. Bananas were wiped out on the Tweed by 'bunchy top' in the 1930s. He made walls using a horse and dray. These were good ones hand stacked like Scotland. There were lots of little walls. In the 1970s and 1980s we rebuilt the walls, where there were eight we brought them back to two. There are none of the original walls left. A lot of stone was taken to Kirra for beach protection works during the 1974 cyclone. On the neighbouring Nichols property thousands of tons of stone was quarried from pits up to 40-50 feet deep including enormous pieces of columar basalt.

No other items of potential heritage significance were identified in the assessment.

There are no recommendations regarding historic cultural heritage.

8.10 Flora and Fauna

The subject site comprises of eight land parcels and covers approximately 35ha. The land has been used for various agricultural activities over many years, including: cattle grazing, sugar cane, bananas and small cropping. Prominent features within the local area of the Subject site include the Tweed River, Terranora Broadwater, the twin towns of Coolangatta and Tweed Heads, and Ukerabagh, Cudgen and Stott's Island Nature Reserves. Dominant habitat types include tidal estuaries, wetlands, mangroves, grasslands and remnant rainforest. SEPP Wetlands 1-33 also occur within a radius of 2-4 km, with SEPP Wetland 23 immediately adjacent to the northern boundary of the site. SEPP 26 Rainforests occur approximately 4-5 km to the north-east at Shallow Bay, Ukerabagh Nature Reserve and Fingal Bay.

Ecological surveys were completed in accordance with DECCW's Threatened Biodiversity Survey and Assessment Guidelines (DGEAR 13.2). However, as the majority of the subject site is comprised of agricultural land and a full fauna survey was not considered necessary.

A vegetation survey resulted in mapping five vegetation communities including: Sclerophyll forest, Rainforest, Wet grasslands and cleared/disturbed vegetation. The rainforest and wetland communities are representative of the Endangered Ecological Communities Lowland Rainforest and Freshwater wetlands (TSC Act 1995). 164 flora species were recorded including the threatened *Macadamia tetraphylla* (TSC Act 1995).

An opportunistic fauna survey was undertaken, in conjunction with the vegetation survey, and four amphibians, four reptiles, two mammals and 38 bird species were recorded. Whilst no Commonwealth or State listed threatened species were recorded on the site, an assessment of available habitat concluded that seven threatened species known to occur in the locality, may potentially occur on the site over time. One of these species was the Commonwealth listed Grey-headed flying-fox (EPBC Act 1999) (i.e. a matter of Nation Environmental Significance – (NES)).

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Impact assessment in accordance with the "Guidelines for Threatened Species Assessment" (DEC & DPI, 2005); "Threatened Species Assessment Guidelines: The Assessment of Significance" (DECC 2007); and "EPBC Act Policy Statement 1.1 Significant Impact Guidelines" (DEH 2006) were undertaken on the State and Commonwealth listed threatened species and EECs. These assessments concluded that the proposed development will not result in any significant impacts on state listed threatened flora, fauna or EEC's and a Species impact Statement is not required (DGEAR 13.3). Similarly, referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) is not required as the proposed action is unlikely to result in a significant impact on any matter of NES (DGEAR 6).

The proposed development has been designed to utilise existing cleared and disturbed areas within the Subject site. Some losses of native vegetation will occur, however, almost 80% of the vegetation losses will occur in within the cleared agricultural land (DGEAR 13.1).

To mitigate for the loss of native vegetation, rehabilitation of the existing habitat areas and the creation of additional habitat within the proposed Conservation Areas will be completed.

A detailed Vegetation Management and Rehabilitation Plan (VMP) has been prepared (**Annexure 16** DGEAR 2.7 & 13.8). The aim of this VMP is to direct the rehabilitation and management of proposed Open Space and Conservation areas including the 7(a) Environmental Protection (Wetlands and Littoral Rainforests). The specific objectives of this VMRP are to: identify areas of retained vegetation that will be maintained through weed control and general maintenance; identify areas that will be rehabilitated using natural regeneration or revegetation plantings; provide management guidelines for revegetation, natural regeneration and weed control; provide guidelines for the translocation of one specimen of *Macadamia tetraphylla*; outline a maintenance and monitoring program; and provide management guidelines for the on-going conservation of vegetation on the site.

The proposed development will provide appropriate buffers and habitat protection as identified in the Tweed Area E Local Environment Study (DGEAR 13.6). A 50m vegetated buffer, including the proposed transmission line easement, and a further 50m buffer comprising of the proposed Broadwater Parkway will be provided to the SEPP 14 wetland to the north of the proposed residential area. Specific details of the revegetation of this area are included in the VMP. The vegetated buffer will be completed independently of the construction of the Broadwater Parkway.

The Tweed Regional Habitat Corridor, as mapped by the NPWS, passes across the northern boundary of the site (DGEAR 13.5). The residential development will impact on this corridor, however the impact area is already cleared and degraded. A strip of land at the most northern boundary of the Subject site and within this corridor is proposed as a buffer between the development and the SEPP 14 Wetland. The buffer area will be the subject of habitat rehabilitated and will therefore be greatly improved as a habitat corridor. There will be no losses associated with the effectiveness of the Terranora Subregional Corridor which occurs to the south of the site. The habitat corridors to the north and south of the site will be effectively linked with the construction and revegetation of a major drainage line through the middle of the site. A faunal underpass will also be constructed to facilitate fauna movement under the Broadwater Parkway.

JWA contacted Tweed Shire Council regarding the recently, submitted project entitled 'Fish Move In, Mosquitoes Move Out' (DGEAR 14.2) Clive Easton, Tweed Shire Council's Entomologist, responded and notified JWA that the project has only officially just got going. Hence, there is no report on the project as yet. However he provided the following information and indicated that he would provide further information on the project when it becomes available. "The project is being carried out in a mature *Avicennia* Mangrove wetland below the Terranora Hills adjacent to the proposed "Area E" rezoning. Basically, we are hoping to evaluate the potential for increased tidal flushing in the mangroves which have become bunded by natural and man-made levees. It is hoped this flushing will increase the fisheries productivity of the site and reduce the mosquito productivity. Research to date has focussed on mosquito larval abundance & distribution, mosquito egg shell counts in the substrate, LIDAR micro elevation data, monitoring water flow with loggers, fish observations and deep core sampling. The site is a prolific mosquito breeding area following major rain and spring tides."

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The Subject site does not immediately adjoin any Crown Lands (DGEAR 16.3). However, Tweed Coast Regional Crown Reserve No. 1012191 encompasses the Terranora Broadwater to the north east and the Tweed River to the south. The proposed development will not restrict current or future access to the Crown Reserve and may result in an increase in visitation to the Terranora Broadwater. However, access will be controlled through designated access points, so negative impacts are highly unlikely. There is also likely to be a minor increase in visitation to the Crown Reserve on the Foreshore of the Tweed River. The protected SEPP 14 Wetland No. 23 occurs between the proposed development and the Tweed Coast Regional Crown Reserve No. 1012191. A buffer of 100m will protect the SEPP 14 wetland from any adverse affects of the proposed residential development (e.g. stormwater runoff). This buffer will also protect the environmental values of the Crown Reserve. There will be no negative environmental impacts on the southern portion of the Tweed Coast Regional Crown Reserve No. 1012191 (ie. the Tweed River).

The proposed internal road network avoids most areas of significant native vegetation and is primarily within areas of degraded agricultural land (DGEAR 5.12). However, the road network will have a minor impact on the Subject site with the removal of a small amount of quality native vegetation (ie. Freshwater Wetland and Rainforest).

Earthworks may also increase soil erosion and the constructed road network will increase stormwater runoff. Mitigation measures devised to prevent/reduce erosion during construction will be implemented. Silt fences, surface drains and temporary sedimentation ponds will be utilised. The implementation of SMP will also protect the riparian areas on site and the SEPP 14 Wetlands. Overall, management of the flow of stormwater will mimic the natural hydrological regime with stormwater management including the construction of a major drainage line through the centre of the site and several sedimentation basins. These devises will prevent sedimentation, nutrient transport; and the dispersal of poor quality water and gross pollution into the riparian areas on site and the SEPP 14 Wetlands.

Overall the proposed development has been designed to avoid significant environmental impacts by situating the residential layout and road network within land that is already cleared and degraded and buffering the SEPP 14 Wetlands to the north. Any minor impacts will be mitigated by the implementation of a Stormwater and Vegetation Management Plan utilising 'up to date' and 'best practice' methods in stormwater management and vegetation rehabilitation.

Figure 19 shows the potential impacts of the proposed development.

The DGEARs require assessment of the need for artificial wetlands to assist rehabilitation of SEPP14 wetland and manage overall water quality

From an ecological perspective, water quality for the development and rehabilitation of the SEPP14 area is primarily addressed in **Annexure 15**.

The stormwater management strategy is described in **Annexure 14**. In summary, constructed wetlands are proposed to manage stormwater runoff from the proposed development to ensure that discharge from the artificial wetlands meets the water quality objectives of the local authority.

A comparison of the pre-developed and post-developed surface water flows from the development indicates that, without an attenuation device, peak flows would increase by up to 105%. The constructed wetlands are therefore necessary for flow attenuation and treatment of stormwater runoff from the development prior to discharge to downstream receiving environments. The strategy is described in greater detail in **Annexure 14**.

The DGEARs require a detailed Vegetation Management Plan to accompany the application

Annexure 16 comprises a Vegetation Management and Rehabilitation Plan addressing management and maintenance of proposed areas of open space and the 7(a) Environmental Protection areas. The specific objectives of the Vegetation Management and Rehabilitation Plan are to:

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- Identify areas of retained vegetation that will be maintained through weed control and general maintenance;
 - Identify areas that will be rehabilitated using natural regeneration or revegetation plantings;
 - Provide management guidelines for the revegetation, natural regeneration and weed control to be implemented;
 - Provide guidelines for the translocation of a *Macadamia tetraphylla* plant;
 - Outline a maintenance and monitoring program for the site; and
 - Provide management guidelines for the on-going conservation of vegetation on the site.

The Vegetation Management and Rehabilitation Plan contains appropriate provisions addressing the following matters:

Section 2 – Management Intent

This section identifies the management intent for areas of:

1. Sports fields
2. Stormwater treatment areas;
3. Passive Open Space; and
4. Conservation Areas.

Figure 20 shows the various management intent areas of the site.

Section 3 – Construction Phase Management

In order to protect the ecological values of the site, vegetation management practices will be of the highest importance during the clearing, construction and rehabilitation phases of the development. Native vegetation will be retained, rehabilitated and protected within Conservation areas and Passive Open Space areas. Native vegetation will also be retained where possible within Stormwater treatment areas and Open Space areas however, the focus will be on revegetation works and landscaping works in these areas respectively.

The regeneration and revegetation works proposed within the Conservation area, Passive Open Space areas and Stormwater treatment areas are discussed in detail in Section 6.

The methods proposed to ensure the retention and protection of existing native vegetation where appropriate during the construction phase are discussed below.

Section 4 – Landscape Management

The intention of the proposed development is to select native trees that will:

- Continue the landscape character of existing native vegetation within and surrounding the subject site;
- Be visually appealing to help promote and market the proposed development; and
- Be compatible with the existing sites and proposed development conditions.

All landscaping within the proposed development should utilise locally endemic species of proven local provenance. The preferred locations for street plantings should be as recommended in the Landscape Master Plan at **Annexure 8**.

Section 5 – Rehabilitation Strategy

The Rehabilitation Strategy for the subject site proposes a combination of assisted natural regeneration, where appropriate, and revegetation works. Several areas of the subject site have been identified for rehabilitation works, particularly within the proposed Passive Open Space and Conservation Areas. Revegetation works are also proposed where appropriate within Stormwater Treatment Areas and Open Space Areas.

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The objectives of the Rehabilitation Strategy are:

- To enhance the vegetation to be conserved;
- To revegetate disturbed areas where appropriate with endemic species,
- To obtain a minimum of 70% native canopy cover within identified regeneration and revegetation areas;
- To reduce detrimental edge effects and other disturbance related impacts on the adjacent SEPP 14 Wetland;
- To improve the value of the subject site as habitat for fauna groups; and
- To manage weeds using plantings of endemic species and best practice control methods to achieve less than 10% exotic weed cover within each stratum.

Translocation of *M. tetraphylla*

Five *M. tetraphylla* plants were recorded on and immediately adjacent to the development site. One of these will require translocation from the proposed development site (see Figure 9 of **Annexure 16**).

Translocation may be defined as the deliberate transfer of plants or regenerative plant material (Vallee et al 2004). The individual, of *M. tetraphylla*, is located within the site proposed for development and is under immediate threat from vegetation clearance (see Figure 3 of **Annexure 16**).

Management of *M. tetraphylla* will involve a combination of translocation actions, consisting of translocating the existing plant combined with the establishment of at least an additional 2-3 (1:1.5) propagated plants (re-stocking) into suitable nearby habitat. Re-stocking refers to an attempt to increase population size or diversity by adding further individuals to an existing population. Upon completion of the translocation project, a total of at least three individuals, will be established in the translocation area.

Although there is no specific literature on the translocation of *M. tetraphylla*, anecdotal evidence suggests that the translocation of this species will be successful. The translocation of reproductively mature *Macadamia integrifolia* (i.e. plantation Macadamias) is almost always successful (K. Wilson pers. com. June 2008). Kim Wilson is currently undertaking the translocation of a number of mature *M. tetraphylla* on a development site in the Ballina area, however, the details of post-translocation success are as yet unavailable.

The guidelines for translocation have been prepared in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al. 2004).

Monitoring

A well-designed restoration monitoring program will allow project managers to detect results months, years, or decades following implementation of a plan. Monitoring data can be used by project managers to demonstrate the ability of the project to meet stated goals and objectives.

This section outlines the monitoring required for the proposed regeneration and revegetation areas.

Adaptive Management

The principles of adaptive management have been incorporated into the administration of restoration projects within a variety of governmental funding authorities and programs (Thom 1997). Comprehensive, long-term monitoring is a component of adaptive management, which relies on the accumulation of evidence (via long-term monitoring) to support a decision that demands action.

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If established early in the project planning phase and implemented during successive monitoring and management phases, adaptive management can be a powerful method to systematically assess and improve the performance of restored ecosystems (Thom 2000).

Examples of some potential adaptive management actions that may be required in the future include:

- Areas of natural regenerating Saltmarsh might reveal encroachment by Phragmites or other invasive plant species.
- Monitoring of tidal and/or Stormwater devices may reveal deficiencies in the design of a culvert or water control structure, which may result in insufficient drainage.
- Manual harvesting or chemical control may be periodically required to control the spread of invasive plants.
- The specific design features of a culvert or water control structure may require enhancement or modification during successive years to optimize tidal flow patterns

Before the implementation of any Adaptive management strategies a report is to be provided to the Tweed Shire Council detailing the proposed management actions and the predicted outcomes from such management practices.

In summary, the VMRP will ensure that the project proceeds in an ecologically sustainable manner and ensures that potential impacts on vegetation are minimised.

8.11 Biting Insects

The Director General's Environmental Assessment Requirements call for an assessment of the potential for an increase in impact of biting insects on the amenity of the area. Where severe, a Biting Insect Management Plan is to be prepared in accordance with Tweed Shire Council's Development Control Plan Section A6 – Biting Midge & Mosquito Control, 2008.

Annexure 22 contains a Biting Insect Management Plan (BIMP). The purpose of the Biting Insect Management Plan is to provide strategies to assess the biting insect nuisance and to assist in minimising the biting insect nuisance on and surrounding the development site.

The site borders the Terranora Broadwater estuary and the existing Banora Point urban and Terranora rural residential areas. Mosquito and biting midge nuisance has been a problem in this area with historic drainage and clearing works within the SEPP 14 wetland area north of the site resulting in changes in the hydrology and vegetation providing a significant breeding ground for these insect vectors. Tweed Shire Council has previously undertaken biological treatment within this drained area, however, recent flood gate modifications has allowed the water levels within the levee to be controlled reducing breeding areas and encouraging the introduction of predator species.

As a component of Draft Tweed Development Control Plan 2007, Section B17 – Terranora Urban Release Area E a Wetland Restoration Plan has been prepared by James Warren & Associates Pty Ltd to address removal of weeds and planting to restore the native vegetation to pre-clearing form within the bundled SEPP 14 wetland area (James Warren and Associates, February 2008). This restoration, together with the hydrological management via modified floodgates and existing levees is likely to reduce biting insect habitat.

A funded project ("*Fish In Mozzies Out*") located within the mangrove area west of the proposed subdivision is also investigating strategies including tidal flushing to improve fish and crustacean habitat and minimise biting insect breeding habitat.

A Conceptual Stormwater Assessment and Management Plan (**Annexure 14**) has been prepared outlining strategies to manage surface water across the site. Details of proposed constructed wetlands are included and would be designed to achieve best practice in controlling biting insect populations.

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Management strategies to minimise biting insect breeding sites within the proposed subdivision and exposure of persons to these vectors has been included.

This report states that the presence of biting insect breeding habitat nearby the proposed Altitude Aspire development site does present a risk of biting nuisance and negative impact on human health from transmission of Ross River virus and Barmah Forest virus for the future occupants of the proposed residential subdivision.

Although the proposed development would place a new population within an area subject to biting insect nuisance, it is likely the proposed stormwater management infrastructure and implementation of the Wetland Restoration Plan would lead to reduced biting insect habitat in the Terranora area. The proposed work would build on recent improvements in biting insect management including habitat modification in areas bordering Terranora Broadwater.

Recommendations within the report relate to strategies to help minimise the biting insect nuisance and focus on the water cycle and vegetation. Measures that occupants can implement including personal protection are also included.

The following summary includes both active and passive management strategies:

- Provide breaks in vegetation to reduce biting insect corridor to dwelling sites
- Ensure earthworks including fill placement and roadway embankments do not impound surface water and create ponded breeding sites
- Where applicable install "Dry" stormwater drainage systems
- Ongoing maintenance of stormwater structures
- Actions by householders to minimise biting insect nuisance
- Provide buffers between breeding sites and dwelling houses
- Water quality in lakes should be suitable for survival of larvivorous fish
- Waterway design to minimise emergent vegetation

It is concluded that implementing the recommendations within Section 8 of the Biting Insect Management Plan during the staged development of the subdivision, in conjunction with the habitat modification measures being implemented off-site, the public health and biting nuisance risk to residents in the proposed subdivision will be adequately minimised.

8.12 Noise

Annexure 12 comprises an Acoustic Report which addresses acoustic issues in detail.

Acoustic Environment

The subject site is primarily affected by road traffic noise from Fraser Drive which is controlled by the Tweed Shire Council. The Fraser Drive is currently a bitumen paved 2 lane carriageway with a posted speed limits between 60-80km/h.

Fraser Drive is considered to be a collector road for the purpose of assessment under the DECC.

Road traffic noise from Fraser Drive is assessed under the DEC (formally Environmental Protection Authority) of NSW. The applicable criterion is referenced from the '*Environmental Criteria for Road Traffic Noise 1999*' document.

Development Type 5 from Table 1 '*Road traffic noise criteria for proposed road or residential land use developments*' states new residential developments affected by traffic noise from collector roads be assessed to the following levels:

- 60 dB(A) Leq (1 hour) (7am-10pm); and
- 55 dB(A) Leq (1 hour) (10pm-7am).

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The above levels include a 2.5 dB(A) allowance for noise reflected from building façades.

Where the above limits cannot be met, buildings should be designed to comply with the internal noise levels outlined in Australian Standard AS/NZS 2107:2000 '*Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors*'.

As indicated in Table 29 a total of 51 proposed residential lots ((ie. 16%) are potentially affected by traffic noise.

Individual Lot Assessments

Noise affected lots will require individual noise assessments so that future dwellings are designed in accordance with Australian Standard AS 3671:1989 '*Acoustics - Road Traffic Noise Intrusion - Building Siting and Construction*' to achieve the internal noise objectives listed in Australian Standard AS/NZS 2107:2000 '*Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors*'.

Measured Noise Levels

Table 27 presents the measured noise levels recorded on Wednesday 24/02/2010.

Table 27 – MEASURED ROAD TRAFFIC NOISE LEVELS		
Road Traffic Noise Descriptor	Time Period	Measured Level dB(A)
L10,18 hour	6am to midnight	70
Noisiest day-time Leq,1 hr	2pm to 3pm	74
Noisiest night-time Leq,1 hr	5am to 6am	70
Highest 10th Percentile Day-time Leq, 1hr	7am to 10pm	72
Highest 10th Percentile Night-time Leq, 1hr	10pm to 7am	66
Leq, 24 hr	Midnight to midnight	69

Graphical presentation of the measured noise levels is shown in Appendix B of **Annexure 12**.

The existing traffic volumes and percentage heavy vehicles for Fraser Drive were obtained from Tweed Head Shire Council. Tweed Shire Council adjusted that a growth rate for year 2021 traffic volumes could be established by calculating the growth between Year 2006 and 2009 counts. The growth rate was found to be 7.9% compound increase per annum, and this has been applied to calculate the year 2021 volume.

The traffic volumes and percentage heavy vehicles are as follows:

Surveyed (2006): 4,375 AADT, 2% heavy vehicles
Surveyed (2009): 5,930 AADT, 2% heavy vehicles
Projected (2010): 5,930 AADT, 2% heavy vehicles
Projected (2021): 13,681 AADT, 2% heavy vehicles

Road traffic noise predictions were conducted using SoundPLAN, a CoRTN based model deemed acceptable under the Environmental Protection (Noise) Policy. The basis of the SoundPLAN Model is as follows, with the noise propagation map presented in Appendix C of **Annexure 12**.

Angle Increment:	1o
Road Surface Type:	Impervious
Speed Limit:	80km/hr
Noise Source Height above grade:	0.5m

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Ground Floor Receiver Height: 1.8m above assumed building pad level
 Upper Floor Receiver Height: 4.6m above assumed building pad level
 Façade Correction: +2.5dB

To verify the road traffic noise prediction model, the calculated L_{10,18hr} traffic noise level at the monitoring location is compared to the measured noise level.

The predicted L_{10, 18hr} existing noise level compared to the measured levels are presented in **Table 28**. As the noise monitor was in a free field position, the predicted noise levels are also given as free field.

TABLE 28 – COMPARISON OF MEASURED AND PREDICTED TRAFFIC NOISE LEVELS		
Measured L10,18hr	Predicted L10,18hr	Required Correction
70.2	70.4	0

As the modelled levels are within the allowable tolerance of 2 dB(A) of the measured levels, no correction is required to the model. It should be noted that CoRTN calculation methodology tends to over-predict.

With no shielding between Fraser Drive and the proposed development, future traffic noise levels are predicted to be above the criteria. Noise levels are up to 10 dB(A) over the criteria for lots adjoining Fraser Drive. The modelled noise levels with no barriers are shown in Appendix C OF **Annexure 12**.

Therefore noise levels have been modelled with the inclusion of an acoustic barrier along the entire eastern boundary.

With 2.4 m High Acoustic Barrier

The traffic noise levels with the inclusion of a 2.4m high acoustic barrier fronting Fraser Drive are presented in **Table 29** below. The lots listed in **Table 29** are those lots which are nearest to Fraser Drive. Any lots not shown in the table are predicted to be below the noise criteria and do not require any further assessment. Noise levels are modelled at the centre of each lot.

The assumed building pad levels are taken from the earthwork contours provided by BradLees Consulting (**Annexure 19**). If pad levels of lots increase by more than +200mm than the levels in this report, further modelling may be required to determine if noise levels are likely to increase.

TABLE 29 – PREDICTED TRAFFIC NOISE LEVELS WITH 2.4M ACOUSTIC BARRIER					
Lot	Assumed Building Pad Level (m AHD)	Floor	Predicted SPL dB(A) in Year 2021 (Façade Corrected)		
			L10 18hour	Day, Leq 1hr	Night, Leq 1hr
301	46.5	Ground	59	61	55
		First	63	65	59
302	48.0	Ground	60	62	56
		First	63	65	59
201	48.5	Ground	59	61	55
		First	62	64	58
202	49.5	Ground	59	61	55
		First	61	63	57
203	50.0	Ground	58	60	54
		First	61	63	57

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TABLE 29 – PREDICTED TRAFFIC NOISE LEVELS WITH 2.4M ACOUSTIC BARRIER					
Lot	Assumed Building Pad Level (m AHD)	Floor	Predicted SPL dB(A) in Year 2021 (Façade Corrected)		
			L10 18hour	Day, Leq 1hr	Night, Leq 1hr
204	50.5	Ground	58	60	54
		First	60	62	56
205	51.0	Ground	58	60	54
		First	59	61	55
206	52.0	Ground	57	59	53
		First	59	61	55
207	53.0	Ground	57	59	53
		First	59	61	55
123	54.0	Ground	57	59	53
		First	59	61	55
122	55.5	Ground	57	59	53
		First	59	61	55
121	56.5	Ground	57	59	53
		First	59	61	55
120	57.5	Ground	57	59	53
		First	59	61	55
119	58.5	Ground	57	59	53
		First	59	61	55
118	60.0	Ground	58	60	54
		First	60	62	56
117	60.5	Ground	57	59	53
		First	59	61	55
116	61.0	Ground	57	59	53
		First	59	61	55
115	63.0	Ground	57	59	53
		First	60	62	56
114	63.5	Ground	57	59	53
		First	59	61	55
113	65.0	Ground	58	60	54
		First	60	62	56
112	66.0	Ground	58	60	54
		First	60	62	56
111	67.0	Ground	58	60	54
		First	61	63	57
110	68.0	Ground	58	60	54
		First	61	63	57
109	68.5	Ground	58	60	54
		First	61	63	57
108	69.5	Ground	58	60	54
		First	61	63	57
107	71.0	Ground	57	59	53
		First	58	60	54

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TABLE 29 – PREDICTED TRAFFIC NOISE LEVELS WITH 2.4M ACOUSTIC BARRIER					
Lot	Assumed Building Pad Level (m AHD)	Floor	Predicted SPL dB(A) in Year 2021 (Façade Corrected)		
			L10 18hour	Day, Leq 1hr	Night, Leq 1hr
106	71.5	Ground	59	61	55
		First	61	63	57
105	75.5	Ground	61	63	57
		First	65	67	61
104	76.5	Ground	60	62	56
		First	64	66	60
103	81.5	Ground	64	66	60
		First	67	69	63
102	78.5	Ground	57	59	53
		First	60	62	56
101	76.0	Ground	55	57	51
		First	56	58	52
503	73.0	Ground	51	53	47
		First	53	55	49
504	72.5	Ground	52	54	48
		First	53	55	49
505	71.5	Ground	51	53	47
		First	52	54	48
506	70.0	Ground	51	53	47
		First	51	53	47
406	67.0	Ground	54	56	50
		First	54	56	50
407	66.0	Ground	54	56	50
		First	55	57	51
408	65.0	Ground	54	56	50
		First	55	57	51
409	64.0	Ground	55	57	51
		First	56	58	52
410	61.0	Ground	54	56	50
		First	55	57	51
435	61.0	Ground	55	57	51
		First	56	58	52
124	56.5	Ground	54	56	50
		First	55	57	51
139	54.0	Ground	55	57	51
		First	56	58	52
140	52.0	Ground	55	57	51
		First	56	58	52
156	47.5	Ground	55	57	51
		First	56	58	52
208	45.5	Ground	55	57	51
		First	56	58	52
224	42.5	Ground	56	58	52
		First	57	59	53

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TABLE 29 – PREDICTED TRAFFIC NOISE LEVELS WITH 2.4M ACOUSTIC BARRIER					
Lot	Assumed Building Pad Level (m AHD)	Floor	Predicted SPL dB(A) in Year 2021 (Façade Corrected)		
			L10 18hour	Day, Leq 1hr	Night, Leq 1hr
225	42.0	Ground	57	59	53
		First	58	60	54
304	40.5	Ground	58	60	54
		First	59	60	55
303	37.0	Ground	59	61	55
		First	61	63	57

Lots along the eastern boundary of the site (ie. nearest to Fraser Drive) are predicted to be above the criteria even with the inclusion of an acoustic barrier. Therefore, further acoustic assessment of dwellings will be required once individual building plans become available. The assessment would ensure the dwellings are designed in accordance with the relevant Australian Standards.

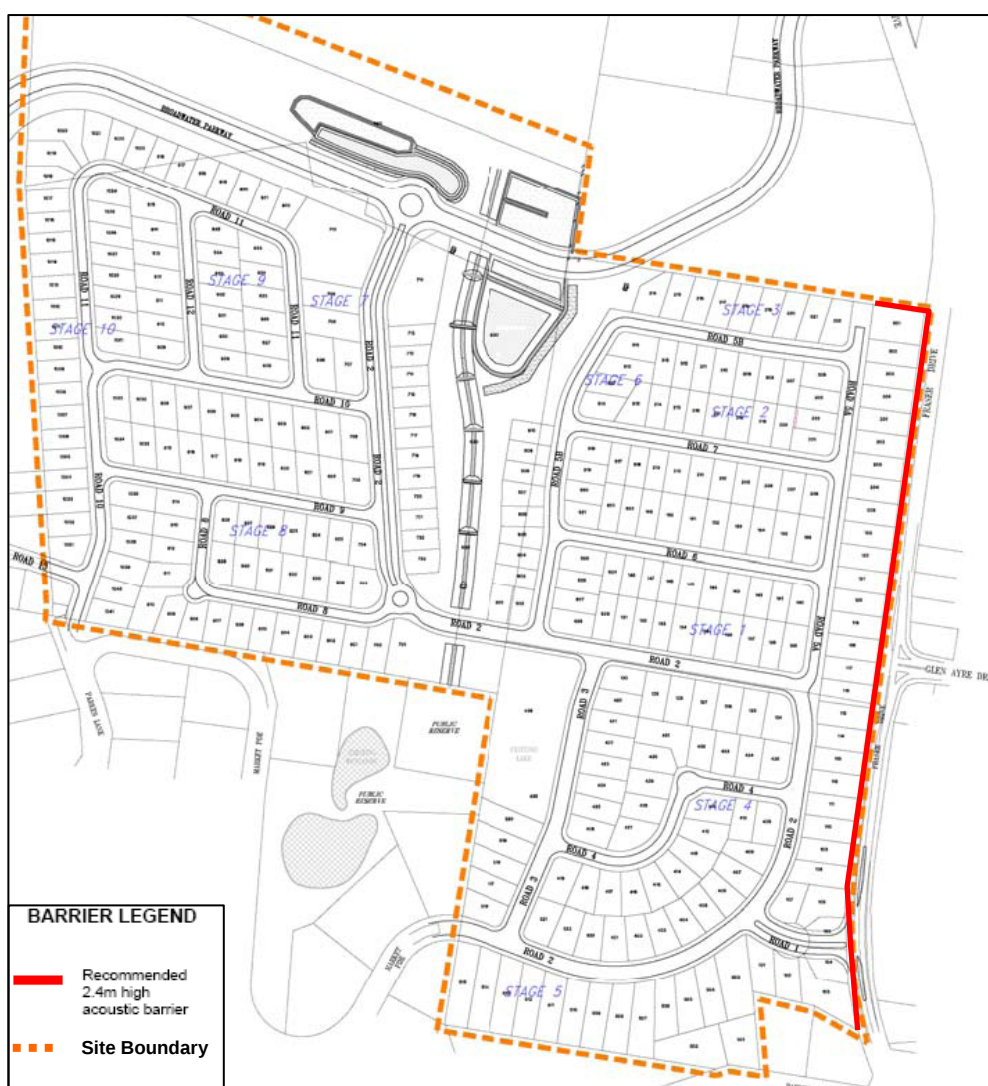


Figure 24 – Recommended Acoustic Barriers
Source: TTM Consulting, December 2010

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The acoustic barrier recommendations are as follows:

- The acoustic barrier, as shown on **Figure 24** should be minimum 2.4m high relative to the height of Fraser Drive. Based on the proposed earthworks, the pad level of lots along the eastern boundary should be lower than the RL of Fraser Drive.

Fraser Drive ranges in level from approximately RL 83m AHD adjacent to the south eastern corner of the site to approximately RL 50m AHD adjacent to the north eastern corner of the site.

- Acoustic barriers should be of material with a surface mass greater than 12.5kg/m². Suitable materials include earth mound, lapped timber palings, fibre cement sheet, plywood, masonry, glass, Perspex, or a combination of materials if desired. Care should be taken to ensure that no gaps or holes are evident.

Individual Lot Noise Assessments

Noise affected lots will require individual noise assessments to ensure that future dwellings are designed in accordance with Australian Standard AS 3671:1989 '*Acoustics - Road Traffic Noise Intrusion - Building Siting and Construction*' to achieve the internal noise objectives listed in Australian Standard AS 2107:2000 '*Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors*'.

It is recommended that habitable rooms of noise affected dwellings achieve the maximum internal noise limits as follows:

- 40 dB(A) Leq, for bedrooms.
- 45 dB(A) Leq, for living areas

Based on the predicted noise levels, the lots which would require individual house assessments are listed in **Table 30** below.

TABLE 30 – LOTS REQUIRING FURTHER NOISE ASSESSMENT	
Floor Level	Lots Requiring Further Assessment
Both Ground and Upper Floors	103, 104, 105, 106, 301, 302, 201, 202, 322
Upper Floor only	102, 108-123, 203, 204, 205, 206, 207

Without acoustic treatment, traffic noise levels are predicted to be significantly above the criteria at lots in proximity to Fraser Drive (ie. Lots 102 – 123, 201 – 207 and 301 – 322). Acoustic barriers have been recommended to reduce noise levels where possible. Noise affected lots would require individual assessments once building plans are available to ensure that buildings are designed in accordance with the relevant Australian Standards.

Impacts potentially arising from traffic noise and the mitigation measure include:

- Urban design/visual.

The 2.4m acoustic fence will be finished in "earth" colours and suitable landscaping will be established on the Fraser Drive side of Tweed Heads fence to soften visual impacts. This may include an earth mound to reduce the height of the fence. As far as possible, having regard to the range of suitable construction materials, the fence will be compatible with the urban design principles contained in the Living Design Guidelines at **Annexure 9**.

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- Noise impacts on future residents.

Subject to the mitigation measures proposed and given that relatively few lots (53 or 17%) are affected, it is considered that noise impacts on future residents will not be significant. In particular, the section of Fraser Drive from Terranora Road to Amaroo Drive will remain as two lanes with a 60km to 80km speed environment and a very small proportion of heavy vehicles and in this context the magnitude and significance of potential impacts is considered to be low.

- Implications of future noise assessments.

31 of the proposed 317 lots (ie. 10%) require further noise assessment, as indicated in Table 30. The individual noise assessments will have implications for the design, orientation and construction standards for the 31 lots and may result in some increase in building costs.

However in the context of the total number of lots in the subdivision and the existing traffic environmental discussed above, the implications are not considered to be significant.

Based on the inclusion of the recommendations specified in Section 7 of **Annexure 12**, the development is capable of complying with the criteria outlined in Section 4 of **Annexure 12**.

These recommendations include:

- The construction of a 2.4m high acoustic barrier on Fraser Drive (see **Figure 24**).
- The design and construction of dwellings on Lots 103 to 106, 301 to 304, 322 and upper floor only for Lots 102, 108 to 123 and 201 to 205 will need to comply with the relevant Australian Standard (AS 3671:1989 Acoustics – Road Traffic Noise Intrusion – Building, Siting and Construction and AS 2107:2000 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors).

8.13 Socio-Economic Impacts

Clause 16 of the DGEARs requires a Social Impact Assessment for the development, addressing the social and economic context of the development in terms of infrastructure requirements, public transport, community services and facilities (including schools and medical services). The Social Impact Assessment is also required to identify the need for any additional and/or augmentation of social and community infrastructure and resources. In particular explore the potential and methods for a new educational facility to be provided for.

8.13.1 Future Demographics

The Terranora Urban Release Area E (of which the Altitude Aspire site forms part) site represents a large proportion of the area within the Far North Coast Regional Strategy that is allocated for future population growth within the Tweed Shire. In this regard it is considered that the demographic profile of the Altitude Aspire development will essentially mirror the characteristics of the incoming population to the area as growth occurs in the Tweed.

Details of the likely future population have been derived from an analysis of the available demographic data relating to the region. The following information is a summary of the ABS 2006 Census data from the Tweed Local Government Area (LGA).

Population Age Structure and Growth

The Tweed Shire has experienced a strong growth rate over the past fifteen years with the resident population increasing from 55953 persons in 1991 to 79321 persons in 2006. This represents an average annual growth rate of approximately 2.7% per annum. The current population of Tweed Shire is estimated at 88000 based on the 2011 projection of 91700 people (Source: Department of Planning 2010).

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Population growth data for the Tweed Shire is summarised in **Table 31**.

TABLE 31 – TWEED SHIRE POPULATION GROWTH 1991 - 2006							
POPULATION					SHIRE WIDE AVERAGE GROWTH		
	1991	1996	2001	2006	1991-1996	1996-2001	2001-2006
Total	55953	63607	71618	79321	7654 (2.7%)	8011 (2.5%)	7703 (2.1%)
0-14	11986	13789	14389	14612	1803 (3.0%)	600 (0.8%)	223 (0.3%)
65+	11019	14311	16992	17604	3292 (5.9%)	2681 (3.7%)	612 (0.7%)

Source ABS

The annual growth rate is decreasing over time. This reflects the fact that the Tweed population is ageing and that most of the growth is from in migration. In the future the annual growth rate is likely to reduce slightly as the base population increases and the amount of in migration remains relatively constant.

Further details relating to the population age structure as it relates to Altitude Aspire is provided in **Table 33**.

Families and Households

Information provided in relation to dwelling occupancy rates by Tweed Shire Council Planning Reform Unit, based on the available 2006 Census data is as follows:

- a) Detached Dwelling – 2.60 people per dwelling.
- b) Medium Density Unit, Villa or Townhouse – 2.3 people per dwelling.
- c) Medium Density Apartment – 1.95 people per dwelling.

Likely Demographics and Community Context

In 2001 the Tweed LGA was divided into two Statistical Subdivisions known as Tweed (A) which included the Urban Centres of Tweed Heads, Tweed Heads South, Banora Point, Bilambil Heights and Kingscliff and Tweed (B) which included the Tweed Coast, Murwillumbah and the Rural areas.

In the 2006 Census the boundaries of the Statistical Areas within the Tweed Shire were altered. Tweed (A) Urban Centres remained the same but Tweed Coast (Kingscliff to Pottsville) was separated from Murwillumbah and the Rural area.

Table 32 below demonstrates that the demographics of the 2006 Tweed Coast and Rural Areas and the 2001 Tweed (B) statistical area are quite different to the Tweed (A) statistical area which contains the main established areas of the Tweed (ie. Tweed Heads, South Tweed, Banora Point, Kingscliff and Bilambil Heights).

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TABLE 32 – SUMMARY OF POPULATION AND HOUSING TWEED 2001- 2006						
	2001 CENSUS			2006 CENSUS		
Criteria	Tweed A (Urban Centres)	Tweed B (Tweed Coast and Rural Areas)	Australia	Tweed A (Urban Centres)	Tweed* (Composite of Tweed Coast and Rural Areas)	Australia
0-14 Population cohort	17.2%	23.1%	20.8%	16.8%	21.3%	19.8%
+55 Population cohort	39.9%	25.1%	22%	39.6%	26.6%	24.3%
Couples with children	31.9%	42.6%	47%	32.5%	40.6%	45.3%
Couples without children	49.8%	38%	35.7%	48.9%	38.4%	37.2%
Detached dwellings	53.4%	82.1%	75.3%	54.2%	73.3%	74.8%
Single person households	26.9%	23.1%	22.9%	27%	22.3%	22.9%

*Tweed Coast and Rural Area 2006 includes composite statistics of Tweed Coast and Rural Centres for comparison purposes with Tweed (B) Coast and Rural Areas 2001.

Major differences arise in Tweed A (Tweed Urban Centres) compared to Tweed B (Tweed Coast and Rural Areas) in the number of children 0-14 16.8% to 21.3% (2006), the ageing population 55+ 39.6% to 26.6% (2006) and the type of housing 54.2% detached housing to 73.3% (2006).

The Altitude Aspire development is to be constructed on a greenfield site. The census data indicates that younger families with children are moving into areas with similar greenfield developments, for example the Tweed Coast (Kingscliff to Pottsville) and Rural Centres such as Murwillumbah. Whereas the established urban areas of the Tweed are ageing and have a higher proportion of older persons.

On this basis the demographics of the 2006 Tweed Coast statistical area reflects the incoming population to the Tweed and this will continue in the Altitude Aspire development as it will provide a range of housing types and choices to respond to the market demands of the incoming population.

This will be much closer to the national average population than the ageing population of the Tweed A (Urban Centres) statistical area (see **Table 33**).

TABLE 33 - 2006 CENSUS – Tweed Coast Local Area		
Criteria	Tweed Coast	Australia
0-4 Population cohort	6.6%	6.3%
5-14 Population cohort	16.0%	13.5%
15-24 Population cohort	10.7%	13.6%
25-54 Population cohort	40.6%	42.2%
55-64 Population cohort	11.3%	11.0%
+65 Population cohort	14.9%	13.3%
Couples with children	38.7%	45.3%
Couples without children	40.8%	37.2%
Detached dwellings	66.0%	74.8%
Single person households	22.3%	22.9%

Source ABS 2006 Census

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Analysis Of Demographic Projections

The Far North Coast Regional Strategy indicates that between the period from 2006 – 2031 a total of 19100 additional dwellings will be required within the Tweed LGA. The Altitude Aspire site will yield 316 dwellings.

Based upon the average Shire wide annual growth rate over the past fifteen year period, a growth rate of 2.0% – 2.5% per annum is anticipated across the Shire. By applying this growth rate and the projected dwelling demand and release areas within the Far North Coast Regional Strategy, it is anticipated that development will occur at a rate of approximately 50 to 60 dwellings per year over a five to six year time horizon within the Altitude Aspire site.

The number of children within the 0-4 age cohort at the end of the first six years is estimated to be 50 children and the number of +65 persons is estimated to be 112. Not all of these children and aged persons will need care facilities. There will also be a need for community facilities which are proposed to be met through Section 94 contributions and the proposed community recreation facility.

Child care facilities for the anticipated demand created by the 50 children in the 0 to 4 cohort could be accommodated in existing child care centres located at Terranora Village (approximately 3km west of the site); ABC child care centre in Greenway Drive, Tweed Heads South (approximately 3km northeast of the site); at Wallum Preschool and child care centre in Woodland Drive Banora Point (approximately 2km northeast of the site) and at Pioneer Parade, Banora Point (approximately 2.5km east of the site). The child care centre on the corner of Leisure and Greenway Drives (approximately 3km east of the site) and Teddy Bears child care centre in Corporation Circuit at Tweed Heads South (approximately 3.5km east of the site).

Ultimately, a child care centre is planned within the Area E Release Precinct in a location approximately 500m to the west of Altitude Aspire, with access from the future proposed Broadwater Parkway. This centre would provide convenient and accessible facilities for children residing in Altitude Aspire.

Based on experience with other Metricon Estates within the Tweed Local Government Area, it is anticipated that the 112 persons aged 65+ are likely to be active and capable of caring for themselves in their own home. No significant increase in demand is therefore likely to be placed on existing aged care services.

This wider urban area of Tweed Heads (Tweed Heads SLA) (including Tweed Heads South, Banora Point, Bilambil) has a population of approximately 30,000 people. Altitude Aspire is estimated to increase the current population by approximately 750 persons over the life of the project which is less than 1.5%. Infrastructure requirements for the development should be viewed in this overall demographic context.

8.13.2 Public Transport

The development is located in relative proximity to several bus services run by Surfside Buslines as shown in **Figure 17**. Whilst the bus routes pass within relatively close proximity to the proposed development (300 metres from the site access intersection and 500 metres from the roundabout intersection with Broadwater Parkway), the topography of the local road network discourages pedestrian access to existing bus stops. This reduces the attractiveness of using the existing buses as a viable public transport mode.

The average weekday frequency for the bus routes shown in Figure 6.1 is one hour for each particular route. Bus route 607, which travels from Tweed Heads to Flame Tree Park, is a relatively new service which was developed to serve to the retail showroom precinct along Greenway Drive and the recently developed residential area of Flame Tree Park.

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The NSW Department of Transport and Infrastructure has indicated that the allocation of future bus services is done so by liaison with the service provider (currently Surfside Buslines) and based primarily on a current or expected demand basis.

It is recommended that Surfside Buslines update Bus Route 607 to continue further south along Fraser Drive and access the proposed development via the future proposed Broadwater Parkway as shown in **Figure 18**. **Figure 18** also demonstrates the proposed bus stop locations along Broadwater Parkway and within the internal road network.

By extending Route 607, residents of the proposed development will be provided with a regular bus connection to the nearby Banora Central Shopping Centre located at Flame Tree Park, as well as connection to regional centres of South Tweed Heads, Tweed Heads and Coolangatta. Four potential bus stop locations have been strategically placed (refer to **Figure 18**). These bus stop locations comply with standard bus stop design practices by providing a maximum walking distance of 400 metres between stops and dwellings within new residential developments.

8.13.3 Schools

The Department of Education and Training anticipates that the 317 residential lots planned for the Altitude Aspire development will generate additional demand for government school facilities. In 2009, the Department advised the Department of Planning, regarding the Altitude Aspire development, that a contribution may be sought from the developer towards the cost of land for education infrastructure in association to the additional demand (as outlined in the Department of Planning's Planning Circular PS 08-017).

The Altitude Aspire development is in the Terranora Public School and Banora Point High School catchments. Terranora Public School and neighbouring Centaur Public School both have anticipated enrolments at levels above their permanent accommodation capacity into the medium term and this additional 300 dwelling development may require additional supplementary accommodation to cater for the demand.

The Terranora Public School site, at 2.5 hectares in size and of uneven terrain, is below the Department's preferred 3.0-hectare optimum size but is now surrounded by residential development, thereby limiting its ability to be readily expanded.

The Centaur Public School site and Banora Point High School site are both at the Department's optimal sizes for schools so in this instance, the Department is not indicating a need for additional land (see **Annexure 30**).

Based on the Department's advice, there is no requirement to identify a site within Altitude Aspire to accommodate a future public school. Tweed Shire Council is currently finalising a Development Control Plan for the wider Tweed Area E Urban Release Area and should the Department ultimately identify a need for additional land to accommodate a school, a suitable site can be identified in the Development Control Plan based on consultations between Tweed Shire Council and the Department of Education. Funding of land acquisition and school construction costs would be the responsibility of the Department of Education, as has occurred with Centaur Public School and Banora Point High School.

8.13.4 Community Services and Facilities

There are hospital services available at Tweed Heads Hospital approximately 6 kilometres to the east and Murwillumbah Hospital 25 kilometres to the southwest.

Police services are available at Tweed Heads approximately 6 kilometres to the east. Funding for a new Police Station has been allocated in the 2010/2011 NSW Budget.

Ambulance services are available at Tweed Heads approximately 6 kilometres to the east.

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Fire fighting services are available at Tweed Heads approximately 5 kilometres to the east.

Neighbourhood shopping services are available approximately 500m to the east at Tweed Heights, approximately 2 kilometres to the north at Leisure Drive, approximately 3 kilometres to the east at Banora Point and 3 kilometres to the west at Terranora Village.

Subregional shopping services are available approximately 4 kilometres to the northeast at Tweed City Shopping Centre at Tweed Heads South.

Medical and chemist services are available approximately 2 kilometres to the north at Leisure Drive, approximately 3 kilometres to the east at Banora Point, 3 kilometres to the west at Terranora Village and also at the Tweed City Shopping Centre which also contains a Medicare Office.

Recreation facilities are available approximately 1.5 kilometres to the north in Fraser Drive (sports fields and Twin Towns Juniors Club), approximately 2.5 kilometres to the northeast at Club Banora and approximately 4 kilometres to the northeast at Tweed Heads Coolangatta Golf Club (golf course and club facilities).

Currently, limited public transport services are available to the Altitude Aspire site. The nearest current bus routes with an average weekday frequency of 1 hour include Terranora Road (approximately 100m to the south of the site – Route 605) and Glen Ayr Drive (approximately 200m east of the site – Route 602).

In addition, Route 607 includes Leisure Drive approximately 1.5km north of the site which is a relatively new service which should be extended to continue south on Fraser Drive such that future residents of Altitude Aspire are provided with adequate access to community, shopping, recreational and entertainment facilities which are not accessible within walking distance.

Figures 17 and 18 show the existing and recommended bus routes.

Further details relating to public transport are contained in the Transport Assessment Report at **Annexure 24**, including proposed cycleway/walkway facilities on Fraser Drive which will link to the Altitude Summit internal network and the wider external network, thus improving accessibility.

In summary, given that the Altitude Aspire project will only increase the population of Tweed Heads by approximately 1.5% and having regard to the range of services and facilities available within a 5 kilometre radius of the site, it is expected that the project will not have any significant adverse social or economic impact. Normal Section 94 and Section 64 Contributions will apply for the provision of water and sewer headworks and cemeteries, roads, open space, Council Chambers, among other community infrastructure as identified in Section 4.6.10 of this Environmental Assessment Report.

8.13.5 Provision of Affordable Housing

Having regard to the nature of the terrain and as elevated parts of the site have extensive water views (and resulting higher land costs), and given that it is relatively remote at present from bus routes and other key infrastructure, it is not ideally suited to affordable housing.

Other land within the wider Area E Release Precinct approximately 500m west of Altitude Aspire is relatively level, of lower elevation, adjacent to the future Broadwater Parkway (intended future bus route) and more suited to affordable housing in terms of land costs and accessibility.

However a range of lot sizes have been included in the design of the development to provide potential housing choice for future residents but in light of the topography and location of the site there are no realistic opportunities for affordable housing to be incorporated into the proposal.

8.13.6 Impacts on Tweed Coast Regional Crown Reserve No. 1012191

This Crown Reserve includes the Terranora Broadwater/Trutes Bay area which is approximately 400m to the north of the site. There are currently no direct vehicular or pedestrian access routes to the Broadwater and none are proposed by way of this application.

Draft Tweed Development Control Plan 2008, Section B17 – Terranora Area E proposed, in accordance with the Local Environmental Study (which underpins the Area E rezoning) that the existing State Environmental Planning Policy No. 14 Wetland (Lot 227 DP 755740) be acquired and placed in public ownership at some later stage in the development of the whole of Area E. However this will not, in itself, facilitate public access to the foreshore and the Wetland Rehabilitation Plan accompanying the Draft Development Control Plan currently being assessed by Council does not foreshadow any direct access to the foreshore area.

Given the spatial relationship between the development site and Terranora Broadwater and the limited convenient access points currently available, it is concluded that given the scale of the development (approximately an additional 750 persons) and the difficult terrain it is unlikely to have any cumulative impact on Tweed Coast Regional Crown Reserve No. 1012191 encompassing Terranora Broadwater to the northwest of the site.

Similarly, given that the Tweed River is located approximately 1 kilometre to the south of the site with no direct pedestrian access available other than via Oxley Cove and Old Ferry Road which is approximately 3 kilometres from the site, and given the additional population to be accommodated it is again unlikely that there will be any significant impact on existing recreational facilities and the use within those reserve areas.

This issue is further addressed in Section 4.13 of **Annexure 15**. **Figure 25** shows the location of the Crown Reserve in relation to the project site.

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Figure 25 – Crown Lands
Source: James Warren and Associates, November 2010

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8.14 Planning Agreements and/or Developer Contributions

- Address details of planning agreement and/or contributions with Council and/or any Govt Agencies.

As indicated in Section 4.6.10, Section 94 Contributions totalling approximately \$25,914 per lot apply to the project based on Council's current Section 94 Plans and Draft Section 94 Plan No. 27 (Area E).

Tweed Shire Council is currently reviewing Section 94 Plan No. 4 (Tweed Road Contribution Plan) and Council anticipates a substantial increase in the contribution rates which could take total contributions beyond the current \$30,000.00 cap.

It is a matter for the Department of Planning and Tweed Shire Council as to how the contributions are applied to comply with the current \$30,000.00 cap imposed by the Minister for Planning.

However, Metricon (Qld) Pty Ltd is prepared to negotiate a Planning Agreement with Tweed Shire Council for contributions in excess of the \$30,000.00 cap. Appropriate provision has been included in the Draft Statement of Commitments in relation to negotiating a Planning Agreement.

- Provide assessment of land to be dedicated. Outline how to be managed and funded in future.
- Ownership

It is proposed to dedicate Lots 436 and 710 to the public as public reserve. Council will be responsible for the day to day care, control and management of those reserves.

It is also proposed to dedicate Lot 630 as a drainage reserve. This lot incorporates the existing natural watercourse and future water quality control mechanisms and again will be vested in the control of Council for management purposes (see **Figure 1**).

The future alignment of Broadwater Parkway will also be dedicated to Tweed Shire Council and this will facilitate the future construction of Broadwater Parkway.

Council Officers advised on 24 November 2010 that Council would make a decision on open space, drainage reserves and roads after a merit assessment has been completed. Management of proposed public land is addressed in detail in Section 8.2.6 of this Environmental Assessment.

- Management

Routine management of the public reserves, drainage reserves and public roads would be undertaken by Council in accordance with its normal obligations under the Local Government Act. Funding will be provided through normal rate revenue and general purpose grants.

9.0 CONSULTATIONS

On 17 March 2010 the following State Agencies were consulted. Key issues raised in responses are addressed in the following table. Copies of responses received are contained at **Annexure 30**.

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9.1 State Agencies

TABLE 39 – STATE AGENCY RESPONSES		
AGENCY	KEY ISSUES	COMMENT
Tweed Shire Council Development Assessment Panel Minutes of the meeting on 26 March 2010.	Council is opposed to the subdivision unless approval for the construction of Broadwater Parkway is included in the proposal and the temporary access to Fraser Drive is not supported.	The alignment of Broadwater Parkway from the Altitude Aspire site to Fraser Drive is not within land owned by Metricon (Qld) Pty Ltd. There is no means by which Metricon can therefore acquire the corridor to enable the road to be constructed. Council will be required to acquire the corridor (funded from contributions from Section 94 Plan No. 4) when it has resolved the final alignment and adopted the Development Control Plan.
		In the interim, a temporary access connection to Fraser Drive as proposed is consistent with a number of other residential estates abutting Fraser Drive which have been approved over the last 20 years and is justified by the Transport Assessment Report at Annexure 24 .
	Addressing relevant provisions of Council's Tweed Local Environmental Plan 2000 and Tweed Development Control Plan 2008.	These issues are addressed in Sections 4.3 and 4.4 of this Environmental Assessment.
	Section 94 Contribution Cap	This issue is addressed in Section 4.6.10 of this Environmental Assessment.
	Servicing generally including water and sewer.	These issues are addressed in Section 8.0 of this Environmental Assessment.
Department of Environment, Climate Change and Water (30 March 2010)	The Department advised that it has no further comments other than those provided to the Department of Planning previous which were incorporated into the DGEARs.	Relevant provisions of the DGEARs incorporating the DECCW comments are addressed in this Environmental Assessment Report.
NSW Office of Water (7 April 2010)	The Office of Water advised that they have no further requirements other than those advised to the Department of Planning which have been included in the DGEARs.	The various issues raised in the DGEARs are addressed in relevant sections of this Environmental Assessment Report.
Northern Rivers Catchment Management Authority (22 March 2010)	The Environmental Assessment should demonstrate consistency with the targets and intent of the Northern Rivers Catchment Action Plan.	This issue is generally addressed in Annexures 14 and 17 .
	Native Vegetation Act.	This issue is addressed in Section 4.6.5 of this Environmental Assessment.
	Potential land use conflicts (address North Coast Guide for avoiding and reducing rural land use conflicts and interface issues).	This issue is addressed in the Agricultural Buffers Assessment at Annexures 10 .

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TABLE 39 – STATE AGENCY RESPONSES		
AGENCY	KEY ISSUES	COMMENT
NSW Rural Fire Service (9 April 2010)	1. Minimising the impact of radiant heat and preventing direct flame contact by ensuring future dwellings are separated from bush fire hazards by identifying adequate asset protection zones in accordance with Planning for Bush Fire Protection 2006. Setbacks will depend on proximity to vegetation, vegetation type and slope; 2. The on going fuel management within the identified asset protection zones; 3. Providing adequate vehicular egress/access to and throughout the proposed development as outlined within 4.1.3 of Planning for Bush Fire Protection 2006; 4. The ability to site and provide for adequate water supplies for bush fire suppression operations; and 5. Minimising the vulnerability of buildings and structures to ignition from radiation and ember attack by addressing the level of construction of assets as per the Australian Standard AS3959-1999 'Construction of buildings in bush fire-prone areas'.	The issues raised by the Rural Fire Service are addressed in the Bushfire Assessment Report at Annexure 23 .
Land and Property Management Authority	No response received.	
Department of Transport and Infrastructure (16 April 2010)	The provision of public transport.	Part of Fraser Drive is a bus route and it is anticipated that the future Broadwater Parkway will also be a bus route. All dwellings will be within reasonable proximity of the proposed bus route.
	A suitable road hierarchy for provision of buses, walking and cycling.	The subdivision design provides for an appropriate road hierarchy having regard to the difficult topographic constraints imposed and other cultural issues relating to existing road networks and property boundaries. Suitable bus routes are provided by Fraser Drive and the future Broadwater Parkway and appropriate walkways and cycleways will be provided on the site.
	Connectivity to surrounding areas.	The subdivision will be connected to Parkes Lane, Market Parade and Fraser Drive for vehicles and pedestrians/ cyclists.
	Staging.	The proposed development will be staged generally from east to west and high densities are not readily achievable because of topographic constraints, existing character and amenity of surrounding areas and distance from existing and proposed neighbourhood centres. The matters raised by the Department are addressed in detail in Section 8.3.3 and Annexure 24.

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TABLE 39 – STATE AGENCY RESPONSES		
AGENCY	KEY ISSUES	COMMENT
Roads and Traffic Authority (9 April 2010)	The Roads and Traffic Authority has requested a Traffic Study addressing key issues relevant to the proposal set out in Section 2.3 of the Roads and Traffic Authority's Guide to Traffic Generating Developments.	Annexure 24 contains a Transport Assessment Report addressing the Roads and Traffic Authority requirements. In addition, Section 94 Plan No. 4 – Tweed Road Contribution Plan provides for appropriate contributions to the distributor road network including upgrading of Fraser Drive, construction of Kirkwood Road and the overpass/interchange with the Pacific Highway and the provision of the link from Mahers Lane to Fraser Drive (Broadwater Parkway).
Department of Education and Training (30 March 2010)	The Department have advised that a contribution may be sought from the developer towards the cost of land for education infrastructure in association with the additional demand.	The Department have not quantified the amount of the contribution and nor is there any Section 94 Contributions Plan in force. In addition the \$30,000 cap imposed by the NSW Government would appear to be an impediment in relation to any further contributions. The Department acknowledged that Centaur Public School and the Banora Point High School site are both to the Department's optimal size for schools so in this instance the Department is not indicating a need for additional land.
Relevant Local Aboriginal Land Council/s and other Aboriginal community groups (Undated, circa March 2010)	Based on the impact of its past and current land use, chances of finding Aboriginal sites or relics within the area is very low. Tweed Byron Local Aboriginal Land Council support the following recommendations. 1. If human remains are located at any stage during construction works that are of Aboriginal origin, then the Site should be cordoned off and be left untouched and the Tweed Byron LALC must be informed. 2. If Aboriginal cultural material is uncovered during the development then work must stop in the area and the Site should be cordoned off and the Tweed Byron LALC must be informed.	The TBLALC recommendations have been included in the Draft Statement of Commitments.
Country Energy (18 May 2010)	Country Energy requires an 11kv connection off Fraser Drive and Parkes Lane.	The Subdivision Layout provides street connections to both Parkes Lane and Fraser Drive within which the 11kv connections can be accommodated.
	Provision of a road corridor from east to west of the site to join Fraser Drive and Mahers Lane is also required.	Draft Tweed Development Control Plan 2008, Section B17 and the various strategic planning undertaken by Council provide for Broadwater Parkway to link these streets and this will provide an appropriate corridor for further east/ west electrical infrastructure requirements.
North Coast Area Health Service (22 November 2010)	The Health Service note that the requirements/recommendations contained in their planning process have received due consideration for the development stage of the proposal.	Matters relating to Biting Midge are addressed in Section 8.11 and Annexure 22 .

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9.2 Community Consultation

Preliminary community consultations have been undertaken and it is intended to undertake a formal consultation program during the public exhibition process for the Major Project Application generally in accordance with the Consultation Program at **Annexure 29**. This will enable stakeholders, residents and other interested parties to clarify any issues and provide comments on the project.

10.0 SUMMARY AND CONCLUSION

The Altitude Aspire site comprises part of the Terranora Area E Urban Release Area which was first identified strategically for urban release in 1991 pursuant to the Tweed Residential Development Strategy. That Strategy was subsequently reinforced by the Far North Coast Regional Strategy 2006 – 2031 which was approved in early 2007. The development proposal is entirely consistent with the Far North Coast Regional Strategy.

In addition, Council has been planning strategically for this urban release area for in excess of ten years by way of the Tweed Development Program 1995, the Tweed 2000+ Strategic Plan of 1995 and various Section 94 Contribution Plans including, in particular, the Tweed Road Contribution Plan, Section 94 Plan No. 4, which is designed to enable the equitable collection of contributions towards upgrading of key road infrastructure to accommodate growth within the Tweed Heads sector. Again, the development proposal is consistent with these Plans.

Whilst there is no adopted Development Control Plan for Area E generally and Altitude Aspire in particular, this is beyond the control of the applicants because the Terranora Area E Landowners Group have funded the finalisation of the Draft Development Control Plan initially commenced by Council's Consultants, Parsons Brinkerhoff but not completed. That Draft Plan was submitted to Council in February 2008 and whilst it has not been completed and adopted to date, it is nevertheless sufficiently advanced to enable key strategic land use allocation, density and disposition issues to be addressed in a co-ordinated and integrated manner. The Altitude Aspire Project Application is generally consistent with the Draft Development Control Plan submitted to Council and where there are inconsistencies they are relatively minor and of no major planning consequence.

The Project Application is underpinned by a detailed investigation of the site's key opportunities and constraints as reflected in the Annexures to this Report. Those opportunities and constraints have informed the development layout and mitigation measures and in particular have enabled a commercially viable and sustainable project to be designed which will ultimately integrate with the permanent Broadwater Parkway road network when the corridor is finalised by Council and acquired.

In considering this Project it should be noted that the South Tweed Heads, West Banora Point Urban Release Area has largely been built out with the exception of a relatively small parcel west of Fraser Drive known as the Sullivan's land. Area E therefore is a key strategic release area to ensure that housing supply continues in an affordable manner to meet the ongoing demand arising from population growth within the Tweed Shire generally and the Tweed Heads sector in particular. In the event that further land is not made available to the market in a timely manner there are likely to be adverse impacts on the affordability of housing and the sustainability of the development and building industry in the Tweed Shire generally.

It is therefore concluded having regard to the foregoing Environmental Assessment that the project is generally consistent with relevant statutory planning controls, compliant with contemporary urban design standards and ESD principles and approval would therefore be sustainable and in the public interest.

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