

# Tweed Area E Local Environmental Study

March 2004

---

Tweed Shire Council

---



ENGINEERS  
AUSTRALIA  
Queensland Division

**Winner**  
Engineering  
Excellence Award  
Category: Project Management

**Highly Commended**  
Engineering  
Excellence Award  
Category: Project Management



**Winner**  
National and Queensland  
Case Earth Award  
Category: Environmental  
Excellence



Stormwater  
INDUSTRY ASSOCIATION INC.

**Highly Commended**  
Queensland Stormwater  
Industry Association  
State Award  
Category: Major WSUD Project  
>\$1.0 million



**Minister's Grand Prize**  
Healthy Waterways Awards  
Category: Industry Award

**Finalist**  
Healthy Waterways Awards  
Category: Industry Award



**Commendation**  
Public Domain Awards  
Category: Bridges



Parsons Brinckerhoff Australia Pty Limited ACN 078 004 798 and  
Parsons Brinckerhoff International (Australia) Pty Limited ACN 006 475 056  
trading as Parsons Brinckerhoff ABN 84 797 323 433

12th floor, IBM Centre  
348 Edward Street  
Brisbane Qld 4000  
GPO Box 2907  
Brisbane Qld 4001  
Australia  
Telephone +61 7 3218 2222  
Facsimile +61 7 3831 4223  
Email brisbane@pb.com.au

ABN 84 797 323 433  
NCSI Certified Quality System ISO 9001

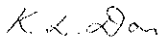
©Parsons Brinckerhoff Australia Pty Limited and Parsons Brinckerhoff International (Australia) Pty Limited trading as Parsons Brinckerhoff ("PB"). [2003]

Copyright in the drawings, information and data recorded in this document ("the information") is the property PB. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that for which it was supplied by PB. PB makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information.

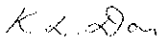
Author: Tim Carleton.....

Signed: 

Reviewer: Kerry Doss.....

Signed: 

Approved by: Kerry Doss.....

Signed: 

Date: 11 March 2004

Distribution: Tweed Shire Council

# Contents

|  | Page Number |
|--|-------------|
| <b>Executive Summary.....</b>                            | <b>X</b>    |
| <b>1. Introduction.....</b>                              | <b>1</b>    |
| 1.1 General  | 1           |
| 1.2 The Planning Framework                               | 2           |
| 1.3 Report structure and scope                           | 7           |
| 1.4 Consultation   | 7           |
| 1.5 Specialist technical advice                          | 10          |
| <b>2. Area E and its context.....</b>                    | <b>12</b>   |
| 2.1 Cadastral description                                | 12          |
| 2.2 Context  | 12          |
| 2.2.1 Shire Context                                      | 12          |
| 2.2.2 Local Context                                      | 12          |
| 2.3 Area E overview                                      | 17          |
| <b>3. Environmental and Social Considerations.....</b>   | <b>19</b>   |
| 3.1 Flora and fauna                                      | 19          |
| 3.1.1 Methodology  | 19          |
| 3.1.2 Findings   | 23          |
| 3.1.3 Discussion   | 33          |
| 3.1.4 State and Federal Legislative Considerations       | 44          |
| 3.1.5 Summary and Conclusions                            | 48          |
| 3.1.6 Recommendations                                    | 48          |
| 3.2 Landform and soils                                   | 49          |
| 3.2.1 Landform and Slope                                 | 49          |
| 3.2.2 Geology  | 52          |
| 3.2.3 Geological Stability                               | 53          |
| 3.2.4 Acid sulfate soils                                 | 54          |
| 3.2.5 Erosion and Sediment Control                       | 58          |
| 3.2.6 Earthworks   | 58          |
| 3.2.7 Summary and Conclusions                            | 61          |
| 3.2.8 Recommendations                                    | 61          |
| 3.3 Flooding, drainage and water quality characteristics | 62          |
| 3.3.1 Topography   | 62          |
| 3.3.2 Flooding   | 62          |
| 3.3.3 Water quality values and objectives                | 64          |
| 3.4 Stormwater management                                | 72          |
| 3.4.1 Adopted stormwater management objectives           | 72          |
| 3.4.2 Stormwater management issues                       | 73          |
| 3.4.3 Water quality                                      | 73          |
| 3.4.4 Water quantity                                     | 105         |
| 3.4.5 Hydraulics   | 115         |
| 3.4.6 Recommendations                                    | 124         |
| 3.5 Biting Insects                                       | 126         |
| 3.5.1 Summary and conclusion                             | 127         |
| 3.5.2 Recommendations                                    | 127         |
| 3.6 Contaminated Land                                    | 128         |
| 3.6.1 Potential Contaminants of Concern                  | 128         |
| 3.6.2 Septic Tank and Sewerage Systems                   | 128         |
| 3.6.3 Pesticides and Farm Chemicals                      | 129         |
| 3.6.4 Recent Report Review                               | 130         |
| 3.6.5 Waste Disposal                                     | 131         |
| 3.6.6 Groundwater  | 131         |

## Contents (continued)

Page Number

|        |   |     |
|--------|---|-----|
| 3.6.7  | <i>Contaminated Land Assessment</i>                     | 131 |
| 3.6.8  | <i>Summary and conclusion</i>                           | 133 |
| 3.6.9  | <i>Recommendations</i>                                  | 133 |
| 3.7    | <b>Heritage</b>   | 134 |
| 3.7.1  | <i>European heritage</i>                                | 134 |
| 3.7.2  | <i>Indigenous heritage</i>                              | 134 |
| 3.7.3  | <i>Summary and Conclusion</i>                           | 135 |
| 3.7.4  | <i>Recommendations</i>                                  | 135 |
| 3.8    | <b>Traffic and access</b>                               | 135 |
| 3.8.1  | <i>Key Issues</i>                                       | 135 |
| 3.8.2  | <i>Existing traffic and access conditions</i>           | 136 |
| 3.8.3  | <i>Future transport planning</i>                        | 143 |
| 3.8.4  | <i>Future proposed transport improvements</i>           | 149 |
| 3.8.5  | <i>Proposed development traffic</i>                     | 149 |
| 3.8.6  | <i>Intersection and Route Analysis</i>                  | 152 |
| 3.8.7  | <i>Internal Movement Networks</i>                       | 157 |
| 3.8.8  | <i>Conclusions</i>                                      | 160 |
| 3.9    | <b>Agricultural lands</b>                               | 162 |
| 3.9.1  | <i>Zoning</i>   | 163 |
| 3.9.2  | <i>North Coast Regional Environmental Plan</i>          | 163 |
| 3.9.3  | <i>TSC Strategic Plan (1996)</i>                        | 164 |
| 3.9.4  | <i>Farmland Protection (2003)</i>                       | 165 |
| 3.9.5  | <i>Agricultural Land Classes</i>                        | 165 |
| 3.9.6  | <i>Biophysical Limitations on the Agricultural Land</i> | 168 |
| 3.9.7  | <i>Land Use Trends</i>                                  | 169 |
| 3.9.8  | <i>Agricultural Land Use Conflicts</i>                  | 169 |
| 3.9.9  | <i>Farming Returns</i>                                  | 171 |
| 3.9.10 | <i>Sustainable Farming Indicators</i>                   | 172 |
| 3.9.11 | <i>Summary and Conclusions</i>                          | 174 |
| 3.9.12 | <i>Recommendations</i>                                  | 175 |
| 3.10   | <b>Bushfire hazard</b>                                  | 175 |
| 3.10.1 | <i>Summary and conclusion</i>                           | 175 |
| 3.10.2 | <i>Recommendations</i>                                  | 176 |
| 3.11   | <b>Visual environment</b>                               | 178 |
| 3.11.1 | <i>Summary and conclusion</i>                           | 180 |
| 3.11.2 | <i>Recommendations</i>                                  | 180 |
| 3.12   | <b>Urban Design</b>                                     | 182 |
| 3.12.1 | <i>Conclusions</i>                                      | 185 |
| 3.13   | <b>Recreation and open space</b>                        | 185 |
| 3.13.1 | <i>Existing open space</i>                              | 185 |
| 3.13.2 | <i>Additional open space requirements</i>               | 186 |
| 3.13.3 | <i>Summary and conclusion</i>                           | 187 |
| 3.13.4 | <i>Recommendations</i>                                  | 188 |
| 3.14   | <b>Services</b>   | 188 |
| 3.14.1 | <i>Water supply</i>                                     | 188 |
| 3.14.2 | <i>Sewerage</i>   | 189 |
| 3.14.3 | <i>Electricity</i>                                      | 193 |
| 3.14.4 | <i>Telecommunications</i>                               | 194 |
| 3.14.5 | <i>Summary and conclusions</i>                          | 195 |
| 3.14.6 | <i>Recommendations</i>                                  | 195 |
| 3.15   | <b>Social and Community Resources</b>                   | 196 |
| 3.15.1 | <i>Existing Social and Community Resources</i>          | 196 |
| 3.15.2 | <i>Required Social and Community Resources</i>          | 197 |
| 3.15.3 | <i>Summary and conclusion</i>                           | 199 |
| 3.15.4 | <i>Recommendations</i>                                  | 199 |

## Contents (continued)

Page Number

|           |  |            |
|-----------|--|------------|
| 3.16      | Impacts on Surrounding Land Use  | 200        |
| 3.16.1    | <i>Surrounding land Use</i>  | 200        |
| 3.16.2    | <i>Potential Impacts</i>   | 200        |
| <b>4.</b> | <b>Statutory and Policy Considerations .....</b>   | <b>204</b> |
| 4.1       | Tweed Residential Development Strategy 1991  | 204        |
| 4.2       | Tweed Shire 2000+ Strategic Plan   | 205        |
| 4.2.1     | <i>Desired Outcomes</i>  | 205        |
| 4.2.2     | <i>Shirewide Strategic Principles and Policies &amp; Actions</i>   | 205        |
| 4.2.3     | <i>Draft Interim Strategic Plan- Cobaki/ Bilambil Heights/ Terranora 1995</i>  | 207        |
| 4.3       | Tweed Futures – A Strategic Plan   | 207        |
| 4.4       | Tweed LEP 2000   | 208        |
| 4.4.1     | <i>Zoning Provisions</i>   | 208        |
| 4.4.2     | <i>Hazards and Buffers</i>   | 211        |
| 4.4.3     | <i>Development Control Plans</i>   | 212        |
| 4.5       | North Coast Regional Environmental Plan 2001   | 214        |
| 4.5.1     | <i>Part 2 Rural Development</i>  | 214        |
| 4.5.2     | <i>Part 3 Conservation and the Environment</i>   | 215        |
| 4.5.3     | <i>Part 4 Urban Development</i>  | 217        |
| 4.5.4     | <i>Part 5 Regional Infrastructure</i>  | 219        |
| 4.5.5     | <i>Part 6 Tourism and Recreation</i>   | 219        |
| 4.5.6     | <i>Miscellaneous</i>   | 219        |
| 4.6       | State Environmental Planning Policies  | 220        |
| 4.6.1     | <i>State Environmental Planning Policy No. 1 - Development Standards</i>   | 220        |
| 4.6.2     | <i>State Environmental Planning Policy No. 4 - Development Without Consent and Miscellaneous Complying Development</i> | 220        |
| 4.6.3     | <i>State Environmental Planning Policy No 5 - Housing for Older People or People with a Disability</i>                 | 220        |
| 4.6.4     | <i>State Environmental Planning Policy No 14 -Coastal Wetlands</i>   | 221        |
| 4.6.5     | <i>State Environmental Planning Policy No. 44 - Koala Habitat Protection</i>   | 221        |
| 4.6.6     | <i>State Environmental Planning Policy No.55 - Remediation of Land</i>   | 221        |
| 4.6.7     | <i>State Environmental Planning Policy No.71 - Coastal Protection</i>  | 221        |
| 4.7       | Section 117(2) Directions  | 223        |
| 4.7.1     | <i>G7 Existing General Provisions</i>  | 223        |
| 4.7.2     | <i>G9 Residential Zones</i>  | 223        |
| 4.7.3     | <i>G12 Environmental Protection</i>  | 223        |
| 4.7.4     | <i>G13 Corridors</i>   | 223        |
| 4.7.5     | <i>G21 Conservation of Environmental Heritage and Ecologically Significant Items and Areas</i>                         | 224        |
| 4.7.6     | <i>G25 Flood Liable Land</i>   | 224        |
| 4.7.7     | <i>G27 Planning for Bus Services</i>   | 224        |
| 4.7.8     | <i>S26 Coastal Policy</i>  | 224        |
| 4.7.9     | <i>Unnumbered Direction- Coastline Management Manual</i>   | 228        |
| 4.7.10    | <i>Circular 1 Acid Sulfate Soils</i>   | 228        |
| 4.8       | North Coast Urban Planning Strategy 1995   | 228        |
| <b>5.</b> | <b>Guiding principles for Ecologically Sustainable Development .....</b>   | <b>229</b> |
| 5.1       | Overview   | 229        |
| 5.2       | Environment Protection and Biodiversity Conservation Act 1999  | 230        |
| 5.3       | <i>Local Government Act 1993</i>   | 231        |
| 5.4       | Coastal Protection Act 1979 and the NSW Coastal Policy   | 231        |
| 5.5       | The Potential Development of Area E and implications for the principles of Ecologically Sustainable Development        | 232        |
| 5.5.1     | <i>Conservation of biological diversity and ecological integrity</i>   | 232        |

## Contents (continued)

Page Number

|           |   |            |
|-----------|---|------------|
| 5.5.2     | <i>Inter-generational equity</i>                            | 233        |
| 5.5.3     | <i>Improved valuation, pricing and incentive mechanisms</i> | 234        |
| 5.5.4     | <i>The precautionary principle</i>                          | 234        |
| <b>6.</b> | <b>Area E Land Use Analysis.....</b>                        | <b>235</b> |
| 6.1       | Land use opportunities                                      | 235        |
| 6.2       | Land use constraints  | 236        |
| 6.3       | Land Use Options  | 237        |
| 6.3.1     | <i>Option 1 – maintain current land use</i>                 | 237        |
| 6.3.2     | <i>Option 2 – urban development</i>                         | 238        |
| 6.4       | Recommendations   | 241        |
| 6.4.1     | <i>Environment and Open Space</i>                           | 241        |
| 6.4.2     | <i>Infrastructure</i>                                       | 242        |
| 6.4.3     | <i>Residential</i>  | 242        |
| 6.4.4     | <i>Commercial</i>   | 243        |
| 6.4.5     | <i>Staging of Development</i>                               | 243        |
| 6.4.6     | <i>Overall Land Budget</i>                                  | 243        |
| <b>7.</b> | <b>LEP Zoning Recommendations.....</b>                      | <b>244</b> |
| 7.1       | Environmental Protection                                    | 244        |
| 7.1.1     | <i>Wetland protection</i>                                   | 244        |
| 7.1.2     | <i>Scenic/escarpment and habitat protection</i>             | 245        |
| 7.1.3     | <i>Water quality</i>  | 245        |
| 7.1.4     | <i>Land adjoining waterbodies</i>                           | 245        |
| 7.1.5     | <i>Flooding</i>   | 246        |
| 7.1.6     | <i>Acid Sulfate Soils</i>                                   | 246        |
| 7.1.7     | <i>Transmission Line Corridors</i>                          | 246        |
| 7.1.8     | <i>Future road corridors</i>                                | 246        |
| 7.1.9     | <i>Contaminated land</i>                                    | 246        |
| 7.2       | Urban Development   | 246        |
| 7.3       | Conclusions   | 247        |
| <b>8.</b> | <b>References .....</b>                                     | <b>250</b> |

## Contents (continued)

Page Number

### List of Tables

|  |     |
|--|-----|
| Table 1-1: The Planning Framework.....   | 2   |
| Table 1-2: Summary of Issues Raised by State Agencies .....  | 7   |
| Table 3-1: NSW National Parks and Wildlife Atlas Database search results - fauna .....   | 28  |
| Table 3-2: NSW National Parks and Wildlife Atlas Database search results - flora .....   | 29  |
| Table 3-3: Department of Environment and Heritage Database Threatened Species<br>listed for the site .....                           | 30  |
| Table 3-4: Planning Classes for acid sulfate soils.....  | 55  |
| Table 3-5: Recommended river health goals and management responses .....   | 65  |
| Table 3-6: Adopted environmental values.....   | 67  |
| Table 3-7: Tweed River water quality objectives for estuaries .....  | 67  |
| Table 3-8: River flow objectives for the Tweed River .....   | 68  |
| Table 3-9: Tweed Shire Council interim water quality objectives for estuarine segments .....   | 69  |
| Table 3-10: Stormwater treatment objectives for post construction (operational) phase of<br>new development .....                    | 70  |
| Table 3-11: Adopted water quality objectives .....   | 72  |
| Table 3-12: Sub-catchment's Areas.....   | 76  |
| Table 3-13: Pre - rural pollutant loads and annual flow.....   | 77  |
| Table 3-14: Existing case – rural pollutant loads and annual flow.....   | 78  |
| Table 3-15: Developed unmitigated case – pollutant loads and annual flow .....   | 79  |
| Table 3-16: Required pollutant reductions .....  | 79  |
| Table 3-17: Developed mitigated case wetlands – pollutant loads and annual flow .....  | 79  |
| Table 3-18: Comparison of wetland case performance against TSC WQO .....   | 80  |
| Table 3-19: Wetland sizes .....  | 80  |
| Table 3-20: Grassed swale and bio-retention design parameters.....   | 81  |
| Table 3-21: Developed Mitigated Case WSUD – Pollutant Loads and Annual Flow .....  | 82  |
| Table 3-22: Household water use .....  | 83  |
| Table 3-23: Developed Mitigated Case WSUD with rainwater tanks – Pollutant Loads and<br>Annual Flow.....                             | 83  |
| Table 3-24: Developed Mitigated Case Treatment Train (Wetlands, WSUD with rainwater<br>tanks) – Pollutant Loads and Annual Flow..... | 84  |
| Table 3-25: Smaller Inlet pond wetlands – pollutant loads and annual flow .....  | 85  |
| Table 3-26: Cost estimate summary .....  | 86  |
| Table 3-27: Additional water quality objectives .....  | 87  |
| Table 3-28: Cumulative frequency statistics .....  | 101 |
| Table 3-29: Percentage impervious for land use categories .....  | 106 |
| Table 3-30: Pervious Manning's n .....   | 106 |
| Table 3-31: Detention basin details .....  | 112 |
| Table 3-32: Channel flow results – (1 hour storm duration) .....   | 114 |
| Table 3-33: Channel flow results – (24 hour storm duration) .....  | 115 |
| Table 3-34: Manning' "n" Values.....   | 117 |
| Table 3-35: Channel flows – developed.....   | 117 |
| Table 3-36: Q100 – base case HEC-RAS model results .....   | 118 |
| Table 3-37: High Manning's "n" HEC-RAS model results.....  | 120 |
| Table 3-38: Low Manning's "n" HEC-RAS model results .....  | 122 |
| Table 3-39: Recommendations and management actions.....  | 124 |
| Table 3-40: Analytical results from Wilkie Fleming and Associates (1995) & adjusted<br>guideline values.....                         | 129 |

**Contents** (continued)  
Page Number

|   |     |
|---|-----|
| Table 3-41: Midblock Capacity and ADT for connector routes between Area E and the Pacific Highway ..... | 141 |
| Table 3-42: Additional generated traffic to full development Area E .....                               | 151 |
| Table 3-43: Description of Agricultural Land Classifications .....                                      | 166 |
| Table 3-44: Agricultural Land Classes within Area E .....   | 167 |
| Table 3-45: Lindisfarne School Agricultural Land Classification.....                                    | 167 |
| Table 3-46: Rationalised Agricultural Land Class Area Summary.....                                      | 167 |
| Table 3-47: Comparison of Area E and Shire Agricultural Land Classes .....                              | 168 |
| Table 3-48: Value of Agricultural production in the Tweed Shire .....                                   | 171 |
| Table 3-49: Gross Margins for Zucchini and Sweet Potato.....  | 171 |
| Table 3-50: Summary of visual qualities of Area E .....   | 178 |
| Table 3-51: Tweed Shire Council Policy Documents .....  | 182 |
| Table 3-53: Shortlist Assessment of Demand for Community Services in Tweed' .....                       | 198 |
| Table 3-52: Summary of Section 94 Plans .....   | 199 |
| Table 4-1: Applicable Shirewide Strategic Principles and Policies and Actions.....                      | 206 |
| Table 4-2: Response to SEPP 71 Matters for Consideration .....  | 222 |
| Table 4-3: Strategic Actions Relevant to the Preparation of LEPs .....                                  | 225 |
| Table 7-1: Zoning Summary .....   | 248 |

**List of Figures**

|   |     |
|---|-----|
| Figure 1-1: Locality Plan .....   | 4   |
| Figure 1-2: Area E Study Area Boundaries .....  | 5   |
| Figure 1-3: Tweed Area E - Comprehensive Planning Framework .....   | 6   |
| Figure 2-1: Current Zoning (Source: Tweed LEP 2000).....  | 18  |
| Figure 3-1: Previous Study Areas .....  | 22  |
| Figure 3-2: Vegetation Communities.....   | 34  |
| Figure 3-3: SEPP 14 Wetlands No 23 .....  | 45  |
| Figure 3-4: Constraints map for environmental values .....  | 47  |
| Figure 3-5: Elevation Map (provided by McLauchlan Surveying).....   | 50  |
| Figure 3-6: Slope Analysis (provided by McLauchlan Surveying).....  | 51  |
| Figure 3-7: Geological Mapping for Area E. Trutes Bay generally depicted in centre of Figure. (Source: Tweed Heads 1:250,000 Geological Series Sheet SH 56-3 (1972))..... | 52  |
| Figure 3-8: Acid Sulfate Soils Planning Classes .....   | 60  |
| Figure 3-9: Terranora Area 'E' – Contour Plan.....  | 63  |
| Figure 3-10: Terranora Area "E" – Catchment Plan .....  | 75  |
| Figure 3-11: MUSIC model for the developed unmitigated case.....  | 78  |
| Figure 3-12: Development impact on daily flow frequency.....  | 100 |
| Figure 3-13: Development impact on Q 1 month flows .....  | 101 |
| Figure 3-14: Treatment train impact on daily frequency.....   | 102 |
| Figure 3-15: Environmental bypass cumulative frequency plot .....   | 103 |
| Figure 3-16: Conceptual wetland layout.....   | 104 |
| Figure 3-17: Original model layout.....   | 107 |
| Figure 3-18: Developed model layout .....   | 107 |
| Figure 3-19: Developed with mitigation model layout.....  | 108 |
| Figure 3-20: Junction 1 – peak flows .....  | 109 |
| Figure 3-21: Junction 2 – peak flows .....  | 109 |



**Contents** (continued)  
Page Number

|              |  |     |
|--------------|--|-----|
| Figure 3-22: | Junction 3 – peak flows .....  | 110 |
| Figure 3-23: | Junction 1 hydrograph .....  | 110 |
| Figure 3-24: | Junction 2 Hydrograph .....  | 111 |
| Figure 3-25: | Junction 3 hydrograph .....  | 111 |
| Figure 3-26: | Junction 1 hydrograph .....  | 112 |
| Figure 3-27: | Junction 2 hydrograph .....  | 113 |
| Figure 3-28: | Junction 3 hydrograph (1 hour storm duration).....   | 113 |
| Figure 3-29: | Junction 3 hydrograph (24 hour storm duration).....  | 114 |
| Figure 3-30: | HECRAS Layout.....   | 116 |
| Figure 3-31: | Saltmarsh mosquito habitat (Source: DCP 25, Tweed Shire Council,<br>1993).....                                       | 125 |
| Figure 3-32: | Potential contaminants sources and receptors .....   | 131 |
| Figure 3-33: | Area E route options.....  | 137 |
| Figure 3-34: | Area E study area and proposed Mahers Lane extension (Source:<br>Halliburton KBR, 2002).....                         | 138 |
| Figure 3-35: | Public transport, cycling and pedestrian networks .....  | 141 |
| Figure 3-36: | Mahers Lane- Fraser Drive Road Alignment Options (Source: Halliburton<br>KBR, 2002).....                             | 147 |
| Figure 3-37: | Agricultural Land Suitability Classes and Encroachment of Urban<br>Development (Source: NSW Agriculture, 1998) ..... | 165 |
| Figure 3-38: | Fire Hazard Rating .....   | 176 |
| Figure 3-39: | Visual analysis.....   | 180 |
| Figure 3-40: | Water Supply Infrastructure.....   | 190 |
| Figure 3-41: | Sewerage Infrastructure .....  | 191 |
| Figure 4-1:  | Zoning of Tweed Area E. (Source: Tweed Shire LEP 2000) .....   | 209 |
| Figure 6-1:  | Area E Constraints .....   | 239 |
| Figure 7-1:  | Proposed Zonings and associated provisions .....   | 248 |

**List of Photographs**

|                 |  |    |
|-----------------|--|----|
| Photograph 2-1: | View from northern end of Mahers Lane looking north-east across<br>SEPP 14 wetlands towards South Tweed Heads .....      | 14 |
| Photograph 2-2: | Lindisfarne School viewed from Terranora Road .....  | 14 |
| Photograph 2-3: | Small crop areas still under production viewed from Fraser Drive<br>looking North-west across Terranora Broadwater ..... | 15 |
| Photograph 2-4: | View across SEPP 14 Wetlands and Trutes Bay to Flametree Park .....  | 15 |
| Photograph 2-5: | Typical view of disused farm land found across site.....   | 16 |
| Photograph 2-6: | View from Fraser Drive across SEPP 14 Wetland to Terranora<br>Broadwater .....   | 16 |
| Photograph 3-1: | Lowland Rainforest showing Macadamia tetraphylla in right hand<br>corner of photo.....                                   | 35 |
| Photograph 3-2: | Piccabeen Palm Forest.....   | 35 |
| Photograph 3-3: | Camphor Laurel dominated habitat.....  | 37 |
| Photograph 3-4: | Macadamia tetraphylla along camphor laurel dominated creek line .....  | 37 |
| Photograph 3-5: | Eucalyptus Tereticornis.....   | 39 |
| Photograph 3-6: | Brushbox Open Forest.....  | 39 |
| Photograph 3-7: | Cleared Areas .....  | 40 |
| Photograph 3-8: | View north across open grazing land, note jacana habitat associated<br>with habitat in the foreground.....               | 40 |

**Contents** (continued)  
Page Number**List of Appendices**

|            |  |
|------------|--|
| Appendix A | Section 62 and 34A of the Environmental Planning & Assessment Act 1979 -<br>Correspondence from State Agencies |
| Appendix B | Property Ownership at October 2002   |
| Appendix C | Compiled flora and fauna species listings  |
| Appendix D | Field Fauna List   |
| Appendix E | Soil Surveys Stability Map (Drawing Number 29400419004A December 1994  |
| Appendix F | Pollution Reduction Efficiencies for Different Stormwater Best Management Practices                            |
| Appendix G | Discussions with Service Providers   |
| Appendix H | Detailed Land Budget Calculations  |
| Appendix I | Draft amendment to Tweed Local Environmental Plan 2000   |

## *Executive Summary*

On 19 July 2000, Tweed Shire Council resolved to prepare a draft Local Environmental Plan (LEP) and Local Environmental Study (LES) under Section 54 of the *Environmental Planning and Assessment Act 1979*, for land identified in Tweed Shire's Residential Development Strategy as Area E. Parsons Brinckerhoff Australia Pty Ltd has been engaged by Council to prepare the aforementioned statutory instruments for Area E. The purpose of the LES is to assess the site for opportunities, constraints, strengths and weaknesses, both statutory and 'on-site', for release as urban development.

Area E is identified in the Tweed Residential Development Strategy 1991 (p. 45) as a logical extension for urban development in the Shire. The site is located adjacent to the rapidly growing locality of Banora Point and is generally bounded by Mahers Lane, Terranora Road and Fraser Drive. Area E is comprised of fifty-seven allotments in seven agglomerated property holdings and thirty-three allotments in individual ownership. Under the Tweed LEP 2000, the site is zoned:

- 1(b1) Agricultural Protection (predominant zoning);
- 5(a) Special Uses (Lindisfarne Anglican Secondary School only); and
- 7(a) Environmental Protection (wetlands and littoral rainforests).

The then Department of Urban Affairs and Planning (DUAP) (now the Department of Infrastructure, Planning and Natural Resources (DIPNR)) advised that the Local Environmental Study for Area E would be required to have regard for:

- The need for consultation with, and agreement from, NSW Agriculture if the land is to be released. DUAP notes that Area E is one of few areas in the Shire zoned 1(b1), being a scarce natural resource.
- Policy 18 (Agriculture) of the Tweed Shire Strategic Plan 2000+, being "include prime crop and pasture land... in an Agricultural Protection Zone to ensure the economic base of Tweed's agricultural industry is maintained.
- A provision of the Terranora Strategic Interim Planning Statement being "to retain the integrity of remaining prime agricultural land".

This LES has been prepared in accordance with the Environmental Planning and Assessment Act 1979 and the requirements of Tweed Shire Council's Consultant Brief.

Area E has a number of development constraints and opportunities which are outlined within this report. The most significant of these are as follows:

- The site is a logical infill site bounded on two sides by existing urban development. It is also located in close proximity to services provided by Tweed Heads.
- The site can be readily serviced with most infrastructure required for an urban area and its development has been planned for a considerable period of time.
- Development of this area will limit pressure on uncoordinated development in other parts of the Shire.
- A number of environmental assets will require conservation and protection within any land-use options chosen for Area E. Buffers and rehabilitation strategies will be implemented for areas that are considered as containing high environmental values, including the wetlands area.

- Traffic generation of the fully developed Area E proposal was estimated to be 16,000 daily trips and 1,500 trips in the peak hour. There are currently four possible access routes between Area E and activity centres to the north-east, which include Terranora Road, Frazer Drive and Leisure Drive, Fraser Drive, Dry Dock Road and Frazer Drive, Leisure Drive and Greenway Drive. Analysis of existing mid-block traffic volumes on these access routes showed these routes would not have sufficient mid-block capacity to accommodate anticipated future traffic volumes resulting from the development of Area E and that road upgradings would be required. Tweed Shire Council is currently planning for these upgrades.
- The water supply, sewage, electricity and telecommunications infrastructure will require upgrading to service the proposed development of Area E. This will include:
  - ▶ The existing 600mm Duroby main will be used to supply water to Area E, along with the development of a pipeline on-site connecting the proposed 3ML reservoir with the 600mm Duroby main. Given the low lying land within Area E, a booster pump from the Duroby main to the reservoir is also recommended.
  - ▶ A new regional sewage pump station and rising main is proposed for servicing Area E when fully developed.
  - ▶ A 66,000 volt electricity transmission corridor will run through the area.
  - ▶ Future telecommunication services will be dependant on the planning outcomes for the site which are yet to be delineated, including residential lot yield.
- Social and community infrastructure and resources that are not present in Area E, may be required for the future development of the site. The existing infrastructure and resources for the site will be required to be augmented to adequately service the anticipated population growth for Area E.
- There are significant hydrology, flooding and drainage constraints for the development of Area E, including runoff from the site contributing to the silting of the mud basin in Terranora Broadwater. Furthermore, the area is identified as an area that may potentially generate acid runoff and nutrient problems as a result of development.
- The sections of the site that are considered as being unsuitable for development, due to geotechnical constraints, are recommended to be used for the purpose of stormwater quality treatment. Due to the soil components (silty and sandy clays) promoting an increase of fine material in stormwater runoff, larger sedimentation areas are advised to resolve this issue. The existing flow paths that are currently utilised for stormwater management should be retained and rehabilitated through the removal of weeds and the subsequent planting of native grass species to ensure adequate sediment and pollutant filtration.
- The rehabilitation of the wetlands area to return it largely to a freshwater regime will eliminate potential breeding habitat for salt marsh mosquitoes. The freshwater mosquito species have a substantially limited range of nuisance. In addition, this action would also ensure that the areas identified as potential acid sulfate soils (PASS) and acid sulfate soils (ASS) remains inundated, limiting potential ASS discharge events.
- As it is unlikely that any change in land use will be supported until the investigations to the appropriate guidelines have been completed for contaminated land, further assessment of point sources and broad acre soil contamination needs to be carried

out, as current data at hand indicates site contamination is present, and there is further potential for site contamination.

- Further details of the constraints and subsequent management strategies are outlined within this report.
- The proposed land uses within Area E will be apportioned as outlined below:
- The provision of trunk (or major/primary) infrastructure will be required to service both Area E and surrounding uses:
  - ▶ Mahers Lane - Terranora Road extension, which will be a minimum of 50 m from the extent of any wetland area (to facilitate wetland conservation);
  - ▶ both electricity transmission corridors (subject to Clause 37 of the LEP) identified in constraints mapping, including a buffer (in plan) of at least 20m (total width) to facilitate operational and occupational health and safety (the linear buffer would be able to be utilised for passive recreation and would provide connection to local and district level parks);
  - ▶ a 3ML water reservoir of 30m diameter that requires approximately 0.3ha of site areas; and
  - ▶ protection of existing sewer mains traversing the site and new corridors for such infrastructure.
- With the residual land area balance equalling 205.6ha, excluding the development constraints, and a nominal 25% of this area being allocated to infrastructure the following approximate land use distribution is envisaged:
  - ▶ 130.45 ha being utilised for residential development at varying lot densities;
  - ▶ 16 ha being utilised for open space (as identified previously);
  - ▶ 15.15 ha being utilised for educational purposes;
  - ▶ 1,000 m<sup>2</sup> being utilised for a local commercial centre; and
  - ▶ 1,000 m<sup>2</sup> being utilised for local community purposes infrastructure.

It is concluded that the proposed rezoning of Area E is appropriate and that recommendations for mitigating potential impacts outlined within this report are adopted.

# 1. Introduction

## 1.1 General

On 19 July 2000, Tweed Shire Council resolved to prepare a draft Local Environmental Plan (LEP) and Local Environmental Study (LES) under Section 54 of the *Environmental Planning and Assessment Act 1979*, for land identified in the Tweed Residential Development Strategy (1991) as Area E.

Area E is identified in the Tweed Residential Development Strategy 1991 (p. 45) as a logical extension for urban development in the Shire. The site is located adjacent to the rapidly growing locality of Banora Point and is land generally bounded by Mahers Lane, Terranora Road and Fraser Drive (see Figures 1.1 and 1.2). Area E is comprised of fifty-seven allotments in seven agglomerated property holdings and thirty-three allotments in individual ownership.

On 11 August 2000, Council advised the then Department of Urban Affairs and Planning (DUAP) (now the Department of Infrastructure, Planning and Natural resources (DIPNR)) of their intention to prepare the amendments to the LEP for Area E. DUAP in response, confirmed on 10 October 2000 that a Local Environmental Study would be required for Area E, having regard to:

- the need for consultation with, and agreement from, NSW Agriculture if the land is to be released. DUAP notes that Area E is one of few areas in the Shire zoned 1(b1), being a scarce natural resource;
- Policy 18 (Agriculture) of the Tweed Shire Strategic Plan 2000+, being "include prime crop and pasture land... in an Agricultural Protection Zone to ensure the economic base of Tweed's agricultural industry is maintained"; and
- a provision of the Terranora Strategic Interim Planning Statement being "to retain the integrity of remaining prime agricultural land".

Tweed Shire Council subsequently prepared a Consultant Brief around 23 August 2002 for the preparation of the draft LEP, LES, associated Section 94 plans and Development Control Plans.

Parsons Brinckerhoff (PB) was engaged by Council in March 2003 to prepare the aforementioned statutory instruments for Area E. The purpose of the LES is to assess the site for opportunities, constraints, strengths and weaknesses, both statutory and 'on-site', for release as urban development.

This LES has been prepared in accordance with the Environmental Planning and Assessment Act 1979 and the requirements of Tweed Shire Council's Consultant Brief.

In considering this LES, it is important to note that it has been established in the Land and Environment Court (Burns Philp Trustee Company and Ors v Council of the City of Wollongong and Ors) that an Environmental Study cannot be prepared by an applicant. Rather, such a study must be prepared by, or on behalf of, Council.

## 1.2 The Planning Framework

Tweed Shire Council's commission to Parsons Brinckerhoff was to establish a comprehensive planning framework for Area E. This framework requires the preparation of planning documents with ever increasing levels of detail to ensure that development across Area E is coordinated and that all issues are dealt with in an integrated manner.

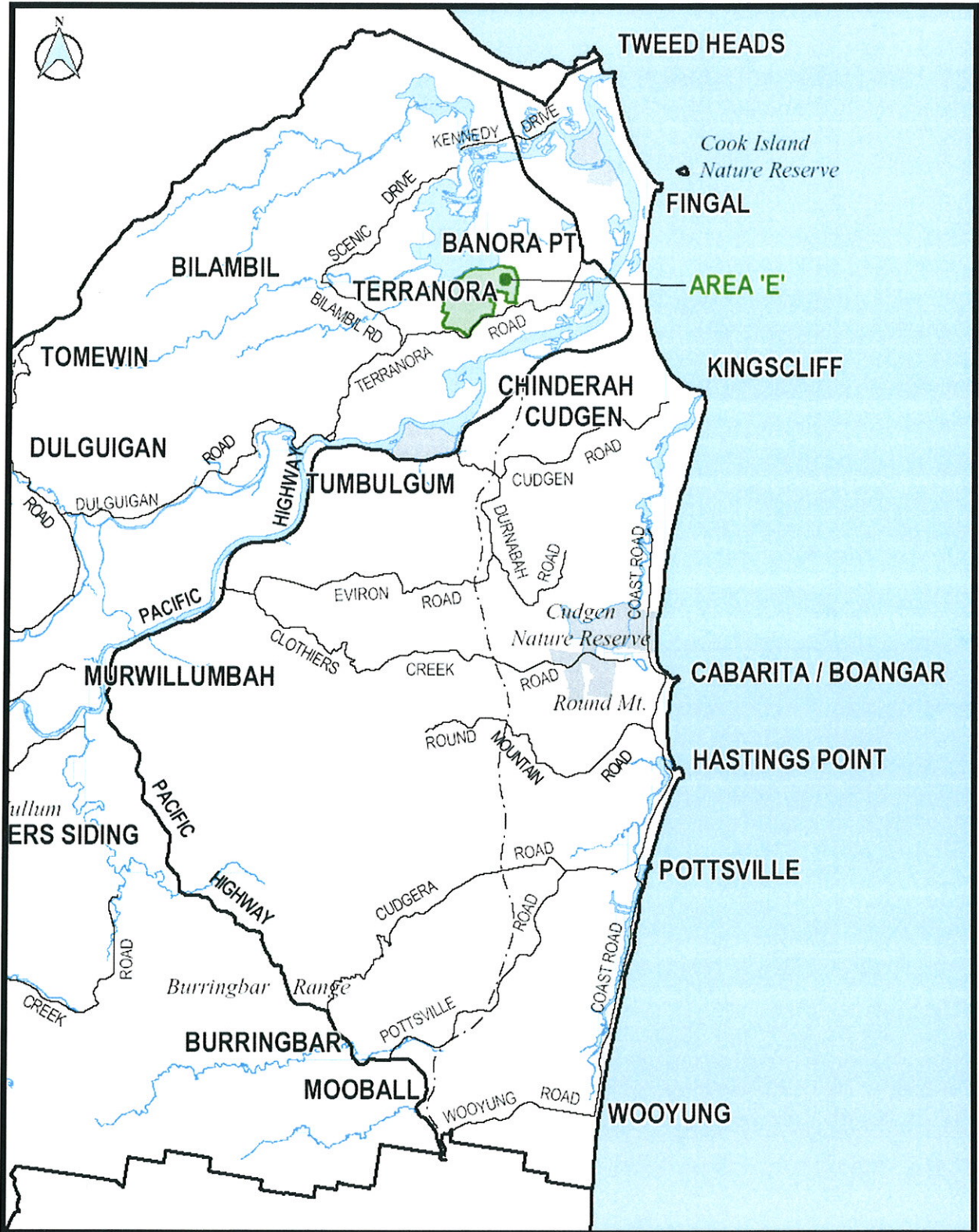
The following table identifies this framework and briefly describes the role of each level in the framework.

**Table 1-1: The Planning Framework**

| Component |  | Content and Purpose   |
|-----------|--|---|
| 1         | Local Environmental Study (LES – this study) | <p>Addresses major planning matters and issues of relevance to the potential rezoning of Area E. Identifies and addresses:</p> <ul style="list-style-type: none"> <li>▪ values and characteristics of site;</li> <li>▪ general planning requirements;</li> <li>▪ requirements of State Government agencies;</li> <li>▪ impacts on and off-site;</li> <li>▪ services required;</li> <li>▪ impact control measures;</li> <li>▪ recommendations for overall land uses; and</li> <li>▪ recommended zonings and controls for inclusion in the Tweed Local Environmental Plan 2000.</li> </ul> <p>The LES also provides recommendations for more detailed assessment /studies and requirements to be included in further stages of the planning framework</p> |
| 2         | Local Environmental Plan (LEP) Amendment     | <p>The Local Environmental Plan Amendment is an outcome of the LES.</p> <p>It is a statutory amendment to the Tweed Local environmental Plan 2000 to include rezoning of land and specific provisions required to control future development.</p> <p>The LES and LEP are advertised at the same time and submissions are called for.</p> <p>The LEP amendment is finalised following consideration of all submissions and finally approved by State Government when all issues have been satisfactorily addressed.</p>  |
| 3         | Structure Plan                               | <p>Follows on from the LEP amendment.</p> <p>The structure plan is an overall framework for coordinated development of the area. It will be developed based on principles outlined in the LES, current Tweed Shire Council planning policies and contemporary planning/urban design theory.</p> <p>The structure plan will identify:</p>  |

|   | Component                      | Content and Purpose  |
|---|--------------------------------|--|
|   |                                | <ul style="list-style-type: none"> <li>▪ the overall road network;</li> <li>▪ locations for specific uses;</li> <li>▪ open space;</li> <li>▪ environmental areas;</li> <li>▪ general design requirements; and</li> <li>▪ other relevant matters</li> </ul>   |
| 4 | Development Control Plan (DCP) | <p>The DCP is a legal document which will encapsulate the specific design and development requirements for Area E. Development will only be allowed to occur once the DCP has been finalised.</p> <p>The DCP will be based on the structure plan and any specific requirements of the LES. The DCP will be used to assess future development applications for the site and developers must adhere to its requirements. The DCP will also work in conjunction with other more general DCPs that apply across the shire. The DCP must be advertised and any comments taken into account before it is adopted by Council.</p> |
| 5 | Section 94 Plans               | <p>Area E will require specific drainage, open space, roads and other facilities and infrastructure to ensure that it can develop in a manner which protects the environment and meets the needs of the community. Section 94 of the NSW Environmental Planning and Assessment Act 1979 allows Council to develop plans to allow developer contributions to be collected to fund these facilities and infrastructure.</p>  |





**Figure 1-1: Locality Plan**





**Figure 1-2: Area E Study Area Boundaries**



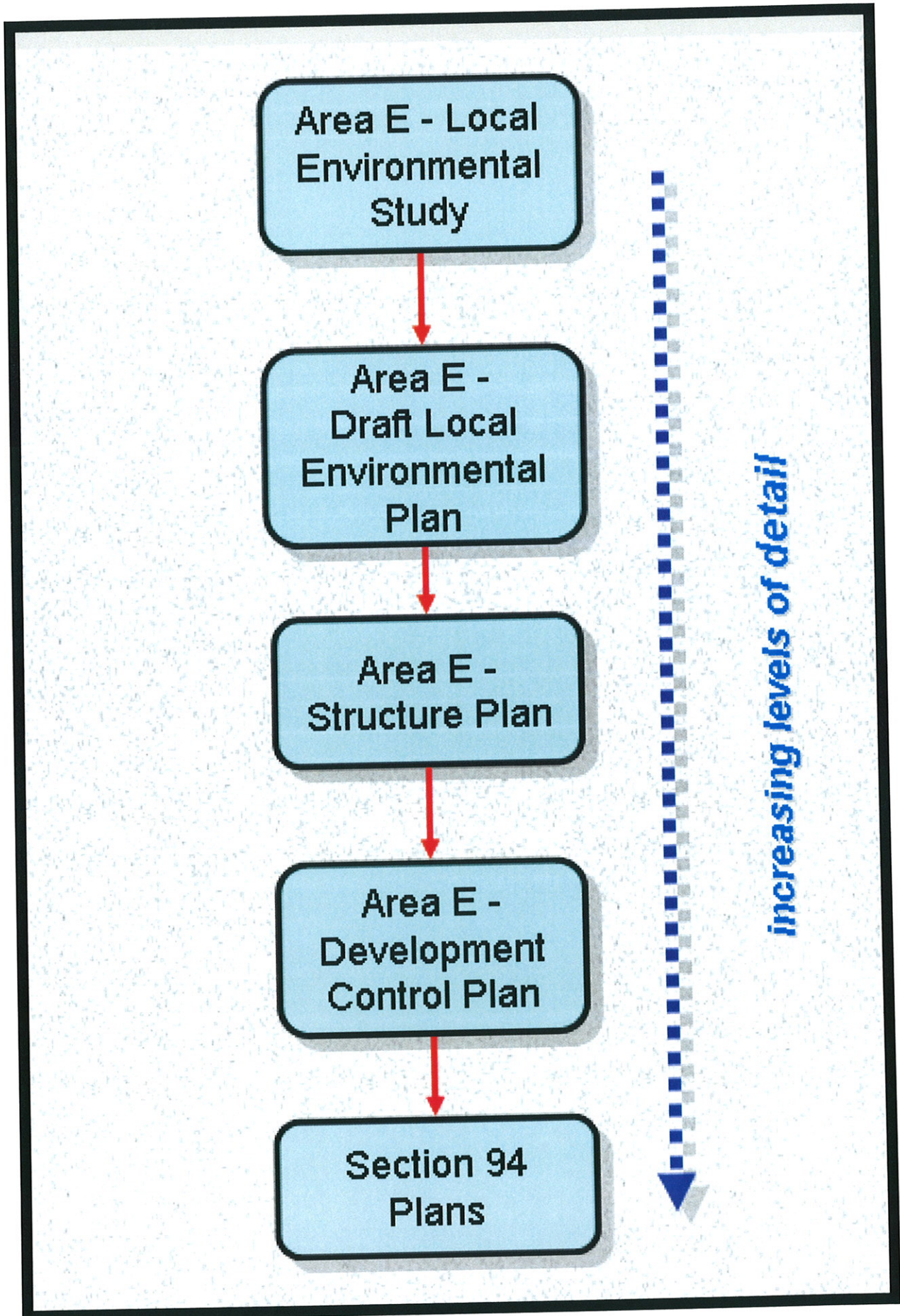


Figure 1-3: Tweed Area E - Comprehensive Planning Framework

## 1.3 Report structure and scope

Following is a brief synopsis of the LES Sections, Appendices and their contents:

- Section 2 provides a description of the cadastral information, context and land uses within Area E.
- Section 3 outlines the environmental and social considerations pertaining to Area E, detailing issues such as landform, soil contamination, environmental heritage, traffic and access and bushfire hazard.
- Section 4 summarises the statutory and policy planning implications for Area E, identifying statutory requirements and considerations for urban land release.
- Section 5 examines the issue of ecologically sustainable development with respect to the potential development of Area E.
- Section 6 provides an outline of the broad land use options available for the development of Area E. This is based on analysis of the identified development opportunities and constraints contained in the previous LES sections.
- Section 7 identifies the requirements for the development of a Local Environmental Plan (LEP) for Area E.

## 1.4 Consultation

As required by Section 62 and 34A of the Environmental Planning & Assessment Act 1979, Tweed Shire Council consulted with public authorities prior to the commencement of this study. The authorities consulted and a summary of the issues raised is set out in Table 1.2.

Responses received are contained in Appendix A.

**Table 1-2: Summary of Issues Raised by State Agencies**

| Authority & Response Date |   | Issues Summary  | LES Section Addressing Issue |
|---------------------------|---|---|------------------------------|
| 1                         | Department of Urban Affairs and Planning<br>10 October 2000 | The LES should address the value of Area E for agriculture, having regard to Policy 18 on page 22, Tweed Shire Strategic Plan 2000+.  | Section 3.9                  |
|                           |   | Highlighted the need to consult with NSW Agriculture, with their agreement on its release being a pre-requisite to any rezoning.  | Section 3.9                  |
|                           |   | Note that an objective of the Terranora Strategic Planning Interim Statement "is to retain the integrity of remaining prime agricultural land".   | Section 3.9                  |
| 2                         | EPA<br>4 March 2002   | Demonstrate how inter-generational equity is to be delivered, regarding the ongoing and precautionary provision of opportunities for agricultural enterprise in Area E.   | Sections 3 and 5.5           |
|                           |   | Examine and address interface conflicts between existing residential development and a consolidated and reinforced agricultural protection zone.  | Section 3.9                  |
|                           |   | Demonstrate how stormwater will be managed (including areas to be rezoned) in accordance with the objectives of Council's Stormwater Management Plan.   | Sections 3.1, 3.3 and 3.4    |
|                           |   | Provision of buffers adjacent to SEPP 14 wetlands is generally the only practical option for ensuring long-term integrity; clearly outline spatially a buffer width appropriate to protect the SEPP 14 wetland. | Section 3.1                  |

| Authority & Response Date                                     | Issues Summary  | LES Section Addressing Issue |
|---|---|------------------------------|
|   | "Any rezoning of Area E should not occur until the Banora Point Sewage Treatment Plant is augmented to a capacity of 75,000 EP or an alternative method of effluent disposal is approved" (p. 85 Draft Interim Strategic Plan Cobaki/Bilambil Heights /Terranora). The actual current capacity is 50,000 EP based on UV Disinfection. | Section 3.14                 |
|   | Contamination may have arisen on lands used for intensive horticulture and market gardening from the use of agricultural chemicals. Examine the likelihood, extent and nature of contamination and potential for remediation consistent with SEPP 55  | Section 3.6                  |
|   | Evaluate potential layout design arrangements as they relate to "Environmental Criteria for Road Traffic Noise 1999". Demonstrate the efficacy of options for addressing conflicts with the Criteria should it be determined that conflicts are likely.   | Section 3.8                  |
| 3 Department of Land & Water Conservation<br>27 February 2002 | Applications will be required to close Crown Public Roads within the site if they are going to be impacted by future development.   | Noted                        |
|   | Potential impacts on quality, quantity and supply of groundwater and surface water.   | Sections 3.3 and 3.4         |
|   | Potential impacts on riparian land and the bed and banks of Terranora Broadwater.   | Sections 3.1, 3.3 and 3.4    |
|   | Potential impacts on SEPP 14 wetlands and mitigation and protection measures for same.  | Section 3.1, 3.3 and 3.4     |
|   | Potential impacts on native vegetation.   | Section 3.1                  |
|   | Stormwater and wastewater management and disposal, including reuse options.   | Section 3.3 and 3.4          |
|   | Land capability assessment including identification of constraints.   | Section 3                    |
|   | Acid Sulphate Soil management.  | Section 3.2                  |
|   | Erosion and sediment control is important in view of the steep nature of the lands.   | Section 3.3 and 3.4          |
|   | There is a need for a license under the Water Act 1912 if structures will intercept groundwater.  | Noted                        |
|   | Opportunities for environmental repair and enhancement.   | Sections 3.1,3.3 and 3.4     |
|   | The need for bushfire hazard management.  | Section 3.10                 |
|   | The need for buffers to environmentally sensitive lands and agricultural lands.   | Section 3.1, 3.5 and 3.9     |
| 4 NSW National Parks and Wildlife Service<br>9 April 2002     | Consider the range of landscape values which appear to be inherent within Area E.   | Section 3.11                 |
|   | Part of Area E is identified as SEPP 14 wetlands, located adjacent to Terranora Broadwater, and considered environmentally sensitive.   | Section 3.1, 3.3 and 3.4     |
|   | Consider the consequences of determinations that would result in a loss of agricultural resources, consistent with ESD principles.  | Section 3.9                  |
|   | Identify areas of significance for native flora and fauna, with reference to the value of habitat for threatened plant and animal species (e.g. Mitchell's rainforest snail), populations or ecological communities and their habitats.   | Section 3.1                  |
|   | Identify the local and regional significance of the vegetation and habitat on site, including core habitat areas, and links to other habitat areas.   | Section 3.1                  |

| Authority & Response Date |   | Issues Summary   | LES Section Addressing Issue |
|---------------------------|---|--|------------------------------|
|                           |   | Areas within and surrounding Area E have been identified as coastal wetland, subject to SEPP 14, and should be zoned Environment Protection.   | Section 3.1                  |
|                           |   | Address in detail the potential impact of the proposed rezoning on SEPP 14 wetlands, including drainage of the subject site, and any potential clearance of vegetation.  | Section 3.1, 3.3 and 3.4     |
|                           |   | The potential impact on Aboriginal heritage values and an assessment of the archaeological and cultural sensitivity of the subject land, through consideration of:<br>Vegetation types;<br>Previous land use;<br>Degree of disturbance;<br>Topography;<br>Context;<br>Distribution/ types of known aboriginal sites in the local area; and<br>Consultation with the Local Aboriginal Land Council.   | Section 3.7                  |
|                           |   | The proposal does not incorporate the conservation values of the site or surrounding area.   | Section 3.1                  |
| 5                         | NSW Department of Public Works and Services<br>14 February 2002 | NSW Department of Public Works and Services advised that they no longer have any statutory role under Section 62 of the EP&A Act 1979, and as such can make no comment on the Draft LEP.   | Noted                        |
| 6                         | RTA<br>2 April 2002   | Include a traffic study to determine the impact of the additional volume of traffic generated by development of Area E, on the surrounding road network, particularly Terranora Road and the Pacific Highway.  | Section 3.8                  |
| 7                         | NSW Fisheries<br>28 March 2002                                  | Examine and demonstrate how the impacts on aquatic biodiversity issues can be minimised to ensure compliance with habitat provisions in the Fisheries Management Act 1994, and associated policies. Issues include: <ul style="list-style-type: none"> <li>▪ identification of threatened species likely to occur in the area or be affected by the proposal;</li> <li>▪ how damage to marine vegetation and other fish habitats will be minimised;</li> <li>▪ whether dredging, reclamation or activities that obstruct fish habitat are proposed and if so, how impacts will be minimised;</li> <li>▪ the size and location of buffer zones; and</li> <li>▪ opportunities for compensatory habitat.</li> </ul> | Section 3.1, 3.3 and 3.4     |
| 8                         | NSW Department of Mineral Resources<br>27 February 2002         | The impact of the proposal upon known or potential mineral or extractive resources.  | Section 3.2                  |
|                           |   | Address the need for continued use of local roads by extractive industry haulage vehicles to and from existing extraction sites in the area.   | Section 3.8                  |
|                           |   | If major earthworks are to be carried out, consideration should be given to making any extracted materials available to the local construction materials industry.   | Noted                        |
| 9                         | NSW Agriculture<br>4 March 2002                                 | Strategic planning context of the locality and any proposed change in land use.  | Section 3.9                  |
|                           |   | Social/community attitudes and aspirations as to future land uses.   | Section 3.9                  |
|                           |   | The legislative and planning framework that applies to future development of the site.   | Sections 3.9 and 4           |



| Authority & Response Date                   | Issues Summary  | LES Section Addressing Issue |
|---|---|------------------------------|
|   | The quality of the subject agricultural lands and their values.   | Section 3.9                  |
|   | Present agricultural uses of the subject (site) and individual allotments involved.   | Section 3.9                  |
|   | The value of the agricultural production and local food production from these lands including direct and indirect values and employment.  | Section 3.9                  |
|   | Rural/urban interface issues - existing and potential issues for mitigating conflicts.  | Section 3.9                  |
|   | Suitability of the locality for urban development.  | Section 3                    |
|   | Use and management of areas not suitable for urban development.   | Sections 3 and 6             |
| 10 Coastal Council of NSW<br>3 October 2002 | Consider Area E within the context of ESD for the region as specified in the NSW Coastal Policy 1997 (p. 25)  | Sections 4 and 5             |
|   | Planning for the future use of the Area E landscape should be considered in terms of the variety of its current form and what this diversity supplies to the region, and will offer future generations. | Sections 3.11, 4 and 5       |
|   | Consider the diverse landscape within the context of NSW Government policy (NSW Coastal Policy 1997).   |                              |

## 1.5 Specialist technical advice

To adequately address issues outlined in Council's study brief, Parsons Brinckerhoff engaged three sub consultants to provide specialist technical advice, in varying capacities, for the duration of the study. These sub consultants are:

- Bob Smith (Resource and Environmental Consultant specialising in coastal agriculture and rural planning issues);
- Darryl Anderson (a local planning consultant with strong knowledge of the study area and technical applications of the Environmental Planning and Assessment Act 1979);
- Woods Bagot (a multi-disciplinary international design company providing architectural, urban design, planning and landscape architecture services nationally, and in South East Asia); and
- JBS Environmental (an accredited contaminated land Auditor provided advice in respect of contaminated land issues).

The role of the above three sub consultants is to provide specialist technical advice for the LES and other study components as required. More specifically this entails:

- Bob Smith has been engaged to investigate issues pertaining to the agricultural lands on-site, including:
  - ascertaining current policy and expectations for agriculture in the area;
  - verifying with Statutory Agencies the current position and outstanding matters to be addressed regarding a change of land use from agriculture to urban; and
  - assessing any potential conflicts between the proposed amendments to the LEP and adjoining prime agricultural land.
- Darryl Anderson of Darryl Anderson Consulting has been engaged to provide advice on technical matters and planning issues affecting Area E, including the application of technical intricacies of the Environmental Planning and Assessment Act 1979 with

respect to not only the LES but subsequent statutory instruments being prepared for the study. This advice has not extended to land use allocations.

- Woods Bagot have been engaged to provide input on contemporary urban design and ESD principles into the development of the Structure Plan and Development Control Plans to be prepared in subsequent study phases. These principles will result in practical, realistic and achievable guidelines and planning controls, which the community and development industry can easily implement, and that are aligned to market realities, local conditions, needs and priorities.
- JBS Environmental were engaged to provide independent specialist advice on contaminated land issues and compliance with NSW legislative requirements.



## **2. Area E and its context**

### **2.1 Cadastral description**

As previously depicted in Figures 1.1 and 1.2, is generally bounded by Mahers Lane, Terranora Road, Fraser Drive and the Terranora Broadwater (Trutes Bay), Terranora. Area E is approximately 297 ha in area and comprises fifty-seven cadastral allotments in seven agglomerated property holdings and thirty-three allotments in individual ownership.

A property ownership cadastral plan, as at 21 August 2002, has been included in Appendix B.

For the purpose of the LES and Study all individual property owners and tenures within Area E will be treated as a single land parcel. This allows for an overall assessment of issues affecting Area E and an integrated and holistic planning approach for future development options for Area E.

### **2.2 Context**

#### **2.2.1 Shire Context**

Tweed Shire has undergone significant growth through the 1980s and 1990s, and this growth has continued into this century. This growth has accelerated in recent years with influences such as the upgrading of the Pacific Motorway from Brisbane, completion of the Tweed Coast Motorway and the 'sea change' phenomenon making the Tweed an attractive living and tourism alternative. Council's recent embarkation of a new strategic planning exercise, 'Tweed Futures' is tacit recognition that the Tweed will continue to grow and there is a desire for Council to ensure this growth is effectively managed, rather than a reactionary approach.

Area E sits as an infill area in the Banora Point/Terranora growth area which since the 1980s has been the major growth area for the Shire. The infill area presents an opportunity to consolidate the urban footprint and is able to be readily serviced. It provides a potential development area to accommodate future growth in a rational and coordinated manner. The development potential of this site has led to Tweed Shire identifying Area E as an area that may accommodate growth in the Shire's Residential Development Strategy (Tweed Shire Council, 1997).

One significant value of Area E is the fact that it has historically been one of the two major small crop areas in the Shire and as such, is an important resource. The value of this resource to the Shire is addressed in this study.

#### **2.2.2 Local Context**

Area E is located west of Tweed Heads and at the northernmost point of Terranora. In the greater region, Area E is located approximately 7km south-west of Coolangatta Airport, approximately 7km south-west of Tweed Heads District Hospital and approximately 5km southwest of the Tweed City Shopping Centre at Tweed Heads South.

The northern perimeter of Area E is bounded by a tract of wetland vegetation fringing Terranora Broadwater. The Broadwater is a significant aquatic habitat and is currently used for oyster farming. Trutes Bay separates Area E from the residential development of Flame Tree Park, on its general northern and eastern banks.

To the east and in the vicinity of Fraser Drive, Area E is bordered by the low-density residential development of Banora Point. This development typically ceases at the Terranora Road ridgeline

Mahers Lane is located on a north-south oriented ridgeline, in the general vicinity of the western periphery of Area E. West and south west of Mahers Lane is the greater residential development of Terranora, in the form of sewered low-density residential allotments (Terranora Village) and unsewered rural residential allotments. Infrastructure in the vicinity of this residential area includes the Terranora Primary School (opposite northern termination of Shamara Road) and Terranora Substation (opposite southern termination of Mahers Lane).

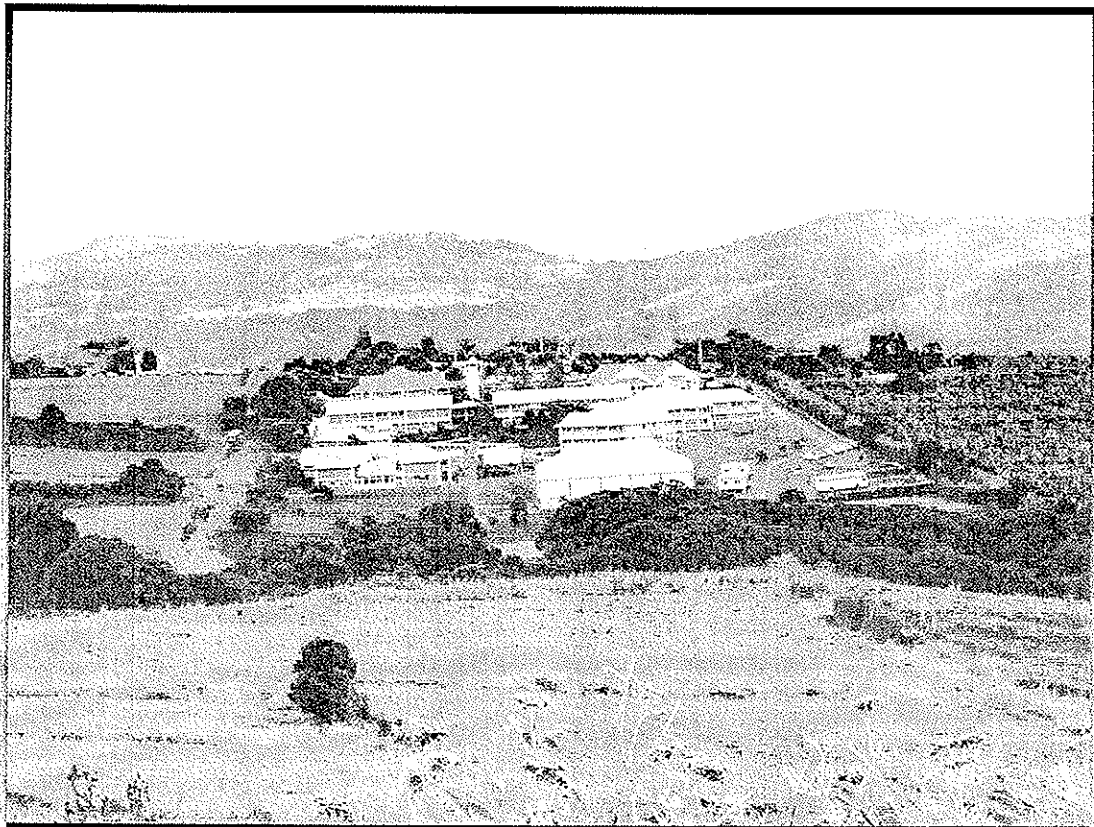
To the south and southeast, Area E rises to the Terranora Road ridgeline, which is characterised by a mosaic of unimproved land and minor agricultural/grazing uses. These uses are of low impact and as such no physical buffering to Area E is required. The adjoining escarpment forms an important scenic context when viewed from the Pacific Highway to the south. Chambers Lookout is also situated opposite the intersection of Fraser Drive and Terranora Road.

Given that Area E is surrounded by urban residential uses on its eastern and western boundaries the ability to undertake agricultural practices in the area has been curtailed. Should agricultural uses on the site be abandoned the need for buffers to surrounding areas will be reduced to the need to buffer the SEPP 14 wetlands, as all other surrounding land uses are compatible with residential development.

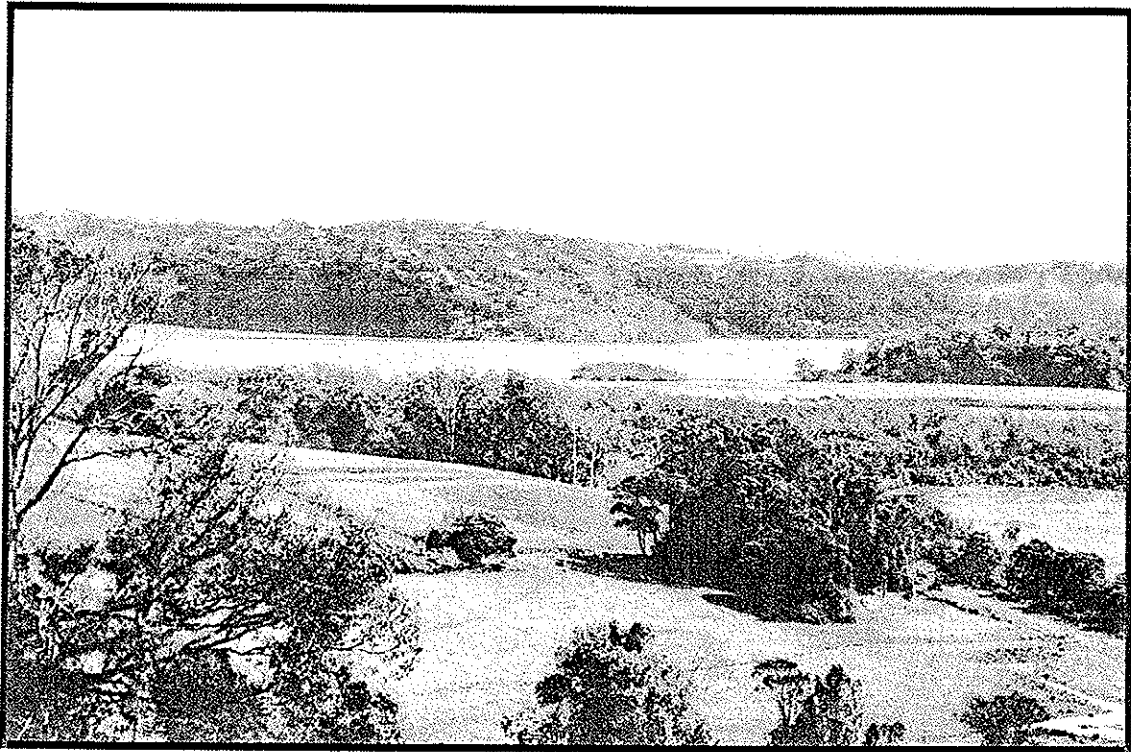
Photographs 2.1 to 2.6 depict the typical characteristics of Area E.



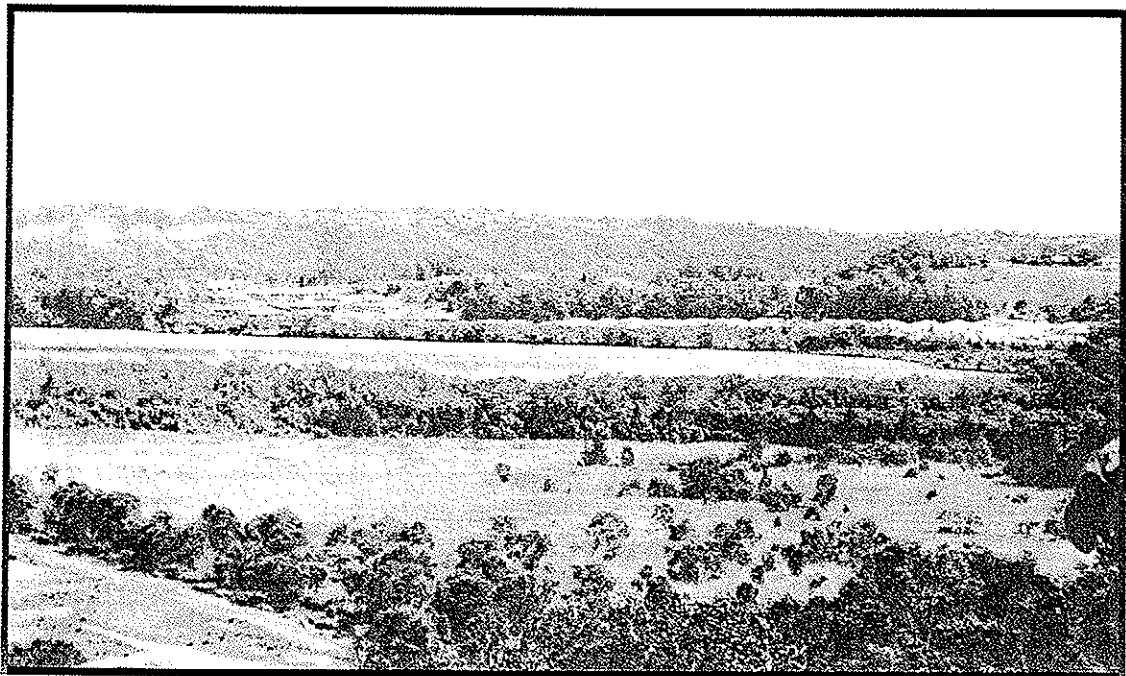
Photograph 2-1: View from northern end of Mahers Lane looking north-east across SEPP 14 wetlands towards South Tweed Heads



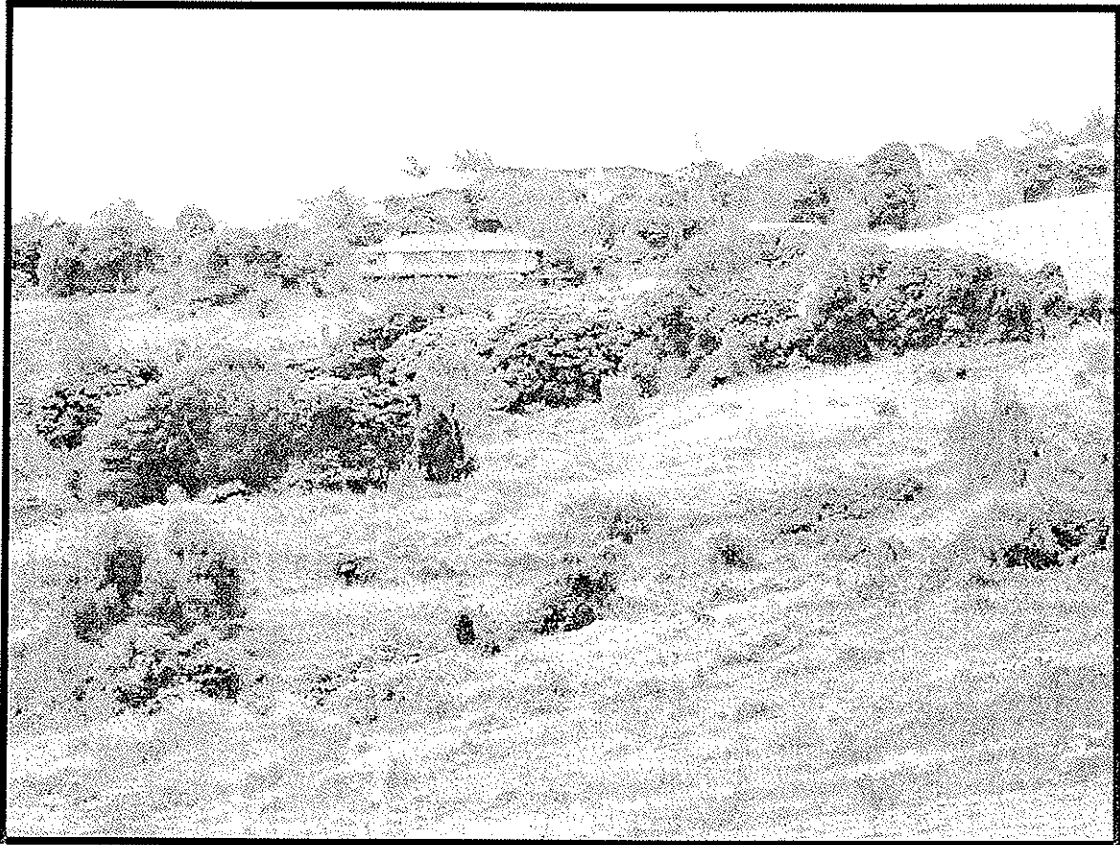
Photograph 2-2: Lindisfarne School viewed from Terranora Road



Photograph 2-3: Small crop areas still under production viewed from Fraser Drive looking North-west across Terranora Broadwater



Photograph 2-4: View across SEPP 14 Wetlands and Trutes Bay to Flametree Park



Photograph 2-5: Typical view of disused farm land found across site



Photograph 2-6: View from Fraser Drive across SEPP 14 Wetland to Terranora Broadwater

## 2.3 Area E overview

Area E is located at the eastern end of the McPherson Range system, typically comprised of sub-coastal foothills. As a result, the topography of the site is undulating, predominated by a series of typically north-south oriented spurs and ridgelines. In a cadastral sense, the dominant spurs are generally located in the vicinity of Mahers and Parkes Lanes, with Fraser Drive situated near the crest of a further ridgeline forming the eastern perimeter of Area E.

A large wetland complex adjacent to Terranora Broadwater forms the northern boundary of Area E. The wetland values of this area of land are recognised in the Tweed LEP 2000 by being it being partly zoned Environmental Protection (7a) and by its identification as a wetland protected by State Environmental Planning Policy no 14 – Coastal Wetlands (Wetland No 23). Area E is otherwise populated with a mixture of highly modified disturbed vegetation remnants, generally including estuarine complexes, melaleuca and swamp sheoak forests, sedgeland and related communities, rainforest and riparian communities.

Area E is predominantly zoned Agricultural Protection 1(b1), recognising its historic use for agricultural pursuits. A comparison of the extent of the 1(b1) zoning, with aerial photography of the site (run date June 2001) and field investigations indicates that agricultural practices have been decreasing in scale in Area E with a significant proportion of the site now lying fallow. Residential dwellings are scattered throughout the area and are typically associated with agricultural uses.

Lindisfarne Anglican Secondary School (zoned Special Use (5a)), fronts Mahers Lane in the west of Area E. A wholesale rose farm is located further north of the school (at Lot 1 on DP 635024), which is also zoned Agricultural Protection 1(b1).

Current zoning is indicated in Figure 2.1.



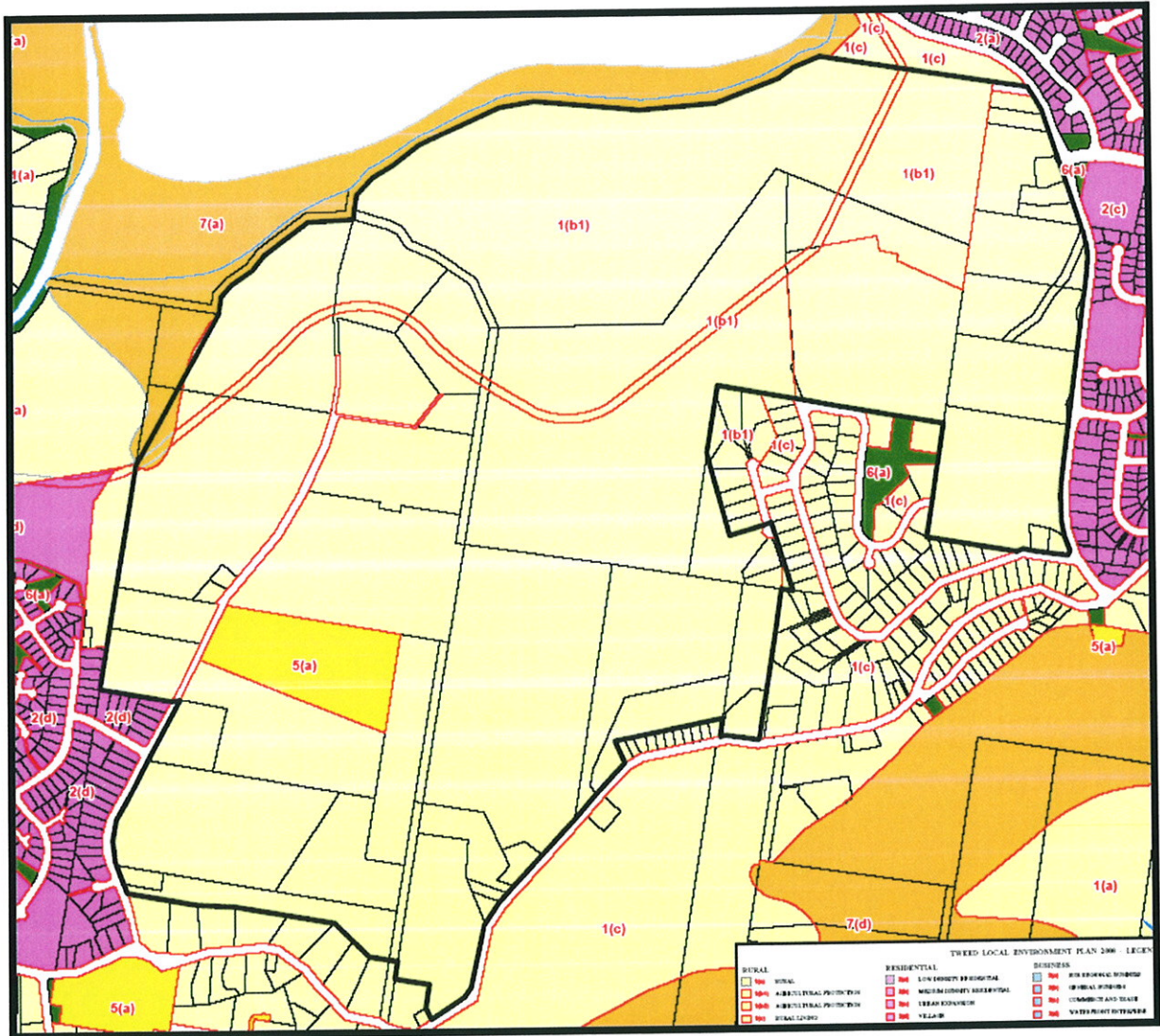


Figure 2-1: Current Zoning (Source: Tweed LEP 2000)