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Cobaki Lakes Development, Tweed Heads

*Prepared for Leda
Manorstead Pty Ltd*

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1.0 INTRODUCTION

Cardno Eppell Olsen has been commissioned by Leda Manorstead Pty Ltd to undertake an assessment of the traffic and transportation related issues relevant to the proposed Cobaki Lakes development.

This report outlines the findings of this assessment, and examines the characteristics of the existing road network, outlines features of the proposed development with regard to traffic and transportation, as well as considers the traffic impact on the broader road network and outlines the agreed road network upgrades that have been developed with Gold Coast City Council, Tweed Shire Council and the Department of Main Roads.

The assessment only considers the traffic and transportation related impacts of the proposal, it is expected that an acoustic assessment of the project will be undertaken by the development proponent in due course.

This report should be read in conjunction with the response to Director General Requirements Design Note published in 18 November 2007, prepared by Cardno Eppell Olsen.

The plans of the development originally submitted with the application have been revised to accommodate design amendments requested by the respective government agencies in previous phases of this application. The updated design plans are included at Appendix A, and discussed in detail in section 2.0.

1.1 References

In preparing this report, reference has been made to the following background material:

- Deeds of Agreement formulated between the previous development site proponents, Gold Coast City Council, Tweed Shire Council (TSC), Leda Manorstead and the Department of Main Roads;
- Veitch Lister Consulting Pty Ltd (VLC) "Banora Point and Tweed Road Development Strategy Review 2004;"
- VLC February 2005 addendum to the above report which was prepared for TSC to provide ultimate traffic volumes corresponding to scenarios with and without the Cobaki Parkway/Tugun Bypass interchange;
- VLC July 2007, Tweed Road Development Strategy 2007;
- Guide to Traffic Engineering Practice – Part 2: Roadway Capacity;
- Guide to Traffic Generating Developments, RTA.

2.0 EXISTING SITUATION

The development site is currently connected indirectly to the Gold Coast Highway, via Boyd Street and Coolangatta Road (a service road that runs parallel to the Gold Coast Highway). Boyd Street connects between the subject site to Coolangatta Road, from Coolangatta Road the site connects to the Gold Coast Highway at a number of key intersections:

- Toolona Street/Gold Coast Highway (signalised);
- Kirribin Street/Gold Coast Highway (signalised);
- Loongana Avenue/Gold Coast Highway (priority controlled formed as left in/left out movements only).

Kennedy Drive has direct access from the Pacific Highway to Piggabeen Road, which runs alongside the southern boundary of the subject site.

The VLC Tweed Road Development strategy identifies that in future, increased traffic growth (including traffic from the development site) will impact upon the following roads:

- Boyd Street and Gold Coast Highway;
- Tugun Bypass;
- Kennedy Drive.

These impacts discussed further within Section 5.0 of this report.

3.0 PROPOSED DEVELOPMENT

3.1 Site Use

It is proposed to develop a masterplanned residential community including up to approximately 5,000 dwellings, a town/village centre, community facilities and education facilities as well as retaining significant environmental protection areas.

The site is defined into 17 precincts, and is proposed to be released over 7 stages.

Plans of development are included at Appendix A. The development matrix, precinct plans, release plans (staging plan) and development road hierarchy plan are also included at Appendix A.

The plans indicate that at this stage detailed consideration has only been given to Release A (Stages 1 and 2) of the development. The design of the remaining precincts has only been progressed to the masterplan stage and design details and lot layout are proposed to be development in response to market demand.

It is noted that this release program is expected to be generally consistent with the requirements of the Deeds of Agreement in place with Tweed Shire Council, Gold Coast City Council and the Roads and Traffic Authority.

3.2 Site Access

Access to Cobaki Lakes will be initially achieved via an extension of Boyd Street to the subject site, creating a new modified arterial/distribution road called Cobaki Parkway. The extension of Boyd Street and creation of Cobaki Parkway is detailed within the deed of agreement between the Tweed Shire Council and Calsonic Management Services Pty Ltd dated 6 August 1993. This deed details the form, function and timing of the extension and is included in Appendix B.

Cobaki Parkway will extend from Boyd Street at the northern end of the development, to cross Cobaki Creek and intersect with Piggabeen Road at the southern end of the site.

Cobaki Parkway will become the major traffic carrying route through the development, and will also provide a public transport route through the development.

As discussed, Boyd Street connects to the Gold Coast Highway and Piggabeen Road connects to Kennedy Drive, which connects to the Pacific Highway. These routes allow the development to be accessed from the major external traffic and highway routes in the area.

Alternate access configurations have been assessed during VLC's investigations, including the need for an interchange at the Boyd Street/Cobaki Parkway overpass of the Pacific Highway, with different ramp configurations. These arrangements and impacts are discussed in further detail in subsequent sections of the report.

3.3 Road Hierarchy

Drawings SK 01.05 and 01.06 identify the internal road hierarchy and the connections to the external road network. The road hierarchy has been designed in accordance with TSC standards to accommodate the estimated daily traffic volumes and give regard to the adjacent the land uses on each road.

The proposed road hierarchy incorporates the following cross sections types, road reserve widths and daily volume thresholds:

- Access Street – 14.5m (vpd<3,000);
- Access Street with Bus Route – 17.0m (vpd<3,000);
- Low Volume Neighbourhood Connector Road – 19.0m (3,000 – 5,000 vpd);
- Normal Neighbourhood Connector Road (Sandy Lane) – 22.4m (vpd>7,000);
- Normal Neighbourhood Connector Road (Sandy Lane) – 27.0m;
- Modified Arterial or Distributor Road (Cobaki Parkway) – 40.0m.

3.4 Alternative Travel modes

3.4.1 Public Transport

The development makes provision for public transport and has been designed to accommodate a bus route along Cobaki Parkway and Sandy Lane. Drawings SK 01.05 and SK 01.07 identify Modified Arterial or Distributor Road (i.e. Cobaki Parkway), and Normal Neighbourhood Connector Road (i.e. Sandy Lane) type cross sections for these roads, which accommodate within the road reserve provision for buses, consistent with TSC standard drawings.

Provision for public transport along these routes will ensure that a significant proportion of the development will be served by public transport within a 400m walkable catchment.

3.4.2 Pedestrian and Bicycle Facilities

Cobaki Lakes will provide an interconnected network of pedestrian and cycle paths and linear links to all neighbourhoods, local parks, active and passive open spaces, community amenities and facilities as demonstrated in drawing SK 01.07.

The open space network plan indicates the indicative locations of 2.0 – 2.5m shared pedestrian and cycle pathways as well as 1.2m on-road cycleways. These pathways are also proposed to connect with the external road network at Boyd Street and Piggabeen Road.

3.5 Provision of At-Grade Intersections

The development proposes conventional intersection types and treatments at locations of traffic conflict. This includes roundabouts at key locations, and unsignalised priority intersections at lower volume conflict points.

As the vast majority of the development is still in the masterplanning stage, detailed design of these intersection treatments has not yet been completed. However it is expected that roundabouts need to be installed at the intersections of:

- Cobaki Parkway/Sandy Lane (2 of);
- Sandy Lane/Plateau Road.

Constructed priority T intersections are expected to be at all other low-order intersections.

The design of these treatments will give regard to the form and function of the road as well as expected traffic volumes, and the design will be based on design criteria outlined in AUSTRROADS Guide to Traffic Engineering Practice Part 5, TSC standard drawing and subdivision guidelines and the RTA guidelines. It is expected that this detail design will occur as development progresses and the masterplan is advanced.

3.6 Access to Schools, Community Facilities, Retail and Commercial Activities

The location of schools, community facilities and commercial and retail activities are illustrated on the concept plan in Appendix A.

The location of the proposed schools and retail facilities are located at key nodal points addressing the neighbourhood connector streets. The facilities do not provide direct frontage access to the arterial/sub-arterial road network consistent with the Director General requirements.

Commercial and retail facilities are also located at key nodes within the development, at the intersection of the neighbourhood connector and modified arterial/distributor roads. While access arrangements for these precincts will be resolved in subsequent stages and applications, access opportunities are available from both roads, and access will be designed appropriately for the frontage road type. This is expected to incorporate controlled/restricted access from the modified arterial/distributor roadways.

Access design and operational assessment will be undertaken at further stages to ensure that no capacity issues arise.

4.0 DEEDS OF AGREEMENT

There are three Deeds of Agreement (DOA) in place which relate to access to Cobaki Lakes from the north.

Because the development site traverses two local authority areas (Tweed Shire Council and Gold Coast City Council), separate deeds with each authority were necessary. These were “back to back” arrangements, prepared by the same solicitor and executed within a month of each other. The agreements remain current.

In Queensland the Cobaki Parkway connects with Boyd Street, which connects with Gold Coast Highway, which is under jurisdiction of Queensland Department of Main Roads (DMR). Therefore, these Deeds require this intersection to be upgraded consistent with requirements outlined by DMR in their planning and design guidelines. This requirement gave rise to the third DOA, that with the State of Queensland acting through DMR.

Copies of each DOA and an outline of their respective essential provisions are provided at Appendix B together with a map showing the location of the proposed works to which each DOA refers.

4.1 Gold Coast City Council Deed

The parties:

- Calsonic Management Services Pty Ltd, its successors and assigns;
- Gold Coast City Council.

Summary of the DOA provisions dated 8 July 1993:

- requires Calsonic to construct and use a temporary access road from the then constructed limit of Boyd Street to QLD/NSW border;
 - the intersection between Boyd Street and Gold Coast Highway in accordance with an agreement with DMR;
 - Boyd Street extension in two lanes, from and including a roundabout at the constructed limit of Boyd Street to the QLD/NSW border.
- Requires Calsonic to construct a four lane upgrade of Boyd Street in QLD when the eastbound traffic volume on Boyd Street at the state border is exceeding 800vph.

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4.2 Tweed Shire Council Deed

The Parties:

- Calsonic Management Services Pty Ltd, its successors and assigns;
- Tweed Shire Council.

Summary of the DOA provisions dated 6 August 1993:

- requires Calsonic to construct a two lane road in NSW from the QLD/NSW border to the Cobaki Lakes boundary, in accordance with Development Approval 92/315;
- requires Calsonic to contribute \$1.57m (adjusted for cost increase) to TSC, when called upon to do so, towards the cost of the Boyd Street overpass at its intersection with the Tugun Bypass (Note: this requirement has been met and the overpass constructed);
- requires TSC to include certain costs in the relevant S94 Contribution Plan;
- makes provisions for the purchase by TSC from Calsonic of the Cobaki Parkway road reserve – 20m wide.

4.3 Department of Main Roads Deed

The Parties:

- Leda Manorstead Pty Ltd;
- Department of Main Roads

Summary of the DOA provisions dated 3 February 1997:

- requires Leda to construct a signalised intersection between Boyd Street and Gold Coast Highway, in three stages:
 1. an Initial Layout, prior to the purchase of any residential lot at Cobaki Lakes constructing a dwelling in that lot;
 2. an Interim Layout before Leda proceeds to develop, market and sell more than 1,000 residential lots at Cobaki Lakes;
 3. an Ultimate Layout:
 - before Leda proceeds to develop, market and sell more than 2,900 residential lots at Cobaki Lakes, or;
 - when two way, peak hour traffic volume on the Gold Coast Highway exceeds 4,300, or;
 - if traffic operational problems occur at the intersection.

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- permits the continuous use of the constructed intersection provided Leda restricts the development, marketing and sale of residential lots at Cobaki Lakes to 3,500 until an interchange is constructed at the intersection of Boyd Street and the Tugun Bypass (Note: TSC's S94 Road Contribution Plan makes provision for the future construction of the interchange).

These deeds provide a framework which outlines timing, responsibility and infrastructure requirements for the northern connection to Cobaki Lakes.

5.0 TRAFFIC IMPACT

5.1 Modelling Background

VLC were initially engaged by TSC in 2003 to undertake a study of number of future land use and transport scenarios within the Tweed Shire. The task was to develop a detailed traffic forecasting model covering the whole of the Shire for two future planning horizons:

1. a “do minimum: approach for the 2011 design year;
2. an ultimate development scenario, which includes development of Cobaki Lakes

Once the model was established, it was also used to review the need and timing for road network improvements elsewhere in the Shire.

The study was conducted in four stages, which were documented and published on December 2004 in separate Working Papers as follows:

- Working Paper No1: Traffic Model Calibration;
- Working Paper No2: Future Demographic Assumptions;
- Working Paper No3: Traffic Forecasts on Ultimate Development;
- Working Paper No4: Traffic Forecasts for 2011.

VLC has also prepared an addendum to the above study in February 2005 which considered ultimate traffic volumes considering traffic scenarios “with” and “without” the Cobaki Parkway/Tugun Bypass interchange.

In addition to the above, TSC subsequently commissioned VLC to review its modelling of the area as part of an update to the Tweed Road Contribution Plan (TRCP), which was published on July 2007.

5.2 Modelling Recommendations and Conclusions

5.2.1 Banora Point and Tweed Road Development Strategy Review 2004

The recommendations from the 2004 study (that included traffic from the development of Cobaki Lakes) were as follows:

- Without the full Tugun Bypass, the Gold Coast Highway (south of Boyd Street) and its parallel service roads would operate above capacity, in both peak hours;
- Kennedy Drive west of the Bypass would also operate at its assessed capacity.

Other than Kennedy Drive, no major problems are anticipated on the Shire's own roads by 2011. There may be a need for improvements at a few specific intersections in the Banora area.

This report is provided at Appendix C.

5.2.2 The February 2005 Addendum

The addendum report focused on implications of incorporating north facing on and off ramps at the Cobaki interchange. The addendum identified that there were clear benefits in providing the ramps in this configuration and this resulted in benefits of approximately \$30,500 per day or \$9M per annum at the ultimate development horizon.

The addendum report also identified that Cobaki Lakes traffic would contribute approximately 50.5% of the traffic demand for these facilities, identifying the potential responsibility of this development.

This report is provided at Appendix D.

5.2.3 Tweed Road Development Strategy July 2007

This study refined the previous modelling undertaken and finalised the Road Network Strategy for Tweed Shire. The report provided recommendations regarding the Cobaki interchange that identify that there are benefits of constructing the north facing ramps only and/or ramps facing both directions. These recommendations are discussed in subsequent sections.

This report is provided at Appendix E.

5.3 Boyd Street

The DOA outlined in Section 4.0 outline the timing, thresholds and mechanisms that relate to upgrading of Boyd Street. The DOA describes initial, interim and ultimate intersection layouts and identifies definitive triggers for their implementation that relate to the number of lots constructed within Cobaki Lakes.

The DMR DOA stipulates that Boyd Street shall be upgraded from two to four lanes either once the eastbound peak hour traffic volume on Boyd Street exceeds the 800vph, or the two way peak hour traffic volume on the Gold Coast Highway north of Boyd Street reaches 4,300vph.

The VLC modelling undertaken in 2007 identifies that Boyd Street will ultimately carry 11,100vpd (see Figure 3.2) if the Cobaki Interchange is constructed. In addition, Figure 3.2a demonstrates that the AM eastbound peak hour traffic with both the Cobaki ramps exceeding the required threshold (i.e. 842vph). Figure 6.1 of the 2007 VLC traffic modelling also identifies that Boyd Street is recommended to be upgraded to a 4 lanes.

Therefore, the most recent traffic modelling undertaken by VLC indicates that traffic volumes and required upgrading is generally consistent with the triggers identified in the DMR DOA regarding timing for the provision of the ultimate intersection form and roadway form.

5.4 Cobaki Interchange

Based upon the 2004 VLC modelling, the Tugun Bypass between Boyd Street and Stewart Road will ultimately carry in the order of 60,000vpd if the Cobaki interchange is not constructed. This is the equivalent of 1,500vph/lane based on a four lane form and 10% peak to daily hour ratio. The RTA refers to AUSTRROADS Guide to Traffic Engineering Practice – Part 2: Roadway Capacity for Level of Service (LOS) to identify impact on traffic efficiency. The Roadway Capacity describes LOC C of freeways for a demand of 1,100 – 1,550vph/lane and travel speed of approximately 85kph.

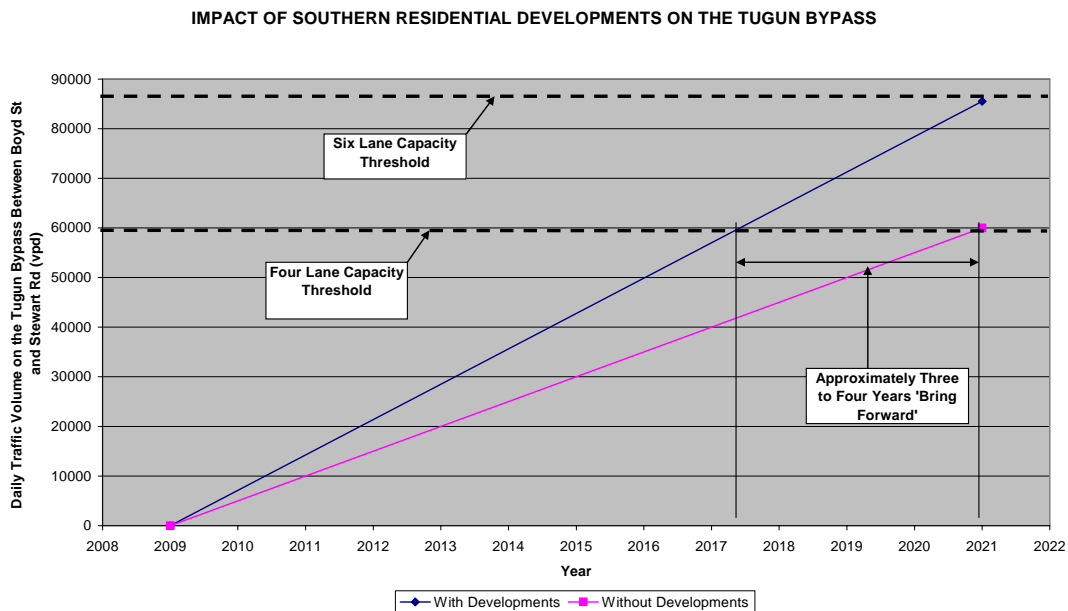
If the Cobaki interchange is built, the 2007 VLC modelling indicates that the Tugun Bypass between Boyd Street and Stewart Road will ultimately carry approximately 85,500vpd. This equates to 1,425vph/lane based on six lanes and 2,138vph based on four lanes. Based upon the Roadway Capacity, this corresponds to LOS F based on four lanes and LOS C based on six lanes. As LOS F is considered to be failing and therefore, should the Cobaki interchange be built, the Tugun Bypass will need to be upgraded to six lanes.

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In order to better understand when the six lane upgrading of the Tugun Bypass is likely to be required, and the impacts of Cobaki Lakes upon that timing, an analysis of traffic demands on the Tugun Bypass north of Boyd Street for the scenarios with and without the Cobaki interchange has been undertaken, assuming linear growth from years 2009 to 2021.

A daily traffic volume of 60,000vpd has been adopted as an appropriate trigger for upgrading of the Tugun Bypass north of Boyd Street from four to six lanes, corresponding to a LOS C. The attached graph illustrates that using this threshold; the bypass will need to be upgraded approximately 3-4 years earlier than originally envisaged at 2021 as a result of the Cobaki interchange being built.

Figure 1 Tugun Bypass Upgrading Scenarios



According to the 2007 VLC modelling (see Figure 6.5), if the Cobaki interchange is built, a proportion of traffic heading north will utilise the interchange rather than using Boyd Street, the Gold Coast Highway and Pacific Highway between Boyd Street and Stewart Road. Either way, the traffic heading north will converge onto the Pacific Highway at Stewart Road. Therefore, the impacts on the Pacific Highway north of this point are the same.

In relation to the impact of the Cobaki Lakes development on the Tugun Bypass, Figure 1.1 of the 2005 VLC traffic modelling demonstrates that the north facing on ramp at the Cobaki interchange is expected to ultimately carry 9,473vpd and will comprise the following traffic components:

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- Cobaki Lakes 50.5%;
- Bilambil Heights 25.2%;
- Rest of west Tweed Heads 9.3%;
- Rest of Tweed Shire 15.1%.

Similarly Figure 6.5 of the 2007 VLC traffic modelling demonstrates that the north facing on ramp at the Cobaki interchange is expected to ultimately carry 11,623vpd. This Figure also depicts a similar volume of 11,327vpd on the northbound off ramp. Assuming conservatively that this ramp comprises traffic Based on the trip proportions described above, it can be assumed that the north bound ramps will carry approximately 22,950vpd and ultimately 31,050 for both sets of ramps. Based on these assumptions, Cobaki Lakes will ultimately contribute approximately 50% of those trips.

On that basis, Cobaki Lakes will bring forward the need to upgrade the Tugun Bypass north of Boyd Street by approximately three to four years (i.e. 50% of the total three to four year bring forward period).

5.4.1 North Facing Ramps Only

Based on the 2007 VLC modelling, the north ramps would allow approximately 18,000vpd to achieve direct access to/from the north of Tugun Bypass. The relief provided to primary roads within Gold Coast City would be significant:

- Boyd Street will reduced by 17,000vpd;
- Gold Coast Highway, north of Boyd Street will reduced by 12,000vpd.

However, an adverse impact of approximately a 20% increase in volumes on the section of the Tugun Bypass, between the Cobaki Parkway and Steward Road interchanges would occur, that would require it to be widened to six lanes.

5.4.2 Both Sets of Ramps

The additional benefits of adding the south bound ramps to the partial interchange mentioned above are:

- the southern ramps would be used by about 7,000vpd and increase volumes on the southern section of the Tugun Bypass by 5,000vpd;
- availability of the new route from Cobaki interchange to the Tweed Bypass would reduce volumes on alternative routes such as:
 - Gold Coast Highway (south of Boyd Street) will reduced by 3,000vpd;
 - Kennedy Drive west of the Tweed Bypass will reduced by 1,600vpd.

While the use of this second pair of ramps would be less than half of that for the north ramps. The economic benefits were even lower. Despite this the ramps are justifiable and their ability to reduce volumes on the critical western section of Kennedy Drive is highly desirable.

Figure 6.1 of the 2007 VLC traffic modelling demonstrates that Tugun Bypass is recommended to be upgraded to 6 lanes in Section C.

5.5 Kennedy Drive

The Ultimate Road network identified in the 2007 VLC report suggests the Kennedy Drive will be deficient in the ultimate traffic scenario, however construction of the full interchange will help relieve some traffic pressure on the western section of Kennedy Drive.

In addition, the 2007 VLC modelling suggests that Kennedy Drive will carry approximately 23,600vpd with the ultimate daily volume scenario including the construction of the interchange with both Cobaki ramps.

Figure 6.1 of the 2007 VLC traffic modelling demonstrates that the western section of Kennedy Drive is recommended to incorporate improvements to a 4 lanes section and Table 6.1 identifies that this should be achieved by creation of peak hour clearways, which are to be the responsibility of developers in the region, with works creditable against contributions that would otherwise be levied.

6.0 CONCLUSIONS

This assessment has considered the issues of a traffic and transportation nature relating to development of Cobaki Lakes, and addressed the requirements of the Director General's response.

Key summaries are as follows:

- The development proposes a masterplanned residential development incorporating approximately 5,000 lots, schools, community facilities and a commercial and retail town centre;
- The attached concept plans identify the proposed staging and release program, as well as the development matrix;
- The development incorporates an interconnected pedestrian and cycle network as well as provision for public transport on the higher order roads within the development;
- The development road hierarchy has been developed consistent with Tweed Shire Council's cross sections;
- Two stages of the development have been progressed in detail, it is proposed to refine the further stages of the masterplan as this proceeds. Note that detailed design will ensure that all roads and intersections will comply with the requirements of AUSTRROADS, RTA design guidelines, and Tweed Shire Council;
- Deeds of Agreement are in place with TSC, GCCC, and DMR regarding the construction and timing and upgrading thresholds of the northern access to Cobaki Lakes via Boyd Street;
- The VLC modelling undertaken for Tweed Shire Council has considered the impacts of Cobaki Lakes within the broader network;
- The VLC modelling identifies Cobaki Lakes responsibilities for contributions to the Cobaki interchange;
- The VLC modelling identifies clear benefits in constructing this infrastructure, both on the immediate area, and broader benefits in relieving pressure on other road network links;
- The VLC modelling also identifies the responsibilities of upgrading other key road network elements, which the traffic from the development contributes to. This also identifies the road network form that is also required.