VIASTRADA

TRAFFIC ENGINEERING AND PLANNING

TRAFFIC IMPACT ASSESSMENT

FOR A

CHANGE
to the
SELWYN DISTRICT PLAN

BROADFIELDS ESTATES LIMITED
EDWARD STREET
LINCOLN

REPORT DATE: 20 MAY 2008

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DOCUMENT INFORMATION

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Statement of Details	
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Project: Liffey Springs Subdivision - Lincoln Traffic Impact Assessment	**Issued:** 20 May 2008 **Status** For circulation

Traffic Assessment for Broadfields Estates Limited
Liffey Springs – 86A Edwards Street

THE PROPOSAL

1 The application seeks to Change the Selwyn District Plan to facilitate the development of a residential subdivision containing a mix of medium density and higher density residential lots.

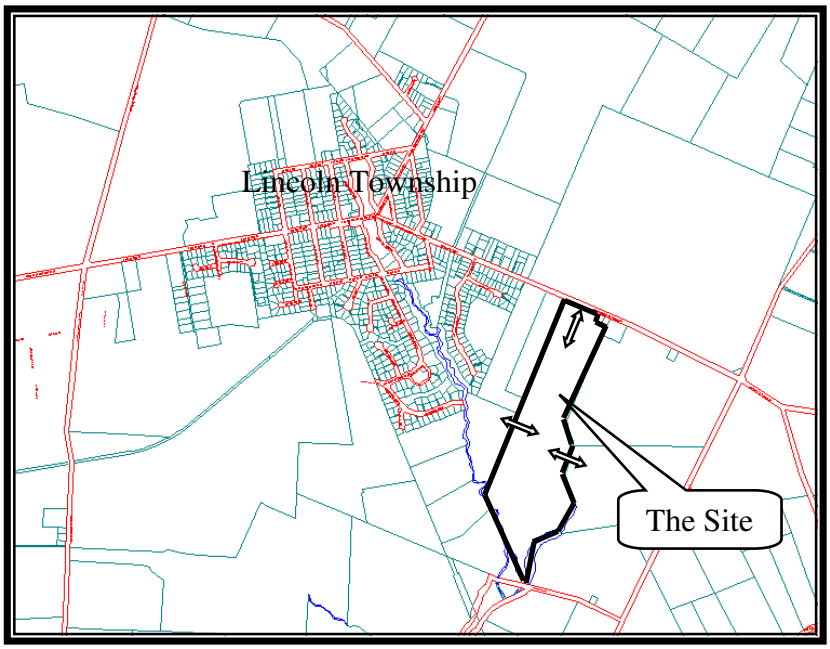

Figure 1 – The site is located on the eastern approach to Lincoln on Edward Street.

2 The primary access to the site will be from Edward Street and provision will be made to allow a second road connection through the Zee Straten land to the west. This second connection will ultimately link to the future road provided for in the concept plans over the L1 Creek connecting the Ryeland's and Lincoln Dale subdivisions to the west.

3 Additional pedestrian and cycle connectivity to Lincoln is provided by footpaths utilising the pedestrian right of way leading to Perthshire Crescent and Southfield Drive in the adjacent Lincoln Dale subdivision.

4 The site also provides a lot for connecting to the land to the east – allowing a future link to Ellesmere Road through that land. This link will complete a useful local-road or collector road-class link through residential areas running parallel to Edward Street and Gerald Street.

THE ROADS

Road Classification

5 Edward Street and Lincoln TaiTapu Road are both classified as Arterial Roads in the Township and Rural sections of the Plan. These roads perform as through-traffic arterials as well as collector roads in terms of providing direct property access along their frontages.

Road Geometry & Intersections

6 The carriageway of Edward Street outside the site is built to a conventional rural cross section with 3.2m lanes (with edgelines) and sealed shoulders. In the vicinity of the proposed intersection there is a vehicle access on the north side of the road to the Rosemerryn property. This access has been configured to Transit New Zealand's and the Plan's "Diagram D" format, resulting in a 3m wide shoulder on the south side of the road for some 90m either side of the access.

7 The nearest intersection is the new intersection to the Lincoln Dale subdivision to the west. This is approximately 180 metres west of the intersection that will serve this proposed subdivision. The transition between 50kph and 70kph areas is just east of this existing intersection, at the western boundary of the site.

Figure 2 – LincolnIndale Intersection on Edward Street The site is on the right beyond the 70kph sign.

8 The transition between 70kph and 100kph is located at the bend in Edward Street near Ellesmere Road to the east.

9 The development of the land the subject of this application will see a further new intersection on Edward Street being located approximately 180 metres from the Lincolndale junction. This increase in the number of intersections in this section of Edward Street, and this frontage activity will be addressed by the extension of the 50kph speed limit zone eastwards to the eastern boundary of the site. This will necessitate the relevant changes to the Council's speed limit zone definitions. All lots will be accessed from the internal roads, with no vehicle crossings onto Edward Street.

10 This change in the speed limit will safely accommodate traffic from the new road intersection, as well as that from the other properties (including Rosemerryn) in the vicinity. It will also support safe travel by cyclists on the roads between the site and Lincoln township.

11 The reduced speed limit will also provide a safer environment for the expansion of public transport routes.

Traffic and Pedestrian Volumes

12 The Council has advised that the 2021 strategic road network model indicates that Edward Street/Lincoln Taitapu Road will be carrying about 4700 ADT on Edward Street between Gerald Street and the new road to the subdivision to the west of the site, and 3800 ADT east to Ellesmere Road.

13 The subdivision is expected to contain about 200 lots. These will each generate between 6 and 10 trips per day, thus the total generation of the subdivision will be between about 1200 and 2000 trips per day.

14 The plans show a possible linkage from the south west of this subdivision through other land that will provide for a future road connection to other subdivisions south of Lincoln. While this will facilitate some through-traffic movement, the net result of traffic from the subdivision choosing to move west on this link, and traffic from the west moving through the subdivision is expected to cancel out. Thus, even should this westward link be established, the trip generation at the intersection with Edward Street is expected to remain in the range between about 1200 and 2000 trips per day.

15 Accordingly, it is anticipated that the future traffic volumes on Edward Street east of the proposed intersection will increase from 3800 to approximately 4400 vehicles per day. West of the intersection with the new subdivision, the volumes will increase from the anticipated 4700 vehicles per day to approximately 5880 movements per day.

16 In a general case, this gives estimated peak hour flows of about 600 movements along Edward Street, and about 180 movements from the proposed intersection serving this proposed development. If some allowance is made for the strong tidal nature of traffic volumes in the vicinity due to the university activity, then in the morning peak these through movements may be closer to 700 vehicles in the peak hour, with the side road movements remaining at about 180 movements.

17 The main delays will be to right-turning traffic. For traffic turning right out of the site the average delays in the peak hour are estimated to be between 2 and 3 seconds, and for drivers turning right into the site (opposed only by the westbound flow on Edward Street) the peak hour average delays will be between 1 and 2 seconds.

18 This is calculated from the following turning and opposing volumes, assuming 33% turning to and from the east, and 67% to and from the west (Lincoln township):

Movement	Turning Volume	Opposing Volume	Delay
Right Turn In	60	400	1.9s
Right Turn Out	30	590	2.9s

19 Outside the peak hours the intersection will continue to operate under free-flow conditions, with total movements in or out of the side road leg occurring at a rate of less than 100 per hour, compared with a 16 hour off-peak average of about 220 passing movements per hour on Edward Street.

20 The Council contemplates that the new intersection should copy the format of the adjacent intersection serving Lincoln Dale, and this is considered to be an appropriate standard to utilise in this situation.

Preferred Road Network

21 The District Plan does not provide any indicative roading layout for the site however the Christchurch Rolleston and Environs Transport Study (CRETS) has provided a clearer view of the likely road network needs in the locality. These include confirmation of Edward Street as an arterial route towards the town centre, and of Ellesmere Road as a major link towards Christchurch. These concepts are embodied in detail in the recently prepared Draft Lincoln Structure Plan (see figure 3, below).

22 In this structure plan a road is shown running through the Liffey Springs site is that connecting Ellesmere Road with Southfield Drive. The structure plan also identifies a minor road connecting the site with Edward Street.

23 In the proposed development plan the link between Southfield Drive and Ellesmere Road is provided for by a road linking to the west (providing for a link through the adjacent property to Southfield Drive) and provision of a road reserve on the eastern boundary of the development. The link to Edward Street is also provided for – being the only access to the site until the link across adjacent sites to the west and east is built by others.

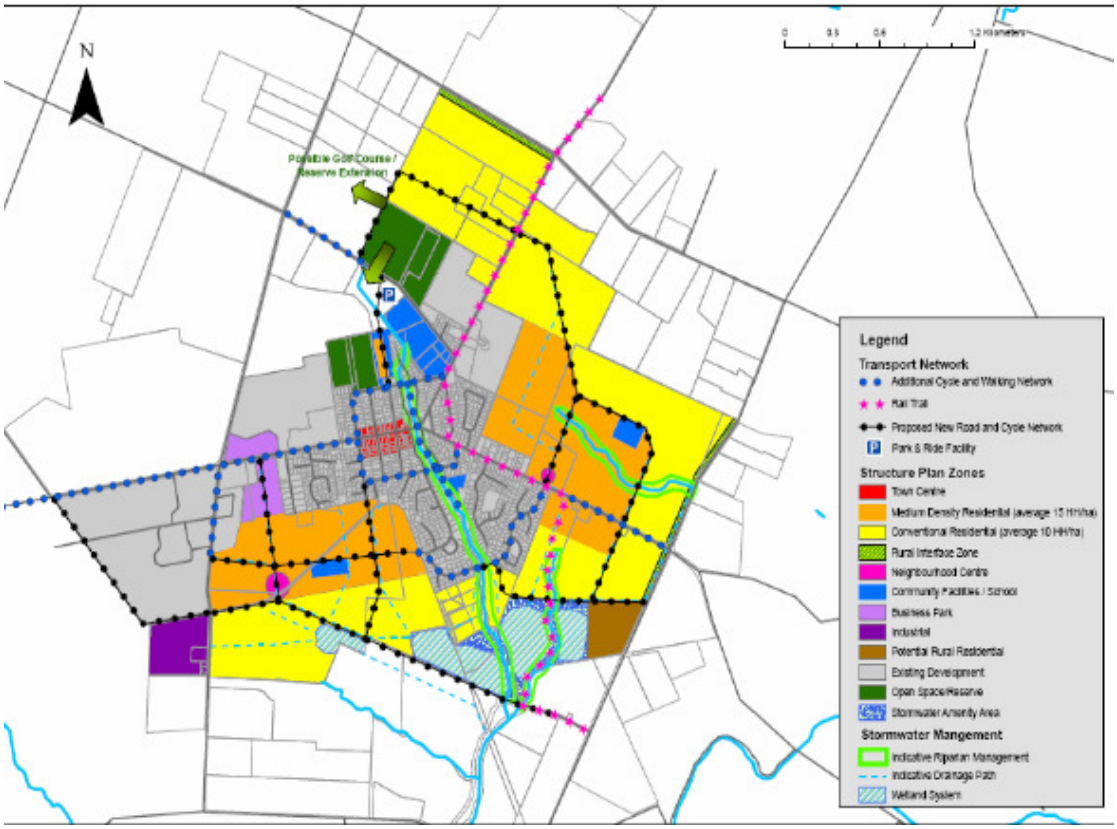

Figure 3 - Recommended Draft Structure Plan for Lincoln (May 2008 version)

24 The site provides for connectivity of the Lincoln Rail Trail through the road and walkway links in the southern section of the development.

25 The Draft Structure Plan refers to the Southfield Drive route as part of the collector/loop road serving the eastern section of the town. Eventually (depending on traffic and pedestrian volumes) this intersection could be controlled by traffic signals. The development of this site's junction with Edward Street will not create any difficulty with the on-going development of the intersection at Southfield Drive-Northfield Drive / Edward Street by other developers.

26 Thus the movement pattern provided for in this Change conforms to the structure plan's expectations.

Public Transport

27 At present there are no bus services running along the section of Edward Street outside the site. The existing Lincoln bus services (Routes 81 and 82) run down Springs Road and Birches Road with about 20 minute headways during the day.

28 The Council's document "Providing for Public Transport within your Subdivision) outlines the approach developers should consider when planning their roading layouts.

29 In the course of preparing the application Broadfield Estates received a letter from the Operations Planner Passenger Services at Environment Canterbury (Shannon Ussher) discussing public transport options for the area (copy attached).

30 The writer notes that depending on development it may become viable to loop the bus route through this area. He then observed that the Liffey Springs roading pattern should connect through to Southfield Drive, and the main access road off Edward Street and the road connecting to Southfield Drive should be able to accommodate buses so that these roads could become a routing option in the future.

31 This letter is dated 6 March 2007. The design workshop for the development of the Lincoln Structure Plan took place in early April 2007. In the course of that design process the potential roading pattern for the locality as broadly defined in CRETS was refined, and the options for routing public transport through the area were thoroughly explored in a discussion with staff from Environment Canterbury.

32 The Draft Structure Plan makes frequent reference to the Southfield Drive route as part of the collector/loop road serving the eastern section of the town. Southfield Drive is expected to connect across Edward Street to the future 'Northfield Drive' which will eventually connect to Birchs Road. The structure plan includes proposals for a small commercial area on this loop road near the intersection of Southfield Drive and Edward Street. Eventually this intersection would be controlled by traffic signals.

33 In our discussions with the staff from ECan at the workshop it was clear that the bus service around this Southfield Drive loop road was at the lower end of their view of viability, and it will not be a particularly well served route – if and when it does eventuate. The mode of operation proposed was that of a shuttle circulating within Lincoln to connect with

the more frequent core services running along Birchs Road and Gerald Street.

34 It is unlikely that the shuttle route would be served by trunk services, and so users of the shuttle with origins or destinations outside Lincoln will be obliged to transfer to other services at interchanges on Birchs Road or Gerald Street (or perhaps at the 'proposed' Park Ride facility) to complete their journeys.

35 The possibility of connecting a route from Halswell via Ellesmere Road to the university site by running along the proposed east-west connecting link through Liffey Springs was discussed however it appeared that this service would be even less viable than the loop road service.

36 Thus the Draft Structure Plan and ECan's view confirms that:-

- The primary bus service serving the area will run along Southfield Drive.
- It is unlikely (but admittedly possible) that the east-west link connecting with Ellesmere Road may be used by bus services at some time the future.
- It is most unlikely that the main road connecting the site to Edward Street will ever be used for public transport services.
- The east-west link may be appropriately categorised as an urban Collector Road
- The road connecting the site to Edward Street, and all other roads in the development would be categorised as Local Roads.

37 From this it is apparent that there is no need to consider the use of the road linking the site to Edward Street as a public transport route, and the only possible issue in relation to public transport would be the use of the east-west link.

38 In the application the east-west link is detailed as having a boundary to boundary width of 20.0m and a carriageway width of 11.0m. This provides road-space for two 3.5m through lanes and two 2.0m parking lanes, and is therefore quite adequate for use by conventional public transport vehicles.

39 At the intersection with the main road through the site the proposed divided carriageway format is quite conducive to the addition of give way signs in favour of the east-west link road should traffic conditions warrant such treatment in the future. There is no need to make any special provision for turning by large numbers of buses at this intersection.

40 Thus the proposed subdivision layout provides properly for the likely use of the roads through the site by public transport vehicles.

Nearby Activities

41 The activities on the adjacent land are either urban development (to the west) or rural or rural/residential (to the east and north).

42 None of these activities predominate in traffic terms, or create any unusual parking demand or traffic generation issues.

MEETING THE PLAN'S REQUIREMENTS

Selwyn District Council District Plan

43 The actual subdivision development will be to be assessed under the relevant rules of the Township Rural section of the Operative District Plan.

44 The subdivision and transport-related rules in that section cover matters such as connections to strategic roads (Edward Street is an Arterial Road, not a Strategic Road), access to allotments, road gradients, parking provision and site access arrangements.

45 The recommended subdivision layout will conform to these requirements allow all sites to be developed in accordance with the relevant rules of the District Plan.

46 The proposal supports the relevant Township transport policies and objectives, as follows:-

47 The development is catering for a demand for properties in the areas close to rural townships – thus minimising the need for travel for domestic travel for shopping, recreation, access to schools and some work travel. In this context, the proposal is ensuring that such development is occurring in a way that will minimise the adverse impact of random rural-residential development and see the continued development of an established township. The location of the development abutting the town boundary means that it can form an integral part of the township's road, network. At the same time, the location will support logical expansions to the public transport system utilising the road connections to other urban land to the north-west of the block.

48 The proposed site layout provides for road traffic and separate off-street cycle and pedestrian linkages to the adjacent subdivision to the west, as well as providing linkages that can be utilised to support future development. With the completion of other planned developments in

the township, these off-road routes will ultimately provide connections to the town centre and to the university that pass through attractive reserve areas clear of arterial traffic routes.

49 The Plan places a strong emphasis on the ability of the Strategic Roads to carry through traffic. These roads (usually State Highways) are to be protected from the adverse effects of other activities.

50 Edward Street is an Arterial Road in the District's roading hierarchy. The Plan sees that these roads are managed to balance each of their functions equally. This gives Edward Street the dual role of providing for both through traffic and property access functions. Thus any cumulative traffic effects resulting from this subdivision will be carried on a road that is of an appropriate classification.

51 The proposed intersection is located in a position that provides ideal visibility. The low level of frontage development will ensure the intersection will function with conventional levels of safety and efficiency.

GENERAL DESIGN CONSIDERATIONS

Outline of Roading Layout

52 The site is generally planar, and thus the Plan's gradient limitations can be readily met. The north-bound carriageway of the new road at the intersection with Edward Street will be kept up to the level of the existing edgeline for a minimum distance of 10 metres back from the edgeline to ensure good visibility for departing drivers.

53 It is expected that this new intersection will be virtually identical to the recently constructed Edward Street / Southfield Drive intersection.

54 It is recommended that the speed change restriction signs be relocated to the east of the subdivision block. For 50kph zones the Plan requires a minimum distance between intersections of 125m. The nearest intersection will be that to the west of the block – some 180 metres away. This complies with the rule.

55 The intersection is located on a straight section of road with over 250m visibility in each direction. Thus, the proposed intersection location will meet the sight distance criteria for all speed limits up to 100kph.

Figure 4 - Looking West. Views from the vicinity of the proposed intersection. Looking East

57 The site's roading layout entails a central 'boulevard–style' roadway with a central swale and a pair of 6.0m wide carriageways. This carriageway width is sufficient to allow for a 3.8m lane for through traffic and a 2.2m kerbside parking lane. It is not intended that the parking lane would be defined by road markings.

58 The new road linking into the former Zee Straden land to the north-west of the site will have a legal road reserve width of 20m and a 9m wide carriageway. This width is sufficient for straightforward operation of public transport while allowing for on-street parking and cycle traffic. There is provision for the extension of this route into the land to the east – thus providing connectivity in that direction for public transport, cycle traffic and other vehicles.

59 All the cul-de-sac roads and the 'loop' road beside the LII River all have 8.5m wide carriageways. An 8.5m carriageway is sufficient for a 2.2m parking lane and two 3.15m through traffic lanes. This width is sufficient to allow two-way operation entailing a motor car and a larger vehicle such as the Onyx refuse recycling vehicle or a fire truck. In some locations additional on-street parking is provided in parking bays.

Provision for Design Vehicles

60 The 'roundabouts' at the cul-de-sac heads have an inscribed circle of about 11.0 metres radius. Swept path checks have confirmed that this is adequate to provide for turning by the Onyx recycling vehicle (which has an outer corner turn radius of about 11 metres).

61 The typical fire truck (the 6/3 Appliance – a typical first-call unit) has a marginally larger turn radius (about 12.5 metres – the legal maximum) however in all cases the cul-de-sac roundabouts would permit this

vehicle to turn with one or at the most two reverse manoeuvres. In other words the turn is physically possible, but it would require one or two additional manoeuvres for the fire engine to complete the turn within the kerbline. Generally the fire service prefers to keep their appliances out of 'dead-end' streets in emergency situations. Most of the cul-de-sacs are only about 70 metres long with the longest being approximately 140 metres, and thus this slightly lower level of traffic service is acceptable in these situations.

62 The roundabout at the end of the main boulevard has a 12m radius. This is not primarily intended as a U-turn facility as drivers will generally proceed straight through the roundabout.

CONCLUSION

63 The proposed plan change will allow for a subdivision that will create approximately 200 lots in a typical peri-urban layout. This layout provides good linkages to adjacent urban developments for vehicles (including public transport), cyclists and pedestrians.

64 The conceptual lot layout depicted in the application will ensure that all internal parking and manoeuvre areas of individual properties are able to comply with the Plan's requirements regarding the movement of vehicles, parking and access.

65 With the recommended relocation of the 50kph/70kph speed change boundary, the new intersection to the site on Edward Street will be fully complying in terms of location, design and sight distances.

66 The intersection with Edward Street suggested in the concept layout will operate with low delays to arriving and departing traffic even during the busiest times of day. Calculations of the anticipated traffic volumes at the new intersection confirm that over the bulk of the day free-flow traffic conditions will prevail.

67 The proposed plan change will facilitate a form of subdivision that is unlikely to have any significant effect on the safety or efficiency of traffic on Edward Street or on the wider road network. Likewise, there are not expected to be any discernible traffic-related effects on rural or residential amenity in the vicinity.

VIASTRADA LTD

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Appendix 1 – Letter from ECan re Public Transport

58 Kilmore Street, PO Box 345, Christchurch
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6 March 2007

David Hobbs
Broadfield Estates Ltd
P O Box 25-028
CHRISTCHURCH

Dear David

RE: LIFFEY SPRINGS DEVELOPMENT

Thank you for sending through a copy of the subdivision plan for Liffey Springs, Lincoln. Below are some comments regarding future public transport provision in the area which Environment Canterbury would like you to consider when planning this development.

At present, the 81 Lincoln Metro service travels from Lincoln University along Gerald Street, onto James Street and then follows Birchs Road to Prebbleton on its way into the city. There are no plans in the near future to change this route through Lincoln township, as the current route provides good coverage of the town and the most direct route to the city. We would therefore not be able to provide access to public transport for residents in Liffey Springs. Residents would face a lengthy walk out to Gerald/James Street to reach the Metro service, and Environment Canterbury would recommend that future residents are advised of this fact.

As this township expands, it may become more viable to add a loop at the end of the route to improve coverage of new subdivisions in Lincoln. Any possible changes would depend on the amount of growth the town experiences, location of the growth and the timing of this development. If significant development occurs south of Gerald Street and Edward Street, it may become viable to loop the bus through this area. This would require connectivity between adjacent subdivisions to allow the bus to travel along a direct route through the area, rather than having to travel in and out of several separate subdivisions.

Environment Canterbury would therefore recommend that Liffey Springs should connect through to Southfield Drive, as shown on the plan provided. We also recommend that the main access road off Edward Street and the road connecting to Southfield Drive should be of adequate width, strength and appropriate layout to allow for buses so that this could become a routing option in the future. Good pedestrian access to and along these streets should be provided so that if public transport travelled through here in the future, all residents could easily access the service.

Yours sincerely

Shannon Ussher
OPERATIONS PLANNER PASSENGER SERVICES

Our Ref: PL5C-54
Your Ref: ESL L020307 ECan - Ussher
Contact: Shannon Ussher