

## Application for Designation

# Christchurch Hospital ASB

## Preliminary Transport Assessment

June 2014 Update

### Ministry of Health

Reference: 146001g

Revision: Final



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## QUALITY ASSURANCE

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Preliminary Transport Assessment - June 2014 Update

**Applicant:** Ministry of Health



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## 1.0 INTRODUCTION

- 1.1.1 This report has been prepared in response to the request from CERA to provide an update on transport related issues associated with master planning for the rebuild of the Christchurch Hospital site, and in particular in association with the current designation proposal for the proposed Acute Services Building (ASB) to be located in the north-western corner of the main Hospital campus.
- 1.1.2 The primary purpose of this report is to provide a further update on the 2013 work undertaken by Urbis and QTP on traffic related matters for the wider Hospital redevelopment (That report is attached as Appendix A). This report will again concentrate on what are considered to be the key issues of parking provision, site access and traffic generation as the proposed ASB design has been refined further since the previous update letter report dated 28 February 2014 (attached as Appendix B). There has also been considerable additional consultation with CERA on transport issues including the interaction of the proposed scale of Hospital development on the planned revised road network in the immediate vicinity of the site.
- 1.1.3 It is anticipated that the data provided in this report will provide CERA sufficient information to ascertain that the ASB proposal can properly integrate with the proposed surrounding road network and that any potential traffic related effects of the proposal, while possibly not fully resolved yet, are able to be suitably mitigated.

## 2.0 PARKING PROVISION

### 2.1 Parking Requirement of the Existing Hospital

2.1.1 The Christchurch City Plan parking requirement for a Hospital is based on bed numbers and equates to a total of 2.17 spaces per bed. It is important to note that this parking requirement is generic and designed to cover a range of hospital activities. It is not a requirement intended to specifically address the parking demand of the Christchurch Hospital campus in particular.

2.1.2 Based on 637 existing beds the City Plan parking requirement would be a total of 1,381 spaces (319 for visitors + 1,062 for staff). However this assessment ignores any historical parking reductions protected by existing use rights.

### 2.2 Existing Parking Supply

2.2.1 Based on measurement from plans provided by the CDHB as part of the redevelopment project, a total of nearly 1,200 vehicle parking spaces are provided over the full campus, as illustrated in Table 1 below:

	Main Site	St Asaph		Total
		(Buildings)	(Open)	
Patients/Visitors	197	389	79	668
Staff/Pool cars	75	354	81	510
<b>Grand Total</b>	<b>272</b>	<b>743</b>	<b>160</b>	<b>1,175</b>

Table 1: Existing Vehicle Parking Provision

### 2.3 Existing Levels of Parking Demand

2.3.1 The joint Urbis/QTP *Preliminary Transport Assessment*, dated February 2014, noted the following in relation to parking demand generated by the existing Hospital activity:

- a) The existing hospital campus has a Gross Floor Area (GFA) excluding car park buildings totalling around 130,000m<sup>2</sup>, with the main site, being the land area located north of Riccarton Avenue, having a GFA of some 104,000m<sup>2</sup>.
- b) It is extremely difficult to establish the actual total parking demand of the Hospital site via vehicle number surveys, as (in common with other significant Central City traffic generators) all parking demand is not accommodated on site and instead is to be spread over a significant area. While the Hospital does have significant dedicated parking areas and parking buildings, it has also

historically placed a heavy reliance on available on-street parking in the area – and in particular along Riccarton Avenue to the west of the site.

- c) Definitive data on hospital employment (in terms of staff on-site at any one time) does not appear to be readily available. Various analysis methodologies suggest a range of 1,465-5,250 people however not all of these people would be on site at any one time. A value of around 3,000 staff on site is considered reasonable for analysis purposes.
- d) In terms of comparison with other similar facilities and analysis of available, and relevant, data suggests the parking demand rates presented in Table 2 below:

Hospital [beds]	Rate/bed	Rate/100m <sup>2</sup> GFA
FVR (UK) [860]	1.94	
Tauranga [337]	3.41	2.30
TPMH [249]	3.16	
Burwood [129]	3.26	
Whakatane [110]	1.85	3.60
ChCh Hospital (1175 space supply for 637 beds)	1.84	1.13

Table 2: Surveyed Total Parking Demand Rates at Other Hospitals

## 2.4 City Plan Parking Requirement of the Proposed Hospital

- 2.4.1 Based on a total of 759 proposed beds the City Plan parking requirement would be a total of 1,645 spaces (380 for visitors + 1,265 for staff). Again this assessment ignores any historical parking reductions protected by existing use rights.

## 2.5 Estimated Future Levels of Parking Demand

- 2.5.1 The joint Urbis/QTP report noted that:
  - a) Applying the FVR rate above to Christchurch would suggest total existing demand for around 1,236 spaces. This demand estimated as considered slightly low given the apparent extensive use of Riccarton Avenue and Hagley Avenue on-street parking by hospital staff and visitors.
  - b) If possible the parking supply should be increased to a preferred level of around 1400-1500 spaces – particularly if bed numbers are going to be increased by around 122 beds. Of this total it was recommended that a minimum of around 600 visitor spaces and 100 spaces be provided to serve critical staff and service needs on the 'main' site, with a further 300 spaces located in the immediate vicinity and a further 400-500 spaces located around the balance of the wider CDHB site.

- 2.5.2 Since that analysis work was undertaken a parking demand survey was taken within the wider Hospital campus and on all streets surrounding the campus on Good Friday being 29th March 2013. This survey data was specifically chosen as commercial activity in the area surrounding the site was closed such that any competition for the on-street parking supply would be minimised. This survey, which was taken at 2-hourly increments across the day, recorded a peak parking demand for around 820 spaces at 2pm (shift changeover) and a design 85%ile demand across the day for around 700 spaces. In terms of this survey it is noted that hospital was not operating all services on a public holiday (and in particular activities on the St Asaph campus were largely closed) and it is also noted that the increased availability of on-street parking on the survey day could have altered staff travel mode towards private car. Allowing for these influences suggests that a typical weekday design demand of around 800 spaces. Extrapolating this demand based on bed numbers suggest a future estimated demand for around 1000 spaces although it is emphasised that the 'snapshot' methodology of the survey would make this estimate very broad.
- 2.5.3 Noting the existing floor area of 130,000m<sup>2</sup>, and noting that the proposal will result in a total GFA of 139,000m<sup>2</sup> (= +7%), and assuming a linear relationship between floor area and parking demand, suggests that a future design parking demand would be around  $1000 \times 1.07 = 1070$  spaces. Again this approach is somewhat 'broad' but would likely overstate things given that many of the services to be provided in the proposed ASB will replicate existing services on site albeit in a larger facility. However the 1070 space estimate is close to the 1000 space estimate above.
- 2.5.4 A third consideration is that it is proposed to provide additional substantial parking facilities in association with the Metro Sports Facility to be located south of St Asaph Street. It is not known how differing peak demands between the Hospital and Sports facilities could affect the viability of a shared use parking facility.
- 2.5.5 Ultimately, as the design of the ASB proposal has been refined further, and a greater understanding of the services to be provided in this building has become known, it is becoming increasingly apparent that the proposed building is unlikely to affect the parking demand of the wider Hospital activity to the extent previously thought. While it remains that master planning of the wider Hospital redevelopment (for example a replacement ambulatory services facility) should seek to improve on-site parking provision to the previously recommend levels of 1400-1500 spaces as an ideal, there appears less argument for this level of parking supply as part of the proposed ASB building if considered as an initial stage of a wider redevelopment.
- 2.5.6 It remains difficult to be precise about proposed parking supply levels however the data and analysis to date suggests that at least a minimum supply of around 1000 spaces should be maintained and that this should be increased, if possible, to a minimum of around 1200 spaces directly in association with the ASB proposal if an improvement in the parking supply level of service is to be sought.

2.5.7 As further site development ensues in the longer time frame, and depending upon parking availability on the Metro Sports Centre site, then an increased optimum supply of around 1400-1500 spaces can be reconsidered at a later date.

## 2.6 Proposed Parking Supply

2.6.1 A key issue with the location of parking for use in association with the Hospital is site access. The main Hospital campus is extremely constrained in terms of site accessibility. While proposed site access arrangements are discussed later in this assessment, it is noted now that the current signalised site access from Riccarton Avenue will always be the primary site access for the Hospital campus.

2.6.2 It is also noted that the provision of visitor parking on the Hospital site has been a contentious issue for the public. Although this may seem somewhat controversial, the decision needs to be made that the main Hospital campus is for the provision of health services and not for the provision of visitor parking generated by it. Instead it is recommended that there needs to be a fundamental change on the management of on-site parking to instead encourage use of any on-site visitor parking areas as drop off areas only and accessible parking- akin to what occurs at airports.

2.6.3 The public expectation of finding a visitor park on the main site in general needs to be removed. The only notable exception to this should be the in the vicinity of the Emergency Department and Oncology Departments as a result of the nature of their operational activity. A parking facility on this location would be afforded an excellent level of access via the existing Riccarton Avenue signals which presently have ample capacity to absorb any additional Hospital generated traffic flow.

2.6.4 Given the above it is recommended that a proposed minimum parking supply of around 1100 spaces is achieved for the ASB project as follows:

- a) Around 200 spaces in the immediate location of the proposed Emergency Department and accessed from Riccarton Avenue.
- b) Around 100 spaces located around the main site in various locations. These spaces are to be prioritised for drop off and accessible parking spaces only.
- c) A minimum of 350 spaces located near the western end of the main site with the logical location being in the location of the current 'blue' parking building.
- d) Around 350 spaces located in the St Asaph Street staff parking building.
- e) Around 100 staff and some visitor spaces located around the various buildings on the St Asaph Street Campus.



- 2.6.5 It also remains a recommendation that with further redevelopment of the Hospital activity that further improvements in the parking supply convenient to the site be made with around 1400-1500 spaces being a target final supply. The additional 300 spaces could logically be achieved as follows:
- f) Increasing the parking supply in the Emergency Department parking structure (although this is less favoured as it will start to reintroduce the mentality that public parking is available on the main hospital site) and/or;
  - g) Increasing the parking supply in the St Asaph Street staff parking building (it is understood that this has the structural capacity to have additional floors added to it), and/or;
  - h) Increasing the parking supply in the replacement 'blue' parking building through adding additional floors (and it is noted that it might be more economic to build a larger building in this location from the outset), and/or;
  - i) Further investigation of shared parking facilities with the Metro Sports centre once its operational characteristics are known.
- 2.6.6 The key point to note from the above assessment is that there are several viable options to provide additional parking supply as the activity requires it. There is certainly nothing in the current designation proposal for the ASB structure that would prevent an improved parking supply situation for the entire Hospital activity over the longer redevelopment period.

## 2.7 Interim Construction Period Parking Supply

- 2.7.1 Perhaps a more critical parking related issue is the ability of the Hospital to provide a suitable parking supply during the construction phase of the ASB project. The location of the proposed ASB will result in the removal of approximately 100 existing parking spaces located to the rear of the Women's Hospital building. Changes to site circulation around the Riccarton Avenue side of the site will also result on the loss of an estimated 30-50 parking spaces. The residual on-site supply will be around 100 spaces and, and noted above, it is recommended that these spaces be prioritised for drop off and accessible parking spaces only.
- 2.7.2 This leaves a demand for around 1000 spaces to be provided off-site. Around 350 spaces are located in the St Asaph Street staff parking building and around 100 staff and some visitor spaces located around the various buildings on the St Asaph Street Campus.
- 2.7.3 The residual demand for around 550 spaces would have historically been met by the on-site provision, the 'blue' parking building and the St Asaph Street staff car park. The majority of this supply was for staff parking.

- 2.7.4 The recent approval to develop the Cricket Oval results in the loss of that temporary car park (partial) solution. CERA's proposals for the road network are to reduce the on-street parking supply.
- 2.7.5 It follows that, in the absence of the blue parking building being operational in the least, there is an urgent need to resolve the construction period parking supply. Three potential solutions have been identified:
- a) Interim use of the future parking areas for the Metro Sports facility located immediately south of St Asaph Street and/or;
  - b) The use of the original Christchurch Women's Hospital; site in St Asaph Street and/or;
  - c) Leasing vacant land owned by third parties within the CBD and yet to be rebuilt upon.

All of these potential solutions will require the use of a shuttle to transport staff at frequent intervals if they are to be considered as valid alternate parking supplies.

## 2.8 Cycle Parking Provision

- 2.8.1 A final, but still important, parking related matter is the issue of cycle parking provision. The City Plan has a parking requirement for one cycle space per three beds which equates to a requirement for 212 spaces based on the existing 637 beds and 253 spaces for the proposed 759 beds.
- 2.8.2 Historically the CDHB has supported the use of alternate transport modes to access all of their sites and quality cycle parking provision has existed on the Christchurch Hospital site for many years. This provision is currently 395 spaces (approx.) within a secure staff facility and 35 spaces available for any users around the periphery of the site. However, the design and placement of these stands is such that only around 260 of the staff-only spaces can be used.
- 2.8.3 It is clear that there is heavy demand for cycle parking where it can be found - particularly within the secure staff facility. It is also apparent that there appears to be quite significant existing over-subscription of the public bike stands, with between 100-130 bikes being observed parked in public areas, compared with the 35 or so (useable) formal cycle stand spaces. The balance demand is met by cycles observed being locked to trees, lamp posts and fencing.
- 2.8.4 A total of between 360-390 cycles have therefore been observed parked on the current main hospital site at any one time (mid-afternoon). This may indicate quite a large latent and currently unsatisfied demand.
- 2.8.5 Noting that the majority of the City Plan car parking requirement is for staff parking provision, and noting that the demand for cycle parking on the site already exceeds the City Plan cycle parking requirement, we have previously recommended that master planning of any redevelopment proposal

should include provision for high-quality and secure staff cycle parking facilities. A total of around 600 cycle-parking spaces should be provided on the main hospital site, with (a minimum) of 500 reserved for staff use. These should meet modern standards for space and security, and be provided undercover where possible.

- 2.8.6 Although the provision for cycle parking is yet to be finalised, there does not appear to be any issues with providing this level of cycle parking supply on the site.

## 3.0 SITE ACCESS PROVISION

### 3.1 Existing Site Access Locations

- 3.1.1 The main Christchurch site is presently has vehicular traffic access at five locations (west to east):
- a) A minor driveway alongside the western site boundary has been recently upgraded to provide an alternative vehicle egress onto Riccarton Avenue for the limited number of car parks serving the relocated Outpatients building.
  - b) The principal access is a signalised intersection on Riccarton Avenue, providing signal-protected turns for both in and out movements. This mainly provides access to the drop-offs for the Women's Hospital and Oncology blocks, to the time-limited (patient and visitor) parking to the north of the Women's hospital block and to the new Outpatients department;
  - c) A secondary access from Riccarton Avenue to the east of the Nurses Chapel affords one-way entry to the main Parkside entry drop-off zone, the A&E department and to a limited number of parking spaces to the immediate south of the Parkside building;
  - d) A signalised (egress only) is provided at the intersection of Oxford Terrace/Antigua Street;
  - e) A bridge over the Avon provides two-way access, both for service traffic and drop-off (10-minute limited) parking alongside the Riverside block;

All existing site accesses have been observed to work well, with relatively little delay on either entry or exit.

### 3.2 Proposed Site Access Locations

- 3.2.1 The following changes are proposed for site access over the existing situation:
- a) The existing western boundary egress will be modified to become an exclusive ambulance access and egress.
  - b) The principle signalised access on Riccarton Avenue will be retained, however the layout of the signals will stretch westwards to the western boundary egress such that ambulances exiting the

Emergency Department will be provided an override to enable an exclusive green phase for them to exit the site as required.

- c) It is proposed to revert the access road along the southern side of the Women's Hospital and Parkside buildings back to a two way flow (the connection along the eastern side of Parkside will remain one way northbound to prevent non-site traffic short cutting through the site from Rolleston Avenue to Riccarton Avenue). Vehicles heading west along this access road will be provide two egress options being at the primary signalised access (for traffic intending to continue west) and also through a modified ramp beside the Nurse's Chapel that is proposed to centre for left turn exit manoeuvres (for traffic intending to continue east) in addition to the current left turn entry manoeuvre. This additional exit location shortens the exit travel route and minimises vehicle conflicts within the site at the top of the ramp.
- d) Modification to the road network outside the site will result in Oxford Terrace, between Riccarton Avenue and Antigua Street, being reduced in capacity to provide for a single lane eastbound route for accessing the existing taxi stand and for future access to development of the St Andrews site. Oxford Terrace, east of Antigua Street, will become a goods servicing route only for nearby businesses. These changes will enable the removal of the signals at the Oxford/Antigua intersection which in turn will increase exiting capacity the existing single lane discharge from the Hospital site. Traffic exiting the site will have to head south along Antigua Street to turn at the Antigua/Tuam intersection.
- e) The bridge over the Avon River to Rolleston Avenue will remain unchanged.

### 3.3 Interim Construction Access

- 3.3.1 The construction of the proposed ASB will be supplied with materials from the southern and eastern ends of the building. Current estimates of peak HGV traffic volumes during the four-year construction programme are up to 30 HGV's per hour in association with the major concrete pours. Outside of these times the HGV traffic flows generated by the project will be much less – typically no more than ten HGV's per hour. Light vehicle traffic generation associated with the build is unknown although volumes are unlikely to be high as most staff vehicles will be parked off-site and shuttles are to be used (this is to be specified as part of any contract tender process).
- 3.3.2 The proposed site access arrangement for the construction phase will be as follows:
  - a) The southern side of the construction area will be serviced from the primary Riccarton Avenue access (the existing signals). This access will be closed to the public for facilitate this use and a barrier is proposed to be placed across the existing link to the front of the Women's Hospital. Public access will instead be via the proposed modified two way access ramp to the east of the

Nurse's Chapel. This separation of construction traffic from 'public' traffic is considered a critical safety feature of the build project.

Trucks departing the southern side of the construction area will do so via the existing western site boundary. It is therefore proposed to 'stretch' the Riccarton Avenue signals from the outset so that trucks exiting the site will do so via a signalised control (this construction exit will then ultimately become the ambulance exit once the ASB and parking structure are complete).

- b) The eastern side of the construction area will be serviced via a proposed Bailey bridge to be installed across the Avon River immediately north of the existing Rolleston Avenue bridge. This bridge is to also provide a physical separation between construction traffic and 'public' traffic. The detailed design of the existing and proposed bridge connections to Rolleston Avenue is yet to be resolved however the current concept is for the Bailey bridge to provide for a separate one-way exit lane from the site only. This is to minimise potential vehicle conflict points both at the Rolleston Avenue boundary and internally within the Hospital site. Swept path analysis undertaken to date confirms that the proposed Bailey Bridge alignment will enable full accessibility by the largest construction trucks expected on site without the need for relocation of the Rolleston statue.

### 3.4 Service Delivery Access

- 3.4.1 Service delivery for the Hospital is presently provided by a 'clean dock,' and a 'dirty dock' both of which are located near the north-western corner of the Riverside building. Service delivery is currently primarily from Rolleston Avenue although the docks are also accessible from Riccarton Avenue if necessary.
- 3.4.2 The extent of the footprint of the proposed ASB means there will be a time on the construction programme when these docks will no longer be directly accessible. A series of alternate service delivery options have been developed depending upon the stage of the ASB construction programme, and none of these options depart from the current use of the Riccarton Avenue primary access and the Rolleston Avenue bridge for delivery access.
- 3.4.3 Ultimately the eastern end of the proposed ASB will provide replacement docks at the lower ground level. Service delivery will then return to being primarily from Rolleston Avenue.
- 3.4.4 The on-site oxygen (VIE) tank is presently located alongside the northern side of the Women's Hospital building. It is accessed by the delivery tanker via the Rolleston Avenue and exits to Riccarton Avenue via the signals. It is proposed to relocate the tank to the eastern end of the site near the present services building. It is proposed that the tanker will continue to access the site via the Rolleston Avenue bridge, and then travel contra-flow along the northbound traffic lane within the site and then exit to Antigua Street. The contra-flow arrangement is not ideal however the tanker

accesses the site once a month around 5:30am and on-site management will avoid any potential conflict with other traffic on this section of road within the site.

### **3.5 Emergency Vehicle Access**

- 3.5.1 The emergency department ambulance dock is located at the eastern end of the Parkside block. Ambulances entering the site from the east do so via the Riccarton Avenue signalised access. Ambulances entering the site from the west do so via the Nurse's Chapel access ramp. Until recently all ambulance traffic left the site via the Antigua Street egress however recent congestion issues at this egress have resulted in the Hospital now allowing ambulances to exit via the Rolleston Avenue bridge as well.
- 3.5.2 The construction phase of the ASB will not affect ambulance access arrangements.
- 3.5.3 The proposed location of the Emergency Department at the western end of the site will provide for an exclusive ambulance site access to Riccarton Avenue alongside the western site boundary.

### **3.6 Pedestrian Accessibility**

- 3.6.1 Pedestrian access into the main Hospital site is provided in several locations along the Riccarton Avenue frontage and also via the Rolleston Avenue bridge.
- 3.6.2 Notable omissions in formal pedestrian routes with the current site layout are alongside the Antigua Street site egress and also the lack of a pedestrian route alongside the internal road between the existing Emergency Department drop off zone and the Rolleston Avenue Bridge. Current design proposals for the entire main site layout rectify these shortcomings.
- 3.6.3 If there is to be less short-medium term visitor parking on the site itself then any remote parking facilities need to provide an extremely high level of pedestrian connectivity to the main site. It is our option that a fundamental design failing of the proposed 'blue' Hospital parking building was the very poor pedestrian connectivity to the main Hospital site. Visitors instead preferred to park on the site itself and thus contributed towards the on-site parking congestion issues. Noting the proposed use of Tuam Street as an arterial connection into the CBD and also as a bus 'super stop' it is strongly recommended that any pedestrian connection between the 'blue building' and the main Hospital site should be grade separated at least across Tuam Street and preferably across Oxford Terrace as well.

## 4.0 TRAFFIC GENERATION

### 4.1 Existing Levels of Traffic Generation

4.1.1 The joint Urbis/QTP *Preliminary Transport Assessment* provided an estimate of existing site generated volumes based on count data collated from the Council. This estimate is summarised in Table 3 below. This is the combined use of all site accesses. It therefore excludes trips generated by the main site from users who park in the public and staff car parking buildings.

	7-8am	8-9am	2-3pm	4-5pm	5-6pm
IN	212	288	334	221	221
OUT	184	158	317	313	206
2-way	396	446	651	534	427
Trips/park	1.44	1.62	2.37	1.94	1.55

Table 3: Existing Main site vehicle generation (vehs/hr)

(Note Riverside access contribution has been estimated based on assumed turnover)

4.1.2 In October 2013 site specific traffic counts were undertaken at all of the main site access points in order to provide a more accurate base set of count data for analysis of potential future traffic volumes to be generated by the main site. These counts were undertaken in the school holidays and so they were adjusted to reflect typical term operating levels through reference to ratios of patient attendance levels. This weekday peak period data is summarised in Tables 4 and 5 below:

Extrapolation based on the AM Survey (0900-1000hrs)	2013 Counted Volume	2013 Access Adjusted Volume	Holiday Adjustment	2013 Adjusted volume
Riccarton Left Turn In	208	256	116.19%	297
Riccarton Right Turn In	122	156	116.19%	181
Riccarton Left Turn Out	50	58	116.19%	67
Riccarton Right Turn Out	21	39	116.19%	45
<b>Subtotal</b>	<b>401</b>	<b>509</b>		<b>590</b>
Slip Lane left turn in	26	26	116.19%	30
Antigua Exit	112	112	116.19%	130
<b>Total Main Site generation</b>	<b>539</b>	<b>647</b>		<b>750</b>

Table 4: Existing main site weekday AM peak vehicle generation from Urbis surveys (vehs/hr)

Extrapolation based on the PM Survey (1300-1400hrs)	2013 Counted Volume	2013 Access Adjusted Volume	Holiday Adjustment	2013 Adjusted volume
Riccarton Left Turn In	228	256	116.19%	297
Riccarton Right Turn In	144	174	116.19%	202
Riccarton Left Turn Out	33	48	116.19%	56
Riccarton Right Turn Out	29	64	116.19%	74
<b>Subtotal</b>	<b>434</b>	<b>542</b>		<b>629</b>
Slip Lane left turn in	19	19	116.19%	22
Antigua Exit	152	152	116.19%	177
<b>Total Main Site generation</b>	<b>605</b>	<b>713</b>		<b>828</b>

Table 5: Existing main site weekday PM peak vehicle generation from Urbis surveys (vehs/hr)

- 4.1.3 Analysis of the Urbis peak hour data relative to Council generated 24hr SCATS and tube count data indicates that the overall main hospital site generates around 2500-3000 vehicles per day across its various site access points.
- 4.1.4 The above information excludes traffic generated by the 'blue' parking building and the balance CDHB sites on the St Asaph Street campus.
- Operational data of the parking building was obtained from the Council for selected dates in February and December 2010 and February 2011 which were all before the February 2011 earthquake that closed the building. This data, which is of limited accuracy owing to the way the data was collected, suggests that the parking building generated around 450 trips per day and around 50 vehicles per hour in the peak hours.
  - Observation of the levels of activity at the balance of the St Asaph Street sites shows that parking turnover was infrequent and that site generation was at relatively low levels. This combined with the long road frontages and multiple access points means that traffic generated by these activities is unlikely to have much effect on road network operation and is not considered further in this report.

Overall it is broadly estimated that the entire Christchurch Hospital activity generates around 4000 trips per day.

## 4.2 Estimated Future Levels of Traffic Generation

- 4.2.1 It has been extremely difficult to predict likely future traffic generation levels as a result of redevelopment of the main Hospital site.
- 4.2.2 Discussions with the project architects have confirmed that the proposed ASB is primarily to provide replacement services on the Hospital site. A significantly increased building size is largely defined



by the demand for improved facilities rather than catering for new facilities within the site. It follows that the ASB building, considered in isolation and based on current patient demand levels, is unlikely to make much difference to overall traffic levels generated by the Hospital activity.

4.2.3 Instead future increased traffic generation levels will be driven by growth in patient numbers as a result of increased population. Three different patient growth methodologies have been assessed<sup>1</sup> and these result in a growth range of 119% to 135% over existing levels for a design year of 2031. The selected growth rate was 130% being considered a suitable design value within the range. The estimated future design year access volumes are estimated in Tables 6 and 7 below:

Extrapolation based on the AM Survey (0900-1000hrs)	2013 Adjusted volume	Adopted Growth rate to 2031	Estimated 2031 Access Volume
Riccarton Left Turn In	297	+30%	386
Riccarton Right Turn In	181	+30%	235
Riccarton Left Turn Out	67	+30%	87
Riccarton Right Turn Out	45	+30%	58
<b>Subtotal</b>	<b>590</b>		<b>766</b>
Slip Lane left turn in	30	+30%	39
Antigua Exit	130	+30%	169
<b>Total Main Site generation</b>	<b>750</b>		<b>974</b>

Table 6: Estimated future main site weekday AM peak vehicle generation from Urbis surveys (vehs/hr)

Extrapolation based on the PM Survey (1300-1400hrs)	2013 Adjusted volume	Adopted Growth rate to 2031	Estimated 2031 Access Volume
Riccarton Left Turn In	297	+30%	386
Riccarton Right Turn In	202	+30%	262
Riccarton Left Turn Out	56	+30%	73
Riccarton Right Turn Out	74	+30%	96
<b>Subtotal</b>	<b>629</b>		<b>817</b>
Slip Lane left turn in	22	+30%	29
Antigua Exit	177	+30%	230
<b>Total Main Site generation</b>	<b>828</b>		<b>1076</b>

Table 7: Estimated future site weekday PM peak vehicle generation from Urbis surveys (vehs/hr)

4.2.4 It is important to note that the estimated +30% level of patient demand growth on the site will happen irrespective of any redevelopment proposal. It will be up to the Hospital to meet this growth and the subsequent effects on the road network will happen regardless.

<sup>1</sup> 1 = CDHB internal projections, 2 = linear relationship based on bed numbers, 3 = population growth from the UDS Landuse Summary (Rapid Recovery CCRP Update)

### 4.3 Potential Road Network Effects

- 4.3.1 The *Preliminary Transport Assessment* concluded that the proposed Stage 1 expansion of the Hospital can be accommodated on the existing and planned surrounding transport network subject to suitable levels of on-site parking provision being made and suitable site access arrangements being achieved.
- 4.3.2 Since that report was prepared we completed the October 2013 traffic counts at the various Hospital site access points and also accessed a wealth of historic traffic count information from both the Council and Urbis archives. This data has now been collated, compared and analysed.
- 4.3.3 The 2013 access surveys showed that the Riccarton Avenue site access has ample spare capacity to accommodate the expected level of traffic growth at this access. Discussions have been held with the Council's Signals Engineers in relation to 'stretching' the layout of the Riccarton Avenue signals to provide separate access and egress for the proposed Emergency Department alongside the sites western boundary. The Council staff were supportive of this concept although they await further detail of it. At this stage there appears to be no design impediment towards catering for additional Hospital generated traffic at this access location.
- 4.3.4 The current signalised Antigua/Oxford site egress has also been surveyed and found to currently suffer from congestion at isolated times of the day. This occurs as a result of this egress carrying at least equal site exiting flows to the main site access at Riccarton Avenue. There are times across the day when insufficient green time is afforded to this egress and queues can form within the site. This matter has been raised with the Council and their signals engineers are to be tasked with reviewing the green time allocation at this access. In the interim the connection to the Rolleston Avenue bridge will remain open to provide additional exiting capacity at the eastern end of the main site.
- 4.3.5 The closure of Oxford Terrace to the east of the Antigua/Oxford site egress will eliminate the need for signals at this egress point. Instead the intersection of Tuam Street and Antigua Street will play a more pivotal role in catering for traffic exiting from the eastern end of the Hospital site. Traffic modelling of the road network in the immediate vicinity of the Hospital site is about to be undertaken by CERA and they have granted permission for the CDHB/MoH to also use this model to evaluate site access options for the St Andrews site. At this stage we record that the matter is not an issue of catering for additional Hospital site generated traffic, but how best to cater for it. This will be resolved in the very near future.
- 4.3.6 If a second major parking facility is provided south of Tuam Street, and this is likely, then a high standard of pedestrian connectivity will be required between the two sites. CERA has agreed that a pedestrian overbridge across Tuam Street to connect the 'blue building' site and the main Hospital site is necessary and their designs for Tuam Street allow for this.

## 5.0 CONCLUSION

- 5.1.1 Overall it is our opinion that there is no traffic generation and site access impediment that would inhibit the progression of the Acute Services building.

## Preliminary Transport assessment

# Christchurch Hospital

2 Riccarton Avenue

3 February 2014

Reference: 146001g (QTP Ref: 2012034)

Revision: Master Planning (V12)



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<b>Urbis Reference:</b>	146001g	<b>TABLE OF CONTENTS</b>
<b>Title:</b>	Application for Land Use Consent – 92 Russley Road, Christchurch	
<b>Client:</b>	Ministry of Health and the Canterbury District Health Board	
<b>Filename:</b>	146001g 140203 Preliminary Transport Assessment V12.doc	
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## 1.0 INTRODUCTION

The following preliminary transport assessment summarises the key transport-related aspects of the proposed development at the CDHB Christchurch Main Hospital campus located at 2 Riccarton Avenue, Christchurch. In particular, the following assessment will provide advice on initial considerations towards the provision of parking for the Campus and how vehicular site access arrangements should be provided.

It is emphasised that the following preliminary assessment is not to be viewed as a complete Integrated Transport Assessment (ITA), such as that required to accompany a future resource-consent application. It is noted from the outset that further research work will be required of the parking demand characteristics of the campus in order to provide a more accurate evaluation of parking supply options for the Hospital activity.

In addition, it is noted that there are various site access options potentially available, depending upon the extent that the Council and/or CERA are willing to alter the surrounding road network in order to achieve the Christchurch Central Recovery Plan.

## 2.0 EXISTING DEVELOPMENT

### 2.1 Estimated Existing Hospital Floor Areas

The existing hospital campus has a Gross Floor Area (GFA) excluding car park buildings totalling around 130,000m<sup>2</sup>, with the main site, being the land area located north of Riccarton Avenue, having a Gross Floor Area (GFA) of some 104,000m<sup>2</sup>.

**Table1: Existing Campus Development Gross Floor Area (m<sup>2</sup>)**

GFA of Existing Site	Main Site <sup>1</sup>	St Asaph <sup>2</sup>	Total
Occupied	104,285	19,295	<b>123,580</b>
Vacant+ancillary <sup>3</sup>		6,695	<b>6,695</b>
Parking Buildings		20,985	<b>20,985</b>
<b>Grand Total</b>	<b>104,285</b>	<b>46,975</b>	<b>151,260</b>

1. Main Site includes 9,660m<sup>2</sup> School of Medicine and 18,745m<sup>2</sup> CWH

2. Includes Staff parking building

3. 'Ancillary' includes crawl space

### 2.2 Estimated Existing Hospital Staff Numbers

Definitive data on hospital employment (in terms of staff on-site at any one time) does not appear to be readily available. Statistics NZ Business Frame estimates suggest that pre-quake total employment on the main hospital site (MB 2678500) was around 5,250, with the St Asaph site (MB 2647800) accounting for a further 550 jobs. These figures do appear in broad alignment with the estimated total of 8,500-9,000 staff employed across all CDHB facilities according to the CDHB website, taking into account staffing levels at the other 13 (smaller) hospitals. Of course, not all of employed staff will work each day and shift patterns are such that the maximum number on site at any one time will be smaller still.

Based on information for Burwood Hospital, where some 660 people are understood to be employed in total, with an estimated 448 staff working each day (68%) and a maximum staff accumulation of 418 (93% working staff) during mid-afternoon shift-change, this would suggest that, if applied to the main Christchurch hospital site, and as a broad estimate, a maximum of around 3,320<sup>1</sup> staff may be on the main hospital site at any one time (1 staff member/31m<sup>2</sup> GFA).

However, this is considered likely to represent an absolute upper estimate, as using other methods/sources significantly lower estimates are produced. For example, the (estimated) maximum staff accumulation at Burwood is equivalent to 3.24 staff/bed<sup>2</sup> whereas the equivalent figure for The Princess Margaret Hospital (TPMH) is 2.30 staff/bed<sup>3</sup>. If applied to the existing Christchurch hospital, this would suggest a potential maximum number of staff on site potentially ranging between 1,465-2,064 people<sup>4</sup>.

Other data sources suggest that major hospitals may have a staffing rate of around 4.5/bed, which would put the total employment at around 2,860.<sup>5</sup> This value accords with a sample employment dataset for Wednesday 27<sup>th</sup> March 2013 of around 25000 staff on site excluding doctors<sup>6</sup>.

### 2.3 Christchurch City Plan Parking Requirement

The Christchurch City Plan parking requirement for a Hospital is based on bed numbers. Car parking requirements are 1 space per 2 beds for patients/visitors plus 5 spaces per 3 beds for staff. This equates to a total of 2.17 spaces per bed. It is important to note that this parking requirement is generic and designed to cover a range of hospital activities. It is not a requirement intended to specifically address the parking demand of the Christchurch Hospital campus in particular. There are also issues with the application of the requirement as it is based on bed numbers which is a far from certain assessment methodology. However the operative City Plan parking requirement forms a useful starting point with more detailed consideration of parking supply being available through the resource consent process.

Adopting the operative City Plan parking requirement for this preliminary assessment, and ignoring any existing use rights for historic site development as afforded under Section 10 of the Resource Management Act (RMA), then based on 637 existing beds<sup>7</sup> the City Plan parking requirement would therefore be a total of 1,381 spaces (319 for visitors + 1,062 for staff), which would suggest a theoretical shortfall of around 400 spaces based on a current on-site parking supply of approximately 977 spaces.

However it is extremely difficult to calculate the actual City Plan parking requirement for the entire Main Hospital campus. This is because many of the buildings across the campus pre-date the application of District Plan parking requirements and/or were developed under a scheduled site status where District Plan parking requirements were not necessarily applicable. There is also a strong element of existing use rights with respect to parking provision as afforded by the provisions of Section 10 of the RMA. To further complicate things there is the additional parking supply located around the various buildings on the southern part of the campus (i.e. south of Tuam Street).

<sup>1</sup>  $5,250 \times 0.68 \times 0.93 = 3,320$ .

<sup>2</sup> Based on 448 daily staff arrivals and estimated max 418 staff on-site at afternoon shift-change/129 beds.

<sup>3</sup> Based on 768 daily staff arrivals and estimated max 710 staff on-site at afternoon shift-change/249 beds.

<sup>4</sup>  $637 \times 2.3$  (TPMH) = 1,465.  $637 \times 3.24$  (Burwood) = 2,064.

<sup>5</sup>  $637 \times 4.5 = 2,867$

<sup>6</sup> Information provided by email from Karen Munn 24 May 2013

<sup>7</sup> Although, in practice, bed numbers vary between around 600-650

An assessment of the parking requirement for the 'main' Hospital site (i.e. north of Riccarton Avenue and the ancillary sites to the south of Tuam Street that provide parking directly for the 'main site') was made by the Council in 2002. This assessment noted a historic parking supply on the 'main' site of 320 spaces. This was considered to be the 'baseline' parking supply with subsequent development of the campus adding or subtracting to this supply based on the City Plan parking requirement being applied to any increases in scale of activity on the 'main' Hospital site.

The construction of the multi-level parking building on the corner of Tuam Street and Antigua Street boosted the parking supply to 709 spaces. While this parking building was a joint venture between the Council, the landowner and the CDHB, all of the parking spaces contained within the building were considered to contribute towards the parking requirement for the 'main' hospital site as this was their fundamental purpose.

The construction of the Women's Hospital reduced the on-site supply to 647 spaces. The proposed City Plan parking requirement for the expanded hospital was assessed at the time as being around 885 spaces. The parking building on the corner of Antigua Street and St Asaph Street then increased the supply by 258 spaces to 967 spaces. The more recent relocation of the outpatients department has further increased the on-site parking supply to around 977 spaces – leaving a 92 space City Plan surplus<sup>8</sup>.

A more complete history of parking supply compared to City Plan requirements is given in Appendix 1. Note that this history also does not consider any parking required and/or provided on other CDHB sites to the south of Tuam Street that form the wider Christchurch Hospital campus. These other sites are assumed as being self sufficient in terms of meeting any applicable District Plan parking requirement. Therefore the preceding assessment and that contained in Appendix 1 should not be considered as definitive for the entire campus.

Instead it is considered that the current redevelopment proposal will provide an opportunity to more fully assess the parking demand of the current level of Hospital activity with the data being used to perhaps develop a site specific parking requirement. This is especially the case given the more recent development of the *health precinct* concept that is likely to provide additional parking infrastructure in the locality anyway.

## 2.4 Existing Vehicle Parking Provision

Based on measurement from plans provided by the CDHB as part of the redevelopment project, a total of nearly 1,200<sup>9</sup> vehicle parking spaces are provided over the full campus, as illustrated in Table 2 below and with locations shown in Figure 1 below.

**Table 2: Existing Vehicle Parking Provision**

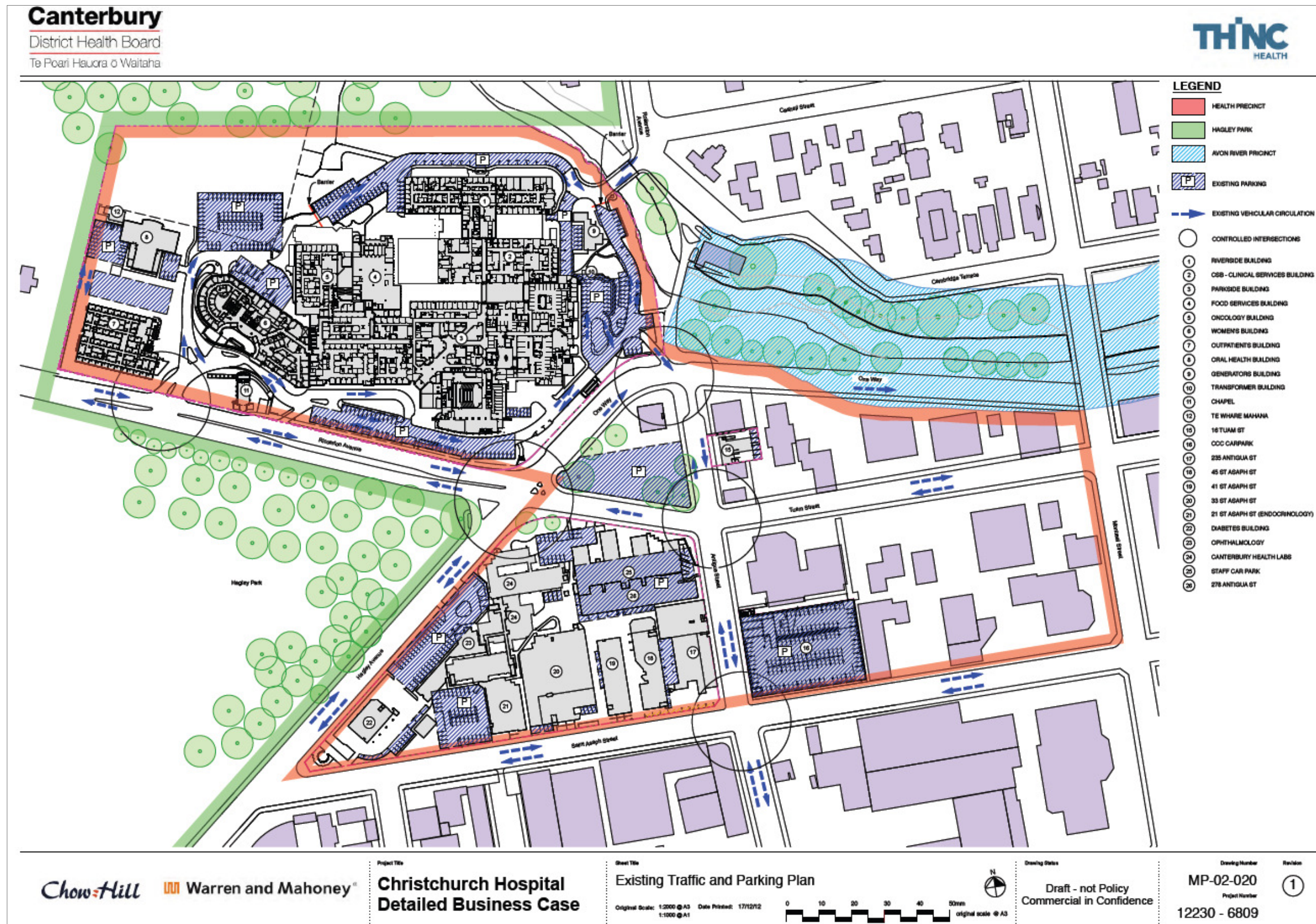
	Main Site	St Asaph		Total
		(Buildings)	(Open)	
Patients/Visitors	197	389	79	668
Staff/Pool cars	75	354	81	510
Grand Total	272	743	160	1,175

<sup>8</sup> 977-885 = 92

<sup>9</sup> This includes the public car parking building of 389 spaces which is currently closed following the Canterbury earthquakes.



Figure 1: Location of Onsite Parking Areas



The existing main site provides an estimated 637 bed spaces – although, in practice, bed numbers vary between around 600-650. On completion of the redevelopment, there would be a net addition of around 30,000m<sup>2</sup> GFA and 122 bed spaces on this site.

## 2.5 Existing Vehicle Parking Demand

It is extremely difficult to establish the actual total parking demand of the Hospital site via vehicle number surveys, as (in common with other significant Central City traffic generators) all parking demand is not accommodated on site and instead is to be spread over a significant area. The parking demand of the Hospital campus will include use by staff of both on-street and potentially (non-CDHB) leased parking, in addition to the CDHB sites and public parking buildings. The total parking demand (not just that provided 'on-site') would, if required, therefore normally be established through careful selection of a vehicle number survey date to avoid the parking demand of third parties being assessed as campus parking demand, or through the application of interview survey data on mode-choice – or estimates of this based on similar, and similarly-located, facilities.

If vehicle number parking demand surveys were to be undertaken, then these would need to record the parking demand in both on-site and off-site locations. An inventory of all available on-site parking across the campus would be prepared and the surveying of the utilisation of these spaces is straight forward. The isolation of Hospital generated on-street parking demand from third party demand could be achieved through selecting a survey date on, for example, a public holiday where other activities in the area are not trading. Good Friday would be an example of this. A check would need to be made that typical staffing levels operate within the Hospital campus on the survey date (this could be more of an issue for the ancillary activities located predominantly on the southern part of the campus).

In the alternative, the need to undertake on-site modal split surveys can be better ascertained once the detail of the current redevelopment proposal is better known – particularly in terms of bed numbers relative to the existing situation.

In terms of comparison with other similar facilities, the Forth Valley Royal Hospital is a modern facility recently opened in Scotland. It serves a population of around 300,000 and has 860 beds as well as A&E departments and other specialist services. This site – which is located in an edge-of-town location such that all parking demand can be identified, has recently been surveyed as generating a maximum parking demand of around 1,667 spaces (1,000 staff parked and 667 patients and visitors) – or a total of around 1.93 parked vehicles/bed. This is less than the City Plan parking requirement of 2.17 spaces per bed. While it is noted that car-ownership levels in Scotland are only around half of that in Christchurch, the location of the Forth Valley Royal is such that 70% of both staff and visitors were car drivers. A higher modal split towards private car in the Christchurch situation suggests the City Plan parking requirement may be a suitable approximation of the likely parking demand of the activity. However further validation of this should be undertaken through parking surveys.

Surveys at Tauranga Hospital in 2008 (when the hospital had a GFA of around 50,000m<sup>2</sup> and 337 in-patient beds – or broadly half of the existing Christchurch site) revealed a total peak parking demand (including on-street) for around 1,150 spaces<sup>10</sup>. Comparing this quantum with the existing total provision at Christchurch would suggest that total actual demand for parking associated with Christchurch Hospital could represent up to around twice the actual provision<sup>11</sup>. Such an estimate would also therefore suggest that up to around 50% of vehicles associated with trips to the existing hospital by staff and visitors could have to park further afield than the existing sites (including the St Asaph area). This does not seem realistic and as such the Tauranga data suggests that staffing efficiencies are likely to be made with increasing Hospital scale.

<sup>10</sup> Source: <http://econtent.tauranga.govt.nz/data/planning/files/Tauranga%20Hospital%20-%20AEE%20-%20Appendix%20B%20-%20Transportation%20Assessment%20&%20Landscape%20Plan.pdf>

<sup>11</sup> Demand of c.2x1,150, compared with 1,175 total spaces provided.

Table 3 below compares the parking demand of various hospitals on a per bed basis and a GFA basis. This shows that the current parking supply rate is at the lower end of the range that is usually supplied with hospitals.

**Table 3: Surveyed Total Parking Demand Rates at Other Hospitals**

Hospital [beds]	Rate/bed	Rate/100m <sup>2</sup> GFA
FVR (UK) [860]	1.94	
Tauranga [337]	3.41	2.30
TPMH [249]	3.16	
Burwood [129]	3.26	
Whakatane [110]	1.85	3.60
ChCh Hospital 1175 spaces for 637 beds	1.84	

Applying the FVR rate above to Christchurch would suggest total existing demand for around 1,236 spaces, which, considering that around 1,175 are provided 'on-site', is also considered slightly low given, for example, that there appears extensive use of Riccarton Avenue and Hagley Avenue on-street parking by hospital staff and visitors.

Having reviewed available data relevant to the current proposal, it is considered the master planning for the Hospital redevelopment could be based on providing a minimum level of around 600 visitor spaces and 100 spaces for critical staff and service needs on the 'main' site, with a further 300 spaces located in the immediate vicinity. Up to another 400 spaces should be provided around the St Asaph site. This supply level would continue to recognise any shortfalls afforded by existing use rights for historic site development. However, this supply level has received criticism from the public in the past.

The preceding preliminary review of the parking requirement versus demand equation suggests that, if possible, the supply should be increased to a preferred level of around 1400-1500 spaces – particularly if bed numbers are going to be increased by around 122 spaces.

## 2.6 Existing Cycle Parking Provision

The City Plan has a parking requirement for one cycle space per three beds which equates to a requirement for 212 spaces based on the existing 637 beds and 253 spaces for the proposed 759 beds.

The main hospital site currently nominally has cycle stand space for around 430 cycles – some 395 within a secure staff facility and 35 available for any users around the periphery. However, the design and placement of these stands is such that only around 260 of the staff-only spaces can be used: Many of the stands, particularly within the secure quadrangle (staff-only) are of a dated design that prevents full use by many modern mountain bikes that have wider tyres. The placement of some of the stands (because of space constraints) means that both sides of many double-sided stands cannot actually be used because of proximity to other stands, trees etc. Essentially, there appears insufficient space within the secure quadrangle to make full use of the nominal number of bike stands provided – but it is clear that there is heavy demand for cycle parking where it can be found, particularly within the secure staff facility.

It is also apparent that there appears to be quite significant existing over-subscription of the public bike stands, with between 100-130 bikes being observed parked in public areas, compared with the 35 or so (useable) formal cycle stand spaces. The balance is locked to trees, lamp posts and fencing.

A total of between 360-390 cycles have therefore been observed parked on the current main hospital site at any one time (mid-afternoon). This may indicate quite a large latent and currently unsatisfied demand.

Noting that the majority of the City Plan car parking requirement is for staff parking provision, and noting that the demand for cycle parking on the site already exceeds the City Plan cycle parking requirement, master planning of any redevelopment proposal should include provision for high-quality and secure staff cycle parking facilities. The provision of such facilities will assist in any arguments towards having a reduced staff vehicle parking supply on the site, if necessary.

## 2.7 Existing Vehicular Access

The main Christchurch site is presently has vehicular traffic access at five locations:

- a) The principal access is a signalised intersection on Riccarton Avenue, providing signal-protected turns for both in and out movements. This mainly provides access to the drop-offs for the Women's Hospital and Oncology blocks, to the time-limited (patient and visitor) parking to the north of the Women's hospital block and to the new Outpatients department;
- b) A secondary access from Riccarton Avenue to the east of this affords one-way (entry-only) access to the A&E department, to the main Parkside entry drop-off zone and to a fairly limited number of parking spaces to the immediate south of the Parkside building;
- c) A minor driveway has been recently upgraded, which provides an alternative vehicle egress (only) onto Riccarton Avenue for the limited number of car parks serving the new Outpatients and adjacent buildings.
- d) A signalised (egress only) is provided at the intersection of Oxford Terrace/Antigua Street;
- e) A bridge over the Avon provides two-way access, both for service traffic and drop-off (10-minute limited) parking alongside the Riverside block;

All existing site accesses have been observed to work well, with relatively little delay on either entry or exit.

## 2.8 Existing Trip Generation

The estimated vehicle trip generation of the existing main site only is shown in Table 4 below. This is the combined use of all site accesses. It therefore excludes trips generated by the main site from users who park in the public and staff car parking buildings.

**Table 4: Existing Main site vehicle generation (vehs/hr)**

	7-8am	8-9am	2-3pm	4-5pm	5-6pm
IN	212	288	334	221	221
OUT	184	158	317	313	206
<b>2-way</b>	<b>396</b>	<b>446</b>	<b>651</b>	<b>534</b>	<b>427</b>
Trips/park <sup>12</sup>	1.44	1.62	2.37	1.94	1.55

(Note Riverside access contribution has been estimated based on assumed turnover)

<sup>12</sup> Based on a 272 space supply on the Main site

### 3.0 PROPOSED TRANSPORT NETWORK IMPROVEMENTS

Section 8, Appendix 4 of the City plan provides the road hierarchy for the greater Christchurch city area. This included a detailed area for within the central city nominally bordered by the four avenues.

The recent earthquakes resulted in the development of the Christchurch Central Recovery Plan which was approved on 31 July 2012 and contained limited information on transport in the central city. It was intended that more detailed work would be done after 31 July 2012 to design a transport system to support the recovery of the central city. It had been developed by the Canterbury Earthquake Recovery Authority (CERA) with extensive input from Christchurch City Council, Environment Canterbury and the New Zealand Transport Agency as well as incorporating feedback from the public consultation process.

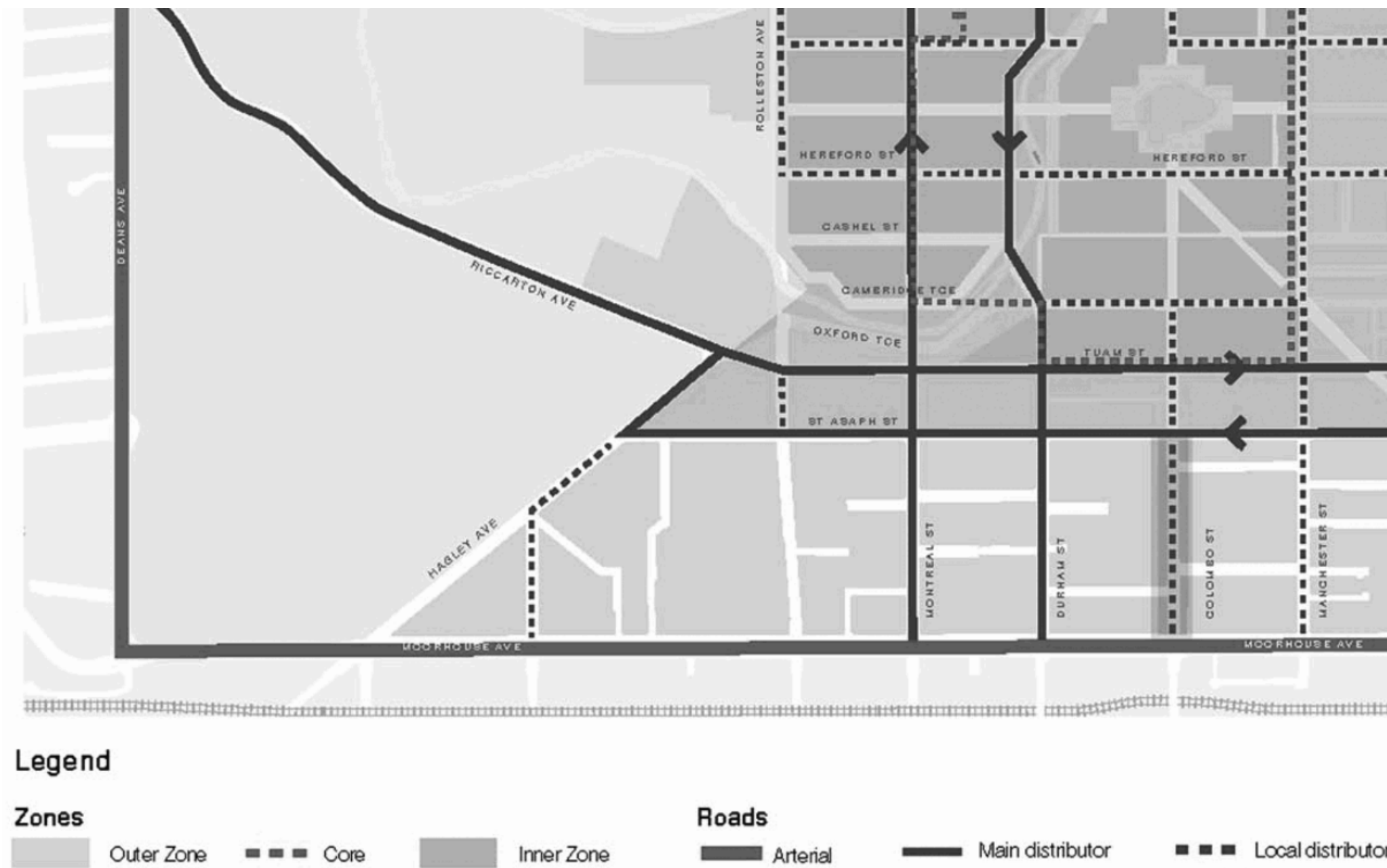
In November 2012 a draft An Accessible City chapter was released. It is focused on how people travel into and around the city, and how the streets will look as the central city redevelops post earthquakes. Public consultation on the draft, which ran from 15 November 2012 to February 1 2013, resulted in various changes with the final version of "An Accessible City" becoming a new chapter of the Christchurch Central Recovery Plan on 31 October 2013. The final version of "An Accessible City" included an appendix of changes required to the City Plan in order to assist with implementation of the central City rebuild. These changes have subsequently been incorporated into the operative City Plan.

Of relevance to this report is the revised road hierarchy from the Central City – presented as Section 8, Appendix 4B in the City Plan. The section of Appendix 4B in the immediate vicinity of the Christchurch Hospital site is presented as Figure 2 on the next page. Key features of this document that are likely to impact on potential options for the transport network to, from, and around the Hospital site may be summarised as:

- a) The arterial (one-way) traffic function of Oxford Terrace and Lichfield Street east of 'Hospital Corner' (the intersection with Hagley Avenue) will be transferred to Tuam Street. The one-ways of Tuam Street and St Asaph Street will be enhanced, as appropriate, with improved streetscapes, but will still be designed to enable efficient traffic movement. These roads (together with Riccarton Avenue) will be known as 'Main Distributors' under a revised City Plan road hierarchy.
- b) The planned traffic function of Hagley Avenue is proposed to be downgraded, being classified as a 'Local Distributor' (between Selwyn and St Asaph streets), and a local road south of this point. To reflect these functions and reinforce the proposed hierarchy designations, changes at the intersection with Moorhouse Avenue and Lincoln Road have been signalled, which would significantly reduce traffic flows on Hagley Avenue. These network changes could have a significant effect on the traffic demands at the 'Hospital Corner' intersection (Hagley/Oxford/Riccarton/Tuam).
- c) Public transport routing within the Central city is also proposed to be revised. A new Interchange located in the block bounded by Colombo, Tuam, Manchester and Lichfield Streets will replace the current (temporary) one. The existing (eastbound) bus services that use Oxford Terrace will in future be routed along Tuam Street. It is currently proposed that westbound services will be routed via the future Interchange along St Asaph Street, turning north into Antigua Street and continuing west (and south-west) via Tuam Street. Between Riccarton Avenue and Antigua Street, Tuam Street would therefore cater for two-way traffic, with westbound likely to be for buses only. A public transport 'Superstop' is proposed to be located in this section. With the current bus routing proposals, this would require 2-3 stops for west and south-west bound services to be located on the south side of Tuam Street, with a similar facility for eastbound services located on the north side.
- d) Hagley Avenue, Oxford Terrace (between Riccarton Avenue and Antigua Street) and Antigua Street are all signalled within the CCRP as key central city cycling routes.

These transport network proposals are aligned to serve wider central city recovery goals. Close links between Hospital Masterplan development with (transport) planning for a number of projects (currently being led by CERA) are apparent. The latter include the Health (and South Frame), and Avon River precincts, together with the Interchange and associated Superstops. Liaison and integration of transport-planning aspects of all of these projects is therefore likely to be essential to ensure that key opportunities are realised and the outcomes optimised.

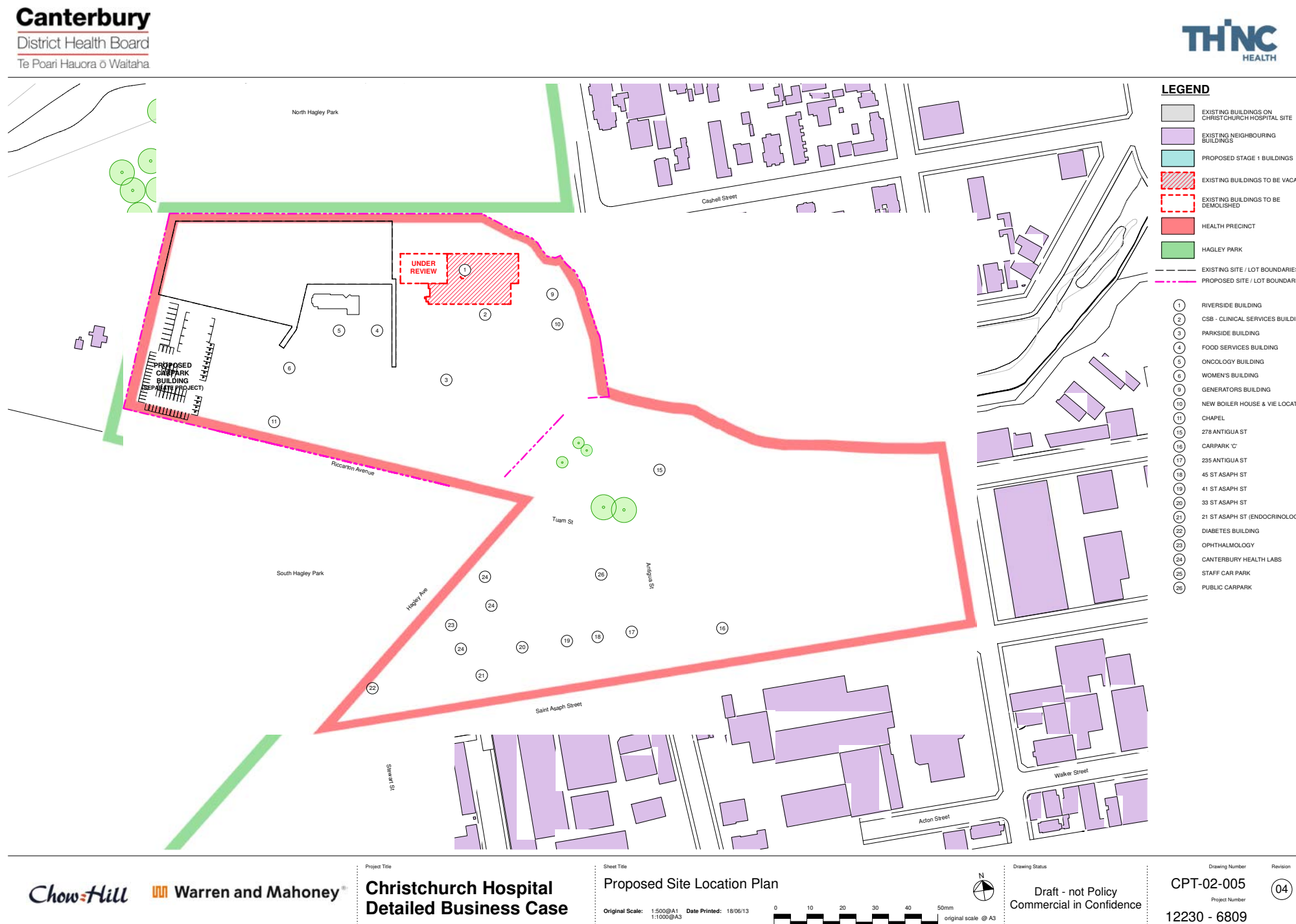
Figure 2: Central City Road Use Hierarchy



#### 4.0 PROPOSED REDEVELOPMENT

The proposed development provides a staged redevelopment strategy that will maintain service continuity and meet future needs for clinical services. It will involve specialist refurbishment along with new-build construction of a new block on the northern part of the site and subsequent demolition of the bulk of the existing Riverside block. The current proposed redevelopment (Stage 1), together with associated access and parking arrangements are illustrated in Figure 3 on the next page. The proposed scale of development is summarised in Table 5 also on the following page.

Figure 3: Proposed Parking and Access



**Table 5: Proposed Stage 1 Development (Main site only)**

Level	Existing Main Site		Continued operations		To be demolished (Riverside)		Proposed Stage 1		Main Site following Stage 1		Net Change	
	GFA	Beds	GFA	Beds	GFA	Beds	GFA	Beds	GFA	Beds	GFA	Beds
LG	18,245	15	15,485	0	-2,760	-15	+2,152		17,637	0	+608	-15
G	19,805	108	17,460	46	-2,345	-62	+10,480		27,940	46	+8,135	-62
1	17,390	82	15,045	28	-2,345	-54	+10,307		25,352	28	+7,962	-54
2	14,025	227	11,715	175	-2,310	-52	+7,927		19,642	175	+5,617	-52
3	12,145	205	9,835	147	-2,310	-58	+3,623	+48	13,458	195	+1,313	-10
4	11,565		9,260		-2,305		+3,623	+57	12,883	57	+1,318	+57
5	5,650		3,350		-2,300		+3,623	+64	6,973	64	+1,323	+64
6	3,515		3,050		-465		+3,623	+64	6,673	64	+3,158	+64
7	1,945		1,470		-475		+3,623	+64	5,093	64	+3,148	+64
8							+3,623	+64	3,623	64	+3,623	+64
<b>Total</b>	<b>104,285</b>	<b>637</b>	<b>86,670</b>	<b>396</b>	<b>17,615</b>	<b>-241</b>	<b>+52,604</b>	<b>+361</b>	<b>139,274</b>	<b>757</b>	<b>+34,989</b> (+34%)	<b>+120</b> (+19%)

(Note all figures are preliminary only for Master planning purposes and may be subject to change in future design stages)

The existing main site provides an estimated 637 bed spaces – although, in practice, bed numbers vary between around 600-650. On completion of the redevelopment, there would be a net addition of around 30,000m<sup>2</sup> GFA and 122 bed spaces on this site. The current proposal therefore anticipates that on completion of Stage 1, bed numbers would rise to around 760, providing around +19% more in-patient capacity than currently.

Stage 1 will not however result solely in an increase in in-patient bed capacity, but also provide improved accommodation for number of other existing campus services, including ED, acute assessment and radiology services. Total GFA will increase by around 28%. Whilst subsequent planning stages may benefit from more disaggregate and detailed analysis based on individual service requirements, it is reasonable to assume for master planning purposes that overall transport demand for the Christchurch Main hospital site is likely to rise by between 20-25%, compared with the existing activity.

#### 4.1 Proposed Parking Provision

As noted earlier, the City Plan parking requirement for Hospitals is based on bed numbers. Car parking requirements are 1 space/2 beds for patients/visitors and 5 spaces/3 beds for staff. If the current Hospital site was reassessed for parking afresh then the existing 637 bed supply would require 1,381 spaces. However recognition of historic development of the site meant that the Hospital was last assessed as requiring 885 spaces.

The 885 space requirement has been based on addition or subtracting more recent development on the site from a historic parking supply of 320 spaces. If this approach continued then the currently proposed 122 bed increase would require a further 61 visitor plus 203 staff spaces to be supplied on the 'site', resulting in a total of 1149 spaces. This is considered to be a minimum future supply level.

If the Hospital was reassessed afresh based on a 759 bed supply then it would require a total of 1,645 spaces (380 for visitors + 1,265 for staff).



Given the historic criticism that the Hospital has received about parking supply, it is considered that continuing to fully rely on historic parking dispensations would not be the most appropriate way forward. The earlier comparison of parking supply versus demand at the Forth Valley and Tauranga sites indicates that the City Plan parking requirement, or something close to it, should be a good approximation of likely future demand.

However the City Plan parking requirement, being based on bed numbers, is not considered to be the easiest method upon which to assess a parking requirement. This is a result of the inherent difficulties in obtaining precise bed numbers. In addition bed numbers can change over time without requiring further Council consent. The City Plan parking requirement issue is further complicated by the need to assess floor areas of 'other' activities within the campus, such as consultant's suites, industrial support facilities and the like, separately for parking. Instead it is considered that the current master planning project should include provision for the different parking assessment methodology to be considered as either part of the necessary resource consent application or as part of a possible plan change process to include and Outline Development Plan (ODP) within the City Plan.

The preceding preliminary review of the parking requirement versus demand equation suggests that, if possible, the supply should be increased to around 1400-1500 spaces in association with a 122 bed increase in capacity. Around 1,000 of these spaces should be located either on or in the immediate vicinity of the 'main' site for both visitors and staff. A 1500 space supply equates to a parking supply rate of 1.1 spaces per 100m<sup>2</sup> GFA<sup>13</sup> on the main site. This parking supply rate would reduce if the additional floor area on the southern part of the campus is included in the equation. This can only be determined through additional survey work as discussed earlier.

The 1400-1500 space parking supply would need to be split between visitor and staff parking. As a starting point for this preliminary analysis, the minimum patient/visitor actual requirement that could be recommended with convenient access to the required services could be represented by the City Plan requirements (1 space/2 beds) - equivalent to 380 spaces for the 759 total beds anticipated at the completion of Stage 1. However, a practical minimum (based on actual demand) is likely to be suggested by the (visitor/patient) demand rates surveyed at Forth Valley Royal Hospital which is equivalent to 0.78 spaces/bed. With addition of a small allowance to ensure the ease of finding a park, we would recommend a rate of 0.85 visitor/patient spaces/bed – or 645 spaces in total (say 600-650 spaces). Note that this would represent a minimum recommended total visitor provision across all services (including the St Asaph site).

In summary of the above it is recommended that master planning for the Hospital redevelopment should allow for a total of 1,400-1,500 car parks to serve both the main site and associated activities across the wider CDHB site. Of this total, it is recommended that a minimum of around 600 visitor spaces and 100 spaces be provided to serve critical staff and service needs on the 'main' site, with a further 300 spaces located in the immediate vicinity and a further 400 spaces located around the balance of the wider CDHB site.

In terms of locations for staff parking provision, future more detailed design for the St Asaph area should be made in conjunction with the balance of the proposed Health Precinct and Metro Sports Centres, to ensure that all opportunities for shared parking utilisation are explored.

## 4.2 Proposed Cycle Parking Provision

As noted above, there appears to be over-utilisation of available cycle parking spaces on the existing main hospital site. Improved provision for cyclists within any redevelopment should therefore be considered in future redevelopment plans, as this can be a 'win-win' - both for staff and visitors (health) and the CDHB (more efficient use of space of cycle parking versus car parking, improved productivity of staff, etc., etc). Opportunities of course for other good-practice initiatives (improved end-of-trip facilities) may also exist.

<sup>13</sup> 1500 spaces divided by a proposed GFA of 133965m<sup>2</sup>

We would recommend that provision for a minimum total provision of 520 spaces ( $c(130^{14}+250^{15})$  existing demand  $\times 1.25$ ) This estimate is only based on factoring existing demand. It would not accommodate the potential for this to increase with wider planned improvements in cycle networks (e.g. CERA/CCDU Central City Recovery Plan initiatives and CCC's Christchurch Strategic Transport Plan), nor a supposition that hospital staff may be more pre-disposed than the wider working population to healthier lifestyle choices.

As such it might be prudent to plan for total accommodation for a minimum of 600 cycle spaces (100 visitor and 500 staff<sup>16</sup>), allowing 1.3m<sup>2</sup> per space for planning purposes. The total may include retention of the existing secure staff facility and improving this through reorganisation and upgrading – along with supplementation with additional space as necessary.

#### 4.3 Proposed Site Access

The proposed site access arrangements for the Stage 1 redevelopment are supported, particularly in the light of some uncertainty over the final form – and timing – of the proposed changes to the wider transport network described above.

Essentially, the concept revolves around a separate and dedicated access and egress for emergency vehicles from Riccarton Avenue, ensuring a high level of service for emergency and acute admissions.

Access for the bulk of the proposed public parking (including the new parking building constructed as part of Stage 1) and some servicing vehicles will continue to be via the existing signalised (all-movement) intersection with Riccarton Avenue.

Other existing access points (the slip road from Riccarton Avenue, signalised-egress onto Oxford Terrace and Riverside service bridge are recommended to be retained under the Stage 1 proposal.

As noted above, we recommend that further work should be pursued by MoH and CDHB with CERA, CCDU, CCC and ECan, to ensure that both the longer-term hospital needs, and aspirations for wider improvements to Central city transport networks are developed (and balanced) in an integrated way. This comment is made in the knowledge of the planned closure of Oxford terrace and varying proposals for Tuam Street between Hagley Avenue and Montreal Street.

Given the location of Stage 1 development towards the western end of the site and the availability of signalised access, it is recommended that the majority of visitor parking for Stage 1 be provided in the general location of the current Outpatients facility.

With further activity expansion on the main site, consideration will also need to be given to a notable parking supply that conveniently serves the eastern end of the main site. This in turn should be serviced by a second primary access point, which most logically could be via an extension from the Hospital corner signals. Alternately, additional parking proviso could be provided on the current (blue) parking building site however pedestrian connectivity would need to be significantly improved over the historic situation. Ultimately there needs to be a significant readily accessible parking supply at each end of the main site. Both the overall site length and likely location of ambulatory care make this essential.

<sup>14</sup> Use in public areas has been counted between 115-136.

<sup>15</sup> Use in the secure staff-only area has been counted between 210-250.

<sup>16</sup> Assuming half the existing demand observed in public space is in fact staff use, total existing staff use would equate to  $65+250=315$  spaces. Applying this pro-rata to the proposed site ( $\times 1.25$ ) suggests demand for 394 staff cycle parks and  $1.25 \times 65=81$  for visitors. The 500 staff and 100 visitor space recommendation is however based on assumed potential for a further 25% increase each on these figures.

#### 4.4 Estimated Future Trip Generation

Based upon the anticipated total main site parking provision recommended earlier (700 spaces in total) and applying the (existing) trip generation rate estimated in Table 4 yields the following estimate of main site vehicle generation, following completion of Stage 1:

**Table 6: Potential Main site vehicle generation (vehs/hr)**

	7-8am	8-9am	2-3pm	4-5pm	5-6pm
IN	540	733	850	563	563
OUT	468	402	807	797	524
<b>2-way</b>	<b>1,008</b>	<b>1,135</b>	<b>1,657</b>	<b>1,359</b>	<b>1,087</b>
Trips/park	1.44	1.62	2.37	1.94	1.55

Once the Masterplan has been advanced (and approved) to a near complete state of certainty, more detailed planning of parking and the (potential) site access configuration and options should be pursued. However, based on the above anticipated generation, we would expect the proposed access arrangements to operate with a reasonable level of service.

A more detailed assessment should include detailed consideration not only of site traffic generation, but traffic distribution (where vehicles come from and go to) and assignment (which routes they choose to make their journey). This is a computer modelling process that would take into account interaction of site-generated traffic with all other traffic on the network, the inter-relationship of both with site parking and access proposals, as well as the proposed wider changes to the transport network as part of the Central City Recovery Plan.

Base traffic models have already been developed by QTP for the CCDU (both for the existing network and for that currently planned) on which to base such an assessment. The outputs of such an exercise will serve to confirm the impact of the proposed development, ensure the site access provides an appropriate level of service for emergency, service, public and staff access - and support any future resource consent application assessment. Such an assessment will be required, given that the proposed development will breach the High Traffic Generator rule within the City Plan.

As noted above, more detailed analysis (modelling) of the site access points under the proposed traffic generation is likely to be sought by CCC to support any Resource Consent (given the site's status as a 'High-Traffic Generator').

## 5.0 OVERALL CONCLUSION AND RECOMMENDATIONS

Our initial conclusion is that the proposed Stage 1 expansion of the Hospital can be accommodated on the existing and planned surrounding transport network subject to suitable levels of on-site parking provision being made and suitable site access arrangements being achieved.

As a result of this preliminary assessment we recommend that:

- a) Master planning should, at this stage, seek to achieve a total of 1,400-1,500 car parks to serve both the main site and associated activities across the wider CDHB site. Of this total, we recommend a minimum of around 600 visitor spaces and 100 spaces be provided to serve critical staff and service needs on the 'main' site, with a further 300 spaces located in the immediate vicinity and a further 400-500 spaces located around the balance of the wider CDHB site. The exact amount of parking to be provided on site in association with current development proposals should be determined through further research of the parking demand characteristics of the existing Hospital activity.
- b) Given the location of Stage 1 development towards the western end of the site and the availability of signalised access, it is recommended that the majority of visitor parking for Stage 1 be provided in the location of the current Outpatients facility. Later development towards the eastern end of the main site should include provision for a second major parking facility in order to provide convenient access to a quality parking supply across the wider campus. If provided on site then this should be serviced by a second primary access point, which most logically could be via an extension from the Hospital corner signals. If the second major parking facility is provided south of Tuam Street, then a high standard of pedestrian connectivity will be required between the two sites.
- c) A total of around 600 cycle-parking spaces should be provided on the main hospital site, with (a minimum) of 500 reserved for staff use. These should meet modern standards for space and security, and be provided under-cover, where possible.

That site access options for the main site be kept as flexible as possible. This includes continuation of the current primary site access via the Riccarton Avenue signals, retention of the current Oxford Terrace egress, and retention of the Cambridge Terrace bridge access.

We recommend that further work and collaboration should be pursued by MoH and CDHB, with CERA, CCDU, CCC and ECan, to ensure that both the longer-term hospital needs, and aspirations for wider improvements to central city transport networks to support Recovery objectives, are developed (and balanced) in an integrated way. The latter include development plans for the Health (and South Frame), and Avon River precincts, together with the Interchange and associated Superstops. Liaison and integration of transport-planning aspects of all of these projects is therefore likely to be essential to ensure that key opportunities are realised and the outcomes optimised.

Prior to further more-detailed development of the Masterplan (and preparation of Resource Consent supporting material, such as an Integrated Transport Assessment), it is recommended that further parking demand research be initiated and that pre-application discussions be initiated with CERA, CCC (and Ecan), to discuss the arrangements proposed.

## Appendix 1: Parking History

The historic parking and access situation for the Hospital site as determined from past consents approved by the Council is as detailed below. It is important to note that the following information only relates to the main Hospital site (i.e. north of Riccarton Avenue) and the ancillary sites to the south of Tuam Street that provide parking directly for the 'main site'. The following assessment does not consider any parking required and/or provided on other CDHB sites to the south of Tuam Street that form the wider Christchurch Hospital campus. These other sites are assumed as being self sufficient in terms of meeting any applicable District Plan parking requirement.

- Until 1998 the Christchurch Hospital had a Transitional District Plan parking requirement for 581 spaces, while around 320 parks were provided on site at the time. Additional parking on other CDHB sites in the vicinity boosted this parking supply, however it is not known if a complying parking supply was actually achieved. It is unlikely that a complying amount of parking was historically provided with the Hospital.
- In 1998 and in 2002 the Council respectively approved RC980761 and RMA20010113 which was for the construction of the multi-level parking building on the corner of Tuam Street and Antigua Street. The parking building is understood to actually contain 389 spaces – boosting the Hospital parking supply to around  $320 + 389 = 709$  spaces. The parking building site and the main hospital site are linked by a tunnel under Oxford Terrace. While this parking building is a joint venture between the Council, the landowner and the CDHB, all of the parking spaces contained within the building are considered to be applicable to the hospital site.
- One of the functions of the parking building was to replace an area of parking formerly available in the location of the recently constructed Christchurch Women's Hospital building. This expansion reduced the parking supply on the main site to around 258 spaces, and reduced the total parking supply to around  $258 + 389 = 647$  spaces. The proposed City Plan parking requirement for the expanded hospital was assessed at the time as being around 885 spaces. Therefore the hospital expansion resulted in an approximate 238 space parking shortfall (an exact shortfall could not be calculated as actual bed numbers were not finalised at the time). It was agreed at the time that the CDHB would make this (predominantly staff) parking available on other CDHB land in the vicinity prior to the expanded hospital commencing operation.
- In 2002 the CDHB successfully applied for resource consent (RMA20010455) to legalise and extend an existing CDHB car park located at 26 St Asaph Street & 46-50 Stewart Street from 202 spaces to 232 spaces. This parking supply was to meet the District Plan parking shortfall identified above. However the CDHB instead built the parking building on the corner of Antigua Street and St Asaph Street which has increased the hospital parking supply to 320 spaces beyond what was considered in 2002 ( $647 + 320 = 967$  space supply) and well above the proposed City Plan minimum parking requirement assessed at the time as being around 885 spaces. This parking supply is an important consideration in terms of parking compliance for future applications as there is a  $967 - 885 = 82$  space surplus.
- Also in 2002, the CDHB successfully applied for two new site access points to be constructed at the main hospital site (RMA20009564). The first access point was a temporary access ramp from Riccarton Avenue into the hospital site to provide an alternate access route which in turn allowed the existing signalised site access to be used as a construction access area. The second access was a new egress onto Oxford Terrace opposite the Antigua Street intersection. Resource consent was required primarily because the proposed access and egress locations did not comply with proposed City Plan rule 8-2.3.5 that limits access to the hospital site to those locations existing at the date of notification of the proposed City Plan. The proposal was also required to be assessed as a high traffic generator under rule 13-2.3.8 of the proposed City Plan.
- In 2005 the Hospital intended removing the temporary access ramp as part of the completion of the Women's Hospital expansion project. However this generated comment from the Accident & Emergency department, St John Ambulance, the Fire service and surgeons that the access ramp should be retained owing to the site access and circulation advantages it provides over using the signalised access. This prompted the CDHB to review overall site access and internal circulation and later in 2005 successfully applied for the permanent retention of the ramp.

- On 22 July 2009 the Council, approved RMA92013981 which was for the new oncology bunker and 145m<sup>2</sup> FTE staff numbers increased by 2 with this proposal as a result of the office extension. There were minor amendments to the parking layout however there was no change in overall parking numbers. These remained at an 885 space City Plan parking requirement and a 967 space supply. The 82 space surplus as assessed in 2002 remained.
- In April 2012 the Council approved RMA92019846 which was for the relocation of the outpatients department into a new temporary facility on the Nurses Hostel site. There used to be around 10-12 spaces located around the old nurses hostel. The outpatient's proposal provided 21 spaces outside the outpatients building. Given that there was no increase in activity on the site, and assuming that the 10-12 space supply was counted in the 967 space supply, then the outpatients proposal increases the City Plan parking surplus by around 9-11 spaces to around 91-93 spaces

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28 February 2014

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**Attention:** Lauren Semple

Dear Lauren,

**RE: Update to the Christchurch Hospital Preliminary Transportation Assessment**

Please find enclosed a copy of the *Preliminary Transportation Assessment* that was jointly prepared by Paul Roberts of Quality Transport Planning and myself. The purpose of this preliminary assessment was to advise the Ministry of Health on traffic related issues associated with the proposed development of a new Acute Services building across the northern side of the Hospital site. This work specifically related to the development of the business case for the proposed building.

From a traffic engineering perspective there are two key issues with further development and/or redevelopment of the Christchurch Hospital site. These relate to the provision of an adequate parking supply and providing a suitable level of service for site generated traffic to both access and leave the site.

Parking Demand

In relation to the parking supply matter, we have advised that master planning should seek to achieve a total of 1400-1500 car parks to serve both the main site and associated activities across the wider CDHB site. Of this total we recommended a minimum of around 600 visitor spaces and 100 spaces be provided to serve critical staff and service needs on the 'main' site, with a further 300 spaces located in the immediate vicinity and a further 400-500 spaces located around the balance of the wider CDHB site.

Given the location of Stage 1 development towards the western end of the site and the availability of signalised access, we recommended that the majority of visitor parking for Stage 1 be provided in the location of the current Outpatients facility. Later development towards the eastern end of the main site should include provision for a second major parking facility in order to provide convenient access to a quality parking supply across the wider campus. If the second major parking facility is provided south of Tuam Street, then a high standard of pedestrian connectivity will be required between the two sites.

## Parking Supply

The design of the proposed Acute Services building has progressed markedly since that report was prepared. In addition that has been a number of consultative meetings held with CERA staff in relating to parking supply for both the Hospital site, the southern Hospital campus and the wider health precinct and proposed Metro Sports facility.

The current proposal is for nearly 400 spaces to be provided at the western end of the Hospital site in the immediate vicinity of the proposed Acute Services building and the proposed Emergency Department. This will be accessed via a modified form of the existing Riccarton Avenue traffic signals.

It is increasingly likely that the previous 'blue' parking building will be replaced by a similar structure and with a similar capacity for around 400-500 spaces. This will likely be accessed from St Asaph Street with the potential for an entry only from Antigua Street.

The staff parking building located on the corner of St Asaph Street and Antigua Street is once again operational and is understood to have a capacity of around 350 spaces. I understand that the staff parking building has the ability to have two additional floors which would boost capacity to around 500 spaces. This will also likely be accessed from St Asaph Street with the potential for an entry only from Antigua Street.

The total supply of 1300-1400 spaces would then be further supplemented by parking located on the southern campus which is currently a capacity of around 200 spaces having allowed for some staff parking being lost from the St Asaph Street site to allow for the Metro Sports facility.

In terms of cycle parking provision, we have previously recommended that a total of around 600 cycle-parking spaces should be provided on the main hospital site, with (a minimum) of 500 reserved for staff use. These should meet modern standards for space and security, and be provided under-cover, where possible. Although the provision for cycle parking is yet to be finalised, there does not appear to be any issues with providing this level of cycle parking supply on the site.

It follows that current planning for parking provision for the Hospital is following the recommendations of the Preliminary Transport Assessment.

## Traffic Generation and Site Access

The Preliminary Transport Assessment concluded that the proposed Stage 1 expansion of the Hospital can be accommodated on the existing and planned surrounding transport network subject to suitable levels of on-site parking provision being made and suitable site access arrangements being achieved.

Since that report was prepared we have undertaken traffic counts at the various Hospital site access points and also accessed a wealth of historic traffic count information from both the Council and Urbis archives. This data has now been collated, compared and analysed in conjunction with patient attendance data and population



growth projections provided by the CDHB and CERA. This data suggests that traffic generation from the Hospital site could increase over existing levels by around 30% by 2031.

The 2013 access surveys showed that the Riccarton Avenue site access has ample spare capacity to accommodate the expected level of traffic growth at this access. Discussions have been held with the Council's Signals Engineers in relation to modifying the layout of the Riccarton Avenue signals to provide separate access and egress for the proposed Emergency Department alongside the sites western boundary. The Council staff were supportive of this concept although they await further detail of it. At this stage there appears to be no design impediment towards catering for additional Hospital generated traffic at this access location.

The current signalised Antigua/Oxford site egress has also been surveyed and found to currently suffer from congestion at isolated times of the day. This occurs as a result of this egress carrying at least equal site exiting flows to the main site access at Riccarton Avenue. There are times across the day when insufficient green time is afforded to this egress and queues can form within the site.

The closure of Oxford Terrace to the east of the Antigua/Oxford site egress will eliminate the need for signals at this egress point. Instead the intersection of Tuam Street and Antigua Street will play a more pivotal role in catering for traffic exiting from the eastern end of the Hospital site. Traffic modelling of the road network in the immediate vicinity of the Hospital site is about to be undertaken by CERA and they have granted permission for the CDHB/MoH to also use this model to evaluate site access options for the St Andrews site. At this stage I record that the matter is not an issue of catering for additional Hospital site generated traffic, but how best to cater for it. This will be resolved in the very near future.

If a second major parking facility is provided south of Tuam Street, and this is likely, then a high standard of pedestrian connectivity will be required between the two sites. CRA has agreed that a pedestrian overbridge across Tuam Street to connect the 'blue building' site and the main Hospital site is necessary and their designs for Tuam Street allow for this.

Overall it is my opinion that there is no traffic generation and site access impediment that would inhibit the progression of the Acute Services building.

If you require any further information please do not hesitate to contact me directly on 03 963 8727 or [ray@urbisgroup.co.nz](mailto:ray@urbisgroup.co.nz).

Yours faithfully,



Ray Edwards

**Managing Director**