

Canberra Central - Proposed Masterplan



Figure 36 Visibility of the proposed street network

# Accessibility Analysis

## Accessibility of the proposed street network

The Waterfront Precinct generally comes out as moderately accessible especially on the north-south links and at the junctions on this relatively tight grid of streets.

Parkes Way comes out as the most accessible east-west link adjacent to the Waterfront Precinct, as it is intersected by a large number of streets from the north. Currently it will likely act as the main spine linking City East to the Waterfront Precinct as an extension to the route from Allara Street.

While there are significant crossing improvements proposed for Parkes Way, there are concerns that the character of this link (a wide, arterial route with a lack of active frontage) will not be as appealing to walk along as that of a well connected pedestrianised link, one street back from the main road. This is coupled with a moderately low level of accessibility on Commonwealth Avenue between London Circuit and Parkes Way.

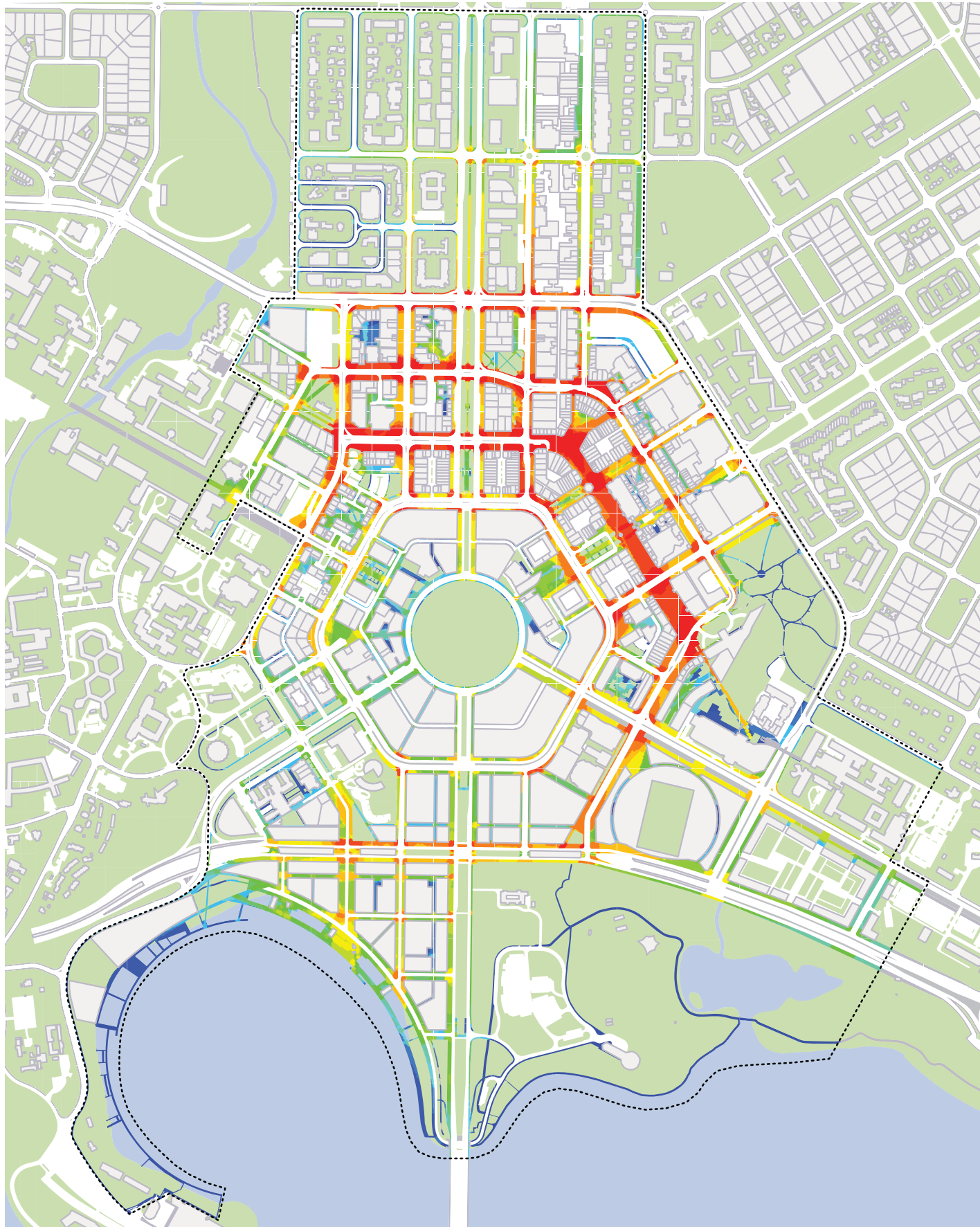
The accessibility results help to highlight the impact of poor visibility, especially at the proposed shopping arcades through blocks O and P to the north of Parkes Way. The alignment of the internal routes do not connect directly with surrounding links, and as a result can be considered relatively isolated.

The new link two blocks west of Commonwealth Avenue is also seen to be relatively inaccessible as despite its width, it is relatively short and does not connect widely with the surrounding road network.

It is therefore recommended that for pedestrians to be truly encouraged to walk between City East and the new waterside development, a more direct diagonal route from London Circuit should be considered with more active frontages lining this key axis.

## Summary of recommendations

- Consider the alignment of the pedestrian movement networks and whether the retail arcades in the Central Precinct could be aligned to better link City Walk, London Circuit and the Waterfront Precinct.
- Acknowledge the important role that natural wayfinding plays in encouraging more walking by having intuitive and highly visible routes with clear vistas to destinations.
- Consider introducing a wayfinding signage system to provide additional navigational support and notify people of the distance and direction to different locations.



Canberra Central - Proposed Masterplan



Figure 37 Accessibility of the proposed street network



## Topography

The existing topography has been superimposed on the masterplan to identify where there may be issues with new road alignments and steep inclines or other topographic constraints.

The masterplan proposals will likely include extensive regrading and landform restructuring to create at grade crossings on Parkes Way and across Commonwealth Avenue. This will change much of the landscape around these areas and significantly enhance pedestrian accessibility.

The mixed use developments in the Central Precinct will however need to be carefully considered as the current gradients north-south are especially steep.

Access to the Vernon Circle from the north-east will likely continue to pose a problem with the gully adjacent to Theatre Lane. Additional bridges or ramps here could encourage more pedestrian movement from City East to the south; however City Hill will likely remain a barrier to pedestrian permeability.

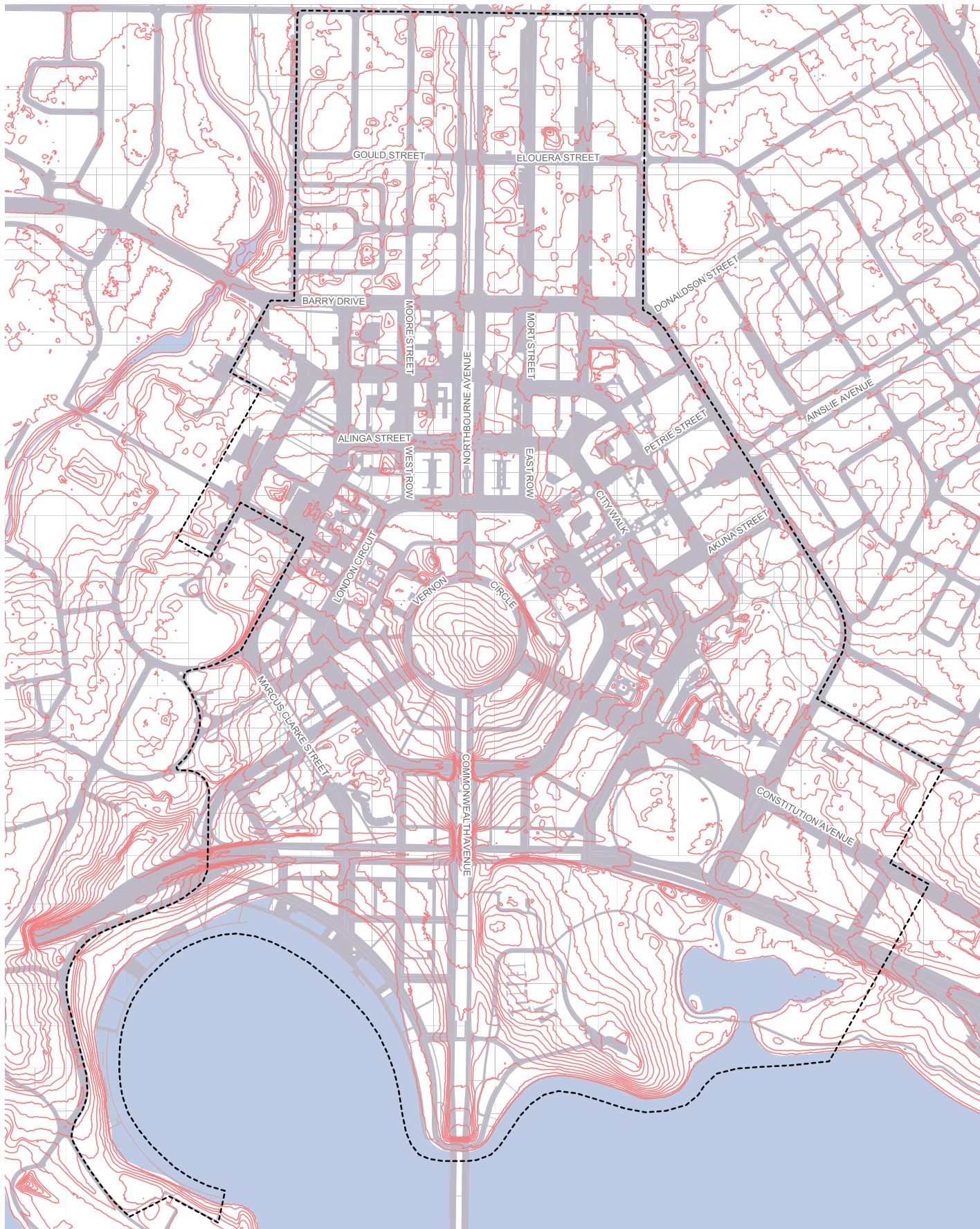
The uphill gradient on Marcus Clarke Street could significantly impact on the desirability of the route north to the public space on the west edge of London Circuit. This should be considered as part of the planning of land uses on this street.

At present the view across Parke Way to the lake is restricted. If the masterplan is to achieve its objectives of having a number of streets with vistas towards the lake, Parke Way will need to be raised and provide a more gradual and even gradient from City Hill to the lake.

### Summary of recommendations

- When designing the main routes for pedestrians, understand the impact of gradients on route choice and provide links which avoid sudden changes in elevation.
- Topography will play an important role in ensuring vistas to the lake are enhanced. Being able to see the water from a greater distance will likely encourage more walking from central areas to the south.





Canberra Central - Proposed Masterplan

Area Topography

- Footway
- Carriageway
- Water
- ⬡ Study Area
- Contour Lines (1 metre)



Figure 38 Existing contours overlaid onto the proposed masterplan

# Land Use

While much of the ground floor footprint and land use design remains to be finalised, our assumptions on the City to the Lake masterplan have been corroborated by the client team at ACT. The agreed land use plan (Figure 39) highlights a renewed focus on providing active retail and food & drink uses at the ground floor level on many of the key links between the the retail core of City East and the new West Basin Estate precinct.

## Waterfront Precinct

This precinct will largely consist of boardwalks and lakeside attractions including the new Canberra Aquatic Centre and New National Cultural Institution, and access to the existing National Museum of Australia. These kinds of large, dispersed leisure attractions generally attract low to moderate pedestrian flows throughout the week during the day, but can have much higher peaks at weekends and during holiday periods.

## West Basin Estate Precinct

The new masterplan proposes a denser urban grain at the West Basin than for many existing parts of the city. This emphasises the intent to create a more walkable character of development with a greater range of facilities supported by a more concentrated residing local population. A relatively high density of retail and food & drink areas are anticipated fronting onto the waterfront and will likely provide an attractive prospect for pedestrians. Internal passageways provide access for residential areas and mews housing within specific blocks; with only limited access to housing these pedestrianised links are likely to have low pedestrian flows.

## Central Precinct

The Central Precinct is a key link between City Hill and the West Basin. It is proposed that it will predominantly provide retail and food & drink services on the ground floor with an especially high density of entrances on the internal pedestrianised routes running parallel to Commonwealth Avenue. These areas will likely attract relatively high numbers of pedestrians although their position in the wider

masterplan is currently quite isolated and may not be as effective at capturing pedestrian movements as it could be.

## Canberra Stadium

The stadium block will likely include a mixed use development around the periphery of the stadium, with a range of food & drink premises at ground floor level. These will support the stadium during games days and help to ensure that people frequent the surrounding streets even when no events are scheduled. As with any major events space, event days are subject to vastly inflated pedestrian flows which will impact on the surrounding street network. The adjacent streets look to include widened footways to accommodate crowding and a distribution of entrances will help to ensure good dispersal of crowds.

## City East

The developments further west of the stadium look to be predominantly residential at ground floor, interspersed with some retail. It is likely that these stores will primarily only serve local residents, unless the area develops a more unique retail offer. Anticipated pedestrian flows are therefore relatively low.

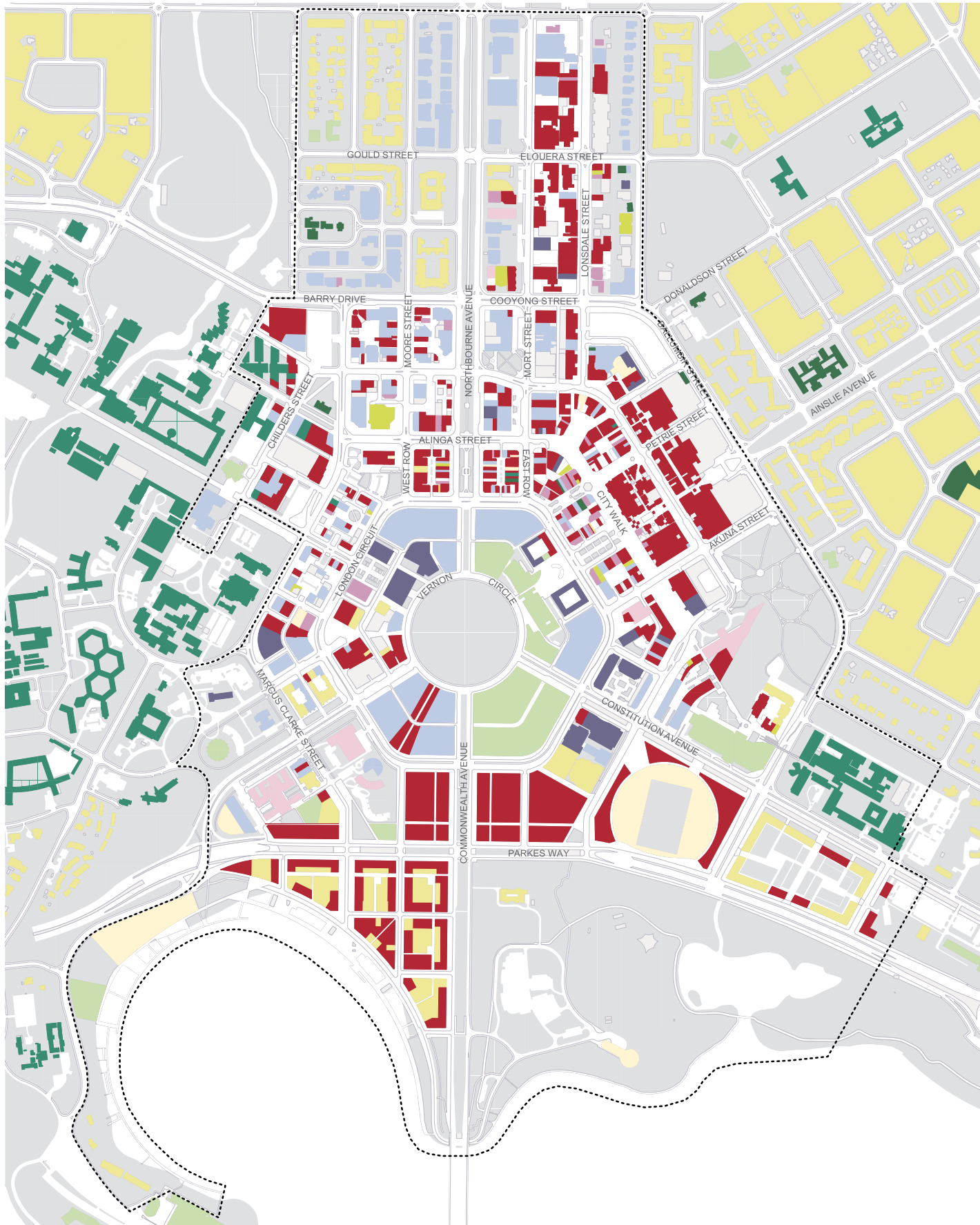
## City Hill Precinct

Fronting onto the Vernon Circle, the majority of major development sites are earmarked for offices, with the Conference and Exhibition Centre to the south-east serving a cultural function, albeit with little active frontage. It is proposed that the internal pedestrianised routes running through the centre of each block will be predominantly utilised for servicing and therefore will have very little active frontage. The impact of this is likely to be that pedestrian movement in the central spaces will be comparatively low with few attractors to support additional movement.

## Northbourne Avenue

The proposed development looks to provide a commercial application that has some potential to extend pedestrian flows from City East; however the relatively low density of building entrances may limit its potential.





Canberra Central - Assumed Development Proposals

Approximate Ground Floor Land Use

- |            |             |            |                      |              |                         |
|------------|-------------|------------|----------------------|--------------|-------------------------|
| Footway    | Openspace   | Study Area | Commercial / Office  | Governmental | Residential             |
| Building   | Carriageway |            | Community            | Health       | Retail / Food and Drink |
| Greenspace | Water       |            | Cultural Institution | Hotel        | Finance & Services      |
|            |             |            | Education            | Leisure      | Vacant Unit             |



Figure 39 Approximate ground floor land uses in the development plan



# Retail / food and drink entrances in view

## Context

It was noted in the 2011 study that Target 5 of the Canberra City Area Action Plan 2010 - 2016 (2010) states that:

“By 2016 external active frontages along designated safe routes will increase by 50% compared with 2006 surveys.”

It is therefore important to consider the number of entrances in view from any given location within the city centre to highlight the visual character and function of the space and ensure that this ambition for activity is fulfilled.

## Methodology

All new retail, food & drink entrances have been mapped across the study area, and using our bespoke spatial analysis software, the visibility of entrances highlighted.

## Key Results

It is clear that the new Waterfront Precinct will not have the same number and concentration of retail entrances to rival City Walk and Alinga Street, which typically have upwards of 50 entrances in view from any given location. However it will provide a moderately high level of retail space when compared with other parts of the city centre and so will likely create a different offer to the main centre and other areas with lower density of retail.

The new link from the London Circuit to the waterfront running parallel to Commonwealth Avenue does however show a moderately high number of retail entrances in view, typically between 22 and 27 entrances. The junctions exhibit the greatest visibility as the alignment enables three streets to be visible from a single point.

The wide street profile for the link two streets west of Commonwealth Avenue has relatively low numbers of retail entrances in view, despite its width. It may be worth

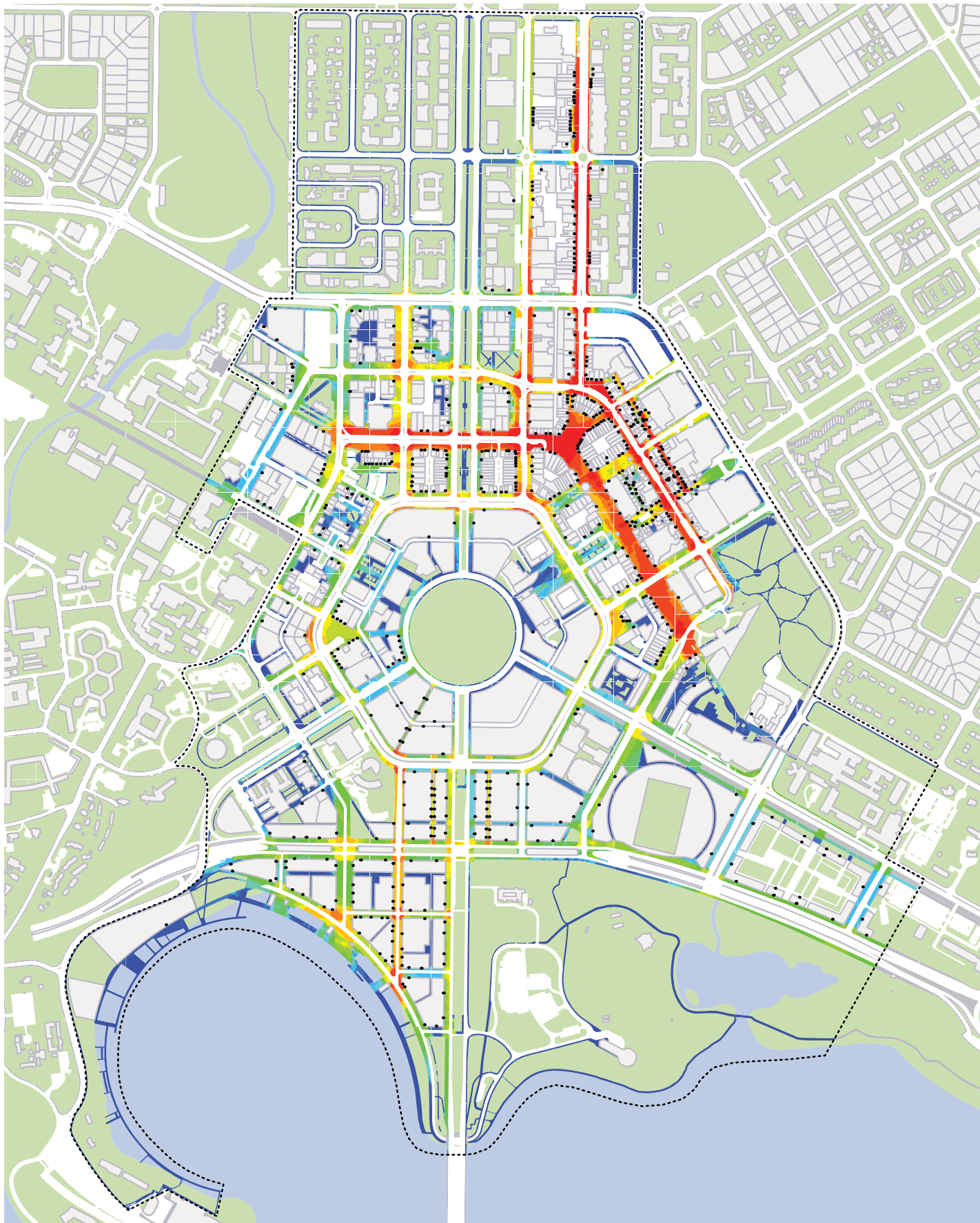
reconsidering the scale of this street and how it can better link the public square to the west side of London Circuit.

The pedestrianised retail arcades also running north-south in the Central Precinct, typically have around 20 entrances in view but this is relatively low due to

The low density of entrances across the Exhibition Centre block serves to sever any continuity of shopfront activity from City Walk.

## Summary of recommendations

- Prioritise one of the two north-south streets going through the Waterfront Precinct to have a high density of active retail frontage and create a strong and attractive linear route for pedestrians.
- Consider whether to provide a lower density retail link between City Walk and the stadium and from the Central Precinct to London Circuit West to support other pedestrian routes between precincts.



Canberra Central - Proposed Masterplan

Retail / Food & Drink Unit Entrances in View

- |            |            |          |          |
|------------|------------|----------|----------|
| ■ 43 to 67 | ■ 17 to 22 | ■ 7 to 8 | ■ 3 to 4 |
| ■ 33 to 43 | ■ 13 to 17 | ■ 6 to 7 | ■ 2 to 3 |
| ■ 27 to 33 | ■ 10 to 13 | ■ 5 to 6 | ■ 1 to 2 |
| ■ 22 to 27 | ■ 8 to 10  | ■ 4 to 5 | ■ 0 to 1 |

⊞ Study Area

Figure 40 Retail / food and drink units in view in the development plan

# All building entrances in view

## Methodology

Building entrances for other land uses can also be useful for indicating the overall extent of natural surveillance and in determining the relative concentration of pedestrian activities. Repeating the application of visibility analysis to all entrances is shown in Figure 41.

## Key Results

For the City Hill precinct the number of building entrances in view is largely unchanged when comparing the masterplan proposal to the existing situation, with only a few new entrances proposed and centred on large blocks.

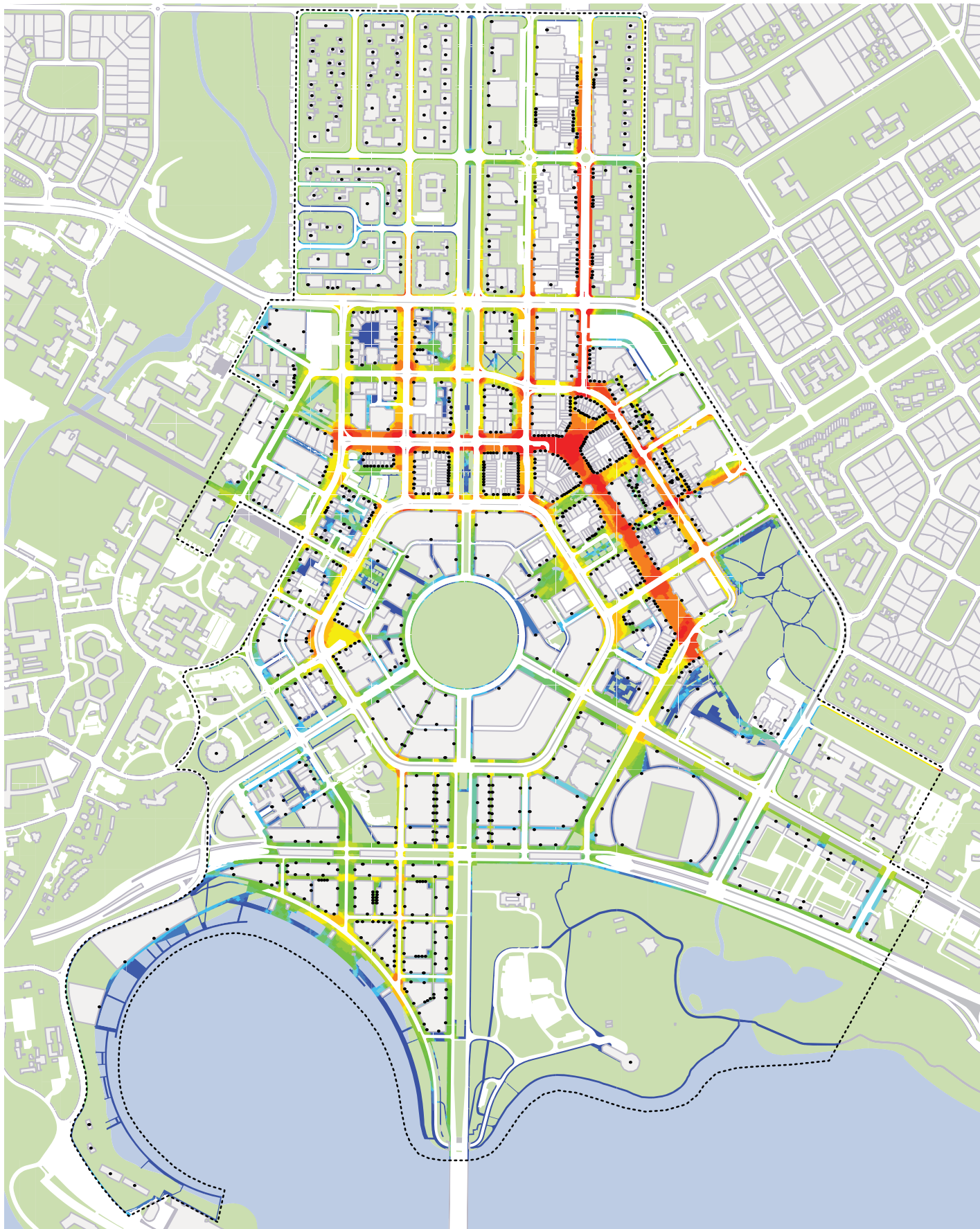
The proposals for the West Basin typically provide more than 10 entrances in view from any given location. This will likely provide a consistent well overlooked and generally active street environment. The results suggest that the links between the West Basin and City East however, are lacking a continuous provision of building entrances to maintain a good level of active frontage between these areas. London Circuit, Allara Street and Parkes Way all exhibit less than 10 entrances in view, which for streets of their width, is especially low, and unlikely to encourage high levels of walking.

There are pockets of good active frontage which have been created within the masterplan including the Central precinct arcades, the junction of Constitution Avenue and Allara Street, and the new direct link north-south from London Circuit to the waterfront. The most consistent of these pockets is the latter link which offers good potential as a walking link from the centre, both in its directness and the proposed density of active frontages. Assuming the Parkes Way at grade crossings are implemented here, it could provide a coherent and attractive route to and from the city to the lake.

## Summary of recommendations

- Prioritise one of the two north-south streets going through the Waterfront Precinct to have a high density of active frontages and create a strong and attractive route for pedestrians.
- Enhance the provision of active frontage on the south-west side of London Circuit (Block I) to provide better continuity of pedestrian attractors from the plaza in City West to the Central Precinct to the south-east.





Canberra Central - Proposed Masterplan

All Building Entrances in View

- |            |            |            |          |          |
|------------|------------|------------|----------|----------|
| • 62 to 99 | • 22 to 30 | • 10 to 13 | • 5 to 6 | • 2 to 3 |
| • 49 to 62 | • 17 to 22 | • 8 to 10  | • 4 to 5 | • 1 to 2 |
| • 39 to 49 | • 13 to 17 | • 6 to 8   | • 3 to 4 | • 0 to 1 |
| • 30 to 39 |            |            |          |          |

Figure 41 All building entrances in view in the development plan

# Proposed transport facilities

## Light rail

### Proposals

Two routes are currently being considered for the light rail metro project with both options confirmed to run from the City to Gungahlin via Northbourne Avenue. The two options will inherently impact on the placement of stations, which will consist of raised platforms, waiting shelters and ticket facilities. This section looks at how accessible the two proposed station placement strategies are, and how convenient they are to walk to from key locations across the proposed masterplan.

### Option 1: Vernon Circle

The Vernon Circle option positions a station opposite the Canberra Theatre Centre on the Vernon Circle and a station between Alinga Street and Bunda Street. The accessibility analysis suggests that there will be low access to the Vernon Circle location, due to low permeability across the City Hill Park and only a single footbridge linking across the Theatre block. The accessibility benefits are limited here and this placement should be carefully considered.

The station location adjacent to Alinga Street shows generally better overall accessibility to and from the surrounding street network.

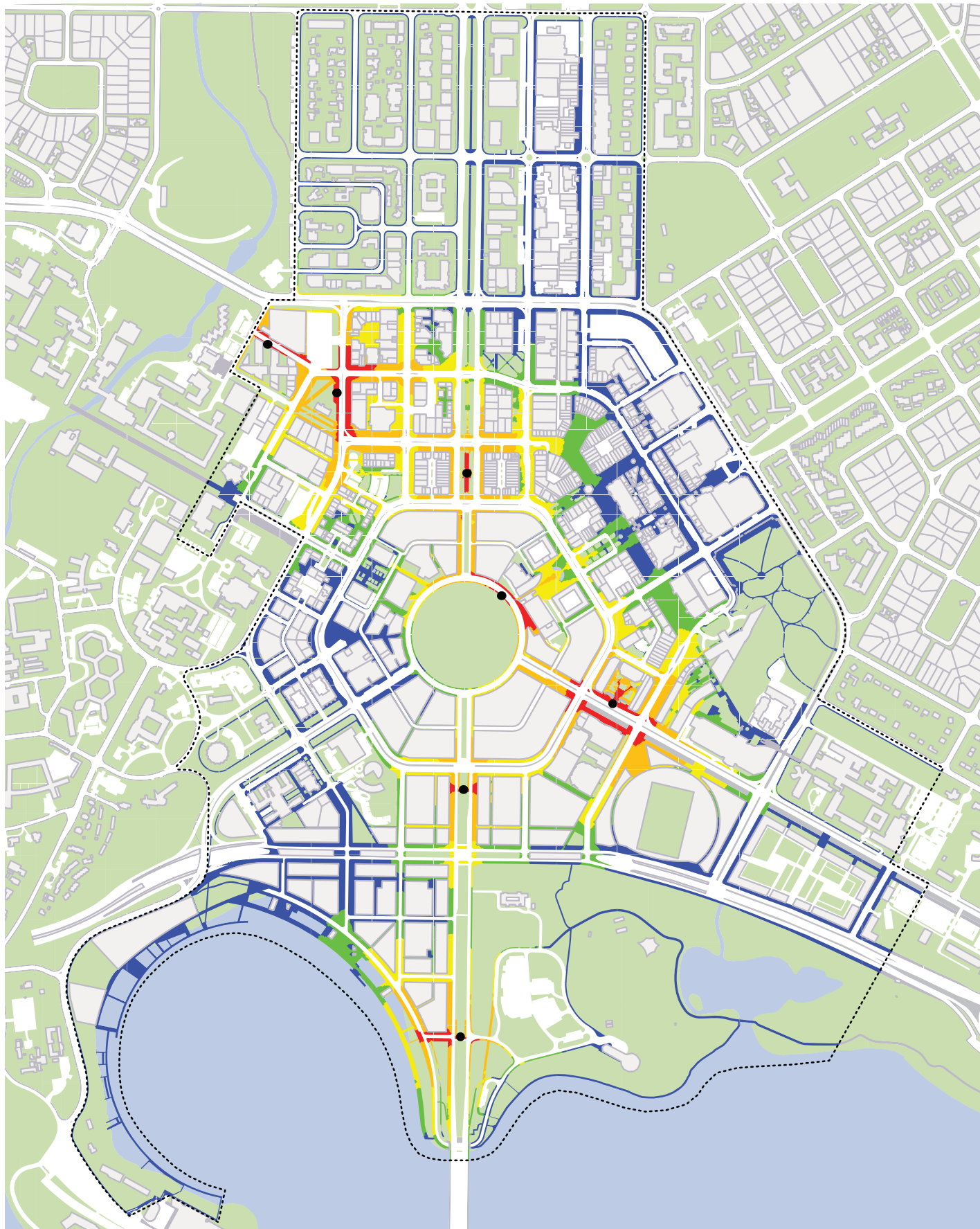
Other stations on the central section of the Vernon Circle line appear generally well located, with good access to the main stadium entrance from the station on Constitution

Avenue, and generally good accessibility to adjacent office areas from the Marcus Clarke Street station.

Two key areas do appear however to have low station accessibility: City Walk and the new Waterside Precinct. It is suggested that these areas represent key destinations in the study area and as such are being underprovided for with this station arrangement. The central and most busy sections of City Walk are shown as having low accessibility to a metro station. This is a concern and suggests that this arrangement is not fulfilling its potential to offer a strong public transport link from the city to the lake.

### Summary of recommendations

- Generally good placement of stations across City West and on Constitution Avenue.
- Reconsider the placement of the station on the Vernon Circle to better serve City Walk and the placements on Commonwealth Avenue to better serve the new Waterfront Precinct.



Canberra Central - Proposed Masterplan

Ease of connectivity to the light rail services - Route Option 1

- High
- 
- 
- 
- 
- Low
- Light Rail Stop
- Study Area



Figure 42 Accessibility to light rail - Option 1



## Light rail

### Option 2: London Circuit

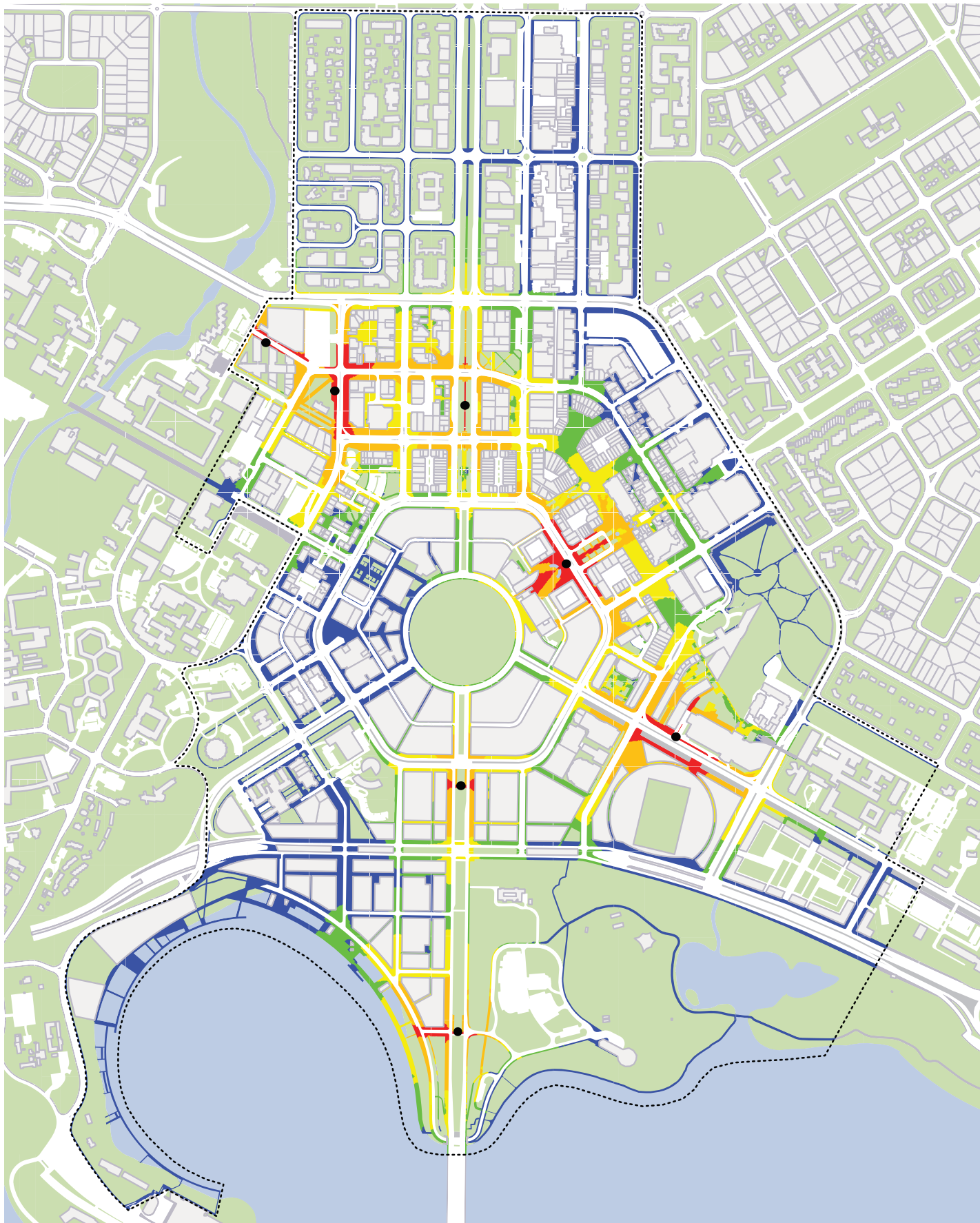
In both options the new Waterfront Precinct does not look to be well connected to a station, especially towards the west. The station placement is too far north and too far south to appropriately serve this new community. While it is recognised that the current proposal will serve the dual function of providing a station for the Commonwealth Park, it is considered insufficient to provide good access for the Waterfont Precinct. It is recommended that a station is considered closer to the junction with Parkes Way to provide a more convenient, walkable location for the majority of residents in this large new development.

The main difference in station placement for the London Circuit plan is the provision of a station aligned to Ainslie Place on London Circuit. This has a dramatic impact on improving accessibility to City Walk and shows high accessibility across Ainslie Place and the Theatre plaza. In terms of accessibility this option has great potential and better serves key destinations.

Moving the other station north of Alinga Street has little bearing on overall station accessibility and remains a good proposal.

### Summary of recommendations

- Option 2 is preferred to Option 1 with better access provided to City Walk with the station on London Circuit.
- Reconsider the location of stops on Commonwealth Avenue to better serve new communities in the Waterfront Precinct.



Canberra Central - Proposed Masterplan

Ease of connectivity to the light rail services - Route Option 2

- High
- 
- 
- 
- 
- Low
- Light Rail Stop
- Study Area



Figure 43 Accessibility to light rail - Option 2

## Bus stops

The ease of access to bus interchange and bus stops can be an important factor in encouraging public transport use and will impact on how pedestrian journeys are distributed. The main change between the existing arrangement and the masterplan is for a bus route to be provided on Commonwealth Avenue, with stops located close to the west entrance of Commonwealth Park and to the north of Parkes Way.

### Bus stop accessibility analysis

It is clear that the new Waterfront Precinct requires new bus routes to support greater uptake of public transport facilities, especially as a large number of residential units are proposed for the area. The provision of a new route on Commonwealth Avenue is a welcome addition to the bus network and would provide a direct link to City East.

The results of the analysis suggest however that the proposed locations for the new bus stops may not be in the most accessible places for serving the new community. In particular the west end of the development has poor access to these bus stops, in excess of 500m from the nearest stop. Furthermore there is no route that serves the new leisure areas being created and it would be recommended to provide more convenient access by bus to these areas. This could be achieved by either routing a service through the new precinct, or providing a stop closer to the junction with Parkes Way.

Parkes Way is especially poorly served and it would benefit from an east-west bus route that includes stops at the new leisure centre, the retail area in the Central Precinct, the south of the stadium and the residential development Block T2. New at grade crossings will make a bus route a much more viable option than the existing situation, by ensuring

that any bus stop is in close proximity to a crossing to allow for convenient access to new developments.

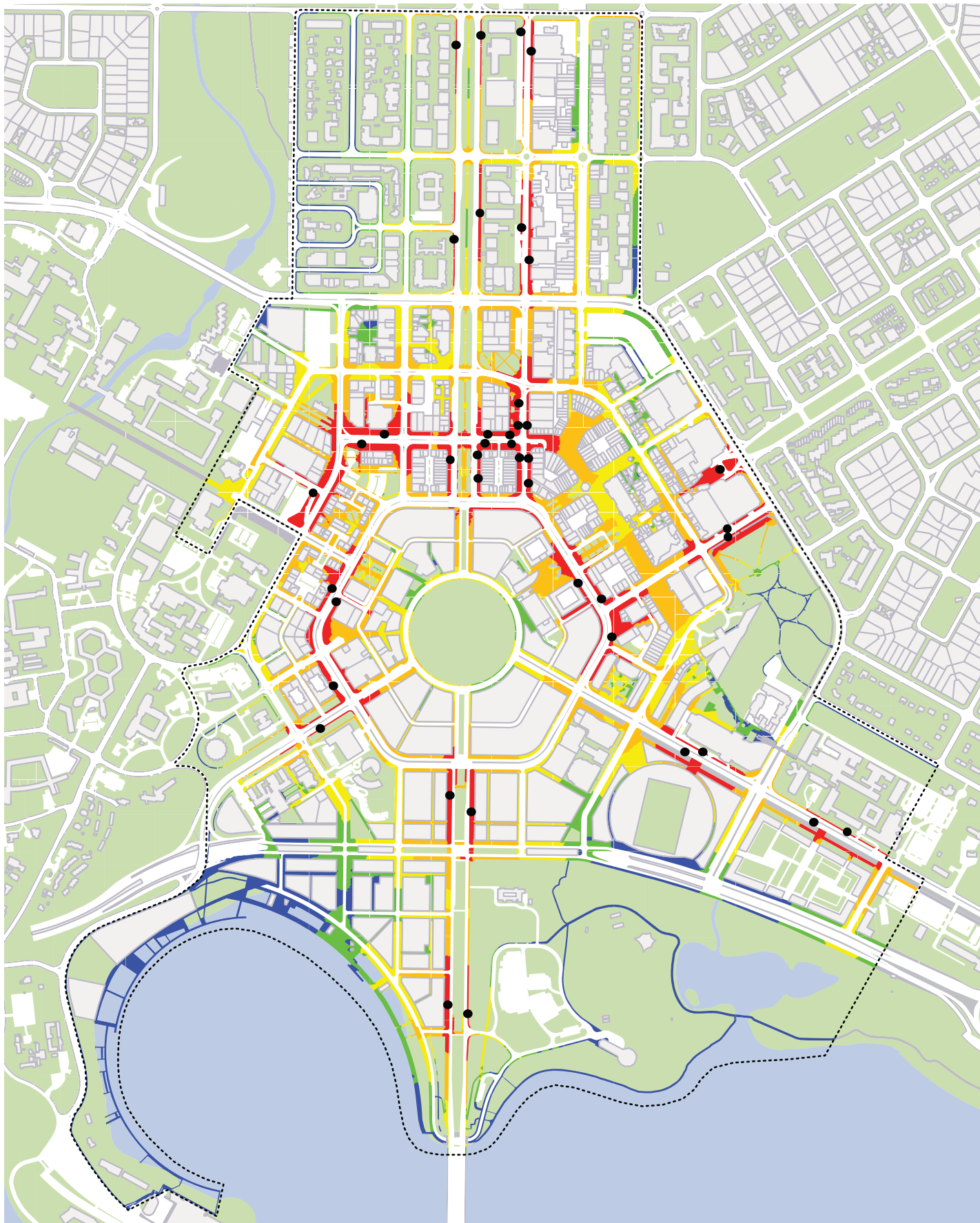
New developments around the Vernon Circle, particularly the Exhibition Centre, would also benefit from better bus service provision, which could simply involve re-routing an existing line.

The introduction of the metro light rail system should be seen as an opportunity to reconsider the role of buses in the network. Buses will need to provide a more localised and accessible service where they are most needed, and should complement rather than double up the route of the metro. This will ensure that more people have wider access to public transport facilities and that walking becomes a more common element of everyday journeys.

### Summary of recommendations

- Reconsider the location of stops on Commonwealth Avenue to better serve new communities in the Waterfront Precinct.
- Consider an east-west bus service along Parkes Way that links the west end of the new Waterfront precinct and the major leisure attractions to City Walk.
- Design the light rail and bus network in tandem so that they provide good interchange at key locations and cover a wider area than at present.





Canberra Central - Proposed Masterplan

Ease of connectivity to the bus services

- High
- 
- 
- 
- 
- Low
- Bus Stop
- Study Area



Figure 44 Bus stop accessibility



# 4 Application of the Calibrated Pedestrian Movement Model

This chapter presents the background, approach and results of the updated Canberra Central pedestrian movement model.



# Introduction

Predictive pedestrian modelling was used in the 2011 assessment to anticipate how future developments may affect the distribution of pedestrian flows across the city. A calibrated model was created based on existing real world pedestrian flows collected in 2011 (see appendix A for flow data collection and appendix B for the calibration process).

The new 'City to the Lake' masterplan has been assessed using the 2011 calibrated model to identify where pedestrians are likely go based on the accessibility of the street and the types of buildings that are proposed on that link.

This process of mapping anticipated flows can be used to evaluate the impact of the masterplan design and to see which streets are most successful in providing attractors to generate additional pedestrian movement.

It can also act as an evidence base for prioritising uplift of the existing street network to support new developments that are likely to be most frequented in the future.

Mapping outputs:

1. Actual observed pedestrian flows from 2011 have been mapped on the existing situation; see figure 46 on page 70.
2. The modelled flows have been mapped alongside to test the accuracy of the model against actual flows and to fill in the gaps where flow data was not collected; see figure 47 on page 71.
3. Finally the model has been applied to the new 'City to the Lake' masterplan and provides details of anticipated flows across the new city configuration; see figure 48 on page 73.

# Modelling Approach

This section clarifies the methodology used in constructing the 2011 model. It should be used as a reference and summary of the approach detailed in appendix A and B.

For each of the 647 street links identified within the site, the output of the model predicts the average pedestrian flow level between 07:00 and 19:00 expressed in pedestrians per hour.

The modelling is based on the standard statistical technique of Linear Multiple Regression Analysis. This technique identifies the relationship between a dependent variable of average pedestrian flows (07:00 - 19:00) with a series of independent variables.

Approximately 50 different independent variables that might have an impact on pedestrian flows have been tested in the model. These measures are different ways of accounting for factors which have been shown to influence pedestrian flows. They include metrics such as:

- Street network visibility
- Street network accessibility
- Street width
- The number of different land uses in view (such as Retail, Food & Drink, Office, Leisure and Cultural destinations)
- The accessibility of each of the land uses identified above
- The accessibility of transport nodes (such as Bus Stops and public car parks)

For each of these independent variables, statistical tests can be undertaken to identify which are significantly correlated with the samples of pedestrian flows (collected for approximately 112 individual street segments as part of the observation studies on the 26th and 27th October and 2nd November 2011).

The final model chosen for this study consisted of four independent variables which explain pedestrian movement. These independent variables are statistically significant and have a line of good fit with observed samples. They consist of:

- The visual connectivity of the street network
- The number of building entrances that can be reached within one change of direction (building entrance accessibility)
- The local visibility of retail land uses
- The number of leisure land uses that can be reached within one change of direction (leisure accessibility)

The results of the model suggest that the predictions are 78.5% accurate when compared to observed flow samples which can be considered a good correlation. A scatterplot was created to compare the observed flow samples with predicted flow from the model. The results suggest that although there are some outliers, in general there is a good fit between the observed and modelled flow.

The results of the model are shown in Figure 20 on page 31, which presents the average pedestrian flow (between 07:00 - 19:00) for each street segment in the study area, expressed in pedestrians per hour. Further information regarding the calibration of the model can be found in Appendix B.

### Observed / Modelled Flow Comparison

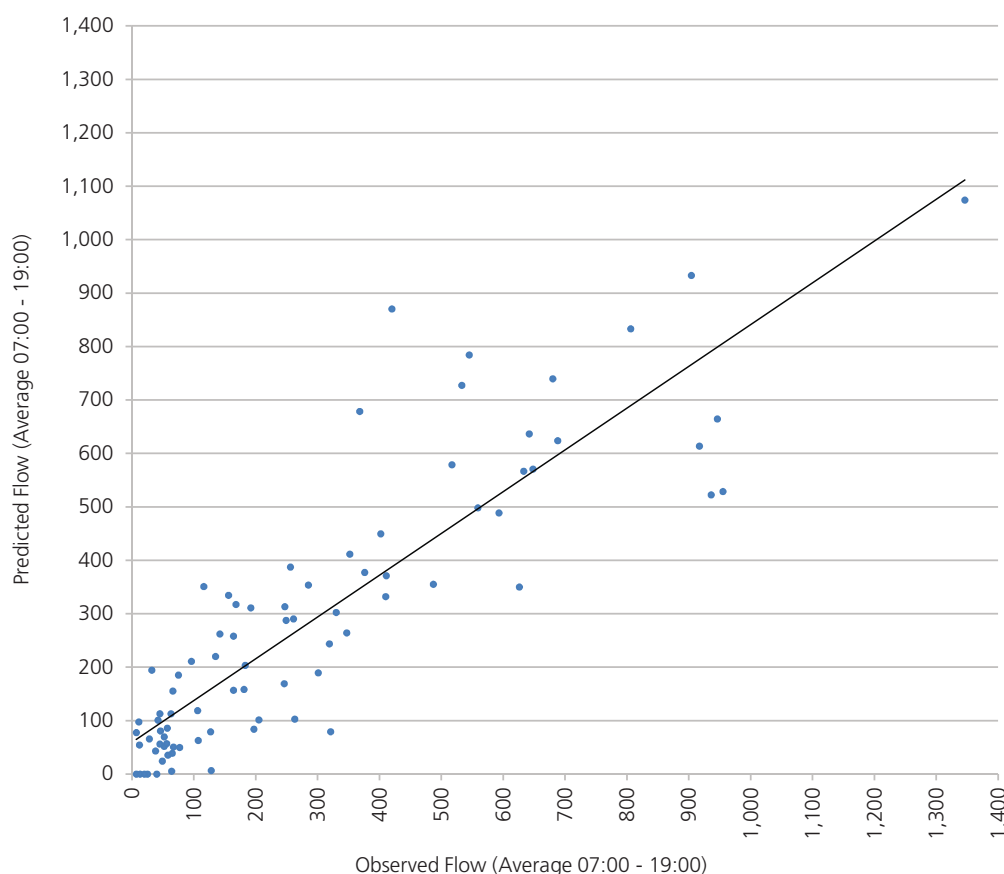
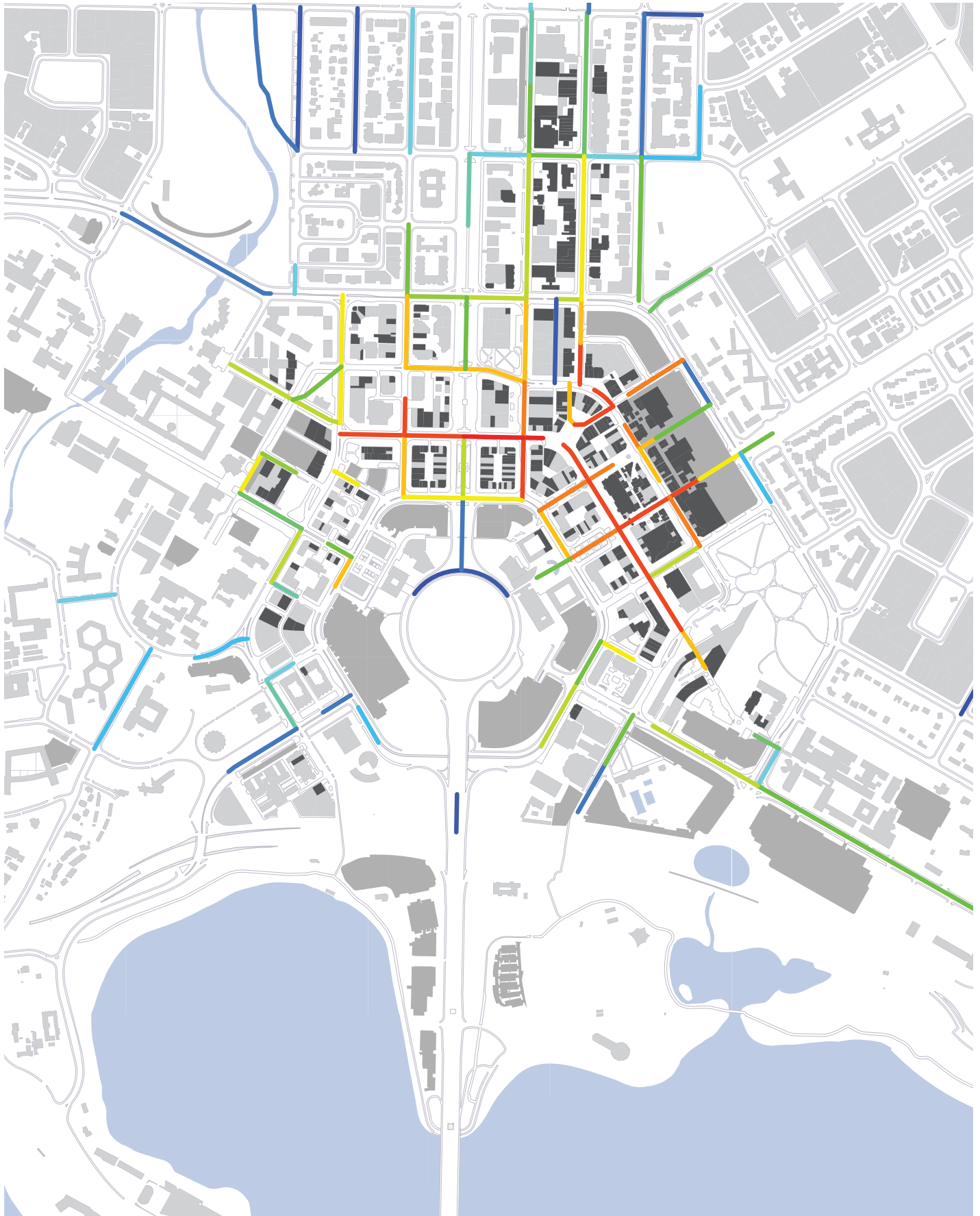
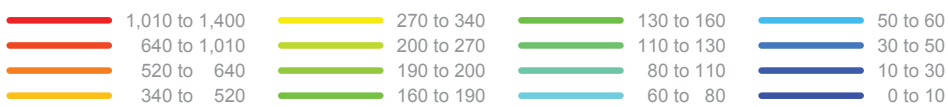


Figure 45 Statistical correlation of modelling results



Canberra Central 2011: Observed Flows

Average Pedestrians Per Hour (PPH)

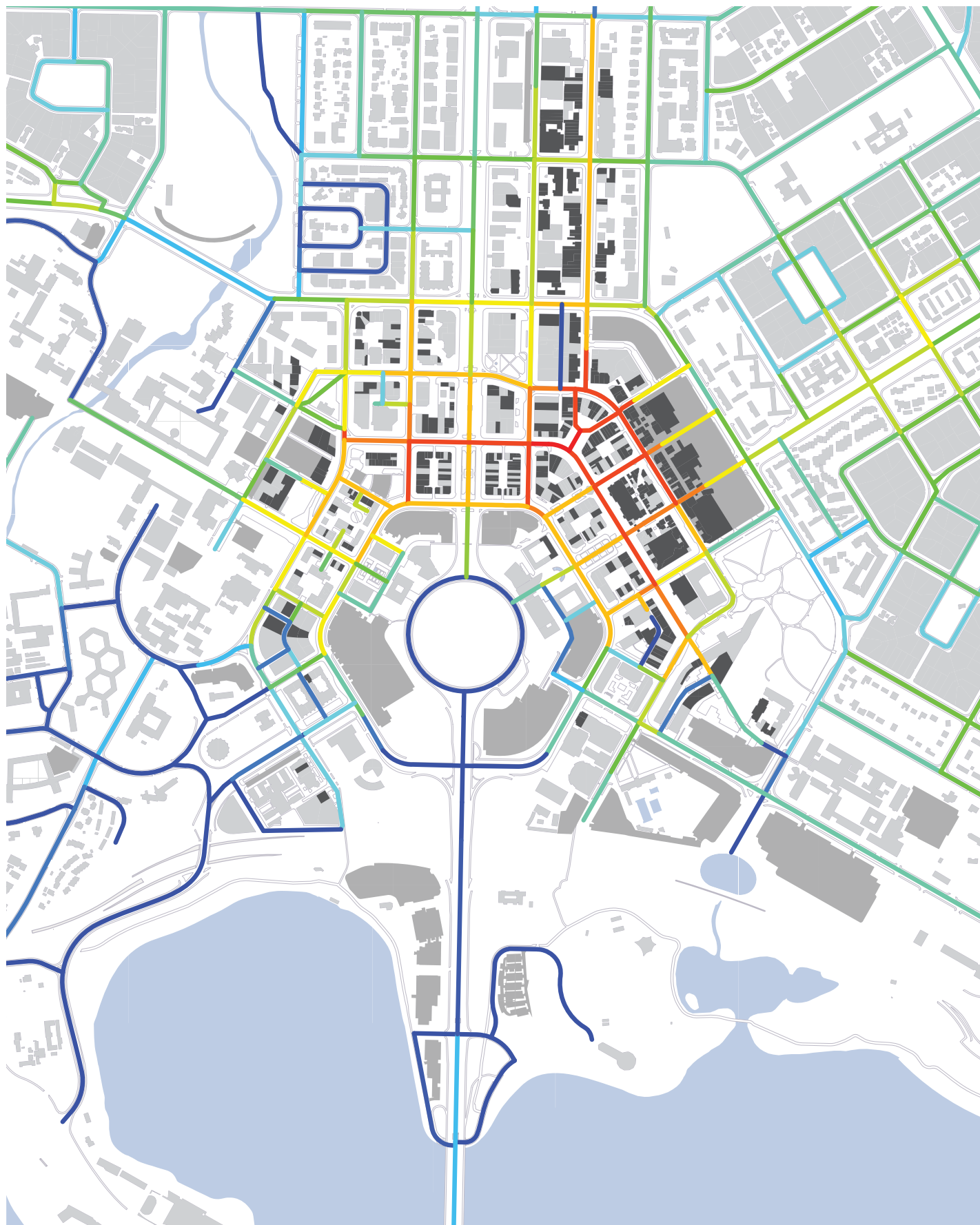


Retail and Food & Drink Units  
 Car Parks



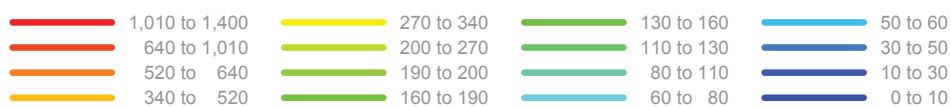
Figure 46 Observed flows from 2011 (07:00 - 19:00 average pedestrians per hour)





Canberra Central 2011: Modelled Flows

Average Pedestrians Per Hour (PPH)



Retail and Food & Drink Units  
 Car Parks

Figure 47 Modelled pedestrian flows within the existing situation (07:00 - 19:00 average pedestrians per hour)

# Predicted pedestrian flows based on the proposed masterplan

The formula derived from the calibrated pedestrian model has been applied to the proposed development plans to understand the likely impact on pedestrian distribution. The results are presented in figure 48.

Key findings from the model:

- Waterfront Precinct

The flow map highlights the extent to which the Waterfront Precinct will likely attract pedestrian movements, with the predominant activity taking place at the intersection of Block U and X and on the two new main streets running north-south. The model suggests that these streets will not prove to be as much of a draw as that of City Walk with its higher density of retail units and larger pedestrianised area, generating more than 1,000 pedestrian movements within an hour. The anticipated number of pedestrians for the Waterfront is closer to 500 people per hour, which is comparable to many areas in the existing city centre.

- Central Precinct

The flow map highlights the north-south retail arcades as being most attractive to pedestrians, with between 340 and 520 people expected on average per hour. The parallel roadside links (shown as green) have lower pedestrian flows in the region of 150 people per hour. These can be considered 'missing links' as they lack the active frontage to attract pedestrians south from City Walk.

- Canberra Stadium

The north-west corner is anticipated to attract high flows of pedestrians in excess of 1,000 people per hour, as it is well connected to City Walk. The north and west side are well connected and as a result will likely generate moderately high footfall; around 500 people per hour. The south and east side of the block will likely be considerably quieter.

- Parkes Way between Allara Street and Commonwealth Avenue

This stretch has especially low pedestrian flows forecasted, anticipated at between 200 and 340 people per hour. This

is partially due to only one side of the road having active frontage and generally a low density of building entrances.

- London Circuit south-east

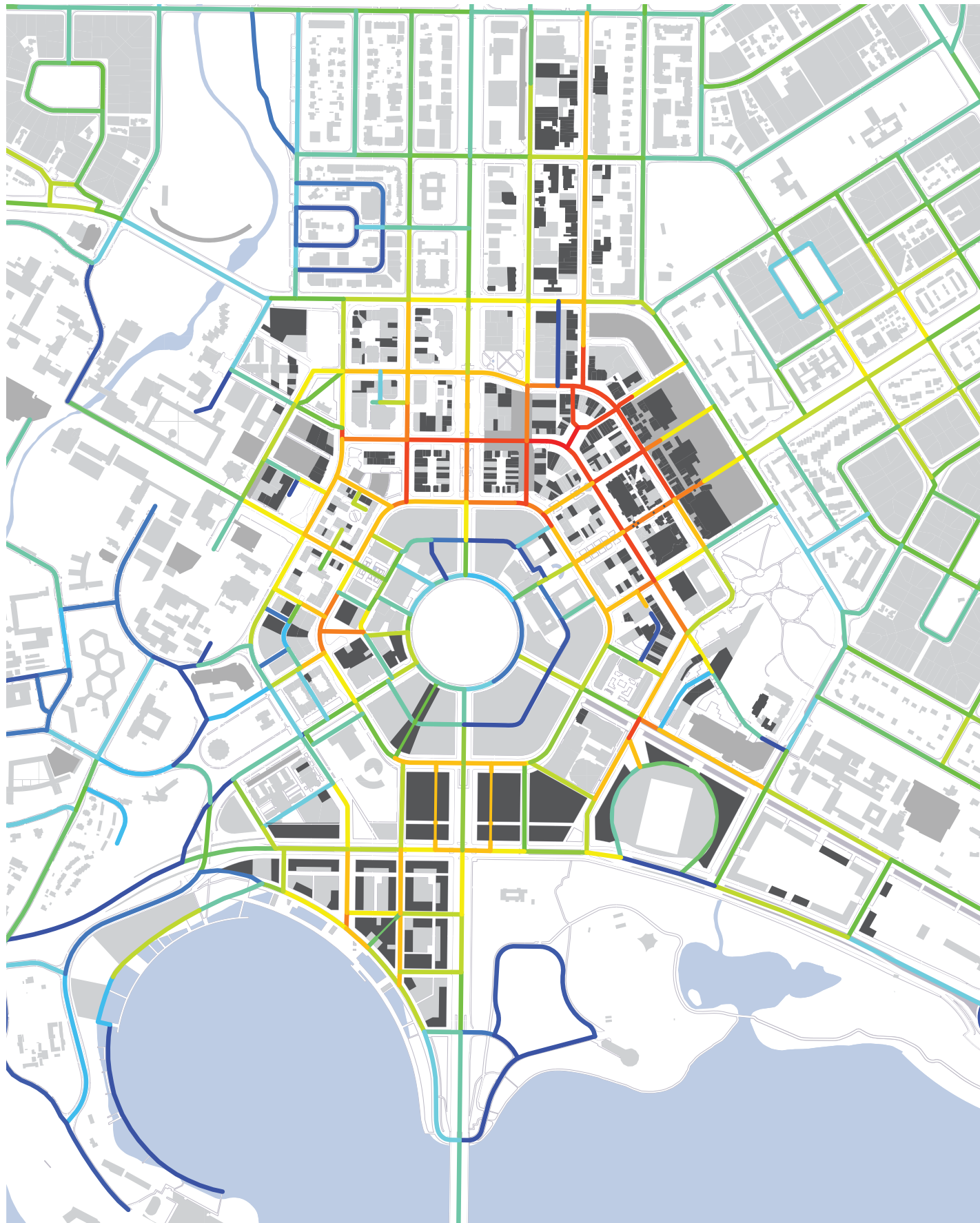
The impact of a low density of active frontages is especially noticeable on the south-east side of the London Circuit adjacent to the Exhibition Centre, with flows of around 200 people per hour anticipated.

- Commonwealth Avenue

It is expected that the north end of Commonwealth Avenue towards the Vernon Circle will become increasingly quiet in terms of pedestrian flows, as the area becomes more isolated towards the centre. It should be noted that the model does not take into account the pull effect of new transport nodes; however the results of the model do highlight that in its current proposed form, this area will not be especially attractive to pedestrians and so a light rail station located here may not actually serve a large volume of desired routes.

- Marcus Clarke Street

The south end of Marcus Clarke Street extending into the new Waterfront Precinct will likely encourage more pedestrian activity. However the lack of proposed active frontages towards its north end, will continue to detach the new lakeside area from inland, with less than 100 people per hour expected on links around Edinburgh Avenue.



Canberra Central - Proposed Masterplan

Average Pedestrians Per Hour (PPH)

	1,010 to 1,400		270 to 340		130 to 160		50 to 60
	640 to 1,010		200 to 270		110 to 130		30 to 50
	520 to 640		190 to 200		80 to 110		10 to 30
	340 to 520		160 to 190		60 to 80		0 to 10

Retail and Food & Drink Units  
 Car Parks

Figure 48 Modelled pedestrian flows within the new masterplan (07:00 - 19:00 average pedestrians per hour)