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Fishermans Bend - Funding & Financing Infrastructure
Case Studies. Stage 2 & 3 Report January 2018

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City of Port Phillip Council



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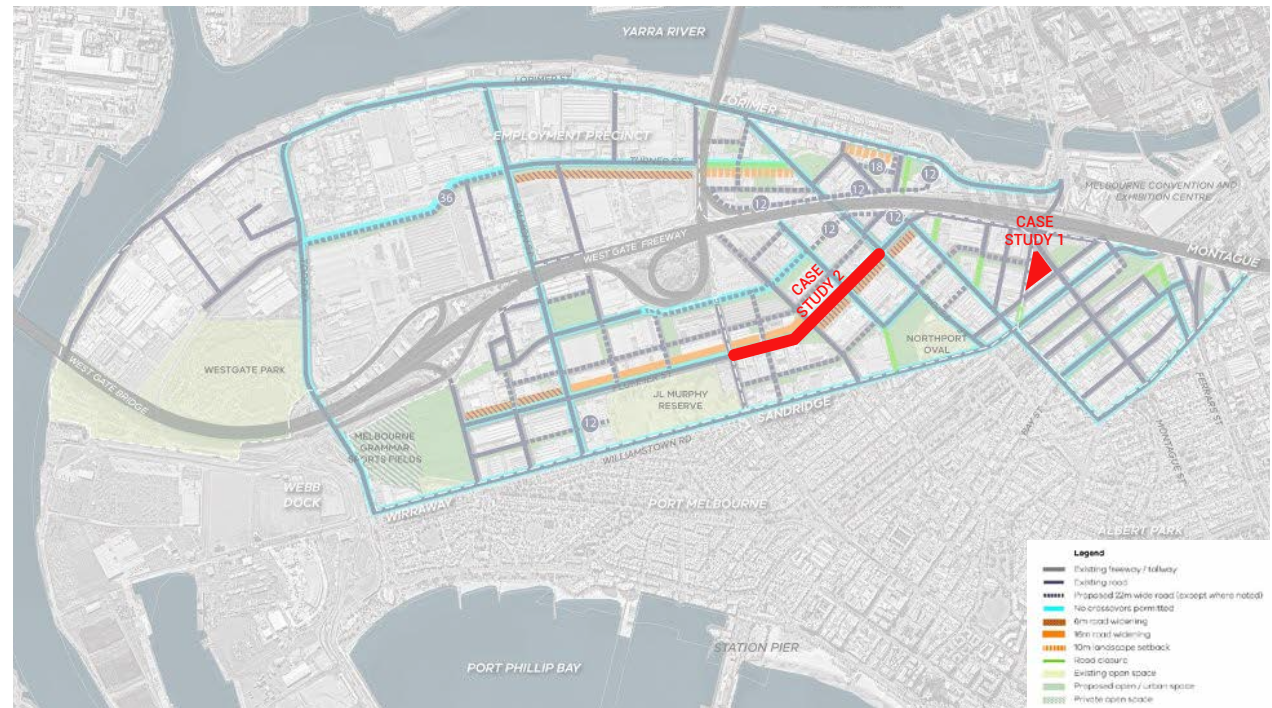
1. INTRODUCTION

Mesh Planning, Cossill & Webley and Charter Keck Cramer were commissioned by the City of Port Phillip (Council) to prepare concept designs and cost estimate plans for two case studies located within the Fishermans Bend urban renewal area.

This report outlines the project brief before concentrating on the two case studies. Case Study One relates to the Montague Sport and Recreation Hub and Case Study Two relates to the Fennell/Plummer Street streetscape and intersection upgrade between Graham Street and Ingles Street. Figure 1 illustrates the location of each case study within the broader Fishermans Bend framework. For each Case Study this report outlines the key site characteristics, the detailed project specifications/assumptions, describes the concept plans and associated estimated construction costs, and particular issues that have been identified with respect to implementing the concept plans on the respective sites. A copy of road cross-sections and the concept plan for Case Study Two provided by Council at the inception meeting are included in Appendix 1.

This is the final report for this project and includes council officer feedback on the completion of stages 1, 2 and 3 of the project.

Figure 1: Case Study Location Plan



2. OUTLINE OF PROJECT BRIEF

2.1 Fishermans Bend Development Context

Fishermans Bend is the largest urban renewal project in Australia. The site is located to the south-west of Melbourne's CBD, covers 485 hectares and comprises five precincts across two local government areas; Montague, Sandridge and Wirraway in the City of Port Phillip, and Lorimer and the Employment Precinct in the City of Melbourne. All precincts except the Employment precinct are proposed to be mixed use.

Over the next 35 years Fisherman's Bend is to transition from predominantly industrial land into a series of urban mixed use neighbourhoods that will accommodate 80,000 residents and 80,000 workers and deliver the vision of 'a thriving place that is a leading example for environmental sustainability, liveability, connectivity, diversity and innovation'.

The Victorian Minister for Planning established the Fishermans Bend Taskforce in January 2016 to lead the planning of the area, consisting of representatives from the Department of Environment, Land, Water and Planning, City of Port Phillip, City of Melbourne, Places Victoria and the Victorian Planning Authority. The Fishermans Bend Taskforce is currently working on a Fishermans Bend Framework, which will provide an overarching strategy to guide the urban renewal program and to implement the Vision.

2.2 Project Scope

The City of Port Phillip recognise the importance of early infrastructure investment to ensure Fishermans Bend is a success and the vision is achieved.

The purpose of this project is to coordinate the preparation of two dimensional concept designs and cost estimates for two defined classes of infrastructure. The findings of this project will provide Council with an understanding of the likely costs required to purchase land and construct new or upgrade existing infrastructure and potential delivery risks. The outputs of this project will inform Council's position on the Fishermans Bend Framework and Council's long term implementation strategy for the area.

The project has been undertaken in the following three stages:

- > **Stage One:** Project inception and confirmation of project assumptions
- > **Stage Two:** Preparation of Concept Designs
- > **Stage Three:** Estimated Cost Plans including a report highlighting delivery risks

The two case studies developed and costed by this project include:

- > **Case Study One** – Montague Sport and Recreation Hub
 - The Montague Recreation Hub comprises a four court indoor multipurpose stadium with supporting infrastructure, youth services and multipurpose community rooms. This case study considers the delivery of the Montague Recreation Hub under two delivery models:
 1. As a stand alone Sport and Recreation hub; and
 2. a Sport and Recreation hub within a mixed use development.
- > **Case Study Two** - Fennell / Plummer Street streetscape and intersection upgrade: Fennell / Plummer Street between Graham Street and Ingles Street.
 - This case study involves a significant upgrade and widening of the existing Fennell and Plummer Streets to accommodate a new tram line, land for a future underground train station, urban square and streetscape works, as well as the construction of a new signalised intersection at the intersection of Fennell, Plummer and Bridge Streets (realigned to form 4 way cross intersection).

The detailed project specifications for each case study are set out in Chapters 3 and 4.

2.3 Project Methodology

The approach to this project was based on a collaborative working relationship between the project team and council officers which included a number of workshops and an ongoing open dialogue with Council officers. The project methodology adopted for this project was focused on the following three key stages.

- > **Stage One:** Project inception and confirmation of project assumptions. Stage One included the first workshop (inception meeting) where Council officers briefed the project team.
- > **Stage Two:** Preparation of Concept Designs. Following a review of the information provided by Council officers to the project team, a workshop was held to discuss and confirm the many project assumptions and to seek clarification on a number of matters. Following this first workshop Council agreed to seek structural engineering advice and an additional workshop with Wood & Grieve Engineers was held to discuss the structural building requirements associated with indoor recreation hubs and in particular building above the indoor courts.
- > **Stage Three:** Estimated Cost Plans including a report highlighting delivery risks. As outlined above, the estimated cost plans will be prepared following receipt of Council officer comments on this report.

2.4 Project Deliverables

Stage One and Two key project deliverables include:

- > **Case Study One** - Montague Sport and Recreation Hub
 - Preparation of a concept utilities plan to determine services needed to support the Montague Sport and Recreation Hub.
 - Preparation of a two dimensional concept layout plan for the recreation hub as both a:
 - Stand-alone facility; and
 - Part of a broader mixed-use development
 - Identification of site area required for the recreation hub, which will be the basis for the site-specific valuation in Stage 3.
- > **Case Study Two** – Fennell/Plummer Street streetscape and intersection upgrade:
 - Development of conceptual utilities plans and cross sections to show existing and future underground services and any service relocation works required,
 - Development of conceptual Functional Layout Plans, which includes the intersection layout, proposed streetscape upgrade and future train station, and
 - Identification of land take areas required to deliver the ultimate streetscape and intersection upgrade, which will be the basis for the site-specific valuation in Stage 3.

Stage 3 project deliverables include:

- > **Case Study One** - Montague Sport and Recreation Hub
 - One site-specific land valuation to determine land acquisition cost.
 - Preparation of Estimated Cost Plan to deliver the Montague sport and recreation hub as either part of a broader mixed use facility or a stand alone facility. The following costs will be determined:
 - Contribution to overall build costs and shared services if part of a larger mixed use development; or
 - Full development costs if delivered as a stand alone building.
 - Preparation of an estimated cost plan for the fitout of the sport and recreation hub.
 - Cash flow analysis – preparation of a total of four cash flow models (does not include a full formal feasibility analysis).
 - Preparation of a high level risk assessment of the cost implications and the various tenure options.
- > **Case Study Two** – Fennell/Plummer Street streetscape and intersection upgrade
 - Site-specific land valuations (up to a maximum of 7 individual valuations) to determine land acquisition costs.
 - Preparation of Estimated Cost Plans along with supporting general engineering advice with notes, assumptions and qualifications; and
 - Preparation of a high level SWOT analysis/risk assessment associated with access relocation to sites that currently take their access from the street front, and delivery of streetscape improvements prior to ultimate development.

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3. CASE STUDY 1: MONTAGUE SPORT & RECREATION HUB CONCEPT DESIGN

3.1 Introduction

The Montague sport and recreation hub is a significant community infrastructure item that will service a catchment located predominantly to the south east of the facility. The sport and recreation hub is proposed to contain an indoor multi purpose stadium and supporting facilities/infrastructure, youth services and multi purpose community rooms. Future community infrastructure within the Fishermans Bend precinct is proposed to be delivered through community infrastructure hubs. The hubs are to be delivered as either a stand alone facility or within a larger mixed use development. Case Study One explores two development options – stand alone or mixed use.

Figure 2: Case Study One - Site Location



3.2 Site Context

The subject site is located at 80 Munro Street, South Melbourne. The site has a total area of 9,709m² and is currently zoned Capital City Zone – Schedule 1. A summary of the key characteristics of the site is set out below. It is important to note that the subject site nominated by Council is an example site only and Council has not made a commitment to it as the preferred location for the future hub or to purchase the site.

3.2.1 Site Specific Issues

The subject site is particularly complex. Following the review of the site conditions and background reports a number of challenges associated with developing on the subject site were identified, which are set out below.

> Shape of the site

- Triangular in shape and bound by Montague Street, Munro Street and Johnson Street.
- The triangular shape of the site limits where the four indoor courts can be located, if delivered on the same level.
- Given the site is bound by roads on all three frontages this affects the design and layout of the site. As a result it is challenging to deliver active and attractive frontages to all three streets and achieve at least 60% visual permeability along all ground level frontages (as prescribed in the draft planning controls).
- The site has limited vehicle access potential which is restricted to Johnson Street and Munro Street.

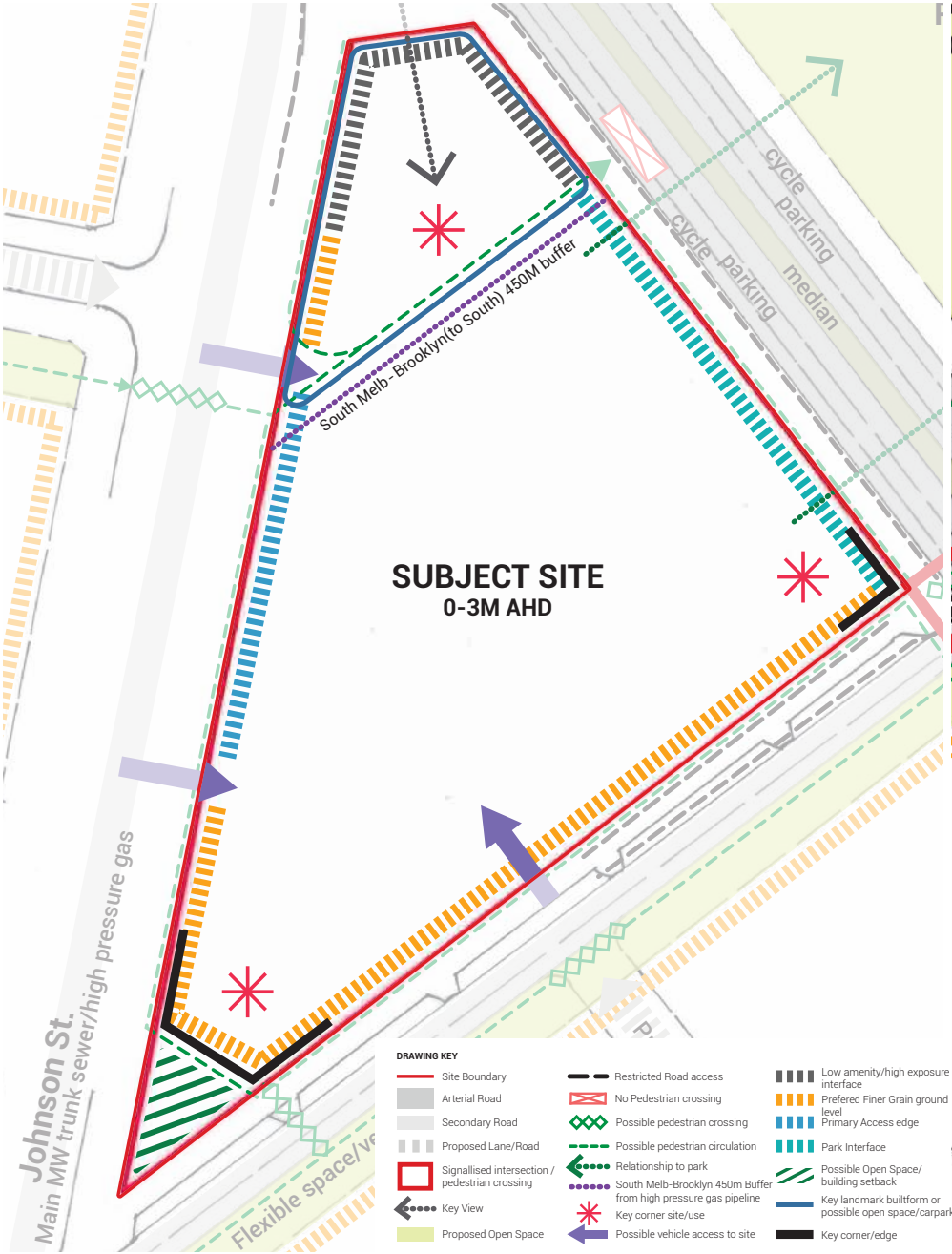
- The northern corner of the site is currently very car dominated (high speed, significant traffic volumes) as Montague Street is an arterial road, and the on and off ramps to the Western Gate Freeway are located directly to the north of the site and therefore the road is currently not particularly pedestrian friendly.
- edge of the site is subject to odour from existing industry, however the amount of land affected is minimal.

> High pressure gas pipeline interest area/ buffer

- APA's West Melbourne – Brooklyn (PL108 T33) high pressure gas pipeline travels along Buckhurst Street within the Montague precinct. The GHD Utilities assessment report (November 2016) states the following: -
 - A 450 meter buffer from the pipeline is required – GHD's Figure 1 shows that the 450m buffer currently affects almost all of the Case Study 1 site.
 - APA recommends that high density residential development or other sensitive land use facilities (e.g. Schools, hospitals, aged care facilities, preschools etc) are located beyond the Pipeline Measurement length (hazardous zone). The buffer (hazardous zone) defines the region that would be affected by the worst case scenario pipeline failure and here are a number of legislative requirements for redevelopment within the vicinity of high pressure gas pipelines.

Figure 3: Site Analysis Plan

- It is important to note that the 2016 GHD report only represents APA's preferred approach and it cannot be assumed that this approach will apply across the entire affected area. It is important to recognize that land use planning is one method to manage the risks associated with a full bore rupture of a gas pipeline. However, the Australian Standard (AS 2885.3) identifies a number of other interventions that the pipeline manager can implement to manage their asset and associated risks. For example, the APA recently approved the construction of a concrete slab over the transmission pipeline in Douglas Street and Ferrars Street due to a new primary school and public park being constructed in the Montague precinct.
- Given the high pressure gas pipeline is located in central Melbourne and traverses through the Fishermans Bend Framework precinct, which is earmarked to be a future high density mixed use area, it is not practical or realistic to locate these sensitive uses 450m from the pipeline. Therefore, other alternative mitigating measures need to be established.
- In light of the above, it is recommended that Council begin discussions with the Fishermans Bend taskforce and APA to identify alternative mechanisms to manage the pipeline whilst facilitating the orderly development and intensification of the area.



> **Flood levels**

- A minimum floor level of 3.0 metres AHD or 0.3 metres above the local overland flow flood level, whichever is higher is required.
- Based on the site feature survey provided by Council the current level of the site is required to be raised by 1.0m - 1.5m in height to meet the minimum flood level requirement.
- The raising of the site area will impact on how the building activates the street.
- The raising of the site also impacts on access to the site including pedestrian ramps to the main entry and access to the ground floor car parking.

> **High risk contamination designation**

- In 2012 Golder Associates prepared a Preliminary Land Contamination Report for the Fishermans Bend precinct which included the subject site.
- Table B1 of the 2012 report notes that the subject site was established as part of an industrial area in the mid to late 1800s (note the subject site is identified as M1 in Table B1). It also notes that an environmental audit had not been completed for the site.
- Figure 12 of the 2012 Golder Report identifies the south western corner of the subject site is within the approximate extent of a historic quarry.
- Figure 19 of the 2012 Golder Associates Report designated the subject site as a 'high risk' contamination site.

- Golder Associates (2012:26) estimate the average contamination costs for high risk sites would be in the order of >\$6M per hectare (note this is not an upper limit). Golder Associates state that further investigations would be required to determine the actual site remediation costs.

> **Soil type**

- The site is located in Zone Z5 in accordance with the Golder Associates report titled High level geotechnical input Fishermans Bend development, 2012. A thin layer of uncontrolled fill overlies approximately 5m of Coode Island Silt which has effectively no structural capacity.
- Due to the subject site being located above a relatively thin layer of Coode Island Silt, the development would likely require piled foundations to support the superstructure. Driven concrete piles present as an efficient option and are widely used for this geographical area.

> **Odour buffer**

- The GHD Fishermans Bend Buffer Assessment (October 2016) identifies that the western edge of the site is subject to odour from existing industry, however the amount of land affected is minimal.

3.2.2 Summary of Proposed Development Context

Council provided an outline of the future development context surrounding the subject site, which is summarised below:

- > The site is located in an area with a maximum discretionary height limit of 24 storeys.
- > A 24 storey height limit applies to all properties directly north of the site, and the 20 storey height limit applies to the properties directly south of the subject site.
- > A future neighbourhood park, Montague North Park, is proposed to be located on the north-east corner of Montague Street and Munro Street opposite the subject site. If the proposed Montague Sport and Recreation hub is delivered on the subject site it is to have a direct relationship with this future park.
- > There is a proposed linear park and road located to the west of the site that will connect into Johnson Street.
- > There is a proposed lane to the south-west of the subject site that will connect into the intersection of Johnson Street and Munro Street.
- > There is a proposed lane through the block to the south of the subject site between Munro Street and Normandy Road.
- > Vehicle access to the site is to be via Johnson Street and/or Munro Street.
- > Mesh have had regard to the above site characteristics and development context and have prepared Figure 3 Site Analysis Plan to illustrate how the site and proposed Sport and Recreation Hub will relate to the surrounding development context.

3.3 Project Specifications / Assumptions

The following project specifications were discussed and agreed to following the first Stage 2 workshop with Council officers. For ease of reference the project specifications/assumptions have been divided into design specifications, proposed planning scheme controls, preferred development options and engineering advice.

3.3.1 Design Specifications

Sports and Recreation

1. Delivery of courts to the larger netball court design dimensions as this ensures they meet competition standards and maximises the flexibility and number of sporting codes that can be played in single court spaces. The inclusion of 2 metre wide spectator seating to allow increased seating and greater circulation around the courts.
2. The multi purpose court configuration is to be consistent with the diagram on page 19 of the Netball Australia National Facilities Policy Technical Manual.
3. As a minimum two playing courts need to be located next to each other and without structural supporting beams in between for competition purposes.
4. Delivery of two cafes. One that services the sports hall and another that will service the broader area and potentially be accessed directly from the street.
5. Provision of community facility elements to be delivered as a three storey component so that the front of the building facing Montague Street presents as a three storey building in both development options (as a minimum).

6. Ceiling height for the indoor courts is 8.3m.
7. The project brief requires that the Montague Sport and Recreation Hub include the provision of four indoor courts and their respective supporting amenities and rooms, youth services and multi-purpose community rooms. Table 1 below sets out the specific floor space requirements for each of these components.
8. It is important to note that the floor space allocation in Table 1 represents the minimum requirement, and the total floor space of the Sport and Recreation Hub delivered in each development scenario is described in detail in Sections 3.5 and 3.6.

Access and Movement

1. Montague Street is to be the primary pedestrian access street, however Munro Street is considered the more pedestrian friendly street given the lower traffic volumes.
2. The main entry to the building is to be located on Montague Street.
3. Johnson Street is to be the primary vehicular/car park access, pick up/ drop off area and include bus parking bays.
4. Any vehicular access to the site via Munro Street would need to be set back from the intersection of Montague and Munro Streets.
5. On street car parking will be provided along the northern side of Munro Street and it is anticipated that on-street car parking will also be provided on Johnson Street.

6. Off-street car parking is to be minimised where possible.
7. The Sport and Recreation hub is to provide 1 car space per 100m² of GFA. Based on an indicative floorspace of a similar facility, a minimum of 55 car spaces is required for the Sport and Recreation hub.

Built form

1. The stadium component of the recreation hub is to have a presence from the overpass and along Montague Street.
2. A future neighbourhood park, Montague North Park, is proposed to be located on the north-east corner of Montague Street and Munro Street opposite the subject site. The proposed Montague Sport and Recreation hub is to have a clear relationship with this future park, if delivered on the subject site.
3. The link between the linear park and Montague North Park will need to connect via the pedestrian signals at the intersection of Montague Street and Munro Street.
4. Basement car parking is not to be provided. This is due to two reasons. Firstly it is technically difficult to achieve due to flood levels and water table issues. Secondly, this case study seeks to explore a 'worst case scenario' in terms of built form.

Table 1: Montague Sport & Recreation Hub – Floor Space Allocation Base Requirements

COMPONENT	M ²
A Indoor Courts	
8.3m high ceiling	
4 Multipurpose courts including run off	
As per Diagram in chapter 2.3 of National Facilities Policy Technical Manual	2946
Spectator seating, circulation, team and officials benches	
1m deep spectator seating area over 30m will provide 30 spectator seats plus team and official benches / wheelchair access. Increasing the depth to 2 metres will provide flexibility for additional circulation space or can accommodate 2 tiers of seating which will increase spectator seating to 80. The area allows for 2m depth.	835
SUBTOTAL A	3781
B Indoor Courts - supporting amenities & rooms	
Must be at same level as courts and not shared with other uses Can form part of a podium and have residential or commercial above	
Player amenities (2 per 4 courts)	40
Player Change rooms (1 per 4 courts)	50
Umpire Change Rooms (1 room per 4 courts)	10
Umpire Amenities (1 room per 4 courts)	10
Umpire Duty Room (1 room per 4 courts)	20
SUBTOTAL B	130
C Indoor Courts - other supporting amenities & rooms	
That may be integrated with and / or shared with their uses	
Public Toilets	24
Accessible Toilet	8
First Aid Room	25

COMPONENT	M ²
Indoor Courts - other supporting amenities & rooms (Cont.)	
Administration Office	36
Tournament Office	15
Kiosk/café (minimum of 1 café)	35
Commercial kitchen	50
Multipurpose/function room	40
Storage	48
SUBTOTAL C	281
D Multi-purpose Rooms	
Community room 1 (youth services)	250
Small meeting/consulting room (youth services)	35
Community Room 2 (sport & well being services)	190
Large Multi purpose Room (dance, table tennis, fitness classes)	250
SUBTOTAL D	725
E Additional Requirements/ considerations	
Entry foyer (minimum)	250
Enclosed entry to building	156
Circulation space (15%) this includes provision of space for the building core/lift well and vertical circulation	913
SUBTOTAL E	1,319
SUMMARY	
A Indoor Courts - under 8.3m high ceiling	3781
B Indoor Courts - supporting amenities & rooms	130
C Indoor Courts - other supporting amenities & rooms	281
D Multi-purpose Rooms	725
E Circulation and foyer	1,319
TOTAL GROSS FLOOR AREA	6,236

*Note: car parking is additional to the 6,236m²

3.3.2 Proposed Planning Scheme Controls

Council officers provided a detailed list of the proposed planning and design controls that will apply to this site, below is a high level summary of these controls. A copy of the detailed controls is provided in Appendix 2.

- > The site has a maximum discretionary height limit of 24 storeys.
- > The site is located in an area with a maximum height limit of 20-24 storeys. The 24 storey height limit applies to all properties directly north of the site, and the 20 storey height limit applies to the properties directly south of the subject site.
- > The discretionary maximum street wall height is 23m (6 storeys). Any levels above the street wall height should be setback 10m from all street frontages and 10m from the centre of new laneways
- > The development is to achieve a minimum of 60% visual permeability along all ground level frontages.
- > All car parking is to be sleeved by active uses and is not to be visible from the street.
- > Floor to ceiling heights of 3.8m are to be applied to the Sport and Recreation hub, commercial and car parking uses.
- > Residential uses are to use a 2.7m floor to ceiling height.
- > Ground floor minimum floor to ceiling height is 4m.
- > Level changes required between the street level and elevated ground level should be integrated into the design of the building.

Access and Movement

- > Car parking requirements: -
 - Commercial areas are to provide 1 car space per 100m² of GFA.
 - Residential areas are to provide 0.5 car spaces per dwelling.
 - 1 car share space is to be provided per 60 car parking spaces.
- > One motorcycle parking space is to be provided for every 100 car spaces.
- > Bicycle parking requirements: -
 - Residential development: - provision of a minimum of one bicycle parking space per dwelling and 1 visitor bicycle space per 10 dwellings.
 - Non-residential development – provision of a minimum of one bicycle parking space per 50m² and 1 visitor bicycle space per 1,000m² of net floor area.
- > There will be no at grade parking open to the air or street, therefore car parking must be sleeved and located within the lower levels/podium, not in a basement.
- > Vehicle access to the site is restricted to Johnson Street and Munro Street.

Floor Space Allocations

- > The proposed planning controls specify specific floor area ratios (FAR) that apply to the subject site for the various allowable land uses. The proposed FAR that affect the site are set out in Table 2 below.
- > The total floor space for the building/s must not exceed a total gross floor area of 59,224m² this is equivalent to 6.1 times the total site area. The sport and recreation component may exceed this total floor space provided it is still within the building height restrictions. However, Case Study 1 does not assume that the sport and recreation hub will exceed the total site FAR.
- > As part of a mixed use development, the proposal must contain a minimum gross commercial floor space of 17,476m², which is equivalent to 1.8 times the total site area.
- > The gross floor area of common service areas shared by commercial/non-residential within the building is classified as commercial floor space.

Table 2: Floor Area Ratios that apply to the subject site

	Floor Area Ratio (FAR)	Total Floor space m ²
Site Area		9,709
Total FAR for entire site	6.1	59,225
Minimum Commercial FAR	1.8	17,476
Maximum Residential FAR	4.3	41,749

- > The Montague Sport and Recreation Hub and any other floorspace for Not-for-profits or community uses can count towards the commercial floor space. In this case study it is assumed that the sport and recreation floor space will count towards the minimum commercial floorspace.
- > As part of Option 2 - mixed use development, the proposal may contain up to a maximum of 41,748m² of gross residential floorspace, this is equivalent to 4.3 times the total site area.
- > The gross floor area of common service areas shared by other uses should be calculated based on the proportion of residential use to other uses within the building.
- > In addition to the floor area ratios explained above, the proposed planning controls also include a Floor Area Uplift (FAU) for the provision of a 'public' benefit. Provision of the Sport and Recreation Hub is considered to be a public benefit, which results in an allowance for an additional 110m² of residential floor space for every 100m² of community infrastructure floor space provided.
- > The gross floor area (GFA) for both commercial and residential uses is defined as the area above ground of all buildings on a site, including all enclosed areas, services, lifts, car stackers and covered balconies. Voids associated with lifts, car stackers and similar service elements should be considered as multiple floors of the same height as adjacent floors or 3.0m if there is no adjacent floor.
- > For the purposes of calculating the floor area ratios (FAR) by land use for the site, the FAR includes the GFA and car parking

3.3.3 Preferred Development Options

There are two preferred development options for Case Study 1 which are described below.

Option 1 – Stand alone development

- > Comprises of a stand alone sport and recreation centre.
- > Given the requirement to sleeve all car parking with active uses this option assumes the car parking is to be provided on the ground floor.
- > Whilst the maximum FAR is applicable to this option the minimum commercial and maximum residential FAR's do not apply.

Option 1 is discussed in further detail in section 3.4

Option 2 – Mixed use development

- > Option 2 seeks to maximise the full development potential of the site including delivering: -
 - Total maximum residential FAR and FAU.
 - Minimum commercial FAR, note the sport and recreation hub component will count towards this minimum.
- > It is developed on the premise that the sport and recreation hub floor space should not exceed the total site floor space FAR and FAU.

Option 2 is discussed in further detail in section 3.5.

3.3.4 Engineering Advice

As part of Stage 2, high level engineering advice was provided by Wood & Grieve Engineers encompassing mainly structural services however general advice relating to building services was also included. Below is a summary of this as it relates to the site more generally and Sections 3.5 and 3.6 outlines their advice specific to the stand alone and mixed use options respectively.

- > Any development would likely require piles as the overall area of the building footprint is large. The design would need to consider the differential movement of the structure across the site and a piled option would be more appropriate in lieu of shallow footings. Pile depths could extend to approximately 25m.
 - > Given there is a requirement for the building level to be raised across the site, the pile cap/slab zone would fit within this.
 - > Sleeved car parking would require some form of ventilation, although this could be minimised by performance based alternatives to large mechanical ventilation units.
- > Commercial columns usually work on a 8m grid structure, the courts require a minimum 15m span which limits the building potential above the courts. The extent of how much can be constructed over the courts is dependent on a number of things, including:
 - Setout of the building;
 - Encroachment over the courts;
 - Height of the building; and
 - Column grids. Given commercial columns are based on an 8m grid structure, additional columns would need to be placed between courts to support development above the courts.
 - > A key challenge to building above the courts in a stacked option would be how the lateral stability of the structure is achieved.
 - > Indoor courts usually require 75mm floor layering above the structure floor level. The floor buildup of the courts is noted only to help inform building height, it has no implication on structure.
 - > Typically, shear walls would be required intermittently along the building's facade to provide stability due to the court spatial requirements.

3.4 Option 1 – Stand Alone Recreation Hub Concept Design

In light of the general project specifications outlined above, a concept plan and utilities plan have been prepared for Option 1. This section outlines the design, planning and structural engineering elements considered which informed selection of the preferred option.

3.4.1 Design and Planning Considerations

A number of initial options were prepared which ultimately informed the preferred concept plan, these options are described below:

Location and layout of the four indoor courts

- > The layout of delivering the four indoor courts on the same level was examined to determine the most efficient arrangement. This involved investigating the layout of the courts i.e. four in a row verses two courts stacked end on end. As a result, the most efficient layout of the four courts is to deliver the courts in pairs (to cater for competitions) and stack them end on end.
- > Given the triangular shape of the site there were limited locations the four courts could physically fit, and as a result the courts would need to be located hard up against either Montague or Munro Streets to fit within the site.

Built form

- > A number of options examined what length/ edge of the recreation centre should be located on Montague Street and whether the bulk of the building could be internalised within the site. The corner of Montague and Munro Streets was identified as the key corner and primary access streets, therefore the building should be located on this corner. In terms of internalising the bulk of the building it is recommended that the finer grain community uses sleeve both Montague and Munro

Streets to provide an active and attractive edge.

- > The position of the courts within the building was explored. It was recognised that locating the courts on the ground floor affects the height of the building as you cannot build above the courts without providing the necessary structural columns within the courts. This was not considered appropriate as the placement of structural columns between the courts would not meet competition standards.
- > In addition, locating the courts on the ground floor creates a challenge to deliver the planning scheme requirement of at least 60% visual permeability as sheer walls are required intermittently along the buildings façade to provide structural stability. The potential for a large span of windows along the street frontage was considered, to allow people to look into the indoor sports stadium. However, due to the site orientation, this was considered undesirable along Montague Street (north-east facing) due to sunlight glare and player safety and impacting on the heat of the courts and players in summer. Provision of smaller windows along Munro Street is acceptable due to it being south facing. In light of the above considerations, it was determined that the four indoor courts are best located on level one.
- > Having regard to the surrounding existing and future development context, and the prominent location of the subject site, it is important that the sport and recreation hub building height reflects this. Accordingly, it is preferable that the sport and recreation hub presents as a three storey building to the Montague and Munro street frontages as opposed to a single storey building.

Relationship of the Sport and Recreation Hub to the balance of the site

- > Given the sport and recreation centre does not cover the full site area a number of options for the balance of the site were identified. These include provision of additional outdoor sport and recreation focused activities, potential locations for a second café, potential sleeved on-site open air car parking, and possible development sites for future towers. Due to the location of the subject site adjacent to the proposed park and the youth focused facilities to be provided within the hub it was considered that an outdoor basketball court and skate park would be most appropriate.

Access and Movement

- > The primary entry to the building was examined as to whether it should be located at the corner of Montague Street and Munro Street or whether it should be located further along Montague Street so it is more central to the building. Given the prominence of the corner of Montague and Munro Street and the existing signalised intersection, it is considered that the entry is best located on this corner with a secondary access point to the youth services provided on the northern edge.
- > Different locations for the car park were explored along with entries from both Johnson and Munro Streets. It is considered appropriate that entries to the car park are provided from both Johnson and Munro Streets to distribute the traffic demands of the hub and reduce queuing in the streets.

- > The level of provision of car parking was examined given that visitors to the centre will often be travelling from outside the immediate walkable catchment. Based on a similar facility a minimum requirement of 55 car spaces was specified. However, given the preference to locate the four indoor courts on level one and the structural support requirements of the four courts, it is considered appropriate that the area underneath the courts on the ground floor is set aside as car park and as a result of the size of the courts, the car park will provide just over 80 car park spaces.

3.4.2 Structural Engineering Considerations

An additional workshop with Wood & Grieve Engineers was held prior to the finalisation of the concept plans and the following advice was provided: -

- > It is anticipated that the community building structure will be conventionally constructed, i.e. concrete/lightweight steel frame.
- > CLT/engineered timber could be used as an option for the roof structure above the courts. Further investigation is required to validate spatial requirements however it is anticipated that this would be feasible.
- > As noted above, piled foundations are likely to be required to support the superstructure (the superstructure is the portion of the building that is above the ground level that receives the live load).

3.4.3 Concept Design

Following the second workshop with Council officers, and an additional workshop with Wood & Grieve Engineers, the preferred option illustrated in Figures 4-6 was agreed upon and refined in consultation with Council officers.

The preferred Option 1 stand alone sport and recreation hub concept plan contains the following elements: -

Ground floor

- > Provision of sleeved car parking to Montague and Munro Streets, entry/foyer off Montague Street, multipurpose room and consulting room (youth services), public toilets, café/kiosk, commercial kitchen and multipurpose/function room and an additional 320m² of unallocated space fronting Munro Street as illustrated in Figure 7. This additional 320m² could be used for a second café, additional multipurpose space/s and/or not for profit space/s.

Level One

- > Provision of four indoor courts separated by a pedestrian space, which is outside the runoff areas, and supporting amenities and rooms including player change rooms and amenities, umpire rooms, first aid, and administration offices as illustrated in Figure 8.

Level Two

- > Provision of two multipurpose rooms along the Montague Street frontage as illustrated in Figure 9.

The preferred Option 1 stand alone recreation hub concept plan is described in further detail below: -

- > Location and layout of the four indoor courts
 - All four courts are provided on the first floor with no development above the courts.
 - The four courts are designed in pairs stacked end on end as illustrated in Figure 8.
- > Built form
 - A three storey façade to Montague Street and Munro Street is preferred given the height of the surrounding existing and future development. Figure 9 shows the two multipurpose rooms located on the second floor.
 - The indoor courts are set back from Montague Street due to the main entry/foyer and provision of multi-purpose rooms fronting directly onto Montague Street. Whilst the courts are visible from the northern point of Montague Street the location of these finer grained uses breaks up the bulk of the building.
 - The provision of the finer grained community and youth services and entry/foyer along Montague Street will ensure the 60% visual permeability is achieved along the ground floor.
 - The additional floor space provided along the frontage of Munro Street can be designed in a way to also achieve a minimum of at least 60% visual permeability at ground level.
 - The car parking on the ground floor is sleeved by the recreation building along Munro Street to create an active edge, as illustrated in Figure 4.

- Two of the four courts front directly onto Munro street, however given these are located on the first floor they are elevated approximately 5.5m from the street level. This is due to the 1.5m increase in the site height to meet the minimum flood level requirements and the provision of a 4m ground floor level.
 - The car parking areas facing Johnson Street and corner of Johnson/ Montague Street do not need to be sleeved as they do not directly address the street frontage, however the Stage 3 costings will allow for mid-range materials for these blank façades to ensure they are relatively attractive. The proposed outdoor uses including a basketball court and skate park and landscaping could further enhance the amenity of these blank facades.
 - The concept plan is designed using 8m grid structure for the columns on the ground floor. This grid structure affects the design on the car park and the orientation of car spaces as the car park needs to be designed to ensure the supporting columns are not located within the circulation space to allow for unimpeded vehicle access.
- > Floor Space Allocation
- Table 3 below sets out the floor space allocation of Option 1.

Table 3: Option 1 Stand alone development floor space allocation

COMPONENT	Gross Building Area m2
Sport and Recreation Hub – Base Model requirements	6,236
Sport and Recreation Hub – Additional Space provided due to building design	1,013
Car Parking	3,136
TOTAL	10,385

Table 3 illustrates that this design provides 3,136m² for car parking and an additional 1,013m² of floor space to the base model requirements. This additional space is due to:

- > The sleeving of the car parking along Munro Street resulting in 320m² of additional floor space being provided on the ground floor. Potential uses for this additional space could be the second café that would activate Munro Street and space for non-for-profit organisations;
- > The requirement to internalise the access to the building adds an additional 156m² to the ground floor and 312m² due to the void located above this area to achieve a three storey building height fronting Montague Street;
- > The requirement to deliver a three storey building results in two levels of floor space being provided above the café/kiosk, commercial kitchen and 40m² multipurpose room located on the ground floor. Whilst Council officers have indicated a preference to retain this area as a void/atrium space there is the potential to locate spectator seating via a mezzanine at the floor height of level 2; and
- > The provision of pedestrian space between the two sets of courts.

Appendix 3 provides a full breakdown of each use on each level for Option 1.

Relationship of the Sport and Recreation Hub with the balance of the site

- > The balance of the site is to be used for youth focused sports and activities. The concept plan illustrated in Figure 7 proposes an outdoor basketball court which would activate the Johnson Street edge and have a direct visual link to the proposed linear park to the north-west. In addition, a potential skate park on the northern corner would have a direct visual link to the proposed neighbourhood park and outdoor basketball court.

Access and Movement

- > Primary pedestrian access to the building is via Montague Street.
- > The youth facilities can be accessed either directly from the central foyer or from the separate external access along the northern edge of the hub. The youth services are located adjacent to the consulting space to enable the facilitation of confidential counselling/ referral services.
- > Primary vehicular access for bus bays, pick up/ drop off is via Munro Street.
- > Primary vehicular access to the car park is via both Johnson Street and Munro Street. The car park allows for internal queuing to minimise the need for cars to queue on the street.
- > Based on a total GFA of 7,249m² a minimum of 74 car spaces, including 70 general car spaces, 1 shared car space, provision for motorcycle parking (equivalent of 1 car parking space); and provision of 131 bicycle parking spaces is required. However, as illustrated in Figure 7 a total of 84 car parks have been provided due to the expanse of area underneath the four indoor courts located on the first floor.

- > Pedestrian movement through the site is facilitated along the northern and western edges via the outdoor space.
- > Physical pedestrian links between the proposed linear park to the west and neighbourhood park to the east requires facilitating movement through the site and bringing pedestrians down to the signalised intersection of Montague and Munro Streets, where they can safely cross Montague Street.

Given Option 1 proposes the delivery of four indoor courts, without any columns located between the courts the use of the roof would be limited to solar panels only. Wood and Grieve Engineers advised that the structure required to span the entire court even with minimal green area would be very deep and the cost would significantly outweigh the benefit.

3.4.4 Issues/ challenges

In addition to the broader challenges associated with the subject site more generally as set out in Section 3.2 above, there are a number of challenges associated with delivering Option 1 – Stand Alone Recreation hub on the subject site, which are outlined below.

- > The triangular shape of the site and the fact it has three road frontages creates a challenge in terms of where the four indoor courts can physically fit within the site, how the building can achieve active and attractive frontages on all three edges and at the same time deliver at least 60% visual permeability at the ground level.
- > Part of the south-west corner of the subject site, at the junction of Munro and Johnson Streets may be required to facilitate a 90 degree intersection in the future.

- > There are a number of structural engineering requirements which affect the design, layout and cost of the recreation building, these include: -
 - Commercial column's usually work on a 8m grid structure, the indoor netball courts require a minimum 15m span which limits the building potential above the courts as supporting columns would need to be placed between the courts.
 - Indoor netball courts usually require 75mm floor layering above the structure floor level.
- > Typically, shear walls would be required intermittently along the building's facade to provide stability due to the spatial requirements of the courts. As a result, if the courts were located on the ground floor it may be difficult to achieve the planning scheme requirement of 60% visual permeability.
- > The building design and required car parking results in substantial additional floor space to the minimum specifications.

Option 1 - Stand Alone Recreation hub, is considered to be an under-development of the site due to the following reasons: -

- > The total floor space of the hub is significantly less than the Total Maximum FAR. Further, the Minimum Commercial FAR is not achieved for the site and an exemption for this would need to be included in the planning scheme controls; and
- > Option 1 on this prominent site may not meet the vision for a landmark building.

3.4.5 Benefits/ advantages

Notwithstanding the above, there are several benefits and advantages associated with delivering Option 1 which include: -

- > Council owns/ controls the entire site and is therefore not reliant upon a developer in terms of timing and outcomes of development;
- > Due to the size of the site there is a substantial amount of additional space that can be utilised for other purposes such as an outdoor basketball court, skate park;
- > The additional floor space included provides an option to expand upon the services provided within this facility to include extra multipurpose spaces, not for profit spaces etc; and
- > The level of provision of car parking, which currently exceeds the planning scheme requirements due to the size of the four indoor courts sitting above the car park, ensures the facility is able to cater for additional uses being located within the hub.

Figure 4: Option 1 Stand Alone Sport & Recreation Hub - Corner of Montague St & Munro St

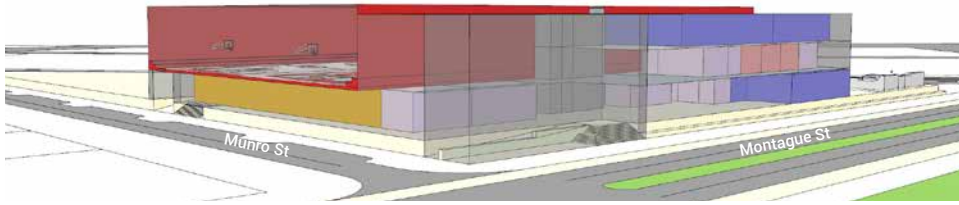


Figure 5: Option 1 Stand Alone Sport & Recreation Hub - Corner of Montague St & Johnson St

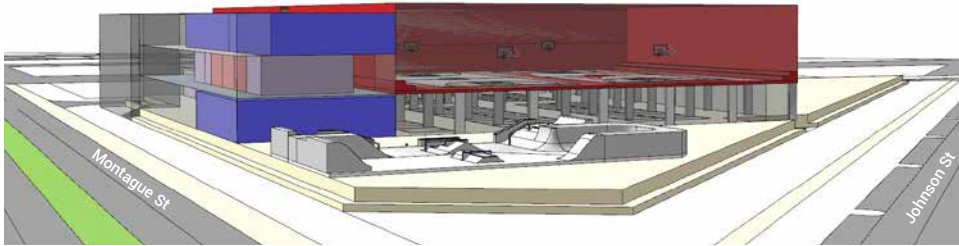
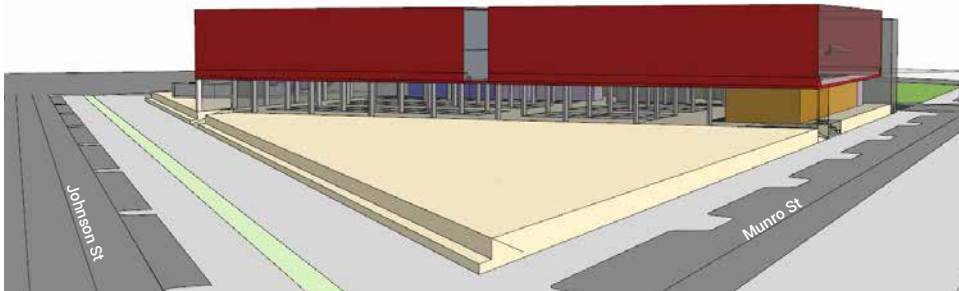


Figure 6: Option 1 Stand Alone Sport & Recreation Hub - Corner of Johnson St & Munro St



Legend

- Recreational Courts
- Uses associated with Recreational Courts
- Larger Multipurpose Rooms
- Non- Associated Uses
- Additional Space
- Permeable Facade/ Circulation Enclosure
- Lift core
- Site Lifting (to comply with required AHD)

Figure 7: Option 1 Stand Alone Sport & Recreation Hub Floor Plate - Ground Floor

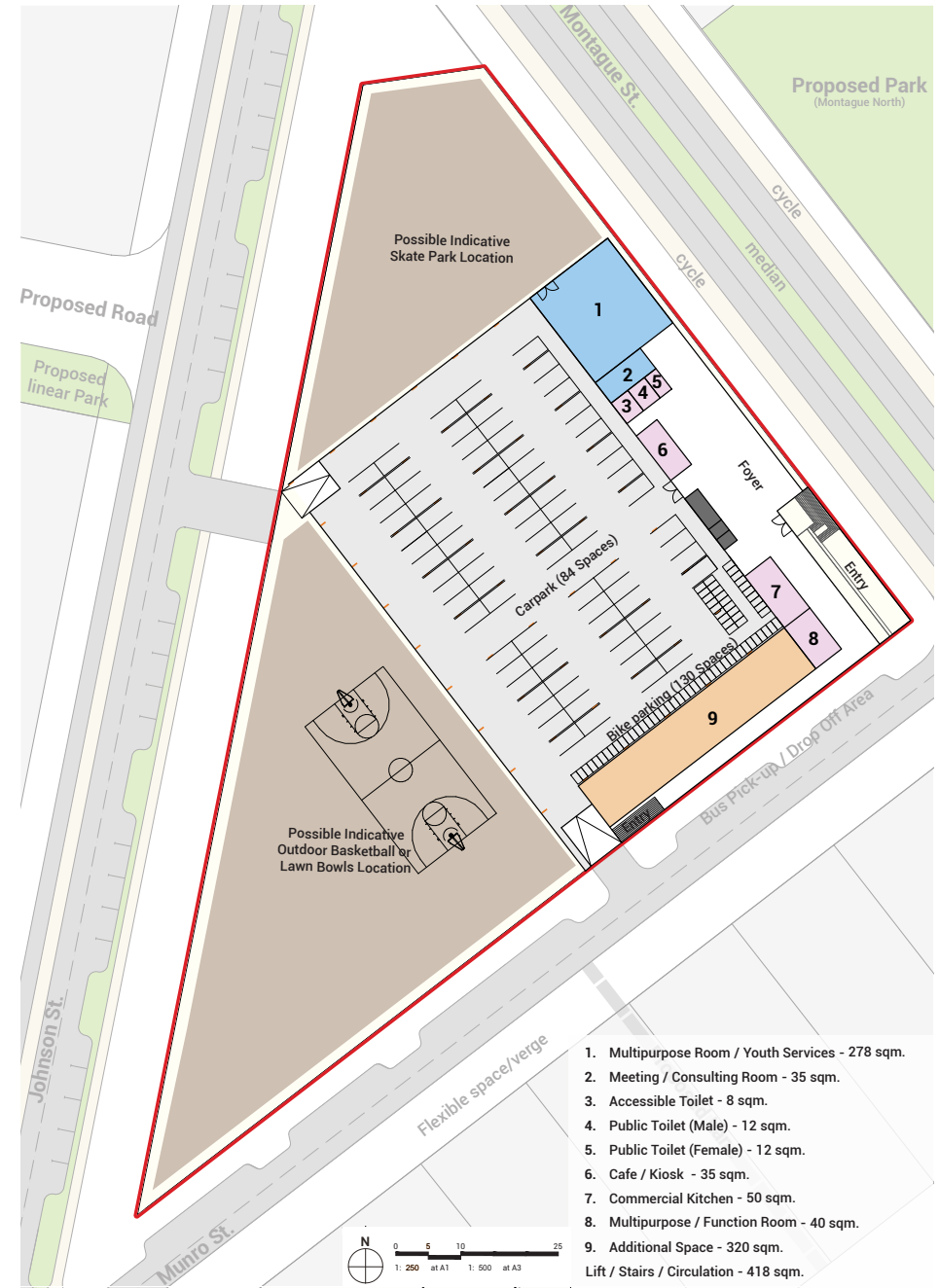


Figure 8: Option 1 Stand Alone Recreation Hub Floor Plate - Level One

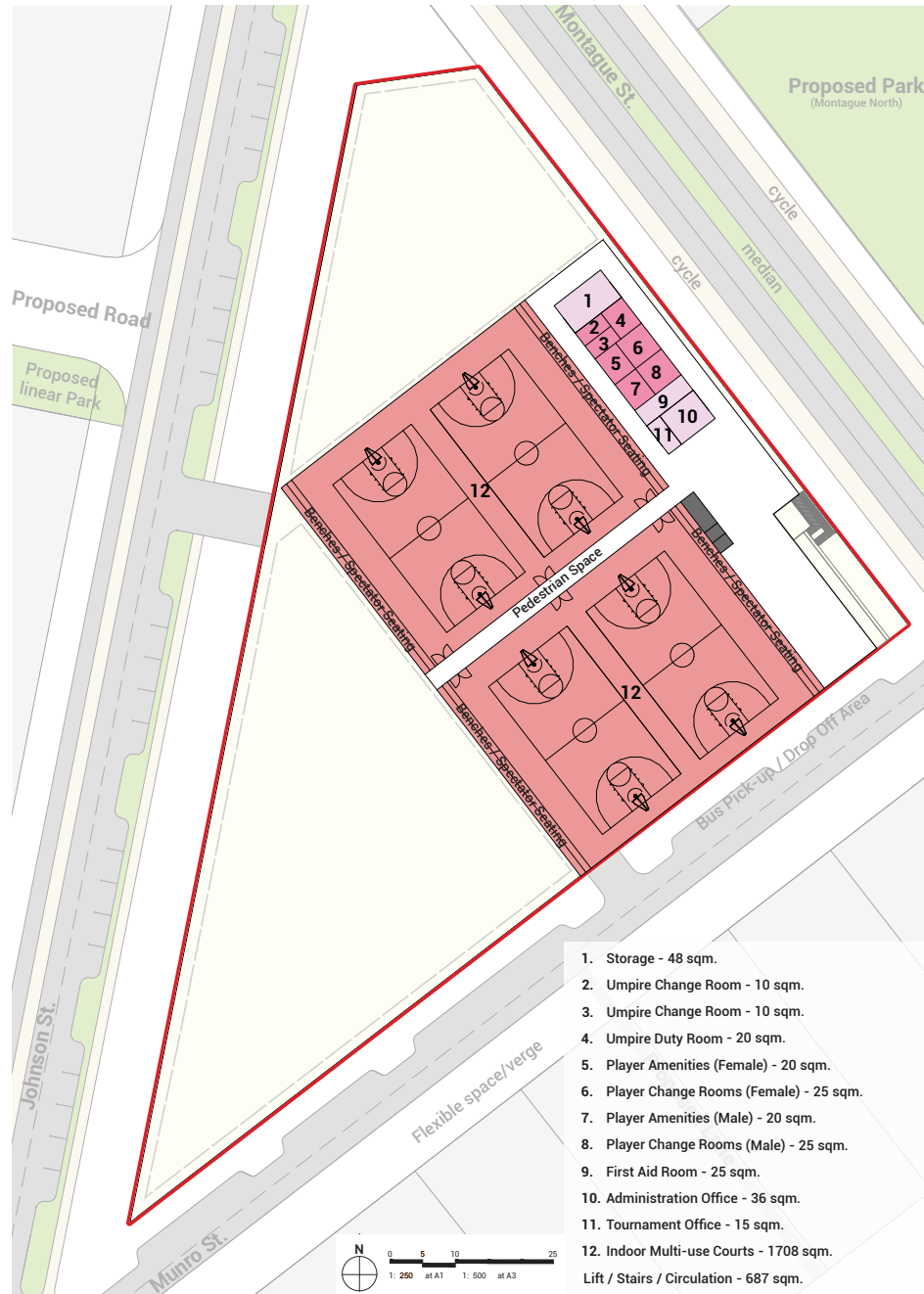
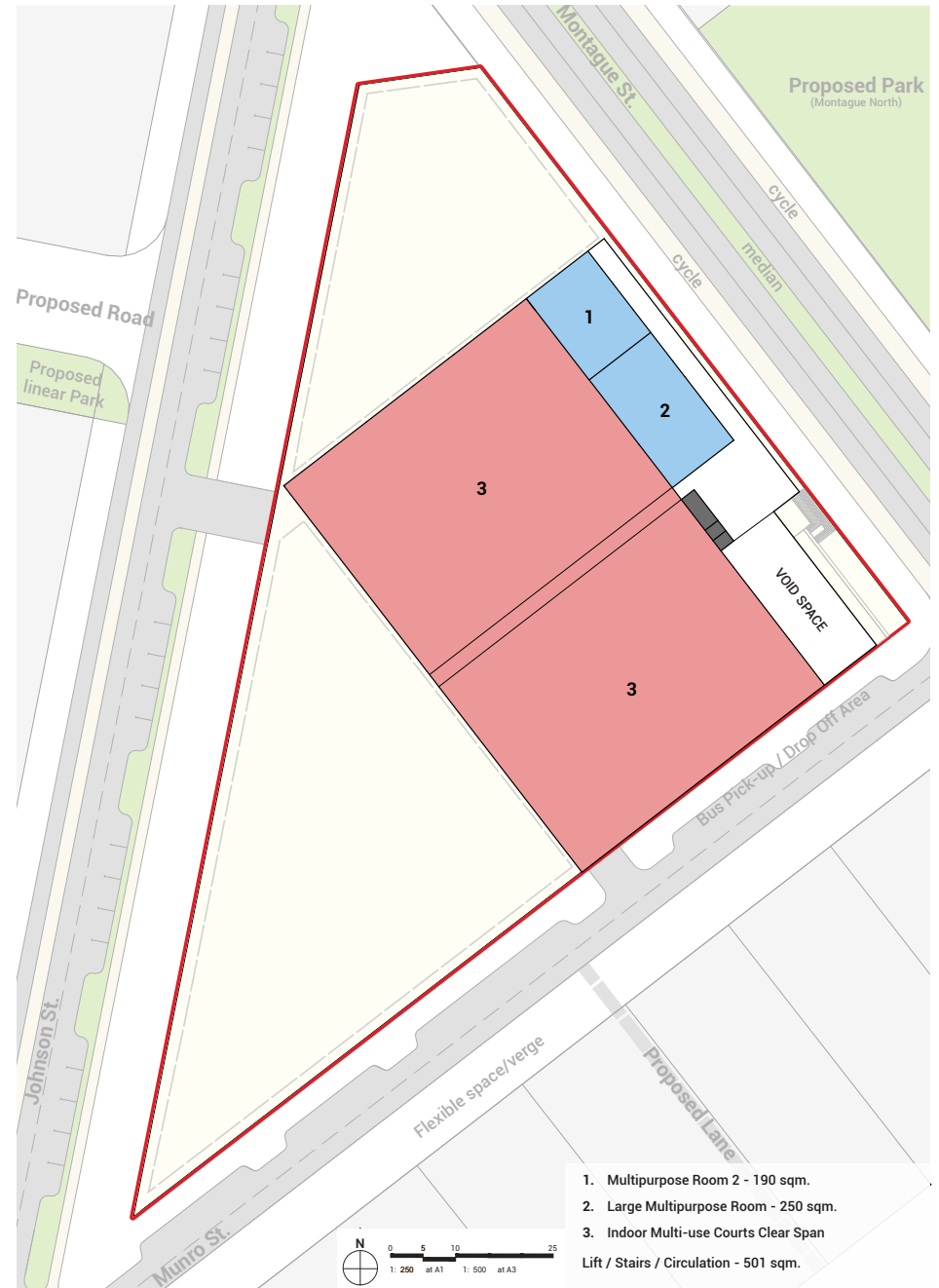


Figure 9: Option 1 Stand Alone Recreation Hub Floor Plate - Level Two



3.5 Option 2 – Recreation Hub within a broader mixed use development Concept Design

Option 2 focuses on the provision of the sport and recreation hub as part of a broader mixed use development. Due to the introduction of additional land uses there are a number of additional project specifications that relate to this development option.

3.5.1 Additional Project Specifications/ Assumptions

Preferred Development Outcomes and Design Considerations

- > The sport and recreation facility is a stand alone building within a mixed use site i.e. whilst the buildings may overlap vertically, there will be no direct access between the Sport and Recreation hub and any adjoining mixed use development.
- > Provision of the community facility components are to be delivered over a number of storeys to ensure it aligns with the floor to ceiling height of the indoor sports courts.
- > Primary pedestrian access to the Sport and Recreation hub building is via Montague Street
- > Secondary access to Sport and Recreation hub building from the internal laneway & Munro Street.
- > A mid-block laneway should be 9m wide and open to the air.

Planning Scheme Controls

- > Minimum commercial floor space requirement of 17,476 m² based on the applicable floor area ratio.
- > Maximum residential floor space of 41,749m² based on the applicable floor area ratio plus additional residential floor space based on the Floor Area Uplift (FAU) and provision of the Sport and Recreation hub as a 'public benefit'.
- > Maximum discretionary street wall height of 23 metres (6 storeys), above the street wall height to be set back 10 metres from each road or laneway frontage.
- > The maximum building height for the site is 24 storeys along the northern section and 20 storeys along the southern edge.
- > There is a requirement for a minimum spacing of 20 metres between towers within the site.

Floor Area Ratios and Floor Area Uplift

- > There are a number of floor area ratios that apply to the subject site for each different land use which are illustrated in Table 4 below. In addition the floor area ratios explained above, floor area uplift (FAU) also applies to the site. The floor area uplift allows for the additional provision of 110m² of residential floor space for every 100m² of community infrastructure floor space provided (in this case the provision of the Sport and Recreation hub).
- > Based on the preferred concept plan for Option 2 the FAU calculations allow for an additional 12,052m² of residential floor space to be located on the site. The total floor space allocation is set out in Table 4 below.
- > Table 4 illustrates that the total maximum residential floor space that can be provided on the site is 53,800m² and the minimum commercial floor space that can be provided on the site is 17,476m², which comes to a combined total floor space of 71,276m².

Table 4: Total Floor Area Ratio (FAR) and Floor Area Uplift (FAU) requirements

	Floor Area Ratio (FAR) / Floor Area Uplift (FAU)	Total Floor space m ²
Site Area		9,709
Total FAR for entire site	6.1	59,225
Minimum Commercial FAR	1.8	17,476
Maximum Residential FAR	4.3	41,749
Maximum Residential Floor Area Uplift (FAU)	110m ² of additional residential floor space to 100m ² of community infrastructure floor space provided	12,052
Total Residential Floor space Allocation (FAR + FAU)		53,800
Total minimum commercial floor space (FAR) and total maximum residential floor space (FAR + FAU)		71,276

3.5.2 Design and Planning Considerations

Having regard to the detailed project specifications applicable to Option 2 a number of options were prepared which ultimately informed the preferred concept plan, these options are described below:

Location and layout of the indoor courts

- > Several options were prepared to determine how best to maximise the development potential of the site whilst meeting the requirements of the sport and recreation hub. This included stacking two courts on top of each other to reduce the footprint of the sport and recreation hub and maximise the development potential of the site. The stacking of the courts raised the issue regarding the level of structural support required to facilitate development above the indoor courts.
- > Structural engineering advice was sought from Wood & Grieve Engineers who advised that a key challenge to building above the indoor courts in a stacked option would be how the lateral stability of the structure is achieved. As a result columns would need to be placed between the courts to support development above. However, placing columns between the courts means the courts are not recognised as 'competition courts'.
- > Part of the spatial planning looked at an option of extending the tower structure over the court structure to maximise utilisation of the site. The engineering advice notes that this may be possible depending on the building height and depth, although it would affect the structural thicknesses across most elements, including columns/floor

depth and potentially core thickness. The extent of how much can be constructed over the courts is dependent on a number of things, including:

- Setout of the building;
 - Encroachment over the courts;
 - Height of the building; and
 - Column grids. Given commercial columns are based on an 8m grid structure, additional columns would need to be placed between courts to support development above the courts.
- > Therefore, if there is only a small portion of the tower that encroaches over the courts this may be able to be accommodated with an increased tower height. However if the tower was entirely constructed over the top of the courts, then the building height would have to be reduced as it may not be feasible to transfer the structure above to accommodate the court requirements.
 - > In light of the engineering advice and the desire to condense the overall footprint of the sport and recreation building it was considered appropriate to provide two indoor courts per level, stacked on top of each other, rather than four courts on the same level, to allow more space to the podium and tower blocks. It was also considered appropriate not to build above the second level courts so these could remain free of columns and therefore designated as competition courts.

Built form and land use

- > As outlined above, the stacked option was preferable to locating four courts on a single level, to maximise the development potential of the site and to ensure the massing of the Sport and Recreation Hub was comparable to the street wall height / podium of the mixed use buildings on the site. One level of courts would have resulted in a large 3-storey element on the site, reducing the development potential and it would be unlikely that the FAR and FAU floorspace could be reached within the discretionary building height.
- > The stacking of the two courts provided two development sites, which were of sufficient size to cater for future podiums and ensure development of a tower above the street wall (podium).
- > The height of the buildings were calculated using the floor area ratios for the site and Council's instructions to only provide the minimum commercial floor space and maximum residential space. This testing proved the development sites were of sufficient size to deliver the maximum FAR & FAU.
- > Having regard to the site context, including its prominent location, sensitive interface and maximum building height of the properties immediately surrounding the site it was agreed to locate the higher tower on the northern edge of the site and lower tower on the southern edge of the site.

Relationship of the Sport and Recreation Hub to the balance of the site

- > A number of options including (1) providing the sport and recreation hub as a stand alone building (i.e. no shared access or common areas, and no development above part of the recreation hub), (2) incorporating the youth and community uses within the podium of one of the development sites and potentially sharing a foyer with commercial/residential uses, and lastly (3) building commercial/residential above part of the recreation hub car park were explored. The findings of this work is discussed below.
- 1. Delivering a stand alone building, that is not vertically integrated with an adjacent mixed use development is not an efficient use of the site area due to the car parking requirements of the recreation hub which reduces the size of the adjacent mixed use development sites.
- 2. The second option highlighted a number of issues in terms of shared use and facilities, hours of access, and it did not create a large reduction in terms of site coverage given the fact that you cannot develop above the indoor courts without providing internal supporting columns which means the courts cannot be used for competition purposes.
- 3. The last option of vertically integrating the Montague mixed use development site over part of the sport and recreation car park is considered most appropriate as it increases the size of the Montague development site, reduces the size of the sport and recreation hub as there is no demand for additional floor space, and delivers a continuous built form edge to Montague Street.

Access and Movement

- > In light of the requirement to raise the subject site, the location and number of primary pedestrian and vehicular access points to all three buildings were explored. In light of the anticipated traffic generation requirements of the mixed use site a proposed central laneway that will provide access to all development sites is considered appropriate. A central open air laneway will reduce the queuing lengths required internal to the car parks and will reduce the ramps areas within the car parks as the laneway will be raised up to the building level and as a result the car parks on the ground floor will be more efficient. An open air 9m laneway also maintains a physical pedestrian connection through the site.
- > Given the site is bound by road frontages on all three sides, it is considered appropriate that the two mixed use development sites can have entries off either street.
- > Due to the proposed site coverage in Option 2 it is considered appropriate that an additional access point to the sport and recreation hub is provided. Based on the location of the sport and recreation hub on the corner of Montague and Munro Streets it is recommended that a secondary access point be provided on Munro Street near the pick up/drop off area.

3.5.3 Structural Engineering Considerations

- > As noted above, piled foundations are likely to be required to support the superstructure.
- > For the stacked courts, the suspended floor structure would require a concrete floor depth of approximately 1.5m. A similar approach in steel would require more depth, in the order of 1.8m. CLT/Engineered timber would not be feasible for the floor structure due to excess structural depth requirements.
- > Services would typically sit below 1.5m floor height which would raise the clear span requirement for the courts.
- > If the courts are located on the top floor of the podium, then a clear open span (trussed roof structure) would be achievable.
- > Consideration should be given to the cost of this development typology, which would likely generate a 20-30% premium when placing the courts on top of one another.
- > Generally, a rooftop terrace would be feasible above the courts, if supporting columns were placed between the courts. This is dependent on the extent and type of use the floor will be subject to, however a floor depth of 1.0-1.5m would be adequate for the purposes of planning building heights.
- > Any tree locations for a rooftop space could be located at column locations to minimise the amount of transfer structures needed, if columns were placed between courts.
- > A 24 storey building would most likely require a 6-8 lifts, which increases the spatial allowance required for the lift/stair core.

- > If a column free court at level two is required, the use of the roof would be limited to solar panels only. The structure required to span the entire court even with minimal green area would be very deep and cost would significantly outweigh the benefit.

3.5.4 Concept Design

Figures 10 - 18 illustrate the preferred layout for Option 2 – Mixed Use development, which is described in detail below.

Location and layout of the indoor courts

- > Providing four courts on a single level within a mixed use development was not considered the best outcome for the site as this significantly constrained the development potential of the site.
- > The sport and recreation building contains two, rather than four, full sized competition courts located on the second level. This is due to the engineering requirement to include supporting columns between the courts to support development above the courts. Netball Victoria confirmed that the provision of supporting columns between the courts would result in the courts not complying with their specifications and therefore not being able to be used for competition purposes. The location of the two competition standard courts on the top floor of the recreation building means a clear open span (trussed roof structure) would be achievable.
- > In light of the above, the recreation building includes the provision of a large multi-purpose space (1,708m²) on the first floor which is equivalent in area to two full sized netball courts.

This space will be able to be used for a range of activities including table tennis, dance, yoga, fitness classes. This space is designed to have the same floor to ceiling height of 8.3m as the netball courts on level 2.

- > The splitting of the four courts over the two levels requires the provision of additional supporting amenities and rooms that must be located on the same floor as the indoor courts. Essentially, the splitting of the indoor courts has resulted in a duplication of the immediate supporting amenities and rooms outlined in the base requirement as per Table 1.

Built form and land use

- > The sport and recreation hub is to be developed on the corner of Montague and Munro Streets.
- > The sport and recreation hub comprises a ground floor and 2-4 storeys and is 23m high. The building comprises a ground floor and courts on levels 1 and 2, however due to the ceiling height of the courts being 8.3m an additional two levels can be accommodated in the portion of the building fronting Montague Street that sits adjacent to the courts.
- > Two development sites have been identified, one at the northern end of the site on the corner of Montague and Johnson Streets which is referred to as the Montague site and another site on the corner of Munro and Johnson Streets which is referred to as the Munro site, illustrated in Figure 10 below.
- > The two towers are 29.5m apart.
- > On the ground floor commercial uses sleeve the car parking provided in both the Munro and Montague podiums. It is noted that an alternative would be to sleeve all car parking, this option would most likely require a car lift and stacking system.

- > The Montague site comprises of:
 - A mix of commercial uses sleeve car parking on the ground floor;
 - The ground floor of this building is built immediately adjacent to the recreation hub;
 - Levels one to five of the podium are proposed to be built over the ground floor and part of the sport and recreation hub car park to utilise the development space above the car park and condense the size of the sport and recreation hub.
 - The Montague tower is set back 10m from Montague Street and Johnson Street.
 - A ground floor plus 19 storeys, it is 58.6m high and includes 38,237m² total floor space.
- > The Munro site comprises of:
 - Commercial uses sleeve the commercial car park on the ground level.
 - Residential car parking is provided on levels 1 and 2.
 - Residential floor space comprises the levels three to five of the podium and all 9 storeys of the tower.
 - The Munro tower is set back 10 metres from both Munro and Johnson Streets and from the centre of the open air internal laneway.
 - A ground floor plus 14 storeys high, it is 44m high and includes 22,512m² total floor space.
 - Please refer to Table 7 for a breakdown of the floor space for each development site and Appendix 4 for a breakdown of floor space for each level.

Floor space allocations

Sport and Recreation Hub floor space allocation

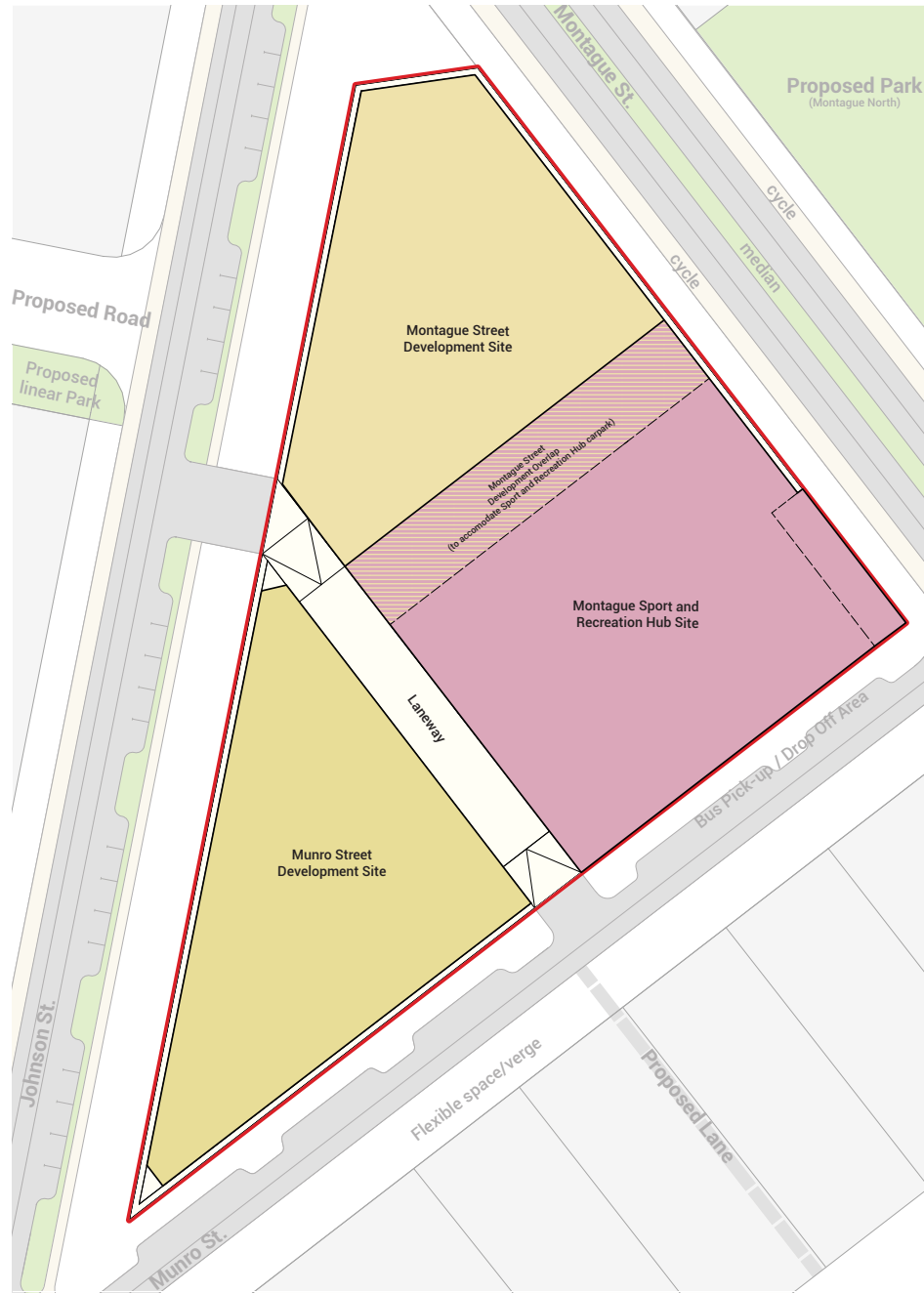
- > Table 5 shows the breakdown of floor space for the sport and recreation building. To reduce the size of the sport and recreation hub: -
 - the community and related uses have been located along Montague Street and Munro Street frontages with the courts sleeved behind; and
 - the Montague building has been pulled across so that part of the first floor overlaps part of the recreation hub car park on the ground floor.
- > It is important to note that the car parking area provided as part of Option 2 is less than that provided in Option 1 (per parking space) this is due to the fact that the building does not need to accommodate the access ramps, as in Option 2 access to the parking areas is provided via the 9m wide laneway which is external to the recreation hub and because the minimum amount of 55 car parks has been provided.
- > Table 5 illustrates that the design provides an additional 3,042m² to the base model requirements. This additional space is due to: -
 - Sleeving of the car parking along Munro Street resulting in provision of an additional 150m² room, and additional access from the car park and additional circulation space;
 - The requirement to internalise the access to the building adds an additional 156m² to the ground floor and 312m² due to the void located above this area to achieve a three storey building height fronting Montague Street;
 - The requirement to deliver a three storey building results in two levels of floor space being provided above the café/kiosk, commercial kitchen and 40m² multipurpose room located on the ground floor. Whilst Council officers have indicated a preference to retain most of this area as a avoid/ atrium space and to use it for rock climbing (484m²); and
 - The stacking of the two indoor courts on top of each other creates an additional two floors along the Montague and Munro Street frontages given the courts are 8.3m high. As a result an additional 1,213m² of potential mezzanine viewing areas (which would otherwise be classified as a void) is created along with the duplication of supporting amenities and facilities that must be located on the same floor as the courts (254m²).

Appendix 4 provides a full breakdown of each use on each level for Option 2.

Table 5: Option 2 floor space allocation for the sport and recreation hub

COMPONENT	Gross Building Area m ²
Sport and Recreation Hub Total Floorspace	6,236
Sport and Recreation Hub – Additional Space provided due to building design	3,042
Car Parking (total of 55 spaces provided)	1,678
TOTAL	10,956

Figure 10: Option 2 Mixed Use Development Sites



Mixed use development floor space allocations

Based on the preferred concept plan for Option 2 as illustrated in Figures 11-13 the total floor space allocated to the site across all three buildings is 71,700m². Table 6 below shows the floor space breakdown by land use across the site.

Table 6 demonstrates that the concept plan delivers the maximum residential floor space of 53,800 m². The site exceeds the minimum commercial floor space by 429m² as a total of 17,905m² has been provided rather than the minimum of 17,476m². This is due to the following reasons: -

- > The community and recreation total floor space of 10,956m² has been counted towards the minimum commercial floor space;
- > The requirement to provide active ground level frontages, as a result commercial uses have been sleeved around car parking on both development sites;
- > The preference to provide a complete level of a single use and not mix residential and commercial uses across a single storey; and
- > Delivering the maximum residential floor space.
- > Exceeding the commercial FAR by 429m² is considered acceptable as commercial FAR is uncapped on this site.

Table 7 provides a breakdown of floor space for both the Montague and Munro development sites as well as the number of car parks required and the number of car parks provided. The number of car parks provided in the Montague mixed use site exceeds the number required by 6 and 3 spaces for the commercial and residential components respectively. The Munro mixed use development site provides an additional 40 car spaces over and above that required this is due to delivering two complete levels within the podium of car parking. An alternative could be to sleeve some residential use around one level of the car parking to reduce the amount of parking provided.

Table 6: Option 2 Mixed use development total floor space allocation

LAND USE	Allowable FAR and FAU m ²	Total Allocated Floor space m ²
Total Sport and Recreation Floor space including associated car parking (commercial floor space)	To be treated as commercial floor space and counted towards the minimum commercial floor space FAR. However, if required the community and recreation floor space can exceed the total site FAR.	10,956
Total Commercial floor space to be provided on the site including associated car parking etc	Minimum 17,476	6,949
TOTAL Commercial floor space including the sport and recreation hub	Minimum 17,476	17,905
TOTAL Residential floor space to be provided on the site including associated car parking etc (FAU plus the maximum FAR)	Maximum 53,800	53,800
TOTAL floor space	71,276*	71,700

*As noted earlier the floor space required for the sport and recreation hub can count towards the commercial floor space, or if necessary it can be additional to the minimum area required and may exceed the total combined commercial and residential floor space.

Table 7: Total Floor space allocation for the two development areas

DEVELOPMENT AREA	PODIUM			TOWER			Building total No. of storeys	No. of dwellings (average 89m ² / dwelling)***	Car & Bicycle Park Requirements				
	Use	Floor space	No. of storeys	Use	Floor space	No. of storeys			N/A	Ratio for Car parks & Bicycles	No. of car parks required*	No. of car parks provided*	
Montague Area (Cnr Montague and Johnston Streets) **	Commercial Land Use	2,949	1.0	Commercial	-	-	20 storeys	N/A	Commercial 1 car park per 100m ² of GFA, 1 car share space per 60 car parks, 1 motorcycle park per 100 car parks, min. of 1 bicycle parking space per 50sqm of non-res floorspace and 1 visitor bicycle space per 1,000sqm of net non-res floorspace.	37			
	Commercial Car Parking	1,490	0.6									43	
	Residential Land Use	7,602	2.4	Residential	19,824	14		286			179		
	Residential Car Parking	6,372	2.0									182	
	TOTAL Commercial				4,439						37	43	
	TOTAL Residential				33,798						179	182	
	TOTAL Building Area				38,237						216	225	
Munro Area (Cnr Munro and Johnston Streets)	Commercial Land Use	1,757	0.7				15 storeys	N/A	0.5 car park per 1 dwelling, 1 car share space per 60 car parks, 1 motorcycle park per 100 car parks, min. of 1 bicycle parking space per dwelling and 1 visitor bicycle space per 10 dwellings.	22			
	Commercial Car Parking	753	0.3									22	
	Residential Land Use	7,530	3.0	Residential	7,452	9		168			103		
	Residential Car Parking	5,020	2.0									143	
	TOTAL Commercial				2,510						22	22	
	TOTAL Residential				20,002						103	143	
	TOTAL Building Area				22,512						125	165	

*includes provision of 1 motorcycle parking space for every 100 car spaces, 1 car share space per 60 car spaces and provision of planning scheme bicycle parking rates

** Because the first floor of the Montague development is overlapped on top of part of the recreation hub ground floor car parking the ground floor of the podium has a total floor space of 2,483m² and the balance 5 storeys of the podium have a total floor space of 3,186m² per level.

***The GFA of an average dwelling has been calculated as 89m², as a provision of 15% has been added to Council's average size dwelling of 77m² to allow for circulation space, core/lifts etc.

Relationship of the Sport and Recreation hub to the balance of the site

- > The Sport and Recreation hub is connected to the Montague podium as a portion of level one of the Montague podium is constructed above part of the recreation hub car park on the ground floor.
- > The Sport and Recreation hub is separated from the Munro podium via the internal 9m laneway.

Access and Movement

- > The main entry to the sport and recreation hub is via Montague Street and a secondary access point is provided off Munro Street.
- > The youth facilities can be accessed directly from the central foyer. The youth services are located adjacent to the consulting space to enable the facilitation of confidential counselling/referral services.
- > Primary vehicular access for bus bays, pick up/ drop off is via Munro Street and Johnson Street.
- > Primary vehicular access to the site is via a 9m wide open air laneway off Munro Street.
- > Entries to the Montague podium can be located off Montague Street and Johnson Street.
- > Entries to the Munro podium can be located off Johnson Street and Munro Street.
- > The core locations shown in Figures 14-19 are indicative only and it is envisaged that the detailed design phase would identify the individual lift cores and their respective lobbies.

Figure 11: Option 2 Mixed Use Recreation Hub - Corner of Montague St & Munro St

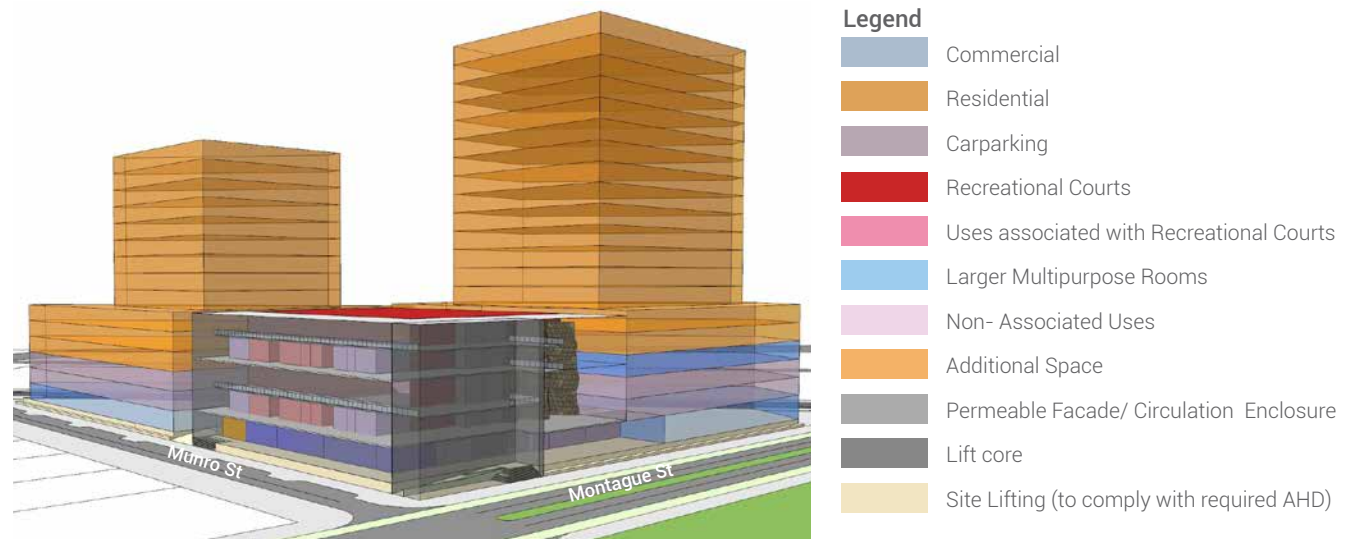


Figure 12: Option 2 Mixed Use Corner of Johnson St & Munro St

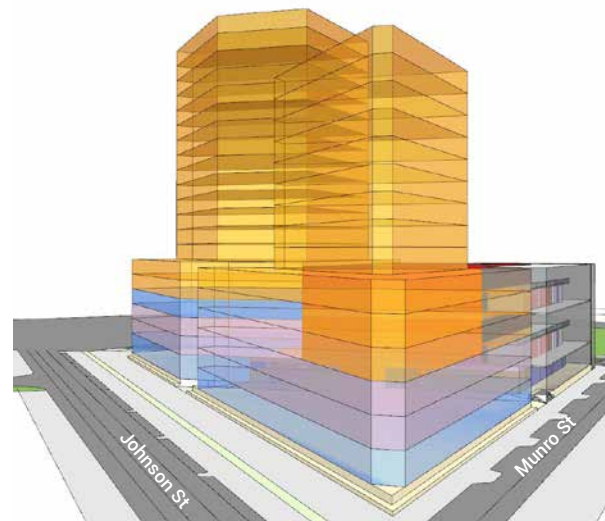


Figure 13: Option 2 Mixed Use Corner of Montague St & Johnson St

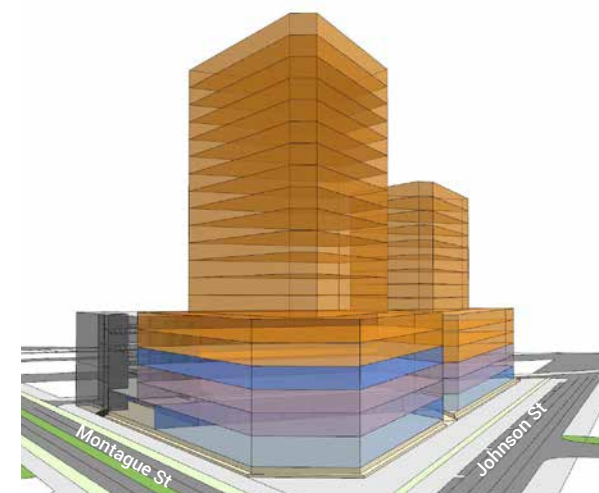


Figure 14: Option 2 Mixed Use Recreation Hub Floor Plate - Ground Floor



Figure 15: Option 2 Mixed Use Recreation Hub Floor Plate - Level One

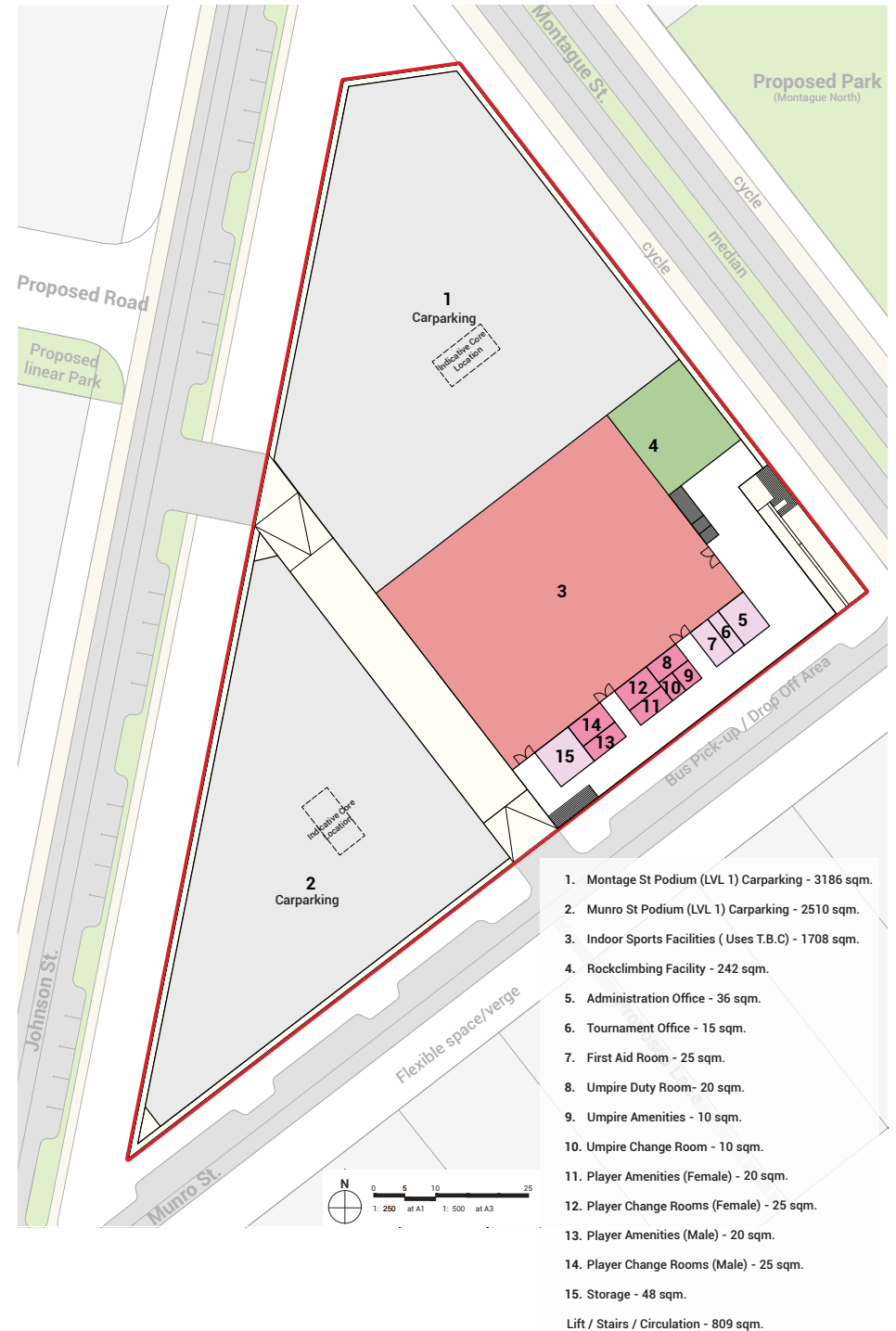


Figure 16: Option 2 Mixed Use Recreation Hub Floor Plate - Level Two



Figure 17: Option 2 Mixed Use Recreation Hub Floor Plate - Level Three

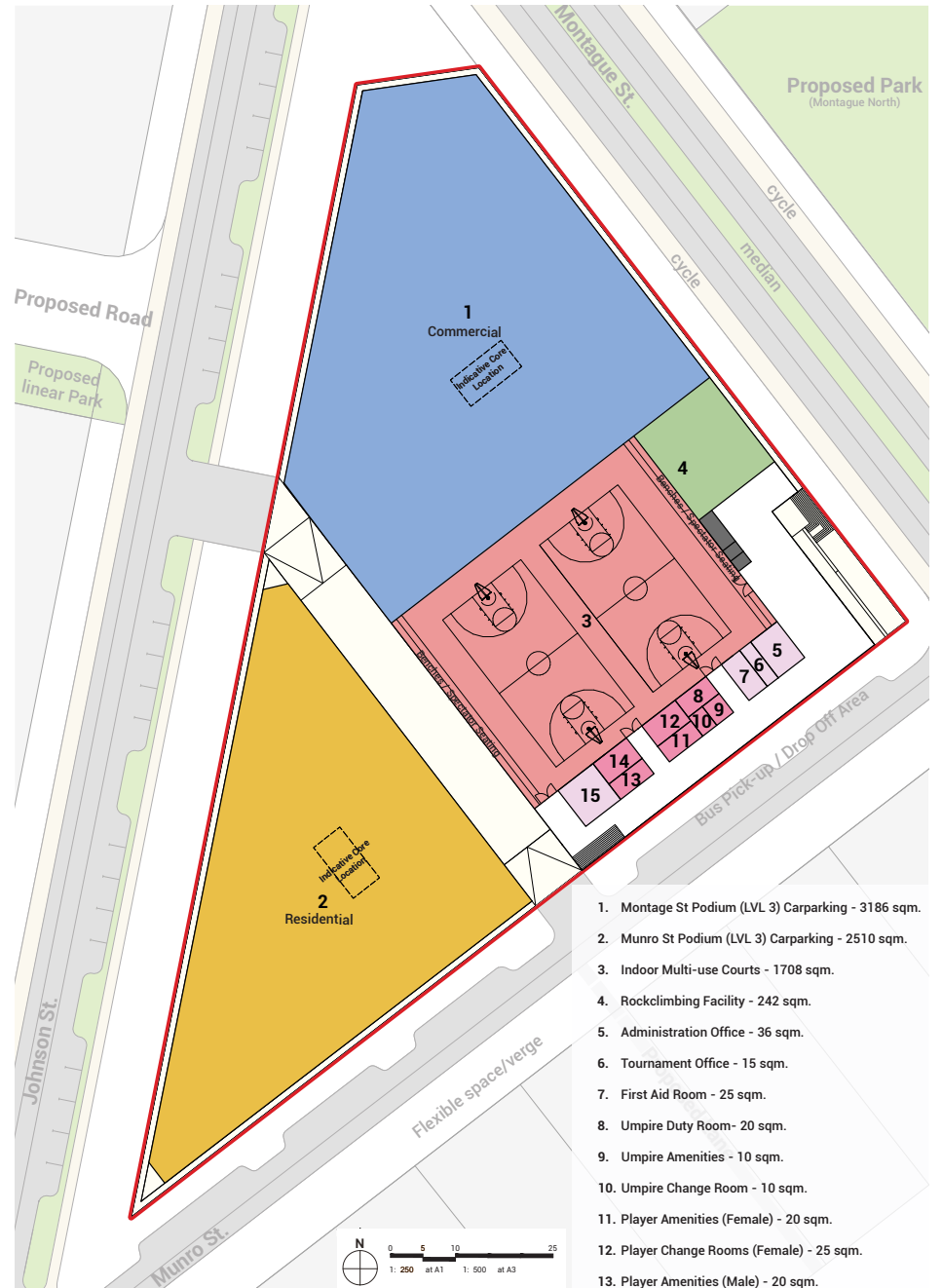


Figure 18: Option 2 Mixed Use Recreation Hub Floor Plate - Level Four & Five



Figure 19: Option 2 Mixed Use Recreation Hub Floor Plate - Tower (level 6+)



3.5.5 Issues/ challenges

In addition to the broader challenges associated with the subject site more generally as set out in Section 3.2 above, there are a number of challenges associated with delivering Option 2 on the subject site, which are outlined below.

- > The ground floor ceiling height of 4m may create issues with the steepness of car park access ramps to the podium level car parking (generally floor heights are 2.6-2.7m).
- > The building design and required car parking results in substantial additional floor space to the base requirements.
- > There are a number of structural requirements applicable to building indoor courts which affect both the design, layout and cost of the building, these include: -
 - Commercial column's usually work on a 8m grid structure, the indoor netball courts require a minimum 15m span which limits building potential above the courts as supporting columns would need to be placed between the courts and as a result the courts would not be able to be used for competition purposes.
 - A key challenge to building above the courts in a stacked option would be how the lateral stability of the structure is achieved.
 - Indoor netball courts usually require 75mm floor layering above the structure floor level
 - Typically, shear walls would be required intermittently along the building's facade to provide stability due to the court spatial requirements.
 - The placing of the courts on top of each other will likely generate a 20-30% premium on the building costs.
- > A Sport and Recreation Hub with four competition standard courts is not viable for this site. This is due to:
 - structural constraints mean that building above competition grade courts (without columns) is not possible, Therefore the stacked option can only deliver 2 competition grade courts.
 - Four competition courts on one level would result in minimal development potential for the remainder of the site, as upper levels cannot be located above the indoor sports courts (without columns). The remaining areas could only be built up to the street wall height due to requirements for upper level setbacks above the street wall. The Maximum FAR would not be achievable on the site and this would be unlikely to be an attractive option for developers.
 - The massing implications of the four court option is also problematic on the site as this portion would be significantly lower than the remaining development sites.
- > To maximise site coverage Option 2 proposes to overlap the Montague mixed use development over part of the sport and recreation car park. Whilst this approach maximises site coverage it raises potential implications with respect to requiring a strata title, and possible acoustic issues associated with placing commercial uses adjacent to the indoor sports courts.
- > Option 2 poses a number of development and delivery challenges which are identified and explained in Chapter 5.

3.5.6 Benefits/ Advantages

Notwithstanding the above, there are several benefits and advantages associated with delivering Option 2 which include: -

- > The total site area required is much smaller compared to Option 1 and therefore it is anticipated that the land costs under Option 2 would be cheaper.
- > Option 2 delivers a built form outcome that is in keeping with the surrounding context, in terms of proposed land use, building height and delivering the maximum FAR and FAU for the site.
- > The mixed use development provides opportunities for government to explore various delivery and tenure options such as the facility being directly delivered by the developer. Chapter 5 examines a number of these tenure and development options and outlines the pros and cons of each.

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3.6 Concept Utilities Plan for the Site

Cossill and Webley have prepared a concept utilities plan for the subject site. It is important to note that the utilities plan shown in Figure 2 is conceptual only and is subject to detailed design. Furthermore, the service locations are from readily available sources, such as 'Dial Before You Dig', and have not been 'proved' on site. It is anticipated that as part of the ongoing development of the Fishermans Bend precinct, service upgrades will be undertaken by the relevant authorities.

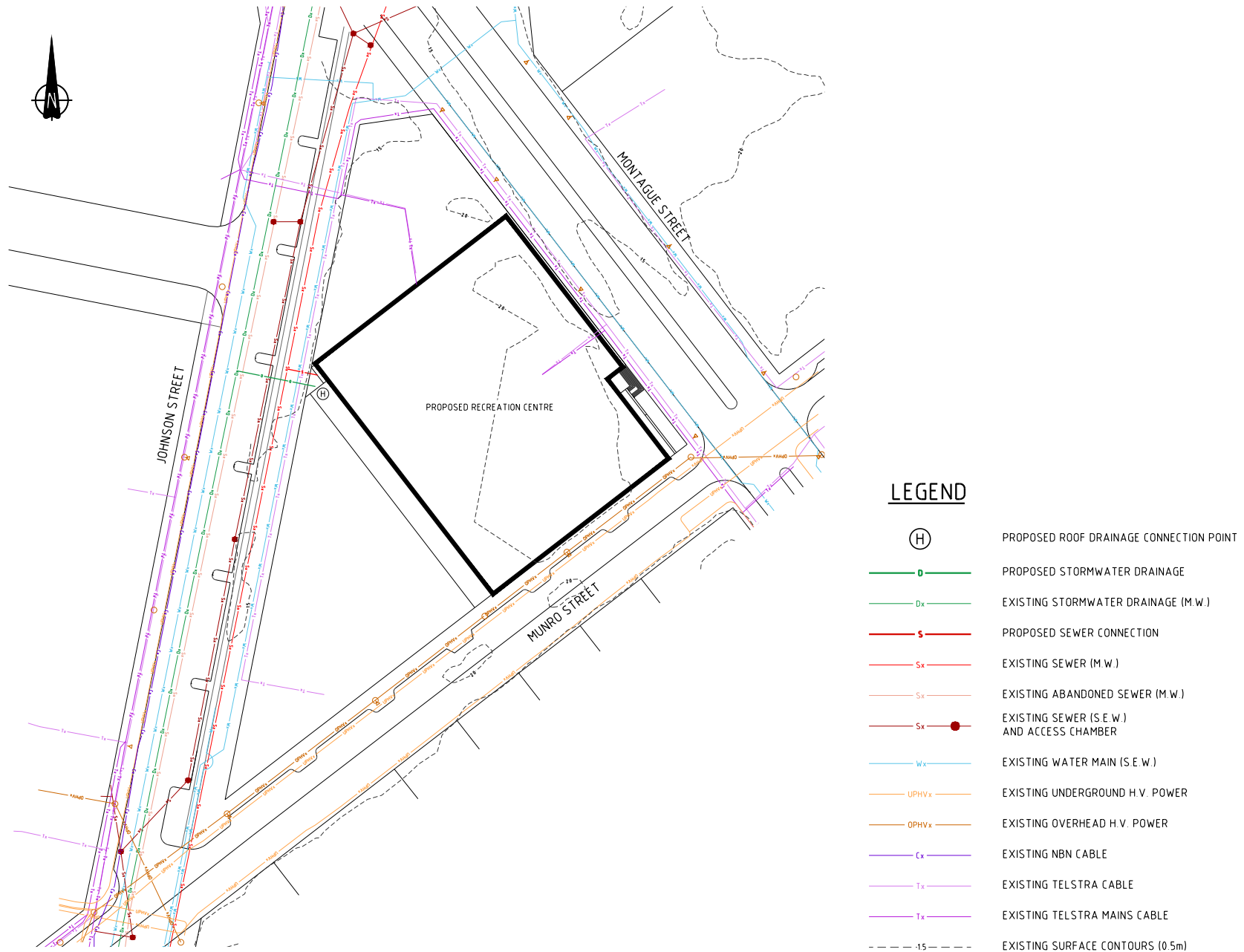
It cannot be confirmed at this stage whether additional trunk services, or upgrades to existing trunk services, are required. The utility upgrades will be determined by the relevant authorities in consideration of the broader precinct and will depend on the timing of development. With regard to the impact of the development on the existing services, no services need to be relocated to service the site, except for the removal of the telecommunications lead-ins.

A summary of the services illustrated in Figure 8 is outlined below: -

- > The site is relatively flat and it is anticipated that the sewer outfall for the property can connect into the existing DN300 sewer on Johnson Street,
- > There is existing DN375 potable water pipelines running along Montague Street and Johnson Street, and a connection point to the water main is anticipated to be flexible to suit the proposed development.
- > There is existing NBN, Telstra, and other communication providers available in the surrounding streets and it is anticipated that a connection will be relatively straightforward.

- > There is existing DN100 gas on the western side of Montague Street. A formal application would be required to determine whether there was sufficient capacity to service the proposed development.
- > There is a 66kV sub-transmission line running along the north side of the street next to the property. The pole line also has fibre optic cable, CTV and Low Voltage bundled cable attached to the poles, which can be placed underground. The 66kV lines are generally very costly to underground. Recent urban renewal precincts have elected to underground the Low Voltage and 22kV or less High Voltage power, whilst leaving the 66kV above ground. The cost plan prepared in Stage 3 provides an estimated cost to underground the 66kV power.
- > The overhead infrastructure in Johnson Street is on the west side of the road away from the proposed development and is only suitable for public lighting. The existing high voltage infrastructure in the adjoining streets (Johnson and Munro) is currently underground, therefore it is likely that an indoor or kiosk substation would be required on site and connect to an underground cable. There are HV (11kV) cables on the east side of Johnson Street and on the north side of Munro Street. There is no HV or mains LV cabling in Montague Street.
- > There is a zone substation located at the corner of Johnson Street and Munro Street. The zone substation currently has sufficient capacity to accommodate the load requirements to the proposed development.

Figure 20: Concept Utilities Plan - Montague Sport and Recreation Centre



3.7 Summary

In summary, the proposed Montague sport and recreation hub is a significant community infrastructure item that will be utilised by a large range of residents and visitors from both within the Fishermans Bend precinct and beyond. Case Study One has highlighted a number of complexities with respect to the selection of the future sites for such recreation hubs and the structural requirements associated with delivering these buildings.

The subject site selected for Case Study One is particularly complex due to its location, site characteristics and the proposed planning and design requirements. Collectively, these matters pose a number of challenges to any proposed development on this site, a summary of the key challenges that need to be addressed by a future development are set out below: -

Site location and shape

Total area is 9,709m². The size of the site is sufficient to accommodate both the stand alone and mixed use options. In the stand alone Option One there is a substantial amount of remaining area that could easily accommodate associated uses such as an outside basketball court and skate park for example.

The triangular shape of the site and the fact that it is bound by Montague Street, Munro Street and Johnson Street poses a number of challenges in terms of: -

- > Potential locations for four indoor courts if delivered on the same level;
- > Delivering active and attractive frontages to all three street frontages and achieving at least 60% visual permeability along all ground level frontages; and
- > The suitability of the hub fronting Montague Street which is currently very car dominated (high speed, significant traffic volumes) and not a particularly pedestrian friendly environment.

Site characteristics

The site is also particularly complex due to historical uses, surrounding infrastructure and the respective buffer requirements and flooding levels.

- > The site was established as part of an industrial area in the mid to late 1800s, the south-western corner of the site is within the approximately extent of a former quarry and the site has been subject to uncontrolled fill.
- > Due to the previous uses on the site it has been identified as high risk contamination site. In 2012 Golder Associates report estimate the average contamination costs for high risk sites would be in the order of >\$6M per hectare (note this is not an upper limit). Golder Associates state that further investigations would be required to determine the actual site remediation costs.
- > Due to the subject site being located above a relatively thin layer of Coode Island Silt, the development would likely require piled foundations to support the superstructure. Driven concrete piles present as an efficient option and are widely used for this geographical area. Pile depths could extend to approximately 25m.
- > A high pressure gas pipeline referred to as the APA's West Melbourne – Brooklyn (PL108 T33) travels along Buckhurst Street within the Montague precinct. The APA currently recommends that high density residential development or other sensitive uses such as schools, hospitals, recreation hubs are located beyond the 450m buffer.

- > Notwithstanding the preference of the APA, it is important to recognise that land use planning is one method to manage the risks associated with a full bore rupture of a gas pipeline. The Australian Standard (AS 2885.3) identifies a number of other interventions that the pipeline manager can implement to manage their asset and associated risks. For example, the APA recently approved the construction of a concrete slab over the transmission pipeline in Douglas Street and Ferrars Street due to a new primary school and public park being constructed in the Montague precinct.
- > Given the high pressure gas pipeline is located in central Melbourne and traverses through the Fishermans Bend Framework precinct, which is earmarked to be a future high density mixed use area, it is not practical or realistic to locate these sensitive uses 450m from the pipeline. Therefore, other alternative mitigating measures need to be established.
- > In light of the above, it is recommended that Council begin discussions with the Fishermans Bend taskforce and APA to identify alternative mechanisms to manage the pipeline whilst facilitating the orderly development and intensification of the area.
- > A minimum floor level of 3.0 metres AHD or 0.3 metres above the local overland flow flood level, whichever is the greater, is required. Accordingly, current level of the site is required to be raised by 1.5m in height to meet the minimum flood level requirement. The requirement to provide a pile cap/slab zone would be able to be situated within the raised building level.
- > The raising of the site area by 1.5m impacts on how the building/s will activate the street frontages and the provision of pedestrian and vehicular access to the site.

Building and Structural Requirements

Sport and recreation buildings which include indoor courts require specific structural engineering specifications which impact upon the layout and design of the building. The main structural requirements associated with indoor courts are set out below: -

- > Indoor courts usually require 75mm floor layering above the structure floor level.
 - > Typically, shear walls would be required intermittently along the building's facade to provide stability due to the court spatial requirements. This requirement impacts on the ability of the building to achieve at least 60% of site permeability if the courts are located on the ground floor.
 - > Commercial columns usually work on a 8m grid structure, however the courts require a minimum 15m span which limits the building potential above the courts.
 - > A key challenge to building above the courts in a stacked option would be how the lateral stability of the structure is achieved.
 - > For the stacked courts, the suspended floor structure would require a concrete floor depth of approximately 1.5m. A similar approach in steel would require more depth, in the order of 1.8m. CLT/Engineered timber would not be feasible for the floor structure due to excess structural depth requirements.
 - > Services would typically sit below 1.5m floor height which would raise the clear span requirement for the courts.
- > If the courts are located on the top floor of the podium, then a clear open span (trussed roof structure) would be achievable.
 - > Consideration should be given to the cost of this development typology, which would likely generate a 20-30% premium when placing the courts on top of one another.
 - > If a column free court at level 3 in any option is proposed, the use of the roof would be limited to solar panels only. The structure required to span the entire court even with minimal green area would be very deep and cost would significantly outweigh the benefit.

Recommendations for future sites

In light of the complexities of the Case Study One subject site it is recommended that Council officers have regard to the following matters when determining future sport and recreation hub locations.

Location: It is recommended that future sites are selected having regard to the following criteria:

- > being centrally located within the primary catchment;
- > near or adjacent to open space;
- > accessible via public transport, shared paths;
- > rectangular in shape;
- > maximum of 1 to 2 road frontages;
- > based on the preferred concept design for the Option 1 stand alone facility it is recommended that a future site is of a size that it can accommodate a minimum building area requirement of 4,725m² (75m x 63m); and
- > for a mixed use development, the site should be large enough to accommodate the minimum building area of the Option 2 sport and recreation hub of 3,720m² (60m x 62m) and also accommodate the FAR (including the option to provide additional commercial floor space) and FAU resulting from the provision of the community hub.

Site characteristics: It is acknowledged that the majority of land within the Fisherman's Bend precinct is subject to a number of constraints that must be mitigated via future development proposals. Ideally future recreation hub sites would be: -

- > located on sites that are not classified as 'high risk' contamination sites. It is acknowledged that most of the sites within the precinct are contaminated to some extent however, it will be much cheaper to develop on a low risk site compared to a high risk site due to the remediation requirements;
- > due to the historical uses of the precinct it is recommended that environmental audits are prepared to determine the full extent of the individual sites; and
- > situated on a site where the minimum floor level is as close as possible to the minimum flood level requirements as this will limit the extent to which the site level will need to be raised.

Planning and Design Requirements: Future design and planning requirements should have regard to the specific building requirements of a recreation hub and ensure sufficient flexibility to allow for the delivery of these hubs within a reasonable budget.

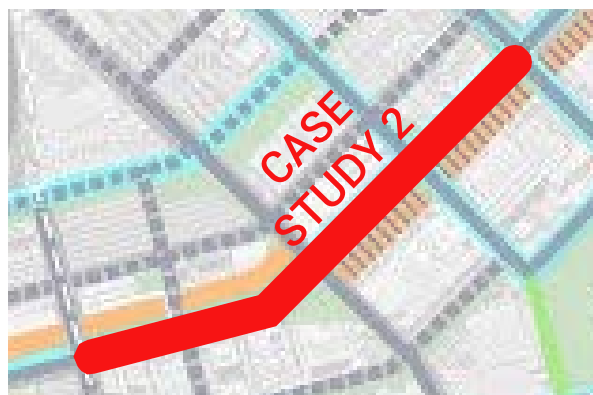
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4. CASE STUDY 2 – FENNEL / PLUMMER STREETScape & INTERSECTION UPGRADE CONCEPT DESIGN

4.1 Introduction

The Fennell/Plummer Street streetscape upgrade is a large project that extends from Graham Street to Ingles Street. The project involves a significant upgrade and widening of the existing Fennell and Plummer Streets to deliver a high quality civic boulevard connecting Sandridge to Wirraway and surrounding suburbs. Case Study Two investigates the section between Graham Street and Ingles Street.

Figure 21: Case Study Two – Site Location



4.2 Site Context

The study area extends from Graham Street to Ingles Street and is currently zoned Capital City Zone – Schedule 1. The study area adjoins 11 properties, and the proposed streetscape upgrade requires additional land from 7 properties. Following a review of the site conditions and background reports a number of challenges associated with developing the streetscape upgrade were identified and are discussed below.

4.2.1 Site Specific Issues

- > Macadam Pavement
 - The existing road pavement in the study area contains Macadam paving.
 - As per the Douglas & Partners, June 2017, report on pavement design and construction notes that the strength of the Macadam pavement can be significantly decreased when disturbed because the lower layer of the Macadam pavement is very coarse grained and relies on interlocking and confinement for strength.
 - Moisture ingress into the pavement is the largest contributor to pavement failures. Methods to 're-confine' the Macadam pavement after disturbance should be investigated, which may allow the pavement to remain on site and reduce costs.

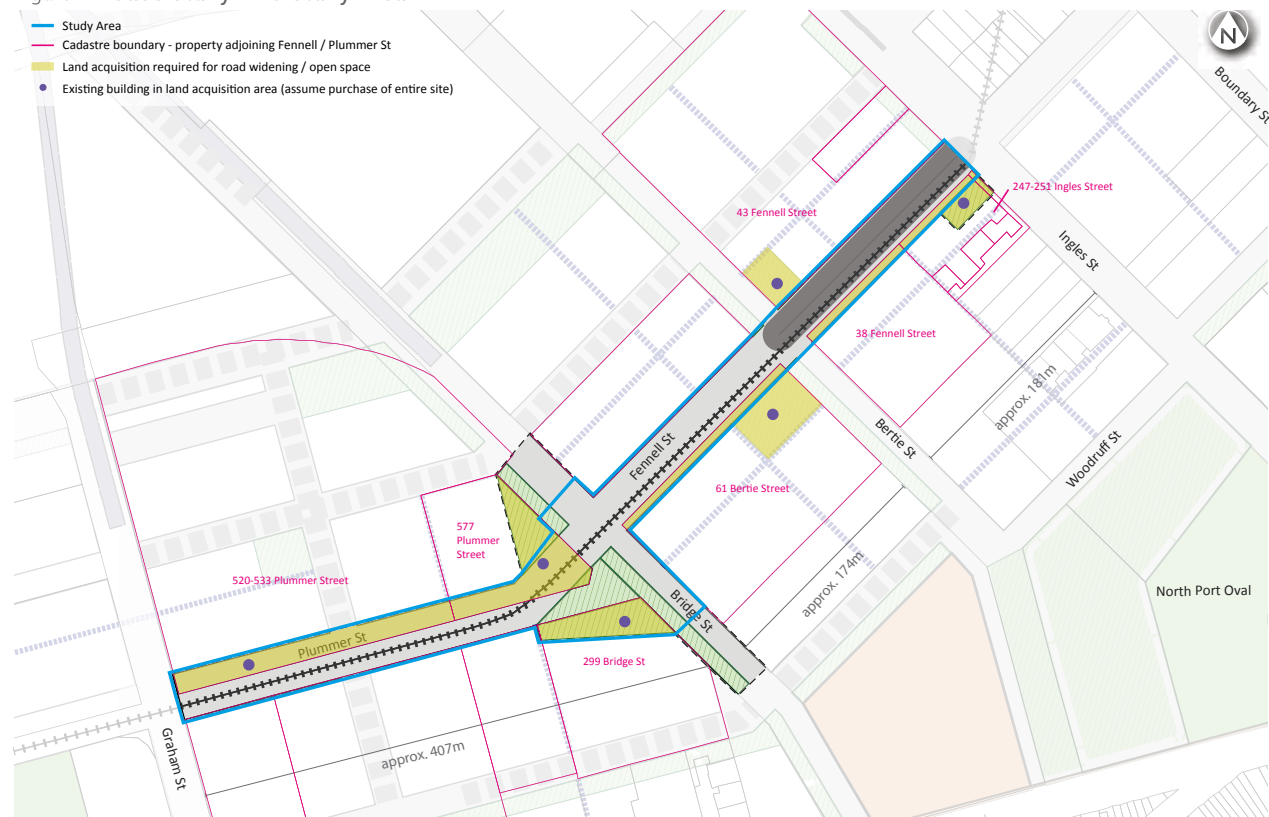
- > Contamination
 - In 2012 Golder Associates prepared a Preliminary Land Contamination Report for the Fishermans Bend precinct which includes the study area.
 - The study area is located within the Fennell Precinct.
 - The Fennell Street end of the study area is shown to have less than 1m of fill whereas the Plummer Street portion is shown to have approximately 1-2m of fill.
 - The study area is contained within sub-precincts F1-F6 and F10 which are identified as medium and high risk contamination sites (Figure 20).
 - Golder Associates (2012:26) estimate the average contamination costs for medium risk sites would be in the order of >\$3M per hectare and high risk sites would be in the order of >\$6M per hectare (note this is not an upper limit). Golder Associates state that further investigations would be required to determine the actual site remediation costs.
- > Land acquisition
 - Due to the landownership pattern and extent of the streetscape upgrades and provision of additional open space this project will require land acquisition from seven properties.

4.2.2 Summary of the Proposed Development Context

Council provided an outline of the future development context surrounding the subject site, which is summarised below: -

- > The Plummer/Fennell Street study area is located in Sandridge, in the centre of a new Metropolitan Activity Centre accommodating the highest jobs and residential density in Fishermans Bend.
- > The vision for Sandridge is 'One of Melbourne's premium office and commercial centres, balanced with diverse housing and retail'.
- > Plummer/Fennell Street is to be a high quality civic boulevard that establishes a landscaped street with pedestrian and cycle routes connecting Sandridge to Wirraway and surrounding suburbs.
- > Future buildings abutting Plummer/Fennell Street will be mixed use, with retail at ground level and a significant amount of commercial and residential development at upper levels:
 - Commercial floor space will accommodate around half of development in this area.
 - The maximum dwelling density is 504 dwellings per hectare.
 - Buildings will range in height from 20-40 storeys and be predominantly podium/tower typologies, with a 4-8 storey street wall.
 - Buildings will be serviced from the rear, wherever possible. It is proposed that no crossovers are permitted along Fennell/Plummer Street, with the exception of lanes, or where no other access is possible.

Figure 22: Case Study Two Study Area



4.3 Project Specifications/Assumptions

The following project specifications were discussed and agreed to following the first Stage 2 workshop with Council officers.

- > The study area for Case Study Two was revised during Stage 2 and the agreed study area is shown in **Figure 22**. The revised case study area boundary is shown in the solid blue line.
- > The Fishermans Bend precinct has a target of 80% of transport movements to be made by public transport, walking and cycling. To meet this target Case Study Two involves significant upgrade and widening of the existing Fennell and Plummer Streets to include a new tram line, land for a future underground train station, civic square and streetscape works, as well as the realignment and construction of a new signalised intersection at the intersection of Fennell, Plummer and Bridge Streets (realigned to form a 4-way cross intersection). 1. A copy of the proposed cross-sections are included in Appendix 1.
- > Road cross sections
 - The ultimate proposed cross section for Fennell/Plummer Street is 36m wide, which requires 6m widening from the southern side of Fennell Street and 16m widening along the north side of Plummer Street.
 - Bridge Street is currently 30m wide and no road widening is required. The Buckhurst Street cross section is to be used for this street including a narrowing of the road and the provision of a linear park along the west side of the street.
 - Bertie Street (outside the study area) is a 28m wide street, which will have the same cross section as Bridge Street (slightly adjusted for a slightly narrower street).
- All new laneways are to be 10m wide.
- The speed limit for the study area is anticipated to be 30km/hr along Fennell/Plummer Street to help humanise the area for active transport. A 40 km/hr speed limit may be appropriate for other streets in Fishermans Bend. The design speed is generally 10km/hr above the posted speed limit.
- > Intersections
 - Signalised intersections will be provided at the Ingles Street, Bertie Street, Bridge Street and Graham Street intersections. These intersections are to be designed to prioritise pedestrian and cyclist movements.
 - All other intersections (new north-south road and all laneways) are to be left-in-left-out intersections.
 - Council officers wish to discourage car usage through the study area and ensure maximum road space for pedestrians, cyclists and public transport.
- > Pedestrian crossing
 - A mid-block pedestrian crossing is to be provided between Bertie Street and Ingles Street.
- > Pick up/drop off/ loading areas
 - Whilst Council prefers not to provide any parking along the length of the study area, drop off and loading areas are to be located along the street to allow for some on-street loading, taxi/uber pick up area and accessible parking.
- > Street tree planting
 - Tree planting is to deliver 50% tree canopy cover. Council's urban forest strategy proposes plane trees to reinforce the civic boulevard quality of the street. Tree spacings of 15m are proposed for the median planting and 10m for the footpaths.
- > Civic Plaza
 - The civic plaza will operate as a large open civic space to accommodate events (markets, performances etc) and requires power, water and the ability to control light levels. Artwork and water features are also included with grass areas at the periphery. Council provided a concept plan for the civic plaza.
 - A number of linear parks are to provide a mix of active and passive spaces, utilising hard and soft/permeable materials appropriate to their location and use/function.
- > Land acquisition
 - The realignment of Fennell/Plummer Street and construction of the intersection and civic plaza requires land acquisition from 7 properties.

4.4 Concept Functional Layout Plan

Cossill and Webley have prepared four concept functional layout plans (FLPs) for Case Study Two. The section below outlines the details of the various cross-sections and intersections that are illustrated in these FLPs. The sections below describe the particular components that have been included in the FLPs.

Fennell/Plummer Streets Cross Section

- > Green tram line offset to the centre of the road reserve to reduce conflict points between pedestrians and vehicles.
- > No on street parking provided.
- > Vehicle drop off / pick up bay provided at each block on northern side of street.
- > Bicycle lanes are at kerb height above the vehicle carriageway.
- > Pedestrian walkway is a 'roll over kerb' height above the bicycle lane.
- > Pedestrian footpath on southern side is flush with tram way.
- > Trees in southern and northern verges are spaced at 10m. Trees in central WSUD corridor are spaced at 15m.
- > Fennell-Plummer vehicle carriageway remains 'at grade' throughout the case study two area, except for the mid-block raised intersection.
- > Water Sensitive Urban Design (WSUD) located in the central median
- > Large 'barrel drain located underneath the southern side of the vehicle carriageway.
- > Existing underground power on southern side of street to remain
- > Above ground 66kV power lines to be undergrounded. New alignment on northern side of street.

- > Water, recycled water and gas to be collocated on southern side of street in shared trench.
- > Existing Optus to remain in place where suitable on southern side of Plummer Street and northern side of Fennell Street.
- > Existing Telstra to be retained in northern side of Fennell Street and relocated to the northern side of Plummer Street.
- > Proposed service locations have been allocated away from tree root zones to promote tree growth and mitigate damage to services.

Bridge Street Cross Section

- > Bridge Street cross section is provided in accordance with the Buckhurst Street cross section, as agreed.
- > Bicycle lanes are at kerb height above the vehicle carriageway.
- > Trees are spaced at 10m.
- > 10.6m linear park proposed on the western side of the road.
- > Pedestrian walkway over tram line provided to encourage safe north-south pedestrian movement.
- > No on-street parking.
- > On-street vehicle pick-up drop-off provided on western side of street at each block.

Bertie Street Cross Section

- > The Bertie Street cross section is similar to Bridge Street, with a 1m reduction in the linear park and 1m removed from eastern footpath.
- > No on-street car parking
- > Pedestrian walkway over tram line provided to encourage safe north-south pedestrian movement.
- > Bicycle lanes are at kerb height above the vehicle carriageway.
- > 9.6m linear park proposed on the western side of the road
- > Trees are spaced at 10m.

New Street Cross Section (North-South Street between Graham Street and Bridge Street)

- > Bicycle lanes are a kerb height above vehicle carriageway
- > 1m separation provided between vehicle parking and cycle lane
- > On-street car parking provided
- > Pedestrian walkway over tram line provided to encourage safe north-south pedestrian movement.
- > Trees are spaced at 10m.

New Laneway Cross Section

- > As per option 3 in City of Port Phillip Design and Technical Standards Manual Section 5.
- > Laneways are one-way only vehicle traffic
- > On-street car parking provided
- > Pedestrian footpaths both sides of laneway
- > Street trees are on same alignment as car bays. Assumed two car bays between trees

Intersections with Fennell/Plummer Streets at Bridge Street

- > Fennell/Plummer Streets form a civic spine that is designed to prioritise public transport, bicycle traffic and pedestrian traffic above vehicles.
- > Initial concept plans for the Bridge Street intersection did not include turning lanes and required traffic to filter when turning right. Upon further review, it was deemed that either the Bridge Street or Bertie Street intersection should include right turning lanes to mitigate vehicles queuing behind right turning vehicles. Given the Bridge Street road reserve is wider than Bertie Street, this intersection was chosen to have the right turning lanes.
- > The right turning lanes are designed to store three cars and are approximately 20m long. The kerb sweep and bicycle lane is designed so that one car can be 'stored' out of the way of through traffic. The car is required to give way to cyclists travelling through the intersection, and the geometry dictates that the vehicle position is angled to provide high visibility of cyclists.

- > Vehicle, bicycled and pedestrian movements must be carefully investigated in relation to the tram line and tram movement through the intersection.
- > Vehicles approaching the intersection along Bridge Street from the south must cross over the tram line prior to entering the intersection. If vehicles turning right on to Fennell/Plummer are required to give way to through traffic travelling south along Bridge Street, there may be 'banking' over the tram line and pedestrian path. Options to address the issue that may be further investigated include:
 - An increased 'all red' time as part of the signals to allow these vehicles to clear the intersection and prevent conflict with other movements
 - Installation of a green/red arrow to stop right turning cars entering the intersection
 - Banning right turn movements
- > For the purposes of the case study, it has been assumed that no right turn movements are allowed from Bridge Street on to Fennell/Plummer. As such, right turning lanes have not been provided.
- > The Bridge Street intersection adopts a 'Copenhagen Intersection' approach with the provision of staggered stop lines and physical separation between vehicles and bicycles.
- > Vehicles turning left remain physically separated to bicycles in the dedicated bike lane with the kerbing providing a barrier.
- > Bicycle stop lines are located ahead of vehicle stop lines to provide vehicles turning left with clear visibility of bicycles moving straight through the intersection.

Intersections with Fennell/Plummer Streets at Bertie Street

- > No turning lanes are provided for the Bertie Street intersection. It is assumed that vehicles turning right will be required to filter to turn right. There may be opportunity to include no right turn signs during peak hours. The lack of turning lanes on Fennell/Plummer is consistent with the intention to provide a pedestrian and bicycle oriented street.
- > The bicycle lanes ramp down to the vehicle carriageway level at all approaches.
- > The pedestrian pathways remain a kerb height above the bicycle and vehicle lanes.
- > Vehicles approaching the intersection on Bertie Street from the south queue from behind the east-west pedestrian crossing. With no provision of right turning lanes, vehicles turning right will block vehicles travelling through the intersection as they wait to turn onto Fennell/Plummer. When the signal turns red, there may be issues with vehicles moving through a red signal and potentially blocking the tram and pedestrian east-west movement. Different options are available to address this issue, and these should be further analysed to determine the approach that best aligns with the project vision.

New Street and laneway intersections

- > Vehicles carriageways are raised at the intersections and are flush with the bicycle lanes and pedestrian path. The raised area is shown in blue in Figures 23 -25.
- > At the approach to Fennell/Plummer Streets, the minor street ramps up to provide an 'at grade' pedestrian crossing. The vehicle carriageway remains raised at the bicycle lane crossing, allowing bicycles to remain at the same level at intersections, rather than having to ramp down and up. The intersections ramp back down immediately prior to entering Fennell/Plummer Streets.
- > Intersections are designed to be 'left-in left-out, to increase safety and traffic flows. A triangular raised median is provided to discourage these movements.

Swept Path Diagrams

- > The 12.5m single unit truck swept path diagrams reveal issues for turning movements at several intersections. Large vehicle routes may need to be identified and intersections modified to suit, with the remaining intersections restricted to smaller vehicles.

Further Work

- > The Concept Functional Layout Plans can be further refined with the inclusion of seating, bins, bike hoops, public lighting, traffic signals etc. For the intersections approaching Fennell/Plummer from the south, consideration should be given to two-light signals – a red light for cars to stop when trams are coming, and no light and a stop sign for when there are no trams. An example of such is on the corner of Fitzroy Street / Park Street in St Kilda. The inclusion of all street furniture must consider tree spacing and the tram.
- > Further investigation into the tram and its impact on the streetscape upgrades. It is recommended that the relevant authorities are consulted prior to the investigation to determine specific opportunities and constraints in relation to the provision of the tram.
- > The intersection geometry can be further refined with the determination of required vehicle sizes/ classes and their movements in the street network. Swept path diagrams can be provided for different vehicle classes and intersections. To allow movement of 12.5m vehicles throughout the precinct, the intersection geometry would need to be significantly increased. 8.8m vehicles may require an increase in geometry and should be tested. To ensure adherence to the project vision, consideration should be given to restricting large vehicles, including delivery trucks and Council waste disposal vehicles, to specific streets, intersections and routes.
- > Development of concept designs for the Civic Plaza and Public Open Space areas throughout the case study area.
- > Investigation of alternatives to the proposed 36m cross section to reduce the road reserve width as 36m is considered quite wide for a 'high street', typically they are between 20-30m wide.

Figure 23: Conceptual Functional Layout Plan (1 of 3)

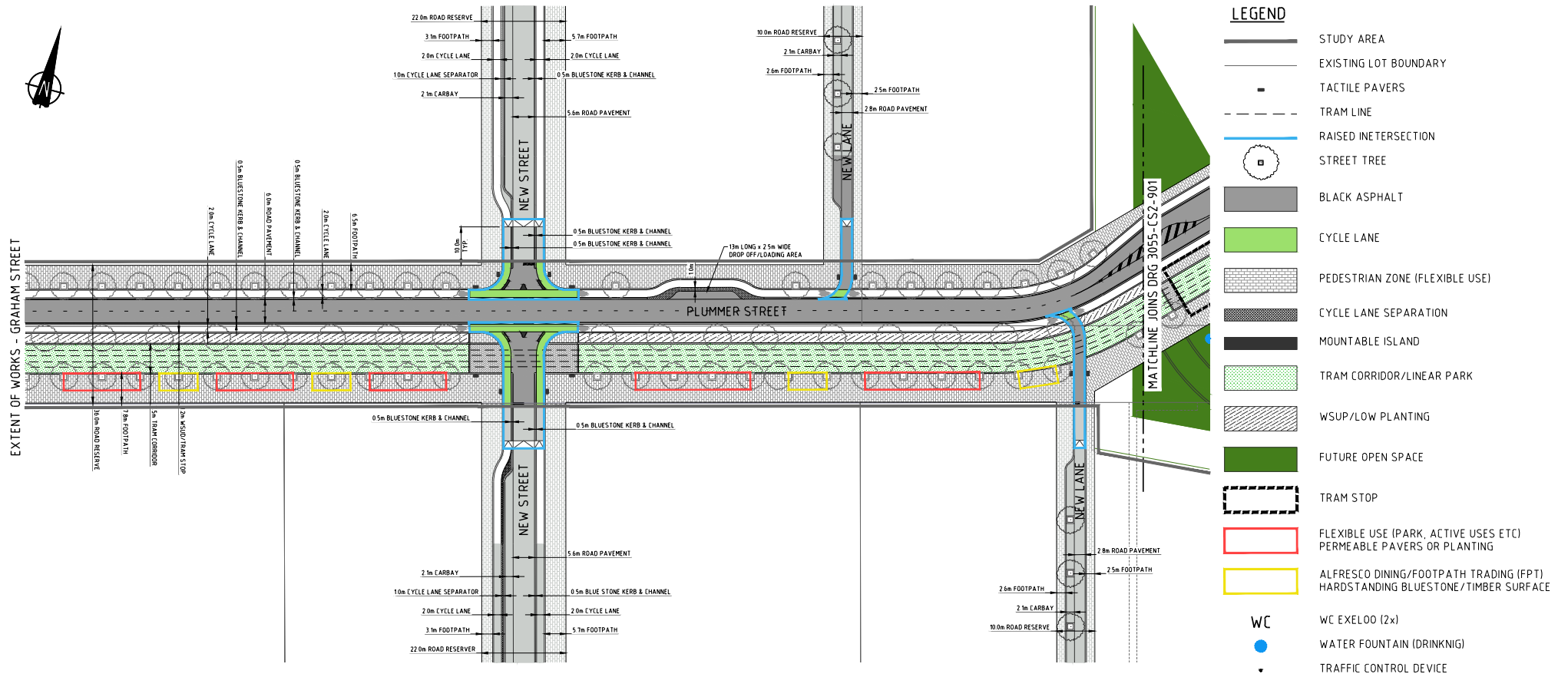
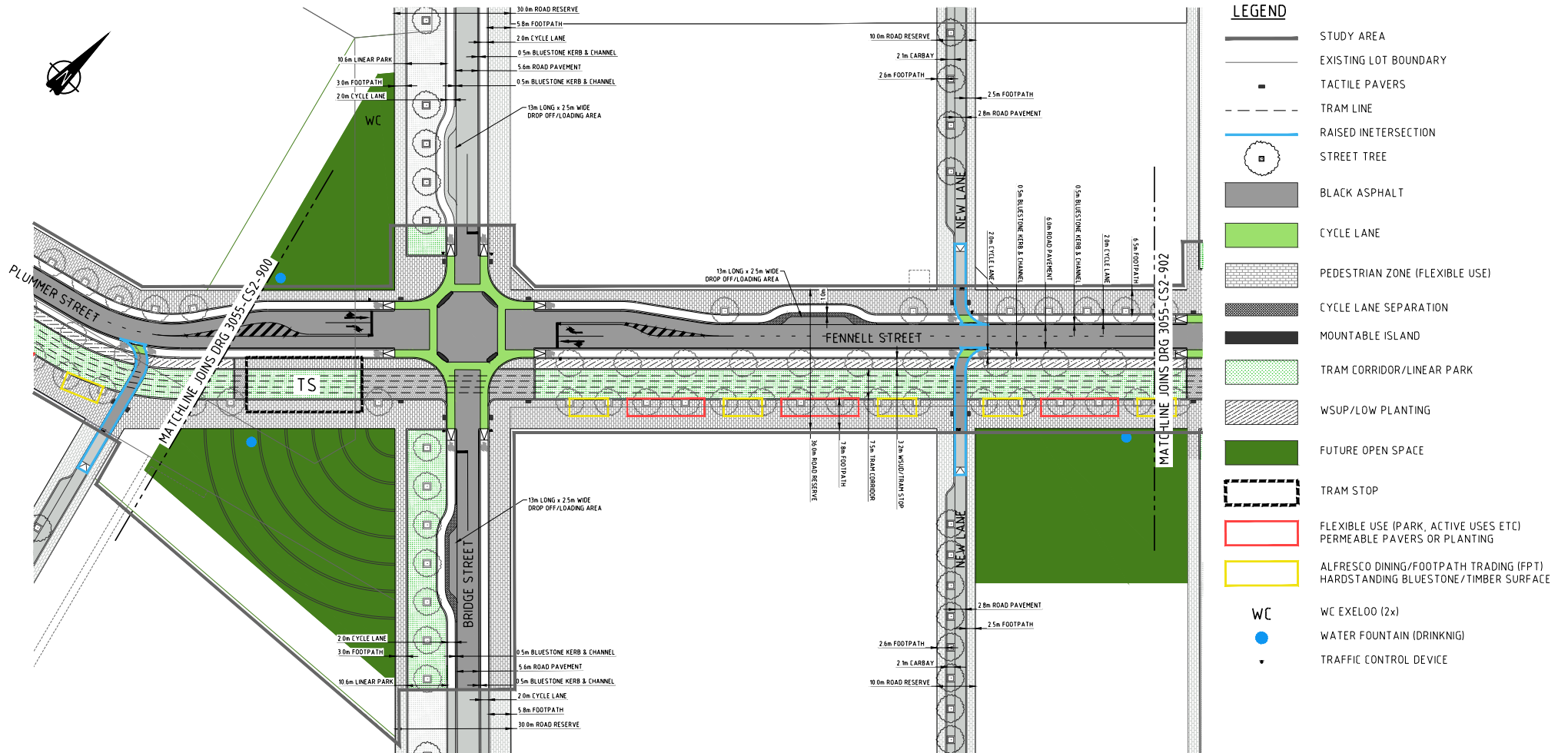


Figure 24: Conceptual Functional Layout Plan (2 of 3)



Note: parking to be provided adjacent to splay.

Figure 25: Conceptual Functional Layout Plan (3 of 3)

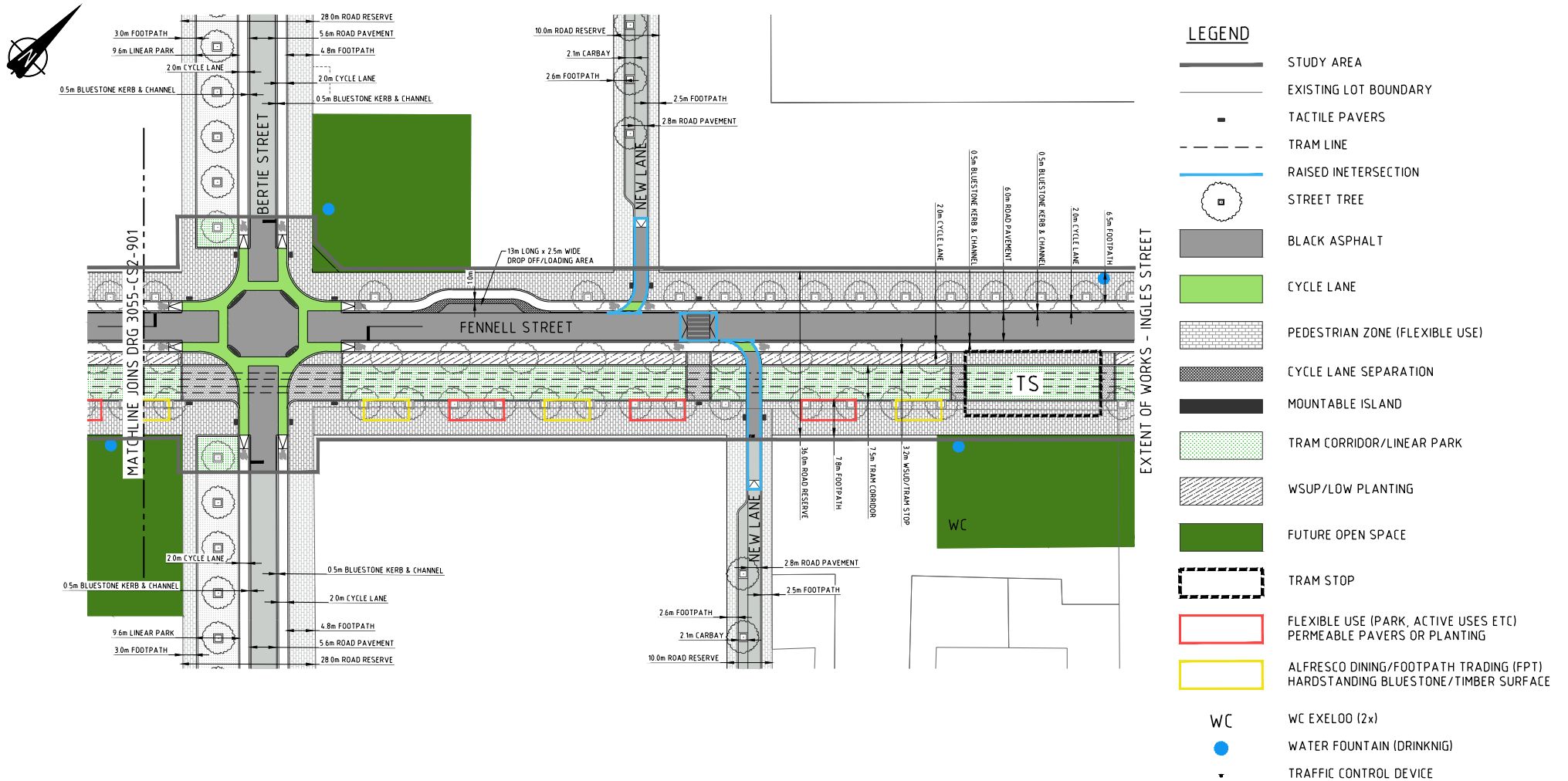
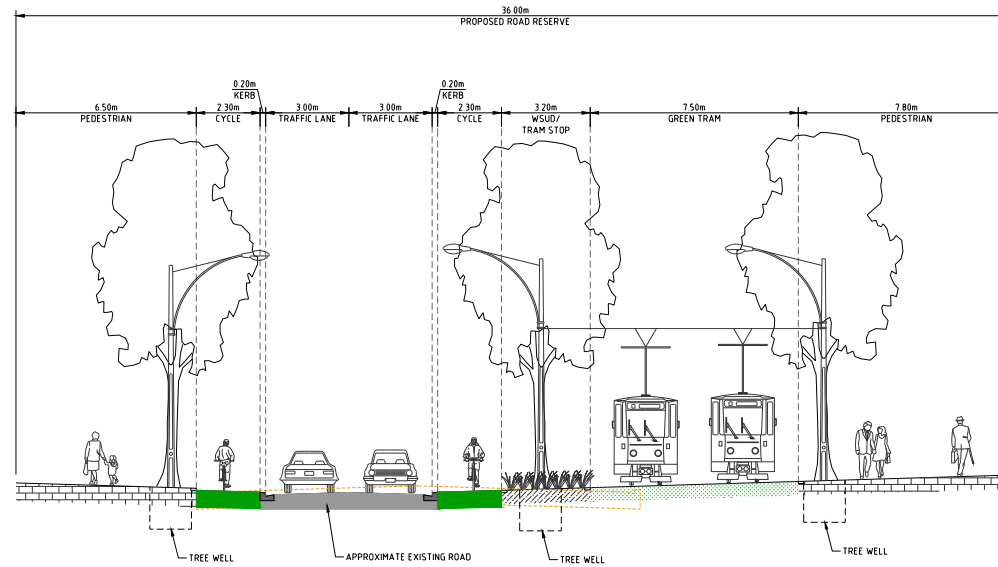
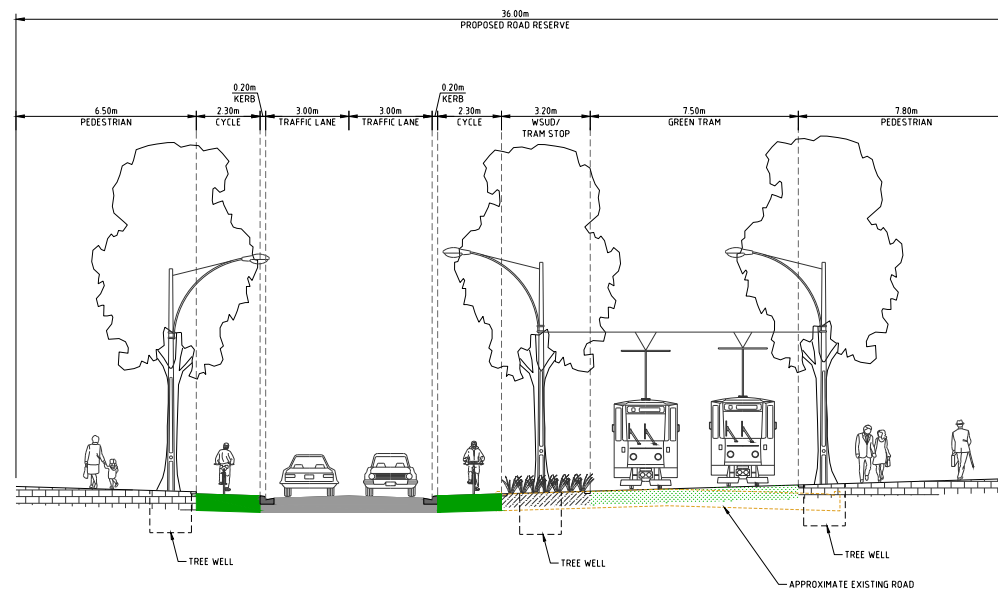


Figure 26: Typical Cross Sections - Fennell & Plummer Street



TYPICAL SECTION - FENNEL STREET
SCALE 1:100



TYPICAL SECTION - PLUMMER STREET
SCALE 1:100

Figure 27: Typical Cross Sections - Fennell & Plummer Street Services

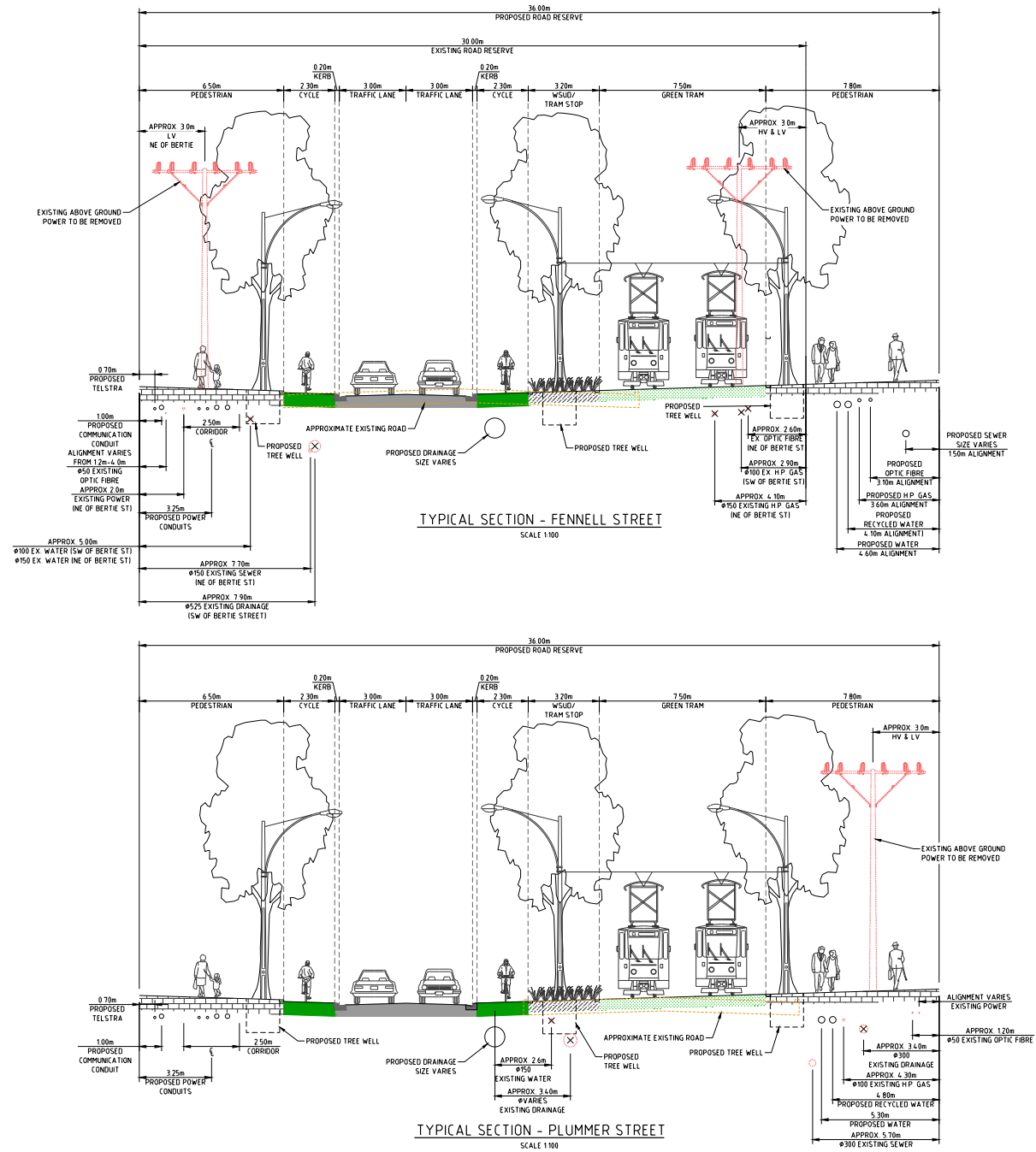


Figure 28: Swept Path Diagrams - 12.5m Truck (1 of 2)

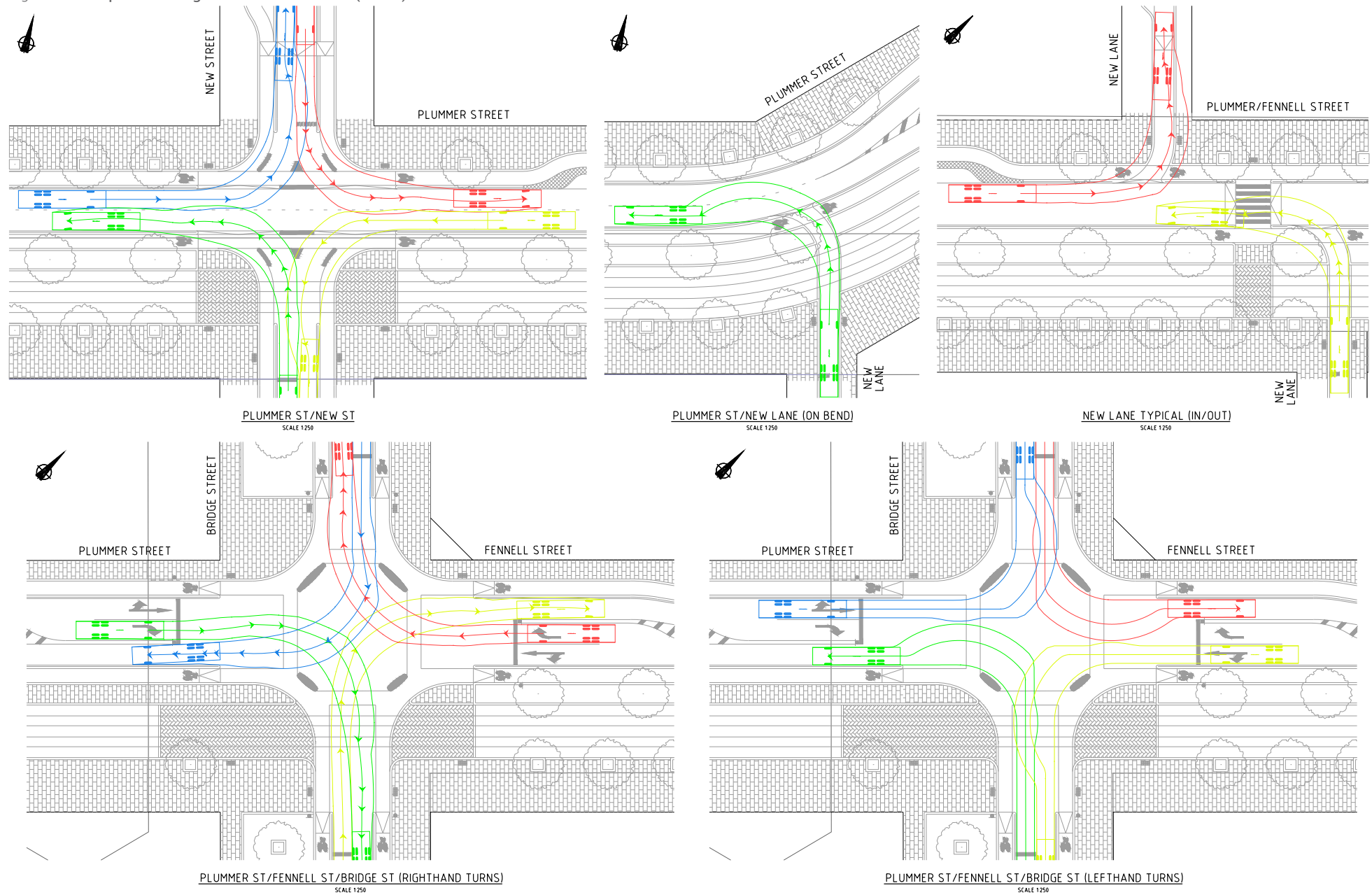
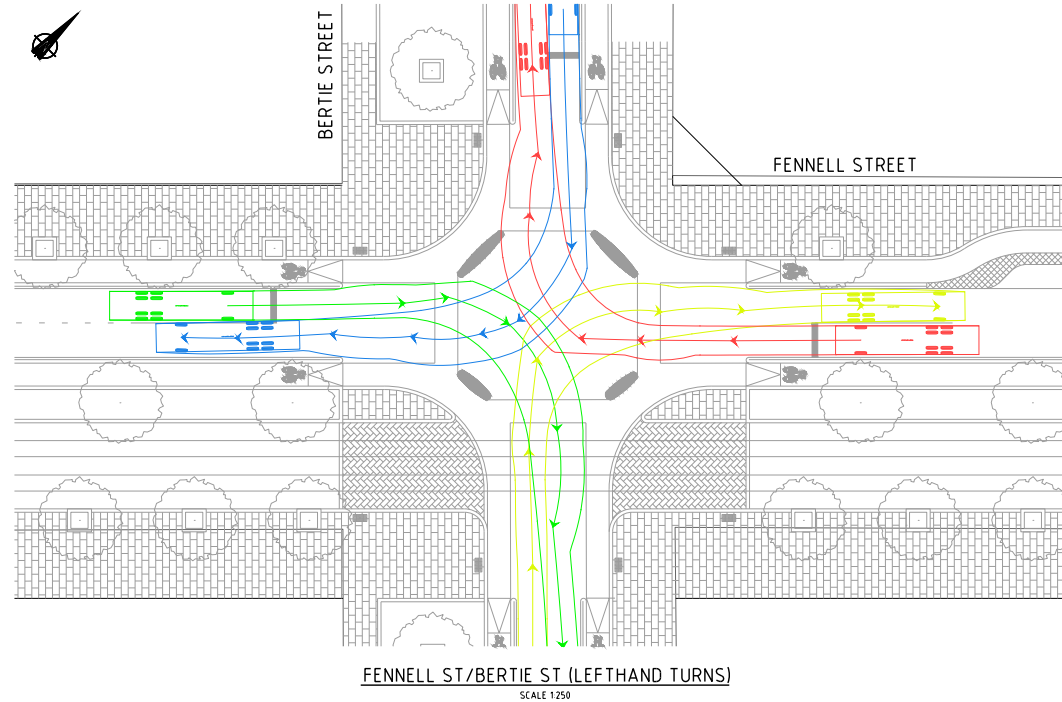
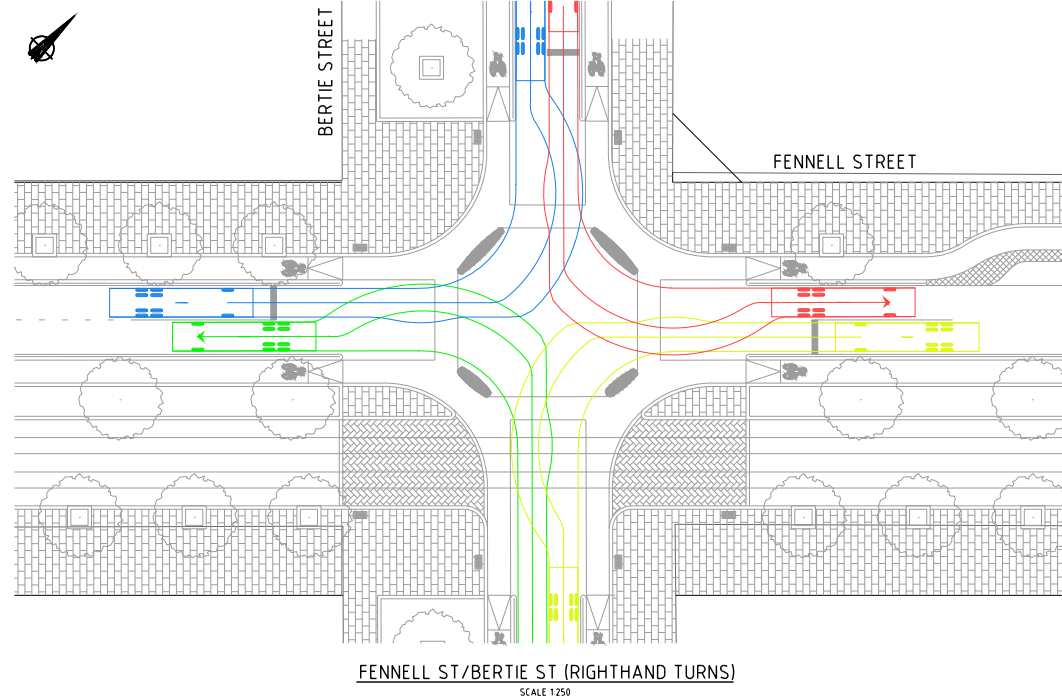


Figure 29: Swept Path Diagrams - 12.5m Truck (2 of 2)



4.5 Land Acquisition Plan

Figure 30 identifies the amount of land required from the respective seven affected properties. Table 8 sets out the amount of land required from each property. Charter Keck Cramer has prepared land valuations for the seven affected properties as part of Stage 3 of the project, which is set out in Chapter 5.

Table 8: Case Study Two – Land Acquisition

PROPERTY ADDRESS	LAND FOR NEW PUBLIC SPACE / ROAD WIDENING
43 Fennell Street	> 1,469m ² is required from this property for the new public space containing station box.
247-251 Ingles Street (strata titled property)	> A total of 1,716m ² is required from this property including: - > 1,259sqm - new public space containing station box. > 457m ² for the 6m road widening from the Fennell Street frontage, along the entire property length
38 Fennell Street	> 610m ² is required from this property to provide the 6m road widening from the Fennell Street frontage along the entire property length.
61 Bertie Street	> A total of 3,392m ² is required from this property including: - > 2,376sqm – new public space containing station box. > 1,016m ² for the 6m road widening from the Fennell Street frontage along the entire property length.
299 Bridge Street	> 1,997m ² is required for the new public space.
577 Plummer Street	> A total area of 3,954m ² is required from this property to include: - > 1,395sqm – new public space. > 2,559m ² for the Intersection/road widening exact size unknown, please estimate off plans. Includes 16m road widening from the Plummer Street frontage along the entire property length.
520-533 Plummer Street	> A total area of 3,540m ² is required to accommodate the 16m road widening from the Plummer Street frontage along the entire property length.

4.6 Concept Utilities Plan

Cossill and Webley have prepared a concept utilities plan (CUP) for the subject site. It is important to note that the utilities plan shown in **Figures 31 - 33** is conceptual only and is subject to detailed design. Furthermore, the service locations are from readily available sources, such as 'Dial Before You Dig', and have not been 'proved' on site. It is anticipated that as part of the ongoing development of the Fishermans Bend precinct, service upgrades will be undertaken by the relevant authorities.

A summary of the services illustrated in **Figures 31 - 33** is outlined below: -

- > The GHD report 'Fishermans Bend Baseline Utility Assessment', referred to herein as 'Utility Assessment', states that the extent of potable water main upgrades cannot be confirmed at this stage, and that the water authority is investigating a minimum pipe size of 225mm diameter for firefighting purposes. The existing potable water mains on Plummer is a 150mm diameter main in the approximate location of the proposed WSUD. The alignment of the main switches at Bridge St to run on the northern side of Fennell St, in approximately the proposed tree alignment. The main is cast iron and was mostly constructed in the 1950's. It is unlikely that the water main could be retained in its current location and likely condition under the proposed streetscape works. The main is not located directly underneath the proposed tree alignments, however it is located less than 1m from the tree alignment and may be damaged as part of the installation of tree wells. The Infrastructure Design Manual (IDM) does not set a strict offset for the water alignment, and it varies depending on the order/magnitude of the street (see SD640 attached). As part of the upgrade of the streetscape, it is anticipated that the main is upgraded to a suitable alignment and minimum of 225mm diameter. The water authority for the area, Melbourne Water (MW), have not completed their servicing strategy and therefore it cannot currently be confirmed whether the main will be upgraded/realigned. Upgrades and new infrastructure in FB is likely to be funded through development contributions payable to MW. It is anticipated that the cost of upgrading the pipe to 225mm will be reimbursable by the water authority, however if MW do not require the main to be upgraded, the cost of realignment will not be reimbursed by MW. Therefore, a conservative approach has been adopted and no reimbursement is included in the cost estimate.
- > The Utility Assessment outlines that a sewer mining plant (SMP) is being investigated to provide a source for recycled water. The recycled water network would provide an alternative to potable water for the future water demand and offset the required upgrades of the potable water network. The CUP nominates a recycled water main, however the size is not provided as this has not yet been determined by MW.
- > The Utility Assessment outlines that MW are investigating the potential feasibility of a pressure sewer network at Fishermans Bend. If the MW strategy dictates that the area will be serviced by pressure sewer, the existing gravity sewer reticulation network will likely become redundant. If gravity sewer is the preferred strategy, the existing sewer may require upgrading to cater for the increased density. The upgrades are anticipated to be funded through Developer Contributions. For the purposes of the case study, it is assumed that the existing sewer is retained where possible. The existing sewer is of sufficient depth that it is expected to be able to be protected during streetscape upgrade works.

- > The brief states that all the above ground electrical is to be undergrounded as part of streetscape works. Existing underground electrical cables are expected to be able to remain in current location, except where the Fennell/Plummer/Bridge intersection is realigned. New below ground electrical cables are expected to be located adjacent to existing underground cables, or in new alignment on the northern side of street. 66kV sub-transmission lines are generally not undergrounded and the power authority may not allow for it to occur. Considering the civic importance of the street, if the authority does not allow it to be undergrounded, other alternatives such as re-routing the 66kV along a different street may be considered. If the 66kV is undergrounded, specific requirements must be adhered to in relation to cable spacing and protection. It is anticipated that a non-standard service corridor, at least 2m wide, would be required to locate the cables. It is expected that there is sufficient space for the corridor on the northern side of the road.
- > Above ground communications connected to electrical poles are predominantly owned by Optus and are to be undergrounded to the communication offset in the concept utilities drawing.
- > Removal and relocation works are required for all services at Bridge-Fennell Streets intersection.
- > There is an existing high-pressure gas pipeline located in proposed tram alignment. Whilst the gas pipeline is 'high pressure', it is not a transmission main that requires a dedicated reserve. It is proposed that the gas pipeline is relocated to the offset as per the typical cross section drawing.
- > The existing drainage alignment does not suit the proposed streetscape upgrade and road carriageway. It is also expected to be inadequate to cater for increased development density and widening of the road reserve, and is assumed to be removed and disposed off-site.
- > A new main drainage line is proposed to be located in the central median.
- > Drainage pits picking up stormwater on the northern side of road will connect perpendicular under the road to the proposed main drainage line.
- > Telstra communications is proposed to be relocated to the northern verge as per the typical cross section drawing.

Figure 30: Land Acquisition Plan

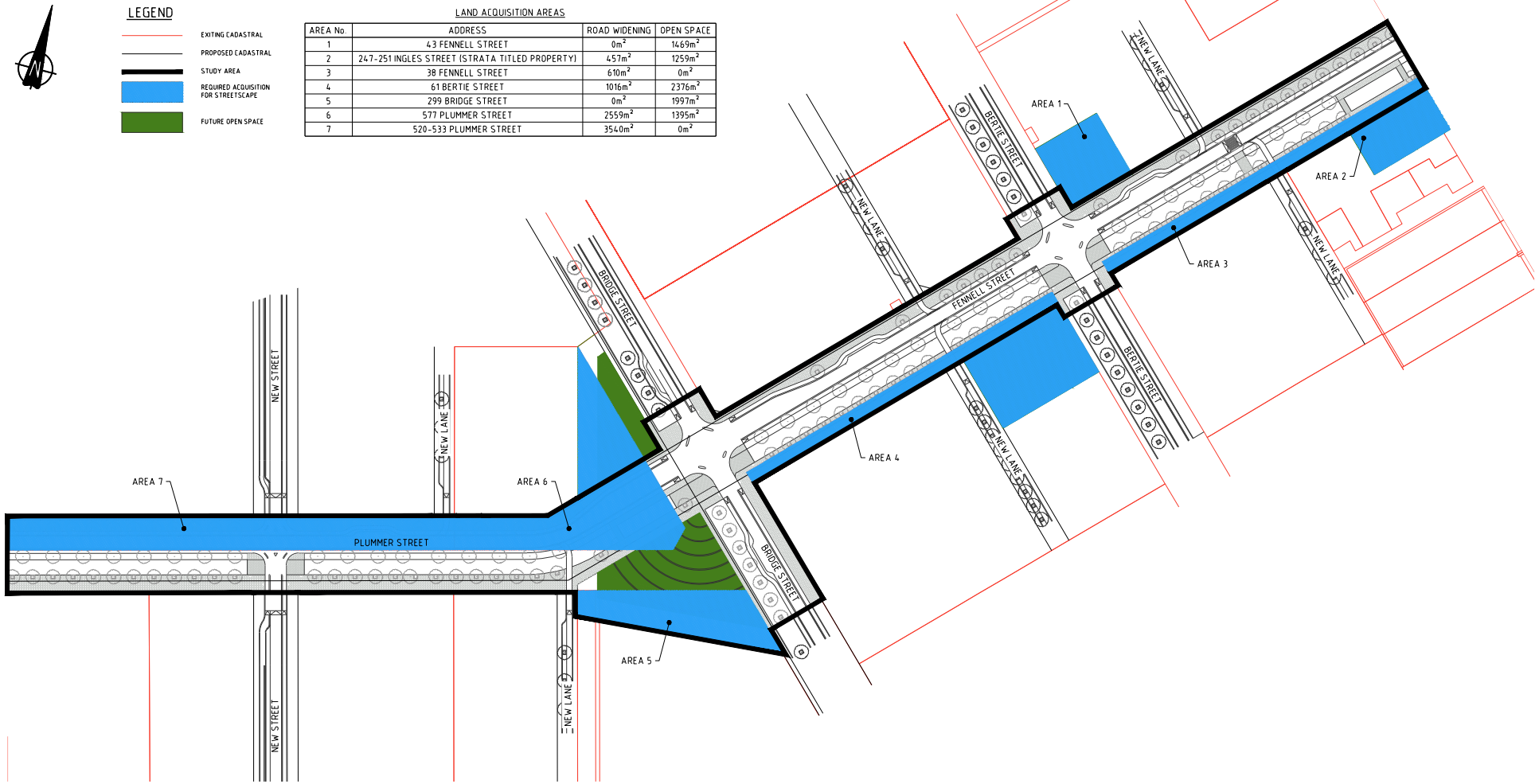


Figure 31: Conceptual Functional Utilities Plan (1 of 3)

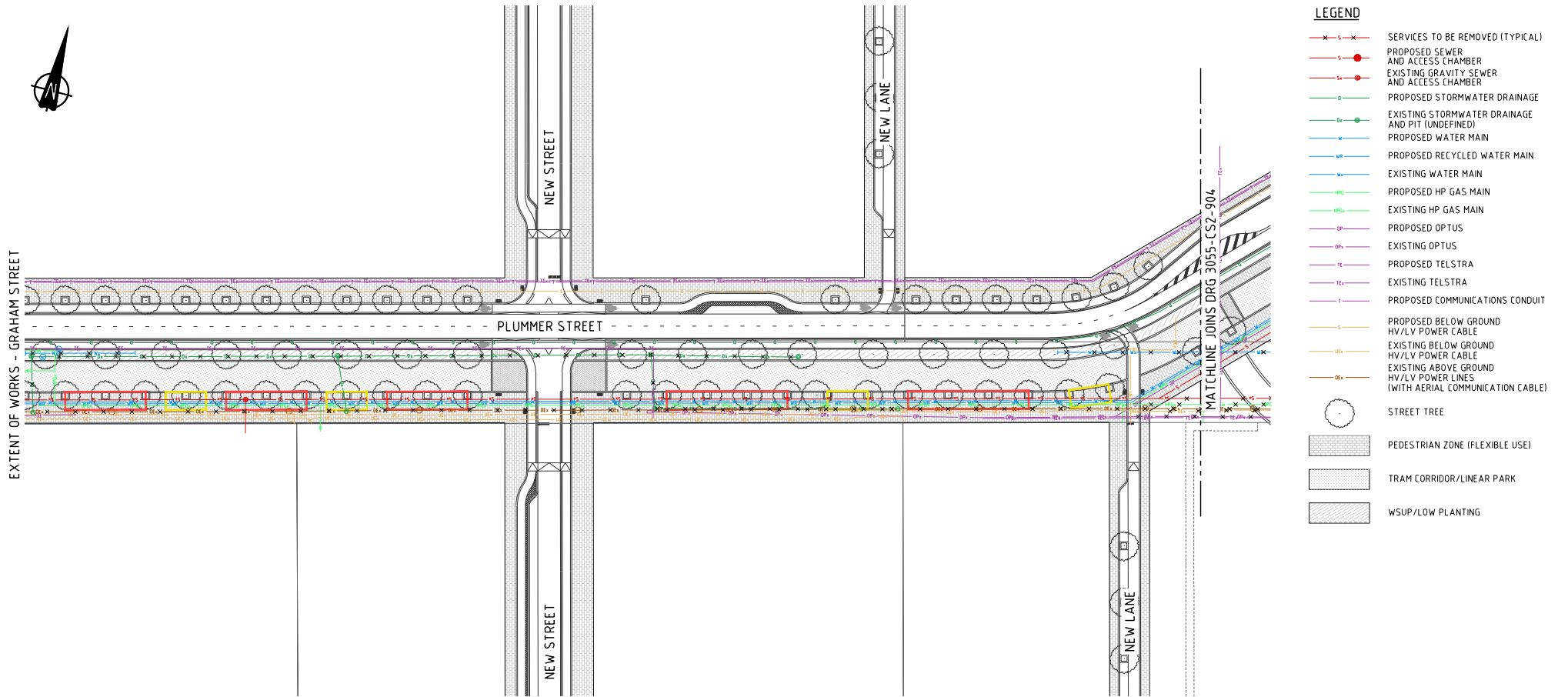


Figure 32: Conceptual Functional Utilities Plan (2 of 3)

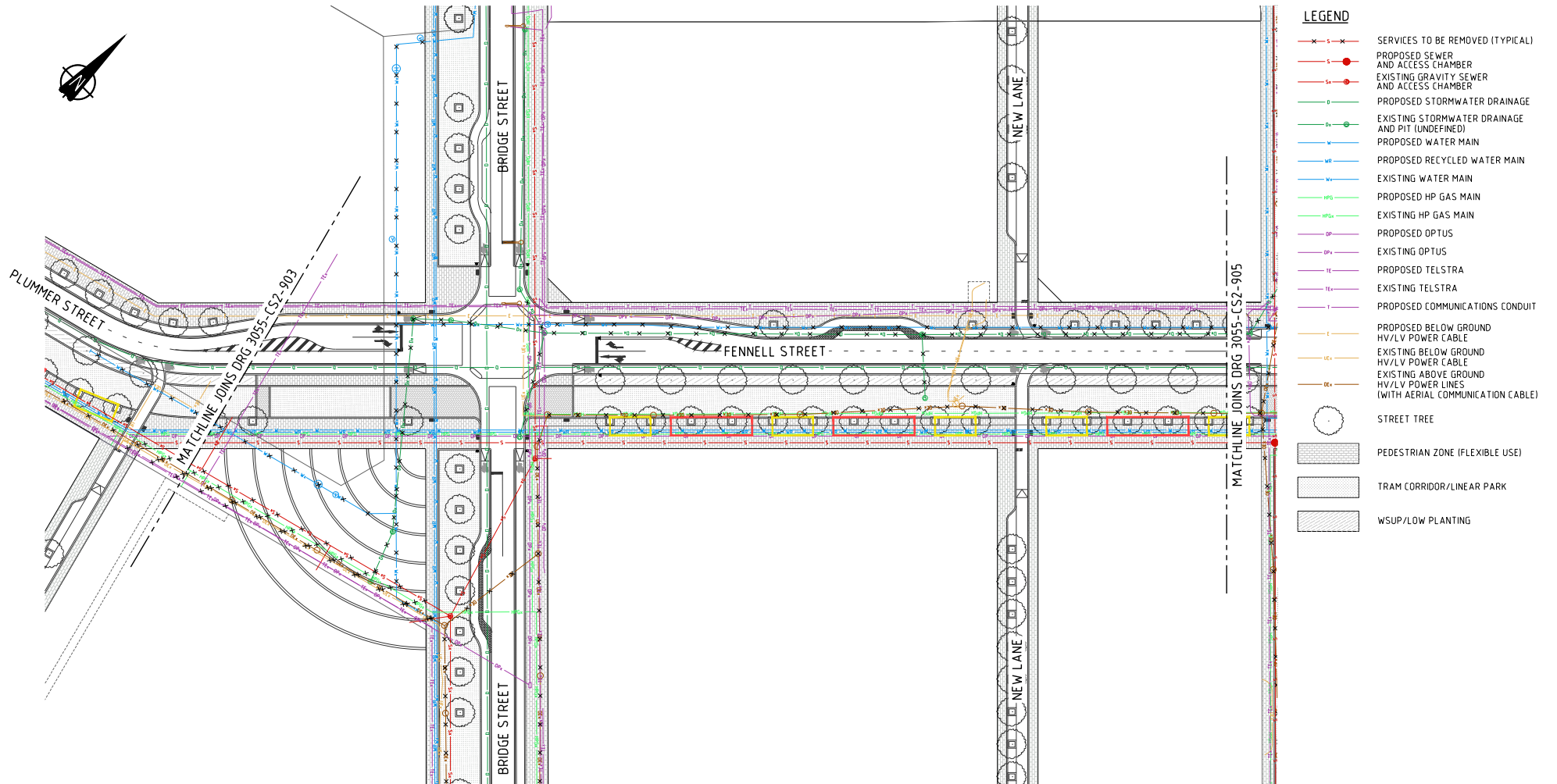
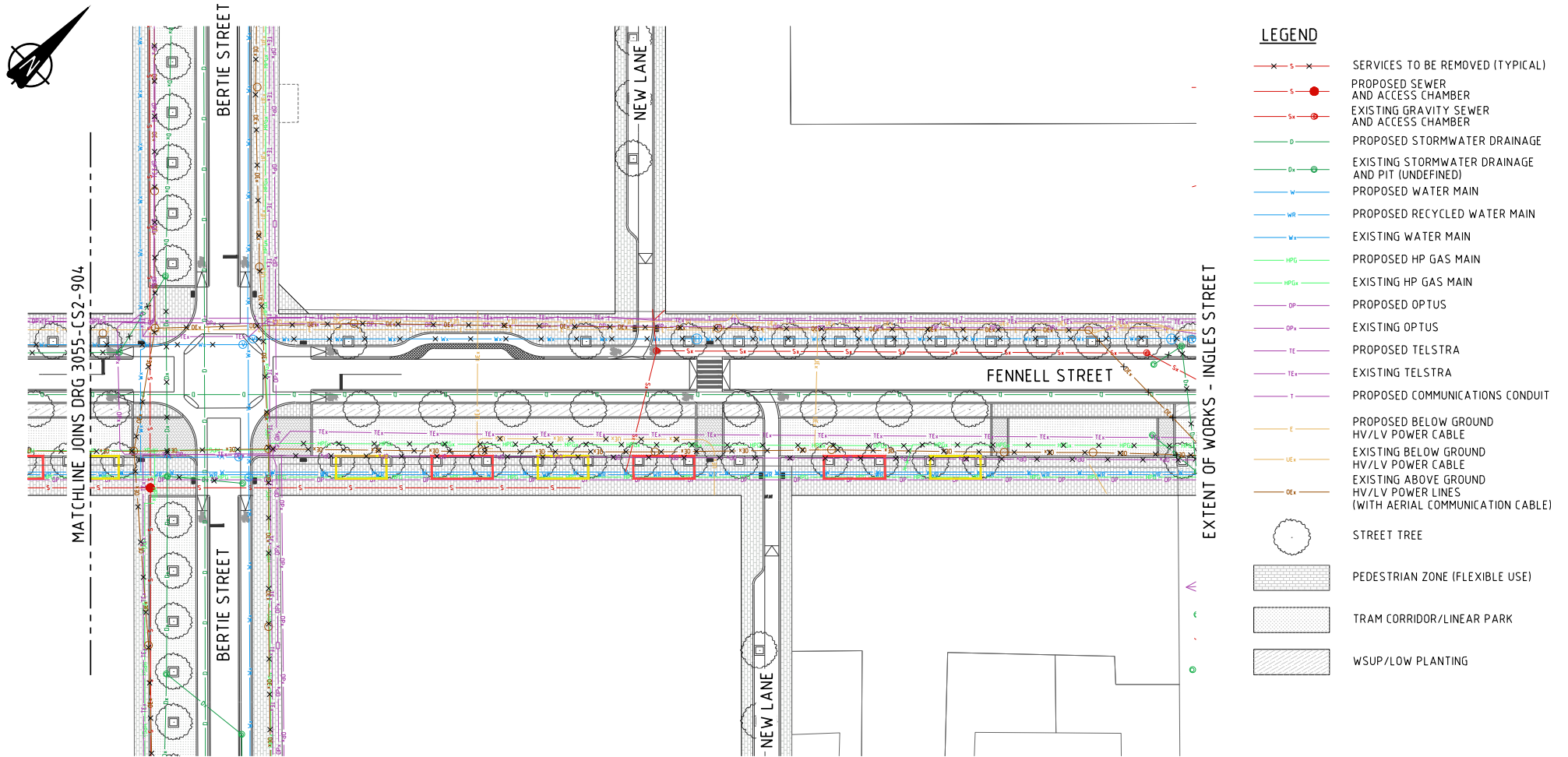


Figure 33: Conceptual Functional Utilities Plan (3 of 3)



4.7 Issues/ challenges

There are a number of challenges associated with delivering Case Study Two, which are set out below.

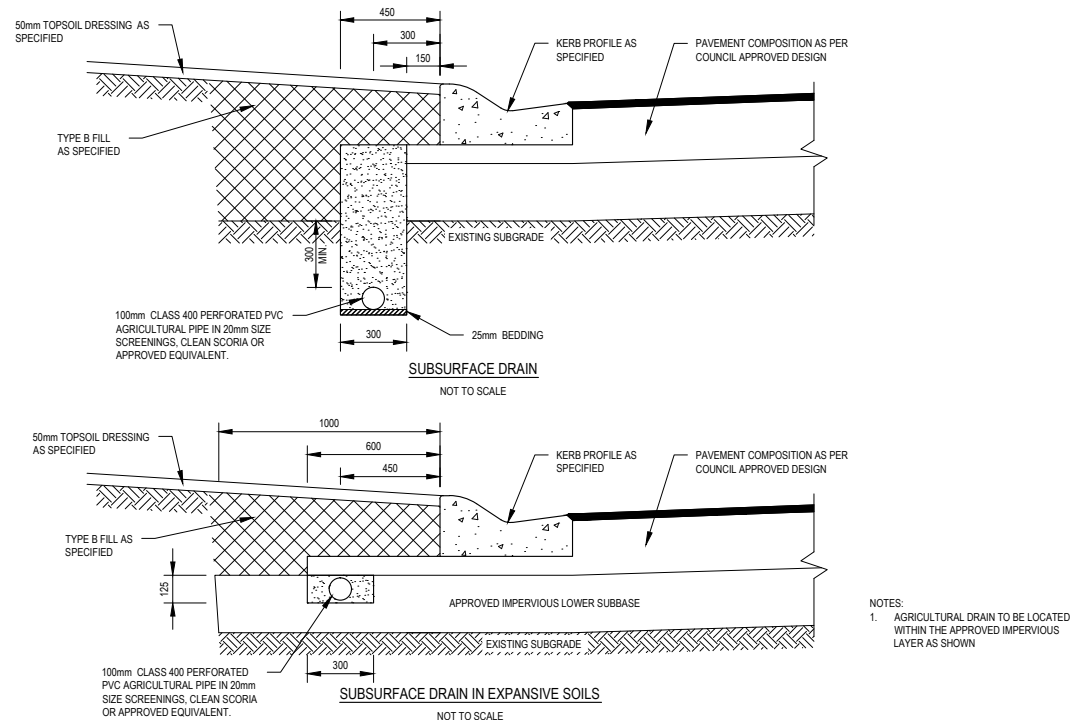
- > The presence of Macadam pavement within the study area
 - Moisture ingress into Macadam pavement is the largest contributor to pavement failures. It is recommended that the new road profile will incorporate agricultural drains, as per the cross section illustrated in **Figure 34**, to divert water away from the pavement. Additionally, there will be parallel service trenches compacted with crushed rock which will disperse any runoff from the landscape areas and mitigate infiltration into the road pavement. In Cossill and Webley's experience, an agricultural drain adjacent to the tree well provides additional protection for the road pavement.
 - The Douglas & Partners, June 2017 report suggests that based on future test results of the existing pavement, the treatment is likely to vary from profiling and resurfacing the asphalt through to complete reconstruction. Considering the pavement will already be disturbed from several aspects of the streetscape improvement, it is understood that the installation of street trees in the Macadam pavement can be achieved using appropriate design and construction methods.
- > The addition of a right turning lane at the southern Bridge Street approach to the Bridge/Fennell-Plummer Streets intersection has a large distance from the stopping line to the point at which the turn is made. It is likely that several vehicles will creep forward toward the turning point, causing vehicles to become caught in the pedestrian and tram zone after the light has turned red. This may lead to vehicles turning well after the red light,

causing accidents. The right turning lanes from Bridge Street on to Fennell-Plummer Street have not been included for this reason. An alternative to overcome this issue is a longer 'all red' signal phase combined with an early stop lantern for bikes so they don't get trapped in the intersections during a change.

- > The addition of the Fennell-Plummer Street turning pockets in the Bridge/Fennell-Plummer Streets intersection cause the north-eastern corner 'pinch point' of the bicycle lane to be 2.2m from the boundary. The intersection would need to be realigned to the west, further imposing on the linear park, or a splay introduced at the property boundary.

- > The vehicle-bicycle separation medians on the southern side of the Copenhagen style intersections is reduced in size due to the proximity to the tram. To provide a full size vehicle-bicycle separation median, the central median would need to be widened, resulting in the tram line being shifted toward the southern boundary and reducing the southern pedestrian zone width.
- > The proposed left-in left-out non-signalised intersection at the new street provides a triangular raised median to discourage vehicles from turning right-in or right-out. The location of the bicycle lane thoroughfare immediately adjacent the vehicle carriageway means that the triangular raised median must have a gap for the bicycle lane, potentially reducing the effectiveness of the raised median.

Figure 34: Sub-Surface Drain Cross-Sections (back of kerb)



- > Staged delivery of the streetscape works is not recommended with the proposed cross section, due to the location of the tram on one side of the road, which requires all road widening to be secured prior to delivery of the tram. There may be potential to stage delivery of the streetscape (i.e. tram prior to full streetscape upgrade) if an alternate road cross section is adopted, with the tram located in the centre of the road.
- > The entire road pavement will need to be replaced and will not be able to be re-used due to the different location of the existing and proposed carriageways, the need to replace/upgrade a large amount of underground services and issues with re-using existing carriageways (e.g. the location of the existing crown of the road relative to future carriageway width and associated drainage issues) etc.
- > As outlined in section 4.6 there are a large number of utility upgrades required, additional studies are required to determine what upgrades are required and the timing of the upgrades. Ideally, all utility upgrade works should be completed either at the same time or prior to the delivery of the streetscape works to ensure that streetscape works are not repeatedly dug up to upgrade services. Throughout the construction of the streetscape upgrades, utilities will need to be maintained to ensure businesses in the area can remain operational. This may require completing the construction and commissioning of utility upgrades prior to commencing construction of the above ground works. There are opportunities that can be explored during detailed design to provide temporary services, or strategically align new service upgrades, to overlap the utility upgrades with the above ground works and reduce the overall construction timeframe.

- > There are several implications associated with the placement of the tram on one side of the road on intersection designs. Given the pedestrian crossings on the south side of Fennell/Plummer Street are a significant distance from the actual intersection due to the tram along one side, it may legally be considered to be a mid-block location. As a result, these crossings may legally need to be marked/signed as a zebra crossing to give pedestrians legal priority.
- > The practicality of providing WSUD in the central tree alignment requires further investigation to determine how the water will flow into the WSUD ponds/swales.

4.8 Benefits / advantages

Notwithstanding the above, there are several benefits and advantages associated with delivering Case Study Two which include: -

- > Provision of a high quality pedestrian and public transport focused streetscape which is a great improvement on the current conditions and is consistent with the planned activity centre.
- > Provision of additional open space areas that will support the future development of high density mixed use precinct.
- > Providing the tram on the side of the road, as opposed to down the middle of the road, ensures the tram is further separated from vehicles which improves the safety of passengers as there are less points of conflict for pedestrians.
- > The upgrade of this streetscape will result in the significant upgrade of the existing services and utilities which will ensure that the services are upgraded to a sufficient level that will be able to support the redevelopment of the surrounding area.

4.9 Summary

In summary, Case Study Two is a great example of upgrading an existing streetscape to provide a high quality civic boulevard that focuses on public transport, pedestrian and cycling rather than being car dominated. It also introduces a civic plaza and additional urban parks to support the future intensification of the immediate area.

Case Study Two highlights several matters for government consideration, including: -

- > Balancing the aspiration for the streetscape to be primarily public transport and pedestrian/cycle focused whilst also providing for the functional operation of vehicles in the area including facilitating right hand turn movements, providing on-street loading areas and pick up/drop of areas.
- > The complexities related to the existing conditions such a Macadam pavement and how this can be managed through the future upgrades to maintain the structural integrity of the pavement.
- > The potential to stage the streetscape and intersection upgrades.
- > Case Study Two proposes a substantial expansion of the existing cross-sections which results in a number of land acquisitions along the length of the streetscape. The full cost of these acquisitions and complexities associated with securing the land is addressed in **Chapter 5** and this may influence further refinement of the proposed streetscape.

5. ESTIMATED COST PLAN

5.1 Introduction

As part of Stage 3 of this project Charter Keck Cramer (Charter) has prepared an Estimates of Value report for both Case Study 1 and 2, preliminary construction cost estimates, and an initial feasibility and options analysis for Case Study 1. Cossill and Webley has prepared a preliminary construction cost estimate for Case Study 2. This chapter outlines a summary of the work completed and a full copy of the respective reports is provided in Appendices 5 to 8.

5.2 Case Study 1: Montague Sport and Recreation Hub

5.2.1 Land Valuation

Charter has prepared an Estimates of Value report for land required for both Case Studies 1 and 2. The estimates of value report has determined a value for purchasing the entire Case Study 1 subject site, comprising 9,709m², at 80 Munro Street, South Melbourne. It is important to note that the subject site is shown as being located within a 'investigation area' for the Montague Sport and Recreation Hub in the draft Fishermans Bend Framework Plan (2017). The subject site has been chosen for the purpose of undertaking Case Study 1 and Council have given no commitment or particular preference to deliver the sport and recreation hub on this site at this point in time.

The Estimates of Value Report clearly sets out the assumptions and limitations of their assessment, however a summary of the key inputs and assumptions is provided below: -

- > The entire site is identified as possibly being required for a future community hub.
- > The total site area is 9,709m².
- > The subject land is zoned for an urban purpose and valued at its unencumbered, highest and best use within this context.
- > The subject land is fully developable.
- > Site remediation works have been undertaken and the respective parcels have received authorisation from the EPA for development in accordance with the Precinct Plan. However, we point out that the sales considered are of a nature which incorporate attributes of varied comparability to the subject/s.
- > The subject sites do not have any adverse environmental matters.
- > The estimate of value has been based on the proposed building controls, as outlined in the 'Fishermans Bend Framework – Draft for Consultation' document, including allowance for 24 storeys (as per Figure 12) and maximum Floor Area Ratios.
- > A Direct Comparison Approach has been used. Charter clearly outline the limitation associated with this approach given the draft planning controls have not come into effect and therefore the market is yet to reflect the effects of these new controls.
- > The assessments are estimates of value only and relate to kerbside inspections. Charter have not had regard to any Title configuration and leases, therefore the assumption being that they are unencumbered and available with vacant possession.

Based on the above, Charter has determined a total estimate of value of \$24.2 million for 80 Munro Street, South Melbourne. Please refer to Appendix 5 for a complete copy of the Charter Estimate of Value Report, November 2017.

5.2.2 Estimated Construction Cost Plan

Charters Quantity Surveying (QS) Business Unit has prepared preliminary construction cost estimates for Case Study 1 for both: -

- > Option 1: Stand Alone Sport and Recreation Hub; and
- > Option 2: Sport and Recreation Hub within a broader mixed use development.

The Charter construction cost estimates for both development options assume the following: -

- > Piled foundation solution to be provided;
- > Given the site is contaminated, but there is no detailed study available or remediation cost available. The decontamination estimate provided by Golder Associates in 2012 of approximately \$6 million per hectare (this not being an upper limit) has been escalated up to and including January 2018 \$ and applied to these estimates;
- > To conform with the flood level requirements, the site will need to be raised (filled) by approximately 1.0-1.5m; and
- > As per the project brief: -
 - Detailed design and project management costs are estimated at 15% of estimated total delivery costs; and
 - contingencies are set at 20% of total estimated delivery cost.

As outlined in the Charter QS report the following items are excluded from the cost estimates: -

- > Cost escalations beyond January 2018
- > Overtime works due to restricted contract period
- > Negotiated or staged contract
- > Site decontamination and asbestos removal (other than provision included above)
- > Window furnishings
- > Artworks
- > Infrastructure works
- > Finance charges and interest
- > Headworks fees and contribution charges to relevant supply authorities
- > Legal fees, marketing, sales, letting charges etc
- > GST

A summary of the final estimated construction costs for each development option is set out below.

Option 1: Stand Alone Sport and Recreation Hub Estimated Construction Cost

No.	Description	Area	Rate \$	Total \$
1.0	Indoor Courts	3,781 m2	3,525	13,328,025
2.0	Indoor Courts Supporting Amenities & Rooms	130 m2	5,050	656,500
3.0	Indoor Courts Other Supporting Areas	281 m2	5,050	1,419,050
4.0	Multi-Purpose Rooms	1,045 m2	3,900	4,075,500
5.0	Additional Area Requirements – Entry Foyer, circulation space, carparking to recreation hub (Note: Consolidated Average Rate Used)	5,148 m2	2,800	14,414,400
6.0	Fitout to Recreation Centre	item	1,750,000	1,750,000
Sub-total				35,643,475
7.0	External Works	item	2,500,000	2,500,000
8.0	Demolition	item	1,300,000	1,300,000
9.0	Decontamination / Remediation Works	item	6,800,000	6,800,000
10.0	Site Levels Filling	item	1,450,000	1,450,000
Sub-total				47,693,475
11.0	Planning Fees (1%)	item	480,000	480,000
12.0	Detailed Design & PM Fees (15%)	item	7,175,000	7,175,000
13.0	Contingencies (20%)	item	11,081,525	11,081,525
TOTAL (GST excluded)				66,430,000

Source: Preliminary Construction Cost Estimate Report, Charter Keck Cramer, January 2018.

Option 2: Sport and Recreation Hub within a broader mixed use development Estimated Construction Cost

No.	Description	Area	Rate \$	Total \$
1.0	Indoor Courts	3,416 m2	4,800	16,396,800
2.0	Indoor Courts Supporting Amenities & Rooms	260 m2	5,700	1,482,000
3.0	Indoor Courts Other Supporting Areas	405 m2	5,300	2,146,500
4.0	Multi-Purpose Rooms	725 m2	4,500	3,262,500
5.0	Additional Area Requirements – Entry foyer, circulation space, mezzanine area overlooking Sports, rock climbing, carpark to recreation hub (Note: Consolidated Average Rate Used)	6,150 m2	4,050	24,907,500
6.0	Fitout to Recreation Centre	item	2,400,000	2,400,000
Sub-total				50,595,300
7.0	Carparking - Commercial	2,243 m2	1,000	2,355,150
8.0	Carparking – Residential	11,392 m2	1,000	11,961,600
9.0	Commercial Office	4,706 m2	2,700	13,176,800
10.0	Residential Apartments	42,408 m2	3,100	135,705,600
Sub-total				213,794,450
11.0	External Works	item	500,000	500,000
12.0	Demolition	item	1,300,000	1,300,000
13.0	Decontamination / Remediation Works	item	6,800,000	6,800,000
14.0	Site Levels Filling	item	1,450,000	1,450,000
Sub-total				223,844,450
15.0	Planning Fees (1%)	item	2,240,000	2,240,000
16.0	Detailed Design & PM Fees (15%)	item	33,600,000	33,600,000
17.0	Contingencies (20%)	item	51,950,550	51,950,550
TOTAL (GST excluded)				311,635,000
TOTAL Sport & Rec. Hub Component Only (GST excluded)				72,572,865

Source: Preliminary Construction Cost Estimate Report, Charter Keck Cramer, January 2018.

A full copy of Charters preliminary construction cost estimates for Case Study 1 is provided in Appendix 6.

5.2.3 Initial Feasibility & Options Analysis

In order to provide the Montague Sport and Recreation Hub, government are considering a range of funding options at their disposal to reduce/minimise capital requirements whilst ensuring a practical solution that sees the effective delivery of key community infrastructure assets. Accordingly, Charter has prepared an Initial Feasibility and Options Analysis for Case Study 1 which has considered the following four delivery options available to government: -

- > **Option 1: Sport and Recreation Hub (Stand Alone Model).** Government acquire the entire site and construct the Recreation Hub as a stand alone facility.
- > **Option 2: Separate Strata Allotment Retained and Recreational Hub Constructed (Mixed Use Development Model).** Government acquire the entire site and achieve a permit for a larger Mixed-Use redevelopment incorporating the Recreational Hub; the balance of the site is then divested with Port Phillip independently undertaking construction of the Recreational Hub on the site.
- > **Option 3: Government Leases Recreational Hub (Mixed Use Development Model).** The site is retained by the existing owner and is redeveloped for a larger Mixed-Use precinct incorporating the Recreational Hub. Government then lease the facility from the land owner on a long term tenure and market levels.
- > **Option 4: Mixed-Use precinct delivered, Port Phillip then purchases the completed Recreational Hub (Mixed-Use Development Model).** The site is retained by the existing owner and is redeveloped for a larger mixed-use precinct incorporating the Recreational Hub, with an agreement to purchase the Recreational Hub at practical completion.

Charter has completed an initial financial analysis for each of the nominated options to establish the Net Present Value (NPV) of future cashflows and the total cost to be incurred by government under each scenario.

Key Information Inputs

The land and construction cost assumptions incorporated within the feasibility and options analysis have been extracted from: -

- > Preliminary Construction Cost Estimates prepared by Charters Quantity Surveying Business Unit (12 December 2017);
- > Indicative realisations underpinned by data from Charters Valuations department; and
- > Charters various financial modelling assumptions predicated on market based returns and performance indicators.

In undertaking their analysis Charters have made the following key assumptions:

Key General Assumptions Applicable to Each Option

- > Each participation option has been modelled over a theoretical 20 year period for our cashflow purposes at the nominated Discount rate of 7.5% p.a. In reality, some options may see Port Phillip holding the facility for a longer period (50-100 years) but to establish consistency across the various scenarios, we have considered the cashflows of all options across a 20 year period;

- > Cost Estimates detailed within the Preliminary Construction Cost Estimate Report (QS) include provisions for Remediation, External Works, Planning & Design fees, Core Construction and Contingencies;
- > Costs and revenues detailed herein are not subject to any escalations;
- > Assumed general cashflow timelines of 3 months settlement for each option, 12 months for town planning (to secure development approval) and 18 months (standalone)/30 months (Mixed-use) for construction;
- > Stamp duty is payable on land purchase as per Victorian SRO with total acquisition costs assumed at 5.50%;
- > Terminal Value of Asset under each scenario equal to the last terms escalated Rental Rate capitalised at a Terminal Yield of 8%;
- > Commencing Rental Rate p.a. equivalent to 8% of the Market Value of the facility, with Market Value reflective of Cost to Construct under each model;
- > Rental Value p.a. escalating in line with CPI over a 20 year period;
- > Outgoings in commencing year payable at \$409,000 p.a. and escalating at CPI (as advised by Port Phillip);
- > For the purposes of their assessment Charter have not considered any financing costs (i.e. interest). Whilst Charter understand there may be some portion of third party financing, in order to benchmark the various purchase/construction and leasing options on the basis of development fundamentals, Charter have disregarded such costs at this initial stage of investigation;

Financial Performance and Return Assumptions

- > A Discount Rate of 7.5% has been adopted for the purpose of our indicative NPV analysis which is predicated upon Charters current knowledge of broad domestic based investment scenarios and our assessment of the risk associated with the various options;
- > A Terminal Yield of 8.00% has been adopted for the purposes of our NPV analysis which is predicated upon current investment market sales results for similar assets;
- > An Alternative Investment Rate of 4.00% has been adopted for the analysis of the "Opportunity Cost" benefit to Port Phillip under the Option 3 – Leasing scenario;

Base Case General Cost, Revenue & Return Assumptions

Other key Cost assumptions are summarised as follows:

Table 9: Summary of Key Cost Assumptions

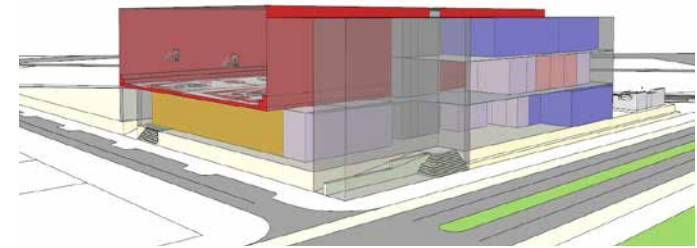
Total Construction Cost – Stand Alone Facility	\$64,430,000
Total Construction Cost – Mixed-Use Facility	\$311,635,000
• Sport & Rec Hub only	\$72,572,865
• Broader Mixed-use component	\$239,062,135
Selling Costs	2.0% plus GST

A summary of Charters indicative feasibility findings for each of the four options are summarised as follows:

Option 1: Sport and Recreation Hub (Standalone Model)

Introduction

Government acquire the entire site from the current owner interests at current market value, achieve a planning permit and subsequently construct the Recreation Hub on the site as a standalone facility for the ongoing use as Community Infrastructure. Costs and timing of construction have been derived from a Preliminary Construction Cost Estimate Report prepared by Charter's Quantity Surveying Business Unit.



Initial Cash Flow Assumptions

For our cost analysis, the following key assumptions have been adopted:

- > Construction of a three level Standalone Recreational Hub of 10,385 sq.m.;
- > Total Construction cost (Excl. of land) of \$66.4m - as per Charter QS assessment subject to the various assumptions;
- > Assessed land value of \$24.2m adopted as purchase price;
- > Contamination on the site is remediated in parallel with the Planning Permit process (refer QS Costings);
- > Terminal capitalisation rate 6.00%, which varies from our base assumption and reflects generous underlying land parcel (9,709 sq.m.) not associated under the balance of options;

Strengths

- > Outright purchase of the land allows government absolute control in the design, planning process and delivery of a stand-alone Community Infrastructure Hub;
- > Development of a prime purpose built Recreational Hub is not contingent upon the design and timing limitations associated with the third-party developer and larger Mixed-Use project;
- > Timeline to occupancy significantly shorter in comparison to the larger Mixed-Use scenario;
- > Full control of destiny and not subject to annual rental increases/market reviews;
- > Flexibility – If at any point in the future the intended end user/occupant changes, the government can re-design/expand/redevelop the facilities;
- > Government retain asset and enjoy capital growth associated with land and buildings over what is likely to be a long term time horizon.

Cost & Timeframe

Indicative Project Costs (GST Incl.)

- (\$92.8m) (including imputed land value - \$24.2m assessed by CKC & Construction Cost Estimates of \$66.43m + ancillary development costs)

Estimated NPV @ 7.50% discount rate over 20 years

- (\$55,289,920)

Indicative Timeframe to Option Implementation:

- | | |
|---|-----------|
| • Settlement | 3 months |
| • Town Planning Permit, Detailed Design & Remediation | 18 months |
| • Core Construction | 18 months |
| • Total | 39 Months |

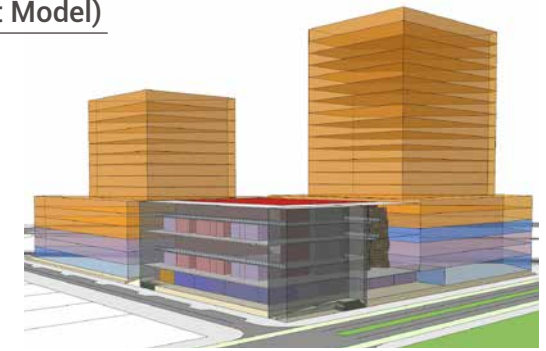
Weaknesses

- > Significant upfront cost to government in implementing this option (\$92.8m +/-);
- > Substantial funding requirement over/above government's annual capital allocation;
- > Government as the owner potentially become exposed to environmental, planning and construction risk;
- > More generally, the proposed option would represent an underutilisation of the site which is proposed to enjoy a 24 storey height limit.

Option 2: Separate Strata Allotment Retained and Recreational Hub Constructed (Mixed Use Development Model)

Introduction

Government acquire the entire site and achieve a permit for a larger Mixed-Use redevelopment incorporating the Recreational Hub; government then retain the portion of the site allocated for the Recreational Hub and proceed to divest the balance to the open market for a third party developer to subsequently deliver in accordance with the endorsed plans. Government is to independently undertake construction of the Recreational Hub in Year 2 subject to the Costs outlined in Charter's QS Estimates.



Initial Cash Flow Assumptions

For the NPV analysis, the following key assumptions have been adopted:

- > Government purchase site for \$24.2m (assessed value) and achieve a permit (incur planning fees) for Mixed-use development with GFA of 71,705 sq.m.;
- > Government divest the balance of the site to the open market for \$23.1m, which represents the approximate Residual Land Value of the Mixed-Use scheme feasibility analysis;
- > The Recreational Hub and balance of Mixed-Use built-form can be constructed independently of each other;
- > Third party developer undertakes construction on balance of the site in accordance with the permit;
- > Community Hub component cost of \$72,572,865 (excl. GST).

Strengths

- > Outright purchase of the land allows government absolute control in the design and planning process before divesting;
- > Government has potential to add value by driving the planning process and achieving a favourable outcome before divestment;
- > Capital is "unlocked" and received by divesting the balance of the site with an attractive mixed-use permit (\$23.1m);
- > Significant capital relief by divesting the balance of the site;
- > Government transfers construction and delivery risk of the mixed-use component onto third party developer;
- > No construction cost obligations by government for larger precinct;
- > Completed Recreational Hub delivered under the control and timing of government.
- > Government enjoy full ownership rights of the asset moving forward;
- > Government ultimately enjoy outright ownership of the facility and therefore benefit from future capital growth over what is likely to be a long time horizon.

Cost, NPV & Timeframe

Indicative initial (1-4 yr) Net Costs for Site and Construction (exc. outgoings/other consultants)

- (\$74.17m)

Estimated NPV @ 7.50% over 20 years

- (\$10,684,336)

Indicative Timeframe to Implement Option (Recreational Hub only)

- | | |
|--|-----------|
| • Settlement | 3 months |
| • Detailed Design, Remediation, Planning | 18 months |
| • Core Construction & Sale of site | 18 months |
| • Final Fitout/Handover | 1 Month |
| • Total | 40 Months |

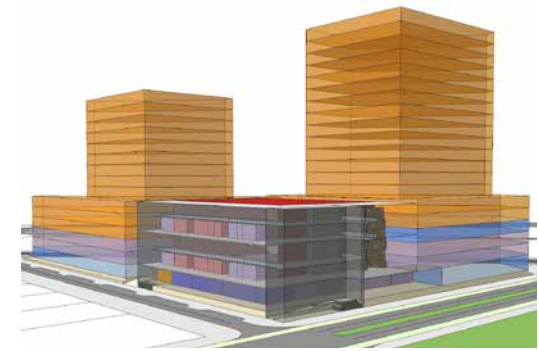
Weaknesses

- > Significant upfront cost to the government to acquire the site (\$24.2m);
- > Government loses control over timing and delivery of the broader development;
- > Government as the owner become exposed to some form of environmental, planning and construction risk;
- > Strata ownership possibly restricts future use compared to outright ownership;

Option 3: Government Leases Community Hub (Mixed Use Development Model)

Introduction

The site is retained by the existing owner and is redeveloped for a larger Mixed-Use precinct incorporating the Recreational Hub as required by way of a Section 173 Agreement. Government then lease the facility from the land owner on a long term tenure at market levels and are relieved of all planning and delivery risk, although lose control of project timing and will not benefit from any capital growth associated with ownership.



Initial Cash Flow Assumptions

For the NPV analysis, the following key assumptions have been adopted:

- > Government lease Recreation Hub of 10,956 Sq.m.;
- > Site required to be developed with a mixed-use development incorporating the proposed Recreational Hub (ie. S173 Agreement);
- > Market value represents construction cost plus builder's margin on cost to a third party delivering the facility, but does not reflect any form of development profits;
- > In recognising the opportunity cost benefit of funds which would otherwise be allocated under an Option 1 scenario (\$92.8m), we have assumed council benefit from a reinvestment rate on each years available funds at 4% p.a. after rent/outgoings;
- > Government occupy the facility until available funds (initially \$92.8m) are entirely diminished (Year 17);
- > Government enter into an initial lease (with options) with fixed annual reviews in line with CPI;

Strengths

- > Significantly lower upfront capital cost than a develop and own scenario;
- > Ongoing construction capital expenditure is the responsibility of the developer with no capital outlay required to purchase the land or construction;
- > Government remove themselves of planning, design and construction risks;
- > Opportunity Cost benefit as theoretically government may invest unused funds which are not required for the site purchase or construction costs;
- > Government may elect to relocate at the conclusion of the lease term;
- > Government do not have to pay stamp duty;

Cost, NPV & Timeframe

Indicative Year 1 Rental Cost (exc. outgoings/other consultants)

- (\$6.38m)

Estimated NPV of net cashflows @ 7.50% over 17 years

- (\$53,366,746)

In recognising theoretical funds available that would otherwise be utilised by government to purchase and construct rather than lease a new facility, the reinvestment return on these funds less than the annual rental rate/outgoings diminishes these funds entirely at **year 17** which reflects the maximum tenure available under this scenario.

Estimated Timeframe to occupation:

- | | |
|---------------------------------|-----------|
| • Settlement | 3 months |
| • Town Planning Permit | 18 months |
| • Core Construction | 30 months |
| • Final Fitout/handover/Leasing | 1 Months |
| • Total | 52 Months |

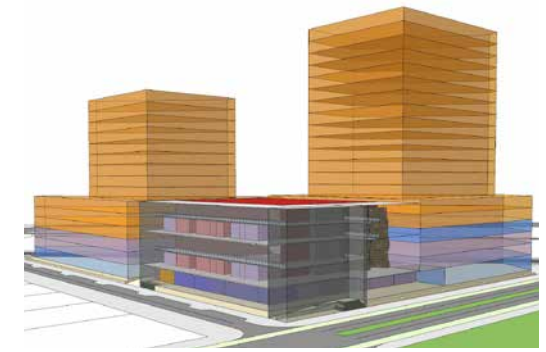
Weaknesses

- > Assuming government have access to similar capital that would be available under a traditional purchase and construct scenario (Options 1 - \$92.8m), differences in the reinvestment rate of 4% p.a. and the rental/outgoings p.a. see all funds, and therefore tenancy, diminished in Year 17;
- > Government as the tenant do not enjoy the benefit of capital growth and are subject to rent escalations/market reviews;
- > Government loses control over timing and delivery of the broader development with a development agreement possibly contingent on financing/pre-sale success of the residential components;

Option 4: Site is retained by the existing owner and redeveloped for a larger mixed-use precinct incorporating the Recreational Hub, with an agreement to purchase the Recreational Hub at practical completion (Mixed Use Development Model).

Introduction

Government work cooperatively with the current owner to assist in achieving a permit outcome on the site, with the developer subsequently delivering the entire precinct with an agreement from government to purchase the Recreational Hub at cost from the developer. Government relieve themselves of delivery risk and benefit from a purpose-built facility at cost plus builders margin on cost.



Initial Cash Flow Assumptions	Cost, NPV & Timeframe										
<p>For the NPV analysis, the following key assumptions have been adopted:</p> <ul style="list-style-type: none"> > Government Purchase the Recreation Hub of 10,956 Sq.m. upon completion at an agreed value which represents cost and builders margin on cost; > Site required to be developed with a Mixed-Use development incorporating the proposed Recreational Hub (ie. S173 Agreement); > Third party developer undertakes construction of the project, with a construction timeline and acquisition of the strata titled Recreational Hub at month 52. 	<p>Indicative Cost to acquire facility at Year 4 (Cost equal to value + margin on cost+ Acq. cost)</p> <ul style="list-style-type: none"> • Cost (\$72.5m) + Margin on cost (10%) + Acq Cost (\$4.39m): (\$84.22m) <p>Estimated NPV @ 7.50% over 20 years</p> <ul style="list-style-type: none"> • (\$11,843,193) <p>Indicative Timeframe to occupation</p> <table border="0"> <tr> <td>• Settlement</td> <td>3 months</td> </tr> <tr> <td>• Town Planning Permit</td> <td>18 months</td> </tr> <tr> <td>• Core Construction</td> <td>30 months</td> </tr> <tr> <td>• Final Fitout/handover/commissioning/Strata Acq</td> <td>1 Months</td> </tr> <tr> <td>• Total</td> <td>52 Months</td> </tr> </table>	• Settlement	3 months	• Town Planning Permit	18 months	• Core Construction	30 months	• Final Fitout/handover/commissioning/Strata Acq	1 Months	• Total	52 Months
• Settlement	3 months										
• Town Planning Permit	18 months										
• Core Construction	30 months										
• Final Fitout/handover/commissioning/Strata Acq	1 Months										
• Total	52 Months										
Strengths	Weaknesses										
<ul style="list-style-type: none"> > Lower upfront capital cost than if government develop and own; > Government remove themselves of planning, design and construction obligations; > Government transfers construction and delivery risk onto third party developer; > No immediate capital required for government until Recreational Hub is complete. Allows time for funding to be sourced; > Completed Recreational Hub delivered to government at an agreed purchase price. 	<ul style="list-style-type: none"> > Government loses control over timing and delivery of the broader development with a Development Agreement possibly contingent on financing/pre-sale success of the residential component; > Significant Capital output (\$84.2m) required at acquisition of Recreational Hub; > Stamp Duty payable on the Recreational Hub facility; > Government requirement to pay margin on cost for the Recreational Hub being constructed. 										

A full copy of the Charter Initial Feasibility and Options Analysis Report is provided in Appendix 7.

5.2.4 Summary

In summary, the Montague Sport and Recreation Hub is a significant community infrastructure asset. The scale of the hub is reflected in the substantial estimated delivery costs illustrated in Table 10.

Given several of these community facilities are required across the Fishermans Bend precinct Council officers have considered four funding options which are discussed in detail in the section above. A summary of the four funding options is provided in Table 11. These options range from the more traditional approach (option 1) whereby the entire site is purchased and the stand alone hub is constructed to options that consider the recreation hub being leased on a long term tenure (option 3). Each option examined considers the estimated total project cost, NPV, timeframe to occupation and other matters such as ownership rights, capital inflow and Charter has identified the strengths and weaknesses of each option. In summary, Charters analysis favours Option 2 – Separate strata allotment retained and recreational hub constructed (mixed use model) as an option that warrants further investigation as the preferred funding model.

In conclusion, the land and construction cost of the proposed sport and recreation hub is significant and given these facilities will form part of a larger list of infrastructure to be delivered across the Fishermans Bend precinct Council will need to ensure that a clear, transparent and robust funding strategy is established. A future funding strategy will need to have particular regard to the following: -

- > Project scope – given the significant land and construction costs estimated for Case Study 1, Council may wish to review the scale, scope and location of future projects to reduce the overall project costs;

- > Staging and time of delivery – the time and staging of delivery will greatly influence the project cashflow and in particular the amount and length of time funds will need to be borrowed;
- > Impact on affordability – if the total delivery costs are to be shared across the catchment area via a future Development Contributions Plan (or similar shared funding mechanism) the total combined cost of these facilities may significantly impact upon the affordability of the area;
- > Delivery mechanism – based on the feasibility and options analysis explored as part of this project, Council may wish to pursue a range of delivery options. This may include exploring delivering hubs by both the tradition purchase and construct method (option 1) as well as retaining separate strata allotment, constructing the infrastructure item and then divesting the balance of the site to the open market (option 2); and
- > Funding sources – given the total cost of the sport and recreation hub government will need to explore a number of funding sources and examine the pros and cons associated with each.

Table 10: Case Study One Sport and Recreation Hub Summary of Costs

Component	Estimated Cost \$
Estimate of Value for entire site (9,709m ²)	\$24,200,000
Estimated QS Construction Cost for the Sport & Recreation Hub, Option 1 (stand alone model)	\$66,430,000
Estimated QS Construction Cost for the Sport & Recreation Hub, Option 2 (within the mixed use model)	\$72,572,865
Estimated QS Construction Cost for Sport & Recreation Hub, residential and commercial development Option 2 (mixed use model)	\$311,635,000

Source: Data sourced from Estimate of Value Report (November, 2017) and Preliminary Construction Cost Estimate Report (January, 2018) prepared by Charter Keck Cramer

Table 11: Summary of Four Funding Options for Case Study 1

	NPV	Indicative Total Cost to Port Phillip	Timeframe to Occupation	Considerations
Option 1	\$55.29m	\$ 92.8m	39 Months	<ul style="list-style-type: none"> > Significant Capital Outlay required; > Port Phillip accept planning, > construction & delivery risk;
Option 2	\$10.68m	\$74.14m (net)	40 Months	> Council are to guide favourable planning outcome and generate Capital inflow by divesting balance of the site.
Option 3	\$53.3m	\$6.38m (1st Year Rent)	52 Months	> Lower initial funds required, although significant capital outlay over 18 year tenure without the benefit of asset ongoing.
Option 4	\$11.84m	\$82.4m	52 Months	> Loss of control of timing and delivery of facility.

Source: Data sourced from Estimate of Value Report (November, 2017) and Preliminary Construction Cost Estimate Report (January, 2018) prepared by Charter Keck Cramer

5.3 Case Study 2: Fennell / Plummer Streetscape and Intersection Upgrade

5.3.1 Land Valuations

As outlined in Section 4.5 land is required from seven affected properties to deliver the proposed Fennell/ Plummer streetscape and intersection upgrade.

Charters Estimate of Value Report (November 2017) clearly sets out the assumptions and limitations of their assessment, however a summary of the key inputs and assumptions is provided below: -

- > The subject land is zoned for an urban purpose and valued at its unencumbered, highest and best use within this context.
- > The subject land is fully developable.
- > Site remediation works have been undertaken and the respective parcels have received authorisation from the EPA for development in accordance with the Precinct Plan.
- > The subject sites do not have any adverse environmental matters.
- > The estimate of value has been based on the proposed building controls, as outlined in the 'Fishermans Bend Framework – Draft for Consultation' document, including allowance for the building height controls (as per Figure 12) and maximum Floor Area Ratios (as per Figure 11).
- > Several affected properties have buildings located within the portion of land required (excluding Strata Titled properties), and in these instances the valuation assessments relate to the purchase of the entire parcel with the land area derived from the Title. In the case the property is Strata Titled, Charter has adopted the assumptions and areas provided by Council.

- > Charter has relied upon the direct comparison approach as the primary basis of their assessment. Charter clearly outline the limitation associated with this approach given the draft planning controls have not come into effect and therefore the market is yet to reflect the effects of these new controls.
- > The assessments are estimates of value only and relate to kerbside inspections. Charter have not had regard to any Title configuration and leases, therefore the assumption being that they are unencumbered and available with vacant possession.

Table 12 below sets out the amount of land required for the streetscape upgrade and the total amount of land valued due to the presence of buildings located within the portion of land required.

Table 12: Case Study 2 - Summary of Estimates of Value

Property address	Land for new public space / road widening	Total amount of land valued (m2)	Estimate of Value (Nov 2017 \$) excl. GST
43 Fennell Street	A total area of 1,469m2 is required from this property for the new public space containing station box.	2,064m2	\$7,200,000
247-251 Ingles Street (strata titled property)	A total area of 1,716m2 is required from this property including: - 1,259m2 - new public space containing station box. 457m2 for the 6m road widening from the Fennell Street frontage, along the entire property length.	3,189m2	\$9,550,000
38 Fennell Street	A total area of 610m2 is required from this property to provide the 6m road widening from the Fennell Street frontage along the entire property length.	610m2	\$2,400,000
61 Bertie Street	A total of 3,392m2 is required from this property including: - 2,376m2 – new public space containing station box. 1,1016m2 for the 6m road widening from the Fennell Street frontage along the entire property length.	19,380m2	\$38,800,000
299 Bridge Street	A total area of 1,997m2 is required for the new public space.	13,700m2	\$27,400,000
577 Plummer Street	A total area of 3,954m2 is required from this property to include: - 1,395m2 for the new public space. 2,559m2 for the intersection and 16m road widening from the Plummer Street frontage along the entire property length.	9,047m2	\$22,600,000
520-533 Plummer Street	A total area of 3,540m2 is required to accommodate the 16m road widening from the Plummer Street frontage along the entire property length.	59,670m2	\$100,000,000
TOTAL	16,678m2	107,660m2	\$207,950,000

Source: Estimate of Value Report, Charter Keck Cramer (November, 2017)

Table 12 illustrates that whilst only 16,678m² of land is required for the streetscape upgrades, a total of 107,660m² has been valued due to the presence of existing buildings located within the portion of land to be acquired. As a result, an additional 90,982m² of land has been included in the valuations.

Due to the presence of existing buildings on six of the seven affected properties, Charter considered two methods of implementation for Case Study 2: -

- 1. Method 1:** Fennell/Plummer Street streetscape upgrade by way of compulsory acquisition of land required (this includes acquisition of the entire parent property or affected strata titles, where appropriate, for all properties other than 38 Fennel Street); and
- 2. Method 2:** Fennell/Plummer Street streetscape upgrade at the point of redevelopment of each site within the private sector through the planning process.

Charters assessment of the proposed costs and risks associated with access relocation to sites that currently take their access from the front, and the delivery of streetscape improvements prior to ultimate development is summarised below.

1. Fennell/Plummer Street streetscape upgrade by way of compulsory acquisition of land required.

Positive Attributes

- > This implementation method allows for a consolidated and streamlined approach to delivering the streetscape upgrades and results in the following positive attributes: -
 - Increased transparency and consistency in the planning, design and implementation process ensuring the efficient delivery of the entire project in a timely manner;
 - Works can be undertaken in a strategic manner, minimising duplication with potential economies of scale;
 - Allows for a holistic approach to access relocation as new access points can be planned across the entire affected area;
 - Autonomy in the decision making process due to the relatively small number of stakeholders involved should one entity acquire all the necessary land required;
 - Ability for the acquiring authority to amalgamate development parcels, establish preferred development outcomes and divest land to the open market for development; and
 - This method would ensure the streetscape upgrades are completed in a timely manner, which would ultimately be quicker than implementing method 2.

Negative Attributes

- > This method requires the purchase of a substantial amount of land, approximately \$208 million worth. This is a significant capital cost and the acquiring authority would need to be adequately resourced;
- > This method is based on compulsory acquisition through the introduction of a Public Acquisition Overlay (PAO) into the Port Phillip Planning Scheme and triggering the land acquisition process via the Land Acquisition and Compensation Act (LACA). The introduction of a PAO may be subject to a protracted planning period and the acquisition process via LACA is considered expensive and lengthy; and
- > There would be significant business loss and disturbance costs.

2. Fennell/Plummer Street streetscape upgrade at the point of redevelopment of each site within the private sector through the planning process.

Positive Attributes

- > This method will be cheaper to implement as it will not require such a large upfront capital cost and the total costs will be less as only the land required for the upgrade will be acquired/purchased; and
- > Less significant business and disturbance costs as existing businesses are able to continue until such time as the respective land owners are ready to redevelop.

Negative Attributes

- > This method results in a piecemeal approach to the upgrade of the streetscape;
- > Implementation is reliant upon the willingness of land owners to redevelop their respective properties and as a result the timing and staging of the project is unknown. This will most likely result in the project being delivered in an ad hoc manner over a long period of time; and
- > Coordination of the project will be challenging and there will be greater barriers (i.e. access relocation, risk of damage to streetscape works, delay in delivering public transport infrastructure) to efficient infrastructure delivery compared with Method 1.

5.3.2 Estimated Construction Cost Plan

Cossill and Webley has prepared preliminary construction cost estimates for Case Study 2. The costs estimated herein are Cossill & Webley Consulting Engineers' Opinion of Probable Cost and are based on relevant experience and informal discussions with contractors, consultants and suppliers. The estimated costs are subject to variation upon formal advice from relevant authorities and detailed design, survey, traffic and geotechnical investigation.

Cossill & Webley have provided a detailed explanation of the various assumptions and allowances applied to their cost estimates, which are set out in Appendix 8. A summary of the main assumptions and allowances is provided below: -

- > Allows for 8.5% of construction costs for Profit and Overheads, 0.5% for Environmental Management and 3% for Traffic Management in line with industry standards.
- > Demolition, removal and disposal off-site of all concrete kerbing, footpaths, asphalt, road pavement, trees, existing drainage, water main and gas main, and removal of sewer only in Fennell/Bridge/Plummer intersection realignment.
- > Removal and disposal of contaminated soil. Soil is assumed to be 13% Category A, 30% Category B and 57% Category C.
- > Assumes a 900mm diameter 'barrel' drain running underneath the southern edge of the vehicle carriageway.
- > Allowance for 300mm PVC sewer at a depth of 2-3m.
- > Allowance for 300mm PVC water main.

- > Allowance for 225mm PVC for recycled water main
- > Electrical consultant provided a high-level estimate on the anticipated cost to underground all above ground power in the study area.
- > Allowance for a 100mm duct along the full length of Fennell/Plummer, with service pits at 100m spacing. Optic fibre is excluded from the estimate and assumed to be hauled after construction of streetscape works.
- > Allowance for 150mm gas to replace existing gas.
- > Allowance is made for a high quality civic plaza. A per square metre rate allowance is applied to the plaza area, inclusive of the northern and southern sections of the plaza.
- > As per the project brief: -
 - Detailed design and project management costs are estimated at 15% of estimated total delivery costs; and
 - contingencies are set at 20% of total estimated delivery cost.

In addition, the following items are excluded from the cost estimates: -

- > Cost escalations beyond December 2017
- > Overtime works due to restricted contract period
- > Negotiated or staged contract
- > Finance charges and interest
- > Headworks fees and contribution charges to relevant supply authorities
- > Legal fees, marketing, sales, letting charges etc
- > GST

Based on the above inputs and assumptions Cossill and Webley estimate that the total construction cost for Case Study 2 – Fennell/Plummer Street streetscape and intersection upgrade is \$43.5 million. Table 13 below provides a summary of the final estimated construction costs.

Table 13: Summary of Case Study 2 – Fennell/Plummer Streetscape and intersection upgrade

Item	Description	Estimated Cost
1	CONSTRUCTION COSTS	
1.1	Profit and Overheads (excludes civic plaza)	\$3,015,000
1.2	Demolition/Relocation Works (excluding electrical)	\$793,000
1.3	Roadworks	\$14,860,000
1.4	Drainage	\$2,574,000
1.5	Sewerage Reticulation	\$1,010,000
1.6	Water Supply Reticulation	\$813,000
1.7	Recycled Water Reticulation	\$297,000
1.8	Electricity Undergrounding and Reticulation	\$4,468,000
1.9	Communications Duct (Smart Cities)	\$308,000
1.10	Gas Reticulation	\$188,500
1.11	Civic Plaza (high specification)	\$3,248,000
1.12	Contingency (20%)	\$6,315,000
	SUB-TOTAL CONSTRUCTION WORKS	\$37,889,500
2	PROFESSIONAL FEES (15%)	\$5,684,000
	TOTAL CONSTRUCTION WORKS	\$43,573,500
3	AVERAGE SQUARE METRE RATE	
3.1	Streetscape Works (excludes plaza)	\$990
3.2	Civic Plaza (high specification)	\$680
3.3	Civic Plaza (medium specification)	\$390
4	AVERAGE LINEAL METRE RATE	
4.1	Streetscape Works (excludes plaza)	\$41,500
5	INTERSECTION COSTS	
5.1	Plummer/Fennell & Bridge Street Signalised Intersection	\$3,884,000
5.2	Plummer/Fennell & Bertie Street Signalised Intersection	\$1,603,700
5.3	Plummer/Fennell & New Street North	\$174,000
5.4	Plummer/Fennell & New Street South with Signal	\$252,000
5.5	Plummer/Fennell & New Laneway North	\$63,000
5.6	Plummer/Fennell & New Laneway South with Signal	\$106,000
5.7	Mid Block Crossing (non-signalised)	\$22,000
5.8	Stopping Bay	\$12,000
6	EXTRA OVER INTERSECTION COSTS	
6.1	Plummer/Fennell & Bridge Street Signalised Intersection	\$1,379,000
6.2	Plummer/Fennell & Bertie Street Signalised Intersection	\$919,000

5.3.3 Summary

In summary, delivery of the Fennell/Plummer Street streetscape upgrade via compulsory acquisition (Method 1) will provide for the coordinated and timely delivery of the entire streetscape upgrade but it requires substantial upfront capital costs in the order of \$251.5 million (\$208 million for land and \$43.5 million for construction). The success of Method 1 is dependent upon the acquiring authority having the capacity and ability to secure all the land required, plan for and package up development parcels and divest them to the open market. The divesting of the balance of the sites will provide capital inflow to the acquiring authority, and ideally the sale proceeds, together with any development contributions levied and collected, will cover the majority of the costs incurred upfront. Whilst the Fennell/Plummer Street streetscape upgrade at the point of redevelopment of each site within the private sector through the planning process (Method 2) will be much cheaper to deliver, there is a greater level of uncertainty in terms of timing and this method will result in the lengthy, ad hoc upgrade of the streetscape.

Given the scale of the Case Study 2 streetscape upgrade and its role as a catalyst for redevelopment of the area, the coordinated and timely delivery of this project needs to be actively considered, including the form and function of the primary delivery agency. In light of the above, the ability and capacity of government to deliver this type of project, along with the many others, needs to be examined. In particular, the potential involvement of a development agency to secure the land, deliver the infrastructure project, plan for and amalgamate development sites and divest these on the open market should be considered.

6 CONCLUSION

The purpose of this project is to prepare two dimensional concept designs and cost estimates for two defined classes of infrastructure. This study has focused on Case Study 1 – Montague Sport and Recreation Hub and Case Study 2 – Fennell/Plummer Street streetscape and intersection upgrade. The findings of this project will provide council with an understanding of the likely costs required to purchase land and construct new, or upgrade existing, infrastructure and the potential delivery risks associated with each Case Study.

6.1 Concept Design

The two case studies examined are complex infrastructure projects due to their scale, design requirements, location, and delivery implications. The outcomes of stage 2 of the project is summarised below.

6.1.1 Case Study 1 - Montague Sport and Recreation Hub

The Montague Sport and Recreation Hub Case Study is a large infrastructure project. This project investigated the potential delivery of the sport and recreation hub as a:

- > Stand -alone facility (option 1); and
- > Part of a broader mixed-use development (option 2).

Both development options are described in detail in Chapter 3 and are summarised below.

Option 1 – Sport and Recreation centre delivered as a stand alone development

- > Comprises a stand alone sport and recreation hub on the subject site.
- > Building is presented as a three storey façade to Montague Street and Munro Street given the height of surrounding existing and future development.
- > All four courts are provided on the first floor with no development above the courts.
- > The provision of the finer grained community and youth services and entry/foyer along Montague Street will ensure the 60% visual permeability is achieved along the ground floor.
- > The additional floor space provided along the frontage of Munro Street can be designed in a way to also achieve a minimum of at least 60% visual permeability at ground level.
- > The car parking on the ground floor is sleeved by the recreation building along Munro Street to create an active edge, as illustrated in Figure 4.
- > Whilst the maximum FAR is applicable to this option the minimum commercial and maximum residential FAR's do not apply.

Option 2 – Sport and Recreation centre delivered as part of a broader Mixed Use development

Option 2 explored the delivery of the sport and recreation hub as a multi storey building as part of a broader mixed use precinct, where the development areas surplus to the sport and recreation hub were developed to maximise the subject sites total floor area ratios and floor area uplift provisions.

The preferred layout for Option 2 is described below:

- > Providing four courts on a single level within a mixed use development was not considered the best outcome for the site as this significantly constrained the development potential of the site.
- > The sport and recreation building contains two, rather than four, full sized competition courts located on the second level. This is due to the engineering requirement to include supporting columns between the courts to support development above the courts. Netball Victoria confirmed that the provision of supporting columns between the courts would result in the courts not complying with their specifications and therefore not being able to be used for competition purposes. The location of the two competition standard courts on the top floor of the recreation building means a clear open span (trussed roof structure) would be achievable.
- > In light of the above, the recreation building includes the provision of a large multi-purpose space (1,708m²) on the first floor which is equivalent in area to two full sized netball courts. This space will be able to be used for a range of activities including table tennis, dance, yoga, fitness classes. This space is designed to have the same floor to ceiling height of 8.3m as the netball courts on level 2 as per Council's requirements.

- > The splitting of the four courts over the two levels requires the provision of additional supporting amenities and rooms that must be located on the same floor as the indoor courts. Essentially, the splitting of the indoor courts has resulted in a duplication of the immediate supporting amenities and rooms outlined in the base requirement as per Table 1.
- > Two development sites have been identified, one at the northern end of the site on the corner of Montague and Johnson Streets which is referred to as the Montague site and another site on the corner of Munro and Johnson Streets which is referred to as the Munro site, illustrated in Figure 10.
- > The two towers are 29.5m apart.
- > On the ground floor commercial uses sleeve the car parking provided in both the Munro and Montague podiums. It is noted that an alternative would be to sleeve all car parking, this option would most likely require a car lift and stacking system.
- > The Montague site comprises of:
 - A mix of commercial uses sleeving car parking on the ground floor;
 - The ground floor of this building is built immediately adjacent to the recreation hub;
 - Levels one to five of the podium are proposed to be built over the ground floor and part of the sport and recreation hub car park to utilise the development space above the car park and condense the size of the sport and recreation hub.
 - The Montague tower is set back 10m from Montague Street and Johnson Street.
 - It is 20 storeys high and includes 38,237m² total floor space.

- > The Munro site comprises of:
 - Commercial uses sleeving the commercial car park on the ground level.
 - Residential car parking is provided on levels 1 and 2.
 - Residential floor space comprises the levels three to five of the podium and all 9 storeys of the tower.
 - The Munro tower is set back 10 metres from both Munro and Johnson Streets and from the centre of the open air internal laneway.
 - It is 15 storeys high and includes 22,512m² total floor space.

The delivery of the hub as a multi storey building in both development options raised a number of structural engineering related matters. Accordingly, high level structural engineering advice was sought from Wood & Grieve Engineers and is summarised below: -

- > Any development would likely require piles as the overall area of the building footprint is large. The design would need to consider the differential movement of the structure across the site and a piled option would be more appropriate in lieu of shallow footings. Pile depths could extend to approximately 25m.
- > Commercial columns usually work on a 8m grid structure, the courts require a minimum 15m span which limits the building potential above the courts. The extent of how much can be constructed over the courts is dependent on a number of things, including:
 - Setout of the building;
 - Encroachment over the courts;

- Height of the building; and
- Column grids. Given commercial columns are based on an 8m grid structure, additional columns would need to be placed between courts to support development above the courts.
- > A key challenge to building above the courts in a stacked option would be how the lateral stability of the structure is achieved.
- > Typically, shear walls would be required intermittently along the building's facade to provide stability due to the court spatial requirements.

As identified above, the engineering requirements of delivering a sport and recreation centre containing 2-4 indoor netball courts are prescriptive and affect both the building footprint (due to the need to provide adequate support underneath the indoor courts if they're not provided on the ground floor) and building height (due to the requirement to provide 8m columns which would need to be placed between the netball courts, which would result in the courts not being able to be used for competition purposes).

Recommendations for future sites

In light of the complexities of the Case Study One subject site it is recommended that Council officers have regard to the following matters when determining future sport and recreation hub locations.

Location: It is recommended that future sites are selected having regard to the following criteria:

- > being centrally located within the primary catchment;
- > near or adjacent to open space;
- > accessible via public transport, shared paths;
- > rectangular in shape;
- > maximum of 1 to 2 road frontages;
- > based on the preferred concept design for the Option 1 stand alone facility it is recommended that a future site is of a size that it can accommodate a minimum building area requirement of 4,725m² (approx. 75m x 63m); and
- > for a mixed use development, the site should be large enough to accommodate the minimum building area of the Option 2 sport and recreation hub of 3,720m² (approx. 60m x 62m) and also accommodate the FAR (including the option to provide additional commercial floor space) and FAU resulting from the provision of the community hub.

Site characteristics: It is acknowledged that the majority of land within the Fisherman's Bend precinct is subject to a number of constraints that must be mitigated via future development proposals. Ideally future recreation hub sites would be: -

- > located on sites that are not classified as 'high risk' contamination sites. It is acknowledged that most of the sites within the precinct are contaminated to some extent however, it will be much cheaper to develop on a low risk site compared to a high risk site due to the remediation requirements;
- > due to the historical uses of the precinct it is recommended that environmental audits are prepared to determine the full extent of the individual sites; and
- > situated on a site where the minimum floor level is as close as possible to the minimum flood level requirements as this will limit the extent to which the site level will need to be raised.

Planning and Design Requirements: Future design and planning requirements should have regard to the specific building requirements of a recreation hub and ensure sufficient flexibility to allow for the delivery of these hubs within a reasonable budget.

6.1.2 Case Study 2 – Fennell/Plummer Street streetscape and intersection upgrade

The Fennell/Plummer Street streetscape and intersection upgrade is a large project that extends from Graham Street to Ingles Street. Case Study Two involves a significant upgrade and widening of the existing Fennell and Plummer Streets to deliver a high quality civic boulevard connecting Sandridge to Wirraway and surrounding suburbs.

The Fennell/Plummer Street study area is located in Sandridge, in the centre of a new Metropolitan Activity Centre accommodating the highest jobs and residential density in Fishermans Bend. Fennell/Plummer Street is to be a high quality civic boulevard that establishes a landscaped street with pedestrian and cycle routes connecting Sandridge to Wirraway and surrounding suburbs. Future buildings abutting Fennell/Plummer Street will be mixed use, with retail at ground level and a significant amount of commercial and residential development at upper levels:

The proposed Fennell/Plummer Street streetscape and intersection upgrade is summarised below: -

- > The study area extends from Graham Street to Ingles Street, as shown in Figure 22.
- > The Fishermans Bend precinct has a target of 80% of transport movements to be made by public transport, walking and cycling. To meet this target Case Study 2 involves significant upgrade and widening of the existing Fennell and Plummer Streets to include: -
 - a new tram line;
 - land for a future underground train station;
 - civic square and streetscape works; as well as
 - the realignment and construction of a new signalised intersection at the intersection of Fennell, Plummer and Bridge Streets (realigned to form a 4 way cross intersection).

In summary, Case Study 2 is a great example of upgrading an existing streetscape to provide a high quality civic boulevard that focuses on public transport, pedestrian and cycling rather than being car dominated. It also introduces a civic plaza and additional urban parks to support the future intensification of the immediate area.

Case Study 2 highlights several matters for council officer consideration, including: -

- > Balancing the aspiration for the streetscape to be primarily public transport and pedestrian/cycle focused whilst also providing for the functional operation of the area including facilitating right hand turn movements, providing on-street loading areas and pick up/drop of areas.
- > The complexities related to the existing conditions such a Macadam pavement and how this can be managed through the future upgrades to maintain the structural integrity of the pavement.
- > Case Study 2 proposes a substantial expansion of the existing cross-sections which affects seven landholdings along the length of the streetscape. The full cost of the proposed land acquisitions is addressed below and may influence further refinement of the proposed streetscape.

6.2 Estimated Cost Plans

Both the Montague Sport and Recreation Hub (Case Study 1) and the Fennell/Plummer streetscape and intersection upgrade (Case Study 2) are large, significant infrastructure projects which is reflected in the estimate cost plans prepared and summarised below.

6.2.1 Case Study 1 Estimated Cost Plan Summary

Based on the estimated delivery costs illustrated in Table 14 below, the total capital cost to deliver the Montague Sport and Recreation Hub as a stand alone facility (option 1) is \$90.6 million and the total capital cost to deliver the sport and recreation hub as part of a larger mixed use development (option 2) is \$96.8 million (including the purchase of the entire site). The total cost to deliver the Option 2 including both the sport and recreation hub and mixed use development is \$335.8 million.

Given several of these community facilities are required across the Fishermans Bend precinct Council officers have considered four funding options which are discussed in detail in the section 5.2.3. These options range from the more traditional approach (funding option 1) whereby the entire site is purchased and the stand alone hub is constructed to options that consider the recreation hub being leased on a long term tenure (funding option 3). Each option examined considers the estimated total project cost, NPV, timeframe to occupation and other matters such as ownership rights, capital inflow and Charter has identified the strengths and weaknesses of each option. In summary, Charters analysis favours funding Option 2 – Separate strata allotment retained and recreational hub constructed (mixed use model) as an option that warrants further investigation as the preferred funding model.

Table 14: Case Study 1 - Summary of Costs

Component	Estimated Cost \$
Estimate of Value for entire site (9,709m ²)	\$24,200,000
Estimated QS Construction Cost for the Sport & Recreation Hub, Option 1 (stand alone model)	\$66,430,000
Estimated QS Construction Cost for the Sport & Recreation Hub, Option 2 (within the mixed use model)	\$72,572,865
Estimated QS Construction Cost for Sport & Recreation Hub, residential and commercial development Option 2 (mixed use model)	\$311,635,000

Source: Data sourced from Estimate of Value Report (November, 2017) and Preliminary Construction Cost Estimate Report (January, 2018) prepared by Charter Keck Cramer

6.2.2 Case Study 2 Estimated Cost Plan Summary

Based on the estimated delivery costs illustrated in Table 15, the total initial capital cost to deliver the Fennell/Plummer streetscape and intersection upgrade is \$251.5 million. The largest component of this cost is the \$208 million worth of land. Whilst only 16,678m² of land is required for the streetscape upgrades, a total of 107,660m² has been valued due to the presence of existing buildings located within the portions of land to be acquired. As a result, an additional 90,982m² of land has been included in the valuations.

Due to the presence of existing buildings on six of the seven affected properties, Charter considered two methods of implementation for Case Study 2: -

1. **Method 1:** Fennell/Plummer Street streetscape upgrade by way of compulsory acquisition of land required (this includes acquisition of the entire parent property or affected strata titles, where appropriate, for all properties other than 38 Fennel Street); and
2. **Method 2:** Fennell/Plummer Street streetscape upgrade at the point of redevelopment of each site within the private sector through the planning process.

In summary, delivery of the Fennell/Plummer Street streetscape upgrade via compulsory acquisition (Method 1) will provide for the coordinated and timely delivery of the entire streetscape upgrade but it requires substantial upfront capital costs in the order of \$251.5 million (\$208 million for land and \$43.5 million for construction). The success of Method 1 is dependent upon the acquiring authority having the capacity and ability to secure all the land required, plan for and package up development parcels and divest them to the open market. The divesting of the balance of the sites will provide capital inflow to the acquiring authority, and ideally the sale proceeds, together with any development contributions levied and collected, will cover the majority of the costs incurred upfront. Whilst Method 2 will be much cheaper to deliver upfront, there is a great level of uncertainty in terms of timing and this method will result in the lengthy, ad hoc upgrade of the streetscape. Given the scale of the Case Study 2 streetscape upgrade and its role as a catalyst for redevelopment of the area, the coordinated and timely delivery of this project needs to be actively considered and prioritised.

Table 15: Case Study 2 - Summary of Costs

Component	Estimated Cost
Estimate of Value for total land area of (Nov 2017 \$)	\$207,950,000
Estimated Construction Cost (Dec 2017 \$)	\$43,573,500
TOTAL cost	\$251,523,500

Source: Data sourced from Estimate of Value Report prepared by Charter Keck Cramer (November 2017) and preliminary construction cost estimate prepared by Cossill & Webley (January 2018)

6.3 Implementation, Funding and Delivery

In conclusion, the land and construction cost of both the proposed sport and recreation hub and Fennell/Plummer streetscape and intersection upgrade are significant. Given these infrastructure projects only form part of the broader shared infrastructure assets to be delivered across the Fishermans Bend precinct government will need to ensure that a clear, transparent and robust funding strategy is established. A future funding strategy will need to have particular regard to the following matters: -

- > Project scope – given the significant land and construction costs estimated for both Case Study 1 and 2, government may wish to review the scale, scope and location of future projects to reduce the overall project costs;
- > Staging and time of delivery – the time and staging of delivery will greatly influence the respective project cashflows and in particular the amount and length of time funds will need to be borrowed. This in turn will affect the borrowing capacity of the development agency;
- > Affordability – if the total delivery costs are to be shared across the catchment area via a future Development Contributions Plan (or similar shared funding mechanism) the total combined cost of these facilities may significantly impact upon the affordability of the area. Given the substantial costs of the Case Study projects, it is likely that the combined total cost of all higher order infrastructure required to meet the needs of the future Fishermans Bend community will result in a high overall charge per dwelling;
- > Delivery mechanism – based on the feasibility and options analysis explored as part of this project government may wish to pursue a range of delivery options. This may include exploring delivering hubs by both the traditional purchase and construct method (funding option 1) as well as retaining a separate strata allotment, constructing the infrastructure item and then divesting the balance of the site to the open market (funding option 2).
- > Development agency - the scale and number of projects required to support the redevelopment of the Fishermans Bend precinct raises a question as to the form and function of the ultimate development agency. The complex development context in terms of the existing land ownership pattern, size and shape of the landholdings, site conditions, presence of existing businesses combined with the scale of the projects proposed and the need for significant upfront capital investment requires a particular type of development agency. The development agency must be well resourced, have the necessary financial capability, provide strong leadership and ideally have the necessary legislative tools ensure a coordinated and timely approach to infrastructure delivery; and
- > Funding sources – given the total cost of both Case Study 1 and 2 projects government will need to explore a number of funding sources and examine the pros and cons associated with each. In particular, government will need to determine whether they have the financial capability to deliver these projects given the large upfront capital costs and potential lengthy development timeframes.