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## Appendices

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Executive Summary

The St Kilda Triangle is a highly visible space of approximately 15,000 square metres located at the heart of St Kilda, near the foreshore, and adjacent to the Palais Theatre. It is used today as a car park for the Lower Esplanade.

This feasibility study was commissioned by City of Port Phillip to provide guidance about whether to provide car parking on the St Kilda Triangle site; and if so, how much parking should be provided.

Several options for a new car park were chosen by Council to be part of the feasibility study. They were:

- Option 0: “Do nothing” - This is the base case against which all other options are compared. In this option, the car parking facilities remain as they are today and only basic maintenance of the car park is provided.
- Option 1: provide 200 car parking spaces
- Option 2: provide 300 car parking spaces
- Option 3: provide 500 car parking spaces

The current site presents issues of underground contaminated material and a relatively high water table. The classification of the contaminated material (Type C or Type B) has a strong impact on removal costs and on the overall project’s viability. The water table impacts the design and construction cost of Option 3.

A qualitative assessment and a financial analysis were conducted for each option. The results are as follows:

- Without the additional revenue created by the presence of commercial space associated with the car park, the project has no financial merit. The design and content of this commercial space needs to be in line with the community vision for the site.
- With the additional revenue created by the presence of commercial space, Option 1 (200 car parking spaces) ranks highest from a qualitative and financial point of view:
  - It has the highest qualitative score; and
  - It has financial merit, whether contaminated material is assessed as Type C or Type B.
- Option 2 (300 car parking spaces) does not score as highly as Option 1 in the qualitative analysis and has less financial merit than Option 1, but could be considered viable for construction in a Type C contaminated material configuration.
- Option 3 (500 car parking spaces) has a very low qualitative score and no financial merit and should not be pursued in its current configuration.

In consideration of the results of the qualitative and financial analysis, an implementation strategy for this project could consist of the following steps:

1. Conduct contaminated material study to determine extent and likely cost impact of ground contamination.
2. Refine project financial analysis based on the results from the contaminated material study.
3. Confirm the preferred development option, including development of design concepts.

4. Issue an Expression of Interest (EOI) to the market for the design, building and operation of the car park.

5. Analyse market responses to the EOI and decide on best approach for Council.
1 The project

1.1 Background

The St Kilda Triangle is a highly visible space of approximately 15,000 square metres located at the heart of St Kilda, near the foreshore, and adjacent to the Palais Theatre. It is used today as a car park for the Lower Esplanade.
In 2008, the proposed development of the site by the City of Port Phillip was strongly opposed by the local community, leading to the abandonment of the proposals. Following this opposition, Council conducted extensive community consultations to define a shared vision for the site. In 2011, Council published *St Kilda Triangle – A Shared Vision (Version 3 – Objectives and Principles)*.

Council then decided to conduct a car park investigation to be used as critical input into the further development and refinement of the Vision document. The purpose of the investigation is to provide guidance to Council about whether to provide car parking on the St Kilda Triangle site; and if so, how much parking should be provided. Options for the future management of the car park are also part of this study.

### 1.2 Business need

Parking provision and traffic management will play an important role in the redevelopment of the St Kilda Triangle. However the physical extent of parking provision and the levels of traffic that it might attract need to be balanced with community and Council aspirations for the Precinct.

There are currently 316 car parking spaces provided by the St Kilda Triangle car park. The current car park provides car parking spaces mainly for:

- Visitors to the Palais;
- Staff of the Palais;
- Visitors to Luna Park; and
- Visitors to St Kilda beach and precinct (Lower Esplanade).

Council estimates that the demand for car parking in the area will continue to grow in the future. On this basis, demand forecast and revenue calculations were conducted to provide input into the financial analysis and can be found in Appendix A.

### 1.3 Scope

The scope of the car park feasibility study covered:

- Feasibility analysis for the construction of an underground car park;
- Analysis of three physical development options: 200, 300 and 500 car parking spaces;
- Recommendation of the most appropriate financing, operating models; and
- Recommendation of best commercial models and options for the way forward.

The scope of the car park project itself includes:

- Provision of underground car parking on the Triangle; and
- Possible provision of some commercial space above the car park in line with community expectations.

Not in scope for this project:

- In depth analysis of future demand for car parking in the area;
- Provision of car parking outside the Triangle precinct, whether on Council land or not;
- Provision of extensive commercial space; and
- Transport options for accessing the precinct.
1.4 Strategic alignment

The provision of a car park on the St Kilda Triangle Precinct is in line with:

- The vision for the Triangle currently developed by Council in consultation with the community; and
- Community feedback on potential uses for the site.

1.5 Rationale for proceeding

Rationale for proceeding with this project:

- Notwithstanding the sustainability goals of the city, the St Kilda Triangle site has car parking which is well utilised and the area is expected to have an increase in visitation; however, current car park facilities are not enough to meet demand;
- There is little car parking provision for the Lower Esplanade outside the current Triangle car park;
- The Palais Theatre and Luna Park are forecasting an increase in number of visitors in future years and are in need of more car parking capacity;
- Palais staff require a number of permanent car parking spaces;
- Sustainable transport strategies developed by the City of Port Phillip Council have helped and should continue to curb the demand for car parking in the area, but not enough to justify the disappearance of the Triangle car park;
- Feedback from community consultations has established the need for some level of car parking on the Triangle; and
- The current at grade car park does not fulfil long term Council vision and is opposed by the community for the way forward.

Risks of not proceeding with this project:

If the project for building a car park on the St Kilda Triangle did not go ahead, the following risks could appear:

- Community resentment: the feedback is that they require some car parking on the Triangle;
- Increased car parking and traffic congestion issues in the area, and especially around the Palais when events are being held at the Palais Theatre;
- Increased car parking and traffic congestion issues on weekends when Luna Park and the Lower Esplanade see an increase in visitor numbers;
- Palais Theatre not achieving its strategic and commercial goals by reducing parking availability and patrons visits; and
- Loss of momentum by Council in the eyes of the community; and
- Loss of potential revenue generation.

1.6 Expected outcomes

Council proposes that the St Kilda Triangle site be redeveloped to accommodate:

- An underground car park with at least 200 car parking spaces and a maximum of 500 car parking spaces;
• Large amount of urban public space, accommodating recreational and cultural activities both day and night including entertainment facilities; and
• Possibly, commercial activities such as restaurants and cafes.
2 Car park concept options

2.1 Site Description

The St Kilda Triangle Precinct (Melways Reference: 57 K10/K11) is bounded by Jacka Boulevard, The Esplanade and Cavell Street. The site has a frontage of approximately 250m with The Esplanade, 250m to Cavell Street and 300m to Jacka Boulevard.

The proposed underground car park is to be constructed adjacent to the existing Palais Theatre.

2.2 Ground Contamination

The project brief stated that the site contains a large amount of historic fill obtained from an unknown source. It goes on to state that any excavated material up to a depth of 2.5m is likely to be classified as Category C contaminated soil.

As part of this feasibility study, the following documents were reviewed:

- Site contamination Assessment Report, St Kilda Triangle, St Kilda, June 2006 by Noel Arnold and Associates;
- Fill Classification and Groundwater Monitoring at St Kilda Triangle, August 2006 by HLA-Envirosceince Pty Ltd; and
- St Kilda Triangle – Land Contamination Investigation, November 2011 by Anna Wallace and Darren Prendergast, Port Phillip City Council.

Review of Contamination Data

Arup completed a brief review of the available contamination test data. The proportion of clean fill, Category C and Category B material was calculated for each borehole location and subsequently across the entire site. Where greater than one sample was collected from each borehole, the proportion of clean fill, Category C and Category B material was calculated. It is noted that the raw data for Palais Theatre entertainment complex referenced in the November 2011 assessment was not available. These results were described as Category C and Category B and were therefore spread evenly between each of these two categories.

As some data was not available and some assumptions were made, it is recommended that a more detailed assessment of the proportion of contaminated material be completed during the design development stage.

Contamination Cost Impact

Based on our analysis of existing data, there is a possibility that contaminated material be assessed as Type B and not Type C. Therefore, for costing purposes, this feasibility study has assumed two scenarios for the type of fill present at the site.

1. Based on the project brief and the recommendations of the St Kilda Triangle – The Land Contamination Investigation Report (2011) assumed 13% is clean fill and 87% is Type C Material. This could be assessed as Type C material and will be referred as “Type C” in the rest of the document. Cost impact for this scenario is high.
2. Based on Arup’s review of the land contamination reports listed above, it could be assumed 13% is clean fill, 64% is Type C material and 23% is Type B Material, which could be assessed as Type B material; it will be referred as “Type B” in the rest of the document. Cost impact for this scenario is very high.

**Contamination Recommendations**

It is recommended that additional advice be obtained to investigate the merit of further sampling to refine the extent of Category B and Category C contamination. A contamination consultant/surveyor should be engaged to more accurately map the distribution of fill across the site.

We recommend Council develops an appropriate management program, consisting of a Soil Management Plan and Remediation Action Plan for the site. This should consider setting aside contaminated material on site for stockpiling and then capping.

We also recommend Council discusses with the Environmental Protection Agency (EPA) the opportunity to reclassify the whole site as Category C material as the Category B classification may be considered an isolated occurrence. This will save significantly on disposal costs. Wallace and Pendergast (2006) note that the Strategic Planning Team from the City of Port Phillip recommend the placement of an EAO over the site and estimate that this will add as much as $80k to the costs for the project.

Consultation is recommended to discuss possible reasons for not applying an EAO, including:

- The site is not considered to be used as a more sensitive use as the existing car park will be replaced with a new car park;
- All excavated contaminants to be removed from site effectively cleaning the site; and
- Any parkland created will be capped with clean material and impervious surfaces (not costed in this study).

**2.3 Concept options**

The purpose of the concept options is not to provide a detailed design for the future car park, but to provide layout concepts to be used to estimate the cost of designing and building the car park. Detailed designs are part of a later stage of the project, when a preferred option for the way forward has been identified.

The car park concept options set out in the project brief have been designed in accordance with the Australian Standards for Off-Street Parking (AS2890.1-2004), the Australian Standard for Disabled Parking (AS2890.6-2009) and the Australian Standard for Bicycle Parking (AS2890.3-1993).

It is anticipated that the proposed car park will accommodate a mixture of short, medium and long-term parking. Accordingly, the proposed car park will observe the requirements of User Class 3 (AS2890.1-2004) “Short-term city and town centre parking, parking stations, hospitals and medical centres” adopting the standard car parking space dimensions of 2.6m wide × 4.54m long with a 5.8m access aisle.

It is envisaged that the car park will operate similarly to many new commercial car parks where the driver receives a ticket upon entering and pays for parking upon returning to the car. Based on the queuing requirements of AS2890.1-2004 the required queue lengths prior to any control point will be: 200 car parking spaces – approximately 30m queuing spaces
length; 300 car parking spaces – approximately 40m queuing spaces length; and 500 car parking spaces: approximately 50m queuing spaces length. To ensure queuing does not span back onto the street network, all options provide almost double the queuing storage area required under the standards.

Ultimately these queuing requirements translate to a single access for the 200 and 300 car parking space scenarios and two access points for the 500 car parking space option.

For the 200 and 300 car parking space options a single entrance point has been identified via Cavell Street, immediately south of the Palais. This location has the benefit of leveraging the existing signalized intersection of Cavell Street/Jacka Boulevard to allow access to the car park from various directions.

The 500 space option will require a second entrance into the car park; it is proposed that this be provided off Jacka Boulevard, immediately west of the existing Pedestrian operated signals. The proposed access will be signalised to accommodate all movements to and from the site and will retain pedestrian crossing facilities close to their existing position.

Stairwells and lifts will be provided across the car park to ensure emergency exits are provided within 50m of all car parking spaces. The lifts are located adjacent to the main vehicle access into the car park via Cavell Street. In addition a shared pedestrian/bicycle ramp is provided adjacent to the vehicle entrance onto Cavell Street. Two lifts will be provided to allow for redundancy, should one fail.

Disability Discrimination Act (DDA) parking will be provided on-site at a rate of 1 space per 50. The DDA parking will be in accordance with AS2890.6-2009 and will be located adjacent to the lifts servicing the car park.

Space will be allocated for secure bicycle parking adjacent to the car park access via Cavell Street. A total of 100 bicycle spaces will be proposed although this could be easily increased to 300 spaces if required. A total of five showers are also proposed to support bicycle use. It is envisaged that the bicycle parking and showers will be of a similar form and operate like the existing bicycle parking at the City of Melbourne, City Square Facility. Access to the bicycle parking is to be provided via a dedicated shared ramp connecting to Cavell Street, ensuring ease of access for all members of the public. A minimum headroom of 2.3m would be accommodated along the ramp.

Motorcycle parking is not currently provided; however this could be easily accommodated in place of some of the proposed parking.

Details of the car park layout concept design process can be found in Appendix B.

2.3.1 Option 1: 200 car parking spaces

The functional layout for this option includes:

- 212 spaces total (incl. 4 DDA spaces);
- Dual Entry Lanes and Single Exit Lane via Cavell Street (immediately south of The Palais);
- Total 70m queuing space on-site (approx. 10 vehicles) prior to entrance control point; and
- Access via existing signalised intersection Jacka Boulevard/Cavell Street.

A concept layout of the underground car park can be found in Appendix C.
2.3.2  Option 2: 300 car parking spaces

The functional layout for this option includes:

- 305 spaces total (incl. 6 DDA spaces);
- Dual Entry Lanes and Single Exit Lane via Cavell Street (immediately south of The Palais);
- Total 70m queuing space on-site (approx. 10 vehicles) prior to entrance control point; and
- Access via existing signalised intersection Jacka Boulevard/Cavell Street.

A concept layout of the underground car park can be found in Appendix C.

2.3.3  Option 3: 500 car parking spaces

The functional layout for this option includes:

- 485 spaces total (incl. 10 DDA spaces), 290 on Basement Level 1, 195 on Basement Level 2;
- Possibility of locating all vehicles on single level if utilise the “slope”;
- Single Entry Lane and Single Exit Lane via Cavell Street (immediately south of The Palais);
- Access via existing signalised intersection Jacka Boulevard/Cavell Street;
- New signalised entry to Jacka Boulevard (aligns with existing POS); and
- Total 100m queuing space on-site (approx. 15 vehicles) prior to entrance control points.

A concept layout of the two levels of the underground car park can be found in Appendix C.
3 Evaluation of the options

3.1 The options

The options for the financial analysis chosen by Council are:

- **Option 0**: “Do nothing” - This is the base case against which all other options are compared. In this option, the car parking facilities remain as they are today and only basic maintenance of the car park is provided.
- **Option 1**: 200 car parking spaces (212 car parking spaces, based on concept layout design)
- **Option 2**: 300 car parking spaces (305 car parking spaces, based on concept layout design)
- **Option 3**: 500 car parking spaces (485 car parking spaces, based on concept layout design)

3.2 Qualitative analysis

A multi-criteria analysis was performed to compare options from a qualitative point of view.

3.2.1 Assessment criteria

The following selection criteria and weightings were developed by Council for comparing options from a qualitative perspective.

<table>
<thead>
<tr>
<th>Selection criteria for each option</th>
<th>Type</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Minimises financial burden on Council</td>
<td>Financial</td>
<td>30%</td>
</tr>
<tr>
<td>Ensures community support</td>
<td>Risk</td>
<td>20%</td>
</tr>
<tr>
<td>Addresses sustainability/ Climate change resilience/ Environment protection issues</td>
<td>Strategic</td>
<td>15%</td>
</tr>
<tr>
<td>Generates interest and support from State Government</td>
<td>Strategic</td>
<td>15%</td>
</tr>
<tr>
<td>Ensures there are no issues with lack of demand</td>
<td>Risk</td>
<td>10%</td>
</tr>
<tr>
<td>Minimises technical risks</td>
<td>Risk/ Technical</td>
<td>5%</td>
</tr>
<tr>
<td>Easy to operate/ Minimises cost of operations</td>
<td>Financial</td>
<td>5%</td>
</tr>
</tbody>
</table>

The following scoring scale, typically used in qualitative assessment for business cases, was used for the feasibility study:

<table>
<thead>
<tr>
<th>Score</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Fails to meet the service requirement</td>
</tr>
<tr>
<td>1</td>
<td>Is ineffective in meeting the service requirement</td>
</tr>
<tr>
<td>2</td>
<td>Is partly adequate in meeting the service requirement</td>
</tr>
<tr>
<td>3</td>
<td>Is adequate in meeting the service requirement</td>
</tr>
<tr>
<td>4</td>
<td>Is superior in meeting the service requirement</td>
</tr>
</tbody>
</table>
3.2.2 Qualitative appraisal of options

The table below details the result of the appraisal (raw scores) performed by Council:

<table>
<thead>
<tr>
<th>Options</th>
<th>Do nothing</th>
<th>200 spaces</th>
<th>300 spaces</th>
<th>500 spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimises financial burden on Council</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ensures community support</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Addresses sustainability/ Climate change resilience/ Environment protection issues</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Generates interest and support from State Government</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Ensures there are no issues with lack of demand</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Minimises technical risks</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Easy to operate/ Minimises cost of operations</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

The weighted scores are detailed in the table below:

<table>
<thead>
<tr>
<th>Options</th>
<th>Do nothing</th>
<th>200 spaces</th>
<th>300 spaces</th>
<th>500 spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimises financial burden on Council</td>
<td>1.2</td>
<td>0.6</td>
<td>0.3</td>
<td>0</td>
</tr>
<tr>
<td>Ensures community support</td>
<td>0</td>
<td>0.2</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Addresses sustainability/ Climate change resilience/ Environment protection issues</td>
<td>0.3</td>
<td>0.45</td>
<td>0.45</td>
<td>0</td>
</tr>
<tr>
<td>Generates interest and support from State Government</td>
<td>0</td>
<td>0.3</td>
<td>0.45</td>
<td>0</td>
</tr>
<tr>
<td>Ensures there are no issues with lack of demand</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Minimises technical risks</td>
<td>0.2</td>
<td>0.15</td>
<td>0.15</td>
<td>0.1</td>
</tr>
<tr>
<td>Easy to operate/ Minimises cost of operations</td>
<td>0.2</td>
<td>0.15</td>
<td>0.15</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>TOTAL WEIGHTED SCORE (/4)</strong></td>
<td><strong>2.3</strong></td>
<td><strong>2.25</strong></td>
<td><strong>2.1</strong></td>
<td><strong>0.5</strong></td>
</tr>
<tr>
<td><strong>TOTAL WEIGHTED SCORE (/10)</strong></td>
<td><strong>5.8</strong></td>
<td><strong>5.6</strong></td>
<td><strong>5.2</strong></td>
<td><strong>1.2</strong></td>
</tr>
</tbody>
</table>
Based on the qualitative analysis, the best options in decreasing order are:

- Do nothing (qualitative score = 5.8/10)
- 200 car parking spaces (qualitative score = 5.6/10)
- 300 car parking spaces (qualitative score = 5.2/10)
- 500 car parking spaces (qualitative score = 1.2/10)

Of the three options considered for the new car park, the 200 car parking space option is qualitatively the most appropriate. It is closely followed by the 300 car parking space option. The 500 car parking space option has a very low qualitative score and is not recommended; this needs to be confirmed by the financial analysis in section 3.3.

### 3.3 Financial analysis for each option

#### 3.3.1 Methodology

The breakdown of the key items of capital cost and recurring revenue and expenditure for the car park associated with each of the options is described in the following diagram.
3.3.2  Key assumptions

A number of assumptions were made for the purpose of this feasibility study. These are as follows:

- **Capital expenditure:**
  - All construction happens in year 0 (no split construction across two years);
  - Half of the surface above the car park is paved; and
  - A contingency cost of 15% is applied to the construction cost estimates of the car park.

- Maintenance costs for the car park is based on actual maintenance cost of similar car parks in Melbourne.

- Inflation: a general CPI increase of 3% was applied annually to costs and revenues for the car park and 5% for the commercial space.

- No revenue during construction (6 months)

- Revenue growth per annum:
  - 3.3% fees and fines increase in line with past increases;
  - 3.6% in line with average Australian GDP growth over the last 15 years;
  - 1% growth due to improved car park facilities (safety etc); and
  - 1% growth due to increased Palais demand.

- Discount rate: 7% was used for calculations, in line with current practices. A sensitivity analysis of 4% and 10% was performed.

- **Commercial space:**
  - Restaurants or cafes; possibly a museum or art centre facilities;
  - Area = 2,000 m²;
  - High grade single storey - Construction cost = $1,900/m² (Two storey construction cost = $2,200/m²) based on Rawlinsons' *Australian Construction Handbook, 2010 edition*; and
  - Maintenance = 10% pa as per usual business case calculations.

- **Exclusions:**
  - Fit-out;
  - Capital upgrades (covered by 10% contingency and maintenance costs); and
  - Cost of borrowed money; the financial analysis does not take into account any potentially needed external government funding.
### 3.3.3 Financial appraisal

The following elements are used for the financial analysis:

- **Net Present Value** (NPV) at 7% discount rate. NPV must be positive and the option with the highest NPV is the best one from a financial point of view.
- **Benefit Cost Ratio**: this ratio must be positive; the option with the highest ratio is the best one from a financial point of view.
- **Internal Rate of Return** (IRR): the option with the highest IRR is the best one from a financial point of view.
- **Payback Period** (Note that the payback period calculations do not take the cost of borrowed money into account. Cost of borrowings may be borne by different stakeholders depending on financial arrangements put in place for the financing of the car park – mainly Council or private investors).

**Table 1** shows the results of the financial analysis for all options, without commercial space. For each option, there are two sub-options:

- “Type C”: in this option, all contaminated material is assessed as type C material.
- “Type B”: in this option, all contaminated material is assessed as type B material.

None of the options has a benefit/cost ratio higher than 1 or an internal rate of return higher than the discount rate (7%). Net Present Value at 7% discount rate is negative in all cases. The project can be said as having no financial merit.

**Table 2** details the results of the financial analysis for each option with 2,000 square metres of commercial space (single storey, high-grade construction).

When commercial space is included to the car park, some of the options have financial merit.

- ✓ With 2,000 square metres of single storey, high-grade commercial space, Option 1 and Option 2 have financial merit: the benefit/cost ratio is higher than 1, the internal rate of return is higher than the discount rate, and Net Present Value is positive. Both have negative NPVs at 10% discount rate.
- ✓ Option 1 (200 car parking spaces) has more financial merit than Option 2 (300 car parking spaces). If contaminated material is all Type B, only Option 1 reaches a slightly positive result.
- ✓ In every case, Option 3 (500 car parking spaces) has no financial merit.
<table>
<thead>
<tr>
<th>Car Park (no retail)</th>
<th>OPTION 0 Do Nothing</th>
<th>OPTION 1 200 Car Spaces</th>
<th>OPTION 2 300 Car Spaces</th>
<th>OPTION 3 500 Car Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type C</td>
<td>Type B</td>
<td>Type C</td>
<td>Type B</td>
</tr>
<tr>
<td>Car Park Capacity</td>
<td>316</td>
<td>200</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Life of Car Park</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>NPV ($m) 4%</td>
<td>51.17</td>
<td>3.85</td>
<td>5.19</td>
<td>3.06</td>
</tr>
<tr>
<td>NPV ($m) 7%</td>
<td>33.62</td>
<td>-4.31</td>
<td>-6.07</td>
<td>-8.19</td>
</tr>
<tr>
<td>NPV ($m) 10%</td>
<td>23.67</td>
<td>-8.97</td>
<td>-12.40</td>
<td>-14.52</td>
</tr>
<tr>
<td>Payback Period (Years)</td>
<td>N/A</td>
<td>14.65</td>
<td>16.05</td>
<td>20.57</td>
</tr>
<tr>
<td>Internal Rate of Return</td>
<td>N/A</td>
<td>5.2%</td>
<td>5.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Benefit / Cost</td>
<td>28.80</td>
<td>0.85</td>
<td>0.84</td>
<td>0.67</td>
</tr>
</tbody>
</table>

**Table 1:** Results of the financial analysis for all options, without commercial space.

<table>
<thead>
<tr>
<th>Car Park with Retail (2,000 m2)</th>
<th>OPTION 0 Do Nothing</th>
<th>OPTION 1 200 Car Spaces</th>
<th>OPTION 2 300 Car Spaces</th>
<th>OPTION 3 500 Car Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type C</td>
<td>Type B</td>
<td>Type C</td>
<td>Type B</td>
</tr>
<tr>
<td>NPV ($m) 4%</td>
<td>51.17</td>
<td>23.95</td>
<td>25.29</td>
<td>23.17</td>
</tr>
<tr>
<td>NPV ($m) 7%</td>
<td>33.62</td>
<td>7.19</td>
<td>5.43</td>
<td>3.31</td>
</tr>
<tr>
<td>NPV ($m) 10%</td>
<td>23.67</td>
<td>-2.26</td>
<td>-5.69</td>
<td>-7.81</td>
</tr>
<tr>
<td>Payback Period (Years)</td>
<td>N/A</td>
<td>11.52</td>
<td>12.25</td>
<td>15.71</td>
</tr>
<tr>
<td>Internal Rate of Return</td>
<td>N/A</td>
<td>9.1%</td>
<td>8.3%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Benefit / Cost</td>
<td>28.80</td>
<td>1.18</td>
<td>1.11</td>
<td>0.85</td>
</tr>
</tbody>
</table>

**Table 2:** Results of the financial analysis for each option with 2,000 square metres of commercial space (single storey, high-grade construction).
3.3.3.1 Sensitivity analysis (without commercial space)

Tables 3, 4 and 5 show the impact of variations in cash flow on the overall viability of the project. Cash flow variations represent in particular the variations in number of visitors. The tables show the impact on these variations on the Net Present Value.

The sensitivity analysis shows that at discount rates of 7% and 10%, none of the options has financial merit (without commercial space), even with cash flow increasing by 15%.

At a discount rate of 4%, Option 1 and Option 2 see their Net Present Value increase significantly when cash flow increases. However, with only 5% decrease in cash flow, the Net Present Value of both options becomes minimal, therefore putting the project’s financial merit at risk.
### Table 3: Sensitivity analysis on NPV at 7% discount rate

<table>
<thead>
<tr>
<th>Change in Cash Flow</th>
<th>OPTION 0 Do Nothing</th>
<th>OPTION 1 200 Car Spaces</th>
<th>OPTION 2 300 Car Spaces</th>
<th>OPTION 3 500 Car Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type C</td>
<td>Type B</td>
<td>Type C</td>
<td>Type B</td>
</tr>
<tr>
<td>-15%</td>
<td>28.40</td>
<td>-7.94</td>
<td>-10.06</td>
<td>-10.75</td>
</tr>
<tr>
<td>-5%</td>
<td>31.88</td>
<td>-5.52</td>
<td>-7.64</td>
<td>-7.63</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>33.62</td>
<td>-4.31</td>
<td>-6.43</td>
<td>-6.07</td>
</tr>
<tr>
<td>5%</td>
<td>35.36</td>
<td>-3.10</td>
<td>-5.22</td>
<td>-4.51</td>
</tr>
<tr>
<td>10%</td>
<td>37.11</td>
<td>-1.89</td>
<td>-4.01</td>
<td>-2.94</td>
</tr>
<tr>
<td>15%</td>
<td>38.85</td>
<td>-0.68</td>
<td>-2.80</td>
<td>-1.38</td>
</tr>
</tbody>
</table>

### Table 4: Sensitivity analysis on NPV at 4% discount rate

<table>
<thead>
<tr>
<th>Change in Cash Flow</th>
<th>OPTION 0 Do Nothing</th>
<th>OPTION 1 200 Car Spaces</th>
<th>OPTION 2 300 Car Spaces</th>
<th>OPTION 3 500 Car Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type C</td>
<td>Type B</td>
<td>Type C</td>
<td>Type B</td>
</tr>
<tr>
<td>-15%</td>
<td>43.23</td>
<td>-1.58</td>
<td>-3.70</td>
<td>-1.95</td>
</tr>
<tr>
<td>-10%</td>
<td>45.88</td>
<td>0.23</td>
<td>-1.89</td>
<td>0.43</td>
</tr>
<tr>
<td>-5%</td>
<td>48.52</td>
<td>2.04</td>
<td>-0.08</td>
<td>2.81</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>51.17</td>
<td>3.85</td>
<td>1.72</td>
<td>5.19</td>
</tr>
<tr>
<td>5%</td>
<td>53.82</td>
<td>5.65</td>
<td>3.53</td>
<td>7.57</td>
</tr>
<tr>
<td>10%</td>
<td>56.47</td>
<td>7.46</td>
<td>5.34</td>
<td>9.94</td>
</tr>
<tr>
<td>15%</td>
<td>59.12</td>
<td>9.27</td>
<td>7.15</td>
<td>12.32</td>
</tr>
</tbody>
</table>

### Table 5: Sensitivity analysis on NPV at 10% discount rate

<table>
<thead>
<tr>
<th>Change in Cash Flow</th>
<th>OPTION 0 Do Nothing</th>
<th>OPTION 1 200 Car Spaces</th>
<th>OPTION 2 300 Car Spaces</th>
<th>OPTION 3 500 Car Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type C</td>
<td>Type B</td>
<td>Type C</td>
<td>Type B</td>
</tr>
<tr>
<td>-10%</td>
<td>21.22</td>
<td>-10.70</td>
<td>-12.82</td>
<td>-14.59</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>23.67</td>
<td>-8.97</td>
<td>-11.09</td>
<td>-12.40</td>
</tr>
</tbody>
</table>
3.3.4 Conclusion of the financial analysis

The following points summarise the findings of the financial analysis:

- Without commercial space, none of the options has financial merit.
- With 2,000 square metres of commercial space:
  - If contaminated material is assessed as all Type C, the following options have financial merit, in decreasing order of merit:
    - Option 1 (200 car parking spaces); and
    - Option 2 (300 car parking spaces).
  - If contaminated material is assessed as all Type B
    - Only Option 1 (200 car parking spaces) has financial merit, but it is so low that it could be considered as having no merit.

It is important to note that in all cases, Option 3 (500 car parking spaces) has no financial merit.

3.4 Conclusion of the options appraisal

Without the additional revenue created by the presence of commercial space above the car park, the project has no financial merit.

With the additional revenue created by the presence of commercial space on top of the car park (single or double storey), Option 1 (200 car parking spaces) is the best option from a qualitative and financial point of view:

- It has the highest qualitative score; and
- It has financial merit, whether contaminated material is assessed as Type C or Type B (although low merit with Type B).

Option 2 (300 car parking spaces) does not score as highly as Option 1 in the qualitative analysis and has less financial merit than Option 1, but could be considered viable in a Type C contaminated material configuration.

Option 3 (500 car parking spaces) has a very low qualitative score and no financial merit and should not be pursued as such.
4 Options for the financing, building and operating of the car park

4.1 Possible models

Commercial models vary mainly by:

- Ownership of capital assets; (OWN)
- Responsibility for investment; (FINANCE)
- Responsibility for construction; (DESIGN-BUILD)
- Responsibility for operating the car park; (OPERATE)
- Assumption of risks, and
- Duration of contract.

They are often classified in order of increased involvement and assumption of risks by the private sector:

BOOT = Build – Own - Operate – Transfer
BLT = Build – Lease - Transfer
The following table summarises the main elements of each model:

<table>
<thead>
<tr>
<th>Models</th>
<th>Ownership of capital Assets</th>
<th>Responsibility of Investment</th>
<th>Responsibility of Operations</th>
<th>Assumption of Risk</th>
<th>Typical Contract Duration (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Contract/ Lease</td>
<td>Public</td>
<td>Public</td>
<td>Private</td>
<td>Public/Private</td>
<td>3-5</td>
</tr>
<tr>
<td>Design-Build</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
<td>Public/Private</td>
<td>3-20</td>
</tr>
<tr>
<td>Lease 1 (BLT)</td>
<td>Public</td>
<td>Public / Private</td>
<td>Private</td>
<td>Public / Private</td>
<td>15-30</td>
</tr>
<tr>
<td>Lease 2 (BLT)</td>
<td>Private</td>
<td>Public / Private</td>
<td>Private</td>
<td>Public / Private</td>
<td>15-30</td>
</tr>
<tr>
<td>Concessions (BOOT/BOT)</td>
<td>Private</td>
<td>Public / Private</td>
<td>Private</td>
<td>Public / Private</td>
<td>15-30</td>
</tr>
<tr>
<td>Private Ownership</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Indefinite</td>
</tr>
<tr>
<td>of Assets (BOO)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A combination of models can also be used, for example a Design-Build model in which the resulting car park is sold to the private sector once usage patterns have been established. Contracts with the private sector can also have specific provisions to make them more attractive to private operators; for example, there could be an upfront payment or financial guarantees to ensure minimum profitability.

Models for most existing car parks in Australia are Design-Build and BOOT.

Case study:

- An Australian hospital is currently looking at building a 300 car parking space car park. It is in negotiation with a private investor for a BOOT model.
- The private investor will build and operate the car park. (Building cost is estimated at $15 million - $50,000 construction cost per car parking space).
- The hospital will pay $300,000 / year for 60 spaces (CPI adjusted) for its own use (staff, visitors).
- The car park will be licensed for 25 years.
- The site will be manned from 9:00am – 6:00pm Monday – Friday and operated remotely on the weekends.
- Parking fees should be in the region of $2.50 - $2.70 per ½ hour with a maximum daily rate of $12.50 (CPI adjusted).
- The car park would revert to the hospital after the 25 year lease / licence.
- The model does not anticipate any on-going rent to be paid by the private investor, but revenue sharing any ‘super profits’ could be a part of the final proposal.
4.2 Market interest

A number of car park builders and operators in Victoria and Australia were contacted as part of this project to gauge their interest in the project. Project details were kept confidential at all times.

Interest from State government in funding all or part of this project was not part of the consultant’s remit.

The market response was as follows:

- Designers and builders of car parks showed strong interest in the project. The project is on the smaller scale to their normal operations, but in light of the current economic environment, was judged as strategically important;
- Car park operators also showed a strong interest in the project;
- The prime location of the car park generated a lot of interest;
- The commercial models which car park builders and operators were interested in were Design-Build and BOOT; and
- Private investors had a strong interest in the commercial space above the car park. They would look at maximising revenue from the space (higher rent values) and from the car park (parking costs, valet parking, added value services).

4.3 Options of interest to private investors

Private investors would potentially be interested in the project if it showed high Net Present Value, Benefit/Cost ratio, and Internal Rate of Return.

All options have low values for the previous assessment criteria. Private investors could therefore seek an upfront payment by Council to guarantee revenue and make the project financially attractive. The amount of the upfront payment would vary according to the option considered, but would require the Internal Rate of Return to reach a certain amount (typically 12%, but this varies according to private investors’ commercial strategies).

Another option would be guaranteed yearly revenue for private investors. If this revenue was not reached in any of the years of operation, Council would be required to provide the difference to the investor. On the other hand, private investors could consider revenue sharing of any profits exceeding a pre-determined amount.

Option 1 (200 car parking spaces) has the highest financial merit of all options and is likely to generate interest. Other options could potentially generate interest if construction costs were kept under control (for example by assessing all contaminated material as Type C).
5 Implementation strategy

An implementation strategy for this project could consist of the following steps:

1. **Contaminated material study**

   It is recommended that additional advice be obtained to investigate the merit of further sampling to refine the extent of Type B and Type C contamination. A contamination consultant/surveyor should be engaged to more accurately map the distribution of fill across the site.

   With the result from further investigation, Council should develop an appropriate management program, consisting of a Soil Management Plan and Remediation Action Plan for the site.

   Council should then discuss with the Environmental Protection Agency (EPA) the need for an Environmental Audit Overlay (EAO). Wallace and Pendergast (2006) note that the Strategic Planning Team from the City of Port Phillip recommend the placement of an EAO over the site and estimate that this will add as much as $80,000 to the costs for the project.

2. **Refine project financial analysis**

   After discussion with the EPA and with the results of the contamination investigation, Council will be in a more definitive position to review the detailed financial analysis of the project and better estimate the return for each option. Council will then have the opportunity to make a final choice of preferred option (number of car parking spaces) for the way forward.

3. **Confirm the preferred development option including the development of design concepts.**

4. **Issue an Expression of Interest (EOI) to the market**

   An EOI is flexible enough to allow Council to make an informed decision about the way it wants to proceed (or not) with the car park project based on market responses. The scope of this EOI could be wide ranging and ask for proposals from market operators for either:

   - The design and building of an underground car park on site; or
   - The design, building and operation of an underground car park on site for a determined period of time (“concession period”).

   The EOI will leave flexibility for market operators to propose the most appropriate commercial arrangement. Commercial space on top of the site should be mentioned as a possible option (with clearly set parameters on what would or would not be acceptable).

5. **Analyse market responses to the EOI and decide on the best approach for Council.**

   Depending on the responses to the EOI, Council may decide to issue a Request for Tender (RFT) or not go forward with the project in its current form.
Appendix A

Demand & Revenue Forecasting
A1 Introduction

The St Kilda Triangle site occupies a prime location in the centre of St Kilda, Melbourne, adjacent to the Palais Theatre, The Esplanade and foreshore, Luna Park, and shopping and entertainment precincts. It is currently used as an open-air paid car park, owned and operated by the City of Port Phillip (CoPP).

CoPP and the local community wish to make the Triangle site into usable public space. In order to do so and maintain the provision of car parking in the area, the CoPP is considering replacing the existing car park with an underground structure.

To understand the financial affordability of an underground car park solution, forecasts for long-term demand and therefore, potential revenue, have been undertaken. This section summarises the development of the forecasts and outlines different demand and revenue scenarios and estimates.

A2 Approach

A2.1 Data Sources

Due to the limited time available for this study, no primary research into demand for parking in St Kilda was able to be undertaken. Data made available by the City of Port Phillip for this study included:

1. Existing parking demand for CoPP car parks based on parking ticket transactions. The data extracted from the CoPP parking system database comprised of:
   - Monthly total transactions for the last two years, revenue, and parking minutes bought for Palais Theatre Car Park (Triangle Site), The Esplanade on-street parking, Belford Car Park, and Station Pier Car Park.
   - Daily total transactions, revenue, and parking minutes bought for 10/01/2011 – 16/01/2011 (high season) and 13/06/2011 – 19/06/2011 (low season) for the above car parks.
   - Hourly total transactions, revenue, and parking minutes bought for Palais Theatre Car Park for the above dates.

2. Annual parking infringements for Palais Theatre Car Park 2011;

3. Details for parking fees and restrictions in the St Kilda area; and

4. CoPP parking policies.
A2.2 Methodology

Given the restrictive data available, the forecasting approach consisted of:

- identifying recorded existing monthly demand for the Palais Theatre car park (constrained base demand);
- identifying existing demand currently accommodated in nearby car parks due to the Palais Theatre being at capacity during busy times and adding to the constrained base demand (unconstrained base demand);
- calculating the relationship between unconstrained and constrained base demand (crowding curve);
- calculating future year unconstrained demand by applying growth factors;
- calculating future year constrained demand by applying the crowding curve;
- identifying existing average cost per transaction for the Palais Theatre car park;
- calculating future average cost per transaction by applying price increase factors; and
- calculating future year revenue by applying future year cost per transaction to future year demand.

A3 Assumptions and Inputs

A3.1 Base Demand

The table below shows the base monthly demand for financial year 2010/11 as extracted from the CoPP parking system database.

<table>
<thead>
<tr>
<th>Month (2010/11)</th>
<th>Total Constrained Transactions</th>
<th>Total Revenue ($)</th>
<th>Total Minutes Bought</th>
<th>Additional Unconstrained Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>9,637</td>
<td>73,636</td>
<td>2,769,135</td>
<td>-</td>
</tr>
<tr>
<td>August</td>
<td>7,881</td>
<td>51,629</td>
<td>2,036,064</td>
<td>-</td>
</tr>
<tr>
<td>September</td>
<td>10,878</td>
<td>85,509</td>
<td>3,274,108</td>
<td>-</td>
</tr>
<tr>
<td>October</td>
<td>14,676</td>
<td>114,265</td>
<td>4,234,675</td>
<td>990</td>
</tr>
<tr>
<td>November</td>
<td>14,877</td>
<td>116,192</td>
<td>4,367,410</td>
<td>851</td>
</tr>
<tr>
<td>December</td>
<td>16,248</td>
<td>126,551</td>
<td>5,041,046</td>
<td>2,938</td>
</tr>
<tr>
<td>January</td>
<td>20,236</td>
<td>157,883</td>
<td>6,589,805</td>
<td>4,215</td>
</tr>
<tr>
<td>February</td>
<td>10,020</td>
<td>84,998</td>
<td>3,018,599</td>
<td>-</td>
</tr>
<tr>
<td>March</td>
<td>13,932</td>
<td>112,754</td>
<td>4,376,361</td>
<td>-</td>
</tr>
<tr>
<td>April</td>
<td>17,326</td>
<td>146,435</td>
<td>5,761,586</td>
<td>-</td>
</tr>
<tr>
<td>May</td>
<td>8,819</td>
<td>72,542</td>
<td>2,614,450</td>
<td>-</td>
</tr>
<tr>
<td>June</td>
<td>8,581</td>
<td>63,929</td>
<td>2,651,266</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>153,111</td>
<td>1,206,323</td>
<td>46,734,505</td>
<td>8,995</td>
</tr>
</tbody>
</table>
Figure 1 below shows the relationship between Palais Theatre car park demand and the Esplanade/Belford car park demand. Whereas the Belford car park shows no increase in demand with increases in Palais Theatre car park demand, there is clear evidence that at high levels of Palais Theatre demand, Esplanade demand increases substantially. This suggests that when the Palais Theatre car park has a monthly demand of approximately greater than 15,000, there is overflow into the adjacent Esplanade on-street parking.

By extrapolating the Palais Theatre – Esplanade relationship forward, where Palais Theatre demand was less than 15,000, it was able to estimate the level of demand that was crowded out of the Palais Theatre car park and into the Esplanade car park. This demand, shown as Additional Unconstrained Transactions in the table above, was then added to the base constrained demand to create the base unconstrained demand.

![Figure 1 – Scatter plot of St Kilda car park demand](image)

### A3.2 Growth Factors

The table below shows the annual growth factors applied to the unconstrained demand.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Annual Growth Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exogenous (general) growth</td>
<td>3.6%</td>
</tr>
<tr>
<td>Extended Palais operations</td>
<td>1.0%</td>
</tr>
<tr>
<td>Improved car park and facilities</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Exogenous growth was determined as the average Australian GDP growth over the past 15 years. There is expected to be an increase in demand generated for the car park through extended Palais operations (i.e. more shows). Additionally, the new underground car park is expected to be more secure and allow new facilities and attractions on the Triangle site, such as commercial space or restaurants, which will also increase demand.

All growth factors were agreed with CoPP.
A3.3 Parking Fee Structure, Price Increases and Availability

For the purposes of the demand forecasting, the existing parking fee structure was assumed to remain. Currently this is:

- $4.20 per hour, $10 all day - from 8am to Midnight – 365 days per year.

Analysis of previous parking ticket prices suggests an annual increase of 3.3%. This was agreed with CoPP. It has been assumed that small annual increases in car parking prices have no affect on demand.

Nearby car park availability in the St Kilda area is not expected to change significantly over the forecast period, and pricing for these car parks is assumed to be consistent with the Triangle site car park.

A3.4 Duration of Stay

It was assumed that the average duration of stay per parked car, as extracted from the CoPP parking dataset, would not vary over time. The rationale for this was:

- Activities in St Kilda would remain consistent over time (i.e. going to the beach, going to the Palais), and hence parking duration would not change; and
- Parking fee structure remains the same and so there is no incentive to park for longer/ shorter time periods.

A3.5 Infringement Revenue

The new underground car park is likely to have controlled entry and exit using barriers. Illegal parking, and hence the issue of infringement notices, will be significantly, if not totally, reduced. Revenue currently generated from infringements (not included in this revenue forecasting) will be eliminated; however, the demand will remain and be realised instead as legal parking revenues.

In 2010/11 there were 4,345 parking infringement notices issued. This demand is included in the forecast and the average revenue per transaction used to generate the revenue from this additional demand.

A3.6 Scenarios

Four future scenarios have been tested as shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Existing</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car park spaces</td>
<td>326</td>
<td>200</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td>Exogenous growth</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Extended Palais operations</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improved car park and facilities</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Removed Infringements</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
### A4 Forecasts

The table below shows the estimated annual demand for each scenario across the forecasting period.

<table>
<thead>
<tr>
<th>Annual Transactions</th>
<th>Year 0 (Base)</th>
<th>Year 1</th>
<th>Year 5</th>
<th>Year 10</th>
<th>Year 15</th>
<th>Year 20</th>
<th>Year 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>153,111</td>
<td>159,008</td>
<td>183,017</td>
<td>212,390</td>
<td>239,400</td>
<td>261,201</td>
<td>288,640</td>
</tr>
<tr>
<td>Small</td>
<td>153,111</td>
<td>137,536</td>
<td>152,442</td>
<td>166,669</td>
<td>176,191</td>
<td>179,034</td>
<td>179,155</td>
</tr>
<tr>
<td>Medium</td>
<td>153,111</td>
<td>157,647</td>
<td>184,488</td>
<td>215,481</td>
<td>240,749</td>
<td>258,358</td>
<td>268,732</td>
</tr>
<tr>
<td>Large</td>
<td>153,111</td>
<td>168,809</td>
<td>205,916</td>
<td>258,527</td>
<td>313,920</td>
<td>365,054</td>
<td>433,516</td>
</tr>
</tbody>
</table>

The table below shows the estimated utilisation per car parking space for each scenario across the forecasting period.

<table>
<thead>
<tr>
<th>Annual Space Utilisation</th>
<th>Year 0 (Base)</th>
<th>Year 1</th>
<th>Year 5</th>
<th>Year 10</th>
<th>Year 15</th>
<th>Year 20</th>
<th>Year 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>40.8%</td>
<td>42.3%</td>
<td>48.7%</td>
<td>56.4%</td>
<td>63.4%</td>
<td>69.1%</td>
<td>76.0%</td>
</tr>
<tr>
<td>Small</td>
<td>40.8%</td>
<td>59.4%</td>
<td>65.7%</td>
<td>71.7%</td>
<td>75.7%</td>
<td>76.8%</td>
<td>76.9%</td>
</tr>
<tr>
<td>Medium</td>
<td>40.8%</td>
<td>45.6%</td>
<td>53.2%</td>
<td>62.0%</td>
<td>69.1%</td>
<td>74.0%</td>
<td>76.9%</td>
</tr>
<tr>
<td>Large</td>
<td>40.8%</td>
<td>29.3%</td>
<td>35.8%</td>
<td>44.8%</td>
<td>54.3%</td>
<td>63.0%</td>
<td>74.5%</td>
</tr>
</tbody>
</table>

The table below shows the estimated annual nominal revenue for each scenario across the forecasting period.

<table>
<thead>
<tr>
<th>Annual Nominal Revenue ($)</th>
<th>Year 0 (Base)</th>
<th>Year 1</th>
<th>Year 5</th>
<th>Year 10</th>
<th>Year 15</th>
<th>Year 20</th>
<th>Year 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>1,206,323</td>
<td>1,292,966</td>
<td>1,677,956</td>
<td>2,236,100</td>
<td>2,886,408</td>
<td>3,628,246</td>
<td>5,439,541</td>
</tr>
<tr>
<td>Small</td>
<td>1,206,323</td>
<td>1,151,060</td>
<td>1,432,810</td>
<td>1,805,320</td>
<td>2,207,980</td>
<td>2,628,511</td>
<td>3,657,496</td>
</tr>
<tr>
<td>Medium</td>
<td>1,206,323</td>
<td>1,315,951</td>
<td>1,723,378</td>
<td>2,297,648</td>
<td>2,936,674</td>
<td>3,638,064</td>
<td>5,247,133</td>
</tr>
<tr>
<td>Large</td>
<td>1,206,323</td>
<td>1,407,329</td>
<td>1,916,065</td>
<td>2,717,297</td>
<td>3,713,340</td>
<td>4,892,560</td>
<td>7,771,692</td>
</tr>
</tbody>
</table>

The table below shows the estimated annual incremental revenue for each underground car park scenario compared to the existing car park across the forecasting period.

<table>
<thead>
<tr>
<th>Incremental Revenue ($)</th>
<th>Year 0 (Base)</th>
<th>Year 1</th>
<th>Year 5</th>
<th>Year 10</th>
<th>Year 15</th>
<th>Year 20</th>
<th>Year 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>1,206,323</td>
<td>1,292,966</td>
<td>1,677,956</td>
<td>2,236,100</td>
<td>2,886,408</td>
<td>3,628,246</td>
<td>5,439,541</td>
</tr>
<tr>
<td>Small</td>
<td>1,164,418</td>
<td>(141,905)</td>
<td>(245,146)</td>
<td>(430,781)</td>
<td>(678,428)</td>
<td>(999,735)</td>
<td>(1,782,046)</td>
</tr>
</tbody>
</table>
Figure 2 illustrates the differential revenue generated by the different future car park scenarios.

Figure 2 – Forecast Car Park Revenue
Appendix B

Car park Concept Options Development
## B1 Site Description

The St Kilda Triangle precinct (Melways Reference: 57 K10/K11) is bounded by Jacka Boulevard, The Esplanade and Cavell Street. The site has a frontage of approximately 250m with the Esplanade, 250m to Cavell Street and 300m to Jacka Boulevard.

The proposed underground car park is to be constructed adjacent to the existing Palais Theatre.

## B2 Ground Conditions

The Geological Survey Map of Victoria 1:63,360 Melbourne (1974) indicates that the site is underlain by Port Melbourne Sand, the Brighton Group and the Melbourne Formation.

Previously, site investigations have been carried out across the site by Hardrock Geotechnical, Noel Arnold and Associates (2006), HLA Envirosiences (2006) and Golder Associates (2006).

The site investigations carried out to date indicate that the site is underlain by 1.3-5.0m of loose Fill and sand, overlying sands and clayey sands of the Brighton Group to a depth of 12 to 16m below the existing ground surface level, overlying Siltstone and Sandstone of the Melbourne Formation. It should be noted that some boreholes achieved refusal at shallow depths within fill material.

Groundwater levels have been measured in 3 standpipes installed at the site, and were found to range between RL -0.18 to -1.9m AHD. Boreholes were read once in December 2005 and once in July 2006. These give a winter and summer reading, albeit in a period of drought. We have conservatively adopted higher groundwater levels due to the nearby presence of the sea.

As the site is close to the sea, a higher water table of RL 0m AHD with a tidal range of +0.5m has been assumed for this assessment. It is recommended that further groundwater monitoring is carried out in a regular bi-monthly basis to assess variations in the water table onsite and assist in any future design.

We understand that excavations at the former Palais Theatre Entertainment Complex have exposed items such as bottles and ceramic lids dating back to the 1890’s. Therefore areas of archaeological significance may be encountered in part of the site. This could present risks which have not been costed.

No underground or above ground service information was provided by the Port Phillip City Council therefore we have not considered any significant services to be present across the site for this feasibility study. This could present risks which have not been costed.

## B3 Ground Contamination

The project brief states that the site contains a large amount of historic fill obtained from an unknown source. It goes on to state that any excavated material up to a depth of 2.5m is likely to be classified as Category C contaminated soil.
As part of the feasibility study, the following documents were reviewed:

- Site contamination Assessment Report, St Kilda Triangle, St Kilda, June 2006 by Noel Arnold and Associates.
- Fill Classification and Groundwater Monitoring at St Kilda Triangle, August 2006 by HLA-Enviroscience Pty Ltd.
- St Kilda Triangle – Land Contamination Investigation, November 2011 by Anna Wallace and Darren Prendergast, Port Phillip City Council.

**Review of Contamination Data**

Arup completed a brief review of the available contamination test data. The proportion of clean fill, Category C and Category B material was calculated for each borehole location and subsequently across the entire site. Where greater than one sample was collected from each borehole, the proportion of clean fill, Category C and Category B material was calculated. It is noted that the raw data for Palais Theatre entertainment complex referenced in the November 2011 assessment was not available. These results were described as Type C and Type B and were therefore spread evenly between each of these two categories.

As some data was not available and some assumptions were made a more detailed assessment of the proportion of contaminated material should be completed during the design development stage.

**Contamination Cost Impact**

Based on our analysis of existing data, we believe there is a possibility that contaminated material be assessed as Type B and not Type C. Therefore, for costing purposes, this feasibility study has assumed two scenarios for the type of fill present at the site.

1. Based on the project brief and the recommendations of the St Kilda Triangle – Land Contamination Investigation Report (2011) assumes 13% clean fill and 87% Type C Material. This could be assessed as Type C material and will be referred as “Type C” in the rest of the document. This scenario has a high cost impact on the project.

2. Based on Arup’s review of the land contamination reports listed above, assumes 13% clean fill, 64% Type C material and 23% Type B Material, which could be assessed as Type B material; it will be referred as “Type B” in the rest of the document. This scenario has a very high cost impact on the project.

**Contamination Recommendations**

It is recommended that additional advice be obtained to investigate the merit of further sampling to refine the extent of Type B and Type C contamination. A contamination consultant/surveyor should be engaged to more accurately map the distribution of fill across the site. The cost to undertake the works would be in the order of $50,000.

We recommend Council develops an appropriate management program, consisting of a Soil Management Plan and Remediation Action Plan for the site.
This should consider setting aside contaminated material on site for stockpiling and then capping. For the price estimate we have assumed some contaminated material can be placed behind open excavation batters (Wall type 1 below).

We also recommend Council discusses with the Environmental Protection Agency (EPA) the opportunity to reclassify the whole site as Category C material as the Category B classification may be considered an isolated occurrence. This will save significantly on disposal costs. Wallace and Pendergast (2006) note that the Strategic Planning Team from the City of Port Phillip recommend the placement of an EAO over the site and estimate that this will add as much as $80k to the costs for the project.

Consultation is recommended to discuss possible reasons for not applying an EAO, including:

- The site is not considered to be used as a more sensitive use as the existing car park will be replaced with a new car park;
- All excavated contaminants to be removed from site effectively cleaning the site; and
- Any parkland created will be capped with clean material and impervious surfaces (not costed in this study).

B4 Car Park Layout

The car park concept options have been designed in accordance with the Australian Standards for Off-Street Parking (AS2890.1-2004), the Australian Standard for Disabled Parking (AS2890.6-2009) and the Australian Standard for Bicycle Parking (AS2890.3-1993).

It is anticipated that the proposed car park will accommodate a mixture of short, medium and long-term parking. Accordingly, the proposed car park will observe the requirements of User Class 3 (AS2890.1-2004) “Short-term city and town centre parking, parking stations, hospitals and medical centres” adopting the standard car parking space dimensions of 2.6m wide × 45.4m long with a 5.8m access aisle.

It is envisaged that the car park will operate similarly to many new commercial car parks where the driver receives a ticket upon entering and pays for parking upon returning to the car. Based on the queuing requirements of AS2890.1-2004 the required queue lengths prior to any control point will be: 200 car parking spaces – approximately 30m queuing spaces length; 300 car parking spaces – approximately 40m queuing spaces length; and 500 car parking spaces: approximately 50m queuing spaces length. To ensure queuing does not span back onto the street network, all options provide almost double the queuing storage area required under the standards.

Ultimately these queuing requirements translate to a single access for the 200 and 300 car parking space scenarios and two access points for the 500 car parking space option.

For the 200 and 300 car parking space options a single entrance point has been identified via Cavell Street, immediately south of the Palais. This location has the
benefit of leveraging the existing signalized intersection of Cavell Street/Jacka Boulevard to allow access to the car park from various directions.

The 500 space option will require a second entrance into the car park; it is proposed that this be provided off Jacka Boulevard, immediately west of the existing Pedestrian Operated signals. The proposed access will be signalised to accommodate all movements to and from the site and will retain pedestrian crossing facilities close to their existing position.

Stairwells and lifts will be provided across the car park to ensure emergency exits are provided within 50m of all car parking spaces. The lifts are located adjacent to the main vehicle access into the car park via Cavell Street. In addition a shared pedestrian/bicycle ramp is provided adjacent to the vehicle entrance onto Cavell Street. Two lifts will be provided to allow for redundancy, should one fail.

Disability Discrimination Act (DDA) parking will be provided on-site at a rate of 1 space per 50. The DDA parking will be in accordance with AS2890.6-2009 and will be located adjacent to the lifts servicing the car park.

Space will be allocated for secure bicycle parking adjacent to the car park access via Cavell Street. A total of 100 bicycle spaces will be proposed although this could be easily increased up to 300 spaces if required. A total of five showers are also proposed to support the bicycle parking. It is envisaged that the bicycle parking and showers will be of a similar form and operate like the existing bicycle parking at the City of Melbourne, City Square Facility. Access to the bicycle parking is to be provided via a dedicated shared ramp connecting to Cavell Street, ensuring ease of access for all members of the public. A minimum headroom of 2.3m would be accommodated along the ramp.

Motorcycle parking is not currently provided; however this could be easily accommodated in place of some of the proposed parking.

Detail of the car park layout concept design process can be found in Appendix B.

**B5 Construction Methodology**

**B5.1 Car Park Level**

The topography of the site ranges from RL+4 to +5m along Lower Esplanade to RL +2.5 to 3m along Jacka Boulevard. For the feasibility study, the finished surface level of the car park roof has been taken at RL+4m. Therefore while along the Lower Esplanade the car park will be at or below existing ground level, along Jacka Boulevard the car park walls will extend 1 to 1.5m above the existing ground surface level.

**B5.2 Basement construction**

In order to construct the basement car park and estimate costs, three construction techniques have been considered appropriate given the layout of the car park and the size of the site. The three techniques are an

- Open excavation using batter slopes;
- Contiguous pile walls; and
- Secant pile walls.

The 212 and 305 car parking space car park layouts require a single level basement and the construction technique is a combination of batter slopes and contiguous pile walls. The 485 car parking space car park layout requires a two level basement over part of the site. The construction of the two level basement would include batter slopes, contiguous and secant pile walls to address groundwater issues. The construction techniques are discussed in the following sections.

The following designs are conceptual and have been developed for costing purposes only. Further design and assessment is required.

**Wall 1: Open Excavation and cast in situ wall**

Where there is sufficient space from the edge of the car park structure to the site boundary, a 1V:2H batter slope is proposed as shown in Figure 2 below. This open excavation construction technique is applicable for a single level basement. The edge of the slope should be offset a minimum of 1.0m from the site boundary/Palais Theatre and the car park structure should be 0.5m from the toe of the slope to allow room for construction.

![Figure 1 Batter Excavation](image)

**Wall 2: Contiguous Pile Wall**

Where excavations are required close to the site boundary, a contiguous piled wall is proposed for a single level basement refer Figure 3 below. Conceptual design analysis shows that a retaining wall comprising 600mm diameter Continuous Flight Auger (CFA) piles at 1200mm centres with 200mm shotcrete between piles is a viable solution. The centre of the piles should be a minimum of 1.0m from the site boundary and 3.5m from the Palais Theatre. Figure 3 presents the contiguous pile wall option, with a plan view of the shotcrete infill between the piles. A hydrophilic seal is recommended between the shotcrete and the piles to minimise water ingress into the basement.

CFA piles are proposed due to the site being underlain by loose fill and sands. Bored piles may encounter stability issues and require casing though the sand layers, especially below the water table.
An alternate design may be to reduce the pile diameter by using temporary anchors. However consideration of the anchors extending beyond the property boundary and the possible conflicts with underground utilities adjacent to the site would be required, so this option has not been developed for this assessment.

Figure 2 Contiguous Pile Wall

Wall 3: Secant Pile Wall

Where a second basement level is required, a secant pile wall is needed to provide groundwater cutoff refer Figure 4. The conceptual design proposes 600mm diameter CFA piles at 500mm centres. Primary and secondary piles will be used, with the secondary pile being unreinforced lower strength (2MPa) concrete (soft pile).

Where the secant wall is only supporting one basement level, the wall will work as a cantilever. However where it is supporting a two level basement, an intermediate temporary ground anchor will be required to limit wall movements and minimise the size of the wall. Conceptual design proposes 150mm diameter prestressed anchors at 2m centres. A 250 I section is proposed to act as a waler between anchors.

The use of ground anchors will need further consideration as they extend beyond the site boundary and the risks associated with encountering underground services. Top-down construction or use of temporary props to replace the anchors could overcome this potential issue, however may increase the construction cost, so an anchor solution has been adopted for pricing.

Some dewatering will be required inside the secant pile walls to enable excavation of the lower basement. The secant pile walls will:

- Reduce the amount of pumping required;
• Significantly reduce potential settlement of adjacent structures (e.g. Palais Theatre); and
• Act as a permanent basement wall.

CFA piles are proposed due to potential instability of the loose fill and underlying sand deposits. Bored piles may be susceptible to hole instability and require the use of temporary casing especially below the water table.

The proposed construction sequence for a two level basement would be:
• Excavate to RL +1.6m;
• Install ground anchors, waler and prestress anchors;
• Dewater and excavate to RL-2m;
• Construct basement 2, basement 1 and car park roof level; and
• Remove dewatering, anchors and whalers.

Figure 4 presents the two level basement option.

Figure 3 Two level basement, secant pile wall and temporary ground anchors.

B5.3 Foundation Construction

A significant portion of a single level basement floor slab will be constructed on fill material and/or loose natural material. Due to the large column spacings used for the car park and possible oversite development, column loads are likely to be significant and shallow foundations are unlikely to be suitable. Therefore a slab spanning between piles has been adopted. The piles would be 750mm CFA piles, approximately 15m in length, located under each column, with a 1.5 x 1.0 x 0.5m pile cap.

An alternate option to piles is to of excavate down through the fill material locally and backfill with engineered fill/stabilised sand to provide pad foundations beneath the internal columns may be considered. However cost implications and construction difficulties due to the removal of additional contaminated material and compacting beneath the groundwater table may make this option impractical
and not cost effective. Also the magnitude of the column loads due to the presence of a three storey structure above the basement (estimated during concept design to be in the order of 4MN) may make the use of a ground bearing slab impractical.

The two level basement floor slab is proposed to be a ground bearing slab on the denser natural soils, with piles installed to resist uplift due to groundwater. Tension piles 400mm diameter, 10m length would be on 4.15 x 4.15m grid (i.e. between columns). Dewatering will be required during construction of the two level basement.

**B5.4 Excavation**

Excavation of the site is expected to be carried out using conventional earth moving equipment.

Obstructions in the ground may be encountered due to a portion of the site previously being occupied by the Palais Theatre Entertainment Complex, which had a basement car park. A desktop study including the review of council records and/or further investigations are recommended to clarify the potential underground obstructions.

As stated in Section B2, no service information has been provided by the Port Phillip City Council, therefore no major service relocations have been incorporated in the cost estimate.

The site may contain items of some archaeological significance. In order to address the presence of artefacts, it is proposed that watching brief is developed, so that archaeologists are present during excavation works where items may be found. Further archaeological studies may reduce the need for this and associated costs. Conversely if significant items are encountered they may result in delays and additional costs.

A monitoring and instrumentation plan will need to be developed during the design phase of the project to monitor the Palais Theatre and other significant/sensitive/private structures in the vicinity.

**B5.5 Basement Structure**

In accordance with the project brief, the concept design of the basement structure has considered the requirement to support a future 3 storey development or an open paved area.

The following car park structural components have been sized during the concept design stage:

- Internal columns 250 x 800mm in size on a 8.3 x 8.3m grid
- Roof slab (RL +4m) - 210mm thick, with 400mm thickening over the columns and outer walls typically (250/400 for end spans). Note thickening to extend 2.4 x 2.4m around columns). A layer of waterproofing, screed and pedestrian brick paving has been allowed over 50% of the roof slab for pricing purposes.
• Basement 1 slab (RL+1.3m) – 180mm thick, with 325mm thick capitals around the columns. Where the slab is constructed at grade, an allowance has been made for a waterproofing layer and 150mm of crushed rock.

• Basement 2 slab (RL-1.5m) - 300mm thick. An allowance has been made for a waterproofing layer and 150mm of crushed rock beneath the slab.

• Cast insitu basement walls (Wall 1) – 200mm thick reinforced concrete, with 300mm deep x 900mm wide thickening in the base slab along the toe of the wall.

• Basement Walls (Wall 2) – The face of the contiguous piles and the 125mm thick shotcrete spanning between the piles will form the permanent walls. A hydrophilic seal is required between the shotcrete and the contiguous piles.

• Base Walls (Wall 3) – The face of the secant piles will form the permanent walls.

Conceptual structural details are presented in B5.2 to B 5.3.

B5.6 Mechanical, Electrical and Services

An allowance has been made however for new water and power connections for the project. A substation or booster may be required for power supply, however the cost has not been included in this feasibility study. This will require further consideration during design development.

The basement car park has been priced assuming the following services:

• Lighting and electrical

• CCTV

• Lifts

• Enclosed car park ventilation (car park will be open on one side, but full mechanical ventilation will be required)

• Fire sprinklers, hydrants and hose reels

• Drainage for level 1 basement with sump pumping for a 2.5m head for the entry of rainfall into the basement

• Drainage for level 2 basement to allow for minor seepage through basement walls

• Stormwater and sewerage drainage and pumping for shower facilities etc.
Appendix C

Concept Layouts

Concept layouts were prepared to inform price of construction.

The car park is underground and concept layouts show the various basement levels. Space above is useable public space.
St Kilda Triangle Carpark Concept
200 Car Space Option (212 Spaces)

Date: 16 Jan 2012
St Kilda Triangle Carpark Concept
300 Car Space Option (305 Spaces)

Date: 16 Jan 2012
St Kilda Triangle Carpark Concept
300 Car Space Option (305 Spaces)

Date: 16 Jan 2012
St Kilda Triangle Carpark Concept
500 Car Space Options – Level B2 (195 Spaces)

Date: 16 Jan 2012
St Kilda Triangle Carpark Concept
500 Car Space Options - Level B2 (195 Spaces)

Date: 16 Jan 2012