

Coming to a New Vision for Perth

Final Report of the

Perth City Rail Advisory Committee

to the Minister for Planning and Infrastructure

Hon Alannah MacTiernan MLA

May 2002

Letter of Transmittal

Hon Alannah MacTiernan
Minister for Planning and Infrastructure

Dear Minister

I have pleasure in presenting the second report of the Perth City Rail Advisory Committee (PCRAC).

This report points towards the largest single change in the face of Perth that we have seen. From the foreshore to Northbridge, the recommendations contained here will transform the way the city is seen and used. At last, the city can be rejoined with its foreshore and, if it is wished, to Northbridge.

The new South West Metropolitan Railway (SWMR) will enter the city across the Narrows Bridge. North of the Bridge, as it leaves the vicinity of the Freeway, it will drop underground, and disappear from view. There will be no trace of the rail line until it emerges on the north side of the city, on its way to Joondalup (Clarkson). But before it emerges it will serve a new underground station beneath the Esplanade as well as new transverse platforms joined to the existing City Station.

In addition, however, the Committee's proposals will –

- Deliver an efficient and reliable railway system;
- Optimise patronage, increasing public transport use in the city;
- Support and enhance the operation of the Perth Convention Centre;
- Reduce construction disruption to a minimum; and
- Revitalise City Station as a meeting place and central hub with connections to all sectors of the city.

To portray this as simply a choice between two rail routes is to trivialize the issue. In the Committee's view, the project is at least as much a matter of civic planning and design as it is a matter routing a railway. This is a classic example of the challenge to coordinate transport and land uses. It is an important decision, worth getting right, for there is little practical chance to undo it.

In its first existence, PCRAC attended to a set of terms of reference which culminated in the report presented to you in March 2002. Now, in its second existence, the Committee has considered and reported on additional terms of reference, designed to ensure that there is one recommended course of action for the SWMR route into the central city.

Throughout its existence, the Committee has sought to pursue its task with rigour and integrity. We have applied open minds throughout. It is time now, though, for the Committee to stand and be counted. In reaching these conclusions we have been assisted by many people, although none of them carry responsibility for what we say here. We acknowledge the assistance of the Committee's executive officer, Richard Mann, who has greatly smoothed the path of this second report during the four weeks that have been available for its completion. We have continued to benefit from the advice and guidance of the Western Australian Government Railways, the Department for Planning and Infrastructure, Main Roads WA, and officers of the City of Perth.

I again express my appreciation for the endeavour and support of my colleagues on this Committee. They have sacrificed their working and their private lives – and occasionally their peace of mind – in pursuit of a best practical answer to a difficult set of questions. They have been ferocious in their commitment.

The Committee has had two lives, which is quite enough for any committee. With this report our work is completed, however, and the Committee is disbanded. On its behalf, I express gratitude to you, Minister. The process has materially benefited from the independence the Government has extended to us throughout. We have had no pre-conceived notion of where our work might lead us, and no pre-conceived notion has been imposed upon us.

We are conscious that two successive State Governments as well as the City of Perth have previously announced their positions on this question, however, and that the Committee's recommendations represent something different from any of those announcements. We are equally aware that the issue has been very divisive: the community has at times been polarized by the controversy. Finally, we are aware that the process in which the Committee has been engaged has added some further time that has tested the patience of those many people who wish to see a start on construction.

In the event, we believe that these challenges have been worth facing. We hope that our recommendations will help galvanize people in a common aim. We are satisfied that enough work has been done and enough discussion has occurred. The time for decisions and actions is here. I commend the vision to you.

Stuart Hicks
Chairman
Perth City Rail Advisory Committee

21 May 2002

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Executive Summary

This report is the second, and final, report of the Perth City Rail Advisory Committee (PCRAC). As in its first report, the views expressed here are unanimously shared by the Committee members.

The analysis and findings in this report should be read in conjunction with the analysis and findings in the Committee's first report.

The Western Australian Government has determined that the South West Metropolitan Railway (SWMR) will not approach Perth along the "Kenwick route" but rather along the reserve of the Kwinana Freeway, entering the central city over the Narrows Bridge. To that extent, both the options examined in this report are "Freeway options".

The Committee has identified the best available "Western" and the best available "Central" options for the traverse of the SWMR through the central Perth area. The Committee's Terms of Reference limit its considerations to these options.

This report is the culmination of thorough investigation, supported by a wide range of expert advice. However, it does not constitute a Master Plan. The report indicates a broad course of action which, if accepted by Government, will necessitate sustained and detailed additional planning.

Findings

Finding 1:
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The Committee's view is that the best Western route option is that previously identified as 3PCC(I), incorporating the Freeway safety and rail operations as described in this report. The Committee is also of the view that this option should incorporate the reconnection of the bus services from the Busport to the Wellington Street bus station, and, should the Freeway option be ultimately chosen as the preferred route, that further consideration be given to the relocation of the Elder Street station and its design in order to minimise disruption to Hay Street traffic during the construction period and, in general, to provide an attractive, pedestrian-friendly station.

Finding 2:
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The Committee is satisfied that the proposed Central route option 1D(I) has been sufficiently improved to satisfy the acceptance criteria specified in its first report. The detailed work since issue of the first report has not only satisfied the criteria, but has produced proposals that have the potential to integrate platforms at Perth station and contribute significantly to the connectivity, ambience and amenity of the foreshore area at the foot of William Street.

Finding 3:
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Based upon the work undertaken by the Committee in its original report which included its Multi Criteria Assessment and the analysis of the key issues as elaborated within this report and including –

- Mass transit,
- Station location and travel time,
- Development railways,
- Integration with bus services,
- Patronage,
- Rail operations, efficiencies and reliability,
- Disruption,
- Future city rail loop,
- Economic and financial considerations,

The Committee finds that the improved Central option 1D(I) is the preferred route compared to the Western route 3PCC(I) for the City of Perth section of the SWMR and recommends that Master Planning continues on the basis of this alignment.

Finding 4:
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Government should pursue the opportunity to significantly enhance the city's amenity by sinking the Fremantle lines to provide connection to Northbridge, completing the renovation of the Horseshoe Bridge and removing the William Street overpass from the foreshore.

1. Background

Introduction

The Perth City Rail Advisory Committee (PCRAC) was commissioned by the Minister for Planning and Infrastructure, Hon Alannah MacTiernan MLA, in November 2001 and in respect of its then Terms of Reference, reported to the Minister on 9 March 2002. Its report, entitled “Report of the Perth City Rail Advisory Committee”, was publicly released on 14 March 2002.

Three route options were identified by the Committee in its report: Eastern, Central and Western.

The Eastern option was preferred by the Committee on transport and city planning grounds. However, the estimated cost of the Eastern option represented more than double the budget for the city segment of the South West Metropolitan Railway (SWMR) project. Government was not prepared to meet this cost and ruled out the Eastern option.

In releasing the PCRAC report, the Minister for Planning and Infrastructure announced that the Government would invite public discussion on the remaining Central and Western route options and conduct additional research before making a final decision.

On 19 April 2002, the Minister reconvened the Committee with the following additional Terms of Reference.

With a view to assisting the Government to make a final determination of a route for the South West Metropolitan Railway (SWMR) into the

Central Business District of Perth, the Perth City Rail Advisory Committee is reconvened.

The Committee is required to:

- 1. Identify the best feasible option to route the SWMR along a “central” alignment and the best feasible option to route the SWMR along a “western” alignment; and*
- 2. Assess these options against the criteria propounded in the Committee’s first report and, after taking into account costs and any other matters the Committee considers to be of material relevance, recommend a preferred route.*

In forming its views, the Committee shall assess all available information, as well as assessing public submissions that have been received during the recently concluded public consultation period. The activities of the Committee, including any necessary additional expert advice or information, shall be resourced by the Commissioner of Railways.

The Committee should not consider other route options.

It should report to the Minister for Planning and Infrastructure within a month. The timeframe for construction of the new railway precludes the Committee from pursuing sources of information or advice which cannot be taken usefully into account within the month.

As previously, the Committee comprised:

- Mr Stuart Hicks – Transport and Business Policy Consultant, formerly Executive Chairman of Transperth and Director General of Transport (Chair);
- Mr Frank Bryant – Consulting Engineer, Chairman BSD Consultants;
- Ms Carey Curtis – Town Planning Lecturer, Curtin University;
- Dr Richard Day – General Manager Rail Development, NSW State Rail Authority, Sydney¹;
- Mr John Hoare – Railway Planning Consultant;
- Ms Sharni Howe – Architect and Urban Designer;
- Mr Tony Packer – President, Property Council of Australia (WA Division);
- Cr Lisa Scaffidi – Councillor, City of Perth.

The current report represents the Committee’s response to its second commission.

Although the work of the Committee has been exclusively focused on discharging the tasks defined in the Terms of Reference, the Committee remains strongly and unanimously of the view that the Eastern route option (Option 2C) is the best option for public transport and for the city. It believes that the cost of the Eastern route option is within the range to be expected when a railway is brought into and under an established city, and that the cost can be funded by appropriate expenditure prioritisation measures or private sector funding.

Notwithstanding these views, the Committee has endeavoured to resolve the issues identified in the Terms of Reference to facilitate an early decision on this important matter.

¹ [Dr Day was unable to attend meetings of the Committee and participated in an advisory capacity only.](#)

Committee *Modus Operandi*

The Committee met for one full day each week. Members undertook a range of tasks between meetings in order to meet the Committee’s tight timeframe. It was assisted by a full-time executive officer, Mr Richard Mann, who was in turn ably supported by Western Australian Government Railways Commission (WAGR) Officers Ms Ingrid Boak, Ms Paula Crookes and Ms Joyce Malins.

As was the case in its first manifestation, the Committee has relied on a number of individuals and organisations to provide the information essential to its deliberations. The fact that the task has been successfully completed within the required timeframe bears testimony to their efforts.

The Committee is grateful to Mr Peter Martinovich and the Perth Urban Rail Development (PURD) team; once again, PURD has demonstrated professionalism and resolve in meeting the onerous demands of the Committee. Similarly, Ms Charlotte Stockwell, Mr Max Hipkins and Mr John Bruning of the City of Perth have worked tirelessly to ensure that the Committee has gained from the City’s work on the Western option. Officers of the Department of Planning and Infrastructure (ably led by Mr Steve Goldie) and WAGR (Mr Laurie Piggott, Mr Brett Inchley and Mr Max Collins) have also provided invaluable input to the Committee.

Finally, the Committee wishes to express its appreciation to the Acting Commissioner of Railways, Mr Reece Waldock, for his support. The Committee’s ready and willing access to the Commission’s resources has proven crucial to our task.

Community Consultation

Following release of the PCRAC report on 14 March 2002, the Minister for Planning and Infrastructure announced the State Government's commitment to a Community Consultation process over the following month.

Accordingly, the Department for Planning and Infrastructure placed a full-page, colour newspaper advertisement inviting comment on the Central and Western options, via a cut-out coupon. The newspaper advertisement was supplemented by public displays, public forums for professional organisations and property owners, establishment of a web page and distribution of leaflets.

The success of the Community Consultation process as a means of eliciting informed opinion was reduced by a full-page colour newspaper advertisement placed by the City of Perth, which presented the case for the Western option only, and included a coupon that permitted only a vote for that option.

In excess of 3,000 responses were received by Government, including more than 500 submitted on "City of Perth forms". As might be expected, the latter indicated overwhelming support (92%) for the Western option. Of the remaining 2,500 submissions, 52% supported the Western option, 31% supported the Central option and 17% supported other route options.

Commonly expressed concerns in Community Consultation submissions included:

- Disruption during construction;
- Visual impact;
- Access around Perth;
- Passenger transfer between trains;

- Development of the "West End" of the city;
- Railway patronage;
- Opportunity for establishing Northbridge-city connections;
- Compatibility with a future city rail loop; and
- Cost.

From the significant disagreement within each of the key themes listed above, it is apparent that there is much confusion and uncertainty in the minds of many people about the plans and intentions for the SWMR in the vicinity of the CBD. However, it is clear that important community issues are construction disruption for both options, visual impact on the foreshore, passenger transfer, station location and the proposed Northbridge connection. Western option supporters were concerned with William Street disruption and foreshore impacts under the Central option, believed the Western option to be less expensive (contrary to the PCRAC report), offer better connectivity to a future rail loop and provide development opportunity for West Perth. Supporters of the Central option believed it served more people, offered access to better destinations and was a better long-term solution. Supporters of both options believed the rail project should include connection between Northbridge and the city.

Due to the conflict arising from the City of Perth campaign for the Western option, it is difficult to draw conclusions from the statistical results of Community Consultation.

The *West Australian* Newspaper carried out an independent telephone poll asking respondents to state their preference for a Central or Western option. From the "Westpoll" random sample of just over 400 people, 39% preferred the Central option, 35% preferred the Western option, 18% were undecided and 8% preferred other options.

Whatever the shortcomings of the various efforts to divine the opinion of the Perth community, they have provided invaluable guidance to the Committee in understanding the factors which are most likely to influence public support.

The Report on Community Consultation prepared by the Department for Planning and Infrastructure is included at Appendix F.

Stakeholder Workshop

Key stakeholders with interests in the effects of the SWMR's entry into the city were invited to participate in a structured workshop held on 24 April 2002. By exploring constraints and opportunities for each option, the Stakeholder Workshop was specifically aimed at assisting the Committee identify the best feasible Central and Western options.

Important issues raised at the Workshop are summarised below. Full details of Workshop outcomes are provided at Appendix G.

Central Option	Western Option
<ul style="list-style-type: none"> • Foreshore impact • Busport integration • Station connectivity • Cost 	<ul style="list-style-type: none"> • Freeway impacts • Development and urban planning • Rail operations

Public Submissions to the Committee

Given that the Community Consultation process had already been undertaken, the Committee did not, on this occasion, advertise for further public submissions or comments. However, the Committee did accept a

small number of submissions that were offered to it during its deliberations. These are summarised in Appendix H.

The views expressed in public submissions supported the outcomes of Community Consultation and particularly, the Stakeholder Workshop (the majority of submissions being from Workshop participants and/or participating organisations). Key issues included:

- Rail operation and efficiency;
- Station connectivity and passenger security;
- Central option impact on the foreshore;
- Compatibility with a future rail loop;
- Western option development opportunity;
- Central option impact on the Convention Centre;
- Small business support for the Central option.

2. Determination of the Best Practical Western & Central Options

General

In accordance with its Terms of Reference, the Committee has reviewed various options identified to service the CBD along Western and Central alignments. In reconsidering information previously available to it, the Committee has been assisted by public submissions, the Stakeholder Workshop and other technical advice that has become available since release of its first report.

Western Option

The Committee continues to be of the view that the best available Western route option is that identified as 3PCC(I) (*Perth City Council (Improved)*) in its first report.

The route of Option 3PCC(I) is the same as that of Option 3PCC. Proceeding northwards from the Narrows Bridge, the alignment follows the Mitchell Freeway between the southbound and northbound carriageways, ramping underground near Mount Street and then continuing northwards parallel to the eastern side of the Freeway, crossing under Wellington Street and curving eastwards to join the existing rail track complex north of the Entertainment Centre. The route is shown in Figure 1.

The option differs from that which has been proposed by the City of Perth in a number of key respects –

Freeway Safety

The Commissioner of Main Roads has previously advised the Committee that –

- The City of Perth's Freeway Option (3PCC) does not provide safe movement from the Riverside Drive On Ramp to the Hay Street Off Ramp.
- This movement is considered essential given the volumes that use it, particularly during the morning peak and the lack of realistic alternative routes.
- Any Freeway option should maintain provision for six lanes over the Freeway section between Mounts Bay Road and the Hay Street off-ramp to ensure that capacity, weaving and merging can be satisfactorily addressed.
- That the vertical profile of the City's Freeway option does not meet standards and cannot be accepted "as is".

This advice was incorporated in the Committee's March 2002 report as Appendix D. This advice has been confirmed by a further letter from the Commissioner of Main Roads dated 3 May 2002, which is included in this report as Appendix A.

The City's original proposal also excluded the connection of the priority bus ramp/lanes between the Narrows Bridge and the Busport; however, the City has recently acknowledged that this connection should be maintained and acknowledges the additional cost of approximately \$0.8 million.

Whilst the Committee has received further commentary on the matters raised by the Commissioner of Main Roads, it has received no additional information which causes it to vary from its original findings in that a Western route along the Freeway should be –

- Designed in a manner that does not compromise Freeway safety; and
- Involves no significant alteration in Freeway vehicle movements.

In this regard it therefore supports the advice provided by the Commissioner of Main Roads, in that these works should be incorporated into the Western route option. The Committee also understands that a significant amount of further work has been done on this proposal, both by Main Roads and through the PURD office. This work has confirmed that the requirements of the Commissioner can be accommodated.

Rail Operations West of City Station

All route options approaching Perth station from the west are encumbered by the difficulty of making a connection which enables “through working” of services between the rapid transit SWMR and Northern Suburbs lines

The Option 3PCC proposal submitted by the Perth City Council envisaged that the SWMR services would be terminated at Perth station. The Northern Suburbs line services would continue to run through to the Armadale line. This latter aspect would cause a number of difficulties among which are restrictions on all-stopping services by new trains, a requirement for platform lengthening, and bringing forward of grade separation and concrete sleeper investments.

In its first report, the Committee proposed that Option 3PCC(I) should include the provision of “flying crossovers” at the west end of Perth station

together with platforms, track and signaling which would enable “through-working” between the rapid transit lines (SWMR and Northern Suburbs line), albeit with train reversal but without inter-line conflict.

The Committee now has the benefit of an analysis and recommendations by the service managers of the Western Australian Government Railways Commission, the authority responsible for urban rail operations and accountable for service performance. This analysis, together with endorsement by the Acting Commissioner of Railways, is attached at Appendix B.

The WAGR analysis included an assessment of Options 3PCC and 3PCC(I). Whilst WAGR has identified shortcomings in both Western options (addressed further in Section 3 of this report), it has confirmed the Committee’s view that Option 3PCC(I) is superior to 3PCC from a rail operations perspective.

Integration with Bus Services

The Committee has been briefed upon further work that has been undertaken by PURD’s consultants, the City of Perth’s consultants, DPI and Transperth in relationship to the connection of the local bus network to the railway. Currently the Busport services a significant function by connecting many of the inner metropolitan bus services with the southern bus services which are to be replaced by the SWMR.

The Committee is aware of a number of options that have been developed which compare the development of a new bus interchange station adjacent to the Elder Street station, or by increasing the capacity of the existing William Street bus station, either by re-routing existing bus routes via Milligan Street or via Barrack and William Streets.

The Committee is of the view that the best Western option should include the necessary provisions to provide connectivity between all bus services in the Perth CBD, and the future rail system.

Bored Tunnel

The Committee has been advised that PURD has commissioned further work to examine a bored tunnel option as an alternative to the cut and cover option for the Western option. The predominant benefit of a bored tunnel would be to reduce disruption to Freeway traffic during the construction period.

The bored tunnel option will not reduce disruption caused by construction of the Elder Street station. However, it would overcome the disruption to the Freeway traffic that would occur over approximately 12 months. It is understood that the bored tunnel option is a feasible construction methodology albeit that it will result in the Elder Street station being significantly deeper and consequently more expensive.

The bored tunnel option also would have the advantage of eliminating the visual and noise impacts relative to the abutting permanent and short-stay residential land uses. However, the cost of boring is now estimated to be an additional \$57 million. The Committee did consider a bored tunnel option itself (Option 3A in its original investigations) and the costs provided at that time indicated that the additional cost was \$40 million.

The Committee however doubts that the additional \$57 million cost would be justified to overcome the disbenefits of disruption to Freeway traffic, visual and noise impacts associated with a cut and cover Western option.

Elder Street Station

The Committee has been advised that the PURD office has commissioned work relative to the design of the Elder Street Station. The construction of this station, as proposed within the original Perth City Council option, required the demolition of the eastern span of the Hay Street bridge and the construction of a temporary bridge to allow for the continuation of the CAT bus operations and pedestrian movements in this locality. However existing Hay Street traffic would not be able to use this bridge for a period of up to 12 months.

The Committee is advised that it is possible to relocate the Elder Street station further north which will avoid the impact upon the Hay Street bridge and therefore minimise the resulting disruption. Pedestrian access will still be maintained from the Elder Street station through escalators to the Hay Street bridge.

The Committee, in its original report, advised that the cost of the Elder Street station, as provided by the City of Perth, was approximately \$14.6 million. This allowed for a semi enclosed structure with basic finishes. The Committee also previously advised that it believed a budget of approximately \$20 million was more realistic for this station. Further discussion with the City of Perth has resulted in the City advising that it has no objection to increasing the allowance to improve the quality of this station. Estimates recently received by the Committee include an allowance of \$22 million for this station for the cut and cover option and \$28 million for the bored tunnel option. The Committee has not seen the full details of this latest work and therefore has not been able to form an opinion as to whether the changes to the Elder Street station as originally proposed would be beneficial.

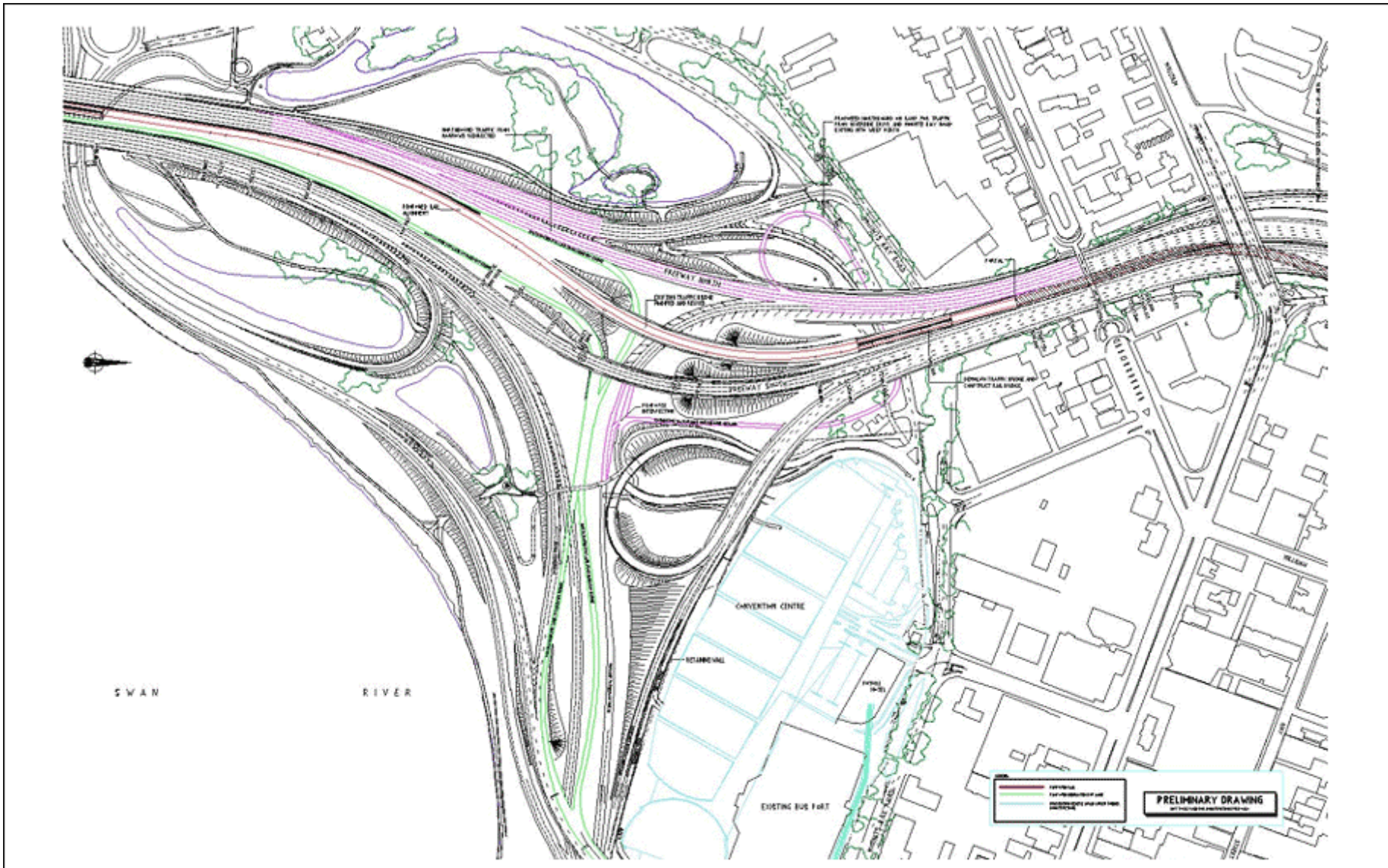


Figure 1a - Western Option Route (Option 3PCC(I)) (Narrows Bridge to Malcolm Street)

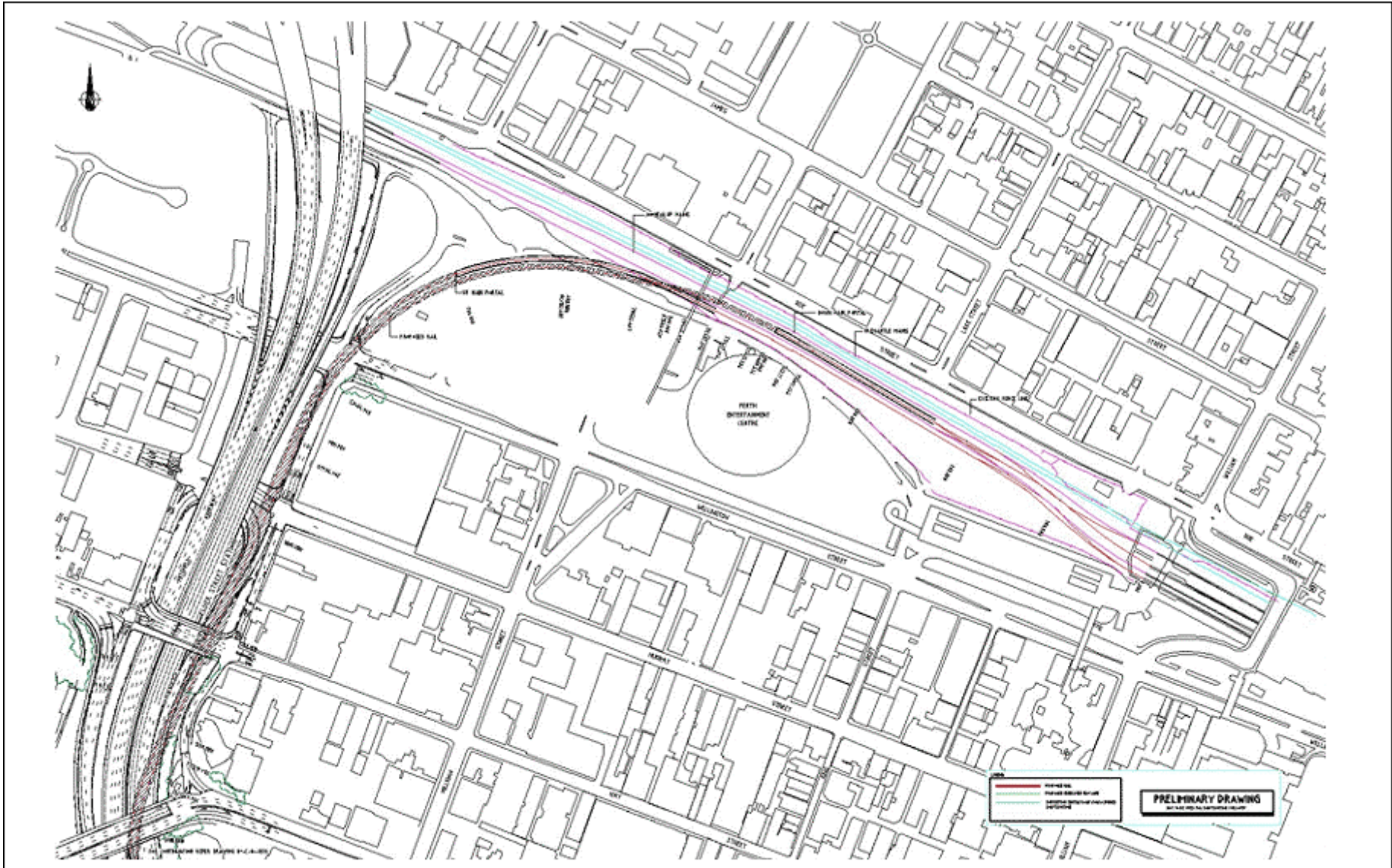


Figure 1b - Western Option Route (Option 3PCC(I)) (Malcolm Street to Perth City Station)

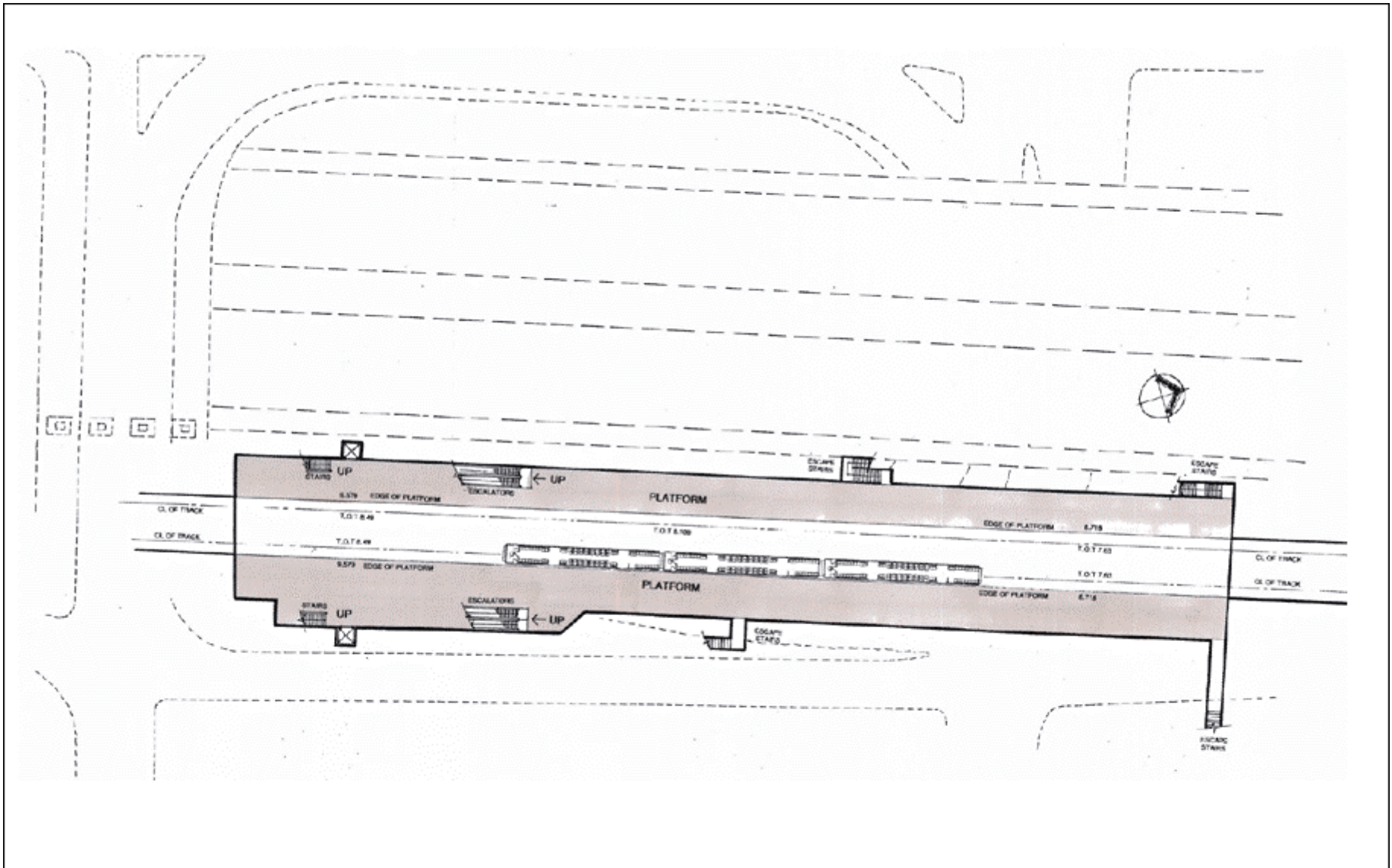


Figure 2 - Platform Plan for Proposed Elder Street Station

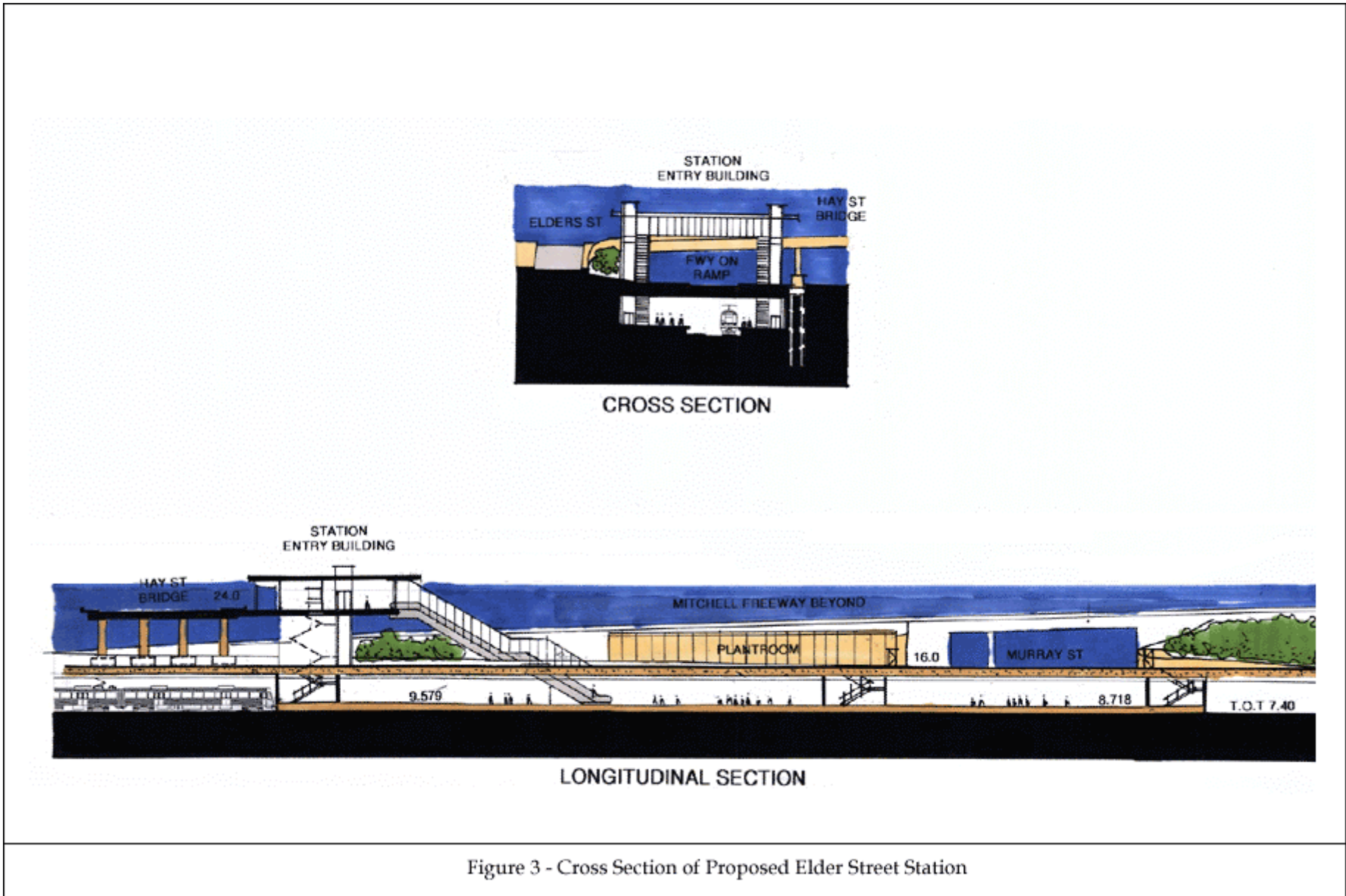


Figure 3 - Cross Section of Proposed Elder Street Station



Figure 4 - Proposed Elder Street Station (Facing North West from the corner of Hay and Elder Streets)

Finding 1

The Committee's view is that the best Western route option is that previously identified as 3PCC(I), incorporating the Freeway safety and rail operations as described in this report. The Committee is also of the view that this option should incorporate the reconnection of the bus services from the Busport to the Wellington Street bus station, and, should the Freeway option be ultimately chosen as the preferred route, that further consideration be given to the relocation of the Elder Street station and its design in order to minimise disruption to Hay Street traffic during the construction period and, in general, to provide an attractive, pedestrian-friendly station.

Central Option

Whilst the best available Western option does not differ from that which was previously identified, the best available Central option has been significantly enhanced since the Committee's first report by further work undertaken by the PURD team. This additional work, the Committee understands, has aimed to address the issues and concerns raised by the Committee in its first report.

Although the PURD's work has not greatly altered the *route* of Option 1D, sufficient changes have been made for the Committee to consider and evaluate the option afresh. This new proposal is code-named Option 1D(I) (*Option 1D(Improved)*).

Its key characteristics are as follows:

- Full enclosure of the railway on the foreshore from the Mitchell Freeway to William Street;
- Enhanced connectivity to the foreshore;

- Bored twin tunnels avoiding disruption in William Street;
- Closer integration of the new platforms with existing platforms at Perth station;
- Urban designs for new platforms and connecting spaces;
- Feasible program coordination with Convention Centre completion;
- Opportunity for removal of William Street bridge on the foreshore.

Option 1D(I) follows the same route as Option 1D, as shown in Figure 6.

Foreshore

After leaving the Mitchell Freeway alignment, the Central option rail lines now enter a cut and cover tunnel only 80 m east of the Freeway southbound carriageway. Enclosed in tunnel (with the top of the tunnel below existing ground level), the lines curve around the foreshore to the east and then north, aligning with William Street, before entering the new Esplanade station.

Esplanade Station

The vertical position of the Esplanade station was previously constrained by a major sewer line located immediately below the structure. Since release of the first PCRAC report, cost effective solutions for relocation of the sewer have been identified. As a result, the station is now positioned completely below ground. Whilst lowering the station adds to its cost, it avoids any long term impact on adjacent infrastructure and by developing additional depth, also allows bored tunnelling to commence beneath William Street just to the north of Mounts Bay Road. The reduced length of cut and cover construction along William Street in turn reduces disruption.

The Esplanade station will connect directly to the Busport via covered pedestrian walkway. The walkway will extend across and over William Street to the grassed foreshore area to the east, thereby providing an unbroken pedestrian connection from St Georges Terrace to the foreshore, with direct links to the Busport, Perth Convention Centre and new station.

PURD has advised the Committee that should construction along the Central route proceed, all works along the foreshore including construction of the Esplanade station can be completed prior to the opening of the Convention Centre in mid 2004, provided Master Planning is completed by the end of June 2002 and preparation of tender documentation commences immediately thereafter.

Esplanade Station to Perth City Station

From a point 50 m north of Mounts Bay Road, twin 6 m diameter tunnels will be bored beneath William Street. The tunnels will be separated by approximately 3 m and located approximately 6 m beneath the existing road surface. The tunnels follow the alignment of William Street until entering new Perth City station platforms east of William Street between Murray and Wellington Streets.

Perth City Station

Under Option 1D(I), the platforms previously referred to as the “William Street station” have been shifted slightly to the east and to the north, now extending under Wellington Street. The new platforms connect to the existing platforms at Perth City station via a foyer located under the Horseshoe Bridge at the western end of the existing station.

Concepts developed by PURD provide for an open plaza at the western end of Perth City station, with direct access to all station platforms as well as the Wellington Street Bus Station.

After departing the new Perth City station platforms, the rail lines curve to the west, passing under Roe Street before ascending to join the existing Northern Suburbs lines.

The Committee’s Criteria for Acceptability of a Central Option

In its first report the Committee stated:

“In the Committee’s view there are city planning benefits (especially in the longer term, when projected development proceeds) of a route that provides a rail station on the south central side of the city, in the vicinity of the Busport. While the William Street Announced route option must be rejected, a significantly enhanced central route option is feasible. For such a route to be acceptable, it would need to be demonstrated to the Government’s and the community’s satisfaction that the following criteria have been met:

- *It would strengthen rather than undermine the relationship of city and river;*
- *It would integrate with the Busport;*
- *It would positively support the Convention Centre;*
- *It would see no reduction in pedestrian space in William Street;*
- *Adequate traffic capacity would be maintained in William Street;*
- *It would have no detrimental effect on buildings at the intersection of William Street and Mounts Bay Road;*

- *It would provide no unreasonable disruption to William Street during construction; and*
- *Its main city station would connect effectively with the existing Perth City Station, in order to minimise walk times for transferring passengers and to maximise the potential to provide for all rail passengers under one roof.*

If these criteria were not met, then it is the view of the Committee that no central route option would remain feasible for the SWMR.”

On the basis of the information then available to it, the Committee also expressed some pessimism that these stringent criteria might be able to be met by a Central option. If they were not met, the Committee said, then the best available Western option, PCC(I), should be adopted.

In the event, the Committee is now satisfied that Option ID(I) will be judged to meet the criteria to the satisfaction of most dispassionate observers.

The Committee’s summary views on each of the criteria are as follows.

- ***Strengthen rather than undermine the relationship of city and river***

Under the revised Central option, the railway line disappears underground soon after crossing the Narrows Bridge.

Under the revised Central proposal, there will be no railway visible on the City’s foreshore.

The station near the junction of William Street and the Esplanade will provide greater access to the river foreshore than is currently available. A covered walkway will for the first time, enable unimpeded pedestrian access

from St Georges Terrace to the grassed Esplanade, to the south of the Allan Green Plant Observatory.

Barrack Square and the Perth Port will be some 400 metres from the new Station.

The role of the Esplanade as a focus of recreation and civic activity will also be enhanced by the new underground Esplanade Station. It will give access for passengers on all five suburban rail lines to activities like the Australia Day Skyworks, the Anzac Day march, circuses, opening/closing of the Perth Festival, and celebrations of the magnitude witnessed when Western Australia won the America’s Cup or its first football premiership. It seems likely that a true mass transit facility in the Esplanade will enhance Perth’s ability to use its foreshore as an appropriate place of community festivities, celebrations and other events.



Figure 5 – Australia Day Skyshow

Integrate with the Busport

The Busport will be 50 metres from the underground Esplanade Station. Access between the two will be by covered walkway, at the same level as the existing Busport's main barrel foyer and its roof gardens.

- ***Support the Convention Centre***

The underground station at the Esplanade will provide excellent transit access to the Convention Centre, in addition to bus services through the nearby Busport.

- ***No reduction in pedestrian space in William Street***

Under the Central option, pedestrian space in William Street after the completion of construction will remain unchanged.

During construction there will be some disruption in the vicinity of the intersection of William Street and Mounts Bay Road, although disruption management plans have been prepared with a view to minimising any adverse effects.

Under the previous William Street proposal, disruption to the lower part of William Street would have been far greater as the cut and cover method of tunnelling was proposed to be used.

The cut and cover method would have caused considerable disruption to retailers and pedestrians alike. By now adopting bored tunnelling, disruption will be negligible south of the intersection of Murray and William Streets. Significant works will need to be carried out at the site of the new station platforms east of William Street and between Murray and

Wellington Streets. However, these works will be contained within the boundaries of the sites to be purchased for the purpose of building the station and disruption to roads and malls will be minor.

- ***Adequate traffic capacity in William Street***

Under the original William Street proposal, traffic in William Street south of St Georges Terrace would have been reduced to two lanes. Under the revised proposal, existing traffic capacity is maintained.

Traffic capacity on William Street north of St Georges Terrace will not be affected.

- ***No detrimental effect on buildings at the intersection of William Street and Mounts Bay Road***

Previously, the railway line was to be constructed above ground at the zcorner of Mounts Bay Road and William Street and impacted on two buildings at that location.

Under the revised proposal, the line enters William Street underground. Detailed geotechnical investigation confirms that the tunnelling will have no detrimental effect on buildings at the lower end of William Street.

Building tenants will benefit from excellent station proximity.

- ***No unreasonable disruption to William Street during construction***

In the original William Street proposal, the line entered William Street between Mounts Bay Road and St Georges Terrace and continued via cut

and cover tunnel to a station near the intersection of William and Murray Streets.

Disruption using this method would have been severe, involving many months of construction during which traffic would not have been able to use William Street and businesses would have experienced major disruption.

With bored tunnelling now proposed, William Street will be largely unaffected and disruption will be minor.

- ***Main city station to connect effectively with the existing Perth City Station***

Under the original William Street proposal, a new city station would have been located under William Street south of Murray Street.

Pedestrians would have been discharged into William Street west of the existing malls and a significant distance from the retail arcades and department stores, which are mostly located in the vicinity of Forrest Place.

Under the revised proposal, the new platforms have been shifted northwards across Wellington Street and slightly to the east, attaining a convenient connection to the existing Perth City Station platforms. Pedestrian access to Forrest Place, shopping arcades and department stores is significantly improved.

Finding 2

The Committee is satisfied that the proposed Central route option 1D(1) has been sufficiently improved to satisfy the acceptance criteria specified in its first report. The detailed work since issue of the first report has not only satisfied the criteria, but has produced proposals that have the potential to integrate platforms at Perth station and contribute significantly to the connectivity, ambiance and amenity of the foreshore area at the foot of William Street.

Bored Tunnelling

During its earlier commission, insufficient information was available to the Committee for it to seriously consider a bored tunnel solution for either the Central or Western option. However, bored tunnelling has since been investigated in detail. Bored tunnelling is not only feasible, but in the case of the Central option, it is now an important part of the construction methodology.

Whilst tunnelling experience using a tunnel boring machine (TBM) is limited in Perth compared to deep basement and cut and cover methods, tunnel construction using TBM's is advanced, mature technology that is used extensively and successfully in a range of conditions. Recent, relevant examples of the use of TBM technology for mass transit systems include:

- Jubilee Line Extension, United Kingdom (tunnel and station excavation adjacent to historic buildings);
- Southern Railway Extension, Sydney (tunnels excavated beneath runways at Sydney Airport);
- Mass Rapid Transit, Singapore (50km of lines through the CBD area).

It is also worthy of note that a 1.4 km long, 2.1 m diameter bored tunnel was recently constructed for the Water Corporation of Western Australia as part of the Perth Main Sewer Replacement Project.

Detailed geotechnical investigation of the Central route has confirmed that the prevailing ground conditions are suitable for the construction of twin, 6 m diameter bored tunnels as proposed. Modelling of settlement effects and damage risk assessment indicate that of the 41 buildings and other structures along the route, only 9 are likely to require protective measures during construction.

Based on the evidence now before it, the Committee is satisfied that bored tunnelling can be carried out successfully in the Perth CBD.

Disruption

Disruption associated with construction of both the Central and Western options has now been examined in detail. Disruption Management Plans identifying disruption effects and describing their management have been prepared for the following scenarios:

- Central option 1D cut and cover tunnelling;
- Central option 1D(I) bored tunnelling;
- Central option 1D(I) bored tunnelling including removal of William Street overpass;
- Western Option 3PCC(I) cut and cover tunnelling; and
- Western Option 3PCC(I) bored tunnelling.

The adoption of bored tunnelling for the Central option has a major, positive impact on disruption. Under this scenario, activities within the city will now be largely unaffected. Temporary diversions will be required for

traffic entering and exiting the Mitchell Freeway but Freeway through traffic will not be affected. Other diversions will affect traffic along Mounts Bay Road, the Esplanade, Mill Street, Spring Street, Barrack Street and the Wellington Street/William Street intersection for about 10 months. Impacts on pedestrian movements will be minor and building access will not be affected by the works. This represents a marked change from the cut and cover scenario, where severe disruption along William Street was unavoidable.

Removal of the William Street overpass does not significantly add to disruption for the Central option.

There are major traffic impacts associated with the Western option cut and cover scenario. Under this option, parts of the Freeway and the Western sector of the city are affected for around 30 months, including a 7 month period where Freeway width will be reduced from four to three lanes in each direction and speed restricted to 50 km/hr. Modelling carried out by Main Roads Western Australia confirms that these restrictions will significantly increase peak hour congestion. Hay Street, Murray Street (each 11 months) and the Murray Street/Elder Street Freeway on-ramp (26 months) will also be separately affected.

As is the case for the Central option, bored tunnelling for the Western option substantially reduces disruption; under a bored tunnelling scenario for the Western option, the impact on Freeway traffic is minimal.

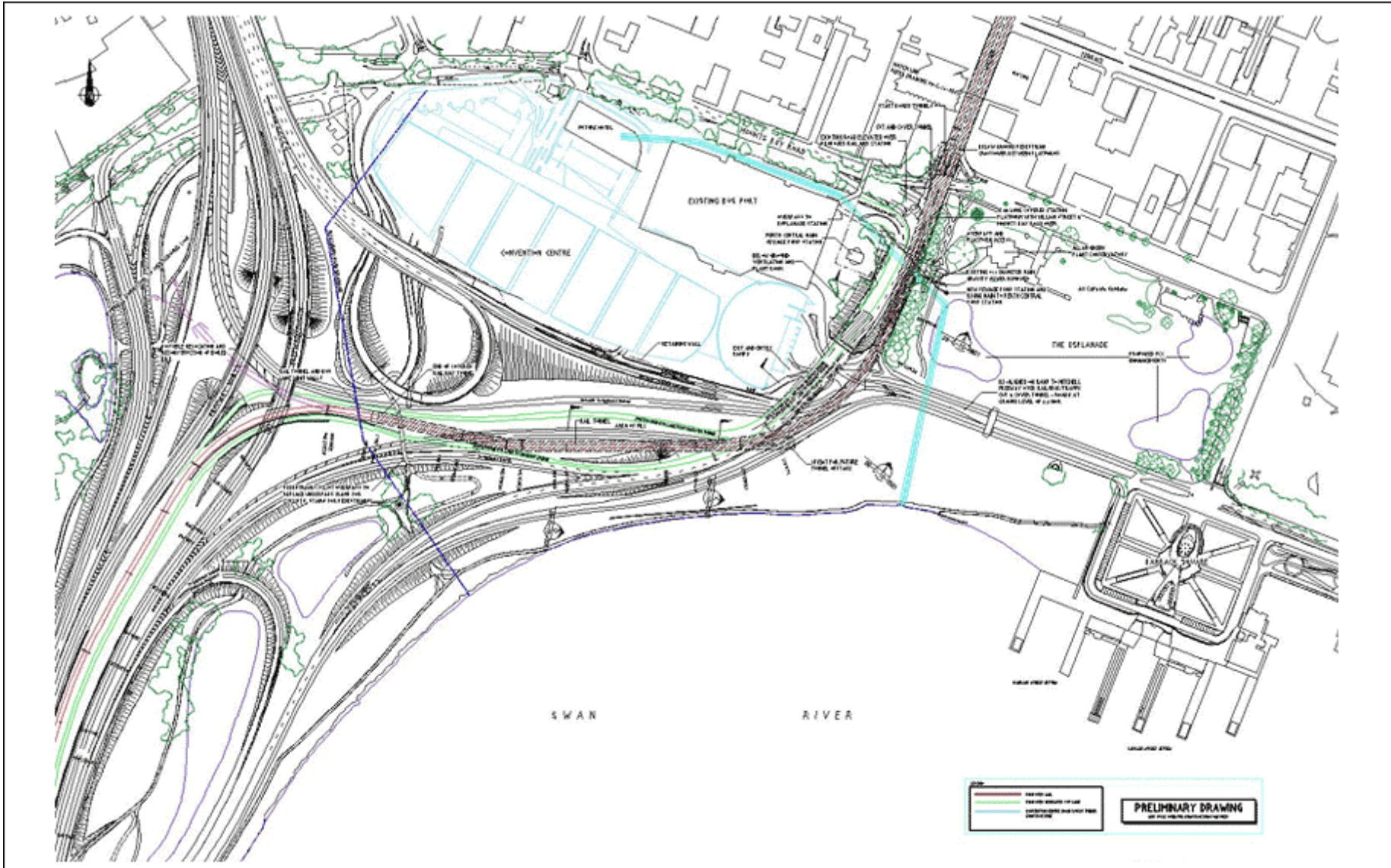


Figure 6a - Central Option Route (Option 1D(I)) (Narrows Bridge to Mounts Bay Road)

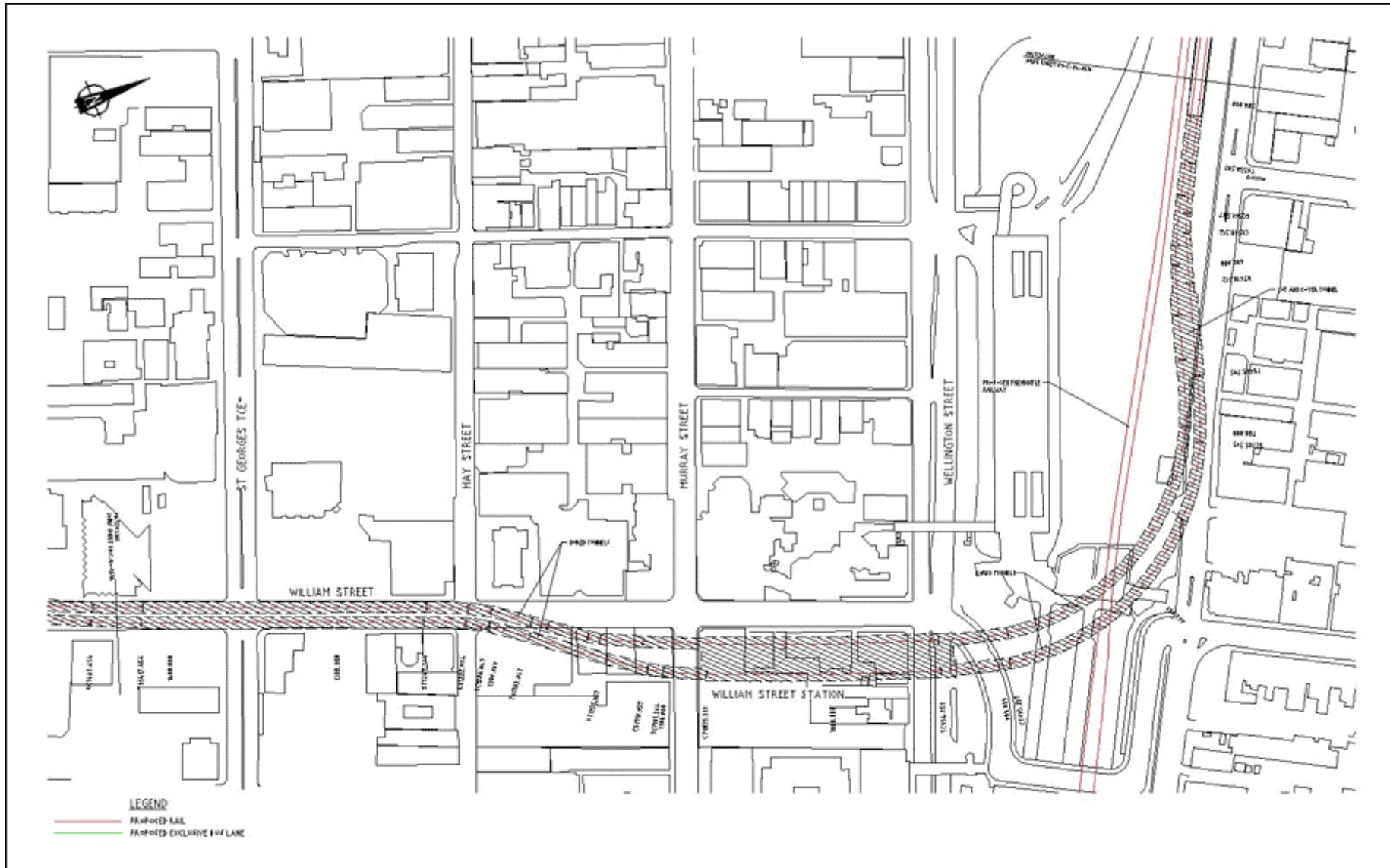


Figure 6b - Central Option Route (Option 1D(1)) (Mounts Bay Road to Perth City Station)

3. Evaluation of the Two Options

Introduction

In its first assignment, the Committee used a Multi Criteria Assessment to undertake a comparative evaluation of the numerous route options then considered. There has not been sufficient time or need to repeat a similar assessment of best Central and Western options determined by the Committee. Alternatively, the Committee has identified key issues for consideration, after taking into account the information and views before it, Community Consultation, the 24 April 2002 Stakeholder Workshop and submissions from the City of Perth, PURD and others. These key issues are elaborated on as follows.

Mass Transit

The strongest justification to build a new rapid rail transit link is the contribution it can make to the movement of very large numbers of passengers. On a transport corridor like Perth's South West, which also offers the prospect of a high quality freeway to accommodate those who choose to use their cars, the railway's greatest contribution to the economic, social and environmental sustainability of the city will be at those times when it is carrying the largest number of people, in the week-day peak periods and occasionally, for a special event such as the Australia Day Skyshow. It is during these peaks that road capacity will be most stretched and road congestion, pollution and energy consumption highest. This is not to deny the role or usefulness of the railway for shoppers, leisure and other travelers, but a train system is built to meet its peak demand and by definition, will not have trouble in meeting demand at other times. To invest in a \$1.4 billion railway that does not seek to maximise its role in the peak period is to lose sight of why it is built at all.

To some extent, the morning peak includes children on their way to school, but the peak period is principally a commuter period when patrons are moving to and from work.

Figure 7 shows where people work in Perth. The height of the vertical bars in the figure represents not buildings, but numbers of people daily working at each site. The higher the bar, the more people who work there.

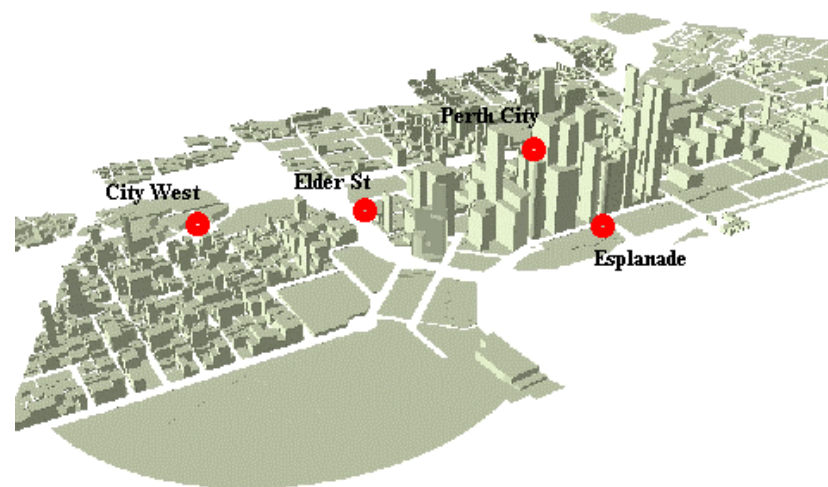


Figure 7 – Employee Location in Perth
Existing and proposed station location indicated, showing the relationship to employment density.

The figure clearly shows that some parts of Perth employ much larger numbers than others. The majority of the many thousands of people who daily commute into the city are headed for the business sector on and around St Georges Terrace.

Station Location & Travel Time

It is worthwhile momentarily to put aside the issues surrounding rail *routes* and to concentrate instead on those affecting *stations*. As the Committee observed in its first report, the choice of route will generally be a comparatively minor issue for rail passengers: what is seen from the window of the moving train is less important than the speed of travel and convenience of access to desired destinations, including any transfer between modes if required.

The State Government has already made a contract commitment which will see the SWMR benefit from some of the fastest city trains ever built. Capable of speeds of up to 130 km/hr, they have been chosen in order to provide rail travel times which will offer strong incentive for people to choose rail over car travel to Perth.

In transport planning, it is well established that the further a passenger must walk to or from a station then the less inclined he or she will be to catch the train. This is even more important at destination stations where (unlike the home origin) the potential for the rail traveler to be collected by car is far more limited.

The Department for Planning and Infrastructure has used the 400 m “*Pedshed*” (the line joining all points located at the “5 minute walk” distance of 400 m from a central point) as a key determinant for station location. It has been argued that passengers are prepared to walk much

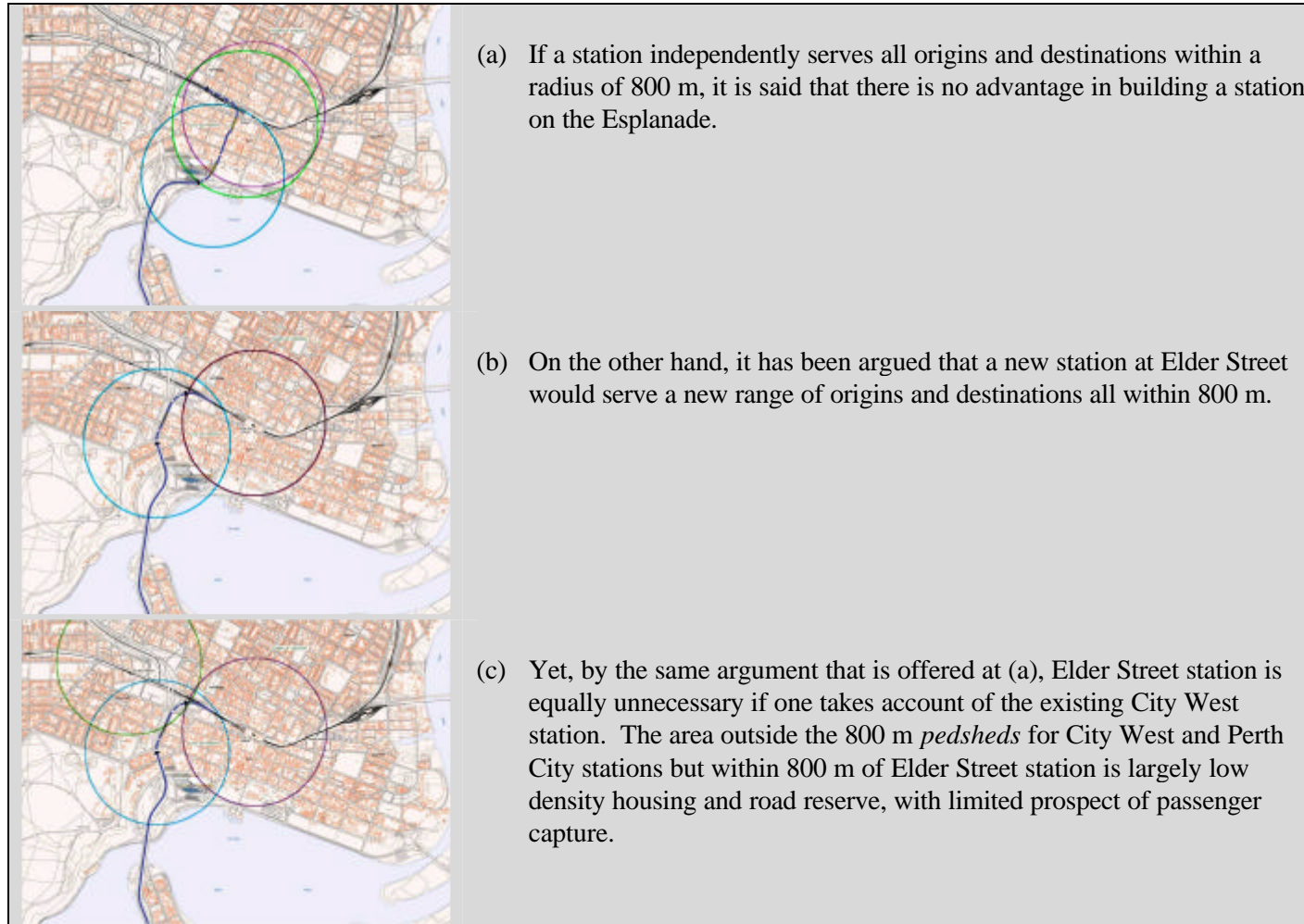
longer distances, and that choice of station location is more realistically based on 800 m (10 minutes walking distance) *pedsheds*. In particular, supporters of the Western option have suggested that the separation of the Elder Street and existing Perth City stations is better aligned to passenger catchments than the more closely spaced stations on the Central route. This argument is presented in Figure 8.

The argument and its conclusions are specious. There is no evidence to suggest that rail travelers in Perth or anywhere else are indifferent as to whether they will need to walk a long or a short distance to and from a station.

Moreover, if passengers were indeed indifferent as to whether they faced a 10 or 15 minute walk when they alighted at a city station, then the Committee fails to see the justification for the purchase of super-fast railcars for the SWMR.

The challenge, as we see it, is to locate city stations so as to put the largest numbers of potential present and future passengers within the shortest feasible distance of the places they wish to go. The train’s job is to boost accessibility.

Figure 8 – The 800 m *Pedshed* Argument



Development Railways

In the latter part of the nineteenth and in the early twentieth centuries, in Australia and elsewhere, some railways were built as a means of “opening up” land. Before cars, buses and trucks, in particular, a railway built in virgin territory was able to render high value to hitherto worthless land.

The Committee is loathe to extend this argument to twenty-first century Perth, however.

The experience of stations like City West and McIver does little to encourage us either. We have identified no appreciable boom in land values or any major growth spurt in their vicinity.

The Committee is unconvinced that a station constructed on the side of the Freeway reserve at Elder Street will herald any new boom in that vicinity, or dramatically change land uses.

The area suffers topographical disadvantages. It sits on a ridge that falls away to the north. Pedestrian access in the north-south axis is poor and the freeway does not assist westerly connections.

The exception would be if the area in the vicinity of the station had been identified as a redevelopment area (like Subiaco, East Perth or Homebush in Sydney) with a clear plan and committed works. There is no such plan, of course.

We have been advised of a scheme to cover over the Freeway cut in the vicinity of Parliament. It would be a folly, however, to commit to build a railway station in the vicinity on the basis of such unfunded possibilities.

The Freeway can be covered over regardless of whether there is a railway there.

With the CBD currently served by only one city station, the Committee cannot enthuse about the City’s second station being built in the vicinity of Elder Street. A station built in the expectation of it generating major new developments would be a cargo cult station.

There is perhaps one other possibility. This would envisage initial construction of the SWMR along the Western route, but without an Elder Street station at this time. The option would allow for the station to be constructed at a later date, when development of the area was planned and committed. Meantime, it could be argued, the Western route would at least keep alive that option while channeling the SWMR along the (potentially) less expensive Freeway route, to deliver passengers to City Station.

The Committee does not subscribe to this view. Whilst the location of the proposed Elder Street station is clearly less than ideal, it lies within an area which does not have convenient access to rail services at present. Patronage forecasts indicate that the station would serve more passengers than the existing City West station. Construction of a Western route without serving this new passenger catchment is not considered to be a practical solution.



Figure 9 – Site of Proposed Elder Street Station

The car in the photograph is crossing Murray Street. To the right is the Mitchell Freeway overpass. The station would be located underground, extending from beneath the car to just short of the Hay Street bridge visible in the background.



Figure 10 – Murray Street in the Vicinity of the Proposed Elder Street Station

The land uses within this area are low intensity activities (carparks, warehousing, vehicle service/repair, etc) which promote low pedestrian traffic. Coupled with a large extent of road pavement, as in Figures 9 and 11, this is a poor quality pedestrian environment.

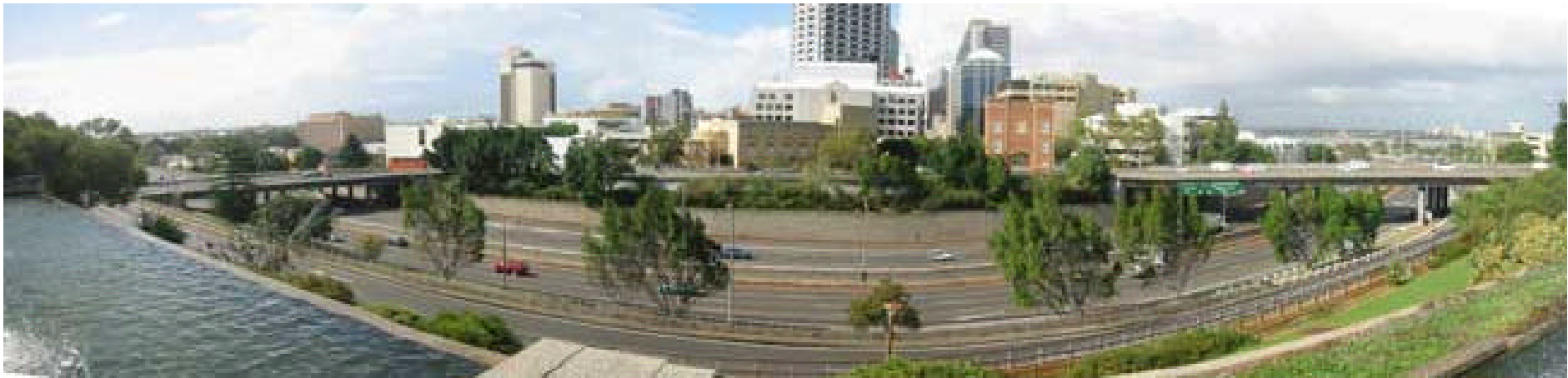


Figure 11 – View Across Freeway to Site of Elder Street Station

Outlook from the west, south of the site for the proposed station. The station would extend to immediately north of the Hay Street road bridge (left of centre), located just east of the southbound Freeway carriageway. The limitations on station access are clear.

Rail Operations

As indicated in Section 2 of this report, a detailed comparative assessment of rail operations for the Central and Western options has been carried out by WAGR.

WAGR's comparison of the best Western and Central route options is summarised in Section 1.0 of its report at Appendix B. The Commission strongly favours the operating scenario for the Central alignment in preference to those for the Western options.

In essence, WAGR has found the Western option 3PCC(I) inferior in terms of both reliability and capacity for patronage growth. The Committee recognises the validity of this conclusion and supports the findings from the WAGR analysis.

WAGR also commissioned Consultant Booz Allen Hamilton to undertake a modelling analysis of operational reliability for the Central (1D(I)) and Western (3PCC(I)) options (see Appendix C). The results of this analysis show that the Central option will result in better On Time Performance than the Western option. This margin is 2% across all services, but for the critical peak period, it is 7%. The difference in On Time Performance arises from the Western option's more complex (and hence less reliable) rail configuration.

The findings of the operational reliability analysis add weight to WAGR's recommendations. The Committee views On Time Performance for the Western option (particularly at peak period when patronage demand and customer expectations are highest) as a key deficiency.

Bus Services

The integration of regional bus services that have routes through the Perth CBD with the future train services is an important element in maximising public transport patronage. The Committee is advised that more than a quarter of all daily public transport trips involve at least one transfer, and that transferring (travel time and convenience) is one of the most significant factors in the public's choice between public transport and the private motor vehicle.

As discussed in Section 2, a significant amount of additional work has been undertaken on this subject since the Committee's original report. This work has identified 31 existing bus routes that would be disconnected from the future rail system should the Western route be favoured over the Central route. Future bus network plans for the Central and Western options were considered by a team of Transperth, DPI, WAGR and City of Perth officers over a period of three months. It is important to note that, although the City of Perth officers questioned philosophically whether there is a need to recreate the lost connections, they have not expressed any concern with the route network structure or operational costs developed as a result of this work.

Under the Central option, the Esplanade Station will provide the connections to these bus services at the Busport and therefore there is no requirement to re-route buses.

Under the Western option, DPI and Transperth consider it essential that the 31 routes be reconnected either via a new bus station constructed adjacent to the Elder Street rail station or through expansion (effectively doubling in size) of the existing Wellington Street bus station. This results in the requirement of additional capital expenditure funding of between \$19.0-\$30.4 million and additional annual operating costs of between \$200,000-\$738,000 depending upon which bus network option is chosen.

Confirmation of these requirements is included in correspondence to the Committee from the Department for Planning and Infrastructure which is attached as Appendix D.

Patronage

The Committee has had access to the Department for Planning and Infrastructure's Strategic Transport Evaluation Model. In its original report the Committee advised of the projected "all day public transport journeys" for each of the options under consideration. Those results indicated that the Central option would result in a 49% increase in patronage relative to the Western option. However, this modeling made no allowance for reconnection of bus services to the future rail system for the Western options as discussed in the previous section.

Further modeling has been undertaken which allows for this reconnection of the bus services, and results indicate that the patronage figures for both the Western and Central options are now much closer. These results are understandable and clearly demonstrate the importance of providing good connectivity between bus and rail services should the objective be to maximise public transport patronage.

The latest modeling however still indicates that the Central option will provide greater public transport journey patronage than the Western option. This result is consistent with the 2006 *pedshed* analysis originally undertaken by the Committee for each of the options. Whilst the Western option showed a slight increase (2.6%) for patrons within an 800 m *pedshed*, the Central alignment provided for a significant increase (45%) in potential patrons within a 400 m *pedshed*.

This projected increased patronage for the Central option is also consistent with the fact that a Central alignment will have better connectivity between rail and bus services. For the Western option it is projected that between 85,000 and 311,000 km of additional bus trips per annum would be required, resulting in patrons having to spend additional time on buses to enable them to transfer to the rail service, therefore making these public transport trips less attractive.

A City Rail Loop

The relationship between the SWMR and any future city rail loop has received continuing attention.

Advocates of the Western route have suggested that its construction would contribute the western side of a future loop that could encircle the CBD. They have suggested that the Central route, by traversing the middle of the city, makes no such contribution.

From the outset, however, the Committee is concerned if there were a sense that the SWMR's route should be chosen so as to commence the construction of a rail loop for Perth. The Committee has not seen sufficient analysis to be even moderately confident of

- the role and rationale of any future city loop,
- the mode of a loop, or
- its route.

Unless and until such detailed analysis and planning has occurred, there is a risk of some distorted decision making, the Committee feels. This work is still many years distant, it is suggested, and a Government decision on a future loop is even further away. Transparently, the community's expenditure on the SWMR will consume much of the available funds for major public transport works in the immediate future. This one project, we understand, stands to wield an immense influence on the State's budget and works program, with no early prospect of it being joined by a second major transit project, involving the construction of some 4-5 km of additional underground railway. In its first report, the Committee modeled a potential future loop, and noted that it did not produce a significantly higher patronage for the considerable investment required.

The Committee agrees that the current decision on the SWMR's route should not be allowed to limit any future decisions about a city loop. In fact, in order to retain the flexibility to enable a future decision, the Committee recommended in its earlier report that:

“... the Western Australian Planning Commission should be requested to investigate the reservation of underground space and related land suitable for a future underground rail loop with a planning horizon of 25 years. The Department for Planning and Infrastructure should be tasked and funded to support this and other strategic rail planning activities.”

However, the Committee is equally concerned that a decision on a future city loop should not be treated as a *de facto* result of the current decision about the route of the SWMR.

If a decision were made to route the SWMR along the Freeway specifically in order to contribute a western leg of a future city loop, it could be a failure if, as a result of subsequent analysis or conditions, any of the following applied in later years:

- No city loop were constructed;
- The loop did not extend far enough west to serve activity in that sector;
- A “transverse” distributor, rather than a loop, were chosen; or
- An alternative surface loop were chosen, with say a light rail system.

In addition, the physical connection of a future loop with the proposed Western option requires a reduction in Freeway traffic lanes or alternatively, significant impact on adjoining property to enable widening of the Freeway to reinstate its lost capacity. The Commissioner of Main Roads has stated that the existing capacity of the Freeway must be maintained and it is unlikely that this position will vary in the future.

The Central route does not prevent a future loop being constructed. In fact it can be argued that it enhances the possibility by providing two integrated transport hubs, one to the north of the central area and one to the south.

Economic & Financial Analysis of the Two Options

Cost

Construction of a railway into any large city is a complex conceptual, planning and logistic exercise. As the Committee has previously observed, planning for this project has earlier been hampered by failure to identify and systematically evaluate alternatives in a transparent and consultative manner. The Committee is satisfied that much has been done to rectify these inadequacies. It believes that a solid analytical base has been established, on which a decision can be made and detailed master planning can proceed.

In the Committee's view, a process "breakthrough" occurs when the project ceases to be defined simply as a task to route a railway. Until then, too much attention can be focused on "lines on maps", and proportionately little attention given to the potential for a major improvement in the infrastructure and fabric of the city, of how it works for people.

The Committee believes this shortcoming was in the minds of many of those who expressed dissatisfaction with the plans that were previously mooted.

It is right that the community should not wish the new railway to be an eyesore. The Committee strenuously agrees, and in its first report established stringent criteria to that effect. It is equally proper that the new railway should not be a disruptive or negative influence on the life of the city. The new railway can in fact be a force for a stunning *enhancement* of city life. The Committee considers that any aspiration less than this is to sell the \$1.4 billion project short. We should resist the temptation to treat the railway as a necessity to be endured.

In its first report, the Committee expressed the view that a Western route would be an acceptable means of bringing the SWMR into the city if it should prove infeasible to enter the city along a more direct Central route.

Indeed, the Committee expressed some pessimism as to whether a feasible, practical Central route could be identified.

However, the Committee is now satisfied that, with a combination of cut and cover and bored tunnelling techniques, and some inspirational thinking about what might make Perth work better, a Central route is both right and feasible.

The more closely the Committee has examined the options, the more clear it has become that it is necessary to take into account such matters as engineering and project management costs, contingencies, non-rail transport costs and risk.

It is not just the recommended route that is affected. Since the Committee's first report, further investigation has more robustly identified other issues for resolution, whatever route might be chosen. The Committee is conscious that some may argue that its cost estimates are inflated. We do not believe that they are; we are vigilant for the integrity of a decision-making process that must not be undermined by unrealistic cost estimates. In saying this, the Committee has been made aware of the significant additional design and estimating work that has been undertaken for both the Central and Western options. After discussion with the Quantity Surveyors, the Committee is satisfied that the estimates now do not require application of separate, nominated contingency amounts.

As for the first PCRAC report, cost estimates were prepared by quantity surveyors Rawlinsons (WA). Risk quantification was managed and facilitated by project manager Clifton Coney Stevens. All cost estimates were subjected to rigorous review by the Committee. Details of cost estimates are provided at Appendix I.

The estimated costs for the Committee’s recommended Central and Western options (3PCC(I) and 1D(I)) are summarised in Tables 1 and 2 respectively. The refinement and detailed examination of the two options has introduced a number of significant variations to the estimated costs shown in the first report. Cost variations for each option are highlighted, with explanatory notes detailing the reasons or justification for the variations as understood by the Committee.

Table 1 – Central Route Cost Comparison

COST ELEMENTS	OPTION 1D [\$M] First Report	OPTION 1D(I) [\$M] Improved
Tunnelling, Track & Other Works	50.0	111.0
Central Station	50.0	52.0
Esplanade Station	11.0	18.0
Quantified risk	38.2	14.5
Contingencies	11.1	Distributed
Total	160.3*	195.5*

* Note – This amount excludes the pro-rata share of Engineering Overheads costs. For the entire SWMR project, these costs total \$137M. Under a Central option, the Perth City section of the project is now accountable for \$27.0M from the total Engineering Overheads budget. Equally, in the Committee’s first report, the Engineering Overheads cost component for Option 1D was \$16.6M, resulting in the total cost of \$176.9M identified in Table A-3 of that report. The PURD office has assured the Committee that the estimated Engineering Overheads cost can be met from the Engineering Overheads budget (under Cost Area 1) for the entire SWMR Master Plan.

In the main, the cost differences between the two proposals represent an increase in scope of the works by PURD in order to satisfy the qualifying

criteria for acceptability as specified by the Committee in its first report, together with a significant reduction in quantified risk (-\$23.7M) as a result of the adoption of bored tunnelling beneath William Street.

The scope increases/variations that have impacted directly on the construction costs for Option 1D(I) are:

- Additional structures to completely cover the railway across the foreshore including additional ventilation, service relocation and the realignment of Riverside Drive/Freeway ramps to accommodate Main Roads and City of Perth planning (+\$25M);
- Lowering of Esplanade Station to accommodate bored tunnelling plus higher quality finishes (+\$7M);
- Bored tunnelling beneath William Street in lieu of cut and cover (+\$10M);
- Relocation and extension of new Central Station platforms, Horseshoe Bridge promenade and plaza (+\$2M); and
- Additional tunnel length in Northbridge rail reserve due to increased depth and relocation of station platforms (+\$10M).

Further, it should be noted that as a result of detailed scrutiny of cost estimates by PURD, the quantity surveyors and the Committee, it has been identified that the cost for tunnelling, track and other works as included in the first PCRAC report should be increased by \$16 million for this option, bringing the total additional cost of Option 1D(I) works to \$54M.

Table 2 – Western Route Cost Comparison

COST ELEMENTS	OPTION 3PCC(I) [\$M] First Report	OPTION 3PCC(I) [\$M] Updated Estimate
Elder St Station	18.2	22.0
Freeway Works	12.5	10.9
Flying Crossovers	14.0	14.0
Central Station	13.0	21.0
Other Works	65.2	69.1
Additional Rail-cars	18.0	31.5
Bus Investments	-	21.0
Quantified Risk	2.9	3.9
Contingencies	11.0	Distributed
Total	154.8*	193.4*

* Note – This amount excludes the pro-rata share of Engineering Overheads costs. For the entire SWMR project, these costs total \$137M. Under a Western option, the Perth City section of the project is now accountable for \$21.0M from the total Engineering Overheads budget plus additional annual operating costs for trains and buses presented as a Net Present Value (NPV) of \$27.1M, bringing the total estimated cost for Option 3PCC(I) to \$241.5M. Equally, in the Committee’s first report, the Engineering Overheads cost component for Option 1D was \$11.7M which together with an NPV of \$16.0M for additional rail operating costs, resulted in a total cost of \$182.5M.

The differences between the two Western route cost estimates represent increases in the scope of the works for terminating the Armadale line and accommodating bus service relocation from the Busport, together with significant increases in additional railcars and associated operating costs arising from in-depth scheduling and costing investigations carried out since the release of the first report.

The scope increases/variations that have impacted directly on the construction costs for Option 3PCC(I) are:

- More detailed architectural investigations revealing the cost for Elder Street station to be higher than previously forecast (+\$3.8M);
- Additional platform, track and signalling works at Perth Station for terminating the Armadale and Nicholson Road services (+\$8.0M);
- Relocation of bus services and purchase of additional buses (+\$21.0M);
- Additional Freeway tunnelling to accommodate Main Roads’ requirement to maintain Freeway lane capacity and in lieu of widening the Freeway but including bridgeworks adjustments (+\$3.9M).

Financial & Economic Evaluation

A financial and economic evaluation of the Western and Central options was carried out by Mr Richard Bullock, a highly experienced transport economist and analyst. His report (updated for current costs) is attached at Appendix E.

The findings of the economic and financial evaluation are summarised in Tables 3 and 4. The values in the Tables are presented as the difference between Option 3PCC(I) and Option 1D(I); positive numbers mean that Option 3PCC(I) has greater costs or lower benefits.

The annual differences are discounted at 8% over 28 years to 2003, representing 30 months of construction followed by 25.5 years of operation. No residual values have been allowed for the additional railcars required under Option 3PCC(I).

Table 3 – Summary of Economic Evaluation of Options 3PCC(I) and Option 1D(I) (\$M 2002)

Source of difference	\$M
Construction	(56.9)
Disruption during construction	15.2
Rail operating cost	11.5
Additional railcars	29.5
Bus operating cost	2.1
Bus terminal	12.2
Additional buses	6.1
User benefits	85.8
Total	107.2

Table 4 – Summary of Financial Evaluation of Options 3PCC(I) and Option 1D(I) (\$M 2002)

Source of difference	\$M
Construction	(56.9)
Rail operating cost	11.9
Additional railcars	32.4
Bus operating cost	2.3
Bus terminal	13.4
Additional buses	6.7
Land tax	2.5
Total	11.3

Summary

Option 1D(I) is better than Option 3PCC(I) from both an economic and financial view. Economically, the lower construction costs are balanced by the greater traffic disruption cost during construction. Option 1D(I) does not have the additional rail and bus operating and capital costs which Option 3PCC(I) requires and also has substantial user benefits from its more Central alignment. Overall Option 1D(I) has economic benefits over Option 3PCC(I) with a Net Present Value (NPV), discounted at 8% to 2003, of \$107 million. It is also better financially, with an NPV of \$11 million on the same basis.

It is noted that the required capital funding for Option 1D(I) is \$195.5 million under Cost Area 4 of the SWMR Master Plan.

Finding 3

Based upon the work undertaken by the Committee in its original report which included its Multi Criteria Assessment and the analysis of the key issues as elaborated within this report and including –

- *Mass transit,*
- *Station location and travel time,*
- *Development railways,*
- *Integration with bus services,*
- *Patronage,*
- *Rail operations, efficiencies and reliability,*
- *Disruption,*
- *Future city rail loop, and*
- *Economic and financial considerations,*

The Committee finds that the improved Central option 1D(I) is the preferred route compared to the Western route 3PCC(I) for the City of Perth section of the SWMR and recommends that Master Planning continues on the basis of this alignment.

4. Recommendation

The Committee recommends that the South West Metropolitan Railway should enter the Perth CBD by a route which demonstrates all of the following features:

- (a) It should cross the Swan River by means of the most efficient augmentation of the capacity of the existing Narrows Bridge.
- (b) Having crossed the bridge it should be entirely concealed below ground within 150 metres from the Mitchell Freeway reserve. There should be no walls, bunds, mounds or any other devices of concealment. Upon completion of construction, there should be no surface vestige of the SWMR rail line apparent, aside from stations, their access facilities and associated skylights, vents etc. These, in turn, should be of superior amenity and design.
- χ (c) The route should provide a new Esplanade Station which:
 - is located adjacent to, and connected directly to, the existing City Busport, in order to facilitate passenger interchange,
 - provides excellent passenger access to the Convention Centre, the City Foreshore and that part of the city to the station's immediate north, including St Georges Terrace, and
 - Has no adverse impact on the operation of the Convention Centre and particularly, meets accepted standards for noise, vibration, security and construction disruption.
- (d) The route should continue northward from the Esplanade Station in twin bored tunnels to a point where north-south rail platforms will be constructed for the existing City Station. These platforms will be:

- Beneath the existing buildings east of William Street and between Murray and Wellington Streets, stretching under Wellington Street to within 50 metres of the current station platforms,
- Embrace urban design principles which seek to minimise walk distance, provide ease of access, enhance station safety and security and maximise connectivity to city destinations.

- (e) The SWMR will connect at City Station to the Joondalup (Clarkson) line to enable the through-running of newly acquired three-car railcar sets, along the 105 km route from Mandurah to Clarkson.
- (f) William Street will be subject to minimal disruption during construction of the new railway and will continue to operate as normal after construction is completed.

Some Semantic Considerations

The Committee is concerned that this recommendation carries with it a number of risks of continued misunderstanding. In particular, the Committee reiterates the following points:

- (a) Although the recommended route will travel beneath William Street for a distance of about three city blocks, it will not significantly intrude upon traffic or pedestrian flows on William Street, either during or after construction. The railway will not be *on* or *above* William Street; nor will it be constructed by cut and cover methods (which would require excavation in the street during construction). The recommended Central route is *not* usefully labelled a “William Street” option.

- (b) South of the Narrows Bridge, the route of the SWMR has already been determined and announced by Government. It has not been part of the Committee's terms of reference. The railway route will follow the Kwinana Freeway to just north of the Narrows Bridge. To that extent, of course, the SWMR route, even under this Committee's recommendation, will be a "Freeway Route."

- (c) The SWMR, like the existing four suburban rail lines, will terminate at the City Station. Passengers will be able to transfer between Perth's five rail lines at this "hub" station. The Joondalup and Mandurah services will be provided by through-running trains, as will the Fremantle and Midland services (as at present). The Armadale trains will terminate at City Station.

5. How the Recommended *Option 1D(I)* Might Work

This report is not a Master Plan. Detailed further planning would occur after Government approval of the recommendations proposed herein. This section of the report seeks to illustrate the concepts envisaged by the Committee.

The Perth City Rail Advisory Committee contends that the construction of the SWMR along the Central alignment as proposed in this report will profoundly enhance the amenity and sustainability of Perth City while simultaneously providing the best feasible and affordable route for the railway.

By planning more broadly for the future city environment, the opportunity for fundamental enhancements becomes available. The construction of the SWMR through Perth City provides a unique opportunity to re-unite the city with its river foreshore and Northbridge.

The benefits of this visionary approach to the city's fabric can extend far beyond the excellent new rapid transit connection. Led by the State Government, with the support and cooperation of the City of Perth and the active involvement of the city's users and businesses, our State capital can enter an exciting new era.



Figure 12 - The Location of the Proposed Esplanade Station
Future view of the foreshore at night, viewed from South Perth

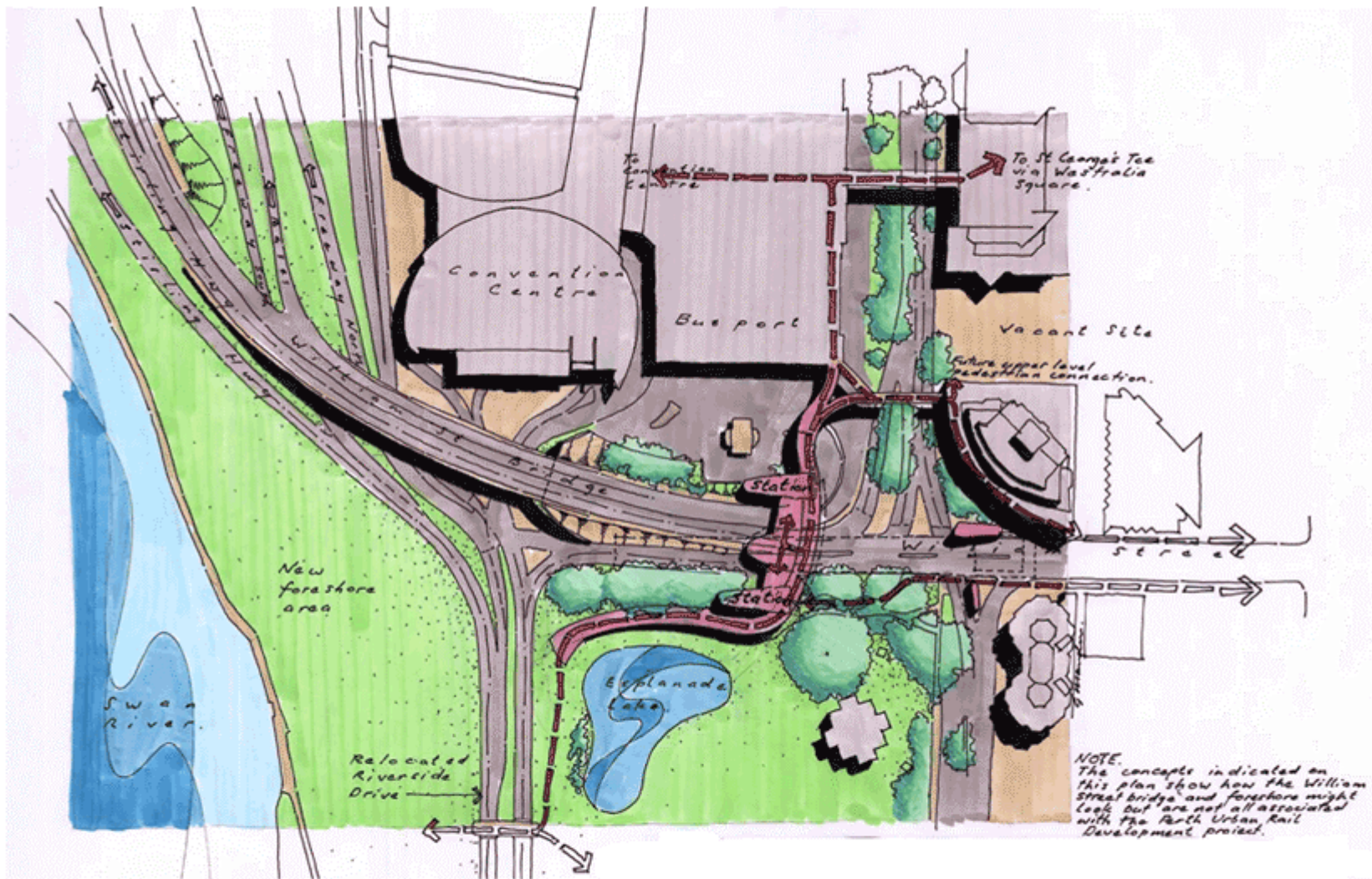


Figure 13 - Concept Plan of New Esplanade Station Pedestrian Access

New pedestrian links connect St Georges Terrace to the Convention Centre, Busport, new Station and foreshore

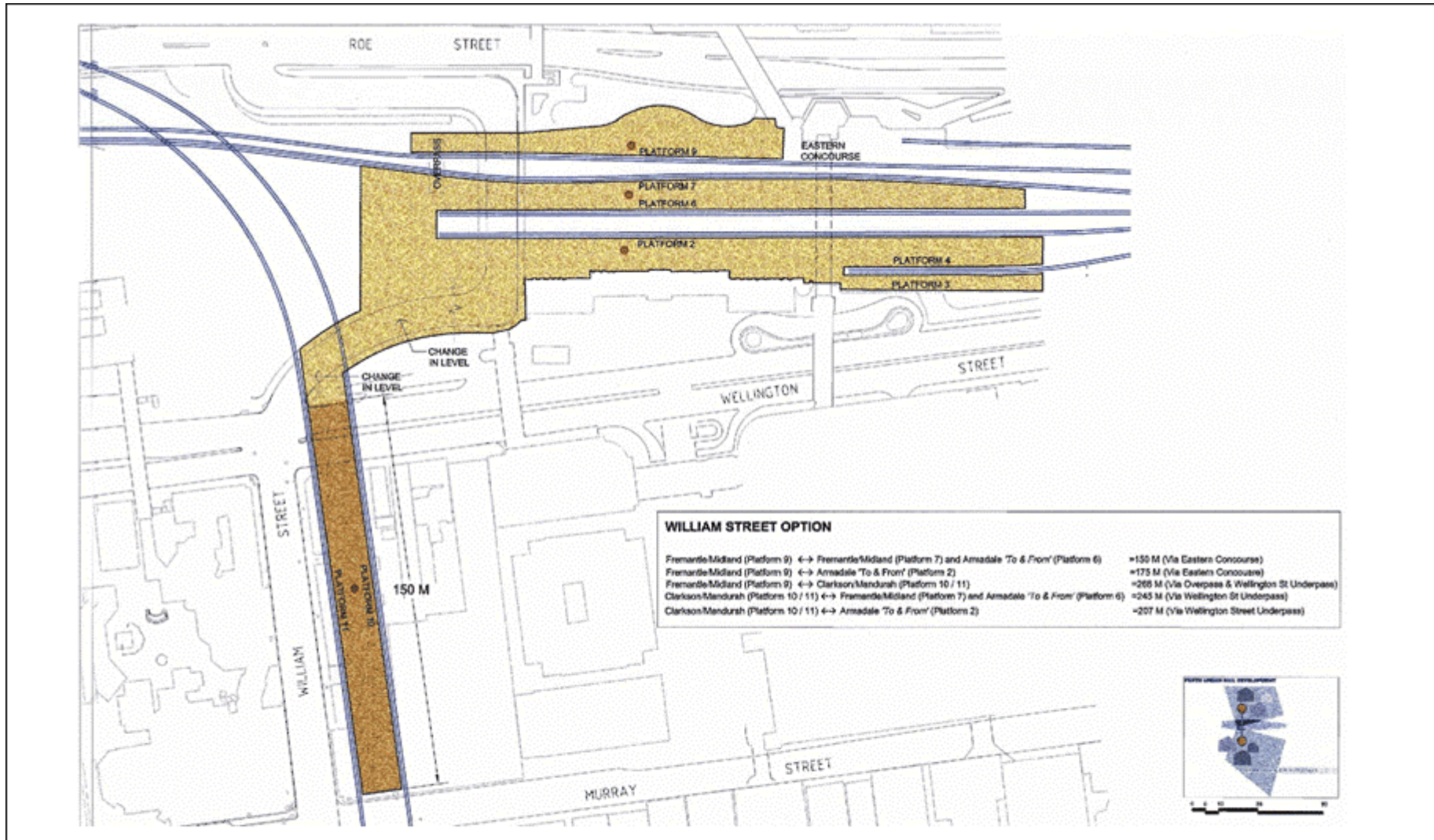


Figure 14 - Layout of the New Perth City Station Platforms

The new platforms extend from north of Murray Street (underneath existing buildings on the east side of William Street) under Wellington Street, with a new station foyer underneath the Horseshoe Bridge.

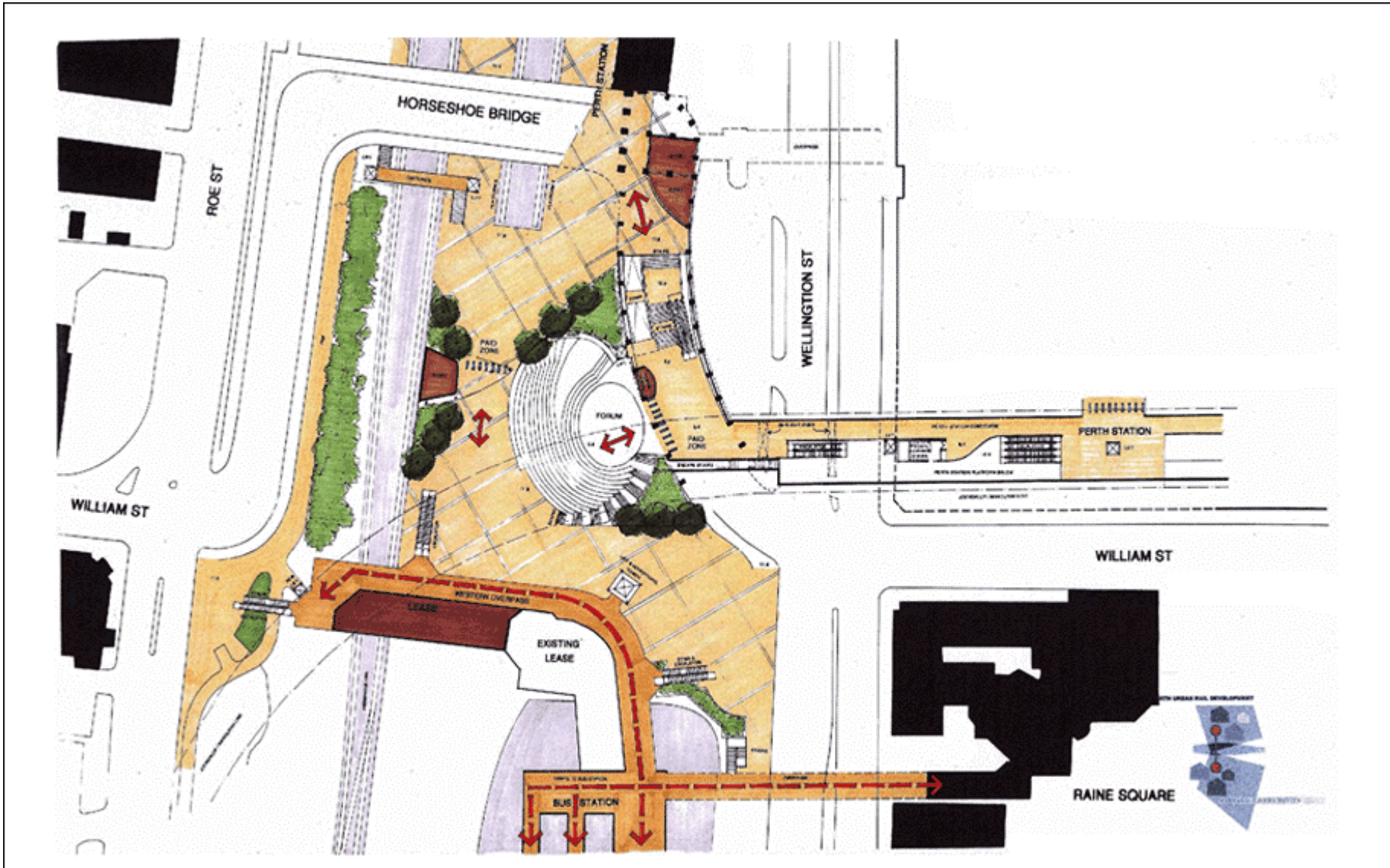


Figure 15 - Plan of New Perth City Station Platforms & Horseshoe Plaza

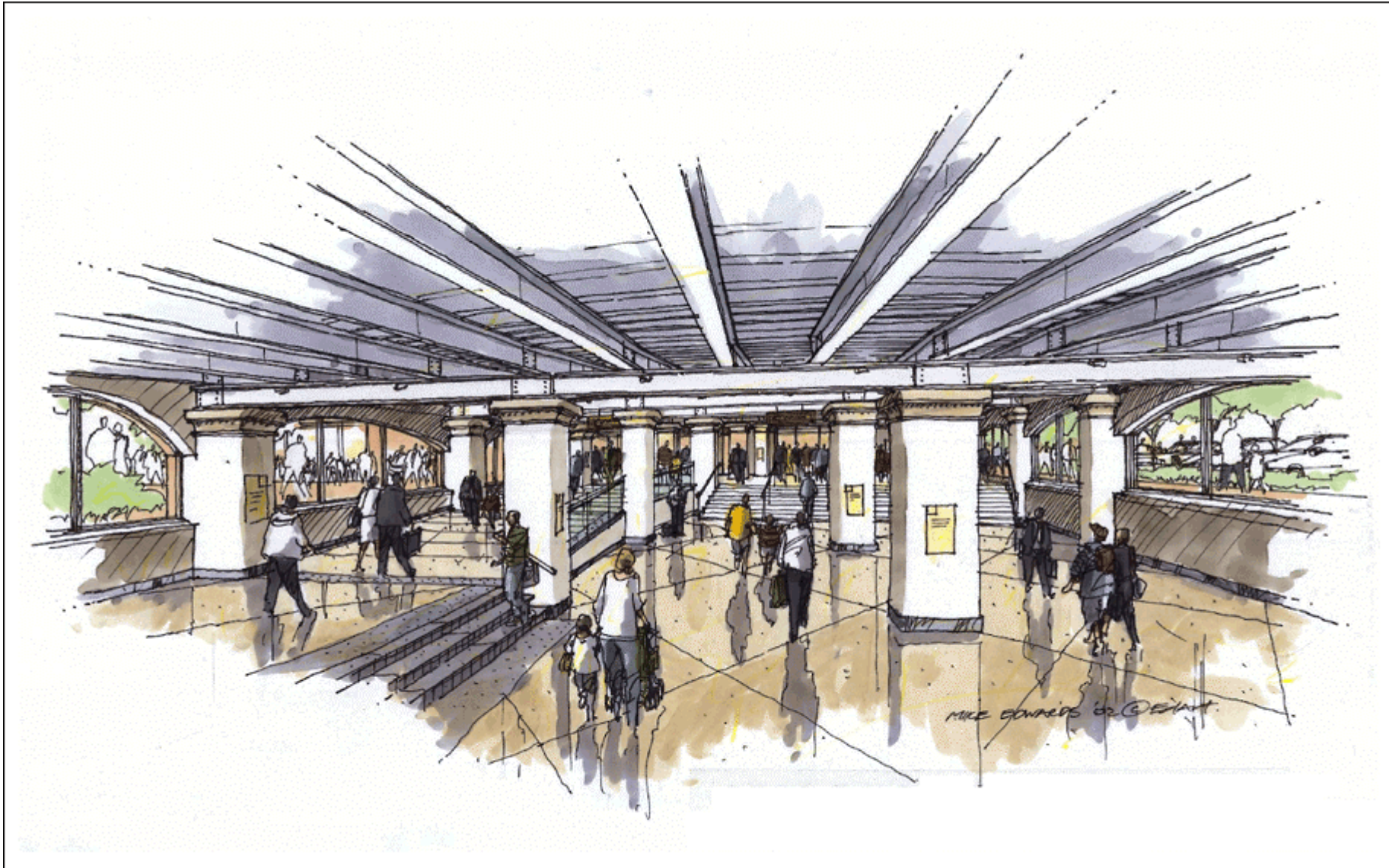


Figure 16 - New Station Foyer Under the Horseshoe Bridge

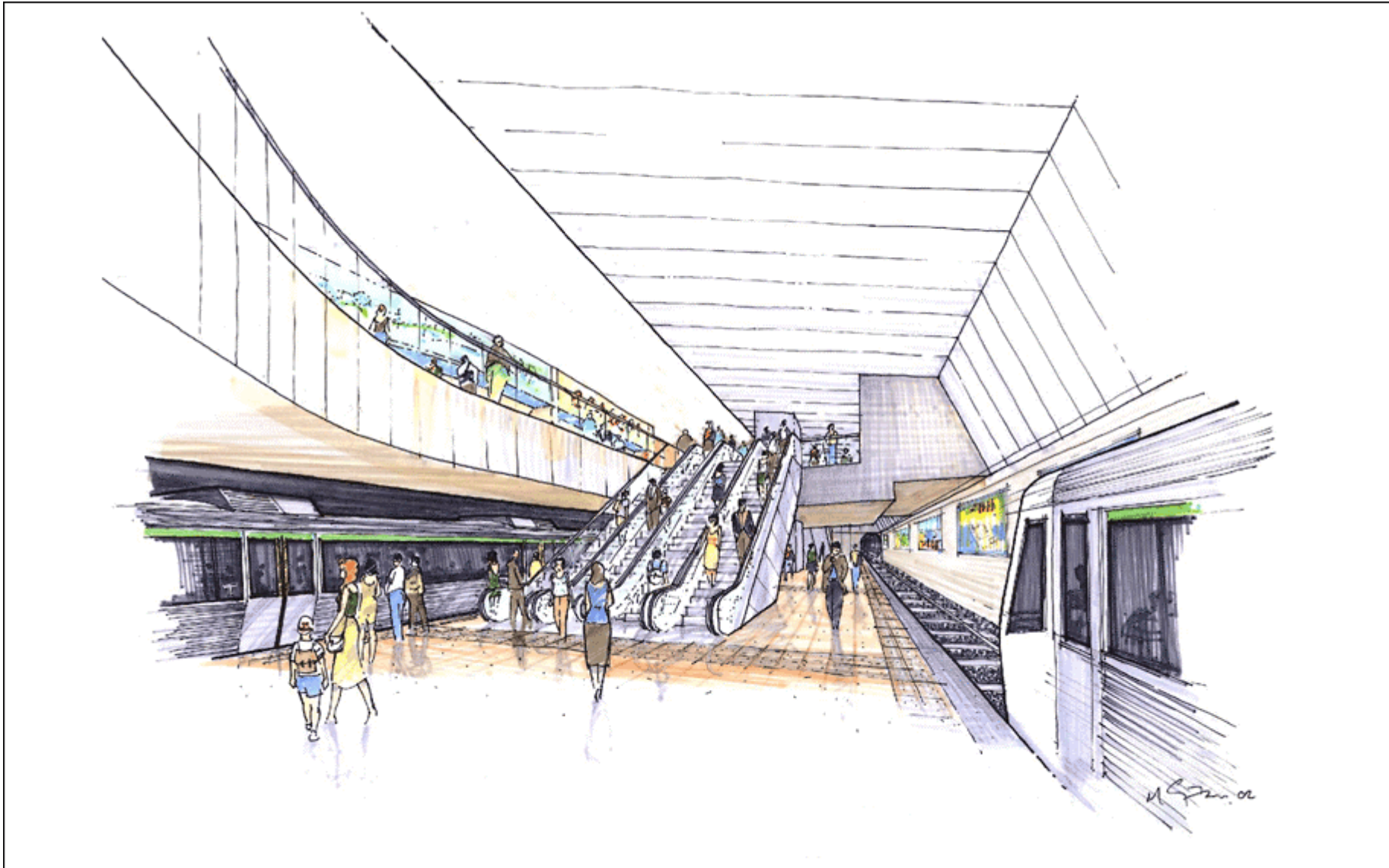


Figure 17 - View of New Station Platforms (Facing Murray Street)



Figure 18 - Pedestrian Links to and from New Station Platforms

Passengers access existing Perth City Station platforms and the Bus Station via the Horseshoe Bridge foyer and Plaza. Connections above the new platforms provide links to Murray Street Mall and Forrest Place.

6. Additional Opportunities

Acceptance of the recommendations provided in this report will provide timely opportunities for additional works that will further significantly enhance the city's amenity, should there be requisite community will and funds.

Sinking the Fremantle Line Through Northbridge

Under the Committee's recommendations, only the Fremantle line will continue on the surface west of the Horseshoe Bridge. Only a failure to sink this one remaining line will prevent the final removal of the barrier between Northbridge and the city that the railway reserve has sustained for more than a century.

In its first report, the Committee stated:

"The Committee considers it to be beneficial to re-consider the long standing issue of connecting Northbridge to the city at ground level before major railway works occur in the vicinity of the Wellington Street Bus Station and the Entertainment Centre.

This issue should be further investigated once the preferred route has been decided."

The Committee has not changed its view. Indeed, the development of the proposed "Horseshoe Plaza" at the western end of Perth City Station enhances the opportunity for establishing permanent ground level connections between Northbridge and the city. It would also further enhance the proposed Horseshoe Plaza as an important public place and transport hub, pivotal in its relationship with the cultural, entertainment,

retail and employment functions of the city. From the strong endorsements in Community Consultation and Stakeholder Workshop outcomes, the proposal clearly has public support. There is no question that sinking the line offers a significant benefit to the creation of the new station precinct.

The first PCRAC report identified additional cost of the order of \$40 million sinking the Fremantle line to provide a ground-level connection to Northbridge. PURD has now developed two proposals for the project, offering a varying degree of connectivity. Rail can be sunk to provide a ground level connection up to and including Lake Street, at an estimated additional cost of \$22 million. Alternatively, the connection can be extended westward to include Milligan Street; for this option, the estimated additional cost for sinking the rail increases to \$39 million.

The prospect of attractive development potential over the "land bridge" (see Figures 19 and 20) offers a range of possible funding scenarios. The Committee urges Government to explore every available avenue for taking advantage of this opportunity.

Horseshoe Bridge & Plaza

Within the Perth City Station budget allocation, the estimated costs for the Central option include the works necessary to renovate the southern leg of the Horseshoe Bridge and to construct the Horseshoe Plaza, allowing for significantly improved pedestrian access at the western end of the station. Improved pedestrian connections include access between City Station platforms and William Street connectivity between Wellington Street and Roe Street.

Discussions have been held with the Heritage Architects who are currently investigating renovation of the entire Horseshoe Bridge. The SWMR

budget for works on the southern leg of the bridge is consistent with the views of the Architects.

Further funding of \$5 million would be required to complete the entire bridge. However, this work is unrelated to the SWMR project and should it ultimately proceed, funding would be required from other sources.

Removing the Freeway & Busway Ramps on the Foreshore

Sinking of the SWMR along the foreshore allows flexibility in the re-establishment of existing road connections.

Under the Committee's recommendation, all existing connections would be restored with little change to current road network configuration. In particular, it retains the road bridge from William Street which carries north- and southbound bus lanes from and to the Transperth City Busport as well as traffic lanes from William Street to Kwinana Freeway and Stirling Highway.

By enclosing the traffic and bus lanes currently accommodated on the William Street bridge in a tunnel immediately alongside the rail tunnel, the road bridge could be completely removed. All existing road connections would be retained through underground and ground level links. Removal of the bridge would eliminate a significant visual barrier from the foreshore and would enhance the view towards the river from the Perth Convention and Exhibition Centre.

The Committee believes that removal of the William Street road bridge is a unique opportunity for the SWMR to add value to the city by strengthening

its relationship with the foreshore. It can be achieved at an additional cost of \$10 million².

Finding 4

Government should pursue the opportunity to significantly enhance the city's amenity by sinking the Fremantle lines to provide connection to Northbridge, completing the renovation of the Horseshoe Bridge and removing the William Street overpass from the foreshore.

² [Estimate verified by Main Roads Western Australia.](#)



Figure 19 - Land Development Potential if the Fremantle Rail Line was Sunk to Lake Street (Option 1)



Figure 20 - Land Development Potential if the Fremantle Rail Line was Sunk to Milligan Street (Option 2)



Figure 21 - Horseshoe Plaza with Rail Line Sunk



Figure 22 - View North from William Street Across Horseshoe Plaza, with Rail Lines Sunk

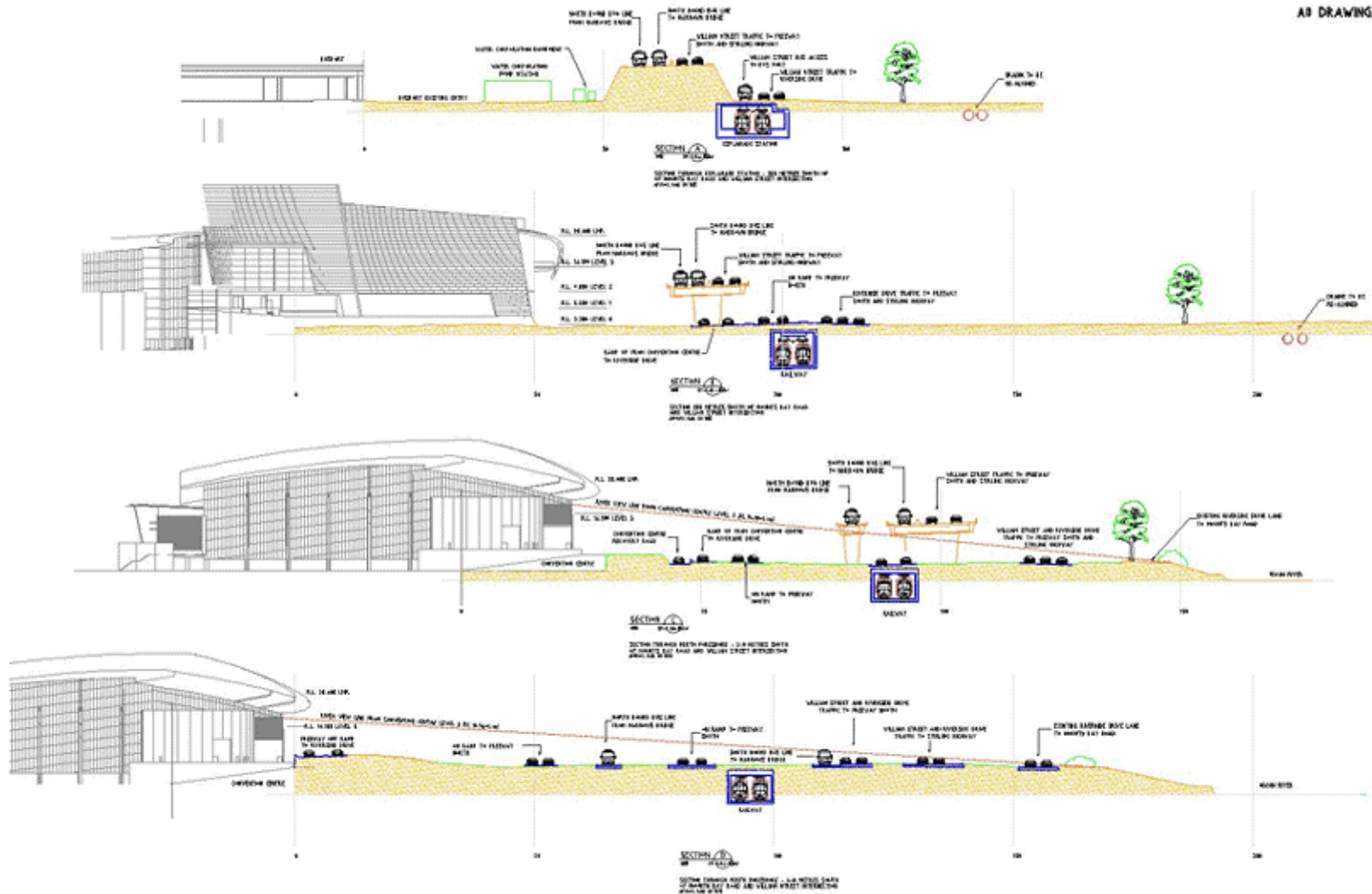


Figure 23 - Cross Sections Showing View from Perth Convention Centre with William Street Bridge Retained

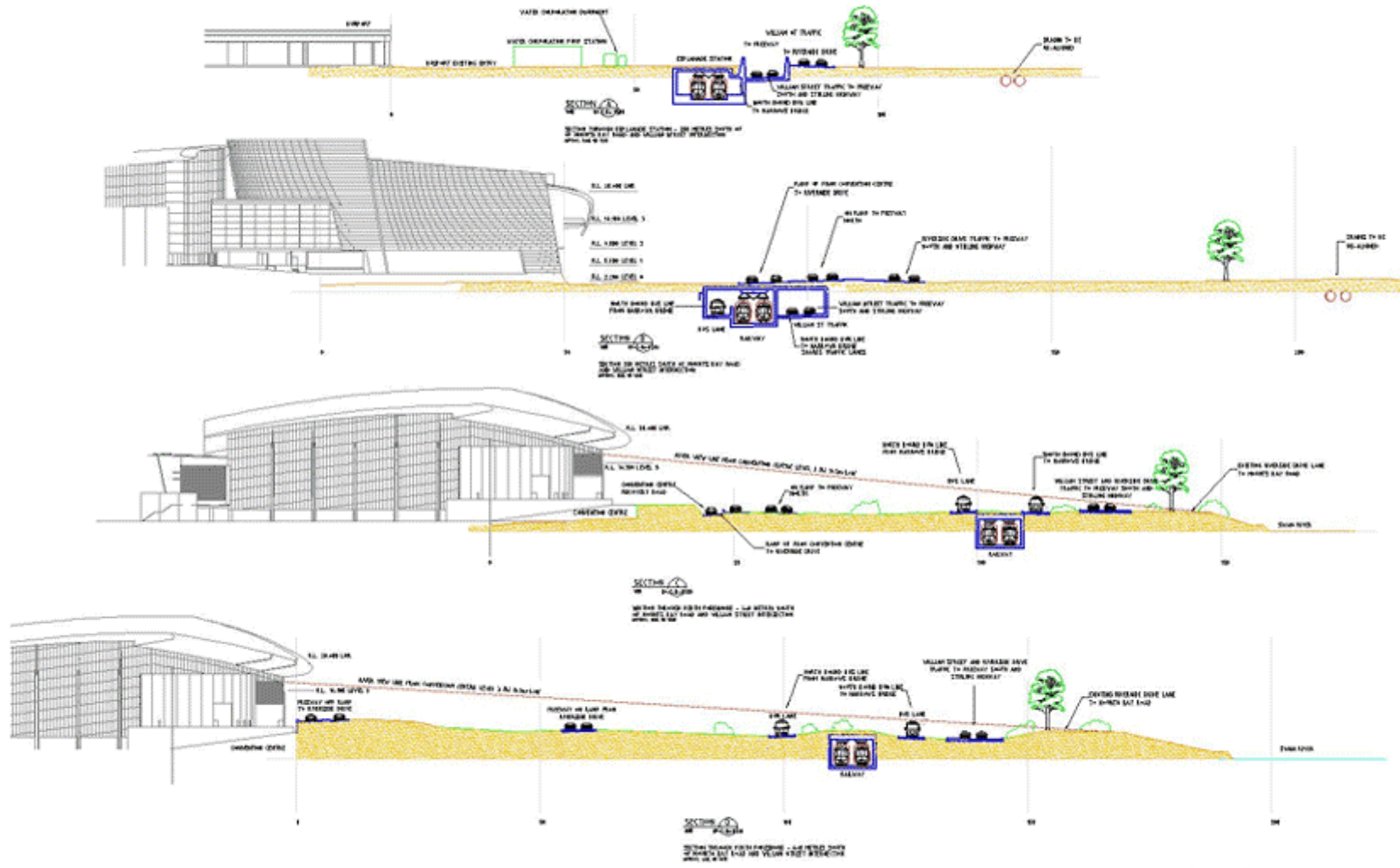


Figure 23 - Cross Sections Showing View from Perth Convention Centre with William Street Bridge Removed



Figure 25 - Aerial View of Future Foreshore with William Street Bridge Removed

7. Implementation & Administration

The Committee has observed in its first report, and again in this report, that the project in the vicinity of the CBD will be more than just a railway construction project. A broad range of executive skills and experience (including major project governance, city planning, property redevelopment and major engineering in a city environment) will need to be harnessed to ensure that the project is managed as a civic amenity, with detailed attention to maximising the project's success not just as a new (and costly) piece of transport infrastructure, but as a positive and permanent enhancement of the city experience.

In its first report, the Committee stated:

“The Committee recommends that over-riding responsibility for the governance of implementation of the South West Metropolitan Railway Project and its associated work within the City of Perth should be entrusted to a small Executive Group which is:

- *Structured as a legal entity with explicit project objectives;*
- *Constituted inclusively, with representation which includes the City of Perth and property owners;*
- *Comprised of individuals who bring a collection of personal competencies and experience so as collectively to ensure that the entire project is prudently and effectively directed;*
- *Underwritten with sufficient statutory powers to see the project through to successful completion, including land acquisition, railway construction, property redevelopment and the powers to contract;*
- *Responsible for completion of the project, according to Government decision as to timing, route, costs and other characteristics, and in conformity with an agreed Master Plan; and*

- *Supported by PURD with assistance from other agencies as required.”*

The Committee is now even more strongly of the view that a Perth City Rail Development Authority (PCRDA) should be established by statute at the time the Enabling Bill is presented to Parliament, to ensure effective governance and a successful outcome. Such an Authority should have the railway construction and land acquisition powers of the Public Works Act delegated to it, as well as the support of the planning powers of the Western Australian Planning Commission.

This authority should not assume the role of the specialist agencies but exercise a coordinating role with ultimate authority and responsibility for implementation, expenditure and dispute resolution.

The Committee perceives three clear advantages of a Perth City Rail Development Authority namely:

- Effective coordination of the diversity of interests and disciplines involved;
- Having more direct focus on the project objectives, an authority would be able to manage implementation more effectively and expeditiously than departments acting individually;
- Relieving the Minister of the ongoing and detailed issues involved with implementation.

The Committee envisages that the Authority would have an independent chair with project governance expertise and members with expertise in transport and construction, city planning, urban design and architecture. It would include representation from business and property interests and the City of Perth, as well as nominees of the State Government.

The Committee acknowledges that it may be necessary to establish an interim management committee pending passage of legislation.

It is expected that the Government would choose to set specific outcomes through legislation (eg objectives, accountability, a sunset clause and boundaries). The two additional works programs (sinking of rail at Northbridge and removal of William Street road bridge) would also be managed by the authority if they were to proceed.

It is anticipated that the Authority would be responsible to the Minister for Planning and Infrastructure and be subject to Ministerial direction in writing. It would report comprehensively and regularly to the Minister.

The PCRDA would not have responsibility for constructing the SWMR, which would be managed under proven State Government arrangements as applied, for example, in the construction of the Northern Suburbs Railway. The PCRDA would provide right of way through Perth City.