



PROPOSED SUBSTATION FOR
JOONDALUP - COMPARISON OF
SCREENING OPTIONS

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1.0 INTRODUCTION

Western Power have proposed a new substation located on the northern side of Shenton Avenue that is bounded by Mitchell Freeway to the west and the railway alignment to the north east. Western Power have been in discussion with the City of Joondalup in regard to the proposed substation. During these discussions the City of Joondalup have indicated that they wish the design to be modified so that it is less visible from Shenton Avenue.

Two Options were proposed by the City of Joondalup. Option 1 being to lower the existing site level proposed by Western Power by 1 metre thus reducing the overall height of the substation. Option 2 is to provide a boundary wall that would act as a screen wall from Shenton Avenue to reduce the possible visual impact of the substation to Shenton Avenue.

Maunsells have been approached by Western Power to undertake an investigative study and report to determine the outcomes of the two options and to consider any other possible option to provide an outcome that would be desirable to the City of Joondalup.



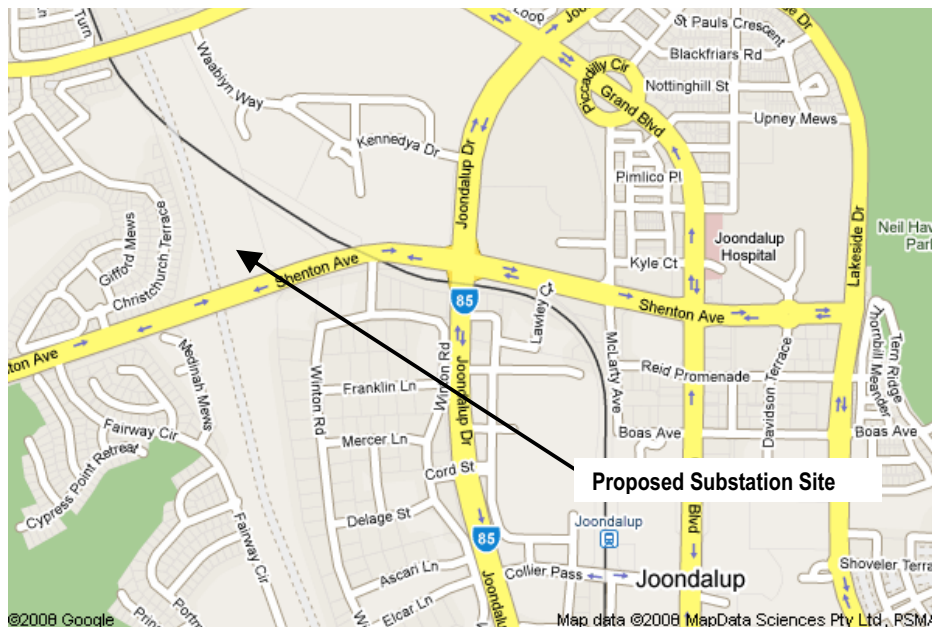
General View of Site



View from Site looking up to Shenton Avenue



View along Shenton Avenue, direction going towards Joondalup



2.0 DESIGN OPTIONS

Three design options were considered in the study.

- **OPTION 1** being to lower the site as outlined to Western Power by the City of Joondalup.
- **OPTION 2** was to provide a boundary screen wall and retaining terraces again as outlined by the City of Joondalup.
- **OPTION 3** is a proposal put forward by the consulting team as a cost effective solution to the screening of the substation however does require some negotiations and final agreement in terms of maintenance of the wall and landscaping.

2.1 OPTION 1

The option lowers the proposed design level of the substation by 1 metre. In order to achieve this, a 1 metre high retaining wall was placed at the base of the one in three batter from inside the boundary of Shenton Avenue to the design level.

A security link mesh fence will be placed on the boundary on the batter. The option has been included but it was felt that it does little to provide any additional screening to the site and the substation will still be predominately visible from Shenton Avenue.

2.2 OPTION 2

Provide for a series of retained terraces on the previously one in three batter in order to achieve a level frontage to the site on Western Power land in order to build a solid screen wall that would provide visual screening from Shenton Avenue. All the outcomes desired by the City of Joondalup are achieved however the cost is much greater than expectations of Western Power.

2.3 OPTION 3

This option provides for the existing Western Power design level to remain and to provide a new screen wall within the City of Joondalup's land to screen the substation from Shenton Avenue. This option provides a solution that caters for the desired outcomes of both Western Power and the City of Joondalup. However it is acknowledged that it requires a level of negotiation and agreement if it is to be realised.

3.0 RETAINING WALL OPTIONS

Three retaining wall options have been considered for both the lowering of the site and the terraced site.

A) Limestone Retaining Wall



Limestone Block Retaining Walls are used extensively throughout WA, providing an economical mass retaining structure. Limestone blocks are readily available and a wide range of contractors are able to install.

B) Twinside Retaining Wall



Twinside Retaining Wall provides an example of a proprietary retaining wall systems, others include mass bloc by Rocla and Keystone, retaining wall by Boral. All systems provide rapid construction.

C) Cribblock Retaining Wall



Cribblock Retaining Walls typically used where it is desirable to minimise the visual impact of large wall faces.

Visually the limestone retaining wall and the twinside retaining wall will be considered far more desirable than the cribblock retaining wall. However the costing options were considered to enable Western Power to review budgets.

4.0 SCREEN WALL OPTIONS

Three screen wall options are available for consideration.

- A) Acoustic wall example being Hebel Noise Barrier System



All three screen wall options have been used extensively around Perth providing excellent screening and noise barriers.

- B) Precast Screen Wall that is supported by steel sections between panels



All systems provide a robust construction which is essential in the proposed location.

Lighter screen construction such as colorbond fencing has not been considered due to concerns over vandalism.

- C) Concrete Block Wall



Both the concrete panels and blocks walls have the potential to provide visual enhancements through choice of brickwork and banding or paint treatment to concrete panels. (Costings do not include for painting to panels).

Blockwork wall has previously been used and complies with Western Power security fence requirements.

All walls will require an anti graffiti treatment to allow the inevitable vandalism to the walls to be removed once it occurs.

5.0 MAINTENANCE RESPONSIBILITIES

Part of the negotiations and discussions between Western Power and City of Joondalup will need to include the delineation of maintenance responsibilities. This will vary depending on the outcome of the discussion in regards to the option for the boundary wall versus the lowering of the site and the final location of the boundary wall.

6.0 BUDGETS

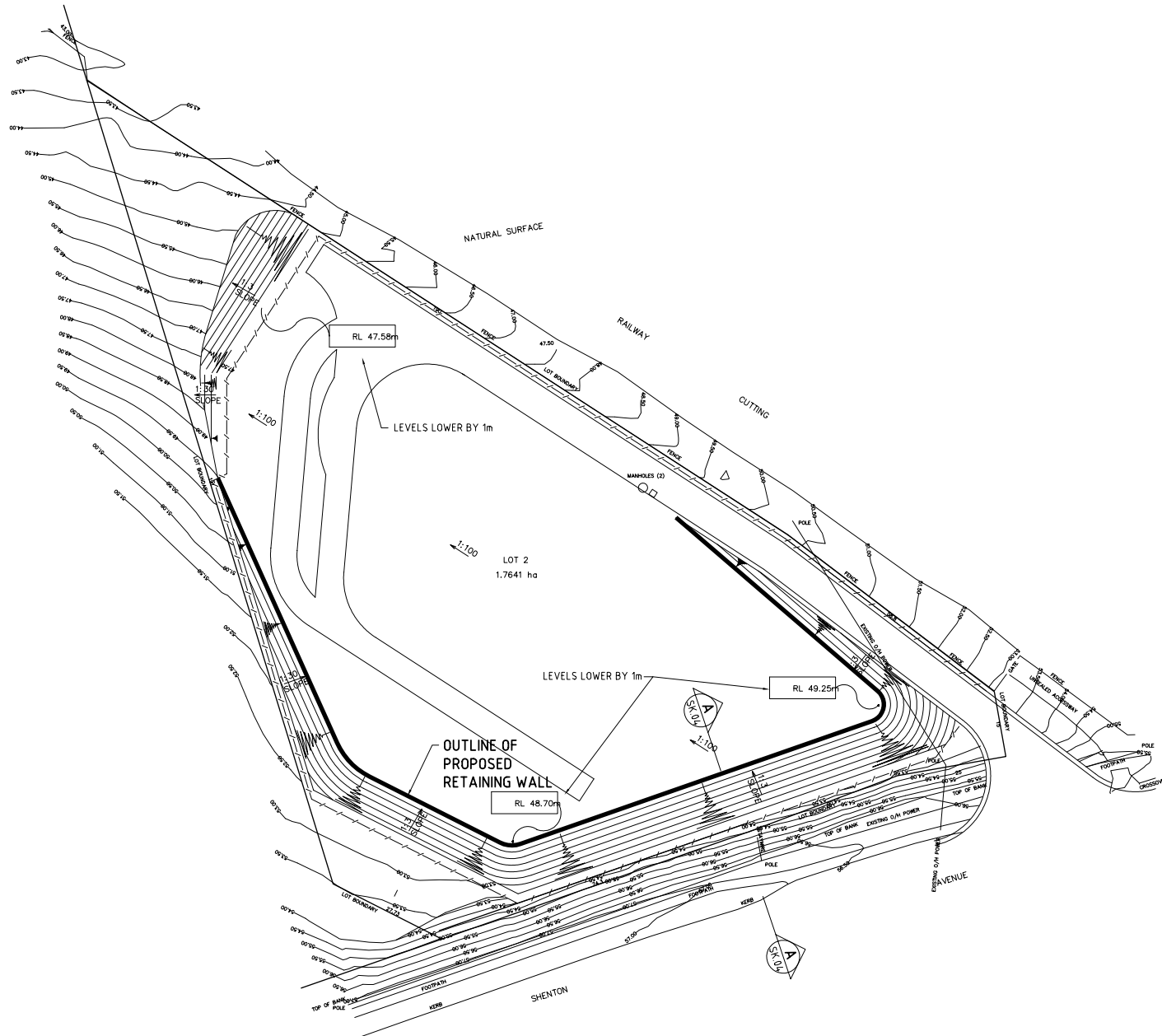
Option 1 – Lower site (Twin-side retaining and no wall)	\$ 568,041.00
Option 2 – Terrace site with screen wall (Twin-side retaining concrete block screen wall)	\$ 826,231.00
Option 3 – Wall (Concrete block wall)	\$ 326,830.00

Note

- Landscaping PC Sum included in each option is \$ 50,000.00
- Preliminaries, Contractors Margins, Contingency, Professional Fees and escalation for one year at 12% has been allowed for in the above budget figures

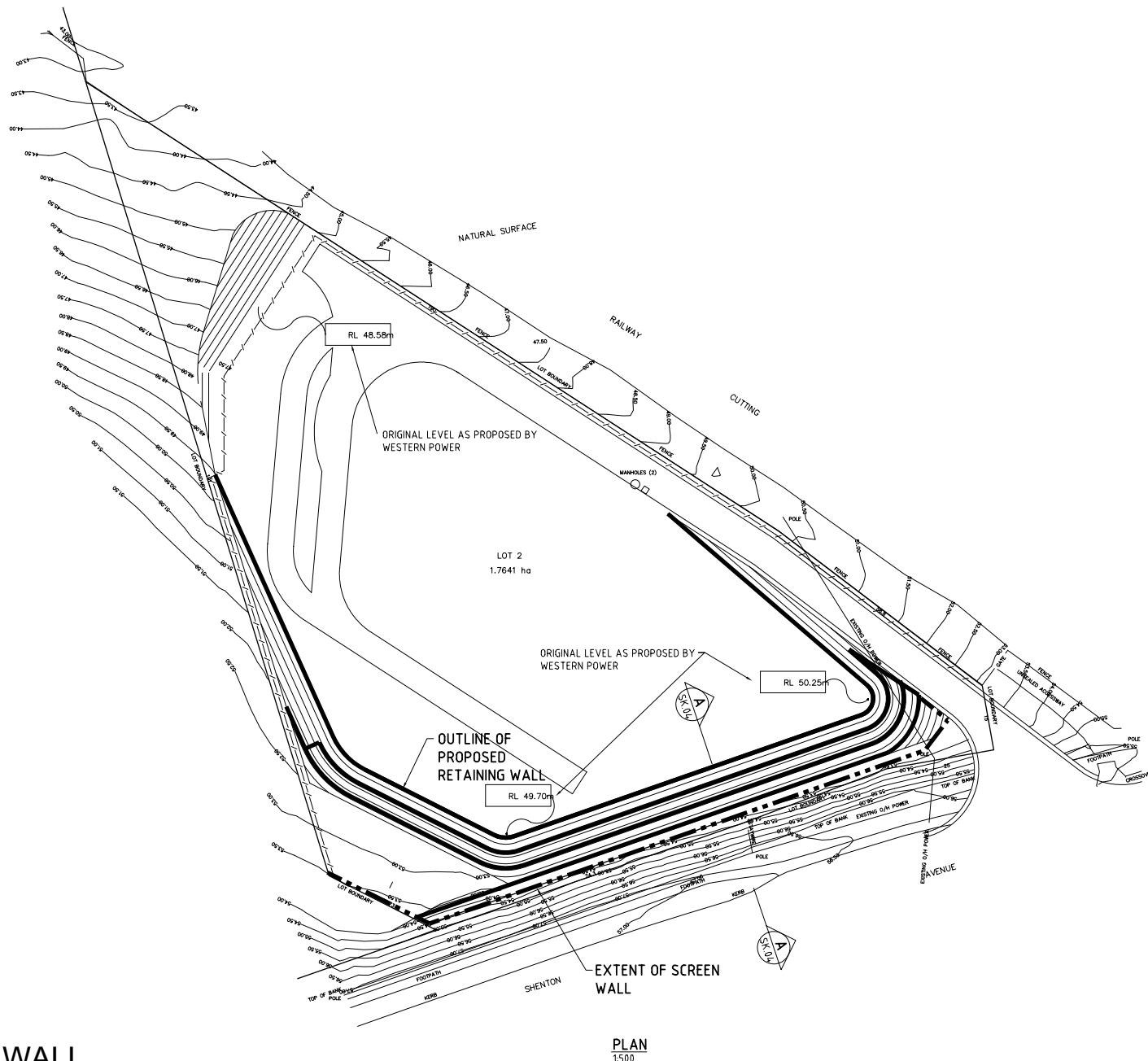
Refer to appendix for detailed option budget breakdowns.

APPENDIX 1 DRAWINGS



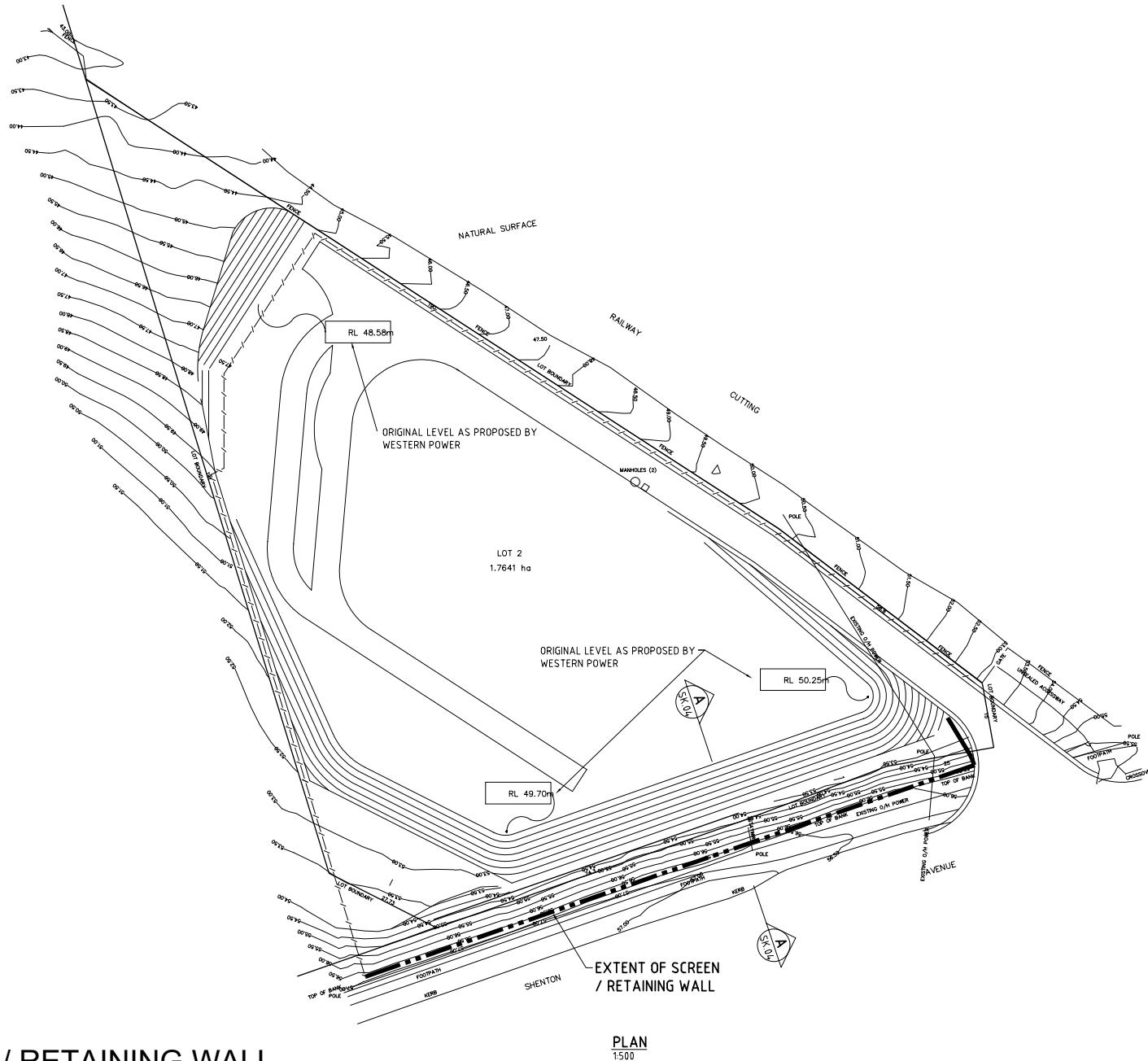
PLAN
1:500

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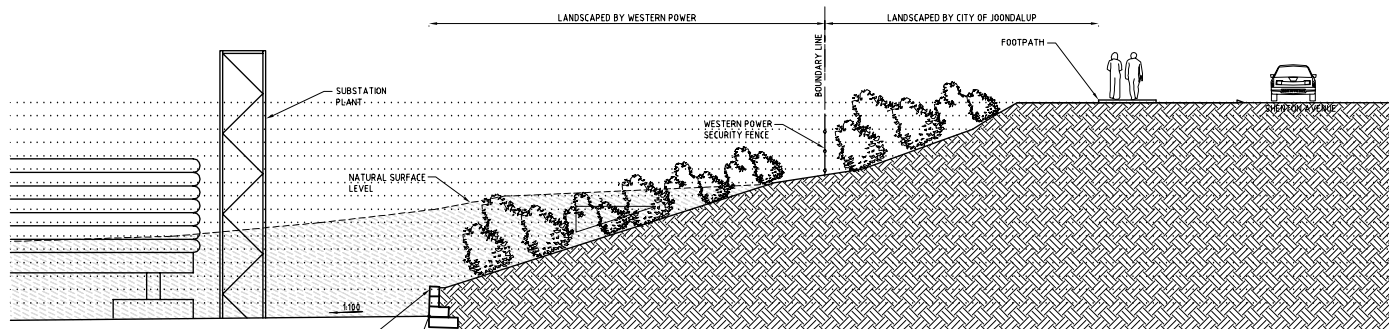
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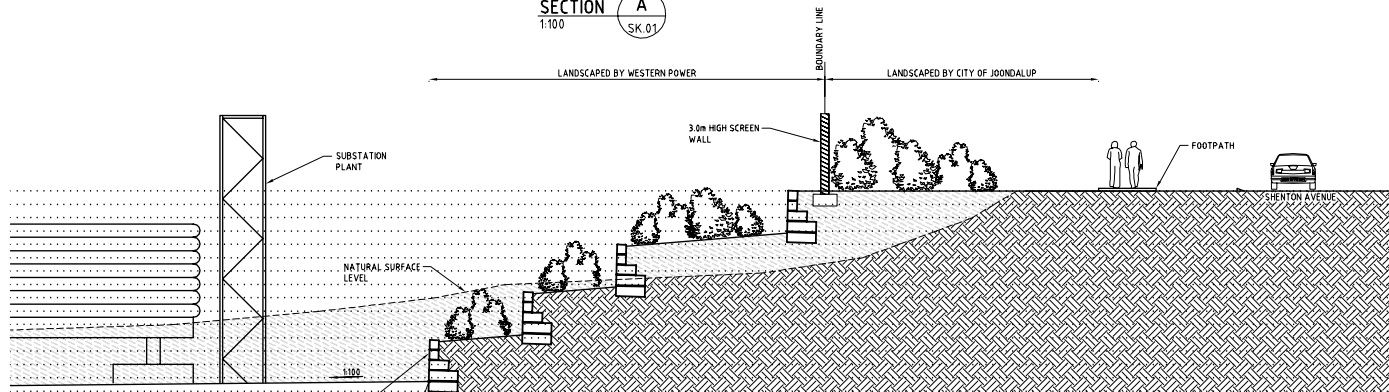


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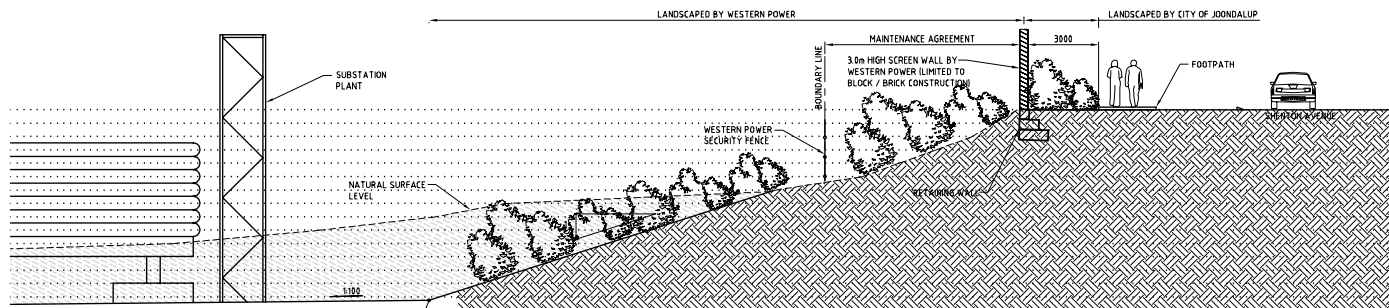
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OPTION 1
SECTION A
1:100 SK.01



OPTION 2
SECTION A
1:100 SK.02



OPTION 3
SECTION A
1:100 SK.03

No.	BY	DATE	DESCRIPTION	APPD	DRG. No	TITLE

DESIGNED		CHECKED	
DRAWN		CHECKED	
APPROVED		DATE	
DATE		SURVEY	

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JOONDALUP SUBSTATION EXTENDED WORKS				
SITE SECTIONS				
Scale	A1-1:500	A3-1:1000	Dwg No.	SK.04
Rev.				

APPENDIX 2 DETAILED BUDGET

JOONDALUP SUB-STATION EXTENDED WORKS

OPTION 1

Site Preparation

Bulk excavation and disposal	207,000.00
Detailed back-filling and compaction to retaining walls	1,700.00

Retaining Walls

Mass limestone	100,000.00
Twinside	72,000.00
Cribblock	110,000.00

Note: No allowance for anti-graffiti to exposed faces of retaining walls

OPTION 2

Site Preparation

Cut to fill on site	62,000.00
Detailed back-filling and compaction to retaining walls	4,600.00

Retaining Walls

Mass limestone	329,000.00
Twinside	240,000.00
Cribblock	365,000.00

Note: No allowance for anti-graffiti to retaining walls

Screen wall 3000H

Hebel noise barrier	116,000.00
Precast concrete - 100 thick	131,000.00
Concrete blocks - 200 thick	114,000.00

Note: Includes anti-graffiti to both faces of screen walls

OPTION 3

Site Preparation

Detailed back-filling and compaction to retaining walls	1,000.00
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Note: No allowance has been made for bulk cut or fill to Option 3 as advised by Maunsall

Retaining Walls

Mass limestone	38,000.00
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Screen wall

Concrete blocks	111,000.00
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The above are net sub-contract costs and for each option and/or material substitution combination, the following will need to be added;

Preliminary items - 12%
Contractor's margin - 10%
Contingency - 25%
Professional fees, say - 7%

Escalation excluded. Allow say, 12%pa





Architecture • Planning • Project Management



Enquiries: Simon Collins
Telephone: (08) 9326 6502

26 June 2008

Mr Martyn Glover
Director Infrastructure Services
City of Joondalup
PO Box 2
JOONDALUP WA 6919

Dear Martyn

Joondalup Zone Substation – Lot 2 Shenton Avenue, Joondalup

We refer to our recent correspondence regarding Western Power's plans to develop Lot 2 Shenton Avenue, Joondalup for the purpose of the Joondalup zone substation.

Following the meeting of 29 April 2008 between Western Power, the City of Joondalup and Main Roads WA, it was agreed that the option of entering the substation from the Mitchell Freeway off ramp to Shenton Avenue would not be pursued, given vehicles used during the construction and maintenance of the substation would not be permitted on the Freeway due to their limited speed and the general safety of Freeway users.

Cognisant of this, it was agreed that Western Power would engage a consultant to review the potential of reducing the level of the substation by an additional metre. It was also suggested that the option of installing a solid screen wall along Shenton Avenue to screen the substation from view, should be investigated in lieu of lowering the site. This investigation has now been completed and a copy of this report has been attached for your information.

It is considered that lowering the level of the substation by an additional one metre will not reduce the visual impact of the substation. The level of the substation has already been reduced by two metres, as per the approved Development Application and recommendation of the City's Director of Planning. The current substation design shows that the busbar will be located below the level of Shenton Avenue.

As such, it is proposed that a screen wall should be installed along Shenton Avenue to screen the substation from view. Two options in this regard have been suggested. The original proposal to install a three metre screen wall on the Shenton Avenue property boundary (options 2 of the report) or the option of installing a three metre screen wall within the Shenton Avenue road reserve (option 3 of the report).

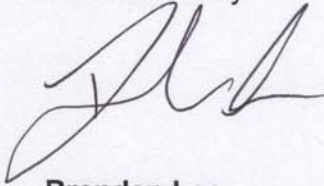
The option of installing the screen wall within the road reserve is Western Power's preferred solution however agreement will be required from the City of Joondalup as it will be installed in the Shenton Road reserve.

If this option is not acceptable to the City, Western Power will pursue the option of installing a solid wall on the Shenton Avenue property boundary.

It is imperative that any outstanding issues related to the Joondalup substation be finalised as soon as possible to avoid further delay to construction. Your consideration and support of the above information would be greatly appreciated.

Should you require further information regarding the above matter, please contact Simon Collins on 9326 6502.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Brenden Lee', written over a horizontal line.

Brenden Lee
Approvals and Development Manager
Environment and Land Management Branch

*cc: Mr Ray Seaman, Regional Manager – Metropolitan, Main Roads WA, Don Aitken Centre,
Waterloo Crescent, East Perth WA 6004*