Arthur Highway Upgrade

North of Murdunna,
South of Murdunna and
South of Taranna

SUBMISSION
to the
PARLIAMENTARY STANDING COMMITTEE
on
PUBLIC WORKS

December 2012

Department of Infrastructure, Energy,
and Resources

Tasmania
Explore the possibilities

Arthur Highway Upgrade

North of Murdunna,
South of Murdunna and
South of Taranna

SUBMISSION
to
PARLIAMENTARY STANDING COMMITTEE
on
PUBLIC WORKS

December 2012

Table of Contents

	Name	Signature	Date
Authorised by:	Shane Gregory General Manager Transport Infrastructure Services Division		

1. Introduction

1.1 Project Background

The Department of Infrastructure, Energy and Resources (DIER) is charged with implementing the Community Roads Program and a total of $18 million has been committed from the Community Roads Program toward improving the alignment of the Arthur Highway.

The Arthur Highway is a Category 3 regional access road, linking the Tasman Peninsula with the rest of Tasmania, via Sorell. Over most of its length it is a two-way, two-lane road with an inconsistent cross section, geometric standard and few overtaking opportunities.

Two sections of the Arthur Highway from Dunalley to Murdunna and from Taranna to Port Arthur have been included in the Community Roads Program. These two sections have alignments which are not consistent with current expectations and, at some locations have a poor crash record.

A project identification process was undertaken in late-2011 to identify projects along the Arthur Highway where the horizontal and vertical geometry of the existing highway was assessed against the target standards. A total of 11 projects were identified and the assessment on each segment of the road established the work type required to bring the road to the target standard. Of the eleven identified projects, three were recommended for further design development and construction based on criteria around addressing poor crash records, ensuring operational consistency with adjoining sections, providing benefit to the largest number of users and ensuring the provision of safe overtaking opportunities - all within the $18 million budget allocation.

It is on this basis that the following three projects are to be implemented along the Arthur Highway:

- North of Murdunna - upgrade the alignment to eliminate very poor horizontal and vertical geometry with a poor crash record.
- South of Murdunna - upgrade the alignment to eliminate poor horizontal geometry with a poor crash record.
- South of Taranna - upgrade the vertical alignment to provide an overtaking opportunity.

1.2 Objectives

The objectives for the Arthur Highway Community Roads Program investment are to provide:

- Improved road safety for all road users.
- Reduced speed differential between light vehicles and larger vehicles (including campervans and buses) caused by poor horizontal alignment.

The objectives of the project are to upgrade the three sections of the Arthur Highway (based on a design speed of 90 km/h) to:

- Meet AUSTROADS Guidelines for horizontal and vertical curvatures.
- Provide 3.0 metre wide lanes with sealed shoulders 1.0 metre wide.
- Provide overtaking sight distance where it is practical to do so.

1.3 Site Constraints

1.3.1 Road Alignment

Prior to undertaking the concept design an assessment of the existing road geometry was undertaken and the findings documented in the report by pitt&sherry entitled Arthur Highway, Dunalley to Murdunna and Taranna to Port Arthur - Project Identification Report dated October 2011.

1.3.2 Environmental

The South of Murdunna site is constrained by sensitive flora. A flora study will be undertaken which will include mitigation strategies associated with each plant species.

2. The Existing Conditions

2.1 The Highway

2.1.1 North of Murdunna

Within the bounds of the North of Murdunna project the Arthur Highway is a two-way two-lane road with an average sealed pavement width of 6.1 metres and a shoulder width varying from no shoulder up to 1.5 metres wide. There are a number of unsealed property accesses along the length of the project.

2.1.2 South of Murdunna

Within the bounds of the South of Murdunna project the Arthur Highway is a two-way two-lane road with an average sealed pavement width of 6.5 metres and 1.0 metre wide unsealed shoulders. There are a number of unsealed property accesses along the length of the project.

2.1.3 South of Taranna

Within the bounds of South of Taranna project the Arthur Highway is a two-way two-lane road with a sealed pavement width that varies from 5.7 metres to 8.3 metres and a varying unsealed shoulder width ranging from 0.5 metres to 3.0 metres wide. There are a number of unsealed property accesses along the length of the project.

2.2 Traffic Flow

The most recent traffic counts indicate that the traffic flow on the Arthur Highway is:

- 1,820 vehicles per day between Dunalley and Murdunna with 6.7% heavy vehicles.
- 1,310 vehicles per day between Taranna and Port Arthur with 9.9% heavy vehicles.

2.3 Road Crashes

The five-year crash history for the Arthur Highway in the vicinity of each of the proposed projects is summarised in Table 1 below. It should be noted that no fatal crashes were recorded on these sections of the Arthur Highway.

Table 1
Crash History

Location	Crash Severity		
	Serious	Minor & First Aid	Property Damage
North of Murdunna	0	4	9
South of Murdunna	2	6	7
South of Taranna	0	2	2

2.4 The Road Side Environment

The abutting land use is rural and rural residential on the North of Murdunna project, rural on the South of Murdunna project and rural residential on the South of Taranna project. The rural land is predominantly used for forestry except for a section of the North of Murdunna project where it is protected with a conservation covenant

There are two large trees within or adjacent to the road reserve along the South of Murdunna project. These trees are within the clear zone and are considered a hazard.

The North of Murdunna project contains 20 power poles close to the edge of the road and there are 15 power poles close to the edge of the road within the South of Taranna project. There is sufficient width in the road reserve to relocate these power poles to outside the clear zone. The South of Murdunna project does not require the relocation of any overhead electricity.

Approximately 1,800 metres of underground telecommunications assets exist in the vicinity of the three proposed projects with the majority located outside the boundaries of each project. However, the proposed works for the South of Taranna project require the relocation of approximately 25 metres of underground assets.

3. Project Justification

The planned outputs for this project include:

- A road that provides a level of safety appropriate for its function as a rural highway and important tourist route.
- A road with reduced maintenance costs.
- A reduction in road crashes.
- A road which is sympathetic to the existing heritage values of the local area.
- A road which minimises impact on flora and fauna values.

The justification for this project is derived from safety improvements, maintenance cost savings and road user benefits. These main issues are discussed below.

3.1 Safety Benefits

The proposed project incorporates the following safety improvements for the road:

- Wider travel lanes and sealed shoulders which will reduce the likelihood of run-off-road crashes.
- Improved alignment by eliminating a number of lower speed horizontal curves.
- Improved delineation through the provision of chevron alignment markers and upgrading of guide posts which will reduce the likelihood of run-off-road crashes.
- The removal of roadside hazards, reducing the severity of run-off-road crashes.

3.2 Maintenance Cost Savings

The proposed project will significantly reduce the recurrent pavement maintenance cost through:

- Provision of extensive areas of new pavement.
- Construction of sealed shoulders to reduce road edge maintenance.

3.3 Road User Benefits

The proposed works will provide the following benefits for road users:

- Reduced severity of crashes.
- More uniform alignment of the road and improved ride quality which will reduce vehicle operating costs.
- Improved overtaking opportunity and thus reduced travel times north of Murdunna and south of Taranna.

4. Project Description

Three projects have been identified along the Arthur Highway that address poor geometry, crash records and the need for overtaking. These three projects are:

- North of Murdunna
- South of Murdunna
- South of Taranna

The location of the three projects is shown in Figure 1 and the proposed layout of the three projects is shown on the drawings in Appendix A.

4.1 North of Murdunna

The section of the Arthur Highway between Dunalley Beach and Murdunna was identified as having very poor horizontal and vertical geometry with a poor crash record. The works propose to eliminate the deficient horizontal and vertical curve and provide 3.0 metre travel lanes (plus 1.0 metre sealed shoulders). An improved crash record can be expected.

4.2 South of Murdunna

The section of the Arthur Highway south of Murdunna has two substandard horizontal curves and a crash cluster likely associated with the differential curve radius in the southbound direction. The works propose to straighten out this section of the Arthur Highway and provide 3.0 metre travel lanes (plus 1.0 metre sealed shoulders). An improved crash record can be expected.

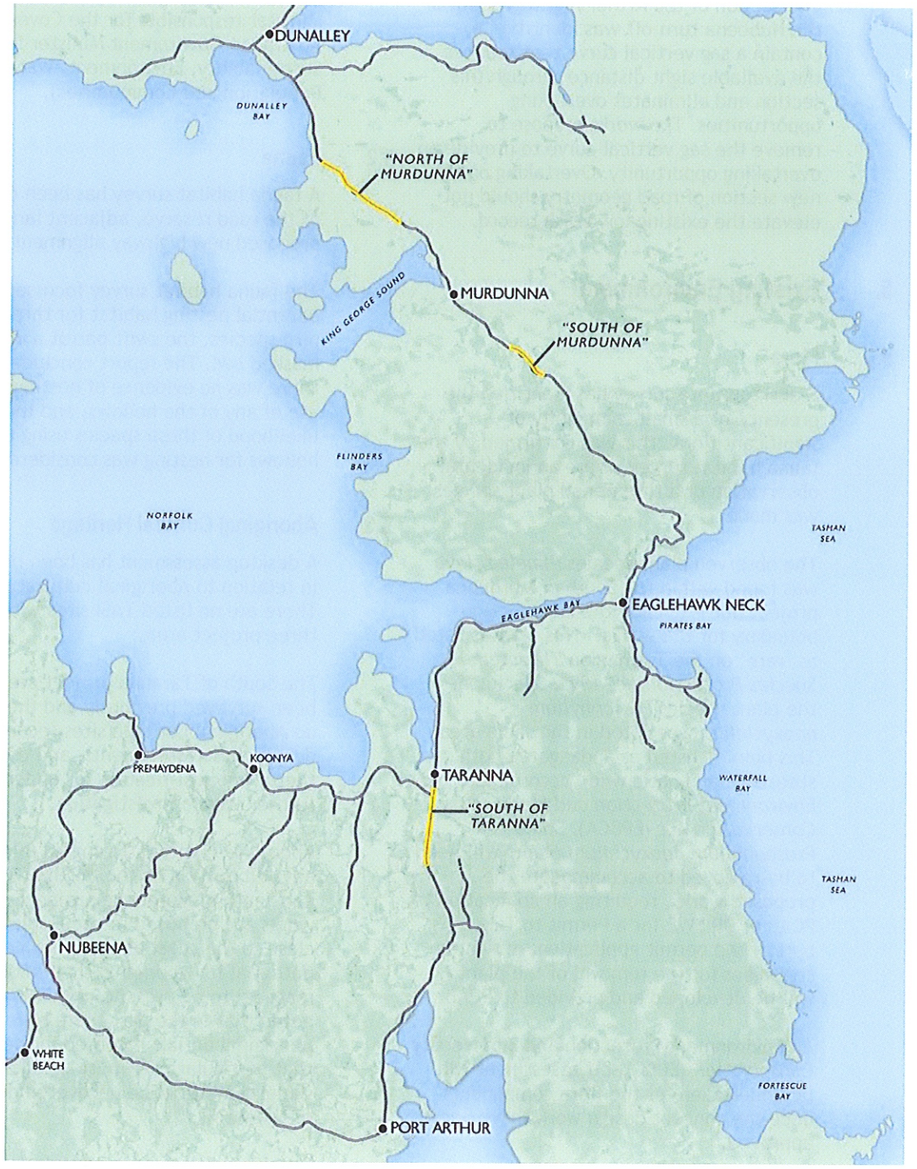


Figure 1 - Location of Projects

4.3 South of Taranna

The section of the Arthur Highway south of the Nubeena turn-off was identified to contain a sag vertical curve that reduces the available sight distance through this section and eliminates overtaking opportunities. The works propose to remove the sag vertical curve to provide an overtaking opportunity. Overtaking on this new section of road geometry should not elevate the existing low crash record.

5. Existing Environment

5.1 Flora

A desktop flora survey has identified the presence of a small community of significant flora. This was confirmed by the fauna habitat survey where an incidental observation of a threatened plant species was made.

The observed plant species *Pimelea flava* was found within the South of Murdunna project but is outside the construction boundary for the works. This plant is listed as 'rare' on the Tasmanian *Threatened Species Protection Act 1995*. Specimens of the plant species *Prasophyllum apoxychilum* was noted in the same area. This plant is listed as endangered both statewide and nationwide according to the *Environment Protection and Biodiversity Conservation Act* (EPBCA). Some *Prasophyllum apoxychilum* plants will need to be removed to accommodate the proposed works, requiring an application to PCAB of DPIPWE for a Permit to Take. As part of the permit application, mitigation strategies for the removal of the plants will be developed and provided to PCAB.

An Environment Protection and Biodiversity Conservation (EPBC) self-assessment will be undertaken for the flora components once the concept design works have been approved.

A flora study will be undertaken prior to the submission of the Permit to Take which will include mitigation strategies associated with each plant species.

The North of Murdunna project requires acquisition from a property which is subject to a Conservation Covenant. An agreement between DIER and the landowner for the removal of the covenant needs to be approved by the Federal Minister responsible for the Covenant (the Australian Government Minister for Sustainability, Environment, Water, Population and Communities).

5.2 Fauna

A fauna habitat survey has been conducted of the road reserve, adjacent land and the proposed new highway alignment.

The fauna habitat survey focussed on the potential nesting habitat for threatened bird species, the swift parrot and the masked owl. The report concluded that there was no evidence of nesting or other use of any of the hollows, and that the likelihood of these species using the hollows for nesting was considered remote.

5.3 Aboriginal Cultural Heritage

A desktop assessment has been undertaken in relation to Aboriginal cultural heritage. There are no listed TASI sites within the three project areas.

The South of Taranna project area has been surveyed previously and there were no Aboriginal heritage sites recorded during those assessments, and therefore there is no justification for undertaking further on-site investigation.

Aboriginal Heritage Tasmania (AHT) have advised caution on the North of Murdunna and South of Murdunna projects where works are proposed to occur relatively close to the coast as there is an elevated potential for Aboriginal shell midden material to be present. AHT have also noted that in the past there have been Aboriginal burials recorded in the area and that particular care must be taken should skeletal material be uncovered during any of the works.

Specific management prescriptions have been developed to further limit potential impacts to any sites in these areas during construction.

5.4 Historic Heritage

A historic heritage desktop assessment has been undertaken for the project.

Historic heritage desktop assessments identified a Coal Reserve covering approximately 2.4 ha on the northern side of the highway on the North of Murdunna project. The Coal Reserve contains a short 30 metre adit. A historic heritage desktop study of the Coal Reserve was then completed. This study concluded that the coal reserve does not have State significance.

No World, Commonwealth, State or Local listed items were detected during the assessments and at present no statutory heritage approvals have been identified for the project.

5.5 Visual Impact

There will be some impact on visual amenity as it will be necessary to remove trees to facilitate the road realignment and improve safety.

In locations where realignment of the Arthur Highway results in areas of redundant road these areas will be rehabilitated and landscaped using a native plant mix.

6. Environmental and Heritage Safeguards

6.1 Proposed Management Regime

In order to limit the impact on the environmental and heritage values identified, the following processes and actions are being incorporated into the project:

- The area of land being acquired for completion of the works has been kept to the minimum extent required by good road design.
- Minimisation of impacts to threatened flora species and potential threatened fauna habitat.
- Locations with environmental values requiring protection will have fencing erected around them for the duration of the construction.
- The Contractor will be made aware of the Aboriginal heritage areas of potential archaeological sensitivity. Soil disturbance in these three areas will be restricted to within the footprint of the required road works.
- In the event that any Aboriginal cultural heritage material is encountered during the construction phase the normal protocols will be followed. These require that all activities cease in the area immediately, pending consultation with the relevant Aboriginal community group(s) and the Manager, of Aboriginal Heritage Tasmania.

6.2 Environmental Heritage Approvals Requirements

An Environmental Protection and Biodiversity Conservation (EPBC) self-assessment will be undertaken for the flora components. It is not anticipated that any approvals will be required in relation to flora and fauna listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

As there are no known sites of cultural sensitivity within the study area, a request will be sent to Aboriginal Heritage Tasmania to confirm that no further investigations need to be undertaken.

No World, Commonwealth, State or Local listed items were detected during the historical heritage assessment. The assessment report concluded that at present, no statutory heritage approvals have been identified for the project.

7. Social Implications

Potential social and economic impacts as a result of the proposed works will be positive, as the aim is to improve the horizontal and vertical alignment of the Arthur Highway, improving safety and providing improved overtaking opportunities.

There will be some short-term social impacts arising from inconvenience associated with the road construction activities. These will be mitigated by good communication and traffic control during construction.

7.1 Property Impacts

There are a total of 46 land titles abutting the Arthur Highway in the vicinity of the three projects.

Approximately 8.1 ha of land acquisition will be required across all three projects. Acquisition will be required from approximately 20 separate land titles across all three projects however the area of acquisition required from each title is generally small. The south of Murdunna project requires approximately 4.3 ha of acquisition including approximately 2.6 ha of acquisition of Forestry Tasmania land.

Discussions have been held with all owners resident in Tasmania from whom land is to be acquired. Those non resident owners have been written to. With all property owners the works have been explained and the acquisition and statutory planning processes have been described. Every effort will be made to ensure that individual concerns have been addressed.

7.2 Public Consultation

DIER has developed Stakeholder Engagement Plans for each of the three projects during the Scoping and Development Phases. Implementation of the Stakeholder Engagement Plans has commenced and stakeholder engagement will be ongoing until the construction of the three projects is completed.

To date, stakeholder engagement in relation to the Arthur Highway projects has included:

- Discussion (at officer level) between DIER and the Tasman Council.
- Letters and telephone contact with relevant landowners in relation to survey works required to allow concept design to progress.
- Letters sent to tourist operators advising of the project concept and canvassing impact of projects.
- Development of a DRAFT project website for the three projects.
- The statutory advertising and display process associated with the Planning Scheme Amendment submitted by DIER for consideration by the Tasman Council. This public consultation process is the responsibility of the Tasman Council and was completed 30 April 2012.
- Display of the three projects at Taranna and Dunalley to provide an opportunity for members of the community to ask questions about the project and provide feedback for consideration by the project team.

During detailed design, meetings will be conducted with affected property owners to clarify the:

- Extent of the required acquisition.
- Works at accesses.
- Replacement of fencing.
- Changes to public utilities servicing their properties.

The land required for the works will be surveyed and the acquisition process will commence. This will involve the Office of the Valuer General and DIER Land Assets Group liaising with the landowners to agree on compensation to be paid.

The final phase of public consultation is during construction. During this period DIER will keep the travelling public informed of possible impacts through signage on the site and notices in the press. There will be close liaison between the contract administration team and adjacent landowners to ensure that the landowners are advised on works staging and potential impacts.

8. Approvals

8.1 Planning Approval

A Development Application (DA) for the south of Taranna project has been lodged with the Tasman Council for approval under the *Tasman Planning Scheme 1979*.

In order for the North of Murdunna and South of Murdunna projects to proceed, planning approval from the Tasman Council is required under the *Sorell S46 Planning Scheme No. 2 1990*. It has been necessary to seek amendment of the *Sorell S46 Planning Scheme No. 2 1990* since the current zoning as Scenic Highway prohibits the road works. A Planning Scheme Amendment application was considered by Tasman Council at their meeting on

28 March 2012. The amendment was then subject to a public consultation period which finished on 30 April 2012 and which elicited no representations. The amendment was considered by Council at their meeting on 23 May 2012. Council resolved to forward a copy of the report on the draft amendment to the Tasmanian Planning Commission (TPC) for approval.

The TPC has approved the Planning Scheme Amendment. A DA for North of Murdunna and South of Murdunna projects will be lodged with the Tasman Council. Following submission of the Development Application, Council will have 42 days to make their decision in relation to the matter.

8.2 State Policies

8.2.1 State Coastal Policy 1996

The Tasmanian *State Coastal Policy 1996* is applicable to all land within a distance of one kilometre from the high-water mark. Parts of the North of Murdunna and South of Taranna projects are within the Coastal Zone and are therefore subject to the requirements of the *State Coastal Policy 1996*.

The outcomes of the *State Coastal Policy 1996* are to be achieved by implementing the Policy through local government planning schemes and will therefore be assessed as part of the planning approval process described in Section 8.1 of this report.

8.2.2 State Policy on the Protection of Agricultural Land

The State Policy on the Protection of Agricultural Land 2000 provides for protection of the State's prime agricultural land from conversion to non-agricultural use and development. The policy defines Prime Agricultural Land as meaning:

Agricultural land classified or capable of being classified as Class 1, 2 or 3 land using the Class Definitions and methodology from the Land Capability Handbook, KE Noble 1992, Department of Primary Industry, Tasmania.

There is no prime agricultural land within the project area. Thus *The State Policy on the Protection of Agricultural Land* does not apply to this project.

8.2.3 State Policy on Water Quality Management

In accordance with Section 35.1 of *The State Policy on Water Quality Management 1997*, all road construction works must employ measures consistent with best practice environmental management to prevent erosion and the pollution of streams and waterways by runoff from sites of road construction.

Appropriate silt control and sedimentation measures will be put in place to protect the surrounding waterways and prevent potential soil erosion on site.

8.3 State Forest (Forestry Act 1920 – Section 20AA, Proclamation)

The *Forestry Act 1920* was enacted to provide for the better management and protection of forests in Tasmania.

The South of Murdunna project requires the transfer of a portion of the State Forest to Road Reserve. Section 20AA of the *Forestry Act 1920* allows for minor alterations to the boundary of the State Forest. The need for the transfer of the land has been discussed with Forestry Tasmania and the proposed proclamation has been agreed.

8.4 Conservation Covenant

A conservation covenant is a voluntary agreement made between a landholder and an authorised body (such as a Covenant Scheme Provider) that aims to protect and enhance the natural, cultural and/or scientific values of certain land. The owner continues to own, use and live on the land while the natural values of an area are conserved by the landholder in partnership with the Covenant Scheme Provider.

The North of Murdunna project requires acquisition from a property which is subject to a Conservation Covenant. An agreement between DIER and the landowner for the removal of the covenant needs to be approved by the Federal Minister responsible for the Covenant (the Australian Government Minister for Sustainability, Environment, Water, Population and Communities). This process is estimated to take 3-4 months and could potentially impact on the project program if a delay occurs.

9. Construction Program and Costs

9.1 Program

Project construction for all three projects is programmed to commence in August 2013. This allows works to be constructed with a lower risk of inclement weather, which would increase costs and delay construction causing extended disruption to the traveling public. The key dates are shown in Table 2.

Table 2
Program - Arthur Highway Upgrade

Project Phase	Start Date	End Date
Design development	Dec '12	April '132
Tendering and tender assessment	Jun '13	Aug '13
Construction	Aug '13	Dec '14

9.2 Costs

The cost estimates have been prepared using the Evans and Peck document, Best Practice Cost Estimation Standard for Publicly funded Road and Rail Construction. The document outlines the preparation of probabilistic estimates based on the risks and confidence levels.

For this project P50 confidence level estimate has been prepared.

"P50 represents the project cost with sufficient risk provisions to provide a 50% level of confidence in the outcome i.e. that there is a 50% likelihood that the project costs will not be exceeded."[1]

The major project components and estimated costs are shown in Table 5, Table 6 and Table 7 for North of Murdunna, South of Murdunna and South of Taranna respectively. The full estimates are in Appendix B.

The Community Roads Program will provide a funding allocation of $18 million.

The cost estimates for the three projects are summarised in Table 3.

The estimated cash flow for the projects is shown in Table 4.

Table 3
Cost Estimate Summary

Project	P50 Estimate	P90 Estimate
North of Murdunna	$8,500,000	$9,500,000
South of Murdunna	$3,700,000	$4,100,000
South of Taranna	$4,200,000	$4,600,000

Table 4
Estimated Cash Flow

Year	North of Murdunna	South of Murdunna	South of Taranna
2011-12	$120,000	$120,000	$120,000
2012-13	$260,000	$220,000	$300,000
2013-14	$7,080,000	$2,910,000	$3,170,000
2014-15	$1,030,000	$480,000	$620,000

[1] As quoted by Evans and Peck, Best Practice Cost Estimation Standard for Publicly Funded Road and Rail Construction.

Table 5
Cost Estimate (P50)
for North of Murdunna

Cost Item	Amount ($)
Scoping and Development	$235,000
Design, Project Management & Contract Administration	$285,000
Property Acquisition	$135,000
Environmental Works	$10,000
Temporary Works / Traffic Management	$55,000
Public Utilities Adjustments	$155,000
Bulk Earthworks	$1,762,000
Drainage	$484,000
Pavements	$1,784,000
Road marking, signage, furniture	$195,000
Landscaping	$49,000
Supplementary Items	$234,000
Reseal and linemarking	$156,000
Inherent Contingency (P50)	$676,000
Contingent Contingency (P50)	$1,505,000
Escalation (P50)	$800,000
TOTAL	**$8,500,000**

Table 6
Cost Estimate (P50)
for South of Murdunna

Cost Item	Amount ($)
Scoping and Development	$233,000
Design, Project Management & Contract Administration	$272,000
Property Acquisition	$98,000
Environmental Works	$10,000
Temporary Works / Traffic Management	$42,000
Public Utilities Adjustments	$0
Bulk Earthworks	$614,000
Drainage	$181,000
Pavements	$626,000
Road marking, signage, furniture	$136,000
Landscaping	$25,000
Supplementary Items	$158,000
Reseal and linemarking	$50,000
Inherent Contingency (P50)	$250,000
Contingent Contingency (P50)	$701,000
Escalation	$300,000
TOTAL	**$3,700,000**

Table 7
Cost Estimate (P50)
for South of Taranna

Cost Item	Amount ($)
Scoping and Development	$235,000
Design, Project Management & Contract Administration	$288,000
Property Acquisition	$165,000
Environmental Works	$10,000
Temporary Works / Traffic Management	$70,000
Public Utilities Adjustments	$123,000
Bulk Earthworks	$433,000
Drainage	$167,000
Pavements	$846,000
Road marking, signage, furniture	$82,000
Landscaping	$45,000
Supplementary Items	$78,000
Reseal and linemarking	$92,000
Inherent Contingency (P50)	$354,000
Contingent Contingency (P50)	$838,000
Escalation	$400,000
TOTAL	**$4,200,000**

10. Conclusions and Recommendations

The design for the proposed projects on the Arthur Highway has been carried out in accordance with appropriate road design standards and guidelines. The design has regard to an acceptable balance of priorities, risks and cost.

Where necessary, the requirements of abutting landowners, the Tasman Council and public utility owners have been incorporated.

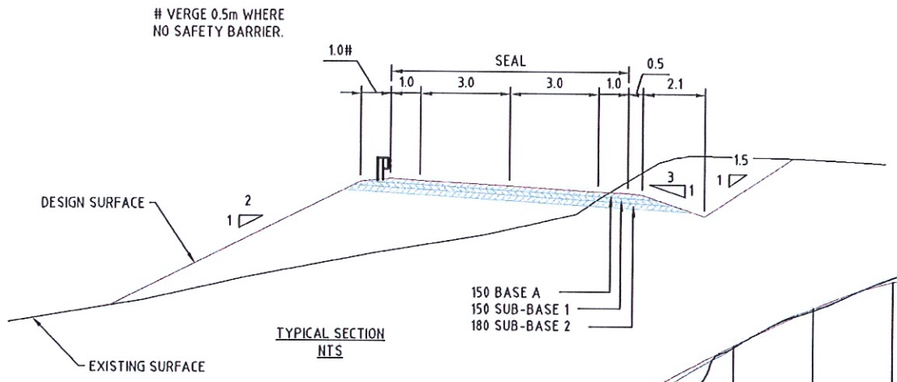
Once complete, the works will provide the following benefits:

- Improved safety by providing increased sight distance, a wider pavement with sealed shoulders, the removal of roadside hazards and the installation of safety barrier.
- Reduced pavement maintenance costs through improvements to pavement drainage and sealing of the shoulder.
- Improved transport efficiency by providing a consistent speed environment through improvement to the horizontal and vertical alignment and by providing additional overtaking opportunities.

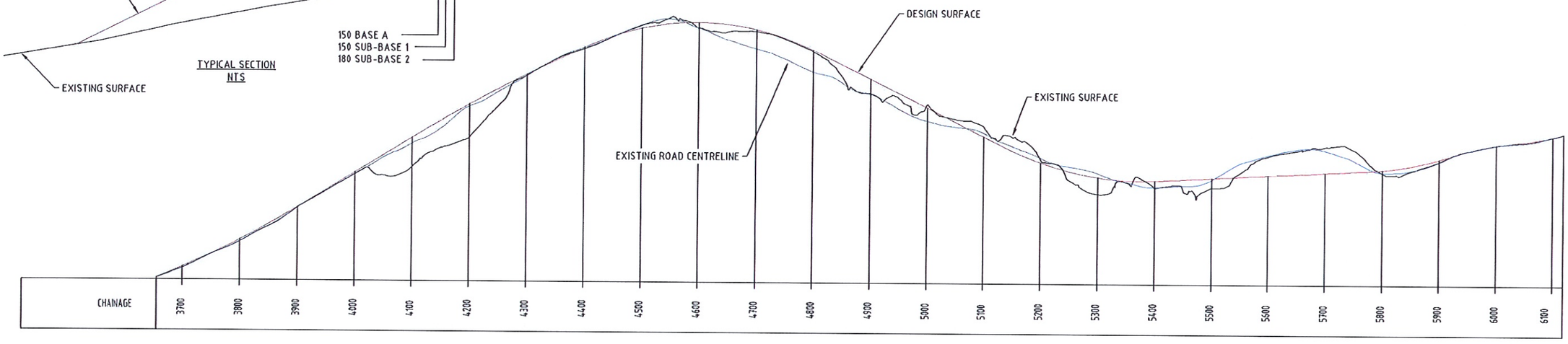
It is recommended that the project be approved.

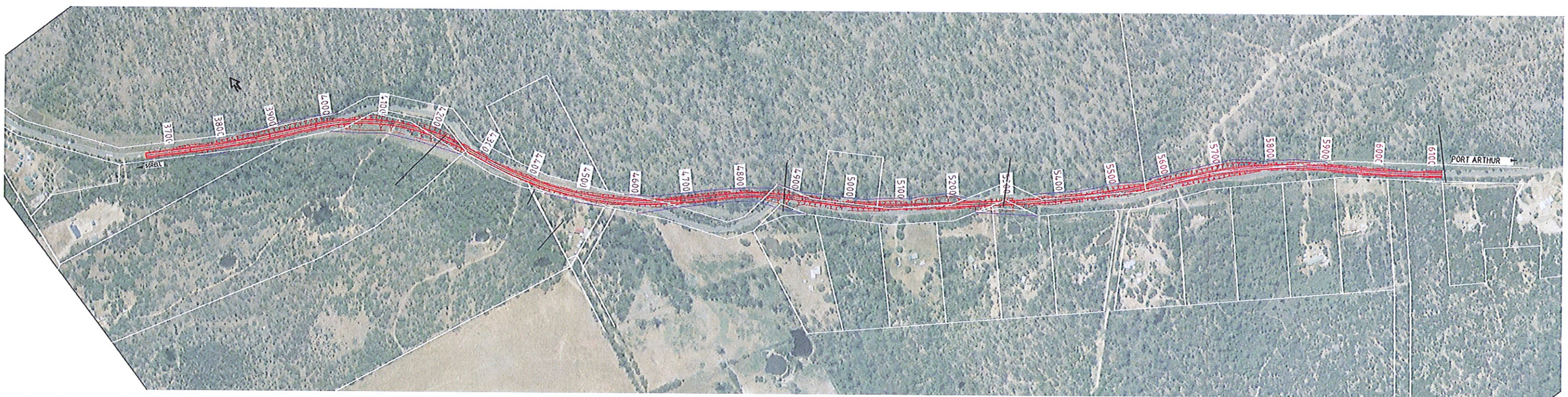
Appendix A

Drawings



TYPICAL SECTION
NTS





No.	Amendment Description	Initials	Date
A3 original	This sheet may be prepared using colour and may be incomplete if copied		

SCALES
1:7500
75 0 75 150 225 300
SCALE IN METRES - 1:7500

Co-ordinate System: MGA ZONE 55 Height Datum: AHD

pitt&sherry

Tasmania Explore the possibilities

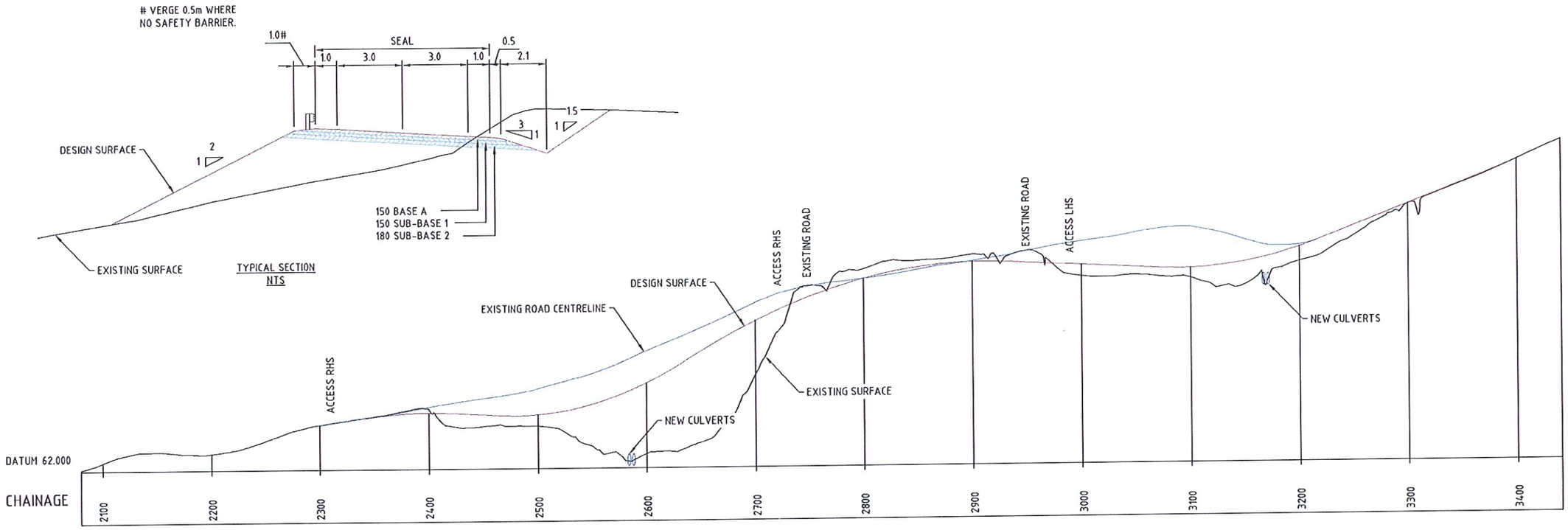
DESIGNED
REVIEWED

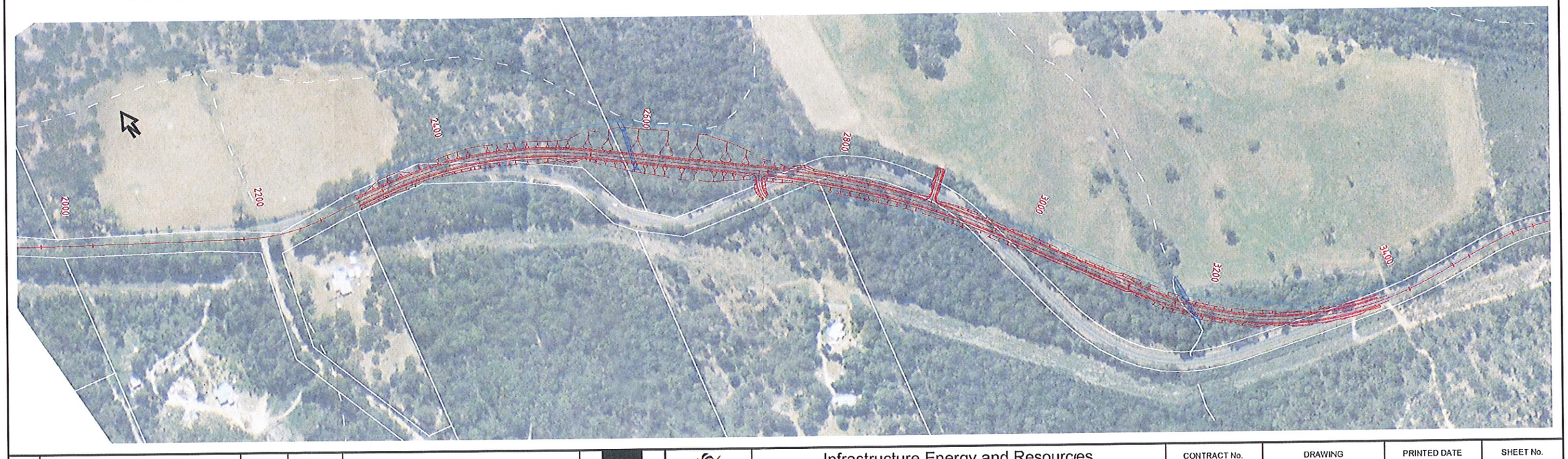
Infrastructure Energy and Resources

ARTHUR HIGHWAY A0142

NORTH OF MURDUNNA

CONTRACT No.	DRAWING	PRINTED DATE	SHEET No.
	HB11348-P13.DWG	26-Nov-12, 9:40 AM	1
REGISTRATION NUMBER			REVISION





No.	Amendment Description	Initials	Date

A3 original | This sheet may be prepared using colour and may be incomplete if copied

SCALES

1:4000

4.0 0 4.0 8.0 12.0 16.0

SCALE IN METRES - 1:4000

Co-ordinate System: MGA ZONE 55 | Height Datum: AHD

pitt&sherry | Tasmania Explore the possibilities

DESIGNED

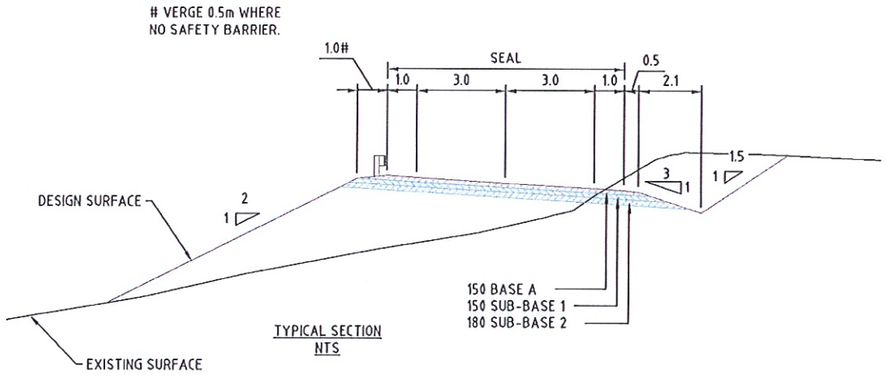
REVIEWED

Infrastructure Energy and Resources

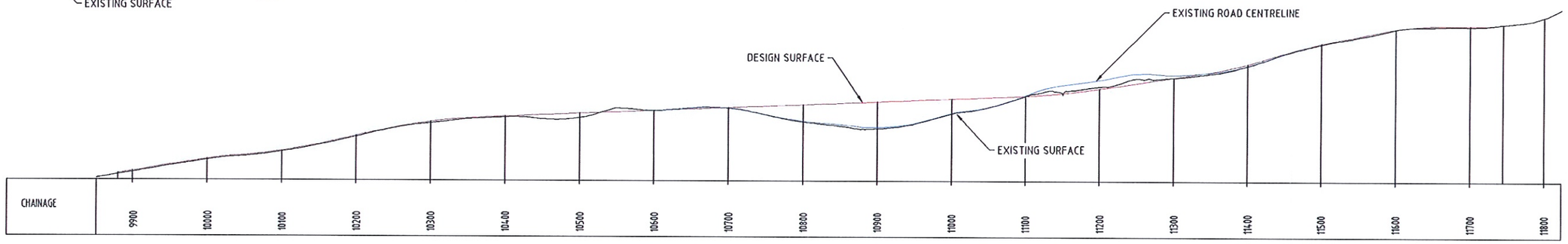
ARTHUR HIGHWAY A0142

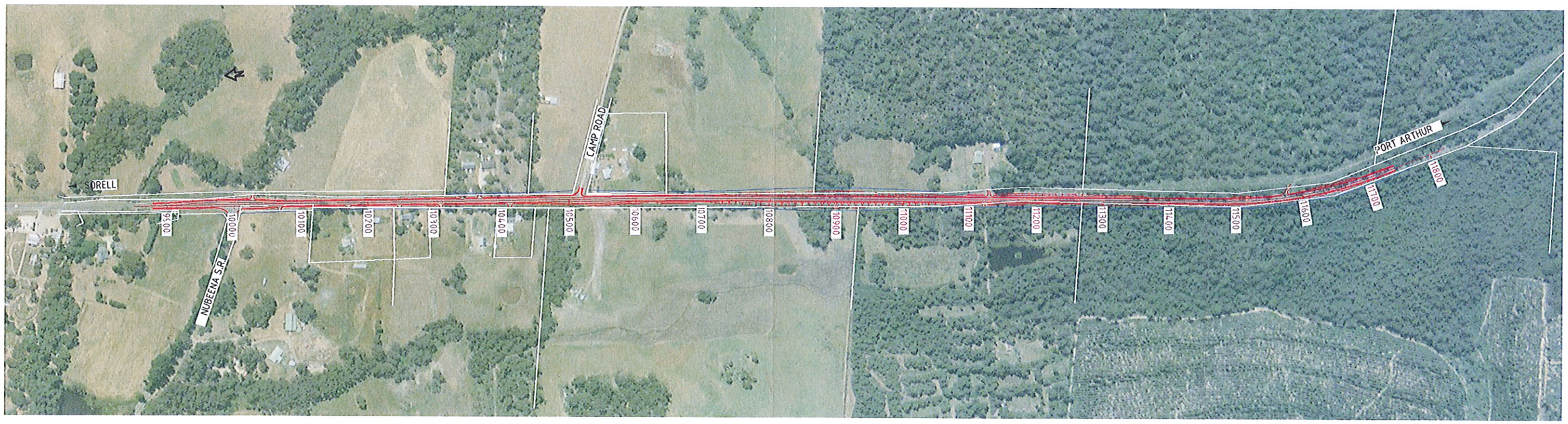
SOUTH OF MURDUNNA

CONTRACT No.	DRAWING	PRINTED DATE	SHEET No.
	HB11348-P14.DWG	26-Nov-12, 9:39 AM	1
REGISTRATION NUMBER			REVISION



TYPICAL SECTION
NTS





No.	Amendment Description	Initials	Date

A3 original | This sheet may be prepared using colour and may be incomplete if copied

SCALES
1:6000
60 0 60 120 180 240
SCALE IN METRES - 16000

Co-ordinate System: MGA ZONE 55 | Height Datum: AHD

pitt&sherry | Tasmania

DESIGNED
REVIEWED

Infrastructure Energy and Resources

ARTHUR HIGHWAY A0142

SOUTH OF TARANNA

CONTRACT No.	DRAWING	PRINTED DATE	SHEET No.
	HB11348-P15.DWG	26-Nov-12, 9:28 AM	1

REGISTRATION NUMBER

REVISION

Appendix B

Estimates

Arthur Highway
Cost Estimate
DIER Project 1280-01-76
North of Murdunna

		Base Estimate						
	Base Estimate Date: May 2012	unit	qty	Rate	Amount	Comment		
1	**Scoping Phase**							
	Project Scoping	Item	1	$ 30,000	$ 30,000	Includes extra for aboriginal and geotechnical survey		
	DIER Project Management	Item	1	$ 10,000	$ 10,000			
	Subtotal: Scoping Phase				$ 40,000			
2	**Development Phase**							
	Project Planning	Item	1	$ 185,000	$ 185,000			
	DIER Project Management	Item	1	$ 10,000	$ 10,000			
	Subtotal: Development Phase				$ 195,000			
3	**Property Acquisition**							
	Property Acquisition	Item			$ 135,000			
	Subtotal: Property Acquisition				$ 135,000			
	Total Pre-Construction Costs				$ 370,000			
4	**Delivery Phase**							
	Preliminary Design	Item	1	$ 60,000	$ 60,000			
	Detailed Design	Item	1	$ 90,000	$ 90,000			
	DIER Project Management	Item	1	$ 10,800	$ 10,800	4 hr per week during 18wk design & tender, 2 hr per week during 24wk construct @ $180/hr (split between 2 & 11)		
	Contract Administration	Item	1	$ 78,240	$ 78,240	Superintendent 4 h/wk @ $180 Sup rep 10 h/wk @$160 Supervisor 30h/w @$140 during 24wk construct (split between 2 & 11)		
	Owner's Costs							
	Client supplied Insurances, Fees, Levies	Item	1	$ 46,257	$ 46,257	Contract insurance (0.37%), DA Fee, Changes to conservation covenant (assumed cost)		
	Subtotal: Delivery Phase Client Costs				$ 285,297			
5	**Total Client's Costs**				$ 655,297			
	Construction							
	Contractor's Direct Costs							
	Environmental Works				$ 10,000			
	Temporary Works / Traffic Management				$ 54,600			
	Bulk Earthworks & Retaining Walls				$ 1,762,023			
	Drainage				$ 483,575			
	Pavements				$ 1,783,541			
	Road markins, signage, furniture				$ 194,747			
	Landscaping				$ 49,298			
	Supplementary Items				$ 234,120			
	Reseal and Linemarking				$ 156,310			
6	**Total Contractor's Direct Costs**				$ 4,728,213			
	Contractor's In-direct Costs							
	On Site Overheads					Included in Contractors direct costs		
	Off Site Overheads and Margin					Included in Contractors direct costs		
7	***Total: Contractor's In-direct Costs***				$ -			
8	**Client Supplied Materials or Services**							
	Electrical Relocation Direct payment to Aurora	poles	20	$ 7,750	$ 155,000			
	Telecommunications relocation direct payment to Telstra					No telecommunication relocation		
	Total Client Supplied Material or Services				$ 155,000			
9	**Total Construction Cost (TCC)**				$ 4,883,213			
	Total Construction + CA Cost				$ 5,168,510			
10	**Base Estimate**				$ 5,500,000			
							P50	P90
	Contingency - inherent risks						$670,900	$1,452,300
	Contingency - contingent risks						$1,504,235	$1,656,180
	Total Contingency						$2,175,135	$3,108,480
11	**Total Contingency as percentage of Base Estimate**						40%	57%
12	**Project Estimate**						$7,700,000	$8,600,000
	Cashflow: Start Construction September 2012, Finish Construction March 2013							
13	**Escalation (applied to Project Estimate)**						700,000	$ 800,000
	% escalation (compared to base estimate + contingency)						4.75%	4.75%
14	**Total Outturn Cost**						$8,400,000	$9,400,000

Arthur Highway
Cost Estimate
DIER Project 1280-01-76
South of Murdunna

	Base Estimate Date: May 2012	Base Estimate unit	qty	Rate	Amount	Comment		
1	**Scoping Phase**							
	Project Scoping	Item	1	$ 30,000	$ 30,000	Includes extra for aboriginal and geotechnical survey		
	DIER Project Management	Item	1	$ 10,000	$ 10,000			
	Subtotal: Scoping Phase				$ 40,000			
2	**Development Phase**							
	Project Planning	Item	1	$ 183,000	$ 183,000			
	DIER Project Management	Item	1	$ 10,000	$ 10,000			
	Subtotal: Development Phase				$ 193,000			
3	**Property Acquisition**							
	Property Acquisition	Item			$ 97,500			
	Subtotal: Property Acquisition				$ 97,500			
	Total Pre-Construction Costs				$ 330,500			
4	**Delivery Phase**							
	Preliminary Design	Item	1	$ 60,000	$ 60,000			
	Detailed Design	Item	1	$ 90,000	$ 90,000			
	DIER Project Management	Item	1	$ 10,800	$ 10,800	4 hr per week during 18wk design & tender, 2 hr per week during 24wk construct @ $180/hr (split between 2 & 11)		
	Contract Administration	Item	1	$ 78,240	$ 78,240	Superintendent 4 h/wk @ $180 Sup rep 10 h/wk @$160 Supervisor 30h/w @$140 during 24wk construct (split between 2 & 11)		
	Owner's Costs							
	Client supplied Insurances, Fees, Levies	Item	1	$ 33,412	$ 33,412	Contract insurance (0.37%), DA Fee, Changes to conservation covenant (assumed cost)		
	Subtotal: Delivery Phase Client Costs				$ 272,452			
5	**Total Client's Costs**				$ 602,952			
	Construction							
	Contractor's Direct Costs							
	Environmental Works				$ 10,000			
	Temporary Works / Traffic Management				$ 41,600			
	Bulk Earthworks & Retaining Walls				$ 613,767			
	Drainage				$ 181,367			
	Pavements				$ 625,916			
	Road marking, signage, furniture				$ 135,524			
	Landscaping				$ 24,980			
	Supplementary Items				$ 158,280			
	Reseal and Linemarking				$ 50,290			
6	**Total Contractor's Direct Costs**				$ 1,841,723			
	Contractor's In-direct Costs							
	On Site Overheads					Included in Contractors direct costs		
	Off Site Overheads and Margin					Included in Contractors direct costs		
7	*Total: Contractor's In-direct Costs*				$ -			
8	**Client Supplied Materials or Services**				$ -	None		
9	**Total Construction Cost (TCC)**				$ 1,841,723			
	Total Construction + CA Cost				$ 2,114,175			
10	**Base Estimate**				$ 2,400,000			
							P50	P90
	Contingency - inherent risks						$206,000	$493,400
	Contingency - contingent risks						$700,970	$762,768
	Total Contingency						$906,970	$1,256,168
11	**Total Contingency as percentage of Base Estimate**						38%	52%
12	**Project Estimate**						$3,300,000	$3,700,000
	Cashflow: Start Construction September 2012, Finish Construction March 2013							
13	**Escalation (applied to Project Estimate)**						300,000	$ 300,000
	% escalation (compared to base estimate + contingency)						4.75%	4.75%
14	**Total Outturn Cost**						$3,600,000	$4,000,000

Arthur Highway
Cost Estimate
DIER Project 1280-01-76
Soutrh of Taranna

		Base Estimate						
	Base Estimate Date: May 2012	unit	qty	Rate	Amount	Comment		
1	Scoping Phase							
	Project Scoping	Item	1	$ 30,000	$ 30,000	includes extra for aboriginal and geotechnical survey		
	DIER Project Management	Item	1	$ 10,000	$ 10,000			
	Subtotal: Scoping Phase				$ 40,000			
2	Development Phase							
	Project Planning	Item	1	$ 185,000	$ 185,000			
	DIER Project Management	Item	1	$ 10,000	$ 10,000			
	Subtotal: Development Phase				$ 195,000			
3	Property Acquisition							
	Property Acquisition	Item			$ 165,000			
	Subtotal: Property Acquisition				$ 165,000			
	Total Pre-Construction Costs				$ 400,000			
4	Delivery Phase							
	Preliminary Design	Item	1	$ 60,000	$ 60,000			
	Detailed Design	Item	1	$ 90,000	$ 90,000			
	DIER Project Management	Item	1	$ 18,360	$ 18,360	4 hr per week during 17wk design & tender, 2 hr per week during 17wk construct @ $180/hr		
	Contract Administration	Item	1	$ 110,840	$ 110,840	Superintendent 4 h/wk @ $180 Sup rep 10 h/wk @$160 Supervisor 30h/w @$140 during 17wk construct		
	Owner's Costs							
	Client supplied Insurances, Fees, Levies	Item	1	$ 8,752	$ 8,752	Contract Insurance (0.37%), DA Fees		
	Subtotal: Delivery Phase Client Costs				$ 287,952			
5	Total Client's Costs				$ 687,952			
	Construction							
	Contractor's Direct Costs							
	Environmental Works				$ 10,000			
	Temporary Works / Traffic Management				$ 70,200			
	Bulk Earthworks & Retaining Walls				$ 432,845			
	Drainage				$ 167,181			
	Pavements				$ 845,712			
	Road marking, signage, furniture				$ 82,336			
	Landscaping				$ 44,588			
	Supplementary Items				$ 78,090			
	Reseal and Linemarking				$ 91,619			
6	Total Contractor's Direct Costs				$ 1,822,571			
	Contractor's In-direct Costs							
	On Site Overheads					Included in Contractors direct costs		
	Off Site Overheads and Margin					Included in Contractors direct costs		
7	*Total: Contractor's In-direct Costs*				$ -			
8	Client Supplied Materials or Services				$ -	None		
	Electrical Relocation Direct payment to Aurora	poles	15	$ 7,750	$ 116,250			
	Telecommunications relocation direct payment to Telstra	m	25	$ 250	$ 6,250			
					$ 122,500			
9	Total Construction Cost (TCC)				$ 1,945,071			
	Total Construction + CA Cost				$ 2,233,023			
10	Base Estimate				$ 2,600,000			
							P50	P90
	Contingency - inherent risks						$356,400	$642,000
	Contingency - contingent risks						$838,813	$903,776
	Total Contingency						$1,195,213	$1,545,776
11	Total Contingency as percentage of Base Estimate						46%	59%
12	Project Estimate						$3,800,000	$4,100,000
	Cashflow: Start Construction September 2012, Finish Construction March 2013							
13	Escalation (applied to Project Estimate)						400,000	$ 400,000
	% escalation (compared to base estimate + contingency)						4.75%	4.75%
14	Total Outturn Cost						$4,200,000	$4,500,000