



Wheatstone Ashburton West Pipeline

Watercourse Crossing Procedure

DRAFT

Prepared for
DBNGP (WA) Nominees Pty Ltd
by Strategen

October 2013



STRATEGEN
environmental consultants

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Strategen is a trading name of
Strategen Environmental Consultants Pty Ltd
Level 2, 322 Hay Street Subiaco WA
ACN: 056 190 419

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Client: DBNGP (WA) Nominees Pty Ltd

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The appendix is in electronic form on a data CD/DVD attached to the inside the back cover of this report or on the disc containing the electronic version of this report.

1. Introduction

1.1 Purpose

This document outlines the procedures to be employed crossing and rehabilitating watercourses while implementing the Wheatstone Ashburton West Pipeline Project. The pipeline alignment intersects the Ashburton River at two locations over its length (see Figure 1).

Two possible methods are available to be undertaken to cross watercourses, with the methods adopted based on the geotechnical characteristics of each site, including expected water flow during construction. The alternative methods proposed involve:

1. Open trenching.
2. Horizontal directional drilling (HDD).

The environmental impacts associated with both methods are largely temporary, although trenching will be more disruptive to the bed and banks of the watercourse and rehabilitation is important to avoid longer-term impacts. HDD cannot be undertaken where the geotechnical characteristics of the site may result in the possibility of drilling fluid escaping through the bed of the watercourse. Generally, trenching will be undertaken on smaller and ephemeral watercourses. The method to be adopted for the individual sites will be determined on a site specific basis.

Potential impacts of the pipeline construction on watercourses and water resources include:

- physical disturbance to watercourses / wetlands, banks and riparian vegetation
- changes to the hydrological regimes of wetlands
- alteration to surface water flow regimes
- deterioration in surface water and groundwater quality
- groundwater drawdown.

This procedure is required to ensure the protection and environmentally sound management of watercourses, including water quality and water dependent ecosystems including minimisation of disturbance to riparian vegetation.

This procedure will be performed in compliance with relevant environmental commitments, permits and procedures including those contained in the DBP Construction Environmental Management Plan (CEMP) document (XX) and with DBP approved construction contractor Environmental Management Plans.

1.2 Scope

This procedure is applicable to all watercourse crossings along the pipeline route.

This procedure outlines information for management of watercourse crossings in relation to the following pipeline activities:

- clearing of watercourse vegetation
- earthworks, HDD and trenching across watercourses
- wet crossing requirements
- stabilisation of banks
- rehabilitation of watercourse form, function and stability.

The overall requirement to minimise the degree of vegetation cover removed and to minimise soil disturbance is addressed in the Flora and Vegetation Management Protocol and Soil Management Protocol within the DBP CEMP.

Figure 1: Wheatstone Ashburton West Pipeline – pipeline alignment

1.2.1 Who needs to read this procedure

All employees involved in construction activities need to read this procedure and must comply with this procedure at all times.

In particular, the following construction contractor personnel are responsible for ensuring compliance with and awareness of this procedure:

1. Construction Manager
2. Spread Superintendent
3. Environmental Manager (Environmental Manager)
4. Site Environmental Officer (Senior Environmental Officer)
5. Land Liaison Officer
6. Relevant Supervisors including:
 - Clear and Grade
 - Trenching
 - Special Crossings / HDD
 - Lower and Lay
 - Reinstatement.

2. Procedures

2.1 General

The following general procedures will apply to all watercourse crossings:

1. All construction activities and environmental management measures will be discussed with the Environmental Manager or Senior Environmental Officer prior to commencement of crossings.
2. The induction program shall involve a watercourse management component to ensure all personnel are aware of the requirements for the protection of watercourses.
3. Bureau of Meteorology forecasts shall be used to avoid construction activity within or on the banks of watercourses during times of wet weather, wherever practicable.
4. River, creek and drain crossings shall be scheduled during dry conditions or low flow periods wherever practicable, by observing weather forecasts.
5. Erosion control measures shall be installed as required to protect sites near the pipeline corridor.
6. Watercourse crossings shall be completed over the shortest time practicable, to minimise the period of open trench.
7. With respect to the various crossing types (See Appendix 1 for typical drawings of the crossing types), the following shall apply:

2.1.1 Major watercourse crossings (Type 1)

1. All major watercourse crossings will be constructed during periods of expected low flow, wherever practicable.
2. All major watercourse crossings will be done as a special crossing (see Section 2.6).

2.1.2 Minor watercourse (Type 2)

1. Type 2 watercourse crossings will be constructed by the mainline crew except when there is significant flowing water or the potential to disturb sensitive downstream receptors or sensitive vegetation.
2. Trench spoil will be stockpiled beside the trench.
3. Appropriate openings in the spoil bank will be provided to allow normal drainage of the area and to prevent surface water from accumulating and flooding.

2.1.3 Minor watercourse (Type 3)

1. Type 3 watercourse crossings will generally be done as a mainline crossing unless there is significant flowing water or the potential to disturb sensitive downstream receptors.
2. Trench spoil will be stockpiled beside the trench.
3. Appropriate openings in the spoil bank will be provided to allow normal drainage of the area and to prevent surface water from accumulating and flooding.

2.1.4 Open drains (Type 6)

1. Type 6 open drains will not be done as special crossings unless there is significant flowing water or the potential to disturb sensitive downstream receptors.
2. Type 6 open drains will generally be levelled out during clear and grade, topsoil and banks will be stored back from the banks of the drain and flume pipe installed as appropriate.
3. Trench spoil will be stockpiled beside the trench.
4. Appropriate openings in the spoil bank will be provided to allow normal drainage of the area and to prevent surface water from accumulating and flooding.

2.2 Survey, fencing and service location

1. Riparian vegetation along watercourses which will be traversed will be delineated on the ground in consultation with the relevant regional office of the Department of Environment and Conservation. The provision of location maps, photographs of potentially affected vegetation and advice on expected timing of watercourse crossing works should be provided to the Department at least four weeks prior to commencement of clear and grade activities on any watercourse crossing.
2. Vehicular intrusion into the riparian zone and along stream banks shall be limited through fencing or flagging and / or signage delineating where vehicles are permitted/not permitted.
3. Vehicles accessing stream and river areas shall keep to existing tracks and remain within the construction corridor or use existing crossings when traversing waterways at all times
4. Waterways and riparian zones shall only be accessed along the construction corridor.
5. All river crossing and associated 200 m buffer areas shall be marked in the field.
6. The total area of disturbance shall be marked out with survey pegs so as to delineate the areas of construction activity.
7. Habitat trees to be retained shall be flagged with appropriate identifying tape.

2.3 Clearing

1. Clearing on river and creek banks will be kept to a minimum and trees and watercourse vegetation will be retained where possible.
2. Vegetation management shall be in accordance with the Flora and Vegetation Management Protocol within the CEMP and other relevant Westnet Energy approved contractor vegetation management procedures.
3. Clear and grade width will be minimised at watercourses to the width required for safe working space. An access track will be constructed through the watercourse if no other access is available.
4. Watercourses may be used for access; however, clear and grade activity beyond the width required for access through major watercourses shall be left until the special crossings crew arrives on site to carry out the works, unless specifically approved by WestNet
5. Cleared and pruned vegetation shall be stockpiled on-site for later use in bank stabilisation and rehabilitation.
6. Unusable plant material will be stacked at an approved location away from the watercourse to ensure that this material does not enter the watercourse.
7. Material taken from the bed will not be mixed with the bank material.
8. During reinstatement, cleared and pruned vegetation shall be placed and secured over the disturbed areas of the mid-stream banks to stabilise and minimise erosion and to encourage the re-establishment of mid-stream vegetation.
9. HDD drill entry and exit points shall be located to avoid impact on riparian vegetation and heritage areas.

2.4 Earthworks

1. Work will be conducted in dry weather as far as is practicable to prevent erosion from rainfall, flooding and run-off.
2. Bureau of Meteorology forecasts shall be used to avoid construction activity within or on the banks of watercourses during times of wet weather.
3. River, creek and drain crossings shall be scheduled during dry conditions or low flow periods wherever practicable by observing weather forecasts.
4. Earth disturbance and the rate (time) of disturbance will be minimised.
5. Work sites will be located at a minimum distance of 200 m set back from the top of banks at water courses.
6. Temporary stockpiles of other than topsoil or vegetation will not be located within 200 m of any watercourse.

7. Disturbed earth will be re-compacted as soon as possible to avoid increasing water turbidity.
8. Topsoil removed from banks will be conserved and will not be mixed with other materials.
9. Stockpiled bank soil will be stored away from the watercourse to ensure that run-off into watercourses does not occur. Spoil will not be disposed of into watercourses.
10. River overburden (sand) stockpiles shall be located in open areas within the river bed so as to not disturb existing river bed vegetation.
11. Trench spoil will be stockpiled close to the trench in a fashion that minimises interference with riverine vegetation. Appropriate openings in the spoil bank will be provided to allow normal drainage of the area and to prevent surface water from accumulating and flooding.
12. The width of the cut in the construction right of way in the vicinity of watercourse crossings will be minimised to that required to enable safe working conditions.
13. Proposed pipe profile drawings for each watercourse crossing will be provided to DBP for approval prior to construction. Pipe will not be installed in any crossing until the profiles of the completed bank cuts and trench bottom have been surveyed and the prepared crossing pipe and coating approved by the Superintendent.
14. Trees of diameter 300 mm or larger will be preserved wherever possible. Any habitat trees will be managed in accordance with the Fauna Interaction Protocol in the CEMP and other relevant Westnet Energy approved contractor fauna management procedures.
15. Trenching will be deeper than nominal depth to allow additional cover at watercourse crossings as specified in the contract. Trenching will be completed in short stretches so that disturbed earth can be backfilled as soon as practicable after trenching.

2.5 Soil management

1. Measures will be implemented to reduce soil erosion and siltation in associated waterways, such as installing silt traps or bunded areas using hay bales and geofabric to filter and allow sediment to settle before the water is released downstream. If there are sand bars or exposed sandy sections of river bed away from permanent pools, pumped / dewater from the trench will be released on to the sand to infiltrate.
2. Soil Management shall be in accordance with the Soil Management Protocol within the CEMP and other relevant Westnet Energy approved contractor soil management procedures.

2.6 Special crossings

1. Major watercourses and any environmentally sensitive water courses or those that are flowing will be treated as a special crossing. Special crossings will be constructed separately from the mainline crews.
2. When other access is available, clear and grade activity at major watercourses shall be left until the special crossings crew arrives on site to carry out the works. Watercourses may be used for access; however, vegetation clearing outside the nominal width of the construction corridor shall be left until the crossing crew carries out the clear and grade, unless approved by DBP.

2.7 Trenching and excavation

1. When surface water is present, diversion berms or drains shall be installed to divert water away from the construction area and to enable flow to downstream areas and water uses to be maintained.
2. Trenches in watercourses shall not be left open during construction breaks that exceed three days duration.
3. No part of the trench, other than "bell holes", shall remain open for more than 14 days unless approved by DBP. DBP is prohibited from providing such an approval unless prior approval has been obtained from the Chief Executive Officer of the Department of Environment and Conservation.
4. Fauna shall be managed in accordance with the Fauna Interaction Protocol in the CEMP and other relevant DBP approved contractor fauna management procedures.

5. Dewater product will be discharged onto the dry riverbed where possible, and only into pools or flowing water where the discharge water quality is similar to the receiving waters.

2.8 Horizontal Directional Drilling

1. HDD drill site, entry and exit points shall be located away from watercourse banks and riparian areas, as far as practicable.
2. Topsoil shall be cleared from the site and stockpiled separately from subsoil upon excavation to allow the subsequent backfilling of soil in the correct horizons.
3. On a daily basis, prior to commencement of works HDD equipment shall be inspected to ensure it is in good working order by the Special Crossings Supervisor.
4. The drilling site shall be contained within an appropriate earthen bund. Topsoil must not be used in the construction of the bund.
5. Drill entry and exit points shall be monitored during drilling for potential fracturing out of drilling mud.
6. Only water based drilling fluids shall be used.
7. Drilling mud shall be contained in mud tanks or pits and de-sanded and recirculated during drilling.
8. Drilling mud and cuttings shall be disposed of consistent with the Waste Management Protocol in the CEMP and other relevant DBP approved contractor waste management procedures.

2.9 Erosion

1. Erosion control devices shall be installed in stream banks, beds and riparian zones to minimise the risk of erosion and sediment runoff in to the watercourse.
2. Removal of riparian, bank and in-stream vegetation should be minimised wherever possible to reduce the risk of erosion and to assist in maintaining the stability of river beds and banks.

2.10 Disturbance to river regime

1. The crossings will be carried out in the shortest feasible time so that flora and fauna are not adversely affected and the river regime can return to its original format.
2. Riparian vegetation to be disturbed will be delineated on the ground.
3. Banks will be crossed so as not to alter the function or capacity of the watercourse and clearing of banks will be kept to a minimum. River bank protection measures will be used to prevent damage to banks.
4. Temporary drainage will be installed where required to minimise disturbance to normal drainage regime. 640 mm diameter flume pipes will be installed as appropriate in all / potential flowing or pooled watercourses to ensure there is no change in the flow and velocity of the water and minimise the risk of erosion and sediment carrying capacity. All temporary flume pipes will be removed during reinstatement.
5. Diversion channels will be installed to allow free passage of water, fish and other aquatic animals in large river systems with heavy flow or where there are sensitive downstream receptors, including riparian water users.

2.11 Restoration

1. Immediately following backfilling of the pipe, the bed and banks of the river will be reinstated. Compaction will be carried out once padding has been placed around the pipe and trench backfilled over the pipe until surface grades are achieved.
2. Restoration will be carried out as soon as possible after completion of laying and backfilling of the pipe and installation of any weights.
3. All loose material and debris will be removed from the bed and the bed will be reshaped to the original gradient to prevent modified water flow and subsequent turbulence which could increase bank erosion.

4. Creek banks or beds will then be restored as nearly as practicable to their original profile. Banks will be rebuilt to their existing profile and capacity with allowance for settlement.
5. The banks of the watercourses will be restored by compacting and grading to the natural contours or to the natural angle of repose of the stream bank material whichever is less steep, except where the Superintendent directs that special bank protection measures be used. Stabilisation will be performed where necessary on banks using the following preferred methods:
 - Anchoring any trees that were removed during clear and grade, into the river bank at a 30 degree angle to deflect water away from the banks downstream and to assist in stabilisation and provide habitat for aquatic fauna.
 - Geofabric/organic matting to stabilise the bank and bind the soil together.
 - Reseeding/revegetating the banks and fertilising with small amounts of native fertiliser.
6. Major watercourses with steep banks may require more secure stabilisation techniques such as:
 - cement/sand mix sand bags
 - rock gabions
 - riprap
7. While these methods are not recognised as best practice as they can lead to the undercutting of the bank around the stabilised surface, such hard stabilisation techniques may be required to protect the gas pipeline. These will be constructed in a manner that does not encourage erosion of the adjacent material.
8. Cleared and pruned vegetation shall be placed over disturbed areas of the banks and secured to stabilise and minimise erosion when the river is in flood and to encourage re-establishment of vegetation.
9. As far as practicable, river beds and banks shall be landscaped to their former pre-disturbance condition and best practice will be followed to ensure that watercourse crossings retain their form and function.
10. Pre-construction equivalent stability, channel profile and bed composition shall be achieved wherever practicable. This will be particularly important if the crossing is located on a bend in the watercourse where erosion may be occurring or has potential to occur causing environmental damage and/or expose the pipeline.
11. Vegetative materials from site clearing will be re-spread along the construction right of way, to prevent wind and water erosion.
12. Any necessary cross banks will be added to protect batters and disturbed areas. Subject to the actual crossing and surrounding terrain, additional material such as mesh and mulch matting will be applied as considered appropriate. Restoration will entail constructing water flow control banks to limit water flow along the construction right of way.
13. Particular care shall be taken with erosion and sediment control in waterway zones when implementing rehabilitation measures.

3. Responsibilities

1. The Construction Manager is responsible for ensuring that this Watercourse Crossing Procedure is implemented and complied with.
2. All employees are responsible for adhering to this Watercourse Crossing Procedure and minimising harm to the environment.
3. The Environmental Manager or Senior Environmental Officer is responsible for auditing compliance with this procedure.
4. The Environmental Manager in discussion with the Construction Manager is responsible for identification of environmental management measures.
5. The Senior Environmental Officer is responsible for the provision of advice in relation to watercourse crossing. The Senior Environmental Officer is also responsible for reviewing the effectiveness of and compliance with this procedure.

4. Monitoring

4.1 Weekly / opportune:

1. All river crossings and drilling sites to be monitored to ensure compliance with this Procedure.

4.2 Opportune:

1. Ensure muds and drilling fluids are contained.

5. Records management

1. The Senior Environmental Officer will maintain records of environmental control measures implemented and records of inspection (photographs etc).
2. The Land Liaison Officer will maintain records of community relations activities undertaken.
3. The Senior Environmental Officer in discussion with the Construction Manager is responsible for identification of environmental management measures.

6. References

National Health and Medical Research Council 2004, *Australian code of practice for the care and use of animals for scientific purposes*, 7th Edition, Australian Government, Canberra, ACT, 2004.

Sharp T & Saunders G 2004, *GEN001 Methods of Euthanasia, Development of a model code of practice and standard operating procedures for the humane capture, handling or destruction of feral animals in Australia*, Australian Government Department of the Environment and Heritage, Canberra, ACT, 2004.

Chapman T, Sims C & Mawson P 2005, *Minimising Disease Risk in Wildlife Management, Standard operating procedures for fauna translocation, monitoring and euthanasia in the field*, Department of Conservation and Land Management, Perth, Western Australia, 2005.

Reilly JS (ed.) 2002, *Euthanasia of Animals Used for Scientific Purposes*, ANZCCART 2nd Edition, Australia and New Zealand Council for the Care of Animals in Research and Teaching, Department of Environmental Biology, Adelaide University, Adelaide, South Australia, 2001.

Water and Rivers Commission 2001, *Stream Stabilisation*, Report No. RR 10, Perth, Western Australia, February 2001.

DBP Construction Environmental Management Protocols (DBPL00-501-0707-01).

Appendix 1

Typical Drawings – watercourse crossings

Major Water Crossing

Minor Water Crossing Type 3

Water Crossing Type 2

Type 6 Crossing Contour or Manmade Drain

Detail of River Bank Stabilisation Using Sandbags

Trench Breakers