

Revised Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline

Appendix 2 – Pipeline Description

22 December 2011

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Economic Regulation Authority

WESTERN AUSTRALIA

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Appendix 2 - Pipeline Description

1. The Economic Regulation Authority's Final Decision on the proposed revised access arrangement to the DBNGP dated 31 October 2011 and amended on 22 December 2011 required that the revised access arrangement proposal should be amended so that the description of the DBNGP is current as of the date of approval of the access arrangement (Required Amendment 1).
2. It is understood that the attached pipeline description date 1 September 2011, is the most current and up to date description available.

**DAMPIER TO BUNBURY NATURAL
GAS PIPELINE SYSTEM:
DESCRIPTION OF THE
GAS TRANSMISSION SYSTEM
AS AT
1 SEPTEMBER 2011**



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1. Introduction

The gas transmission system is described in Section 2 in terms of the boundaries of the transmission pipeline system between Dampier and Bunbury. These boundaries are defined by the system's inlet and outlet points and notional gate points.

At inlet points, ownership of gas transfers from shippers to DBP. Facilities upstream of the inlet points are owned by shippers or by parties other than DBP.

At outlet points, ownership of gas transfers from DBP to shippers. Facilities downstream of the outlet points are owned by shippers or by parties other than DBP.

Section 3 describes the major component parts of the gas transmission system.

Section 4 provides the route map for the Dampier to Bunbury Natural Gas Pipeline system.

2. Description of the Gas Transmission System: Inlet Points, Outlet Points and Notional Gate Points

The schematic on the following page describes the gas transmission system in terms of its inlet and outlet points.

“Inlet point” means *a flange or joint or other point specified in an access contract as the point at which the shipper delivers gas to the DBNGP Owner under the contract.* Table 1 defines each of the inlet points in the gas transmission system.

“Outlet point” means *a flange or joint, notional gate point or other point specified in an access contract as a point at which the DBNGP Owner delivers gas to the shipper under the contract.* Table 2 defines each of the outlet points.

“Notional gate point” means the point for a distribution sub-network at which all grants of capacity in respect of that sub-network are to be made. Each notional gate point is defined in Table 3 which also shows the associated outlet points.

“BEP Capacity” means the accessible capacity under the BEP Lease Agreement between BEP Owners and the *DBNGP Owners to delivers DBNGP gas using the BEP Pipeline.*

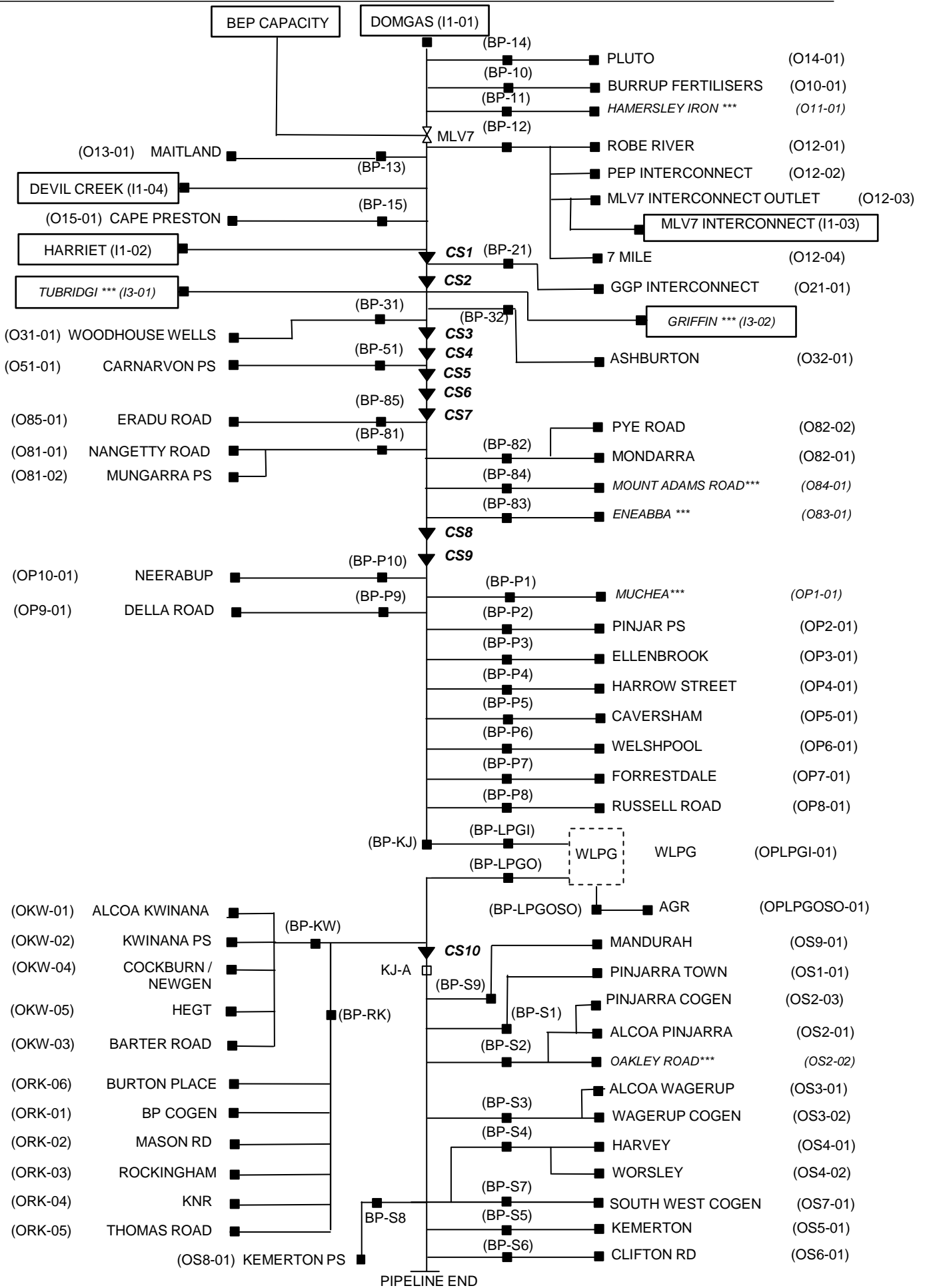
The following designations are used in the schematic and tables:

□		Gas source
■	Ix-xx	Inlet point x-xx
■	Oy-yy	Outlet point y-yy
■	BP-zz	Branching point zz. Branching points have no regulatory significance but serve to identify points of branching from the main pipeline.
□		Inline metering facility KJ-A Kwinana Junction Meter Station M2A KJ-B*** Kwinana Junction Meter Station M2B
▼	CSn	Compressor Station n
	PS	Power Station

Number of inlet points	= 4
Number of inactive inlet points	= 2
Number of branching points	= 40
Number of outlet points	= 51
Number of inactive outlet points	= 5
Number of notional gate points	= 12

(*** *Inactive Inlet or Outlet points are currently inactive, not used or decommissioned*)

*Dampier To Bunbury Natural Gas Pipeline
Description of the Gas Transmission System*



Note Inlet or Outlet Points with * are inactive/decommissioned**

**TABLE 1
GAS TRANSMISSION SYSTEM: INLET POINTS**

LOCATION	POINT DESIGNATION	DISTANCE FROM DAMPIER (Pipeline kilometres)	DESCRIPTION
DOMGAS Dampier Plant	I1-01	0.000	Inlet point is at the upstream flange of the flange joint upstream of the monolithic insulation joint on the main gas pipeline just inside the fence of the Dampier facilities compound.
MLV7 Interconnect Inlet	I1-03	21.968	Inlet point is at the PEP side flange of isolation valve HV5020 located on the meter run 3/4 within MLV7 compound
Devil Creek	I1-04	58.66	Inlet point is located at the insulation joint downstream of the hot-tap valve within the offtake compound.
Harriet	I1-02	136.924	Inlet point is at the second insulation gasket upstream of valve ZV1 between the Harriet meter station and the mainline interconnecting pipe. This gasket is located inside the Harriet meter compound.
Tubridgi	I3-01	272.694	Inlet point is at the second insulation gasket upstream of valve ZV1 between the Tubridgi meter station and the mainline interconnecting pipe. This gasket is located inside the Tubridgi meter compound.
Griffin	I3-02	272.729	Inlet point is at the second insulation gasket upstream of valve ZV2 between the Griffin meter station and the mainline interconnecting pipe. This gasket is located inside the Griffin meter compound.

**TABLE 2
GAS TRANSMISSION SYSTEM: BRANCHING POINTS AND OUTLET POINTS**

LOCATION	POINT DESIGNATION	DISTANCE FROM DAMPIER (Pipeline kilometres)	DESCRIPTION
Branching Point Burrup Fertilisers	BP-10	3.574	This is a branching point located at the insulation gasket downstream of the hot-tap valve within the Burrup Fertilisers metering compound
Burrup Fertilisers	O10-01	3.574	Outlet point is at the insulation gasket downstream of the venturi nozzle RO019 located within the Burrup Fertilisers metering compound
Branching Point Pluto	BP-14	2.3	This is a branching point located at the insulation joint downstream of the hot-tap valve within the metering compound
Pluto	O14-01	2.3	Outlet point is at the insulating joint downstream of Pluto meter station. This joint is located outside the meter compound.
Branching Point MLV6	BP-11	8.845	This is a branching point located at the first tee downstream of HV100A and HV100B valves located inside the MLV6 compound.
Hamersley Iron	O11-01	9.440	Outlet point is on the upstream side of the insulation joint located 0.5km downstream of the odorant facilities.
Branching Point MLV7	BP-12	21.933	This is a branching point located at the first reducer downstream of HV100A and HV100B valves located inside the MLV7 compound.
PEP Interconnect	O12-02	21.968	Outlet point is at the spectacle-blind upstream joint located downstream of the meter station.
MLV7 Interconnect Outlet	O12-03	21.968	Outlet point is at the PEP side flange of isolation valve HV5020 located on the meter run 3/4 within MLV7 compound
Robe River	O12-01	22.083	Outlet point is at the reducer on the downstream side of the odorant injection facility at the outlet of Cajaput Well meter station.
7 Mile	O12-04	21.950	Outlet point is at the last insulating joint downstream of the meter runs. This joint is located inside the MLV 7 compound.
Branching Point Maitland	BP-13	29.993	This is a branching point located at the insulation gasket downstream of the hot-tap valve within the metering compound
Maitland	O13-01	29.993	Outlet point is at the downstream flange of the drop-out spool downstream of the hand valve HV134 within the meter station
Branching Point Cape Preston	BP-15	82.490	This is a branching point located at the insulation joint downstream of the hot-tap valve within the metering compound
Cape Preston	O15-01	82.490	Outlet point is at the insulating joint downstream of Cape Preston meter station. This joint is located outside the meter compound.
Branching Point GGP Interconnect	BP-21	137.2	This is a branching point located at the connection downstream of the station bypass line within the Compressor Station at CS1

**TABLE 2
GAS TRANSMISSION SYSTEM: BRANCHING POINTS AND OUTLET POINTS (CONTINUED)**

LOCATION	POINT DESIGNATION	DISTANCE FROM DAMPIER (Pipeline kilometres)	DESCRIPTION
GGP Interconnect	O21-01	137.2	Outlet point is on the downstream pipe linking the DBNGP and the GGT and at the intersection between the DBNGP and the GGT easements
Branching Point Ashburton	BP-32	272.729	This is a branching point on CS 2 emergency station bypass pipe located upstream of valve ZV2.
Ashburton	O32-01	272.729	Outlet point is downstream of valve SDV5101.
Branching Point Woodhouse Wells	BP-31	311.586	This is a branching point located at downstream of the hot-tap valve within the metering compound
Woodhouse Wells (Exmouth PS)	O31-01	311.586	Outlet point is on the downstream flange of the reducer downstream of the insulation joint within the meter compound
Branching Point MLV55	BP-51	578.858	This is a branching point located at the first flanged joint downstream of HV100A and HV100B located at the MLV55 compound.
Carnarvon Power Station	O51-01	748.583	Outlet point is at the insulation joint downstream of the pig receiver located at the Carnarvon Power Station.
Branching Point MLV90	BP-85	967.096	This is a branching point located at the pipeline junction between valve HV205C and HV206 inside the MLV90 compound.
Eradu Road	O85-01	967.116km	Outlet point is at the first isolation joint located downstream of Eradu Road meter station located inside the MLV90 compound.
Branching Point MLV91	BP-81	996.544	This is a branching point located at the first reducer downstream of HV100A and HV100B located at the MLV91 compound.
Nangetty Road	O81-01	996.851	Outlet point is at the first insulation flange located downstream of the injection line of the odorant facility. This insulating flange is located inside the Nangetty Road compound.
Mungarra Power Station	O81-02	999.126	Outlet point is on the upstream side of the isolation valves on each gas turbine generating unit located downstream of pressure relief valves.
Branching Point Pye Road	BP-82	1043.730	This is a branching point located on the downstream flange of valve HV001 located inside the Pye Road meter station compound.
Mondarra	O82-01	1043.740	Outlet point is at the insulating gasket downstream of Mondarra meter station. This gasket is located inside the Mondarra compound.
Pye Road	O82-02	1043.765	Outlet point is at the insulating flange upstream of the odorant injection point, located inside the Boral compound at the Pye Road meter station.
Branching Point MLV93	BP-84	1054.211	This is a branching point located at the first insulating joint on the supply line to the meter station. The insulating joint is located in the MLV93 compound.

TABLE 2
GAS TRANSMISSION SYSTEM: BRANCHING POINTS AND OUTLET POINTS (CONTINUED)

LOCATION	POINT DESIGNATION	DISTANCE FROM DAMPIER (Pipeline kilometres)	DESCRIPTION
Mount Adams Road	O84-01	1054.216	Outlet point is at the first insulation joint located downstream of Mount Adams Road meter station located inside the MLV 93 compound.
Branching Point CS8	BP-83	1113.551	This is a branching point located on the downstream side of HV105B. The branching point is located in the MLV95 and Eneabba meter station compound.
Eneabba	O83-01	1113.621	Outlet point is at the insulation joint downstream of the launcher isolating valve.
Branching Point Muchea	BP-P1	1307.000	This is a branching point located at the downstream flange of HV1 located in the Muchea meter station compound.
Muchea	OP1-01	1307.036	Outlet point is at the reducer located downstream of the odorant injection facility.
Branching Point Neerabup	BP-P10	1309.835	This is a branching point located at the insulation joint downstream of the hot-tap valve within the metering compound
Neerabup	OP10-01	1309.835	Outlet point is at the insulating joint downstream of meter station. This joint is located outside the meter compound.
Branching Point MLV116	BP-P2	1311.157	This is a branching point located on the downstream side of the HV 100A valve located inside the MLV116 compound.
Branching Point MLV117	BP-P9	1323.931	This is a branching point comprising the downstream flanges of valves HV100A and HV100B located inside the MLV117 compound.
Della Road Meter Station (MLV117)	OP9-01	1323.996	Outlet point is at the insulating joint upstream of the distribution system valve pit located outside the MLV117 compound.
Pinjar Power Station	OP2-01	1326.157	Outlet point is on the upstream side of isolation valves on each gas turbine generating unit located downstream of pressure relief valves.
Branching Point MLV118	BP-P3	1336.740	This is a branching point located at the first insulation joint on the supply line to the Ellenbrook meter station. This insulation joint is located inside the MLV118 compound.
Ellenbrook	OP3-01	1336.750	Outlet point is at the first insulation joint located downstream of valve HV010.
Branching Point Harrow Street	BP-P4	1343.510	This is a branching point located at the first tee upstream of HV100A on the 350mm inlet header to the Harrow Street meter station.
Harrow Street	OP4-01	1343.610	Outlet point is on the upstream side of the second outlet valve located downstream of odorant injection facility.
Branching Point MLV119	BP-P5	1347.339	This is a branching point located at the first reducer downstream of valves HV100A and HV100B located inside the MLV119 compound.

**TABLE 2
GAS TRANSMISSION SYSTEM: BRANCHING POINTS AND OUTLET POINTS (CONTINUED)**

LOCATION	POINT DESIGNATION	DISTANCE FROM DAMPIER (Pipeline kilometres)	DESCRIPTION
Caversham	OP5-01	1347.434	Outlet point is at the insulation joint located downstream of the odorant injection facility.
Branching Point MLV120	BP-P6	1359.664	This is a branching point located at the first reducer downstream of valves HV100A and HV100B inside the MLV120 compound.
Welshpool	OP6-01	1359.714	Outlet point is on the upstream side of the second outlet valve located downstream of the odorant injection facility.
Branching Point MLV122	BP-P7	1379.695	This is a branching point located at the first reducer downstream of valves HV100A and HV100B inside the MLV122 compound.
Forrestdale	OP7-01	1379.750	Outlet point is on the upstream side of the second outlet valve located downstream of the odorant injection facility.
Branching Point MLV129	BP-P8	1398.638	This is a branching point located on the downstream side of valve HV700 located on the inlet side of the Russell Road pre-regulation set. The point is adjacent to the Kwinana Junction scrubber bypass.
Russell Road	OP8-01	1408.183	Outlet point is on the upstream side of the second outlet valve located downstream of the odorant injection facility.
Branching Point Kwinana Junction	BP-KJ	1399.000	This is a branching point located at the centreline of the valve HV401A, located in the Kwinana Junction compound.
Branching Point Inlet to WLPG	BP-LPGI	1401.997	This branching point is at the first insulating flange located downstream of the pressure reducing valve PV035.
Branching Point Second Outlet from WLPG	BP-LPGOSO	1401.997	This branching point is at the insulating gasket upstream of the AGR metering facility located at the second return line from the WLPG plant.
WLPG	OPLPGI-01	1402.025	Outlet point is at the second insulating flange located downstream of the pressure reducing valve PV035.
Branching Point Outlet from WLPG	BP-LPGO	1402.066	This branching point is at the first insulating flange upstream of valve V14 located on the return line from the WLPG plant.
AGR	OPLPGOSO-01	1402.297	Outlet point is at the spectacle blind located on the downstream side of the restriction nozzle/blind located downstream of the AGR meter skid.
Branching Point Kwinana West	BP-KW	1405.217	This is a branching point located at 500 to 300 reducer located upstream of valves KLV3 and KLV4.
Branching Point KLV1	BP-RK	1405.327	This is a branching point located at the downstream side of valve VB11 located upstream of the TiWest Cogen meter station offtake.
Burton Place	ORK-06	1405.327	Outlet point is downstream of insulation joint. This joint is downstream of valve HV056 inside CS 10 compound.

TABLE 2
GAS TRANSMISSION SYSTEM: BRANCHING POINTS AND OUTLET POINTS (CONTINUED)

LOCATION	POINT DESIGNATION	DISTANCE FROM DAMPIER (Pipeline kilometres)	DESCRIPTION
Thomas Road	ORK-05	1407.620	Outlet point is on the upstream side of the TiWest valve located inside the TiWest cogeneration facility.
BP Cogen	ORK-01	1407.716	Outlet point is at the upstream flange of the isolation valve (HV017) located downstream of the meter skid.
Mason Road	ORK-02	1409.647	Outlet point comprises the upstream flange of the second valve located downstream of the pig receiver of the BP Kwinana lateral and the first insulation gasket downstream of the first valve located downstream of the pig receiver of the BP Kwinana lateral.
Kwinana Power Station	OKW-02	1409.651	Outlet point is at the insulating gasket on the downstream side of the meter station outlet valve HV501A.
Cockburn PS / NewGen	OKW-04	1409.651	Outlet point is at the insulation gasket on the downstream side of the sonic nozzle (F0439).
HEGT	OKW-05	1409.651	Outlet point is at the insulation joint on the downstream side of the sonic nozzle (RO 001).
Barter Road	OKW-03	1409.751	Outlet point comprises the upstream flange of the second meter station outlet valve downstream of the insulation joint and the upstream flange of the valve located downstream of the insulation joint.
Alcoa Kwinana	OKW-01	1410.557	Outlet point comprises the outlet flanges on the downstream side of the meter station outlet valves HV601A and HV601B.
KNR (Previously know as WMC)	ORK-04	1410.837	Outlet point comprises the upstream side of the second isolating valve located on the KNR boundary for the high pressure line and the insulation joint located upstream of the second isolation valve for the low pressure line.
Rockingham	ORK-03	1410.857	Outlet point comprises the: 1462) upstream flange of the meter station outlet valve located downstream of the odorant injection facilities. ii) upstream flange of the second valve located downstream of the CSBP pipe.
Branching Point South 1	BP-S1	1449.456	This is a branching point located at the first insulating flange downstream of valve HV001 located upstream of the MLV143 compound.
Mandurah Branching Point	BP-S9	1434.870	Branching point is downstream of valve HV03. This valve is located downstream of insulating joint inside the meter compound.
Mandurah Offtake	OS9-01	1434.870	Outlet point is at the insulating joint upstream of pig launcher compound. This joint is located inside the offtake compound.
Pinjarra Town	OS1-01	1449.476	Outlet point is on the upstream side of the second outlet valve located downstream of the odorant injection facility.

**TABLE 2
GAS TRANSMISSION SYSTEM: BRANCHING POINTS AND OUTLET POINTS (CONTINUED)**

LOCATION	POINT DESIGNATION	DISTANCE FROM DAMPIER (Pipeline kilometres)	DESCRIPTION
Branching Point South 2	BP-S2	1458.106	This is a branching point located at the anchor flange located downstream of valve PLV1 located inside the MLV143 compound.
Oakley Road	OS2-02	1462.592	Outlet point is at the insulation gasket located downstream of valve HV105.
Alcoa Pinjarra	OS2-01	1463.426	Outlet point comprises the outlet flanges on the downstream side of the meter station outlet valves HV601A and HV601B
Pinjarra Cogen	OS2-03	1463.426	Outlet point is at the insulation gasket located downstream of valve ZV784
Branching Point South 3	BP-S3	1489.329	This is a branching point located at the first tee upstream of MLV150 located inside the Wagerup West compound.
Alcoa Wagerup	OS3-01	1498.857	Outlet point comprises the outlet flanges on the downstream side of the meter station outlet valves HV601A and HV601B.
Wagerup Cogen	OS3-02	1498.857	Outlet point is at the insulation gasket located downstream of shutdown valve
Branching Point South 8	BP-S8	1507.18	This is a branching point located on the downstream side of the hand valve HV012 located inside the MLV154/155 compound.
Kemerton PS	OS8-01	1511.91	Outlet point is at the upstream flange of the drop out spool located downstream of the insulation gasket downstream of the pressure reduction skid
Branching Point South 4	BP-S4	1513.630	This is a branching point located at the first tee upstream of the insulation joint adjacent to MLV154 located inside the MLV154 compound.
Branching Point South 7	BP-S7	1513.635	This is a branching point located on the tee at the junction of the SW loop and the Worsley Cogeneration lateral, below ground in the MLV154/155 compound.
Harvey	OS4-01	1522.096	Outlet point is at the upstream flange of the isolation valve located downstream of the odorant injection facility.
Branching Point South 5	BP-S5	1525.104	This is a branching point located on the downstream side of the offtake valve HV1 located inside the Kemerton meter station.
Kemerton	OS5-01	1525.124	Outlet point is at the upstream flange of the valve located downstream of the insulation joint.
Branching Point South 6	BP-S6	1530.439	This is a branching point located at the first reducer downstream of MLV156 and situated in the Clifton Road compound.
Clifton Road	OS6-01	1530.457	Outlet point is at the first insulating joint located downstream of the odorant injection facility.
South West Cogeneration	OS7-01	1546.000	Outlet point is at the first insulating flange located downstream of the meter skids.
Worsley	OS4-02	1546.620	Outlet point is at the flange downstream of the insulation joint located downstream of the meter station outlet valve.

TABLE 3
GAS TRANSMISSION SYSTEM: NOTIONAL GATE POINTS

NOTIONAL GATE POINT	ASSOCIATED OUTLET POINT/S	TRANSMISSION OUTLET POINT/S DESIGNATION
NGP - Nangetty Rd	Nangetty Road	O81-01
NGP - Eneabba	Eneabba	O83-01
NGP - Muchea	Muchea	OP1-01
NGP - Ellenbrook	Ellenbrook	OP3-01
NGP - North Metro	Harrow Street Caversham	OP4-01 OP5-01
NGP - South Metro	Welshpool Forrestdale Russell Road	OP6-01 OP7-01 OP8-01
NGP - Barter Road	Barter Road	OKW-03
NGP - Rockingham	Rockingham	ORK-03
NGP - Pinjarra	Pinjarra Town Oakley Road	OS1-01 OS2-02
NGP - Harvey	Harvey	OS4-01
NGP - Kemerton	Kemerton	OS5-01
NGP - Clifton Road	Clifton Road	OS6-01

NGP - “name” Notional gate point - “name”

3. Description of the Gas Transmission System: Component Parts

The principal component parts of the gas transmission system are:

- a) the main line between Dampier and Bunbury;
- b) gas turbine driven centrifugal compressor units and associated facilities including aftercoolers;
- c) main line valves;
- d) laterals;
- e) outlet stations;
- f) Kwinana Junction metering station;
- g) supervisory control and data acquisition (SCADA) system and the associated microwave communications facility; and
- h) odorising facilities.

General Description

The gas transmission system comprises high pressure gas transmission pipeline, including laterals, and associated compression plant, and valves, linking gas suppliers in the north west of Western Australia with markets principally in the South West.

The gas transmission system is not a single continuous entity, and consists of the following major parts.

Dampier to Kwinana Section

The Dampier to Kwinana section is rated and operates at 8.48MPa. It delivers gas to all part haul outlet points, and to all full haul outlet points between Compressor Station 9 (CS9) and Kwinana Junction. Five laterals ranging in diameter from 350mm (14 inches) to 150mm (6 inches) are connected to this pipeline section. The main line loops to Wesfarmers LPG Plant at Kwinana Junction. Under an arrangement with Wesfarmers LPG Pty Ltd, gas leaves the system at a point immediately upstream of the company's LPG extraction plant at Kwinana and is returned to the system immediately downstream of the plant.

Kwinana Junction

Kwinana Junction, 1,399km downstream of Dampier, is a major junction in the gas transmission system. All gas delivered to Kwinana West, Rockingham Lateral, W LPG Plant and Pipeline South pass through Kwinana Junction. Facilities for gas quality measurement upstream and downstream of the LPG plant are also located at Kwinana Junction.

Kwinana West Lateral

This section is rated at 6.89MPa and operates at approximately 4.5MPa. It consists of three different pipes ranging in diameter from 500mm (20 inches) to 200mm (8 inches). The Kwinana West Lateral delivers gas to outlet points at Alcoa Kwinana, Kwinana Power Station, and to the outlet point at Barter Road.

Rockingham Lateral

A short 180m long, 600mm (18 inches) pipeline provides a link between the suction of CS10 and Rockingham lateral. The Rockingham lateral and the link are rated at 6.89MPa and operates at approximately 4.5MPa. It consists of three different pipes ranging in diameter from 300mm (12 inches) to 150mm (6 inches). The Rockingham Lateral delivers gas to outlet points in the Kwinana industrial area and supplying the distribution system serving Rockingham and Mandurah.

Pipeline South

Compressor Station Number 10 (CS10) is located at the beginning of Pipeline South. Pipeline South MAOP is equal to 6.89MPa. It consists of three different pipes ranging in diameter from 500mm (20 inches) down to 200mm (8 inches). It terminates at MLV157 located at Clifton Road, north of Bunbury. Five laterals ranging in diameter from 450mm (14 inches) to 250mm (10 inches) are connected to this pipeline section. The pipeline section between MLV150 and MLV154 is looped with 18" diameter pipeline. The Pipeline South delivers gas to outlet points at Alcoa Pinjarra, Alcoa Wagerup and Worsley Alumina, South West Cogen, Kemerton Power Station, and to outlet points supplying the distribution systems at Pinjarra Town, Oakley Road, Harvey, Kemerton and south of Clifton Road.

Stage 4, 5A and 5B Looping Sections

The 26" diameter loop sections have been designed, constructed and tested to operate at 10.2MPa, however, the loop sections are currently operated at the same MAOP as the existing Mainline at 8.48MPa. Stage 4 consists of 217km loops in 10 sections immediately downstream of CS1 to CS10. Stage 5A loops continues from stage 4 for another 571km. Stage 5B loops continue 430km from stage 5A but also includes the eleventh section from MLV 7 to CS 1. This is called loop 0.

The physical characteristics of the main pipeline and laterals are in the following Tables 4 and 5. The details for the looped sections are set out in Table 6.

Mainline Valves

The locations of the main line valves which control gas flow through the Dampier to Bunbury main line are shown on the Pipeline Route Maps of Section 6. Areas through which the main line passes are classified (in accordance with Australian Standard 2885) as broad rural R1 and suburban T1. In areas classified as R1, main line valves are spaced approximately 30km apart. They are approximately 10km apart in areas classified as T1. The majority of the mainline valves can be remotely actuated from the control centre.

“MAOP” denotes maximum allowable operating pressure.

**TABLE 4
MAIN LINE: PHYSICAL CHARACTERISTICS**

SECTION: DAMPIER TO KWINANA JUNCTION		
Length	1,311.2km	87.4km
Nominal size	660mm	660mm
Wall thickness	8.74mm	12.7mm
Steel type	API 5LX 65 DSAW	API 5LX 65 DSAW
MAOP	8,480kPa (gauge)	8,480kPa (gauge)
SECTION: KWINANA JUNCTION - W LPG PLANT - KWINANA JUNCTION		
Length	6.4km	
Nominal size	660mm	
Wall thickness	14.27mm	
Steel type	API 5LX 65 DSAW	
MAOP	8,480kPa (gauge)	
SECTION: KWINANA JUNCTION TO MAIN LINE VALVE 141		
Length	10.8km	
Nominal size	500mm	
Wall thickness	7.94mm	
Steel type	API 5LX 65 DSAW	
MAOP	6,890kPa (gauge)	
SECTION: MAIN LINE VALVE 141 TO MAIN LINE VALVE 150		
Length	73.5km	
Nominal size	500mm	
Wall thickness	5.56mm	
Steel type	API 5LX 65 DSAW	
MAOP	6,890kPa (gauge)	
SECTION: MAIN LINE VALVE 150 TO MAIN LINE VALVE 154		
Length	23.9km	
Nominal size	250mm	
Wall thickness	4.80mm	
Steel type	API 5LX 52 ERW	
MAOP	6,890kPa (gauge)	
SECTION: MAIN LINE VALVE 154 TO MAIN LINE VALVE 157		
Length	16.9km	
Nominal size	200mm	
Wall thickness	4.80mm	
Steel type	API 5LX 52 ERW	
MAOP	6,890kPa (gauge)	

**TABLE 5
GAS TRANSMISSION SYSTEM LATERALS (CONTINUED)**

SECTION: MAIN LINE VALVE 150 TO MAIN LINE VALVE 154 (LOOPLINE)		
Length	24.3km	
Nominal size	450mm	
Wall thickness	6.35mm	
Steel type	API 5LX 60 ERW	
MAOP	8,280kPa (gauge)	
SECTION: CS10 TO ROCKINGHAM LATERAL PIPELINE (ROCKINGHAM LATERAL LINK)		
Length	0.18km	
Nominal size	600mm	
Wall thickness	12.65mm	
Steel type	API 5LX 70 ERW	
MAOP	6,890kPa (gauge)	
HAMERSLEY IRON		
Length Nominal size	0.5km	
Wall Thickness	200mm	
Steel Type	6.4mm	
MAOP	API 5LX 52 ERW	
	8,480kPa (gauge)	
GGT INTERCONNECT		
Length Nominal size	1.48km	
Wall Thickness	300mm	
Steel Type	9.5mm	
MAOP	API 5LX42	
	10,200kPa (gauge)	
CARNARVON		
Length Nominal size	163.7km	7.4km
Wall Thickness	150mm	150mm
Steel Type	4.8mm	6.4mm
MAOP	API 5LX 42 ERW	API Grade B ERW
	8,480kPa (gauge)	1,900kPa (gauge)
MUNGARRA		
Length Nominal size	2.5km	
Wall Thickness	150mm	
Steel Type	6.4mm	
MAOP	API 5L Grade B ERW	
	8,480kPa (gauge)	
PINJAR		
Length Nominal size	14.2km	
Wall Thickness	350mm	
Steel Type	7.1mm	
MAOP	API 5LX 52 ERW	
	8,480kPa (gauge)	

**TABLE 5
GAS TRANSMISSION SYSTEM LATERALS (CONTINUED)**

RUSSELL ROAD			
Length Nominal	7.3km		
size Wall	300mm		
Thickness Steel	9.5mm		
Type MAOP	API 5LX 46 ERW		
	6,890kPa (gauge)		
KWINANA WEST			
Length Nominal	2.0km	2.8km	1.5km
size Wall	500mm	350mm	200mm
Thickness Steel	7.9mm	9.5mm	8.7mm
Type MAOP	API 5LX 65DSAW	API 5LX 52 ERW	API Grade B ERW
	6,890kPa (gauge)	6,890kPa (gauge)	6,890kPa (gauge)
ROCKINGHAM			
Length Nominal	3.2km		2.6km
size Wall	300mm		150mm
Thickness Steel	9.5mm		6.4mm
Type MAOP	API 5LX 46 ERW		API 5L Grade B ERW
	6,890kPa (gauge)		6,890kPa (gauge)
KNC/BP (Part of Rockingham Lateral Located Downstream of Mason Road Outlet Station)			
Length Nominal	1.6km		
size Wall	250mm		
Thickness Steel	9.3mm		
Type MAOP	API 5LX 42 ERW		
	6,890kPa (gauge)		
COGEN (Part of Rockingham Lateral Located Downstream of Cogen Outlet Station)			
Length Nominal	0.9km		
size Wall	200mm		
Thickness Steel	8.2mm		
Type MAOP	API 5LX 42 ERW		
	6,890kPa (gauge)		
TIWEST COGENERATION LATERAL (Part of Rockingham Lateral)			
Length Nominal	0.58km		
size Wall	150mm		
Thickness Steel	7.1mm		
Type MAOP	API 5LX 42 ERW		
	6,890kPa (gauge)		

**TABLE 5
GAS TRANSMISSION SYSTEM LATERALS (CONTINUED)**

ALCOA PINJARRA		
Length Nominal	2.5km	2.9km
size Wall	300mm	300mm
Thickness Steel	7.1mm	9.5mm
Type MAOP	API 5L Grade B ERW	API 5LX 52 ERW
	6,890kPa (gauge)	6,890kPa (gauge)
ALCOA WAGERUP		
Length Nominal	8.0km	1.5km
size Wall	350mm	350mm
Thickness Steel	7.1mm	9.5mm
Type MAOP	API 5L Grade B ERW	API 5LX 42 ERW
	6,890kPa (gauge)	6,890kPa (gauge)
WORSLEY		
Length Nominal	32.9km	
size Wall	250mm	
Thickness Steel	4.8mm	
Type MAOP	API 5LX 52 ERW	
	6,890kPa (gauge)	
SOUTH WEST COGENERATION LATERAL		
Length Nominal	32.9km	
size Wall	450mm	
Thickness Steel	6.35mm	
Type MAOP	API 5LX 60 ERW	
	8,280kPa (gauge)	
KEMERTON POWER STATION LATERAL		
Length Nominal	4.94km	
size Wall	300mm	
Thickness Steel	6.4mm	
Type MAOP	API 5LX 42 ERW	
	6,900kPa (gauge)	

TABLE 6
STAGE 4, 5A AND 5B LOOPING SECTIONS

LOOP 0 (DOWNSTREAM OF MLV 7)	
Length Nominal	115.08km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW Current Operating 8,480kPag, Design 10,200kPag
LOOP 1 (DOWNSTREAM OF CS1)	
Length Nominal	116.91km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW Current Operating 8,480kPag, Design 10,200kPag
LOOP 2 (DOWNSTREAM OF CS2)	
Length Nominal	120.43km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW Current Operating 8,480kPag, Design 10,200kPag
LOOP 3 (DOWNSTREAM OF CS3)	
Length Nominal	118.35km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW Current Operating 8,480kPag, Design 10,200kPag
LOOP 4 (DOWNSTREAM OF CS4)	
Length Nominal	118.96km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW Current Operating 8,480kPag, Design 10,200kPag
LOOP 5 (DOWNSTREAM OF CS5)	
Length Nominal	118.03km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW Current Operating 8,480kPag, Design 10,200kPag
LOOP 6 (DOWNSTREAM OF CS6)	
Length Nominal	115.22km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW Current Operating 8,480kPag, Design 10,200kPag

LOOP 7 (DOWNSTREAM OF CS7)	
Length Nominal	110.13km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW
	Current Operating 8,480kPag, Design 10,200kPag
LOOP 8 (DOWNSTREAM OF CS8)	
Length Nominal	123.20km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW
	Current Operating 8,480kPag, Design 10,200kPag
LOOP 9 (DOWNSTREAM OF CS9)	
Length Nominal	90.505km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW
	Current Operating 8,480kPag, Design 10,200kPag
LOOP 10 (DOWNSTREAM OF CS10)	
Length Nominal	70.96km
size Wall	660mm
Thickness Steel	8.74mm
Type MAOP	API 5LX 70 ERW
	Current Operating 8,480kPag, Design 10,200kPag

Compressor Stations

Ten compressor station sites are spaced at intervals of about 140km along the main line. Gas turbine driven centrifugal compressors at eight of these stations are used to maintain pipeline pressure to meet natural gas demand in the Perth metropolitan area and at the inlet to Wesfarmers LPG Plant.

A summary of compression plant is presented in Table 7.

**TABLE 7
COMPRESSOR STATIONS**

COMPRESSOR STATION	DISTANCE FROM DAMPIER (KM)	GAS TURBINE DRIVER
1	137.2	Unit 1 Solar Mars 15000hp (10MW) Unit 2 Solar Mars 15000hp (10MW)
2	272.1	Unit 1 General Electric LM500 (4MW) Unit 2 Solar Mars 15000hp (10MW) Unit 3 Solar Mars 15000hp (10MW)
3	409.3	Unit 1 Solar Mars 15000hp (10MW) Unit 2 General Electric Model LM500 (4MW) Unit 3 Solar Mars 15000hp (10MW)
4	546.9	Unit 1 General Electric LM500 (4MW) Unit 2 Solar Mars 15000hp (10MW) Unit 3 Solar Mars 15000hp (10MW)
5	684.8	Unit 1 Solar Mars 15000hp (10MW) Unit 2 Solar Mars 15000hp (10MW)
6	824.9	Unit 1 General Electric Model LM500 (4MW) Unit 2 Nuovo Pignone PGT10 (10MW) Unit 3 Solar Mars 15000hp (10MW)
7	966.6	Unit 1 General Electric LM500 (4MW) Unit 2 Solar Mars 15000hp (10MW) Unit 3 Solar Mars 15000hp (10MW)
8	1114.1	Unit 1 Solar Mars 15000hp (10MW) Unit 2 Solar Mars 15000hp (10MW)
9	1256.8	Unit 1 Nuovo Pignone PGT10 (10MW) Unit 2 Solar Mars 15000hp (10MW)
10	1402.3	Unit 1 Solar Centaur 4000hp (3.0MW) Unit 2 Solar Centaur 4000hp (3.0MW) Unit 3 Solar Taurus 10000hp (7MW) Unit 4 Solar Taurus 10000hp (7MW)

Aftercoolers

Aftercoolers are installed immediately downstream of the Domgas Dampier Plant inlet point, and immediately downstream of CS1 to CS10 compressor stations. The aftercoolers have been designed to control the downstream gas temperature below 45°C.

Outlet and Inlet Stations

DBP owns and operates outlet stations on the Dampier to Bunbury Natural Gas Pipeline.

“Outlet station” means *either a gate station or the metering equipment site associated with a transmission outlet point, and includes all facilities installed at the site to perform overpressure protection, reverse flow protection, excessive flow protection, gas metering and measurement, and telemetry, and all standby, emergency and safety facilities, and all ancillary equipment and services.*

Inlet stations are located upstream of the inlet points to the gas transmission system and are owned and operated by parties other than DBP.

SCADA System

The SCADA system is a micro-computer facility located at the control centre. The master station is a network of nineteen stations interconnected by a local area network, and consists of four operator stations, two logging stations, seven communication stations, three remote stations and three remote operator stations. Over one hundred Field Remote Terminal Units (RTUs) are polled by the communication stations for data and respond to commands from the master station.

The communication link to stations north of Perth is a microwave system. There are microwave antennas and repeater stations at main line valve stations and at compressor stations. SCADA communications south of Perth make use of a UHF radio system.

Odorising

Gas in the main pipeline between Dampier and the Wesfarmers LPG plant at Kwinana is not odorised. Upstream of Kwinana Junction, gas is odorised at outlet stations with the exception of those stations serving the Port Hedland Pipeline and the Geraldton area. Gas into the Geraldton area is odorised at the Nangetty Road outlet station. Downstream from Kwinana Junction, gas is odorised in accordance with the *Gas Standards Act* sufficient for commercial/industrial use. The level of odorant is increased at outlet stations delivering gas into the distribution system and at Clifton Road outlet station.