Title of Proposal - North Galilee Water Scheme (NGWS) Project

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Transport - Water

1.2 Provide a detailed description of the proposed action, including all proposed activities.

Adani Infrastructure Pty Ltd (Adani) is an Australian wholly owned subsidiary within the Adani Group of companies ultimately held by Adani Enterprises Ltd (an entity listed on the National Stock Exchange of India). Adani proposes to construct and operate the North Galilee Water Scheme (NGWS) to provide a secure and reliable water supply under a commercial agreement to the operators of the Carmichael Coal Project (CCP) and potentially in the future, other resource-extraction projects in the northern Galilee Basin. The NGWS is located approximately 160 kilometres (km) north-west of Clermont in Central Queensland.

The NGWS includes two stages: Stage A and Stage B. While referred to as “Stages”, these components will not necessarily be developed in sequence. Associated infrastructure herein is discussed in relation to these two stages:

Stage A – Belyando Junction Dam, Intake, Pipeline and Camp
The Stage A component includes construction and operation of flood harvesting infrastructure that will pump water from the river into an off-stream storage, and then supply water to the CCP via pipeline.
The main components of this Stage are:
• An intake channel from the Suttor River (0.79 hectare (ha) of clearing required)
• An intake pump station and buried pipeline (corridor of 30 metres (m) for 3.8 km and a total of approximately 11.40 ha disturbance)
• Upgrade to the existing Belyando Junction 2.2 GL storage dam on the Belyando Junction property to a nominal 10 GL capacity. This requires an estimated footprint area of approximately 170 ha including the dam and associated infrastructure. Borrow pits and necessary access tracks within, and immediately surrounding the dam, may be established to supply dam wall fill material.
• The buried Belyando Pipeline located within a 30 m construction corridor along a 49 km route that crosses four minor watercourses and one major watercourse. This pipeline is expected to require an impact area of approximately 147 ha;
• The Gregory Developmental Road break tank and pump station covering a footprint of approximately 0.09 ha within an already pre-cleared area
• Laydown areas immediately adjacent to the pipeline within a 75 m easement.

Stage B - Pipeline

The Stage B Pipeline is a buried pipeline with a 30 m construction corridor extending from Stage A and, for the most part running adjacent to the Carmichael Rail Project alignment. Stage B has been assessed as two sections: Stage B1 extends from Stage A to the boundary of Moray Downs property (Lot 662 on SP296622); with Stage B2 continuing west until the Carmichael Rail Project loop area within the CCP Mine Lease. Sections of Stage B1 and Stage B2 have been deviated into the corridor already assessed by the Commonwealth and State Governments as part of the separate NGBR Project. These deviations have been made to avoid additional impacts to sensitive environments as part of design option engineering.

The relevant scope of works includes:
• Stage B1 pipeline component is 32.5 km long located within a 30 m corridor with a disturbance area of approximately 94 ha. This stage crosses two minor and three major watercourses
• Stage B2 pipeline component is 28.5 km long comprising a disturbance area of approximately 85 ha. This stage crosses three minor and one major watercourse (North Creek).
• A series of smaller offtake pipelines (20 m disturbance corridor) that will provide water to associated infrastructure for the CCP including a proposed airport and mine workers accommodation village
• Laydown areas immediately adjacent to the pipeline corridor within a 75 m pipeline easement.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
DAM	1	-21.435039997923	146.85050582204
DAM	2	-21.432003994572	146.87350844655
DAM	3	-21.453813878524	146.88595389638
DAM	4	-21.457089073927	146.86964606557
DAM	5	-21.457568364644	146.85934638295
DAM	6	-21.435838935676	146.84947585378
DAM	7	-21.435838935676	146.84947585378
DAM	8	-21.435039997923	146.85050582204
INTAKE CHANNEL	1	-21.452815328705	146.88539599691
INTAKE CHANNEL	2	-21.450977979169	146.89535235677
INTAKE CHANNEL	3	-21.458886405988	146.91071605001
INTAKE CHANNEL	4	-21.460244375513	146.91037272725
INTAKE CHANNEL	5	-21.454413005133	146.89492320333
INTAKE CHANNEL	6	-21.455771016332	146.88531016622
INTAKE CHANNEL	7	-21.452655560099	146.88522433553
INTAKE CHANNEL	8	-21.452815328705	146.88539599691
PIPELINE	1	-21.457129014881	146.85947512899

Area	Point	Latitude	Longitude
PIPELINE	2	-21.459285810103	146.88058947835
PIPELINE	3	-21.469190681977	146.88462352071
PIPELINE	4	-21.474462355338	146.89071749959
PIPELINE	5	-21.481810430142	146.89775561605
PIPELINE	6	-21.522457748252	146.90050219808
PIPELINE	7	-21.531639753152	146.90796946798
PIPELINE	8	-21.548405394426	146.91689585958
PIPELINE	9	-21.548325562628	146.91475009237
PIPELINE	10	-21.531719594127	146.90651034627
PIPELINE	11	-21.522777132079	146.89878558431
PIPELINE	12	-21.482609111581	146.89612483297
PIPELINE	13	-21.470468680917	146.88307856832
PIPELINE	14	-21.460803535758	146.87930201803
PIPELINE	15	-21.458966286899	146.85878848348
PIPELINE	16	-21.45664972272	146.85913180623
PIPELINE	17	-21.457129014881	146.85947512899
PIPELINE	1	-21.548245730786	146.91612338338
PIPELINE	2	-21.548006234997	146.91612338338
PIPELINE	3	-21.547128080388	146.91612338338
PIPELINE	4	-21.557266450934	146.95491885457
PIPELINE	5	-21.558543675703	146.9547471932
PIPELINE	6	-21.548245730786	146.91612338338
PIPELINE	1	-21.557984891251	146.95328807149
PIPELINE	2	-21.557905064725	146.95328807149
PIPELINE	3	-21.557984891251	146.95328807149
PIPELINE	4	-21.558304196916	146.95491885457
PIPELINE	5	-21.682301173621	146.94127177511
PIPELINE	6	-21.681902383631	146.93989848409
PIPELINE	7	-21.557984891251	146.95328807149
PIPELINE	1	-21.6818226255	146.94110011373
PIPELINE	2	-21.689558958614	146.94479083333
PIPELINE	3	-21.692988334208	146.94685076986
PIPELINE	4	-21.701681036729	146.94848155294
PIPELINE	5	-21.713722353773	146.95431803975
PIPELINE	6	-21.753347914149	146.9502839974
PIPELINE	7	-21.753029039776	146.94856738363
PIPELINE	8	-21.713403391478	146.95303057943
PIPELINE	9	-21.701441795059	146.94710826192
PIPELINE	10	-21.693387093513	146.94539164815
PIPELINE	11	-21.681902383631	146.93989848409
PIPELINE	12	-21.6818226255	146.94110011373
PIPELINE	13	-21.6818226255	146.94110011373

Area	Point	Latitude	Longitude
PIPELINE	1	-21.752949321072	146.94839572225
PIPELINE	2	-21.753347914149	146.95019816671
PIPELINE	3	-21.777181768124	146.94307421956
PIPELINE	4	-21.784673867372	146.93895434652
PIPELINE	5	-21.834717416037	146.91989993367
PIPELINE	6	-21.835275127694	146.92024325643
PIPELINE	7	-21.836709233394	146.91998576436
PIPELINE	8	-21.836629561232	146.91852664266
PIPELINE	9	-21.835036108679	146.91852664266
PIPELINE	10	-21.784594166249	146.93775271688
PIPELINE	11	-21.776623830179	146.94187258992
PIPELINE	12	-21.752949321072	146.94839572225
PIPELINE	1	-21.836575356056	146.91836443498
PIPELINE	2	-21.836416011539	146.91870775773
PIPELINE	3	-21.836336339214	146.92008104875
PIPELINE	4	-21.836973716571	146.92008104875
PIPELINE	5	-21.847251034104	146.90051165178
PIPELINE	6	-21.841594617429	146.84369173601
PIPELINE	7	-21.842231971343	146.84180346086
PIPELINE	8	-21.840877590879	146.84128847673
PIPELINE	9	-21.840240230926	146.8430050905
PIPELINE	10	-21.845657699942	146.89999666765
PIPELINE	11	-21.844701690918	146.90214243486
PIPELINE	12	-21.836575356056	146.91836443498
PIPELINE	1	-21.840957260673	146.84137430742
PIPELINE	2	-21.840957260673	146.84137430742
PIPELINE	3	-21.842072633131	146.84180346086
PIPELINE	4	-21.843427002273	146.83725443437
PIPELINE	5	-21.847091701487	146.83124628618
PIPELINE	6	-21.852190257108	146.82575312211
PIPELINE	7	-21.861749558482	146.81253519609
PIPELINE	8	-21.901413818967	146.75631609514
PIPELINE	9	-21.903962149286	146.73777666643
PIPELINE	10	-21.911925387793	146.71614733293
PIPELINE	11	-21.910571668649	146.71520319536
PIPELINE	12	-21.903325070979	146.73709002092
PIPELINE	13	-21.90165272687	146.74979296281
PIPELINE	14	-21.900378546759	146.75545778825
PIPELINE	15	-21.895918826665	146.76172342851
PIPELINE	16	-21.861669900281	146.81064692094
PIPELINE	17	-21.851313955808	146.82489481523
PIPELINE	18	-21.846374702513	146.82987299516
PIPELINE	19	-21.842550647235	146.83605280473
PIPELINE	20	-21.840957260673	146.84137430742

Area	Point	Latitude	Longitude
PIPELINE	1	-21.910173513512	146.71477404191
PIPELINE	2	-21.91009388235	146.71477404191
PIPELINE	3	-21.911686497114	146.716404825
PIPELINE	4	-21.915906840119	146.69855204179
PIPELINE	5	-21.919728929635	146.68413248613
PIPELINE	6	-21.926576583434	146.67340365007
PIPELINE	7	-21.927691286598	146.65700998857
PIPELINE	8	-21.924187904402	146.63186159685
PIPELINE	9	-21.922117683485	146.60920229509
PIPELINE	10	-21.917180881356	146.54860582902
PIPELINE	11	-21.917499389884	146.53744783952
PIPELINE	12	-21.922595429445	146.52723398759
PIPELINE	13	-21.930398386506	146.51624765947
PIPELINE	14	-21.940589359559	146.50131311967
PIPELINE	15	-21.954998786162	146.48105707719
PIPELINE	16	-21.953645476744	146.48002710893
PIPELINE	17	-21.921799185287	146.52620401933
PIPELINE	18	-21.916464234562	146.53667536333
PIPELINE	19	-21.915747584163	146.54826250627
PIPELINE	20	-21.923073173803	146.63289156511
PIPELINE	21	-21.926337717335	146.65709581926
PIPELINE	22	-21.925382248928	146.67297449663
PIPELINE	23	-21.918773416873	146.6828450258
PIPELINE	24	-21.910173513512	146.71477404191
PIPELINE	1	-21.953327049125	146.48011293962
PIPELINE	2	-21.953247442109	146.47994127824
PIPELINE	3	-21.954759967789	146.48114290788
PIPELINE	4	-21.96558599741	146.46655169084
PIPELINE	5	-21.970998702874	146.45633783891
PIPELINE	6	-21.969725143675	146.45556536272
PIPELINE	7	-21.964630792682	146.46586504533
PIPELINE	8	-21.953327049125	146.48011293962
PIPELINE	1	-21.953804690285	146.48268786027
PIPELINE	2	-21.967814783463	146.49376001909
PIPELINE	3	-21.968769966781	146.4959057863
PIPELINE	4	-21.970998702874	146.49779406145
PIPELINE	5	-21.971953864779	146.49642077043
PIPELINE	6	-21.969486350054	146.49470415666
PIPELINE	7	-21.968292375925	146.49195757463
PIPELINE	8	-21.954441542668	146.48148623064
PIPELINE	9	-21.953645476744	146.48268786027
PIPELINE	10	-21.953804690285	146.48268786027

Area	Point	Latitude	Longitude
PIPELINE	1	-21.967337189396	146.49127092912
PIPELINE	2	-21.968690368416	146.48766604021
PIPELINE	3	-21.971555881433	146.48371782854
PIPELINE	4	-21.972590635813	146.48037043169
PIPELINE	5	-21.974102955576	146.47221651628
PIPELINE	6	-21.975456070132	146.46861162736
PIPELINE	7	-21.973784573807	146.46766748979
PIPELINE	8	-21.972192654252	146.47290316179
PIPELINE	9	-21.971237493953	146.480284601
PIPELINE	10	-21.970123132151	146.48371782854
PIPELINE	11	-21.968053579895	146.48680773332
PIPELINE	12	-21.966461596101	146.49041262224
PIPELINE	13	-21.967416788518	146.49127092912
PIPELINE	14	-21.967337189396	146.49127092912
PIPELINE	1	-21.970759911394	146.4564236696
PIPELINE	2	-21.970759911394	146.4564236696
PIPELINE	3	-21.97028232723	146.45753946855
PIPELINE	4	-21.970600716851	146.45779696062
PIPELINE	5	-21.988190634063	146.47290316179
PIPELINE	6	-21.991294510819	146.47049990251
PIPELINE	7	-21.990100720102	146.46912661149
PIPELINE	8	-21.988429396224	146.47049990251
PIPELINE	9	-21.970759911394	146.4564236696
PIPELINE	1	-21.973625382654	146.46792498186
PIPELINE	2	-21.973864169316	146.46783915117
PIPELINE	3	-21.975456070132	146.46861162736
PIPELINE	4	-21.977445921054	146.46363344743
PIPELINE	5	-21.976013231201	146.46260347917
PIPELINE	6	-21.973625382654	146.46792498186
PIPELINE	1	-21.969725143675	146.45539370134
PIPELINE	2	-21.969725143675	146.4556511934
PIPELINE	3	-21.970839508599	146.45650950029
PIPELINE	4	-21.989145680297	146.41702738359
PIPELINE	5	-21.991692438825	146.41462412431
PIPELINE	6	-21.995353324115	146.4139374788
PIPELINE	7	-21.998457044157	146.41342249467
PIPELINE	8	-21.999093696283	146.41187754228
PIPELINE	9	-21.995751240737	146.41222086504
PIPELINE	10	-21.991612853313	146.4132508333
PIPELINE	11	-21.988429396224	146.41565409257
PIPELINE	12	-21.969725143675	146.45539370134

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The entire Project area is situated near the north-western boundary of the Brigalow Belt Bioregion which covers much of Central Queensland extending from Townsville south to Narrabri in New South Wales. Climate in the area is described as arid to subhumid with distinct wet and dry seasons. The Project area lies largely within the Belyando Downs subregion of the Brigalow Belt Bioregion. A portion of the Stage B alignment occurs within the Alice Tableland subregion of the Desert Uplands Bioregion. The address of the lots traversed by the Project and the associated tenure are included in **Table 1.**

The Stage A Belyando Junction dam expansion and associated utility infrastructure developments are located within the Lot 3 SP278559 and a stock route (401CHAR). The Stage A Pipeline traverses Lot 1 on SP147334, Lot 2 on SP147334 (Mount Douglas Station), the Gregory Developmental Road, Bowen Developmental Road, an Unnamed Road, and Lot 4 on SP116046 (Disney Station) and Lot 3235 on SP156095 (Old Twin Hills Station). Approximately 455 m of the Stage A pipeline will be located in the GBSDA (Rail Corridor Precinct) prior to connecting with Stage B.

The utility infrastructure for Stage B of the NGWS is proposed to be located over six separate properties. Stage B1 of the pipeline connects with Stage A at the boundary of Disney Station and Old Twin Hills Station. The pipeline corridor travels for approximately 1.2 km within the north-west section of Old Twin Hills Station prior to crossing Mistake Creek and entering Lot 1 SP147546 (Goodawada Station). The pipeline corridor traverses approximately 1.15 km of Goodawada Station, in the south-eastern section of the property, prior to entering Lot 637 SP278706 (Elgin Downs Station).

The corridor follows the northern boundary of Elgin Downs Station for approximately 5.5 km before turning south-west and entering Lot 3 SP278704 (Cassiopeia Station). In total, the corridor travel for approximately 18.5 km within Elgin Downs Station. The corridor continues to traverse Cassiopeia in a south-west direction for approximately 9.2 km prior to entering Moray Downs Station (Lot 662 SP296622) near its intersection with the Belyando River. The corridor travels for approximately 30 km west within Moray Downs prior to entering the mine lease area (Stage B2). The pipeline also enters Lot 5 on SP296622 and Lot 3 on SP296622 which are the site of the airport and workers accommodation.

The land use of the properties is rural (low intensity cattle grazing). A section of the Stage B pipeline is located in EPC 2161. The Project is in close proximity to the CCP which is located on Mining Lease (ML) 70505 and ML 70441. Land use and lot numbers are summarised in **Table 1**.

The address of the lots traversed by the Project and current tenure are included in Table 1.

Table 1 –Property Addresses

Lot on Plan	Property Address and tenure
3 SP278559	Mount Hope Road Llanarth, QLD, 4820 (Freehold)
4 SP116046	12541 Gregory Developmental Road Belyando, QLD, 4721 (Leasehold)
1 SP147334	15626 Gregory Developmental Road Belyando, QLD, 4721 (Freehold)
3235 SP156095	472 Twin Hills Road Belyando, QLD, 4721 (Leasehold)
2 SP147334	15626 Gregory Developmental Road Belyando, QLD, 4721 (Freehold)
662 SP296622	3211 Moray Carmichael Boundary Road, Belyando, QLD 4721 (Leasehold)
3 SP278704	3886 Elgin Road Belyando, QLD, 4721 (Freehold)
1 SP147546	Moray Road Belyando, QLD, 4721 (Leasehold)
637 SP278706	1871 Elgin Road Belyando, QLD, 4721 (Leasehold)
5 SP296622	Moray Carmichael Boundary Road, QLD, 4721 (State Land)
3 SP296622	Moray Carmichael Boundary Road, QLD, 4721 (State Land)

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

total area = 1,234.39 ha. 30m corridor = 549.05 ha

1.7 Is the proposed action a street address or lot?

Lot

1.7.2 Describe the lot number and title. Refer to table 1 in section 1.5

1.8 Primary Jurisdiction.

Queensland

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

Yes

1.10.1 Is there a local government area and council contact for the proposal?

No

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 01/2019

End date 03/2020

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

State and Local Government Planning Framework

The NGWS is located within the Isaac Regional Council and Charters Towers Regional Council local government areas. Additionally, a small section of the southern tip of the Stage A pipeline and the Stage B pipeline are within the Galilee Basin State Development Area (GBSDA). The NGWS will cross a number of administrative areas, including those identified as:

· ‘Rural Zone’ as defined in the Belyando Shire Planning Scheme 2008 as administered by the Isaac Regional Council

· ‘Rural Planning area’ as defined in the Dalrymple Shire Planning Scheme 2006 as administered by the Charters Towers Regional Council

· GBSDA as administered by the Queensland Government Office of the Coordinator-General.

The following State and local regulatory framework applies to the NGWS:

· *State Development and Public Works Organisation Act 1971*, including the following scheme:

  o Galilee Basin State Development Area Development Scheme 2015

· *Planning Act 2016*, including the following local instruments:

  o Belyando Shire Planning Scheme 2008

  o Dalrymple Shire Planning Scheme 2006

· *Transport Infrastructure Act 1994*

- *Nature Conservation Act 1992*
- *Vegetation Management Act 1999*
- *Building Act 1975*
- *Fisheries Act 1994*
- *Forestry Act 1959*
- *Land Act 1994*
- *Water Act 2000*.

The following permits and confirmations have been obtained by Adani for the NGWS Project:

- Material Change of Use (MCU) Development Permit assessed by Charters Towers Regional Council for the upgrade of an off-stream flood harvesting storage and associated infrastructure (Belyando Junction dam and intake) (MC15/94)
- Operational Works Development Permit for taking or interfering with water and high impact earthworks in a wetland protection area assessed by the Queensland Government State Assessment and Referral Agency. This covered the intake, pump and gravity diversion infrastructure.
- Grant of a Water Licence from the Strategic Reserve of unallocated water in Sub-catchment E of the Burdekin Basin (Suttor River) – extracting 12.5 GL per annum (reference 617268). The assessment by the Queensland Department of Natural Resources, Mines and Energy (DNRME) involved targeted public consultation (including with downstream users), assessment of potential riparian impacts, assessment of water source and demand, and modelling of the take against environmental flow objectives.
- State Development Area MCU Development Permit for Stage B pipeline and associated infrastructure in the GBSDA assessed by the Office of the Coordinator-General
- Confirmation from the Department of Agriculture and Fisheries (DAF) that an Operational Works Development Permit for Waterway Barrier Works was not required for activities associated with the Belyando Junction dam.

Several additional State and local consents will need to be obtained for the project, including but not limited to:

- MCU Development Permit for a Major Utility (pipeline) in the Charters Towers Regional Council
- Operational works permit for excavation or filling in Isaac Regional Council.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders.

Statutory public consultation has been completed for:

· Water Licence for the take of water from Sub-catchment E of the Burdekin Basin (Suttor River) – extracting 12.5 GL per annum (reference 617268. This involved a statutory Indigenous stakeholder consultation period and targeted landholder and downstream user consultation.

· The MCU Development Permit by Charters Towers Regional Council for the upgrade of an off-stream flood harvesting storage and associated infrastructure (Belyando Junction dam and intake) (MC15/94).

Consultation with all relevant landholders along the pipeline route has also been completed and in-principle land-use and access agreements have been secured.

In addition, there are two registered Native Title claims associated with the land to be traversed by the NGWS Project (Table 3).

Table 3 – Registered Native Title Claims

Name	Tribunal No.	Status	Agreement Details
Wangan and Jagalingou People	QC2004/006	Active	Area Agreement
Jangga People	QCD2012/009	Active	Area Determination

Sections of the NGWS are located on lease land, state land and freehold properties. The proposed tenure for the pipeline does not extinguish native title in these locations. Adani have engaged with the relevant Indigenous groups and have Cultural Heritage Management Plans (CHMP) in place for the Project which are further discussed in Section 3.9.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project.

Impact assessments for various components of the NGWS have been completed. The relevant assessments relate to the approvals listed in Section 1.12 and are listed as follows:

· NGWS Riverine Protection Permit Application (CDM Smith 2015)

· NGWS – Belyando Junction Dam: Material Change of Use Report (CDM Smith 2015)

· NGWS – Material Change of Use Planning Report (CDM Smith 2015)

· NGWS – Environmental Assessment Report (CDM Smith 2015)

· NGWS Commonwealth Matters of National Environmental Significance Review (CDM Smith 2018) (see Attachment 8 to 11).

A detailed environmental impact assessment was completed for the State Development Area MCU Development Permit for the Stage B pipeline and associated infrastructure in the GBSDA. This included an environmental assessment that considered impacts to soil, groundwater, fauna and flora, cultural heritage and social matters. This assessment considered relevant Commonwealth, State and Local legislation.

A MCU Development Permit was submitted to and approved by Charters Towers Regional Council for the upgrade of an off-stream flood harvesting storage and associated infrastructure. This was an impact assessable MCU development application and considered impacts on ecology, soil, water resources and cultural heritage impacts. Both desktop and onsite ecological assessments were undertaken in March and May 2015 for the area that was proposed to be disturbed.

1.15 Is this action part of a staged development (or a component of a larger project)?

No

1.16 Is the proposed action related to other actions or proposals in the region?

Yes

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation).

The NGWS Project is related to other actions proposed in the area which includes:

· The Carmichael Coal Mine and Rail Project (CCP) (EPBC 2010/5736). The NGWS will provide a secure and reliable water supply under a commercial agreement to the operators of the CCP, and potentially in the future, other resource-extraction projects in the northern Galilee Basin.

· The NGWS Stage B pipeline corridor is also located immediately adjacent to the rail component of the CCP and in seven locations, the NGWS enters this rail corridor to avoid potential additional impacts to MNES.

The NGWS Project will form a separate and distinct project from related actions being CCP and the NGBR Project. In addition to a different proponent, the NGWS Project will require:

· A separate financial investment decision

· Separate applications for State and local government approvals.

There is potential in the future for the NGWS to supply additional resource-extraction projects

that are located in the surrounding region and have already been subject to the State and Commonwealth approvals process or are undergoing that process. These potentially include projects such as the China Stone Coal Project (located north of the CCP mine lease). At this stage there are no such water supply agreements in place or in the process of approval (to the best of the proponent's knowledge) and the current State Government approved water licence for the NGWS is sufficient to supply the CCP only.

Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

• Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;

• Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;

• Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

No

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

No

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

No

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Species	Impact
Ornamental Snake Ornamental snake occurs in	The species was not identified within the

Species	Impact
low-lying areas with deep-cracking clay soils that are subject to seasonal flooding and adjacent areas of clay and sandy loams. The species is found in woodlands and shrublands in brigalow, gidgee, blackwood (Acacia argyrodendron) or coolabah-dominated vegetation communities associated with moist areas, particularly gilgaied landscapes. It also occurs in modified grassland associated with gilgais, and lake margins and wetlands (Melzer 2012). The species has been recorded in the following REs (see DotEE 2018) all of which occur in the local area: 11.4.6, 11.4.8, 11.4.9 and 11.3.3. Ornamental snake shelters in soil cracks and under fallen timber. It is a nocturnal species and feeds almost entirely on frogs, though lizards may very occasionally be eaten (Ehmann 1992; Wilson and Swan 2008). They are known to congregate around waterholes and temporary pools where frogs are abundant. They are most likely to be encountered following heavy summer rains (Melzer 2012). Gilgais are a known important habitat for the species and the presence of remnant vegetation is not required for the species to occur (SEWPaC 2011). The species is known to occur in relatively high densities where suitable low-lying soils occur (pers. comm. S. Wilson).	NGWS corridor. However, it has been recorded in the wider area on several occasions during recent surveys associated with CCP associated Projects, mainly in the vicinity of Stage B (refer to Attachment 3 and Section 5.2.1 of Attachment 11 for further detail). An assessment was carried out and important habitat for Ornamental Snake was determined to be present in the NGWS footprint. Several records of Ornamental Snake located close to the western extent of Stage B were associated with the Moray Power Project (MPP) (CDM Smith 2014). An analysis of available 'important habitat' for the species was carried out for the MPP based on field habitat observations, aerial imagery and vegetation mapping. The NGWS Project requires the estimated disturbance of 24.9 ha which may be considered 'important habitat' for ornamental snake based on the MPP analysis (i.e. mapped habitat within a 25 km radius of sightings in the western extent of Stage B). It is very likely habitat outside of this area that is suitable for the species will also be impacted, for instance high quality gilgai habitat adjacent to Nairana National Park on the Stage A pipeline and adjacent to the Belyando River and Mistake Creek on the Stage B pipeline. An assessment of the potential impact outside of the area considered as 'important habitat' was carried out within the current alignment options. The assessment was based on the presence of ground-truthed remnant vegetation considered suitable for the species (RE 11.4.6 and RE 11.3.3), examination of pre-clearing vegetation mapping for the area, analysis of aerial imagery to identify suitable gilgai habitat in cleared grazing lands, and examination of pre-clearance survey reports completed for the Carmichael Rail Project. The assessment identified the following impacts to potential habitat for the species based on a Project footprint (it is noted the final footprint will be refined and impacts to REs are likely to be reduced further): • RE 11.3.3 – 14.96 ha; • RE 11.4.6 – 6.03 ha; • Stage B habitat mapping –

Species	Impact
	24.9 ha; and • Cleared gilgai habitat – 91.54 ha. This provides a total estimated impact area of 137.43 ha of habitat considered suitable for Ornamental Snake within the NGWS footprint based on a 30 m construction corridor (refer to potential Ornamental Snake habitat mapping in Attachment 3). This is considered conservative as it is not proposed that the entire 30 m wide corridor will remain entirely cleared during the operational phase of the Project. On completion the majority of the corridor will be revegetated, with only a 10 m wide cleared track proposed for maintenance purposes covering an area of approximately 45.8 ha. To provide context to the extent of this impact an analysis was carried out on the availability of suitable habitat across the wider area. The analysis was based on suitable REs for the species as listed by DotEE (2018) and using current Queensland Government vegetation mapping (refer to Attachment 3). There is potentially 17,407 ha of suitable vegetated habitat within a 10 km buffered radius of the NGWS Project available for the species (refer to Attachment 4). This figure may be conservative as it does not include suitable non-remnant habitat. The NGWS Project (using 137.43 ha of overall impact area) represents 0.79% of this area. Available habitat for the species at the level of subregion and bioregion is also provided in Table 5-2 of Attachment 11(although this assumes the species occurs throughout which is unlikely). The Draft Referral guidelines for the national listed Brigalow Belt reptiles (BBR Guideline) refers back to the Significant Impact Guidelines for vulnerable species to determine if there is likely to be a significant impact on any species as a whole. A significant impact assessment for a vulnerable species has been undertaken in accordance with the criteria under the Significant Impact Guidelines (DotE 2013). Due to the difficulty in detecting the species ‘important habitat’ may be considered as a surrogate for an ‘important population’ for the assessment (DotEE 2017). The species is well within its known range; however, there is

Species	Impact
	no evidence the area comprises key source populations either for breeding or dispersal or are necessary for maintaining genetic diversity. The Significant Impact Guidelines (DotE 2013) also refer to 'habitat critical to the survival of a species' which includes the following. "Areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal; • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators); • to maintain genetic diversity and long term evolutionary development; or • for the reintroduction of populations or recovery of the species or ecological community. Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act." There is no recovery plan for the species and the Approved Conservation Advice for Ornamental Snake (TSSC 2014) does not identify any critical habitat for the species. There is no evidence the area is to be used for population reintroductions, needed to maintain genetic diversity or for long-term species maintenance. Habitat in the area is almost certain to be used for foraging and breeding given the species occurs there, however these are very broad terms. Impacts associated with construction earthworks for the Stage A and B pipelines will be temporary. Following pipeline installation, trenches will be backfilled and levelled off. A cleared (4 m width) track will also be retained for maintenance purposes. The pipeline corridor will be subsequently managed to prevent the occurrence of woody plant species and weed incursions. The following best practice mitigation has been incorporated in the alignment and construction methodology: • Clearing of remnant vegetation through the Project has been avoided by aligning the pipeline through existing cleared areas where

Species	Impact
	possible; • Where possible, undertake construction in the dry season when the species is dormant and prior to the known breeding season; and • Where trenching is a construction methodology, minimise trench open periods and undertake daily trench inspections for trapped individuals. Pages 5-8 and 5-9 of Attachment 11 (and as summarised below) assesses the potential impacts arising from the NGWS project to the Ornamental Snake against the Guidelines for species listed as nationally Vulnerable under the EPBC Act. Note, as stated above, 'important habitat' is considered as a surrogate for 'important population' for this species (as per SEWPaC 2011) and is considered as occurring in the Project area. An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will: 1. lead to a long-term decrease in the size of an important population of a species - Important habitat has been identified in the Project area. Similar habitat for the species is abundant in the surrounding landscape. The Project is linear and narrow, and impacts will be largely of a temporary nature (i.e. inadvertent mortality during construction). The pipeline alignment will be rehabilitated following construction excepting an operational access track for maintenance purposes. It is considered unlikely the Project will lead to a long-term decrease of an important population. 2. reduce the area of occupancy of an important population - The Project is linear and narrow, and impacts will be largely of a temporary nature (i.e. during construction). Clearing of remnant vegetation that may be suitable for the species will be minimal. Much of the Project footprint is already cleared of native woody vegetation. Following construction, pipeline corridors will be accessible to fauna including Ornamental Snake. It is considered unlikely the Project will reduce the area of an important population. 3. fragment an existing important population into two or more populations - Impacts associated with construction earthworks for the Stage A

Species	Impact
	and B pipelines will be temporary. The Project's operational phase will not result in the fragmentation of ornamental snake habitat along either the Stage A or Stage B pipeline. 4. adversely affect habitat critical to the survival of a species - Under the definitions provided in the EPBC Act Significant Impact Guidelines (DotE 2013) there is no evidence that the Project area encompasses 'habitat critical to the survival of the species'. The Project is linear and narrow in nature and impacts will be largely confined to the construction period. In addition, there is an abundance of similar habitat surrounding the Project area and in the wider region. 5. disrupt the breeding cycle of an important population - The species is known to produce offspring from September to November (Melzer 2012). The Project has potential to disrupt the breeding cycle of an important population should construction activities occur during the known breeding season. 6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline - The Project is linear and narrow in nature and impacts will be confined to the construction period. In addition, there is an abundance of similar habitat surrounding the Project area and in the wider region. The Project is considered unlikely to cause the species to decline. 7. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat - Much of the project area is already subject to intense modification due to the introduction of grass species for cattle grazing. Parthenium already occurs across much of the Project area and largely in cleared lands. The Project EMP will incorporate measures to control the introduction and spread of weed species across the Project area. The measures will be in place for the life of the Project and will have an added benefit to adjacent lands. The Project is considered unlikely to result in invasive species becoming established in this species' habitat. 8. introduce disease that may cause the species to decline - Given the nature

Species	Impact
	of the Project it is considered highly unlikely that it will cause the introduction of a novel disease into the area. 9. interfere substantially with the recovery of the species - There is no Commonwealth recovery plan for this species. The Project is linear and narrow, and impacts will be largely confined to the construction period. In addition, there is an abundance of similar habitat surrounding the Project area and in the wider region. The Project is considered unlikely to interfere substantially with the recovery of the species.
Squatter Pigeon The squatter pigeon is a vulnerable listed species under the EPBC Act. It is largely terrestrial, foraging and breeding on the ground and is usually seen in pairs or small groups of up to 20 or more birds. The southern subspecies occurs mainly in dry grassy eucalypt woodlands and open forests (Frith 1982; Crome and Shields 1992) but also inhabits Callitris/Acacia sp. woodlands and was reported from open plains in its historical southern range (Frith 1982) but have also been found in sandy sites near permanent water (Blakers et al. 1984). Squatter pigeons dust-bathe and are often encountered on dirt tracks and in areas of bare soil denuded of ground cover by livestock (Frith 1982; Higgins and Davies 1996). Although they remain common in heavily grazed country in tropical Queensland (Reis 2012), they are typically more common in un-grazed land compared to grazed land (Woinarski and Ash 2002). This species was historically found from Cape York Peninsula in Queensland south to the Dubbo region in New South Wales. There have been no official records in New South Wales since the 1970s and the species has declined greatly in southern Queensland (Higgins and Davies 1996; NPWS 2003). Much of the original habitat in Queensland has been replaced with pasture for livestock (Higgins and Davies 1996). Threats to existing populations include clearing and fragmentation of habitat, overgrazing by livestock and feral herbivores, trampling of nests by livestock, predation by feral cat (Felis	The species has been recorded throughout the NGWS Project area and surrounds including within the corridor itself (refer Attachment 3 for locations). The subspecies range occurs north to Townsville and west to Charleville. Important populations of the Squatter Pigeon have been identified as those isolated and sparsely distributed sub-populations that occur south of the Carnarvon Ranges in central and southern Queensland including: • Populations occurring in the Condamine River catchment and Darling Downs of southern Queensland; • Populations occurring in the Warwick-Inglewood-Texas region of southern Queensland; and • Any population that may potentially occur in NSW (Squatter Pigeon Workshop 2011). North of the Carnarvon Ranges the species remains common and is considered to be distributed as a single, continuous (that is inter-breeding) sub-population (DotEE 2017). Therefore, individuals in the Project area are unlikely to be key sources for breeding, dispersal, or maintaining genetic diversity. Under the definition provided in the MNES guidelines (DotE 2013) the individuals occurring in the Project area cannot be considered an important population. In summary, there is not considered to be an 'important population' of Squatter Pigeon in the Project area and therefore no impacts are on an important population of this species are expected to occur. Any impacts to local individuals will be restricted to the construction period and temporary. A significant impact assessment for a vulnerable species has been

Species	Impact
catus) and red fox (Vulpes vulpes), and illegal shooting.	undertaken in accordance with the criteria under the Significant Impact Guidelines (DotE 2013). This assessment is available in Section 5.2.2 of Attachment 11.
Koala Koalas are listed as Vulnerable under the EPBC Act. They have a distinct association with eucalypt woodland and forest habitat types containing suitable food trees (Hume and Esson 1993; Moore and Foley 2000; Martin et al. 2008). They are not necessarily restricted to bushland or remnant areas and are known to exist and breed within farmland and the urban environment (Dique et al. 2004). Similarly, movement is not confined to vegetated corridors, as they also move across cleared rural land and through suburbs (Martin et al. 2008). They use a variety of trees, including many non-eucalypts, for feeding, shelter and breeding purposes (Dique et al. 2004; Martin et al. 2008). They can; however, have distinct, localised preferences throughout their range, selecting some species in preference to others (Pahl and Hume 1990). They tend to favour individual trees for a variety of reasons, including high leaf moisture content, high leaf nutrient content (which is often related to low fibre content making leaves more palatable) and low amounts of chemical compounds produced by eucalypts to resist herbivory (Pahl and Hume 1990; Hume and Esson 1993; Moore and Foley 2000).	The EPBC Referral Guidelines for the Vulnerable Koala ('Koala guidelines') (DotE 2014) provide guidance on whether proposed actions could likely have a significant impact on the koala. An assessment was carried out regarding Koala Habitat in the NGWS footprint (refer Section 5.2.4 in Attachment 11 for further detail). The 'Koala guidelines' does not refer to any 'important populations' of Koala due to a lack of information at the time of writing. The guidelines provide a 'koala habitat assessment tool' to assist in the determining the sensitivity, value and quality of lands potentially impacted under development proposals. The assessment tool is to be used to determine whether lands may be considered as 'critical to the survival of the Koala' and therefore critical to the long-term survival and recovery of the species. The results of the assessment are to aid the decision-making process and determine whether a Project may need to be referred to DotEE based on potential significant impacts to Koalas and / or habitat critical to the survival of the species. An assessment has been made of the habitats value to Koala within the NGWS area to inform the significant impact assessment. The Project is linear, relatively narrow and covers a wide area of mostly cleared lands. When considered in its entirety lands located within the Project area have been assessed as having a habitat score of 5 (refer Table 5-3 in Attachment 11) which may be considered as 'critical to the survival of the species' (i.e. habitat score greater than or equal to 5). Under the 'Koala guidelines' it is recommended that a project be referred where it is proposed to 'clear greater than or equal to 20 ha of habitat containing known Koala food trees in an area with a habitat score greater than or equal to 8.' Where this is not proposed, the guidelines recommend that a referral be based on an appraisal of the Project

Species	Impact
	considering factors such as Koala density and level of habitat fragmentation. Based on the current available Project footprint, it is estimated the NGWS will impact the following habitat for Koala: • 4.35 ha of remnant vegetation containing a primary food tree species (i.e. river red gum); and • 17.4 ha of vegetation containing secondary food tree species (i.e. coolabah, poplar box and Reid River box). However, not all of this area is likely to be considered as 'critical habitat' for koala. This is a conservative figure and likely a significant over-estimate of the potential impacts that will occur, as clearing can be reduced during the on-ground construction phase of the Project by using existing cleared alignments and avoiding koala food trees through the relatively open riparian woodland in the Project area. It is believed clearing impacts can be reduced to less than 20 ha of habitat considered 'critical to the survival of the koala' as described in the referral guidelines. Assessment has been completed for potential NGWS impacts referring to the characteristics outlined in the guidelines assessing the potential for adverse impacts to 'habitat critical to the survival of the koala'. In terms of potential impacts to koala associated with the Project it is considered no referral be required for the Project given: • No koalas or evidence of presence has been observed in or near the NGWS Project area during Project surveys or other CCP related surveys; • Clearing of habitat will be linear in nature, relatively narrow (maximum of 30 m) and potentially reduced during temporary on-ground construction activity i.e. following construction the Project will not provide a barrier to koala movement (should the species occur in the area) and will not substantially fragment habitat corridors; and • Management and mitigation measures can be put in place to avoid impacts to koalas. As such the Project is considered unlikely to 'adversely affect habitat critical to the survival of the koala' as assessed using the Commonwealth's 'Koala guidelines.' Management Measures to

Species	Impact
	Avoid and Reduce Impact • Large koala habitat trees, in particular riparian river red gums, can be marked and potentially avoided during pre-clearing assessments during the construction process; • Pre-clearing fauna spotter to ensure no koalas are present in the trees to be cleared; and • Minimise clearing within watercourses and riparian vegetation In summary, as no 'important population' is known to exist in the Project or wider area, and no individuals have been recorded at the site, it is considered unlikely the proposed works will have more than a minor impact on this species, should an impact occur.
Black-Throated Finch The black-throated finch is an Endangered listed species under the EPBC Act. Black-throated finches occur primarily in dry open grassy woodlands and forests with seeding grasses and free-standing water (DotEE 2017). They are thought to require a mosaic of habitats in the wet season to allow them to find enough seeding grasses. They are most often found in open or very open savannah woodland, often along watercourses and usually with dense grassy groundcover, but also in woodlands dominated by Melaleuca sp. or Acacia sp. (Higgins et al. 2006). Black-throated finches are gregarious, occurring mostly in twos or small flocks of up to 20 birds, though several hundred may congregate around waterholes (DotEE 2017). They often associate with other finch species. They are primarily granivorous, feeding on the seeds of native grasses and occasionally other types of plants. They also include insects in their diet, particularly in breeding season. Breeding can occur throughout the year under optimal conditions and varies throughout its range. In the Townsville area, breeding typically occurs during the wet season, usually between February and May; however, nesting has been recorded at all times of year (Higgins et al. 2006). They are known to breed at least once or twice per year but possibly more in good conditions. The nest is a bulky, rounded structure of woven dry grass that tend to be	The Significant impact guidelines for the endangered black-throated finch (southern) (Poephila cincta cincta) ('the BTF guideline') (DEWHA 2009) sets out guidance for determining activities likely to have significant impact on the subspecies. An assessment of the Project's activities has been carried out (refer Section 5.2.3 in Attachment 11 for further detail). The assessment has been summarised as follows: Action Within Black-Throated Finch Habitat An important area for the black-throated finch is defined as being 'within 5 km of a post-1995 sighting'. Sighting records within 5 km of the NGWS Project area are limited to: • An unspecified number of individuals observed 7.4 km due south of the western extent of Stage B during targeted surveys for the species (GHD 2012). The survey site comprised isolated patches of tall trees (mainly brigalow) next to a farm dam in a cleared landscape dominated by buffel grass; • A single individual recorded at a farm dam during targeted searches for the species (GHD 2013) located 3.1 km south-east of the western extent of the Stage B corridor. Site located in an area with several isolated patches of larger trees, mainly brigalow, in a cleared landscape dominated by buffel grass; and • A single individual observed approximately 11 km north-west of this first record (2 km south of Stage B alignment) during surveys for the Moray-Carmichael Road EAR (Jacobs 2015). Habitat was not described

Species	Impact
constructed in tree hollows or forks and located close to water. They are also known to nest in long grasses, shrubs or saplings, mistletoes and beneath raptor nests (DotEE 2017). Black-throated finch (southern) is listed as Endangered under the EPBC Act and there is a substantial population identified within the CCP mine lease survey area (GHD 2012 and 2013) with sporadic records west of this area.	but appears to be cleared lands close to a watercourse (refer Attachment 3 and Figure 4-8 of Attachment 10 for record locations). These sighting records are within highly modified landscapes that generally appear unsuitable for the species. No other sightings have been recorded within the Project area despite several ecological assessments in the wider area for other CCP associated projects. This is in spite of the presence of a well-known population of the species in the CCP mine lease area. Actions Likely to Have a Significant Impact The following relevant Project activities could be associated with a impacts on a population of Black-throated Finch as they have potential to lead to the loss, degradation and or fragmentation of habitat through: • Clearing of grassy woodlands near waterholes; • Temporary earthworks or excavation; • Construction of tracks, structures and/or hard surfaces; and • Temporary increase in local vehicle traffic. Significant Impact Thresholds The BTF guideline outlines the character and quality of the habitat may be significantly diminished if an action results in one of the impact thresholds identified in pages 5-14 and 5-15 of Attachment 11. In summary, works associated with the Project will increase the availability of a permanent water source and clearing will be limited to habitat which is considered suboptimal unsuitable habitat for the black-throated finch (southern). Significant impacts on this species are therefore considered unlikely as a result of the Project.

2.4.2 Do you consider this impact to be significant?

No

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No

2.7 Is the proposed action to be taken on or near Commonwealth land?

No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

2.13 Is the proposed action likely to have ANY direct or indirect impact on any part of the environment in the Commonwealth marine area?

No

Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

Attachment 10 describes the existing environment of the Project site (both Stage A and Stage B) as well as the listed threatened and migratory species. The content from Attachment 10 is presented below. Attachment 11 presents the assessment of potential significant impacts to matters of national environmental significance including threatened ecological communities, listed threatened species and migratory species. Refer to section 2 for the assessment relating to matters of national environmental significance.

Existing Environment

REGIONAL

The entire project is situated near the north-western boundary of the Brigalow Belt Bioregion which covers much of Central Queensland extending from Townsville to Narrabri in New South Wales. Climate in the area is described as arid to subhumid with distinct wet and dry seasons. The Project area lies largely within the Belyando Downs subregion of the Brigalow Belt Bioregion. A portion of the Stage B alignment occurs within the Alice Tableland subregion of the Desert Uplands Bioregion. The dominant vegetation communities present are as follows:

Brigalow (*Acacia harpophylla*) and gidgee (*Acacia cambagei*) communities on fine textured clay soils;Reid river box *(Eucalyptus brownii)* (usually with other eucalypt species) communities on Cainozoic sediments with a thick sandy surface layer; andCoolabah (*E. coolabah*) open woodland on alluvial plains, clay levees and texture contrast soils.

The Project area is dominated by vegetation communities located on the following land zones (as described by Neldner 2012):

Land zone 3 - recent Quaternary alluvial systems (alluvial river and creek flats); and

Land zone 4 - Tertiary-early Quaternary clay plains (clay plains).

The NGWS Project occurs in an agricultural area primarily used for cattle grazing. As a result of historic and current grazing activities, much of the landscape has been cleared of woody vegetation. Vegetation remaining is associated with elevated rocky areas, rivers, creeks and minor drainage lines. There are also several protected areas in the region containing large tracts of vegetation including Willandspey Regional Park, Blackwood National Park, Epping Forest National Park, and Nairana National Park (see Figure 1 of Attachment 9). The Stage A

pipeline lies adjacent to the eastern boundary of Nairana National Park for part of its length; however, there will be no impact to the park itself. The remaining protected areas lie more than 15 km from the Project and no protected area will be traversed for site access.

Review of the current DNRME vegetation mapping for the area confirms a total of 17 REs are predicted to be impacted by the project activities. Many of these occur as mixed polygons with up to four REs potentially occurring within a single mapped RE area. Of these, three REs are equivalent to the brigalow (*Acacia harpophylla* dominant and co-dominant) TEC as described by DotEE's *Species Profiles and Threats Database* (DotEE 2018) (refer Table 4-1 of Attachment 10). The following sections describe the ecological values of each stage of the Project as they relate to MNES as evaluated during the site surveys.

Regional Aquatic Values

The Project area is characterised by wide floodplains of braided rivers and creeks associated with the Belyando River Basin. The Project is located primarily within the Belyando Basin and partly within the Suttor Basin. Within these basins, the Project is located within the Belyando Floodplain, Carmichael River Sub-catchment, Mistake Creek Sub-catchment and the Upper Suttor River Sub-catchment.

The Belyando Basin covers an area of approximately 35,000 km². Most of the Project area is within the Belyando sub-catchment while a small section of the Stage A pipeline lies within the Suttor River sub-catchment. Both sub-catchments are located within the Burdekin River Basin. The Burdekin River is one of Australia's largest rivers and is known to carry significant sediment during flow periods. The Burdekin River is one of the largest single sources of sediment and fresh water to the Great Barrier Reef lagoon (NQ Dry Tropics 2015).

The Belyando River drains semi-arid inland areas bound by the Great Dividing Range in the west and the Denham and Drummond Ranges to the east. It flows in a northerly direction before joining the lower reaches of the Suttor River, which then joins the Burdekin River entering the Burdekin Falls Dam approximately 90 km downstream of the Project area. Cattle grazing is the dominant land use of the area with a small percentage of the land used for dryland cropping of cereals.

Review of the gauging sites in the Belyando River area indicate the flow regime is highly seasonal with natural flows peaking from December to April (the wet season) with low to negligible flows experienced from May to November (the dry season). Wet season flood events are usually of a relatively short duration. Although rainfall shows a strong seasonal bias, river flows are more associated with individual events and there are periods of no rainfall during the wet season. The water quality in the Belyando Basin is known to have moderately elevated suspended sediment concentrations and loads during the wet season event flows.

The nearest wetland listed on the Directory of Important Wetlands of Australia (DIWA) database is the Doongmabulla Springs complex which is located 18 km west of the Project area and will not be impacted by Project-related activities. There are several coastal wetlands listed on the DIWA database located downstream of the Burdekin Falls Dam. The dam; however, heavily regulates downstream water flows and the Suttor and Belyando Rivers contribute a comparatively low percentage of incoming flow (Burrows 1999).

A review of aquatic MNES for the region shows there are no threatened freshwater aquatic species in the Burdekin catchment. A desktop assessment conducted as part of the CCP EIS identified 51 fish species known to occur within the Burdekin Basin (GHD 2012a) and 17 fish species as likely to occur in the CCP Project area (i.e. the Carmichael River and tributaries). Field surveys of the project area recorded 11 fish species (GHD 2012a). A comprehensive survey of the fish fauna from the Belyando-Suttor river systems recorded a total of 15 fish species (Burrows *et al.* 2009). None of the species recorded in either survey are listed as threatened species under State or Commonwealth legislation. These are common and widespread freshwater species including: midgley's carp gudgeon (*Hyseleotris* species), purple-spotted gudgeon (*Mogurnda adspersa*), agassiz's glassfish (*Ambassis agassizii*), eastern rainbowfish (*Melanotaenia splendida*), spangled perch (*Leiopotherapon unicolor*), sleepy cod (*Oxyeleotris lineolata*) and Hyrtl's tandan (*Neosilurus hyrtlii*). It is considered these results will be indicative of that found in aquatic habitats in the Project area as the NGWS Project is within this river system. Aquatic vegetation was found to be limited within the CCP studies with only four species identified during surveys.

STAGE A

Vegetation Assessment

The predicted clearing of remnant vegetation for Stage A of the Project (based on current Department of Natural Resources and Mines (DNRME) mapping) is detailed in the Table 4-2 of Attachment 10. The clearing impacts are based on a corridor width of a maximum of 30 m. It is likely that clearing for the pipeline can be minimised through some areas during construction. Based on current DNRME mapping, the corridor will cover up to 44.28 ha of remnant vegetation including 15.65 ha containing vegetation that may qualify as a brigalow TEC.

The results of the protected matters search predicted two TECs, both listed as Endangered under the EPBC Act, to occur in the proposed pipeline corridor: brigalow (*Acacia harpophylla* dominant and co-dominant); and the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin (GAB).

There is no spring complex associated with the GAB in the vicinity of the Stage A footprint. There are three REs mapped within the Stage A footprint which may be considered as potential brigalow TEC (DotEE 2018):

RE11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains;

RE11.4.8 – *Eucalyptus cambageana* open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains; and

RE11.4.9 – *Acacia harpophylla* with a mid-storey of *Terminalia oblongata* and *Eremophila mitchellii* on Cainozoic clay plains.

The on-site assessment confirmed that very little brigalow occurs within either the corridor or the Belyando Junction Dam area (Refer plate 4-2 of Attachment 10). A large tract of vegetation associated with Nairana National Park mapped as containing brigalow was found to be non-

remnant and comprise gidgee (RE11.4.6). A Property Map of Assessable Vegetation (PMAV) Application to correct vegetation mapping boundaries and types was submitted to the DNRME for processing. While the current mapping indicates a total of 33 ha of remnant vegetation (including 15.65 ha containing vegetation that may qualify as a brigalow TEC) the PMAV survey confirmed that no REs equivalent to the brigalow TEC occur within this portion.

The area to be cleared for the flood-harvesting pump station is mapped as potentially containing brigalow TEC (RE11.3.1); however, field assessments confirmed that no brigalow occurs within or near the proposed impact area. Riverine vegetation on both the Belyando and Suttor Rivers is dominated by Coolabah (RE11.3.3) and river red gums (E. camaldulensis) (RE11.3.25) in the canopy. Ground cover has been extensively impacted by cattle access.

A flood-harvesting intake pipeline associated with the dam extends approximately 4 km through cleared lands to the east where it crosses an anabranch of the Belyando/Suttor River adjacent to a cleared easement associated with an existing river impoundment through coolabah and river red gums (Refer plate 4-3 of Attachment 10).

The main Stage A pipeline crosses an extensive alluvial clay plain and both an anabranch and the main channel of the Belyando River. A thin strip of unmapped brigalow (not large enough to qualify as a TEC) is crossed by the pipeline 600 m south-east of the dam area. Both rivers are currently mapped as containing brigalow TEC vegetation communities (RE11.3.1); however, no brigalow was observed near the Belyando River crossings.

Approximately 6 km of the proposed pipeline south of the Suttor River was not able to be visited during the site inspection. Aerial imagery and RE mapping indicate this area is largely cleared.

The pipeline then turns south along the eastern boundary of Nairana National Park (Refer plate 4-4 of Attachment 10). Most of this area has been cleared in the past and is now largely regrowth gidgee on gilgai formations (Refer plate 4-5 of Attachment 10). Along this southern section, approximately 3.4 km of habitat currently mapped as potential brigalow TEC (RE11.4.8) was found to be solely gidgee woodland (RE11.4.6).

South of Nairana National Park, the proposed pipeline will cross the Gregory Developmental Road and run just outside the Gregory Developmental Road easement for 4 km. This is non-remnant habitat comprising regrowth Acacia and Eucalyptus spp. or grasslands on stony soils providing little habitat value for the identified MNES species. The pipeline then turns south onto Disney Station where it initially traverses sparse eucalypt woodland for 1.2 km before entering a cleared easement (varying between 30-50 m wide) dominated by the introduced buffel grass. The easement extends for 6 km to the south and encompasses several areas of mapped potential brigalow TEC (RE11.3.1 and 11.4.8) that cross the easement. Although brigalow was observed within the area it was not observed in the easement itself.

Fauna Assessment

The existing dam provides habitat value for a variety of waterbirds including species formerly listed as migratory under the EPBC Act. Great egret (*Ardea alba*) and white-bellied sea-eagle (*Haliaeetus leucogaster*) were observed at the dam during the site survey. Nevertheless, the

Project works will increase habitat for these and other waterbird species. Expansion of the dam site will have a minor impact on remnant vegetation with 0.7 ha of vegetation located directly to the north predicted to be impacted by extending the capacity of the current dam. The new dam wall is located on cleared cattle grazing land dominated by the introduced buffel grass (*Cenchrus ciliaris*) and holds little value for terrestrial MNES fauna (Refer plate 4-2 of Attachment 10).

A large topographical depression mapped as a wetland protection area under State legislation is located between the Belyando River anabranch and the Suttor River intake site. The intake pipeline is located on the northern edge of this area. The site was inspected during the site assessment. No water was present at the time with dried native grass species and juvenile river red gums present in the area. Given its position in the landscape it is likely the wetland is highly ephemeral and only retains water after flooding events. At these times, it is likely to provide temporary value for a variety of wetland birds including migratory species.

An extensive pool was present at the Suttor River site of the proposed intake pump station at the time of the site survey. These riverine habitats provide suitable forage trees for koala (*Phascolarctos cinereus*) (Vulnerable – EPBC Act), particularly where red gums occur. Ornamental snake (*Denisonia maculata*) is known to occur in RE11.3.3 (DotEE 2018) and where cracking clays occur.

Extending south of the Belyando Junction dam area, The Stage A pipeline crossing point at the Belyando River is located 1.8 km upstream of the confluence with the Suttor River and contained a large pool of water, although was not flowing at the time of the survey. It is likely this area retains water during extended dry periods given the presence of the standing water observed even after a very dry wet season. Although only the main channel crossing could be visited during the site survey, the area of the proposed pipeline provides some limited habitat for koala (riparian habitat) and ornamental snake (where cracking clays occur).

Approximately 6 km of the proposed pipeline south of the Belyando River was not able to be visited during the site inspection due to access constraints. Aerial imagery and RE mapping indicate this area is largely cleared although extensive areas of gilgai formations occur. Gilgai habitat is suitable for ornamental snake although inspection of clay plains south of this area showed degraded soil structure due to the impact of cattle trampling. Habitat along Bowen Developmental Road is largely cleared. A patch of potential brigalow TEC (RE11.4.8 and 11.4.9) on the north side of the road was found to solely comprise gidgee (RE11.4.6) in the vicinity of the pipeline. Squatter pigeon (*Geophaps scripta scripta*) (Vulnerable) was observed in sandy habitat along the pipeline corridor on the Bowen Developmental Road. Along the eastern boundary of Nairana National Park is now largely regrowth gidgee on gilgai formations. The gilgai habitat along much of this section was found to be in good condition and is likely to provide suitable habitat value for ornamental snake.

The pipeline south of the Nairana National Park and into the Disney Station property is gently hilly encompassing clay soils in lower sections that may provide habitat for ornamental snake. Squatter pigeon was observed in this section along a sandy creek bed lined by Reid River box. South of the easement the pipeline passes through predominantly cleared habitat, this area was not assessed as aerials and records showed the corridor to be cleared. The site visit confirmed

cracking clay soils occur throughout including some areas of gilgai formations that may be suitable for ornamental snake. Inspection of accessible areas showed extensive degradation due to the presence of cattle and buffel grass.

Figure 4-3 and Figure 4-4 of Attachment 10 show MNES fauna locations and TECs based on results of the site visit, RE mapping (where these areas were unable to be accessed) and examination of aerial imagery.

STAGE B

Description

Stage B consists of a 30 m wide pipeline corridor, within a 75 m easement (refer plate 4-1 of Attachment 10). There will be a 10 m wide pipeline operational corridor within the 30 m corridor. This pipeline extends 58 km in an approximate east-west direction ending at the boundary of the CCP mine lease area (Figure 4-5 of Attachment 10). Stage B1 begins approximately 4 km south-east of Disney Station dam and runs west to south-west within and along the southern boundary of the Carmichael Rail Project corridor for 33 km.

Stage B2 commences at the intersection of the pipeline with Moray-Bulliwallah Road south of the Carmichael Rail Project corridor (Figure 4-6 of Attachment 10). The Stage B2 pipeline easement then runs westward towards the mine, adjacent to the rail corridor. The route passes through predominantly cleared lands including several minor drainage lines; however, it crosses a significant tract of remnant vegetation associated with the Belyando River. This section of the pipeline and 30 m corridor will be constructed within the Carmichael Rail Project corridor which has already been assessed under the EPBC Act.

Two minor water offtakes will transfer water along pipelines to the proposed mine workers accommodation village and airfield. A connecting pipeline between the two offtakes follows the cleared Moray-Carmichael Road. The maximum impact area for these minor pipelines is approximately 54.07 ha based on a 20 m wide construction corridor.

Vegetation Assessment

The predicted clearing of remnant vegetation for Stage B1 and Stage B2 of the Project (based on current DNRME mapping) is detailed in Table 4-3 of Attachment 10. The clearing impacts are based on a corridor width of a maximum of 30 m. It is likely that clearing for the pipeline can be minimised through some areas during construction, particularly at creek crossings. Based on current DNRME mapping, the corridor will cover up to 37.69 ha of remnant vegetation including 17.38 ha containing vegetation that may qualify as a brigalow TEC.

The results of the protected matters search predicted two TECs, listed as Endangered under the EPBC Act, to potentially occur in the proposed pipeline corridor: brigalow (*Acacia harpophylla* dominant and co-dominant); and the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin. The nearest spring complex

associated with this TEC are the Doongmabulla Spring complex which is located 20 km south-west of the western extent of the Stage B2 pipeline. Based on proximity to the site and potential for impacts, only the brigalow TEC is considered relevant to this review and the Project.

The three endangered REs mapped within the Stage B footprint which may be considered as potential brigalow TEC (DotEE 2018) are:

RE11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains;

RE11.4.8 – *Eucalyptus cambageana* open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains; and

RE11.4.9 – *Acacia harphphylla* with a mid-storey of *Terminalia oblongata* and *Eremophila mitchellii* on Cainozoic clay plains.

It should be noted that during the Project route selection process, additional impacts to all areas comprising potential brigalow TEC vegetation (under DNRME mapping) were avoided through deviation of the pipeline into the Carmichael Rail Project corridor (Refer Figure 4-7 in Attachment 10) which has already been subject to assessment under the EPBC Act. The information is presented here for the sake of completeness.

Saunders Havill (2012) have carried out detailed vegetation mapping surveys within this section based on the 100 m width of the adjacent Carmichael Rail Project corridor based on DNRME's Property Map of Assessable Vegetation process for changing incorrect RE mapping. The mapping found only two areas adjacent to the Stage B1 pipeline which contain brigalow communities and thereby qualify as a brigalow TEC. The recent on-site assessments by CDM Smith confirmed this result.

In general, much of the remnant vegetation remaining within the Stage B corridor has been subject to tree clearing/thinning and is currently used for cattle grazing. The Stage B1 pipeline crosses a relatively flat plain that traversing relatively well vegetated areas associated with Mistake Creek in the east and the Belyando River in the west of this section (Refer Figure 4-8 of Attachment 10). Vegetation communities associated with the braided Belyando River system are currently mapped as comprising brigalow TEC vegetation communities (RE11.3.1). No potential brigalow TEC was observed in the vicinity of the Belyando River crossings (Plate 4-6) which are dominated by coolabah and gidgee woodland (RE11.3.3) Reid River box woodlands (RE11.3.10). Similar vegetation occurs on Mistake Creek (Plate 4-7) where scattered brigalow was also observed although this community (RE11.3.5) is not considered as a brigalow TEC (DotEE 2018).

The habitat between these areas has been heavily impacted by tree clearing and thinning. Approximately 9 km west of Mistake Creek a thin area mapped as potential brigalow TEC (RE11.4.8) was found to be solely gidgee woodland (RE11.4.6). Potential brigalow TEC (RE11.3.1) was confirmed as occurring approximately 6 km south-west of this area as also identified by Saunders Havill (2012). A further 3.5 km west of this area is another patch of potential brigalow TEC (RE11.3.1) (refer insets to Figure 4-8 and Figure 4-7 of Attachment 10) identified during the Saunders Havill assessment (2012). This area could not be accessed

during the December 2016 site assessment for confirmation and it has been assumed to be correct for this review based on aerial photography. The remaining remnant vegetation in the Stage B1 corridor comprises open forest dominated by gidgee, woodlands dominated by Reid River box, or mixed eucalypt communities.

West of the Moray-Bulliwallah Road, the Stage B2 pipeline and associated water offtake pipelines pass almost entirely through lands cleared for cattle grazing. Most this area is a flat plain dominated by buffel grass. Patches mapped as remnant grassland areas (Saunders Havill 2012) were found to be heavily dominated by Buffel Grass and/or regrowth brigalow and are considered unlikely to be native grassland communities (refer to Plate 4-8 of Attachment 10). Gilgai depressions occur patchily throughout the Stage B2 alignment. A single small patch of brigalow (RE11.3.1) which had not previously been mapped was identified close to North Creek (Refer to Attachment 10 Plate 4-9 and inset of Figure 4-8). Although small this area qualifies as a TEC (i.e. > 0.5 ha in area), it has been avoided by the alignment.

Fauna Assessment

The riparian vegetation along the Belyando River provides a regional corridor that connects Willandspey and Nairana National Parks to the north with Bygana and East Top Nature Refuges to the south. Squatter Pigeon has been recorded on the Belyando River nearby south of the Stage B1 crossing (CDM Smith 2013; Jacobs 2015). The species prefers sandy soils and needs access to permanent water. During the December 2016 survey the species was identified on four occasions including two observations in the vicinity of the Belyando River system, on the bank of a waterhole on North Creek and next to a farm dam (refer to Figure 4-8 of Attachment 10). All sightings were observed on sandy soils. In the region, this is a widespread and relatively common species which may occur throughout the alignment where suitable soil occurs on land zone 3.

Black-throated finch (southern) (Poephila cincta cincta) habitat is mapped as potentially occurring in riparian vegetation along the Belyando River and Mistake Creek (GHD 2012b). The species requires permanent water, native grass species and hollow bearing trees [as their nests tend to be constructed in tree hollows (DotEE 2018)]. Site observations in December 2016 identified both areas as potentially suitable for the species although there have been no records of the species during any surveys in these habitats. A single black-throated finch individual was observed approximately 2 km south of the Stage B2 corridor during the Moray-Carmichael Road assessment (refer to Figure 4-8 of Attachment 10) (Jacobs 2015). Although the habitat value of the sighting location is not known, the site appears to be in cleared vegetation located south of a vegetated drainage line. Black-throated finch has also been observed at a farm dam 3.2 km south of the western extent of Stage B2 (refer to Figure 4-8 of Attachment 10). The habitat at and surrounding the site is described as low value for this species due to the dominance of the introduced buffel grass and habitat that is largely cleared of woody vegetation (GHD 2013). A substantial population of this species exists to the west of the Stage B Project area on the CCP mine lease (GHD 2012a).

Ornamental snake habitat is also mapped as coinciding with the remnant vegetation communities in the Belyando River and Mistake Creek corridors (GHD 2012b). The species has been recorded close to the western extent of the corridor in recent years (GHD 2013; CDM

Smith 2013; CDM Smith 2014) as well as to the east of Mistake Creek (CDM Smith 2013) (refer to Figure 4-8 of Attachment 10). Patchy shallow gilgai habitat occurs along the Stage B1 corridor, generally in cleared areas. More suitable habitat for ornamental Snake occurs in the alluvial systems adjacent to both the Belyando River and Mistake Creek where gidgee communities on cracking clays with shallow gilgais were observed. Ornamental snake is known to occur in this habitat (RE11.3.3) (DotEE 2018).

The Stage B2 corridor is almost entirely cleared of woody vegetation, although much of the cleared habitat in the area shows the presence of gilgai formations. This was confirmed during previous survey work in this area for the Moray Power Project assessing habitat suitability for ornamental snake (CDM Smith 2014). The survey work has shown this species does not require the presence of remnant vegetation and can occur in cleared buffel pasture where gilgais also occur (CDM Smith 2014). Much of the gilgai and watercourse habitat within the Stage B corridor may be suitable for ornamental snake.

The most suitable habitat for Koala occurs along both Mistake Creek and the Belyando River where good quality river red gum habitat occurs. No individuals or evidence of habitat use (scratches or scats) were observed during the surveys for the NGWS or other nearby projects (Moray Power or Adani Quarries project). The species has not been recorded outside of a single occurrence in the CCP (GHD 2012a).

LISTED THREATENED AND MIGRATORY SPECIES

The desktop assessment indicated that twenty-three threatened (Endangered or Vulnerable) MNES fauna and flora species have potential to be impacted by NGWS Project activities.

Species identified in the database searches were subsequently categorised as to their potential to occur in the study area following onsite habitat assessment. Four categories were used to classify the likelihood of a species being present. Categories were defined as:

1. Known – confirmed during field assessments for this project, and/or confirmed present from other field assessments (associated with the CCP) in or directly adjacent to the Project area

2. Likely – suitable good quality habitat observed during field assessments and desktop records from the wider area, and/or confirmed from other field assessments associated with the CCP in the wider area

3. Potential – possibility of suitable habitat and records of the species occurring within the wider area

4. Unlikely – no suitable habitat or not known to occur within the wider area.

Following the results of the desktop assessments and the on-site field assessment for the Project, it is considered that four species listed under the EPBC Act are known to occur, or are considered likely to occur within the Project area or adjacent surrounds:

- Ornamental snake (Vulnerable)
- Squatter pigeon (Vulnerable)
- Black-throated finch (Endangered)
- Koala (Vulnerable).

A further two species listed as migratory under the EPBC Act are considered as potentially occurring in the area. Three species formerly listed as migratory have been identified previously during surveys for the Project (refer to Table 4-4 of Attachment 10). Two MNES flora species and four fauna species have potential to occur and may be potentially impacted by the proposed Project. The remaining species were considered unlikely to occur. The probable occurrence of all conservation significant flora and fauna species including those identified from the desktop assessment is provided in Table 4-4 of Attachment 10.

3.2 Describe the hydrology relevant to the project area (including water flows).

The NGWS infrastructure is largely located within the Belyando Basin which drains arid inland areas from the south and the central west to the Burdekin River, which flows to the Burdekin Falls Dam. A small section of the Stage A pipeline is within the Upper Suttor River Sub-catchment. The Burdekin River is one of Australia's largest rivers and carries significant sediment during flow periods. The Burdekin River is considered to be one of the largest single sources of sediment and fresh water to the Great Barrier Reef lagoon (Burdekin Dry Tropics Board 2005).

Peak natural flows within the sub-catchment are from December to April with low to negligible flows experienced from May to November.

The Belyando Basin covers an area of approximately 35,000 km^2. The majority of Stage A and all of Stages B and Stage C are located within the Belyando Basin. The Belyando River is bound by the Great Dividing Range in the west and the Denham and Drummond Ranges to the east, and flows in a northerly direction before joining the lower reaches of the Suttor River. The Carmichael River Sub-catchment feeds into the Belyando River being located to the south of Stage B and is approximately 9,750 km2.

Infrastructure and Watercourse Crossings

The Suttor River intake pump is proposed to be located on the Suttor River within the Belyando Junction property. The site is essentially located on the outside bend of the main river channel, although, as part of a braided system, a high flow channel immediately upstream of the site approaches the site at a right angle.

The NGWS pipeline will cross a number of watercourses. The Stage A pipeline requires nine crossings of 'minor' waterways and one major waterway crossing (The Belyando River itself). The Stage B alignment requires for six minor crossings and three major crossings (including the

main channels of Belyando River and Mistake Creek, as classified by the State Government.

Flow and Water Quality Data

The area is characterised by wide floodplains of rivers and creeks with reasonably well-defined channels and wide floodplains. Review of the gauging sites in the Belyando River indicate the flow regime is highly seasonal and dominated by the wet season. Peak natural flows within the sub-catchment are from December to April with low to negligible flows experienced from May to November. During the wet season, flood events are of a relatively short duration, however there has been periods of no flow in some those wet season months.

Flows at the Suttor River were estimated using data from an existing State Government (DNRME) gauging station at St Anns, which is approximately 30 km downstream of the proposed Belyando Junction dam and Suttor River intake. This station is the closest station to the extraction location with sufficient data collection over time to allow reliable flow statistics to be characterised (1967 – present). Mean daily gauged flows for the Suttor River by month indicate flow through the Suttor River is significantly higher in the wetter months (January, February and March) with mean daily flows exceeding 17,000 ML/day for the month of February. This indicates there is a significant supply of water during the wetter months.

The results of flow analysis indicates flows within the Suttor River are more reliable through the months of November through to May. During wetter periods average daily flows range from approximately 3,760 ML in December increasing to approximately 17,400 ML in February and down to 7,680 ML in March.

A review of historical water quality results collated by DNRME (2015) from the St Anns gauge site was compared to guidelines parameters were derived from the QWQG and ANZEC guidelines for moderately disturbed ecosystems. Water quality within the area is dependent on flow regimes and seasonal variation within individual waterways. Based on this information water quality criteria related to construction water discharges will acknowledge the site water quality parameters at the given location prior to discharge. It should be noted that the existing water quality is much worse than the WQOs for a number of parameters including turbidity, pH, total nitrogen and total phosphorus.

3.3 Describe the soil and vegetation characteristics relevant to the project area.

An assessment of the soil classification of the area was undertaken by reviewing the ASRIS 2011 data, Land Resources Areas (LRAs), as well as a review of the site specific soil sample records in the locality to further define the local soil physical attributes and confirm applications of LRA descriptions.

Soils within the area are understood to be five to six million years old and more than 36 m deep (Coventry *et al.* 1985). The predominant soils across the Stage A and B pipelines are vertisols and kandosols, with some small areas of chromosols, dermosols, and rudosols. Management considerations of these soils and their key features are summarised below. Vertisols typically have a uniform clay texture, shrink-well properties and smooth surfaces on the faces of soil

aggregate. Kandasols are shallow to deep red and brown gradational soils and uniform sands, often on crests and upper slopes.

Vertisols

- Topsoils have moderate fertility

- Topsoils have medium to heavy clay textures and therefore soil workability may make stripping difficult

- Subsoils are mildly to moderately alkaline, sodic and saline at depth and have high Calcium to Magnesium (Ca:Mg) ratios

- Due to high cation exchange capacity and exchangeable Ca and Mg levels and clay minerology, these subsoils are unlikely to be highly dispersive

- They have a low dust potential.

Kandosols

- May have some ferruginised rock outcrop

- Low fertility and low Plant Available Water Capacity, and have limited agricultural productivity

- Medium to high dust potential

- These soils are relatively stable when undisturbed but materials may have low coherence following disturbance and, therefore, be susceptible to soil erosion

- The soil materials throughout these profiles allow for flexibility in the use of these materials.

Chromosols

- Dominant throughout the wider region

- Feature a strong texture contrast between the topsoil and subsoil.

Rudosols

- Distributed throughout parts of the region

- Characterised by a lack of horizontal development, other than the accumulation of organic matter in the A1 horizon.

Dermosols

- Present in small land units throughout the region

- Lack a strong texture between the A and B horizons, but generally have a strong B2 horizon.

Vegetation characteristics are discussed broadly in **Section 3.1.**

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area.

The site for the proposed action is within an area that has been degraded by agricultural activities and is not considered to have outstanding features.

3.5 Describe the status of native vegetation relevant to the project area.

Surveys have been carried out along the length of the NGWS Project footprint. Anomalies with existing State government vegetation mapping were corrected using the Queensland Property Map of Assessable Vegetation process. The following descriptions are based on ground-truthed observations.

Stage A

On-site assessments confirmed that very little brigalow occurs within either the corridor or the Belyando Junction dam area. A large tract of vegetation associated with Nairana National Park mapped as containing brigalow was found to be non-remnant and comprise gidgee (RE11.4.6).

The area to be cleared for the flood-harvesting pump station is mapped as potentially containing brigalow TEC (RE11.3.1); however, field assessments confirmed that no brigalow occurs within or near the proposed impact area. Remnant riverine vegetation on both the Belyando and Suttor Rivers is dominated by coolabah (RE11.3.3) and river red gums (RE11.3.25) in the canopy. Ground cover has been extensively impacted by cattle access. A flood-harvesting intake pipeline and/or channel associated with the dam extends approximately 4 km through cleared lands to the east where it crosses an anabranch of the Belyando/Suttor River adjacent to a cleared easement associated with an existing river impoundment through coolabah and river red gums.

The main Stage A pipeline crosses an extensive alluvial clay plain and both an anabranch and the main channel of the Belyando/Suttor River. Both rivers are currently mapped as containing brigalow TEC vegetation communities (RE11.3.1); however, no brigalow occurs at either crossing.

The pipeline turns south alongside the eastern boundary of Nairana National Park. Most of this area has been cleared in the past and is now largely regrowth gidgee on gilgai formations. Along this southern section, approximately 3.4 km of habitat currently mapped as potential brigalow TEC (RE11.4.8) was found to be solely gidgee woodland (RE11.4.6).

South of Nairana National Park the pipeline will cross the Gregory Developmental Road and run just outside the Gregory Developmental Road easement for 4 km. This is non-remnant habitat

comprising regrowth Acacia and Eucalyptus spp. or grasslands on stony soils. The pipeline then turns south onto Disney Station where it initially traverses sparse remnant eucalypt woodland (RE11.11.15c) for 1.2 km before entering a cleared easement (varying between 30-50 m wide) dominated by buffel grass. The easement extends for 6 km to the south and encompasses several areas of mapped potential brigalow TEC (RE11.3.1 and 11.4.8) that cross the easement. No brigalow was observed within the easement itself and the mapping has been corrected. The remaining remnant vegetation in the easement comprises isolated patches of coolabah woodland within large tracts of cleared habitat.

In general, much of the remnant vegetation remaining within the Stage B corridor has been subject to tree clearing/thinning and is currently used for cattle grazing. The Stage B pipeline initially crosses a relatively flat plain that traverses relatively well vegetated areas associated with Mistake Creek in the east and the Belyando River in the west of this section. Both crossings are dominated by stands of coolabah and gidgee woodland (RE11.3.3) and Reid River box woodlands (RE11.3.10) with narrow strips of river red gum riparian forests (RE11.3.25) along the creek lines. Vegetation communities associated with the braided Belyando River system were previously mapped as comprising brigalow TEC vegetation communities (RE11.3.1), however, ground-truthing surveys observed gidgee dominated woodlands (RE11.3.3). Similar vegetation occurs on Mistake Creek.

The habitat between these areas has been heavily impacted by tree clearing and thinning. Approximately 9 km west of Mistake Creek a thin area mapped as potential brigalow TEC (RE11.4.8) was found to be solely gidgee woodland (RE11.4.6). Potential brigalow TEC (RE11.3.1) was confirmed as occurring approximately 6 km south-west of this area as also identified. A further 3.5 km west of this area is another patch of potential brigalow TEC (RE11.3.1). These areas have been avoided by diverting the pipeline into the Carmichael Rail Project corridor which has already been assessed by DotEE. The remaining remnant vegetation in the Stage B corridor (east of the Belyando River) comprises open forest dominated by gidgee, woodlands dominated by Reid River box, or mixed eucalypt communities.

West of the Moray-Bulliwallah Road, the Stage B pipeline and associated water offtake pipelines pass almost entirely through lands cleared for cattle grazing. Most this area is a flat plain dominated by buffel grass. Patches mapped as remnant grassland areas (RE11.4.11) were found to be heavily dominated by Buffel Grass with patchy regrowth brigalow. Nevertheless, these areas have remained as previously mapped.

The predicted impact of clearing remnant vegetation (based on ground-truthing flora surveys) within the NGWS footprint is provided in Attachment 15. These areas are based on the potential 30 m pipeline corridor. The Table details the ‘worst-case’ vegetation clearing footprint based on the current alignment which lies directly adjacent to property boundaries in some sections of the Project. The final alignment is still to be refined and is expected to be realigned and will reduce the final vegetation clearance footprint.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The topography associated with the NGWS is relatively flat, featuring long undulating plains. Topographic features in the Project area range between 160 m AHD to 280 m AHD. The proposed Stage A pipeline corridor traverses steeper undulating terrain between the approximate chainages of 25 km to 42 km. The maximum relief is where the Belyando Pipeline is adjacent to the Nairana National Park and there are two areas where construction will occur on slopes over 7%, which have been identified as areas of high erosion risk.

3.7 Describe the current condition of the environment relevant to the project area.

The Project occurs in an agricultural area primarily used for cattle grazing. As a result of historic and current grazing activities, much of the landscape has been cleared of woody vegetation and is dominated by introduced pasture. Vegetation remaining is associated with elevated rock areas, rivers, creeks and minor drainage lines. Disturbance to remnant vegetation has been minimised during the NGWS design phase. Where possible pipeline corridor selected utilises existing cleared tracks and easements. The pipeline corridor is set at a maximum required width of 30 m. Further details specifically on flora and fauna current conditions are presented in Section 3.1.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area.

There are no Commonwealth Heritage Places within the Project area within close proximity to the Project.

3.9 Describe any Indigenous heritage values relevant to the project area.

Adani have progressed and produced a CHMP in consultation with the Wangan and Jagalingou People, as well as the Jangga People. The CHMP nominates the mitigation measures required in the event of unexpected finds and or discovery of human remains. The CHMP commits to ensuring that comprehensive assessments are undertaken prior to commencement to Project activities.

Indigenous cultural heritage studies undertaken as part of the adjacent CCP have identified possible indigenous cultural heritage artefacts located within proximity of the utility infrastructure. The CCP (GHD 2012) literature suggests there is considerable evidence for a close association of discrete archaeological deposits with soaks and gilgais, which are common in the area. Potential impacts include disturbance or damage to unknown cultural sites and values during construction activities. Cultural heritage inspections will be undertaken to ensure duty of care under the ACH Act and identify and preserve any located artefacts within the construction footprint.

Given the nature of the cultural heritage agreements and management process that has been progressed by Adani, it is not anticipated that there will be any major impacts that will significantly impact on Indigenous heritage values surrounding the utility infrastructure.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area.

The NGWS will be located on land currently classified as freehold, leasehold and easement tenure. The tenure of land is predominately leasehold with a small number of properties held freehold. An easement will be secured over the pipeline corridor prior to operation.

3.11 Describe any existing or any proposed uses relevant to the project area.

There are no other current land uses known, proposed or reasonably foreseeable for the Project area other than the existing cattle grazing and supporting activities that occur over this landscape.

Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

Attachment 12 and 13 present a construction environmental management plan and a concept erosion and sediment control plan respectively.

Disturbance to remnant vegetation has been minimised during the NGWS design phase. Much of the study area has been cleared and is dominated by introduced pasture. Where possible pipeline corridors utilise existing cleared tracks and easements. Pipeline corridors are set at a maximum required width of 30 m.

Non-remnant habitat in the NGWS area is for the most part dominated by the introduced buffel grass, a species noted for increasing the intensity of bushfires compared to native grass species. For operational maintenance purposes the pipeline corridors will not be revegetated with woody vegetation. Pipelines will be revegetated with native grass species where they are found to occur adjacent to the cleared area. Pipelines will subsequently be monitored under a Rehabilitation Management Plan to ensure success of revegetation program.

Given the small amount of overall clearing of remnant vegetation required in an already highly fragmented landscape, the narrow extent of clearing for the NGWS, and post-construction vegetation rehabilitation of the pipeline corridors it is not considered likely that habitat connectivity for the identified MNES in the region will be impacted following construction.

Mitigation measures have been developed to minimise impacts associated with construction and operation of the Project. A construction environmental management plan (CEMP) has been prepared and has been included in Attachment 12 as supporting documentation and includes:

· Minimising the disturbance footprint to remnant vegetation, where feasible, during the detailed Project design phase

· Preclearance surveys to mark out and minimise extent of large tree disturbance where clearing is to be carried out in favoured koala habitat (riparian river red gum communities)

· Prevent or minimising disturbance from Project construction and operations to adjacent habitat, outside the Project area, including that suitable for Ornamental Snake. Vegetation outside the clearing area will be marked and cordoned off to protected from heavy machinery and other development-related disturbances and prevent unnecessary impacts.

· Pre-clearing surveys will be carried out by a qualified fauna spotter before any clearing of remnant vegetation. During the preclearance survey, large and small hollows that may provide shelter for fauna will be identified and marked. These hollows will then be saved (recovered) and used for habitat in non-disturbed areas in the dam and pipeline surrounds.

· The fauna spotter will be present during clearing activities to ensure no fauna are present prior to clearing. The fauna spotter catcher will be present to inspect gilgai habitat considered as habitat for ornamental snake. Fauna potentially captured during clearing will be identified, recorded and released to suitable nearby habitat.

· A speed limit will also be established on site to limit the incidence of fauna mortality.

· Implement weed control measures throughout construction and including post-construction (rehabilitation) monitoring and management

· Monitoring of feral populations or potential predators of the species during construction, and implementation of a control program if necessary

· Preparation of a site-specific Erosion and Sediment Control Plan for construction. This will aim to prevent or limit adverse runoff impacts affecting surrounding habitat.

· Targeted training and awareness for terrestrial ecology matters and responsibilities will be provided to all staff and contractors during site inductions. Ongoing training including the observance of (and compliance with) speed limits and reporting of onsite fauna observations and fauna mortality will be implemented.

· Detailed species management actions for Ornamental Snake during construction including the following:

  o Pre-clearing fauna spotter survey to identify individuals located on-site, and shift them into neighbouring areas prior to clearing

  o Where possible, undertake construction in the dry season when the species is dormant and prior to the known breeding season

  o Where trenching is a construction methodology, minimise trench open periods and ensure trenching left overnight during pipeline construction periods is left ramped at each end to allow nocturnal fauna to escape where it becomes entrapped. A fauna spotter will examine trenching in the morning prior to any works in order to remove any remaining fauna.

The above management strategies would be implemented during the detailed design, construction and operational phases of the Project and established within the Project EMP. The

Project EMP will incorporate subplans specifically to minimise impacts to Ornamental Snake habitat. Measures will focus on ameliorating threats to the species where possible and managing or enhancing suitable habitats.

The measures implemented above will reduce direct impact to fauna values including potential MNES identified with the Project area. Once implemented the significant residual impact to fauna populations in the Project area is considered low.

Rehabilitation

Following completion of works, the disturbed area will be reinstated and rehabilitated to the original ground levels. All temporary plant and equipment will be removed via the dedicated ingress and egress points. All waste material will be removed and disposed offsite. Topsoil will first be artificially reseeded with fast growing native grass species to bind and stabilise the soil. Cleared vegetation (logs, branches, etc.) will be distributed over the rehabilitated are to encourage the return of the ecology. In addition, native plant saplings, of the same species that occur in pre-vegetated areas, will be planted in the cleared areas, but in order to protect the pipeline from root damage, tress will not be permitted within 5 m of the pipeline centreline.

Weed control and monitoring throughout the first 12 months will be implemented to ensure successful regeneration. Revegetation will be carried out in consultation with the leaseholder and with DNRME to ensure the measures proposed are acceptable and have a high likelihood of success

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

It is not anticipated that there would be significant impact to the following MNES as a result of the Project:

· World Heritage values of a declared World Heritage property - No World Heritage Properties occur in or immediately adjacent to the proposed disturbance area

· National Heritage values of a National Heritage Place - No National Heritage Values occur in or immediately adjacent to the proposed disturbance area

· Declared Ramsar wetland - No Ramsar wetlands occur in or immediately adjacent to the proposed disturbance area

· Commonwealth marine area - No Commonwealth marine areas occur in or immediately adjacent to the proposed disturbance area

· Commonwealth land - No Commonwealth land occurs in or immediately adjacent to the proposed disturbance area.

No listed flora or TECs were identified within the NGWS footprint during floristic surveys for the

Project. Fauna surveys undertaken within the broader study area since 2007 have confirmed the presence of Squatter Pigeon (southern) (Vulnerable), Ornamental Snake (Vulnerable) and Black-throated Finch (Endangered) in the vicinity of the Project footprint. Koala (Vulnerable) has also been recorded within the wider area surrounding the NGWS Project.

Adani does not anticipate there will be significant impacts to listed migratory species. There is little habitat suitable for Migratory wetland bird species in or adjacent to the Project area. The Project has potential to increase the availability of habitat for these species through the expansion of the Belyando Junction Dam. Aerial species such as Fork-tailed Swift may occur over heavily disturbed areas and will not be impacted by activities associated with the Project.

Adani anticipates that under the Guidelines (refer pages 5-8 and 5-9 of Attachment 11) there may be temporary impacts to Ornamental Snake largely through clearing of suitable habitat during the construction period for the pipelines. This has been estimated to impact 24.9 ha of ‘important habitat’ in which the species has been found to occur (the western extent of Stage B) and an overall further 112.53 ha of potential habitat elsewhere in the Project footprint, this is based on the 30 m construction corridor. There may also be significant impacts to breeding activity for the species should construction works be carried out during the known breeding season (September to November). Impacts are expected to be temporary given vegetation regeneration along the alignment following construction. There will be no habitat fragmentation following completion of construction works. A minor track will be maintained along the alignment for pipeline maintenance purposes. Refer to proposed measures to reduce potential impacts in Section 4.1.

Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

No

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

Adani notes that the NGWS Project has triggered the significant impact referral threshold for the Ornamental Snake (*Denisonia maculata*). The assessment provided above in Section 2.4.1 and in the attached EPBC Act Review (refer to Attachment 8, 9, 10 and 11), concludes that there are potential impacts of up to 137.43 ha of what may be classed as 'important habitat' (under DotEE guidelines) for Ornamental Snake habitat during construction. However, the residual impacts to the habitat during the operational phase of the project are likely to be reduced to 45.8 ha following regeneration of the majority of the corridor.

Adani considers the impacts of the NGWS Project on Ornamental Snake are not significant given:

- The regional availability of suitable habitat for the species and the very minor proportion of this habitat the NGWS Project will impact

- There were no sightings of Ornamental Snake during targeted field surveys

- Avoidance, mitigation measures and rehabilitation will be undertaken during construction and operation to further reduce potential impacts.

As such, Adani considers the NGWS Project is not a controlled action under the EPBC Act.

Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

The Proponent (Adani Infrastructure Pty Ltd) has adhered to its regulatory responsibilities in association with its activities. The Proponent has not been the subject of any environmental legal proceedings that have resulted in fines or prosecution.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

Both Adani Infrastructure and the Australian parent companies not been subject to any proceedings under a Commonwealth, State or Territory law.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

See Attachment 6 and 7 for a copy of the Environmental Policy and ISO 14001 Certification respectively.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Yes

6.4.1 EPBC Act No and/or Name of Proposal.

Adani Infrastructure Pty Ltd (the Party taking the action) has previously referred the Whyalla Solar Farm Project under the EPBC Act (EPBC 2017/7910).

Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Australian Bureau of Statistics (ABS) (2017). Australian National Accounts, State Accounts 2016–17. Accessed 12/03/2018 at http://www.qgso.qld.gov.au/products/tables/gsp-factor-cost-industrycomponents/index.php. Blakers, M, Davies, SJJF, and Reilly, PN (eds.) (1984). The atlas of Australian birds. Royal Australasian Ornithologists Union, Melbourne University Press, Melbourne. Burdekin Dry Tropics Board (2005). Burdekin Dry Tropics Natural Resource Management Plan (2005-2010). Burrows DW (1999), An initial environmental assessment of water infrastructure options in the Burdekin catchment. Report prepared for the Department of Natural Resources (December 1999). CDM Smith (2013), Carmichael Coal Mine and Rail Project Supplementary Environmental Impact Statement. Volume 4, Appendix C5 –Quarry Applications. CDM Smith (2014), Moray Power Project - Environment Assessment Report, Appendix A – Moray Power Applications. Prepared for Adani Mining Pty Ltd (November 2014). CDM	The proponent has relied a range of published literature including published guides, peer review journal articles, project generated technical reports. As such, the proponent considers the reliability of the data used for this referral to be high.	Any uncertainties or uncertainties identified in the cited text should be considered in the context of the literature it is presented.

Reference Source	Reliability	Uncertainties
Smith (2015). Carmichael Pipeline Corridor Selection. Prepared for Adani Mining Pty Ltd (April 2015). CDM Smith (2017). North Galilee Water Scheme Property Map of Assessable Vegetation. CDM Smith. Prepared for Adani Infrastructure Pty Ltd (April 2017) Coventry, R.J., Stephensen, P.J and Webb, A. (1985) Chronology of landscape evolution and soil development in the upper Flinders River Area, Queensland, based on isotopic dating of Cenozoic basalt, Australian Journal of Earth Science, vol. 32, pp. 433-447 Crome, F and Shields, J (1992). The parrots and pigeons of Australia: The national photographic index of Australian wildlife. Angus and Robertson, Pymble. Debus, S (2012). The Birds of Prey of Australia: a Field Guide to Australian Raptors, Oxford University Press, Melbourne. Department of the Environment (DotE) (2013). Matters of National Environmental Significance: significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999, Commonwealth Department of the Environment, Canberra. Department of the Environment (DotE) (2014). EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory), Commonwealth of Australia.		

Reference Source	Reliability	Uncertainties
Department of the Environment and Energy (DotEE) (2017). Species Profile and Threats Database. Commonwealth Department of the Environment and Energy. http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl, Accessed January 11, 2017. Department of the Environment and Energy (DotEE) (2018). Denisonia maculata in Species Profile and threats Database, Department of the Environment, Canberra. http://www.environment.gov.au/sprat. Accessed March 2018. Department of the Environment, Water, Heritage and the Arts (DEWHA) (2009). Significant impact guidelines for the endangered black-throated finch (southern) (Peophila cincta cincta). Commonwealth Department of Sustainability, Environment, Water, Populations and Communities, Canberra. Department of Natural Resources Mines and Energy (2015). Water Monitoring Information Portal. Queensland Government. https://www.qld.gov.au/environment/water/quality/monitoring Dique, DS, Preece, HJ, Thompson, J and Villiers DL (2004). ‘Determining the distribution of a regional koala population in south-east Queensland for conservation management.’ Wildlife Research, vol. 31, pp. 109-117. Ehmann, H (1992). Encyclopaedia of Australian Animals: Reptiles, Angus and Robertson, Sydney. Frith, HJ (1982). Pigeons and doves of Australia. Rigby, Adelaide.		

Reference Source	Reliability	Uncertainties

GHD (2012). Mine Technical Report: Terrestrial Ecology, Carmichael Coal Mine and Rail Project. Prepared for Adani Mining Pty Ltd (November 2012). GHD (2013). Report for Offsite Infrastructure Ecological Assessment. Prepared for Adani Mining Pty Ltd (July 2013). Higgins, PJ (ed.) (1999). Handbook of Australian, New Zealand and Antarctic birds, Vol. 4, Parrots to dollarbird. Oxford University Press, Melbourne. Higgins, PJ and Davies, SJJF (eds.) (1996). Handbook of Australian, New Zealand and Antarctic birds, Vol. 3, Snipe to pigeons. Oxford University Press, Melbourne. Higgins, PJ, Peter, JM and Cowling, SJ (eds.) (2006). Handbook of Australian, New Zealand and Antarctic birds Vol. 7, Boatbills to starlings, Part B, Dunnock to starlings. Oxford University Press, Melbourne. Hill BM and Ward SJ (2010). National Recovery Plan for the Northern Quoll Dasyurus hallucatus. Department of Natural Resources, Environment, The Arts and Sport, Darwin. Hume, ID, and Esson, C (1993). ‘Nutrients, antinutrients and leaf selection by captive koalas (Phascolarctos cinereus).’ Australian Journal of Zoology, vol. 41, pp. 379–392. Jacobs (2015). Carmichael Coal Mine and Rail Project, Moray-Carmichael Road Environmental Assessment Report. Prepared for Adani Mining Pty Ltd (February 2015).

Reference Source	Reliability	Uncertainties

Marchant, S and Higgins, PJ (eds.) (1990). Handbook of Australian, New Zealand and Antarctic birds, Vol 1, Ratites to Ducks, Part B Australian pelican to ducks. Oxford University Press, Melbourne. Martin, RW, Handasyde, KA and Krockenberger, A (2008).'Koala.' In: S Van Dyck and R Strahan (eds.), The mammals of Australia. 3rd edn. Reed New Holland: Sydney. pp. 198–201. Melzer A (2012). 'Ornamental Snake.' In: Queensland Threatened Animals. Edited by: Curtis, L.K., Dennis, A.J., McDonald, K.R., Kyne, P. M. and Debus, S.J.S. CSIRO Publishing, Collingwood. Moore, BD and Foley, WJ (2000). 'A review of feeding and diet selection in koalas (Phascolarctos cinereus).' Australian Journal of Zoology, vol. 48, pp. 317-333. Neldner, V.J., Wilson, B.A., Thompson, E.J. and Dillewaard, H.A. (2012). Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Version 3.2. Updated August 2012. Queensland Herbarium, Queensland Department of Science, Information Technology, Innovation and the Arts, Brisbane. NSW NPWS (2003). Threatened species of the New England Tablelands and north-west slopes of New South Wales. NSW Parks and Wildlife Service, Coffs Harbour. North Queensland (NQ) Dry Tropics (2015). Our Region.

Reference Source	Reliability	Uncertainties

Accessed 17/06/2015 at http://www.nqdrytropics.com.au/about-the-region/. Office of State Revenue (2015). Royalty Statistics. Accessed 12/03/2018 at https://publications.qld.gov.au/dataset/royalty-statistics. Pahl, LI, and Hume, ID (1990). 'Preferences for Eucalyptus species of the New England Tablelands and initial development of an artificial diet for Koalas.' In: AK Lee, KA Handasyde and GD Sanson (eds.), Biology of the Koala. Surrey Beatty and Sons, Sydney. pp. 123–128. Reis, T (2012). 'Squatter Pigeon' In: Queensland Threatened Animals. Curtis, LK, Dennis, AJ, McDonald, KR, Kyne, PM and Debus, SJS (eds.). CSIRO Publishing. Saunders Havill (2012). Carmichael Coal Rail Project Separable Proportion 1 (SP1). Prepared for Adani Mining Pty Ltd (July 2012). SEWPaC (2011). Draft referral guidelines for the nationally listed Brigalow Belt reptiles. Commonwealth Department of Sustainability, Environment, Water, Populations and Communities, Canberra. Squatter Pigeon Workshop (2011). Proceedings from the workshop for the Squatter Pigeon (southern). 14-15 December 2011. Toowoomba Office of the Queensland Parks and Wildlife Service. Threatened Species Scientific Committee (TSSC) (2014). Approved Conservation Advice for Denisonia maculata (Ornamental Snake).

Reference Source	Reliability	Uncertainties
Commonwealth Department of Sustainability, Environment, Water, Populations and Communities, Canberra. Wilson, S. and Swan, G (2008). A Complete Guide to Reptiles of Australia, New Holland Publishers Australia Pty Ltd, Sydney. Woinarski, JCZ and Ash, AJ (2002). ‘Responses of vertebrates to pastoralism, military land use and landscape position in an Australian tropical savanna.’ Austral Ecology, vol. 27, pp. 311-323.		

Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

The construction and operation of all mining projects, large and small, require a secure and reliable water supply. The CCP requires offsite water supply infrastructure for the extraction, storage and delivery of water for the operation phase as there is insufficient onsite water available to meet the total demand.

Water is a major component in the production of coal for the operational phase of mining. Coal is Queensland's largest export industry and mining industries are the cornerstones of the State's economy. Studies in 2016 to 2017 showed that the mining sector directly contributed $31.3 billion toward Queensland's gross state product (Australian Bureau of Statistics 2018), equating to 10.48 percent of the state's total economic output for that year, and coal supplied approximately $3.4 billion in royalties to the State in 2016-2017 (Office State Revenue 2018).

The purpose of the NGWS is to support development of the CCP and associated infrastructure throughout the operational phase of the project. In the longer term, there is potential to supply water to other resource projects in the northern Galilee Basin. Adani has sought and received the flood harvesting licence under the Water Act 2000 (as granted by the Queensland Government) which allows for the extraction of up to 12.5 GL of water per year from river flows above 2,592 megalitres per day. The NGWS Project allows that licence to be effectively used and water delivered to the CCP. This extraction is from the Strategic Reserve of unallocated water in Sub-catchment E of the Burdekin Basin (Suttor River) (available at: https://www.legislation.qld.gov.au/view/pdf/2017-09-02/sl-2007-0189).

Adani has applied for and obtained a water licence to extract from the Strategic Reserve Allocation (i.e. identified reserves of unallocated water in the basin). At the time of establishing the reserve volumes in the Burdekin Basin Resource Operations Plan 2009, there was 150 GL available for allocation across the Sub-catchment E general and strategic reserves. The water licence grants a capped allocation determined by impact assessment against Environmental Flow Objectives (EFOs) and Water Allocation Security Objectives (WASOs). The criteria establish the requirements for adequate environmental flows and water allocation for potable and agricultural purposes.

The NGWS Project infrastructure will allow for this harvested water to be stored and transported to the CCP for use.

No Development Alternative

The CCP requires water to service the construction and operational phases. Not developing the

NGWS was not considered an option as without the NGWS Project, the water extraction licence would be sterilised. Water harvested would in effect be stored without an efficient operational transport mechanism to the CCP mine. The NGWS has considered several water sources and components in order to service the CCP and surrounding uses in the Project area. The consequences of not proceeding far outweigh the consequences for proceeding, including both economic, social and infrastructure benefits for the region and State.

External Water Supply Alternatives

Given the rural nature of the northern Galilee Basin, there are limited existing water supplies in the region. Landholders in the area predominantly use groundwater bores and/or surface water harvesting. The closest existing large-scale water supply is the Burdekin Falls Dam, located approximately 150 km to the north-east of the CCP. Alternative water source options were considered in the early planning stages of a water scheme. A detailed analysis has been undertaken by Adani with input from recognised firms including GHD, Hyder, Calibre and Engeny, as well as CDM Smith. In September 2014, CDM Smith was engaged by Adani to revise and refine the water supply strategy to ensure a secure and reliable source of water can be delivered within the project schedule of the CCP. This review considered the following water sources:

· Local flood harvesting dam (new dam on the Moray Downs property taking water from the Belyando River – leasehold held by Adani)

· Local flood harvesting dam (existing and/or upgraded dam on the Disney property taking water from Mistake Creek)

· Construction water bores (use of existing bores and supplementing them with additional bores adjacent to the mining lease area)

· Regional flood harvesting dams (existing and upgraded dams on the Belyando Junction Property taking water from the Suttor River downstream of the confluence with the Belyando River)

· Accessing water from the Burdekin Falls dam

· Accessing water from the Burdekin to Moranbah Pipeline.

It is not feasible to source water from other locations given the remote location of the CCP. The combined option of the regional flood harvesting dams and pipelines (Stage A and B) were selected by Adani and CDM Smith to be the preferred NGWS scheme to support the CCP and other potential proposed projects.

NGWS Options Assessment

Extraction Points

Several extraction points on Belyando River, Suttor River and Mistake Creek were considered.

Integrated Quantity Quality Model (IQQM) modelling was undertaken to identify the most reliable source which maintained compliance with the Water Resources (Burdekin Basin) Plan (WRP).

The Stage A Belyando Junction dam flood harvesting scheme considered various extraction points including:

· The Belyando River anabranch (within closer proximity to the Belyando Junction Dam)

· Two locations on the Suttor River below the confluence with the Belyando River.

The Belyando River anabranch extraction point was unsuitable as the modelled reliability analysis showed that harvesting from the anabranch does not provide favourable or reliable 95-percentile or 98-percentile results. Model results for the Suttor River indicated; however, that this option is preferred as it provides a suitably reliable yield compared to flood harvesting from the anabranch.

Pipeline Route Options

CDM Smith (2015) has undertaken a desktop assessment and multi-criteria analysis (MCA) to identify pipeline corridors to connect the chosen water sources to the CCP and northern Galilee Basin resources area. The objectives of this assessment were to:

· Identify a route that is highly acceptable

· Minimise the disturbed areas by following existing road and/or rail corridors and other cleared corridors

· Avoid Matters of National Environmental Significance (MNES) and other environmentally sensitive areas.

CDM Smith undertook a corridor selection assessment of several route options for each of Stage A and B which included field validation work to confirm that the preferred corridors selected from the desktop analysis were based on suitably reliable data.

While other options were considered, the Stage B alignment was selected to follow the NGBR Project corridor to minimise environmental impact and encumbrances on properties and road infrastructure.

The proposed action does not consider any alternative locations, timeframes or activities as part of this referred action as an alternative location, timeframe or other activities do not present better water provision options for the CCP, or a known reduced impact on MNES.

8.1 Select the relevant alternatives related to your proposed action.

8.27 Do you have another alternative?

No

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

Head of Env & Sustainability

9.2.2 First Name

Hamish

9.2.3 Last Name

Manzi

9.2.4 E-mail

reception.australia@adani.com.au

9.2.5 Postal Address

GPO Box 2569
Brisbane QLD 4001
Australia

9.2.6 ABN/ACN

ABN

16606764827 - ADANI INFRASTRUCTURE PTY LTD

9.2.7 Organisation Telephone

07 3223 4800

9.2.8 Organisation E-mail

reception.australia@adani.com.au

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:..... Date: .....

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Person proposing the action - Declaration

I, HAMISH MANZI, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature:..... Date: 18/04/2018

I, _____, the person proposing the action, consent to the designation of _____ as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature:..... Date: .....

9.3 Is the Proposed Designated Proponent an Organisation or Individual?

Organisation

9.5 Organisation

9.5.1 Job Title

Head of Environment & Sustainability

9.5.2 First Name

Hamish

9.5.3 Last Name

Manzi

9.5.4 E-mail

reception.australia@adani.com.au

9.5.5 Postal Address

GPO Box 2569
Brisbane QLD 4001
Australia

9.5.6 ABN/ACN

ABN

16606764827 - ADANI INFRASTRUCTURE PTY LTD

9.5.7 Organisation Telephone

07 3223 4800

9.5.8 Organisation E-mail

reception.australia@adani.com.au

Proposed designated proponent - Declaration

I, HAMISH MANZI ON BEHALF OF ADANI INFRASTRUCTURE PTY LTD, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature:..... Date: 18/04/2018

9.6 Is the Referring Party an Organisation or Individual?

Organisation

9.8 Organisation

9.8.1 Job Title

Managing Principal Environmental Services

9.8.2 First Name

Mark

9.8.3 Last Name

Imber

9.8.4 E-mail

imberms@cdmsmith.com

9.8.5 Postal Address

Level 4

51 Albert Street
Fortitude Valley QLD 4006
Australia

9.8.6 ABN/ACN

ABN

88152082936 - CDM SMITH AUSTRALIA PTY LTD

9.8.7 Organisation Telephone

07 3828 6900

9.8.8 Organisation E-mail

imberms@cdmsmith.com

Referring Party - Declaration

I, Mark Imber, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature:..... Date: 17 Apr 18

Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. 2.1-2.3_2.5-2_mnes_no_impact_summary.pdf
2. attachment_b_fig_1_regional_location.pdf
3. attachment_b_fig_2_os_location_and_records.pdf
4. attachment_b_fig_3_os_potential_habitat.pdf
5. attachment_b_fig_4_epbc_referral_boundary_figures.pdf
6. attachment_c_env_certification.pdf
7. attachment_c_env_policy.pdf
8. attachment_d_ngws_epbc_review_final_16042018_appendices.pdf
9. attachment_d_ngws_epbc_review_final_16042018_report1-20.pdf
10. attachment_d_ngws_epbc_review_final_16042018_report21-47.pdf
11. attachment_d_ngws_epbc_review_final_16042018_report48-72.pdf
12. attachment_eccpwat-cdmsmith-ze051-rpt-en-0189_final_cemp_rev_2-28032018.pdf
13. attachment_f_ccpwat-cdmsmith-ze051-rpt-en-0190_cescp_rev_2_28032018.pdf
14. attachment_g_epbc_act_referral_area.zip
15. estimated_remnant_vegetation_impacted.pdf
16. reduce_bjd_-_da_for_mcu_approval_-_adani_infra_-_150811.pdf
17. tec_and_listed_species_summary_of_impact_assessment.pdf