

## **22. CONCLUSION**

This chapter summarises the main findings of the Supplementary Report to the Surat Gas Project Environmental Impact Statement (SREIS). The report has been prepared to respond to the request by the Chief Executive of the Department of Environment and Heritage Protection (EHP) to provide additional information, to address issues raised in submissions on the Surat Gas Project Environmental Impact Statement (EIS) (Coffey Environments, 2012b) and to reflect refinements and updates to the project description. The impacts and mitigation measures as presented in the EIS have also been reviewed.

### **22.1 The SREIS Process**

Details of submissions received on the EIS and consultation carried out by Arrow, changes to the project description and the additional technical studies completed to inform the SREIS are summarised below.

#### **22.1.1 Submissions**

The EIS was placed on public exhibition from 16 March 2012 to 14 June 2012. The Chief Executive of EHP received 167 submissions relating to the EIS from government agencies and the public during this time. Detailed comments on the EIS were also received from the Department of Environment and Resource Management (DERM), now EHP and the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC).

Arrow has considered the issues that were raised in the submissions and has provided detailed responses to approximately 2,300 issues in Part B of the SREIS. Responses to the DERM and SEWPaC comments are also included in Part B. In some cases, the information requested from the submitter was available in the EIS and the detailed technical studies in its appendices, and a reference to that information has been given. In other instances, further explanation has been provided on specific points where clarification was requested. Additional information and technical studies completed as part of the SREIS process have assisted to address some issues. These studies are referenced in the responses to submissions and are contained in the appendices of this SREIS with the key findings of each study presented in Part A.

Arrow has considered each submission and has provided a response to all issues raised in submissions made on the EIS.

#### **22.1.2 Consultation Activities**

During the public exhibition period for the EIS, Arrow continued to consult with stakeholders, and held community-wide consultation sessions. These sessions were supported by a communications program aimed at increasing community member and stakeholder awareness of the consultation activities and where they could find information about the EIS process.

Arrow is committed to ongoing engagement with stakeholders and the community throughout the EIS process and further stages of the project. Arrow will continue to operate the Community Information Centre in Dalby and will convene bi-monthly meetings of its Surat Community Reference Group and the Arrow Intensively Farmed Land Committee. Arrow will also continue to seek one-on-one meetings with landowners and other stakeholders and further meetings of the Area Wide Planning group.

### 22.1.3 Project Updates

Since publication of the EIS in March 2012, the basis of design for the project has further refined. A new development concept based on drainage areas has improved the potential recovery of the gas resource and optimised the location, arrangement and sequencing of infrastructure required to extract and process coal seam gas. A revised development sequence is proposed, based on exploration results and field development planning for the Surat Basin. The phasing of development will continue to mature and evolve through landowner consultation, and as exploration improves Arrow's understanding of the resource, and field development design optimises the location, arrangement and sequencing of infrastructure required to maximise gas recovery.

The main changes to the project description since the EIS was submitted include:

- The relinquishment of tenure blocks within exploration tenements, significantly reducing the size of the project development area from approximately 8,600 km<sup>2</sup> to 6,100 km<sup>2</sup>.
- The introduction of 11 'drainage areas' to replace the 5 development regions described in the EIS. The 11 drainage areas take advantage of natural topography encouraging the flow of gas and water to natural low points.
- A higher sustained gas production rate of 1,215 TJ/d compared to 1,050 TJ/d with an increased proportion of production going to export.
- A reduced number of production wells (from approximately 7,500 to 6,500).
- The drilling of deviated wells (in addition to vertical wells) allowing for up to 12 wells at a specific surface location (multi-well pad).
- A change from six to eight central gas processing facilities (CGPFs), two with water treatment facilities (and a change from six to no integrated processing facilities). Identification of properties (purchased and/or leased by Arrow) for the location of four CGPFs.
- Refinement of Arrow's forecast coal seam gas water production profile and revision of the Coal Seam Gas Water and Salt Management Strategy.
- Inclusion of operational discharges to watercourses.
- Adoption of the preferred power option as connection to Queensland's electricity transmission grid. Temporary generation of power on site has been maintained as an option.
- An increase in the width of high-pressure gas pipeline construction right of ways from 25 to 30 m to a maximum of 40 m.
- An increase in the peak construction workforce from 710 to 2,300, and a decrease in the peak operations workforce from 460 to 400.
- An increase in the number of temporary workers accommodation facilities (TWAFs) from five to approximately six and an increase in capacity of each TWAF (from 200 to 350 personnel to between 450 and 1,050 personnel). The location of one TWAF has been identified, with remaining TWAFs to be located in the same property as a CGPF.

These project changes were reviewed by relevant technical specialists to determine whether the impacts as assessed in the EIS captured the full range of potential impacts of the project and whether the proposed mitigation and management measures were still adequate.

#### 22.1.4 Additional Studies

Arrow commissioned further technical studies to address aspects of the changes made to the project description and to provide additional information to inform the review of impacts as assessed in the EIS. In some cases, the studies responded to specific issues raised in submissions and/or the comments received from DERM and SEWPaC.

Further technical studies were carried out as follows:

- Remodelling of air quality impacts to take account of changes to ground-level emissions from the temporary power supply option, the introduction of multi-well pads and the revised flaring rates.
- Estimation of greenhouse gas emissions to take account of changes to the number CGPFs and production wells, preferred power supply option (and demand scheduling), revised methane gas composition, and increased sustained gas production.
- An update on agricultural production data and analysis of trends and current and emerging factors influencing the agricultural industry in the Darling Downs.
- Remodelling of potential project impacts on groundwater drawdown to account for the revised coal seam gas water production estimates, presentation of new information related to groundwater-dependent ecosystems and review of management and mitigation measures.
- Assessment of the potential impacts on the geomorphology, hydrology, water quality and flows for watercourses traversing or adjacent to properties proposed for the siting of project facilities and infrastructure, including the receiving environment for potential operational discharges. An assessment of overland flow and flooding was also undertaken to identify areas within each property that are vulnerable to flooding.
- Additional aquatic ecology studies including field surveys of Arrow owned and/or leased properties identified for development.
- Additional terrestrial ecology studies including field surveys of Arrow owned and/or leased properties identified for development and updates to vegetation mapping for the project development area.
- Strategic modelling of predicted traffic volumes from project-related traffic and case studies including pavement impact, fitness for use, and intersection assessments.
- Remodelling of noise impacts to take account of changes to projected noise levels from the CGPFs (and co-located water treatment facilities) and the multi well pads.
- A review of potential social impacts taking account of the most recent census and other data and increases to the peak construction workforce numbers.
- Review of the preliminary hazards and risks associated with changes to the layout of the CGPFs and the introduction of multi-well pads.

These technical studies are included in the appendices to the SREIS and the main findings are presented in Part A of the SREIS.

## **22.2 Key Findings of the SREIS**

Many of the environmental aspects assessed in the EIS did not require review or reassessment as the project changes did not materially alter the conclusions of the EIS. These include climatic adaptation, geology, landform and soils, landscape and visual amenity, Indigenous and non-Indigenous cultural heritage, economics and waste management. The impacts and management measures for these aspects remain as presented in the EIS. Further information and clarifications have been provided on these aspects in Part B through the responses to issues raised in submissions.

The technical studies validated the assessments presented in the EIS with the findings used to review and update management measures and commitments where required. This section summarises the findings of the technical studies and any additional management measures proposed to address project impacts.

### **22.2.1 Validation of Environmental Impacts**

The key findings of the technical studies and the revised or new management measures are described below.

#### **Air Quality**

The predicted air pollutant concentrations in the project development area as a result of project activities are less than predicted in the EIS. Vehicle emissions of NO<sub>x</sub> are expected to increase, however the reduced numbers of production wells and CGPFs has seen a reduction in overall NO<sub>x</sub> emission rates and therefore a reduction in NO<sub>x</sub> and O<sub>3</sub> across the region. Localised air emissions from the operation of CGPFs (including flaring and temporary power generation) and the temporary power generation at multi-well pads are lower than the EPP (Air) objective for ground-level NO<sub>2</sub> concentration. Following connection to the Queensland electricity grid, the main sources of air pollutant emissions during operations will be from traffic, flaring and potentially some wells which may retain power generation equipment at the wellhead. These sources of air emissions are relatively minor. Pollutants other than NO<sub>2</sub> will be emitted in low quantities against a low background environment and no impacts from these pollutants are predicted on a regional or local scale.

The assessment with revised project emissions data demonstrated that the impacts are less than those predicted in the air quality impact assessment completed for the EIS and show that depending on equipment and site selection the air quality objectives can be met. The predicted impacts and the commitments presented in the EIS remain valid.

#### **Greenhouse Gas Emissions**

The project description updates have resulted in a reduced estimate of cumulative Scope 1, 2 and 3 greenhouse gas emissions over the 35-year project life compared with those reported in the EIS. Overall, the estimated emissions have decreased by 21% when compared with the EIS estimate, largely due to improved understanding of the power demand profile over the life of the project. The connection to the Queensland electricity grid lowers estimates for Scope 1 emissions and results in higher estimates for Scope 2 emissions. The commitments detailed in the EIS remain appropriate for managing greenhouse gas emissions from the project.

#### **Agriculture**

The project impacts on agricultural productivity discussed in the EIS remain relevant. The overall area dedicated to agriculture in both the Darling Downs region and in Queensland overall has reduced although agricultural production and the value of commodities has recorded strong

growth in recent years. Efficiency and productivity gains in the region have led to this growth and have offset the impacts of climate variability and encroachment of the resources sector.

Coexistence (integration with farming operations) continues to be the objective of Arrow's project development planning. Arrow has made 12 coexistence commitments to operate by and has continued with initiatives to manage the impacts of coal seam gas activities on agriculture. Arrow is working with various groups, principally the Arrow Intensively Farmed Land Committee, to work through the issues of most concern to landowners and to facilitate opportunities for coexistence on intensively farmed land. In particular, Arrow has initiated an Area Wide Planning process, is demonstrating the integration of coal seam gas activities with agriculture at its Theten property, and is developing a land access protocol. Arrow is also working on the basis for compensation to landholders according to a number of factors such as land value, land use, added value, and disturbance payments.

## **Groundwater**

Further modelling has been undertaken to assess potential impacts on groundwater from the revised coal seam gas water production profile. Arrow has used the Office of Groundwater Impact Assessment (OGIA) Surat Cumulative Management Area (CMA) model structure (which incorporates a detailed sub-model of the Condamine Alluvium groundwater model) for re-assessment of the groundwater impacts of the current project development plan. The OGIA Surat CMA groundwater model represents the most suitable method for modelling groundwater impacts available at this time. Factors specific to the Surat Gas Project have been incorporated into the model and include specific extraction scenarios and a revised coal seam gas water production profile.

Updated information has been obtained on the internal structure and hydrogeology of the Condamine Alluvium, and the level of connectivity between the Condamine Alluvium and the underlying Walloon Coal Measures. New information has also allowed a more detailed description of groundwater-dependent ecosystems, including springs, watercourse springs, groundwater-fed watercourses and lakes, and groundwater-dependent vegetation.

Aspects of Arrow's updated Coal Seam Gas Water and Salt Management Strategy were also taken into account in the assessment.

The modelling results show an overall decrease in the predicted groundwater drawdown levels (in response to Arrow's revised development plan) compared to those predicted in the EIS. The drawdowns predicted for the Walloon Coal Measures have increased compared to the drawdown levels presented in the EIS, however they occur over smaller, and more localised areas. Most impacts in aquifers above and below the Walloon Coal Measures are also localised and there is variation in where these impacts occur across the project development area. Overall, potential impacts and mitigation measures identified in the EIS remain valid.

Arrow is committed to offsetting its component of modelled likely flux of groundwater from the Condamine Alluvium as a result of coal seam gas water extraction from the Walloon Coal Measures through a process of 'virtual injection' in the area of greatest predicted drawdown.

Arrow has also committed to provide data to the OGIA as required under the Underground Water Impact Report (UWIR) for the Surat CMA that contributes to the understanding of cumulative impacts on the groundwater systems of the Surat Basin. Arrow will implement other requirements of the current UWIR (as the responsible tenure holder) and relevant regulatory obligations as part of its ongoing management of groundwater impacts.

## Surface Water

The potential impacts of project activities on surface water values presented in the EIS largely remain valid for watercourses proposed for discharge of coal seam gas water. Additional impacts and mitigation measures respond to the introduction of operational discharges to Bottle Tree Creek and the Condamine River. Both these watercourses exhibit a variable flow regime with extendable periods of low or 'cease to flow' events.

Hydraulic modelling has shown that changes in watercourse geomorphology are unlikely for discharge volumes up to 86 ML/d in Bottle Tree Creek and 130 ML/d in the Condamine River, provided the discharge rates are gradually increased and decreased. A preliminary environmental flows assessment has indicated that a deviation of up to 20% from the existing flow regimes is possible without causing adverse impacts to geomorphology, hydrology, water quality, aquatic ecology and terrestrial ecology (i.e. riparian vegetation).

Water quality of watercourses in the receiving environment for potential discharges is typical of surface waters found in the Balonne River and Condamine River sub-basins and will not be significantly impacted as a result of operational discharges. Water quality samples collected as part of the SREIS supported the interim water quality guidelines developed for the project and presented in the EIS. Coal seam gas water will be treated and balanced to meet the interim water quality guideline values for beneficial uses, including crop irrigation, stock watering, drinking water and ecosystem function. A discharge strategy will be developed, informed by an aquatic ecology monitoring program and water quality monitoring results which will inform site-specific water quality guidelines. The site-specific guidelines will take into account of the different flow conditions in the watercourses and existing variations in water quality.

Flood modelling has shown that substantial areas within the five properties remain flood free during the modelled 1-in-100-year ARI flood event and are capable of accommodating the footprint required for development of facilities. Overland flow paths are unlikely to be affected due to the availability of flood-free land.

Additional management and mitigation measures have been proposed to address potential direct and indirect impacts of coal seam gas water discharges, and to guide the siting and design of discharge points and infrastructure constructed on floodplains. Other commitments presented in the EIS remain valid.

## Aquatic Ecology

The aquatic ecology values in the project development area catchments have been further characterised, including those on the five Arrow owned and/or leased properties identified for development. The values and the impacts on these values associated with project activities are consistent with those presented in the EIS, and the mitigation measures remain valid.

The prevailing hydrologic conditions of the watercourses in the area have naturally influenced assemblages of aquatic flora and fauna. Where discharges of treated coal seam gas water are proposed, these assemblages are typically low in diversity and seasonally variable. Most species recorded during the aquatic ecology surveys have broad habitat requirements and are generally tolerant of a wide range of hydrological, water quality and habitat conditions.

During periods of high-flow events, the potential impact on aquatic ecosystems of discharging treated and untreated coal seam gas water was determined to be low; and during periods of low flow or cease to flow conditions was high. Additional management options (to be included in a discharge strategy) will aim to reduce the impacts on aquatic ecology values during low flow conditions. These measures will consider discharge volumes, flows and duration, and water

quality. Aquatic ecology and water quality monitoring requirements at the watercourses where discharges occur will be included in the strategy, including periodic inspections for geomorphic and ecological changes.

### **Terrestrial Ecology**

The terrestrial ecology values of the project development area and the impacts to these values are as presented in the EIS. The sensitivity of the terrestrial ecology values has been refined based on a review of updated data and information, including higher resolution mapping of vegetation communities and habitat. Habitat requirements for listed species have been classified and mapped as 'core habitat known', 'core habitat possible' and 'general habitat'. The findings of the field surveys on properties identified for development have confirmed the presence or possible presence of communities, populations and individuals of listed species.

Habitat mapping and additional updated information on individual listed species will inform the requirements for ecological surveys prior to siting of infrastructure on properties, and for preconstruction clearance surveys to be carried out prior to construction. The preliminary constraints mapping planning tool presented in the EIS will continue to be updated to reflect new information and used to inform site and route selection.

The mitigation measures presented in the EIS will be effective in protecting the terrestrial ecology values. Offsets for unavoidable impacts on listed ecological communities and species (and their habitat) will be provided in accordance with relevant Queensland and Australian government legislation and policies.

### **Roads and Transport**

Updated data was collected on existing (2011) traffic conditions on the former Darling Downs region road network and the data is generally consistent with that presented in the EIS. This information was used to determine the potential impacts that project-generated traffic would have on the existing road network through updated strategic traffic modelling.

The strategic traffic modelling identified an increase in the estimated total project vehicle kilometres travelled when compared to the EIS. The modelling assumed a 3% traffic growth rate over the long-term as the total increase in traffic from developments in the region and is consistent with the range presented in the EIS (2% to 8%). Changes to the project description have resulted in increased traffic demand along the Toowoomba-Cecil Plains Road in particular, although the net increase in daily traffic volumes on individual state-controlled roads is below the threshold for significant impacts set by the Department of Transport and Main Roads (TMR).

Overall, the traffic assessment builds on the studies undertaken for the EIS and verifies the appropriateness and effectiveness of the planned management strategies. Case studies (including fitness for use, intersection and pavement impact assessments) focused on roads in the vicinity of the locations of the five properties identified for development. The studies have confirmed that the management strategies presented in the EIS will mitigate significant impacts to the same or a higher level than that required under the Queensland Government's Guidelines for Assessment of Road Impacts of Development (GARID).

A logistics plan and road use management plans will be developed, in consultation with local councils and TMR, to manage the increased traffic volumes and road safety issues associated with the project. Arrow will enter into infrastructure agreements with TMR and councils following the development of road use management plans.

## **Noise and Vibration**

Modelling of the updates to the project description result in predicted construction and decommissioning noise levels consistent with those presented in the EIS. Predicted vibration impacts presented in the EIS remain valid for project construction and operation and are predicted to be below the threshold of human detection at distances greater than 100 m from project activities.

Predicted noise levels associated with the operation of the maximum sized multi-well pads (12 wells) for both permanent (grid power) and temporary (during construction) power scenarios were higher than those reported in the EIS for the single wells. Under the grid power scenario, the long-term night-time noise criterion will be achieved at separation distances of 400 m without attenuation, compared to 200 m for single wells in the EIS. Under the temporary power scenario, noise levels are expected to meet this criterion at distances of 400 m or greater for a multi-well pad with 12 well heads, with implementation of typical attenuation measures such as those presented in the EIS.

Noise modelling of the CGPF operation with the permanent and temporary power scenarios indicates that operational noise levels can achieve the long-term night-time noise criterion of 28 dB(A) at distances of 1.5 km or greater with acoustic treatment. Siting constraints, such as distances to sensitive receptors, will determine the need for further acoustic treatment.

Operational noise levels are generally consistent with those reported in the EIS. The updated modelling shows that the long-term night-time noise criteria can be achieved 1.5 km from the facility which can be reduced through varying levels of acoustic treatment. The location of the facilities on Arrow owned and/or leased properties will determine the extent to which the noise contours can be contained within the property, thereby reducing the potential for nuisance noise on adjacent properties.

## **Hazard and Risks**

No new hazards or risks were identified as a consequence of the project description changes and no changes are required to the residual risk ratings presented in the EIS. The introduction of multi-well pads required some updates to the hazard scenarios, with additional control measures identified to manage these hazards and the associated risks. The typical controls outlined in the EIS otherwise remain appropriate.

The risk contours for the multi-well pad show that the risks are consistent with the single well design presented in the EIS. The updated fatality risk contours for the CGPF show a reduced risk, with the risk contours being largely contained within the boundary of the site. This reduced risk has meant that the corresponding safety buffers have also reduced.

Overall, only minor changes have occurred to the hazards and risks identified in the preliminary hazard and risk assessment resulting from the project description changes with implementation of the identified controls and buffers. Further detailed quantitative risk assessments and safety risk studies will be undertaken for the project during the front-end engineering design phase.

### **22.2.2 Validation of Social Impacts**

The review of updates to the project description has found that overall the changes will lead to some minor variations in the potential impacts identified in the social impact assessment completed for the EIS.

Of note is the increase in the peak construction workforce and the changes to key demographic indicators such as population growth, the housing market and an increase in the number of

people identifying as Indigenous. As a result, population is expected to increase in excess of organic growth (a new impact), and there is an increased likelihood of local employment opportunities and local expenditure on goods and services being generated by the project. Overall, one new social impact was identified and two changes to the level of impacts predicted in the EIS are expected to result in an increased likelihood of positive social impacts occurring.

Arrow has included additional actions in the updated draft social impact management plan to strengthen the existing commitments to managing social impacts. These actions respond to the identified impacts and capture further initiatives that Arrow has made in the area of social performance since the EIS was finalised. With these additional actions in place, the social impacts were found to be consistent with those presented in the EIS.

### **22.2.3 Validation of Impacts on Matters of National Environmental Significance**

The implementation of Arrow's avoidance, mitigation and management measures will avoid adverse impacts from project activities, or reduce the severity of impacts, on MNES species and communities in the project development area.

The first preference in site and route selection is to avoid known habitat for MNES. Two critically endangered ecological communities of 'extremely high' sensitivity will be avoided ('Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland' and 'White box-yellow box- Blakely's red gum grassy woodland and derived native grassland').

Residual impacts for each MNES have been assessed on the basis that avoidance may not always be possible, as the locations of infrastructure across the project development area are not currently known. If not avoided, 10 species of extremely high sensitivity retain high to major residual impacts, even with the application of other management and mitigation measures. Many of these species have records outside and/or are not confirmed in the project development area. Arrow will aim to avoid core habitat in areas to be developed where surveys verify the presence of these species.

Project activities within the five properties identified for development, and assessed through targeted surveys, may cause localised significant impacts to the MNES communities and species present. The assessments are conservative and assume complete clearance at the property level. Across the project development area, impacts may be of low significance based on extensive availability of habitat and a broad distribution of species.

Field development planning will use the constraints mapping planning tool to consider the presence and potential presence of MNES species and communities in a particular area. Data collection will be ongoing and the results used to refine areas of known and possible core habitat for threatened species as the project progresses. The information will also inform refinement of the conceptual gas field layout, particularly the location and arrangement of production facilities and routes for the gas and water gathering lines.

Measures for management of MNES species, including methods for translocation of MNES species, amendments to clearing plans and offsets will be developed dependent on the species or habitat identified. Recovery and offset plans will be implemented on a site-specific basis as required.

There is limited potential for significant cumulative impacts on MNES as a result of Arrow's development actions if avoidance of core habitat is achieved. Arrow will manage the impacts of its

activities at a project level and will continue to collaborate with proponents of interacting developments, including the findings of ongoing ecological studies and habitat offsets.

## **22.3 Management Measures**

Arrow has reviewed the management measures and strategies presented in the EIS following the updates to the project description, the review of findings of the additional technical assessments, and comments made in submissions.

### **22.3.1 Commitments**

The commitments made by Arrow in the EIS have been reviewed so that they remain appropriate for managing project activities and addressing the identified impacts. These commitments relate to the project development area in the Surat Gas Project as described in the EIS at time it was submitted. Some revisions have been made to existing commitments and 23 new commitments have been included in the SREIS. New and revised commitments resulted from changes to the project description since the EIS was finalised and to further clarify the intent of the commitment. The majority of the new commitments resulted from further development of the draft social impact management plan.

### **22.3.2 Coal Seam Gas Water and Salt Management**

Arrow's Coal Seam Gas Water and Salt Management Strategy has been revised to align with current government policy. Arrow's preference is to supply treated coal seam gas water (and untreated coal seam gas water subject to the water quality requirements of the end use and relevant approval) for beneficial use. The management options for coal seam gas water being considered are as follows:

- Distribution to existing users for substitution of their existing groundwater allocations from the Condamine Alluvium ('virtual injection') and as additional supply, and to new users.
- Distribution via watercourses to existing and new users in managed schemes.
- Injection into suitable aquifers to support recharge if an appropriate regulatory framework is in place and subject to trials to determine the volumes and rates of coal seam gas water that could be injected.
- Discharge to watercourses under defined conditions where coal seam gas water cannot be beneficially used or due to operational, technical, environmental or economic constraints e.g., water treatment plant upset uses cannot be feasible.

Arrow has developed a commercial framework to support the supply of coal seam gas water to groundwater users who hold allocations from the Condamine Alluvium. Under the proposed framework, end users would receive and use water supplied by Arrow in lieu of utilising their groundwater allocations. The end user will accept responsibility for the impacts of their use of the water. Arrow will be responsible for providing water to third party users that meets relevant water quality guidelines for the end use.

Arrow is considering several brine management options including selective salt recovery at a joint-industry facility or Arrow-only facility, injection into a suitable formation, discharge to the ocean, and disposal to landfill. The preferred management option is beneficial use through recovery of salt and soda ash products.

The management options for coal seam gas water and brine/salt will be reviewed continually as field development planning evolves and opportunities for additional beneficial uses present themselves.

### **22.3.3 Environmental Offsets**

Arrow has developed a Draft Environmental Offset Strategy that sets out its approach to the delivery of offsets across all of its projects. Offsets will meet the requirements of current Australian and Queensland government policy and will only be used once the hierarchy of avoiding, minimising, and mitigating significant impacts has been followed. Any offsets will contribute to managing and protecting biodiversity.

Arrow's Draft Environmental Offset Strategic Management Plan has been developed under the strategy and describes measures taken to avoid and minimise impacts, identifies Arrow's likely disturbance of vegetation and habitat for listed species, presents evidence of opportunities to offset the possible losses and sets out Arrow's preferred approach to the provision of environmental offsets.

The plan presents the results of GIS analysis to identify suitable patches/tracts of target regional ecosystems which will assist with the identification of potential offset sites. Preliminary indications are that the proportion of 'core habitat known' for each MNES species that may be disturbed by project activities as defined by the conceptual field development layout is small. The application of Arrow's environmental framework approach is likely to reduce this area further as areas of core habitat are avoided and the conceptual field development layout is refined. Preliminary assessment of the availability of regional ecosystems (and habitat) indicates that there are sufficient areas within which to identify potential offset sites.

## **22.5 Summary**

Changes to the project description, including revised typical or expected arrangements, configurations, construction methods and coal seam gas infrastructure design, have allowed Arrow to incorporate new design elements to reduce the project's footprint and potential environmental and social impacts.

The assessments undertaken for the Surat Gas Project, as detailed in the EIS, and reviewed and validated in the SREIS, show that the potential impacts of the project are manageable through the implementation of the proposed mitigation and management measures (commitments). Cumulative impacts of development in the region are unlikely to be exacerbated due to the timing and staged nature of the project's development.

Arrow has made additional commitments to those set out in the EIS in response to the outcomes of the investigations and studies undertaken for the SREIS. Information has also been provided in the SREIS on the management and monitoring plans to be developed for the project, as well as on environmental offset requirements.

This SREIS provides further information on the project and its potential impacts, including the property locations for some of the key infrastructure. The development case presented in the SREIS will continue to be refined over the life of the project to recognise emerging policy, evolving industry best practice and operational experience.

The SREIS confirms the conclusions of the EIS, and completes Arrow's response to the Chief Executive of EHP's request to provide additional information (including on project changes) and to address comments made in submissions on the EIS.

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Surat Gas Project