

Aspect	Impacts	Proposal-specific mitigation measures to be addressed in the Environmental Management Plan
		Minimise offsite impacts associated with dust generation or sedimentation progressively landscaping of disturbed areas during construction to minimise soil erosion and weed establishment
Rehabilitation	Reinstate the creek profile and promote stability in disturbed waterways	Replace sediments in order they were removed
		Reshape banks according to current profile
		Design the proposal to take into account the results of geotechnical investigation to address the potential for differential settlements soft or compressible soil types
		Reinstate bank soils over pipeline with a soil-rock mix (~100-300 mm), jute matting and re-grassing to reduce the risk of bank erosion
		Implement an appropriate maintenance program to ensure vegetation is established following completion of works.
		It is recommended that a rehabilitation plan be prepared to address weed invasion post construction and implement reinstatement of native vegetation in <i>non-certified</i> land.

6.3.3 Conclusions

Construction of the proposal will clear up to 1.88 hectares of native vegetation. Impacts in *certified* land would amount to 1.56 hectares of native vegetation and habitat, including 0.58 hectares of Cumberland Plain Woodland listed under the EPBC Act.

As impacts occur in *certified* land under the Biodiversity Certification Order, there is no requirement to undertake an assessment of significance or offset. All areas of ENV which fall into the site are expected to be directly cleared or indirectly affected. The proposed impacts that occur in *non-certified* areas of the growth centre would require reinstating in accordance with the Relevant Biodiversity Measures of the Sydney Growth Centres Biocertification Order. While the site is currently governed under Biodiversity Certification, it is necessary to avoid, minimise and mitigate the impacts associated with the proposal.

The proposal is not considered to have a significant impact on flora and fauna, provided that the mitigation measures provided in **Table 6-7** are implemented.

6.4 Air and energy

6.4.1 Existing environment

Climate

Climatic information obtained from the Bureau of Meteorology's (BOM's) automatic weather station at Liverpool (Michael Wenden Centre), which is the closest station to the study area, indicated a mean annual rainfall of 764 mm, with high rainfall in summer and drier winter months. The mean daily maximum temperature ranges from 30.1°C in summer to 17.9°C in winter and the mean minimum temperature ranges from 17.8°C in summer to 4.2°C in winter (BOM 2014).

Air quality

Air quality in the study area is typical of a semi-rural setting. The dominant contributors to air quality are emissions from vehicles along Fifteenth Avenue, Cowpasture Road and the Westlink

M7 Motorway and dust emissions from construction works in the area. Other dominant sources of pollutants within the LGA include solid fuel burning (domestic), lawn mowing and domestic/commercial solvents/aerosols (DoE 2014).

A search of the National Pollutant Inventory undertaken on 9 May 2014 for the Liverpool LGA for the 2011-2012 reporting period which identified that 28 substances were emitted from 19 facilities in the Liverpool LGA.

Energy

Sydney Water's Climate Change Strategy identifies and addresses the risks associated with climate change. This includes:

- becoming carbon neutral for energy and electricity use by 2020
- implementing best practice in energy efficiency for water and wastewater treatment
- using renewable energy across the business
- helping the community and businesses to be water efficient
- building and operating a desalination plant. The power needs of the plant are fully offset by renewable energy
- recycling 70 billion litres of wastewater a year by 2015.

6.4.2 Impacts and environmental measures

Construction

Air quality

The proposal has the potential to impact on air quality by generating dust during excavation, construction vehicles driving over exposed soil and wind blowing over stockpiles. Dust impacts have the potential to impact on the amenity of those occupying nearby residential properties.

Potential air quality impacts during construction of the pipelines would be transient as construction moves progressively along the alignment, meaning that individual locations would be affected by dust for short periods of time. In addition, construction of the pipelines would minimise surface disturbance at any one time as the excavation works and rehabilitation would happen progressively. Dust may also be generated by works at compounds located at the WWPS1190 and other locations to support construction. As indicated in **Section 5.4.2**, the Delivery Contractor would select the location of construction compounds and this would take into consideration the potential for land use in adjacent properties to be affected.

The operation of construction plant and equipment would also result in additional exhaust emissions in the area.

Air quality impacts due to the generation of dust and exhaust emissions would be short-term and temporary and would be minimised by implementing the mitigation measures outlined in **Table 6-8** that have been successfully implemented by Sydney Water during construction of other wastewater services in the SWGC and North West Growth Centre (NWGC).

Energy

Construction of the proposal would generate greenhouse gas emissions from the combustion of fuels by:

- construction equipment
- delivery vehicles transporting materials to construction sites
- vehicles removing waste materials from construction sites
- staff vehicles.

Vegetation removed for the proposal would release greenhouse gases and reduce the potential of the local environment to absorb greenhouse gases in the future. However, as the proposal would require minimal vegetation clearance, potential impacts are considered minimal.

Operation

Air quality

Potential operational impacts on air quality would include odours from wastewater pipelines, the WWPS1190 and vent shafts.

Operation of the wastewater pipelines has the potential to generate odours if they are not properly designed or operated. Offensive odours generally occur when the wastewater becomes anaerobic (lacking oxygen) due to poor ventilation or stagnant conditions in the pipelines which may be caused by low or no flows. Designing the pipelines with adequate slope and ventilation would significantly reduce the risk of odour emissions. The potential for odours is generally highest during the initial operational phase of a system when few customers have connected. The system operates more effectively as more customers connect and flows increase. As the study area becomes increasingly urbanised, it is likely that residences may be built in close proximity to vent shafts. However the increased population would result in increased flows in the wastewater pipelines, and a decrease in the release of potentially offensive odours. Residents may experience some odour from ventilation shafts but appropriate design and location would reduce the likelihood of odour impacting on amenity.

Odour may also be emitted from the WWPS1190. The nearest sensitive receiver to the WWPS1190 is a residential property located south east about 500 m of the proposed WWPS1190. As the study area becomes increasingly urbanised, it is likely that residences would be built in close proximity to the WWPS1190 given nearby residential zoning. The WWPS1190 would be designed to comply with EPL No. 372 to minimise offensive odours. Odour risk would largely be managed by chemical dosing at the WWPS1190. A CDU would be required at the WWPS1190 to mitigate odours and septicity.

Odour management would be carried out in accordance with the requirements of the POEO Act and Sydney Water's existing procedures. Odour complaints would be registered and investigated. Engineering, operational or other odour reduction measures would be implemented where verified odour complaints are received about odour releases from the wastewater system. Significant odour impacts from the proposal are considered unlikely.

Energy

The proposal would require energy to operate the WWPS1190 and this would marginally increase Sydney Water's total energy use. The proposal would be operated in accordance with procedures relating to energy use that apply to Sydney Water's existing network.

Provided the mitigation measures in **Table 6-8** are implemented, impacts of the proposal on air quality would be minimised.

Summary of impacts and mitigation measures for air quality

Table 6-8 : Summary of impacts and mitigation measures – air quality

Aspect	Impacts	Mitigation measures to be addressed in the Environmental Management Plan
Pre-construction		
Air Quality	Odour from wastewater pipelines	Designing the pipelines with adequate slope and ventilation to reduce the risk of odour emissions.
		Where practicable, locating vent shafts away from sensitive receivers.
		Designing WWPS1190 to enable a CDU to be installed in future to mitigate odours, if required.
Construction		
Air quality	Erosion of exposed surfaces, stockpiles and materials resulting in dust emissions	Dampening, covering or mulching exposed surfaces in windy conditions.
		Locate stockpiles away from sensitive receivers. All work areas and stockpiles will be monitored for dust generation, particularly during hot, dry or windy weather.
		Managing material stockpiles to minimise the generation of dust and wind erosion.
		Increasing the frequency of dust suppression (such as watering) when winds visibly mobilise dust particles.
		Covering materials transported to and from the site to reduce dust generated in transit.
		Using sealed access roads where they are available. Access points would be inspected to determine whether material is being transferred to the surrounding road network. Roads would be swept as required to control dust generation.
		Reduce vehicle speeds on unsealed access roads to minimise dust generation
		Minimising the time between ground disturbance and rehabilitation as far as practical to minimise airborne dust and particulates.
		Avoiding construction activities that generate high dust levels during windy conditions.
		Rehabilitating exposed areas as soon as possible following excavation.
	Exhaust emissions from vehicle and equipment	Ensuring that all construction plant and machinery are properly maintained and fitted with emission control devices complying with the Australian Design Standards.
		Turning off machinery and vehicles when not in use.
		Maintaining all work vehicles/machinery to a standard such that visible particulates in exhaust emissions are not visible for a continuous period of more than 10 seconds.
	Odour from wastewater pipelines	Appropriate odour control measures will be available on site at all times and will be implemented immediately when odour problems arise or if odours are likely to cause public concern.
		Odour or air pollutant emission complaints will be dealt with promptly and the source will be eliminated wherever

Aspect	Impacts	Mitigation measures to be addressed in the Environmental Management Plan
		practicable. Details of the complaint will be recorded as per the SW Customer Complaints process.
Energy and greenhouse gas emissions	Generation of greenhouse gas emissions	Providing measures that specify how energy use would be managed and greenhouse gas emissions would be minimised during construction.
		Maintaining vehicles to ensure that all emission reduction devices are in good working order. Records would be kept on site.
		Reducing energy use by minimising excavation volumes and recycling top soil to reduce transport/disposal/resource use, and ensuring plant and equipment is well maintained and turned off when not in operation.
	Vegetation clearing resulting in reduction of carbon dioxide absorption	Minimising tree removal
	Reporting requirements	Capturing energy use data to comply with the <i>National Greenhouse and Energy Reporting Act 2007</i> , reporting requirements and Sydney Water's energy management procedures. This includes reporting via a SWEMS0015.07 Contractor Environmental Performance Report on a monthly basis.

6.4.3 Conclusions

Potential impacts on air quality during the construction and operation of the proposal are unlikely to be significant provided that the mitigation measures provided in **Table 6-8** are implemented.

6.5 Noise and vibration

This section provides a summary of the noise and vibration assessment prepared by Jacobs. **Appendix E** includes a copy of this assessment.

6.5.1 Existing environment

The area surrounding the WWPS is a rural, with noise peaks resulting from natural noise sources such as crickets and birds. Low level background noise is dominated by continual traffic on the Westlink M7 Motorway (see **Figure 19**). Local traffic and residential noise is also occasionally audible. During the weekend, noise from the nearby Sydney International Shooting Centre dominates the noise environment.

To the east, along Seventeenth Avenue and Southern Cross Avenue, construction noise and traffic on the Westlink M7 Motorway dominate the noise environment. The area is currently subject to large scale housing development construction works, and noise and traffic associated with these works is audible during daytime hours.

Sensitive receivers

Sensitive receivers in the area of the development are primarily semi-rural residential properties, interspersed with light industrial / commercial land uses.

All receivers are located more than 500 m from the WWPS, however many residential and commercial properties are located in close proximity to the proposed pipeline routes.

Noise sensitive receivers include the following:

- Residential properties on Gurner Avenue (eastern end).