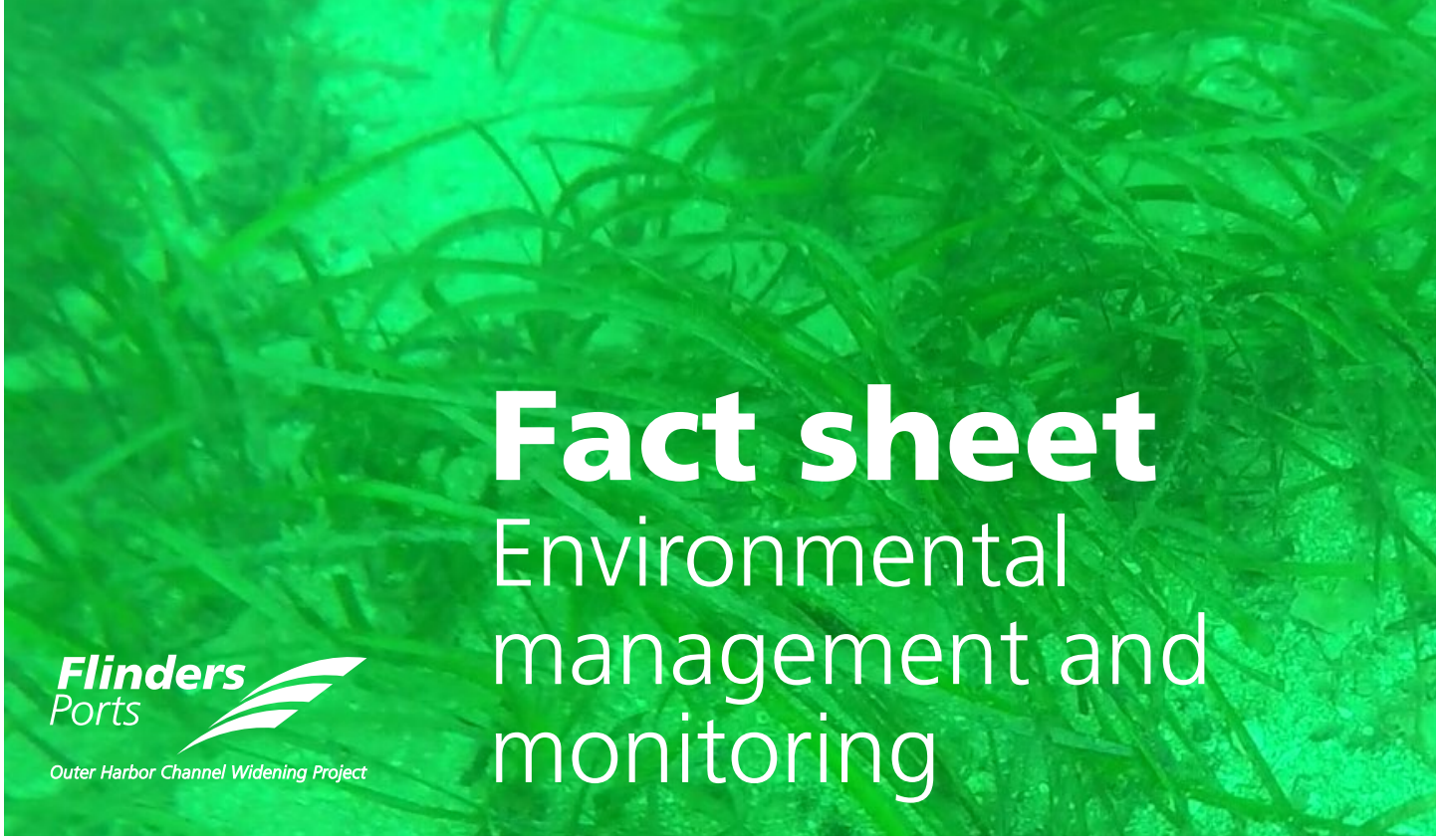

Flinders Ports

Outer Harbor Channel Widening Project

Fact sheet
Environmental management and monitoring

ENVIRONMENTAL CONSIDERATIONS

Environmental considerations have been central to decision-making around the dredging methodology and determining the EPA dredge licence conditions.

An Environmental Monitoring Program (EMP) has been developed to support monitoring and survey methods of environmental factors before, during and after dredging. The EMP is part of the Dredge Management Plan used to manage activities throughout the project.

Environmental matters considered as part of the planning for the project include:

- Minimising impact of direct removal of seagrass and indirect loss of seagrass from turbid plumes generated by dredging and the deposition of dredge material.
- Reducing the risk of spread of marine pests and Pacific Oyster Mortality Syndrome (POMS) from dredging activity and vessel movement.
- Precautions to reduce the risk of injury to marine mammals, such as dolphins and whales, in Gulf St Vincent, The Port River and Barker Inlet.
- Noise, waste and water quality considerations associated with project works.
- Limiting disturbance of populations of shorebird and wetland bird species, which inhabit Bird Island.

ENVIRONMENTAL REQUIREMENTS

Flinders Ports has worked closely with key government agencies to develop the EMP, ensuring it complies with relevant Commonwealth and State legislation, as well as regulatory conditions to protect the environment.

These include compliance with:

- The approved Development Application conditions
- EPA dredge licence, including regular reporting throughout the project
- Department of Environment and Water's (DEW) Native Vegetation Clearance permit
- Enviornmental Protection and Biodiversity Conservation Act 1999, Environment Protection Act 1981, Maritime Safety and Pollution Legislation, Historic Shipwrecks Act 1976, Biosecurity Act 2015 and Australian Ballast Water Management Requirements

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SEAGRASS MANAGEMENT AND MONITORING

It is estimated four hectares of sparse seagrass will be removed directly from the dredge area.

Indirect disturbance from dredging may impact approximately 158 hectares.

Seagrass management will include:

- A survey of seagrass extent and density before and after dredge works to track potential impacts and recovery
- Payment of a Significant Environmental Benefit to the Native Vegetation Fund
- Minimising turbidity during dredging
- Dredging in winter, when seagrass is less actively growing and less sensitive to a reduction in light availability due to turbidity

Moderate to dense seagrass

Comprises communities of Amphibolis and/or Posidonia species. These seagrass show high resistance to disturbance, but are slow to recover from disturbances. These areas include "seagrass meadows" and are generally at a distance from the Outer Harbor channel, as shown below.

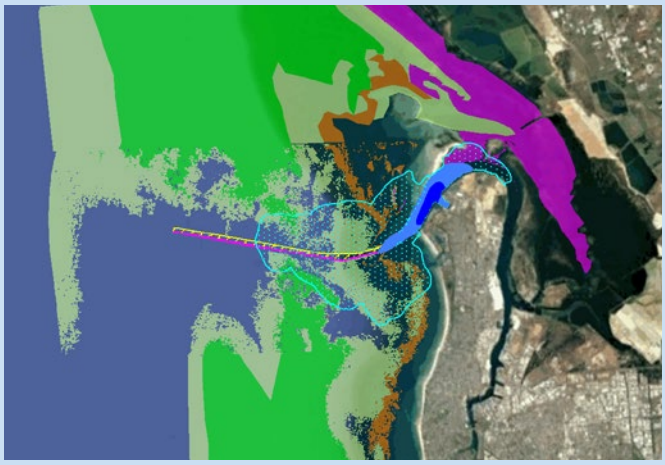
Sparse seagrass

Comprises widespread but patchy Halophila australis and/or very sparse Posidonia species. Halophila australis is a colonising species with a short life cycle and low resistance to disturbances, but can recover quickly.

Seagrass dominated by Heterozostera

Heterozostera is another colonising species with a short life cycle that recovers faster from disturbance than perennial species.

Types of seagrass and zone of potential turbidity impact - winter



Types of seagrass and zone of potential sediment deposits - winter

Zone of potential low to moderate impact on water quality resulting in seagrass recovery between 6 months (lower end of range) to 24 months (upper end of range).

Zone of potential high impact on water quality with predicted seagrass recovery time greater than 24 months.

Some seagrass, molluscs or rock

WATER QUALITY

Water quality will be monitored in three locations every 10 minutes during dredging. The following parameters will be measured:

- Turbidity - measured in Nephelometric Turbidity Units (NTU) to measure suspended sediments within the water
- Photosynthetically Active Radiation (PAR) – to measure the available light at on the seafloor available to seagrass to utilise. Terrestrial PAR will also be measured to make allowances for cloudy conditions.
- Dissolved oxygen, pH, salinity and temperature

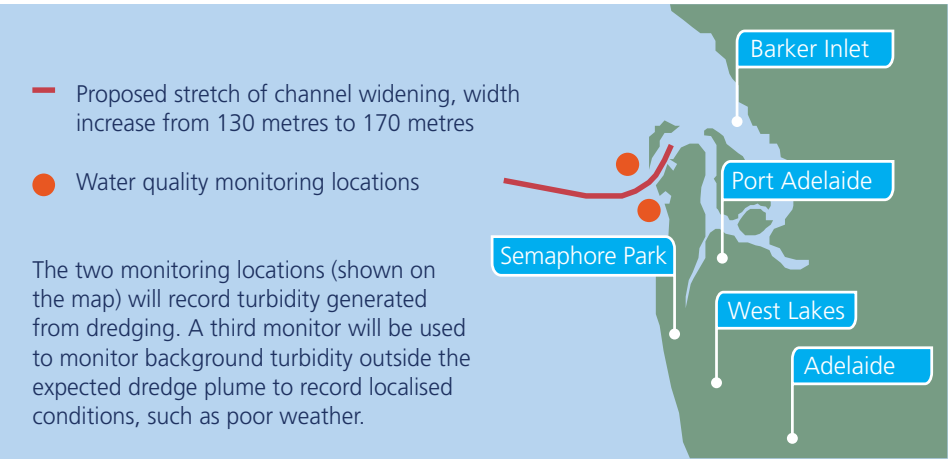
WATER QUALITY MONITORING LOCATIONS

To supplement the continuously logged data, and to give independent measures of turbidity, water samples will be collected at the three monitoring sites approximately every three weeks and analysed for:

- Total suspended solids
- Turbidity
- Chlorophyll-a

Water samples will be analysed at a NATA accredited laboratory, with results provided in monthly reports.

Data will be provided to the EPA and will be shared on the Flinders Ports website.



TURBIDITY MANAGEMENT

There will be a strong focus on managing turbidity – the amount of suspended sediments in the water.

The dredge works will follow an adaptive management approach whereby turbidity is monitored in real-time. Should nominated limits be exceeded (as shown below), the dredge contractor will either adjust or cease dredging. The graphic below describes the set criteria and associated actions.

Turbidity management criteria

Criteria measured in Nephelometric Turbidity Units (NTU).

Nephelometric Turbidity Units measures suspended sediments in water. This will be continuously measured every 10 minutes in the lead-up to and during dredging.

CRITERIA	ACTION. THE DREDGE CONTRACTOR WILL:
ALARM 2.8 NTU, based on a 15 day rolling median, or, 5.8 NTU based on a 6 day rolling median	Alter its methodology to reduce turbidity by: • changing the location of dredging, • altering the overflow regime to reduce fines spilt to water, or • changing the tide on which dredging occurs.
HOLD 5.8 NTU based on a 15 day rolling median, or 15.8 NTU based on a 6 day rolling median	• cease dredging with the vessel that is generating turbidity until level fall back below the specified limit • notified the EPA immediately and provide a report on the activity and corrective actions taken to prevent events of the same nature reoccurring

Turbidity will be further managed by:

- A dredging methodology which involves no "double-handling" of dredge material
- Use of a "green valve" on the Trailing Suction Hopper Dredge
- Dredging will occur at all times within the design dredge footprint and vessels will be fitted with a tracker (Automatic Identification System (AIS) unit) that maps and monitors movement and opening and closing of the hopper door

ADDITIONAL ENVIRONMENTAL MANAGEMENT MEASURES

Potential impact	Management actions	Reporting and corrective action
Disturbance or injury to large marine mammals, such as whales or dolphins	• A trained Marine Mammal Observer to spot for the presence of marine mammals and alert the dredge vessel team • Pausing or delaying dredge works if marine mammals are within 50 metres of the Backhoe Dredge • Piling works (required for the repositioning of navigation aids) will implement 'soft start' procedures to encourage marine mammals to leave the area • Comply with speed limits in the Port and speed restrictions in Adelaide Dolphin Sanctuary	• Reporting and recording all sightings of marine mammals • Any wildlife incidents will be reported to the EPA and/or DEW
Oil / chemical spills affecting water quality and possibly marine flora and fauna	• Regular inspections of vessel parts and maintenance system in place for all equipment • Spill kits readily available on all vessels • No sewage discharged from vessels within harbor • Emergency Response Plan in place	• Ongoing monitoring and reporting • Incidents investigated and Emergency Response Plan enabled
Noise associated with dredge operations	• Dredging near Outer Harbor port entrance to be conducted during daytime hours and in favourable weather conditions • Engines and equipment to be maintained in good condition • Conduct noise impact assessment	• Noise to be within limits of permits and approvals • Implement complaints register to monitoring and address concerns • Noise complaints investigated and corrective actions implemented
Spread of POMS Virus beyond the Port River Estuary	• POMS Managament Plan in place • Dredge vessels to remain at least 10km away from any oyster lease • The removal or destruction of bivalves within the dredge area prior to commencement of dredging • Detailed anti-fouling measures for the dredge equipment prior to arrival in Outer Harbor • Dredging to be undertaken during cooler months where water temperatures are no greater than 18 degrees	• Provide to the EPA the records to demonstrate completion of biofouling management of each dredging vessel prior to entry into South Australian waters
Spread of Caulerpa taxifolia (a pest species for seagrass)	• A detailed survey prior to dredge works commencing to confirm the presence or not of Caulerpa taxifolia in the dredge area. If present, a management strategy will be developed.	• Implement approved management strategy with PIRSA

ENVIRONMENTAL AUDITS DURING DREDGING

An environmental audit will take place at least monthly, during dredging. The audit will be conducted in accordance with International Standard 14001: Environmental Management Systems protocols and will be expected to include:

- General observations of status of environmental controls for the project
- General environmental management measures are in place and actively managed
- Monitoring and measurement results during the audit period
- Compliance with legislative obligations, including conditions of approval and requirements of the Dredge Management Plan
- Onsite environmental management controls are effective in managing environmental risk and are being maintained
- Non-conformances are being identified and recorded
- Appropriate corrective actions are being undertaken in the event of non-conformances