

**Submission
No 205**

INQUIRY INTO IMPACT OF THE WESTCONNEX PROJECT

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Requirement for independent expert review to ensure environmental and risks to community amenity are addressed rigorously in the EIS for construction of the Western Harbour Tunnel

by
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Summary of requirement for review

The information made available to date by NSW Road and Maritime (RMS) is not sufficient to allow rigorous independent assessment of the risks posed during installation of the immersed tube Western Harbour Tunnel (ITWHT) and of operations planned for Glebe Island/White Bay. The dredging of contaminated sediments and excavation of sandstone bedrock to allow installation of the ITWHT and the large excavation works

and of the measures proposed to reduce and monitor the risks and for corrective actions in the event of a failure of one or more measures.

In response to my enquiry in May 2018 for access to consultant/s reports relating to the nature and extent of contamination of sediments within the ITWHT corridor and at Glebe Island/White Bay, RMS stated access to relevant reports was not publicly available and that adequate information would be provided in the project Environmental Impact Statement (EIS).

RMS provided e-links to consultants reports that were stated to address “Sediment management ... (that) has been successfully completed on several recent projects in Sydney Harbour...” However, the reports referred to small-scale dredging projects, some not in Sydney Harbour, and to one project that has not commenced. None of the completed projects were of the scale and complexity that are expected to be encountered in the ITWHT corridor during excavation of contaminated sediments and installation of the immersed tubes. One of the projects referred to by RMS had not commenced.

The installation of the ITWHT, in a very narrow part of the upper harbour close to residences and subject to passage of large vessels, poses challenging environmental and community amenity issues that need to be thoroughly assessed and reviewed so that a reliable EIS can be prepared.

It is not satisfactory that the next phase of the project to which the community would be able to respond to is the EIS because this document would contain only a summary of technical issues, which would not contain sufficient detail to allow an independent expert assessment of the risks posed by construction of the ITWHT.

The ITWHT project does not meet the principles of ecological sustainability development or of community amenity, given that enormous quantities of contaminated sediment, perhaps as much as 580,00 cubic metres reported in the media, are required to be excavated from the ITWHT corridor and from White Bay/Glebe Island. These materials are proposed to be dewatered and treated at Glebe Island prior to being disposed to landfill.

Disposal of treated materials to landfill is contrary to policy of NSW EPA's “Waste Avoidance and Resource Recovery Strategy 2014 – 2021”, which has the objective of “...increasing waste diverted from landfill to 75%” during this period.

RMS has not made public the cost of excavating, treating and disposing contaminated sediments and treatment and disposal of contaminated water for the ITWHT project. If the volumes reported in the media are close to actual volumes, the total cost is estimated to be several hundred million dollars (including the EPA waste levy for disposal to landfill).

Most of the impact to the amenity of the community and to the environment and costs for dredging contaminated sediments and their transporting, dewatering, treatment and disposal to landfill would be eliminated by construction of a bored WHT from Yurulbin Point to the Waverton Coal Loader.

Prior to completion of the EIS the RMS should be required to provide:

- reports (e-copies) by environmental and geotechnical consultants to allow an independent review of the risks posed by installation of the ITWHT so that experts and

- the community can articulate concerns that can be addressed comprehensively in the EIS; and
- the cost/benefit analysis and the impact to the community relating to the proposed immersed tube tunnel compared with a tunnel bored through sandstone bedrock beneath the harbour. This information will allow an independent expert review of the cost/benefit and ecological sustainability of each method to be included in the EIS.

An independent expert assessment of the risks posed to the environment and to likely impacted communities by the proposed ITWHT works is required so that the concerns can be addressed comprehensively in the EIS. It will not be sufficient for experts and members of the communities to respond to an EIS that is prepared without expert independent review of the reliability of consultants' reports that are relied upon by the EIS.

It is expected that significant delays to the project will result from incomplete information being contained in an EIS that did not satisfy significant environmental risks and community concerns.

Sources of information

To date, RMS has not made available significant details of the construction of the ITWHT, particularly relating to management of contaminated sediments and the impact to the community during its construction and the treatment and disposal to landfill of excavated sediments. Based on publicly available information, the risks posed to the environment and to the amenity of the community during construction of the ITWHT are believed to be high. However, the risks cannot be assessed reliably based on available information.

In May 2018, I requested by email to RMS access to reports by environmental consultants relating to investigation of the nature and extent of contaminated sediments in the ITWHT corridor. In response to my enquiry, RMS stated relevant details would be published in the project Environmental Impact Statement (EIS) to which members of the public will have the opportunity to comment on. RMS also provided e-links to consultants' reports which were claimed to address "Sediment management ... *(that) has been successfully completed on several recent projects in Sydney Harbour...*"

As of August 2018, the publicly available sources available to me to assess the risks to the marine environment of Sydney Harbour and to the amenity of residents posed by construction of the ITWHT are:

- reports in the SMH and ABC News dated 12 March 2018, which were stated to be based on a "high-level study marked 'cabinet in confidence'", which was prepared for the NSW Government";
- the brochure "Western Harbour Tunnel", by RMS dated May 2018, that was provided in a letterbox drop to some residents; and
- the "Western Harbour Tunnel. Project Update", dated July 2018 (Project Update).

Location of the ITWHT

The Project Update indicated the ITWHT is proposed to extend from Yurulbin Point, Birchgrove, to Waverton at the former Coal Loader. The length of the tunnel is approximately 700 metres.

Construction of the ITWHT

The ITWHT is proposed to be constructed using steel shells that are to be prefabricated elsewhere and be reinforced with concrete at Glebe Island and then floated to the ITWHT corridor.

The Project Update stated concrete reinforced tubes are to be placed into trenches dredged into sediments on the seafloor within the ITWHT corridor. Given the shallow water depths over much of the length of the proposed ITWHT (approximately 12 to 14 m at low tide) and diagrams shown in the Project Update, it appears some parts of the tunnel will need to be excavated into the Hawkesbury Sandstone bedrock that underlies the sediments to allow passage of large vessels, such as the fuel tankers that discharge at the nearby former Shell fuel terminal at Greenwich and large vessels that periodically refuel at this terminal.

The Project Update did not set out the method to be employed to remove sandstone bedrock or the measures proposed to address risks that may be encountered. It is possible that explosives

or percussion drilling from barges could be employed to remove sandstone, but the risk posed by these operations to the environment and the impacts to the amenity of the community were not addressed.

The high-energy methods of removing sandstone bedrock are likely to impact the amenity of the nearby community and are required to be clearly explained to the community so that their concerns can be considered and addressed in the EIS.

Dredging and treatment of sediments

Excavation of sediments was described briefly in the Project Update to be undertaken using a “*trailer suction hopper vessel*”, in which sediments are dredged from the seafloor using a surface vessel and are contained on the vessel for later transfer to barges.

The Project Update provided no details relating to risks posed by implementation of the proposed dredging method or of measures that would be implemented to control, monitor and rectify:

- contamination of harbour waters from spills of sediment and/or contaminated water;
- transport of dredged sediments to Glebe Island/White Bay;
- release of odours from sediments during storage on the vessel, discharge of sediments to barges for transport to Glebe Island/White Bay and during treatment of sediments to allow disposal of treated sediments to landfill.

Extent of contaminated sediments

To date, RMS has not made public the lateral or vertical extent of contaminated sediments:

- that will be dredged to within the ITWHT corridor to allow the tunnel sections to be lowered into place; or
- at Glebe Island/White Bay.

The SMH and ABC reported that the documents prepared for the NSW Cabinet would require excavation of:

- 100,000 cubic metres of contaminated sediment from the ITWHT and their transport to the Glebe Island treatment works; and
- a further 480,000 cubic metres of materials, “*likely to be heavily contaminated*”, at the Glebe Island/White Bay treatment works.

The above volumes are extremely large and cannot be independently verified by information provided in the Project Update. These volumes are very much greater than volumes addressed in all of the combined works relating to contaminated sediments completed in Sydney Harbour to date and that were referred to in the Project Update as having “...*been successfully completed on several projects in Sydney Harbour*”.

No information available to date has documented the manner in which contaminated sediments will be dewatered, treated and disposed or how contaminated water that is dredged together with the sediments will be treated and disposed.

The locations of all proposed measures for environmental protection, their monitoring and rectifying non-conformances are required to be independently reviewed so that the risks can be addressed in the EIS.

Nature of contamination of sediments

To date, RMS has not made available results of investigations of the nature or extent of contaminated sediments within the proposed excavation corridor for the ITWHT or of the contamination status of materials to be excavated from White Bay at the Glebe Island treatment facility.

In summary, it is likely that sediments to be excavated for the ITWHT are significantly contaminated by the following:

- Gasworks waste generated adjacent to AGL’s former Waverton gasworks. Elsewhere sediments adjacent to former gasworks (Darling Harbour, Neutral Bay and Mortlake) are or were contaminated with compounds similar to those identified at other former gasworks. It is expected that sediments in Balls Head Bay, adjacent to AGL’s former Waverton gasworks would also be contaminated by similar compounds. In operation of

former gasworks, waste from the gasworks operations was commonly dumped or leaked into the adjacent waterways. Some components of gasworks waste are highly toxic to marine biota.

- Petroleum leaks and spills sourced from the former Shell terminal at Greenwich would have contributed to contamination of sediments in Gore Cove and adjacent sediments. Significant contamination of sediments by petroleum hydrocarbons and polynuclear aromatic hydrocarbons (PAHs) was identified adjacent to the former BP fuel terminal in Berrys Bay. Some components of petroleum are highly toxic to marine biota.
- Marine anti-fouling chemicals. It is likely that vessels transiting the ITWHT corridor to and from the former Shell terminal, the Waverton gasworks, HMAS Waterhen and the Waverton coal loader would have been protected by anti-fouling paints that commonly contained one or more of tributyltin, lead, zinc, copper and mercury, which contaminate sediments as they erode from the hulls of vessels. The components of anti-fouling paints are, by design, highly toxic to marine biota.
- Contaminants sourced from former industrial operations proximal to Yurulbin Point. Ship construction and repair facilities, former general industrial operations and contaminated filling placed behind seawalls are known to have taken place in this area. Potential contaminants are likely to include polynuclear aromatic hydrocarbons, heavy metals, petroleum hydrocarbons and tributyltin.

Sediments in White Bay have a high risk of being contaminated by historical industrial operations and by landfilling at the former White Bay Power Station and from contaminated filling placed behind seawalls. Potential contaminants are likely to include polynuclear aromatic hydrocarbons, heavy metals, PCBs, petroleum hydrocarbons, pesticides and tributyltin. There is a lesser risk that sediments may contain asbestos and a higher risk that filling materials in on-shore locations may contain asbestos.

It is likely that anthropogenic contaminants, such as petroleum hydrocarbons and polynuclear aromatic hydrocarbons, would contribute to unpleasant odours if these sediments were excavated.

In addition to the anthropogenic contaminants, sediments excavated for placement of the immersed tubes at the ITWHT and for treatment facilities at Glebe Island/White Bay are "*acid sulfate soils*" that contain naturally occurring iron sulfides. On exposure to the atmosphere or to oxygenated water the iron sulfides produce sulfuric acid, which gives rise to increased mobility of heavy metals. In addition, the acid sulfate soils contain naturally occurring hydrogen sulfide (H₂S – "*rotten egg gas*"), which is toxic and is highly odorous even at extremely low concentrations (less than 1 part per million). The risk posed by the acid sulfate soils was not addressed in the Project Update.

The extremely large scale of the sediment excavation works within the ITWHT corridor and sediment excavation works and operations at Glebe Island/White Bay pose a high risk of environmental impacts to Sydney Harbour and to amenity impacts to communities in the Birchgrove, Waverton, Greenwich, East Balmain, Rozelle and Pyrmont. These impacts have not been addressed in the Project Update.

Excavation and treatment methodologies

The Project Update stated excavation of contaminated sediments to allow placement of the immersed tubes would be undertaken using a "*trailer suction vessel*". This method will result in large volumes of water contaminated by fine-grained sediment being extracted with the contaminated sediments. This water is not suitable to be returned to the harbour and would be required to be treated in a water treatment plant (WTP) that would be required to be constructed at Glebe Island. This matter was not addressed in the Project Update.

The inability of WTPs to treat large volumes of contaminated water contained in excavated sediments within expected project timelines is a factor that is well understood to limit the progress of treatment of contaminated sediments. Throughput of the WTP to be installed at Glebe Island is expected to pose a serious constraint to the progress of both the dredging in the ITWHT corridor and at the treatment works at Glebe Island. This matter was not addressed in the Project Update.

In addition, if treatment of the water through the WTP could not remove contaminants to the low concentrations that the EPA would allow to be discharged to Sydney Harbour, considerable cost would be involved in disposing of the water to the Aqueous Waste Treatment Plant at Lidcombe (owned by NSW Government) or, if capacity was available and the contaminant levels were

sufficiently low, to Sydney Water's sewerage system. This matter was not addressed in the Project Update.

Because of the presence of acid sulfate soils and odorous contaminants in the dredged sediments, it is unlikely that sediments could be dewatered in evaporation basins open to the atmosphere on Glebe Island without serious loss of amenity to the adjacent communities. Even if dewatering and treatment of contaminated sediments is undertaken using best practice within an enclosed structure, it is likely that odours would impact the White Bay cruise ship terminal and residents in proximity to White Bay and parts of Rozelle, East Balmain, Pyrmont and Glebe. This matter was not addressed in the Project Update.

The disposal of dredged sediments to an off-shore dumping area requires approval by the Commonwealth. It is unlikely that approval would be given for off-shore disposal of contaminated sediments. This matter was not addressed in the Project Update.

The Project Update indicated that, in addition to excavation of the contaminated sediments, removal of Hawkesbury Sandstone bedrock from the WHT corridor would be required. However, the volume of sandstone and the method for removing the sandstone were not addressed in the Project Update.

Practical difficulties relating to excavation of sediment within the WHT corridor

Significant practical difficulties are expected to arise from excavation of contaminated sediments within the ITWHT corridor due to:

- the narrowness of this section of the harbour (approximately only 300 m wide from Yurulbin Point to Manns Point);
- high tidal current velocities in this narrow part of the upper harbour;
- high use of this part of the harbour by ferries, Rivercats, work boats, naval vessels, pleasure craft and very large petroleum fuel tankers;
- generation of waves by wind and by passage of vessels; and
- disturbance of sediments within parts of the ITWHT corridor, which are only 10 to 14 metres deep in parts, at low tides.

The above issues, even when access and speed restrictions are applied to vessels transiting the proposed ITWHT excavation work area, pose significant risk of fine-grained sediments escaping from the work area. This matter was not addressed in the Project Update.

None of the projects referred to the Project Update as having “...*been successfully completed...recent projects in Sydney Harbour*” exhibit complexities that will be experienced in installation of the ITWHT or in excavation of sediments at Glebe Island/White Bay.

Presence of a “*plume of toxic sediments in Sydney Harbour*”

The SMH and ABC reports referred to works at the ITWHT and at White Bay to result in a “...*plume of toxic sediments in Sydney Harbour*”. However, the EPA would not allow this situation to occur. All works would be required to ensure minimal escape of contaminated sediments or contaminated water to Sydney Harbour. Nevertheless, some assurance that contaminated sediments would not escape into the water column should have been provided in the Project Update.

The environmental protection measures to minimise escape of contaminated sediments from work areas can be expected to be strictly regulated by the EPA and to result in delays to the work program if accidental migration of significant suspended sediment or perhaps dissolved contaminants occurs from the work area.

To allay community concerns, the EIS is required to address in detail the environmental protection measures that will be implemented during works within the ITWHT and at Glebe Island/White Bay.

Disposal of excavated sediments into “*deep holes in Sydney Harbour*”

The SMH and ABC reports stated that some excavated sediments could be disposed into “*deep holes within Sydney Harbour*”. The EPA and RMS, the owners of the seabed of Sydney Harbour, have never allowed sediment, contaminated or not, to be disposed into Sydney Harbour.

To allay community concerns, the EIS is required to document that no materials excavated from the ITWHT corridor, bored tunnels and Glebe Island/White Bay will be disposed into Sydney Harbour.

Use of Yurulbin Point Park

Potential construction sites for the WHT were stated by RMS to include Yurulbin Point Park, which would be used for an entry site for road header machines and for water-based transport of tunnel spoil to Glebe Island. The Project Update did not provide an estimate of the volumes of materials that would be transported, to the duration of these works and of protection measures that would be required to ensure protection of the environment and community amenity.

Although the Project Update stated access to Yurulbin Point Park as a staging area would be by water, it is likely that some vehicle access via Louisa Road will be required. This road is narrow and is unsuitable for transit by heavy vehicles.

Again, transit of supply vessels by water would give rise to practical difficulties to maintaining the integrity of environmental protection measures that will be needed to prevent migration of contaminated sediments from the ITWHT work areas.

The proposal for works for the WHT installation to be will give rise to considerable adverse impact to the communities of Birchgrove, Greenwich, Waverton, East Balmain, Rozelle and Pyrmont.

The EIS is required to satisfy communities impacted by works at Yurulbin Point Park will be carried out in a manner that protects the amenity of the communities.

Use of Glebe Island and White Bay

The Project Update stated Glebe Island/White Bay would be used for:

- immersed tube fit out for the WHT tunnel units;
- transfer and treatment of contaminated sediments for transfer into trucks for “safe disposal” (i.e. disposal to landfill);
- handling of spoil (assumed to be excavated sandstone from bored tunnels) from Yurulbin Point and Berrys Bay; and
- deliveries to on-water construction sites and coffer dams.

The EIS is required to satisfy communities impacted by works at Glebe Island/White Bay will be carried out in a manner that protects the amenity of the communities.

Use of Berrys Bay

The Project Update stated Berrys Bay would be used as a “...*temporary construction site and barge mooring*”, including major deliveries and spoil removal.

However, the Project Update did not address how the works in this area would protect sediments in parts of Berrys Bay that are known to be contaminated from former industrial activities so that contaminants are not mobilised into the water column during these activities. The EIS is required to address this issue.

Lack of sustainability of the proposed immersed tube WHT works

Overall, construction of the ITWHT does not deliver an ecologically sustainable solution, would give rise to a significant risk of contaminating harbour waters, would result in unacceptable volumes of contaminated sediments being stored and treated at Glebe Island and subsequently disposed to landfill and would produce unacceptable impacts to communities over wide areas during 24hour/7days operations and from vessel and truck movements.

RMS has not disclosed the duration of construction of the ITWHT and the treatment of contaminated sediments at Glebe Island/White Bay. However, it is likely excavation works and treatment of contaminated sediments and water at Glebe Island could take at least 3 to 4 years.

Significant impact to the community and to the environment

None of the information provided by RMS relating to the ITWHT works and the removal and treatment of tunnel spoil, on a 24 hours/7 days per week basis, has addressed the significant impact the project will undoubtedly have on the communities and, unless stringent environmental control measures are implemented, on the environment.

It is inevitable the project will generate significant adverse outcomes to the community in relation to:

- dredging operations;
- odours from dredged sediments;
- some movement of supplies by trucks using Louisa Road;
- vibration and noise from dredging and excavation works, particularly during excavation of sandstone bedrock for the ITWHT using percussive or blasting methods;
- noise from barges from the ITWHT and tunnel boring work areas transiting to Glebe Island;
- noise from barges and other supply vessels transiting from the base to be established in Berrys Bay; and
- excavation works and treatment of contaminated sediments and water at Glebe Island/White Bay.

Licensing of the ITWHT works

The ITWHT works at works at Glebe Island/White Bay will require the EPA to issue Environmental Protection Licences (EPLs) under the Protection of the Environment Operations Act. The EPLs will include limits on the mass and/or concentrations of contaminants that can be released to the atmosphere and to the Sydney Harbour, as well as hours of operation, environmental protection requirements, limits on noise and vibration, storage and disposal of treated sediments, transport routes to and from Glebe Island via the Harbour and by road to landfill, etc.

However, appropriate EPLs can be entered into only after all significant risks to the environment and to community amenity have been carefully considered and addressed satisfactorily by RMS and documented in the EIS.

Preferred construction option

Given the uncertainties of estimating difficulties associated with excavating, transporting and treating contaminated sediments and the high probability of lack of amenity to the community caused by noise and odour during these processes, together with the high cost of treating contaminated sediments and transporting and disposing these materials to landfill and the poor environmental sustainability of these methods, the preferred construction method for the WHT is by tunnelling in sandstone bedrock.

Excavated sandstone removed during bored tunnelling would be classified as virgin excavated natural material (VENM) and can be used on any location and does not need to be treated or disposed to landfill and does not require approval of the EPA to be used for any lawful purpose.

Bored tunnelling from Yurulbin Point to the Waverton Coal Loader would result in increased grades. Assessing the impact of increased grades and their impact on air quality is beyond my expertise and prior to preparation of the EIS, it is recommended that expert advice be obtained by independent traffic and air quality experts and that this information be provided to RMS for addressing in completing the EIS.

Requirement for independent review of proposed ITWHT works

The ITWHT project, involving dredging/excavation, transport and treatment of contaminated sediments and their disposal to landfill is by far the largest and most complex project of its type ever undertaken in Sydney Harbour.

The RMS has made light of the risks posed in installing the ITWHT by reference to “*successfully completed...recent projects in Sydney Harbour*”, each of which cannot be compared to the ITWHT project in terms of scale, environmental risk, ecological sustainability and impact to community amenity. As noted above, some of the projects referred to by RMS were not located in Sydney Harbour and removal of contaminated sediments at one of the projects has not commenced.

My review is based on reports published in the media, brief details provided in the RMS brochure dated May 2018 and to “*successfully completed...recent projects in Sydney Harbour*” referred to in the Project Update. This information is misleading and is not adequate to provide a comprehensive review of the risks associated with the proposed works in installing the ITWHT and in excavating and treating contaminated materials at Glebe Island/White Bay.

The ITWHT project poses extensive environmental and community risks that have not been referred to in documents made public by RMS to date. The information provided to date provides no confidence that the ITWHT project can be completed without significant and unacceptable risk to the environment and to the communities in proximity to the proposed works.

To provide a rigorous assessment of the risks posed by works at the sites of the ITWHT and at Glebe Island/White Bay, complete reports of environmental and geotechnical investigations prepared by consultants engaged by RMS are required to be independently reviewed so that the results of the reviews can be addressed in preparation of the EIS.

Preparation of an EIS by RMS without an independent review of the risks posed by each of the phases of the ITWHT works will result in an EIS that will not adequately address environmental and community concerns.

Declaration

The author resides adjacent to Snails Bay at a distance of approximately 500 m from Yurulbin Point and 1 km from the Waverton Coal Loader and will be impacted by preparatory works and installation of ITWHT if stringent control measures to address the risks posed in installing the ITWHT and transporting spoil from tunneling operations have not been identified and addressed satisfactorily in the EIS to mitigate the risks to the extent practicable.

The author practices as an independent consulting environmental scientist and has extensive experience in the assessment, management and remediation of contaminated land and sediments. The author is not seeking to be engaged for any role in reviewing consultant's reports relating to the ITWHT.