Decision Report

Refresh Vaucluse and Diamond Bay Project

December 2020

Sydney WATER

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Acknowledgement of country

The Vaucluse and Diamond Bay area is the land of the Gadigal and Birrabirrigal people of the Eora/ Dharug Nation. Protecting waterways and the environment in this catchment is consistent with the environmental stewardship the traditional owners have provided for thousands of years. We acknowledge these traditional custodians and their ancestors of the land and waters. Their lore, traditions and customers nurture and continue to nurture the water, creating wellbeing for all. We also pay our respect to Elders, past, present and emerging.

Abbreviations

BOD	Biological Oxygen Demand
CBA	Cost Benefit Analysis
CEMP	Construction Environmental Management Plan
CRG	Community reference group
EPA	Environmental Protection Authority
EP&A	Environmental Planning and Assessment Act (and Regulation)
EPL	Environment Protection Licence
HRT	hydraulic retention time
H2S	Hydrogen sulphide
ICNG	Interim Construction Noise Guidelines (EPA, 2009)
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
NRAR	Natural Resource Access Regulator
REF	Review of Environmental Factors
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
VDB	Vaucluse Diamond Ba
VOOS	Vaucluse Ocean Outfall Sewer
WASA	Water Services Association of Australia
WMP	Waste Management Plan
WSW, WAL	Water Supply Works, Water Access Licence (groundwater approvals)
WWTP	Wastewater Treatment Plant

1 Introduction

Three ocean outfalls on the Vaucluse peninsula remain as the only outfalls on the NSW coast that continue to discharge untreated wastewater into the ocean. The ocean outfall located at Vaucluse has been in operation since 1918, and the outfalls at Diamond Bay and Dover Heights have been in operation since the 1930s.

In 2016, the EPA issued a Pollution Reduction Program requiring Sydney Water assess the level of risk to the environment and public health posed by these outfalls. In response to the findings of the pollution study, Sydney Water initiated the "Refresh Vaucluse and Diamond Bay" project in March 2018. This work culminated in the NSW Government announcing its commitment to Sydney Water's proposed solution to stop the continuous flow of untreated wastewater from the last three ocean outfalls in Sydney in November 2018.

The proposed solution involves transferring wastewater flows from the existing ocean outfalls to the Bondi Wastewater Treatment Plant (WWTP). This would be achieved by constructing and operating two new wastewater pumping stations, new wastewater pipelines and ancillary infrastructure in the Vaucluse and Diamond Bay areas to divert flows away from the ocean and send it to the Bondi WWTP.

The principle objectives of the proposal are to protect public health and the environment. Once operational, the proposal would significantly reduce pollution to the environment by eliminating wastewater entering the environment from the three ocean outfalls. We anticipate a 93 percent reduction in the volume of untreated wastewater discharged to the ocean.

We prepared a Review of Environmental Factors (REF) for the project in June 2020. The REF identified impacts to biodiversity and typical construction impacts, such as traffic, dust and noise. The REF concluded that by adopting the mitigation measures listed we are unlikely to have a significant impact on the environment.

We exhibited the REF from 8 June 2020 to 28 June 2020 where state government, local government, community members and other interested stakeholders were invited to comment on the project. We received 33 submissions raising 147 comments about each of the aspects addressed in the REF, such as noise and vibration, odour, flora and fauna and visual impacts. This Decision Report responds to the submissions received.

1.1 The purpose of the decision report

This Decision Report:

- considers the comments raised in the submissions
- identifies any changes to the project that have resulted from consideration of the submissions or subsequent planning or concept design work
- identifies whether any new mitigation measures, or changes to existing mitigation measures, are required

- recommends whether we should proceed with the proposal.

1.2 Planning approval framework

The *Environmental Planning and Assessment Act* 1979 (EP&A Act) provides the statutory context for the project's environmental assessment. The project has been assessed under Part 5.1 of the EP&A Act, with Sydney Water as the determining authority. The State Environmental Planning Policy (Infrastructure) 2007 allows us to undertake the project without development consent.

The REF assessed the potential environmental impacts of the Refresh Vaucluse and Diamond Bay project. We considered the potential impacts against matters listed in clause 228 of the *Environmental Planning and Assessment Regulation* 2000 (EP&A Regulation). We concluded that the project is unlikely to have a significant impact on the environment. This report outlines our consideration of the comments raised in submissions received during the public exhibition of the REF and whether our conclusion has changed as a result.

1.3 Summary of the project from the REF

The project, as described in the REF, involves eliminating the continuous flow of untreated wastewater entering the environment by diverting the wastewater flows from the three ocean outfalls to Bondi WWTP.

In summary, the REF described the scope of works as:

- the transfer of dry weather wastewater flow from the Vaucluse, Diamond Bay and Dover Heights ocean outfalls to Bondi WWTP
- the construction of two new wastewater pumping stations, one at Parsley Bay and one at Eastern Avenue Reserve
- the construction of a new 1.8 km wastewater pipeline from Parsley Bay to Carlisle St, at a depth of up to 60 m
- the construction of wastewater infrastructure, including pipes, maintenance holes and ventilation points in Vaucluse, Diamond Bay, Dover Heights and Rose Bay.

1.4 Project objectives

The principle objectives of this proposal are to protect public health and the environment. In implementing these objectives, Sydney Water will achieve the following outcomes:

- reduce risks to human health
- enable environmental improvement by eliminating the continuous flow of untreated wastewater into the ocean environment
- reduce plastic and other solid waste entering the ocean via the outfalls.

1.5 Further environmental assessment

The REF was developed based on a concept design of the project. Since the REF was placed on public display, and in response to the community and stakeholder submissions received, there have been some changes to the concept design of the pump station at Parsley Bay, to reduce and refine the area of impact (Section 3).

Further project refinements may be necessary during the detailed design phase. If later design changes involve environmental impacts not assessed in the REF or this Decision Report, an REF Addendum will be prepared. Further environmental impact assessments will also be placed on Sydney Water's website.

2 Consultation

Sydney Water is committed to ensuring that all information regarding the Refresh Vaucluse and Diamond Bay is clear, accurate and timely.

Consultation with key stakeholders commenced in 2018 and will continue throughout the upcoming project phases – detailed design, construction and operation - with community members being consulted where the project directly impacts them.

This consultation will be undertaken by a team selected by Sydney Water to deliver project communications. As representatives of Sydney Water, all community relations' policies and procedures will be adhered to and we will continually monitor their performance during project delivery.

The following sections describe the consultation done to date and proposed future consultation during upcoming phases of the project.

2.1 Community Reference Group (CRG)

Following a public expression of interest process in May 2018, 12 residents from Dover Heights, Vaucluse, Rose Bay and North Bondi were selected to be part of a Community Reference Group (CRG). The purpose of this CRG was to enable Sydney Water to better understand community expectations for the Vaucluse and Diamond Bay ocean outfalls, so that community values could be included in decision-making for the long-term solution.

The CRG process was robust and effective in understanding the community's expectations. Between May and August 2018, Sydney Water took the group on a journey from understanding the results of the pollution study, the way wastewater systems work and more technical discussions on the options (seven in total) developed through the detailed planning process.

While the CRG and other external stakeholders were asked to express their views, Sydney Water indicated from the outset that the responsibility for the decision on the proposed solution would lie with Sydney Water.

Alongside the CRG, Sydney Water also sought feedback from the wider community. Over 3000 individual users visited the Refresh Vaucluse and Diamond Bay project page on Sydney Water's online engagement platform, Sydney Water Talk, and around 300 residents attended six pop up information sessions held in Rose Bay and Diamond Bay in November 2019.

2.2 REF public display

The REF was on public display from Monday 8 June to Sunday 28 June 2020.

We invited the community and stakeholders to provide written submissions on the REF by:

- delivering a community newsletter to 14,602 local residents. The newsletter informed the community of our proposed work, the REF being on display and invited written submissions
- including a QR code in the newsletter which, if scanned, enabled community members to download an App to their phone. This App contained the content of the newsletter plus a questionnaire and sign-up function for regular project updates. The App has been installed 52 times, visited 80 times and shared 16 times since 8 June 2020
- The REF was displayed on the Refresh Vaucluse and Diamond Bay Project page of the Sydney Water Talk website. This page received a total of 702 visits during the display period and the REF was downloaded 67 times
- Sending a letter to relevant government agencies and councils advising of the REF display dates and the submission process. This included:
    - Gabrielle Upton MP
    - Woollahra Council
    - Waverley Council
    - Environment Protection Authority
- A media release was issued to local media and resulted in an article in the Wentworth Courier on Wednesday 10 June 2020
- An email with a link to the REF was sent to 235 subscribers of the Refresh Vaucluse Diamond Bay project page
- The REF was also promoted on the Sydney Water LinkedIn and Twitter pages. The LinkedIn post received 272 reactions and nine comments, while the Twitter post received 19 likes and four re-tweets. A further Tweet was posted on 23 June to encourage submissions. This was re-tweeted three times and was liked five times.

Due to the Covid-19 pandemic and the need to practice physical distancing, the REF display and community engagement during this phase was generally conducted digitally and with minimal group gatherings. However face-to-face engagement did occur whilst practicing social distancing with properties that could be directly impacted by the work.

There was little opportunity to display copies of the document in libraries as these premises were closed during the display period. However, the REF was published on Sydney Water Talk with virtual and face-to-face community engagement opportunities as per below.

2.2.1 Door knocks

During the REF display period, the community engagement team door knocked 237 properties closest to the proposed work areas. Of these, 43 residents were at home, which enabled a brief discussion about the project and potential impacts. Where residents were not at home, we left postcards encouraging the residents to get in touch with the Sydney Water team. These postcards were also distributed to an additional 260 homes near the work areas.

2.2.2 Virtual information sessions

Three virtual community information sessions were held during the REF display period. These took place via Zoom and were held on:

- Tuesday 16 June, 5.30pm – 7pm
- Thursday 18 June, 5.30pm – 7pm
- Wednesday 24 June, 5.30pm - 7pm.

A total of 33 people registered on Eventbrite to attend the information sessions, with 20 people attending the sessions.

Each session involved a presentation on the project background and interactive online questions to gauge existing levels of understanding and concern about the project. This was followed by short overview presentations on the different work areas of the project. Participants were encouraged to ask the Sydney Water team questions and outline any concerns. Online questions were also used to gauge support for and concerns about the project.

2.3 Further consultation since exhibition of the REF

Following exhibition of the REF, Sydney Water has continued consultation with both Waverly and Woollahra Council's on the proposal, including location of infrastructure, timing and other council projects in the area.

We also met with Woollahra Council and adjacent residents at Parsley Bay between August and November. Key matters raised by Council during the site meetings relate to:

- reducing community impacts including noise associated with rock breaking, as well as traffic and safety impacts
- minimising vegetation clearing and protecting threatened species
- maintaining or providing new and replacement infrastructure, such as the amenities block and parking spaces
- avoiding impacts to big canopy trees by retaining the large fig tree and certain branches
- providing appropriate revegetation, including initial planting and maintenance
- co-locating infrastructure where possible (such as the electrical kiosk)
- environmental management and construction methodology/techniques.

In response to these concerns, we have amended the design of the pump station which will reduce vegetation clearing and rock excavation. Additional mitigation measures have been included in this Decision Report to address these matters.

3 Project changes

There were several submissions on the REF raising concerns about the proposed work at Parsley Bay. In response to these submissions, we have amended concept design of the pump station. The design changes and reduced environmental impacts are summarised in Section 3.1 below. There may be further refinements during the detailed design process to optimise design and further reduce environmental impacts where possible.

3.1 Changes to Parsley Bay wastewater pump station

As a result of follow up consultation with adjacent residents and Woollahra Council, we have amended the concept design of the pump station at Parsley Bay, thereby reducing community and environmental impacts.

The amended pump station design at Parsley Bay includes:

- refining the layout and siting of the wastewater pump station largely within the footprint of the existing amenity building and car park
- reducing the area of natural rock and vegetation to be cleared
- removing the retaining wall originally proposed at the rear of the pump station and installing a new retaining wall at the front to match the existing wall
- redesigning the wastewater pipelines leading to the wastewater pump station to accommodate the amended pump station design
- co-locating the electrical kiosk with the pump station
- minor re-configuring of car park to account for some encroachment of the pump station into carparking spaces.

The below sections provide further details on how the amended design of the Parsley Bay pump station will reduce impacts associated with vegetation, noise and visual amenity.

Aspect	Environmental improvement from project change
Vegetation	The amended pump station design reduces vegetation clearing and excavation at the site of the pump station by moving the footprint out of the natural areas and further into the car park. The total area of clearing for the pump station design has been reduced from an estimated 196 m^2 (original design) to an estimated 144 m^2 for the amended design. The amended design reduces the number of mature trees to be impacted, and the amount of branch and canopy removal required for the large Port Jackson fig tree.
Noise	The amended pump station design reduces vegetation clearing and excavation at the site by about 26%. This reduced scope of works will reduce the duration of noise and vibration impacts to nearby receivers.

Visual amenity	The pump station has been redesigned to reduce vegetation clearing ensuring the residents continue to be screened from public view from Parsley Bay by existing vegetation. Additional consideration has also been given to the visual impact of the pump station with further design amendments proposed to maintain the natural look and visual amenity of the area. The images below show the existing and indicative design of the pump station. The changes in the proposed redesign that will reduce the visual impact of the pump station include: • constructing a natural sandstone retaining wall to help blend the pump station in with the existing environment • removing the existing pedestrian access ramp to the amenities building and replacing this with native vegetation and landscaping • relocating the proposed electrical kiosk from the western side of the large fig tree to the pump station site which will further reduce the project footprint

Existing infrastructure, amenities block, vegetation and car park

Indicative proposed design for Parsley Bay pump station

Note: The loss of the car spaces is planned to be compensated by re-configuring the current car park layout.

4 Submissions

This chapter summarises the submissions received, in response to the public display of the REF.

4.1 Number of submissions and comments

All written correspondence and feedback received via email, the Sydney Water Talk website and the App were treated as submissions. On this basis, a total of 33 submissions were received during the display period (31 emailed plus two via Sydney Water Talk and the App), as well as 15 calls to the community information phone line. Copies of submissions received are included in Appendix A. Of the 33 submissions, there were 147 comments that have been addressed in this Decision Report.

4.2 Topics

An analysis of the comments identified 11 distinct topic categories, Table 1 lists the 11 topic categories as well as how many submissions, and the number of comments within the submissions, related to each topic.

The most comments received related to potential social and visual impacts, the scope of works as well as air quality and odour. There were also many supportive comments for the project which can be viewed in the submissions in Appendix A.

Table 1 REF submissions - comments/topics breakdown

Topic	No of submissions	No of comments
Social and visual	17	31
Scope of works	13	19
Air quality and odour	11	20
Noise and vibration	10	13
Flora and fauna	9	16
Environmental performance and compliance	8	12
Traffic and parking	6	12
Waste management	3	10
Topography and geology	2	2
Heritage	1	1

Topic	No of submissions	No of comments
General	9	11

Table 2 below provides a summary of all 147 comments received across the 33 formal submissions on the REF. Each comment is addressed in Section 5 below.

Table 2 Summary of comments raised in submissions

No.	Question/comment	Submission/ Agency	Location addressed in this report
Social and Visual			
1	Concern regarding the above ground infrastructure at Eastern Reserve and the impacts this will have on the amenity of the area as well as detract from recent improvement works undertaken by Waverley Council.	Submission #2	Section 5.1
2	Concern that the proposed pump station at Parsley Bay will not fit in with the natural landscape of the area.	Submission #2	Section 5.1
3	Concern that the look of the Parsley Bay pump station will not be sympathetic to the surrounding bushland area. Suggestion that a landscape architect be engaged to develop a landscape design for the area.	Submission #8	Section 5.1
4	Confirmation that the Parsley Bay pump station will be accessible by both a set of stairs and a ramp from the carpark.	Submission #12	Section 5.1
5	Query that the replacement toilet and changing room facilities should be completed and in full operation before the existing facilities are closed to the public.	Submission #12	Section 5.1
6	Query on how long the access to Parsley Bay through the reserve will be blocked during construction.	Submission #14	Section 5.1
7	Concern that the removal of vegetation near the Parsley Bay pump station will reduce the privacy of adjacent residential properties from the car park.	Submission #15	Section 5.1
8	Concern that residential properties positioned behind the Parsley Bay pump station will lose access to Parsley Bay from their properties.	Submission #15	Section 5.1
9	Confirmation that dilapidation surveys on residential properties will be undertaken prior to construction commencing.	Submission #15	Section 5.1
10	Concern regarding impact to resident swimming pool in close proximity to the Parsley Bay pump station.	Submission #15	Section 5.1

No.	Question/comment	Submission/ Agency	Location addressed in this report
11	Concern that the new amenities block will reduce the available parking space at Parsley Bay.	Submission #16	Section 5.1
12	Concern that the Parsley Bay pump station will not be sympathetic to the surrounding bushland, and that the pump station should be located beneath the existing paved car park area for less visual impact and reduced impact on tree routes.	Submission #16	Section 5.1
13	Concern that residential properties positioned behind the Parsley Bay pump station will lose access to Parsley Bay from their properties.	Submission #18	Section 5.1
14	Concern that removal of vegetation near the Parsley Bay pump station will reduce the privacy of adjacent residential properties from the car park. Question regarding whether replacement mature vegetation will be planted.	Submission #18	Section 5.1
15	Query whether access into Parsley Bay from the properties located behind the Parsley Bay pump station will remain during construction.	Submission #18	Section 5.1
16	Confirmation of a dilapidation survey on properties adjacent to the Parsley Bay pump station prior to construction.	Submission #18	Section 5.1
17	Query on being kept up to date on any changes to the design and impact footprint of the Parsley Bay pump station.	Submission #18	Section 5.1
18	Query on having further opportunity to provide feedback on the detailed design of the project.	Submission #18	Section 5.1
19	Confirmation on a dilapidation survey of their property prior to construction.	Submission #20	Section 5.1
20	Concern that Woollahra Council has not been involved in the planning process regarding the new amenities block at Parsley Bay, and that it won't be constructed prior to the project commencing.	Submission #21	Section 5.1
21	Concern that the new amenities block at Parsley Bay will not be constructed prior to the project commencing, as well as concern that a temporary amenities block will not be cater to the peak usage of the park by the public.	Submission #22	Section 5.1
22	Concern the construction work at Eastern Reserve will impact the foundations and stability of adjacent residential properties.	Submission #24	Section 5.1
23	Concern that the pump station at Eastern Reserve will impact the public open space in the area. Suggestion that the pump station be moved closer to Oceanview Avenue.	Submission #27	Section 5.1

No.	Question/comment	Submission/ Agency	Location addressed in this report
24	Concern that the new amenities block at Parsley Bay be operational before the existing amenities block is decommissioned.	Submission #31	Section 5.1
25	Query as to what pre-dilapidation investigations are proposed for public and private property adjacent to Eastern Avenue Reserve, Oceanview Street, Ray Street and Kimberly Avenue.	Waverley Council	Section 5.1
26	Concern regarding the visual impact of the vent stack at the western end of Oceanview Avenue. Waverley Council would like to be consulted on the location and design.	Waverley Council	Section 5.1
27	Suggestion that the design of the Eastern Reserve pump station should minimise impacts on sight lines and aesthetic appearance of the park.	Waverley Council	Section 5.1
28	Access through Eastern Reserve should be maintained as much as possible during construction.	Waverley Council	Section 5.1
29	Request for further information on the replacement amenities block at Parsley Bay. Including: • the plan to include a functional toilet block prior to construction. If this cannot be undertaken then a modern temporary demountable toilet to Council's approval needs to be incorporated • location and design • planning and environmental considerations • consultation of a new design.	Woollahra Council	Section 5.1
30	Concern that open trenching along Carlisle Street and Dover Road will have greater impacts on the community then less intrusive trenchless construction methodologies.	Woollahra Council	Section 5.1
31	Concern that the REF does not provide a commitment to repair and reinstate any Council land or infrastructure damaged as part of the project.	Woollahra Council	Section 5.1
Scope of works			
32	Question regarding the timing of when the Diamond Bay wastewater pipes will be diverted?	Submission #1	Section 5.2
33	Question regarding the timing of when the discharge from the outfalls will stop.	Submission #1	Section 5.2

No.	Question/comment	Submission/ Agency	Location addressed in this report
34	Concern that the proposed solar light at Eastern Reserve will not be maintained as accountability and responsibility is unclear.	Submission #2	Section 5.2
35	Query regarding the duration of the project.	Submission #4	Section 5.2
36	Query regarding how long areas of the coastal walk will be closed.	Submission #4	Section 5.2
37	Query regarding why trenchless construction methods are not utilised for laying the wastewater pipeline along Oceanview Avenue as impacts to the residents would be reduced.	Submission #4	Section 5.2
38	Query regarding what infrastructure will be installed at the western end of Oceanview Avenue where the wastewater pipeline connects to the existing wastewater system.	Submission #4	Section 5.2
39	Concern that the project will exacerbate current water seepage issues currently being experienced along Carlisle Street.	Submission #10	Section 5.2
40	Query as to whether a risk assessment has been completed for the co-location of the vent stack and power supply at Eastern Reserve.	Submission #12	Section 5.2
41	Concern that the construction footprint at Parsley Bay is larger than expected and from what was previously communicated.	Submission #15	Section 5.2
42	Question regarding the timing, duration and hours of work for work on Dover Road, Rose Bay.	Submission #17	Section 5.2
43	Concern that the Parsley Bay pump station footprint is larger than the existing amenities block. Explanation as to why a larger area is needed to accommodate the pump station.	Submission #18	Section 5.2
44	Query regarding resurfacing Carlisle St at the completion of the works.	Submission #20	Section 5.2
45	Query regarding having the proposed footprint at Parsley Bay marked out in situ so further comment can be made.	Submission #22	Section 5.2
46	Concerns that the REF has not adequately assessed the operational impacts of the Parsley Bay pump station on public health, safety and the environment.	Submission #26	Section 5.2
47	Concerns that pressurised wastewater may leak resulting in contamination to an important public and environmentally sensitive area. Wastewater pump stations should not be built near a public beach.	Submission #26	Section 5.2
48	Concern regarding the design of the pump station at Eastern Reserve.	Submission #27	Section 5.2

No.	Question/comment	Submission/ Agency	Location addressed in this report
49	Suggestion that the works at Diamond Bay be timed with the upgrade of the public boardwalk.	Waverley Council	Section 5.2
50	Road restoration work on Oceanview Avenue has technical requirements and Council would like further consultation regarding the scope of these works.	Waverley Council	Section 5.2
Air quality and odour			
51	Concern regarding odour from the infrastructure along Carlisle Street.	Submission #3	Section 5.3
52	Concern regarding odour from the Vaucluse wastewater pipeline. Questions regarding the frequency of pumping and the use of odour neutralising agents.	Submission #12	Section 5.3
53	Query regarding why the pump station at Parsley Bay has a vent stack and the Eastern Reserve pump station does not.	Submission #15	Section 5.3
54	Concern regarding odour from the vent stack at the Parsley Bay pump station, and that is should be eliminated or moved.	Submission #15	Section 5.3
55	Question regarding whether the existing vent stack at Parsley Bay will be moved, and if existing odours will be eliminated.	Submission #18	Section 5.3
56	Concern on the relocation of the existing vent stack on Carlisle St and potential impact to vegetation. Query on whether the new vent stack will require an odour control unit and whether it will impact on property values.	Submission #20	Section 5.3
57	Concern regarding the location of the vent stack along Carlisle St and associated potential impacts.	Submission #23	Section 5.3
58	Concern that the vent stack will create a bad odour and reduce the air quality. The wind often blows up Eastern Avenue from off shore.	Submission #24	Section 5.3
59	Concern that the size of the vent stack at Eastern Reserve is large and is a visual pollutant.	Submission #24	Section 5.3
60	Concern regarding the location of the vent stack along Carlisle Street and the frequency of odour emissions and impact to human health to surrounding residents.	Submission #28	Section 5.3
61	Concern regarding the relocation of the vent stack on Carlisle Street, including why the existing vent stack cannot be utilised and what the function of the new one will be.	Submission #29	Section 5.3

No.	Question/comment	Submission/ Agency	Location addressed in this report
62	Concern regarding the odour currently generated from Bondi WWTP, including frequency of testing and what mitigation measures are in place to treat the odour.	Submission #29	Section 5.3
63	Suggestion for installing an odour control unit at each of the proposed vent stacks.	Submission #29	Section 5.3
64	Concern regarding no provision for odour control and mitigation at vent stacks.	Submission #30	Section 5.3
65	What studies have been completed to determine the levels of foul air expected by the proposal?	Submission #30	Section 5.3
66	What methodology will be used to assess the impact of foul air/ odour during commissioning and operation of the new infrastructure? How will it be monitored?	Submission #30	Section 5.3
67	Concern regarding the acceptability of odour and if Sydney Water employees would put up with odour near their homes.	Submission #30	Section 5.3
68	Query regarding current mitigation measures for reducing odour at Bondi WWTP and how impacts to surrounding residents are evaluated.	Submission #30	Section 5.3
69	Suggestion that all potential air and odour emissions be identified during both construction and operation and strategies be proposed to minimise their impact.	EPA	Section 5.3
70	Query to clearly document the odour assessment process and standards used in planning documentation.	EPA	Section 5.3
Noise and vibration			
71	Concern regarding the impact of drilling near Fitzwilliam Road on residential properties, including noise and structural damage.	Submission #7	Section 5.4
72	Query regarding the change in noise and odour levels before and after the completion of the project at Eastern Reserve.	Submission #9	Section 5.4
73	Question regarding whether there will be audible noise from the pump stations once they are operational.	Submission #15	Section 5.4
74	Question regarding the length of noise and vibration during construction.	Submission #18	Section 5.4
75	Concerns regarding noise generated between 7 am – 8 am and impacts on surrounding residents and school age children.	Submission #22	Section 5.4
76	Concern regarding noise pollution from the pump stations and how frequent they will operate.	Submission #24	Section 5.4

No.	Question/comment	Submission/ Agency	Location addressed in this report
77	Concern regarding noise pollution from the proposed vent stack on Carlisle Street.	Submission #28	Section 5.4
78	Question regarding the expected increases to the ambient noise levels at Parsley Bay and Eastern Avenue.	Submission #30	Section 5.4
79	Concern that the predicted construction noise levels for a number of highly affected receivers are significantly above the highly noise affected criteria of 75db(A)	EPA	Section 5.4
80	Statement that it is critical for Sydney Water to work toward mutually acceptable and negotiated outcomes with the affected community, including regular and responsive communication and consultation with the community in a transparent and honest matter.	EPA	Section 5.4
81	Suggestion that a noise and vibration assessment be undertaken at the detailed design phase to ensure that the final design of the pump stations comply with the requirements of the EPA's Noise Policy for Industry (NPI). This includes post-commissioning validation of operational noise levels.	EPA	Section 5.4
82	Consideration of best practice environmental noise management in relation to industry published guidelines, such as the Environmental Noise Management Manual and the Construction Noise Strategy.	EPA	Section 5.4
83	Recommendation that quantitative vibration monitoring be undertaken and reported on with maximum limits for vibration set by a suitable qualified geotechnical engineer.	Waverley Council	Section 5.4
Flora and fauna			
84	Suggestion that mature trees be planted in the grassed area of Parsley Bay to provide more shade.	Submission #8	Section 5.5
85	Query regarding the REF not assessing impacts to native fauna, including the Eastern Water Dragon and freshwater eel. Also concern regarding the discharge of any dewatering into Parsley Creek.	Submission #12	Section 5.5
86	Concern regarding which mature trees near the Parsley Bay pump station will be removed.	Submission #15	Section 5.5
87	Concern regarding the impact of the Parsley Bay pump station on the root systems and canopy of adjacent mature trees.	Submission #16	Section 5.5
88	Concern that the project will have a negative impact on the habitat of native plants and animals at Parsley Bay. Further	Submission #18	Section 5.5

No.	Question/comment	Submission/ Agency	Location addressed in this report
	consideration should be given to the natural environment as the design progresses.		
89	Concern regarding the impact of the project on rare and threatened species at Parsley Bay and Diamond Bay. Suggestion that plants be translocated and reinstated after construction.	Submission #22	Section 5.5
90	Concern regarding the impact to the *Eucalyptus robusta* near the trench entrance at Parsley Bay, as well as the soil seed bank which is known to contain the threatened *Acacia terminalis* sp *terminalis*, as well as impact to *Syzigium paniculatum* individuals.	Submission #22	Section 5.5
91	Consultation with Woollahra Council Bush Regeneration crew is required regarding impacts to flora and fauna.	Submission #31	Section 5.5
92	Concern that the vegetation along Carlisle Street will be impacted by the proposed works.	Submission #31	Section 5.5
93	Suggestion that the Eastern Reserve pump station design should include coastal native heath plantings to improve the overall appearance.	Waverley Council	Section 5.5
94	Concern regarding the clearing of remnant vegetation at Diamond Bay. Suggestion that alternative access points be investigated and that any required vegetation removal be undertaken by a bush regeneration contractor that can maximise native plant relocation and minimise weed densities.	Waverley Council	Section 5.5
95	Utilisation of existing disturbed areas of the boardwalk is favourable over impacting vegetation communities.	Waverley Council	Section 5.5
96	Concern that the REF and supporting Flora and Fauna (Biodiversity) report does not adequately assess the environmental impacts of the project on Parsley Bay bushland and the threatened species for which it provides habitat.	Woollahra Council	Section 5.5
97	Concern that the footprint of the construction works at Parsley Bay are larger than expected, and that the REF is not clear on how the disturbed vegetation will be restored.	Woollahra Council	Section 5.5
98	Query as to how rehabilitation of vegetation at Parsley Bay will occur, and that further work is needed to quantify and minimise vegetation impacts.	Woollahra Council	Section 5.5
99	Concern that groundwater will be discharged to Parsley Creek, which leads to Parsley Bay, which provides habitat for	Woollahra Council	Section 5.5

No.	Question/comment	Submission/ Agency	Location addressed in this report
	seagrasses and the endangered White's Seahorse. What testing and scheduling will be undertaken prior to any discharge?		
Environmental performance and compliance			
100	Query regarding the extent of environmental improvement that is expected from the project, e.g. improvements to water quality.	Submission #6	Section 5.6
101	Concern regarding the location of the Parsley Bay pump station and if alternative locations were considered.	Submission #8	Section 5.6
102	Concern regarding the frequency of discharge from the outfalls during wet weather, including the capacity of the Rose Bay submain during wet weather, and whether the duration and quantity of discharge from the outfalls in wet weather will be recorded and made available to the public.	Submission #12	Section 5.6
103	Question regarding frequency of wet weather overflows from Diamond Bay ocean outfalls.	Submission #12	Section 5.6
104	Concern regarding the impact the additional wastewater flow will have on Bondi WWTP, including scale, hours of operation, noise and odour.	Submission #13	Section 5.6
105	Question regarding the current location of discharge of wastewater in Vaucluse and Diamond Bay, and what catchments the outfalls are servicing. Also concern regarding potential discharge into Parsley Bay and why this area was chosen as the location of the wastewater pump station.	Submission #14	Section 5.6
106	Question regarding where the wastewater is discharged once it is diverted to Bondi WWTP, including any requirements to extend the deep ocean outfall.	Submission #14	Section 5.6
107	Concern regarding how safe the treated wastewater is for the ocean, marine life and future generations.	Submission #14	Section 5.6
108	Concerns regarding the pump station at Parsley Bay having a negative impact on the bay and environment.	Submission #25	Section 5.6
109	The REF does not show the catchments which are currently serviced by the outfalls that will be redirected.	Submission #31	Section 5.6
110	Suggestion to consider and document the potential impact of the works on the existing reticulation network and infrastructure.	EPA	Section 5.6
111	Concern that consideration needs to be given to any existing infrastructure that may require upgrade to support the additional flows and increased maintenance requirements and/or risk of	EPA	Section 5.6

No.	Question/comment	Submission/ Agency	Location addressed in this report
	environment impact such as dry and wet weather overflows and additional load on Bondi WWTP.		
Traffic and parking			
112	Concern that the information provided in the Construction Traffic Impact Assessment relating to New South Head Road is incorrect.	Submission #12	Section 5.7
113	Concern regarding the proposed traffic route from Parsley Bay is inadequate and missing information between Vaucluse Road and Parsley Road. Suggestion that Vaucluse Road not be used and that Fitzwilliam Road and Hopetoun Avenue be used.	Submission #12	Section 5.7
114	Concern that the number of vehicle movements provided in the REF is an underestimate.	Submission #12	Section 5.7
115	Query regarding the number of available parking spots at Parsley Bay and whether they will be reduced once the project has finished.	Submission #12	Section 5.7
116	Concern regarding the impacts to traffic along Carlisle Street during construction. Request for a traffic management plan.	Submission #19	Section 5.7
117	Concern regarding street parking along Conway Ave during construction.	Submission #20	Section 5.7
118	Concern that the public use of Parsley Bay will be disrupted during construction, and that safe access to the park is still available.	Submission #22	Section 5.7
119	Concern that Woollahra Council staff need access to all areas of Parsley Bay during construction to continue maintenance duties.	Submission #22	Section 5.7
120	Suggestion that any vehicular access to Eastern Reserve be minimised.	Waverley Council	Section 5.7
121	Concern that the car park at Parsley Bay will be out of action for 12 months, particularly as council has just designed an accessible play-space. Request for at least a drop off, or accessible car space to be made available.	Woollahra Council	Section 5.7
122	Clarification on access tracks in Parsley Bay bushland that will be utilised during construction.	Woollahra Council	Section 5.7
123	Request that the REF include reference to the Local Government Act and the Roads Act and address how the project fulfils the requirements of both acts with respect to entering and altering Council controlled lands and assets.	Woollahra Council	Section 5.7

No.	Question/comment	Submission/ Agency	Location addressed in this report
Waste management			
124	Query as to whether there is another potentially contaminated site to the east of Carlisle Street at the junction of Hamilton Street and Old South Head Road.	Submission #12	Section 5.8
125	Suggestion to develop an Unexpected Finds Protocol in relation to potential contamination.	EPA	Section 5.8
126	Ensure that any reports submitted to the EPA under the *Contaminated Lands Management Act 1997* (CLM Act) are prepared, or reviewed and approved, by a certified consultant.	EPA	Section 5.8
127	Suggestion that an Acid Sulphate Soils Management Plan be developed for the project.	EPA	Section 5.8
128	Reminder that the EPA should be notified under Section 60 of the CLM Act for any identified contamination that meets the triggers in the Guidelines for the Duty to Report Contamination.	EPA	Section 5.8
129	Reminder that where relevant, works must be carried out in accordance with EPA guidelines made or approved under Section 105 of the CLM Act.	EPA	Section 5.8
130	Suggestion on a number of aspects to be included in the Waste Management Plan.	EPA	Section 5.8
131	Reminder that all asbestos waste loads over 100kg or 10 m2 removed from site must be tracked using the EPA's online "Waste Locate" system. Any rejected waste due to the presence of asbestos must not be reprocessed but transported to a facility that can lawfully receive asbestos waste.	EPA	Section 5.8
132	Reminder that any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal, except Virgin Excavated Natural Material as defined by the Waste Classification Guidelines issued by the EPA that are current at that time, is not permitted unless expressly permitted by planning legislation and/or approvals and/or consents relevant to the site.	EPA	Section 5.8
133	Concern where waste from trenching will be stockpiled at Parsley Bay.	Woollahra Council	Section 5.8
Topography and geology			

No.	Question/comment	Submission/ Agency	Location addressed in this report
134	Question regarding what plans are in place to ensure the area around Parsley Bay pump station remains stable if large boulders need to be removed	Submission #18	Section 5.9
135	Query that work in Eastern Reserve should not weaken the sandstone geology resulting in the failure of the sandstone in advance of that caused by natural processes.	Waverley Council	Section 5.9
Heritage			
136	Concern that the REF does not include the Heritage Impact Statement in the Appendix, and that it should include reference to State Heritage Listed street name plates within the footpath and kerbs.	Woollahra Council	Section 5.10
General			
137	Suggestion that the project should have acquired a residential block rather than place the infrastructure in public reserves.	Submission #2	Section 5.11
138	Questions regarding the wastewater pump station at Marine Parade, Watsons Bay, including how it fits into the project, if any work is proposed at this location, if any capacity and condition assessments have been undertaken and how back flow in the reticulation network and overflows are being addressed.	Submission #5	Section 5.11
139	Query regarding how the project will address current Rose Bay foreshore health issues, including health issues and proposed management measures.	Submission #6	Section 5.11
140	Suggestion that the kiosk/ café building at Parsley Bay should be renovated and updated as part of the project.	Submission #8	Section 5.11
141	Comment that fresh stormwater should be diverted over the blue mountains instead of discharged into the ocean.	Submission #10	Section 5.11
142	Query regarding the condition of the Vaucluse Ocean Outfall between Parsley Bay and the Pacific Ocean and what works are planned over the next 50 years.	Submission #12	Section 5.11
143	Suggestion that the REF and supporting documents should still be made available on the Sydney Water Talk website after the submission period has closed.	Submission #12	Section 5.11
144	Query regarding the structure of the REF.	Submission #12	Section 5.11
145	Query regarding the reuse of wastewater.	Submission #14	Section 5.11

No.	Question/comment	Submission/ Agency	Location addressed in this report
146	Concern that the improvements from the project are not based on actual scientific data.	Submission #24	Section 5.11
147	Concern regarding the justification of the project if there is minimal impact to public health due to inaccessibility to the coastline where the existing outfalls are located.	Submission #30	Section 5.11

5 Consideration of submissions

This chapter addresses the comments raised in the submissions received. Each submission was reviewed, and specific concerns have been identified and grouped for the environmental aspects as presented in the REF.

The concerns raised by submissions are presented in boxes and our response is provided below. The text from each submission has been paraphrased as per Table 2 in Section 4 above. If a submission raised several comments, only the relevant parts of the submission have been presented for each issue. The exact text of each submission is provided in Appendix A.

5.1 Social and visual

Concern regarding the above ground infrastructure at Eastern Reserve, the impact it will have on the amenity of the area and how it will detract from recent works by Waverley Council.

Concern that the pump station at Eastern Reserve will impact the public open space in the area. Suggestion that the pump station be moved closer to Oceanview Avenue.

Suggestion that the design of the Eastern Reserve pump station should minimise impacts on sight lines and aesthetic appearance of the park.

The Eastern Reserve pump station has been designed to have most of the infrastructure located below ground. This will reduce the visual impact of the pump station once it has been constructed as most infrastructure will not be visible. Some infrastructure, such as the electrical kiosk, needs to be above ground for access and to provide ventilation for the safe operation and maintenance of the pump station.

The covers of the access hatches to the below ground infrastructure will be flush with the ground surface. It is proposed to plant grass around the hatches to minimise their visual impact by blending into the surrounding ground cover of the reserve. Native coastal health vegetation will also be planted around the pump station to further minimise any visual impact. We will engage a landscape architect to scope the landscaping works to blend with the existing environment. We will consult surrounding residents to ensure they have an opportunity to provide feedback on the concept design of the pump station and highlight any areas of concern.

Several locations for the pump station at Eastern Reserve were considered during the planning phase of the project. The current location is the preferred location based on:

- the need to intercept the existing Diamond Bay ocean outfalls located at Diamond Bay and Eastern Reserve
- the need to construct on stable ground and avoid large caverns located under the cliff face along Eastern Reserve which were identified during the investigation phase of the project.

Concern that the Parsley Bay pump station will not fit in the natural landscape of the area.

Concern that the Parsley Bay pump station will not be sympathetic to the surrounding bushland area. Suggestion that a landscape architect be engaged to develop a landscape design for the area.

Concern that the Parsley Bay pump station will not be sympathetic to the surrounding bushland, and that the pump station should be located beneath the existing paved car park area for less visual impact and reduced impact on tree routes.

In response to written submissions and further consultation with Woollahra Council, the design of the pump station at Parsley Bay has been amended. The footprint has been moved slightly into the car park area and the overall footprint has been reduced.

It is not possible to locate the pump station completely beneath the existing paved car park. This is due to the location of existing wastewater infrastructure within Parsley Bay, which sits at levels higher than the adjacent car park. Locating new infrastructure below existing infrastructure would increase the risk of wastewater overflows. In addition, some infrastructure, such as the electrical kiosk needs to be above ground for access, and to provide ventilation for the safe operation and maintenance of the pump station.

Although vegetation removal will be required for construction of the pump station and ancillary infrastructure at Parsley Bay, we have reduced the amount of vegetation clearing (and rock breaking) by refining the design. We will work with Woollahra Council and local bushcare groups to offset this vegetation at a higher ratio. About 12 trees will need to be removed at the pump station site, however this will be minimised during detailed design where possible. During the upcoming project phases, we will develop a detailed revegetation plan for Parsley Bay which will include a landscape plan for reducing the visual impact of the pump station. We will engage qualified and experienced bush regenerators to undertake the work in consultation with Woollahra Council's Bushland Maintenance team.

Different locations for the pump station at Parsley Bay were considered during the planning phase of the project. The current location is the preferred location based on:

- the need to intercept the Vaucluse Ocean Outfall Sewer (VOOS) which is located at Parsley Bay in order to divert the flow to Rose Bay
- consultation with Woollahra Council, Vaucluse Precinct Committee and the CRG
- comparatively minimal environmental impact as the pump station will largely be in a previously disturbed area, i.e. mostly within existing footprint of the amenities block, which is not highly visible from the Parsley Bay foreshore area
- replacement of the existing amenities block with a modern amenities block in a more accessible and safe location.

Confirmation that the Parsley Bay pump station will be accessible by both a set of stairs and a ramp from the carpark.

The Parsley Bay pump station will be accessible via a set of stairs and a ramp. Sydney Water operational and maintenance staff will periodically access the site to carry out inspections and maintenance of the pump station.

Query on how long the access to Parsley Bay through the reserve will be blocked during construction.

It is estimated that the works at Parsley Bay will take approximately 12 months. During detailed design, the staging and timing of the project will be developed. We will consult with surrounding residents and Woollahra Council once we have determined the extent and duration of work at the Parsley Bay car park and surrounding public areas. At this stage, we are planning to use only the existing car park for construction activities. Access to the remainder of Parsley Bay will be maintained.

We will aim to minimise our construction footprint as much as possible, as well as the duration of the work at Parsley Bay. It is not expected that the grassed reserve of Parsley Bay will be blocked during construction. All efforts will be made to confine the construction work to the existing car park and to ensure pedestrian access to the reserve is maintained during construction.

Concern that residential properties positioned behind the Parsley Bay pump station will lose access to Parsley Bay from their properties.

Query whether access into Parsley Bay from the properties located behind the Parsley Bay pump station will remain during construction.

Concern that removal of vegetation near the Parsley Bay pump station will reduce the privacy of adjacent residential properties from the car park. Question regarding whether replacement mature vegetation will be planted.

Due to redesign of the pumping station, the existing access tracks through the bushland areas of Parsley Bay will now be available after construction of the project. However, access to areas around the existing amenities block and car park will be restricted during construction to protect public safety. There will be times when track access to other areas of Parsley Bay will be temporarily blocked during certain construction activities, however, restrictions will be temporary and alternative access provided where possible. The staging of construction activities will be determined during the detailed design phase. We will consult with any impacted residents during these phases if restrictions to any existing access tracks are identified.

Vegetation trimming and removal will be required at the location of the Parsley Bay pump station and for associated infrastructure works. The REF assessed the maximum vegetation that may need to be removed. However, in response to community feedback following the REF, we have amended the pump station design, and this has reduced the amount of vegetation to be cleared. Some trees will be removed (see Section 5.5 for further details) but these will have limited potential to impact privacy.

During upcoming project phases, we will look to further reduce the amount of vegetation clearing. We will aim to restrict vegetation removal to ground coverage and retain large mature vegetation. If this cannot be achieved, we will consult any impacted adjacent landowners and seek to replace these with mature specimens wherever possible.

All cleared vegetation will be offset (re-planted) at a higher ratio. However, replacement vegetation may not be able to be replanted in the same location. We will work with Woollahra Council and local bushcare groups regarding our proposed revegetation plan for Parsley Bay.

Confirmation that dilapidation surveys on residential properties will be undertaken prior to construction.

Confirmation of a dilapidation survey on properties adjacent to the Parsley Bay pump station prior to construction.

Confirmation on a dilapidation survey of their property prior to construction.

Concern regarding impact to resident swimming pool in close proximity to Parsley Bay pump station.

Query as to what pre-dilapidation investigations are proposed for public and private property adjacent to Eastern Reserve, Oceanview Street, Ray Street and Kimberly Avenue.

Concern the construction work at Eastern Reserve will impact on the foundations and stability of adjacent residential properties.

The REF (section 6.1.8) identifies that dilapidation surveys and asset condition assessments will be undertaken prior to any works that have the potential to be impacted by vibration. These surveys would be undertaken on structures located within 22 m of any area requiring rock breaking and drilling. Both the pump station sites at Parsley Bay and Eastern Reserve will require rock breaking and drilling. The nature of the work along Oceanview Street, Ray Street and Kimberly Avenue will be determined during the upcoming detailed design phase of the project.

In addition to the proposed dilapidation surveys, vibration levels will be monitored during activities such as rock breaking, to ensure the vibration levels comply with recommended guidelines and standards.

Concern that the new amenities block will reduce the available parkland space at Parsley Bay.

Concern that Woollahra Council has not been involved in the planning process regarding the new amenities block at Parsley Bay, and that it won't be constructed prior to the project commencing.

Concern that the new amenities block at Parsley Bay will not be constructed prior to the project commencing, as well as concern that a temporary amenities block will not cater to the peak usage of the park by the public.

Query that the replacement toilet and changing room facilities should be completed and in full operation before the existing facilities are closed to the public.

Concern that the new amenities block at Parsley Bay be operational before the existing amenities block is decommissioned.

Request for further information on the replacement amenities block at Parsley Bay, including:

- *the plan to include a functional toilet block prior to construction. If this cannot be undertaken then a modern temporary demountable toilet to Council's approval needs to be incorporated*
- *location and design*
- *planning and environmental considerations*
- *consultation of a new design.*

The location of the new amenities block has not yet been finally determined. We are working with Woollahra Council regarding this aspect of the project. It is intended that we will have the new amenities block operational prior to the decommissioning and demolition of the existing amenities block. However, due to project uncertainties, such as procurement and supply lead times, this cannot be guaranteed. If temporary amenity facilities are required, they will be appropriately sized for the peak usage of the park.

Query on being kept up to date on any changes to the design and impact footprint of the Parsley Bay pump station.

Query on having further opportunity to provide feedback on the detailed design of the project.

We have worked with Woollahra Council and nearby residents to amend the design of the pump station and reduce vegetation clearing and excavation (Section 3). We will continue consulting and working with the community during detailed design, as well as into construction. We will also work with the delivery contactor to minimise vegetation clearing along access routes to avoid mature trees and threatened species. If any major changes are proposed as the design progresses, we will communicate with and engage the surrounding community. Further community information sessions will be held during detailed design and prior to construction where the community will have another opportunity to provide their feedback on how we plan to deliver this project.

Concern regarding the visual impact of the vent stack at the western end of Oceanview Avenue. Waverley Council would like to be consulted on the location and design.

Details regarding the location of the vent stack at the western end of Oceanview Avenue will be developed during detailed design. Consultation with surrounding landowners and residents, including Waverley Council, will occur regarding the need, size and location of the vent stack. We will aim to minimise the visual impact of the vent stack.

Access through Eastern Reserve should be maintained as much as possible during construction.

We will ensure access to Eastern Reserve, outside of the pump station construction site, is maintained during construction. There may be times where access to the reserve from the eastern end of Eastern Avenue will be restricted due to public safety during construction. The timing and extent of any restricted access will be determined during detailed design and into construction. We

will give as much notice as possible to the surrounding community regarding any temporary changes to accessing Eastern Reserve.

Concern that open trenching along Carlisle Street and Dover Road will have greater impacts on the community then less intrusive trenchless construction methodologies.

Query regarding why trenchless construction methods are not being used for laying the wastewater pipeline along Oceanview Avenue as impacts to the residents would be reduced.

The wastewater pipeline along Carlisle Street, Dover Road and Oceanview Avenue is proposed to be delivered by open trenching for the following reasons:

- it is more efficient. Open trenching is the preferred methodology at this stage, with potential to install up to 20-30 m of pipeline per day (depending on ground and weather conditions). Trenchless installation is a longer process, which means the duration of traffic and construction impacts on surrounding residents can be greater
- the ground condition in the area has softer material, making open trench construction methods preferable
- underground services can easily be located and avoided via open trenching
- construction will progressively move along Carlisle Street, Dover Road and Oceanview Avenue, impacting adjacent residents and available street parking in small sections at a time. Trenchless construction would require the placement of a large pit at either end of Carlisle Street, Dover Road and Oceanview Avenue, which would impact adjacent residents for a longer period.

Concern that the REF does not provide a commitment to repair and reinstate any Council land or infrastructure damaged as part of the project.

The following references in the REF provide a commitment to reinstate and repair all impacted areas:

- Section 6.1.8 states that a dilapidation survey / asset condition assessment will occur prior to the commencement of works on structures that might be damaged
- Section 6.1.9 states that we will consult with the relevant traffic authority, i.e. Council, regarding restoration of pavement
- Section 6.1.9 states that any temporary access tracks will be restored to pre-existing conditions or better at the completion of works
- Section 6.1.10 states that work sites will be restored to pre-existing condition or better.

5.2 Scope of works

Question regarding the timing of when the Diamond Bay wastewater pipes will be diverted.

Construction of the Refresh Vaucluse and Diamond Bay Project is expected to begin in mid-2021 and be completed by the end of 2023. The staging of the project, including the details regarding when work will commence in Diamond Bay and other work locations identified in the REF, are yet to be determined.

Question regarding the timing of when the when the discharge from the outfalls will stop.

The continuous discharge of untreated wastewater from the ocean outfalls located at Vaucluse, Diamond Bay and Dover Heights will stop by the end of 2023.

During construction, the ocean outfalls will continue to operate. Once the new infrastructure has been built, tested and commissioned, wastewater flows will be diverted away from the ocean outfalls. This will be the final stage of the project, as such it is expected to occur mid to late 2023 based on current project timeframes.

However, during prolonged wet weather events the ocean outfalls will be used as an emergency release point when the wastewater system is at full capacity.

Concern that the proposed solar light at Eastern Reserve will not be maintained as accountability and responsibility is unclear.

Query relating to whether a risk assessment has been completed for the co-location of the vent stack and power supply at Eastern Reserve.

We will own, operate and maintain all the assets proposed for the Eastern Reserve pump station, including the proposed solar light.

During detailed design, a risk assessment of all proposed infrastructure will be undertaken. This will assist in determining the feasibility of the solar light. If any changes are required to this design, they will be communicated to the community.

Query regarding the duration of the project

Question regarding the timing, duration and hours of work for work on Dover Road, Rose Bay.

Query regarding how long areas of the coastal walk will be closed.

Suggestion that the works at Diamond Bay be timed with the upgrade of the public boardwalk.

The project is expected to commence in mid-2021 and finish in late 2023.

The staging of the work has not yet been determined. This will occur following the recruitment of a delivery contractor to deliver the work early next year. The delivery contractor will manage the next

phase of the project – detailed design – during which a staging plan will be developed outlining the timing of construction of each component of the project.

Regarding Dover Road, the work required at that location is a relatively small component of the project and should take approximately four to six weeks to complete. We will notify surrounding residents when more specific details on timing are known.

We are also working closely with Waverley Council about the timing of our works and their upgrade of the public boardwalk at Diamond Bay. Where possible, we will look for opportunities to minimise the cumulative impacts of these two projects to surrounding residents and visitors to the area. We will consult with the community when further details are known.

Query regarding what infrastructure will be installed at the western end of Oceanview Avenue where the wastewater pipeline connects to the existing wastewater system.

At the western end of Oceanview Avenue, the new wastewater pipeline from Parsley Bay will connect into the existing wastewater system that leads to Bondi's treatment plant, specifically the Rose Bay Submain which is located on Old South Head Road.

New pipes will be installed below ground and a maintenance hole cover on the surface of the road for Sydney Water access. A vent stack will also be required in the area near the intersection of Oceanview Avenue and Old South Head Road. The location of the vent stack will be confirmed during detailed design. We will work with the surrounding residents to minimise any visual impact on the community.

Concern that the project will exacerbate current water seepage issues currently being experienced along Carlisle Street.

The source of the water seepage addressed in the written submission is unknown at this stage. Water seepage may be from groundwater pooling naturally or from a leaking pipe.

Prior to any construction work commencing on Carlisle Street, we will undertake site walks and service locating. This will ensure we locate and identify all surrounding utilities and services, including any stormwater, water and wastewater pipelines. Once located, measures will be put in place to safeguard existing services during our work.

While our project will not impact the water seepage, we will work with Council prior to construction to determine whether the potential fault can be remedied during our project work. If the water seepage is from a natural groundwater source, we will obtain relevant groundwater approvals from the Natural Resources Access Regulator (NRAR).

Concern that the construction footprint at Parsley Bay is larger than expected and what was previously communicated.

Concern that the Parsley Bay pump station footprint is larger than the existing amenities block. Explanation as to why a larger area is needed to accommodate the pump station.

Query regarding having the proposed footprint at Parsley Bay marked out in situ so further comment can be made.

The location of the pump station at Parsley Bay will include the existing footprint of the amenities block and extend further to the east. The design and layout of the pump station has been refined since the REF (Section 3) to reduce the footprint as much as possible. However, work outside the existing amenities footprint is required in order to construct and install all pump station infrastructure, to the required safety standards and to meet maintenance requirements during operation of the pump station. During detailed design we will look to optimise the design and layout even further to reduce the footprint of the pump station and the area of rock and vegetation removal. The majority of infrastructure will be located below ground with hatches at the surface for access.

Query regarding resurfacing Carlisle St at the completion of the works.

Road restoration work on Oceanview Avenue has technical requirements by Waverley Council. Council would like to be liaised with regarding the scope of these works.

At the completion of the works, all impacted areas, such as roadways, will be reinstated to pre-construction conditions. We will work with Waverley and Woollahra Councils on any requirements regarding restoration of council owned land and roads, including Oceanview Avenue. We will also look to coordinate parts of the project with any planned road maintenance work by council to reduce the duration of impact to the community.

Concerns that the REF has not adequately assessed the operational impacts of the Parsley Bay pump station on public health, safety and the environment.

Concerns that pressurised wastewater may leak resulting in contamination to an important public and environmentally sensitive area. Wastewater pump stations should not be built near a public beach.

The principle objectives of this project are to protect public health and the environment by reducing discharge of untreated wastewater to the environment.

The operational impacts of the proposed pump stations at both Parsley Bay and Eastern Reserves have been assessed by the REF (section 3.2.6 and section 6). The operational impacts are considered minimal, with the REF providing mitigation measures to reduce these impacts on the surrounding environment and community.

There are no human health / safety impacts to the community associated with the operation of these pump stations. The Parsley Bay pump station will not require any discharge or overflow into Parsley Bay. Any overflows during wet weather will be captured and directed to the existing Vaucluse ocean outfall.

The new 1.8 km pipeline from the Parsley Bay pump station to Rose Bay's Carlisle Street will undergo a rigorous quality assurance and pressure testing process. The pipeline is made of polyethylene and is surrounded by grout. All welds and joins along the pipeline will be tested and will only be installed if they meet all quality assurance tests. The pipeline is designed to be leak and maintenance free. However, regular monitoring and testing undertaken at the pump station would allow any potential unexpected leaks in the pipeline to be detected.

The majority of Sydney Water's wastewater network operates via gravity, where wastewater flows to a pump station before being pumped via the wastewater mains to a treatment plant. Wastewater pump stations are generally located in the low point of the area, which is often near waterways, including public beaches.

There are five pumping stations currently operating near waterways in the Vaucluse catchment (see Figure 1 on page 58). Measures have been put in place to ensure operation of the proposed pump stations at Parsley Bay and Eastern Reserve would not have any impact on the surrounding environment. This includes diverting wet weather flow to the ocean outfalls when the pump station is at full capacity.

Concern regarding the design of the pump station at Eastern Reserve.

The pump station at Eastern Reserve has been designed to be mainly below ground and therefore minimise the visual impact on the community. In addition to this, there are numerous large caverns located under the cliff that limit the available space to construct the pump station. During detailed design, we will continue to work with Waverley Council and the adjacent residential properties on the placement and design of above ground infrastructure, such as retaining the existing white picket fence and the placement of the electrical kiosk.

5.3 Air quality and odour

Concern regarding odour from infrastructure along Carlisle Street.

Concern on the relocation of the existing vent stack on Carlisle St and potential impact to vegetation. Will the new vent stack require an odour control unit and will it impact on property values.

Concerns regarding the location of the vent stack along Carlisle St and associated potential impacts.

Concern regarding the location of the vent stack along Carlisle Street and any odour emissions and impact to human health to surrounding residents.

Concern regarding the relocation of the vent stack on Carlisle Street. Including why the existing vent stack cannot be utilised and what the function of the new one will be.

There is an existing vent stack on Carlisle Street located on the south-eastern side of the road near the boundary of no. 37 and no. 39-43.

During detailed design of the project, investigations will be completed to determine if the proposed wastewater pipeline along Carlisle Street can connect into this existing vent stack, or if the existing

vent stack can be relocated. If feasible, there will be no additional vent stack installed at Carlisle Street. However, if connection into the existing vent stack is not feasible, we will work with local residents on an alternative location.

An odour investigation was completed during the concept design phase of the project. This assessment identified that both the Vaucluse and Diamond Bay catchments are considered to have low odour nuisance due to low Biological Oxygen Demand (BOD) and hydrogen sulfides (H_2S), both of which can produce odour. However, during the detailed design phase of the project, further assessment will be undertaken on the need for any odour control devices, such as passive carbon filters at the proposed vent stacks.

Wastewater vent stacks are commonly located in private and public property. Odour emitted from vent stacks is infrequent. As a precautionary measure, they are designed to be around 14 m high to assist with dispersion of odour away from sensitive receivers.

Concerns regarding odour from the Vaucluse wastewater pipeline. Questions regarding the frequency of pumping and the use of odour neutralising agents.

Concern regarding odour from the vent stack at the Parsley Bay pump station, and that it should be eliminated or moved.

Question regarding whether the existing vent stack at Parsley Bay will be moved, and if existing odours will be eliminated.

Query regarding why the pump station at Parsley Bay has a vent stack and the Eastern Reserve pump station does not.

The retention time of wastewater in the Vaucluse area is low, which reduces odour generation from stagnant wastewater. An odour assessment was completed to inform the concept design of the project. It identified that no odour neutralizing agents/ odour treatment was required due to the low BOD and hydrogen sulfides in the wastewater.

Both pump station locations will require a vent stack to enable passive air flow. This is outlined in Section 6.1.4 of the REF.

There is an existing vent stack located near the Parsley Bay amenities block in the bushland area. Under the amended pump station design, this vent stack will not be moved, however this will be confirmed during detailed design. Odour levels will not increase as a result of the construction of the pump station. Odour levels will be monitored from the Parsley Bay pump station following construction. If required, odour mitigation will be installed, for example a passive carbon filter, to minimise odour generation.

There is no existing vent stack at Eastern Reserve so a new one will be installed during construction of the pump station. The vent stack at the Eastern Reserve pump station will be located at the existing light pole, which will be removed and replaced with a solar light to be co-located on the vent stack. The overhead powerline that provides power to the current light pole will be removed, which will also minimse the current visual impact.

Concern regarding the odour currently generated from Bondi WWTP, including frequency of testing and what mitigation measures are in place to treat the odour.

Query regarding current mitigation measures for reducing odour at Bondi WWTP and how impacts to surrounding residents are evaluated.

The Refresh Vaucluse and Diamond Bay project will involve the diversion of dry weather wastewater flows from the Vaucluse and Diamond Bay ocean outfalls to the Bondi WWTP. Due to the small size of these catchments and with minimal growth forecasted in the area, the additional flow to the Bondi WWTP from Vaucluse and Diamond Bay is assessed as negligible. That is, it will have no impact on the plant. Therefore, the project will not involve any works to Bondi WWTP.

Odour management at Bondi WWTP currently involves:

- two odour scrubbers that capture, transfer, treat and release air back to the local atmosphere. The quality of the released air must meet EPA environmental guidelines
- monitoring concentrations of H_2S at the release points of the treated air. Monitoring is linked to the plant's computerised operation system and will set off alarms when the EPA environmental guidelines are breached
- operational personnel continually monitoring (24/7) the quality of the released treated air to the local atmosphere, as well as responding to any breakdowns and corrective maintenance of the infrastructure related to the two odour scrubbers. Monitoring odour levels is proactive to ensure adequate control measures are in place, including notification to all surrounding residents when planned maintenance is required
- registering and investigating complaints regarding odour at Bondi WWTP.

Suggestion for installing an odour control unit at each of the proposed vent stacks.

Concern regarding no provision for odour control and mitigation at vent stacks

An odour investigation was completed during the concept design phase of the project. This assessment identified that both the Vaucluse and Diamond Bay catchments have low odour nuisance due to low BOD and hydrogen sulfides, both of which can often produce odour. However, during detailed design and following construction, further assessment will be undertaken on the need for any odour control devices, such as passive carbon filters, at the proposed vent stacks.

Concern that the size of the ventilation stack at Eastern Reserve is too large and is a visual pollutant.

We are concerned that the ventilation stack will create bad odour and reduce the air quality in our street. The wind often blows up Eastern Avenue from off shore.

The vent stack at the Eastern Reserve pump station is currently sized at approximately 14 m in height. Sydney Water has a standard design for its vent stacks to ensure they adequately mitigate

any odour generated by the wastewater system. The vent stack will be located at the current location of the light pole near the cliff edge, with a solar light to be co-located on the vent stack. The overhead powerline that provides power to the current light pole will be removed, both of which will minimse and improve the current visual amenity.

An odour investigation was completed during the concept design phase of the project. This assessment identified that both the Vaucluse and Diamond Bay catchments have low odour nuisance due to low BOD and hydrogen sulfides, both of which can often produce odour. The assessment showed odour control devices would not be required for the vent shafts proposed. This will be confirmed during detailed design and odour control devices (passive carbon filters) would be installed if needed.

What methodology will be used to assess the impact of foul air/ odour during commissioning and operation of the new infrastructure? How will it be monitored?

Concern regarding the acceptability of odour and if Sydney Water employees would put up with odour near their homes.

What studies have been completed to determine the levels of foul air expected by the proposal?

Suggestion that all potential air and odour emissions be identified during both construction and operation and strategies be proposed to minimise their impact.

Query to clearly document the odour assessment process and standards used in planning documentation.

The REF assesses the air quality impacts, including odour, of both the construction and operational phase of the project. Potential odour impacts during construction could occur during the initial construction period when cut-ins to allow diversion of the existing wastewater are required (approximately 1-2 weeks) and following construction when connection to the new pumping station is required (also around 1-2 weeks in duration). The remaining time when the new pump stations are being built, the system is closed (offline) and the potential for odour generation during construction from open access holes is avoided.

An odour assessment was completed during the concept design phase of the project to inform the design of the pump stations and pipelines. This assessment included:

- wastewater characterisation (presence of sulphates, dissolved sulphides concentration of BOD all of which may produce odour)
- wastewater retention time in the system (period to turn wastewater septic)
- design of wastewater systems (slope)
- presence of natural ventilation/ ingress vents
- analysis of any odour complaints in the area.

The outcome of our odour assessment is consistent with the results we have been gathering since 2010, which is when we began monitoring the quality of wastewater discharging from the ocean

outfalls. The wastewater in the catchment is found to have low levels of odour-generating substances such as sulphates, BOD, and dissolved sulphides.

The system was also analysed against the Water Services Association of Australia (WSAA) Hydrogen Sulphide Control Manual which indicates that a 2-4 hour hydraulic retention time (HRT) could result in a high potential for odour. The HRT for Vaucluse was estimated to be around 1.45 hours and the HRT for Diamond Bay was even shorter at around 0.35 hours, both well within the WSAA standard. This indicates a low risk for onset of wastewater septicity and generation of H_2S gas (odour).

The specific risk for both wastewater catchments (Diamond Bay and Vaucluse) was then considered. Diamond Bay and Vaucluse areas represent medium to high density residential areas, which increases the potential exposure levels. However, even with a medium risk in terms of residential exposure, both catchments were assessed as an overall low risk of odour potential considering all of the above factors. During detailed design, we will continue to design odour mitigation measures such as passive vent filters.

Odour testing with the use of handheld equipment and sensors will be undertaken once the pumping stations have been built to ensure no nuisance odours are detectable which may impact surrounding residents. If nuisance odour is detected, installation of odour control equipment will be considered.

5.4 Noise and vibration

Concern regarding the impact drilling near Fitzwilliam Road will have on residential properties, including noise and structural damage.

Fitzwilliam Road is located approximately 250 m from the work site at Parsley Bay and is unlikely to experience significant noise and vibration impacts (with potential to cause structural damage). There may be minor increases in noise during rock breaking activities for Fitzwilliam Street residents, however, these will be temporary and restricted to standard construction hours. Residents will also be notified when rock breaking activities are planned.

Query regarding the change in noise levels before and after the completion of the project at Eastern Reserve.

Question regarding if there will be audible noise from the pump stations once they are operational.

Concern regarding noise pollution from the pump stations and how frequently they will operate.

Question regarding the expected increases to the ambient noise levels at Parsley Bay and Eastern Avenue.

The proposed wastewater pump stations at Parsley Bay and Eastern Reserve will operate intermittently, with the pumps designed to operate at a maximum of eight starts/ stops per hour.

The pumps, which are located approximately 7 m below ground, will only operate when completely submersed in wastewater. So how often the pumps turn on and off depends on the volume of wastewater flowing into the pump station over a certain period of time. It is anticipated the pumps would turn on up to eight times per hour during peak periods (usually 6-9am and 3-8pm), about once per hour overnight, and three to four times per hour at other times. Due to the size of the catchment, we only require small sized pumps at both locations, meaning lower noise emissions. At Parsley Bay, the pump station has been designed for an inflow rate of 65 L/s (234 cubic metres/hour) and at Eastern Reserve the inflow is 30 L/s (108 cubic metres/hour).

A Noise and Vibration Impact Assessment was completed by GHD during the concept design phase (REF Appendix E). The noise generated by the pump stations during operation was assessed as low and the pump stations will be compliant with the EPAs *Noise Policy for Industry*. This is due to:

- the pump stations are small and do not require large sized pumps to operate
- the pumps will operate infrequently (up to 8 times per hour during peak periods)
- the pumps are located approximately 7 metres below ground
- the pumps only operate when completely submersed in wastewater which, including their location below ground, insulate the generation of any above ground noise. This equates to a noise reduction of approximately 20dB.

There would be noise associated with any repair/ maintenance work at the pump stations, and in the case of emergencies, for example if a diesel generator were required for an extended power outage. These impacts would be infrequent. During commission, tests would be undertaken to confirm the modelled and predicted operational noise levels from the pump stations were achieved.

Question regarding the duration of noise and vibration during construction

Concerns regarding noise generated between 7 am – 8 am and impacts on surrounding residents and school age children.

The project is expected to commence in mid-2021 and finish in mid to late 2022. The proposed construction hours for the project (REF section 3.6) are:

- Monday to Friday – 7 am to 6 pm
- Saturday – 8 am to 1 pm
- Sunday and public holidays (no work).

The areas that will take the longest to construct will be the pump stations at Parsley Bay and Eastern Reserve. Construction will take approximately 12 months to complete at these locations, with rock breaking activities expected to occur intermittently over 2-3 months. The refined design of the pump station at Parsley Bay reduces the need for excavation (and rock breaking) and provides increased separation from residential properties, reducing the magnitude and duration of potential impacts.

For trenching activities, predominately along roadways, noise and vibration impacts are limited for each receiver as the construction progresses along the alignment. Care will be taken to reduce the noise and vibration generated by the works.

Although works are permitted to begin at 7 am Monday to Friday as per the EPA's *Interim Construction Noise Guidelines* (ICNG), care will be taken to limit high noise generating activities wherever possible to after 8am.

Concern regarding noise pollution from the proposed vent stack on Carlisle Street.

Vent stacks are passive infrastructure that allow the below ground pipeline to emit air. There is currently a vent stack on Carlisle Street which we will look to use as part of this project. If this is not feasible, a new vent stack will be installed, and the existing vent stack removed. In both scenarios, there will be no operational noise from the vent stack.

Recommendation that quantitative vibration monitoring be undertaken and reported on with maximum limits for vibration set by a suitable qualified geotechnical engineer.

Section 6.1.8 of the REF notes that vibration monitoring will occur to ensure compliance with relevant standards to prevent impact to structures. This will be focused in areas where vibration generation is likely, such as rock breaking at the two pump station sites, and drilling for trenchless pipeline construction. We will continue to engage acoustic specialists to undertake vibration monitoring of the project.

5.5 Flora and fauna

Suggestion that mature trees be planted in the grassed area of Parsley Bay to provide more shade.

We will work with Woollahra Council regarding the restoration of the work sites at Parsley Bay. A landscape plan will be prepared in consultation with council. The landscape plan will include replanting impacted vegetation with similar native vegetation. As Woollahra Council own and manage the reserve, it is their decision regarding locations of replacement vegetation outside the impacted areas.

Query regarding the REF not assessing impacts on the presence of native fauna, including the Eastern Water Dragon and freshwater eel.

The REF (Section 6.1.3) assesses potential impacts on flora and fauna. It states that no impacts to native fauna are expected due to the relative minor impacts of the works. If any native fauna is encountered during construction, they will be encouraged to move out of the construction area. The construction areas will also be secured to prevent any harm to native fauna wandering into the construction areas. The Biodiversity Assessment (REF Appendix C) also concludes that the

removal of small areas of habitat which may be used by common and widespread native fauna (such as the Eastern Water Dragon and native birds) would have a negligible impact on biodiversity in the area. On the basis of this assessment, we do not anticipate impact on the Eastern Water Dragon or the freshwater eel. As noted in Appendix B, there is a small area of potential foraging habitat of the Powerful Owl which may need to be cleared, however the vegetation is unlikely to provide habitat of value for foraging or roosting. Impacts to the Powerful Owl are not expected. No-go areas have been identified to protect areas of higher biodiversity value including potential roosting habitat and large canopy trees.

Concern regarding which mature trees near the Parsley Bay pump station will be removed.

Concern regarding the impact of the Parsley Bay pump station on the root systems and canopy of adjacent mature trees.

An Arboricultural Impact Assessment was completed as part of the REF which assessed the impact of the project on mature trees around the proposed pump station location at Parsley Bay. The area of clearing for the project was provided as a 'worst case' assessment and further detail was requested by the community and Woollahra Council. As part of the refinement of the pump station design GHD undertook additional assessment of biodiversity impacts.

The assessment showed the likely removal of about five mature trees on the eastern end and six mature trees on the western end. The mature trees likely be removed or affected from the eastern end of the disturbance area include a *Ficus rubiginosa, Casuarina glauca* (two), *Angophora costata, Melaleuca ericifolia, Acacia maidenii.* A juvenile *Pittosporum undulatum* is also likely to require removal. From the western end of the disturbance area, the mature trees likely to be removed or affected include a Brush Daphne *(Pittosporum undulatum)*, Rough Tree Fern *(Cyathea australis)*, Swamp Oak *(Casuarina glauca)*, and three previously lopped Magenta Lilly Pillys (*Syzygium paniculatum*). Three juvenile specimens are also likely to be removed; a *Syzygium paniculatum, Sygygium austral* and a *Sygygium smithii*. However, some of these trees may be able to be retained, and this will be further explored during detailed design.

There following trees may be affected during construction of the pump station:

- Port Jackson Fig (large tree) located on the edge of the carpark at the western most end of the likely disturbance area. The tree has a spreading canopy extending over several car-parking places, so will need at least one branch and some canopy removed. There is also the potential for a small section or roots to be removed or damaged.
- Port Jackson Fig (smaller tree) located near the proposed excavation for the launch pit.
- an additional Rough Tree Fern located at the back of the amenities block may also require removal given its proximity to the existing structure.

Vegetation impacts will be further investigated during detailed design. We will look to avoid any impacts to existing vegetation, including any mature trees wherever possible. An Arborist will be engaged during construction to assist with minimising impacts on mature trees.

Concern that the project will have a negative impact on the habitat of native plants and animals at Parsley Bay. Further consideration should be given to the natural environment as the design progresses.

The proposed works at Parsley Bay, including the pump station and associated wastewater pipelines, have been designed to minimise impacts on the environment. The pump station will require the removal of the existing amenities block (which will be relocated to an alternative location within Parsley Bay) and a section of the car park. Construction of the pump station and associated infrastructure will require vegetation removal. We have refined the area of the pump station to reduce vegetation and rock clearing. During detailed design we will look to further minimise the environmental impact of the works at Parsley Bay, for example, by investigating options for trenchless pipeline construction methodologies rather than open trenching. Mitigation measures will be detailed in the CEMP to protect existing vegetation and flora and fauna habitats.

All impacts to vegetation at Parsley Bay will be offset in accordance with the Sydney Water Biodiversity Offset Guideline. Implementation of this guideline will ensure that there is no net loss of vegetation as we will offset (re-plant) at a higher ratio to what is cleared. We will work closely with Woollahra Council and bushcare groups about how best to restore and rehabilitate the impacted areas.

Concern regarding the impact to the Eucalyptus robusta near the trench entrance at Parsley Bay, as well as the soil seed bank which is known to contain the threatened Acacia terminalis sp terminalis, as well as impact to Syzigium paniculatum individuals.

Concern regarding the impact of the project on rare and threatened species at Parsley Bay and Diamond Bay. Suggestion that plants be translocated and reinstated after construction.

Concern that the REF and supporting Flora and Fauna (Biodiversity) report does not adequately assess the environmental impacts of the project on Parsley Bay bushland and the threatened species for which it provides habitat.

The large Swamp Mahogany *Eucalyptus robusta* located near the trench entrance is not expected to be impacted by the project, however this will be confirmed during detailed design. The tree is an important habitat tree and is planned to be retained and protected during construction. An Arborist will be engaged during construction to advise on how to protect the root systems of the *Eucalyptus robusta* and other large mature trees.

The REF (Section 6.1.3) and Biodiversity Assessment (REF Appendix C) assessed the impact of the Project on threatened ecological communities, and threatened flora and fauna. For Parsley Bay the assessment included potential impacts to Sunshine Wattle (*Acacia terminalis subsp. Terminalis),* Magenta Lilly Pilly *(Syzygium paniculatum)* and the Powerful Owl (*Ninox strenu*). The assessment findings are summarised below:

- Sunshine Wattle: The assessment found that previously recorded individuals of Sunshine Wattle (*Acacia terminalis* subsp. *Terminalis)* near the carpark edge at Parsley Bay had been removed during garden maintenance. During the survey, and follow up surveys in

August and November, no individuals were identified within the project footprint. Sunshine Wattle is listed as an Endangered species under the NSW BC Act and the Commonwealth EPBC Act. Mitigation measures for the species have been identified in the Tests of Significance (Appendix B) and will be incorporated into the vegetation management plan prepared under the CEMP. Measures include re-using top soil removed for the project during restoration and rehabilitation work in order to retain the soil seed bank.

- Magenta Lilly Pilly: several Magenta Lilly Pilly (*Syzigium paniculatum)* individuals were identified within the project footprint during the flora and fauna surveys for the Biodiversity Assessment (REF Appendix C). Removal of these threatened species were of particular concern to the community and Woollahra Council and an additional site inspection was undertaken in November to assess impacts associated with the amended pump station design. As noted above, three mature specimens (previously lopped to the stump) and one juvenile specimen (that appears to be Magenta Lilly Pilly) will still require removal. However, the refined design and reduction in vegetation clearing ensures the retention of one mature specimen of Magenta Lilly Pilly as well as numbers of early-mature specimens and juvenile specimens (that appear to be Magenta Lilly Pillys) upslope of the construction area. Further details including proposed mitigation measures to reduce impacts have been included in the Test of Significance for this species (Appendix B).
- Powerful Owl: Powerful Owl (*Ninox strenu*) is known to be present in Parsley Bay, however was not recorded during biodiversity surveys carried out for the project. Hollows of suitable size to provide breeding habitat were not identified in the construction footprint. While the vegetation to be cleared is not important habitat for the Powerful Owl, no go areas have been identified to protect areas of higher biodiversity value, which includes roosting habitat for the Powerful Owl. An updated Test of Significance has been prepared for the Powerful Owl (Appendix B).

The proposed works would have a negligible impact on potential habitat for these threatened flora and fauna species and would not threaten the persistence of any local populations. The Tests of Significance concluded that the project would not have a significant impact on these threatened species (Appendix B).

Section 5.7 of the Biodiversity Assessment report states the following:

> *"Based on the above findings, the project is unlikely to have a significant impact on any threatened species, population or ecological community listed under the Biodiversity Conservation Act….Similarly, the project would not have a significant impact on threatened biota or migratory species listed under the EPBC Act and a Referral to the Commonwealth is therefore not required".*

Mitigation measures will be implemented to minimise impacts to biodiversity including:

- Potential impacts on Powerful Owl would be mitigated by the fauna management measures detailed in the report including not carrying out work if native fauna is present in the impact area and protection measures for mature trees detailed in the arboricultural assessment (GHD 2019a).

- An arborist will be present on site during construction when works are required in close proximity to mature trees to ensure no damage is sustained to the root systems.

During the detailed design phase and construction planning we will investigate ways to reduce impacts to native vegetation communities. By slightly altering the construction method or access route, we will aim to minimise the extent of disturbance and removal of threatened species and mature trees.

Consultation with the Woollahra Council Bush Regeneration crew is required regarding impacts to flora and fauna.

As part of the refinement of the pump station design, additional site meetings have been held with Woollahra Council including on potential biodiversity impacts. The refined design reduces the area of vegetation impacts compared to the original design. Less mature trees and threatened species will also be impacted. Overall, we have reduced the total area proposed for clearing (for both the pump station and associated infrastructure). For the infrastructure on the eastern side of the creek, we will work with the delivery contractor during detailed design to further minimise vegetation clearing.

A Vegetation Management Plan will be prepared during detailed design, and in consultation with Woollahra Council. Vegetation replanting and rehabilitation will be undertaken by a qualified bush regeneration company. We will also consult with Woollahra Council about using or working with the local bushcare groups who have detailed knowledge of the flora and fauna at Parsley Bay.

Concern that the vegetation along Carlisle Street will be impacted by the proposed works.

The wastewater pipeline along Carlisle Street will be constructed within the roadway. We don't anticipate any street trees will be impacted by these works. Care will be taken to avoid any roots that extend into the work site. If required, we will have an arborist on site during construction to provide advice to minimise any potential impacts to street trees.

Suggestion that the Eastern Reserve pump station design should include coastal native heath plantings to improve the overall appearance.

Sydney Water will work closely with Waverley Council regarding impacts to Eastern Reserve. The final design and layout of the pump station has not yet been determined. Once further work has been completed in the detailed design phase we will consult the community and Waverley Council. Where possible we will incorporate native plantings around the pump station to assist in reducing any visual impact, as well as increasing the native vegetation in the area.

Concern regarding the clearing of remnant vegetation at Diamond Bay. Suggestion that alternative access points be investigated and that any required vegetation removal be undertaken by a bush regeneration contractor that can maximise native plant relocation and minimise weed densities.

Utilisation of existing disturbed areas of the boardwalk is favourable over impacting vegetation communities.

During detailed design, we will look to optimise and reduce the impacts to vegetation at Diamond Bay. This will include investigations of alternative access points. We will work with Waverley Council and seek feedback on potential alternative access points to use during construction.

All vegetation clearing and restoration for the project will be undertaken by a qualified bush regeneration company. We will also work with any existing bushcare groups during restoration and rehabilitation of impacted vegetation.

Concern that the footprint of the construction works at Parsley Bay are larger than expected, and that the REF is not clear on how the disturbed vegetation will be restored.

In addition to the construction of the pump station at Parsley Bay, works are also required within the bushland areas to intercept the existing wastewater reticulation system. This will involve the construction of short sections of pipeline to divert the wastewater from the VOOS to the new pump station. As noted above, the pump station design has been refined, reducing vegetation cleating. Further opportunities to reduce clearing will be sought with the delivery contractor during detailed design for all infrastructure and access requiring clearing. A landscape plan will be prepared in consultation with Council and the bushcare group to document how the disturbed vegetation will be restored.

Concern that groundwater will be discharged to Parsley Creek, which leads to Parsley Bay, which provides habitat for seagrasses and the endangered White's Seahorse. What testing and scheduling will be undertaken prior to any discharge?

Concern regarding the discharge of any dewatering into the Parsley Creek.

Potential impacts to the Whites Seahorse (*Hippocampus whitei*) located on Parsley Bay swimming nets have been assessed in the Marine Environment Assessment (REF Appendix C). The report found that *"despite not locating any on the day of the survey ... it is prudent to consider syngnathids, including White's Seahorse, are present".* While presence was assumed, the project would not involve any activities in the marine environment and accordingly environmental impacts, including impacts on White Seahorse, would not occur as a result of the project.

Preliminary investigations have identified groundwater within the construction footprint at Parsley Bay. The quantity and quality of the groundwater will be confirmed during detailed design when further investigations are undertaken. If groundwater discharge is required, we would use the existing wastewater network, or the VOOS for disposal, to prevent any potential impact on Parsley Creek and Parsley Bay.

As part of the CEMP, a Groundwater Dewatering Management Plan will be developed. A Water Supply Works Approval (WSA) will be obtained prior to construction, as well as a Water Access Licence (WAL) if required from the NRAR. These approvals will contain further details regarding the estimated volume of groundwater to be displaced during construction, as well as its quality and method of disposal.

Query as to how rehabilitation of vegetation at Parsley Bay will occur, and that further work is needed to quantify and minimise vegetation impacts.

Section 6.1.3 of the REF quantifies the extent of vegetation impacts across all construction areas of the project. We will employ a qualified bush regeneration company to complete all unavoidable vegetation clearing prior to construction as well as all required rehabilitation following the completion of works. We will consult with Woollahra Council and local bushcare groups regarding impacts to vegetation, as well as where we can assist with replanting and vegetation offset opportunities.

The REF assesses a worst-case scenario for the area of impacted vegetation for the project. Refinement of the pump station design at Parsley Bay has reduced proposed vegetation clearing (from 196m^2 to 144m^2 for the pump station and from 0.36 ha to 0.07 ha for the associated infrastructure and access). As the design progresses into the detailed design phase, we will look for opportunities to further reduce the extent of vegetation impacts. All impacted vegetation will be offset in accordance with Sydney Water's Biodiversity Offset Guideline.

5.6 Environmental performance and compliance

Query regarding the extent of environmental improvement that is expected from the project, e.g. improvements to water quality.

Sydney Water's 2016 Pollution Study stated that despite the lack of water quality monitoring, the conservative likelihood of pollution in the immediate receiving waters is very high, as the pollution source (the three ocean outfalls) is a continual discharge, and the discharge is untreated.

It is estimated that around 2000 people annually are in direct contact with the contaminated water, with the study concluding that the risk to public health in the area immediately adjacent to the outfalls is 'very high'.

Harmful marine debris, such as gross pollutants, endocrine disrupting chemicals, microplastics, and emerging chemicals of concern, make the environmental risk 'high'. As the discharge wastewater is not treated, there is no capture of solid materials (e.g. toilet paper, sanitary products, wet wipes). This 'floating rubbish' has been observed at all three outfall sites.

This proposal will eliminate the continual discharge of untreated wastewater into the ocean at Vaucluse, Diamond Bay and Dover Heights, by about 93%. Water quality would also improve by reducing plastic and other solid waste entering the ocean via the outfalls.

Concern regarding the frequency of discharge from the outfalls during wet weather, including the capacity of the Rose Bay Submain during wet weather, and whether the duration and quantity of discharge from the outfalls in wet weather will be recorded and made available to the public.

Question regarding frequency of wet weather overflows from Diamond Bay ocean outfalls.

The wastewater discharge via the Vaucluse, Diamond Bay and Dover Heights outfalls will be reduced by 93%. Under wet weather conditions, when the wastewater system reaches capacity, transfer of wastewater to the Rose Bay Submain will cease and instead, will be directed to the existing ocean outfalls. Over a ten-year period, we estimate that there will be around 254 events of this nature.

Information relating to the number of overflow events is published each year in the Sydney Water Annual Report which is a publicly available document.

Question regarding the current location of discharge of wastewater in Vaucluse and Diamond Bay, and what catchments the outfalls are servicing. Also concern regarding potential discharge into Parsley Bay and why this area was chosen for the location of the wastewater pump station.

The REF does not show the catchment in which are currently serviced by the outfalls that will be redirected.

Concern regarding the location of the Parsley Bay pump station and if alternative locations were considered.

There are currently three ocean outfalls located in Vaucluse, Diamond Bay and Dover Heights that discharge untreated wastewater at the cliff face. Figure 1 shows the location and current catchments serviced by each of the three outfalls. It is worth noting that sections of Rose Bay and Dover Heights (non-coloured area in Figure 1) are already connected to the Bondi WWTP.

In order to collect the wastewater from the Vaucluse catchment, the existing large wastewater infrastructure shown in yellow in Figure 1 needs to be intercepted. The existing network has five pumping stations and gravity pipes which transfer flows to Parsley Bay. The Vaucluse Ocean Outfall Sewer (VOOS) starts from Parsley and terminates at the cliff face of the Christenson Park. The infrastructure converges near Parsley Bay before it flows via the ocean outfall pipe. As such, Parsley Bay is the ideal location to divert the flow away from the ocean outfall as it requires minimal infrastructure and disturbance to the community.

During the planning of the Refresh Vaucluse and Diamond Bay project alternative options for the pump station at Parsley Bay were investigated. This included Vaucluse Bay as well as potential residential blocks in the area. However, the Parsley Bay location was preferred due to the comparatively reduced impact on the environment and community. All options were also presented to Woollahra Council and the CRG for comment and feedback.

There will be no planned discharge of wastewater into Parsley Bay. All wet weather overflows will be diverted to the existing Vaucluse outfall via the VOOS as per the current operation.

The yellow boxes in Figure 1 below show the locations of existing wastewater pump stations at Watsons Bay and Vaucluse Bay.

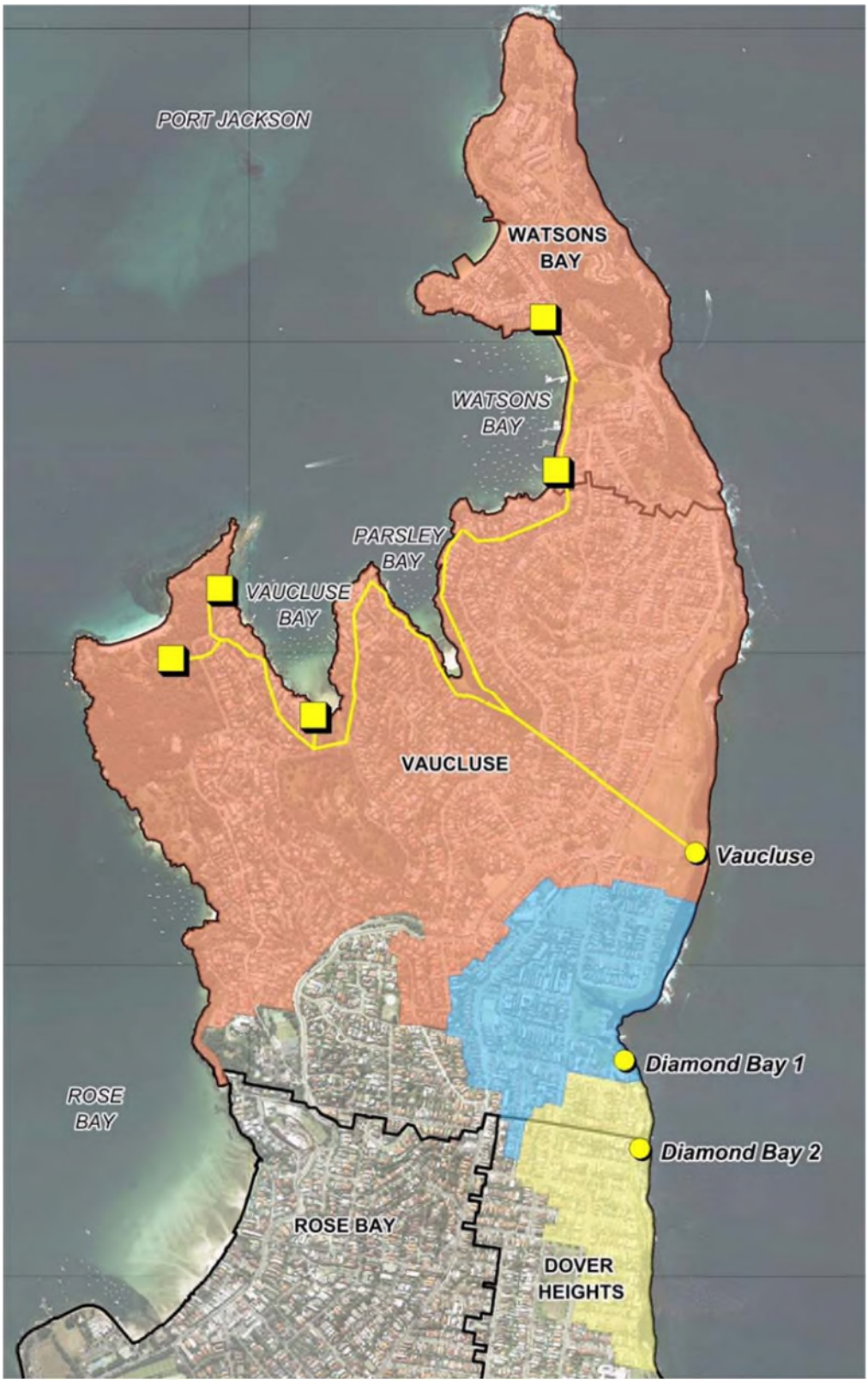

Figure 1 - Servicing catchments of the existing ocean outfalls at Vaucluse and Diamond Bay

Question regarding where the wastewater is discharged once it is diverted to from Bondi WWTP, including any requirements to extend the deep ocean outfall.

The dry weather wastewater will be diverted from the Vaucluse, Diamond Bay and Dover Heights outfalls to the Bondi WWTP where it will be combined with the wastewater already being treated at the plant. The added flows to Bondi WWTP are negligible as the Vaucluse and Diamond Bay catchments are very small (less than 1 % increase) compared to the large catchment already serviced by the plant. The wastewater would be treated at the Bondi WWTP and discharged via the existing deep ocean outfall. The deep ocean outfall was built in the early 1990's and is located 60 metres below the seabed, about 3 kilometres out to sea.

No upgrades and modifications to the existing deep ocean outfall are required for the project.

Concerns regarding the pump station at Parsley Bay having a negative impact on the bay and environment.

The following aspects of the Parsley Bay pump station design and location will assist in minimising impacts to the environment:

- The pump station will be located where the current amenities block adjacent to the car park is located, as well as the area immediately east of the amenities block
- No overflow of wastewater into Parsley Bay will be required as part of the operation of the pump station. All wet weather flow will be diverted to the existing Vaucluse ocean outfall via the VOOS
- Upon completion of the pump station, native planting will be planted around the pump station to minimise the visual impact
- A replacement modern amenities block will be constructed in a more accessible location at Parsley Bay in consultation with Woollahra Council.

Concern that consideration needs to be given to any existing infrastructure that may require upgrade to support the additional flows and increased maintenance requirements and/or risk of environment impact such as dry and wet weather overflows.

Suggestion to consider and document the potential impact of the works on the existing reticulation network and infrastructure.

Current (2018) and projected (2046) population numbers for the Vaucluse and Diamond Bay catchments were used when designing the project. The population projections indicated there would be only a small increase of 11,000 people by 2046, compared to the current population.

Population and employment data were used to determine the wastewater flows during the planning phase. The three outfalls currently discharge wastewater to the ocean at an average dry weather flow of about 3.8 ML per day. In 2046 the average dry weather flows are projected to be 3.9 ML/d.

During the concept design phase of the project, a detailed investigation into the capacity of the receiving wastewater network was completed. The investigation concluded that the Rose Bay Submain has considerable capacity and can accept the additional flows from Vaucluse and Diamond Bay without requiring any upgrades.

The additional wastewater flow will not require any changes to the maintenance requirements or increase the frequency of dry and wet weather overflows. During substantial wet weather events, the wastewater from the Vaucluse and Diamond Bay catchments will be diverted back to existing ocean outfalls. This will ensure that the wastewater network will not be compromised as a result of this project.

Water consumption has reduced due to public awareness and water initiatives by Sydney Water and the State Government.

Concern regarding the impact the additional wastewater flow will have on Bondi WWTP, including scale, hours of operation, noise and odour.

Concern regarding additional load on Bondi WWTP.

The size of the Vaucluse and Diamond Bay catchments are small and will have a negligible impact on Bondi WWTP. The additional flow that will be diverted from the existing ocean outfalls at Vaucluse and Diamond Bay to Bondi WWTP will result in an overall increase of inflows of approximately <1% of the licenced volume, which is within the existing capacity of the plant. This will not have an impact on the hours of operation, noise or odour levels at Bondi WWTP.

Concern regarding how safe the treated wastewater is for the ocean, marine life and future generations.

The project will eliminate the continual discharge of untreated wastewater at the cliff face of Vaucluse, Diamond Bay and Dover Heights. The project will also substantially reduce the potential for plastics, hygiene and other sewer debris in the waterways. There will be reduced potential for wastewater plumes and odour generated from the untreated wastewater discharges from the outfalls. This will improve the quality of the water at these locations, making them safer for human use and reducing the potential for environmental impacts to the marine environment.

The dry weather wastewater will be diverted to Bondi WWTP where it will be treated to the requirements of our EPL issued by the EPA before being discharged to the ocean via the deep ocean outfall.

Sydney Water frequently monitors and reports on the water quality conditions at the deep ocean outfalls as part of a long-term monitoring program. The monitoring results indicate there is not a risk to the environment or the human health for current and future generations.

5.7 Traffic and parking

Concern that the information provided in the Construction Traffic Impact Assessment relating to New South Head Road is incorrect.

Concern the proposed traffic route from Parsley Bay is inadequate and missing information between Vaucluse Road and Parsley Road. Suggestion that Vaucluse Road not be used and that Fitzwilliam Road and Hopetoun Avenue be used.

The REF included a Construction Traffic Impact Assessment (TIA) that was completed by GHD during the concept design phase of the project. The purpose of that report was to provide an assessment of the impacts of the additional vehicle movements associated with construction of the project on the local traffic network. The report is not a traffic management plan (TMP), however a TMP will be prepared during detailed design, as part of the project's CEMP. The TMP will use traffic information available during detailed design and will refine vehicle movement details and routes. This will include New South Head Road and the construction route from Parsley Bay. The TMP will be approved by Woollahra Council prior to construction.

Concern that the number of vehicle movements provided in the REF is an underestimate.

The number of vehicle movements provided are based on the available information at the time of preparing the concept design, TIA and REF. There is potential that at different stages of the project, the number of movements may increase or decrease. Once a delivery contractor has been engaged, the construction vehicle movements will be refined and a TMP will be prepared prior to construction.

Query regarding if the number of available parking spots at Parsley Bay carpark, and whether it will be reduced once the project has finished.

The number of available parking spaces within the Parsley Bay car park has the potential to be marginally reduced following the completion of the works. With the redesign of the pump station, GHD have developed several alternative car park configurations to minimise loss of car spaces, and these have been provided to Woollahra Council for consideration. The car park configurations need to include parking for Sydney Water maintenance vehicles as well as other providers such as Council garbage collection and deliveries to the café. During detailed design, we will continue to work closely with Woollahra Council to maintain as much of the available parking spaces as possible.

Concern regarding the impacts to traffic along Carlisle Street during construction. Request for a traffic management plan.

Concern regarding street parking along Conway Ave during construction.

Concern that the public use of Parsley Bay will be disrupted during construction, and that safe access to the park is still available.

Concern that Woollahra Council staff need access to all areas of Parsley Bay during construction to continue maintenance duties.

Suggestion that any vehicular access to Eastern Reserve be minimised.

Construction works along Carlisle Street will result in some disruptions to local traffic and access. Traffic impacts are expected to be transient, following the linear progression of construction activities. A TMP will be prepared prior to construction, including providing notification to residents to inform them of potential impacts and timeframes.

No work is proposed along Conway Avenue. However, work will be in close proximity which may have temporary impacts to street parking on Conway Avenue.

Construction work at Parsley Bay will take approximately 12 months to complete. During construction, safe pedestrian access to Parsley Bay reserve and the swimming area will be maintained via existing access tracks. Traffic control along Horler Avenue will be required due to the movement of trucks to and from the construction site. Pedestrian public access to Parsley Bay via Horler Avenue will be under the direction of traffic management workers.

Partial or complete closure of the car park will be required during construction. While vehicle access to the car park at Parsley Bay will be restricted and controlled by a TMP, we will ensure Council's maintenance staff can access Parsley Bay to complete required maintenance activities. We will work closely with Woollahra Council to minimise access impacts as much as possible.

Vehicular access to Eastern Reserve will be required during construction of the pump station. We will ensure that vehicle movements are optimised and impacts to Eastern Reserve are minimised where possible. Details relating to construction compounds and vehicle access will be refined during detailed design and included in the TMP. We will consult Woollahra Council, Waverley Council and the local community during the detailed design phase regarding access and construction footprint.

Concern that the car park at Parsley Bay will be out of action for 12 months, particularly as council has just designed an accessible play-space. Request for at least a drop off, or accessible car space to be made available.

During detailed design we will look at ways to maintain an accessible car space or provide a space for drop-offs to the accessible play-space. We will consult with Woollahra Council during this phase of the project to determine how this can be achieved.

Clarification on access tracks in Parsley Bay bushland that will be utilised during construction.

We have not yet determined which access tracks will be utilised during construction. The REF proposes the use of the access track on the north-eastern side of Parsley Creek to gain machinery access to the bushland area of Parsley Bay. This access track follows the existing Watsons Bay Submain wastewater pipeline. However, the use of this access track will require vegetation removal along the length of the route. During detailed design, we will look to refine this proposal so that the shortest possible routes and smallest machinery are used to access the north-eastern side of Parsley Creek. We will also explore options to walk machinery along the creek bed, to reduce the impact to the bushland.

Request that the REF include reference to the Local Government Act and the Roads Act and address how the project fulfils the requirements of both acts with respect to entering and altering Council controlled lands and assets

The REF addresses 'entering and altering Council controlled lands and assets' in Appendix B – Consideration of Infrastructure SEPP (ISEPP). Under the ISEPP (Clause 13), Sydney Water is required to consult with Waverley Council and Woollahra Council as the works:

- *Involve installation of a temporary structure on, or enclosing, a public space under councils control that will cause a disruption to pedestrian or vehicular traffic that is not minor*
- *Involve excavation to the surface or, a footpath adjacent to, a road for which the council is the roads authority that is not minor or inconsequential*.

The REF answers 'yes' to both considerations. As such, during detailed design we will consult with both Waverley Council and Woollahra Council regarding impacts to council controlled lands, roads and assets. The ISEPP provides a similar function to the *Local Government Act 1993* and *Roads Act 1993,* requiring appropriate consultation, management and restoration works.

5.8 Waste management

Query as to whether there is another potentially contaminated site to the east of Carlisle Street at the junction of Hamilton Street and Old South Head Road.

No works are proposed along Hamilton Street, or on Old South Head Road in the vicinity of Hamilton Street. As such, if there are existing contaminated sites in this location, they will not be disturbed by the project.

Suggestion to develop an Unexpected Finds Protocol in relation to potential contamination.

Suggestion that an Acid Sulphate Soils Management Plan be developed for the project.

An Unexpected Finds Protocol for potential contamination will be included within the Waste Management Plan (WMP) developed by the delivery contractor during preparation of the CEMP.

An Acid Sulphate Soils Management Plan will be developed by the delivery contractor during preparation of the CEMP, as identified in the REF (Section 6.1.5).

Ensure that any reports submitted to the EPA under the Contaminated Lands Management Act 1997 (CLM Act) are prepared, or reviewed and approved, by a certified consultant.

Reminder that the EPA should be notified under Section 60 of the CLM Act for any identified contamination that meets the triggers in the Guidelines for the Duty to Report Contamination.

Suggestions on a number of aspects to be included in the Waste Management Plan.

Reminder that where relevant, works must be carried out in accordance with EPA guidelines made or approved under Section 105 of the CLM Act.

Reminder that all asbestos waste loads over 100kg or 10 m^2 removed from site must be tracked using the EPA's online "Waste Locate" system. Any rejected waste due to the presence of asbestos must not be reprocessed but transported to a facility that can lawfully receive asbestos waste.

Reminder that any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal, except Virgin Excavated Natural Material as defined by the Waste Classification Guidelines issued by the EPA that are current at that time, is not permitted unless expressly permitted by planning legislation and/or approvals and/or consents relevant to the site.

The following waste management measures (REF section 6.1.5) will be implemented for the project:

- Track waste as required using EPA's *WasteLocate* online tracking system
- Manage waste in accordance with relevant legislation and maintain records to show compliance.

We will ensure that the WMP developed by the delivery contractor as part of the CEMP covers all reminders included in the submission on the REF by the EPA.

Concern that no indication on where waste from trenching will be stockpiled at Parsley Bay.

Details regarding the exact locations for stock piling of spoil will be detailed in the CEMP developed by the constructor prior to construction. However, as a general rule, all stockpiling locations, and other ancillary facilities, will be located in previously disturbed areas such as the car park within the identified construction footprint shown in the REF document. If any stockpiling sites are required outside the REF assessment area, we will undertake additional environmental assessment and include the REF addendum on Sydney Water Talk website.

5.9 Topography and Geology

Question regarding what plans are in place to ensure the area around Parsley Bay pump station remains stable if large boulders need to be removed.

Query that work in the Eastern Avenue Reserve should not weaken the sandstone geology resulting in the failure of the sandstone in advance of that caused by natural processes.

The detailed design phase of the project will include a structural design informed by geotechnical investigations. This will ensure that all work at Parsley Bay and Eastern Reserve will not comprise the stability of the surrounding areas. A dilapidation survey will be undertaken (REF section 6.1.8) of structures around the construction areas before work commences. In the unlikely event that impact to the stability of the surrounding area is caused by the project, these will be rectified at the completion of the works.

5.10 Heritage

Concern that the REF does not include the Heritage Impact Statement in the Appendix, and that it should include reference to State Heritage Listed street name plates within the footpath and kerbs.

The Non-Aboriginal Statement of Heritage Impact was included as Appendix D of the REF. As part of that assessment, the State Heritage Register was consulted for any potential impact to State Heritage Listed items. The only State Heritage Listed item identified was Vaucluse House (SHR no. 0955) which is located outside the proposed project area. No street name plates within the footpath and kerbs were identified in the State Heritage Register during this assessment. A recent check during preparation of this Decision Report confirmed that there are no additional State Heritage listed items, or impact to listed heritage items as a result of the project.

5.11 General

Suggestion that the project should have acquired a residential block then place the infrastructure in public reserves.

Acquiring a residential block in Vaucluse or in Diamond Bay/Dover Heights is cost prohibitive and does not represent value for money.

Questions regarding the wastewater pump station at Marine Parade, Watsons Bay. Including how it fits into the project, if any work is proposed at this location, if any capacity and condition assessments have been undertaken and how back flow in the reticulation network and overflows are being addressed.

Sydney Water has five existing pump stations in the Vaucluse catchment, which includes the pump station at Marine Parade, Watsons Bay. These are required to pump wastewater from low-level areas, i.e. close to sea level. The wastewater from the Watsons Bay pump station is pumped via

the Watsons Bay submain to Parsley Bay. No capacity assessments are required at Watsons Bay for the proposed works as there will be no changes in the volume of wastewater being produced.

As with all Sydney Water assets, the Watsons Bay pump station undergoes planned routine maintenance, as well as regular condition assessments to determine any future renewal works.

Query regarding how the project will address current Rose Bay foreshore health issues, including health issues and proposed management measures.

This comment is interpreted to relate to the pollution forecasts and swimming suitability ratings for Sydney Harbour beaches (Beachwatch Program). Rose Bay Beach water quality is often rated as unsuitable for swimming. Pollution in the foreshore area is a result of stormwater, marine pollution and a nearby Sydney Water overflow site. The proposed Refresh Vaucluse and Diamond Bay Project does not involve work at the Rose Bay foreshore area. However, Sydney Water has commenced a separate project to reduce wastewater overflows at Rose Bay. Details will be provided on Sydney Water talk as the new project progresses.

Suggestion that the kiosk/ café building at Parsley Bay should be renovated and updated as part of the project.

Sydney Water does not own or manage the kiosk/ café building at Parsley Bay. However, Woollahra Council has been made aware of this suggestion.

Comment that fresh stormwater should be diverted over the blue mountains instead of discharged into the ocean.

Stormwater is a highly valuable resource that can enhance the liveability, sustainability and resilience of our cities. While the water resilience of the western plains over the Blue Mountains is an important consideration, fresh stormwater does have a role to play in the Sydney basin. Although there is merit in this suggestion, it does not form part of the scope of the Refresh Vaucluse and Diamond Bay Project. Further information on Sydney Water's stormwater network is available at www.sydneywater.com.au/SW/education/water-management/Stormwater

Query regarding the condition of the Vaucluse Ocean Outfall between Parsley Bay and the Pacific Ocean and what works are planned over the next 50 years.

The Vaucluse Ocean Outfall between Parsley Bay and the Pacific Ocean is a tunnel in solid sandstone rock approximately 50 m below ground. The asset is considered maintenance free and no works are planned over the next 50 years. The outfall location at the cliff face is regularly inspected in case of damage from the environment. When required, maintenance works are carried out to ensure the outfalls are not blocked or at risk of failure.

Suggestion that the REF and supporting documents should still be made available on the Sydney Water Talk website after the submission period has closed.

The REF and supporting documents, including this Decision Report, will remain on the Sydney Water Talk website for the duration of the project.

Query regarding the structure of the REF.

The structure of the REF has been determined under the Sydney Water Environmental Management System (EMS). This system is certified to ISO14001 industry standard. The structure ensures we assess all potential environmental impacts as per the requirements under the *Environmental Planning and Assessment Act 1979.*

Query regarding the reuse of wastewater.

Wastewater within the Vaucluse and Diamond Bay catchments will be diverted to Bondi WWTP where it will be treated before disposal via the deep ocean outfall. There is no planned reuse of wastewater proposed within these catchments, or at Bondi WWTP. However, Sydney Water does reuse or recycle water in some catchments, such as the Rouse Hill Water Recycling Scheme.

Concern regarding the justification of the project if there is minimal impact to public health due to inaccessibility to the coastline where the existing outfalls are located.

Concern that the improvements from the project are not based on actual scientific data.

Sydney Water assessed the level of risk to the environment and public health posed by the existing Vaucluse and Diamond Bay outfalls via a pollution study in 2016. The pollution study included both qualitative and quantitative studies on the impact of untreated wastewater being discharged at the cliff face of Vaucluse and Diamond Bay. This study found that:

- the plume of untreated wastewater from the outfalls is larger than previously assumed
- the number of people using the area for recreation is greater than previously estimated
- there are negative environmental outcomes associated with the continuous discharge of untreated sewage in the area.

A Cost Benefit Analysis (CBA) was carried out which produced several decision metrics that helped inform investment and selection of a preferred option. The CBA considered economic, social and environmental costs and benefits. The principle objectives of the proposal are to protect public health and the environment. The assessment has been based on previous studies (including the EPA initiated Pollution Reduction Program) and current modelling. We anticipate a 93 percent reduction in the volume of untreated wastewater discharged to the ocean, with associated environmental and social benefits.

6 Environmental management

This section provides details on the additional mitigation measures for the project, in response to submission received. All other mitigation measures in the original REF would be incorporated into the CEMP and implemented during construction.

Table 3 Summary of additional mitigation measures

Aspect	Additional mitigation measures
Flora and fauna	All top soil that requires removal at Parsley Bay will be stockpiled separately and reused during restoration work in order to maintain the existing seed bank.
	We will work closely with Woollahra Council and Waverley Council, and local bushcare groups, regarding restoration and rehabilitation of impacted vegetated areas. All work will be undertaken by a suitably qualified bush regeneration company.
	A landscape plan will be prepared in consultation with Woollahra Council, Waverley Council and local bushcare groups to document how the disturbed vegetation will be revegetated and restored.
	During detailed design we will optimise the design to avoid any impacts to the large mature *Eucalyptus robusta* and *Angophora costata* at Parsley Bay. We will also aim to remove only two boughs of the large Port Jackson Fig tree (retaining the rear bough). However, this will be determined in consultation with an arborist and the delivery contractor, and will be based on both the health of the tree and safety of workers.
	During early construction works, we will commit to any feasible translocation of threatened Magenta Lilly Pilly specimens at Parsley Bay where impacts can't be avoided.
	To avoid extensive damage to vegetation, smaller machinery to be used and shortest route to access the two maintenance locations on the other side of the creek. An option to be explored is walking the machinery down the creek.
	Measures identified in the Tests of Significance (Appendix B) will be incorporated into the CEMP and relevant subplans (vegetation management and landscape plan)
General environmental management	Additional measures related to Parsley Bay identified during consultation with Woollahra Council following the REF will be addressed during detailed design.
Waste Management	All reminders provided in the submission from the EPA (see Appendix A of the Decisions Report) will be addressed in the CEMP and supporting Waste Management Plan.

7 Next steps

Written submissions from the community and key stakeholders are an important source of information, which help guide our decision making and consultation through future project phases. Engagement with local residents and councils has led to improvements in the project, such as refining the design of the pump station at Parsley Bay and reducing vegetation clearing.

Sydney Water is committed to delivering this project and a key step in the process was to obtain funding approval for the project. In 2018, we surveyed more than 10,000 Sydney Water customers in Greater Sydney, the Blue Mountains and the Illawarra region on their willingness to help pay for discontinuing the ocean outfalls. Their support resulted in the Independent Pricing and Regulatory Tribunal (IPART) allocating funding for Refresh Vaucluse and Diamond Bay in its 2020 price determination for Sydney Water customers. In November 2020, this funding was granted by Sydney Water's Board of Directors.

We can now commence the process of engaging the team that will be responsible for delivering this project. This step is crucial to the long-term success of this project. When building this team, we will be looking for partners recognised for their construction and technical capability, but who also understand that consulting and engaging the community and key stakeholders is integral to planning a successful construction project

Detailed design is expected to commence early 2021, during which we will finalise the project design and prepare for construction (develop environmental management plans and obtain any additional approvals). We will also determine project staging and timing with a view to minimse impact on surrounding communities.

During this process we will develop a Community and Stakeholder Engagement Plan to ensure that the community and key stakeholders continue to be involved and informed.

From mid 2021 we aim to commence construction works.

8 Conclusion

Sydney Water has assessed the potential environmental impacts of the proposal in accordance with the requirements of Part 5.1 of the EP&A Act.

The public consultation process undertaken for the proposal is outlined in Section 2 of this report. In response to the public display of the Refresh Vaucluse Diamond Bay Project REF, 33 written submissions were received raising 147 comments.

We have considered and responded to the comments raised in the submissions. As a result of our consideration of the submissions and further consultation undertaken, we have made some changes to the proposal, particularly in relation to layout of the pump station at Parsley Bay and associated vegetation clearing.

In considering the submissions, additional mitigation measures have been proposed (Table 3). All other proposed mitigation measures outlined in the REF will be incorporated into the CEMP for implementation during construction.

We will continue to work closely with the community and stakeholders as the project progresses into the next phases.

The project is not likely to result in a significant impact to the environment. It is recommended to proceed with the proposal as detailed within the REF and this Decision Report.

9 Recommendation

For the purposes of the EP&A Act, it is recommended that the Refresh Vaucluse Diamond Bay Project proceed, as described in the REF and this Decision Report. It is further recommended that the project be implemented in accordance with the mitigation measures listed in the REF and this Decision Report.

Prepared by: Dane Collins and Jill Berwick, Environmental Scientists, Asset Lifecycle

Reviewed by:

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Senior Environmental Scientist
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Date: 16/12/20

Reviewed by:

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Asset Lifecycle
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Environment and Heritage Manager
Asset Lifecycle
Date: 16/12/20

Approved by:

Paul Plowman
General Manager
Asset Lifecycle
Date: 16/12/20

Appendix A – Submissions received

Submission 1

Re: Wastewater discharge from Diamond Bay update request

Sent: 6 June 2020 4:52 PM

From: [redacted]

To: vauclusediamondbay;

Hello!
Would you be able to tell us when the wastewater pipes from Diamond Bay will be diverted? Or at least when the wastewater discharge might stop in the area? Hubby and I absolutely love this part of Sydney but are won't consider staying at Vaucluse Waters until the discharge ends. Can't seem to find any other updates online. Hope you can help!
Kind Regards, [redacted]

Submission 2

Archived: Monday, 27 July 2020 2:12:46 PM
From: [redacted]
Sent: Tue, 9 Jun 2020 19:43:44
To:
Cc:
Subject: Feedback on REF and Vaucluse outfall diversion project
Sensitivity: Normal

I understand the imperative of adding new infrastructure to enable treatment of currently untreated sewerage outfalls.
The design as proposed requires placing of unsightly additional plant/equipment in public reserves, and I have a strong objection to this.
In the broader scale of the costs of this project, acquiring sites for installation of plant without compromising scarce public space should be entirely achievable. Existing Sydney Water pumpingstations (e.g. 11 Cliff St Watsons Bay, 10 Collins Ave Rose Bay) sit on dedicated lots and I don't see that these should be any different. Moreover, existing pumping stations enclose plant in
architecturally treated enclosures (brick, tiled roof, detailed external finishings), rather than sprawling non-discrete concrete littered with hatches and steel boxes where lawn or natural rock was before.

Specific feedback:

-
- The concrete expanse speckled with hatches and substation boxes proposed for Parsley Bay is an egregious misuse of a natural environment public reserve.
  Similarly the addition of equipment boxes to Eastern Reserve, a precious green strip of the clifftop reserve, directly connected to Waverley Council's iconic boardwalk is an unsightly detraction from the high-quality amenity that Waverley Council has been working towards with recent cliff fence upgrades, native vegetation re-establishment, and high quality stone
- retaining and native landscaping between Bulga Rd and Eastern Ave.
  I also suggest that "solar light" proposed to replace the existing street light in Eastern reserve is inadvisable. Other areas where former Energy Australia street lighting has been replaced by bespoke local government or other entity lighting (such as council-maintained lighting in Rose Bay and Double Bay, and council bus stop lighting at former tram shelters) have prolonged periods of outage and ongoing maintenance issues. Retaining completely standard Energy Australia, grid powered lighting ensures a clear service-level commitment, accountability and responsibility for correct function, maintenance and replacement (as applies to all other street lighting). A lone specialty light managed by some unspecified entity with unclear or unenforceable obligations might as well be taking the light away.

I have CCed Vaucluse Progress Association secretary Tony Booth, the Diamond Bay precinct committee's Alan Aaron and my local member Gabrielle Upton for visibility of my

feedback.
Thank you for the opportunity to comment.
[redacted]

[redacted]Sincerely

[redacted]

[redacted]

Submission 3

Archived: Monday, 27 July 2020 2:19:20 PM
From: [redacted]
Sent: Wed, 10 Jun 2020 13:28:02
To:
Cc:
Subject: Question
Sensitivity: Normal

Re the proposed new (a) connection, (b) vent stack, and (c) trenched pipeline on Carlisle Street Rose Bay - is there any chance that these could be a source of a bad odours in the immediatevicinity?

I previously lived close to the North Bondi 'chimney' on the golf course (aka the old 'stinkpot") and on a bad day the smell was horrendous. I now live close to where the proposed Carlisle Stconnection, vent stack and trenched pipeline are to be situated.

[redacted]

Submission 4

Archived: Monday, 27 July 2020 2:21:21 PM
From: [redacted]
Sent: Wed, 10 Jun 2020 12:15:33
To:
Cc: SW
Subject: Refresh consultation
Sensitivity: Normal

Thanks for the leaflet that was delivered today. It goes a long way to explaining the plans and impact. Some questions I could not see answers for are

- how long the work will last for in mid 2021?
- specifically how long will you close access to parts of the coastal walk?
- you are open digging the full length of Oceanview Avenue, the obvious question is why that won't be trenchless which would be much less disruption to residents? Is it cost?
- what equipment is being installed at the west end of oceanview where the new pipe presumably meets existing infrastructure?

[redacted]

[redacted]

Submission 5

Archived: Monday, 27 July 2020 2:22:29 PM
From: [redacted]
Sent: Wed, 10 Jun 2020 12:14:58
To:
Subject: Marine Parade, Watsons Bay - Impacts
Sensitivity: Normal

Hi,

I received the Refresh Vaucluse and diamond Bay newsletter. This was very informative and provided much information about this important project. However, I looked extensively on the nominated website to find details of how the sewer station on Marine Parade Watsons Bay connects into the overall plan to redirect all waste water in the area to the Bondi deep ocean outfalls; but I was unable not find answers to my questions below. Appreciate if you are able to provide the answers to these, at your earliest convenience:-

1. How does Marine Parade, Watsons Bay sewer facility currently connect to the Ocean outfall at Vaucluse?
2. What changes are planned at this location as part of this project ? If any changes why are they not included in the statement of environmental effects?
3. What assessments have been undertaken to check the current condition and capacity of the piping out of Marine Parade Watsons Bay is fit for purpose based on the increasing planned use in the area from increased patronage at the Naval Base, and Watson Bay Hotel?
4. During heavy rain the waste water system in the area is over filled, causing back flow in the pipes, how will this issue be addressed in the plan?
5. During heavy rain, and if the facility at Marine Parade is over flowed, to where does this overflow discharged to? The harbour or elsewhere.

Thank you so much.

Regards,

[redacted]

Submission 6

Archived: Monday, 27 July 2020 2:23:37 PM
From: [redacted]
Sent: Wed, 10 Jun 2020 09:51:36
To:
Subject: Additional information request
Sensitivity: Normal

Thank you for details of proposed project to address the health risks existing in current situation around Diamond Bay and Vaucluse.
This project is as you state going to improve water quality, reduce odour etc.,
Are you able to provide more specific details about the degree to which this improvement is expected. eg., how much will water quality be improved from current quality %. The vague nature of these suggested improvements is not very informative. Please provide more details.

At this point I would also like to raise the lack of inclusion of any measure to address current Rose Bay foreshore health issues. Signs are displayed at times near Ferry terminal to warn public of contamination and health risks. It is disappointing to see a project as you have described not including in proposed works to address this matter. Feedback on proposed management of this health risk is also sought from you.

[redacted]

[redacted]

[redacted]

[redacted]

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Submission 7

Archived: Monday, 27 July 2020 2:26:30 PM
From: [redacted]
Sent: Wed, 10 Jun 2020 09:42:43
To:
Subject: Refresh Vaucluse & Diamond Bay
Sensitivity: Normal

Hi,

I just tried to call the 1800 number on the leaflet I received and it is not working, an American voice says "Call cannot be completed as dialled. Please consult your directory & dial again".

Could you please supply me with a number I can use.

My house is in Fitzwilliam Road. I have downloaded the app and looked at the REF but it does not give me the information I require. It appears the planned new pipeline will be running very close to or under my house, & I would like to know exactly what is proposed & how any drilling will affect my property – noise, damage, or whatever. Or if in fact the very basic map does not show the actual line correctly.

Thanks

[redacted]

Submission 8

Archived: Monday, 27 July 2020 3:23:33 PM
From: [redacted]
Sent: Wed, 10 Jun 2020 09:23:05
To:
Cc:
Subject: RE: Update on the Refresh Vaucluse and Diamond Bay project
Sensitivity: High

Dear Sydney Water,

I am extremely concerned about your proposal to build the pumping station at Parsley Bay – one of our most pristine natural reserves, only metres from a new playground.

Surely there is a more appropriate location for the pumping station – anywhere outside this beautiful Reserve! Where will you be building the new toilet facility – by cutting down and removing the beautiful bushland which makes Parsley Bay so special and leaving a concrete eyesore in the place of the existing toilet block. I really can't express more forcefully how abhorrent I find this proposal.

What are the alternatives? Have you even explored them?

Turning Parsley Bay into a sewer is shocking proposal.

Regards

[redacted]

[redacted]

[redacted]

From: DOMINIS, HRVOJKA [mailto:hrvojka.dominis@sydneywater.com.au]
Sent: Wednesday, 10 June 2020 12:36 AM
To: Undisclosed recipients:
Subject: Update on the Refresh Vaucluse and Diamond Bay project

We're one step closer to changing history!

After years of planning, we've landed a solution that has the support of the local and wider Sydney community. Our solution will see wastewater diverted away from the ocean and sent to a nearby treatment plant in Bondi, maximising the use of Sydney Water's existing network while keeping construction and environmental impacts to a minimum.

Since we last wrote to you, we've been assessing the potential construction and environmental impacts of building this solution. This work is now complete and we have a Review of Environmental Factors (REF) for you to look at.

The attached newsletter provides an overview of the proposed solution and the full REF can be downloaded from the document library on the Sydney Water Talk website - www.sydneywatertalk.com.au

Meet the team

With physical distancing in place, we have opted to host three virtual community information sessions. If you have some questions and would like to speak to the project team, please join one of our Zoom sessions.

- Tuesday 16 June, 5.30pm to 7pm
- Thursday 18 June, 5.30pm to 7pm
- Wednesday 24 June, 5.30pm to 7pm

Each session is open for 1.5 hours, there's no need to attend for the whole time, just join at a time that suits you. To register, go to https://refreshvdb-informationsession.eventbrite.com

Make a submission

As this is a formal process, please send your written submissions to vauclusediamondbay@sydneywater.com.au by **Sunday 28 June 2020**.

Spread the word

We've created a new app to share project information as we progress through planning and into construction. Download the App to your phone or tablet by following the prompts https://refreshvdb.shareableapps.com . We want to reach out to as many people as possible, feel free to share the app with your friends, family or neighbours to keep everyone up-to-date on the project.

Got any questions?

Call us on 1800 645 466

Email us at vauclusediamondbay@sydneywater.com.au

Submission 8

Archived: Monday, 27 July 2020 3:25:31 PM
From: [redacted]
Sent: Fri, 26 Jun 2020 21:56:50
To:
Subject: RE: Refresh Vaucluse and Diamond Bay project submissions closing 28 June
Sensitivity: High

Dear Sydney Water,

I am now resigned to the fact that you will need to put the pumping station at Parsely Bay. I am glad to see you are at least retaining the tree shown in the attached image. To cut it down would be a travesty.

However the concrete platform above the pumping station and red pump valves look very stark and barren in such a beautiful location. You should at least pay a landscape architect to come up with a landscape design for the top of the platform with sympathetic garden beds and indigenous plants. In addition, as a return to the community for such disruption you should completely renovate and update the kiosk/café facilities building as part of the relocation of the toilet block. Near the kiosk is actually a safer location for the toilets as you don't need to cross the road so that is good. Another thing you could do for the community in Parsley Bay is to plant some more mature legacy trees such as Port Jackson Figs in the lawn, as no one ever sits in the middle in summer as its too hot, everyone chases the shade from one side of the lawn to the other.

Regards

[redacted]

[redacted]

[redacted]

From: vauclusediamondbay [mailto:vauclusediamondbay@sydneywater.com.au]
Sent: Friday, 26 June 2020 3:07 PM
To: vauclusediamondbay
Subject: Refresh Vaucluse and Diamond Bay project submissions closing 28 June

We're in the last few days of calling for public submissions on plans to refresh Vaucluse and Diamond Bay. This work will put an end to the continuous flow of untreated wastewater into the ocean from the last three remaining coastal outfalls in Sydney.

Make a submission
As this is a formal process, please send your written submissions to vauclusediamondbay@sydneywater.com.au by **Sunday 28 June 2020**.

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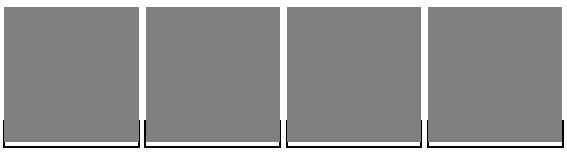

Submission 9

A [redacted]

Wed 10/06/2020 9:09 AM

Eastern Reserve sewage works

To vaucusediamondbay

You forwarded this message on 10/06/2020 10:45 PM.

Hello
I'm hoping to get information about noise and odour before vs after completion of the sewage work at Eastern Reserve.
Thanks
[redacted]

Submission 10

Archived: Monday, 27 July 2020 9:26:23 PM
From: [redacted]
Sent: Thu, 11 Jun 2020 17:28:39
To:
Cc:
Subject: Refresh Vaucluse and Diamond Bay Project
Sensitivity: Normal

Hi,

I've just read the proposed plans for this project from the pamphlets delivered to our mail boxes.

We live in Carlisle St.

Firstly I note Carlisle St is a proposed trenched pipeline route to be built along the road. How long will it take to complete the exercise for Carlisle St?

Secondly I hope no trees will be impacted...the Woollahra Council 'mistakenly' cut down many trees between 11- 19 Carlisle St about two years....we don't want to impact our green vegetation further!

Thirdly Sydney Water and Sydney Roads put in new curbing and water pipes from Chamberlain St via the top end of Fernleigh Av into the top of Carlisle St in the first half of 2020. These changes have certainly meant we have seen increased water seepage in the garage area of [redacted] Carlisle St.We have bought this issue to the attention of Woollahra Council. We require your assurance that the proposed trenched pipeline planned to start mid 2021 does not exacerbate this known issue.

Appreciate your advice to the above questions.

[redacted]

Submission 11

Archived: Monday, 27 July 2020 9:28:21 PM
From: [redacted]
Sent: Wed, 10 Jun 2020 10:26:59
To:
Subject: RE: Update on the Refresh Vaucluse and Diamond Bay project
Sensitivity: Normal

It is probably to late now but I have always been in favour of sending fresh stormwater back over the Blue Mountains instead of wasting it in the ocean!!

[redacted]

From: DOMINIS, HRVOJKA
Sent: Wednesday, 10 June 2020 12:36 AM
To: Undisclosed recipients:
Subject: Update on the Refresh Vaucluse and Diamond Bay project

We're one step closer to changing history!

After years of planning, we've landed a solution that has the support of the local and wider Sydney community. Our solution will see wastewater diverted away from the ocean and sent to a nearby treatment plant in Bondi, maximising the use of Sydney Water's existing network while keeping construction and environmental impacts to a minimum.

Since we last wrote to you, we've been assessing the potential construction and environmental impacts of building this solution. This work is now complete and we have a Review of Environmental Factors (REF) for you to look at.

The attached newsletter provides an overview of the proposed solution and the full REF can be downloaded from the document library on the Sydney Water Talk website - www.sydneywatertalk.com.au

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Call us on 1800 645 466

Email us at vauclusediamondbay@sydneywater.com.au

\f0

[redacted]

13th June 2020

Diversion of Christison Park and Diamond Bay OOS to Bondi STP

References:

1. Sydney Water Brochure 'Cleaning our blue backyard together' without any date and any reference number. This was put in my mail box on 11 June 2020.
2. Review of Environmental Factors, Refresh Vaucluse Diamond Bay (June, 2020)

Dear Sydney Water,

I have supported the diversion of the untreated Ocean Outfall Sewers (OOS) to Bondi STP since before Sydney Water's Minister, Tim Moore, promised to have the work completed by 1995!

I am mainly interested in the proposed work at Parsley Bay.

There are a number of matters in references 1 and 2, that have to be commented upon.

The REF on page 8 shows an unusual road arrangement at the roundabout at the junction of Old South Head Road and New South Head Road.

The REF on page 11 states: "Under wet weather conditions, when the wastewater system reaches capacity, transfer of wastewater to the Rose Bay submain will cease and instead, will be directed to the existing ocean outfalls. Over a ten-year period, we estimate that there will be around 254 events of this nature." This is about once per fortnight on average. Is this frequency acceptable in 2020? How will SPS 1216 be controlled when the Rose Bay sub-main has reached capacity? How reliable is the technology? Will the times and quantity of discharge to the Christison Park outfall be recorded? Will this information be publicly available?

As the Christison Park Ocean Outfall Sewer has been in operation for over 100 years, what is the condition of the section between Parsley Bay and the Pacific Ocean? What major work is planned on this section of the OOS over the next fifty years?

Traffic:

Appendix F on page 6 states about New South Head Road "Speed Limit The general speed limit is 60 km/h with a School Zone speed limit (40 km/h) which is enforced during 8:00 to 9:30 am and 2:30 pm to 4:00 pm school days near Cranbrook School." I feel that this information is inadequate. When heading north the speed limit changes after Vickery Avenue

and before Norwich Road down to 50 km/h until it ends where it joins Old South Head Road. There are three school zones along New South Head Road:

1. Ascham School (opposite Edgecliff Train Station)
2. Cranbrook School
3. Kambla & Kincoppal-Rose Bay Schools

Appendix F on page 42 states: "The construction traffic movements are expected to occur: To/from the pump station at Parsley Bay: New South Head Road, Vaucluse Road, Parsley Road, Horler Avenue." Similarly, the REF on page 67 states: "The construction traffic movements are expected to occur with works associated at:

- Parsley Bay: New South Head Road, Vaucluse Road, Parsley Road, Horler Avenue

A quick glance at a map shows that the nominated route has a gap between 'Vaucluse Road' and 'Parsley Road'. There are a number of possible roads to use to move over this gap. The suggested route should have been documented by GHD!

As a local, I suggest that Vaucluse Road is not used. Take a 325 bus trip along Vaucluse Road mid-week during both morning and afternoon school zone times to see the problems.

I am not a traffic expert, but I suggest that a better route would be:

- New South Head Road
- Hopetoun Avenue
- Fitzwilliam Road
- Parsley Road
- Horler Avenue

The REF on pages 20-21 states: "The construction workforce is estimated to peak at around 40 people a day.
The construction workforce is likely to fluctuate each day, depending on the program of work, but would generally be around:

- • 15 people at Parsley Bay
- • 15 people at Eastern Avenue Reserve
- • 10 people at Carlisle Street.

The REF on page 67 states: "Expected construction traffic volumes for the proposal would be:

- • 30 daily light vehicle movements
- • 5 - 10 daily heavy vehicle movements per construction site."

In light of my observations of light vehicles associated with construction sites in the Vaucluse area, I feel that the total number of light vehicle movements is underestimated as about half the light vehicles leave and return to the construction sites for morning tea/lunch runs.

The REF on page 35 states: "Parsley Creek flows down a gully from Hopetoun Road and through Parsley Bay Reserve before entering Parsley Bay. This creek flows within the construction boundary of the works but will not be impacted by the works." The REF on pages 38-39 does not mention the Eastern Water Dragon that is seen on the cliffs on both sides of Parsley Bay as well as throughout the gully especially along Parsley Creek. The fresh water eels in Parsley Creek should be considered. If site dewatering is being discharged to Parsley Creek then a uniform rate of discharge over 24 hours should be maintained.

The REF on page 32 states: "There are no known salinity or acid sulphate soils within the site. There is one known recorded contaminated site within one kilometre. This is the Rose

Bay Budget Service Station located at 638-646 New South Head Road, Rose Bay." The service station is now gone and a major redevelopment of mixed commercial/residential is nearing completion. To the east of the Carlisle Street site at the junction of Hamilton Street and Old South Head Road, there is a new mixed development including a Bunnings store. Before the redevelopment there was a Bunnings store with an open car park on this site. In this car park there were a number of monitoring wells. I do not know what the monitoring wells were for, but I suspect for some form of contamination.

The REF on page 72 has Figure 10:

My interpretation of the 'Proposed' picture shows public access to the top of Sewage Pumping Station 1216 by both steps and by the ramp from the car park. Is this correct?

I am unable to find in the REF if there will be a reduction in the total number of parking spots available to the general public after the sewage pumping station is completed or the same number will be reinstalled.

The REF on page 46 states: "Both the Vaucluse and Diamond Bay catchments have been assessed as having a low odour nuisance from the new proposed wastewater infrastructure. This is due to the nature of wastewater in the catchments having low Biological Oxygen Demand (BOD) and hydrogen sulfides, both of which can often produce odour. We consider the risk of odour generation during operation of the proposed wastewater infrastructure to be low." "Use of odour neutralising agents during construction and commissioning of the pumping stations." Rising mains from sewage pumping stations are notorious for odour generation. This rising main will be 1.8 km long. What will be the longest interval between pump operation cycles at SPS 1216? This may be in wet weather when on bypass to the Christison Park OOS. What odour neutralising agents are going to be used? Hydrogen sulfide

is itself an odorous compound itself. Typically, it can be smelt up to levels of 5 ppm; above this level the odour detection sensors are desensitised and it is not smelt. It is dangerous. The Water Board/Sydney Water had many sulfide problems in the sewers in the Botany area due to the tanneries.

The REF on page 25 states: "This REF will be available to download from sydneywatertalk.com.au from 9th June to 28th June 2020." Although submissions will no longer be accepted after 28th June 2020, I believe for public openness all of the REF and its appendices should remain readily accessible on the Sydney Water website after 28th June 2020.

The REF has a number of specialists' inputs to the documents, however I get the impression that a number of them visited the sites with a check list whilst wearing blinkers.

The replacement toilet and changing room facilities should be completed and in full operation before the existing facilities are closed to the public.

The REF was prepared with some outdated information, with what I consider as inaccurate information and with important omissions. I believe that the REF should have been written with a general overview, then each of the sites dealt with separately and then a summary.

On the bottom of the middle page of the brochure it states: "We know it won't be simple or easy to retrofit a network nearly 100 years old but we also know it needs to be done." The REF on page 2 states: "The ocean outfall at Vaucluse has been in operation since 1918." The Christison Park OOS is now over a 100 years old.

On the bottom of the middle page of the brochure there is a diagram showing trenchless technology with the explanation: "Trenchless techniques involve digging pits in the road to launch and retrieve the pipe sections." The pipes are left in the ground but the 'drilling machine' is recovered via the 'retrieval pit'.

What are the contact details for the Sydney Water Project Manager for this program?

I support this project. I would hope that there is clear thinking being done in the planning work.

[redacted]

Submission 12

Archived: Monday, 27 July 2020 9:32:02 PM
From: [redacted]
Sent: Thu, 18 Jun 2020 12:44:30
To: vauclusediamondbay
Subject: Zoom session Refresh Vaucluse Diamond Bay
Sensitivity: Normal

Good Day Sydney Water,

I have already made a submission on the REF.

I 'attended' the zoom meeting on the evening of Tuesday 16 June 2020.

From the zoom session the following points arose:

- In the 2002 Sydney Water 'Have your say' questionnaire that had to be submitted by Friday 24 January 2003, one of the impacts that was listed was "Minimising the visual impact of any aboveground infrastructure". Two of the immediate neighbours to SPS 1216 and one immediate neighbour to SPS 1217, all asked very clear and logically expressed questions about the visual impact of the SPSs. All of these questions should have been expected and prepared for. I was very disappointed by the response of the 'Senior Project Manager' who gave me the impression that he was familiar with the night's 'slide presentation', but not familiar with the details of the REF and had not been on the sites recently. This projected a bad image of Sydney Water. His answers were bureaucratic and vague ~ 'in the final design'.
-
- The vent stack for SPS 1217 was both a vent and a power generation and storage site. I had not heard of this combination before. Has a risk assessment been conducted for this design?
-
- Although the REF on page 11 documents that up to 254 wet weather overflows over 10 years to the Christison Park OOS, the zoom session revealed that there will be wet weather overflows when SPS 1217 is not working. I have been unable to find in the REF how many overflows in 10 years and from which OOS they will occur.

I fully support the diversion of the three OOS to Bondi STP, but I fear poor communications might derail or delay the program.

Thank you

[redacted]

[redacted]

Submission 13

[redacted]

Hi

Thank you for sharing the information on the Refresh Vaucluse & Diamond Bay project...

Great project and definitely long overdue. To fully assess the proposed plan, would appreciate you sharing information on the implications for the Bondi wastewater treatment plant and potential impact (in terms of scale, hours of operation, and size, noise, smell, implications for residents living in vicinity both positive and negative)...

Am hoping this project has minimal additional implications but rather a total upgrade and modernization of that facility to accommodate the increased volume will also be part of the plan...

Kind regards

[redacted]

Submission 14

Archived: Monday, 27 July 2020 9:55:14 PM
From: [redacted]
Sent: Fri, 19 Jun 2020 10:03:26
To:
Subject: Refresh Vaucluse and Diamond Bay
Sensitivity: Normal

To Whom It May Concern,

Sydney Water

Dear Sir/Madam

We have viewed the information leaflet entitled *Refresh Vaucluse and Diamond Bay* which you have put out and delivered/sent to local residents in Vaucluse, but we have not read in detail the whole 85 odd page Review of Environmental Factors available online.

As a result of receiving the leaflet, we now have a number of comments and queries.

We have lived for 24 years in Hopetoun Avenue, just above the Walkway down through the Parsley Bay Reserve rainforest to the flat park area and beach. For many years we have used both the pathways through the Reserve, and have noticed sewerage odour at various points in the lower section of the northern pathway, and wondered what it can possibly have related to.

1. Are we correct in now understanding from the RV&DB information leaflet that effluent has actually been discharging into the Harbour at this location, and for a considerable length of time? What is the catchment area for this effluent, and is it untreated raw sewage? If it does go into the Harbour – you speak of '**improving the harbour'**, which sounds extremely ominous to us, as though this is in fact the lamentable truth - how far out is it discharged? Obviously it is a popular swimming area in summer, with shark nets in place, which would further trap undesirable solids. Why was this area chosen for this purpose? And why would effluent be discharging in to the Harbour at all, full stop?

2. We cannot believe that untreated raw sewage has been discharging into the ocean at the points at Christison Park and Diamond Bay marked on your maps. After all the fuss about Bondi some years ago (I myself had a badly infected foot for some time, due to swimming at Bondi after receiving a badly grazed ankle in a fall), and that outfall then being extended further out into the ocean, it beggars belief that there are outlets at Vaucluse and Diamond Bay (which we never even knew existed) which have been continuing to function in the way that Bondi did in former times.

3. If the sewage currently being discharged in Vaucluse is to be piped to the treatment station at Bondi, where is it then to be ducted to and/or discharged? This does not appear to be stated in the leaflet, and the desired impression seems to be that the problem ends there. Is it to be added to the existing outfall at the Bondi location? That would presumably significantly increase the amount of matter, and one imagines that the pipeline would therefore need to be extended even further out to sea. Are there any plans for this? What is the catchment area for the sewage currently discharged off Bondi? Is it coming from Greater Sydney, or just from the Eastern Suburbs? Or is the treated material to then be returned to the existing outfall points in Vaucluse, without installing new lengthy pipelines further out to sea? Is treated sewage really safe for our precious oceans and marine life, and what we are leaving for future generations?

4. The bottom line glaringly obvious question in all this which occurs to us, 'Why on earth is effluent from a big city like Sydney still being discharged into our precious oceans at all, and not being piped inland to where, with its huge water content, it is sorely needed for agricultural production, and especially at times such as we have been experiencing in recent years, with the worst drought in NSW on record? The volume of water required from our precious water catchments for the efficient functioning of the millions of toilets and showers in a city like Sydney must be stupendous. And to think that this valuable waste water just gets discharged into the ocean appears to us to be a tragic mistake. At the very least it might involve a split system, where even if sewage on the eastern side of the CBD was still discharged into the ocean for a time, at least that on the western side of the CBD could be piped inland. Surely this is a legacy we must leave for our children, or at least contemplation of same.

5. On a more personal note, if there are going to be works carried out at the bottom of the pathway through the Parsley Bay Reserve, does that mean that there will be no access to the beach for local residents via that route for a fairly lengthy period of time? We presume that all care will be taken to preserve the adjacent native bushland.

Having written the foregoing, we do also wish to convey our gratitude and appreciation for your efforts so far in planning to tackle the obviously enormous problems involved in the various difficult situations.

Yours Faithfully,

[redacted]

Submission 15

Archived: Monday, 27 July 2020 9:57:13 PM
From: [redacted]
Sent: Fri, 19 Jun 2020 09:17:42
To:
Subject: Re: Thank you for your time and contribution
Sensitivity: Normal

Thankyou for the email and the information presented via zoom recently.

This email is a submission as requested.

I live at [redacted] and the Parsley Bay pumping station proposed is directly in front of my property, and that of my neighbour at number 26.

I have a range of concerns which do not relate to the broad objective you are seeking, which are laudable. Rather they relate to the impact of the specific location of the pumping station.

Dot points are best to list the concerns.

1. The construction footprint is much larger than anticipated. The initial conversations suggested just replacing the toilet block and excavating beneath it, but indicative drawings suggest something three times that size.
2. We have a large swimming pool situated within 5 metres of the construction site and located on the same rock structure that will be excavated. We have real concerns regarding stability and damage from excavation.
3. I note the pumping station at Dover Heights does not have a vent stack yet Parsley Bay does. Is that necessary?
4. If it is necessary we are concerned about smell. At present we do not notice smell from the existing vent, although our neighbour does (their house is closer). Our concern is that odours will become a feature and we would like assurances that this will not be the case. In any event an effort should be made to move the vent location of it cannot be eliminated.
5. We have lived in the location for almost 20 years and a key selling feature to us is direct access to the park, and privacy from the car park. We have been told this will not be affec ted but need to understand how this will be ensured. Detailed plans would help.
5. The artists drawings would suggest that many of the large trees in front of our property will be removed as part of excavation. We would like to understand which trees are being r emoved,and further information on replanting recommendations would be useful.
6. Please confirm that dilapidation reports will be carried out In advance of construction, and we would like to understand our rights of compensation if damage occurs. We do not wish to bethe lone litigants against the large government corporation if mistakes happen on such a large project.
7. Will there be audible noise from the pumping station once it is operating?

I would suggest a sensible way to address some of these issues would be a meeting on site with my neighbour and one of you engineers.

Thanks and regards,

[redacted]

\f0Sent from portable device

\f0

> \f0On 18 Jun 2020, at 10:42 am, vauclusediamondbay wrote:
>
> \f0\u65279?
>
> Hello and thank you for attending our Zoom community information session on Tuesday night. It was great to put faces to names and fantastic to hear your questions and feedback. We hope we answered your questions and concerns, if not, please do not hesitate to get in touch.
>
> This is not the end of the conversation!
>
> We have your email address now, so we'll add you to the mailing list so we can keep you up-to-date on the outcomes of the exhibition and future opportunities to be involved with the planning and design of this project. If you do not wish to be contacted, please let me know.
>
> **Make a submission**
> As this is a formal process, if you want to provide feedback to the REF, we do need a written submission. Simply reply to this email and send a submission by Sunday 28 June 2020.
> Spread the word
> We've created a new app to share project information as we progress through planning and into construction.
> Download the App to your phone or tablet by following the prompts https://refreshvdb.shareableapps.com .
> We want to reach out to as many people as possible, feel free to share the app with your friends, family or neighbours to keep everyone up-to-date on the project.
>
> ---

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Submission 16

Archived: Monday, 27 July 2020 9:58:23 PM
From: [redacted]
Sent: Thu, 25 Jun 2020 19:22:33
To:
Subject: PARSLEY BAY REFRESH
Sensitivity: Normal

---

hello Sydney Water

The upgrade of Sydney Water Infrastructure will improve and protect the water quality of Sydney Harbour. This is an important initiative.

The proposed location of the pump house on the site of the existing toilet block at Parsley Bay, while a discrete site, means that another location in the park is required to situate these facilities.
This land swap taking up valuable parkland on what is a scenic and small harbour park.

Additionally the proposal to place the pump house below grade, in proximity to a mature fig, is problematic. The removal of the limbs proposed is not best practice or supported by Australian Standards.
It is also likely that significant roots lie below the toilet block or within the excavation area, given the tree species and the radius of both the Tree Protection Zone and Structural Root Zone.
A second opinion on the arboricultural impact of these works is warranted.

The proposal as illustrated in Figure 10 of the REF, shows the removal of the toilet block, major structural limbs of the fig and replacement with a large area of pavement and highly visible surface infrastructure.
This is not sympathetic to this much loved bush park. Given the significance of the landscape character of this park, other viable options should be investigated.

One option could be to locate the pump house below the carpark with a roof designed for vehicle traffic. Situating this element within an existing paved surface where access panels are less obtrusive.
The sensitive integration of above ground infrastructure- electrical kiosks, valves and ventilation shafts- could be designed to avoid tree roots, the carpark circulation route and minimise loss of carparking bays.
New planting screening the surface infrastructure. This proposal may have cost implications if an irregular structure is required but the works will be better integrated within the park.

A review of the Arboricultural Impact Assessment and consideration of alternative siting options will respect the landscape significance of Parsley Bay for future generations to appreciate and enjoy.
The works an exemplar of construction in a sensitive site.

Thank you for the opportunity to respond to this proposal.

[redacted]

Figure 10 – Existing and proposed viewpoint analysis at Parsley Bay

EXISTING

PROPOSED

Submission 17

Archived: Monday, 27 July 2020 10:01:59 PM
From: [redacted]
Sent: Fri, 26 Jun 2020 16:00:20
To:
Cc:
Subject: Dover road
Sensitivity: Normal

Hi there, we are residents of Dover Road, Rose Bay. I can see from the leaflet there is 'trenched pipeline' planned. When will this start and end?

What are the hours of work?
Thanks

Murray

--

[redacted]

Submission 18

Archived: Monday, 27 July 2020 10:03:35 PM
From: [redacted]
Sent: Thu, 25 Jun 2020 11:25:38
To:
Subject: FW: Thank you for your time and contribution. Submission Parsley Bay Pumping Station
Sensitivity: Normal

To Sydney Water Management,

Re : Parsley Bay pumping station Submission.

The following is a record of what was discussed at the Zoom meeting on 16/6/20 and a list of our concerns and questions with regards to this development.

I,[redacted] requested an on-sight meeting (with my neighbour [redacted] Parsley Rd) with the senior Sydney Water engineer, environmental and project manager BEFORE a detailed construction design commences for the purpose of clarifying your plans and avoiding negative impacts to the environment and the property owners.

The on-site meeting is to discuss and mark out tree, boulder removal and the area allocated for the pumping station, above ground electrical kiosk, access panels, valves and ventilation shaft. Confirmation of the size of this footprint proposal and the effect of the removal of large boulders and the subsequent stability of the area and my property located above.

Before the on sight meeting please make the necessary enquiries to be able to answer the questions below for discussion on site.

1a) Can the construction design team make provisions to ensure that we are not negatively impacted by the final design? We would like to understand which area

is allocated to the underground pumping station and if it will be contained to the envelope the current toilet block, as was our understanding from Bala and

Melinda last December.

The artist impression drawings on this recent brochure show a substantially larger footprint to the east and possibly south than was discussed on site at the meeting last December with Bala and Melinda.

b. What is the purpose of the area extending east of the toilet area envelope as shown on the artist impression drawing? The drawing shows this as a large cleared area. Please be specific in explaining what this area will be used for and most importantly will this area be excavated and or cleared? Will there be any work done under this extended area?

2. It is important to note:

a. This area has established native trees and large boulders of rock which in our opinion should be retained in order to maintain the ecological balance of the area which has been established over many decades if not a century. The preservation of this area is essential as it is an important habitat and food source for wildlife in the area such as birds and water dragons, which we often see. Extensive disruption to this area will have a negative impact on wildlife habitat and food source which should be considered in detail by the construction design team.
b. Stability of the area. Huge existing boulders stabilise this sloping area. Some of these rock boulders extend below the surface. Removal through excavation of any of these boulders could have a major impact on the stability of the whole area. What are your plans in stabilizing the area if boulders are removed?
c. For over a century there has been access from our property into the park. We bought the property 20 years ago from an elderly women in her 80's who was born in the property. At that time the owners told us that they had always had access into the park. It is important that we continue to have this pre-existing access, so that the value of our asset is not jeopardised.
d. Over the time we have owned the property the area has naturally produced many established screening trees which provides our home with privacy from the public car park and from the sight of the existing stack. Removal of these established trees will impact our pre-existing privacy and reserve views. If any of the established trees are to be removed will they be replaced with similar mature trees so that we are able to retain our privacy and security?

3.

a) What is the estimated time for Noise and vibration whilst construction is in progress?

b) Will it be possible to have access into the park whilst construction is occurring from

our property?

c. What is the estimated noise and vibration after construction from the pumping

station?

d. Will the existing ventilation shaft be moved from its current position?

4.

a. We currently experience sewerage odours from the shaft and there have been a number of attempts to rectify this problem. There has been an improvement during the winter months but we still experience odours during the summer months.

b. Please confirm that the stack will not be moved closer to our home and that the new pumping station will eliminate all odours, as we have been told.

5. Confirmation of a dilapidation report being completed for my house before and after construction.

6. To be kept up to date on any changes proposed to the footprint, design and or effect on the area behind my house.

7. Subsequently to be shown a preliminary construction design before a detailed plan and to have a voice and the opportunity to object if we believe the environment or we are negatively impacted.

Please confirm you receive this submission.

I look forward to hearing from you.

Thank you,

Kind Regards,

[redacted]

From: vauclusediamondbay <vauclusediamondbay@sydneywater.com.au>
Sent: Thursday, 18 June 2020 10:43 AM
To: Undisclosed recipients:
Subject: Thank you for your time and contribution

Hello and thank you for attending our Zoom community information session on Tuesday night. It was great to put faces to names and fantastic to hear your questions and feedback. We hope we answered your questions and concerns, if not, please do not hesitate to get in touch.

This is not the end of the conversation!

We have your email address now, so we'll add you to the mailing list so we can keep you up-to-date on the outcomes of the exhibition and future opportunities to be involved with the planning and design of this project. If you do not wish to be contacted, please let me know.

Make a submission
As this is a formal process, if you want to provide feedback to the REF, we do need a written submission. Simply reply to this email and send a submission by Sunday 28 June 2020.
Spread the word
We've created a new app to share project information as we progress through planning and into construction.
Download the App to your phone or tablet by following the prompts https://refreshvdb.shareableapps.com .
We want to reach out to as many people as possible, feel free to share the app with your friends, family or neighbours to keep everyone up-to-date on the project.

\f0 

Submission 19

[redacted]

Hi there
I received a newsletter recently with your plans and drawings for the pipeline and pumping stations from Vaucluse to Rose Bay.
I live on Conway Ave, Rose Bay and our only access point is via Carlisle St, Rose Bay which I note will be subject to on street digging of trenches for this project.
I am in support of the overall project as I have seen close up the run off at Diamond Bay and Vaucluse but would like to request a detailed traffic management plan for the digging on Carlisle St.
The street is very narrow in certain parts and has a huge amount of traffic on it due to Macauley Primary School, a large number of developments on the street, many people using it and Fernleigh Ave as a thoroughfare to get to their children to and from Kambala School plus car parking on both sides of the street. This makes it a very difficult and sometimes dangerous street to navigate.
Many times this year I have been stuck and unable to pass through due to cars being parked on both sides and a vehicle coming opposite. On a couple of instances I have not been able to get my children to school on time as the road has been blocked by cranes and manned stop zones due to concrete pouring and other construction events.
I would ask that in planning for the digging of the trenches and the subsequent disruption to traffic flow on the street again that you work closely with Woollahra Council (who I have cc'd in) to ensure that locals can still get up and down Carlisle St. This may include stopping parking on one side of Carlisle St during the trench digging and/or blocking Fernleigh Ave as a thoroughfare during the period of the works.
I appreciate your consideration of this as you plan for this important project.
Please provide information as to what you decide closer to the time.
Best of luck and kind regards
[redacted]

[redacted]

SUBMISSION: REFRESH VAUCLUSE and DIAMOND BAY

[redacted]

SUBMISSION:

I am fully in support of the proposed move to divert the wastewater in our part of Sydney, which will result in a much healthier environment for all.

In this submission to you, I would like to request that three issues will be covered, such that my property/my home - and access to it - are secure at

all times while this project is carried out:

1) **I request a dilapidation survey on my property**
I live on the [redacted] Carlisle Street and Conway Avenue, in the [redacted] cottage (of two semis) of our building.
It is the high side of Carlisle Street. There are 28 steps to our front door, and level access at the back of the property.

I understand from the Zoom session I attended on 16/06/2020, that you will do a dilapidation survey on my property,
and that it is up to me to request this be done in order that it will be done.
Please regard this request as being made today, via this submission.
This survey is to include both the sandstone fence, timber fences, tiled steps, garden infrastructure, underground pipes and the house.

(In a previous, unfortunate experience, when a multi apartment complex was being built across the road from us, a dilapidation survey was done
on the house, but not on the garden and the outdoor structures. In the end we had to pay thousands of dollars to replace the sewerage pipes,
which had cracked and collapsed due to the drilling and associated work across the road.
We were not covered by any insurance in this matter).

I would also request a detailed explanation of my rights in this matter, and how I would need to go about repairs and compensation from you, should
anything break collapse or be otherwise rendered damaged or unusable, if damage would be incurred.
Thank you.

2) **I request an assured parking spot and access to driving my car.**

I have no off- street parking space – neither a garage, carport nor a driveway. My car is always parked on Conway Ave, with convenient access to our back gate.
I use the car every day, and would require assurance of daily access to my car, and to being able to drive out of Conway Ave., and back again, on a daily basis,
and at times, more than once a day.
(Please note that there is a driveway leading to our back gate which is marked [redacted] but the driveway is not mine and belongs to the owners of [redacted] Conway Ave.
I never use this driveway to park my car).

3) **Resurfacing of Carlisle Street.**
With extensive digging and disruption to the road surface of Carlisle Street, I would request that when all work is completed, that the road be resurfaced/tarred
to the highest standards, not just have potholes etc filled in at random.
I would like to think that this part of the work that you are proposing to undertake, would be considered of utmost importance to the quality of life of residents who have to live through the disruption this project will entail, and to the protection of and value of, our vehicles.

Please confirm receipt of my Submission to you, and I look forward to hearing from you regarding matters raised herewith.

Sincerely,

[redacted]

REFRESH VAUCLUSE and DIAMOND BAY

[redacted]

A FURTHER SUBMISSION:

I have looked further into the proposed REFRESH VAUCLUSE and DIAMOND BAY wastewater re-direction to and through Rose Bay.

In this further submission to you, I wish to pose a number of questions, concerning the **proposed relocation of the Carlisle Street vent stack.**

A closer look at your maps, indicates that you plan to move a vent stack that has existed diagonally across the road from us for decades (I have lived at [redacted] Carlisle Street since 1979, and it was here back then), to literally outside my front gate.

I would like your answers to the **environmental, physical aesthetic, health implications of your proposal** as indicated in the map in your brochure.

1) What is your **reason for creating new infrastructure** in order to move a resource that already exists, (and can be updated) a few metres across the road?
   I question any consideration your plan embraces, from logistics and obvious additional cost implications, as well as a longer period of great inconvenience for me and
   other residents of our street, in moving the stack across the road.

2) As a Woollahra Council resident, I have had to comply with strict rules imposed by Council regarding our environment. The cutting down of trees, and even
the cutting off of large branches, has required a ranger to come out and assess whether such actions may be taken by the resident, and is often denied.
It seems to me, that in planning to relocate the vent stack, you may also be **planning to sacrifice the gracious tree** that has always been there. just outside our home,
adding to the green environment we have been fortunate to live in, and foster.
If this were the case, your plan would **destroy a beautiful aspect of Carlisle Street, that has taken decades to nurture**.

3) I understand that the vent stack would allow **outflow of what I call *waste-air***, fumes from the wastewater flowing underground just outside, that would carry **fumes with bacteria and chemicals**, dissipating these into the air I breathe in day and night. It will be a nightmare.
May I reference that I lived in Bondi as a child.... And these days I often drive along Military Rd in Bondi Beach/Dover Heights; I have had the bad luck of breathing in the waste air just on these short journeys.
4) Therefore, what proposals and plans have you put into place, to build into the vent stack -wherever it may end up - **for an odour control unit/s to be built into the infrastructure** right now, at the design stage of your development? Obviously a unit that may be switched on at times of need!

5) Your plan to relocate the vent stack would render the front of my property void of any green aesthetic and beauty, and **my home bare and more vulnerable**.

6) All those years ago I chose to live in this part of Rose Bay for health reasons among others. It is not on a main road, so car exhaust fumes and smells are less than on larger traffic arteries.
When property and infrastructure development is not ongoing here, it is quiet, clean and fresh.

This has important health implications for me as I suffer from headaches and **require the air quality in my environment to be maintained at a high standard.**
Having a vent stack at my doorstep will potentially have poor health outcomes for me and my family.

7) It is obvious to me, and to all concerned, that building **a vent stack on the green strip outside my front gate,** as your proposal appears to do, will **devastate the value of my property**,
and cause me and my family financial harm in the long run. This is would not progress but regression at its worst.
Your proposal does not at all take the needs of people like me, who have lived in this neighbourhood for so long, into consideration. I have therefore come to the conclusion that while in principle, I supported REFRESH VAUCLUSE AND DIAMOND BAY, as things stand, I find that this aspect of your proposal totally unacceptable to me and I oppose it.

In closing this part of my Submission, let me say that **I would like a representative/s** from Sydney Water and specifically from Refresh Vaucluse and Diamond Bay,

to make arrangements **to come to my home** with detailed documents, maps and plans to discuss this matter further.
I am sure my immediate neighbours would be most interested too.

You have my email address and phone number, please get in touch at your earliest convenience.

Sincerely,

[redacted]

Submission 21

Archived: Monday, 27 July 2020 10:15:35 PM
From: [redacted]
Sent: Sat, 20 Jun 2020 12:08:07
To:
Subject: Refresh Vaucluse and Diamond Bay
Sensitivity: Normal

Hi,

I live at Parsley Bay Reserve and I have concerns about the proposed removal of the toilet block. In your pamphlet (titled "Refresh Vaucluse and Diamond Bay") you state, and I quote, "Wewill build a new, improved toilet block at Parsley Bay **before** we remove the old one to put in our pumping station."
Are you assisting Woollahra Council in preparing and submitting your proposal for the new toilet block? It is my concern that this process has not even commenced and, given the complexity of such a task, environmental approvals, community engagement, etc, I fear that it is not a real priority for you.
But it should be your number one priority.
It is bad enough that the entire car-park will be unusable when (and **if**) you start work. But to also inconvenience people (primarily mothers with toddlers and also a fair share of elderly patrons) by not having proper toilet facilities is simply intolerable and **will not happen**.
It makes me question your entire plan. Have you simply chosen the easiest and cheapest and most convenient option for yourselves? Maybe there are better, but more expensive options, which you are not sharing with the public.
I'm afraid to say that I don't trust you, and many of the locals share my view.
I will also be sending this letter to the relevant state and federal members of government.
Someone in power needs to shine a very bright light on this project.

Regards,

[redacted]

Submission 22

Archived: Monday, 27 July 2020 10:20:12 PM
From: [redacted]
Sent: Sat, 20 Jun 2020 09:32:30
To: vauclusediamondbay
Subject: Submission regarding construction at Parsley and Diamond Bay.
Sensitivity: Normal

Dear Sydney Water,
I have read your information regarding construction at Parsley and Diamond Bay.
I have 5 main areas of concern.

1. I do not agree to the demolition of the toilet block at Parsley Bay before council has located and environmentally planned, designed and constructed a new toilet and shower/change room facility able to cater for the 500 people that attend the park on a good summers day. This process would take as long as the process you are undertaking now. The money is no object answer I have been hearing does not solve the location problem. The supply of a temporary toilet facility for an indefinite period of time is also unacceptable.
2. The disturbance of rare and threatened species habitat is not acceptable at Parsley Bay and Diamond Bay. Key threat abatement measures must be adhered to under legislation. Construction equipment must not damage the biodiversity that exists in the marsh at Diamond Bay and ground over layer next to the paths at Parsley. Translocation experts must be utilised. The 300 year old Eucalyptus robusta near the trench entrance at Parsley Bay will have it's major roots affected most likely causing death. Powerful owls and micro bats roost in the hollows. The soil seed bank contains the threatened Acacia terminalis sap terminalis at the long footbridge and Syzigium paniculatum trees and saplings occur through the mid storey.
3. Public use of the park, kiosk and will be severely affected. Measures must be put in place to ensure safe access is still available to park users. The traffic and parking in Parsley Road will be affected.
4. Staff need access to all areas of the park to continue maintenance duties.
5. The noise at 7am - 8am must be minimised. The caretaker residence and neighbours have school age children and are asleep. Lack of sleep is bad for health.

I would like to see the proposed footprint marked out in situ for further comment.

Thank you for the opportunity to comment.

[redacted]

Submission 23

[redacted]

27 June 2020

Refresh Vaucluse and Diamond Bay
PO Box 399
PARRAMATTA. NSW. 2124
By email: vauclusediamondbay@sydneywater.com.au

Dear Sir or Madam,

Thank you for the opportunity to provide a submission in response to the Review of Environmental Factors for Sydney Water's proposed refresh Vaucluse and Diamond Bay proposal.

I'm concern relating to the relocation of the vent stack and the lack of detail provided by Sydney Water on the levels of odour and foul air that may be generated by the proposal.

It is unreasonable to expect the residents to accept the vent stack change based on such limited detail and without an assessment of the potential impacts to our properties. On this basis, I would appreciate Sydney Water provide further details, so residents could have a better understanding of the proposal and its impacts on the neighborhood in regards to odour and foul air, so they can accept or not this proposal.

Yours faithfully,

[redacted]

[redacted]

Submission 24

Archived: Monday, 27 July 2020 10:24:03 PM
From: [redacted]
Sent: Sun, 28 Jun 2020 20:40:30
To:
Subject: Objections to Refresh Vaucluse and Diamond Bay Project
Sensitivity: Normal

\f0Project Manager

\f0
Refresh Vaucluse and Diamond Bay Project

We would like to raise the following **Objections to the proposal.**

1. We live close to the Eastern Avenue Reserve - which is a very narrow sandstone shelf. We are concerned that trench work drilling - will undermine the foundations and structural stability of
our property.

2. We are concerned that the ventilation stack will create a bad odour and reduce the air quality in our street. The wind often blows up Eastern Avenue from off shore.

3. We are concerned that the size of the ventilation stack Is too large, and is a visual pollutant.

4. We are concerned about noise pollution emanating from the proposed new pump station. If it is in operation 24-7 the noise will be incessant.

5. Overall, the projected “gains” of the proposal are based on modelling and guesswork - and not on actual scientific data.

[redacted]

Submission 25

Archived: Monday, 27 July 2020 10:27:16 PM
From: [redacted]
Sent: Sun, 28 Jun 2020 19:48:31
To:
Subject: Fw: Sewer pumping station
Sensitivity: Normal

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\f0From: Simon Butler-White
Sent: Sunday, 28 June 2020 7:45 PM
To: vauclusediamondbay@sydneywater.com
Subject: Sewer pumping station

Good afternoon.

I'm a local resident and would like to register my opposition to a sewer pumping station in Parsley Bay, as I believe it will have a negative impact on the bay and environs.

[redacted]

[redacted]

28 June 2020

Submission in Response to Review of Environmental Factors

Refresh Vaucluse Diamond Bay (June 2020)

[redacted]

Having examined the Review of Environmental Factors ('REF') and accompanying appendices together with Vaucluse Diamond Bay Ocean Discharges Pollution Study Report (PRP), it would appear these documents, considered together, are substantially deficient in material respects. To the extent that the construction of the sewage pumping station below Parsley Bay Beach is predicated on these reports, it is submitted that the studies fail to address key questions regarding the operation of the pumping station and possible adverse effects on public health and safety.

The gravamen of this submission is that while the PRP purports to show why the current sewage system is inadequate and the REF goes to extraordinary lengths to show that construction of the facility poses no untoward dangers, the reports are conspicuously silent on the very real threat of injury to environment and human habitation caused by the ongoing and long-term operation of the pumping station.

The REF proposes a subterranean sewage pumping station below the Parsley Bay Beach kiosk. However, it is beyond dispute that sewage pipes, despite quality of construction and materials, may leak from time to time despite best efforts. Further, sewage that is being pumped is necessarily under pressure. Pressurised fluids are invariably more likely to leak and, when a leak occurs, leakage under pressure can have serious if not catastrophic consequences.

In short, pressurised sewage let loose below ground can cause enormous amounts of contamination even if promptly detected.

The risk of beach contamination and injury to children, pets, and marine life is of paramount concern yet it rates barely a mention in the reports – where the focus is almost entirely on construction and not subsequent operational risks.

In this connection, the reports fail to appropriately consider:

1. Parsley Bay is on Sydney Harbor – an environmentally fragile body of water. Despite ongoing diligent efforts, the Harbor is always at risk of pollution because of maritime activities and human activities associated with being surrounded by a major urban centre.

2. Further, Parsley Bay is a recreational beach area that even now, from time to time, has unhealthy bacteria counts and is unsafe for bathing. Its tidal drainage is modest at best. Consequently, even a slight augmentation of bacterial levels may be serious to aquatic life. It is well-known that Parsley Bay is frequently used by recreational anglers.

3. Parsley Bay Beach is also routinely used by small children who crawl and play and dig in the sand. Beach sand is an ideal medium for harbouring bacteria.

4. Parsley Bay Beach is surrounded by residences whose amenity and even value may be adversely affected by noxious fumes released by leakages and beach contamination.

These environmental factors must be considered in light of the risks of ground leakage. It is nothing short of reckless to consider building this facility based on construction factors without comprehensively analysing environmental and health risks caused by the operational risks on a long-term basis. Five to ten years would appear to be a minimal risk assessment period.

It is further submitted that had the operational risks been properly considered, the idea of building the sewage pressurisation/transfer system under a public beach would have been discarded in the first instance.

Before the proposal can even be considered at a preliminary level, a proper environmental study of ongoing operational risks must be conducted and independently evaluated with an opportunity for a full community consultation. Review by State and Federal authorities is also appropriate because of impacts on the Harbor itself. A proper study must consider the amount of waste that can be discharged through even a small leak, safety features to detect leaks, along mechanisms to immediately close the beach before wildlife and children are injured and to promptly notify neighbouring residences of the emergency.

In summary, the proposal should not be considered at this time – not until an adequate environmental study has been completed. At that time, and only then, may there be a meaningful consideration of this scheme.

Submission 27

Archived: Monday, 27 July 2020 10:31:26 PM
From: [redacted]
Sent: Sun, 28 Jun 2020 19:30:51
To:
Subject: Pumping station design
Sensitivity: Normal

Hello,

Thank you for updating the residents on the plans and allowing us to give feedback. We all want the same outcome for cleaner water and to eliminate the smell in our community.

Here is some feedback for the revised artists impression of the Eastern Reserve concept:

ADVANTAGES

- Picket fence being retained is a good idea as just having the bollards was a safety concern
- Access panels/kiosk substation/pumping station valves seem to have been moved closer to fence line

DISADVANTAGES

- Having a total of SIX separate facility locations (2 x access panels, 1 x large kiosk substation, 3 x pumping station valves) is VERY messy, scattered and POORLY designed
- Eastern Reserve is a public space used by locals and is the only flat, accessible open space on the cliffside that locals use for exercise, relaxation and recreation – feels like it's being DESTROYED by locating the pumping station right there
- Looks like an eyeseore for Eastern Avenue residents to have to look at every day

SUGGESTIONS

- Why can't the whole station site (including the access panels/kiosk substation/pumping station valves) be MOVED further along in the unusable space between Eastern & Oceanview Avenues? There is dead space closer to Oceanview Avenue and the reserve at the end of Oceanview is only used as a walkway/thoroughfare anyway for people, as they come to Eastern Reserve to use that as a park space.
- Was the park space at the end of Oceanview Avenue an option AT ALL or has Eastern Reserve been chosen since it's flat and clear? If that's the case, it's heartbreaking that a parkland space is going to be RUINED just for convenience and it makes more sense to move it closer to Oceanview since the pipes are running through there anyway.
- Can the number facility locations be minimised? Having SIX separate metal obstructions is NOT a cohesive design.

Thanks again and I would greatly appreciate you considering my suggestions.

[redacted]

28 June 2020

Sydney Water
Refresh Vaucluse and Diamond Bay
PO Box 399
PARRAMATTA NSW, 2124

Dear Sir or Madam,

We are emailing you herewith to lodge our objection to the short time we have had to digest the information provided on your brochure distribution and to also lodge an objection to the the proposed "vent stack to be located in Carlisle Street, Rose Bay. As we received a brochure in our mailbox the day before the last Zoom session on 24 June 2020 and on the day of the Zoom session were not able to participate.

I have downloaded the countless number of pages on your website covering the VDB proposal but have not had sufficient time to study the whole detail of the Refresh Vaucluse and Diamond Bay proposal.
We moved to Carlisle Street in March 2020 and were completely ignorant of the plans regarding Refresh VDB. The brochure below was the first we had been informed of it.

We have read through much of the information on your website and would like to document our concerns.
Our apartment is at [redacted] and bedroom at the front of the building which we estimate to be about 15 metres from the proposed site of the trench to be dug, and directly opposite the "new vent stack". This gives us concerns regarding noise pollution and more harmfully dust pollution during construction and air quality and odour concerns after completion of the works.

We have been advised that the vent stack was previously located outside 33-37 Carlisle Street and we are most curious as to the reason it would be moved across

and up the street a few metres which would place it directly across the road from our bedroom. We would welcome your assurances that we are not going to have to keep our doors and windows closed in order to breathe air that is not tainted.

I am having great difficulty locating any pictures of this proposed "new vent stack" and would be obliged if you could avail us some photos.
There is great detail provided regarding the plans proposed for the total 'Refresh Diamond Bay and Vaucluse" project but very very little detail regarding how the end part of the proposal (Carlisle Street to Dover Road Section) will affect the health and wellbeing of the residents who live here. Consideration among other things was given to recreational fisherman and swimmers (as quoted about 2000 per annum) who have the choice whether to swim or fish but as far as I can see no such consideration the the residents of Carlisle Street who DO NOT have the choice not to participate.

I trust we will receive a response to this email in a timely fashion.

Thank you

[redacted]

[redacted]

[redacted]

27 June 2020

Refresh Vaucluse and Diamond Bay
PO Box 399
PARRAMATTA. NSW. 2124
By email: vauclusediamondbay@sydneywater.com.au

Dear Sir or Madam,

Thank you for the opportunity to provide our submission in response to the Review of Environmental Factors for Sydney Water's proposed refresh Vaucluse and Diamond Bay proposal (information session attended by Maria Sophios on 26 June 2020).

Our concerns relate to the following;

1. Air Quality

There is a lack of detail provided on the levels of odour and foul air that may be generated by the proposal. At 6.1.4 on page 46 of the Review of Environmental Factors states:

"Air quality is usually considered in terms of odour and dust. There is potential generated by the existing wastewater network systems, which can cause nuisance to surrounding receivers. Potential odour generation from wastewater networks usually occurs during the hottest periods of the year (e.g. summer)"

The report goes on to discuss potential impacts of "*Construction*" due to generation of dust and vehicle exhaust emissions and further impacts are expected to be minimised because *"the new wastewater infrastructure has been designed to minimise the generation of odour"* and the waste in the catchment has *"low Biological Oxygen Demand (BOD) and hydrogen sulfides"*. This references only the Parsley Bay and Eastern Ave Reserve wastewater pumping stations and the three new ventilation points at the pumping stations and Oceanview Avenue.

Further, the report states on page 47;
"Odour levels will be monitored in the new wastewater infrastructure <u>during commissioning and operation</u> to assess if further odour mitigation measures are required"

If anyone from Sydney Water has lived in Dover Heights in the last 2 years, they would be acutely aware of the unacceptable levels of disgusting odour generated by the Bondi sewer treatment plant. When the wind blows in the wrong direction the

smell is unbearable, irrespective of the season (i.e. all year round). After 18 months, we [redacted] chose to leave Dover Heights because of this reason. We currently have no knowledge of the level of complaints or dissatisfaction from the residents of Dover Heights in relation to this issue, but if our experience is any indication of Sydney Water's approach to odour control, then unfortunately it does not provide us with any level of hope that its mitigation or control is a priority.

Would you please clarify;

a). When was the last time Sydney Water conducted testing to monitor foul air generated by the Bondi sewer treatment plant and its impacts on the residents of Dover Heights?

b). When was the last time steps were taken to reduce or mitigate the odour generated by the Bondi sewer treatment plant?

c). Has the plant been fitted with odour control units at all?

While we understand that a small percentage of wastewater will be added to the Bondi plant by this proposal, if provision can be made at the design stage for odour control measures to be installed, the argument that space is not available post the project for retrofitting will be largely eliminated. Given the vast $65-$70million budget for the project, provision for the added cost for odour control units at Parsley Bay, Eastern Avenue, Ocenview Road and Carlisle Street can and should be made now.

2. Relocation of the Vent Stack

Scant information has been provided in relation to the new vent stack to be installed at Carlisle Street.

The proposal in relation to the "new vent stack" in Carlisle St, seems to be a RELOCATION of the existing vent stack from its current position at the front of 33-37 Carlisle Street. This vent stack has been in this location for at least the last 40 years that [redacted] has been the owner of [redacted] Carlisle Street.

Would you please advise us on the following;

a). What will the vent do? Will this vent breathe in or breathe out?
b). Has the impact on air quality been considered for Carlisle Street, Rose Bay? If so, where is it in the reports? If not, why not?
c). Why is a "new vent stack" needed, when there is one already in the street?
d). What is the **actual** proposed location of the "new vent stack"?
e). Why isn't the **current** vent stack being upgraded to accommodate the needs of the proposal?
f). What is the justification for the relocation of the new vent stack from its current position at the front of 33-37 Carlisle St?
g). What will the new proposed vent stack look like?

h). Has Sydney Water considered the detrimental impact on the property values and owners of those properties adjacent to the "new" proposed location of the vent stack?

The northern section of Carlisle St is potentially negatively impacted by the proposal to install a vent stack in a new location, yet the scant detail provided does not allow stakeholders to assess those impacts. Only an unresolved photograph in the photo gallery is provided to disclose to residents that the proposal includes the installation of a "new vent stack" in Carlisle St. There is no detailed discussion provided in any of the reports regarding this proposal and its impacts on stakeholders.

It is unfair and unreasonable that residents are expected to accept such a major change based on such scant detail and without any assessment of the potential impacts to their properties.

On this basis we are opposed to the proposal to relocate the vent stack to the northern end of Carlisle St and ask that consideration be given to upgrading of the existing sewer vent be undertaken to accommodate the needs of this project. It will become a major issue for neighbours in the immediate vicinity of the proposed "new vent stack" and understandably, will become more active in their opposition to the proposal.

Would you kindly have one of your representatives provide the information requested in point 1 - air quality a). to c). above and point 2 - relocation of vent stack a). to h). above, as a **matter of high priority**, so that affected residents have a clearer understanding of the proposal and its impacts on the neighbourhood.

Yours faithfully,

[redacted]

[redacted]

28 June 2020

Refresh Vaucluse and Diamond Bay
PO Box 399
PARRAMATTA. NSW. 2124
By email: vauclusediamondbay@sydneywater.com.au

Dear Sir or Madam,

Thank you for the opportunity to provide our submission in response to the Review of Environmental Factors for Sydney Water's proposed refresh Vaucluse and Diamond Bay proposal (information session attended by [redacted] on 26 June 2020).

As property owners in the close vicinity to the proposed new pump station at Eastern Avenue we are gravely concerned about the impacts of foul air and odour that will be generated by the new ventilation stack.

Foul air and odour emanating from the Eastern Avenue ventilation stack needs to be addressed due to the impact on air quality in the area and surrounds, and the overall amenity of the residents. There has been no provision in the proposal for installation of odour control units at any of the sites at Parsley Bay, Eastern Avenue and Oceanview Avenue.

As stated in our previous submission, provision for odour control and mitigation should be made during the design phase of the project and not left as an after-thought to be retrofitted after causing consternation for residents who are left impacted.

As there has been very little information provided in the document library in relation to expected levels of foul air and odour generated by the proposal, would you please provide us with further details in relation to the following;

1. Would you please direct us to any studies that have been undertaken to determine the levels of foul air expected to be generated by the proposal for each of the sites Parsley Bay, Eastern Avenue and Oceanview Avenue?
2. What are the expected increases to ambient noise levels at Parsley Bay and Eastern Avenue?
3. What methodology will be used to assess the impact of foul air/odour during the time of commissioning and operation of the new wastewater infrastructure?
4. In what way will the odour levels be "monitored" during the commissioning and operation of the new infrastructure?

5. Will the appropriate Sydney Water employees be asked to live, as a resident, in the vicinity to experience the real-life effects of foul air during the assessment period?
6. What steps has Sydney Water taken in the last 10 years to mitigate the foul air generated by the Bondi Sewerage treatment works?
7. As the authority responsible how often does Sydney Water evaluate the impacts of foul air/odour generated by the Bondi Sewerage Treatment plant on current residents of Dover Heights?

We note, among other things, that in the Pollution Study Report (PRP 305) on the Area of Potential impact, it states;

"as the pilot modelling results have not been calibrated or validated, there remains some uncertainty about the extent of the area impacted by the outfalls..." page 40

And further, at Peer Review, the reviewer noted;

"that while the predicted zones of impact (probability and risk based) were reasonable, further field investigations were recommended e.g. water quality data or dye release monitoring to verify impact zone boundaries..." page 41

Similarly, in relation to Public health, the report states;

"There is minimal information available about water quality in the receiving waterway of the VDB wastewater discharges.." and these are referred to as a *"gap in knowledge..."* and

"The waters adjacent to the VBD outfalls are not formally recognised as recreational environments given the poor accessibility of the coastline in this area.." and *"accessibility to the immediate area is hazardous due to the surrounding terrain..."* page 53.

Justification for these extensive infrastructure works costing between $65 million to $70 million (Zoom meeting 26th June 2020) is based on what your own reports qualify at best, as gaps in knowledge, minimal information, predictive modelling, uncalibrated or unvalidated impacts, recommendations of further field investigations and plenty of "waffle".

Pursuant to your own Pollution Study Report, there is minimal impact to public health due to the inaccessibility of the coastline. It is inconceivable that the project is being considered at all in the context of this and the overall cost of the project.

The impacts, however, to all the residents close to the infrastructure works are clear, namely:

1. Reduction in air quality in surrounding areas,
2. Reduced amenity of the residents in surrounding areas,
3. Adverse visual impacts at Eastern Avenue and Oceanview Avenue,
4. Increased ambient noise generation at Parsley Bay and Eastern Avenue,
5. Adverse impacts to property values in all areas,

6. Potential damage and impact to structural integrity of dwellings,
7. Increased construction noise and pollution,
8. Additional traffic congestion and waste generation,
9. Disruption to daily life during 18 months of infrastructure works
10. An unrealistic and unfair timeframe given to residents in which to understand the true impacts of the proposal.

These impacts should be carefully addressed and considered, and as the authority responsible it is incumbent on Sydney Water to do so. In addition, all affected residents should be afforded further time to understand the impacts of the proposal.

Please respond to our concerns as a matter of urgency, as we cannot offer our support for this project based on the information provided thus far.

Yours faithfully,

[redacted]

Submission 31

Archived: Monday, 27 July 2020 10:55:39 PM
From: [redacted]
Sent: Sun, 28 Jun 2020 15:32:34
To:
Subject: Submission :: Refresh Vaucluse and Diamond Bay
Sensitivity: Normal

We are supportive of the thrust of this project.

The sewage from this area of the Eastern Suburbs peninsula should not be allowed to be thrown into the ocean without treatment

However, we have comments as below.

REF Background

the review of environmental factors does not give any explanation of the area serviced by the sewers that are going to be redirected.

A map showing the catchment area for the sewers to be diverted would help us to understand why the choices have been made .. and in particular the locations of the pumping stations.

Parsley Bay …

1 there is an active Woollahra Council Bush regeneration crew who have worked in the area and a should be actively consulted through the team leader (Margaret Lai) about work to occur in this area.

2 Relocation of an amenities block is required … so new one should be operational before the old one is closed.

3 Here are some threats to existing trees but I see that there is some mention this in the environmental impact review page 38. This should be minimised, and the Bush Regeneration Team should be consulted

Carlisle Street

REF states that "Carlisle Street is a broad street with wide nature strips and large mature trees growing on both sides."

However, the REF is unclear about whether these tress will be impacted by the works proposed.

We submit that they should be protected and the REF would do well to assure us of this

Best Regards [redacted]

[redacted]

[redacted]

Please consider our environment before printing this email

Waverley Council
PO Box 9, Bondi Junction NSW 1355
DX 12006, Bondi Junction
Customer Service Centre
55 Spring Street, Bondi Junction NSW 2022
ABN: 12 502 583 608

Our ref: A16/0769

Sydney Water
1 Smith St
Parramatta 2150
Email: vauclusediamondbay@sydneywater.com.au

26 June 2020

Dear Sir/Madam,

RE: Refresh Vaucluse and Diamond Bay Review of Environmental Factors

Thank you for the opportunity to comment on the Review of Environmental Factors (REF) for the Sydney Water Refresh Vaucluse Diamond Bay proposal.

The two outfalls in the Waverley Local Government Area and the third outfall in the Woollahra Local Government Area are the last remaining untreated sewer outfalls on the NSW coastline and this ongoing pollution problem is unacceptable. Waverley Council supports the overall project that will reduce untreated effluent entering the ocean by 93%.

The Waverley Council submission outlines issues and options to improve the project and to ensure that any impacts and issues are minimised or prevented from occurring. Waverley Council looks forward to working in a collaborative manner so that the project can be completed successfully so that upgrades to Diamond Bay Reserve and Eastern Reserve can occur.

Please contact Waverley Council's Executive Manager, Environmental Sustainability, Sam McGuinness at sam.mcguinness@waverley.nsw.gov.au if you have any questions.

Yours sincerely,

Peter Monks
Director, Planning, Environment & Regulatory

WAVERLEY COUNCIL

Waverley Council Submission - Sydney Water Refresh Vaucluse Diamond Bay

This submission responds to the Review of Environmental Factors (REF) for the Sydney Water Refresh Vaucluse Diamond Bay proposal. Waverley Council supports the overall project that will reduce untreated effluent entering the ocean by 93%.

A solution to this problem was proposed by Sydney Water over 10 years ago, however, previous proposals by Sydney Water lacked a high degree of early community consultation and the proposal from that time was going to have significant impacts and interruptions on the local community. As a result of this there was strong community opposition to the proposal at that time and the project did not proceed. Accordingly, the problem has continued to impact on our marine environment.

In the development of the current Sydney Water Refresh Vaucluse Diamond Bay Project, Waverley Council Officers, Councillors and local community members have been consulted extensively. The Community Reference Group (CRG) was able to assist Sydney Water progress options to the point where there is broad support of the project. These options have been developed and outlined in the REF. Feedback from the CRG and from Council has directly resulted in amendments to the concept design proposed.

This project achieves an outcome of the Waverley Council Delivery Plan and our Environmental Action Plan to ensure that the water quality along our coastline is as high as possible. This project will reduce the main water pollution source in the Waverley LGA.

Although Waverley Council supports this project, it is important to note that this project will have impacts in the construction phase and once the project is completed. Our comments in this submission outline areas where there is the potential to improve or mitigate any impacts during the construction phase and once established. Waverley Council Officers will be available to provide feedback on design details of the project when this is available. This project will also have the potential to assist Council in the reconstruction of the Diamond Bay boardwalk which requires a major upgrade. Council looks forward to working with Sydney Water so that our respective projects can support each other and improve the Diamond Bay and Eastern Reserve areas.

Geotechnical impacts

The proposed Eastern Reserve pumping station and the connection to the Diamond Bay sewer connection are in areas or near to areas that have been identified by Waverley Council as having a potential geotechnical risk as outlined in the Waverley Coastal Risk Management Policy. Any works in these areas should ensure that any geotechnical issues are prevented and should improve the structural integrity of the area and the rocks and cliff themselves.

Initial investigations undertaken by Sydney Water have shown significant overhangs in the Eastern Ave Reserve as well as near to and adjacent to the outfall at Diamond Bay. Any drilling or excavation near to these areas may result in the weakening of the sandstone which may result in the failure of this sandstone in advance of that caused by natural processes.

In Appendix E of the REF it is stated that:
Structures located within 22 metres of the construction work area may experience cosmetic damage impacts.

Further detailed work is required by Sydney Water to ensure that the cliff and associated rock at Diamond Bay and Eastern Reserve is not damaged through construction works, except to construct the specific works themselves. To ensure this occurs, Council recommends that quantitative vibration monitoring be undertaken and reported on with maximum limits for vibration be set by a suitably qualified geotechnical engineer. The project will require detailed and constant monitoring by a geotechnical engineer to ensure that no geotechnical problems occur or will occur in the future as a result of this project.

Waverley Council seeks feedback from Sydney Water on what pre-dilapidation investigations they propose for public property and private residences adjacent to Eastern Ave Reserve, Oceanview St, Ray St and Kimberly Ave that may be impacted by excavation and drilling.

Surface Infrastructure

A ventilation point will be required at the western end of Oceanview Avenue near Old South Head Road. The visual impact should be minimised as far as practicable through consultation with surrounding residents. This and any other additional surface infrastructure should be designed so as to fit in with the current environment and minimise aesthetic impacts. Council would like to be consulted on the details of any proposed infrastructure, including the location and design.

Eastern Reserve

The position of the pump station in Eastern Reserve should be moved as close to the road as possible to minimise impacts on the park and ensure that the park remains as wide as possible. All other infrastructure proposed as part of the pump station should be designed so that it minimises impacts on sight lines and the aesthetic appearance of the park. Any vehicular access to the park should be minimised or achieved using the road reserve only. The inclusion of coastal native heath plantings is probably necessary to improve the appearance of the pump station and is encouraged to be included in the design. Council Officers can assist in the design development of this.

During construction, access through the park should be maintained as much as possible and whenever feasible. Eastern Reserve is an important north-south walking route for residents and visitors where access should be maintained.

Diamond Bay

Near to the proposed works at Diamond Bay there is both Sea-cliff Heath and Sea-cliff Sedgeland remnant vegetation. Council has also established native plant vegetation adjacent to this area that provides habitat, suppresses weeds and improves the appearance of this area. The Sea-cliff Sedgeland is close to the sewer connection point to Eastern Reserve proposed in the REF and should be protected. Council can provide mapping to show Sydney Water and their contractors the exact location of the remnant vegetation.

The initial concept proposal of the REF potentially shows the requirement for planted and remnant vegetation to be cleared to provide an access path to construct the new infrastructure and complete the connection to Eastern Ave Reserve. The amount of clearing that is proposed is not supported as there may be other options to reach this point such as utilising the boardwalk as much as possible. Any clearing that does occur and is unavoidable should be undertaken by a qualified bush

regeneration contractor so that weeds are successfully removed, and remnant plants transplanted or re-planted. These works may be able to assist in further establishing native plantings in this area, particularly where there are high weed densities. Council can provide specific feedback and assistance as to how this could occur so that once the project is complete that weed densities are reduced and native plant areas maximised.

Council has recently completed urgent remediation work of the boardwalk at Diamond Bay. This boardwalk will be replaced, potentially in the construction timeframe of the Sydney Water works. This provides Sydney Water contractors the opportunity to utilise the areas already disturbed by the boardwalk as their construction access route minimising any further disturbance to surround vegetation communities. It would be preferable that the two project construction timelines run sequentially so that once Sydney Water works are complete, Council's contractors can complete rebuilding the boardwalk and reopen the area to the public as quickly as possible. Council is developing designs around the future boardwalk and will be able to liaise with the relevant Sydney Water staff on the details of this project. It would be appreciated if Sydney Water can continue to provide updates on the project timeline to enable the two projects to align along with clarity around monetary contributions towards the restoration of disturbed areas of the two reserves.

Trenching on Oceanview Ave

Council has no objections to these proposed works and how they are proposed to be undertaken. In order to facilitate suitable restoration of Council assets, Sydney Water will be required to liaise with Council's Manager, Asset Systems & Planning, Nikolaos Zervos on 9083 8625 or nikolaos.zervos@waverley.nsw.gov.au to scope the restoration work.

Council expresses interest in quoting for the restoration works and has technical requirements that need to be met in undertaking these works. These include requirements such as full lane width and panel replacement of excavated infrastructure in accordance with Aus-Spec and any other Council design specifications.

Council Ref: *20/114844*
Your Ref:

2 July 2020

Sydney Water
Refresh Vaucluse

Review of Environmental Factors (REF) –
Refresh Vaucluse Diamond Bay, Sydney Water (June 2020)
Submission by Woollahra Municipal Council

I refer to the Sydney Water – Refresh Vaucluse proposal and the Review of Environmental Factors (REF) document on exhibition for public comment until 5 July 2020.

Comments by Woollahra Council will focus on the following key areas:

1. Environment & Biodiversity
2. Landscaping & Tree Management
3. Aboriginal Heritage
4. Construction impacts on Park Usage
5. Replacement of Toilet block
6. Engineering

Environment and Biodiversity

Council's Environment and Sustainability Team have reviewed the REF prepared by Sydney Water for the Refresh Vaucluse Diamond Bay project and provide the following comments. Comments relate to the impact of the project on the Woollahra LGA, specifically the Parsley Bay and Rose Bay aspects of the project. Whilst there will be overall benefits to the project in terms of marine water quality and environmental health, and we support the project in this regard, we have significant concerns regarding the local biodiversity impact of the project at Parsley Bay. The project footprint extends into the bushland area, which is habitat for threatened species.

Our comments begin with review of the Flora and Fauna Assessment (Biodiversity) undertaken by GHD, as this assessment provides critical information on which the REF is based.

Flora and Fauna Assessment (Biodiversity), GHD, 2020 (Appendix C)

The Flora and Fauna Assessment (Biodiversity) completed by GHD is of critical importance as the findings are used as the basis of the biodiversity impact assessment undertaken in the REF. The following comments are made about the Flora and Fauna Assessment (Biodiversity).

Redleaf Council Chambers
536 New South Head Road
Double Bay NSW 2028

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Double Bay NSW 1360

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www.woollahra.nsw.gov.au

DX 3607 Double Bay
ABN 32 218 483 245

The Flora and Fauna Assessment (Biodiversity):

a) Does not reference Woollahra Council's *Biodiversity Conservation Strategy*. This document is a key source of biodiversity information about the Parsley Bay bushland area.
b) Does not accurately refer to the *Acacia terminalis subsp. terminalis* which is known to be present within Parsley Bay and is present within the seed bank. Senesced individuals are located within the proposed construction area and attempts are being made with Department of Planning, Industry and Environment (DPIE) (formerly Office of Environment and Heritage) Save Our Species team to regenerate individuals on site.
c) Does not adequately acknowledge or assess the impacts on the semi-permanent Powerful owls (*Ninox strenu*) located within the reserve. Individuals are often sited roosting within the Reserve, a site inspection carried out on the 18th June 2020 confirmed one adult (with ringtail possum feed) roosting in trees directly within the proposed footprint. Currently, there is a pair residing in the area, which may be mating partners or juveniles.
d) Inconsistently refers to the planted status of *Magenta Lilly Pilly* (*Syzygium paniculatum*) located on site and claims do not align with prior advice received from DPIE. GHD state that *'Although a threatened species, these planted specimens do not contribute to the conservation of the species' (GHD, 2020b)*. In contrast, the Woollahra Biodiversity Conservation Strategy (Section 7.2.2, page 7-7) states that, in reference to the *Magenta Lilly Pilly* within Parsley Bay Reserve, *'OEH (now DPIE) recommend that management for this species should reflect its threatened species listing despite its potential unnatural origin*'.
e) Does not adequately address the presence and assess the impacts on the endangered population of Whites Seahorse (*Hippocampus whitei*) located on Parsley Bay swimming nets.
f) Does not discuss how disturbance will be minimised. Existing walking trails not digitised on maps provided therefore areas proposed to be disturbed are unclear.
g) Is unclear about the impact on the creek line. The Biodiversity Assessment states that *'There would be no direct impact on the creek line located within Parsley Bay Reserve'* (5.2.4 Aquatic impacts, page 34), however the map of works (Figure 3, page 23) shows open trenched pipework going through the creek line.

On the basis of the above comments, the Environment & Sustainability Team does not believe that the Flora and Fauna Assessment (Biodiversity) undertaken by GHD is an adequate basis for assessing the environmental impacts of the project on Parsley Bay bushland and the threatened species for which it provides habitat.

Refresh Vaucluse Diamond Bay REF

The following comments are provided about the *Refresh Vaucluse Diamond Bay Review of Environmental Factors* (REF).

a) Council objects to the encroachment of the construction footprint into the bushland area at Parsley Bay Reserve. This footprint is well beyond the current carpark area, and from all consultation with Sydney Water to date, our expectation was that the construction footprint would be contained within the area of the carpark and the existing amenities block.

b) The REF goes beyond its legal capacity in reference to removing or impacting on the *Magenta Lilly Pilly* (*Syzygium paniculatum*) located on site, in that the assessment states that:

> *'The assessment found that the proposal is unlikely to affect any threatened species. As such, we will not require a Species Impact Statement (SIS) and / or approvals under this Act'*. (Table 4, page 28).

The Woollahra Biodiversity Conservation Strategy (Section 7.2.2, page 7-7) states that, in reference to the Magenta Lilly Pilly within Parsley Bay Reserve:

> *'OEH recommend that management for this species should reflect its threatened species listing despite its potential unnatural origin'.*

Neither GHD nor Sydney Water have the Authority to make such a claim. Confirmation is required from the NSW Department of Planning, Industry and Environment (DPIE) (formerly Office of Environment and Heritage) as to whether a SIS is required.

c) The project involves an unacceptable level of disturbance to Parsley Bay Bushland being one of Council's Key Habitat areas:
   i. Up to 0.36ha of vegetation at Parsley Bay (page 40) is proposed for clearing to construct the wastewater reticulation pipelines (REF, section 3.4). As the Reserve is only 3.7ha (Woollahra Council Biodiversity Conservation Strategy page 8-8), this represents 9.7% of the vegetation on site, which is a substantial amount for a small urban reserve that is highly valued for its natural bushland.
   ii. The REF does not adequately demonstrate how disturbed vegetation will be restored. Council and the community have invested considerable time and effort into rehabilitating the bushland areas, including:
      - Bushcare: Community members meet every Thursday to conduct bush regeneration works within the Reserve (4.5 hours x average of 4 people per meeting over 4 years), which represents over 936 hours per year or 3,744 hours of volunteer hours worked over the last year.
      - Bush regeneration: Council bush regeneration staff conduct work within the reserve (2 staff, one day a week (7 hour p/d) over 5 years) i.e. 3640 hours over the past 5 years. Additionally before this time a team of staff were permanently onsite.
      - Save Our Species (DPIE) funded projects to regenerate threatened species have been undertaken at the site for a number of years.

d) Council has concerns about the potential discharge of groundwater to Parsley Creek. This creek leads to Parsley Bay, which provides habitat for seagrasses and the endangered White's Seahorse. The potential impact of this has not been assessed by the REF.

e) There has been no indication as to where waste from the trenching will be stockpiled. Any waste / sediment must be contained within the existing carpark area to prevent further impact on the Parsley Bay Bushland and Parsley Creek.

f) Digging of the pit at Parsley Bay appears to be within 2-3m of a 200+ year old *Eucalyptus robusta* and *Angophora costatas*. Care must be taken to ensure that there is no damage to the roots of these trees that occur in the yellow work zone.

Council requests:

a) A site inspection to walk the proposed construction areas in order to better understand the direct area of impact and to ensure that Sydney Water staff are aware of the location of key species on site.

b) That Sydney Water provide Council with a copy of the Construction Environmental Management Plan (CEMP) to enable us to provide comment and limit movements into bushland areas and ensure optimal environmental protection.

c) That actions addressing the following points are included in the Mitigation Table (REF Appendix C, GHD Flora and Fauna Assessment (Biodiversity), Table 6 Environmental safeguards):
   - Clarify how disturbance will be minimised through utilising existing walkways. Particularly for the eastern most section where only limited open trenching is being completed.
   - Confirm details of retention and replanting of key understory vegetation and soil to be reused on site in rehabilitation (REF Appendix C, GHD Flora and Fauna Assessment (Biodiversity), Table 6 Environmental safeguards).
   - Provide details regarding how and what rehabilitation will be undertaken after construction works are completed considering the considerable effort of Council and the community to manage and improve the site over many years. Council requests the employment of a suitably qualified bushland restoration company to translocate the soil and groundcover to be reinstated when works complete.
   - Confirmation on how tree root zones that are within the active trenching zones will be protected i.e. *Eucalyptus robusta* located within 2m in the small blue zone and various *Angophora costatas* located within the work zone.

d) That Sydney Water provide Council with confirmation from DPIE regarding GHD's ascertain that a Species Impact Statement (SIS) and / or approvals under the Biodiversity Conservation Act are not required.

e) That Sydney Water confirm whether GHD have approached NSW DPI (Fisheries) regarding the potential impact on Whites Seahorses (*Hippocampus whitei*) located on nets at Parsley Bay.

f) Confirmation on what scheduling, provision and testing parameters will be provided to Council regarding water quality testing before dewatering is conducted (Section 6.1.2).

g) That any groundwater discharged to waterways or stormwater be tested prior to discharge to ensure that water is of suitable quality for primary contact in order to protect Parsley Bay and Rose Bay.

h) That Sydney Water provide Council with information about where any waste is to be stockpiled before being taken off site, and where pipes and any equipment is to be stored onsite. Any encroachment onto bushland is not acceptable.

i) That, to avoid further encroachment and disturbance to the bushland at Parsley Bay Reserve, stringing out of pipe be undertaken at Carlisle Street, not Parsley Bay.

Landscaping and Tree Management

a) Landscaping works; Page 72 - Fig 10 shows the existing and proposed viewpoint of the Parsley Bay works. The REF states that trees will be planted in this area. This is unclear and needs further clarification regarding species and size.

b) Tree Management; 5 trees were assessed in the Arborist report. There is no mention of any trees within the natural areas and potential impacts. Open trenching is proposed through a natural area, no tree assets or their proximity to the trench has been assessed to establish the potential impact.

   The REF states that the removal of large trees will be avoided. There is little information recorded that the true nature of tree loss is not apparent within the bushland areas. This should be assessed before construction techniques are determined such as open trench/trenchless.

   It is noted that "Actual vegetation impacts would be quantified prior to clearing and required offsets provided for verified impacts." As vegetation loss may include large remnant trees that cannot be suitably replaced with offset planting further investigation of the impacts along the trenches/access areas within the natural areas needs to be undertaken.

c) Any pruning of Council owned trees will need the permission and supervision of Council Arborists. The retention of the significant trees around the existing toilet block is a high priority.

Aboriginal Heritage

These comments are limited to consideration of Aboriginal heritage. The Council has commissioned an Aboriginal Heritage Study for the Woollahra LGA and has appointed Coast History and Heritage to carry out the study. In the course of undertaking this project the consultants are conducting extensive fieldwork to verify known Aboriginal sites and identify additional sites.

The principal consultant, Dr Paul Irish, has been informed of the Sydney Water project and has viewed the two documents referred to above. Dr Irish has inspected Parsley Bay Park and considers that if the proposed works are confined to the area indicated in the documentation there is unlikely to be disturbance of Aboriginal sites. He did raise a slight concern about a rock shelter (AHIMS#45-6-0709) which was recorded in the 1890s with a dot on a surveyor's map placing it in the general vicinity of the works. The item has not been found since that time. Dr Irish considers that the item may be located within one of the neighbouring residential properties which have sandstone outcrops. However, he would like to see a copy of the Aboriginal Heritage Due Diligence assessment carried out by Kelleher Nightingale

Consulting in March 2020 to establish whether the rock shelter site was considered and is not likely to be harmed by the proposed works. This will assist the Council with its comments on the project.

Construction Impacts on Park Usage

a) Carpark Management; The carpark being out of action for 12 months is a real concern, particularly as we have just designed an accessible play-space. We ask for at least a drop off, or accessible car space to be made available as Parsley Bay Reserve is not accessible from the other parking options. Aside from people with mobility issues, parents and carers with Prams are also going to find it difficult to visit the reserve.
b) Access Track; Page 68 refers to a 5m access track into the bushland and states that locations are shown in Figures 6 and 7. In review Fig 6 is detailed Flora and Fauna at Diamond Bay and Fig 7 is detailed Non-Aboriginal Heritage at Parsley Bay. This requires clarification and further detail to understand what the impacts of the access track are.

Replacement of Toilet Block

The REF is unclear on the proposal for the new toilet block. Council have previously requested more detail on this which requires urgent discussion as follows;

- The plan to include a functional toilet block prior to construction. If this cannot be undertaken then a modern temporary demountable toilet to Council's approval needs to be incorporated.
- Location and design.
- Planning and environmental considerations.
- Consultation of a new design.

Engineering Management

Section 5 of the REF, Legislative Requirements, outlines a number of legislation that is related to the project but remains silent on the Local Government Act 1993 and the Roads Act 1993.

Council requests the REF include reference to the Local Government Act and the Roads Act and address how the project fulfils the requirements of both acts with respect to entering and altering Council controlled lands and assets.

The REF also identifies significant construction works, such as open cut trenching, within the road reserve in Carlisle Street and Dover Road, in Rose Bay. This type of construction work is likely to cause significant community disruption, major disturbance and damage to Council's land and infrastructure and traffic and transport issues, particularly around schools, educational facilities and commercial areas within the municipality.

Council requests that further strong consideration be given to less intrusive construction methodologies such as micro tunnelling in our busy, narrow roads.

The REF also remains silent on the repairing and reinstating Council's damaged lands and infrastructure.

Council requests the REF include a commitment to repair and reinstate any Council land or infrastructure damaged as part of the project to the satisfaction of Council's Manager Engineering Services.

The REF briefly discusses non-Aboriginal and Aboriginal heritage items however it is noted that the Appendices, which includes a Heritage Impact Statement, has not been included as part of the REF document. Council would like to acknowledge that in addition to all the listed and unlisted heritage items identified in the REF, there may be State heritage listed street name plates within the footpath and kerbs in the area.

Council requests that the Appendices be included and submitted to Council for review and that the Heritage Impact Statement include reference to State Heritage Listed street name plates within the footpath and kerbs.

Council thanks you for the opportunity to comment on the Sydney Water – Refresh Vaucluse proposal and the Review of Environmental Factors (REF). We look forward to further input into this project moving forward.

I propose a meeting with all relevant areas of Council and Sydney Water to discuss our comments further and where applicable organise a site meeting to discuss the footprint. Please don't hesitate to contact myself on 9391 7177.

Yours sincerely

Paul Fraser
Manager – Open Space & Trees

DOC20/529947

2 July 2020

Ms Hrvojka Dominis
Senior Communications & Engagement Advisor
Sydney Water Corporation
Level 13, 1 Smith Street
PARRAMATTA NSW 2150

Dear Ms Dominis

Review of Environmental Factors Refresh Vaucluse Diamond Bay Project

I refer to your email dated 10 June 2020 to the Environment Protection Authority (EPA) inviting the EPA's comments on the proposed Review of Environmental Factors (REF) for the Refresh Vaucluse Diamond Bay Project.

The EPA understands that Sydney Water has determined that it is the proponent and determining authority for the works under Part 5 of the *Environmental Panning and Assessment Act 1979*.

The EPA understands that the proposal includes the construction and operation of two new wastewater pumping stations, new wastewater pipelines and ancillary infrastructure for the purpose of diverting the ocean outfalls at Vaucluse and Diamond Bay to Sydney Water's existing sewage treatment plant at Bondi. The environmental value associated with the diversion of the existing ocean outfalls is recognised by the EPA.

The EPA has reviewed the REF and considers that the key environmental protection issues associated with the proposal are construction noise and vibration, management of contaminated soils and waste, existing infrastructure capacity and operational odour emissions from vent stacks and sewage pumping stations. The EPA's comments on these matters are attached to this letter (***Attachment A***).

If you wish to meet to discuss any of the matters raised in this letter, please contact Laura Ansted on (02) 9995 6812 or laura.ansted@epa.nsw.gov.au.

Yours sincerely,

BENN TREHARNE
A/Unit Head Regulatory Operations Metro South
Environment Protection Authority

Attachment A

EPA comments on Review of Environmental Factors Refresh Vaucluse Diamond Bay Project

The EPA has reviewed the information provided by Sydney Water in the *Review of Environmental Factors Refresh Vaucluse Diamond Bay Project* June 2020 and has identified the following matters for your consideration.

Noise and Vibration

The EPA notes that the proposed works will be undertaken in a highly urbanised environment and that currently proposed mitigation measures are unlikely to reduce noise levels below the construction noise management levels.

The EPA understands that the existing background levels in the area are low and that construction impacts are predicted to include but are not limited to:

- 99 residential receivers being highly noise affected (75dB(A)) for 2-3 months during rock breaking activities for the construction of the wastewater pumping station
- 229 residential receivers being highly noise affected for 1-2 weeks each during progressive open trenching pipeline construction
- Up to 17 residential receivers being highly noise affected associated with vehicle movement at the entry and exit to the HDD sites at Parsley Bay and Carlisle St.

Furthermore, the EPA notes that the predicted construction noise levels for a number of highly noise affected receivers are significantly above the highly noise affected criteria of 75db(A) and that it is not unusual for construction works to occur for longer than predicted.

Whilst it is not necessarily unusual for construction noise impacts to temporarily impact sensitive receivers, the noise levels predicted highlight the importance of carefully and thoroughly considering and applying all reasonable and feasible mitigation measures during construction. It is expected that the length and significance generally of predicted impacts assist in determining what is reasonable in the circumstances. Diligent consideration of construction and operational noise mitigation options and environmental assessment during the planning process may assist Sydney Water in avoiding potentially significant expense in retrofitting existing infrastructure and in maintaining community relationships.

Hours of construction

The EPA's Interim Noise Guideline (ING) identifies the following standard hours:

Work type	Recommended standard hours of work
Normal construction	Monday to Friday – 7am to 6pm Saturday - 8am to 1pm No work on Sundays or public holidays
Blasting	Monday to Friday – 9am to 5pm Saturday 9am to 1pm No blasting on Sundays or public holidays

The EPA understands that Sydney Water is proposing that works align with these standard hours, with the exception of some works including "public infrastructure works that shorten the length of the proposal and are supported by the affected community" and "works where a proponent demonstrates and justifies a need to operate outside the recommended standard construction hours".

In relation to works outside of these standard construction hours, it appears to be generally proposed that the approvals process aligns with guidance in the ING, including justification for the

works, consideration of potential noise impacts, community notification requirements and seek approval from Sydney Water's Project Manager.

The EPA recognises that some critical infrastructure activities cannot be undertaken without causing noise impacts and that some 'out of hours' and 'night-time' scheduling may be required due to the location of works and requirements to maintain the operational integrity of transport infrastructure and utilities.

However, the range of sensitive time periods and community acceptance of the noise levels predicted during the construction phase may be significantly impacted by the potential number of residents working from home due to the COVID-19 pandemic. This subsequently may impact on a number of factors including the assessment of the feasibility and reasonableness of any potential noise mitigation options, hours of operation, and need for respite as part of the proposed works.

The EPA considers it critical that Sydney Water works toward mutually acceptable and negotiated outcomes with the affected community, including regular and responsive communication and consultation with this community in a transparent and honest matter.

Operational noise levels

The EPA notes that the *Vaucluse Diamond Bay Noise and Vibration Impact Assessment* (GHD, May 2020) has undertaken an assessment of operational noise impacts and identifies that general operational noise levels are predicted to be well below noise criteria for the nearest receiver. It is also recommended that in the Noise and Vibration Assessment that in relation to operational noise from the pump stations, an assessment is undertaken at detailed design phase to ensure that the finalised design complies with the requirements of the EPA's Noise Policy for Industry (NPI). In consideration of the predictive nature of the noise assessment and the predictions of operational noise well below noise criteria, the EPA recommends that, alternatively, post-commissioning validation of operational noise levels could be undertaken, which will allow for the best determination of any additional mitigation measures required.

Recommendation

The EPA recommends that Sydney Water:

- Continues to undertake extensive and transparent consultation with residents and the affected community regarding the works, including any changes to community opinions on the works as a result of COVID-19 factors such as increases in residents working from home.
- Seeks to negotiate mutually beneficial arrangements with the affected community regarding the timing of works in consideration of a number of factors including: times of day when the community is more sensitive to noise, consecutive works outside of standard hours, whether the community is prepared to accept a longer construction duration in exchange for respite.
- Undertakes comprehensive due diligence in relation whether all feasible and reasonable noise mitigation measures have been applied, particularly in circumstances where community acceptance of the temporary works may change during the project.
- Undertakes post-commissioning validation of operational noise levels.
- Ensures that any proposal for works to be carried out of the standard construction hours comprehensively considers the benefits and impacts of these works, the drivers behind the need for these works, and the community support for these works, including consultation with individual residents where applicable.
- Where not already undertaken, consideration of best practise environmental noise management in relation to industry published guidelines, such as the Environmental Noise Management Manual (RTA 2001) and the Construction Noise Strategy (TIDC 2007).
- Considers any lessons learnt and community feedback in relation to noise mitigation and management through previous projects such as the *Refresh Woolloomooloo* project.

- Maintains effective oversight of its contractors, sub-contractors and agents in relation to noise management.

Contaminated and Acid Sulphate Soils

The REF identifies the potential for contaminated materials being found during the works, including fill material containing Polycyclic Aromatic Hydrocarbons (PAHs) or asbestos in both friable and bonded states. The REF further states that further sampling will be undertaken prior to construction to understand the extent and nature of the PAH contamination and mitigation measures. The management options for unexpected contaminated material finds do not appear to be well identified in the REF.

The EPA also notes that there is potential for Acid Sulphate Soils to be found in various locations of the proposed sites.

Recommendation

The EPA recommends that Sydney Water:

- Develops an Unexpected Finds Protocol in relation to potential contamination.
- Uses "certified consultants" where relevant for contaminated land matters. The EPA's Contaminated Land Consultant Certification Policy supports the development and implementation of nationally consistent certification schemes: https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/clm/18520-contaminated-land-consultant-certification-policy.pdf?la=en&hash=D56233C4833022719BCE0F40F870C19DC273A1F7. The EPA requires that all reports submitted to the EPA for the purpose of requirements under the CLM Act are prepared, or reviewed and approved, by a certified consultant.
- Addresses management of acid sulphate soils via an Acid Sulphate Soil Management Plan and considers the implication of any in-situ soils in any relevant ongoing maintenance of infrastructure.

The EPA also reminds Sydney Water that:

- Works must be carried out in accordance with relevant EPA guidelines made or approved under section 105 of the *Contaminated Land Management Act 1997* (CLM Act) such as *Planning Guidelines- SEPP 55 Remediation of Land* which includes assessment of the suitability of the land and any remediation required in relation to the proposed use.
- The EPA should be notified under section 60 of the CLM Act for any contamination identified which meets the triggers in the Guidelines for the Duty to Report Contamination: https://www.epa.nsw.gov.au/~/media/EPA/Corporate%20Site/resources/clm/150164-report-land-contamination-guidelines.ashx

Waste Management

The REF identifies that a Waste Management Plan will be prepared as part of the Construction and Environmental Management Plan and briefly identifies some inclusions in this plan. Due diligence in waste planning will assist Sydney Water in meeting its legislative obligations

Recommendation

The EPA recommends that:

- The Waste Management Plan proposed covers all demolition, construction and excavation works that generate waste that will be disposed offsite.
- The Waste Management Plan is prepared prior to waste being transported off the site.
- The Waste Management Plan includes but is not limited to the following:
  a) Estimations of the different waste types to be generated from the proposed works
  b) Estimations of how much of each waste type will be generated from the proposed works

c) A list of all places (full street address) where waste will be transported to
d) Written confirmation from each place of disposal (listed in point c) that they can lawfully receive the types of waste proposed to be transported there
e) Where the place of disposal changes after the plan has been made, an amendment to the plan can be made as an addendum that includes an update points a) to d) above.
f) Arrangements in relation to classifying all waste generated and transported off the site in accordance with the EPA's *Waste Classification Guidelines* as in force at the time.
g) Arrangements in relation to meeting all asbestos tracking and reporting requirements, including the use of the online WasteLocate system.
h) Arrangements in relation to recording waste vehicle movements including departure and arrival times, truck and dog registrations and drivers.
i) The steps to be taken ensure that differing waste types are segregated on the site
j) Arrangements in relation to collecting and retaining legible copies of all receipts and weighbridge dockets relating to disposal of waste from the site for at least 6 years after each record is made.

The EPA reminds Sydney Water that:

- All asbestos waste loads over 100 kilograms or 10 square metres removed from the site must be tracked using the EPA's online "Waste Locate" system, according to the requirements of the *Protection of the Environment Operations (Waste) Regulation 2014*. Further details on these requirements can be found on the EPA's website at: https://www.epa.nsw.gov.au/your-environment/waste/transporting-asbestos-waste-tyres/tracking-asbestos-waste-locate
- You must not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal, except Virgin Excavated Natural Material as defined by the *Waste Classification Guidelines* issued by the EPA that are current at that time, unless expressly permitted by planning legislation and/or approvals and/or consents relevant to the site.
- Processing of fill material containing asbestos is prohibited. Any loads of waste from the works that are rejected from a waste facility due to the presence of asbestos must not be reprocessed but transported to a facility that can lawfully receive asbestos waste.
- It is the EPA's expectation that the proponent maintains effective oversight of its contractors, sub-contractors and agents in relation to the lawful disposal of waste from the work sites.

Odours

The EPA understands that an odour assessment for the new wastewater infrastructure was completed as part of a Concept Design Report (GHD, 2020d) and that this assessment predicted that the new infrastructure had a low odour nuisance potential due to low BOD and hydrogen sulphides. However, this assessment was not available to the EPA and it is not clear what standard was used in this assessment.

The works include the construction of three ventilation points located at each of the pumping stations as well as along Oceanview Avenue. Based on the information provided, it appears that the pumping station and ventilation pipes for Parsley Bay may be located at a lower height than the surrounding residential receivers. This height differential may have an impact on the effective dispersion of odours from this ventilation stack.

Notwithstanding the above, the EPA acknowledges that operational performance may differ to odour predictions. The REF states that "odour levels will be monitored in the new wastewater infrastructure during commissioning and operation to assess if further odour mitigation measures are required." However, the details of this odour monitoring or potential mitigation measures examined have not been clearly identified.

Recommendation

The EPA recommends that Sydney Water:

- Identifies potential air and odour emissions (point source emissions from plant and equipment) during both the construction and operational stages and identifies mitigation strategies to minimise point and/or fugitive and/or odour impacts, should Sydney Water's predictive assessment of odours be inconsistent with operational odours.
- Clearly documents the odour assessment process and standards used in its planning documentation and is transparent in its proposals.
- Assesses the potential for odour impacts in relation to the ventilation points and dispersion pathways for odour, in consideration of the topography surrounding these vents and the relative height of sensitive receivers.

Infrastructure capacity

The EPA understands that the diversion of the ocean outfalls will increase the flows through the existing reticulation network and infrastructure. However, the impacts of this matter have not been clearly addressed in the information provided to the EPA.

Recommendation

The EPA recommends that Sydney Water:

- Considers and documents the potential impact of the works on the existing reticulation network and infrastructure, and
- Considers the feasibility and reasonableness of infrastructure upgrades and/or other risk mitigation measures where it is expected that the additional flows increase maintenance required and/or the risk of environmental impacts, such as via dry and wet weather overflows or additional load on the existing Bondi treatment system's capacity to treat pollutants.

Appendix B – Tests of significance

Memorandum

18 November 2020

To	Dane Collins - Sydney Water Corporation		
Copy to			
From	Jayne Tipping	Tel	+61 2 92397166
Subject	Refresh Vaucluse Diamond Bay – Biodiversity Assessment Addendum: Assessments of significance for Sunshine Wattle, Magenta Lilly Pilly and Powerful Owl, Parsley Bay Reserve	Job no.	2128225

1 Introduction

In November 2018, the NSW Government announced its commitment to address the flow of untreated wastewater from three ocean outfalls at Vaucluse and Diamond Bay. Sydney Water proposes to construct and operate sewerage infrastructure at Vaucluse and Diamond Bay (the project), which will redirect untreated wastewater through the wastewater network to the catchment of Bondi Wastewater Treatment Plant for treatment, mitigating the associated risks to water quality and public health.

GHD Pty Ltd was engaged by Sydney Water to prepare a Biodiversity Assessment report (GHD 2020) to inform the Review of Environmental Factors (REF) for the project (Sydney Water 2020). The REF has subsequently been exhibited by Sydney Water.

This Biodiversity Assessment Addendum technical memorandum has been prepared to address a request from Woollahra Council received as part of their submission on the REF, for an assessment of the likely significance of impacts on the following threatened species that occur within Parsley Bay Reserve:

- Sunshine Wattle (*Acacia terminalis* subsp. *terminalis* Eastern Sydney)
- Magenta Lilly Pilly (*Sygygium paniculatum*)
- Powerful Owl (*Ninox strenua*)

After a site meeting with representatives of Sydney Water, Woollahra Municipal Council and GHD on 17 August 2020, review of threatened species information provided by Council and consideration of potential impacts on individuals or populations of these species, Assessments of Significance for each species have been prepared pursuant to Part 7.3 of the NSW *Biodiversity Conservation Act 2016* and Section 5AA of the *Environmental Planning and Assessment Act 1979* in the context of the proposed development within Parsley Bay Reserve. The Assessments of significance take into consideration modifications to the layout of the new wastewater pump station that have occurred as a result of ongoing detailed design and in response to community consultation and feedback on the REF and refined indicative clearing estimates for other proposed excavation and construction areas and access identified as part of the assessment of the amended design. The findings of an inspection of the

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indicative disturbance footprint for the amended design and of other construction locations undertaken with Sydney Water on the 13 November 2020 has also informed this revised assessment.

The assessments of significance and additional supporting information are provided below. The outcome of the assessments is that the project, including the amended design, is unlikely to have a significant impact on the Sunshine Wattle, Magenta Lilly Pilly or Powerful Owl.

2 Assessments of significance

2.1 Sunshine Wattle (*Acacia terminalis* subsp. *terminalis* Eastern Sydney [G.P. Phillips 126])

This subspecies was formerly described as *Acacia terminalis* subsp. *terminalis* (Salisb.) J.F.Macbr.

Sunshine Wattle is listed as an Endangered species under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Sunshine Wattle is a shrub with bipinnate leaves from 1 to 5 m tall, and habit may be erect or spreading, possibly depending on location. Inflorescences of pale yellow flowers are borne between March and July. Pollinating vectors include small birds and bees (Knox *et al.* 1985). Seeds mature in November. Plants have a life span of 8 to 20 years. Research indicates that optimal seed germination occurs after fire or other disturbances (Benson and MacDougall 1996). "…Compared to the other subspecies, it has denser short hair on branchlets, leaf stalks, and flower stalk, and is of white or pale yellow colour. Its flower stalks are thicker and contain smaller glands…." (Bremner and Goethe 2010).

Preferred habitat includes coastal heath and open woodland, on sandy soils. Distribution extends between Botany Bay to the northern foreshore of Port Jackson. Recorded populations occur at the Quarantine Station, Clifton Gardens, Dover Heights, Parsley Bay, Gap Park, Nielsen Park, Cooper Park, Parriwi Park, Quakers Hat Park, Little Bay and Watsons Bay. Populations occur as scattered individuals or are locally common "….in sandy soil on creek banks, hillslopes or in shallow soil in rock crevices and sandstone platforms" (PlantNet).

"…The total population size of a taxon is taken to be the total number of mature individuals i.e. individuals that are capable of reproduction …. The total number of mature *Acacia terminalis* subsp. *terminalis* individuals across all 27 known populations is estimated to be less than 500….Woollahra Council is responsible for three sites on either crown reserves….or Council reserves….all zoned 6(a) Public Recreation…." (Bremner and Goethe 2010). The size of individual populations varies from a few individuals to hundreds of mature plants, although only six populations contain more than 10 mature plants.

Threats to the species include habitat loss and fragmentation resulting from urban development, weed invasion, dieback from *Phytophthora cinnamomi*, inappropriate fire regimes and the potential for the sub-species to hybridise with horticultural cultivars (Bremner and Goeth 2010).

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Locations of populations or individuals of Sunshine Wattle in Parsley Bay Reserve are indicated and described in mapping and monitoring notes by SMEC (2020) and threatened species mapping provided by Council (WMC 2020). These records include naturally occurring specimens and those that have been planted by Council Bushcare officers. Live specimens are not currently apparent at all of the locations where individuals have been previously recorded. Recent monitoring surveys have confirmed the presence of one mature individual and one juvenile in monitoring sites adjacent to the Crescent in the northern part of the reserve (SMEC 2020). SMEC (2020) note that in this area, "The thick layer of leaf litter present may be too deep for acacia germination without a disturbance event such as fire….". Targeted searches for the species undertaken in the southern area of the reserve failed to locate a population of the species identified in 2016 surveys or any other specimens. SMEC (2020) note that "the forest structure may be coming too closed to provide suitable habitat for this species".

During surveys carried out by GHD (2019), one senescent specimen of Sunshine Wattle was recorded near the parking area, to the south-east of the existing amenities block. This specimen was not recorded during surveys carried out by GHD (2020), although it is possible that seeds have been retained in the leaf litter or soil. During the site meeting of 17/08/2020, no individuals or populations of Sunshine Wattle were recorded within or proximate to the proposed construction areas.

It is likely that no existing specimens of Sunshine Wattle will be disturbed by the proposed works at Parsley Bay Reserve, although it is possible that a seed bank derived from previous individuals occurs in several locations, such as the area to the south-east of the existing amenities block and east of the creek line where individuals have been previously recorded.

The proposed works have been designed to minimise the extent of vegetation clearing and disturbance required through the use of directional drilling/micro-tunnelling where possible. Clearing and ground disturbance have been further reduced through the amended design for the pump station where the impact area has been reduced from an estimated 196 m^2 for the original design to an estimated 144 m^2.

A Construction Environmental Management Plan (CEMP) and Vegetation Management Sub-Plan (VMP) will be prepared and implemented that will contain specific safeguards to minimise potential impacts on native vegetation. Specific measures to minimise impacts on the Sunshine Wattle will include:

- Clear delineation of the construction footprint and erection of temporary protective fencing to protect areas of adjoining habitat
- Pre-clearing surveys of proposed construction areas by a project ecologist
- A protocol for the collection and transfer of topsoil to suitable rehabilitation sites nominated by Council to retain any soil seed bank and potentially augment the local population of the Sunshine Wattle
- Measures for the rehabilitation of temporarily disturbed areas that are not required for infrastructure or operational requirements.

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Given it is possible that seeds in the existing seed bank will be stimulated into germination in areas of disturbance (see Auld 1996), monitoring of seed germination after completion of works should be included in the CEMP/VMP.

Assessment of Significance for the Sunshine Wattle (*Acacia terminalis* subsp. *Eastern Sydney [G.P. Phillips 126]*)
a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.
No specimens of Sunshine Wattle were observed within the proposed construction footprint during the site inspection undertaken on the 17/08/2020. It is unlikely that any existing specimens of Sunshine Wattle will require removal, although it is possible that seeds occur within the seedbank within some of the proposed disturbance areas. Several monitored populations and individuals of Sunshine Wattle occur in areas of the reserve, which will not be affected by the proposed works. It is unlikely that an area of habitat will become fragmented or isolated from other areas of habitat as a result of the proposed works (see c (ii) below). Connectivity between areas of occupied habitat and other areas of potential habitat at the site will be maintained and existing opportunities for seed dispersal and genetic exchange (movements of pollinators such as bees) will not be affected. Prior to commencement of works, an ecologist will undertake a pre-clearing survey of proposed disturbance areas for threatened plants. If any seedlings are detected measures would be taken to avoid the specimens if possible or alternatively to translocate seedlings to a nearby area of suitable habitat outside of the construction area. Any proposed translocation would be considered in consultation with Council bushcare staff. Topsoil in areas that will be permanently disturbed for proposed infrastructure or operational requirements will be carefully removed and relocated as soon as possible to suitable locations nominated by Council bushcare staff. A vegetation management plan will be prepared as a sub-plan to the CEMP, which will provide guidance for the rehabilitation of disturbed areas not required for infrastructure or operational requirements following construction and may improve existing growing conditions for this species in suitable areas. Given the presence of this species in areas outside the construction footprint and given the efforts to retain the soil seed bank and associated soil mycorrhizae, any potential impacts to the meta-population of Sunshine Wattle will be minimised. Given the previously recorded presence of individuals and populations outside the construction footprint and minimal impacts to existing potential habitat extent, quality and connectivity the proposed works are unlikely to cause any disruptions to the breeding cycle of this population such that a viable local population of the species is likely to be placed at risk of extinction.

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b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
Not applicable to this threatened flora species.
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,
Not applicable to this threatened flora species.
c) In relation to the habitat of a threatened species, population or ecological community:
(i) The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity and
Areas of known occupied habitat at Parsley Bay Reserve will not be removed or modified for the proposed works. In most cases, existing potential habitat will not be affected, because trenchless construction methods will preclude the need to excavate and opportunities to avoid impacts for access will be identified during detailed design (eg temporary bridging over vegetation). Where permanent disturbance will be required, the topsoil will be collected and transferred as soon as possible to a suitable rehabilitation site determined by Council, in which case it is likely that the extent of available habitat in the locality may be eventually increased, rather than reduced. A vegetation management plan will be prepared as a sub-plan to the CEMP, which will provide guidance for the rehabilitation of disturbed areas not needed for operational requirements following construction.
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
It is unlikely that an area of habitat will become fragmented or isolated from other areas of habitat as a result of the proposed works. Known specimens of Sunshine Wattle at the Reserve occur in areas that will not be affected by the proposed works. Connectivity between areas of occupied habitat and other areas of potential habitat at the site will be maintained and existing opportunities for seed dispersal and genetic exchange (movements of pollinators such as bees) will not be affected. Fragmentation of potential habitat will be minimal, because existing tracks and open spaces will not be increased significantly and disturbed areas will be rehabilitated following construction through the implementation of a VMP.
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

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It is apparent from previous records that the population size and density in the Reserve is small, in comparison with populations in, for example North Head (see Bremner and Goethe 2010), and it is also apparent that the existing habitat at Parsley Bay Reserve is not typical of the habitat occurring at North Head or Little Bay, where large, viable populations occur.

Known specimens at the Reserve will not be affected and connectivity between areas of occupied habitat will be maintained and existing opportunities for seed dispersal and genetic exchange will not be affected. The small areas of potential habitat that will be removed or modified do not contain individuals of Sunshine Wattle, do not comprise high quality habitat (eg are likely to be too shaded) and are unlikely to be important for the long-term survival of the species in the locality.

It is possible that some areas proposed for excavation contain seeds of Sunshine Wattle within the topsoil and leaf litter. As topsoil and leaf litter will be removed from proposed excavation areas and will be transferred as soon as possible to suitable locations, it is possible that the existing population in the locality may eventually be augmented.

c) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The proposed works will not have an adverse impact (direct or indirect) on any declared area of outstanding biodiversity value listed under Part 3 of the BC Act.

d) Whether the proposed development or activity constitutes or is part of a key threatening process or is likely to increase the impact of, a key threatening process.

The proposed works may affect the operation of the following KTPs of potential relevance to the Sunshine Wattle:

- Clearing of native vegetation – The Final Determination for this KTP defines clearing as 'the destruction of a sufficient proportion of one or more stratae (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of a stand or stands (NSW Scientific Committee 2001).
- The proposed works have been designed to minimise the extent of vegetation clearing and disturbance required through the use of directional drilling/micro-tunnelling where possible. The proposal is unlikely to exacerbate the operation of this KTP to any significant degree because in most areas of the proposed disturbance footprint clearing will be restricted to the temporary removal of groundcover and understorey vegetation only and will not result in the loss or long-term modification of the stand.
- Opportunities to reduce the disturbance footprint east of the creek line will be assessed during detailed design and selection of construction methods and an

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ecologist will be onsite during clearing to guide vegetation clearance and assist in further minimising impacts on vegetation where practicable.

- A vegetation management plan will be prepared as a sub-plan to the CEMP, which will provide guidance for the rehabilitation of disturbed areas not required for operational requirements following construction. It is possible, that creating temporary openings in existing vegetation cover and soil disturbance may favour the germination and establishment of Sunshine Wattles if there are seeds in the soil in these areas.
- Infection of native plants by *Phytophthora cinnamomi* - Construction activities have the potential to introduce the root-rot fungus *Phytophthora cinnamomi* into the subject site, which could lead to dieback of vegetation and is identified as a threatening process for the Sunshine Wattle (Bremner and Goethe 2010). The CEMP and VMP will include safeguards in order to minimise the potential for the introduction or spread of *Phytophthora cinnamomi* and the proposal is unlikely to increase the operation of this KTP.
- Invasion, establishment and spread of *Lantana camara* - Construction activities have the potential to further spread Lantana in the subject site, which is identified as a threatening process for the Sunshine Wattle (Bremner and Goethe 2010). The CEMP and VMP will include safeguards to minimise the potential for the introduction of weeds, including Lantana, and the proposal is unlikely to increase the operation of this KTP.

Conclusion of Assessment of Significance

Based on consideration of the above criteria, the proposed works are unlikely to have a significant effect on the local occurrence of Sunshine Wattle, pursuant to s.5AA of the EP&A Act, given:

- It is unlikely that any existing individuals or populations of Sunshine Wattle will be removed and known specimens and areas of occupied habitat at the reserve will not be removed or modified
- Given the presence of individuals and populations outside the construction footprint and minimal impacts to existing potential habitat extent, quality and connectivity the proposed works are unlikely to cause any disruptions to the breeding cycle of this population such that a viable local population of the species is likely to be placed at risk of extinction
- Retention of the soil seed bank and associated soil mycorrhizae and transfer to suitable habitat rehabilitation areas has the potential to augment the local population.

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2.2 Magenta Lilly Pilly; Daguba (*Syzygium paniculatum* Gaertn.)

The Magenta Lilly Pilly species is listed as Endangered under the BC Act and Vulnerable under the EPBC Act.

The Magenta Lilly Pilly is a small to medium sized rainforest tree that grows to 15 m with attractive magenta fruit. Although the distribution of this species is restricted to a narrow, linear coastal strip from Upper Lansdowne (near Kempsey) in the north to Conjola State Forest in the south, it has been planted extensively as an ornamental. In the Central Coast region (including Sydney), the species occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest patches. To the north and south of Sydney, preferred habitat is "….mainly in littoral rainforest on sand or in subtropical rainforest on sandy soil derived from sandstone" (Floyd 1990). Records of natural occurrences in Greater Sydney include Coalcliff, Towra Point and Kurrajong Heights. Records north of Gosford include Avoca, Wamberal Lagoon, North Entrance, Ourimbah Creek and Budgewoi (Fairley 2004). Mills and Jakeman (2010) suggest that the southern limit of natural distribution is Jervis Bay, and that the occurrences around Lake Conjola "….probably originate from specimens planted in gardens…".

Current threats to the survival of this species are outlined in OEH (2012). Those threats which are potentially relevant to the meta-population at Parsley Bay Reserve include:

- Habitat clearing and fragmentation
- Low genetic diversity (see Payne 1997; Thurlbey 2010)
- Weed infestation
- Inappropriate fire regimes
- Climate Change, and
- Myrtle Rust.

Locations of populations or individuals of Magenta Lily Pilly in Parsley Bay Reserve are indicated and described in mapping and monitoring notes by SMEC (2020) and threatened species mapping provided by Council (WMC 2020). These records include specimens that have been planted by Council Bushcare officers and those that have self-recruited on site. Records of Magenta Lilly Pilly are mainly restricted to the south-eastern end of Parsley Bay Reserve and to a patch near sandstone ledges adjacent to The Crescent (WMC 2020). Traverses of the southern zone of the park undertaken as part of a recent monitoring event found a population of the species at various stages of maturity but mostly new recruiting juveniles, comprising 1 adult, 26 juveniles and 3 seedlings (SMEC 2020).

During the site visit of 17/08/2020, additional searches were carried out for Magenta Lilly Pilly within the likely disturbance footprint and proximate areas and in areas that may be disturbed for access. A further inspection of the indicative disturbance footprint for the pump station amended design and of other construction locations was undertaken on the 13 November 2020. Specimens identified were mostly described as *Syzygium paniculatum* although there was some uncertainty with regard to their identification because most potential records were juvenile specimens and hence difficult to identify to species level with certainty. Without the presence of fruit, reliance for identification was placed on the

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leaf descriptions by Floyd (1990): "….lanceolate to slightly obovate, 5-9 cm, tapering to a point at the tip but tapering more abruptly at the base. Dark, glossy green above, paler below, Oil dots scattered and small but clearly visible. Leaf stalk 3-6 mm long".

Based on recent inspection of indicative construction footprints it is estimated that five Magenta Lily Pillys are likely to be removed within the indicative construction footprints and a further eight juveniles growing along the existing access track may be impacted dependent on access arrangements determined during detailed design. The amended design has reduced the number of Magenta Lilly Pillys potentially impacted by the proposal at the pump station site from around 16 possible specimens identified in the REF to four specimens, including three heavily lopped mature specimens and one juvenile.

The amended design and reduction in vegetation clearing should ensure the retention of one early-mature specimen of *Syzygium paniculatum* as well as other early-mature and juvenile specimens located outside of the indicative construction footprint. Specimens of *Syzygium paniculatum* which will still require removal are three mature specimens which have been lopped back to the stump as well as one possibly self-recruited juvenile specimens. The former are probably old specimens which have been regularly lopped, because of their locations – two close to an existing inspection pit near the amenities block, an the another is growing below this pit, at the base of the batter, on the edge of the carpark.

Other Magenta Lily Pillys that are likely to be removed or that may be affected by the proposed works include:

- One specimen within the indicative excavation area for the proposed substation. There are three juvenile *Syzygium* species at this site that have not flowered or borne fruit, inhibiting positive identification. A conservative approach has been adopted and one specimen was identified as a possible Magenta Lilly Pilly. The Magenta Lilly Pilly specimen is suppressed in response to low light levels and crowding from adjacent vegetation. It is possible that the specimens could be translocated, but only if a large, intact rootball can be retained during the translocation. Another specimen located nearby to the west of the existing staircase may require protection during works.
- Up to eight juvenile specimens also occur at scattered locations either side of the existing access track on the eastern side of the creek in the vicinity of areas that may be temporarily disturbed for the construction of wastewater infrastructure. It is likely that many of these specimens can be protected and retained during construction through careful alignment of access pathways.

Existing populations described by SMEC (2020) that occur in areas of more appropriate habitat, including beneath the rock shelves, and specimens that occur immediately along the creek line are located beyond the construction area and will not be disturbed by the prosed works.

The Magenta Lilly Pillys in the reserve, being mostly planted and of uncertain provenance, were not considered a natural occurrence in the Biodiversity Assessment that accompanied the REF. The National Recovery Plan for Magenta Lilly Pilly (OEH 2012) does not include the Parsley Bay meta-population as a natural occurrence of the species, although WMC (2015) includes records for this

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species at Cooper and Trumper Parks, as well as Parsley Bay. The specimens of Magenta Lilly Pilly at Parsley Bay Reserve do, however, occur in appropriate habitat. OEH (2012) comment that "….There is evidence to suggest that the abundance of Magenta Lilly Pilly within its natural range has been markedly reduced since European settlement, and that a number of subpopulations may have been entirely eliminated".OEH (2012) then comment that "….In recent years, a number of new Magenta Lilly Pilly locations have been recorded in the Sydney metropolitan area. For example, 14 new locations were recorded between 2000 and 2005. Only one record is supported by a specimen lodged with the National Herbarium of NSW, and it is unclear whether the record in question relates to a natural occurrence or a planted tree. The remaining 13 records appear to have been made by botanical consultants during the course of environmental assessment work….".…..It is considered likely that a proportion of the Sydney metropolitan records will prove legitimate, as small patches of potential habitat can still be found in Sydney (including the littoral rainforest at Bundeena and the moist vegetation types on sandy soil in areas such as Balmoral, Pittwater and Lane Cove (Benson & Howell 1990)".

In this context and given concerns raised by Council, this assessment of significance has been prepared based on the assumption that the meta-population of Magenta Lilly Pilly at Parsley Bay Reserve is a natural occurrence.

The proposed works have been designed to minimise the extent of vegetation clearing and disturbance required through the use of directional drilling/micro-tunnelling where possible. As discussed above, the amended pump station design has also reduced the extent of clearing required and reduced the numbers of Magenta Lilly Pillys that will be removed at this site. There are likely to be further opportunities to limit vegetation clearing and disturbance required for construction and access through detailed design and construction planning.

A Construction Environmental Management Plan (CEMP) and Vegetation Management Sub-Plan (VMP) will be prepared and implemented that will contain specific safeguards to minimise potential impacts on native vegetation. Specific measures to minimise impacts on the Magenta Lilly Pilly will include:

- Pre-clearing surveys by an ecologist familiar with identification of the species to tag and quantify all individuals located within or proximate to proposed disturbance areas with the aim of avoiding and protecting specimens where possible and identifying seedlings that cannot be avoided that may be suitable for translocation at other appropriate sites (to be determined in consultation with Council bushcare officers).
- Clear delineation of the construction footprint and erection of temporary protective fencing to protect areas of adjoining habitat or specimens where deemed necessary by the on-site ecologist
- Measures for the rehabilitation of temporarily disturbed areas of habitat that are not required for infrastructure or operational requirements.

Residual impacts to the Magenta Lilly Pilly that cannot be avoided will be offset in accordance with the Sydney Water Biodiversity Offset Guideline (SWEMS0019.13). The number of specimens to be removed would be quantified prior to clearing and offsets provided for verified impacts. All restoration

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and offsets will be identified and implemented in consultation with council requirements. The location of offsets / replanting would be determined in consultation with council.

Assessment of Significance for the Magenta Lilly Pilly (*Syzygium paniculatum*)
a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Existing populations of Magenta Lilly Pilly have been mapped at several locations within Parsley Bay Reserve (see WMC 2020 and SMEC 2020). Most of the occupied habitat and known specimens and the areas of most suitable habitat, including along the creek line edges and beneath sandstone rock shelves, occur outside proposed disturbance areas. Based on recent inspection of indicative construction footprints it is estimated that five Magenta Lily Pillys are likely to be removed within the indicative construction footprints.

A number of juvenile and early mature specimens (approximately eight) also occur at scattered locations either side of the existing access track on the eastern side of the creek in the vicinity of areas that may be temporarily disturbed for construction access. The intention is to avoid and protect as many early-mature and juvenile specimens as possible in these areas by undertaking pre-clearing surveys to identify and tag all specimens and through detailed design and selection of construction techniques. Methods of protecting these specimens will be detailed in the CEMP and VMP and may include the installation of temporary protective fencing, if deemed necessary by the on-site ecologist.

NPWS (2001) proposes that a 'local population' of *S. paniculatum* should be defined on a catchment basis with occurrences of the plant within each catchment constituting a 'local population'. "The rationale for this approach is based on the likely dispersal of seed being related to the riparian habitats in which the plant occurs." (NPWS 2001). Furthermore, populations should be assumed to be viable regardless of size, unless proven otherwise. As the Magenta Lilly Pilly is a long-lived species with potentially large seed dispersal areas … even small populations may be viable should the conditions enable successful recruitment" (NPWS 2001).

In this context, it may be assumed that any specimens from a sub-population which will require removal are a component of the other occurrences of Magenta Lilly Pilly in Parsley Bay Reserve, and, although a viable population, have genetic links with the other sub-populations in the Reserve most of which will be retained and protected.

The lifecycle of the Magenta Lilly Pilly can be affected by changes in local catchment hydrologies which may affect habitat conditions, seed dispersal and recruitment. The establishment of invasive weeds may prevent seedlings reaching maturity and fire has the potential to kill individuals or if too frequent lead to a decline in recruitment success and potential loss of local populations (NPWS 2001). The proposed works are unlikely to result

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in any changes in conditions that would make existing habitat unsuitable for successful recruitment. The creek line will be underbored and the proposed works will not change the existing hydrology of the local catchment. Measures will be incorporated into the VMP to minimise the potential for the introduction of new weeds or spread of existing weeds at the site. The proposed works do not involve burning of vegetation and are unlikely to result in fires at the site. Based on the above considerations, conditions at the site will remain suitable for successful recruitment and the proposed works are unlikely to have an adverse effect on the life cycle of the Magenta Lilly Pilly such that the viable local population of the species is likely to be placed at risk of extinction.
b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
Not applicable to this threatened flora species.
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction
Not applicable to this threatened flora species.
c) In relation to the habitat of a threatened species, population or ecological community:
(i) The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity and
The majority of known occupied habitat for Magenta Lilly Pilly in the Reserve occurs beyond the proposed disturbance footprint and will not be removed or modified. The patches of vegetation which contain specimens of the Magenta Lilly Pilly that will be permanently removed for construction comprise a relatively small proportion of available habitat in the reserve. Only small, highly localised areas of habitat will be permanently removed for construction. A vegetation management plan will be prepared as a sub-plan to the CEMP, which will provide guidance for the rehabilitation of temporarily disturbed areas following construction.
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
It is unlikely that an area of habitat will become fragmented or isolated from other areas of habitat as a result of the proposed works. The majority of known specimens of Magenta Lilly Pilly and areas of suitable habitat at the Reserve occur in areas that will not be affected by the proposed works. Connectivity between areas of occupied habitat and other

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areas of potential habitat at the site will be maintained and existing opportunities for seed dispersal and genetic exchange will not be affected. Fragmentation of potential habitat will be minimal, because existing tracks and open spaces will not be increased significantly, and disturbed areas not needed for operational requirements will be rehabilitated following construction through the implementation of a VMP.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

The number of early-mature, juvenile and seedling specimens of Magenta Lilly Pilly which occur within the proposed construction areas represents a small proportion of the viable population which has been recorded within Parsley Bay Reserve. The sub-population of Magenta Lilly Pilly that occur to the east of the amenities block, does not occur in typical habitat (see Keith et al. 1997). It is likely that most of the specimens of Magenta Lilly Pilly which occur areas along the existing access track and adjacent to the creek line can be protected and retained through detailed design. The most appropriate habitats, such as beneath the sandstone rock shelves and in the creek line where the majority of specimens occur are located beyond the disturbance footprint. This area has been identified as a no-go area during construction.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The proposed works will not have an adverse impact (direct or indirect) on any declared area of outstanding biodiversity value listed under Part 3 of the BC Act.

e) Whether the proposed development or activity constitutes or is part of a key threatening process or is likely to increase the impact of, a key threatening process.

The proposed works may affect the operation of the following KTPs of potential relevance to the Magenta Lilly Pilly:

- Clearing of native vegetation – The Final Determination for this KTP defines clearing as 'the destruction of a sufficient proportion of one or more stratae (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of a stand or stands (NSW Scientific Committee 2001).

  The proposed works have been designed to minimise the extent of vegetation clearing and disturbance required through the use of directional drilling/micro-tunnelling where possible and through amended design. The proposal is unlikely to exacerbate the operation of this KTP to any significant degree because in most areas of the proposed disturbance footprint clearing will be restricted to the temporary removal of

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groundcover and understorey vegetation only and will not result in the loss or long-term modification of stands of vegetation. However, there are small areas of native vegetation that comprises occupied habitat of this species that will be permanently removed for the new pump station and substation.

Opportunities to further reduce the disturbance footprint, in particular associated with site access, will be assessed during detailed design and selection of construction methods and an ecologist will be onsite during clearing to guide vegetation clearance and assist in further minimising impacts on native vegetation and specimens of the Magenta Lilly Pilly where practicable.

A vegetation management plan will be prepared as a sub-plan to the CEMP, which will provide guidance for the rehabilitation of disturbed areas.

- Introduction and establishment of Exotic Rust Fungi of the order *Pucciniales* pathogenic on plants of the family Myrtaceae - Construction activities have the potential to introduce Myrtle Rust to the study area, which is identified as a threatening process for the Magenta Lilly Pilly (OEH 2012). The CEMP and VMP will include safeguards in order to minimise the potential for the introduction or spread of Myrtle Rust and the proposal is unlikely to increase the operation of this KTP.
- Invasion, establishment and spread of *Lantana camara* - Construction activities have the potential to introduce Lantana into the subject site, which is identified as a threatening process for the Magenta Lilly Pilly (OEH 2012). The CEMP and VMP will include safeguards to minimise the potential for the introduction of weeds, including Lantana and the proposal is unlikely to increase the operation of this KTP.

Conclusion of Assessment of Significance

Based on consideration of the above criteria, the proposal is unlikely to have a significant effect on the local occurrence of Magenta Lilly Pilly, pursuant to s.5AA of the EP&A Act, given:

- Although up to 13 Magenta Lilly Pillys may require clearing, most of the existing local population of Magenta Lilly Pilly in Parsley Bay Reserve will not be affected by the proposed works.
- The removal of 5 specimens from the sub-population of Magenta Lilly Pilly from thepump station and substation area and the possible removal of up to 8 additional juvenile specimens for access is unlikely to be important for the long-term survival of the species. Other viable sub-populations occur in areas of similar habitat to the south and east of the likely construction area. Given the presence of individuals and populations outside the construction footprint and minimal impacts to existing potential habitat extent, quality and connectivity the proposed works are unlikely to cause any

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disruptions to the breeding cycle such that a viable local population of the species is likely to be placed at risk of extinction.

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2.3 Powerful Owl (*Ninox strenua)*

The Powerful Owl is listed as a vulnerable species under the NSW *Biodiversity Conservation Act 2016* (BC Act).

The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The species requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. It breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation.

Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old with breeding taking place from late summer to late autumn. Pairs of Powerful Owls are believed to have high fidelity to a small number of hollow-bearing nest trees and will defend a large home range of 400 - 1,450 hectares (Higgins, 1999).

Powerful Owls are monogamous and mate for life. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them.

Habitat clearing and fragmentation which removes foraging and breeding habitat is a recognised threat for the Powerful Owl. While breeding pairs are known to successfully occupy some urban bushland remnants, adults can vacate nests and abandon young or eggs if disturbed.

The Powerful Owl has previously been recorded at Parsley Bay, Woollhara Golf Course, Neilson Park Reserve and South Head (WMC 2015). At Parsley Bay Reserve, individuals have often been observed roosting in vine thickets (mostly *Cissus hypoglauca* with several *Gynochthodes jasminoides*) within Coastal Sandstone Foreshore Forest east of the creek line within Parsley Bay Reserve. Observations have included up to two individuals and an individual with captured prey (Ringtail Possum) (Woolhara Council Bushcare Staff *pers comm*). A breeding pairs are known to occur at Neilson Park and at Centennial Park (OEH 2019).

There are no hollow-bearing trees identified within or adjacent to the construction footprint that contain hollows of a suitable size to provide breeding habitat for this species. No nest trees are known in the Reserve (Woolhara Council bushcare officer *pers comm*). A breeding pair is known from Centennial Park and there are also records of the species at Neilson Park, located about 0.5 km to the west of Parsley Bay (OEH 2019a).

The proposed works have been designed to minimise the extent of vegetation clearing and disturbance required through the use of directional drilling/micro-tunnelling where possible. The amended design for the pump station has also reduced the area of vegetation clearing required.

Based on the amended design for the pump station, the indicative clearing estimates for other proposed excavation and construction areas and access, the proposal would result in approximately 725 m^2 (0.07 ha) of vegetation clearing.

The areas to be disturbed do not represent important foraging or roosting habitat for the Powerful Owl and comprise a relatively small proportion of available habitat in the reserve and locality.

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Clearing within the indicative construction footprints, in particular north of the creek line will be largely restricted to the localised and temporary removal of understorey and groundcover vegetation. There may be a requirement for the removal of some trees growing along the edge of the existing access track and in the vicinity of the maintenance structures at the eastern end of the Reserve. It is likely that clearing and excavation can be located predominantly within existing clearings although it may not be possible to avoid all trees, including a number of planted Swamp Oaks (*Casuarina glauca*), dependent on the preferred construction option, required machinery and given spatial constraints. These planted Swamp Oaks are not growing in typical habitat and do not provide habitat for the Powerful Owl or its prey species. Consideration would be given, during production of the VMP for replacement of any Swamp Oaks removed for the project with indigenous species associated with coastal riparian closed forest.

A no go area has been identified to exclude construction activities from areas of higher quality habitat for the Powerful Owl to the north of the existing access track. Vine thickets that comprise known roosting habitat and large mature trees that are likely to provide habitat for prey species in this area will be retained and protected. The small reduced area of native vegetation that will be removed for the new pump station and associated wet well southeast of the existing amenities block is of lower habitat quality for the Powerful Owl and would represent a minor proportion of low quality foraging habitat in the locality for any breeding pair.

Opportunities to further limit vegetation clearing and disturbance required for construction and access will be explored during detailed design and construction planning.

A Construction Environmental Management Plan (CEMP) and Vegetation Management Sub-Plan (VMP) will be prepared and implemented that will contain specific safeguards to minimise potential impacts on native vegetation and habitat. The CEMP will also include management protocols to minimise impacts on fauna during construction. Specific measures to minimise impacts on the Powerful Owl and its habitat will include:

- Clear delineation of the construction footprint and erection of temporary protective fencing to protect areas of adjoining habitat from disturbance, including the identified no-go area north of the existing access track
- Pre-clearing surveys of proposed construction areas by a project ecologist and stop work procedures if owls are roosting in vegetation within or proximate to the construction areas
- Targeted surveys for nest sites or breeding activity within Parsley Bay Reserve and within 100 m of the construction sites at the beginning of the breeding season. Protocols are to be included in the CEMP for avoiding noisy construction techniques in the vicinity of any nest or roost trees/habitat for the critical stage of the breeding cycle between early May and mid-September, if a nest site is detected.
- Measures for the rehabilitation of temporarily disturbed areas that are not required for infrastructure or operational requirements.

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Assessment of Significance for the Powerful Owl (*Ninox strenua*)

a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Parsley Bay Reserve provides known roosting and foraging habitat for the Powerful Owl. No known nest trees are present, but it is likely that breeding pairs known from the locality (eg Centennial and Neilson Parks) use the reserve for roosting and foraging as part of a larger home range.

Disturbance of vegetation along and east of the creek line where owls are known to roost and that provides habitat for prey species, including possums and the Grey-headed Flying Fox, will be largely avoided through the use of trenchless construction methods. Careful siting of infrastructure and access areas to minimise surface disturbance, avoid mature trees through detailed design will further minimise impacts on areas of habitat. The impacts would be temporary, and largely restricted to understorey and ground cover species. Mature trees and associated vine thickets that provide roosting habitat for the owls and habitat for prey species would be protected in a no-go area north of the existing access track. Disturbed areas not required for infrastructure or operational requirements would be revegetated following construction through the implementation of a VMP.

The small areas of native vegetation that will be permanently removed for the pump station do not contain important foraging or roosting habitat for the Powerful Owl and would represent a minor proportion of habitat in the locality for any breeding pair.

Parsley Bay is a small reserve located in an urban area, with existing noise from vehicles and people, and owls that roost in the reserve during the day would be habituated to some background noise levels and human activity. It is likely that noisy construction work would deter owls from roosting at the site temporarily during the construction phase, although owls are still likely to forage at the site at night outside of construction hours. There is a very low risk of injury or mortality of adult Powerful Owls during construction. As noted, construction impacts would be small and localised, largely restricted to groundcover vegetation and would not include removal of any mature trees or vine thickets where individuals have been observed roosting. Fauna management protocols would be included in the CEMP to minimise impacts on owls that may occur in areas proximate to construction activities, including stop work procedures until the owl has vacated the site of its own volition.

Breeding owls are known to be sensitive to loud noise in the vicinity of nest sites and additional noise during construction could result in abandonment of nests or eggs, if breeding is found to occur at the reserve or within 100 m of construction areas. Given that there are no known nest sites within the reserve and no breeding is known to occur at Parsley Bay, the risk of this is very low. The CEMP will include protocols for the inspection of the site at the beginning of the breeding season to identify any owl nest site or breeding

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activity. If a nest tree is identified at the reserve or within 100 m of construction areas, this risk must be mitigated by ensuring noisy construction activities occurs outside the winter breeding season. It is unlikely that adult male owls roost at the site during the breeding season given the absence of a nest site and that during the time the female and young are in the nest hollow, the male owl typically roosts nearby (10-200 m).

Operational noise levels are not expected to exceed existing background noise levels at Parsley Bay Reserve (see Sydney Water 2020) and would be highly unlikely to deter owls from continuing to use the site post construction. The proposed wastewater pumping station will be located predominantly below ground which will reduce the amount noise generated at the ground surface. The pumps will operate periodically and are unlikely to generate excessive noise or vibration.

Based on the above considerations, the proposed works are unlikely to affect the reproductive success of local breeding pairs of the Powerful Owl and the proposed works are unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable to this threatened flora species.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable to this threatened flora species.

c) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity and

Based on the amended design for the pump station, the indicative clearing estimates for other proposed excavation and construction areas and access, the proposal would result in approximately 725 m^2 (0.07 ha) of vegetation clearing.

The areas to be disturbed do not represent important foraging or roosting habitat for the Powerful Owl and comprise a relatively small proportion of available habitat in the reserve and locality.

North of the creek line, localised areas of groundcover and understorey species and are likely to be removed or modified for the installation of wastewater infrastructure. There may be a requirement for the removal of some trees growing along the edge of the

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existing access track and in the vicinity of the maintenance structures at the eastern end of the Reserve. It is likely that clearing and excavation can be located predominantly within existing clearings although it may not be possible to avoid all trees, including a number of planted Swamp Oaks (*Casuarina glauca*), dependent on the preferred construction option, required machinery and given spatial constraints at this location. These planted Swamp Oaks are not growing in typical habitat and do not provide habitat for the Powerful Owl or its prey species. Consideration would be given, during production of the VMP for replacement of any Swamp Oaks removed for the project with indigenous species associated with coastal riparian closed forest.

. Larger canopy trees and vine thickets where owls have been observed roosting will not be removed and protected within a no-go area. Large hollow-bearing trees and figs that occur in proximate areas and which provide habitat for prey species will also be avoided. Impacts would be for the most part temporary and modify a very small area of suitable habitat for this species. A vegetation management plan will be prepared as a sub-plan to the CEMP, which will provide guidance for the rehabilitation of temporarily disturbed areas not needed for infrastructure or operational requirements following construction.

The proposed works are highly unlikely to significantly modify habitat for the Powerful Owl outside of the construction footprints.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

It is unlikely that an area of habitat for the Powerful Owl or prey species will become fragmented or isolated from other areas of habitat as a result of the proposed works. Connectivity between areas of habitat at the site and adjoining areas will be maintained and existing opportunities for movement will not be affected. Small temporary clearings are unlikely to form a barrier to the movement of prey species through the site. Fragmentation of habitat will be minimal, because existing tracks and open spaces will not be increased significantly, and disturbed areas not needed for operational requirements will be rehabilitated following construction through the implementation of a VMP. In this context, the proposal would not have an adverse effect on habitat connectivity for the Powerful Owl or its prey.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

The site does not contain a nest site for the Powerful Owl and the proposed works are unlikely to affect the lifecycle of the species such that a viable local population of the species would be placed at risk of extinction (see part a above). Nevertheless, the site provides roosting and foraging habitat for Powerful Owls and comprises part of the home range of adult owls that occur in the locality. As noted above, the highest quality habitat for

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the Powerful Owl on site, including known roosting and foraging habitat will be protected in a no go area, disturbance in proximate areas will be of a temporary nature and existing habitat connectivity in the Reserve and with adjoining areas will be maintained. While Owls may be deterred from roosting within the site during phases of noisy construction they are likely to continue to forage at the site at night and are likely to continue to use the site for roosting and foraging post construction. There are areas of equivalent vegetation in the study area and locality, including alternative habitat resources and refuge from construction activities in retained native vegetation immediately adjoining the site and at nearby Neilson Park.

Given these considerations, the area of habitat to be removed or temporarily modified, is not considered important or critical to the long-term survival of the Powerful Owl in the locality.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The proposed works will not have an adverse impact (direct or indirect) on any declared area of outstanding biodiversity value listed under Part 3 of the BC Act.

e) Whether the proposed development or activity constitutes or is part of a key threatening process or is likely to increase the impact of, a key threatening process.

The proposal may affect the operation of the following KTPs of relevance to the Powerful Owl:

- Clearing of native vegetation – The Final Determination for this KTP defines clearing as 'the destruction of a sufficient proportion of one or more stratae (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of a stand or stands (NSW Scientific Committee 2001).

  The proposed works have been designed to minimise the extent of vegetation clearing and disturbance required through the use of directional drilling/micro-tunnelling where possible and amended design. The proposal is unlikely to exacerbate the operation of this KTP to any significant degree because in most areas of the proposed disturbance footprint clearing will be restricted to the temporary removal of groundcover and understorey vegetation only and will not result in the loss or long-term modification of the stand. The small area of native vegetation that will be permanently removed for the new pump station to the east of the existing amenities block has been reduced in extent through amended design and does not provide high quality habitat for the Powerful Owl.

  It is likely that the disturbance footprint can be further reduced during detailed design and construction planning and an ecologist will be onsite during clearing to guide

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vegetation clearance and assist in further minimising impacts on native vegetation that provides habitat for the Powerful Owl where practicable.

A vegetation management plan will be prepared as a sub-plan to the CEMP, which will provide guidance for the rehabilitation of disturbed areas not required for infrastructure or operational requirements following construction.

- Infection of native plants by *Phytophthora cinnamomi* - Construction activities have the potential to introduce the root-rot fungus *Phytophthora cinnamomi* into the study area, which could lead to dieback of vegetation that provides roosting and foraging habitat for the Powerful Owl and its prey species. The CEMP and VMP will include safeguards in order to minimise the potential for the introduction or spread of *Phytophthora cinnamomi* and the proposal is unlikely to increase the operation of this KTP.
- Introduction and establishment of Exotic Rust Fungi of the order *Pucciniales* pathogenic on plants of the family Myrtaceae - Construction activities have the potential to introduce Myrtle Rust to the study area, which could lead to dieback of vegetation that provides roosting and foraging habitat for the Powerful Owl and its prey species. The CEMP and VMP will include safeguards in order to minimise the potential for the introduction or spread of Myrtle Rust and the proposal is unlikely to increase the operation of this KTP.

The proposal would comprise a minor addition to the impact of these KTPs in the locality (if at all) and is not likely to affect the viability of a local population of the Powerful Owl.

Conclusion of Assessment of Significance

Based on the consideration of the above factors, the proposal is not likely to have a significant effect on a local population of the Powerful Owl, given that:

- Areas of known roosting and foraging habitat, including vine thickets east of the creek line would not be removed and protected in a no-go area
- Only a small area of potential foraging/roosting habitat would be permanently removed east of the existing amenities block for the new pump station and associated wet well. Removal of vegetation north of the creekline would be temporary, and largely restricted to understorey and ground cover species. Trees proximate to proposed disturbance areas or that may require removal for access do not provide habitat for the Powerful Owl or its prey species and would be replaced following construction. Disturbance areas areas would be revegetated following construction through the implementation of a VMP
- No known nest trees are present at Parsley Bay Reserve and construction noise is unlikely to affect any breeding pair or result in the abandonment of a nest

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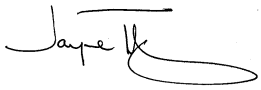
- No mature hollow-bearing trees that may provide habitat for arboreal mammal prey species or that may develop future suitable nesting hollows would be removed.

Sincerely,



Jayne Tipping
Technical Director Biodiversity
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References

Auld, T.D. (1996). 'Ecology of the Fabaceae: fire, ants and the soil seedbank', *Cunninghamia*, vol. 4, pp. 531-551.

Benson, D & Howell, J (1990). *Taken for Granted: The Bushland of Sydney and its Suburbs*, Kangaroo Press, Sydney.

Benson, D.H. & McDougall, L. (1996). 'Ecology of Sydney Plants: Part 4 Fabaceae', *Cunninghamia*, vol. 4, pp. 553-746

Benson, D & McDougall, L (1998). 'Ecology of Sydney plant species part 6: Dicotyledon family Myrtaceae', *Cunninghamia*, vol. 5, no. 4, pp. 808-987

Bremner, M. and Goeth, A. (2010). National Recovery Plan, *Acacia terminalis* subsp. *terminalis*. Report prepared for DECC.

Department of Environment and Conservation (DEC 2006). *NSW Recovery Plan for the Large Forest Owls: Powerful Owl* (Ninox strenua), *Sooty Owl* (Tyto tenebricosa) *and Masked Owl* (Tyto novaehollandiae). DEC, Sydney.

Fairley, A. (2004). *Seldom Seen. Rare Plants of Greater Sydney.* Reed New Holland, Sydney.

Floyd, A. (2008). *Rainforest Trees of Mainland South-eastern Australia*, revised edition, Terania Rainforest Publishing, The Channon.

GHD (2019). *Parsley Bay Arboricultural Assessment.* Report prepared for Sydney Water.

GHD (2020). *Vaucluse Diamond Bay – Concept Design Biodiversity Assessment.* Report prepared for Sydney Water.

Keith, D.A., Chalson, J.M. and Auld, T.D. (1997). *Assessing the status of threatened plants: a new methodology and an application of the vascular flora of NSW. Final report: Project number 450*. Commonwealth Endangered Species Program. Environmental Australia, Biodiversity Group. Unpublished Report.

Knox, R.B., Kenrick, J., Bernhardt, P., Marginson, R., Beresford, G., Baker, I. & Baker, H.G. (1985). 'Extrafloral nectaries as adaptations for bird pollination in *Acacia terminalis*'. *American Journal of Botany*, vol. 72, pp. 1185-1196.

Mills, K and Jakeman, J. (2010). *Native Trees of the NSW South Coast.* Envirobook, Canterbury.

NSW NPWS (2001). *Environmental Assessment Guidelines*, Syzygium paniculatum.

NSW Scientific Committee. (2001). *Final determination to list 'Clearing of native vegetation' as a key threatening process on Schedule 3 of the Threatened Species Conservation Act 1995*. NSW Scientific Committee, Hurstville.

NSW Scientific Committee. (2002). '*Final determination to list 'Infection by native plants of* Phytophthora cinnamomi' as a key threatening process on Schedule 3 of the Threatened Species Conservation Act' 1995. NSW Scientific Committee, Hurstville.

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NSW Scientific Committee. (2006). '*Final determination to list 'Invasion, establishment and spread of* Lantana camara' *as a key threatening process in Schedule 3 of the Threatened Species Conservation Act'*. NSW Scientific Committee, Hurstville.

OEH (2012) *National Recovery Plan Magenta Lilly Pilly* Syzygium paniculatum. Office of Environment and Heritage, Coffs Harbour.

OEH (2019). NSW bionet atlas. Office of Environment and Heritage, Sydney.

Payne, R. (1991). 'New findings of the rare tree *Syzygium paniculatum* (Myrtaceae) in the Wyong area, New South Wales', *Cunninghamia*, vol. 2, no. 3, pp. 495-498.

Payne, R. (1997). '*The Distribution and Reproductive Ecology of* Syzygium paniculatum and Syzygium australe (Myrtaceae) *in the Gosford-Wyong Region'*, Master of Natural Resources Thesis, University of New England, Armidale.

SMEC (2020). Excerpts from *Draft Biodiversity and Environmental Monitoring Report*. Prepared for Woollahra Council.

Sydney Water (2020). *Review of Environmental Factors Refresh Vaucluse Diamond Bay.*

Thurlby, K.A.G. 2010, '*The Population and Reproductive Biology of the Magenta Lilly Pilly (*Syzygium paniculatum*) and its Implications for Conservation'*, Bachelor of Science\Arts (Honours) Thesis, University of New South Wales.

Woollahra Municipal Council (WMC) (2015). *Woollahra Biodiversity Conservation Strategy 2015-2025.*

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