



1 Introduction

This Construction Management Plan has been prepared to accompany the Environmental Impact statement (EIS) for the African Savannah & Congo Precincts at Taronga Zoo to the Department of Planning and Environment in response to the Secretary's Environmental Assessment Requirements (SEAR) (Issue 9 of 2012, Construction Impacts).



Figure 1 – Proposed Site Plan

Project Overview

The African Savannah & Congo precinct project is a key component of the Master plan and is helping Taronga achieve its key objectives over the next 10-20 years.

The precinct will occupy an area of 102,34 m² and represents a significant capital investment in the Zoo's next 10-20 years. It has a focus on building upon Taronga's contribution to conservation, science, education and enhancing the visitor experiences.

The proposed new African savannah and Congo exhibits with the giraffe and zebra enclosures occupying an area of >2m/1 the lion enclosures >2m/1 the giraffe enclosures 7/0m/1 the < (api enclosure 3/3m/1 and the Meerkat Fennec Fox with +3@m/1 provide the visitor with a new and exciting zoo experience. Whilst a large proportion of the area is taken up by back of house animal welfare facilities, visitor circulation, roads, service areas and visitor facilities, visitors can expect larger expansive themed animal exhibits representative of the African savannah and deep forests of the Congo.

This Construction Management Plan relates to the redevelopment of the existing African giraffe precincts along with some aviaries at the north end of the proposed project footprint which is located centrally at Taronga Zoo.



Figure 1 – Location Plan

In summary the extent of the works can generally be summarised as follows:

26 The demolition of the existing African and ; orilla exhibits and existing infrastructure

6 The construction of the new precinct which will include:

- Savannah
 - To Aion exhibit areas
 - A shared "le*ible space "or ; ira""e15ebra and < strich
 - Meer(at and Fenec Fo* e*hibits
- Congo
 - T. o ; orilla e*hibits
 - Ao. lands rain "orest
 - < (api e*hibits
- Throughout
 - Interpretative "eatures to "acilitate learning about conservation
 - Colding dens
 - Containment "encing
 - Aandscaping
 - Milling and seating areas
 - Interpretative and directional signage
 - 9 e. e*hibits pedestrian paths
 - Deeper sa"e corridors
 - E*hibits enrichment devices and visitor vie. ing areas
 - Animal "ood preparation area ?e&uipment store

(Project Staging and) ey Milestones

The project is intended to be delivered in three stages being: Savannah ' Congo as per layout below.

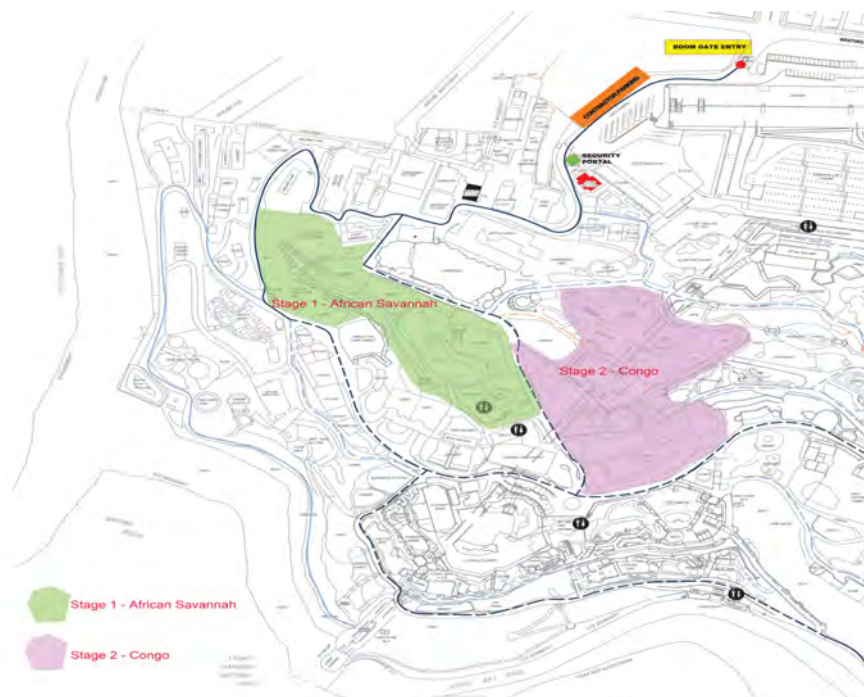


Figure (– Staged Plan

(*1 Project Staging and) ey Milestones

The indicative program and (ey milestones are outlined in the "ollo. ing schedule:

Stag 1 +Savannah	
• Site Establishment	February / , 2>
• Commencement on site	March / , 2>
• Commissioning	9 ovember / , 23
• Animal Establishment	# ecember / , 23
• < pening o" E*hibit	February / , 23
Stage +Congo	
• Site Establishment	April / , / 2
• Commencement on site	May / , / 2
• Commissioning	August / , / /
• Animal Establishment	eptember / , / /
• < pening o" E*hibit	< ctober / , / /

, Construction Activities

, *1 Site \$sta&lishment

ite establishment . ill initially be located . ithin the unused holding areas at the north end o" the site6

ite sheds . ill be located once demolition . or(s have been completed and as soon as is practicable6

Coardings and sca""olds . ill be erected as re&quired "or sa"ety and site demarcation6

ecurity protocols1chec(points1crane and loading =ones . ill be established6

, * Service - iversions

ervices a""ected during construction . ill be identi"ied and traced so as to ascertain the e*act e""ect on the construction . or(s and to minimise disruption other areas o" the 5oo6

Thorough investigation . ill be underta(en to ensure capping and removal o" services does not a""ect other parts o" the 5oo6

The Cigh Voltage net. or(at Taronga 5oo operates at 22(V and is privately o. ned by Taronga 5oo and all . or(s . ill be in accordance . ith Taronga 5oos Cigh Voltage Installation a"ety Management Plan (l MP!

All hydraulic services including water storm water and sewer drainage will be located and capped at the perimeter of the construction site during the demolition and site preparation phase of the works as required

4.1 Demolition and Reconstruction

The demolition of the existing concrete structures will be carried out using a combination of concrete crushers and rock breakers depending upon the location and nature of the demolition works

No demolition works will commence until a hazardous material assessment has been completed and any identified hazardous materials have been removed

A comprehensive survey of the existing site is to be conducted prior to demolition to identify existing materials for reuse or recycling. Possible recycled materials include bricks and timber from existing structures

Materials from the demolition process of the existing exhibit will be reclaimed where possible and reused in and around the zoo

The project has set a target to divert a majority of the demolition and construction waste from landfill. A project specific Waste Management Plan (WMP) is to be developed and implemented by the contractor to manage all waste streams expected to be generated on site

Contaminated soil and or hazardous materials such as asbestos are to be excluded from the recycling reuse rate

There will be close consultation with all stakeholders during the demolition phase to inform of timing of any demolition works which may impact on the zoo operations and amenity

4.2 Excavation

The excavation for the foundations and site levels will commence upon completion of the demolition

Excavated material will be reused on site as controlled fill where required and any excess fill will be removed using excavators and trucks

Trucks will be dispatched via the designated access routes to the approved tip locations

4.3 Foundations

Foundations will be constructed in such a way as to mitigate the risk of noise and vibration that may affect adjacent areas

4.4 Building Structures

The exhibit buildings and spaces will be constructed from a variety of materials with a combination of masonry block construction and light weight construction methods

4.5 Enclosures

The enclosures are to be a combination of physical barriers including and tensile stainless steel mesh

, *2 Landscaping

Landscaping works will involve the installation of mature plants to create the appropriate theme.

, *3 Finishes and Fit out

The finishes and fit out of the exhibit buildings and spaces will commence once the building are watertight.

This work will proceed in a conventional sequence with the partitions, services, rough-ins and wet trades followed by the dry finishes and services.

, *14 Services

In-ground infrastructure services including water, stormwater, sewer, drainage and electrical reticulation will be installed at the same time as the structure is commenced.

The services design will determine the location of connection to mains supplies and also the need for any upgrading to these mains.

The rough-in and fit out of services within the exhibit buildings and spaces will be undertaken with the fit out and finishes of the relevant areas.

The commissioning of these services will be required before completion and handover of the facility.

Integration of the exhibit buildings and spaces services with the control systems for the entire Zoo will be a part of completion of the services to the project.

, *11 Material Handling

Materials for the project will be hoisted and moved by a combination of mobile cranes and forklifts.

Concrete pumping for the new structure will generally take place from within the site any impact on the surrounding Zoo operations will have to be addressed prior to concrete pours.

The size of materials delivery and heights will have to be considered in order to access the site via the existing Zoo internal road network.

6 Impacts on Adjoining Neighbours

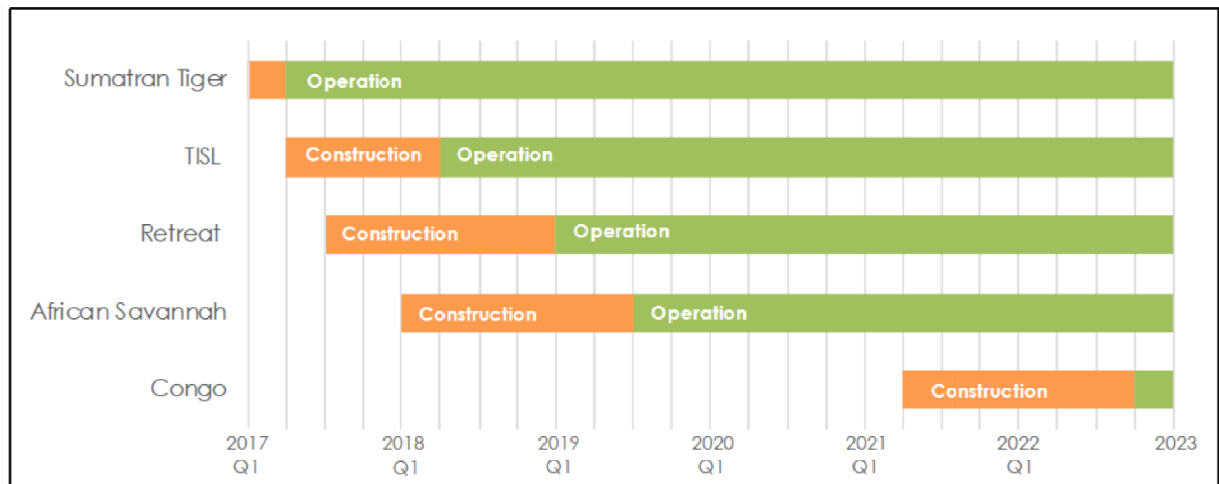
The development site is located in centrally in Taronga Zoo Sydney and is bounded by the Chimpanzee, Tamarin and Tiger and several other animal exhibits. The immediate adjoining neighbours closest to the development site are the residential properties accessed off the existing road.

The effect of construction on adjoining neighbours and other Taronga Zoo operations will be:

- Noise during demolition and construction activities
- Traffic from demolition and construction activities
- Perimeter hoardings
- Overhead mobile cranes
- Overhead works

1.1 Cumulative Impacts of Taronga - developments

The 500 is undertaking a number of development projects over the coming years including the subject of this report. See the programme below.



In order to minimise the cumulative impacts of concurrent projects it is intended to:

- stage projects so that there is a minimum overlap of concurrent projects
- Conduct regular construction impacts meetings that will foresee and address possible construction impacts and develop programme strategies to mitigate the effects of these conflicts
- Provide information to interested community groups where appropriate and early notifications to neighbours if upcoming construction impacts are anticipated

1.2 Consultation groups

1.2.1 General

TC A and its Contractor will establish appropriate liaison groups to keep its residential neighbours informed of the construction project

TC A will also develop a Communication Plan that will determine the appropriate communication with neighbours and other Taronga 500 operations are consulted during the construction stage of the project

1.2.2 Complaints register

The Contractor will record details of all complaints received during construction. The Contractor is to establish and maintain a register of Complaints and report to the Project Manager on a monthly basis the status of each complaint.

1 Environmental Risks due to Construction and Mitigation Measures

With regard to environmental risks and mitigation measures associated with the construction refer to Table below.

Issue or Risk	Risk Mitigation Measure
Demolition: Site Establishment	
26 Noise from demolition work	- The construction equipment (such as the excavator and small rock breaker/concrete pulveriser) will be fitted with noise mitigation equipment where possible - Noisy work will be identified and advised to stakeholders in advance to inform when noise may affect their operations
6 Dust from demolition and construction work	- Screens to be placed around the site - Where possible large concrete elements to be crushed on site - Construction activities and vehicle access routes to be hosed down - Construction vehicles to be hosed down when leaving site - Adjacent roadways approaching site to be regularly cleaned
6 Hazardous materials being removed	- Hazardous material assessment to be undertaken to define removal and disposal methods - Consent approval work to be undertaken as per the assessment recommendation report
6 Sediment from stormwater	Silt traps and filters (sacks and fabric) to be used at required locations along the stormwater system
Construction works	
46 Noise from construction work	- Construction equipment to be fitted with noise mitigation equipment - Location of concrete pump to be considered to minimise noise to adjacent neighbours - Noisy work will be identified and advised to stakeholders in advance to inform when noise may affect their operations
6 Vibration whilst Constructing foundations	- Driven piles to be used instead of driven piles - Work will be identified and advised to stakeholders in advance to inform when noise may affect their operations
76 Use of construction traffic plant	- Construction activities and public to be separated with appropriate traffic control measures - Safe public access routes to be pre-agreed, provided and maintained - Construction work not to be undertaken on Major Event days in consultation with stakeholders

>6 : aste . ater "rom construction activities6	• : aste . ater to be collected and treated prior to disposal
Flora and Fauna Protection	
36 Aoss o" threatened and endangered species	• Engage Aborist Æcologist to conduct Flora and Fauna surveys and create site inventory to determine e*istence o" any threatened species or endangered communities
2, 6Aoss o" habitat	• %etain1. here possible1signi"icant trees and animals in e*isting locations
226Aoss o" species	• #etermine e*isting populations o" non threatened endemic plants and animal species1relocate1transplant . here possible6
Soil Classification &refer to - ouglas & Partners 8eport	
2/ 6Aead Contaminated oil	• It is recommended that the lead and =inc impacted material in the vicinity o" test bore A, + be either (a!managed onEsite under the e*isting 2m deep "ill layer (e""ectively a capping layer! . ith an appropriate environmental management plan? management procedures in place in the site management plan1or(b! e*cavated1disposed (o""Esite! and resultant e*cavation validated6
2+6Contaminated oil (; eneral!	• An une*pected "inds protocol (GFP! should be prepared . hich outlines the steps to be underta(en to identi"y1report and manage any signs o" potential environmental concern encountered during earth. or(s?edevelopment . or(s6These usually comprise noti"ying . or(ers during the standard site induction o" . hom to report "inds to1and then the protocol "or isolating the "ind1organising investigation and management and noti"ying appropriate personnel?organisations6
\$rosion and Sedimentation	
2@ sediment deposit into . ater. ays and ground sur"ace disturbed due to construction activities	• Minimise soil disturbance through better planning and phasing o" activities • Minimise stoc(piling through better planning and coordination o" e*cavation1"illing and emban(ment construction . or(s • Contain storm. ater runE"" on site • Install and maintain sediment control devises parallel to the contours o" the site and immediately do. nElope o" any areas disturbed6 • Establish and maintain vegetative cover on rehabilitated areas . ith suitable grass or native vegetation • Gnderta(e routine inspection o" erosion and sediment control devises6

2 ; or 9 place 5 ealth and Safety

The Contractor is to be appointed the Principal Contractor under the : C' Act6The Contractor is to prepare a site pecific : C' Management Plan6

pecific areas that have been identified o" particular importance are:

- Preventing falls from height6
- Preventing electrocution from existing1"ture and construction po. er supply6
- Adjacent structures remaining safe and stable6
- Providing adequate side support to excavations6
- Coaming and public protection6
- Controlling public pedestrian and vehicle traffic around perimeter o" site6

3 Traffic Management < uring Construction=

3*1 ; or 9 5 ours

It is proposed that the construction . or(s . ill be carried out bet. een the "ollo. ing hours

Monday to Friday 7:, , am H0:, , pm

Saturday 7:, , am H2:, , pm i" inaudible on adjoining premises1other. ise
>:, , am to 2:, , pm

Construction vehicles . ill only be permitted to enter the 500 bet. een the hours o" 0:, , am to 4:, , pm Mondays to Friday inclusive and 7:, , am to 2:, , pm Saturdays1but excluding public holidays6

Any . or(outside the proposed construction hours . ill be subject to prior approval from Mosman Council or 9 : #epartment o" Planning6

3* Construction Traffic >ehicle Type

Construction vehicles li(ely to be generated by the construction activities include:

- Articulated truck(s for the delivery o" machinery (including mobile cranes and diggers)
- Truck(s to collect demolition material and excavated material
- ; eneral vehicles such as concrete truck(s1medium rigid truck(s1small rigid truck(s1 tradesman\$ utilities and courier vans6

3*(Construction >ehicle Access

The construction vehicles . ill use the "ollo. ing accesses:

- : hiting Feach %oad access via the sta"" carpar((to be used during . or(hours!
- Fradley\$ Cead %oad access (to be used outside o" =oo operating hours!

The figure below shows access points and routes within the 500 and also potential lay down area for construction materials

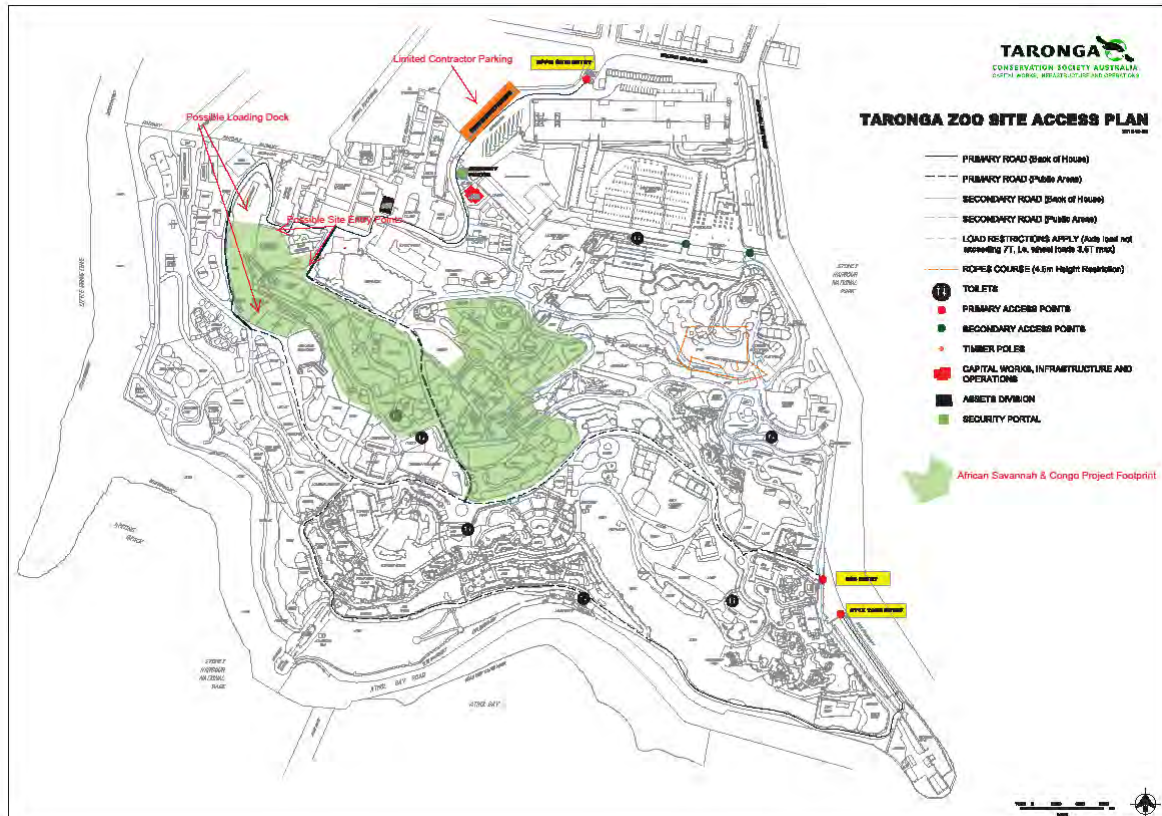


Figure (– Site Access Plan

Taronga 500 also implements a strict vehicle policy within the 500 grounds which is applicable for the construction. The Vehicle policy is detailed below.

- 26 Restrict movements of vehicles to the minimum requirements for executing the : or(s6
- #o not drive private vehicles into the 500 grounds6
- * - o not exceed 14 9m per hour*
- +6 #o not drive vehicles including suppliers\$delivery vehicles within the public areas o" the 500 bet. een the hours o" 36 , am to 46 , pm during school holidays and . ee(ends1 and 2, 6 , am to +6 , pm at other times6
- @ Fet. een 06 , am and 36 , am and bet. een 46 , pm and 06 , pm during school holidaysand bet. een 06 , am and 2, 6 , am and bet. een +6 , pm and 06 , pm at other times1 up to ten (2, ! vehicle movements are permitted per day in the public areas6 Escort larger vehicles to the construction ite6
- 46 Movements o" vehicles in other areas o" the 500 are restricted to bet. een the hours o" 06 , am to 06 , pm subject to the approval o" the %P6
- 06 %oads within the 500 may not have a heavy duty pavement6 The roads may not be suitable for articulated or long . heel base vehicles6 ome o" the roads are unsealed and may not be suitable for use in . et . eather6
- 76 %oads within the 500 may have limited . idth and headroom6 Chec(the access be"ore organising vehicular transport6

- >6 Gse a route as directed by 500 sta"" and noti"ied prior to start and use service roads . here possible6
- 36 Amit movement o" heavy vehicles to be used in removing spoil or other materials "rom the Taronga 500 to bet. een the hours o" 76+, am to @+, pm on Monday to Friday and bet. een 76+, am to 26 , pm on aturday1or as re&uired by Mosman Council1subject to restrictions in item + above "or vehicle movements . ithin the 5006
- 2, 6 Ta(e responsibility "or any damage caused by vehicles1 including those o" subcontractors and suppliers1using the roads and repair any such damage at no cost to the Principal6
- 226 Deep access roads and ad)acent "ootpaths1 gutters and drains clear o" construction . aste1debris and mud1clean as re&uired and remove . aste1debris and mud "rom the 5001all at the Contractor\$ cost6
- 2/ 6 Comply . ith the physical limitations on the height o" vehicles using 500 roads6
- 2+6: here it is necessary to remove "ences . ithin the 500 to enable access to be gained to . or(areas1(eep the areas secure at all times and reinstate the "ences as soon as practical6
- 2@ # o not ride in/on bac(o" vehiclesBand ride in seat . ith seat belt "astened6
- 246 Fuelling o" vehicle at or near public areas is not permitted6
- 206 Par(vehicles on site . ithin the site compound or at locations as directed by 500 sta""6
- 276 The ?oo is a pedestrian par9 and pedestrians have right of # ay*

As listed above1the construction vehicles accessing the 500 grounds . ould occur outside o" the busy =oo operating period6Vehicle access . ithin the 500 grounds . ould generally be limited to 06 , am H2, 6 , am and +6 , pm H06 , pm

3*, Construction Vehicle Routes

The designated truck routes for the construction vehicles are:

- To/From North via Spit Bridge Military Road Fradleys Cead Road
- To/From : West via Military Road Fradley\$ Cead Road

This is shown in the figure below.



Figure , – Construction Access Routes

All construction vehicles accessing site should do so in full compliance with the required clear way and parking restrictions

3. Estimate of Construction Traffic

It is estimated that the construction activities could generate construction vehicles peaking at 2 to 3 deliveries per day (i.e. 2 to 3 vehicles per hour). This low volume of construction vehicle traffic is unlikely to present any road capacity problems in the vicinity of the site or cumulative impacts refer Traffic Management Plan.

3. Parking for Construction ; workers

The number of workers likely to be on the site will vary throughout the project however it is anticipated that up to 4 workers may be present at any one time.

Construction vehicles will park in the available car park which could be designated parking section for contractors only.

3.1 Emergency access

Access to the construction area by emergency vehicles could be available via the two access points which are via Fradleys Creek Road or : hitting Feach Road.

14 ; Waste Management

The proposed demolition contractor will be required to recycle and reuse where possible.

A comprehensive survey of the existing site is to be conducted prior to demolition to identify existing materials for reuse or recycling. Possible recycled materials include bricks and timber from existing structures.

Materials from the demolition process of the existing exhibit will be reclaimed where possible and reused in and around the zoo.

Elements such as concrete, steel, aluminium and timber will be separated and recycled or reused where possible.

Prior to commencement of demolition and excavation, an asbestos hazardous material assessment will be undertaken on all structures and soil material. Any hazardous material identified will be disposed of in accordance with statutory and EPA requirements and guidelines.

The project has set a target to divert a majority of demolition and construction waste from landfill. A project specific Waste Management Plan (WMP) is to be developed and implemented by the contractor to manage all waste streams expected to be generated on site.

oil or contaminated materials such as asbestos are to be excluded from the majority recycling reuse rate.

11 Construction Noise Management

A full construction noise and vibration impact assessment and management plan will be prepared by the contractor once the structure and likely construction methods are developed further

A high level construction environmental noise assessment has been carried out based on assumptions about the type of equipment that could be used on site. These noise sources are likely to be effectively controlled through:

- Coating around the work site and local enclosures of noisy plant or activities
- Selection of quieter methods where possible and appropriate, particularly for piling
- Selection of low vibration methods where possible and appropriate
- Vibration monitoring and management controls for heritage and historic structures
- Coordination of works with neighbours and activities such as the Freeflight Bird show.

The Contractor will be responsible for preparing a detailed Work Plan and Schedule including updated noise and vibration impact assessments for proposed methods and timing of each stage of work.