SYDNEY OLYMPIC PARK AUTHORITY

Planning Assessment Report

Application No:	DA 12-10-2014
File No:	F14/1007
Application Site:	LOT 201 DP 1041758 – BOUNDARY CREEK PRECINCT, SYDNEY OLYMPIC PARK
Proposal:	Construction & Operation of Sustainable Leachate Treatment Wetlands at Boundary Creek Precinct
Applicant:	David Young – Sydney Olympic Park Authority (SOPA)
Assessing Agency:	SOPA Planning on behalf of the Department of Planning & Environment
Determining Agency:	Department of Planning & Environment

1 Background

SOPA manages ten (10) remediated landfill systems across Sydney Olympic Park. The remediated lands comprise a series of individual leachate collection systems. The management and operations of the leachate infrastructure is dictated by the terms of the Licence issued under the *Contaminated Lands Management Act 1997* (CLM Act) by the Environment Protection Authority (EPA) and SOPA's approved Remediated Land Management Plan.

The remediated landfill site formerly known as the Golf Driving Range Landfill is located on the northern side of Shirley Strickland Avenue and Australia Avenue, within the Boundary Creek Precinct under Sydney Olympic Park Master Plan 2030. The site has been redeveloped and is currently used as an AFL football training ground (known as Tom Wills Oval). For the purposes of this development application, the landfill site will be referred to as the Boundary Creek Precinct (BCP) landfill.

A small volume of leachate is currently treated on-site using sustainable wetland technologies however the majority of the leachate generated by the various landfills across Sydney Olympic Park is directed for treatment at the Liquid Waste Treatment Plant in Hill Road which is operated by Transpacific Industries (TPI).

SOPA's Sustainable Leachate Strategy sets out the framework for developing a more sustainable leachate management system for Sydney Olympic Park. The strategy goals are as follows:

- develop a sustainable leachate management system for Sydney Olympic Park landfills;
- treat leachate onsite using natural biological processes and in close proximity to each source;
- comply with relevant State Government statutory and environmental standards, and establish contingency plans to manage leachate should biological treatment fail; and
- reduce and ultimately eliminate leachate disposal to the Lidcombe Liquid Waste Treatment Plant over time.

On 22 March 2013 a delegate of the Minister for Planning and Infrastructure granted approval to a development application (DA 03-02-2013) for the construction of an environmentally sustainable wetland leachate treatment system at Wilson Park to treat the leachate output from Blaxland Common. A subsequent consent (DA 18-08-2013) was issued on 9 December 2013 in respect of the use and operation of the system.

The Blaxland wetlands are currently in the commissioning phase, operating under an environment protection license (EPL) from the NSW Environment Protection Authority (EPA). Treatment of leachate is in the early stages, however the wetlands are achieving the discharge criteria set by the NSW EPA and treated leachate is being discharge periodically to the receiving environment. Full operation is expected to be reached in six to twelve months.

SOPA commissioned Australian Wetlands Consulting (AWC) to provide a Feasibility Report on sustainable landfill leachate treatment and disposal for the BCP Landfill. The Feasibility Report identified a preferred approach for biological treatment system that takes advantage of existing disused stormwater ponds located on the southern batter of the BCP Landfill to treat leachate and disposes of treated leachate via irrigation back over the landfill. The Authority has endorsed this preferred approach and the detailed design must, as a minimum, be consistent with the general principles, considerations and factors provided in the Feasibility Report.

Once the preferred design is determined it can only be implemented after obtaining relevant statutory approvals including:

- development consent under Part 4 of the EP&A Act;
- the amendment of Notice 28040 issued under the CLM Act for any matter affecting management of the landfill; and
- if discharge to waters is required, issue of a new licence under the *Protection of the Environmental Operations Act 1997* (POEO Act), authorising discharge of treated leachate effluent to adjacent waterways.

The preferred approach does **not** include any discharge to waters, therefore a licence under the *Protection of the Environmental Operations Act 1997* (POEO Act), authorising discharge to adjacent waterways is **not** required.

The advanced concept design based on this approach and prepared by AWC will be the subject of further detailed design during SOPA's tender process, which is currently underway. The environmental assessment presented in this Statement is based on the advanced concept design and other technical information prepared by AWC.

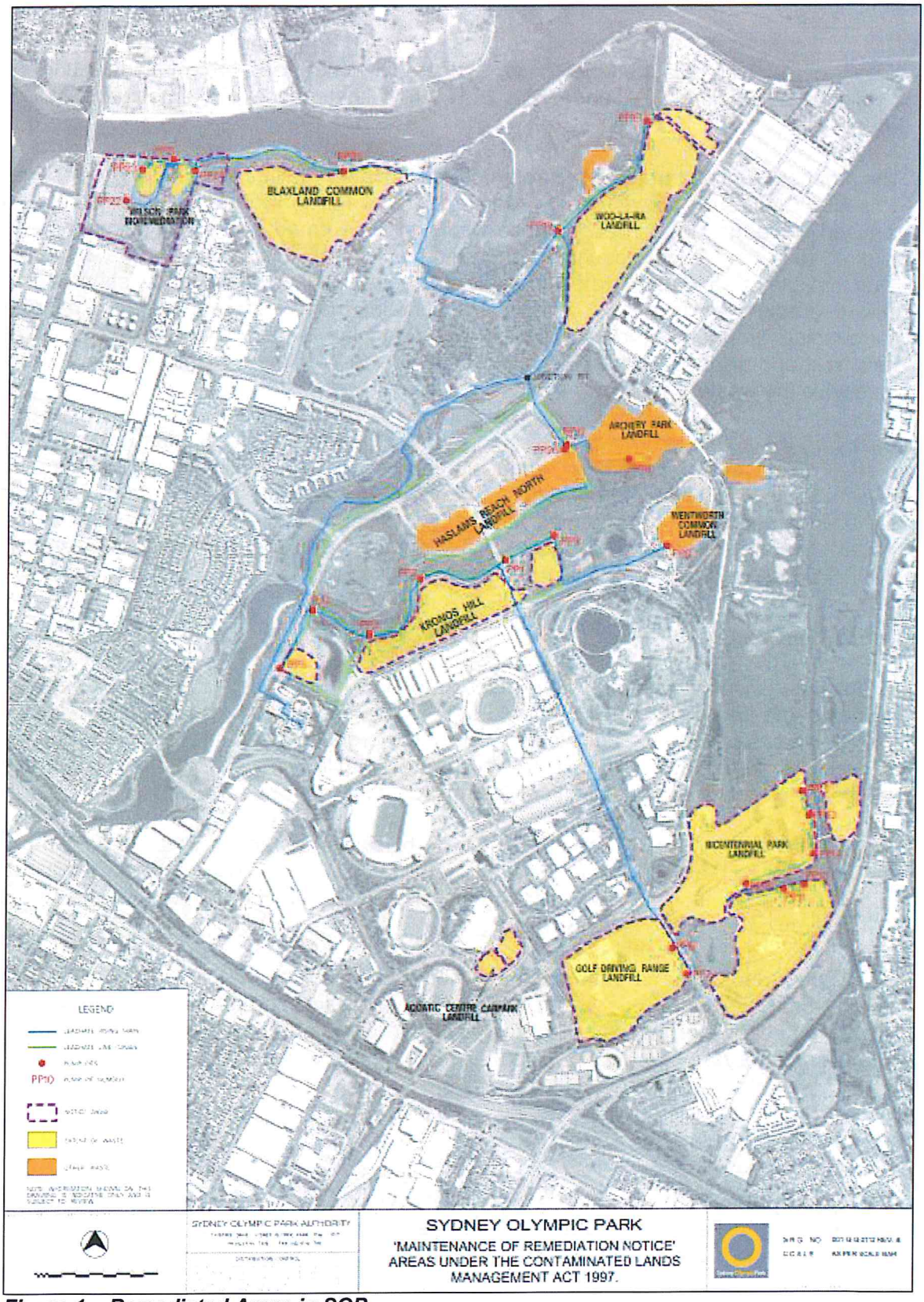

Figure 1 – Remediated Areas in SOP

Regulation

Seven of the remediated landfills at Sydney Olympic Park are managed under strict conditions set by the EPA under the CLM Act, Maintenance of Remediation Notice No. 28040.

The proposed wetland treatment infrastructure is located within the Boundary Creek Precinct. This site is currently subject to the Maintenance of Remediation Notice and the landfill is required to be managed in accordance with SOPA's Remediated Lands Management Plan referred to in the Notice. Leachate generated by the landfill is required to be extracted to a level that allows an inward hydraulic gradient to be maintained within the waste mounds. This inward gradient ensures that wastes are contained and pollutants do not migrate into surrounding groundwater or surface waters. Leachate is currently transferred off-site for treatment and disposal to the Lidcombe Liquid Waste Treatment Plant which is lawfully able to receive the waste.

Based on the advanced concept design prepared by AWC, the proposed wetland treatment system would treat leachate for irrigation back over the landfill footprint with runoff and minimal infiltration back into the landfill. Based on this design, there will be no discharge to the environment. Further, treatment and irrigation of wastewater over contaminated land is not a listed activity under Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act) therefore **no** license will be required.

Consultation with EPA

SOPA has consulted with the EPA in relation to the proposed development and has provided a copy of the Feasibility Study prepared by AWC. In correspondence dated 29 August 2014, the EPA advised of its in-principle support for the proposed leachate treatment and disposal system provided that it is designed and operated in a manner that does not present an unacceptable risk to human health or the environment.

The EPA also identified a range of matters to be addressed in the detailed design phase of the project, which are discussed in further detail in this Report. The landfill will continue to be regulated under the CLM Act Notice administered by the EPA to ensure the remediated landfill continues to be effectively managed.

The area proposed to be irrigated is a remediated landfill periodically irrigated with recycled water from the WRAMS system at Sydney Olympic Park. The proposal will not displace the use of potable water and does not trigger the requirement for a Section 60 approval under the *Local Government Act 1993*, for a Water Recycling Scheme.

2 Site and Location

Sydney Olympic Park is located approximately 14 km west of the Sydney CBD and 8 km to the east of the Parramatta CBD, and includes 430 hectares of Parklands comprising open space, recreation areas, wetlands and waterways.

The subject site is part of Sydney Olympic Park and is under the care, control and management of the Sydney Olympic Park Authority. The site is legally described as Lot 201 in DP 1041756, and is more commonly known as the former Golf Driving Range / Boundary Creek Precinct (BCP) landfill covers an area of approximately 13.613ha, the extent of which is illustrated at Figure 2.

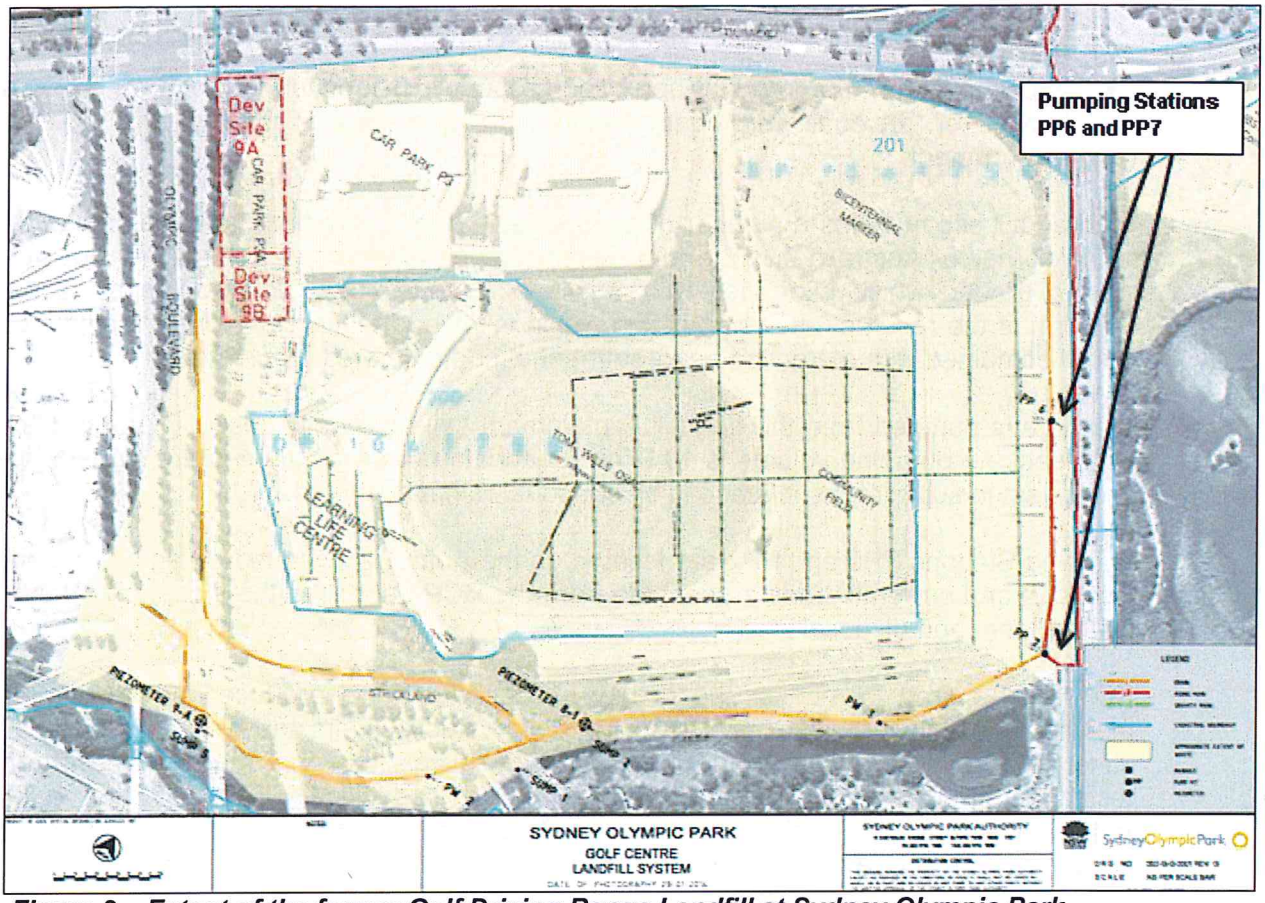

Figure 2 – Extent of the former Golf Driving Range Landfill at Sydney Olympic Park

The landfill is on the western side of Australia Avenue, directly opposite Lake Belvedere in Bicentennial Park. Shirley Strickland Avenue and Boundary Creek define the southern boundary of the landfill site, with Sarah Durack Avenue to the north. As illustrated above, the south western corner of the landfill extends beyond Olympic Boulevard.

The site of the proposed Leachate Treatment System occupies an area of approximately 12,500m^2 and is located on the south facing slope leading down to Boundary Creek on the southern edge of the AFL training ground (Tom Willis Oval). Figure 3 illustrates the location of the proposed leachate wetland treatment system relative to development in this part of Sydney Olympic Park.

Boundary Creek defines the southern extent of the site of the proposed system. This waterway was realigned by SOPA's predecessor (the Olympic Co-Ordination Authority) to mitigate flooding potential. The realignment of Boundary Creek was designed to accommodate a 1:100 year flood and previous inundation to surrounding landfills.

The Creek has been diverted away from the most contaminated part of the site and drains have been installed along its edge.

The Landfill in Detail

The Golf Driving Range / Boundary Creek Precinct (BCP) landfill site covers an area of approximately 13.613ha. The BCP Landfill includes three former landfills (Homebush Common, Southern Threshold and State Sports Centre Precinct), mainly comprising putrescible waste, with remediation works completed in 1994, and additional remediation works completed in 1998 to 1999. A Site Audit Statement (SAS) was issued in December 2000 declaring the site suitable as park, recreational open space and playing field, subject to:

- Preparation and implementation of an auditor approved Environmental Management Plan (EMP); and
- Implementation of an auditor approved groundwater monitoring program to assess the impact of residual soil contamination on groundwater quality and risk to the environment.

The Landfill site includes a number of landscape features, including the Bicentennial Marker at the corner of Australia Avenue and Sarah Durack Avenue as well as the elevated AFL training ground which interfaces with Australia Avenue as a battered grassy slope. The landform is the result of site remediation which involved the construction of a single capped landfill combined with extraction and treatment of contaminated groundwater.

Leachate is pumped from the Landfill containment cell on a daily basis. The annual median daily leachate pumping volume is 10.97m^3. Leachate pumping volumes are highest in winter and lowest in summer, as influenced by seasonal rainfall patterns.

Pumping Stations PP6 and PP7 are located on the Australia Avenue frontage of the site (see Figure 2) and currently transfer leachate from the BCP Landfill to the Lidcombe Waste Plant for treatment and disposal.

SOPA is required to monitor the quality of leachate being produced at the site every 6 months. The data provided for AWC's feasibility study covers the period January 2001 to June 2012. AWC's review of the leachate data reveals that that many of the parameters tested are at or below the laboratory detection limit – specifically Copper, Lead, Aluminium, Arsenic, Cadmium, Chromium and Cyanide. This data indicates the consistent extremely low concentrations of heavy metals in the leachate.

The leachate quality data from Pumping Stations PP6 and PP7 is characterised as being:

- Elevated in NH4 and TN;
- Elevated in BOD;
- Elevated in EC, TDS and a number salts;
- Moderately elevated in TPH's;
- Moderately elevated in SO4; and
- Highly variable as indicated by the high Standard Deviation in many of the analytes tested.

AWC has advised that during the period of the sampling regime the concentrations of these contaminants appear to have reduced. However, upon further investigation, this reduction is more a function of preceding rainfall. That is, in times of prolonged rainfall, concentrations of certain pollutant reduce when compared to times where little rain has fallen.

In summary, a low monthly rainfall results in a low volume of leachate generated at a high strength, and conversely, high monthly rainfall results in a high volume of leachate generated at a low strength. This information has repercussions for the biological treatment and disposal systems where concentrations of contaminants may be detrimental to biochemical reactions and vegetation. Using this assumption, differing leachate concentrations can be applied to both low and high rainfall conditions, again by calculating the differing percentiles of the leachate quality data.

Figure 3 – Extent of the proposed treatment system **(Highlighted in red)**

3 Proposed Development

This application seeks approval for the construction and operation of an environmentally sustainable wetland leachate treatment system on the northern side of Boundary Creek at Sydney Olympic Park to treat the leachate output from the BCP Landfill. The system, through adaptive re-use, utilizes the existing infrastructure of a now defunct stormwater treatment system. The existing stormwater ponds will require renovation and / or modification to accommodate the proposed system however the reuse of these structures represents a sustainable and cost effective outcome.

AWC developed a custom numerical irrigation model to identify the size of the irrigation system required to contain all leachate produced from the BCP Landfill during a range of events over a prolonged period of time and to have the capacity to store 100% of leachate sourced during extremely wet weather.

The model calculated a wet weather storage volume requirement of 317m^3 which was based upon an irrigation area of approximately 1.5 ha and a default daily irrigation rate of 4 mm per day. The key principle is that as the irrigation area increases the storage area required reduces.

Accordingly AWC has reported that an irrigation area of 1.5 ha under an irrigation rate of 4 mm per day will be sufficient to dispose of all leachate emanating from the BCP Landfill provided a leachate storage capacity of a minimum of 317m^3 is available.

The main contaminant of concern is salinity, with increased salinity resulting from low rainfall conditions. AWC expects that there will be routine monitoring and should salinity concentrations be considered unacceptable further dilution with freshwater will occur. As indicated above, treated leachate will be irrigated at a rate of 4mm per day, unless rainfall in the preceding 3 days exceeds 10mm. In such circumstances an automated valve will direct the treated leachate to irrigation storage for disposal at a later stage.

The proposed system comprises a Vertical Flow Wetland (VFW) of 150m² followed by a Free Water Surface (FWS) of 400m² after which 33m³ (80%) of the treated leachate is recirculated back to the collection tank for retreatment. A separate FWS of 200m² provides final polishing for the 8.2m³ (20%) not recirculated. A schematic diagram of the treatment train has been provided at Figure 4. The strategy provides a very high quality wastewater which is expected to achieve discharge requirements suitable for disposal to the environment via irrigation at a rate of 4mm per day distributed over a 1.5ha area.

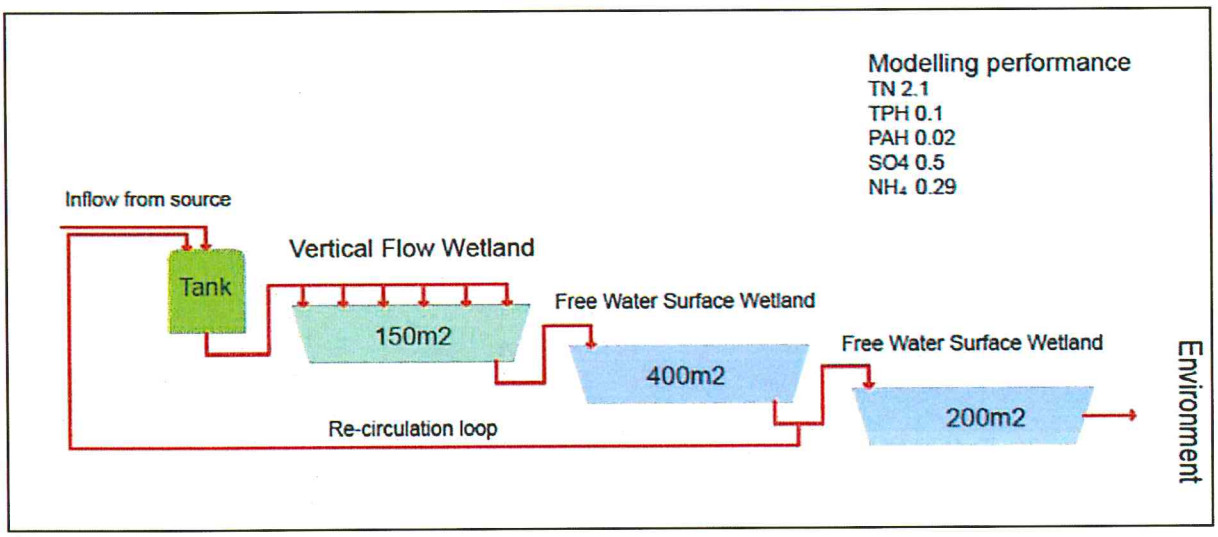

Figure 4 – Diagram of proposed leachate treatment system

The aim of the on-site treatment process is to achieve a leachate quality suitable for disposal via irrigation back over the landfill. The preferred approach using natural biological treatment wetlands is however expected to achieve a much higher quality leachate effluent of a standard suitable for disposal to the environment. While disposal to the environment is not proposed, a high quality effluent will provide much greater confidence by minimising potential risks to human health and the environment. The wetland treatment system is based on the following outcomes:

- Long term sustainable on-site treatment;
- Operation simplicity;
- Low capital and operating costs;
- Low maintenance requirements;
- Low energy requirements; and
- Minimum dependency on external treatment and/or disposal providers.

SOPA's ultimate aim is to operate the treatment wetland system in accordance with the best practice management and to achieve compliance with the EPA requirements for disposal of treated leachate via irrigation and maintain the integrity of the remediated landfill.

The wetland system utilises natural treatment processes to filter and remove pollutants from the leachate. Disposal via irrigation allows the entire process to be contained entirely on the remediated landfill minimising potential impacts to the environment and encouraging strong vegetative cover over the landfill. Natural biological treatment followed by disposal via irrigation back over the landfill is the most suited to SOPA's long term sustainability objectives. The use of wetlands for the treatment process will provide SOPA with a least cost, low energy and low maintenance sustainable treatment system that through the use of locally indigenous plant species will integrate with and enhance local biodiversity.

In summary, the following criteria have informed the advanced concept design prepared by AWC:

- achieve Licence compliance that will meet EPA effluent quality limits;
- provide a least-cost solution for advanced treatment of the BCP Landfill leachate;
- appropriate system sizing for the predicted flows which are to be verified and incorporated in the detailed design;
- minimal ongoing operational and maintenance requirements;
- the system should demonstrate and reflect sustainability;
- the leachate treatment must result in a positive effect on the receiving environment including fauna and flora, water and air quality and the local community; and
- enhance / preserve visual amenity whilst ensuring public safety.

Components of the Wetlands System

The proposed Sustainable Leachate Treatment System re-uses redundant stormwater infrastructure located on the southern batter of the BCP Landfill site. This re-use of the existing infrastructure will minimise the need for excavation. The major components of the system include:

- 1 x Header Tank;
- 1 x Vertical Flow Wetland @ 150m^2;
- 3 x Free Water Surface Treatment Wetlands @ 200m^2 each; and
- Sump and Pumping Station (as determined by the detailed design).

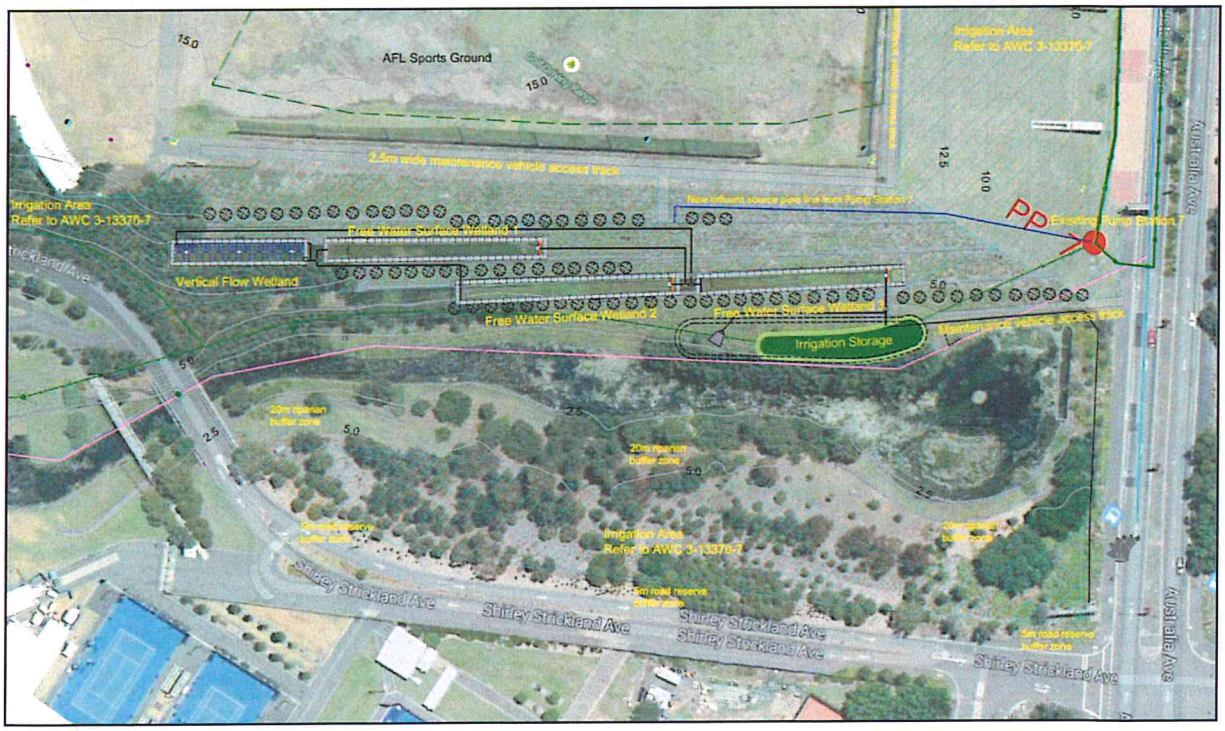

Figure 5 – Layout of System

Header Tank

Leachate will be pumped to a suitably sized Header Tank which will be installed adjacent to the Vertical Flow Wetland at the western end of the site. The tank provides primary separation of suspended solids from the contaminated water received from the Landfill pump pits (PP6 and PP7). Mixing of the untreated water and treated recirculated water will also occur within the tank.

Leachate will be delivered to the treatment system in batches – the Header Tank fills, then valves open when the water level reaches the top. This "on / off" operation promotes air to penetrate into the vegetated gravel media cells and enhance the oxidation processes.

Incoming water supplies into the tank will be configured to increase the concentration of dissolved oxygen in the water. This will be by means of installing a diffuser plate on the outlet of the connection. This will also help prevent the incoming water from disturbing any suspended solids which have already settled.

It is envisaged that there will be periodic controlled releases from the Header Tank over the flow forms in each 24 hour period. The rate and frequency of these controlled releases will be determined by the detailed design to meet the required effluent quality for sustainable long-term irrigation of effluent. The required rate and volume of releases will be fined-tuned on-site once the installation has been completed to ensure that optimum wetland performance is achieved.

Vertical Flow Wetlands (VFW)

Vertical Flow Wetlands provide a sub-surface system that is highly effective at oxidising wastewaters. The gravel / media provide a substrate with large surface areas for microbial activity to attach and deliver effective treatment. Vegetating the system further increases the surface area within which microbial activity can occur (within the root zone) whilst creating a landscaped element, consistent with the character of the locality.

The VFW will be lined with an HDPE material, a minimum 1.5mm thick. Existing basalt gabions contain the wetlands and will hold the HDPE in place. The gabions are keyed into the existing embankment.

A sump will be located at the base of the Flow Forms with a 110mm diameter, high density polyethylene drain which feeds the distribution network within the Vertical Wetland cells. The sizing of this infrastructure will be designed to accommodate 4-5 litres per second from the Flow Forms.

The invert of the sump will be installed above the top water level of the VFW drain in which they are servicing.

The distribution network will be a wet system, with gravity distributing the water from the sumps to the wetlands. Pipework within the VFW will be installed completely flat across the wetland, with seepage holes drilled into the top of the pipe to ensure even water distribution.

It is expected that the HDPE material lining the base of the Vertical Flow Wetland will be overlaid with a 150mm deep coarse drainage layer, 100mm transition layer of fine sand, 350mm filter media comprising coarse gravel, topped with planting media.

The VFW drains by gravity to the Free Water Surface Wetlands.

Free Water Surface Wetlands (FSW)

Free Water Surface Wetlands are shallow impoundments planted with emergent, rooted vegetation. Water flows overland through the wetland, primarily above the sediment surface. The three (3) FSW are arranged in a lineal manner along the southern batter of the BCP Landfill.

The wetland cells will have an Operating Water Level depth of 300mm on average, densely planted with appropriate wetland plant species.

No open water is visible because the primary mechanism for nutrient treatment occurs through microbial activity and it is the extensive surface areas produced by high density planting and organic debris within the system that forms a substrate for microbes to effectively colonise.

Water level control is essential to maintaining an appropriate density of plant growth. Optimal water depths are between 100 – 300mm on average and whilst higher levels (up to 500 – 600mm) are acceptable for short periods, they should not be maintained for longer than a few weeks. Deeper waters for prolonged periods will adversely impact the density of vegetation.

Water will drain by gravity from the Vertical Wetlands into the FSW distribution network. The sizing of the hydraulic infrastructure will be designed for peak flows coming from the Vertical Wetlands.

An adjustable dam overflow is to be located at the south eastern end of the FWS which has been sized to accommodate a combined flow of treated water and rainfall. The drainage from the wetlands will be interconnected into one drain that will gravity feed to a treatment system recirculation pump.

Recirculation Pump

The recirculation pump, to be located within an in-ground pump chamber will return water to the Header Tank if the required treatment quality levels are not achieved.

The sizing of this infrastructure will be determined during the detailed design phase.

Water that meets the discharge design quality will be discharged into another pump pit and then dispersed as irrigation of the identified areas within the Landfill (***Figure 6***), subject to EPA Licence approval.

Figure 6 – Area proposed to be irrigated by treated leachate – note that only those areas shown red (total area 1.57ha) will be irrigated

Irrigation Storage Area

The existing stormwater detention Pond located at the eastern end of the site and immediate to the north of Boundary Creek (***Figure 7***) will provide emergency storage in the unlikely event of system overflow or additional storage being required during peak rain events.

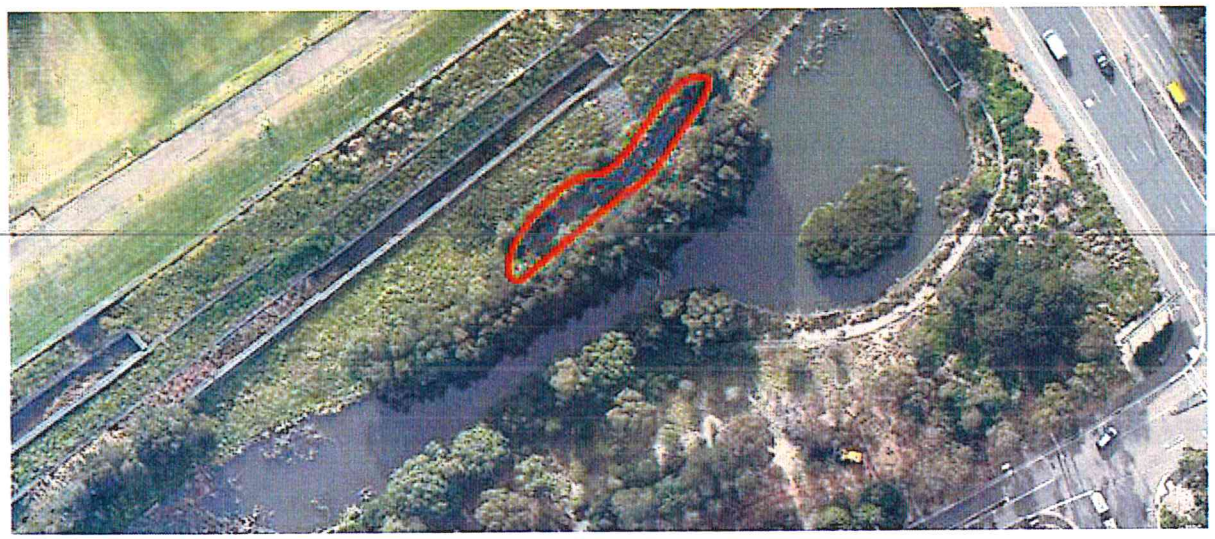

Figure 7 – Existing Pond at the eastern end of the proposed Leachate Treatment System

SOPA will manage levels in the Pond and will pump out / tanker to the Trans Pacific facility until such time as an alternate management process and / or reuse within the overall treatment systems is tested and approved by SOPA and the EPA.

The sizing of the irrigation storage pond will be finalised as part of the detailed design. In accordance with the requirements set out under the CLM Act Notice 28040 issued to SOPA for the management of its legacy landfills, if excavation is required to enlarge the existing

pond, this would subject to the requirements set out by the NSW EPA for undertaking works on remediated lands.

Wetland Sizing and Performance

The annual median daily leachate pumping volume is 10.97m^3, with 8.42m^3 and 2.55m^3 attributed to pump wells PP7 and PP6 respectively. Leachate pumping volumes are highest in winter and lowest in summer, as influence by seasonal rainfall patterns rainfall.

The proposed system comprises a Vertical Flow Wetland (VFW) of 150m² followed by a Free Water Surface (FWS) of 400m² after which 33m³ (80%) of the treated leachate is recirculated back to the collection tank for retreatment. A separate FWS of 200m² provides final polishing for the 8.2m³ (20%) not recirculated. The strategy provides a very high quality wastewater which is expected to achieve discharge requirements suitable for disposal to the environment via irrigation at a rate of 4mm per day distributed over a 1.5ha area.

Wetland Plant Selection

Plant selection for the treatment wetland system was based on a number of criteria. Of primary consideration is that the selected species must have the capacity to survive in the conditions present in the treatment system.

The following criteria have been employed in the species selection for the treatment wetland system at the BCP Landfill:

- treatment process enhancement;
- visual amenity;
- robustness;
- ease of maintenance;
- integration with local ecology; and
- maintenance of substrate acceptance capacity (vertical flow).

The Planting Plan prepared by AWC which accompanies this application illustrates a series of broad vegetation zones to be planted in both the Vertical Flow and Free Water Surface treatment wetlands.

Additional landscape works around the Header Tank and along the edges of the VFW and FSW will be provided to ensure that the site is fully integrated in the existing landscape and that the visual amenity is preserved and enhanced as appropriate.

Construction Phase

The construction phase of the Project is programmed to occur over a 20 week period, scheduled to commence in January 2015, with completion by the end of May 2015.

A Construction Environmental Management Plan (CMP) will be prepared by successful contractor, which will be subject to SOPA approval as part of the contract for completion of the works.

Storage of materials will be confined to the working area or areas immediately adjacent. Warning signs will be installed on the existing perimeter fence to further restrict public access. A project information sign will be erected to inform the public about the project and to provide relevant emergency contact details.

Erosion control and dust suppression measures will be implemented as required. Shake-down areas will be installed at all exits from the construction zone.

Excavation is potentially only required for any enlargement of the existing Pond at the eastern end of the site for construction of the pumping infrastructure. There will be no disturbance to the landfill capping. The existing gabions serve a retaining function to the wetlands and hold the geo-fabric lining in place.

Clean planting media will be required to be certified by the supplier to be VENM and chemically suitable prior to supply and will be imported and added to the lined wetland ponds as a substrate to support the wetland vegetation.

Wetland vegetation will be planted at a rate of 4 stems per m^2. It is preferable to implement the wetland planting in the spring.

Upon completion of the construction phase, the hydraulics of the system will be tested however the full hydraulic capacity of the ponds will not be tested until the wetland vegetation is fully established (12 months from completion of construction).

The scope of construction works associated with the project includes:

- site establishment – in this regard it should be noted that SOPA will limit all construction vehicle access to / from the site to Shirley Strickland Avenue in order to minimize the impact on operations at Sydney Olympic Park. It is anticipated that the construction of a temporary haul road will be necessary to afford direct access to the site;
- installation of header tank and associated connections;
- clearing of existing vegetation etc. from the redundant stormwater treatment infrastructure, accurate grading of base;
- re-line the structures with geo-fabric, spreading of drainage and planting substrate;
- pipe works trenching and rectification;
- any (minor) modifications to the existing Pond at the eastern end of the site to accommodate irrigation storage; and
- supply and installation of wetland plants and other landscaping.

Commissioning Phase

The commissioning of the process will occur in two phases, as described below:

Process Establishment

The Process Establishment Phase is the period during which the wetland vegetation is established. This phase of the project requires a flexible response capability, with mechanisms in place for input and calibration of the process.

During this 6 month period the establishment of the wetland vegetation will be closely monitored, in particular optimizing plant growth and the expansion of rhizomes and stolons in the system to achieve full cover.

Optimisation of the flow regime is also required during this phase, which entails setting level controls and timing of the batch leachate dosing. During the vegetation establishment, water levels in the FWS Wetland will be managed to less than 50mm depth and the vertical flow will be regularly dosed (up to 6 times per day).

It may be necessary to install temporary protective measures such as caging, nets or other devices designed to deter herbivores from destroying the young plant material.

Four to six months following the completion of construction, water levels within the Wetland will be gradually increased to 100 – 200mm – provided that the vegetative cover has sufficient density to preclude open water.

In the last six months of the Process Establishment phase, maintenance will taper off as the wetland should be in a period of stable growth.

Monitoring of the system will occur continuously, checking to ensure system process is functioning at an optimal level.

Process Commissioning Period

The Process Commissioning Period represents the final stage of the wetland implementation process. Its objective is to verify and finalise the performance goals established during the design state. During this stage of the process, the physical, chemical and biological characteristics of the wetlands will be assessed which will determine whether the wetland is achieving its intended function namely, satisfying the performance standards specified by the EPA.

The wetland maintenance in this 12 month period will include regular wetland health assessments. During the Spring the wetland cells will be sequentially drained (i.e. one will remain operational while the other is rested for a period of between 30 and 40 days). This "resting" provides for optimal health and function of the wetland vegetation.

System monitoring will occur on a continuous basis to ensure optimal function of the system.

Utility Services

Electricity, potable water and sewer services are available in the vicinity of the site. The proposed sustainable wetland leachate treatment system will require connection to the electricity supply to service the demand generated by the pumping station.

A temporary connection (approx. 3-4 months) to the WRAMS will be required during the establishment phase to support the landscape treatment.

4 Zoning and Permissibility

The site is zoned B4 Mixed Use under State Environmental Planning Policy (Major Development) 2005.

(1) The objectives of Zone B4 Mixed Use are as follows:

- *(a) to protect and promote the major events capability of the Sydney Olympic Park site and to ensure that it becomes a premium destination for major events,*
- *(b) to integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling,*
- *(c) to ensure that the Sydney Olympic Park site becomes an active and vibrant town centre within metropolitan Sydney,*
- *(d) to provide for a mixture of compatible land uses,*
- *(e) to encourage diverse employment opportunities,*
- *(f) to promote ecologically sustainable development and minimise any adverse effect of land uses on the environment,*
- *(g) to encourage the provision and maintenance of affordable housing.*

(2) Development for any of the following purposes is permitted without consent on land within Zone B4 Mixed Use:

environmental protection works; recreation areas.

(3) Except as otherwise provided by this Part, development for any of the following purposes is permitted with consent on land within Zone B4 Mixed Use:

roads; any other development not specified in subclause (2) or (4).

(4) Development for any of the following purposes is prohibited on land within Zone B4 Mixed Use:

bulky goods premises; caravan parks; industries; moveable dwellings; resource recovery facilities; restricted premises; rural industries; sex services premises; truck depots; warehouse or distribution centres.

The proposed sustainable leachate treatment system is not a purpose identified in either subclause (2) or (4) and is therefore permissible in the B4 Zone with consent.

The treated leachate is proposed to be disposed on site via irrigation, which falls within the definition of Category 1 Remediation Work (as defined by State Environmental Planning Policy No. 55), which requires development consent.

5 Crown Development

SOPA is a statutory authority representing the Crown pursuant to Section 6 of the SOPA Act. Accordingly, this application is a Crown DA to which Part 4, Division 4 of the EP&A Act applies.

6 Delegated Authority

The Minister is the consent authority pursuant to Schedule 6, Part 1, Clause 3 of the SEPP Major Development 2005 and Clause 22 of the *Sydney Olympic Park Authority Act 2001*. On 10 November 2014, the Minister delegated her powers and functions under Section 80 of the *Environmental Planning and Assessment Act 1979 (the Act)* to a Director and/or Manager in the Infrastructure and Industry Assessments Division of the Department, where:

- The relevant local Council has not made an objection, and
- A political disclosure statement has not been made, and
- There are no public submissions in the nature of objections

Auburn City Council has not objected to the proposal, a political donations disclosure statement has not been made, and no public submissions have been received. Accordingly, the application can be determined by a Director and/or Manager.

7 Statutory framework

Environmental Planning and Assessment Act 1979

The proposal is local development to which Part 4 of the Environmental Planning and Assessment Act 1979 (the Act) applies. Decisions made under the Act must have regard to the objects of the Act, as set out in Section 5 of the EP&A Act. The proposal complies with the objects as it will provide an artificial wetlands system which can treat leachate in an environmentally sustainable manner.

Refer to Part 9 of this report for the assessment of the application against the heads of consideration set out under Section 79C of the Act.

Sydney Olympic Park Authority Act 2001

Clause 22(2) of the SOPA Act requires consideration of the Environmental Guidelines. The SEE provided a detailed assessment of the development against relevant provisions of the *Environmental Guidelines*. Having regard to the SEE, it is considered that the proposed development is generally consistent with the *Guidelines*.

The DA was also referred to SOPA's Environment & Parklands Units. No objections were raised to the development, subject to conditions. Refer to Part 8 of this report for more details.

Contaminated Land Management Act 1997

The BCP Landfill is subject to Notice 28040 issued under the CLM Act. The Notice requires that the land be managed in accordance with SOPA's Remediated Lands Management Plan 2009 (RLMP).

The proposed development involves works which are beyond the scope of the current RLMP. As a consequence regulatory approvals will be sought prior to undertaking the work as per Management Strategy No. 29 of the RLMP.

With respect to the land use related issue under the CLM Act, remediated landfills should be used for the purposes for which they have been deemed suitable by site audit or site validation process, and in accordance with relevant development consents issued under the EP&A Act.

Site audit statements for the existing BCP do not require exclusion of public access. However it is envisaged that consistent with the existing biological treatment systems located at Wilson Park, the proposed BCP treatment wetlands would be fenced and managed as a restricted access area to minimise any potential for contact with untreated landfill leachate.

Having regard to the above, it is considered that the proposed development is unlikely to have adverse contamination impacts, subject to compliance with appropriate conditions of consent.

Protection of the Environment Operations Act 1997

The POEO Act protects and restores the quality of the environment in a regulatory framework. A conditional Licence may be required for activities which impact on water, soil or air quality, or which generate waste. Penalties apply for non-compliance with Licences, or for environmental harm.

The advanced concept design indicates that the proposed wetland treatment system would treat leachate for use in irrigation back over the landfill footprint. Runoff and infiltration back into the landfill will be minimal and there will be no discharge to the environment. Treatment and irrigation of wastewater over contaminated land is not a listed activity under Schedule 1 of the POEO Act therefore no license will be required under the *Protection of the Environment Operations Act*.

Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 (TSC Act) requires that a Species Impact Statement (SIS) be prepared for development on land that will significantly affect threatened species, populations or ecological communities and their habitats.

The site of the proposed works is well removed from primary habitat and on this basis it is considered that the proposal will not have any significant effect on the GGBF.

Having regard to the above, it is considered that a SIS under the TSC Act is not required.

8 Consultation

8.1 Public notification

The proposal was publicly exhibited for 30 days from 11 November to 11 December 2014 in accordance with the provisions of the *State Environmental Planning Policy 55 (Remediation of Land)* in the Sydney Metro newspapers (Daily Telegraph and Sydney Morning Herald).

No submissions were received from the public exhibition process.

8.2 External agency referral

Environmental Protection Authority

The application was referred to the EPA on 11 November 2014 to comment.

Written comments were received from the EPA on 12 December 2014. The EPA is generally supportive of the application subject to the conditions of consent to include for the development of a Detailed Design Report that addresses the EPA's recommendations in their letter of 29 August 2014 (refer to Appendix 2 of the DA documentation) and AECOM's recommendations provided in its advice of 23 October 2014 (refer to Appendix 5 of the DA documentation).

The EPA also advised they are in an ongoing dialogue with SOPA on licencing related matters at SOP. SOPA is committed to maintaining and enhancing this ongoing relationship and looks forward to working with the EPA on implementing and operating this system.

Auburn Council

Auburn Council was notified by letter on 11 November 2014 of the proposed development application. No submission or correspondence has been received from the Council in response.

8.3 Internal referrals within SOPA

The application was referred to the following internal Sydney Olympic Park Authority units for review and comment on 20 August 2014:

Internal department	response
Building Services	No objections subject to conditions.
Parklands & Assets	No comments / objections.
Precinct Coordination	No comments / objections.
Major Projects	No comments / objections.
Environment and Ecology	No objections subject to conditions.
Environmental Infrastructure	No objections subject to conditions.
Commercial and Property	No comments / objections.

All conditions recommended by the respective Units have been incorporated into the draft Conditions of Consent where appropriate and necessary.

9 Assessment

The application has been assessed against the relevant heads of consideration set out under Section 79C (1) of the Act, which requires a consent authority, in determining a development application, to take into consideration the provisions of:

Environmental Planning Instruments

Consideration of relevant EPIs (including SEPPs) is provided in **Appendix A**. The proposal is generally consistent with the relevant requirements of the relevant EPIs.

Development Control Plans

Sydney Olympic Park Master Plan 2030 (MP 2030) is a deemed DCP. Consideration of MP 2030 is provided in **Appendix A**

Proposed Instruments

There are no draft EPIs that are applicable to Sydney Olympic Park.

Planning Agreements

There are no planning agreements that are applicable to this application.

Prescribed matters EP&A Regulations 2000

The proposed development is able to comply with relevant provisions of the *Environmental Planning and Assessment Regulations 2000* subject to fulfilment of conditions of consent.

Impact of the development

Impacts of the development are considered in detail in Part 10 of this report below. It is considered that the proposed development is unlikely to adversely affect the natural, social or economic environment, subject to the imposition of appropriate conditions of consent.

Suitability of the site for the development

The proposed sustainable leachate treatment system will be established on the southern batter of the Landfill which, whilst it is currently accessible to the general public, there are no

formalised pathways and the terrain is not conducive to recreational uses. Notwithstanding, SOPA will fence the wetland treatment system to preclude any opportunity for human contact with leachate. The issue of public access will be addressed in the Detailed Design Report which is to be developed in consultation with the NSW Environment Protection Authority (EPA) in accordance with Condition A6 of the consent.

The selected site of the proposed development is considered to be suitable given the potential impacts of the proposed development can be managed to ensure that there is not substantive impact on the quality of the environment, the general amenity of the locality and human health.

Public notification & submissions

This matter has been addressed in Part 8 of this report.

The public interest

The proposal is considered to be in the wider public interest as it:

- Is consistent with the in-force provisions and controls of the principle environmental planning instrument applying to the land contained with *State Environmental Planning Policy (Major Development) 2005*;
- Is consistent with SOPA's commitment to improving the performance of landfill leachate systems operations and the progressive move towards sustainable management practices, and save millions of public money; and

Given the residual impacts associated with the development can be mitigated and managed; it is considered that the development is in the interest of public.

10 Key Issues

The key issues for the development are considered to be potential impacts during the construction phase, and impacts during the operational phrase. The potential impacts of the proposed development are summarized as follows and are addressed in greater detail further below.

During the Construction Phase

- Potential disturbance to the existing landfill cap
- Erosion and/or sediment impacts
- Waste generation
- Vegetation removal
- Green & Golden Bell Frog

During the Operational Phase

- System failure / maintenance of system operation
- Generation and management of potentially contaminated sludge / sediment
- Uncontrolled discharge of potentially contaminated effluent
- Visual impact

mounds resulted from the previous remediation activities are currently capped. The RLMP states the following management target with respect to excavation on the cap:

> *No alteration of landforms or excavations below 0.5m without regulatory authority approval.*

Disturbance of the contaminated soil beneath the cap can present potential contamination exposure to human health during construction. Any proposed penetration of the cap, removal and relocation of soils must have regard to this Notice and any requirements under SEPP 55 (Remediation of Lands). This will require preparation of a management plan that has regard to SEPP 55 to assist in dealing with management of contaminants during and after the construction process and gaining appropriate approval from the EPA.

The proposed header tank, flow form cascades and the vertical flow wetlands are located within the footprint of the Landfill. Excavation works will be limited to the installation of pumping infrastructure and any excavation required to increase the size of the existing irrigation storage pond. The proposal is to re-use existing infrastructure to minimise disturbance to the landfill cap. The application was referred to the EPA & SOPA's Senior Manager – Environmental Infrastructure; no objections were raised, subject to conditions.

Erosion & Sediment Control

The construction of the treatment system is expected to involve minor excavation and earthwork activities. Erosion and stormwater runoff has the potential to spread or promote the migration of sediment, posing environmental impacts on waterways. If such sediment is contaminated, impacts could result in further significant consequences.

Whilst it is not anticipated that excavations for the key system elements will extend beyond 0.5m depth a site specific environmental management plan should be prepared prior to the commencement of any works on site which details appropriate erosion and sediment control measures to prevent sediment entering waterways or disrupt the drainage system. The range of measures may include, but not necessarily be limited to:

- the installation of physical barriers;
- limitation of exposed ground;
- covering and bunding of stockpiles;
- dampening of exposed surfaces;
- covering of spoil/material when transporting in vehicles;
- wheel wash of vehicles prior to exiting the site; and
- cleaning of footpaths and roadways.

In addition, unexpected finds protocols will be implemented to manage contaminated material, in the event it is encountered. It is considered that the implementation of the above measures would ensure that the works would be unlikely to result in an unacceptable environmental impact on the waterways.

Waste Management

Management Strategy 15 in SOPA's RLMP 2009 states that land remediation works should, as far as physically and technologically possible, result in no off-site disposal of contaminated or treated landfill waste material.

Some minor excavation may be required for the construction of the system, primarily associated with the possible enlargement of the existing eastern Pond and trenching associated with installation of the requisite connections. Off-site disposal of minor quantities

of waste or excess material, if required, is to be classified in accordance with the 'Waste Classification Guidelines; Part 1 Classifying Waste' (NSW EPA, 2009) and disposed to licensed facilities in accordance to the classification.

In addition it is recommended that an unexpected finds protocol be developed as part of the site specific environmental management plan to manage contaminated material if it is encountered during the construction phase. The implementation of these measures would reasonably minimise waste generation, and present an acceptable approach in managing off-site disposal of waste and excess material. No off-site disposal of contaminated or treated landfill waste material is expected at this stage.

Vegetation Removal

The construction of the proposed leachate treatment system will necessitate the removal of some vegetation.

In this regard it should be noted that all the existing vegetation in this locality has been planted by SOPA and its predecessors following remediation of the land, none is naturally occurring or could be construed to be remnant vegetation.

The drawings provide details of planting within the wetlands and also indicative locations / opportunities for additional tree planting along the edges of the VFW and FSW however the details of the future landscape treatment will be determined by SOPA.

Green & Golden Bell Frog

As indicated previously in this report, the site of the proposed development is located more than 1km from the nearest identified areas of habitat. Furthermore, the land upon which it is proposed to construct the wetland leachate treatment system comprises large areas of (regularly) mown grass, interspersed with native plantings, comprising predominantly *Casuarina* species. This type of terrestrial landscape does not typically provide habitat for the GGBF.

Notwithstanding the above, the GGBF is known to be a highly mobile species and as a consequence it is possible that they could be found outside the areas of known habitat, including on the subject site.

The construction of the proposed system will necessitate some excavation / earthworks as well as the removal of some terrestrial vegetation. In order to address the possibility of frog mortality during the construction works, a temporary frog fence will be installed around the work area, in a suitable location / configuration if considered necessary by SOPA's Environment & Ecology Unit.

It is noted that the nature and the plant species used in the Free Water Surface Wetland cells may ultimately provide an environment which is attractive to the GGBF and therefore represents a positive outcome in terms of biodiversity. However it should be recognised that this is not their primary function. The application was also referred to SOPA's Senior Manager – Environment & Ecology; no objections were raised, subject to conditions.

Potential Impacts during the Operational Phase

Discharge of Potentially Contaminated Effluent

A key feature of the advanced concept design is the inclusion of series of automated alarms that monitor levels within the wetland ponds. These alarms will be monitored via SOPA's Supervisory Control and Data Acquisition (SCADA) telemetry system. There are a number of contingency mechanisms which will be employed in the ultimate detailed design to maintain the integrity of the system.

As described previously the AWC model calculated that an irrigation area of 1.5 ha under an irrigation rate of 4 mm per day will be sufficient to dispose of all leachate emanating from the Landfill provided a leachate storage capacity of a minimum of 317m^3 is available. This leachate storage will be provided in the existing pond at the eastern end of the site which will be refurbished and expanded as required.

If rainfall in the preceding 3 days exceeds 10mm an automated valve will direct the treated leachate to the irrigation storage pond for disposal at a later stage. It is understood that the pond will provide a storage capacity of approximately 1 month.

In extreme or prolonged periods of wet weather where the capacity of the pond is exceeded, SOPA will retain the ability to pump leach back to the Lidcombe treatment facility through Pump Pits PP6 and PP7 on Australia Avenue.

The advanced concept design represents a very conservative model and gives a high level of redundancy and safety margin.

Maintenance of Operational Integrity

Management and maintenance of the treatment system is an essential part of the system operation. The system will be managed in accordance with an Operation and Maintenance Manual prepared by the Contractor engaged to design and construct the facility and approved by SOPA. The Manual will clearly define the roles and responsibilities and sets out key management and maintenance elements which will include:

- observation and inspection requirements;
- operation principles;
- asset management (e.g. pump operations, water level control, plant growth maintenance);
- operations and maintenance tools (e.g. checklists, schedules and forms); and
- contingency response (e.g. emergency pump-out).

Initial system checks will be performed and monitored. Based on the results of these initial system checks and monitoring data, a system adjustment can be performed to refine / optimise system performance.

Visual Impact

The proposed wetland leachate treatment system entails re-use of existing redundant infrastructure and will result in minimal alteration to the existing landscape.

Any existing vegetation required to be removed to facilitate construction access or otherwise disturbed will be reinstated in accordance with SOPA's requirements. On this basis it is considered that the visual impact associated with the proposed development will be minimal.

11 Conclusion

The proposal is of a nature that is generally in keeping with the overall objectives and functions of the site and permissible land use. It is consistent with the in-force provisions and controls of the principle environmental planning instrument applying to the land contained with *State Environmental Planning Policy (Major Development) 2005*; and consistent with SOPA's commitment to improving the performance of landfill leachate systems operations and the progressive move towards sustainable management practices, and save millions of public money.

The application has been considered with regard to the matters raised in section 79C of the EP&A Act. Given the residual impacts associated with the development can be mitigated and managed; the proposed development is considered to be acceptable, in the public interest and is recommended for **conditional approval**.

12 Recommendation

It is recommended that the Director – Industry & Key Sites of the NSW Department of Planning & Environment:

A) **Consider** the findings and recommendations of this report;

B) **Approve** this development application, subject to conditions, pursuant to Section 80(1) and 80(A) of the EP&A Act;

C) **Sign** the attached Instrument of Approval;

D) **Authorise** Sydney Olympic Park Authority to carry out post-determination notification pursuant to Section 81 of the EP&A Act,

Prepared by

Dat Tran
A/Manager, Urban Planning
Sydney Olympic Park Authority

Reviewed by

Alan Marsh
Chief Executive Officer
Sydney Olympic Park Authority

Endorsed by

30.1.15.

Ben Lusher
A/Director – Industry & Key Sites
NSW Department of Planning & Environment

Appendix A

Environmental Planning Instruments

State Environmental Planning Policy (Major Projects) 2005 (MD SEPP)

The aims of the MD SEPP are to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State, and to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes.

Sydney Olympic Park is identified as a State Significant Site under the MD SEPP, and Part 23 of Schedule 3 of the MD SEPP identifies a number of provisions relating to the carrying out of development within Sydney Olympic Park, which are considered below.

Clause 9 – Zone B4

The issue of zoning & permissibility has been considered in detail in Part 4 of this report; the subject site is zoned B4 Mixed Use and is permissible with consent

Clause 23 – Public utility infrastructure

Clause 23 provides that development consent must not be granted unless the consent authority is satisfied that any public utility infrastructure (water, electricity etc.) that is essential for the proposed development is available or that adequate arrangements have been made to make that infrastructure available when required.

Electricity, potable water and sewer are available in the immediate vicinity of the site as shown on the Services Diagram.

Notwithstanding, a condition has been included requiring the applicant to consult and obtain written advice from various utility service providers regarding connection, relocation and/or adjustment of any services affected by the development.

Clause 24 – Major events capability

Clause 24(2) of the SEPP provides that the consent authority must be satisfied that during major events held within the Sydney Olympic Park site:

(a) *traffic generated by the development is likely to cause the local road network and connections to the regional road network to become saturated or otherwise fail, and*
(b) *the development is likely to prevent the effective management of crowd movement and transport services, and*
(c) *the development is likely to compromise the effective functioning of major event infrastructure, and*
(d) *the development conflicts with the emergency management plans of government agencies or the emergency evacuation plans of major event venues.*

The consent authority is required to consider impacts of the proposal during major events held within the Sydney Olympic Park site, including consideration of traffic, crowd

management, functioning of major event infrastructure, and emergency evacuation plans. The proposed development is unlikely to have any impact on the operation / capacity of SOP to accommodate major events because:

- the proposed sustainable leachate treatment system is integral SOPA's management of the landfill sites; and
- it will be controlled by SOPA and can therefore be managed during major event mode.

Clause 25 – Transport

Clause 25 requires the consent authority to consider and be satisfied that the development includes measures to promote public transport use, cycling and walking. In this regard, the proposed development will have no impact on, nor will it influence the use of public transport when visiting Sydney Olympic Park.

Notwithstanding, a condition should be imposed requiring a Construction Management Plan to be submitted to SOPA's satisfaction so that the construction of the wetlands will not have any adverse impacts on the transport/public transport network of the precinct.

Clause 26 – Master plan

Development consent must not be granted for development on land within the Sydney Olympic Park site to which a master plan applies unless the consent authority has considered that master plan.

Sydney Olympic Park Master Plan 2030 (MP 2030) was approved by the Minister for Planning & Infrastructure in accordance with Section 18(4) of the Sydney Olympic Park Authority Act 2001 and came into effect on the 10 March 2010.

The development is considered to be consistent with the objectives and controls of the Master Plan 2030.

Clause 29 – Development within an Environmental Conservation Area

The subject site is **not** located within an Environmental Conservation Area. Notwithstanding, the application was referred to the Authority's Senior Manager – Environment & Ecology, who has raised no objections to the application, subject to conditions.

Clause 30 – Design excellence

Development consent must not be granted for development that is the erection of a new building or external alterations to an existing building unless the consent authority has considered whether the proposed development exhibits design excellence.

Design excellence requirements are only applicable to the built environment within the urban town centre and therefore are not applicable to this development. Notwithstanding, it is considered that the development has been carefully planned and designed to ensure that it is aesthetically pleasing.

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)

The intent of State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) is to provide a consistent approach to the remediation of land across the State by specifying certain matters that consent authorities must consider when determining development applications on land which is potentially contaminated.

Under the provisions of Clause 7 of SEPP 55 the consent authority must not consent to the carrying out of any development on land unless it has considered whether the land is contaminated. If the land is found to be contaminated, the Consent Authority must be satisfied that the land is suitable in its contaminated state or can and will be remediated in order for it to be suitable for the purpose for which the development is proposed.

The proposed treatment system constitutes an extension of the remediation / management measures currently implemented for the BCP Landfill. Such work is considered to fall within the definition of Category 1 remediation work, requiring consent prior to commencement of the work. According to SEPP 55, remediation work must, in addition to complying with any requirement under the EP&A Act or any other law, be carried out in accordance with:

(a) the contaminated land planning guidelines, and
(b) the guidelines (if any) in force under the CLM Act, and
(c) in the case of a Category 1 remediation work - a plan of remediation, as approved by the consent authority.

The proposal was publicly exhibited for 30 days from 11 November to 11 December 2014 in accordance with SEPP 55 provisions for Category 1 remediation works, in the Sydney Metro newspapers (Daily Telegraph & Sydney Morning Herald). No submissions were received from the public exhibition process.

The application was referred to the EPA and to the Authority's Senior Manager – Environmental Infrastructure. No objections to the application were raised, subject to conditions.

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

As of 1 July 2009, Regional Environmental Plans (REPs) were removed from the hierarchy of environmental planning instruments in NSW in an effort to simplify the State's planning system. All existing REPs are now deemed State environmental planning policies (SEPPs) and remain a matter for consideration in the assessment of a development application under Section 79C of the Act.

Sydney Regional Environmental Plan – Sydney Harbour Catchment 2005 commenced in September 2005 and provides a planning framework to achieve better environmental outcomes for Sydney Harbour and its catchment. Although the Plan applies to the whole of the Sydney Catchment Area, including the subject site, it primarily provides planning provisions relating to the foreshore and waterways area as identified under the SREP. The site is not located within the foreshores and waterways area and therefore the provisions of the Plan do not apply to the subject proposal.