Australian Government

Intermediate Level Solid Waste Storage Facility

Statement of Evidence for the Parliamentary Standing Committee on Public Works

Submission 1.0

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1. About ANSTO

ANSTO (the Australian Nuclear Science and Technology Organisation) is responsible for the operation and management of Australia's landmark nuclear infrastructure and research facilities across its two main campuses (Lucas Heights, in Sydney, and Clayton, on the outskirts of Melbourne). These facilities include the Open Pool Australian Light-water (OPAL) Multi-purpose Research Reactor, the Australian Centre for Neutron Scattering, the Centre for Accelerator Science, the National Deuteration Facility, and the Australian Synchrotron.

ANSTO scientists and researchers, and their collaborators, use this infrastructure to investigate public health issues, the environment, and the nuclear fuel cycle to identify solutions to some of the biggest questions in science for the benefit of all Australians.

ANSTO is also the home of Australian nuclear medicine production. ANSTO operates a Nuclear Medicine Manufacturing Facility for molybdenum-99 production (the world's most widely used nuclear medicine) and a Nuclear Medicine Production Facility, more commonly known as Building 23, for processing and distributing a range of nuclear medicine products to Australian clinics and hospitals, as well as to some international markets.

On average, each Australian will benefit from at least two nuclear medicine procedures during their lives[1]. Between 75 and 80 per cent of nuclear medicine isotopes used in Australia come from ANSTO's Lucas Heights campus in Sydney. On average, ANSTO's radioisotopes provide 10,000 to 12,000 nuclear medicine procedures that benefit Australians each week. Nuclear medicine imaging provides detailed physiological and molecular information to help diagnose cancers and to investigate other conditions in most organs and tissues in the body (for example, the heart, brain, lungs, bones, liver, kidneys, and thyroid).

2. Executive Summary

Radioactive waste is a by-product of nuclear medicine production and ANSTO's research and commercial activities. ANSTO is responsible for the safe interim storage and predisposal management of its radioactive waste at its Lucas Heights campus until the proposed National Radioactive Waste Management Facility (NRWMF) is operational. One such waste stream is intermediate level solid radioactive waste (ILSW).

ANSTO's existing facility to store ILSW is forecast to reach capacity from 2027 for certain waste streams. The NRWMF is unlikely to commence receiving waste until after 2030. Should it not be possible to store further ILSW, ANSTO will be required to cease nuclear medicine production, with significant consequences for Australia's healthcare system. An interim solution is therefore required for the storage of this waste.

This proposal is for the construction of a purpose-built facility to store ILSW on an interim basis. The facility has been fully funded by the Australian Government in the 2020-21 and 2021-22 Budgets[2], with the 2021-22 Budget providing $59.8 million to support the interim storage of intermediate level solid waste. The capital estimates for this facility are supported by a P80 cost estimate.

The remaining design, regulatory approval, and construction time for this facility is approximately five years, meaning it will be available to receive waste before existing storage capacity is exhausted; this is important in case there are any unforeseen delays in the program to deliver the facility. The proposed facility presented in this submission is the result of comprehensive options analysis and costing and development work to ensure that the waste capacity increase project is the most cost effective, suitable, and practical solution.

[1] Based on published Medicare statistics combined with non-MBS data sourced from the nuclear medicine community, http://medicarestatistics.humanservices.gov.au/statistics/mbs_group.jsp.
[2] See: https://www.industry.gov.au/sites/default/files/2021-05/2021-22-department-of-industry-science-energy-and-resources-pbs.pdf, p. 101.

3. Background, Purpose and Need for Works

3.1. Background

In making radiopharmaceutical products, ANSTO generates radioactive waste, which it is responsible for safely storing and managing prior to disposal. This waste is an unavoidable by-product of providing both domestic and international markets with life-saving nuclear medicines. ANSTO is Australia's recognised expert in radioactive waste management practices, and is responsible for approximately 40 per cent of Australia's low level waste (LLW) and most of Australia's intermediate level waste (ILW). ANSTO currently stores over 496 cubic metres of ILW from legacy activities, and generates an additional five cubic metres per annum. This will increase to approximately fourteen cubic metres per annum upon the commencement of operations of the new 'Synroc' waste treatment facility (see Public Works Committee Report 1/2013, the Australian Nuclear Science and Technology Organisation (ANSTO) Nuclear Medicine Project), which will convert some of ANSTO's intermediate level liquid waste (ILLW) from nuclear medicine production into a solid waste form.

ANSTO's waste is primarily stored at its Lucas Heights campus in New South Wales. Ultimately, radioactive waste from all of Australia's waste producers, including ANSTO, will be conditioned (packaging the waste in a form suitable for disposal) and then transported to the NRWMF. Low level waste will be disposed of at the NRWMF, while ILW will be temporarily stored at the same site until a final disposal pathway is provided. Importantly, the establishment of the NRWMF will bring Australia into line with internationally accepted best practice whereby all waste is managed in a centralised national facility. In the meantime, with over 60 years of expertise in safely managing nuclear material and its by-products, ANSTO is well equipped to ensure safe and secure interim storage of its wastes.

3.2. Purpose of Works

The purpose of the proposed new ILSW storage facility is to expand ANSTO's ILSW storage capacity by at least 10 years to 2037. ANSTO's existing facility for the interim storage of ILSW is forecast to reach capacity from 2027. The NRWMF is expected to be operational after 2030; therefore, this interim facility will bridge the gap (with some contingency) between the expiration of existing storage capacity and NRWMF operations. Increasing storage capacity for this period also allows time to design, receive approval for, and construct a facility to condition and pack the waste, which must be undertaken before it can be transferred to the NRWMF (further analysis of conditioning is provided below). The proposed facility will largely replicate the design and functionality of the existing waste storage facility, and will be situated near to the existing waste store to allow for operational efficiencies. This project involves the design, construction, commissioning, and licensing of the facility.

3.3. Need for the Works

Operating licences issued to ANSTO by the national nuclear safety regulator, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), are dependent on ANSTO being able to store and manage radioactive waste safely. Accordingly, without this interim storage capacity, ANSTO likely would need to cease or scale-back its reactor-based activities once existing storage is exhausted. This could include ceasing nuclear medicine production for both domestic patients and export until such time as the resulting waste can be safely stored. Continued safe and reliable radioactive waste management is also critical to ensuring the ongoing confidence of the broader community, and the Lucas Heights community more specifically.

In addition, ANSTO is in the final stages of constructing the 'Synroc' waste treatment facility for intermediate level liquid waste (ILLW), the output of which will be classified as ILSW. Without this interim facility in which to store the resulting ILSW, ANSTO would face a need for additional ILLW storage. As well as the costs involved in that option, a solid is obviously easier and safer to store than is a liquid. This interim facility is the safest and most cost-effective option to secure waste and to manage it safely until the longer-term management solution is available.

The proposed facility will be located at ANSTO's Lucas Heights campus in Southern Sydney where the waste is produced, minimising waste handling. ANSTO has the capabilities required to commission and oversee the construction of this facility and a track record of more than 60 years of safe and effective operation of storage facilities of this nature and management of existing waste of this type.

More broadly, ANSTO is taking steps to identify efficiencies in its waste management practices, including through waste characterisation to ascertain whether space can be 'freed up' in the existing storage facility. However, it is clear that sufficient space cannot be created in ANSTO's existing facilities and that additional storage is required until such time as the NRWMF is operational.

3.4. Public Value

The work of ANSTO is critical in the provision of life-saving radiopharmaceutical products to both domestic and international markets. There is clear public value in this project, which will secure ANSTO's ongoing capacity to deliver radiopharmaceuticals for Australian patients.

3.5. Revenue

This project will not directly deliver any revenue-generating assets or generate revenue because of its implementation. However, the works are required to sustain revenue-generating operations within ANSTO, such as the production and sale of radiopharmaceutical products.

4. Options Considered

4.1. Options Analysis

In Budget 2020-21, ANSTO received $3.7 million to undertake further detailed planning of interim management options for ILSW storage (amongst other things) to allow the Government to assess the most efficient and effective approach to the design and construction of new storage capacity. Five options have been carefully considered. Concept designs for Options one and two were completed and feasibility studies for Options three and four were also completed. Cost estimates were developed to inform the options analysis. The options considered and the reasons for the dismissal of the options other than option 2 are summarised below:

4.1.1. Option 1 - Waste Conditioning (Processing & Packaging) Facility with Interim Storage - $216 million

A novel facility with capability to condition and package ILSW ready for transport to the NRWMF. This option also provided the interim storage for this packaged waste required to bridge the forecast storage capacity shortfall.

This option, while providing the functionality to complete the conditioning and packaging of waste required for transport to the NRWMF, carried too high a technical risk. The main inputs into the design of such a conditioning facility will rely on Waste Acceptance Criteria (WAC) being finalised for the NRWMF by its operator, the Australian Radioactive Waste Agency. Currently, the WAC for the NRWMF are in a generic state. This is because a site for the facility has not been acquired, and the necessary licensing and approvals processes that would verify the WAC have not yet been undertaken. Without WAC, waste packaging requirements cannot be developed, which means that the design of a facility to condition waste appropriately for transport to, and storage at, the NRWMF cannot be undertaken.

4.1.2. Option 2 - Interim Storage Only Facility (Preferred Option) – overall project budget $59.8 million

A new facility designed as a modern equivalent of the existing ILSW storage facility. This provides a direct continuation of existing operations for storing waste in below-ground shielded vaults, with no processing capacity to make waste ready for transport to the NRWMF. Benefits of the low capital outlay, a proven design, and minimal organisational change at low business risk make this option preferred.

4.1.3. Option 3 - Above-Ground Storage in Shielded Casks - $162 million

Placement of waste into discrete shielded casks for above-ground storage would represent a departure from existing practice. This option initially promised the benefits of staged investments to mitigate the risk of providing too much storage. However, after undertaking a feasibility study, an additional specialised radiological containment facility was identified as being a necessary precursor to support the loading of the casks in a safe manner. This need for an additional facility made the option cost prohibitive and poor value for money; consequently, the option was discounted for further consideration.

4.1.4. Option 4 - Extension of Capacity of the Existing Storage Facility - $16 million

In the past, the existing facility has had its capacity increased by extending its portal frame and excavation to provide additional storage pits. On this basis, a further extension was considered. However, this would have required relocation of the ANSTO fence line into the surrounding buffer zone (with significant practical and regulatory implications), leading to unnecessary site expansion and environmental impact. If the fence had not been moved, feasibility studies showed a high risk that this solution would fail to provide sufficient storage capacity to bridge the gap between the expiration of existing storage capacity and NRWMF operations, and therefore was a high risk to security for ongoing operations. This option was not considered further.

4.1.5. Option 5 - Do Nothing

Do nothing was not considered feasible due to ANSTO's licence conditions, community and worker safety, and consequential risk to nuclear medicine production.

4.2. Justification of Adopted Proposal

In considering the options presented above, ANSTO judged the merit of the solutions based on a number of factors, including cost effectiveness, risk profile, public interest, and feasibility/buildability. Further to the information presented above, the following points outline the justification of Option 2 as the preferred solution.

Low Technical Risk
As a direct functional continuation of the existing storage methods, the design for this facility has already been proven in operations at Lucas Heights for many decades. This option presents a low risk of design delays from engineering problems compared to other options and a lower risk of poor implementation during construction.

Low Comparative Cost
In cost benefit analyses, this option provided the highest benefit for the capital outlay – it achieves the required minimum 10 years of storage for close to a third of the price of the next option considered.

Achievable Schedule
Without the novelty of the solutions to condition and package waste, or to attempt temporary above ground storage, this project can be delivered in a shorter period of time than the others considered.

Low Organisational Impact
This option, unlike others, requires no additional staffing for waste operations or maintenance within ANSTO as it presents a direct continuation of existing operations – i.e., it is a 'business as usual' solution.

5. Scope of Works

5.1. Introduction – Intermediate Level Solid Waste

There are two waste streams to be stored within the facility – both are classified as intermediate level solid wastes. The first waste stream are filter cups, which are used to remove solids from the radiopharmaceutical production process. These filter cups are closed before being placed inside a tube. This tube is then placed within another tube, which is placed within the outermost vessel. The assembly is then welded shut. These barriers ensure radiation safety for workers and members of the public.

The second waste stream comprises aluminium bins filled with wastes, such as glass vials and one-use pharmaceutical tubing from the production processes. Synroc cans, which will comprise a stable synthetic rock formation sealed within a metal can, will also be stored in these bins. These cans will be made when liquid waste is turned into solid waste at ANSTO's Synroc waste treatment facility, which is under construction. Both the filter cup storage vessels and the Synroc cans are individually sealed waste packages, which prevent release of radionuclides.

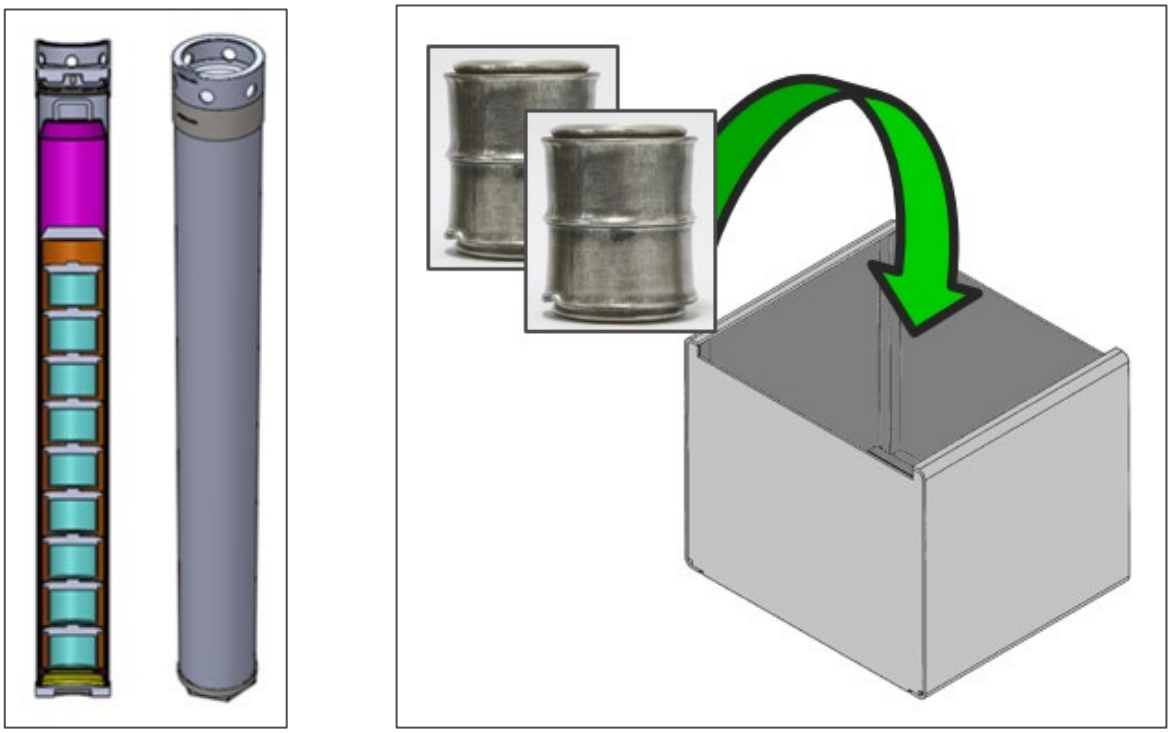

Figure 1 - Enclosed filter cups (above left) and Synroc Cans within aluminium bin (above right)

5.2. Design concept

The overarching design philosophy is to provide a simple, functionally driven solution for an interim storage-only facility. The facility will include:

- Secure below-ground concrete vault with radiation shielding and environmental monitoring
- Engineered structures for retrievable below-ground storage locations for the ILSW filter cup storage vessels and aluminium bins
- Secure above-ground superstructure including:
  - electric overhead travelling crane
  - active ventilation
  - information and operational technology connected to ANSTO's secure network
- Drive-through truck bay.

The facility is designed to store 10 years of ILSW at current forecast production rates of molybdenum-99. This storage capacity is designed to mitigate the capacity shortfall prior to the commencement of operation of the NRWMF and ANSTO's future conditioning of the ILSW into forms that meet the NRWMF's future Waste Acceptance Criteria. Additionally, the storage capacity will facilitate the future decommissioning of the existing ILSW facility (Building 27).

The Building Code of Australia description of the concept design is as follows:

Characteristic	Description
Classification	Class 7b (Storage)
Type of construction	Type B (due to floor area and volume)
Floor area and volume	1186m^2 area and 8048m^3 volume
Rise in storeys	One
Levels contained	Two
Fire compartments	One
Importance level	Level 4 (hazardous material storage)

5.2.1. Further Description

A steel portal frame structure with pre-cast concrete walls forms the superstructure of the facility, which is approximately 15 metres wide by 50 metres long and 10 metres tall. Inside, a series of approximately 10 metre-deep pits are lined with reinforced concrete and a shielding ceiling. In operation, plugs in the pit ceiling are removed by the facility's dedicated crane and the waste is lowered into the pit. The pits are designed so that the waste is easily recoverable for monitoring and future removal and conditioning. In addition to the plugs, which provide both shielding and security, there are a multitude of additional security measures in place inside the building, in the building structure, and across the broader site, which is under the constant protection of the Australian Federal Police. This design has been successfully implemented on the ANSTO site in the past, with the existing waste storage facility still successfully in operation.

Figure 2 – Concept Render of Preferred Option – Jacobs Group (Australia) Pty Ltd 2019

5.3. Site selection and integration with ANSTO site plan

A site selection study was performed to locate the proposed facility within the Waste Management Precinct at the ANSTO Lucas Heights campus. Options for the facility were considered as part of the upcoming ANSTO 2035 Master Plan Campus Renewal project; siting was subject to the constraint that the facility must be located within the ANSTO secure zone. It was preferable that the facility be located within the Waste Management Precinct, close to existing waste storage facilities, particularly Building 27 (the existing ILSW facility) and Building 93 (the interim waste store for reprocessed fuel), as well as to consider options for expansion should other nearby buildings come to the end of their lives.

Figure 3 – Site aerial photograph of potential sites

Two available sites were considered, as shown above, and scored according to the following criteria, with the rationale for Site A's selection also presented below:

Criteria (equal importance)	Rationale
Site utilisation efficiency	Facility shape suits Site A and also maximises efficiency of the footprint of future developments as nearby buildings come to end of life.
Suitability for process flow design	Site A is more conducive to the preferred linear arrangement, while Site B would require the facility to be designed in a less efficient "L" shape.
Bushfire exposure	Site A is not within the Flame Zone risk of any potential bushfire threat, whereas Site B is partially within the Flame Zone, which would require mitigating measures.
Expandability	Site B has a small advantage over Site A for potential future expansion.
Extent of site works required	Both sites are generally comparable regarding the site works required. Intermodal shipping containers currently stored at Site A need to be relocated prior to works commencing.
Truck access	Both sites are generally comparable regarding access for semi-trailers.
Car parking	Site A has existing space allocated to staff parking, whereas Site B would require demolition or place further pressure on parking availability within ANSTO.
Access to utilities	Site A is closer in proximity to existing utilities including sewer, water, communications, and power than Site B.

5.4. Facility Location

ANSTO is situated in the local government area of Sutherland Shire, approximately 35 kilometres south-west of Sydney's Central Business District. The site for the proposed facility is within ANSTO's 70-hectare site at Lucas Heights and is indicated in the figures below. The facility is located within the Waste Precinct and is in line with ANSTO's 2035 Master Plan Campus Renewal. ANSTO's Lucas Heights site is free-hold Commonwealth land. The site selected for the facility is a brownfield site that does not require clearing of native vegetation.

Figure 4 – Site Location within ANSTO's Waste Precinct

Figure 5 – ANSTO Site within Surrounding Buffer Zone

5.5. Materials Handling

The materials handling flow of the proposed facility follows the same design philosophy as the existing ILSW storage facility, Building 27. ILSW is delivered to the facility in storage vessels held within transport flasks on a semi-trailer vehicle. The transport flasks are then off-loaded in the truck bay by an overhead crane and moved to a designated storage location within the facility. The transport flask is operated to lower the storage vessel into the below-ground concrete-lined storage vault. The empty transport flask is then returned to the truck using the overhead crane and transported from the facility.

5.6. Structural and Civil

The proposed concept structural design is a steel portal-framed building superstructure, with a fully braced roof and end bays supported on concrete piled footings. The building exterior will be clad in precast concrete panels and lightweight steel. The roof will be clad with steel sheeting, while the ground floor is to be constructed of reinforced concrete. Within the building will be sub-floor in-situ concrete storage vaults in over-excavated rock, supported directly on rock. Rock walls are to be over-excavated away from the basement walls with sufficiently sized spoon drains around the full perimeter of the basement with falls to soak-away pits. An agricultural drain network is to be provided below all basement slabs leading to soak-away pits with waterproof membranes provided below all basement and ground floor bearing slabs.

The external materiality of the facility is to be of the same design principles as other more recently constructed buildings within the Waste Management Precinct (see for example the ANSTO Waste Management Facilities Extension and Upgrade submission to the Public Works Committee in 2015[3]).

From geotechnical investigations at the site, rock is typically encountered within one metre of the existing ground level. The structures will typically be supported directly on rock, depending on the depth of the footing.

Specific design requirements for the facility will be to meet the design loads of the thick concrete radiation shielding, the 12 tonne steel and lead transport flasks, and sufficient vault size to meet the storage capacities.

The engineered structures for both ILSW waste streams will be based on the existing designs from Building 27. The steel frames for the aluminium bins and sealed steel tubing for the filter cup storage vessels allow for retrieval necessary for ongoing quality audits and inspections, including by International Atomic Energy Agency safeguards inspectors, and future conditioning.

Civil engineering works for the facility will include roadworks to support the maximum vehicle size of a 19 metre semi-trailer for passage through the building via a truck bay. Additional works will include new kerbs along the adjacent road (Dalton Avenue), footpaths, parking, and stormwater management.

5.7. Mechanical, Electrical and Monitoring

Mechanical services within the proposed facility will include:

- A dangerous goods-rated crane rated to lift the ILSW transport flasks
- Active ventilation system, stack, and stack monitoring system to ventilate via cascaded pressure differentials for contamination control of any off-gas products produced in the below ground storage vaults. The system will be comprised of HEPA and carbon filter banks and exhaust fans.

Additional monitoring within the proposed facility for safety and security of material will include:

- Radiation monitors
- Moisture detection monitors.

The project will include provisions for kiosk transformers and associated power infrastructure upgrades to provide supply to the facility. The facility will additionally include backup electrical supply via generators. Low voltage distribution will support the mechanical services, luminaries, and ICT systems.

[3] https://www.aph.gov.au/Parliamentary_Business/Committees/Joint/Public_Works/ANSTO_Upgrade

5.8. Hydraulics

The hydraulics design for the facility includes the following services:

- Sub-soil drainage for the waste vault
- Domestic potable water (cold)
- Fire hydrant and hose reel systems
- Sanitary plumbing and drainage services
- Roof water draining system connecting to civil stormwater infrastructure.

All sanitary and trade waste plumbing and drainage systems shall be designed in accordance with the requirements of the AS3500 standard for Plumbing and Drainage and Sydney Water requirements.

Trade waste drainage is to be provided to safety shower and eye wash stations if they are assessed as required. The trade waste drainage is to be collected and drained to existing B-line active waste drainage via a holding pit for testing. An isolation valve is to be provided at the holding test pit before discharging to the B-Line active waste drainage.

ANSTO will be required to divert the B-line active trade waste drainage plumbing around the site during site preparation.

The rainwater collection system will interconnect with the proposed civil stormwater system and shall be designed in accordance with the Australia Rainfall and Runoff (ARR) guidelines and ANSTO Building Code, assuming a 1 in 100 year storm event.

5.9. Fire Protection

The scope of the proposed fire services within the proposed facility includes:

- Automatic Fire Detection and Alarm System (FDAS)
- Occupant warning system
- Portable hand-held fire extinguishers
- Fire hydrant system
- Fire hose reels.

The FDAS shall be a cost-effective, reliable, networked system connected to the existing fire alarm network on site and connected to the ANSTO Security Operations Centre.

The facility is to be designed and constructed in accordance with the ANSTO Building Code, the National Construction Code, and ASIO Technical Note 1/15, as well as the NSW regulations (Environmental Planning and Assessment Regulations) incorporating the Planning for Bushfire Protection (PBP) 2019, and AS 3959, Construction of buildings in bushfire-prone areas.

A bushfire opportunities and constraints report has been prepared against the concept design of the facility. The proposed location of the facility is supported by the ANSTO site-wide bushfire protection measures; however, due to its proximity to the perimeter fence, a small segment of Site A is affected by a Bushfire Attack Level-40 (BAL-40); the remainder of the site is at BAL-29.

5.10. Safety in Design

The proposed facility will meet the requirements of the ANSTO Building Code and the National Construction Code for Safety in Design, including the development and maintenance of risk management plans and hazard registers and formal Construction Hazard Assessment and Implication Reviews at major milestones within the design development and construction phases.

In addition to these processes, the facility is subject to the requirements of the ANSTO Enterprise Risk Management System, which ensures independent design reviews by the Systems, Safety and Reliability team and the Safety and Reliability Assurance team. These two independent bodies within ANSTO provide technical risk assessment support to the project team in assessing risks at all stages of the project.

For nuclear-specific risks, ANSTO's radiation protection services and nuclear analysis teams provide independent analysis and advice.

Assessment of the proposed facility for Work Health and Safety (WHS) related hazards is split into the construction phase and the operational phase. The Principal Contractor will be responsible for construction-related hazards, working within the requirements of the ANSTO Building Code and state and federal regulations. During operation, the development of operational procedures will be the responsibility of ANSTO Waste Management Services, and individual procedures will be subject to independent assessment by the Safety and Reliability Assurance team, which includes representatives from ANSTO WHS.

5.11. Environmental Sustainability

ANSTO maintains an Environmental Management System for environmental planning and management. This system is independently certified to the AS/NZS ISO 14001 Standard for Environmental Management Systems and is subject to internal and external audits to verify compliance with the external standard and internal requirements. All principal contractors for major projects at ANSTO also are certified to ISO14001.

Activities of Commonwealth organisations must be in accordance with the principles of Ecologically Sustainable Development (ESD) under the *Environment Protection and Biodiversity Conversation Act 1999*. There is an ESD consultant within the project team for the future phases of the facility's development. Furthermore, ANSTO's Building Code stipulates NABERS (National Australian Built Environment Rating System) rating requirements for new designs.

ANSTO's Work Health Safety and Environment Policy includes the following statement:

> *We are committed to effective stewardship, the sustainability of our operations and to responsibly interact with the local ecology and biosphere, and to protect it. We will minimise our environmental footprint through the sustainable use of resources and by the prevention, minimisation and control of pollution.*

Before commencing work on the proposed facility, ANSTO will prepare a Project/Construction Environmental Management Plan, which will consider the potential impact and mitigation measures to the natural environment, native fauna populations, and native flora.

5.12. Security Measures

ANSTO has a responsibility to protect its information, intellectual property, assets, operations, and nuclear and radiological materials and facilities. This includes the responsibility to meet recognised international standards for the physical protection of its nuclear and radiological materials and facilities against theft, diversion, sabotage, or terrorism.

A Security Plan has been developed to specify protective measures to meet the identified threats to the security of the proposed facility. Key objectives are:

- To maintain a secure work-site protected from unauthorised entry
- To implement a system for the appropriate vetting and supervision of workers and visitors
- To effectively classify and control access to documents
- To continuously review threats and implement counter-measures throughout the various stages of construction.

The Security Plan demonstrates ANSTO's commitment to establish appropriate measures and procedures to achieve the objectives stated in the Australian Government's Protective Security Policy Framework, the *Australian Radiation Protection and Nuclear Safety Act 1998*, ARPANSA regulatory guidelines relating to the review of plans and arrangements, and permits issued to ANSTO by the Australian Safeguards and Non-proliferation Office under section 13 of the *Nuclear Non-Proliferation (Safeguards) Act 1987*.

ANSTO maintains a scalable protective security system and can implement additional precautions to address an increased threat level.

The security procedures at the proposed facility are designed to protect the assets and also to help with the protection of people from exposure to hazards. There will be no radioactive material or radiation (other than normal background) in the siting and construction phases except for calibration sources, which may be required to commission area radiation monitors after construction is completed.

The security-related design features of the facility will be supported by Australian Government Security Construction and Equipment Committee (SCEC) certified consultants.

Once constructed, the facility will be protected by the same modern surveillance systems as are employed across the rest of ANSTO and will be monitored continuously on site by Australian Federal Police Protective Services officers.

5.13. Associated plans and drawings

To meet the security requirements described in section 5.12, plans and drawings have been provided in the Confidential Submission.

5.14. Additional provisions

This project is seeking exemption for compliance with the *Disability Discrimination Act*, as the proposed development is an industrial workplace and staff need to be able-bodied to carry out operational functions. The requirement for the tasks performed in these areas could include working using PPE, manual handling of heavy and bulky equipment, using cranes and robotics to lift and move items, and operating forklifts.

Landscaping and schedule of plants have not been completed at the current stage of design; however, the costs to do so have been included. There are no ‘below the line’ items. The entirety of the project scope is noted within this referral and funded in full.

ANSTO’s existence and functions to produce radioisotopes for medicine, and to manage and store radioactive waste from its activities, are legislated within the *Australian Nuclear Science and Technology Organisation Act 1987*.

6. Schedule & Budget

6.1. Schedule & Delivery Method

The project is constrained in schedule both by regulatory approval processes and by the required completion date. As shown in the executive schedule summary below, work cannot begin to construct the facility until a construction licence is approved by ARPANSA. The project is scheduled to be completed, including receipt of an ARPANSA operating licence and commissioning, by May 2026, which is ahead of the current forecast expiration of waste storage capacity.

The overall project schedule is summarised in the figure below, with the table following providing further information and milestones. The phases are in line with ANSTO’s Project Management Lifecycle Framework and are aligned closely to standard stages of a project implemented in the ‘waterfall’ style.

Phase	FY22				FY23				FY24				FY25				FY26			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Set-Up																				
Procure																				
Design																				
Construct																				
Commission																				
Close-Out																				
Licensing																				

Figure 6 – Executive Schedule Summary

Description of Project Phase Works	Milestones	Dates
Set-Up • Develop project governance documentation; e.g. Project Management Plan, Quality Management Plan, and Risk Management Plan • Assign Executive sponsor and formally charter project • Resource/staff project team • Define stage gates and committees for critical status reviews	• Internal release of funding through ANSTO governance procedures • Establishment of a project team • Completion and sign-off of all project establishment documentation, plans, and arrangements	June 2021 - Dec. 2021
Procure • Develop contracts and approach to market • Subject to PWC approval, tender for detailed design and construction of the facility • Award a principal contractor	• Approach to market let on AusTender • Contract with principal contractor signed	June 2021 - March 2022
Design • Complete the design of the facility • Design reviews by technical authorities • Hold point – await regulatory approval to construct (critical path)	• Preliminary Design Review • Detailed Design Review	March 2022 - Feb.2023
Construct • Establish site • Excavate pits • Build concrete bunkers for waste • Construct steel frames and attach concrete panels for superstructure • Complete installation of crane and pit lids • Mechanical and electrical/control fit-out for active ventilation and security features	• Site established and owned by principal contractor • Excavations complete • Waterproof superstructure achieved • Internal bunker completion • Completion of fit-out	Jan 2024 - Aug. 2025
Commission • Test all installed systems for safe operation against functional intent and design specifications • Hold point – await regulatory approval to begin operating	• Pre-commissioning • Cold commissioning • Hot commissioning	Jun. 2025 - Oct. 2025
Close-Out • Provide post-implementation reports • Collate and archive project records • Defects monitoring and rectification	• Pass project audits • Project feedback and post-implementation review	Jan. 2026 - Mar. 2026
Licensing • Prepare and submit regulatory licence applications for the facility at various levels of maturity in design	• Obtain Siting Licence • Obtain Construction Licence • Obtain Operating Licence	Jun. 2021 - Dec. 2025

6.2. Budget

The Budget for the overall project is $59.8 million, which includes the construction costs for the facility as well as regulatory, commissioning, and contingency costs.

Detailed budgetary line items are provided in ANSTO's confidential submission for this referral to ensure a cost effective and competitive procurement process for the construction of the facility.

7. Project Execution Considerations

7.1. ANSTO Stakeholder and Community Consultation

ANSTO has strong relationships with its external stakeholders, including the local council, local members of the NSW Parliament, as well as the local community of Lucas Heights, where ANSTO is one of the major employers. ANSTO is in continuous communication with local representatives and community interest groups about works on site. Communication regarding this project will be no different and it will also be subject to public input during each licensing submission period after lodgement with ARPANSA. In this regard, ANSTO has specifically briefed the offices of the NSW Members of Parliament, whose electorates incorporate ANSTO (Holsworthy) or are adjacent to ANSTO (Heathcote), and the Mayor of the Sutherland Shire Council regarding this project.

Regulators of interest for this facility, include ARPANSA and the Australian Safeguards and Non-proliferation Office (ASNO). ANSTO has already engaged with ARPANSA and ASNO, and the Department of Agriculture, Water and the Environment ahead of referral of the works under the *Environment Protection and Biodiversity Conservation Act*.

In addition, given the close links of the project drivers to the date of delivery of the NRWMF, ANSTO has liaised closely with the Australian Radioactive Waste Agency about the progress of the NRWMF project.

Plans for the proposed facility have been developed with extensive consultation across ANSTO. Internal stakeholders who have reviewed plans and arrangements include the following ANSTO representatives:

- Site technicians and operators of the existing facility
- Work Health and Safety team
- Systems Safety and Reliability team
- Environment monitoring group
- Procurement team
- Safety and Reliability Assurance
- Security and Safeguards team
- Waste Management Services
- ANSTO Maintenance and Engineering
- Government and International Affairs
- Finance and Operational Services
- Radiation Protection Advisors
- The Office of the CEO
- The ANSTO Board

7.2. Environmental and Heritage Considerations

Construction of the proposed facility will occur within the Lucas Heights perimeter and result in short term, localised, small-scale impact to soils, air quality, flora and fauna, noise, visual amenity, and landscape. Management protocols by the principal contractor will restrict any impact on surface runoff and erosion and mitigate any other environmental effects in line with dedicated construction and environmental impact management plans.

In operation, the facility is designed not to release material to the environment. Significant and proven mitigation measures have been included in the design to prevent water ingress into the below ground storage vaults. Furthermore, an active ventilation system will ensure that any airborne contamination is captured in high efficiency particulate filters. The design is based directly on an existing facility, which has been in operation for over 50 years.

ANSTO is subject to restrictions on environmental discharges by ARPANSA for each licensed facility, by the Department of Agriculture, Water and the Environment, as well as the Sydney Water Corporation. Risk assessments conducted on the facility design have concluded that there will be no significant releases to the environment as result of this facility. ANSTO will continue to monitor existing wells in place for ground water contamination and complete baseline site radiological studies of soils. Furthermore, any trees removed by the project are required to be replanted in equivalency in line with ANSTO's Building Code.

There are no heritage considerations for the project. The site is a brown field site and no heritage listed buildings are in the area.

7.3. Quality Assurance

All procurements associated with this investment will be in line with Commonwealth Procurement Guidelines, as well as ANSTO's internal procurement policies. The construction, commissioning, and operation of the facility will be undertaken to meet the requirements of the ISO 9000 family of quality management standards and ISO 14001: Environmental Management System. The buildings will also comply with the Building Code of Australia and the ANSTO Building Code.

7.4. Community Impacts

It is expected that this project will have no impact upon the local community. The facility is of the same design as the existing facility on site at Lucas Heights, and operations will not affect the community any differently than existing practices that are undertaken within the ANSTO buffer zone.

Given the isolated location of the ANSTO site at Lucas Heights, there will be minimal disruption to the local community in surrounding suburbs (Menai-Heathcote) both during the construction period and post-construction. ANSTO does not anticipate large numbers of truck movements during the construction phase. There will be no increase to radiation levels at ANSTO or the surrounding suburbs. All works will remain within the existing site boundaries which, in turn, are within the existing designated buffer zone for the site.

Building projects of this nature provide employment opportunities from which the local community can benefit. While no additional staff are required to operate the facility, there are significant contracted work packages required to be completed and a need for skilled construction workers. The project will also provide a positive economic benefit to small businesses in the Sutherland Shire and adjoining regions.

Construction activity is expected to be conducted between 7.00 a.m. and 5.00 p.m. Monday through Friday and will be in line with local regulations and requirements. The Principal Contractor will be required to provide traffic, environment, and site management plans for approval by ANSTO. However, given the buffer zone that surrounds ANSTO, any noise is unlikely to travel to, and be heard by, neighbours.

Broader public value is delivered by this project, as it allows continued production of radiopharmaceutical products at ANSTO, and two in three Australians will benefit from the use of these products in their lifetime.

7.5. Management of Project Responsibilities and Resources

The project will be governed under ANSTO's Project Management Policy and supported by the ANSTO Capital Program Management Office.

ANSTO's Maintenance and Engineering division will be responsible for the overall management of the project. A principal contractor is to be procured in accordance with the Commonwealth Procurement Rules to be responsible for the detail design and construction of the facility.

Once the facility is commissioned, operation of the facility will be the responsibility of ANSTO's Waste Management Services team. Decommissioning plans are developed throughout the development process and maintained during the life of the facility.

7.6. Nuclear Considerations

The facility will be licensed as a nuclear installation. As such, ANSTO will seek regulatory approval from ARPANSA three times: first, prior to establishing the site; second, before beginning construction; and third, before commencing operations to store waste. Proposals for any future modifications and/or new construction associated with the facility would require the approval of ANSTO's Safety and Reliability Assurance team and, if significant, of ARPANSA.

ANSTO will also provide appropriate submissions and notifications to the Australian Safeguards and Non-proliferation Office. The new facility will be licensed as a new associated facility with ASNO.

The waste will be stored in engineered, shielded storage pits within the facility with conventional concrete shielding walls. Radiation measurements at the exterior surfaces of the building will be within safe limits and all design elements will be in line with the As Low as Reasonably Practical (ALARP) principle. The pits will be isolated from the water table, with the added assurance of routine water table sampling by the ANSTO environmental monitoring team. The waste will be retrievable for eventual conditioning and subsequent storage at the NRWMF and for randomised inspection and sampling by regulatory authorities and international safeguards inspectors.

7.7. Risk Assessment

The project is subject to the risk management processes of ANSTO. It is ANSTO policy that all major projects assess risks, identify risk owners, and develop action plans to mitigate identified risks. Risks for this project are also assessed for their potential impact on budget, schedule, and performance. Risks are discussed on a regular basis at ANSTO project management meetings, and the ANSTO Capital Committee has an oversight role on ANSTO risk management. The Risk and Audit Committee also provides risk governance.

The Systems Safety and Reliability team and the Safety and Reliability Assurance team within ANSTO provide independent oversight of all safety and environmental risks and work to support ANSTO's Maintenance and Engineering project team.

The two main risks within this project are as follows:

- Project delay: if significant, this would result in:
  - ceasing or scaling-back of reactor-based activities once existing storage is exhausted - importantly, the supply of radiopharmaceuticals to the Australian market; and
  - Reputational damage to ANSTO.
- Standard commercial and contractual issues in the procurement, design, and construction of the facility, leading to cost excursions and/or project delays.

Further information on risk and its mitigation can be found within the confidential submission. However, it should be noted for the public interest that the design and environmental risks of this project are low. The proposed facility is based on an existing design, which has been safely operating on site at Lucas Heights for decades. Modern control measures and construction techniques will make the new facility even safer and more robust than the existing proven design upon which it is based.

End of Document