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SOUTHERN HIGHLANDS REGIONAL SHOOTING COMPLEX

Operational Environmental Management Plan

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CONTACT

JASON LAGOWSKI
Technical Director

T 02 8907 9000
M 0439 143 424
E Jason.lagowski@arcadis.com

Arcadis
Level 16, 850 George Street,
Sydney, NSW, 2000

OFFICE OF SPORT SOUTHERN HIGHLANDS REGIONAL SHOOTING COMPLEX (SHRSC)

Operational Environmental Management Plan (OEMP)

Author	Heather Tilley	
Checker	Jason Lagowski	
Approver	Brad Searle	
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REVISIONS

Revision	Date	Description	Prepared by	Approved by
-	01/02/2016	First draft issue	SB	BS/JL
1	20/05/2016	Updated draft issue	SB	JL
2	20/06/2016	Draft updated to include 800 metre range	SB	JL
3	04/09/2016	Final OEMP including independent review comments	SB	JL
4	22/12/2016	Revision based on WaterNSW comments	KL	JL
5	21/09/2018	Updated to include Mod 5 conditions, and revised WCMP, BMP, EP	HT	BS
6	06/12/2018	Updated following DP&E, WaterNSW, EPA review	HT	BS
7	28/03/2019	Update following DP&E Approval of OEMP and FAR Range Licence Issue	PL	RG

ACRONYMS AND DEFINITIONS

Acronym / Term	Meaning
ANZECC	Australian and New Zealand Environment Conservation Council
BMP	Bushfire Management Plan
The Complex	Southern Highlands Shooting Range Complex including the 50 metre, 500 metre and 800 metre ranges, and future additional ranges (200 metre range, shotgun range, indoor air range and clubhouse)
DECC (NSW)	Department of Environment and Climate Change (now OEH)
DECCW (NSW)	Department of Environment, Climate Change and Water (now OEH)
DP&E	Department of Planning and Environment
EILs	Ecological Investigation Levels
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Agency
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GILs	Ground Water Investigation Levels
HILs	Health Investigation Level
ITRC	Interstate Technology & Regulatory Council
LEP	Local environment plan
LGA	Local Government Council
NEPM	National Environment Protection Measure
NPWS	National Parks and Wildlife Services
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OOS	Office of Sport
PPE	Personal protection equipment
The Site	Hill Top Rifle Range
SHRSC	Southern Highlands Shooting Range Complex
SWMP	Soil and Water Management Plan
SWMS	Safe Work Method Statement
WCMP	Water Cycle Management Plan
WSC	Wingecarribee Shire Council

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1 INTRODUCTION

1.1 Background

The Southern Highlands Regional Shooting Complex (SHRSC) at Hill Top (the Site) is a long-standing commitment to the sport of shooting by the NSW Government. It was first approved in 2010 to secure long-term tenure for shooting clubs impacted by urban encroachment in the Illawarra and Southern Highlands Region. It involves the transfer of more than 2800 hectares of land to the State's National Park and Reserve system under an 'off-set' package as shooting clubs merge and relinquish their home ranges.

The SHRSC currently provides access to three outdoor ranges (50 metre, 500 metre and 800 metre ranges). Future additional ranges (200 metre range, shotgun range, indoor air range and clubhouse) are permitted in terms of the Minister's Conditions of Approval.

The 800 metre range was approved by Wingecarribee Shire Council (WSC) in 1986 and has been operational since 1987. The range was managed by the Southern Highlands Rifle Club until 15 February 2007, when the Southern Highlands Regional Shooting Complex Inc (SHRSC Inc), took over the day-to-day management.

Construction of the 50 metre and 500 metre ranges was approved by the then NSW Department of Planning (now Department of Planning and Environment) on 1 March 2010 (Major Project Number 06-0232). Construction commenced in October 2010, but was halted in April 2012, after the Firearms Registry advised that various aspects of the initial design were not compliant.

Arcadis (formerly Hyder Consulting) was engaged by DStudio Architects on behalf of the Office of Sport (OOS) to review the previous civil design of the 50 metre, 500 metre and 800 metre shooting ranges and associated drainage structures, to assess the constructed civil works against the previous design and to identify elements of design and construction that require further revisions for future works. Construction of these ranges was completed in early 2019 with operations commencing soon thereafter.

Arcadis has prepared an Operational Environmental Management Plan (OEMP) (the Plan) on behalf of the Office of Sport, to comply with the Conditions of Approval. The OEMP has been developed to ensure the long-term sustainability of the services the SHRSC provides.

The SHRSC aims to:

- Provide well managed shooting ranges catering for rifle, pistol, shotgun and air-range disciplines that meet the needs of participating clubs in the Illawarra and Southern Highlands Region;
- Ensure that all operational activities at the ranges are conducted in a manner consistent with the licence terms, Conditions of Approval and the various environmental management plans; and
- Ensure that access to/from and use of the site is conducted in a manner that does not unduly impact on the amenity of Hill Top and surrounding communities.

1.2 OEMP Purpose

The OEMP has been developed to address the Conditions of Approval (MP 06_0232) as modified, which requires the preparation of an OEMP in consultation with the Environmental Protection Agency (EPA) and to the satisfaction of the Secretary of Department of Planning and Environment (DP&E) prior to the commencement of the use of the new ranges.

The OEMP identifies the operational environmental management measures that will be applied to operation of the SHRSC to manage identified environmental risks. The specific requirements prescribed in the Environmental Assessment, Submissions Report, and the revised Statement of Commitments have also been considered. This OEMP is specific to the 50 metre, 500 metre and 800 metre ranges.

1.3 OEMP Objectives

The main objectives of the OEMP is to:

- Provide a management framework for the SHRSC that aims to manage potential operational impacts on the environment. It includes practical mitigations strategies for managing key environmental impacts, a system of monitoring, reporting and auditing, and a process for implementation of corrective action;
- Identify the relevant environmental legal and other regulatory requirements applicable to the operation of the SHRSC;
- Establish and define environmental roles and responsibilities;
- Assign responsibility for the implementation, management, and review process of the OEMP;
- Provides all operational personnel with sufficient information to undertake their activities at the SHRSC;
- Ensure all operation staff are made aware of the potential impacts on the environment resulting from the operation of the SHRSC, and the associated management strategies to ensure compliance with legal and other relevant environmental requirements, and
- Outlines the operational commitments of the environmental assessment process which are to be implemented on-site.

1.4 Structure of this Plan

Section 1	Provides the background to the development and operation of the Complex.
Section 2	Provides the general operational details of the SHRSC such as operating times, safety requirements and access arrangements.
Section 3	Outlines the statutory requirements including relevant legislation, guidelines, compliance requirements and relevant Plans and sub-Plans for the SHRSC.
Section 4	Describes the general management practices which would be applied at the SHRSC. This includes the roles and responsibilities, complaint management and emergency and incident management and procedures,
Section 5	Describes the management measure which will be implemented to avoid and minimise any potential environmental impacts.
Section 6	This Section provides monitoring requirements, including inspections and auditing and the review procedure of this Plan to ensure its ongoing effectiveness.
Appendix A	The Bushfire Management Plan provides guidance on prevention of bushfires at the SHRSC site.
Appendix B	The Emergency Evacuation Procedure Plan describes the evacuation procedure in the unlikely event of an emergency occurring at the SHRSC site.
Appendix C	Provides various forms to assist with environmental and safety management on the site.
Appendix D	Detailed drawings of the stormwater structures at the ranges.
Appendix E	Describes the existing environment for the SHRSC and the surrounding area.
Appendix F	Describes the good management practices that can be implemented on the site to minimise environmental impacts.
Appendix G	Provides for the procedure to follow in the event there is an unexpected contamination find.

2 SHRSC OPERATIONS

2.1 SHRSC Regional Context

The SHRSC is within the Wingecarribee Local Government Area (LGA) near the village of Hill Top, approximately 11 kilometres north of the town of Mittagong and approximately 110 kilometres southwest of Sydney. Mittagong is located within the Southern Highlands of New South Wales at the southwestern extent of the Greater Sydney Region.

The Bargo State Conservation Area surrounds the northern, eastern, and southern boundaries of the SHRSC boundary. The Nattai National Park, which forms part of the greater Blue Mountains World Heritage Area, adjoins the western boundary of the site. The Wattle Ridge pastoral property adjoins the north-western corner of the boundary, and a cleared TransGrid electricity easement runs along the eastern boundary.

See **Figure 2-1** for the regional context.

2.1.1 Land Use and Ownership

The Southern Highlands Rifle Club leased the land occupied by the 800 metre Hill Top Rifle Range from the National Parks and Wildlife Services (NPWS) in 1987 and managed the range until 15 February 2007, after which SHRSC Inc took over the day-to-day management. On 1 October 2017, the Office of Sport took over the management of the range and commenced operations as the Southern Highlands Regional Shooting Complex (SHRSC).

An area of 1,036 hectares (Lot 100 DP 1088254) was excised from the Bargo State Conservation Area under the *National Parks and Wildlife (Adjustment of Areas) Act 2006*. This land has been vested to the Minister administering the *Sporting Venues Authorities Act 2008* (currently the Minister for Sport) and has been added to Schedule 1 of that Act as land owned by the Minister. The Office of Sport represents the interest of the Minister for the SHRSC.

The SHRSC occupies approximately 16 hectares of Lot 100 DP 1088254. The area occupied by the range and associated facilities was cleared in accordance with the Conditions of Approval. The remaining 1,020 ha has been retained in its existing condition as a vegetation buffer zone and also acts as a safety zone for the SHRSC.

2.1.2 Offsets agreements

Under the offset arrangements, a total of 2,831 hectares of land was added to the State reserve system to compensate for the excised 1,036 hectares. This represents a net gain of 1,795 hectares of high conservation land.

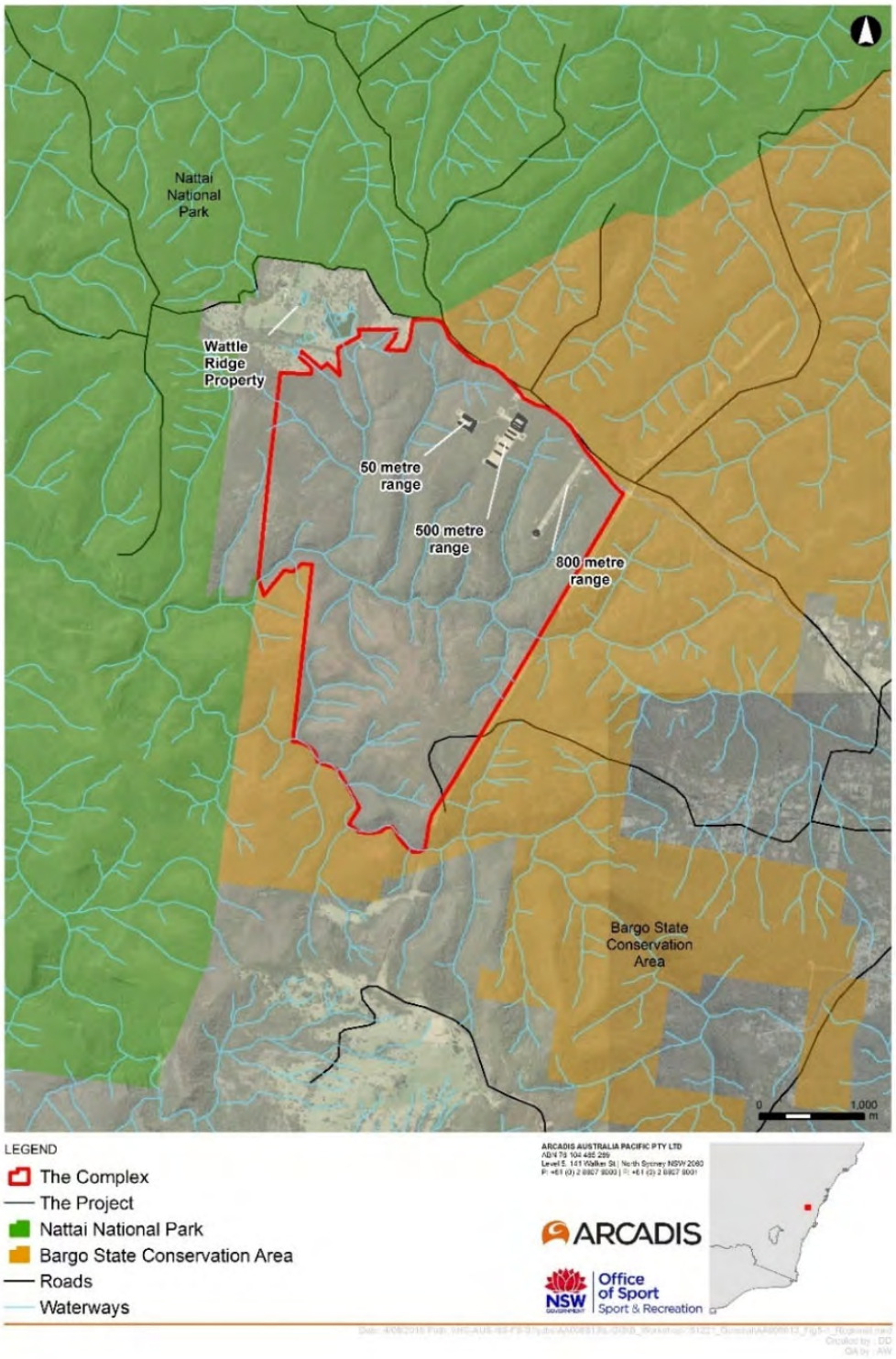


Figure 2-1: Regional Context of the SHRSC site

2.2 Site Description

Figure 2-2 shows the locations of the 800 metre, 500 metre and 50 metre ranges within Lot 100 DP 1088254. All three ranges are located within dense native bushland approximately 6 kilometres northwest of the Hill Top Village Centre. They are all accessible via the unsealed Wattle Ridge Road.

The following sections provide more detail on the facilities available and the main design features of each of the ranges. Section 3 of the Environmental Assessment – Volume 1 (GHD, February 2008) (EA) describes the existing environmental features at the SHRSC.

2.2.1 800 metre range

The 800 metre range comprises a seven-target rifle range 800 metres long, with firing mounds at 100 metre intervals. **Table 2-1** details the design of, and facilities at, the 800 metre range.

Additional information relating to the Best Practice design is provided in **Appendix F**.

Table 2-1: 800 metre range facilities and design

Area	800 metre range description
General facilities	• Covered firing point • Small clubhouse • Toilet facilities
Carpark	• Informal car parking is available
Range surface	• The range is graded in a concave manner with the firing points elevated to maintain a common line of fire from all distances. • The surface is vegetated with a well-established mix of local native grass regrowth. • The range area borders directly to dense native bushland
Stop butts	• The stopbutt has an overall height of 4.95 metres and a forward face angle of 35°. • A 300 mm thick layer of loose gravel (19 mm) surface has been applied to the lower 2.5 metres of the forward face. • A 300 mm thick stabilised sand and fine gravel surface has been applied to the remaining upper face area. • Subsoil drains at the base of the gravel layer and across the front of the stopbutt drain rainwater through a lime treatment train.
Subsoil drains	• Subsoil drains traverse the mantlet and gallery areas in front of the stopbutt draining seepage through a lime treatment train.
Sediment basins	• N/A
Drainage swales	• N/A
Safety	• Red flags are displayed at the entry of the range and on the range when it is in operation. • There are warning signs at the entry, on perimeter fences and at potential unofficial entry points.

2.2.2 500 metre range

Table 2-2: 500 metre range facilities and design

Area	500 metre range
General facilities	• Covered firing point • Utilities include water tanks, generator and solar power system • Control room • Toilets, waste water septic system
Carpark	• Existing surface is in good condition and has been recently extended. • Some informal car parking is available adjacent the site entry
Range surface	• The range is graded in a concave manner with the lowest point being between the 50 metre and 100 metre target distances. • The surface has been seeded with a mix of local native grasses. • The range area borders directly to dense native bushland.
Stop butts	• The stopbutt has an overall height of 4.3 metres and a forward face angle of 35° • A 300mm thick loose gravel (19 mm) gravel has been applied to the lower 2.5 metres of the forward face. • A 300 mm thick stabilised sand and fine gravel surface has been applied to the remaining upper face area. • Subsoil drains at the base of the gravel layer and across the front of the stopbutt drain rainwater through a lime treatment train.
Sediment basins	• The range drains to three sediment basins each with a perimeter security fence. These were constructed to capture sediment runoff during the initial construction phase, but have been retained as water quality ponds which also provide a water source for range irrigation. • The basins are in good condition with no visible signs of erosion. • Rip rap scour protection is located at the inlets and outlets.
Drainage swales	• Trapezoidal swales are located around the western, eastern, and southern sides of the range. • The western and eastern swales divert dirty water to the sediment basins and the southern swales divert clean water toward the bushland.
Subsoil drains	• Subsoil drains traverse the range behind each intermediate target mound draining seepage through a lime treatment train.
Safety	• Red flags are displayed at the entry of the range and on the range when it is in operation. • There are warning signs at the entry, on perimeter fences and at potential unofficial entry points.

2.2.3 50 metre range

Table 2-3: 50 metre range facilities and design

Area	50 metre range
General facilities	• Covered firing point • Utilities include water tanks, generator and solar power system • Control room • Toilets, waste water septic system
Carpark	• Existing surface is generally flat and has been recently constructed
Range surface	• The range is longitudinally graded toward the stopbutt.

Area	50 metre range
	• A loose gravel surface has been applied to aid a subsurface rainwater drainage system. • The sides of the range areas are walled with precast concrete panels.
Stop butts	• The stopbutt has an overall height of 4.3 m and a forward face angle of 35 degrees. • A loose 19mm gravel surface 300mm thick has been applied to the lower 2.5m of the forward face. A stabilised sand and fine gravel surface 300mm thick has been applied to the remaining upper face area. • Subsoil drains at the base of the gravel layer and across the front of the stopbutt drain rainwater through a lime treatment train.
Sediment basins	• The range drains to one sediment basin on western side of range with a perimeter security fence. • The basin is in good condition with no visible signs of erosion. Rip rap scour protection at inlets and outlets. • The basin was constructed to capture sediment runoff during the initial construction phase, but has been retained as water quality ponds which also provide a water source for range irrigation
Drainage swales	• Trapezoidal swales are located around the western and southern sides of the range. • The western swales divert dirty water to the sediment basin and the southern swales divert clean water toward the bushland.
Subsoil drains	• Four subsoil drains traverse the range at 12.5m centres draining seepage through a lime treatment train.
Safety	• Red flags are displayed at the entry of the range and on the range when it is in operation. • There are warning signs at the entry, on perimeter fences and at potential unofficial entry points.

2.2.4 Range Danger Area

Chapter 2 of *NSW Firearms Registry Range Users Guide Version 9 (April 2013)* provides guidelines on the construction of "Range Danger Area" (RDA) templates, which control the set-out of the ranges.

For the SHRSC, the following Range Danger Area applies:

- Ranges have been located to enable each of the ranges to be used concurrently, as the target areas of each range does not encroach into the danger templates of adjoining ranges.
- The safest range layout has been used, that is a double lateral ricochet safety template has been used in place of single lateral ricochet safety template. This allows for the use of hard targets and firing on ground containing crystalline (Igneous/Metamorphic) rock formations.
- The Range Danger Area templates are accommodated within the site boundary.
- The Range Danger Area templates for the 50 metre, 500 metre and 800 metre ranges are shown on **Figure 2-3** and were approved by the NSW Firearms Registry on 16 February 2017 as shown below:

From: Richard Oakley [mailto:oakl1ric@police.nsw.gov.au]
Sent: Thursday, 16 February 2017 1:45 PM
To: Ginger, Robyn <robyn.ginger@sport.nsw.gov.au>
Subject: RE: FW: SHRSC Hill Top - Range Danger Templates [DLM=For-Official-Use-Only]

The Firearms Registry will accept the RDA templates as supplied, simply change the 2760 metres to 2750 metres and the corresponding 3560 metres to 3550 metres. I am assuming those measurements are a typing error only.

The RDA Templates meet our requirements and will be accepted as the templates applied to all three ranges as depicted.

Regards,

R. Oakley
Range Inspector
Firearms Registry
NSW Police Force

Dick Oakley | Firearms Registry | Major Events & Incidents Group | New South Wales Police Force | Email: oakl1ric@police.nsw.gov.au | Phone: 02 6670 9868 / 64868 | Fax: 02 6670 9811 / 64811 |

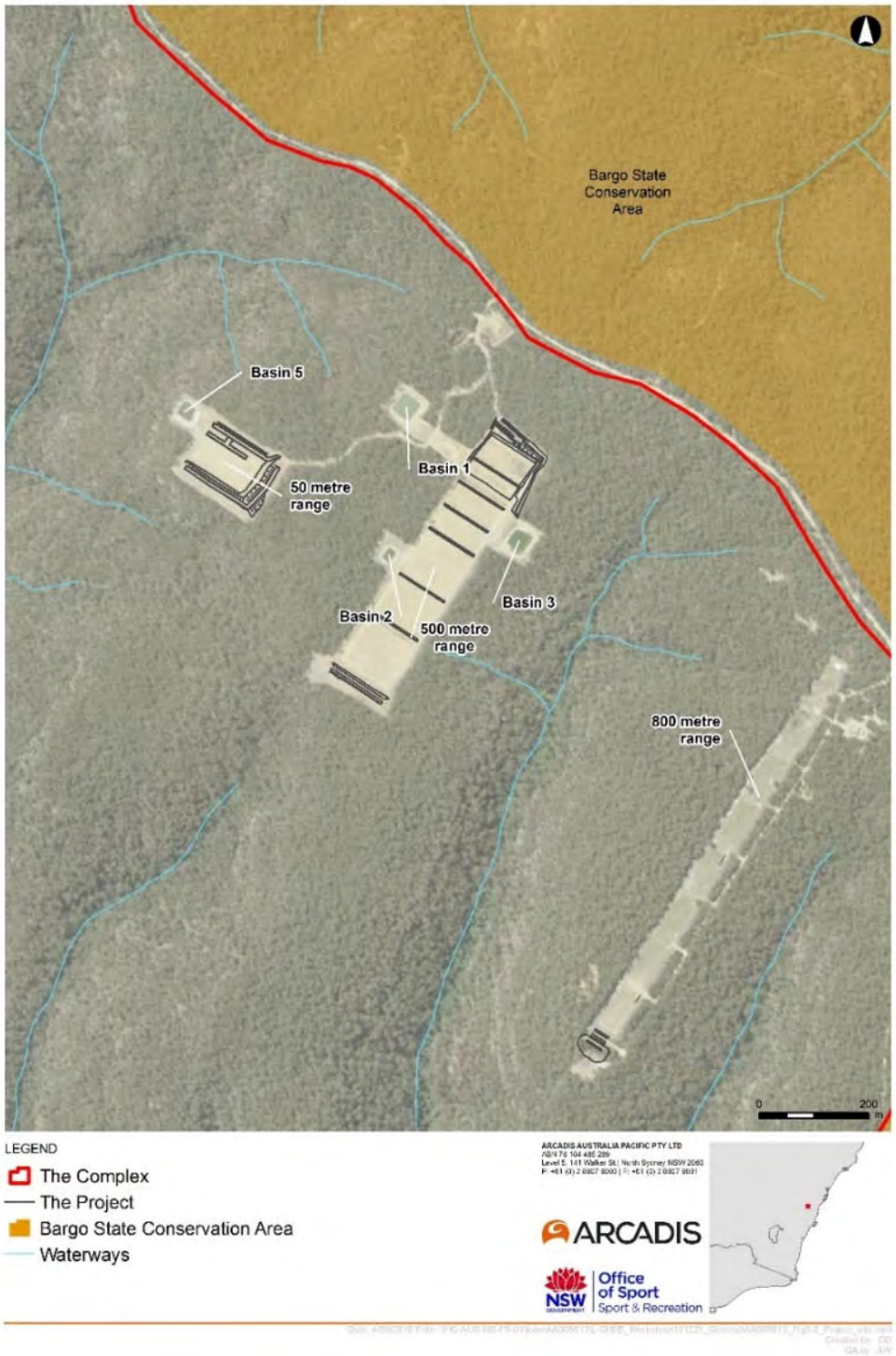


Figure 2-2: SHRSC site and surrounding area

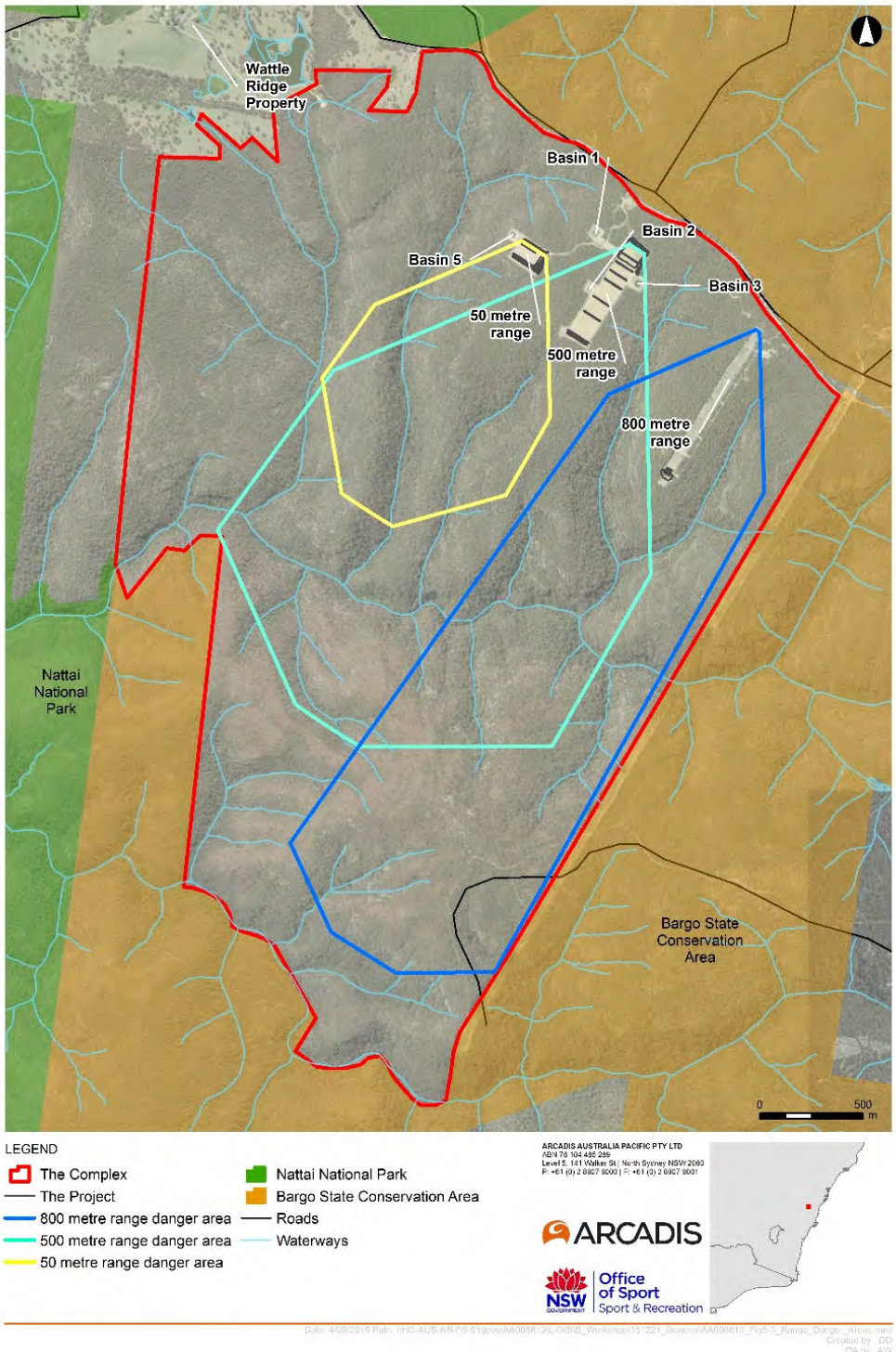


Figure 2-3: Range Danger Areas for the SHRSC

2.3 Range Operation

2.3.1 Range management

The SHRSC is managed and operated under the auspice of the Sydney International Shooting Centre being part of the Office of Sport. The Office of Sport is responsible for the day to day management of the SHRSC.

Table 2-4: Contact details for enquiries

Enquiries	Contact details
Phone number	13 13 02
Postal Address	Sydney International Shooting Centre Range Road, Cecil Park NSW 2178
Website	https://shootingcentre.nsw.gov.au/SHRSC

2.3.2 Range operating hours

The 50 metre, 500 metre and 800 metre ranges can be used:

- Up to four days per week (Mondays to Sundays)
- Between 10 am and 5 pm.
- No shooting is permitted after 5 pm, except for Special Events
- Shooting on public holidays is not permitted except for Special Events

The ranges are predominantly used on weekends, while weekday use is via advanced booking only.

2.3.3 Maximum number of shooters

The maximum number of shooters each day on each range was outlined in *Preferred Project Report (GHD, 2008).* These are summarised in **Table 2-5**. The estimated number of shooters per range per year is provided in

Table 2-6.

Table 2-5: Maximum number of shooters

Number of shooters	Days per year
1-10	65
11-40	128
41-80	6
81-120	93
121-160	5
>161	3
Venue closed	66

Number of shooters	Days per year
Total number of days	**365**

Table 2-6: Estimated number of shooters per range

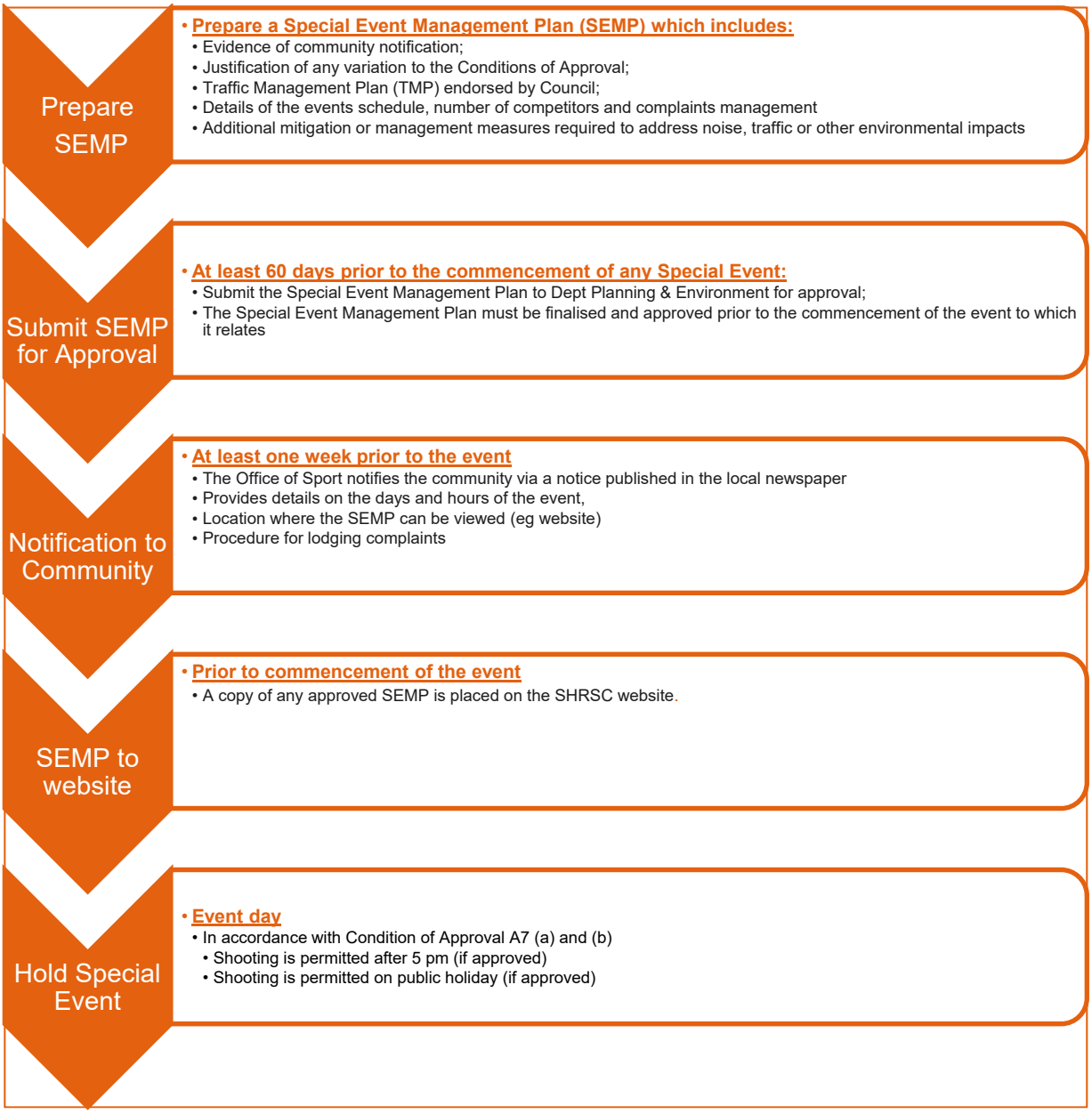
Month	800m Range	500m Range	50m Range
January	405	290	135
February	310	240	155
March	335	220	170
April	390	335	205
May	330	215	155
June	405	280	375
July	290	235	155
August	385	280	205
September	280	235	155
October	380	225	185
November	365	370	205
December	295	145	75

2.3.4 Special events and public holidays

Up to three Special Events can be staged at the SHRSC each year. Special Events may be held on public holidays. The procedure for special events is outlined in **Figure 2-4.**

At least 60 days prior to the commencement of any Special Event:

Figure 2-4: Procedure for special events



2.3.5 Range Rules

The Office of Sport has developed a set of '*SHRSC General Rules and Range Rules'* that include the requirements of the Conditions of Approval (MP 06_0232 MOD 5) (See **Section 3.1.1**), the NSW Firearms Registry (See **Table 3-4** and **Table 3-5**), and this OEMP.

The Office of Sport is empowered to make, repeal and amend such 'SHRSC General Rules and Range Rules' as is considered necessary for the wellbeing of the Complex. The Office of Sport also has the power to discipline any member club, ordinary member or visitor found guilty of infringement of any rule or rules determined by the Office of Sport.

The 'SHRSC General Rules and Range Rules' are displayed at all Control Points and posted in prominent places around the SHRSC for all members and visitors to the SHRSC. The Range Rules are provided on the SHRSC website (https://shootingcentre.nsw.gov.au/SHRSC).

Storage of firearms

No firearms or ammunition is to be kept on site when the SHRSC is not in use, with the exception of special events, in which case firearms and ammunition may be stored on site subject to approval by the NSW Police, under the provisions of the relevant legislation.

2.3.6 Public Use

The *Firearms Act 1996* states that people who satisfy the licensing and related requirements of the Act have a legitimate right to pursue lawful shooting activities. Genuine reasons for having a licence include sport/target shooting, recreational hunting/vermin control, firearm collection, primary production, business or employment or animal welfare.

All visitors to the SHRSC (shooting or non-shooting) must abide with the General Rules and Range Rules set by the Office of Sport for safe shooting and appropriate conduct whilst on the SHRSC.

Licenced users:

- A licensed applicant, whose genuine reason for having a licence is sport or target shooting, must be a current member of a shooting club approved by the Police Commissioner in accordance with the regulations, and which conducts competitions or activities requiring the use of firearms for which the licence is sought.
- Genuine reason definitions for having a shooting licence can be found in the Act under Part 12 – 'Genuine reason for having a Licence'.

Unlicensed users:

- Unlicensed persons may only be authorised to possess and use a firearm whilst participating in an approved firearms safety training course under the direct supervision of an approved firearms instructor.
- This is subject to successfully completing the required *'Declaration - Person Shooting on an Approved Range'* or undertaking a *Firearms Safety Training Course' P650 form.* This does not apply to prohibited firearms.
- Persons aged between 12 and 18 can only do so if their parent or legal guardian completed the P650 declaration. More information can be obtained from the NSW Firearm Registry.

3 STATUTORY REQUIREMENTS

The operation of the SHRSC is required to comply with all relevant legislation, permits, licences and development approvals applicable to the site.

A copy of the approved OEMP and all relevant statutory documentation registers will be kept at the SHRSC and shall be readily available for perusal by operational staff, the public and relevant regulatory authorities as required.

3.1 Development Approval

The operation of the SHRSC was approved under the *Environmental Planning and Assessment (EP&A) Act 1979*. Approval was originally granted on 1 March 2010 (MP 06_0232) and has been subject to five modifications since this time.

Table 3-1: EP&A Act approval modifications

Mod	Description	Approval
1	Amended the location of the 500 metre rifle range and 200 metre combined rifle and pistol range	23 October 2010
2	Corrected the plan showing the location of the 50 metre pistol range	15 December 2010
3	To provide for two sign in booths for the 500 metre rifle range and 50 metre pistol range	16 February 2011
4	Modification of various noise conditions, specifically A6 and A9	Refused (7 May 2012)
5	To amend various aspects of the design for the 500 metre and 50 metre ranges and modify various Conditions of Approval	31 July 2017

This Plan has been developed in accordance with specific requirements as prescribed in the Environmental Assessment, Submissions Report, the Conditions of Approval (as modified) and the revised Statement of Commitments.

All previous environmental assessments and modifications can be viewed on the DP&E website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=1051

3.1.1 Conditions of Approval

The Conditions of Approval relevant to the operation of the SHRSC are outlined below in **Table 3-2:**

Table 3-2: MP_06_0232 Conditions of Approval relating to this OEMP

No.	Condition	Reference in this Plan
A7	**Hours of Use-Outdoor Ranges**	
(a)	All outdoor ranges shall not operate for more than four days in any week, Mondays to Sundays (ie. there shall be no shooting on any outdoor range for at least three days a week). The hours of use of the outdoor ranges on these four days shall be between 10 am and 5 pm each day. No shooting is permitted on any of the outdoor ranges after 5 pm, except for Special Events (refer to Condition A10).	Section 2.3.2 Section 2.3.4
(b)	Shooting on public holidays is not permitted except for Special Events (refer to Condition A10).	Section 2.3.2 Section 2.3.4

No.	Condition	Reference in this Plan
A9	**Firearm Noise Limits**	
	The noise from firearms or use of the site must not exceed LZpeak 75 dB at the following locations: a) at the south-western end of Rocky Waterholes Road, Hill Top (representing the existing residences at 1, 2 and 4 Rocky Waterholes Road); and b) at Nattai Road, Hill Top, adjacent to the western entrance to Wattle Ridge Farm (representing the existing residence). The assessment of noise compliance from the Southern Highlands Regional Shooting Complex shall be undertaken in accordance with the EPA's *Target Shooting Ranges: Application Note for Assessing Noise Compliance* (2015).	Section 5.4
A10	**Special Event**	
(a)	Up to three Special Events can be staged at the shooting complex each year. Special Events may be held on public holidays.	Section 2.3.4
(b)	At least 60 days prior to the commencement of any Special Event, a Special Event Management Plan must be prepared and submitted to the satisfaction of the Secretary. Unless otherwise agreed to by the Secretary in writing, the Management Plan must: i. include evidence of community notification; ii. justify any variation to the conditions of this approval; iii. include a Traffic Management Plan endorsed by Council; iv. include details of the events schedule, number of competitors and complaints management; and v. any additional mitigation or management measures required to address noise, traffic or other environmental impacts.	Figure 2-4
(c)	A Special Event Management Plan must be finalised and approved prior to the commencement of the event to which it relates.	Figure 2-4
(d)	At least one week prior to the commencement of any Special Event, the proponent must notify the community via a notice published in the local newspaper outlining the days and hours of the event, where the Special Event Management Plan can be viewed and how complaints can be made through the methods outlined in Condition E6.	Figure 2-4
(e)	A copy of any approved Special Event Management Plan must be placed on the proponent's website prior to the commencement of the event.	Figure 2-4
A11	**Independent Auditing and Reporting**	
(a)	Each year for the first three years of operation of the new ranges, and every three years thereafter, unless the Secretary directs otherwise, the proponent must commission and pay the full cost of an Independent Environmental Audit of the Project. This audit must: i. be conducted by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the Secretary; ii. include consultation with the relevant authorities; iii. assess the environmental performance of the Project and assess whether it is complying with the requirements in this approval, and any other relevant approvals (including any assessment, plan or program required under these approvals); iv. review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and	Section 6.5

No.	Condition	Reference in this Plan
	v. recommend measures or actions to improve the environmental performance of the Project, and/or any strategy, plan or program required under these approvals.	
(b)	The first audit report prepared in accordance with Condition A11(a) must recommend appropriate operating hours for the continued operation of the complex based on the management activities implemented and compliance with the conditions of approval.	Section 6.5
(c)	Within three months of commissioning an audit, or as otherwise agreed by the Secretary, the proponent must submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report. ***Note:*** *The audit team must be led by a suitably qualified auditor, and include relevant experts in any other fields specified by the Secretary.*	Section 6.5
A13	**Compliance with Relevant Legislation and Australian Standards**	
	The proponent shall comply with all relevant Australian Standards and Codes (including Building Code of Australia) and obtain all necessary approvals required by State and Commonwealth legislation in undertaking the Project.	Section 3 and Table 3-4
D2	**Operational and Environmental Management Plan (OEMP)**	
	An Operational Environmental Management Plan should be prepared in consultation with the EPA and to the satisfaction of the Secretary prior to commencement of use of the new ranges. The OEMP replaces the Interim OEMP approved under Condition A6 of this approval and is to include, but not be limited to the following requirements:	This Plan
(a)	Operational days of the shooting complex, and maximum number of shooters each day on each range, to reflect the usage figures in the Preferred Project Report.	Section 2.3.2 and Table 2-5
(b)	Details of noise monitoring at each range, as required by Condition A11A of this approval.	Section 5.4
(c)	Bushfire sub-plan and emergency and evacuation procedure plan including days when no shooting is permitted.	Section 4.8.2 and Appendix A
(d)	Details of the design of ranges and management practices in accordance with the *US EPA Best Management Practices for Lead at Outdoor Shooting Ranges* including regular clean-up of spent bullets and target fragments.	Appendix F
(e)	The approved Water Cycle Management Plan required by Condition 83 of this approval	Water Cycle Management Plan (WCMP) - Operational Phase (ErSed, August 2018) (submitted to DP&E for review and approval)
(f)	Erosion, sediment and stormwater controls.	Soil and Water Management Plan (SWMP) – Construction and Operational Phase (ErSed, August 2018) (submitted to DP&E for review and approval) Section 5.4
(g)	Methods to encourage the use of non-lead based ammunition.	Appendix F - Use of alternate bullet and primer materials

No.	Condition	Reference in this Plan
(h)	The proposed fencing and range danger areas approved by the NSW Firearms Registry.	Section 2.2.4 Figure 2-3
(i)	Ongoing environmental auditing and reporting.	Section 6.4 and Section 6.5
(j)	A description of the procedures to be implemented for managing, responding to and reporting any incidents, complaints and non-compliances with statutory requirements; and	Section 4.5
(k)	A protocol for periodic review of the plan.	Section 6.6
D5	**Fencing and warning signs**	
	All fencing and warning signage around the site, and closure of any bushwalking tracks within the range danger areas is to be in place prior to the commencement of the use.	Section 5.4
D6	**Removal of Trees**	
	Trees along the embankment of the existing dam on the site, located adjacent to the proposed new clubhouse, are to be removed prior to the commencement of use of the new ranges.	Section 5.4
E1	**Storage of firearms**	
	No firearms or ammunition is to be kept on site when the shooting complex is not in use, with the exception of special events referred to in Condition A10 of this Approval, in which case firearms and ammunition may be stored on site subject to approval by the NSW Police, under the provisions of the relevant legislation.	Section 2.3.5

3.1.2 Statement of Commitments

The revised Statement of Commitments relevant to this Plan are outlined below in **Table 3-3.**

Table 3-3: Statement of Commitments relevant to the OEMP

Ref	Commitment	Reference in this Plan
General Management Plans		
G1	Implementation of Operational Environmental Management Plan as outlined in the environmental assessment.	This Plan
Water catchment, hydrology and water management		
W1	Sediment control ponds would be established at the commencement of construction. A minimum of 6 ponds, with a combined storage volume of 3,620 m^3 would be provided and would be retained for operation of the proposal.	SWMP – Construction and Operational Phase (ErSed, August 2018) (submitted to DP&E for review and approval) Appendix D Appendix F Stormwater management
Noise		
N1	Noise Monitoring would be undertaken in accordance with the NSW Environmental Protection Authority's 'Target Shooting Ranges: Application Note for Assessing Noise Compliance' dated July 2015 to confirm compliance with Chapter 164 of the DECC's Environmental Noise Control Manual	Section 5.4 Section 6.1

Ref	Commitment	Reference in this Plan
N2	Attended noise monitoring would be undertaken on the first 3 occasions of use of the new ranges and annually thereafter, to demonstrate that noise will not exceed the specified firearm noise limit.	Section 5.4 Section 6.1
N3	Monitoring may also be undertaken at the SHRSC by the operator or the regulatory authority for assessing compliance during ongoing operations. Such an assessment may be announced (with the knowledge of the shooting range operator) or unannounced by the regulatory authority.	Section 5.4 Section 6.1
Social		
S1	The Office of Sport would establish a community complaint/enquiry service for the shooting complex. The service would be established on the Office of Sport's webpage and provide an online enquiry form for the purposes of receiving and responding to any enquiries including complaints from a member of the public in relation to activities conducted at the complex. A record of complaints would also be held for at least 4 years after the complaint was made.	Section 4.4

3.2 Other legislation

The other applicable legislation relevant to the operational environmental management for the SHRSC is provided in **Table 3-4.**

Table 3-4: Applicable legislation

Act	Aim	Applicability to the SHRSC
Federal Legislation		
Environment Protection and Biodiversity Conservation (EPBC) Act 1999	This Act is the Australian Government's key piece of environmental legislation and provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places—defined in the EPBC Act as matters of national environmental significance	The ecological assessment for the Project considered the potential impacts on matters of national environmental significance. The ecological assessment found that the SHRSC was unlikely to have a significant impact on any threatened species listed under Act or their habitat, provided the mitigation measures identified in the environmental assessment are implemented. A referral to the then Department of Environment and Water Resources was not required.
State Legislation		
Environmental Planning and Assessment (EP&A) Act 1979	The EP&A Act, together with the EP&A Regulation provides the overarching framework for planning in NSW. The regulation supports the day-to-day requirements of this system.	The construction and operation of the SHRSC was determined to be a Major Project under Section 75J(2) of the now repealed Part 3A of the EP&A Act. Approval was originally granted on 1 March 2010 (MP 06_0232) and has been subject to five modifications since this time. Modification 5 was approved under Section 75W of the Act.
Firearms Act 1996, *Firearms Regulation 2006*	The underlying principles of this Act are to confirm firearm possession and use as being a privilege that is conditional on the overriding need to ensure public safety, to improve public safety and to facilitate a national approach to the control of firearms. Under the Act, the following obligations	**All licenced shooters**: • Must notify the *NSW Firearms Registry* of changes to name, address • Are subjected to inspections by the NSW Police to confirm the types of firearms owned and the safe storage of firearms and ammunition. • The regulations also contain requirements for the carrying and safe transport of firearms and ammunition. The Office of Sport is required to report, to the NSW Firearms Registry, the number of shooting attendances of each licenced shooter who uses SHRSC as a reason to hold a firearms licence. **Range Licence Holder:** • Must report to the NSW Firearms Registry as required • Must ensure that red flags and safety warning signs as specified in the *Range Users Guide'* (NSW Firearms Registry) are erected, as appropriate. The Office of Sport has developed the ranges in line with the *Range Users Guide* and the conditions placed on the range by the NSW Firearms Registry regarding the range (ie Location, Description, Range Danger Template, Authorised Firearms, Authorised Events; and Range Conditions.

Act	Aim	Applicability to the SHRSC
Biodiversity Conservation Act (2016)	The purpose of the Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principals of ecologically sustainable development. This Act repeals the following Acts: • *Threatened Species Conservation Act 1995 (NSW)* • *Nature Conservation Trust Act 2001 (NSW)* • Parts of the National Parks and Wildlife Act 1974 (NSW).	Measures to avoid and minimise impacts on threatened species and communities listed under the Act, that are known or considered likely to occur in the project site have been provided in Section 5.4. In addition, any vegetation removal will be undertaken in accordance with the requirements of the OEMP and the relevant legislation
Contaminated Land Management Act 1997	The main aim of this Act is to establish a process for investigating and (where appropriate) remediating land that the Environment Protection Authority (EPA) considers to be contaminated significantly enough to require regulation under Division 2 of Part 3.	The environmental assessment indicated that evidence of contamination caused by existing range activities was limited to soils from within the existing target range, with surface and subsurface soil sampled directly in front of the base of the stopbutt. Although minimal evidence of contaminant migration from the existing Hill Top Rifle Range, remediation of contaminated soils was undertaken to minimise any potential impacts to human and ecological health risks. In addition, a soil and water management plan for the existing and proposed ranges would be implemented to minimise the potential migration of contaminants to downstream waterways.
Local Land Services Act (2013)	The Act establishes a corporation with the responsibility for the management and delivery of local land services to the social, economic, and environmental interests of the State in accordance with any State priorities for local land services.	The SHRSC will be operated in accordance with the requirement of the Act/ Part 5A relates to the management of native vegetation. The *Land Management (Native Vegetation) Code* (2017) applies to all land in NSW to which Part 5A of the *Local Land Services Act 2013* applies. The aim of the code is to authorise clearing of native vegetation on Category 2 regulated land. The Code does not allow the clearing of native vegetation if that vegetation forms part of a critically endangered ecological community.
National Parks and Wildlife (NPW) Act (1974)	The Act protects Aboriginal objects and places in NSW. It is an offence disturb or move an Aboriginal object; excavate land for the purpose of discovering an Aboriginal object; knowingly destroy, damage or deface an Aboriginal object or Aboriginal place; knowingly cause or permit the destruction, damage or defacement of, an Aboriginal object or Aboriginal Place.	If the Office of Sport or the SHRSC users, clients or their contractors plan an activity that will disturb or destroy Aboriginal heritage, permission will be sought from OEH before any work is commenced.
National Parks and Wildlife (Adjustment of Areas) Act (2016)	The Act aims to amend the NPW Act to change the reservation status of certain land and for other purposes	An area of 1,036 hectares (Lot 100 DP 1088254) was excised from the Bargo State Conservation Area under Act. This land has been vested to the Minister administering the *Sporting Venues Management Act 2002* (currently the Minister for Sport) and has been added to Schedule 1 of that Act as land owned by the Minister. The Office of Sport represents the interest of the Minister for the SHRSC

Act	Aim	Applicability to the SHRSC
Rural Fires Act (1997)	The Act provides for the prevention, control and suppression of bush fires, and for the mitigation of danger resulting from bushfires. The Act contains provisions for the control and suppression of fires that are imminent or burning, including a definition of the responsibilities of various authorities during bush fire emergencies. Importantly, it also ensures that measures to reduce the hazards that contribute to the occurrence, intensity and spread of fire are carried out by responsible agencies	The SHRSC is located within bushfire prone land as identified by Wingecarribee LEP. A Bushfire Management Plan (Building Code & Bushfire Hazard Solutions P/L, August 2018) has been prepared and is structured to ensure the approach to bushfire planning is consistent with current risk management frameworks adopted by emergency service organisations and the National Parks and Wildlife Service.
Sporting Venues Authorities Act 2008	The Act allows for the establishment of the State Sporting Venues Authority. The Authority is responsible for maintaining and improving the Authority's land and to ensure that asset management plans are in place for that land.	The Office of Sport is the responsible delegated authority for the operation of the SHRSC
Water Management Act 2000	The objective of the Act is to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations, including protection of water sources, associated ecosystems, ecological processes and biological diversity and their water quality, and fostering sustainable and efficient use of water.	A 10,000 litre tank, sourced from a rainwater collection system, is located at the site primarily for firefighting purposes. No licencing of this water supply is required under the Act.
Environmental Planning instruments		
State Environmental Planning Policy (Sydney Drinking Water Catchments) 2011	The aims of this Policy are: (a) to provide for healthy water catchments that will deliver high quality water while permitting development that is compatible with that goal, and (b) to provide that a consent authority must not grant consent to a proposed development unless it is satisfied that the proposed development will have a neutral or beneficial effect on water quality, and (c) to support the maintenance or achievement of the water quality objectives for the Sydney drinking water catchment.	The SHRSC is located within the Sydney Drinking Water Catchment (SDWC_015). Several engineering controls have been installed to minimise the potential for runoff to affect downstream water quality, and ultimately minimise impacts to the Sydney drinking water. Controls include: • Sediment control basins to settle sediment before the water is discharged • Permanent erosion control. • Roof water is captured in rainwater tanks for general use around the site locations for each range. • The site is serviced by an on-site treatment system designed to meet current best practice standards • Stopbutts have been designed in accordance with the US EPA (June 2005) Best management practices for lead outdoor shooting ranges, EPA-902-B-01-001.

Act	Aim	Applicability to the SHRSC
Local Legislation		
Wingecarribee Local Environmental Plan (WLEP) 2010	This Plan aims to make local environmental planning provisions for land in Wingecarribee in accordance with the relevant standard environmental planning instrument under section 33A of the Act	The SHRSC is located within the Wingecarribee LGA on land zoned E1 (National Parks and Nature Reserves), E2 (Environmental Conservation) and SP1 (Special Activities). Under the LEP the site is also located within: • Bushfire prone land (Vegetation Category 1) • Sydney Drinking Water catchment • Has a number of Category 3 Water courses on the site

3.3 Licences and permits

The Office of Sport is required to comply with all licensing, operational and land management requirements for the Complex.

The Complex is operated in compliance with the following authorised documents:

- Firearms Registry (NSW Police) Shooting Range Approval (See **Table 3-5)**
- Conservation Agreement with the National Parks and Wildlife dated October 2010.

The Office of Sport will exercise oversight of the operations of the Complex in terms of those matters within its jurisdiction. In addition, matters related to the licensing of the ranges will be subject to oversight by the Chief Range Inspector, NSW Firearms Registry.

Table 3-5: Applicable licences and permit

Licence /Permit number	Licence	Regulator	Expiry
411698925	Shooting Range Approval (50, 500 & 800 Ranges)	NSW Firearms Registry (NSW Police Force)	3 November 2021

Any other permits or licences applicable to the SHRSC site will be included under this section as they become available and or as required.

3.4 Guidelines and Specifications

The relevant guidelines, policies and specifications to this Plan include (but not limited to):

Table 3-6: Relevant guidelines, policies and specifications

Type	Title
Design brief	• Range design brief SHRSC – Office of Sport
Guidelines	• ITRC (2005): Technical guideline – Environmental management at operating outdoor small arms firing ranges • Landcom (2004): Managing Urban Stormwater: Soils and Construction Volume 1, 4th ed., NSW Government. • NSW DECC (2006): Guidelines for the NSW Site Auditor Scheme – 2nd edition • NSW Firearms Registry (2013): Range Users Guide Version 9, April 2013 • NSW DECCW (2014): Waste Classification Guidelines - Part 1: Classifying Waste, November 2014 • US EPA (2005): Best Management Practices for Lead at Outdoor Shooting Ranges • EPA's Target Shooting Ranges: Application Note for Assessing Noise Compliance (2015)

Type	Title
Sampling Guidelines	• NSW EPA (1995): Contaminated sites - Sampling Design Guidelines ‘ • ANZECC (2000): Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000, including Sediment Quality Guidelines Volume 1 Section 3.5 • ANZECC / NHIVIRC (1992): Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites • NEPM (1999): National Environment Protection (Assessment of Site Contamination) Measure (Amended 2013) • NEPM (2013): Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater • NSW DECC (2006) ‘Guidelines for the NSW Site Auditor Scheme – 2nd edition’
Codes	• Building Code of Australia

3.5 Consultation

Condition D2 of the Conditions of Approval requires that the OEMP should be prepared in consultation with the NSW Environment Protection Authority (EPA) and to the satisfaction of the Secretary prior to commencement of use of the new ranges.

A draft copy was provided to EPA on September 2018 for comment prior to submission of a final Plan to the DP&E for approval.

A record of consultation undertaken is included in **Table 3-7**.

Table 3-7: Record of consultation

Agency	Date	Comment
Water NSW	09/2016	Comments received from Water NSW have been included in the OEMP.
EPA	09/2018	No comments received
Water NSW	09/2018	No further comments received
DP&E	09/2018	Approval for shooting range templates and estimated number of shooters per range included.

4 ENVIRONMENTAL MANAGEMENT

4.1 Environmental Management Overview

Responsibility for environmental management of the SHRSC sits with the Office of Sport through the Venue Manager.

The general approach to the management and control of environmental impacts of site activities for Office of Sport staff and contractors (when required) under this OEMP is shown in **Figure 4-1**. Activities at the SHRSC would be undertaken in accordance with the requirements of the OEMP.

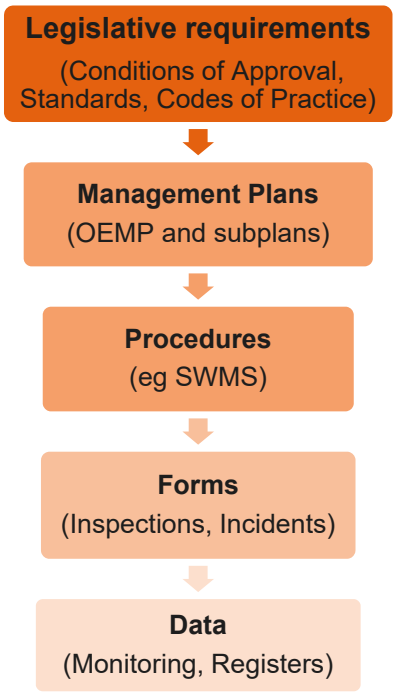


Figure 4-1: Approach to environmental management

4.2 Roles and Responsibilities

The key roles for the SHRSC are provided are outlined in **Table 4-1**

Table 4-1: Key roles and responsibilities

Role	Responsibility
Venue Manager	• Has overall responsibility for the environmental performance of the operational SHRSC. • Responsible for all operational environmental management controls as stated in this Plan, unless specifically stated otherwise • Responsible for engaging specialist contractors to undertake the monitoring as required under the OEMP • Acts as the primary contact point in relation to environmental performance of operations and reports relevant environmental matters to Office of Sport and other relevant authorities as required • Maintains / archives relevant environmental documentation (eg SWMS, incident reports, complaints registers etc) • Reviews and approves changes to the OEMP • Acts as the 24-hour EPA contact

Role	Responsibility
Range Officers / Office of Sport staff	• Coordinates and supervises shooting activities • Reports incidents to Venue Manager, as required • Promotes the SHRSC Range Rules during shooting activities
Public / Shooters	• Responsible for abiding with the provisions of the *Firearms Act 1996* and the *Firearms Regulation 2006* • Responsible for abiding with the General and Range Rules set by the Office of Sport for safe shooting and appropriate conduct whilst on the SHRSC • Must sign-in at the 'Allocated Control Point' • Consider the Hill Top Community and surrounding villages. • Must keep to the speed limits near the ranges
Contractors	• Soil, Sediment and Water sampling will be undertaken by experienced personnel and will be engaged by the Venue Manager • Contractors will undertake all sampling in accordance with the requirements of the OEMP, relevant legislation (See Section 3.2) and the relevant guidelines (See Section 3.4). • Where required the appropriate documentation (eg SWMS for reclamation works) must be provided and approved by the Venue Manager

4.3 Safe Work Method Statement

Safe work method statements (SWMS) will be required prior to any reclamation works occurring at the ranges.

A template is provided in **Appendix C.** The completed SWMS should be archived in an appropriate location e.g. located on a cloud based information system.

Contractors or Complex personnel undertaking the reclamation works will need to wear appropriate personal protection equipment (PPE) during works. This would include (but not limited to):

- Goggles, glasses and face shields
- Ear plugs and ear muffs
- Filter respirators, airline respirators and self-contained breathing apparatus (SCBA)
- Safety shoes and boots, spats and rubber gum boots
- Hard hats and broad brimmed hats
- Aprons, overalls, gloves and high visibility clothing
- Any substance or physical barrier used to protect health, like sunscreen.

4.4 Complaint Management

The Office of Sport has established a community complaint/enquiry service for the shooting complex https://shootingcentre.nsw.gov.au/contact.

All complaints are handled in line with the Office of Sport's Complaints Handling Policy[1].

The policy requires the receipt of complaints is acknowledged promptly and assessed and prioritised in accordance with the urgency and/or seriousness of the issues raised. If a matter concerns an immediate risk to safety or security the response will be immediate and will be escalated appropriately.

The policy includes a three-tiered complaint system:

- Level 1 – Informal resolution

[1] https://sportandrecreation.nsw.gov.au/sites/default/files/complaints-handling-policy.pdf

- Level 2 – Formal resolution, which includes a four-step process. If the customer is not satisfied with the formal resolution, a level 3 process can be instigated
- Level 3 – External review options

Customers making complaints will be informed about the process, expected timeframes and of the progress and reasons for any delay.

All complaints will be acknowledged within five working days.

4.5 Incident Management

Environmental incidents and non-compliances with environmental licences or development approval conditions are required to be recorded and tracked (See **Appendix C**). Incident response and notifications ensure that:

- The environmental impact is minimised and cleaned up/rehabilitated as soon as reasonable and feasible
- All relevant stakeholders, including regulators, are informed of the incident in a timely manner
- Mitigation and management measures are identified and implemented as appropriate to prevent recurrence.

An environmental incident report template can be found in **Appendix C**. The report provides a guide to record all information relevant to an incident.

Response to environmental incidents will be in accordance with the procedures outlined throughout this Plan.

4.6 Unexpected Discoveries

The potential exists for unexpected events or discoveries to occur during operation of the SHRSC. The key aspects for consideration here are:

- Spills to land and water
- Contaminated soils
- Asbestos identification

The procedures outlined in **Appendix G** provide the guiding actions where an unexpected discovery or event may occur. Reference should also be made to **Sections 4.3** and **Section 6.1**.

4.7 General hygiene and safety

The use of firearms generates immediate environmental concerns that users of the Complex would be aware of when preparing to make use of the SHRSC. More than just a local concern, sound can disturb local wildlife or nearby property owners. The location of the range alleviates concerns for neighbours as it located in a rural setting, a significant distance from any sensitive receivers (residential areas, community facilities, educational establishments etc.).

However, the range user can be affected by noise and lead dust as well as other fine particles. Signs are posted at the SHRSC warning the user of noise hazards, and recommended hygiene requirements (washing hands thoroughly before eating and after use). However, hearing protection should still be considered by the shooter and spectators.

4.8 Emergency management

4.8.1 Emergency Management Plan (EMP)

An Emergency Management Plan (ComSafe Training Services, 2018) has been developed for the SHRSC.

This Plan provides guidance and procedures to follow in the unlikely event of an emergency occurring at the Complex. A hard copy of the Plan will be available at the control point of each range and is also available on the website: https://shootingcentre.nsw.gov.au/SHRSC

The Emergency Management Plan aims to cover operational emergency management aspects that are reasonably foreseeable. In the event of an unforeseen failure beyond design parameters or exposure to emergencies the emergency management plan would be followed.

Key emergency contacts are listed in **Section 4.8.4**.

4.8.2 Bushfire Management Plan (BMP)

A Bushfire Management Plan (Building Code & Bushfire Hazard Solution P/L, August 2018) is provided in Appendix A.

This BMP details the fire management objectives, strategies, actions and mitigation requirements for the SHRSC and replaces the previous BMP prepared by GHD (Australia) of 2010 for the 800m range.

The BMP recognises that land management in relation to bushfire mitigation measures is to be a co-operative approach between the Office of Sport, the National Parks and Wildlife Service, and the NSW Rural Fire Service (being both the major land management and firefighting services for the Nattai region).

4.8.3 Emergency evacuation procedure plan

The emergency evacuation procedure plan has been provided in Appendix B and would be reviewed in preparation for an emergency evacuation. In the event of an emergency evacuation, this plan summarises the requirements of the Emergency Management Plan (ComSafe Training Services, 2018) developed for the Complex.

4.8.4 Emergency Contact Details

Table 4-2: Key emergency contact details for the Complex

Contact	Telephone number
All emergencies (Ambulance/Fire/Police)	000
NSW Rural Fire Service	000
NSW State Emergency Services	132 500
NSW Rural Fire Service (Wingecarribee)	(02) 4871 2666
NSW Police (Bowral)	(02) 4862 9299

Table 4-3: Other essential emergency contact details

Contact	Telephone number
Southern Highlands Regional Shooting Complex site contact	0416 046 015
Wingcarribee Shire Council	(02) 4868 0888
Bowral Hospital	(02) 4861 0200
Balmoral Rural Fire Service	(02) 4889 8387
Office of Sport	(02) 8782 0101 0434 074 172 (ah)
Bushfire Information - NSW Rural Fire Service	1800 679 737
Utilities – Sydney Water	13 20 90
Utilities – TransGrid	(02) 6226 9666
NSW National Parks – Duty Officer	0419 428 054
Roads and Maritime Services - 24 Hour Traffic enquiry line	13 27 01
Water NSW	1800 061 069

5 IMPLEMENTATION

The use of firearms generates immediate environmental concerns that users of the SHRSC must be aware of when preparing to make use of the SHRSC site.

More than just a local concern, sound can disturb local wildlife or nearby property owners. The location of the range alleviates concerns for neighbours as it located in a rural setting, a significant distance from any sensitive receivers (residential areas, community facilities, educational establishments etc.).

However, the range user can be affected by noise and lead dust as well as other fine particles. Signs would be posted at the SHRSC site warning the user of noise hazards as well as washing hands thoroughly before eating, after use of the Project site.

However, hearing protection should still be considered by the shooter and spectators.

5.1 SHRSC Environmental Management

The general goal of environmental management at shooting ranges is to effectively eliminate detrimental impacts posed by the range or shooting activities on the environment, public health, or public welfare.

A wide array of options exists for managing lead and other environmental issues at ranges. These include range layout, bullet or shot containment structures, bullet or shot recovery and recycling, lead stabilisation and control measures, and use of non-lead bullets or shot.

Operational methods for range improvement can modify the way a range is used or maintained in an effort to reduce contaminant transport from the range areas. In particular, concerns from lead residues and suspended solids (from soil erosion) leaving ranges or range areas may be decreased or eliminated through relatively simple changes to range management.

Some changes have no impact on operations and can be implemented with little or no cost to the ranges. These operational methods (but not limited to) are outlined below:

- Evenly distribute/stagger firing lane usage to minimise impact to stop butt stability and vegetation in the high-use areas of the stop butt and to reduce the frequency of stop butt repairs
- Minimise or eliminate firing into waterbodies (drainage lines and sediment ponds), which increases the potential for ecological risk to lead exposure as well as the risk for lead migration
- Sustain vegetative cover on and around the Project site. Ensure maintenance activities will sustain and promote vegetation growth, especially on the stop butts and in drainage lines
- Caution would be exercised during irrigation to prevent over irrigation and possible dissolution of lead
- Sustainable activities include annual fertilisation and/or lime addition based on a soil nutrient analysis and a vegetation management regime (Section 5.2 of the Ecological Management Plan GHD, 2010) that allows tall vegetation on the berm and runoff pathways. Tall grass slows storm water runoff and filters out suspended solids before they leave the ranges.

5.2 Potential Environmental Risks

A detailed summary of environmental issues applicable to operations of the SHRSC is presented in Part D of the Environmental Assessment (EA) (GHD, 2008). Specialist studies were commissioned to assess potential impacts associated with ecology, cultural heritage, bushfire, hydrology, water management and contamination, soil, noise and traffic.

A summary of specialist reports undertaken at the SHRSC have been summarised in **Appendix E**.

5.3 Environmental Management Plans

Various Management Plans for the SHRC will form part of an integrated approach to the OEMP.

Details of the sub-plans are provided below:

- Soil and Water Management Plan (Ersed Environmental Pty Ltd, August 2018)
- Water Cycle Management Plan (WCMP) (Ersed Environmental Pty Ltd, August 2018)
- Bushfire Management Plan (Building Code & Bushfire Hazard Solution P/L, August 2018)
- Emergency Management Plan (ComSafe Training Services, 2018)
- Ecological Management Plan (GHD, 2010)

These Plans must be read in conjunction with the OEMP and will serve as the basis of ongoing sampling and monitoring at the SHRSC as stated in this Plan.

Figure 5-1 below presents the relationship between the various management plans developed for the SHRSC and which would be read in conjunction with this OEMP.

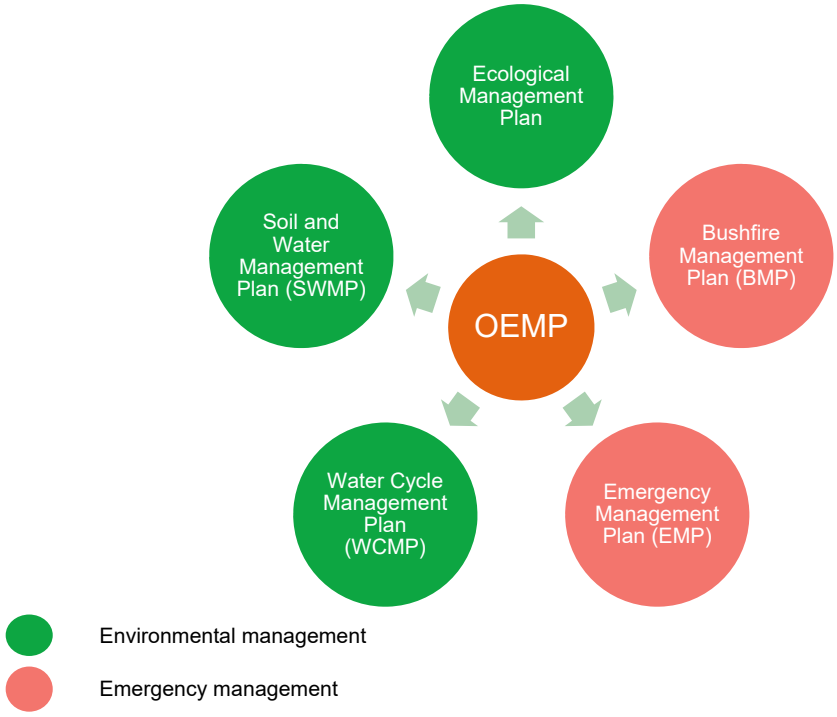


Figure 5-1 Management Plans for the SHRSC and their relationship with the OEMP

5.4 Operational and Environmental Management Actions

Operational management measures have been developed to manage the SHRSC operational environmental impacts outlined in **Appendix E**.

These actions draw on the good practice management measures outlined in **Appendix F** and are summarised in **Table 5-1** below.

Table 5-1 includes the operational and environment actions with management measures and links to the Minister's Conditions of Approval.

The Venue Manager is responsible for all operational environmental management controls as stated in this Plan, unless specifically stated otherwise.

Table 5-1: Operational and environment actions table

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
G1	General	Unhygienic conditions.	• Encourage users of the range to wash hands after use and/or prior to eating. • Ensure toilets are cleaned and maintained (e.g. soap supply is sufficient) regularly.		Section 4.7	Daily
G2	General	Safety issues to bushwalkers and others using the Bargo State Conservation Area.	• Red flags would be displayed at the entry and stop butts when the ranges are in operation. • Warning signs would be located at the entry, on fences and at possible unofficial entry points across the ranges. • All fencing and warning signage around the site, and closure of any bushwalking tracks within the range danger areas is to be in place prior to use of the ranges.	CoA D5	Sections 2.3 Section 3.2 Section 4.7 Appendix E - Existing Environment	Continuously
C1	Contamination	Lead contamination of soil, surface water and groundwater derived from ordinance	• If monitoring indicates exceedance of relevant contamination criteria, remediation of soils will be undertaken • Usage of firing lanes at the ranges would be staggered to minimise impacts on stop butt stability. • Grass would be established where possible as an erosion control and to assist with filtering pollutants from runoff. • Rake fine agricultural grade lime into soils within the range, shot fall zones, and stop butts to reduce the mobility of metals by increasing soil pH to within the range of 6.5 to 8.5. • Test for chemical characteristics of soil around stop butts to confirm maximum quantity of phosphate application in stop butt trenches to avoid phosphate accumulation and runoff to waterways. • Monitor pH and phosphate levels where lime and phosphate are added to soils.	CoA B3 and D2	Appendix F - Good Management Practice Section 6.1	As required

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
			• Re-apply lime when the pH of soils is found to drop below pH 6.5. • To prevent metal migrations at the shooting range, shot fall zones are overlapped to minimise the area of potential impact. • Where feasible the use of less toxic shot (i.e. non-lead) would be promoted by the clubs. • A long-term monitoring program would be implemented at the site to monitor possible metal accumulation and migration from the site.			
C2	Contamination	Lead exposure to user's and operators at the ranges	• As above.	CoA B3 and D2	Appendix F - Good Management Practice Section 6.1	As required
C3	Contamination	Lead exposure to animals and plants	• As above.	CoA B3 and D2	Appendix F - Good Management Practice Section 6.1	As required
W1	Waste	Left over putrescible waste, drinking cartons and food scraps from range users.	• Waste would be managed to the principles embodied in the *Waste Avoidance and Resource Recovery Act 2001* and include avoidance; reuse and disposal as a last resort.	CoA A13	Appendix F – Good Management Practice Appendix E – Waste	Daily during shooting events
W2	Waste	Excess and leftover spent shot, spent cartridges, clay pigeon fragments and target paper.	• Wastes generated would be classified in accordance with the *NSW EPA (1999) Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes.* • Waste would be managed to the principles embodied in the *Waste Avoidance and Resource Recovery Act 2001* and include avoidance; reuse and disposal as a last resort.	CoA A13	Appendix F – Good Management Practice Appendix E – Waste	As required

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
N1	Noise	Exceeding noise levels	• Noise Monitoring would be undertaken in different climatic conditions to confirm allowable operational usage in accordance with the *EPA's Target Shooting Ranges: Application Note for Assessing Noise Compliance (EPA, 2015).*	CoA A9 and D2	Section 6.1	As required
N2			• The noise from firearms or use of the site must not exceed LZpeak 75 dB at the following locations: (a) at the south-western end of Rocky Waterholes Road, Hill Top (representing the existing residences at 1, 2 and 4 Rocky Waterholes Road) (b) at Nattai Road, Hill Top, adjacent to the western entrance to Wattle Ridge Farm (representing the existing residence).	CoA A9 and D2	Section 6.1	During shooting events
N3			• Undertake noise monitoring annually to confirm compliance with the EPA's *Target Shooting Ranges: Application Note for Assessing Noise Compliance (EPA, 2015*)	CoA A9 and D2	Section 6.1	Annually
N4			• The noise impacts, including traffic noise, of any proposal to increase site usage would be subject to detailed investigation. This would involve noise measurements, at the nearest sensitive receivers, of all firearms (recreational and military) used and fired in their respective ranges.	CoA A9 and D2	Section 6.1	As required
N5			• Measurement results may trigger additional measures such as: – Altering the acoustic design at the ranges – Restriction of firearms used on the site – Restriction of the use of certain firearms to specific ranges.	CoA A9 and D2	Section 6.1	As required

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
N6	Noise	Damage to hearing (both users and spectators)	• Attended noise monitoring will be undertaken quarterly in the first twelve months of operations (aligned with each season) and annually thereafter to confirm noise levels from firearms measured at the locations specified in Condition A9 comply with appropriate limits. • The monitoring must include that of the known noisiest firearms being used on the range and be undertaken in accordance with the EPA's *Target Shooting Ranges: Application Note for Assessing Noise Compliance (2015)*. • Encourage the use of ear protection for users and spectators at the ranges.	CoA A9 and D2	Section 6.1	Quarterly in the first twelve months of operation Annually thereafter
N7	Noise	Changes in firearm use at the ranges	• Monitor new firearms with a potential to be louder than existing firearms used and proposed to be used on site to ensure it does not affect the allowable maximum site usage.	CoA A9 and D2	Section 6.1	As required
B1	Bushfire	Ignition of trees, bushes, and/or grasses caused by open flame/sparks e.g. bullet ricochet spark etc. and escalation of situation into a mobile bushfire.	• Appropriate fire extinguishers must be located at the control point for each range • Regular fire prevention inspections by the Wingecarribee Rural Fire Service and implement any recommendations.	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	During shooting events
B2	Bushfire	Build-up of dry fuel leading to increased risk of fire within and adjacent to site.	• Ensure paper/cardboard/rags/etc. waste receptacles are regularly emptied • Ensure there are no areas containing large amounts of dry vegetative fuel (such as leaves, felled trees or shrubs, tall dry grass) adjacent to any work areas of the ranges	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	During shooting events

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
			• Ongoing vegetation management as per Section 5.2 and Section 5.7 of the Ecological Management Plan (GHD, 2010) • The management of the hazards remaining on the ranges would be by means of a Conservation Agreement with the OEH.			
B3	Bushfire	Not Used.	•			
B4	Bushfire	Ignition from lightning strikes.	• Appropriate fire extinguishers located at the control point for each range. • Ensure there are no areas containing large amounts of dry vegetative fuel (such as leaves, felled trees or shrubs, tall dry grass) adjacent to any work areas of the ranges	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	As required
B5	Bushfire	Ignition of bushfire caused by cigarette smoking and disposal of cigarette butts.	• Smoking permitted only in designated areas where appropriate disposal units are provided • Appropriate fire extinguishers located at the control point for each range.	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	Daily during shooting events
B6	Bushfire	Ignition of bushfire caused by Catalytic converters on petrol driven vehicles.	• Users of the ranges to park in designated car parks • Avoid parking in long grass for maintenance activities • Ensure ongoing maintenance of all vehicles used on site to minimise spark ignition from exhaust systems.	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	Daily during shooting events
B7	Bushfire	Inadequate storage of combustible or flammable substances.	• All Hazardous Chemicals and Dangerous Goods (if stored on-site) must be kept in secure storage facilities according to the regulations and designation of the Safety Data Sheet (SDS) requirements.	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	Continuously

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
B8	Bushfire	Inadequate knowledge of bushfire contingency plan in an emergency situation.	• All range inductions are to clearly explain the site's bushfire contingency plan and emergency management and evacuation procedures • Liaison with emergency services, site familiarisation tours, and workshops including carrying out contingency plan	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	As required
B9	Bushfire		• Clearly display site plan with relevant contact details and mitigation information.	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	Continuously
B10	Bushfire	Site personnel being unaware of a bushfire in vicinity of Project site.	• Establish effective liaison with emergency services • Site personnel to check Rural Fire Service website (www.rfs.nsw.gov.au) at least twice daily during the fire season (October 1st - March 31st).	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	Twice daily during the fire season (October 1st - March 31st).
B11	Bushfire	Site personnel having no knowledge of declared Total Fire Ban Days.	• Establish effective liaison with emergency services. • Site personnel to check Rural Fire Service website (www.rfs.nsw.gov.au) at least twice daily during the fire season (October 1st - March 31st).	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	Twice daily during the fire season (October 1st - March 31st).
B12	Bushfire	Overgrown asset protection zones	• The asset protection zone would be managed in accordance with Standards for Asset Protection Zones (NSW RFS 2005).	CoA C2 and D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	As required

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
B13	Bushfire	Ineffective revegetation leading to a build-up of ignition sources (e.g. dry, dead vegetation)	• All revegetation is to be in accordance with asset protection zone specifications.	CoA D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	As required
B14	Bushfire	General	• An emergency management plan has been developed in accordance with the NSW RFS Guideline Preparation of Emergency/Evacuation Plan (NSW RFS 2004) • Liaison with the NSW Rural Fire Service Volunteer Bushfire Brigade and with NPWS staff working in the Wingecarribee LGA. • Consultation with these organisations would cover advice of bushfire ignitions sources and their mitigation, public education with respect to bushfires in the area and potential for site management to support and assist the local Rural Fire Service staff and volunteers as appropriate.	CoA C2 and D2 c)	Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018)	As required
T1	Traffic	Traffic congestion and safety concerns	• Heavy vehicles to avoid travelling through Hill Top during the Roads and Maritime school zone program hours (8 am – 9.30 am and 2.30 pm – 4 pm)	CoA D3	Section 5.4	Daily during shooting events
T2	Traffic	Traffic congestion and safety concerns	• Traffic volume reports to be prepared during operation to assist Wingecarribee Shire Council to monitor local traffic conditions.	CoA D3	Section 5.4	As required
E1	Ecology	Damage to surrounding vegetation due to increased visitation or illegal access	• Access to surrounding bushland restricted to existing bushwalking tracks • Block off/ restrict access to tracks through surrounding bushland by installing bollards/ large rocks and boulders (obstacles). Rehabilitate unused/ unwanted tracks via natural regeneration method, supplement with plantings if required.	CoA A1 and B2	Appendix F – Vegetation and groundcover management Ecological Management Plan (GHD, 2010)	Continuously

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
			• Installation of signs at access points restricting off-road access and clearly demarcating walking trails, signage stating 'stay on marked trails' (or similar) • No new access tracks will be created except for emergency fire management. Internal roads will be maintained to ensure all-weather access for 4WD vehicles • Management of illegal vehicle access considerations will be undertaken jointly with the NSW Police and the NPWS, OEH.			
E2	Ecology	Potential removal, damage of native vegetation and possibly disturbance-colonising threatened flora species due to maintenance of access roads and other routine activities	• Implementation of threatened flora management procedure (Appendix E of the Ecology Management Plan GHD, 2010) • Provide induction and species ID cards to all maintenance staff likely to encounter threatened flora (e.g. road maintenance staff, bush regenerators, gardeners, landscapers).	CoA B2	Appendix F – Vegetation and groundcover management Ecological Management Plan (GHD, 2010)	As required
E3	Ecology	Establishment and spread of weeds due to increased visitation to the area	• Implement Weed Management Strategy (Appendix E of the Ecology Management Plan GHD, 2010) • Access to surrounding bushland restricted to existing bushwalking tracks • Block off/ restrict access to unnecessary tracks through surrounding bushland by installing bollards/ large rocks and boulders (obstacles) • No horse-riding permitted in the Complex.	CoA B2	Appendix F – Vegetation and groundcover management Ecological Management Plan (GHD, 2010)	As required
E4	Ecology	Impacts on plants and vegetation communities as a result of too	• Fire management will be in accordance with the Bushfire Management Plan for the Plan area (GHD, 2011).	CoA B2 and D2	Appendix F – Vegetation and groundcover management	Ongoing

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
		infrequent or too frequent fire			Appendix A – Bushfire Management Plan (BC&BHS, 2018) Emergency Management Plan, (ComSafe Training Service, 2018) Ecological Management Plan (GHD, 2010)	
E5	Ecology	Loss of biodiversity values in the range areas	• Regular photos taken at identified and future post development photo points for the purposes of ongoing monitoring of conservation values in accordance with Item 1 y) of the Conservation Agreement (see Section 7.1; Appendix B of the Ecology Management Plan GHD, 2010). This will form the basis for decisions regarding ongoing management actions in consultation with OEH.	CoA B2	Ecological Management Plan (GHD, 2010)	As required
E6	Ecology	Increased risk of invasive species/weeds	• Weed management measures to consider the following: – Control of noxious weeds; and – Reduction of edge effects and invasion of exotic species into adjacent vegetation. • Monitoring European Rabbit activity within the cleared firing ranges through periodic searches of the ranges, noting the presence of this pest species through grazing, burrowing or pellets. Any observed increase in activity would trigger a management plan to prevent the further spread of this species.	CoA B2	Appendix F – Vegetation and groundcover management Ecological Management Plan (GHD, 2010)	As required
E7	Water quality	Soil erosion caused by an increase in velocity and volume of surface water flows due to removal of vegetation, and	• Retain sediment control measures such as silt fences installed during construction phase until cleared areas are sufficiently revegetated • Ensure all swale drains are sufficiently revegetated to infiltrate collected surface runoff from all impervious and developed areas	CoA B3 and D2 f)	Appendix F - Good Management Practice Section 6.1 Ecological Management Plan (GHD, 2010)	Ongoing

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
		reshaping of land profile.	Stop butts and target mounds would be designed to reduce erosion, including the construction of a 2:1 slope to improve stability, to promote low-velocity sheet flow, and to assist with vegetation establishment. *It should be noted, the angle of the forward slope is specified by NSW Police range guidelines as being constructed to at least 30° but ideally 35° in relation to the range fairway* • Minimise the clearance of vegetation and ensure maintenance of stop butts are promptly revegetated • Report all incidents and near misses as per the Incident Report Form • The usage of firing lanes at rifle and pistol ranges would be staggered to minimise on stop butt stability • The establishment of grass where possible as an erosion control, which would also assist with filtering pollutants from runoff • Raking of fine agricultural grade lime into soils within the range, shot fall zones, and stop butts to reduce the mobility of metals by increasing soil pH to within the range of 6.5 to 8.5 • Testing to identify the chemical characteristics of soil around stop butts to confirm maximum quantity of phosphate application in stop butt trenches in order to avoid phosphate accumulation and runoff to waterways • Based on soil testing results, adding phosphate to soils in a trench around the stop butts to further immobilise metals • Monitoring for pH and phosphate levels where lime and phosphate are added to soils • Re-application of lime when the pH of soils is found to drop below pH 6.5		Soil and Water (Ersed Environmental Pty Ltd, August 2018) Water Cycle Management Plan (WCMP) (Ersed Environmental Pty Ltd, August 2018)	

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
			• Lead management measures to prevent metal migrations at the shooting range would entail overlapping of shot fall zones to minimise the area of potential impact • Where feasible the use of less toxic shot (i.e. non-lead) would be promoted by the clubs • A long term monitoring program would be implemented at the site to monitor possible metal accumulation and migration from the site. The monitoring program is outlined in Section 8.1.			
W1	Water quality	Water catchment quality and water contamination from lead	• As above and including: • Sediment control ponds would be established at the commencement of construction and would be retained for operation of the proposal • Stop butts and target mounds would be designed to reduce erosion, including the construction of a 2:1 slope to improve stability, to promote low-velocity sheet flow, and to assist with vegetation establishment. *It should be noted, the angle of the forward slope is specified by NSW Police range guidelines as being constructed to at least 30° but ideally 35° in relation to the range fairway* • Stop butts would be constructed from suitable clean site soils or imported clean fill and all rocks and other debris removed to minimise the potential for ricochet • The stop butt would be designed to minimise contact between water and Projectiles to reduce the rate of shot deterioration and metal leaching • Details on the location, description and nature of stormwater management structures such as pits, pipes, inlet filters, gross pollutant traps, sedimentation basins, and rainwater collection system • An identification of the responsibilities and detailed requirements for the inspection, monitoring and	CoA B3 and D2 f)	Appendix F - Good Management Practice Section 6.1 Ecological Management Plan (GHD, 2010) Soil and Water (Ersed Environmental Pty Ltd, August 2018) Water Cycle Management Plan (WCMP) (Ersed Environmental Pty Ltd, August 2018)	Ongoing

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
			maintenance of all stormwater management structures, including the frequency of such activities • The identification of the individuals or positions responsible for inspection and maintenance activities including a reporting protocol and hierarchy, and procedures for managing and notification of water quality emergencies • Checklists for recording inspections and maintenance activities.			
W2	Water quality	Migration of contaminants from the cleared range areas to Rocky Water Holes Creek and tributaries	• The usage of firing lanes at rifle and pistol ranges would be staggered to minimise on stop butt stability • The establishment of grass where possible as an erosion control, which would also assist with filtering pollutants from runoff • Raking of fine agricultural grade lime into soils within the range, shot fall zones, and stop butts to reduce the mobility of metals by increasing soil pH to within the range of 6.5 to 8.5 • Testing to identify the chemical characteristics of soil around stop butts to confirm maximum quantity of phosphate application in stop butt trenches in order to avoid phosphate accumulation and runoff to waterways • Based on soil testing results, adding phosphate to soils in a trench around the stop butts to further immobilise metals • Monitoring for pH and phosphate levels where lime and phosphate are added to soils • Re-application of lime when the pH of soils is found to drop below pH 6.5 • Lead management measures to prevent metal migrations at the shooting range would entail	CoA B3 and D2 f)	Appendix F - Good Management Practice Section 6.1 Ecological Management Plan (GHD, 2010) Soil and Water (Ersed Environmental Pty Ltd, August 2018) Water Cycle Management Plan (WCMP) (Ersed Environmental Pty Ltd, August 2018)	As required

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
			overlapping of shot fall zones to minimise the area of potential impact • Where feasible the use of less toxic shot (i.e. non-lead) would be promoted by the clubs • A long term monitoring program would be implemented at the site to monitor possible metal accumulation and migration from the site. The monitoring program is outlined in Section 6.1			
W3	Water quality	Increase in surface water runoff from impervious surfaces	• The establishment of grass where possible as an erosion control, which would also assist with filtering pollutants from runoff	CoA B3 and D2 f)	Appendix F - Good Management Practice Section 6.1 Ecological Management Plan (GHD, 2010) Soil and Water (Ersed Environmental Pty Ltd, August 2018) Water Cycle Management Plan (WCMP) (Ersed Environmental Pty Ltd, August 2018)	As required
W4	Water quality	Effluent water quality discharges	• the SHRSC will have an Ecomax Septic System or equivalent, designed in accordance with AS/NZS 1547:2012 • The design wastewater flow allowance for restroom facilities (toilets and hand basins only) is 15 L/equivalent population (EP) / day (roof water supply), and has been designed based on an expected maximum occupancy of 220 EP. • *500 metre range:* – is located 138 metres from Sediment Basin 3 – surrounded on three sides by a 0.5m high earth bund separating it from local surface falls.	B3, D2 f) and AN3	Appendix F - Good Management Practice Section 6.1 Ecological Management Plan (GHD, 2010) Soil and Water (Ersed Environmental Pty Ltd, August 2018) Water Cycle Management Plan (WCMP) (Ersed Environmental Pty Ltd, August 2018)	As required

ID	Environmental Aspect	Impact	Management Measure	Condition	Where addressed	Timing
			– located 225 metres from various ephemeral drainage lines and tributaries within the dense bushland and 1.75 kilometres from Rocky Waterholes Creek. • *50 metre range:* – Is located 42.5 metres from Sediment Basin 5 – surrounded on three sides by a 0.5m high earth bund separating it from local surface falls. – located 2955 metres from various ephemeral drainage lines and tributaries within the dense bushland and 1.87 kilometres from Rocky Waterholes Creek. • Treatment processes include: filtration, pH adjustment, ion exchange, volatilization, biological water and nutrient uptake, oxidation and reduction, absorption, chemical precipitation, detention and evaporation or dilution depending on rainfall/evaporation balance. • Treated effluent is clear, colourless • Fine agricultural grade lime would be applied to soils within the range, shot fall zones, stopbutts and collection trenches to reduce the mobility of metals by increasing soil pH to within the range of 6.5 to 8.5. • The dose of lime required would be determined by laboratory testing and specifications provided for individual lime products. • Re-application of lime would be undertaken when the pH of soils is found to drop below pH 6.5. • Ecomax effluent meets the national health and medical research council guidelines for "reclaimed effluent" but it is not potable.			

6 MONITOR AND REVIEW

6.1 Environmental monitoring

A monitoring program would be implemented to monitor possible metal accumulation and migration from the ranges. The monitoring program includes:

- Soil monitoring – See **Table 6-3**
- Sediment monitoring – See **Table 6-4**
- Surface water monitoring – See **Table 6-5**
- Inspection of shot curtain, stop butts, shot fall zones and erosion control structures – **Table 6-6**
- Inspection of vegetation health and density – **Table 6-2**.

All proposed environmental monitoring and reporting of soils, sediments and water will be undertaken by a suitably qualified person(s).

The proposed monitoring programs should be read in conjunction with the WCMP and the SWMP.

Sampling plan examples are provided in Appendix A of the WCMP for the various ranges at the Complex. These are guides to sampling requirement locations and numbers and should be confirmed within the WCMP for each sampling exercise.

Sampling areas and methods would be undertaken following the guidelines provided in **Table 3-6** and assessment criteria adopted are provided in **Table 6-1.**

Table 6-1: Assessment criteria adopted for monitoring

Aspect	Guideline	Criteria
Soil and sediment	NEPM National Environment Protection (Assessment of Site contamination) Measure (1999 Amended 2013):	Health Investigation Level (HILs) C Developed Open Space (Parks, playgrounds, playing fields use, includes public recreational facilities such as SHRSC)
		Ecological Investigation Levels (EILs) for urban residential and public open space land
Water	ANZECC, (2000) – Australian and New Zealand Guidelines for Fresh and Marine Water Quality	ANZECC Protection of fresh water species (PFWS)- 95% trigger value
		ANZECC Recreational Water Quality Guidelines (RWCG)
	NEPM National Environment Protection (Assessment of Site contamination) Measure (2013).	Ground Water Investigation Levels (GILs) for Freshwater Note: As GILs for Antimony (Sb) are not available due to insufficient data, a Low Reliability Trigger Value is adopted from Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 2. Aquatic Ecosystems — Rationale and Background Information (Chapter 8) 2000.

6.2 General monitoring requirements

Table 6-2: General monitoring requirements

Aspect	Monitoring required
Vegetation	Regardless of whether direct measurement or an indirect quantitative method is being used, at least: • one full growing season (one year) would be allowed for vegetation growth before evaluating performance. • Two full seasons (years) of growth and establishment are even more desirable to accurately judge the success of revegetation efforts to minimise erosional transport of lead.
Vegetation management and chemical use	• Vegetation and groundcover at the ranges would be inspected annually by the Venue manager • If there is visual evidence of erosion or bare areas of groundcover at any time, localised areas of revegetation may be required. • Use of chemicals at the SHRSC will be tracked and used in the planning and reporting of ongoing sampling exercises. These would be recorded in the template provided in **Appendix C – Environmental and Safety Forms** (or similar). • Particular attention will be required at the outlet areas of drainage infrastructure to monitor and manage any issues with weed establishment and spread.
Noise monitoring	Attended noise monitoring is to be undertaken: • on the first three (3) occasions of use of each range / facility, • thereafter, quarterly in the first twelve months of operations (aligned with each season) and • annually thereafter to confirm noise levels from firearms measured at residences comply with appropriate limits. The monitoring must include that of the known noisiest firearms being used at the SHRSC. The noise from firearms or use of the site must not exceed LZpeak 75 dB, in accordance with the EPA's Target Shooting Ranges: Application Note for Assessing Noise Compliance (2015).
Bullet tracking	• Tracking and reporting of quantities and types of ammunition/ bullets is required across all ranges. • This information would be used to inform ongoing monitoring at the facilities and reported within the annual reporting of sampling at the ranges in the template provided in **Appendix C – Environmental and Safety Forms**
Management of soil pH as part of lead management	• Intensive monitoring of soils in the key management areas (primary and secondary impact areas) is recommended to confirm and track soil pH levels. • This sampling may be undertaken by a suitably qualified person(s) every second quarter with simple field kits • Formal monitoring of pH in these areas every six (6) months timed to coincide with water monitoring. • The monitoring program in **Table 6-3** would be adhered to. • Data from these field sampling exercises will be recorded in the template provided in **Appendix C – Environmental and Safety Forms** and included in annual monitoring reports.

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Table 6-3: Proposed monitoring program for soils

Analytes/Suite	Frequency	Sample locations	Assessment criteria (mg/kg)	
			Site specific EILs relevant to land use	NEPM HIL (C) Recreational
PAH Total	Annually	• Primary shot zones • Secondary shot zones • Shot fall areas		300
PAH - B(a)PTEQ				3
PAH - B(a)P			(ESL) 0.7 [2]	-
Cadmium			-	90
Arsenic			100	300
Chromium			414	300
Copper			132	17,000
Mercury			-	13
Nickel			34	1,200
Antimony			-	15[3]
Tin			Observations only no default criteria referenced in NEPM 2013	
Lead			1,113	600
Zinc			190	30,000
Iron			Observations only no default criteria referenced in NEPM 2013	
TCLP		Selective analysis only for samples which return values > 250% of the NEPM HILs (C) criteria to assess material handling and management requirements. Consideration to be given to NSW Waste Classification Guidelines where required.		
Cation exchange Capacity (CeC)		Selective analysis only to monitor soil condition and potential changes over time. Used for possible recalculation of EILs where required.		

[2] Ecological Screening levels
[3] Dutch intervention value for Antimony in Soil / Sediment (Feb 2000)

Analytes/Suite	Frequency	Sample locations	Assessment criteria (mg/kg)	
			Site specific EILs relevant to land use	NEPM HIL (C) Recreational
pH	6 monthly Plus quarterly field sampling of pH in primary and secondary impact areas	**For areas outside the primary and secondary impact zones:** • Values should statistically correspond with background concentrations. • Discussion of reported pH values and possible management issues are to be addressed in the ongoing monitoring reports. **For areas within shot fall zones:** • pH values should be maintained to achieve the objectives of best practice management of those areas, and the potential for pH to affect the mobility of target analytes. • The target pH for best practice management of shot fall areas should approximate pH 7 (pH 6.5-8.0) where other leachate engineering controls have not been otherwise adopted. For areas within shot fall zones, observed pH values should reflect the objectives of the management of those areas and be discussed in relation to the potential for pH to effect the mobility of target analytes. Generally, this will result in a target pH to be pH 7or above.		
Clay content	As required	Clay content is used for generation of EILs and to inform consideration of values in homogeneous soil.		

Table 6-4: Proposed monitoring program for sediments

Analytes/Suite	Frequency	Sample locations	Assessment criteria (mg/kg)	
			Site specific EILs relevant to land use	NEPM HIL (C) Recreational
PAH	Annually	• All basin inlets and below outlets • Creek areas accessible off range when available.	4,000	45,000
Cadmium			1.5	10
Arsenic			20	70
Chromium			80	370
Copper			65	270
Mercury			0.15	1
Nickel			21	52
Antimony			2	25
Tin			For observation only – no default criteria referenced in ANZECC 2000	
Lead			50	220
Zinc			200	410

Analytes/Suite	Frequency	Sample locations	Assessment criteria (mg/kg)	
			Site specific EILs relevant to land use	NEPM HIL (C) Recreational
Iron			For observation only – no default criteria referenced in ANZECC 2000	
pH	6 monthly Plus quarterly field sampling of pH in primary and secondary impact areas	• pH should reflect the operational objectives of the treatment train for the surface water sampled. • Samples from areas at or below the outlet from water quality structures should generally be consistent with the pH range reported in sampling events to date. Extreme values either high or low should be addressed for management action in ongoing monitoring reports. • At areas within treatment trains of surface water quality system, pH should reflect the objectives of that stage of the treatment train given that it directly affects mobility target contaminants.		
Clay content	As required	Only when suggested by external factors or observations		

Table 6-5: Proposed monitoring program for surface waters

Analytes/Suite	When	Where	Assessment criteria	
			ANZECC 2000 PFWS/NEPM GIL	ANZECC 2000 RWQG
Total N	Six monthly	• All basin inlets and below outlets • Creek areas accessible off range when available.	For observations only – Comparison value = 250 µg/L[4]	
Ammonia as N[5]			900 µg/L (0.9mg/L) Comparison Value = 13 µg/L (0.013mg/L)[6]	10,000 µg/L (10 mg/L)
Phosphate (FRP)			0.15 mg/L	-
Dissolved oxygen			For observations only – Comparison value = 90-100%[7]	
Phosphorus			For observations only – Comparison value = 20 µg/L [8]	
Nickel			11 µg/L	100 µg/L
Arsenic (As-V)			13 µg/L	50 µg/L

[4] Default Trigger Values for physical and chemical stressors for slightly disturbed ecosystems in SE Aust. Upland River (Chapter 3 Table 3.3.2 ANZECC WQG) –Total Nitrogen 250 µg/L.

[5] Ammonia as Nitrogen (N) is variable based on pH. Possible pH ranges between pH 6.5 to pH 8.5 are 2460 µg/L to 400 µg/L or 2.46 mg/L to 0.4Mg/L. (ANZECC 2000 WQG-guidelines-vol2-8-3 Table 8.3.7 Freshwater trigger values as total Ammonia-N in µg/L at different pH.) This is the expected range for reporting purposes.

[6] Default Trigger Values for physical and chemical stressors for slightly disturbed ecosystems in SE Aust. Upland River (Chapter 3 Table 3.3.2 ANZECC WQG) –NH4+ 13 µg/

[7] Default Trigger Values for physical and chemical stressors for slightly disturbed ecosystems in SE Aust. Upland River (Chapter 3 Table 3.3.2 ANZECC WQG) - for Dissolved Oxygen Upper and Lower Limit 90 % Saturation and 110 % Saturation

[8] Default Trigger Values for physical and chemical stressors for slightly disturbed ecosystems in SE Aust. Upland Rivers (Table 3.3.2 ANZECC WQG Ch3) - Total Phosphorus 20 ug/L or 0.02mg/L

Analytes/Suite	When	Where	Assessment criteria	
			ANZECC 2000 PFWS/NEPM GIL	ANZECC 2000 RWQG
Chromium (CrIII)			3.3 µg/L[9]	50 µg/L
Lead			3.4 µg/L	50 µg/L
Copper			1.4 µg/	1,000 µg/L
Zinc			8 µg/L	5,000 µg/L
Antimony			9 µg/L	-
Electrical Conductivity (EC) /Salinity				30-350 µscm^{-1}
Glyphosate			1,200 µg/L	200 µg/L
Ph		• pH should reflect the operational objectives of the treatment train for the surface water sampled. • Waters from areas at or below the outlet from water quality structures should generally be consistent with the range observed in sampling to date. Extreme values either high or low should be discussed and responded to as part of reporting on sampling exercises. • For areas within treatment trains of surface water quality measures. pH should reflect the objectives of that stage of the treatment train as it directly effects mobility target contaminants. • Comparison value pH6.5- pH8.0[10]		
Turbidity		• 50mg/L as measured by laboratory and/ or as per adopted field NTU reading following approved correlation. Comparison value 25 NTU[11]		

[9] Low Reliability Trigger Value (ANZECC WQG Vol2 Chapter 8) - Chromium III for Freshwater Aquatic species of 3.3 ug/L in low hardness water (30mg/L CaCO3)
[10] Default Trigger Values for physical and chemical stressors for slightly disturbed ecosystems in SE Aust. Upland River (Chapter 3 Table 3.3.2 ANZECC WQG) –pH 6.5-8.0.
[11] Default Trigger Values for physical and chemical stressors for slightly disturbed ecosystems in SE Aust. Upland River (Chapter 3 Table 3.3.3 ANZECC WQG) – Turbidity 25 NTU. High values may be observed during high flow events

Table 6-6: Monitoring program for visual inspections

Location	Inspect	Frequency
Water Quality Basin Outlets, inlets and Surrounds	Evidence of scour/ failure of structure	Six monthly and after any severe storm events
Engineering controls including berms, drains, channels, stopbutts, access tracks and culverts	Evidence of damage, erosion, sediment outside controlled areas.	Six Monthly and after any severe storm events
Engineering controls – Lime treatment process	Lime treatment pits and other accessible subsurface drainage	Six monthly
Safety and signage	Fencing around sedimentation basins, visibility of signage	Six monthly
Range perimeter	Evidence of loss and/or damage from stray projectiles	Annually

6.3 Changes to the SHRSC and associated monitoring

Quantitative measurement of environmental factors would be undertaken initially after any modifications at the SHRSC site and at least annually or after any significant incident or complaint.

Evaluating the effectiveness of range modifications at reducing lead transport can be performed in a number of ways. Lead levels found in transport pathways (surface water/runoff, groundwater, air) can be measured directly or calculated as a change in transport potential.

Two direct quantitative methods for measuring the effectiveness or success of range modifications are as follows:

- Comparison of lead concentrations in a particular transport pathway (surface water/runoff, groundwater, air) before and after range modifications
- Comparison of lead levels to regulatory criteria or concentration goals after modifications

6.4 Environmental Reporting

As required, contamination assessment/remediation reports should be compiled in accordance with the NSW *EPA (2011) Guidelines for Consultants Reporting on Contaminated Sites* by a suitably qualified person.

The results of the monitoring are to be incorporated into an annual report to be prepared by Office of Sport and submitted to Water NSW.

The report as a minimum is to contain the following sections:

- Summary, highlighting any test failures and site observations
- Map and summary of testing locations
- Analysis of testing results including trend analysis i.e. changes over the monitoring period
- Recommendations for remedial work, and modifications to management procedures
- Recommendations to change the monitoring program i.e. additional testing, change of frequency etc.
- SHRSC remedial or management works undertaken including removal of lead Projectiles from stop butts, volume retrieved and method of disposal.

6.5 Environmental Auditing

Each year for the first three years of operation of the new ranges, and every three years thereafter, unless the Secretary directs otherwise, the proponent must commission and pay the full cost of an Independent Environmental Audit of the Project.

The audit team must be led by a suitably qualified auditor, and must include relevant experts in any other fields specified by the Secretary.

The audit report must be submitted to the Secretary, together with its response to any recommendations contained in the audit report within three months of commissioning the audit, or as otherwise agreed by the Secretary.

The Condition A11 of Modification 5, outlines the requirements for independent auditing and compliance report. See Table 3-2 for more details

6.6 OEMP Review

A review of the OEMP would occur at least one annually, to determine whether the OEMP has been implemented and performed as intended, the problems (if any) encountered, and what types of adjustments (if any) would be made. It is also useful to monitor the environmental benefits that have resulted from implementation of management and engineering actions.

6.7 Document Control and Records

Record-keeping is essential for evaluation of the OEMP. Records that may be useful in evaluating the effectiveness of this Plan include, but not be limited to, the following:

- Range inspection by the Venue Manager
- All monitoring and inspection reports
- External audit reports
- Reports of pollution incidents, environmental non-conformances and follow-up actions
- Reports of environmental complaints and follow-up actions
- Photographs of pre-existing conditions versus conditions after environmental improvements have been implemented (before and after photographs)
- Log of actual implementation dates, problems addressed, associated costs, conditions, problems encountered, and follow-up actions
- Frequency of changed operational practices (i.e. mowing on poorly vegetated soils) and observed results
- Comparison of changes in operational costs related to changed procedures
- Frequency and type of environment-related complaints from range users or the public/spectators.

An example records schedule is provided below in Appendix C – Environmental and Safety Forms.

APPENDIX A BUSHFIRE MANAGEMENT PLAN

Attached Separately

APPENDIX B EMERGENCY BUSHFIRE EVACUATION PROCEDURE PLAN

INTRODUCTION

This plan is for SHRSC (50 metre, 500 metre and 800 metre ranges) and has been designed to assist management to protect life and property in the event of a bushfire.

The aim is to have preplanning for an evacuation of the premises where there is a need to relocate a group of people from one place to another to enhance the protection of those people.

This is a sub-Plan of the OEMP required under condition D2 (d) of the Minister's Conditions of Approval.

This Plan should be read in conjunction with the Emergency Management Plan (ComSafe Training Services, 2018) and the Bushfire Management Plan (Building Code & Bushfire Hazard Solutions P/L, 2018).

ROLES AND RESPONSIBILITIES

Table B 1 highlights the key personnel and contact detail in the unlikely event of an emergency situation occurring at the Project site.

Table B 1: Roles and responsibilities of the key personnel for emergency evacuations at the Project site

Role	Building/Area of responsibility	Contact phone number
Chief warden	50 metre, 500 metre and 800 metre ranges	

EVACUATION TRIGGER

An evacuation may be initiated under the following circumstances:

- A bushfire is known to be nearby/approaching the ranges
- A bushfire originates within the ranges or is travelling through the ranges
- There is so much smoke about that it is causing medical problems for users and range operators and that they would be taken somewhere less affected by smoke
- Wait until you are told to leave by police or fire authority before you evacuate (Not advisable but sometimes unavoidable).

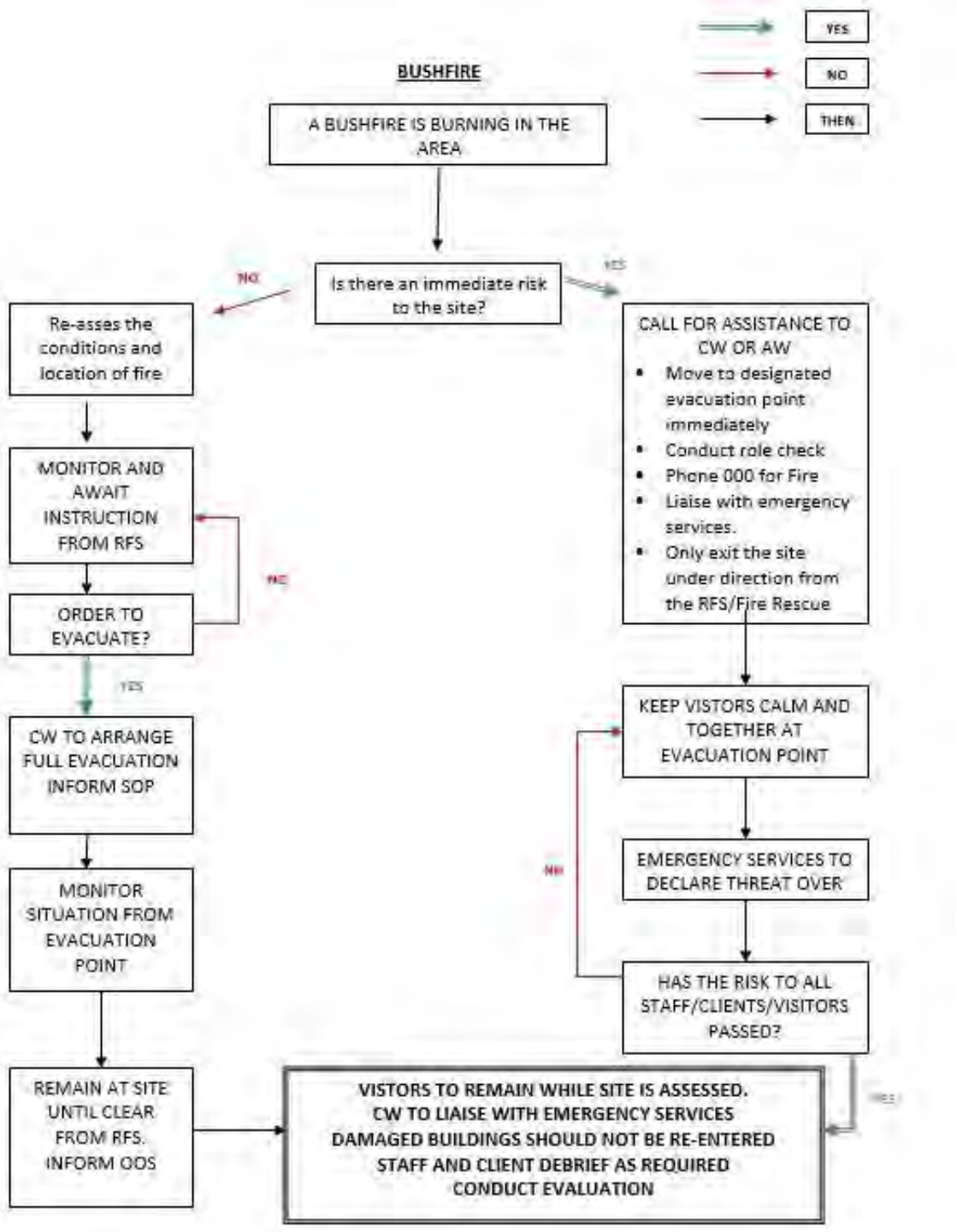


Figure B 1: Process for assessing bushfire risk and evacuation

EVACUATION LOCATION

Venues identified as potentially ‘safe-refuge’ are shown below.

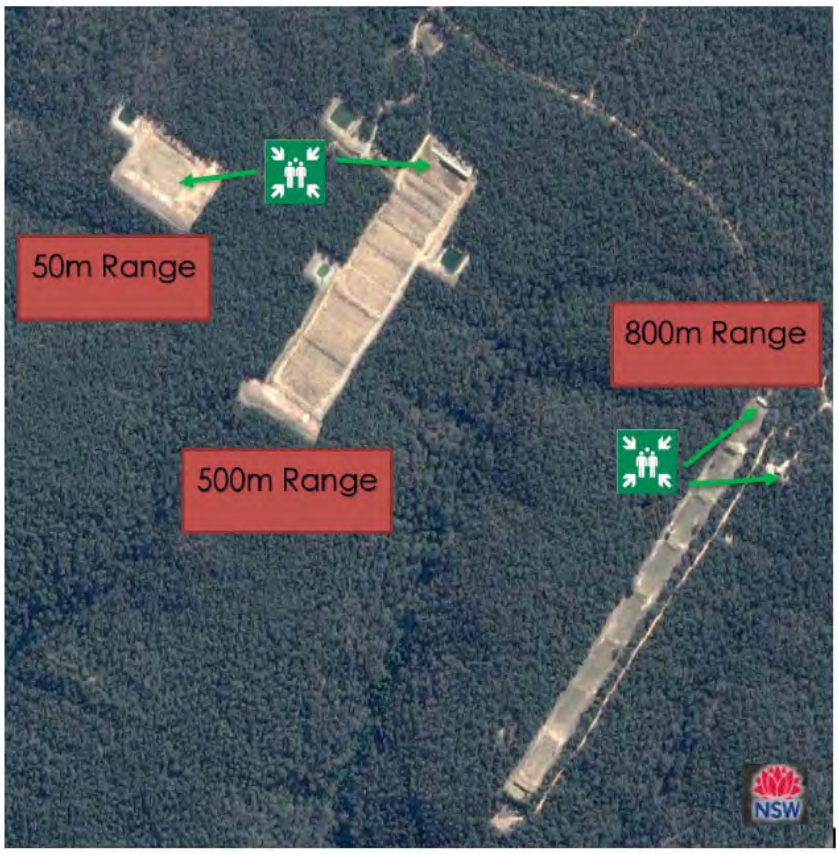


Figure B 2: On site Emergency Evacuation Plan for SHRSC

50 metre range

Location: Inside the concrete dividing walls of the firing lines.

Description: The concrete walls of the firing lines south of the firing point will provide some degree of safety from an incident, particularly bushfire. This location does not provide any amenities such as drinking water, toilet facilities, seating, client security or land line communication.

500 metre range

Location: The open space immediately in front of the firing point.

Description: The area in front of the firing point to the south is recommended as a final assembly area or a staging area dependent upon the type of incident and its extent. This area is open to smoke and embers but is sufficiently close and central to emergency transport.

800 metre range

Location: Inside the firing point structure or adjacent the Temporary Site Office

Description: The firing point itself is recommended as one of two possible final assembly or staging areas dependent upon the type of incident and its extent. The other area is adjacent the temporary Site Office beside the Club house. Both areas will be subject to smoke and embers but are sufficiently close to emergency transport.

OFFSITE EVACUATION (IF REQUIRED)

Where an approaching bushfire is of high intensity or is likely to impact the Complex, all occupants including contractors and staff should be relocated to safer, more tenable areas at Hill Top.

In these circumstances the following should be adhered to:

- Evacuation must be undertaken early to avoid being caught in the fire
- Do not attempt to evacuate at the last minute, evacuate early if possible
- Follow the advice of the RO/OOS or the responding fire authority
- If fire is close it may be safer to seek shelter within the Temporary Site Office building until the fire passes
- Roads are extremely dangerous places to be caught during a fire. There are more than 2 km of road between the Complex and the township of Hill Top. External relocation or evacuation will require travel along Wattle Ridge Road. This road may become involved in fire or be severely impacted by smoke thus becoming unsafe for all road users. Where bushfire impact likely or known to have occurred, occupant evacuation along Wattle Ridge Road during direct bushfire impact must not be allowed.
- Stay calm, do not panic.

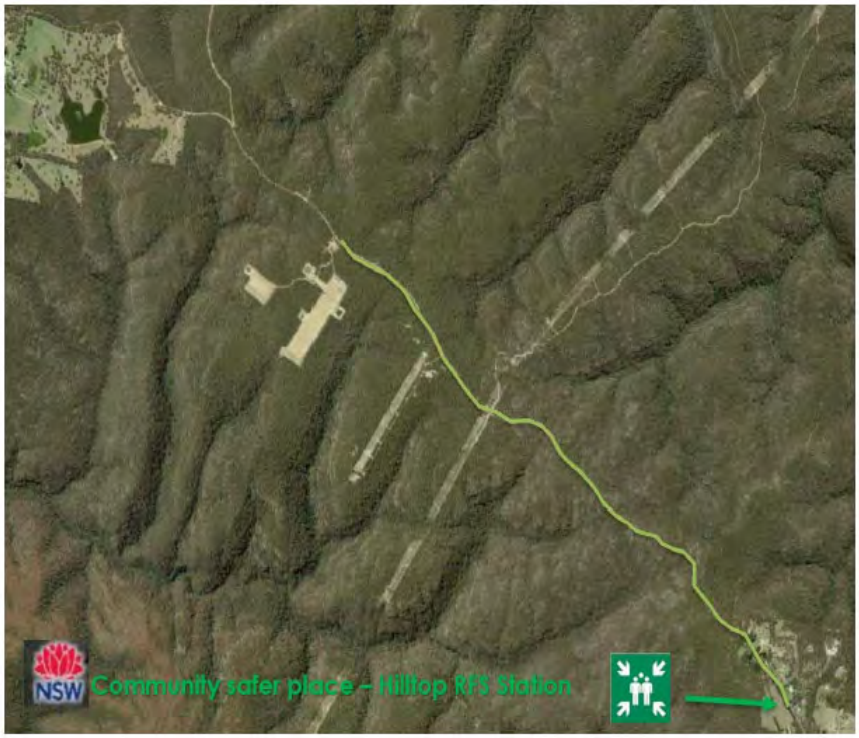


Figure B 3 Off site neighbouring safer place - SHRSC

TRANSPORTATION

Users and range operators are expected to use their own vehicles to access the Complex as public transport is not available to the Project site. The primary mode of transport from the site by users and range operators in the event of an emergency evacuation would be by their own vehicles or persons who do not have their own vehicle, would car pool with users/operators that do have a vehicle.

In the unlikely event that alternate transport is required, the local taxi services would be contacted. Their details are as follows:

Name: Southern Highlands Taxi

Contact: (02) 4872-4800

ENSURING ALL PERSONS AT THE RANGES ARE ACCOUNTED FOR

During an incident, it is imperative that all occupants within any of the ranges and grounds are accounted for by Complex staff. This function shall require a full head count as they arrive at a designated Final Assembly Area or before they leave the Complex. This will be cross referenced with the visitor entry book.

The process of carrying out this function will be difficult however booking information may be of assistance accounting for all visitors is extremely important, as it is possible that attending Emergency Services may have to re-enter burning areas to search for someone who has already left the area thus placing the fire fighters at further unnecessary risk.

Additionally, where bushfire impact occurs, visibility may be seriously reduced by smoke therefore moving occupants to a safe final assembly area away from the bushfire will greatly assist the head count and provide reasonably tenable conditions.

CONTACT DETAILS

See Section 4.8.4

SECURITY DETAILS

The Office of Sport would be responsible for security at the Complex.

In the event of an emergency evacuation, security would not be required, however, users would ensure their firearms are correctly stored and put away.

SITE PLANS

See Figure 2-2

Also see Appendix B of the Bushfire Management Plan (Building Code & Bushfire Hazard Solutions P/L, August 2018)

EVACUATION PROCEDURES

In the event of a fire at a range building the procedures outlined in Section 7 of the Emergency Management Plan (ComSafe Training Services, 2018) would be followed.

APPENDIX C ENVIRONMENTAL AND SAFETY FORMS

Environmental/Emergency Incident Report

Safe Work Method Statement (SWMS)

Records Schedule Example

ENVIRONMENTAL/EMERGENCY INCIDENT REPORT (TO BE COMPLETED BY THE RO OR WITNESS)

1.	Full name	
2.	Job title/relevance	
3.	Were you directly involved in the incident/ non-compliance? *If no, state capacity in completing this form*	YES/NO CAPACITY:
4.	Date of incident/non-compliance	
5.	Time of incident/non-compliance	

6. Brief description of the location of the incident/non-compliance

7. What occurred?

- □ Incident
- □ Near miss
- □ Non-compliance with relevant legal and other requirements

8. Nature of the occurrence?

- □ Fire
- □ Explosion
- □ Spillage, leakage or uncontrolled discharge of substances (other than special, hazardous or restricted substances)
- □ Spillage of special, hazardous or restricted substances (e.g. oil, detergent, paint)
- □ Emission to air of gas, dust, fumes or other pollutants
- □ Pollution of water courses, surface water drains, foul water sewers
- □ Contamination of land, flora, fauna
- □ Damage to archaeology, listed building, local heritage etc.
- □ Noise, litter, light, odour, vibration or other nuisance
- □ Waste management (escape or improper storage/disposal)
- □ Human health and safety
- □ Other risk *(please describe below)*

Details of incident *Give as much detail as you can. For instance, the name of any substances involved, what happened leading up to the event, the part played by any people including third parties, the names of any witnesses, any action taken at the time of the event.*

Containment:
Clean up/remediation actions:
Other details:
Were the police or emergency services involved? YES/NO If YES, give details:
Rectification/Rehabilitation required?

Training/Re-training required?
Incident investigation undertaken?
Witness names and contact details:
Details of any preventative actions taken:
Signature: Date of completing this form:

SAFE WORK METHOD STATEMENT (SWMS)

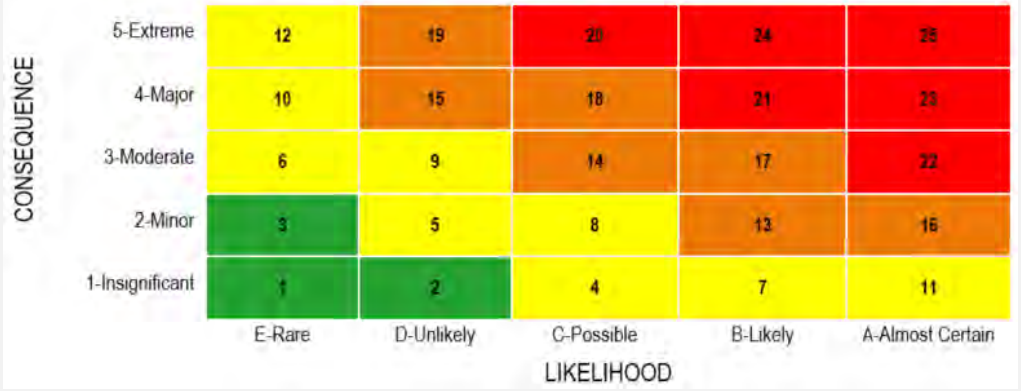
SWMS Title: Describe the task or activity covered by this SWMS			
Date:		Version Number:	
Project Name:			
Site/ Location Name:			
Site/Location Address:			

This SWMS was prepared by: (insert name, signature, position and date below)			
Name	Position	Signature	Date

This SWMS was Approved by: (insert name, signature, Name of Project manager and date below)			
Name	Project manager	Signature	Date

The names and positions of personnel assigned the responsibility for supervising this work and their qualifications are as follows:			
Name	Position	Qualifications	Date

Risk Assessment Matrix



Risk Rating

KEY	CONTROL MEASURES	OUTCOME
1-3 Low Level Risk	These risks are regarded as acceptable within normal business activities, are managed effectively by routine and standard procedures and can be excluded from further detailed consideration.	Continue with the Work
4-12 Medium Level Risk	Staff can arrange their own risk assessments and control measures provided that they are competent to do so.	Competent Staff can decide to Proceed
13-19 High Level Risk	Discuss risks and proposed controls with your line manager who will decided whether senior management attention and further evaluation is necessary. A risk action plan is normally needed which clearly allocates responsibilities and timetables for action	Manager can decide to proceed
20-25 Very High Level Risk	These risks will require close management attention at senior level, detailed evaluation and a formal risk action plan.	Only the Regional Board can decide to proceed

Risk Consequence

Risk Likelihood

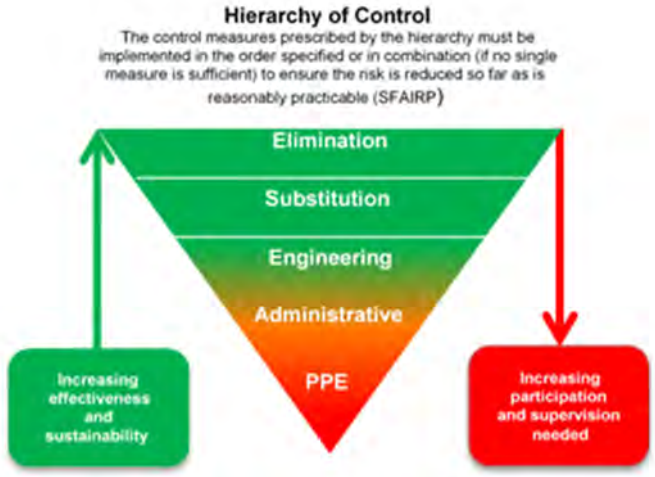
Consequence	Description	Score
Extreme	Project Terminated through our default and / or > loss of all Net Contribution Large scale shareholder losses or damage to our public image. Incident involving a fatality or permanent disability. An environmental impact that is likely to spread beyond the immediate site and will remain a serious problem over a prolonged period. Damage to property greater than $ 1 million	5
Major	Large negative impact on key performance indicators. >60% Loss of Net Contribution Major injury that would require a prolonged recovery or result in an incomplete recovery or a life threatening illness or disease. An environmental impact that is severe and likely to impact beyond the immediate site and remain a problem in the medium term Damage to property greater than $100k	4
Moderate	Significant negative impact on key performance indicators. Loss of production capability, 25% - 60% Loss of Net Contribution. Broken bones or any injury that results in over 3 days lost work time. Onsite environmental impact that is localised and has short term effects. Damage to property greater than $10k but less than $100k-	3
Minor	Minor negative impact on key performance indicators. 5% - 25% Loss of Net Contribution Minor injuries that require first aid treatment. On-site release immediately contained resulting in only minor and transient environmental impact. Damage to property between $500 and $10k	2
Insignificant	Insignificant negative impact on key performance indicators. Trivial effect on Net Contribution Minor cuts, bumps or bruises that don't require first aid No appreciable environmental impact Damage to property under $500	1

Likelihood	Description	Score
Almost Certain (>50%)	The event/impact is common and expected to occur in most circumstances	A
Likely (25% - 50%)	The event/impact has happened before and will probably occur again	B
Possible (10% - 25%)	This event/impact could occur at some time	C
Unlikely (5% - 10%)	This event/impact is not likely to occur	D
Rare (<5%)	This event/impact may occur in exceptional circumstances	E

HIERARCHY OF CONTROL DEFINITIONS

Controlling risks in a workplace is necessary to prevent injury, illness and or environmental damage. First, identify and assess the risks, then decide on the best way to control them by applying the Hierarchy of Control as follows:

1. **Elimination** - controlling the hazard at source
2. **Substitution** - replacing one substance or activity with a less hazardous one
3. **Engineering** - installing guards on machinery
4. **Administration** - implementing policies and procedures for safe work practices
5. **Personal Protective Equipment** - use of goggles, respirators, and ear plugs etc.



When deciding on the best way to control a risk, start at the top of the hierarchy of controls, i.e. investigate if the risk can be eliminated first, for example by changing the way the work is done, or by substituting safer substances or equipment. This is the most effective way to control a hazard. If these methods are not possible, use engineering, administrative controls to reduce or minimise the risk.

Step #	**Work Activity Sequence** *Step by Step*	**Hazard/Aspect** *Against each step or location list the hazards that may adversely affect people plant (equipment) or the environment*	**Risk/Impact** *Describe the harm that could result to people plant (equipment) or the environment*	**Inherent risk** *Risk rating before controls*			**Controls** *For each risk list the existing or required measures to be applied to eliminate or minimise the risk*	**Residual Risk** *Risk rating after controls*		
				C	L	IR		C	L	RR

Step #	Work Activity Sequence *Step by Step*	Hazard/Aspect *Against each step or location list the hazards that may adversely affect people plant (equipment) or the environment*	Risk/Impact *Describe the harm that could result to people plant (equipment) or the environment*	Inherent risk *Risk rating before controls*			Controls *For each risk list the existing or required measures to be applied to eliminate or minimise the risk*	Residual Risk *Risk rating after controls*		
				C	L	IR		C	L	RR

Competency and Training (list the licenses, certificates of competency or training required to undertake work under this SWMS)	

Personal Protective Equipment (list the PPE required to undertake work under this SWMS)	

Hazardous Chemicals used (list any hazardous chemicals required to undertake work under this SWMS)	

Emergency plans or rescue procedures relevant to the activity (list applicable emergency plans or procedures)	

Work health and safety legislation that applies to work under this SWMS	

Australian standards that apply to work under this SWMS	

Codes of practice that apply to work under this SWMS	

Manufacturers / suppliers specifications that applies to work under this SWMS	

SWMS Induction Statement
I have read and understood the content of this safe work method statement and will implement the controls prescribed for the protection of my health and safety, the environment or plant and equipment. I have asked questions or queried where I was unsure or concerned about any part of the safe work method statement. If circumstances change and I am not able to carry out the whole or part of this task according to what is specified in this safe work method statement I will cease work and immediately advise my supervisor and assist in reviewing this safe work method statement.

I acknowledge I have the right and responsibility not to commence, or cease work, that I reasonably believe to pose a risk to my health and safety, that of co-workers or members of the public.

Name	Signature	Date	Name	Signature	Date

Records Schedule Example

Project or action	Responsibility	Initial (I) or recurring (R)	Start date	Completion date	Cost	Follow up actions (if required)

APPENDIX D STORMWATER STRUCTURES

See Soil and Water Management Plan attached Separately

APPENDIX E EXISTING ENVIRONMENT

CONTAMINATION

Soil/sediment and water samples were collected in May 2015 by Ersed Environmental[12] to validate the results of the initial 2013 sampling event, to gather further data and to determine any potential contamination.

Soils/sediments and water samples were collected from:

- Sediment basin (B1) and the 500 metre range sediment basins (B2 and B3) and the existing pond at the car park sediment basin (B4)
- A natural creek off catchment located approximately 300 metres east of the 500 metre range
- Pond adjacent to the 800 metre range
- Channel at rear of 800 metre range
- The stop butt impact area and the mulched sump behind the impact area on the 800 metre range

These locations are shown in Figure E 1 and Figure E 2 below. The results are provided in the **Error! Reference source not found.** section below.

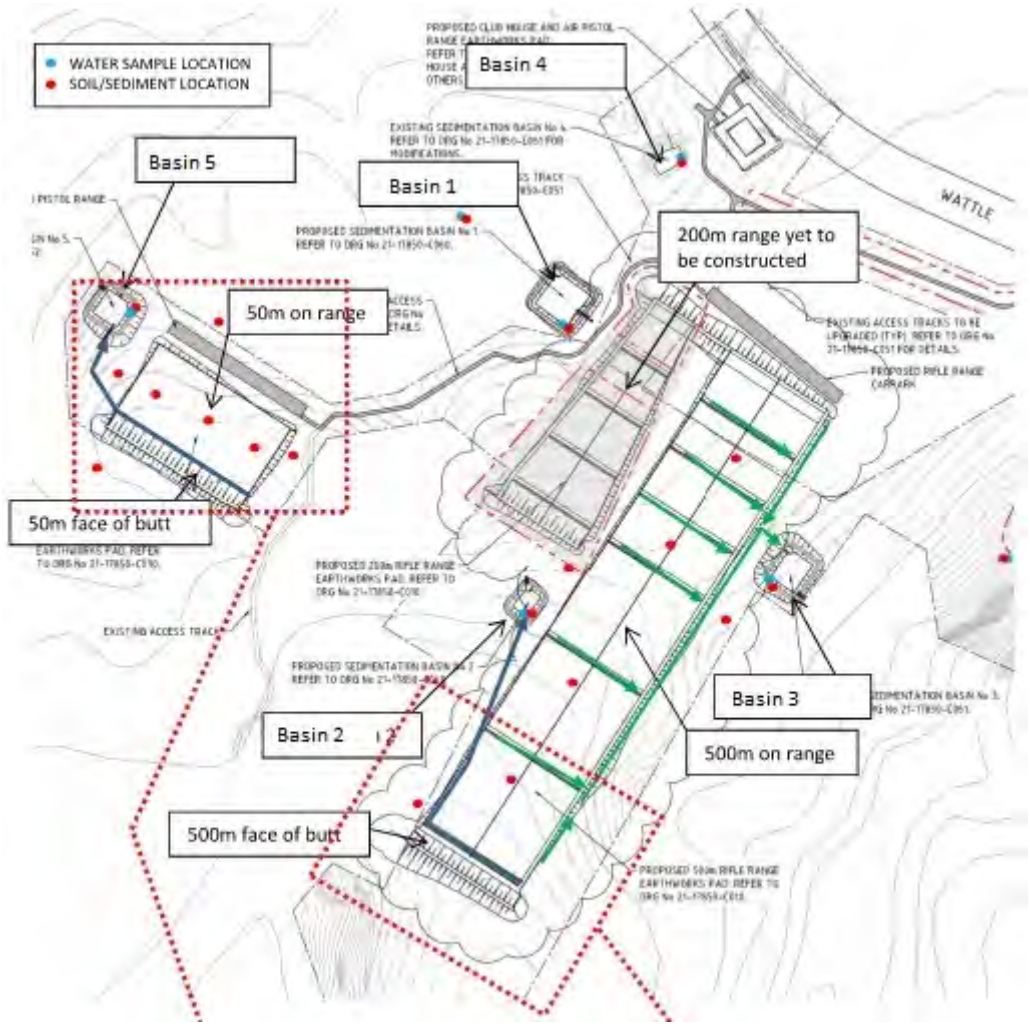


Figure E 1: Soil/sediment and water sampling locations undertaken at 50m and 500m ranges in May 2015

[12] Results for the sampling is included in the *Southern Highlands Regional Shooting Complex (SHRSC) Soil, Water and Sediment Monitoring & Assessment,* February 2016, prepared by ErSed Environmental Pty Ltd

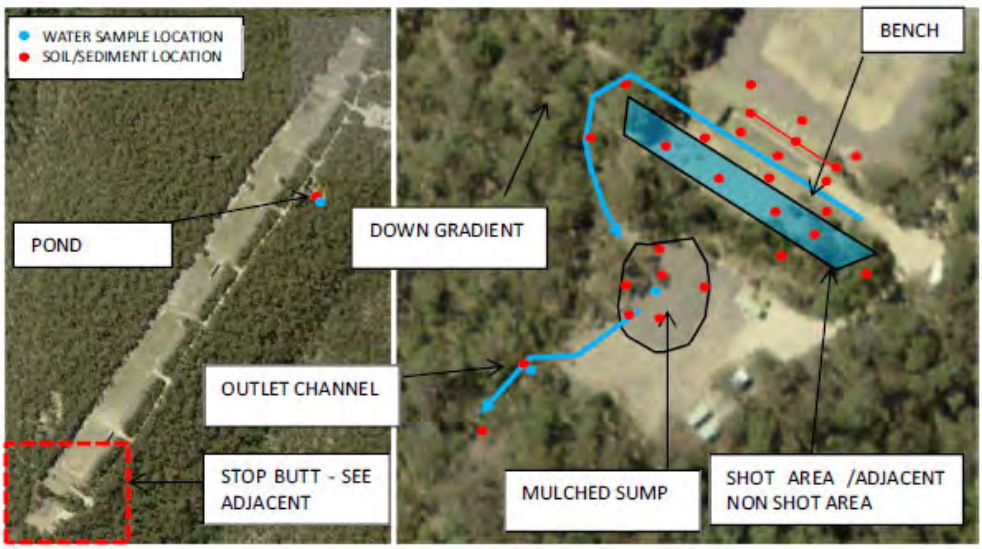


Figure E 2: Soil/sediment and water sampling locations at 800 metre range in May 2015

Results for 50 metre and 500 metre ranges

See Table 7, **Error! Reference source not found.**. No contamination issues were identified within samples from the non-operational areas (50 metre and 500 metre ranges) for any anolytes. Similarly, no contamination issues were identified for:

- Ammonia
- Phosphorous
- Nickel
- Arsenic
- Chromium
- Lead.

However, ANZECC Protection of Fresh Water Species (95 per cent) Levels were exceeded for:

- Nickel
- Copper
- Zinc.

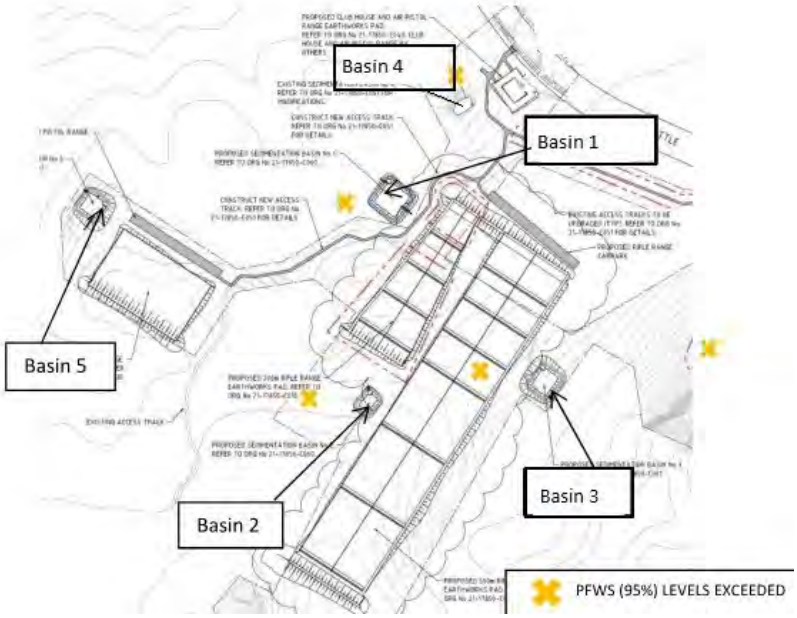


Figure E 3: Locations where ANZECC Protection of Fresh Water Species (95 per cent) Levels were exceeded

Results for 800 metre range

Sampling of the stop butt area on the 800 metre range showed some contamination with NEPM 2012 HIL D Industrial being exceeded for lead only (Table 8, **Error! Reference source not found.**).

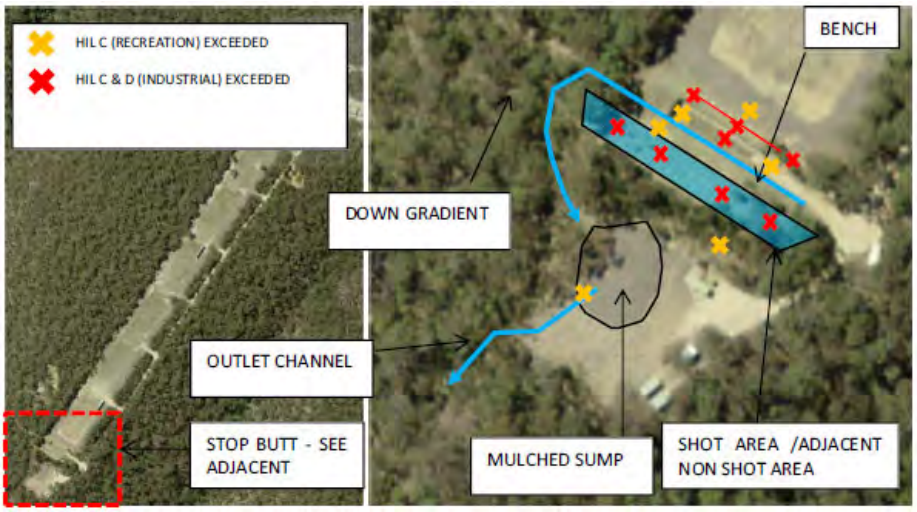


Figure E 4: Sampling locations where contamination levels exceed HILS (C & D) on 800 metre range

ANZECC Protection of Fresh Water Species (95%) /NEPM GIL Levels were exceeded on the 800 metre range (Table 10, **Error! Reference source not found.**) for the following:

for:

- Nickel
- Arsenic
- Chromium
- Copper
- Zinc

This was for the sample taken from the seepage water at the invert of the mulch pond at rear of 800 metre stop butt. This water returned a pH of 2.2.

Such highly acid conditions can be expected to increase the leaching and mobility of metals from soils and any contamination sources.

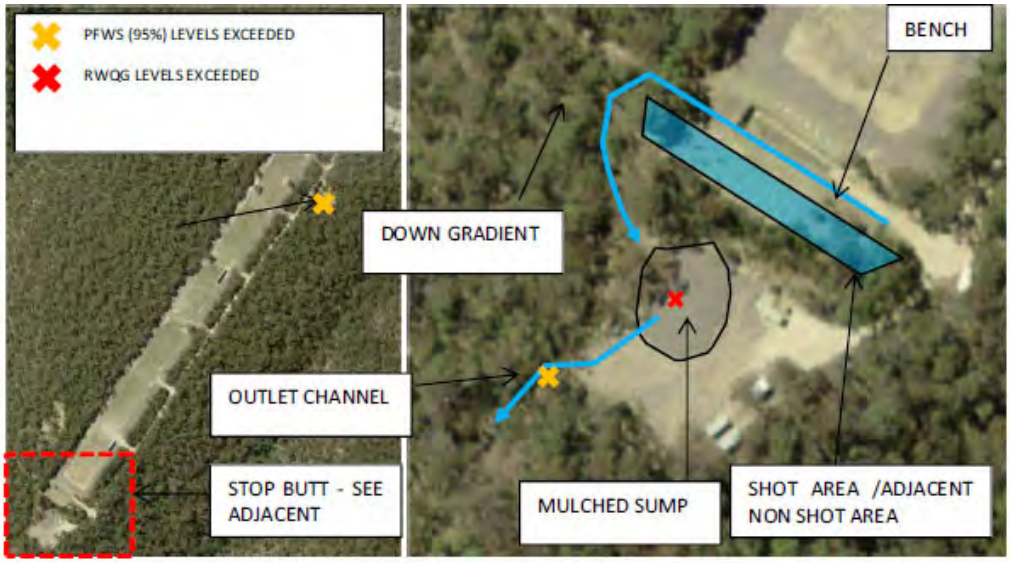


Figure E 5: Sample locations where levels exceeding the nominated ANZECC guidelines were found on 800 metre range

A borehole was drilled on 12-13 July 2007 adjacent to the proposed clubhouse. This location was chosen as it was considered to be representative of the likely groundwater regime. Drilling was stopped at a depth of 50 metres as no groundwater had been encountered. Therefore, it is extremely unlikely that groundwater would be impacted by the Project as the main contaminant transport mechanism is likely to be associated with surface water runoff given the shallow depths to bedrock and topography of the site.

Further information on contamination is provided in Section 10.4 and Appendix E of the EA.

Exposure and human health

EPA's Best Management Practices for Lead at Outdoor Shooting Ranges (EPA, 2003) describes the effects of exposure to lead on children and adults. At firing ranges, shooters, firearms instructors, spectators and range employees can be exposed to significant levels of lead dust and fumes. Protecting the health of range employees, shooters and spectators, while minimising environmental contamination from lead exposures, is an important element in the safety plan for ranges. During shooting activities, lead is deposited at the firing line and the impact berm or drop zone.

Incidental ingestion occurs from repeated hand-to-mouth actions. These particles can be ingested if shooters eat or smoke prior to washing their hands after shooting. This pathway usually generates the majority of lead exposures.

Range workers would be trained in the procedures required to handle lead and the possibility of overexposure to lead particles. Everyone using or working on the range would be encouraged to wash hands often in facilities provided for this purpose. Workers and users would be cautioned about eating and drinking in these areas.

Lead shot and bullet distribution

Knowing where Projectiles are deposited on a range is a key first step in the management of lead and other constituents. Projectiles land in a particular area based on range design, site conditions, range activities, and operating procedures. If Projectiles are contained within a defined area, range management can then control the access to and use of that area. This practice also has a direct bearing on lead management.

Generally, rifle/pistol ranges have a backstop berm (stop butt), and lead is typically concentrated in a small area of the stop butt behind the targets. Although bullets may occasionally strike the side berms or the foreground between the firing line and the targets, lead is usually sparsely distributed throughout these areas relative to its concentration in the stop butt. Ricochets increase the distribution of lead to other areas.

Shooting off site

In the unlikely event that shooting activities impact properties not owned or controlled by the Office of Sport, there is potential human health concern if current or future use of that property increases potential exposure. Management measure outlined in Section 5.4 would prevent or minimise shooting off site. Notwithstanding, shooting off site is considered unlikely due to the surrounding bushland and distance away from surrounding sensitive receivers.

DUST

Dust from bullets impacting berms and from lead recovery/recycling operations often contains lead. Lead recovery may be a large generator of dust at rifle/pistol ranges. Lead can also enter the air from:

- A release of lead due to the heat of burning powder acting on bullet base with exposed lead
- Friction between the barrel and an unjacketed bullet
- Burning lead compounds used in primer mixtures.

These minute lead particles can fall onto shooting benches or to the ground where they mix with or attach to soil. These particles may become airborne dust when the soils are disturbed. Several of these sources of lead may occur close to the breathing zone of the shooter. These processes introduce lead into the air, where it could be inhaled. Range operators would be aware of potential concerns about inhalation of lead and take appropriate steps to control dust (refer to Section 5.4). Dust from these sources, especially lead recovery operations, can also contribute to a decrease in the aesthetic value of the SHRSC site.

Lead shot recovery techniques may inevitably generate airborne particles due to scraping surface layers of soil/surface material, which can contain lead. The amount of dust generated by these operations is dependent on timing (e.g. during windy conditions and if the soil/surface layer are very dry).

Recovery that is undertaken when soil/surface layer is moist and winds are light may generate less dust; however, any dust generated from these activities could result in lead exposure to range operators and nearby sensitive receivers.

WASTE

In addition to spent lead shot, other components, such as cartridge cases are produced as waste at the ranges and need to be considered in operational management.

Table E 1: Typical waste at the SHRSC

Waste	Description
Shooting Waste	• Spent cartridge cases are unsightly litter and contain metals, polycyclic aromatic hydrocarbons (PAHs) and other residue that can contribute to contamination issues at the Project site.
General waste	• Operational waste would be generally limited to putrescible waste, drinking cartons and food scraps from gun club members and visitors, shots, spent cartridges and target paper. • Operational waste would not alter significantly from existing operations apart from a minor increase in the quantity of waste generated. • Waste would be managed to the principles embodied in the *Waste Avoidance and Resource Recovery Act 2001* and include avoidance and reuse and disposal as a last resort.

NOISE

Sounds of shooting and other activities from a range are inevitable. They create one of the most common issues for ranges with respect to range neighbours. The perception of sound is both a psychological and physical process, and how people respond to it depends on many factors, including its nature, the time of day, and whether they like its cause.

The main sources of sound on rifle/pistol ranges are muzzle blast, supersonic bullet flight, and, least importantly, bullet impact. Muzzle blast is caused by rapidly expanding gas from the burning propellant powder as it leaves the barrel. Sound from bullet impacts varies; it is generally lowest in sand traps or earth berms and highest in metallic bullet traps. The extent to which the sounds from rifle/pistol ranges are perceived as unwanted noise by people outside depends much on the type of range itself.

Attended noise monitoring and observations at the Complex, undertaken as part of the noise assessment for the EA (refer to Appendix F of the EA) indicate a noise environment typical of a rural acoustical environment that is dominated by natural sounds, having little or no road traffic.

During attended measurements, wind and leaves blowing in trees was noted as the primary noise source, however wind speeds were below 5 metres per second. Insects and local fauna (birds both flying overhead and calling from nearby trees, roosters, dogs) were also intermittently noted.

Firearm discharge is described as a slight 'pop' at attended measurement locations. While firearm discharge was audibly perceptible, it had a negligible effect on the overall ambient noise environment.

Further information on the noise environment, and an assessment of the potential impacts of the Complex, are provided in Section 10.6 of the EA and Appendix F of the EA.

Attended noise monitoring at 4 potentially affected residential receiver boundaries was undertaken during firearm discharge at the existing Hill Top Rifle Range. Testing of recreational use was undertaken using three shotguns, five rifles and two pistols. Testing of the military use was undertaken using five SR98 rifles. It should be noted that military use will not be undertaken at the SHRSC site.

Although audible to slightly audible, some measurements were recorded as 'no reading' or stated as being less than background, as no noticeable change was noted on the sound level meter. Therefore, while the noise was perceptible, they had a negligible effect on the overall ambient noise environment.

Measurements at the identified sensitive receivers indicated that the maximum impacts from firearm types are as follows;

Table E 2: Noise measurements for firearms at the SHRSC

Firearm	Noise level – db(lin) Peak Hold
Military rifles (SR98 Sniper Rifle)	73
Domestic rifles (308mm and 310mm rifles):	71
Shotguns (12 gauge and 20 gauge):	70
Pistols (44 revolver and 357 magnum)	63.

The proposed 500 metre range and 50 metre range are set back approximately 850 metres and 1,500 metres respectively from the existing Hill Top 800 metre range. Given the proposed site configuration, received linear peak hold sound pressure levels at residences to the southeast of the site would not be expected to increase above those measured during the noise assessment.

Received linear peak hold sound pressure levels at the boundary of the Wattle Ridge property to the northwest of the site could potentially increase by a minor amount above those measured, due to the closer proximity of the proposed ranges to this property. However, predicted increases are not likely to be significant.

BUSHFIRE

The vegetation within the site is Dry Sclerophyll Forest with a shrubby sub formation, which confirms the land mapping as supporting bushfire prone land. The vegetation across the lands is identified as 'forest' under the requirements of the NSW Rural Fire Service.

Bushfire is a regular occurrence in the region and given the Venue's location, bushfire impact would be expected to be severe from any direction. The main shooting areas for the ranges are well maintained grassed areas and not likely to suffer severe impact, however grass fires could still travel along the shooting line.

Bushfire is noted in the Draft 2016 Wollondilly/Wingecarribee Bushfire Risk Management Plan as being a likely occurrence every six (6) years or so. The area surrounding and including the site has been identified as being:

Table E 3: Bushfire classification for the SHRSC

Key	Description
Location No. 51;	Southern Highlands Shooting Complex
Risk Level	Very High
Priority Level	2A
Treatment regime	T170 – Hazard Reduction / T172 – Bushfire Preparedness T211 – Bushfire Preparedness

The area has been identified as a 'Land Management' zone meaning that management of the land is required to meet relevant land management objectives.

Compliance with bushfire guidelines would be achieved by satisfying design measures outlined in the Rural Fire Service's Standards for Bush Fire Protection Measures for Special Fire Protection Purpose Developments and the current legislative standard Planning for Bushfire Protection 2006. These designs measures have been incorporated into the Project and include:

- Asset Protection Zones
- Appropriate access and egress for fire fighting vehicles
- Appropriate building standards
- Water supply for fire-fighting purposes, which includes a 10,000 litre static water supply specifically reserved and adapted for fire-fighting purposes
- A Bushfire Management Plan, prepared by Building Code & Bushfire Hazard Solutions P/L (August 2018), has been developed for the Complex and is provided in Appendix A. The plan includes bushfire management strategies and reporting and monitoring requirements.
- An Emergency Management Plan, prepared by ComSafe Training Service (August 2018) and a bushfire emergency evacuation procedure plan (Appendix B), including closure of the site if there is an imminent threat of bushfire. This is a standalone document and should be read in conjunction with the OEMP.

It is important to note that recreational shooting munitions are not explosive nor do they contain phosphorous and do not include tracer ammunition, as they are illegal to be obtained by civilians. Recreational shooters only use non-tracer ammunition; therefore there will be a negligible chance of fires starting from ammunition use, even on days of high fire danger.

TRAFFIC

The estimated traffic generation as a result of the operation of the SHRSC is based on the traffic assessment completed for the Submissions Report (GHD, 2008). The peak daily traffic would be 160 vehicles per day, and this is predicted to occur three times in a year. The following table summarises the GHD assessment:

Table E 4: Estimated traffic movements for the SHRSC

Occurrences (# of day)	Vehicle per day (vpd)
3	120-160
7	80-160
97	40-80
258	40
269	50

It is noted that, for the majority of the operational time (258 days), vehicular traffic would be less than 40 vehicles per day, which is similar to the existing weekend peak operation of 39 vehicles per day.

The Complex would increase the traffic through the Hill Top centre on one day a year by approximately 121 vpd with a maximum of 41 vehicles in the peak hour of the busiest day under the worst case scenario. The additional vehicle movements generated by the operation of the SHRSC are not considered to have a significant effect on the performance of intersections, according to *Austroads – Part 5 Intersections at Grade - Practical Absorption Capacity.*

Impacts to local road

- Wattle Ridge Road and West Street would remain within the accepted range with regard to the environmental capacity standards outlined by the Roads and Traffic Authority (RTA) (now Roads and Maritime Services).
- Wilson Drive, during peak periods, would exceed the desired Roads and Maritime environmental goal threshold, however peak hour traffic volumes would still remain within the maximum environmental capacity standard outlined by Roads and Maritime.

It is noted that average traffic from the range would be lower than the worst-case scenario used for traffic assessment in the EA.

The traffic assessment for the EA identified existing deficiencies in the Hill Top Road network. However, the operation of the SHRSC would not exacerbate existing deficiencies identified in the Hill Top road network but exposure to these safety concerns would be increased.

FLORA AND FAUNA

The vegetation within the site is relatively uniform eucalypt woodland. Variations in vegetation within the site is minor and is generally in the form of some canopy and mid-storey species becoming more or less dominant. This community most closely resembles the vegetation community of the Hawkesbury Sandstone Woodland. None of the vegetation communities recorded in the SHRSC site are considered to qualify as an endangered ecological community (EEC) listed by either the *Threatened Species Act* (now repealed by the *Biodiversity Conservation Act 2016*) or EPBC Act.

No threatened flora was identified during flora surveys undertaken for the ecological assessment (refer to Appendix B of the EA). Potential habitat for a variety of fauna was present within the Complex due to the extensive areas of intact vegetation and presence of mature, hollow-bearing trees. One threatened species, the Yellow-bellied Glider (*Petaurus australis*), was recorded in the Complex during fauna surveys.

The Complex is considered to be of high ecological value, providing suitable habitat for a range of threatened flora and fauna, however it was determined that the Complex is unlikely to impact significantly on the long-term survival of populations of specific threatened species in the area, based on the limited areas being cleared in comparison to total site area and the maintenance of connectivity.

The high ecological value of the site and surrounding native vegetation has been recognised in the offset package developed in consultation with the Department of Environment and Climate Change (DECC, now OEH). The addition of 2,831 hectares to the regional reserve system is intended to offset both the excision of land from the Bargo State Conservation Area and the clearing of vegetation as part of the Complex. The overall offset ratio, of land to be cleared versus additional land protected in perpetuity is 1:176. This ratio is considered adequate to demonstrate an overall ‘maintain or improve’ outcome for biodiversity conservation.

To increase the certainty of long term maintenance of threatened species, a number of management measures have been recommended in Section 10.1.4 of the EA to ensure that the ecological values of the site are protected during construction and operation. This includes a Conservation Agreement between the Office of Sport and the OEH to manage the site, which would include a Plan of Management.

GEOLOGY, SOILS AND TOPOGRAPHY

The underlying geology of the Complex comprises the Hawkesbury Sandstone of the Mittagong Formation (Herbert and Helby, 1980). The Complex lies within an outcrop of the Narrabeen group, which comprises sandstone, claystone and siltstone. The Hawkesbury sandstone overlies a Triassic shale unit, the Wianamatta Group.

The Complex is characterised by relatively flat topography, being situated on a spurline that trends to the north from the Wattle Ridge Range. This spurline occupies a position between two tributaries of the Rocky Waterholes Creek. All watercourses are upper tributaries of the Nattai River.

The three main groups of soils that occur within the region are (NPWS, 2001):

- Sandstone tableland soils
- Valley soils (sandstone derived)
- Soils associated with nutrient rich shales and igneous rocks.

These soil landscape types are unstable when disturbed. They are highly susceptible to mass movement, such as slides and rock falls, as well as wind and water erosion (Hazelton and Tille, 1990).

A major cause of erosion in an area of this type is fire. In a post fire event, the loose sandy soils remain bare for a long period and if rain then shortly follows a fire, there is a resulting increase in surface run-off, causing increased erosion, and a reduction in plant propagation and animal habitats.

WATER QUALITY

The Hawkesbury Nepean Catchment Management Authority (HNCMA) has classified 98 per cent of the Nattai River as being 'Near Intact'. The *Draft Hawkesbury Nepean Catchment Action Plan (2007)* identifies a strategy for managing the entire catchment and sets out procedures for looking after the near intact systems such as the Nattai River.

HYDROLOGY

A number of daily rainfall stations are located in close proximity to the Complex. Table E 5 summarises the two closest stations to the Complex, providing station number, name and year of recording site opening (data sourced from the Bureau of Meteorology: BOM).

Table E 5: Climate rainfall data from two sites in proximity to the Complex

Station number	Station name	Year of site opening	Maximum mean monthly rainfall (mm)	Minimum mean monthly rainfall (mm)
068044	Mittagong (Alfred Street)	1886	93.5	52.6
068052	Picton Council Depot	1880	90.7	44.0

A review of climate data for the region indicates that there is some variability in the rainfall with the maximum mean monthly rainfall of 93.5 mm in March, while the minimum mean monthly rainfall recorded is about 44.0 mm in September. The average annual rainfall is approximately 857.45 mm. The mild seasonal variability would indicate that rainwater collection via rainwater tanks is viable.

Rocky Waterholes Creek, which is immediately south of the Complex, drains directly to the Nattai River approximately 6 kilometres to the west of the existing Hill Top Rifle Range. The Nattai River drains north to Lake Burragorang.

The catchment of Rocky Waterholes Creek is approximately 23.5 km^2, whilst the catchment of the Nattai River upstream of the junction with Rocky Waterholes Creek is approximately 240 km^2. The total catchment area of the Nattai River upstream of Lake Burragorang is approximately 480 km^2.

As the site is situated on top of a spurline that runs from north to south, the natural fall is from the centre of the spurline to the east and to the west into steep gullies. The gullies drop from the level of Rocky Waterholes Creek Road down to Rocky Waterholes Creek, a fall of some 100 metres over a distance of less than one kilometre.

As a result of the topography, the Complex is not subject to flooding.

HYDROGEOLOGY

The SHRSC is located within the Hawkesbury Sandstone – southeast groundwater flow system, which consists of layered aquifer system with yields ranging from less than one to 50 litres per second. Basalt caps are expected to occur in some areas of the Mittagong Ranges, with groundwater from this horizon discharging into seeps, springs and rivers (Sydney Catchment Authority, 2006).

According to the Department of Natural Resources Groundwater Licence database, groundwater within the Hill Top area was found to be present at depths of approximately 20 metres in the sandstone aquifer. The depths to groundwater within the aquifers is expected to be dependent on rainfall and therefore is likely to vary seasonally. However, groundwater is expected at depths greater than 15 metres. No obvious groundwater table was present within 50 metres below the Complex.

Further information on hydrology and groundwater is provided in Section 10.5 and Appendix E of the EA and the SWMP and WCMP also provide additional information on water quality at the Complex.

APPENDIX F GOOD MANAGEMENT PRACTICE

Specific actions that can be undertaken at the SHRSC to address specific environmental concerns has been provided in **Table F 1**. The actions listed in this table, supplemented by the background information in **Appendix E – Existing Environment**, will provide an effective OEMP.

Each technique has its pros and cons, and each range must be evaluated based on its unique circumstances.

Table F 1: Potential operational management measures for control of lead at the SHRSC

Approach type	Rifle/pistol range management measure
Operational management	• Bullet recovery and recycling
	• Chemical soil amendment
	• Alternative materials (e.g. non-lead bullets)
	• Bushfire management
	• Vegetation cover
Operational engineering	• Clay layers/mixing
	• Physical barriers to shot distribution
	• Elimination of depressions that hold water
	• Storm water management/erosion control
	• Shot fall zones designed to be outside of surface water bodies

The following Sections describe these management techniques in detail.

USE OF ALTERNATE BULLET AND PRIMER MATERIALS

Recent innovations in Projectile technology have allowed most major munitions manufacturers the ability to offer low-lead, non-lead, and non-lead frangible type rounds for shooters. Environmental impact considerations for long-term use of frangible Projectiles include the release of non-lead metals and the inability to recover intact Projectiles in the environment. Copper, tungsten, and zinc are the primary replacement metals being used. Some ammunition uses a lead core contained in a jacket of non-lead metal. These bullets are designed to maintain the integrity of the lead core so that no lead is exposed after impact.

Lead-free primers are available for pistol cartridges and centre-fire and rim-fire ammunition.

It should be noted that other metals used as a replacement for lead shot may have different physical or chemical properties. If the SHRSC switches to steel or other shot material, care would be taken to update safety measures appropriate for that material. Whatever type of non-lead shot is used, there still may be potential for environmental issues arising from the cartridges and their components. Depending on the location, it may be necessary to recover spent shot even from non-lead materials.

The implementation of using alternative bullets and primer materials would be determined by the Office of Sport, provided appropriate management measures are implemented to reduce or avoid environmental impacts.

CONTROL OF LEAD SHOT DISPERSION AND SHOT CONTAINMENT METHODS

Controlling dispersion can be one of the most cost-effective means of managing spent lead shot (and other cartridge components) on a range. Bullets would be contained in the defined area of the range - the smaller the area of containment, the smaller the potential for environmental impacts due to lead. This includes bullets

that may ricochet off previously fired rounds or small rocks in the stop butts or off the surface of the side berms or the foreground soil. There are several ways to contain bullets after hitting the targets on ranges.

The use of barriers, is another means of controlling lead shot dispersion. The stop butts for at the SHRSC will limit the shot fall zone size and limit the amount of shot from landing in the drainage lines, sediment ponds, or off property. Concentrating the shot then helps reduce the area subject to potential lead reclamation or other management efforts.

Bullet containment is extremely important not only for shooter/public safety reasons, but also metal recovery and containment to mitigate impacts to the environment, particularly lead contamination and migration.

Alternative containment systems include sand traps, steel bullet traps, shock-absorbing concrete (SACON), crumb-rubber blocks, granular-rubber (shredded-tire) berms, and other materials that contain and decelerate Projectiles, improve safety on the ranges, and collect the bullets for recovery.

SHRSC design

50 metre and 500 metre ranges

Reshape the stop butt with a zone of blue metal (no greater than 19 mm thick), to capture all bullet strikes based on the projectiles.

This blue metal zone would be approximately 300 mm thick and up to 2 metres high, it would be held in place by timber sleeper walls at the top and bottom of this zone and would extend the entire length of the stop butt. Refer to **Figure F 1**.

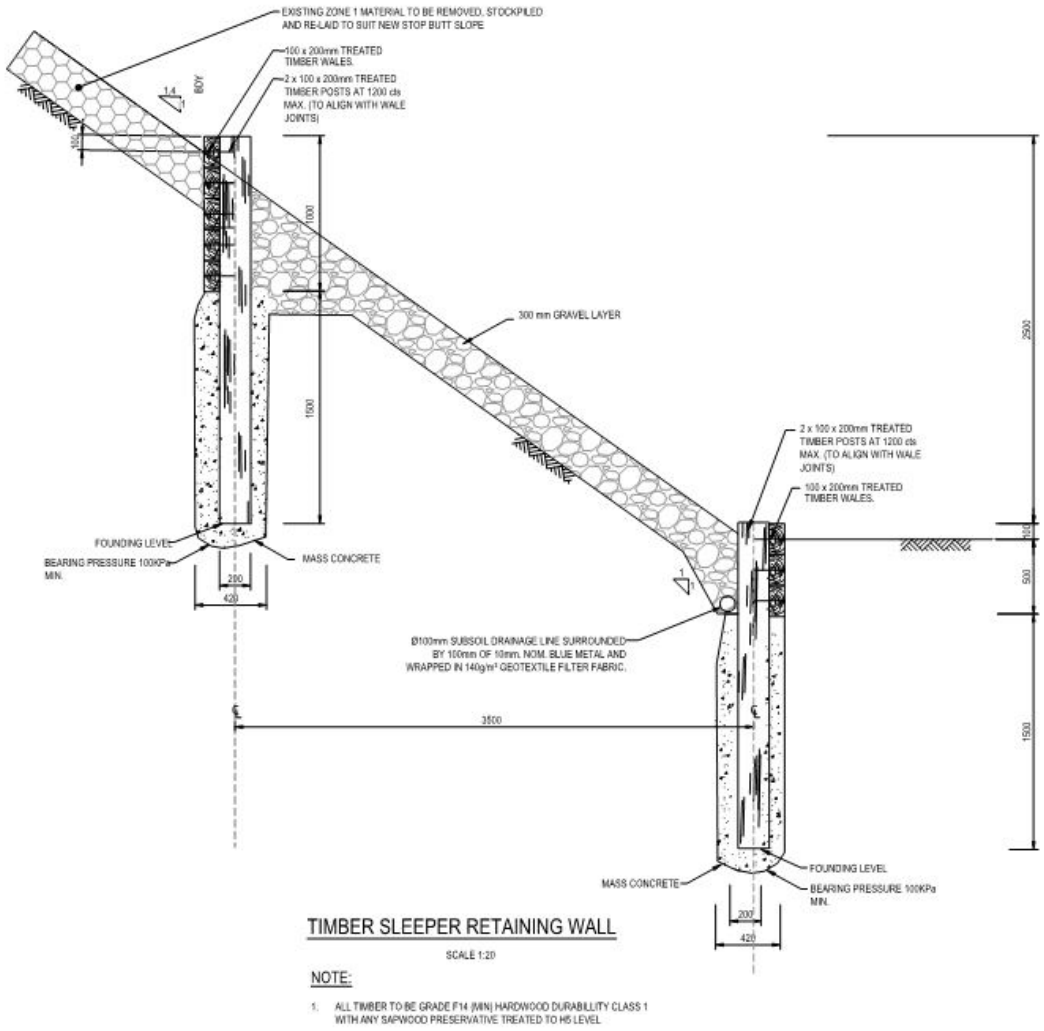


Figure F 1: Cross section of the stop butt design for the 50 and 500 metre ranges

800 metre range

At the 800 metre range, a precast concrete bullet capture box would be filled with blue metal, and timber sleepers would line the exposed concrete faces of each box at the firing lanes. Refer to **Figure F 2**.

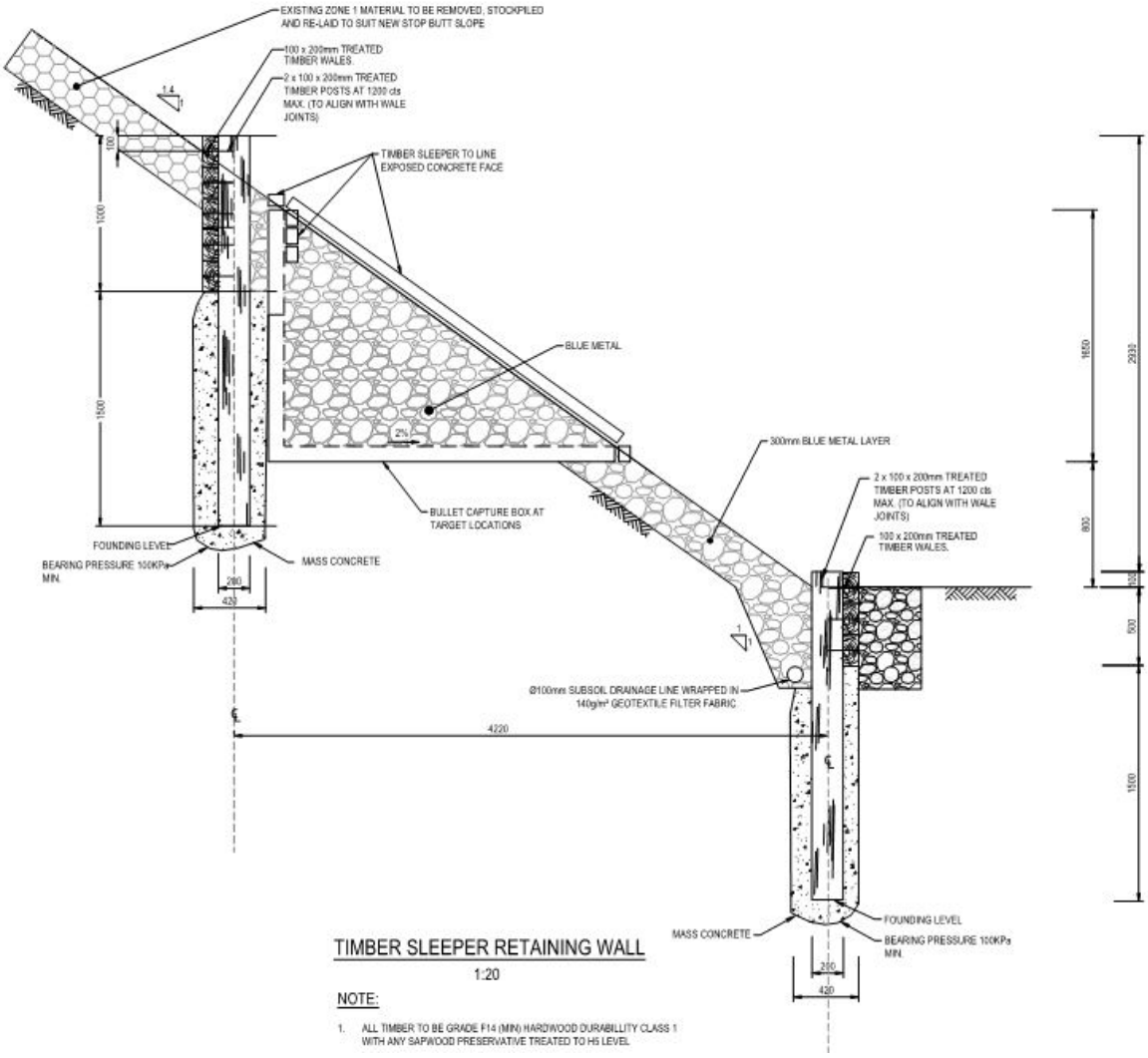


Figure F 2: Cross section of the stop butt design for the 800 metre ranges

Maintenance of stop butts and berms

Berm maintenance between lead recovery and recycling operations for stop butts typically involves periodically replacing eroded surface materials, reseeding bare areas, fertilising, watering, and otherwise maintaining vegetation.

This can be completed by the Range Officer and Office of Sport personnel or sub-contracted to appropriate personnel. It would be completed based on **Section 6.1**, visual inspection by the Range Officer/Office of Sport or if any complaints are made.

LEAD REMOVAL AND RECYCLING

Periodic removal of lead/Projectiles from the range is an operational management activity that may control the migration of lead by removing the source. It is a range maintenance activity when operational or when maintenance issues arise (e.g. ricochets off accumulated metals, elevated airborne lead level).

This method of managing lead on ranges can be expensive and could result in significant range downtime during the maintenance event unless only a targeted removal of the concentrated lead deposition areas

immediately behind the targets is performed. Lead removal would be considered a last resort, from those stated above, in lead management methods.

The following management practices for removing lead could be applied at the SHRSC:

- Lead recycling/recovery:
  - Size separation (screening)
  - Hydrodynamic separation (classification)
  - Density (gravity) separation
  - Froth flotation
  - Magnetic separation for iron based alloys
- Hand raking and sifting
- Vacuuming
- Treatment additives
- Soil treatment
- Soil washing (wet screening, gravity separation, pneumatic separation).

These practices (if required) would follow Section 3.4 of the *US EPA Best Management Practices for Lead at Outdoor Shooting Ranges* (US EPA, 2005) and Section 3.6 to 3.8 in the *Technical guideline – Environmental management at operating outdoor small arms firing ranges* (ITRC, 2005).

Reclamation activities

Reclamation activities may generate dust, especially in dry soil conditions. To prevent or minimise dust from traveling from the SHRSC site and impacting surrounding sensitive receivers, reclamation activities potentially generating dust would be carried out during periods of light winds (<19 km/h) and when soils are not significantly dry. A light water spray may also be applied when undertaking reclamation activities, provided appropriate erosion and sediment controls are in place.

The following is a brief description of what could be applied at the SHRSC:

- Bullets in stop butts may be deep (up to 0.5-1 metres) and would be included in the recovery effort. Depending on usage rate and firing accuracy, metal may begin to accumulate in the face of the berm away from the bullet pocket.
- Recovery may require excavation of 0.5-1 metres of the face of the berm, mechanical screening of the soil to separate the bullets, and replacement of the soil on the berm face.
- The Office of Sport would consider amending soils with lime, phosphate, or other stabilisation additives prior to replacing the amended material on the stop butts.
- Recovery from side berms, mantlets and the foreground is similar, although excavation does not have to be as deep or frequent.
- After lead recovery is completed, the areas would be regraded and vegetation re-established to control soil erosion (in accordance with the requirements of the OEMP) as **Vegetation and groundcover management** section below.

Timing

The lead reclamation process may occur during club off-hours so that club activities are not interrupted. Additionally, remediation may be undertaken on a range-by-range basis, to minimise any disruptions to club activities.

- Generally de-leading of stop butts will occur after approximately 50,000 to 80,000 rounds or approximately every 2 to 3 years, depending on range use (Department of Defence, 2005).
- Nonetheless, lead reclamation activities will be determined based on visual inspection and monitoring results or at a maximum of 80,000 rounds being fired at any one range.

- Reclamation activities will vary in length depending on weather, site accessibility, range size, and number of personnel assigned to perform the reclamation.
- Reclamation activities may generate dust, especially in drier western locations. To prevent or minimise dust from traveling off the range and causing complaints from neighbours, reclamation activities generating dust should only be conducted during periods of little to no wind. In addition, such activities should be completed as quickly as possible.

Vegetation removal

Using machinery to reclaim lead usually requires that the area be clear of scrub vegetation. Grass, mulch, or compost is generally removed during the reclamation process.

Vegetation removal would be carried out manually or with the use of machinery e.g. excavator or backhoe.

Scraping or raking

The minimum requirement for ballistic de-leading is to remove the top 150 mm of soil or surface material from the face of the stop butt (Department of Defence, 2005).

The surface material removed from the range will need to be stored in an area with an impermeable barrier (e.g. concrete hardstand) and good stormwater drainage away from the stop butts prior to sifting.

The following outlines some of the techniques which could be implanted to scrape or rake the stop butts.

Table F 2: Methods for scraping or raking

Method	Procedure
Manual	• Range personnel can do the raking or shovelling of the face material of the stop butt by hand
Mechanical	• The face material is usually removed by scraping with a backhoe or larger digging arm. • The digging arm or bucket will be drawn upwards (from the bottom of the stop butt to the top to avoid/reduce dispersing surface material) when scraping of the 50 and 500 metre stop butts is carried out. • The concrete bullet capture boxes at the 800 metre ranges would be scraped out using a small excavator.
Vacuum	Another option is a vacuum system that will collect the lead shot containing surface material from the range. This technique is generally suited to hilly, rocky or densely vegetated terrain. Here, vacuuming takes the place of hand raking/shovelling. **Method 1** • A vacuum machine is used to collect the lead shot containing surface material. • Once collected, the lead shot containing surface material must be sifted through a screening system (See **Table F 3)**. **Method 2** • Another way to apply vacuuming involves removing the top layer of the stop butt manually with shovels. • The material is then spread thinly over an impermeable material such as plywood. • A vacuuming device is then used to collect the materials that are lighter than lead (e.g., sand or soil), while leaving behind the heavier materials (i.e., lead bullets/shots and fragments). It should be noted, that if the stop butt is deeply scooped13 up to 1 metre of the stop butt face may have to be removed between scoops to reinstate a straight/flat face. This may limit use of vacuuming and hand raking/sifting techniques.

[13] Scooped definition: The repeated impact of projectiles into a bullet catcher or stop butt has two main effects on the nature of the stop butt being displacement of the bullet catcher material from the most regular points of impact

Screening

The stop butt facings will need to be sieved/sifted following a single process or multiple processes outlined below.

Table F 3: Methods for screening

Method	Procedure
Manual	• The collected soil/blue metal would be passed through a 4-8 mm (or suitable sized) screen to remove larger particles. This process will allow most of the lead shot sized particles to pass through the screen. • The sifted material (not captured by the 4-8 mm screen) should be passed through a 1-4 mm (or suitable sized) screen to capture smaller lead shot and lead fragments. This process will also allow sand and other small sediment to pass through the screen. • The screens should be mounted on a frame for support and can be varying sizes e.g. 1 m^2. • The lead remaining on the screens would be visually recognised and removed by hand. Appropriate personal protective equipment (PPE) equipment will be used (e.g. gloves).
Mechanical	
Screening machine	• A screening machine (also referred to as a mobile shaker, gravel sizer, or potato sizer) may be used to sieve the collected stop butt face. This device uses a series of stacked vibrating screens (usually two screens) of different mesh sizes and allows the user to sift the lead shot-containing surface material (gathered by the techniques described in **Table F 2.** The lead shot is then conveyed to a container (e.g. bucket) ready for storage and disposal.
Soil washing (Physical and Gravity Separation)	Soil washing is the separation of the surface material into its constituent particles. • Typically, the surface material is first excavated from the range (as per **Table F 2)** and mixed into a water-based wash solution. • The wet surface material is then separated using either wet screening or gravity separation techniques described below. • After physical separation, which will remove the coarse particulate metals, an acid leaching (soil/surface material washing) process may be needed to remove the lead remaining in the soil/surface material either as fine particulates or as molecular or ionic species bound to the soil/surface material matrix. • The wash solution is then treated to extract the dissolved lead. • The soil pH is neutralised using lime or other appropriate amendment to raise the pH to a neutral range (approximate pH of 7), before the soil is returned to the range. ***Note:*** *Any water used in the washing process will be in a closed loop system and will require the appropriate erosion and sediment controls. The used water would need to be tested to ensure ANZECC guidelines are met prior to discharge/disposal.*
Wet screening	• Particles larger and smaller than the surrounding surface material are passed through a series of large-mesh to small-mesh screens. • Each time the mixture passes through a screen, the volume of the surface mixture is reduced. • Large particles such as lead shot/bullets and fragments are screened out of the soil/wash mixture early in the process, and can be taken off-site for recycling • The left over surface material is placed back on-site.
Gravity Separation	• This technique can be used in cases where the lead particles are the same size as surrounding surface material particles. • The wet surface material/wash mixture is passed through equipment, which allows the denser materials (i.e., lead materials) to settle to the bottom of unit and separate out of the surface material/wash mixture.

Method	Procedure
Pneumatic Separation	• After screening, the resulting lead, surface material, and other lead-sized particles may enter a blowing/pneumatic separation system. • Here the lead shot is separated from the surface material and other debris by the blowing air.

Storage of the excavated surface material

During the refacing of the stop butts, consideration should also be given to the temporary storage of lead contaminated materials to minimise leaching to adjacent areas.

- Salvaged lead should be stored in a secured, fenced area and certified free from contaminated materials before transport or long-term storage.
- This may include stockpiling of impacted material on an impermeable layer (e.g. concrete, bitumen, HDPE (High Density Polyethylene) liner) and the usage of silt barriers (or other similar erosion and sediment control measures) to minimise migration.
- Alternatively, surface material can be placed directly into lined waste skips.

The shorter the distance the material has to be transported for stockpiling, the better.

Managing lead from stop butts

Where possible the recovered lead is recycled or disposed of at an appropriately licenced recycle/disposal centre as soon as possible and remaining as a last resort no longer than one month at the SHRSC.

Lead to be disposed, would be placed in an impermeable container, out of the elements (e.g. sun, wind and rain) and at least 50 metres away from any watercourses, sediment ponds or drainage lines.

Placement of materials suitable to return to the stop butt

Any surface material/debris automatically screened out as being too big or too small is either returned to the field or re-screened to ensure no lead is caught in the debris.

The remainder of the materials are, where possible, reinstated into the stop butts. Consideration should be given to the pH, type of surface material and the concentration of lead and heavy metals proposed to be used in any replacement materials incorporated into this facing.

Prior to replacement of the face layer, the stop butt core is to be benched or scored horizontally to provide a keying layer between the core and face.

Stop butt maintenance

After reclamation operations are complete, sediment and erosion control measures should be implemented to stabilise the disturbed surface material.

Maintenance of stop butts should be completed in accordance **Vegetation and groundcover management** provided below.

Localised areas of remediation and the vegetated top of the stop butts

Localised areas of reclamation of a stop butt may be required prior to full face reclamation. If visible signs of concentrated areas of impact or scooping are evident, within either the blue metal or vegetated areas above the blue metal on the stop butt, the following would be applied.

- When repairing a localised area of a stop butt, or a section of a berm, focus on filling the impact points where concentrated impacts have created holes or scoops in the stop butt. These areas would be best reclaimed using manual scraping/raking (See **Table F 2**) and screening (See **Table F 3**) methods.
- The process of storing the excavated surface to remediated localised areas would then be followed accordingly.

- Remove rocks, which can ricochet, while avoiding widespread damage or unnecessary removal of established vegetation. Avoid bulldozing or pushing stop butts further away from the targets. These practices loosen surface materials and increase potential for erosion.
- Stop butt maintenance would also include reseeding un-vegetated areas, fertilising, watering and maintaining vegetation (refer to **Vegetation and groundcover management** for these works).
- The stop butts would also be routinely inspected in accordance with the requirements of the OEMP (as outlined in **Section 6.1**).
- When regrading the stop butt, do not grade the stop butt at a steep slope.
  - A 2:1 slope at the rear will produce an inherently stable stop butt and will be easier to vegetate.
  - The angle of the forward slope is specified by NSW Police range guidelines as being constructed to at least 30° but ideally 35° in relation to the range fairway.

VEGETATION AND GROUNDCOVER MANAGEMENT

Establishing a vegetative cover is critical to storm water management and preventing lead migration. Maintaining a vegetative cover on the entire SHRSC, with special attention paid to stop butts, impact areas, and runoff flow paths, is the best way to reduce off-range transport of lead and sediment.

The following procedure will be used to maintain vegetation and ground cover:

- Revegetation would be required as soon as practical after reclamation or any clearing has been carried out.
- Water and fertiliser would be applied as needed until a substantial groundcover is established.
- Vegetation and groundcover at the ranges would be inspected annually. If there is visual evidence of erosion or bare areas of groundcover at any time, localised areas of revegetation may be required.
- Plant selection would focus on the use of non-invasive species that are appropriate for the local climate. Plants that are hardy and able to withstand the local environment/climate would be chosen. The Office of Sport would determine the most appropriate vegetation and material for mats and mulches (if required) prior to planting.
- As a general guide, the range surface and stop butts should be hydromulched with the following seed mix:
  - Sydney seeds dryland pasture blend, consisting of: Perennial rye grass (30%); tall fescue (30%); cocksfoot (8%); phalaris (8%); subterranean clover (19%); white clover (5%)
  - Ryegrass ~ 20-25Kg/ha (for colder periods) or Japanese millet ~ 20-25Kg/ha (for hot periods).
- Prior to hydromulching, fertiliser is to be applied to the range surface.

Application of insoluble phosphate additives can reduce lead leaching and runoff, and since it is relatively insoluble, it does not wash away during rain events.

Various vegetative cover techniques are potentially applicable to the SHRSC.

These are outlined in **Table F 4**.

Table F 4 : Vegetative groundcover techniques relevant to the SHRSC

Technique	Description	Benefit	Applicability
Grass-lined channels/swales	As storm water runoff flows through the swale, the vegetation filters the flow. The swale may also be designed to promote filtration through a subsoil matrix or infiltration into the underlying soil.	A properly designed grass-lined swale can effectively remove suspended solids and trace metals.	Grass-lined swales are particularly effective at the base of impact berms located behind targets. They may be effectively applied to collect and transport runoff from known concentrated impact points within the impact area (if non-dudded) to other storm water management features, such as sediment ponds or to areas where the runoff can be released without erosion or sedimentation damage.
Grass filter strips	Filter strips are strips or areas of vegetation placed between a disturbed area and a potentially environmentally sensitive area(s). This may include along the berm and stop butt faces and around the edge of the ranges.	Grass filter strips can effectively remove suspended solids and trace metals from overland sheet flow. They also promote infiltration of runoff water into the soil.	Grass filter strips can be widely used in range applications. The strips may be applied at the inlet and outlets of grass-lined swales and storm water management structures, such as diversions and detention ponds to manage sediment loads in the runoff.
Riparian buffer zones	Riparian buffer zones are natural or restored areas adjacent to waterways/waterbodies that provide a physical separation of these water resources from range activities. These zones can provide a storm water management function similar to grass filter strips while maintaining the ecosystem and habitat of the water resource.	Natural and restored buffer areas improve soil quality and stabilise stream banks. The extensive root systems of natural plant communities add organic matter to the soil as plant parts die and are replaced. This organic matter acts as a food source for the soil microbes that fix nitrogen and improve soil physical properties to allow water to infiltrate the soil.	Riparian buffer zones can be widely used where range boundaries and impact areas are located near surface water resources such as the sediment ponds.
Erosion control mats and mulches	Erosion control mats and mulches are temporary erosion control practices used to stabilise exposed slopes and channels or recently planted soil surfaces.	Mulch and erosion control mats provide temporary erosion control during the establishment of vegetation. Permanent erosion control mats reinforce vegetation to control erosion in areas where vegetation alone would be overcome by high-flow erosive forces.	Temporary erosion control mats and mulch are applicable where newly seeded soils require temporary erosion control until a stand of vegetation is established. Synthetic permanent erosion control mats in conjunction with vegetation are applicable where runoff flow velocities or erosive scouring forces exceed the limits of natural or man-made fibre mats, mulches, and vegetation alone.

Technique	Description	Benefit	Applicability
Hydromulching, Hydroseeding and Strawmulching	These techniques are generally one-step processes where seed, fertiliser and mulch are mixed together in water and the slurry sprayed onto the area to be seeded.	These techniques can provide erosion control on gently sloping to moderately steep slopes e.g. Stop butts and berms. They can ultimately remove suspended solids and trace metals before reaching any sensitive environments e.g. waterways, groundwater.	These techniques could be applied to much of the Project site relatively quickly and efficiently. Site preparation is recommended involving ripping of the existing surface and application of topsoil. Sufficient watering is required until a healthy vegetation layer is established. Timing of application should be considered e.g. depending on vegetation variety could occur during spring. Retailers of these products should be consulted prior to selection and application.

Trees along the embankment of the existing dam on the site (Basin 4 in **Figure 2-2**), located adjacent to the new clubhouse, are to be removed and trees will be kept clear from the embankments of all the sedimentation ponds, to minimise the possibility of trees damaging them.

STORMWATER MANAGEMENT

Stormwater runoff represents the predominant mechanism for transporting the greatest volume of pollutants (lead residues and eroded soils/sediments) the most quickly and for the greatest distances. It also represents the media and quickest pathway for impacting human or ecological health by potentially introducing range pollutants into nearby surface water resources.

Section 4.2.2 of the WCMP developed for the SHRSC would be read in conjunction with this Section to manage stormwater effectively at the SHRSC.

Existing environment

Detailed figures of the stormwater management structures at the Complex can be found in Appendix G.

Stormwater management techniques

Implementation of the following stormwater techniques listed in **Table F 5** would minimise or avoid any environmental impacts at the Project site.

Table F 5: Stormwater techniques relevant to the Project

Technique	Example	Benefit
Flow diversion	Land shaping and diversion channels (e.g. ditches, swales, small dikes)	Flow diversion methods may be used to prevent stormwater from impact berms or areas that have the highest potential for erosion from flowing onto comparatively clean range areas or mixing with stormwater from the clean areas. This will minimise the land area impacted by mobilised munitions constituents in the runoff and the volume of contaminated runoff requiring management.
Runoff velocity reduction	Check dams, turnouts and level spreaders, riprap aprons and adequately vegetated areas	Lowering the water velocity will lower the water's sediment load-carrying capacity and reduce the potential for erosion on the range floor that may occur with channelled flow.
Subsoil drainage treatment	Installation of lime treatment boxes at the downstream location of each subsoil drain	Lead treatment (for adequate pH adjustment (generally a target of pH 7 or above) to minimise lead mobility and ease of future maintenance.

Design of these structures would follow the general notes and site works details in the 'Hill Top Civil drawings'.

For further reference, refer to:

- Sections 3.2.2, 3.2.3 and 3.2.6 of the *US EPA Best Management Practices for Lead at Outdoor Shooting Ranges (EPA, 2005)*
- Section 3.5 and 3.7 of the *Technical guideline – Environmental management at operating outdoor small arms firing ranges (ITRC, 2005)* provide detailed design of these structures.
- In addition, erosion and sediment control and stormwater measures will be in accordance with the principles and methods specified in *Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004)*

Inspection monitoring and maintenance of stormwater structures

The Venue Manager will be responsible for arranging the inspection, monitoring and maintenance of the stormwater structures at the Complex.

Inspection of stormwater structures would be undertaken every six (6) months or after a significant rainfall event occurs (greater than 20 mm falling within 24 hours or visible signs of pooling water along the range surface or around drainage structures).

The effectiveness of management measures will be reviewed following rainfall events or where significant maintenance is required and no greater than six-monthly. Refer to **Table F 6** for a summary of stormwater management and maintenance.

Table F 6: Stormwater management and maintenance

Stormwater Measure	Inspection and monitoring	Maintenance / corrective action	Timing
Flow diversion	Inspect for: • Scour and erosion • Loss of vegetative • Evidence of debris (e.g. organic matter, sediment, bullets, litter) • Surface ponding	• Reinstate drainage lines • Remove litter and debris • Reinstate vegetative grass cover using seeding and hydromulching as per **Appendix F – Vegetation and groundcover management** • Implement temporary controls (e.g. bales, sediment socks) until new diversion can be reinstated.	After significant rainfall events Not less than six-monthly
Runoff velocity reduction	Inspect for: • Surface ponding • Erosion and scour associated with concentrated flows	• Regrading of surface to minimise ponding and/or remove scouring • Reinstatement of vegetative cover	After significant rainfall events Not less than six-monthly
Subsoil drainage treatment	Implement monitoring: • See **Section 6.1 Table 6-3 and Table 6-4** • Inspect pits	• Identify composition of sand/soil filtering media and liming requirements based on monitoring program and total and dissolved lead concentrations.	As per **Section 6.1**
Permanent sediment ponds	• Sediment deposition • Litter and debris • Failure of inlet/outlet points	• Removal of sediment to maintain design capacity • Repair of inlet/outlet points where erosion/scour is evident	Six-monthly or following significant rainfall events
Infiltration areas	• Surface ponding • Loss of vegetative • Erosion	• Reinstate vegetative grass cover using seeding and hydromulching as per **Appendix F – Vegetation and groundcover management** • Regrade surface to reduce ponding and erosion impacts	Six-monthly or following significant rainfall events greater than 20 mm falling within 24 hours

APPENDIX G UNEXPECTED CONTAMINATION PROCEDURE