

LATAH COUNTY ZONING COMMISSION EXHIBIT LIST

Public Hearing for Conditional Use Permit #865

Date: September 19th, 2012 Time: 5:30 pm Applicant: PNW Arms File #: CUP 865

EXHIBITS:

- Exhibit #1. Criteria Worksheet and Application Summary
- Exhibit #1A. Latah County Comprehensive Plan and Vicinity Map
- Exhibit #1B. Zoning Map
- Exhibit #1C. Adjoining Property Owners and Aerial Photograph Map
- Exhibit #1D. Site Plans
- Exhibit #2A. Application Form (Submitted by Applicant)
- Exhibit #2B. Application Form (Submitted by Applicant)
- Exhibit #2C. Applicant's Narrative (Submitted by Applicant)
- Exhibit #2D. Applicant's Narrative (Submitted by Applicant)
- Exhibit #2E. Safe Boundary (Submitted by Applicant)
- Exhibit #2F. Photographs (Submitted by Applicant)
- Exhibit #3. Staff Introduction for Latah County Zoning Commission public hearing for CUP 865 on September 19th, 2012
- Exhibit #4. Letter from Latah Economic Development Council received on September 12, 2012
- Exhibit #5. Letter from Alturas Analytics, Inc. received on September 12, 2012
- Exhibit #6. Letter from Idaho Economic Advisory Council received on September 12, 2012
- Exhibit #7. Letter from Idaho Department of Labor received on September 12, 2012
- Exhibit #8. Letter from Latah County Sheriff received on September 12, 2012
- Exhibit #9. Letter from Janie and Rob Nirk received on September 17, 2012
- Exhibit #10. Letter from City of St. Maries received on September 17, 2012
- Exhibit #11. Letter from Gritman Medical Center received on September 17, 2012
- Exhibit #12. Letter from Avista Corp. received on September 17, 2012
- Exhibit #13. Letter from City of Potlatch received on September 19, 2012
- Exhibit #14. Letter from Linda Murray received on September 26, 2012
- Exhibit #15. PNW Arms Small Arms Range Design and Construction Guidelines (Submitted by Applicant on October 15th, 2012)
- Exhibit #16. Letter from Richard Larsen received on October 15th, 2012

NOTICE OF PUBLIC HEARING
BEFORE THE LATAH COUNTY ZONING COMMISSION
Wednesday, September 19th, 2012, 5:30 p.m.

The Latah County Zoning Commission will hold a public hearing on Wednesday, September 19th, 2012 in Room 2-B, Latah County Courthouse, Moscow, Idaho, to receive comments on:

CUP # 864 – A request by Ernest Brannon for a conditional use permit to operate a bed and breakfast and chapel on a 12-acre parcel in the Agriculture/Forest zone. The property is located at 2493 Blaine Road, Moscow, in Section 27, Township 39 North, Range 05 West, B.M. in Latah County and is referenced as Latah County Assessor's parcel number RP39N05W278563A.

CUP # 865 A request by PNW Arms for A) a conditional use permit to operate a private range for business demonstration and limited law enforcement use on a portion of a parcel zoned Agriculture Forest and B) a conditional use permit to continue operation of an exterior product testing facility on a portion of a parcel zoned Industrial. The property is located at 1293 E Freeze Road, Potlatch, in Section 26, Township 42 North, Range 05 West, B.M. in Latah County and is referenced as Latah County Assessor's parcel number RP42N05W261556A.

All interested parties are encouraged to attend. Accommodations for individuals who qualify under the ADA are available upon request. Notice is required in the Planning Dept. 3 working days prior to the hearing in order to acquire accommodations. This hearing will be held pursuant to the Latah County Hearing Procedures Ordinance and under authority of the Idaho Local Planning Act, the Latah County Comprehensive Plan and the Latah County Land Use Ordinance. The Latah County Zoning Commission reserves the right to limit the length of testimony.

Additional information on this request, including copies of the proposal, is available from the Planning Dept., Latah County Courthouse, Moscow, Idaho. (208) 883-7220.

Mauri Knott
Associate Planner

(This is a public service announcement)

CRITERIA WORKSHEET & APPLICATION SUMMARY

Note: This exhibit does not represent staff analysis of information provided by the applicant supporters, or opponents; however, staff has identified policies which may be applicable to this particular request. Information submitted to the Planning Department prior to the mailing of the staff packet has been organized herein in relation to the applicable criteria for approval or denial. This worksheet is intended only to help identify if all relevant criteria have been addressed with supporting factual information and to provide a juxtaposition of any conflicting testimony that has been presented.

Type of request:

Conditional Use Permit to A) operate a **private range** in the Agriculture/Forest zone and B) to continue operation of an exterior product testing facility in the Industrial.

Description of application:

A request by PNW Arms for A) a conditional use permit to operate a private range for business demonstration and limited law enforcement use on a portion of a parcel zoned Agriculture Forest and B) a conditional use permit to continue operation of an exterior product testing facility on a portion of a parcel zoned Industrial. The property is located at 1293 E Freeze Road, Potlatch, in Section 26, Township 42 North, Range 05 West, B.M. in Latah County and is referenced as Latah County Assessor's parcel number RP42N05W261556A.

Applicable Code:

Section 7.01.02 (see exhibit #3) and *Sections 3.01.02.3 and 3.05.02.5*

Section 3.01.02.3- The Latah County Land Use Ordinance, under section 3.01.02(10), lists "Gun Clubs" as a conditionally permitted use in the Agriculture/Forest Zone. The Latah County Land Use Ordinance defines "Gun Clubs" as "a private or public location where people meet, may have memberships, or may belong to an organization where guns are fired for practice or entertainment, including private or public firing ranges."

Section 3.05.02.5- The Latah County Land Use Ordinance, under section 3.05.02(5), lists "all manufacturing uses beyond the limitations set forth ins Section 3.05.01.5" as a conditionally permitted use in the Industrial Zone.

Facts of application and the information submitted

Site Characteristics:

Size of Parcel: 66 acres
Floodplain: Zone "C" and Zone "A" (all activity is located outside zone A)

Land Use and Regulations:

Comprehensive Plan Designation: Industrial Commercial Residential
Existing Zoning: Agriculture/Forest and Industrial
Existing Uses: Manufacturing and Agriculture
Neighboring Zoning: Agriculture/Forest
Neighboring Uses: Public Right of Way, Agriculture, Residential,

Infrastructure/Services:

Water: Private Well
Sewer: Private Septic
Access: East Freeze Road (permitted)
Fire Protection: Potlatch Fire District

Applicable Statute, Ordinance, and Comprehensive Plan Sections:

Local Planning Act: Idaho Code 67-6512

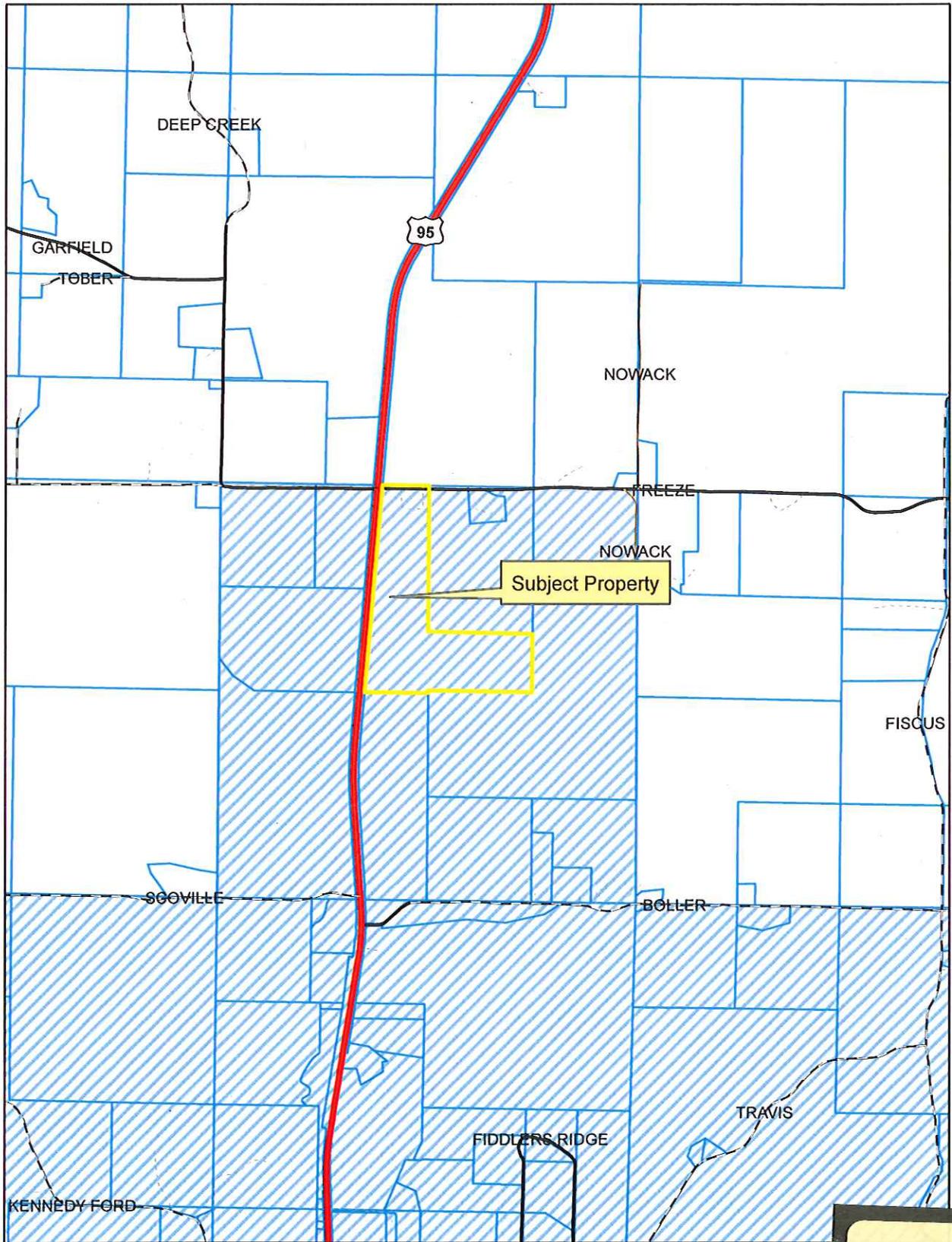
Latah County Land Use Ordinance # 269, as amended:

Section 3.01 Agriculture/Forest Zone
Section 3.05 Industrial
Article 7 Conditional Use Permits

Latah County Comprehensive Plan

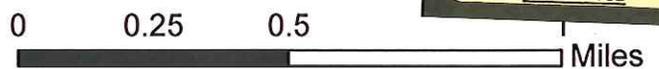
CUP 865 Comprehensive Plan and Vicinity Map

Planning & Building Department



- Legend**
- Comprehensive Plan ZONE**
- AFR
 - AOI
 - ICR
 - PRODUCTIVE
 - RURAL

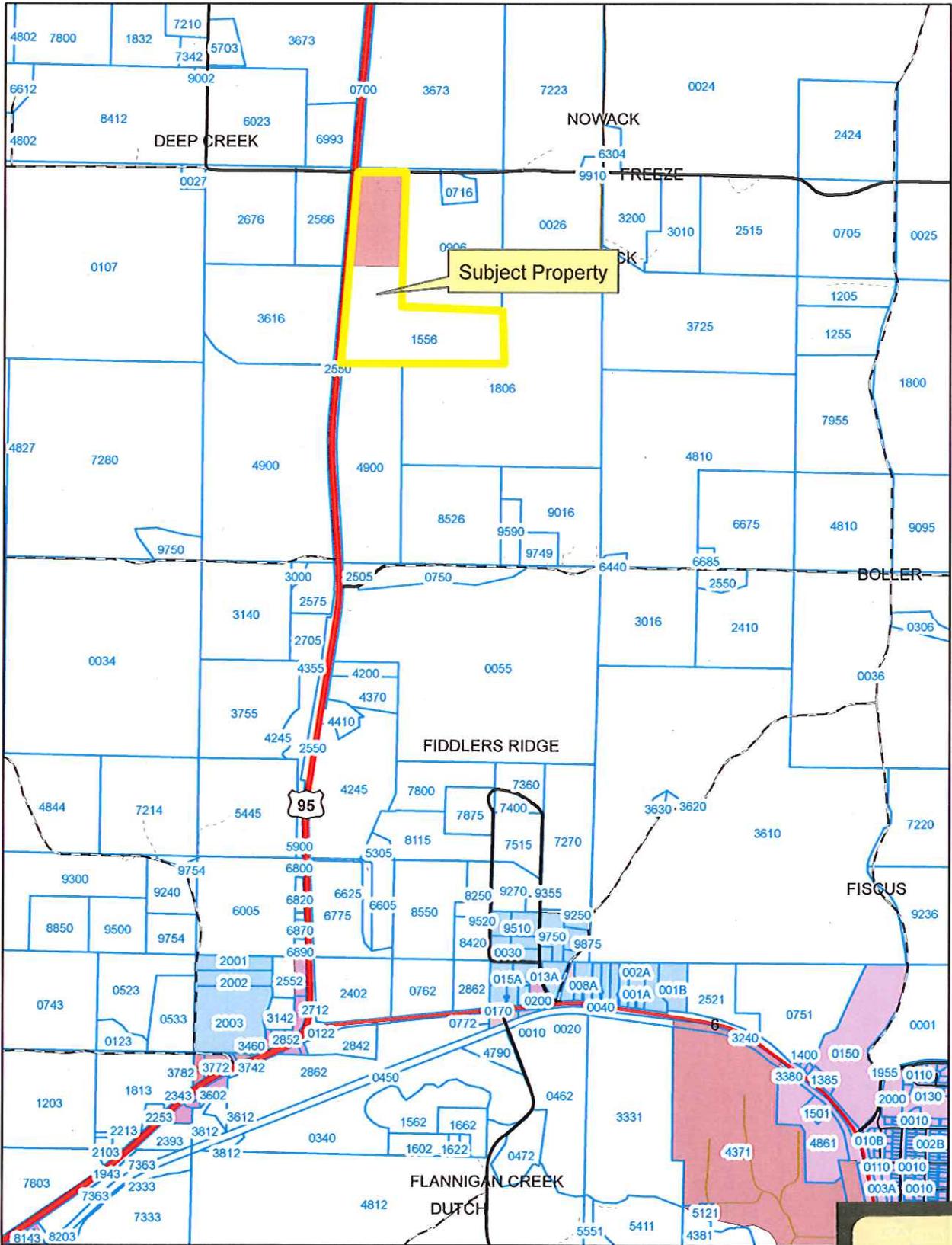
*Created on 09/1



LCZC Hrg: CUP 865
 Applicant: PNW Arms
 Exhibit #: 1A
 Date: 09/19/2012

CUP 865 Zoning

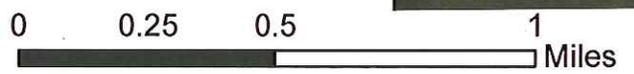
Planning & Building Department



Legend

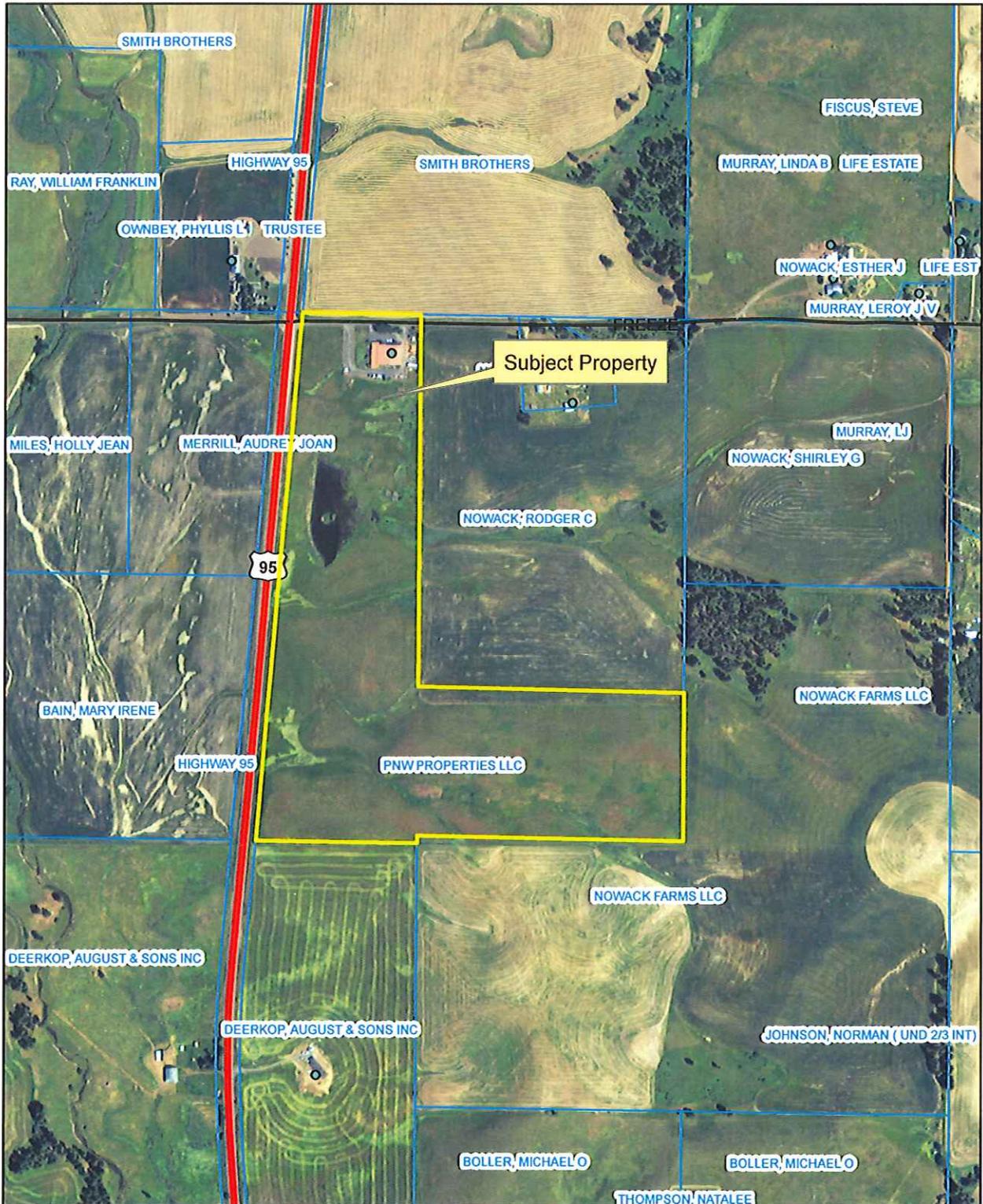
Zoning_Districts_2009	Area of Impact - Genesee	Multiple Family Residential	Single-Family Residential (R1)	<i>*Created on 09/10</i>
ZONE_TYPE	Commercial	Municipality	Suburban Residential	
	Agriculture / Forest	Rural Residential		
	Agriculture / Forestry	Motor Business	Single-Family Residential	

LCZC Hrg: CUP 865
 Applicant: PNW Arms
 Exhibit #: 1B
 Date: 09/19/2012



CUP 865 Adjacent Property Owners and Aerial Map

Planning & Building Department



Prepared by MK on 09/10/2012

Legend

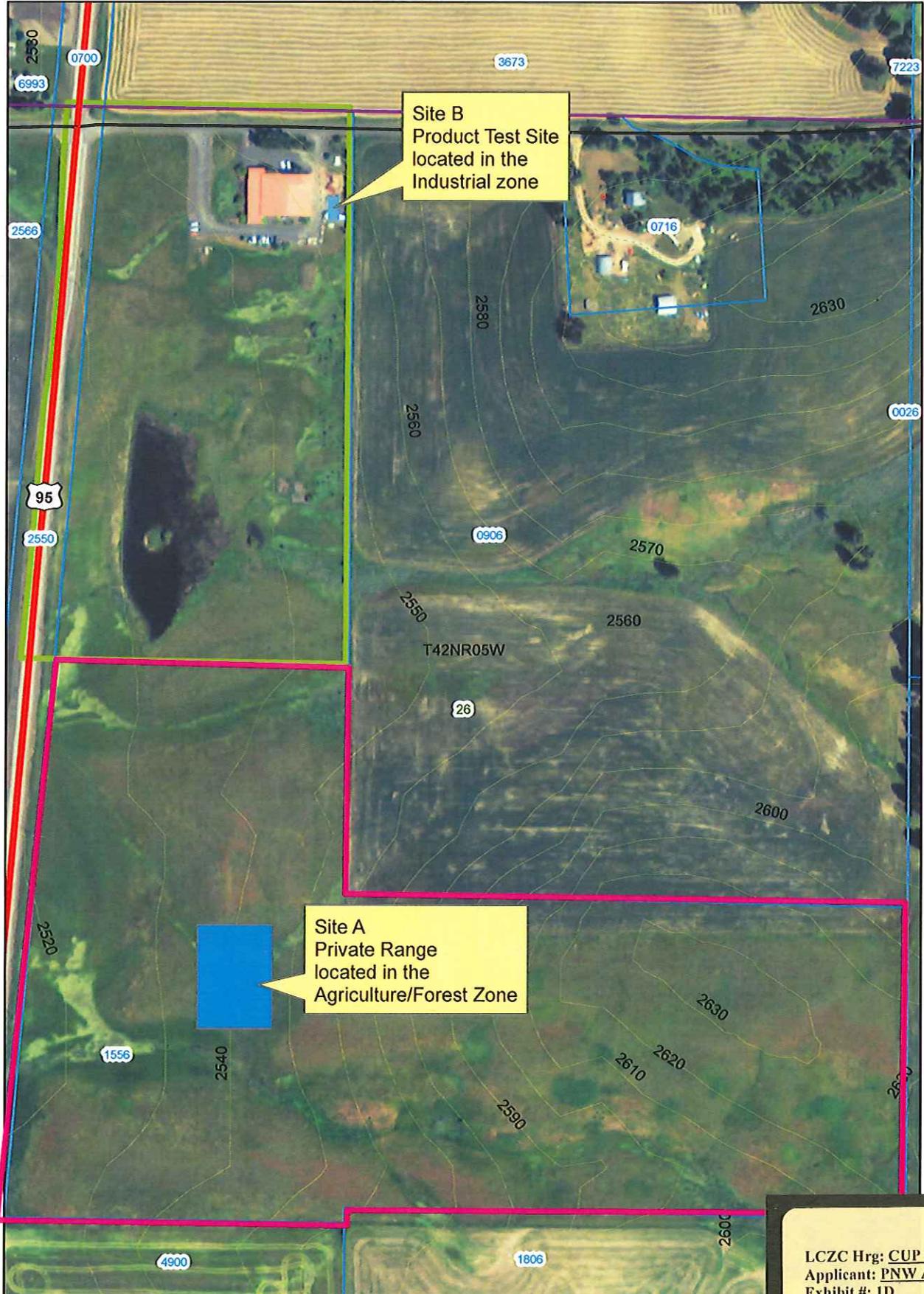
- Parcels
- Addresses

NOTE: This Document is a representation only.
Latah County bears no responsibility for errors or omissions.

LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 1C
Date: 09/19/2012

Sites

Latah County Planning and Building



LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 1D
Date: 09/19/2012

NOTE: This Document is a representation only.
Latah County bears no responsibility for errors or omissions.

A



Application for Conditional Use Permit

Instructions

Please complete the application and required attachments. For certain uses, additional information may be necessary. Incomplete applications or applications without all required attachments will not be accepted. A public hearing will be scheduled only after Staff has determined the application is technically complete.

Please submit to: **Latah County Department of Planning & Building**
Latah County Courthouse 522 S Adams, Room 205, P.O. Box 8068, Moscow, ID 83843 (208) 883-7220

1. Applicant Information			
a. Applicant Name PNW Arms		b. Home Phone	
c. Work Phone			
d. Mailing Address 1293 E Freeze Rd		e. City Pothatch	f. State ID
g. Zip code 83855			
h. Property Owner (if different than applicant) PNW Properties LLC		i. Home Phone	
j. Work Phone			
k. Mailing Address 1293 E Freeze Rd		l. City Pothatch	m. State ID
n. Zip code 83855			

2. General Site Information				
a. Assessor's Parcel Number(s) RP 42 N05W26 1556A			b. Parcel Address (if applicable)	
c. Acreage of Existing Parcel 45.8 acres A/F	d. Zoning A/F	e. Comprehensive Plan Designation ICR	f. Floodplain designation(s) ZONE AFC	g. FEMA Panel # 140086004513
h. Is the parcel within an Area of City Impact? <input type="checkbox"/> Yes. <input checked="" type="checkbox"/> No.	i. Impact City N/A		j. Road Used to Access Site Freeze Rd	

Note: Sites within an area of city impact may require additional notification time prior to public hearings or a hearing before the other jurisdiction.

i. Existing Uses Agriculture

3. Service Provider Information (please attach additional information if requested)		
a. Fire District Pothatch	b. Road District North Latah	c. School District Pothatch
d. Source of Potable Water (i.e. water district or private well)		e. Sewage Disposal (i.e. sewer district or private septic system)

4. Adjacent Properties Information	
a. Zoning of Adjacent Properties Industrial / Ag / Forest	b. Existing Uses of Adjacent Properties Manufacturing, Public Right of Way, Agriculture Rural Residential

5. Permit Information
a. Proposed Use Private gun range

b. What provision of the Latah County Zoning Ordinance allows the proposed use to be considered for a Conditional Use Permit in the Zoning District in which the property is located?

Note: If the proposed use is not specifically listed, please contact the Department prior to submittal to determine if the use is similar to those that are specifically listed as conditionally permitted uses. The Department may require additional information in order to make a determination.

6. Authorization		7. Attachments	
The applicant does hereby certify that all of the above statements and information in any attachments transmitted herewith are true, and further acknowledges that approval of this application may be revoked if it is found that any such statements are false.		All attachments should be reproducible in black and white at 8 1/2" x 11"	
a. Signature of Applicant	b. Date 8.28.2012	<input type="checkbox"/> Fee: (\$200.00) Make checks payable to Latah County.	
c. Signature of Property Owner (if different than applicant)	d. Date	<input checked="" type="checkbox"/> Completed Narrative Worksheet: See instructions on the Conditional Use Permit Narrative Worksheet.	
		<input checked="" type="checkbox"/> Site Plan: The site plan should include a north arrow, location of roads and rights-of-way, existing buildings, improvements and features; the location and dimensions of proposed facilities, improvements and operations; as well as any other details necessary for the Zoning Commission to make a decision.	

Office Use Only			
Date Received 8/28/2012	Amount 200	Receipt No. 890645	By MSL
CUP # CUP 865	Date Determined Technically Complete	By	
Hearing Date			

- Vicinity Map: The map should show the site location in relation to neighboring communities and natural features.
- Assessor's Plat Map: Include a copy that shows the subject parcel and adjoining parcels.
- Other Attachments: Required by some certain proposed uses.

LCZC Hrg: CUP 865
 Applicant: PNW Arms
 Exhibit #: 2A
 Date: 09/19/2012

B



Application for Conditional Use Permit

Instructions

Please complete the application and required attachments. For certain uses, additional information may be necessary. Incomplete applications or applications without all required attachments will not be accepted. A public hearing will be scheduled only after Staff has determined the application is technically complete.

Please submit to: **Latah County Department of Planning & Building**
Latah County Courthouse 522 S Adams, Room 205, P.O. Box 8068, Moscow, ID 83843 (208) 883-7220

1. Applicant Information

a. Applicant Name PNW Arms		b. Home Phone	c. Work Phone	
d. Mailing Address 1293 E Freeze Rd		e. City Potlatch	f. State ID	g. Zip code 83855
h. Property Owner (if different than applicant) PNW Properties LLC		i. Home Phone	j. Work Phone	
k. Mailing Address 1293 E Freeze Rd		l. City Potlatch	m. State ID	n. Zip code 83855

2. General Site Information

a. Assessor's Parcel Number(s) RP 42 N05W26 1556A			b. Parcel Address (if applicable)	
c. Acreage of Existing Parcel 20	d. Zoning IND	e. Comprehensive Plan Designation ICR	f. Floodplain designation(s) ZONE AFC	g. FEMA Panel # 1400860045B
h. Is the parcel within an Area of City Impact? <input type="checkbox"/> Yes. <input checked="" type="checkbox"/> No.		i. Impact City N/A	j. Road Used to Access Site Freeze Rd	

Note: Sites within an area of city impact may require additional notification time prior to public hearings or a hearing before the other jurisdiction.

i. Existing Uses
~~Agriculture~~ Industrial

3. Service Provider Information (please attach additional information if requested)

a. Fire District Potlatch	b. Road District North Latah	c. School District Potlatch
d. Source of Potable Water (i.e. water district or private well)	e. Sewage Disposal (i.e. sewer district or private septic system)	

4. Adjacent Properties Information

a. Zoning of Adjacent Properties Industrial / Ag / Forest	b. Existing Uses of Adjacent Properties Manufacturing, Public Right of Way, Agriculture, Rural Residence
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5. Permit Information

a. Proposed Use
Product testing

b. What provision of the Latah County Zoning Ordinance allows the proposed use to be considered for a Conditional Use Permit in the Zoning District in which the property is located?

Note: If the proposed use is not specifically listed, please contact the Department prior to submittal to determine if the use is similar to those that are specifically listed as conditionally permitted uses. The Department may require additional information in order to make a determination.

6. Authorization

The applicant does hereby certify that all of the above statements and information in any attachments transmitted herewith are true, and further acknowledges that approval of this application may be revoked if it is found that any such statements are false.

a. Signature of Applicant 	b. Date 8.20.2012
c. Signature of Property Owner (if different than applicant)	d. Date

7. Attachments

All attachments should be reproducible in black and white at 8 1/2" x 11"

Fee: (\$200.00) Make checks payable to Latah County.

Completed Narrative Worksheet: See instructions on the Conditional Use Permit Narrative Worksheet.

Site Plan: The site plan should include a north arrow, location of roads and rights-of-way, existing buildings, improvements and features; the location and dimensions of proposed facilities, improvements and operations; as well as any other details necessary for the Zoning Commission to make a decision.

Vicinity Map: The map should show the site location in relation to neighboring communities and natural features.

Assessor's Plat Map: Include a copy of that shows the subject parcel and adjoining parcels.

Other Attachments: Required by staff for certain proposed uses.

Office Use Only	
Date Received 8/28/2012	Amount 200.
Receipt No. 590645	By WCC
CUP # CUP 865	Date Determined Technically Complete
Hearing Date	By

LCZC Hrg: **CUP 865**
 Applicant: **PNW Arms**
 Exhibit #: **2B**
 Date: **09/19/2012**



Conditional Use Permit Narrative Worksheet

Application Information

Applicant's Name

Phone Number

Purpose: To assist the Zoning Commission in making an informed decision regarding the applicant pursuant to the requirements of the Latah County Land Use Ordinance.

Instructions: Please respond to each section of this form. If you need more space, you may attach additional sheets to the worksheet.

Description of Proposal

Describe your proposal in detail. Include all aspects of your proposal.

PNW ARMS is planning on using this private range for the purpose of demoving ammunition to its customers. Also planning to offer the range for intermittent law Enforcement use. ~~the range~~ LE/mil usage will be limited from 0900 - 1700. PNW Arms usage hours are from 0900 - 2100.

Existing Uses of Property

Please describe what uses, structures and features currently occupy the property.

Pasture

Consistency Requirements

Please respond to each of the three criteria listed in Section 7.01.02 of the Latah County Land Use Ordinance by explaining how your proposal meets each criteria. If the provided space is insufficient, please attach your responses to this packet.

A. The use is not detrimental to the health or safety of those in the surrounding area and will not otherwise adversely affect permitted uses or the enjoyment of such uses in that zone to any greater extent than a permitted use in that zone.

As per the attached diagrams, ~~the~~ the shooting zones were oriented away from inhabited residential structures. High berms are constructed ~~to provide~~ as a safety mechanism, to capture projectiles.

B. The use will not require facilities or services with excessive costs to the public.

No

LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 2C
Date: 09/19/2012

C. The use is not in conflict with the goals and policies of the Comprehensive Plan.

No we do not have any seen conflict with the goals or policies of the comprehensive plan. The conditional use permit would in fact support the economic clause per the comprehensive Plan objective three (3).

In addition to your response above, please explain your proposal's consistency with the proceeding elements of the Comprehensive Plan. If a certain element is not applicable to your proposal, please explain why. Please refer to the Latah County Comprehensive Plan for specific goals and policies of the particular elements.

a. Community Design Element

The stated purpose does not conflict with the uses per the defined community design element number eight (8).

b. Population Element

N/A

c. Housing Element

N/A

d. Economic Development Element

With the approval of the conditional use permit our business and the local community will both be beneficiaries from the improvements. Local law enforcement will have reduced training costs, lower logistic costs, and access to PNW Arms facility infrastructure. Our business will benefit from customer demands.

e. Public Services, Facilities, and Utilities Element

The use of the property will not have an added burden to local, state, or federal resources.

f. School Facilities and Student Transportation Element

N/A

g. Transportation Element

We are using an existing access point and will not adversely affect local highways or access roads.

h. Natural Resource Element

The layout was designed to use the natural terrain of the property to limit construction and avoid areas such as wetlands.

i. Special Areas Element

N/A

j. Hazardous Areas Element

The proposed use would limit the potential for wild fire by exposing earth, removing vegetation and putting down crushed earth.

k. Recreation Element

N/A

l. Land Use Element

The use is complimentary to non corner ~~zone~~ comprehensive planning designation.

m. Implementation

N/A

n. Property Rights Element

^{violate}
We do not ~~violate~~ the constitutionality of our neighbors property rights.

o. Water Resource Element

N/A



Conditional Use Permit Narrative Worksheet

Application Information

Applicant's Name

Phone Number

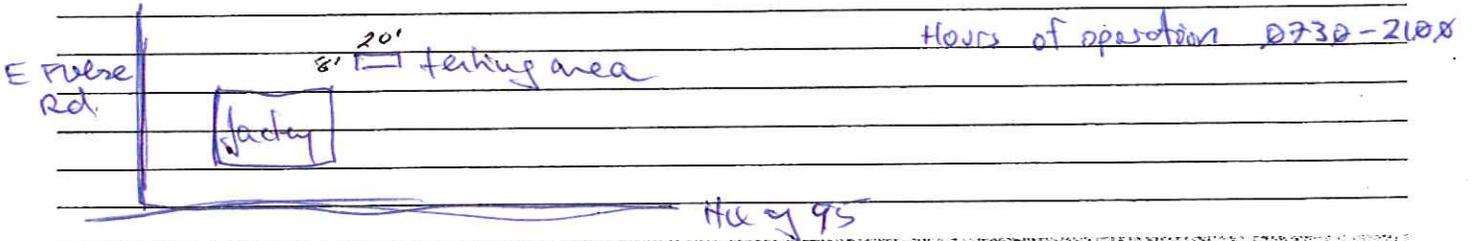
Purpose: To assist the Zoning Commission in making an informed decision regarding the applicant pursuant to the requirements of the Latah County Land Use Ordinance.

Instructions: Please respond to each section of this form. If you need more space, you may attach additional sheets to the worksheet.

Description of Proposal

Describe your proposal in detail. Include all aspects of your proposal.

Taking and testing a production setup is an essential part of PNW Arms' ammunition manufacturing operation. Rounds from new batches are taken for through various chambers for speed, pressure, etc. The testing area is arranged as follows



Existing Uses of Property

Please describe what uses, structures and features currently occupy the property.

ammunition and parts manufacturing

Consistency Requirements

Please respond to each of the three criteria listed in Section 7.01.02 of the Latah County Land Use Ordinance by explaining how your proposal meets each criteria. If the provided space is insufficient, please attach your responses to this packet.

A. The use is not detrimental to the health or safety of those in the surrounding area and will not otherwise adversely affect permitted uses or the enjoyment of such uses in that zone to any greater extent than a permitted use in that zone.

High beams and limited use to ensure maximum safety. Private access only

B. The use will not require facilities or services with excessive costs to the public.

No

LCZC Hrg: CUP 865
 Applicant: PNW Arms
 Exhibit #: 2D
 Date: 09/19/2012

C. The use is not in conflict with the goals and policies of the Comprehensive Plan.

No we do not have any seen conflict with the goals or policies of the comprehensive plan. The conditional use permit would in fact support the economic clause per the comprehensive Plan objective three (3)

In addition to your response above, please explain your proposal's consistency with the proceeding elements of the Comprehensive Plan. If a certain element is not applicable to your proposal, please explain why. Please refer to the Latah County Comprehensive Plan for specific goals and policies of the particular elements.

a. Community Design Element

The stated purpose does not conflict with the uses per the defined community design element number eight (8).

b. Population Element

N/A

c. Housing Element

N/A

d. Economic Development Element

This is critical to our business and would in essence cause our operations at this facility to cease if the C.U.P. is not approved

e. Public Services, Facilities, and Utilities Element

The intended use will not have an added burden to local, state, or federal resources.

f. School Facilities and Student Transportation Element

N/A

g. Transportation Element

We are using an existing access point and will not adversely affect local highways or roads.

h. Natural Resource Element

N/A

i. Special Areas Element

N/A

j. Hazardous Areas Element

The proposed use would limit the potential for wildfire by exposing earth, removing vegetation and putting down crushed rock.

k. Recreation Element

N/A

l. Land Use Element

The use is complimentary to our current comprehensive planning designation. This will fully utilize the existing industrial designation.

m. Implementation

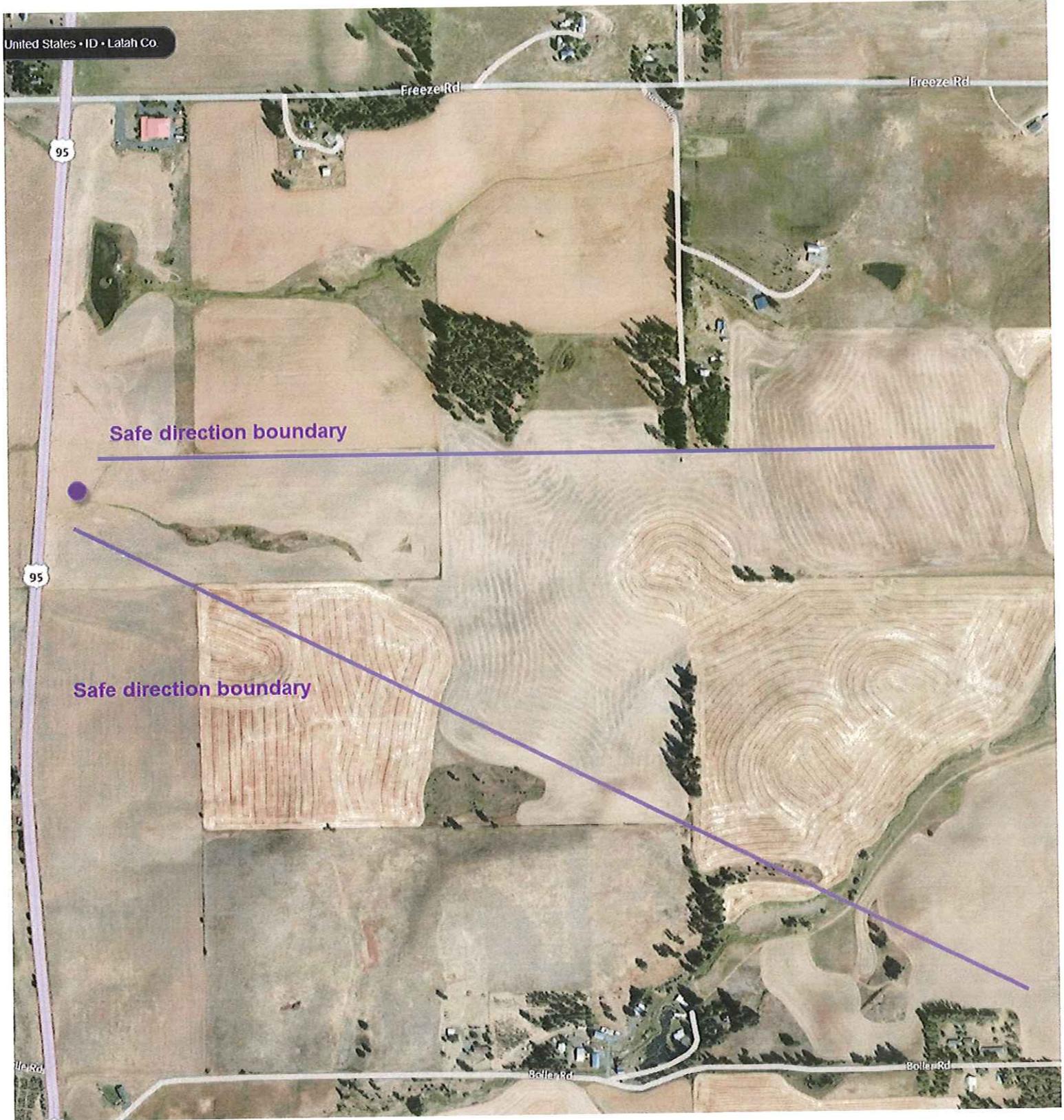
N/A

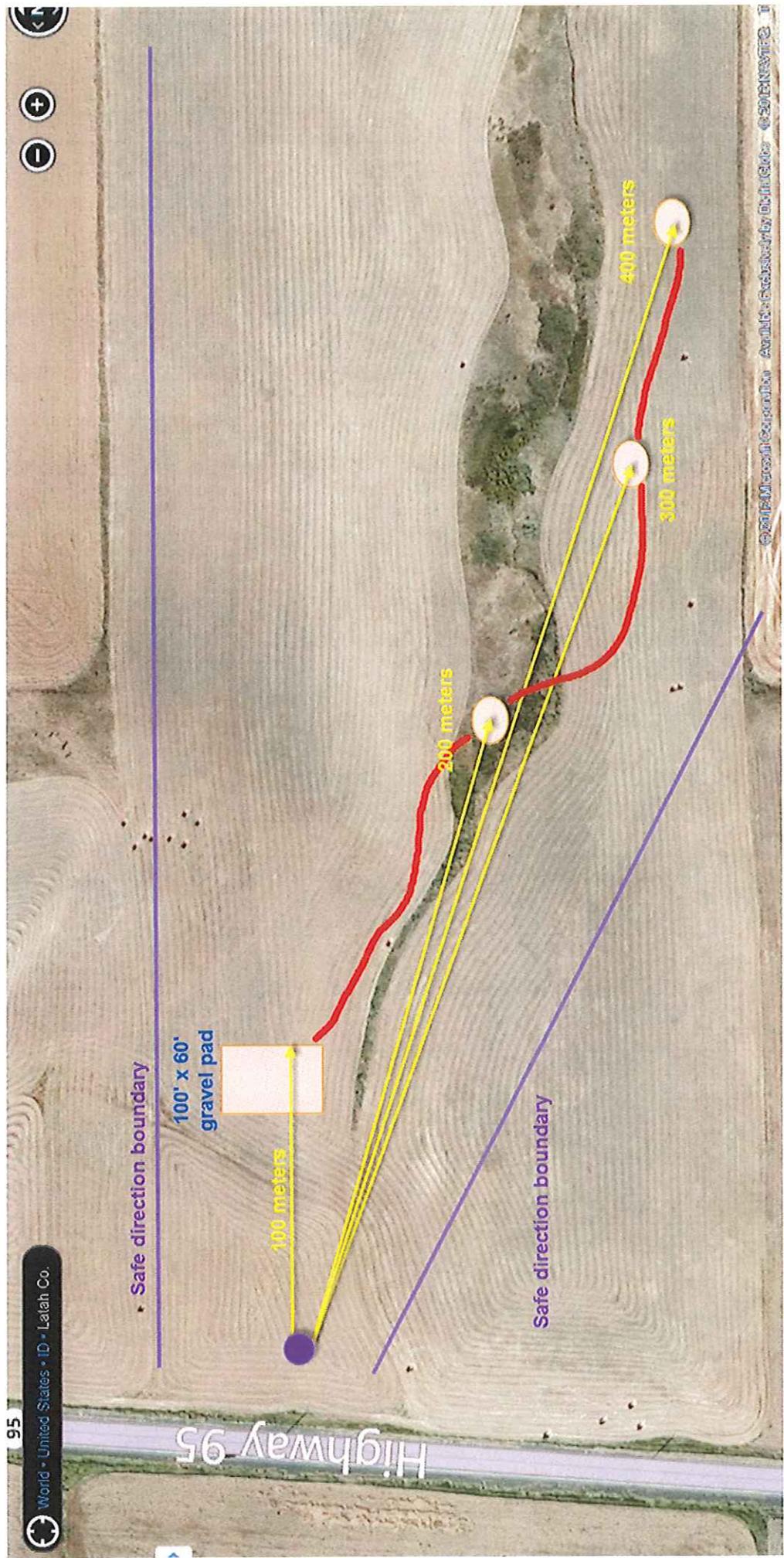
n. Property Rights Element

We do not violate the constitutionality of any of our neighbors' property rights.

o. Water Resource Element

N/A





Safe direction boundary

100' x 60' gravel pad

100 meters

200 meters

300 meters

400 meters

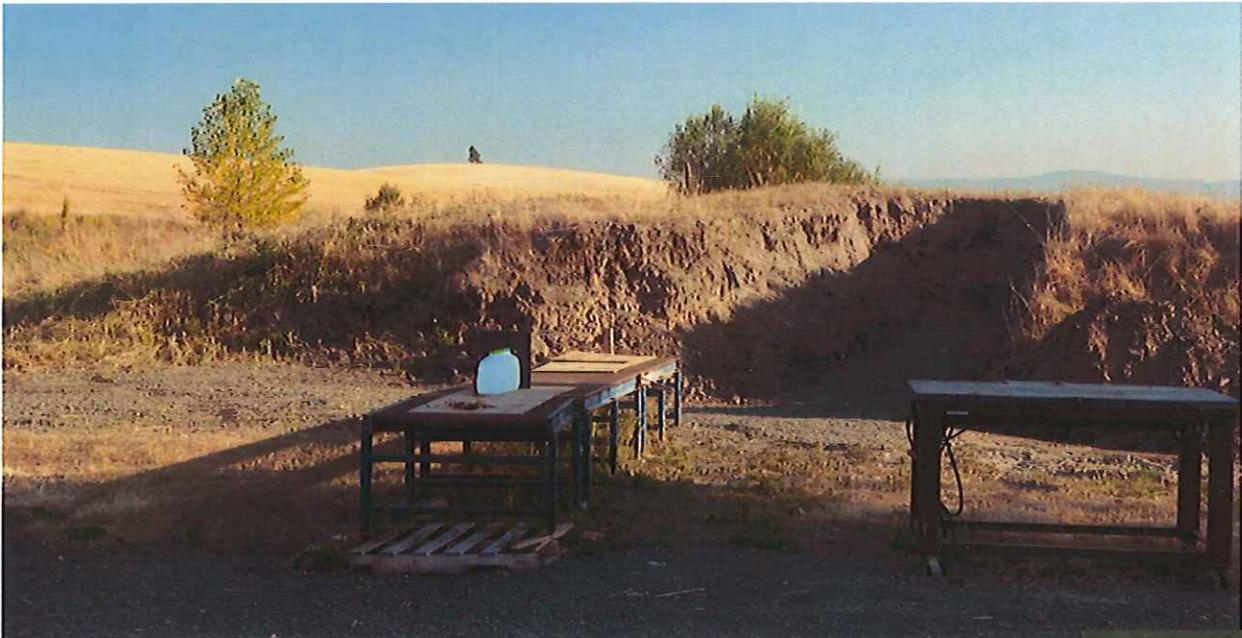
Highway 95

Safe direction boundary

CUP #865 Site A
(View from HWY 95 looking East)



CUP #865 Site B
(View from factory looking South)



LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 2F
Date: 09/19/2012

CUP #865 – Staff Introduction

A request by PNW Arms for A) a conditional use permit to operate a private range for business demonstration and limited law enforcement use on a portion of a parcel zoned Agriculture Forest and B) a conditional use permit to continue operation of an exterior product testing facility on a portion of a parcel zoned Industrial. The property is located at 1293 E Freeze Road, Potlatch, in Section 26, Township 42 North, Range 05 West, B.M. in Latah County and is referenced as Latah County Assessor's parcel number RP42N05W261556A.

Section 7.01.02 requires:

1. A conditional use permit may be granted if the Zoning Commission finds that the proposed use conforms to each of the following criteria:
 - A. The use is not detrimental to the health and safety of those in the surrounding area and will not otherwise adversely affect permitted uses or the enjoyment of such uses in that zone to any greater extent than a permitted use in that zone;
 - B. The use will not require facilities or services with excessive costs to the public;
 - C. The use is not in conflict with the goals and policies of the Latah County Comprehensive Plan.
2. If the Zoning Commission finds that a proposed use is essential to the public health, safety, or welfare, such use may be permitted even if the use is not found to meet the criteria listed above.
3. The Zoning Commission shall have the authority to set an expiration date for any conditional use permit so long as the reasons for such are included in their findings of fact and conclusions of law.

Exhibits will now be entered into the record.

The following exhibits were submitted with the staff packet:

EXHIBITS:

- | | |
|---------------------|---|
| Exhibit #1. | Criteria Worksheet and Application Summary |
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| Exhibit #4. | Letter from Latah Economic Development Council |
| Exhibit #5. | Letter from Alturas Analytics, Inc. |



Latah Economic Development Council

220 E. Fifth Street, Suite 339
PO Box 9406
Moscow ID 83843
Phone: 208.883.2279
Cell: 208.301.1221
Email: LEDC@moscow.com

September 12, 2012

Michelle Fuson, Director
Latah County Planning and Building Department
PO Box 8068
Moscow ID 83843

RE: PNW Arms Conditional Use Permits

Dear Michelle:

The Latah Economic Development Council urges you to approve the two Conditional Use Permits that PNW Arms is requesting for their rural Potlatch location, and to welcome them as a vital member of our community and new economy.

The mission of Latah Economic Development Council is to create jobs and economic opportunity. PNW Arms helps fulfill that mission by bringing excellent jobs, economic opportunity and a broadened tax base to the people of Latah County and the State of Idaho.

PNW Arms is key to the redevelopment of the old Potlatch mill site, now known as River Ridge Recreational Technology Center. As the result of an extensive marketing and tactical study completed by P'Chelle International, PNW Arms will serve as the model for rec-tech industry growth in the Potlatch area. The plan has worked very well. With PNW Arms assistance, Eagle View Research has committed to relocate from Shelton Washington to Latah County next year.

A recent study by Steve Peterson, Associate Economics Professor at the University of Idaho, described how Latah County lagged behind Whitman County in manufacturing growth. Manufacturing grew 152% in Whitman County compared to only 5% in Latah County. Embracing companies like PNW Arms and Eagle View Research can help bridge this gap and bring higher paying jobs and a better economy to Latah County. But we need your help.

Please approve the Conditional Use Permits for PNW Arms as presented.

Thank you,

Sincerely,

A handwritten signature in black ink that reads "B. J. Swanson". The signature is written in a cursive, flowing style.

B. J. Swanson
Executive Director

LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 4
Date: 09/19/2012

September 4, 2012

Michelle Fuson, Director
Latah County Planning and Building Department
PO Box 8068
Moscow ID 83843

RE: PNW Arms Conditional Use Permits

Dear Michelle:

Please include this letter in support of the Conditional Use Permits for PNW Arms, Freeze Road, Potlatch.

I have personally met the PNW Arms owners and am very impressed with their business minds and vision for the future. They are truly a high tech company with excellent plans to expand in Latah County. Having PNW Arms in rural Potlatch goes along with the State of Idaho 2008 recreation technology recruitment campaign. In the Northwest Public Radio feature last week about Potlatch and PNW Arms, Idaho Department of Commerce Director Jeff Sayer said, "...from a strategic standpoint having arms and ammunition manufacturers makes a lot of sense for the State of Idaho." It can also make a lot of sense for Latah County by providing high paying jobs and expanding our tax base.

In addition to the NWPR article, the features done by the Associated Press, Fox Network News and soon the History Channel will further promote the business friendly climate of Latah County and hopefully bring in other high tech, high quality companies. We are moving toward a new economic model that will benefit all in Latah County.

Please approve the Conditional Use Permits for PNW Arms and show them and others that Latah County is a business friendly place.

Thank you,

Sincerely,



Robin Woods
President

September 12, 2012

RECEIVED

SEP 12 2012 MK

LATAH COUNTY

Latah County Zoning Commission
c/o Latah County Planning and Building Department
PO Box 8068
Moscow ID 83843

RE: PNW Arms Conditional Use Permits

Dear Commissioners:

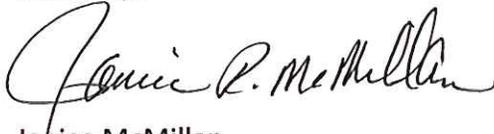
Please register my support to approve the Conditional Use Permits for PNW Arms at their rural Potlatch location.

As Chair of the Idaho Economic Advisory Council, I know the importance of bringing new companies, new jobs, a broadened tax base and overall economic value to a region. PNW Arms is doing this for the Potlatch area. Assisting them with their business and expansion plans will attract other like businesses, new jobs and investment into the area.

Our economic picture is changing. In 2008, the Idaho Department of Commerce embarked on a promotion to bring recreation technology companies to the state as part of their Project 60 Campaign. PNW Arms is a prime example of the success of this campaign. PNW Arms has actively assisted the City of Potlatch with the River Ridge Recreational Technology Center and helped recruit Eagle View Research from Shelton Washington. They are a valuable resource and good neighbor to the Potlatch community.

Please approve the Conditional Use Permits for PNW Arms and show other businesses that may wish to locate here in the future that Latah County is business friendly.

Sincerely,



Janice McMillan

Chair

Idaho Economic Advisory Council

LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 6
Date: 09/19/2012

IDAHO

DEPARTMENT OF LABOR

C.L. "BUTCH" OTTER, GOVERNOR
ROGER B. MADSEN, DIRECTOR

September 12, 2012

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SEP 12 2012 *mk*

LATAH COUNTY

Latah County Zoning Commission
Latah County Planning and Building Department
PO Box 8068
Moscow ID 83843

RE: PNW Arms Conditional Use Permits

Dear Commissioners:

This letter is to ask for your approval of the Conditional Use Permits for PNW Arms to continue operations near Potlatch.

Idaho Department of Labor has provided almost \$104,000 in Workforce Development Training Fund dollars to reimburse PNW Arms for staff training costs and is also assisting them in recruiting qualified employees. We appreciate that they give priority to hiring Veterans. In our experience they conduct their operation with the utmost professionalism and cooperation.

To have PNW Arms relocate to Potlatch is a tremendously valuable economic development opportunity for the region. Good manufacturing jobs like those at PNW Arms can give a tremendous boost to the local economy and provide incredible opportunities for Idaho workers.

Your approval of the Conditional Use Permits for PNW Arms is strongly encouraged.

Sincerely,

Roger B. Madsen

Roger B. Madsen
Director



OFFICE OF THE SHERIFF

LATAH COUNTY, IDAHO

P.O. Box 8068
Moscow, Idaho 83843
(208) 882-2216
FAX (208) 883-2281



Wayne Rausch
Sheriff

Brian Strampher
Chief Deputy

Michael Rosen
Support Services

Ron Manell
Jail Commander

09/05/2012

RECEIVED
SEP 12 2012^{ML}
LATAH COUNTY

Planning and Building Department
Latah County Courthouse
Moscow, Idaho 83843
Attn: Michelle Fuson

Dear Michelle,

It is with pleasure that I recommend that PNW Arms be issued a permit to construct a shooting range on its property to the north of Potlatch, Idaho.

PNW Arms is in business to provide both law enforcement and the military cutting edge technology to enhance their ability to protect and serve the American people both here and abroad. In the performance of that business, it is necessary for them to shoot weaponry of various calibers and configurations at various distances and conditions, to include multiple shooting bays.

Testing and evaluation are essential components of insuring competent manufacturing results. As an added benefit to Latah County, the Sheriff's Office has been offered the future use of this range to facilitate our firearms training program. One advantage to the proposed PNW location is the ability to shoot in low light (night) conditions made necessary by court decisions throughout the legal arena. From time to time, PNW will bring in instructors with expertise in numerous law enforcement related disciplines.

I believe that PNW Arms is a viable and vital addition to the Latah County workforce, and that the relationship the Sheriff's Office has with them is mutually beneficial. If you have any questions, don't hesitate to call me.

Sincerely,

Wayne Rausch
Latah County Sheriff

LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 8
Date: 09/19/2012

September 12, 2012

RECEIVED

SEP 17 2012 *mk*

LATAH COUNTY

Michelle Fuson, Director
Latah County Planning and Building Department
PO Box 8068
Moscow ID 83843

RE: PNW Arms Conditional Use Permits

Dear Ms. Fuson:

Please accept this letter as our strong support for the Conditional Use Permits for PNW Arms, Freeze Road, Potlatch.

We live just north of the PNW Arms facility. In these difficult economic times, it is good to drive by their location and see activity and people working. The possibility of our local people having the option to work at a high quality local manufacturer is very welcome. It will be even better if PNW Arms can be the center of a cluster to attract more like manufacturers and more jobs to strengthen our community.

We understand that times are changing and so are jobs. A small amount of noise from PNW Arms is no greater than many of the other sounds that are common in the area.

Please approve the Conditional Use Permits for PNW Arms.

Sincerely,

Janie + Ron Nirk

Janie & Ron Nirk
1010 Brincken Road
Potlatch ID 83855

LCZC Hrg: CUP 865
Applicant: PNW Arms
Exhibit #: 9
Date: 09/19/2012



RECEIVED
SEP 17 2012 ^{MK}
LATAH COUNTY

City of St. Maries

"On the Shadowy St. Joe"

602 College Avenue, St. Maries, Idaho 83861

Phone 208-245-2577

Mayor Tami Holdahl
smcityhall@smgazette.com

Fax 245-6579

September 14, 2012

Latah County Zoning Commission
Latah County Planning and Building Department
PO Box 8068
Moscow, Idaho 83843

RE: PNW Arms Conditional Use Permits

Commissioners:

Please approve the Conditional Use Permits for PNW Arms.

In August I was invited to tour their facility and talk with them about specialized ammunition for law enforcement. They are an amazing high technology company with state-of-the-art ballistics. I can clearly see why the military is interested in their products.

It is a great resource to have a company like PNW Arms in our area. I hope they are very successful and attract more companies like them that may want to settle in Benewah County and St. Maries, too.

You are lucky to have PNW Arms. Please help them succeed by approving the Conditional Use Permits. However, if you chose not to approve them, please send them my way.

Sincerely,

Tami Holdahl

Mayor City of St. Maries

LCZC Hrg: CUP 863
Applicant: PNW Arms
Exhibit #: 10
Date: 9/19/2012



Administration

700 S. Main
Moscow, ID 83843-3046
(208) 882-4511

September 14, 2012

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SEP 17 2012 *ML*

LATAH COUNTY

Michelle Fuson, Director
Latah County Planning and Building Department
PO Box 8068
Moscow ID 83843

RE: PNW Arms Conditional Use Permits

Dear Michelle:

Please approve the two Conditional Use Permits to allow PNW Arms to continue operating at its Freeze Road location.

Gritman Medical Center operates a rural clinic in Potlatch. We are pleased to be a part of the Potlatch Community and support the many positive things that are beginning to happen. One of those positive things was the arrival of PNW Arms last year. PNW Arms has become a vital part of the community, a good neighbor. They provide much-needed higher paying jobs with benefits and are assisting the City of Potlatch with the River Ridge Recreational Technology Center to bring in more viable businesses and high quality employers.

In addition, PNW Arms was the focus of several news features highlighting the area by the Associated Press, Fox Network News, Boise State Public Radio and soon to be visits by the History Channel and Discovery Channel. The Potlatch area is on the verge of rising out of economic depression into economic prosperity. But we are not there yet. We must all work together to make this happen. Gritman Medical Center is committed to partnering with the Potlatch Community to assist. We need your help also.

Please approve the Conditional Use Permits as requested. This will send a strong message to others that the Potlatch Community, Latah County and the State of Idaho are ready to do business.

Sincerely,

A handwritten signature in blue ink that reads "Kara Besst".

Kara Besst
Chief Executive Officer

LCZC Hrg: 865
Applicant: PNW Arms
Exhibit #: 11
Date: 9/19/2012



September 14, 2012

Michelle Fuson, Director
Planning and Building Department
Latah County
P.O. Box 8068
Moscow, ID 83843

Re: PNW Arms CUP #865

Dear Michelle:

Thank you for the opportunity to provide comment on CUP # 865 submitted by PNW Arms, 1293 E Freeze Road, Potlatch, regarding their request to operate a private range for business demonstration and limited law enforcement use on a portion of a parcel zoned Agriculture Forest and to continue operation of an exterior product testing facility on a portion of a parcel zoned Industrial.

I support this CUP request and the opportunity to expand the County's manufacturing and private sector job base. As you are aware, the current PNW Arms facility and this industrially-zoned site has long played an important role in providing manufacturing employment opportunities in the region. Speaking from both a local and statewide business recruitment strategy, the arrival of PNW Arms is very consistent with our shared vision of developing a recreational/technology manufacturing cluster within the Potlatch area including the nearby River Ridge Recreational Technology Center and our efforts to adaptively repurpose the former Potlatch Mill property.

Currently serving as president of the Latah Economic Development Council, I support the PNW Arms CUP application, the promise it provides to our local workforce, and the opportunities to further enhance and develop a true "rec-tech" cluster in the Potlatch area of Latah County.

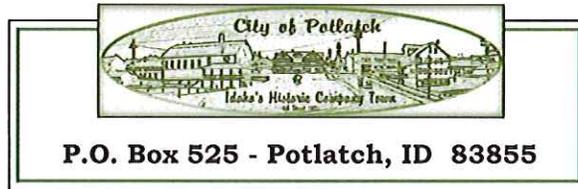
Thank you for your careful consideration of this important CUP application.

Sincerely,

Paul J. Kimmell

Paul J. Kimmell
Regional Business Manager – Palouse Region
107 S. Grand Ave., Suite E
Pullman, WA 99163
509-336-6263
paul.kimmell@avistacorp.com

CZC Hrg: 865
Applicant: PNW Arms
Exhibit #: 12
Date: 9/14/2012



September 12, 2012

Michelle Fuson, Director
Latah County Planning and Building Department
P.O. Box 8068
Moscow, ID 83843

RE: PNW Arms Conditional Use Permits

Dear Michelle:

Please approve the two Conditional Use Permits to allow PNW Arms to continue operating and growing at their Freeze Road location.

The Potlatch community welcomes PNW Arms and we are very fortunate that they chose our area to relocate from Issaquah, Washington. With the popularity of the recreational technology industry in the State of Idaho, PNW Arms brought us into that sector along with Nightforce in Orofino, ATK in Lewiston and other small rec-tech businesses. We hope the synergy created with this cluster will bring more rec-tech businesses and more good jobs.

The City of Potlatch, Potlatch Corporation, Latah Economic Development Council and many other partners have worked hard to redevelop the old Potlatch mill site in hopes of bringing in new jobs to replace those lost when the mill closed. With the arrival of PNW Arms, the redevelopment was named the River Ridge Recreational Technology Center (R³TC) with the mission to attract similar businesses. A marketing and tactical plan done by P'Chelle International strongly suggested using PNW Arms as key to the redevelopment and the owners of PNW Arms have been very helpful in guiding this plan. We look to PNW Arms as the leader for a new and very welcome economy in the Potlatch area.

Please approve the Conditional Use Permits as requested and show PNW Arms that we appreciate their business.

Sincerely,


David Brown,
Mayor

RECEIVED

SEP 26 2012

LATAH COUNTY

Linda Murray
1324 E. Freeze Rd.
Potlatch, ID 83855

September 20, 2012

Dear Office of Planning and Building:

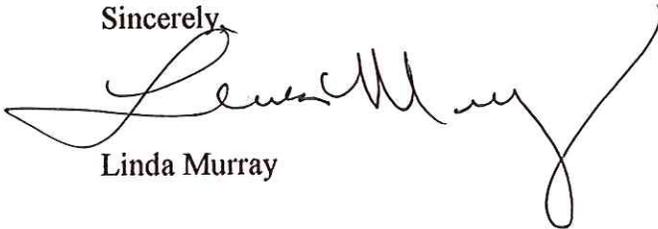
I would like to express my concern regarding the proposal of PNW on Freeze Road in Potlatch, ID to build another shooting range on their re-zoned property. Originally, this property was zoned agriculture and thanks to the previous owners of D8, it is no longer an agricultural zone. Since this has taken place, many years prior, there has been nothing but problems with the users/owners of this property.

My first concern with PNW is the statement made by them at the meeting on September 19th, which was in the generality of "we have talked to all the neighbors and they have no problems with our shooting". NOTHING COULD BE FURTHER THAN THE TRUTH. First of all, PNW has not spoken with ANY of the neighbors on Freeze Rd and eastward of Freeze Rd. I live less than 1/8 of a mile from them, directly on the hill above them and I personally am NOT in favor of increasing their potential range for additional shooting. Their noise from shooting is beyond annoying and quite honestly in my opinion, "disturbing the peace." Shooting does indeed take place at all hours of the day and night, sometimes up to 9pm. Also, it is heard many times on Saturdays and even Sundays! In addition to the shooting, they have dogs that bark all night long.

Secondly, having an open range such as they currently have seems very unsafe, especially located right next to highway 95. Do they really have a license to conduct business this way? If so, it is quite surprising.

Lastly, based on the points I have made above, I highly disapprove of allowing them additional range possibilities UNLESS, they have covered facilities thereby making the sound more muffled and certainly more safe for neighbors and passing by traffic.

Sincerely,



Linda Murray

LCZC Hrg: 865
Applicant: PNW Arms
Exhibit #: 14
Date: 9/19/2012



PNW Arms
Weapons Science™

**PNW Arms Small Arms Range Design
and Construction Guidelines**

10/15/2012

LCZC Hrg: CUD 865
Applicant: PNW Arms
Exhibit #: 15
Date: 10/15/2012

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1. Overview.

This document describes design guidelines and technical details for a private range to be built at PNW Arms' Potlatch facility. The document is largely based on and a subset of guidelines established by the US Air Force for Small arms Range design. The original document defines guidelines for many different range types such as Non-Contained or Partially-Contained and many different weapon types from handgun to grenade launchers, anti-tank weapons and mounted machine guns. This document only contains information relevant to a fully contained range for pistol and rifle calibers up to but not including 50BMG.

2. Fully Contained Range - Definition

A fully contained range is designed to prevent 100 percent of the direct-fired rounds and 100 percent of the ricochets from leaving the limits of the range. This type of range is used when the required minimum Surface Danger Zone (SDZ) or Vertical Danger Zone (VDZ) requirements are not available because of lack of land area or compatible land use. These ranges have an overhead containment structure (ballistic safety baffles) and sidewalls. The building envelope is typically not designed to prevent projectile penetration unless it is part of the containment. The structure elements and materials used for the building roof may vary depending upon the type and configuration of interior overhead containment, type of backstop, and method used to trap bullets. The fully contained range design must preclude the escape of both direct-fired projectiles and ricochets. Construct the overhead baffles with a minimum of 150 millimeters (6 inches) of horizontal overlap between the trailing edge of any baffle and the leading edge of the next baffle downrange. The range design must include engineering controls to mitigate hazardous noise and other occupational and environmental hazards resulting from the use of both lead and non-lead frangible ammunition.

2.1. Fully Contained Indoor Range.

A fully contained indoor range has a firing platform, bullet trap, and baffle system (or other ballistic containment system) enclosed within a complete building envelope. The complete building envelope is required to prevent influences from the exterior environment and to allow a slight negative pressure to be maintained within the range.

2.2. Fully Contained Outdoor Range.

A fully contained outdoor range has baffle systems exposed to the environment and does not have a complete building envelope enclosing the entire range.

3. Range Geometry.

3.1. SDZ Geometry.

The range danger zone includes the projectile impact area, the SDZ, and the VDZ. Refer to Figure 1 for the typical geometry of the SDZ.

3.2. Limits of Fire.

The limits of fire are imaginary lines drawn from the outermost edges of the endmost firing positions, extended downrange through the target line and terminating at the SDZ limit. The limits of fire may be perpendicular to the firing line or they may depart the firing line at a designated angle. The range's configuration and use determines the departure angle of the limits of fire.

3.3. Projectile Impact Area or Direct Fire Zone.

The projectile impact area is bounded by the left and right limits of fire, the firing line, and extends to the minimum SDZ arc length for the ammunition and range type (Table 1). When the target line and the firing line are the same width, the impact area forms a rectangle (Figure 1). When the target line is wider than the firing line, the impact area becomes a pie-shaped area formed by the limits of fire and the arc of the minimum SDZ length (Figure 2).

3.4. Ricochet Danger Area.

The ricochet danger area is the area between the impact area and the secondary danger area. The ricochet area is typically determined by extending a line drawn at a 10 degree angle off the left and right limits of fire, beginning at the firing line and extending to the minimum SDZ arc

3.4.1. Secondary Danger Areas.

Secondary danger areas are provided to catch fragments from exploding ammunition or ricochets from rounds that impact at the outer edge of the ricochet danger area. A line beginning at the intersection of the firing line and the firing limits is drawn departing from the line of fire at an angle of 40 degrees, extending outward for 1,000 meters (3,280 feet). From the 1,000-meter point, a second line extends to a point on the minimum SDZ arc 100 meters (328 feet) outside the ricochet area limits. The numbers above and in the diagram below are applicable to a non-contained range.

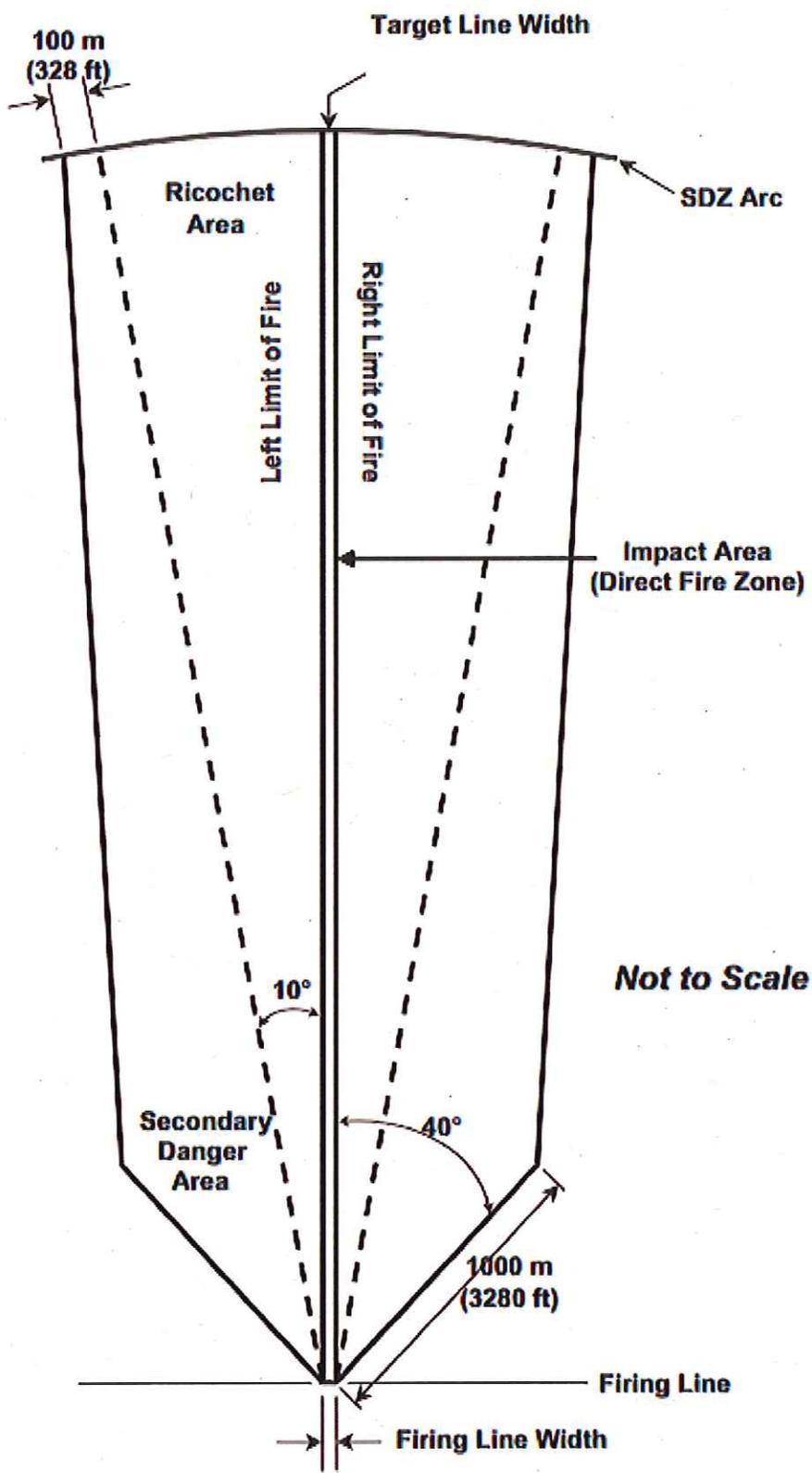


Figure 1. SDZ Configuration — Firing Line Width Equal to Target Line Width

3.5. Firing Line Positions/Platforms.

The number of firing positions establishes the width of the firing line. All small arms (rifle, pistol, and shotgun) ranges should have a minimum of fourteen positions on the firing line. Add additional positions in increments of seven firing positions. The width of the firing positions must be at least 1.52 meters (5 feet) center-to-center. The firing line must be located on a stable horizontal surface that is at least 4.3 meters (14 feet) wide, clear distance, for the length of the firing line. For most ranges, the firing platform is a concrete slab on grade.

3.6. Position Numbering.

Each firing position will be numbered beginning from the left when facing the target line. The numbers must be at least 200 millimeters (8 inches) tall and displayed on rectangular backgrounds attached to the position barricade or other location that is clearly visible to all shooters and range officials. Odd-numbered positions will be marked with white numbers on a black background; even-numbered positions will be marked with black numbers on a white background.

3.7. Position Barricades.

A wooden barricade must be installed at the left edge of each firing position. The minimum nominal dimensions of the wood must be 50 millimeters (2 inches) by 150 millimeters (6 inches). The top surface of the horizontal member must be 1220 millimeters (48 inches) above the platform.

3.8. Firing Line.

Paint a red line a minimum of 100 millimeters (4 inches) wide on the leading edge of the firing platform on the target side. For non-contained ranges without concrete firing line platforms, a firing line will be marked definitively in red on the downrange side of the firing positions; examples include treated timber embedded along the firing line and painted red, or a line of safety cones. This is the stationary firing line and must be continuous for the full length of all the firing positions. For move-and-shoot courses of fire, the firing line is relocated down range as appropriate for the training scenario.

3.9. Ready Line.

Paint a yellow line 100 millimeters (4 inches) wide on the firing line platform at least 2.4 meters (8 feet) behind the firing line (towards the rear of the firing platform). The line must be continuous for the length of the firing platform.

3.10. Target Line.

Targets are placed along the target line, which runs parallel to the firing line. Targets are placed opposite and aligned with each firing position.

3.11. Target Line Configuration.

3.11.1. Distances

The distance from the firing line to the target line must be the same for all firing positions. Targets may be placed on turning, pop-up, or stationary mechanisms, or target-retrieval systems along the target line. Ensure that the line of sight from the firing line to the target line is clear and structural members, baffles, walls, or improper lighting do not obstruct the shooter's sight picture from any firing position the shooters will use (e.g., prone, kneeling, left barricade, right barricade). Number each target location the same as its corresponding firing position. On non-contained ranges, the target line may be fixed and several firing lines constructed to permit firing at reduced distances. When this option is used, only the rear-most firing line will incorporate a firing platform. If the range has an earthen backstop, ensure there is sufficient distance between the closest firing line and the earthen backstop to eliminate the possibility of backscatter and ricochets affecting the shooter. For manufactured bullet traps, ensure there is 15 meters (49 feet) between the closest firing line and the bullet trap.

3.11.2. Target Center

The center of the target must be located between the upper limit of fire (standing position), which is 1500 millimeters (60 inches) above the firing line, and the lower limit of fire (prone position), which is 150 millimeters (6 inches) above the firing platform. The entire target face must be fully displayed to the firing position when exposed to the shooter for engagement.

3.11.3. Design to use

Criteria Applicable to All Ranges. Design all range components (including ballistic safety structures and deflector plates) to satisfy the requirements for the weapon and ball ammunition used on the range. Except for non-contained ranges, ballistic safety structures are required for firing ranges. Ballistic safety structures include baffles, side containment, and backstops. Baffles are safety structures classified as canopy baffles or overhead baffles. Side containment is provided by sidewalls, berms, or discontinuous side baffles. A backstop is an impact berm or bullet trap designed to stop direct-fired rounds.

3.11.4. Construction Materials.

The materials selected for range construction must achieve the longest life-cycle possible, considering frequency of use, budget constraints, or other concerns. The desired life expectancy of permanent small arms range construction is 20 years. Permanent construction does not include protective construction, baffles, or sacrificial materials intended to capture projectiles. Evaluate alternative range design options using a life-cycle cost composed of the initial costs plus all operation and maintenance (O&M) costs for the first five years of range operation. Using the proper materials for sidewalls, baffles, overhead containment, bullet traps, and other areas where a projectile could impact will ensure that the bullet is deflected downrange and not towards the firing line. Ricochet control must be considered when positioning brackets used for baffles, locating bolt heads, and selecting protective construction.

3.11.5. Horizontal and Vertical Control.

Establish vertical control by assuming the firing platform surface is equal to elevation 0.0 meter. The firing line is the baseline for horizontal control.

3.11.6. Drains.

On outdoor ranges, use positive grading to direct water away from the firing line and toward the target line. When the length of the slope or the natural terrain requires using drains between the target and the firing line, a trench drain should be located at the forward edge of the bullet trap. If a trench drain is installed, the bullet trap should extend into the trench drain to eliminate any exposed edges that may cause unpredictable ricochets. Use grade breaks to prevent exposing vertical surfaces to the firing line. Do not route storm water runoff from any range floor to a stream, pond, or other body of surface water. In some circumstances, if the range is located near a surface water body, it may be necessary to incorporate detention basins or flow-through sand or peat filters to prevent particulate heavy metals that may be present in storm water runoff from reaching surface water bodies. Indoor ranges will not have floor drains downrange of the firing line. See the EPA's *Best Management Practices for Lead at Outdoor Shooting Ranges* for additional guidance.

3.11.7. Wall Surfaces.

Construct wall surfaces for fully contained ranges of reinforced concrete, fully grouted reinforced masonry, or hardened steel plate of a thickness sufficient to prevent penetration by any projectiles fired on the range. If hardened steel plate walls are used, submit data and supporting calculations to the MAJCOM for approval. Steel plate wall designs must address noise abatement and must not have exposed bolts or anchors. If concrete or masonry walls are used, they must remain unpainted to preserve their inherent sound-absorbing properties. Walls should have a continuous smooth surface, with no projections above the wall surface from bolt or rivet heads or the leading edge of deflector plates. Wall expansion/contraction joints should be designed with care to ensure a smooth wall surface is maintained. The typical 19-millimeter (0.75-inch) chamfered wall joint detail is not permitted unless baffle/deflector plates are incorporated in the joint design to span the chamfer. To eliminate erratic ricochets, install baffle/deflector plates to protect any range features attached to the wall. The deflector plates should be recessed into the wall surface to eliminate exposed edges.

3.11.8. Openings.

If an existing building is converted for use as a range, all openings downrange of the firing line must be filled in with ballistic safety structures. All heating, ventilation, and air conditioning (HVAC) equipment downrange of the firing line must be located behind baffles or the backstop. In new buildings, conceal pipes and conduits in the walls, above the ceiling baffles, or behind protective baffles. In converted buildings, relocate exposed pipes or provide protective construction. When doors are required downrange, they must be constructed of ballistic-resistant materials and equipped with hardware to allow opening only from the range side. Protect downrange doors with baffles and provide

them with a visual and audible alarm.

3.11.9. Ventilation.

The ventilation system must control exposure to lead in accordance with 29 CFR 1910.1025, *Lead*. The supply and exhaust air system is critical to the safe operation of fully contained ranges and for the health of range users.

3.11.10. Airflow.

The ventilation system should provide laminar airflow across the range toward the bullet trap. At the firing line, the air velocity must be 23 meters per minute (mpm) (75 feet per minute [fpm]), ± 4.6 mpm (15 fpm). Airflow should be evenly distributed across the firing line ± 4.6 mpm (15 fpm). Noise from the ventilation system will not exceed 85 decibels (dBA) behind the firing line.

3.11.11. Air Distribution.

To ensure contaminants are removed from the firing line, install a perforated air distribution plenum, radial plenum, or other distribution fixture along the rear wall to provide unidirectional airflow across the firing line and continuing downrange. The air-distribution fixture should be installed to ensure prescribed air velocities at every shooter location. The distance from the firing line to the perforated rear wall, radial plenum, or other distribution fixture will be a minimum of 5 meters (16.4 feet). The air distribution plenum openings must be sized to provide no more than 610 mpm (2000 fpm) velocity through the openings, with a recommended velocity between 122 mpm to 183 mpm (400 fpm to 600 fpm).

3.11.12. Noise Reduction.

Engineering controls to reduce noise levels and dampen reverberation shall be implemented. Noise reduction in the range and noise transmission out of the range are different design considerations. Mass and limpness are two desirable attributes for sound absorption. Unpainted heavy masonry walls provide mass. Absorptive acoustical surfacing will reduce the noise level in the range but have little effect on transmission outside the range. Ambient noise levels at the firing line shall not exceed 85 dBA. Short-duration noise such as gunfire will exceed the 85 dBA level and may be as high as 160 dBA. Reflective surfaces in a range will reverberate noise during firing, extending the decay rate of the noise. Long decay rates (>1 second) will require the engineer to treat the noise not only as impulse (peak pressure considerations) but also as continuous noise. Therefore, sound-absorbing materials should be used to reduce the reverberation rate to below 1.5 seconds.

3.11.12.1.

Use acoustical treatment on surfaces behind the firing line and on the wall and baffle surfaces of the up-range half of the range. Acoustical material shall be nonflammable and will not impede heavy metal dust removal using a vacuum process. Floor areas behind the firing line may be covered with acoustic material (rubber mats) if it will not impede heavy metal dust removal.

3.11.12.2.

Do not paint downrange walls or acoustic tile, since paint significantly degrades the sound-absorbing qualities of the materials. Existing ranges may continue using painted surfaces. Special sound-absorbing concrete blocks are available that reduce noise in the range.

3.11.12.3.

Acoustic panels no larger than 1200 millimeters (47 inches) wide may be installed on walls, ceilings, and baffles. Blown-on acoustic material and carpeting are not permitted due to the difficulty of cleaning accumulated heavy metal dust.

3.11.12.4. Operational controls.

Appropriately identified and properly fitted hearing protection will help reduce noise exposure for personnel below 85 dBA. BE will evaluate noise exposures and make recommendations for proper hearing protection to reduce noise levels for shooters and range personnel.

3.11.13. Fire Protection.

Burnt propellant, muzzle flash, freezing temperatures, and bullet damage all conflict with the operation of standard fire protection design. To resolve these conflicts, the Air Force only requires sprinklers when the range is constructed integral with range support facilities like training rooms and cleaning rooms. Sprinklers are required in the range support facilities and on the firing platform area, but are not needed in the downrange area or at the target area. Smoke and infrared detectors are also problematic and impractical in the downrange area or at the target area because of the amount of smoke and periodic muzzle flashes from the weapons. No detection is required in the downrange area and none in the range support facilities or firing platform area since these areas are protected by sprinklers. Assume metal bullet traps—rubber, foam, and other materials used for bullet traps may require dedicated additional fire protection features per the manufacturer's recommendation. Egress paths shall not require travel downrange from the primary firing line. Downrange space shall not be included in calculating minimum egress capacity requirements. Egress marking, emergency lighting, and egress door hardware shall not be required downrange of the primary firing line.

4. Infrastructure.

4.1. Range Control Booth.

The control booth is a control center from where the chief range officer can observe and control the entire range. All range types should have a control booth. The following criteria apply to the design and construction of control booths.

Locate the control booth behind the ready line. Place the booth to permit an unrestricted view of all firing positions. The booth location and design must not impede ventilation airflow.

The minimum size for the control booth platform is 1.5 meters by 3 meters (5 feet by 10 feet). Align the long side parallel to the firing line.

The booth must be high enough (0.6 meter [2 feet] minimum above the floor) to permit the range official an unrestricted view of the entire firing line and the projectile impact area, including all range entry points. Also, windows and doors within the booth must not restrict or distort the range official's view. Closed-circuit television monitors may be used to enhance, but will not replace, this requirement.

Provide a work table or counter at least 0.8 meter by 1.2 meters (2.5 feet by 4 feet) to accommodate reference materials, and provide at least one duplex electrical outlet in the worktable/counter area. Provide lighting for night/limited-visibility operations.

The range control booth should have positive pressure relative to the rest of the range or be sealed/isolated so that fumes and dust from firing do not enter and contaminate the booth.

4.2. Communication System.

The range communication system must support communications between the control booth, the firing line, range control, range support buildings, and emergency response personnel. A permanent, hard-wired public address system is required. On a multiple-range complex, the system must also support communications between individual ranges. If it is not practical to install landlines, or if a break in landline service occurs, radio or cellular communications may be used. The control booth should be wired with connections to the base local area computer network.

4.3. Barriers, Fences, and Signs.

Secure the range and SDZ areas to prevent unauthorized entry. Use barriers to block roads, walkways, or paths.

4.3.1. Doors

Fully contained ranges require barriers in the form of key-operated, locked doors or electrically locked doors to prevent entry while firing is in progress.

4.3.2. Use fencing

to prevent people, animals, and vehicles from entering range SDZs. A chain-link fence around the complete range complex, including the SDZ, is preferred. Use barriers or gates to block access paths. On existing partially contained baffled ranges with earth side berms and an earth/metal backstop, as a minimum, install a 1.82-meter (6-foot) chain-link fence along the sides of the SDZ and on the downrange side of the impact area, incorporating the berms. Install the fence no closer than 5 meters (16 feet) from the

toe of the berms and backstop. For fully contained ranges with concrete containment walls and an earth/metal backstop, as a minimum, install the fence from one wall, around the backstop, to the opposite wall when range components are exposed. For example, if the back side of the bullet trap and spent round-retrieval system is exposed, erect a fence to restrict access by unauthorized personnel. Provide a locked access gate for maintenance equipment.

4.3.3. Typical range signs

are shown in Figure 7. Warning signs, and flashing red warning lights for night operations, should be positioned on the approaches to the range and along the perimeter of the SDZ if access is not otherwise restricted. Place red flags and/or rotating/flashing red lights at appropriate locations to signal when the range is in use. Place signs along the normal boundaries of the range. Post the signs no more than 100 meters (328 feet) apart along the range perimeter, parallel to roads or paths. Based on local topography, place signs close enough to give reasonable warning along other areas of the SDZ. Refer to Table 2 for proper location of warning signs. Signs must be bilingual where English is not the national language or multilingual where needed. Post bilingual signs on continental United States (CONUS) ranges located near foreign borders. Consult the installation legal office for local policy on bilingual signs. Construct warning signs in compliance with UFC 3-120-01, *Air Force Sign Standard*. The warning signs should have standard red letters on a white background.

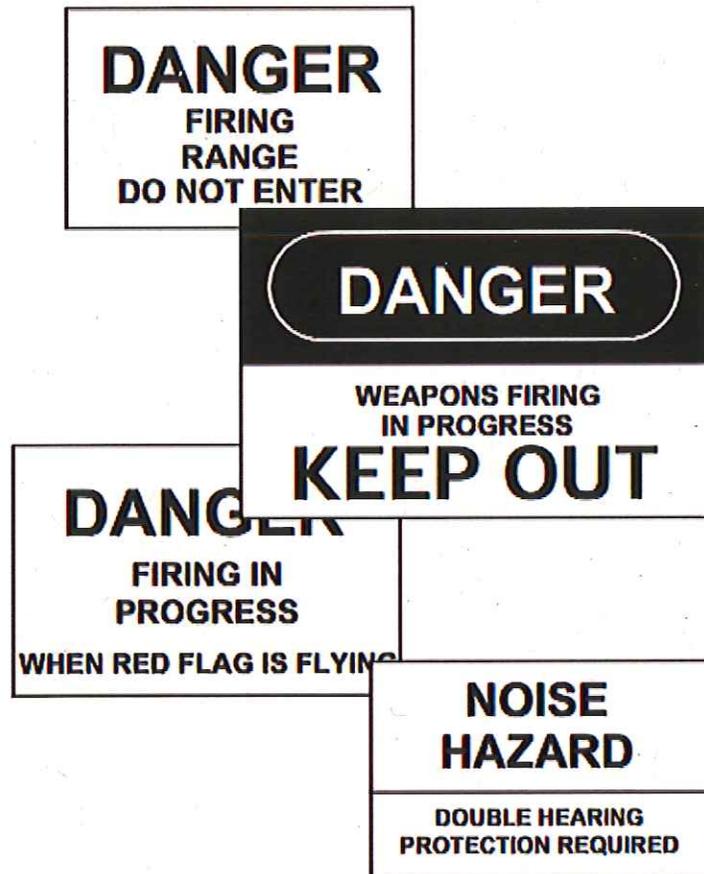


Figure 2. Typical Range Signs

Table 2. Locations of Warning Signs

Warning Sign	Location
Danger Firing in Progress When Red Flag is Flying	Approach roads
Danger Firing Range Do Not Enter	Fencing and barriers every 100m (328 ft)
Danger Weapons Firing in Progress Keep Out	Entry road
Noise Hazard Double Hearing Protection Required	Firing line

4.4. Utilities.

Install utilities to prevent damage from normal firing range operations. Do not place any aboveground utilities in the impact zone or the ricochet zone. When utilities are directly behind backstops or berms, provide access for a maintenance vehicle. Underground utilities with proper cover may be placed anywhere on the range complex if maintenance and repair easements are provided.

4.5. Water and Sanitation.

Water must be available for drinking, sanitation, hand-washing stations, and safety equipment. Drinking water and a latrine may be provided by adjacent range support facilities. The required latrine size will be determined using conventional planning criteria and based on the number of people (instructors and trainees) supported.

4.6. Electrical Power.

Provide electrical power for lighting, maintenance equipment, public address systems, ventilation, bullet trap dust collection system, and target-turning mechanisms.

4.7. Roads and Parking.

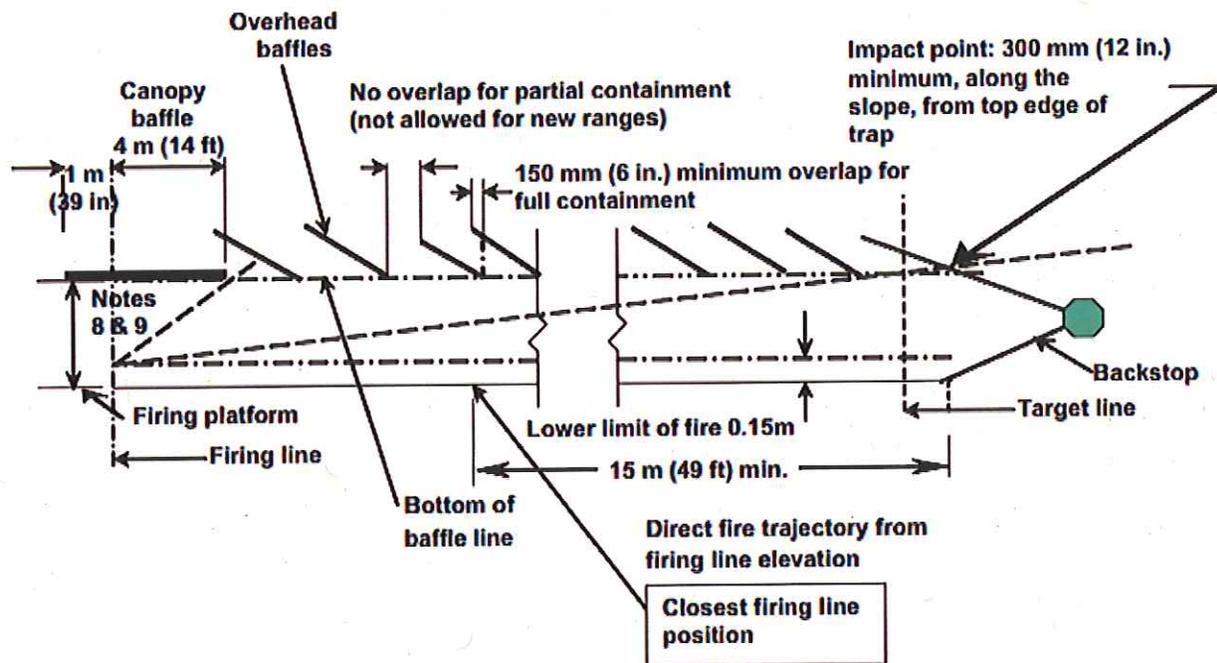
Design roads and parking for access by passenger vehicles and light or medium trucks. Provide surfaced all-weather roads for connector roads from public roads to the range complex.

4.8. Storm Water Runoff and Drainage.

Design storm water control structures to prevent storm water erosion of impact berms. Divert surface water runoff within the range

5. Additional Criteria for Fully Contained Ranges.

Construct fully contained ranges to preclude any bullets from leaving the containment limits. This requires additional attention to detail so no gaps, openings, or other paths for bullet escape are present. Use ballistic safety structures to provide the containment. For fully contained ranges, construct overhead baffles with a minimum of 150 millimeters (6 inches) of horizontal overlap between the trailing edge of any baffle and the leading edge of the next baffle downrange. Figure 8 shows a baffle arrangement for full containment.



Notes:

1. This profile is based on a level range and a fixed firing line.
2. The target distance is established by CA to satisfy the intended training or courses of fire.
3. A tactical, fully contained range will allow shooters to move laterally along the firing line and downrange.
4. Overhead baffles must be angled from 12° to 32° from the horizontal.
5. Fully contained ranges require a 150-mm (6-in.) minimum baffle overlap.
7. The bullet impact point on the bullet trap is not less than 300 mm (12 in.) below the top edge of the trap as measured along the slope.
8. If vehicle access is not required, locate the bottom of the baffles at least 2.45 m (8 ft) above the firing platform.
10. The canopy baffle may be sloped up to 30 degrees from the horizontal. If sloped, the high point of the canopy is closest to the target line.

Figure 3. Typical Overhead Baffle Configuration

6. Ballistic Safety Structures.

6.1. Canopy Baffles.

A canopy baffle is an angled or horizontal baffle attached to and directly above the firing platform, extending downrange from the firing line. It prevents direct-fired rounds from escaping the range between the firing line and the first overhead baffle. The bottom of the canopy baffle must be at least 2.45 meters (8 feet) above the level of the firing platform if vehicle access is not required. The canopy will begin at least 1 meter (3.2 feet) behind the firing line and extend at least 4 meters (14 feet) forward of the firing line toward the target line. A canopy baffle may be used to provide a covered firing line position on a non-contained range without either overhead baffles or side containment. Face the portion of the canopy baffle directly over the firing positions with plywood, lumber or other approved material of sufficient thickness to capture the ricochet from a round fired directly over the shooters.

6.2. Overhead Baffles.

An overhead baffle is an angled baffle (vertical baffles are not authorized for new range projects) installed downrange to deflect and contain direct-fired rounds. Install overhead baffles downrange between the overhead canopy and the backstop. A shallow angle deflects bullets more easily and there is less metal fatigue and denting in the surface of the plate. A fully contained range requires a 150-millimeter (6-inch) minimum overlap of baffles. The overlapping baffles will allow shooter movement throughout the range and will prevent projectiles from leaving the range even if the weapon is accidentally fired straight up. Line-of-sight analysis shall consider rounds fired from any angle and any training position forward of the firing line. Angled overhead baffles redirect projectiles downrange. Install angled overhead baffles with the bottom edge further downrange than the top edge. Install overhead baffles parallel to the firing line. Refer to Figure 8 for a typical configuration. Install angled overhead baffles for new ranges and baffle replacement projects.

6.3. Additional Criteria for Vehicle Access.

New training scenarios will use vehicles for practicing vehicle dismount, cover, and engaging targets from the vehicle. The design vehicle for range design purposes is a HMMWV ("Humvee") without a pedestal-mounted weapon. Vehicle access requires consideration of higher clearance from range floor to baffles and vehicle paths into the range.

6.4. Baffle Construction.

6.4.1. Parts quality

Construct ballistic safety structures for fully contained ranges with attention to the quality of the fabricated parts. Baffle plates with butt joints must fit together closely to prevent any gaps more than 1.6 millimeters (0.0625 inch) wide. Modern plate-cutting techniques can provide precise dimensions, but particular care must be taken in erecting the baffles to ensure a precision fit of parts. The development of construction/erection details that use overlapping joints and joint-closure plates may provide a better, more economical solution than precise fabrication and also may simplify the erection procedures.

6.4.2. Materials

As a minimum, use materials specified in Table 3. These materials may also be used for protective construction. For angled-steel plate baffles, install plywood facing to prevent "splash-back" ricochets on baffles located within 5 meters (16.4 feet) of the expected position of the shooter. If shooters move downrange and fire, splash-back protection will be required for baffles at the downrange locations as well. Plywood shall be fire resistant treated (FRT) plywood in accordance with International Building Code (IBC) section 803 class A flames spread 0-25 and smoke development 0-450. Note: The Brinnell Hardness Number (BHN) measures steel hardness. The higher the BHN, the harder the steel.

Table 3. Construction Materials for Canopy and Overhead Baffles

Weapons	Ammunition	Construction*
Handguns	.22 LR, .38 cal., .45 cal., .357 cal., 9mm, .44 cal.	6 mm (0.25 in) steel plate with a nominal 440 BHN or higher, covered with one sheet of 19 mm (0.75 in) and one sheet of 11 mm (0.4375 in) plywood
Rifle, carbine, machine gun	5.56mm, 7.62mm, .30 cal.	10 mm (0.375 in) steel plate with a nominal 500 BHN, covered with one sheet of 19 mm (0.75 in) and one sheet of 11 mm (0.4375 in) plywood

*Notes:

1. On steel plate baffles, install FRT plywood facing on overhead baffles located within 5 meters (16.4 feet) of the shooter to mitigate the risk of "splash-back" ricochets. Attach the 19-millimeter (0.75-inch) sheathing to the steel using flathead countersunk screws. Attach the 11-millimeter (0.4375-inch) FRT plywood to the 19-millimeter (0.75-inch) sheathing using #8 flathead screws at 300-millimeter (11.8-inch) spacing.

2. Nominal AR500 ballistic plate manufactured to BHN 500 may have BHN values ranging from 480 to 530.

6.4.3. Side Containment or Sidewalls.

Sidewalls are required to prevent direct fire from exiting the range. Finished elevation of a

sidewall must be above the top edge of the highest overhead baffles. Each sidewall must be at least 1.52 meters (5 feet) from the outside edge of the firing position limits of fire and extend at least 1 meter (3.2 feet) to the rear of the firing line. Sidewalls may be made of earth, fully grouted reinforced masonry block (CMU), reinforced concrete, or hardened steel.

6.4.4. Continuous Walls.

Vertical smooth-faced walls constructed of reinforced concrete, CMU with fully filled cores, or hardened steel may be used for sidewalls. Table 4 lists minimum wall thicknesses. Design these walls for all dead and live loads, including lateral forces. See paragraph 7.2.9 for noise-reduction requirements. Walls will extend 1 meter (3.2 feet) behind the firing line to prevent a bullet fired parallel to the firing line from leaving the range.

Table 4. Sidewall Minimum Thickness

Material	Caliber			
	.45/9mm	5.56mm	7.62mm	.50
3500 psi concrete	150 mm (6 in.)	150 mm (6 in.)	200 mm (8 in.)	300 mm (12 in.)
Grout-filled CMU	200 mm (8 in.)	300 mm (12 in.)	300 mm (12 in.)	600 mm (24 in.)

6.4.5. Discontinuous Sidewall Baffles.

Side baffles are similar to overhead baffles, except they provide discontinuous protection to each side of the range outside the entire length of the line of fire. They are set between 15 and 45 degrees relative to the line of fire and provide an advantage over continuous walls whenever cross-range ventilation is needed.

6.4.6. Earth Berms.

The slope of earth berms must not exceed a 2:3 vertical-to-horizontal ratio unless materials are stabilized. If native soil characteristics will not produce a stable slope at this angle, use fabric reinforcement in the fill. The soil may require conditioning to achieve satisfactory soil pH levels to prevent lead decomposition. Typical angles of repose for natural soils in loose or least-dense state are shown in Table 5. Use Table 5 only as a guide, since mechanical stabilization may increase the angle of repose. The width of the top of the berm must be at least 3 meters (9.8 feet). Construct the outer layer (2 meters [6.5 feet] thick) of the impact face with sands, silty sands, or clayey sands, free of rocks, and with 100 percent passing the #4 sieve, ASTM C136. Soil with more than 40 percent

clay-size particles passing the #200 sieve is not acceptable for the outer 2- meter (6.5-foot) layer of the impact face. Clay may be used for the core. For erosion control, plant a vegetative cover on the faces and tops of berms. Irrigation devices may be used on the faces and tops of berms not subject to direct fire. Ensure access for maintenance vehicles.

Table 5. Natural Angles of Repose (Internal Friction) for Naturally Occurring Soils

Soil Types	Angle of Repose/ (Internal Friction)
Silty sand/fine sand/clayey sand	30
Coarse sand	35
Silts	25
Gravel/sandy gravel/gravelly sand	34

6.4.7. Backstops.

A backstop is used behind the target line. It must stop a direct- fire bullet by media capture or deflect the bullet into a trap.

6.4.8. Earth Backstops.

Earth backstops are the most common backstop for non-contained ranges. As an example, for a 25-meter (82-foot) non-contained range, locate the backstop so the longitudinal centerline of the berm (backstop) is at least 50 meters (164 feet) from the firing line. The toe of the slope must be located at least 9 meters (29.5 feet) from the target line nearest the backstop. The top of the backstop must be high enough so that a line drawn from the firing line and under the last overhead baffle will intersect the backstop at least 2 meters (6.5 feet) below its top. The impact face of the earth backstop must be soil with 100 percent passing the #4 sieve, ASTM C136, for a depth of 2 meters (6.5 feet). The slopes should be stabilized with grass vegetation and access provided for maintenance and repair equipment. Incorporate a steel deflector plate (eyebrow) into the backstop if a higher degree of confidence is required to prevent direct-fired rounds from leaving the impact area of the backstop. Soil with more than 40 percent clay-size particles passing the #200 sieve is not acceptable for use in the impact area face of the backstop. If required, soil should be conditioned to achieve suitable pH levels as indicated in paragraph 7.3.3.1.

6.4.9. Backstop Deflector Plates (Eyebrows).

A deflector plate is not a bullet trap. See paragraph 7.5.7.4 for bullet trap requirements. A backstop deflector is typically installed on top of an earth backstop to provided added containment safety. Install the backstop deflector plate at an angle between 30 and 42 degrees from horizontal (see Figure 11). Angles other than these are permissible if test data and calculations support the design. Set the highest edge of the deflector plate nearest the firing line. The shallow angle deflects bullets more easily

and there is less metal fatigue and denting in the surface of the plate. Anchor steel plates supported by concrete or masonry with flush countersunk heads. Eliminate exposed edges which may produce erratic ricochets. Ensure edges of steel plates are milled at all joints and joints are butted flush and smooth. Plates must be free from buckle or wave. Exposed edges must be chamfered to a 45-degree angle to a fillet approximately 4 millimeters (0.16 inch) wide. Exposed structural members supporting deflector plates are not permitted. Welding must conform to AWS D1.1, *Structural Welding Code – Steel*, latest edition. Position steel plates so welds are no closer than 450 millimeters (17.7 inches) from the center of a target position.

Michelle Fuson, Director
Latah County Planning and Building Dept.
PO Box 8068
Moscow Id 83843

October 15, 2012

The Latah County Zoning Commission is investigating the safety and noise aspects of PNW Arms having a private gun range for demonstrations and training. I would like to voice some of my concerns regarding the location of this proposed range.

The size and location of the property is not suitable for a private gun range. The property has a slope of about 10%. This means people will be shooting with guns elevated. If a bullet escapes the grounds it has a better opportunity to travel an extreme distance.

The property is not large enough to contain any escapes or misses. There are houses, roads, and actively worked fields down range from the proposed range. All of these areas could be put in danger.

The location of the proposed range is too convenient. It is on HWY 95 about 1 quarter mile from PNW Arms building. At present it is very easy for anyone to stop and use the facility. There is an "informal" entrance from the highway to the range. The people I have seen on the range to date have no identifying patches on their clothing or vehicle. I have no idea if they are part of PNW. There needs to be a good fence around this facility.

If this range is allowed to go in, does it affect the use of property for the people down range? If someone legitimately wanted to build, would the zoning or planning commission need to take the safety of the new structure into account because of this undersized range?

There are many legal and libel considerations the county needs to investigate. The internet has many stories of mishaps and law suits regarding gun ranges. The county needs to give this more than a casual look to ensure they are not setting themselves up for legal issues in the future. If Potlatch wants to be the next gun and munitions hot spot, it would make sense for a proper range to be developed for this and all other companies to use.

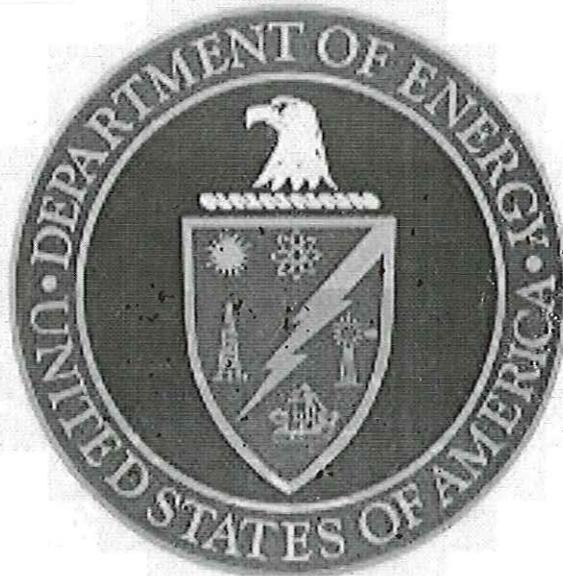
As far as noise mitigation is concerned, It is hard to say how loud this range will be without actually hearing it being used. Their other test facility is very loud. It is not just the loudness of gun fire that is a concern, but what it represents. Earlier testimony talked about how loud cow and combines are. But, with cows and combines you don't automatically look around to see where the cow or combine is pointed. Gun fire is very unsettling to the safety of anyone who hears it.

I have attached a copy of the range design criteria from the DOE for your assistance in the matter.
http://www.hss.doe.gov/SecPolicy/pfs/Range_Design_Criteria.pdf

Thank you,
Richard Larsen
1012 S. Nowack Lane
Potlatch ID. 83855

LCZC HRG: CUP 865
Applicant: PNW Arms
Exhibit No.: 14
Date: 10/15/2012

RANGE DESIGN CRITERIA



U.S. DEPARTMENT OF ENERGY
Office of Health, Safety and Security

AVAILABLE ONLINE AT:
<http://www.hss.energy.gov>

INITIATED BY:
Office of Health, Safety and Security

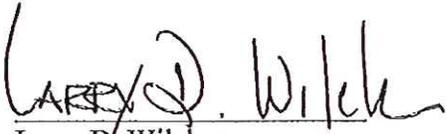
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Local DOE management is responsible for the proper execution of firearms-related programs for DOE entities. Implementation of this document's provisions constitutes only one segment of a comprehensive firearms safety, training, and qualification program designed to ensure that armed DOE protective force personnel are able to discharge their duties safely, effectively, and professionally. Because firearms-related activities are inherently dangerous, proper use of any equipment, procedures, or techniques etc., identified herein can only reduce, not entirely eliminate, all risk. A complete safety analysis that accounts for all conditions associated with intended applications is required prior to the contents of this document being put into practice.

CERTIFICATION

This document contains the currently-approved firearms "Range Design Criteria" referred to in DOE O 473.3, *Protection Program Operations*.



Larry D. Wilcher

Director

Office of Security

Office of Health, Safety and Security

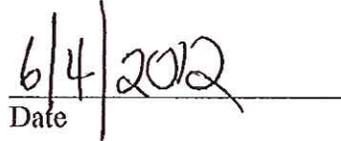

Date

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ATTACHMENT 1 -- RANGE DESIGN FIGURES	Attachment 1-1

RANGE DESIGN CRITERIA

1. PURPOSE. This document contains design criteria for U.S. Department of Energy (DOE) live-fire ranges for use in planning new facilities and major rehabilitation of existing facilities. This document will be approved and maintained by the Office of Security, Office of Health, Safety and Security (HSS) as a stand-alone document on the HSS website: <http://www.hss.doe.gov/SecPolicy/pfs.html>.
2. PLANNING FACTORS. All applicable local, State, Federal, U.S. Environmental Protection Agency, Occupational Health and Safety Administration (OSHA), and National Environmental Policy Act requirements should be addressed and be reviewed annually (at least every 12 months) by the site to incorporate any requirements and/or changes that occur.
3. PLANNING OVERVIEW.
 - a. General Considerations.
 - (1) Live-fire range design should: (a) promote safe, efficient operation; (b) include provisions for ease of maintenance; and (c) be affordable to construct and maintain.
 - (2) Live-fire ranges should be designed to prevent injury to personnel and to prevent property damage outside the range from misdirected or accidental firing and ricochets. They should also be designed to direct ricochets away from the firing line inside the range.
 - (3) An open range may be established provided that enough distance and land area available to allow for surface danger zones (SDZs) appropriate for the weapons to be used. Lack of SDZs may require baffled ranges. Extreme weather conditions may necessitate indoor ranges.
 - b. Type of Range.
 - (1) Range requirements should be considered when determining the type and size of the range and the material to be used.
 - (2) The range should be suitable for training and qualifications for all courses of fire used on the site as set forth in the HSS-approved Firearms Qualification Courses.
 - (3) The range should be designed for shooting day and reduced-lighting DOE firearms courses, moving targets, multiple targets, and advanced shooting courses/activities (e.g., shooting at steel targets) that may be required by the site.

- (4) When determining whether the facility will be an indoor, open outdoor, partially baffled, or fully baffled range, the decision-making process should include site weather conditions, available land, available funding, and environmental, safety, and health considerations. The following additional factors should be considered.
- (a) How many shooters must be accommodated?
 - (b) Will emphasis be on training or competitive activities?
 - (c) What types of firearms and range of ammunition will be used? (See Table 1.)
 - (d) Will the facility be used exclusively by DOE or will it be open to other organizations?
 - (e) What special uses will be made of the facility; e.g., advanced training, special weapons, or explosives?
 - (f) What lighting will be required, and what lighting is desired?
 - (g) What administrative space will be needed?
 - (h) What types of target mechanisms will be used?
 - (i) Will spectator safety areas be needed?
 - (j) What types of acoustics will be needed?
 - (k) How will lead contamination be controlled?
 - (l) Where will bullet traps be needed?
 - (m) Where will firearms cleaning and maintenance be performed?

c. Site Selection Preparation. The site selected should accommodate the required facility. It should meet acceptable standards for safety and have sufficient space, access, and acceptable zoning and construction costs. Land acquisition costs, future land values, and possible restrictions should also be examined. To ensure the project is feasible the following data should be considered.

- (1) Documents. Copies of specific site, environmental, and construction criteria; applicable mandated regulations from Federal, State, county, and local authorities; copies of ordinances, zoning regulations, soil conservation standards, health department requirements, and any other regulations that may pertain to the project should be obtained.

- (2) Alternate Sites. Identify alternate sites, because one or more of the potential sites may be unsuitable or construction costs may be prohibitive.
 - (3) Technical Data. Gather technical data relevant to each site including zoning maps, aerial photographs, topographic maps, and onsite ground and aerial information.
- d. Considerations. The criteria to be considered in this process are:
- (1) environmental restrictions; e.g., Endangered Species Act, Wilderness Act, and air and water pollution criteria;
 - (2) access; e.g., is it adequate or should a roadway be constructed to the site;
 - (3) construction cost; e.g., berms, baffles, barriers, earth moving;
 - (4) other restrictive Federal or State statutes and local ordinances; and
 - (5) community growth, especially in areas where urban growth is rapid. Escalating property values may make it unwise to construct in a particular area.
- e. Preliminary Design Stage.
- (1) Prepare:
 - (a) a preliminary layout sketch of each site;
 - (b) a draft document, which should include specifications for applicable zoning, building codes, environmental, safety, and health considerations, and other pertinent restrictions;
 - (c) alternative preliminary site plans showing different range layouts;
 - (d) a planning cost estimate; and
 - (e) a risk analysis report.
 - (2) Submit all environmental, zoning and building permit applications for approval. Be prepared, via the draft document, to present and, if necessary, defend the proposal at public hearings before zoning boards, health officials, and other governmental bodies involved in issuing permits.
- f. Final Design Stage.
- (1) The preliminary site plans include a layout of the proposed range with its accompanying safety fan in a cross section and top view.

- (2) The range master/manager, training manager, safety manager, industrial hygienist, appropriate operating personnel and public works engineer should review and approve the design requirements during the planning phase, before the construction drawings are started, and during the construction phase.

4. OUTDOOR RANGE DESIGN.

a. Site Selection.

- (1) Outdoor range sites should be remote from other activities but accessible by road. SDZs should not extend across traveled roads, navigable waterways, railroads, or other areas.
- (2) To protect against unauthorized access, SDZs should be controlled while firearms are being discharged. To prevent future encroachment, SDZs should be recorded on site maps.
- (3) If other methods to control access to SDZs are not effective, then the zones should be fenced in. Natural barriers around the site; e.g., rivers, hills or a large drainage channel may be used to prevent encroachment and will ensure privacy. The best site is one with a natural backstop for projectiles to reduce the cost of constructing earth impact berms and to provide natural sound abatement.
- (4) Outdoor ranges should be oriented to eliminate firing into the sun. The range should be oriented to the north or slightly to the northeast. The ideal direction is between due north and 25° northeast.

b. Range Planning.

- (1) Firing into upward sloping land and land with natural backstops of hills or mountains is recommended.
- (2) Firing platforms, access roads, and targets should be elevated above the flood level.
- (3) The line of fire in rough terrain should be perpendicular to high ground. The line of fire on flat terrain should be free of knolls, ridges, and trees that reduce visibility.
- (4) Known distance ranges should be as flat or evenly graded as possible. If the grade between the firing points and target does not exceed 2 percent, then the firing points may be below the target.
- (5) Roads used for setting and servicing targets in impact areas and for maintenance of earth berm may be graded pathways. Roads in areas not subject to disturbance; e.g., vehicle parking areas, and roadways behind

firing lines or out of range of weapons, should be designed for anticipated vehicle weight and usage.

- (6) The ground between the targets and firing line should be free of any hardened surface (smooth-surfaced walkways excepted) such as rocks or other ricochet-producing material.
- (7) The surface may be sodded or planted with low-growing ground cover.
- (8) The surface should be smooth, firm, and graded to drain away from the targets. A slight side-to-side grade of 1 percent to 2 percent should be provided for storm water runoff. For baffled ranges, the lateral slope should not exceed 2 percent because of the geometry of the baffle system.
- (9) The overall size will be governed by the range distance and number of firing positions.
- (10) Range distances from the firing line to the target are determined by the approved DOE qualification courses of fire for all weapons available for use by Protective Force (PF) personnel and by site-specific training courses of fire. The distances from the firing line to the target should be accurate to ± 0.1 percent. It is important that any inaccuracy in the firing line-to-target distance is a greater, rather than lesser, distance (e.g., 101 yards for a 100-yard range instead of 99 yards).
- (11) Shooters should have secure footing.

c. Surface Danger Zones. SDZs should be established to contain all projectiles and debris caused by firing ammunition and explosives (see Table 1). SDZ dimensions are dictated by the types of ammunition, types of targets, and types of firing activities allowed on the range. A basic SDZ consists of three parts: impact area, ricochet area, and secondary danger area (Figure 1). Figures 2 through 6 illustrate the application of the basic parts in the design of SDZs for various kinds of range activities.

- (1) The primary danger area established for the impact of all rounds extends 5° to either side of the left and right limits of fire and downrange to the maximum range of any ammunition to be used on the range.
- (2) The ricochet area is 5° to either side of the impact area and extends downrange to the maximum range of any ammunition to be used on the range.
- (3) The secondary danger area is that area paralleling, and 100 yards outside of, the outermost limits of the ricochet area and extending downrange to the maximum range of any ammunition to be used on the range.

- (4) Boundaries of SDZs must be posted with permanent signs warning persons of the danger of the live-fire range and prohibiting trespassing. The signs must be posted in a way that will ensure a person cannot enter the SDZ without seeing at least one legible sign (i.e., usually 200 yards distant or less).
 - (5) Limit of fire markers, both external and internal, must be placed to denote right and left limits of fire. Where cross firing is to be conducted, internal limit markers must be emplaced to denote internal right or left limits of fire from specific firing positions.
 - (6) Ranges may be located parallel to one another if in compliance with Figure 19 for separation.
 - (7) When there is insufficient distance to lay out a new range with the required SDZ or utilize other ammunition with a maximum range that does not exceed the SDZ, engineered or administrative controls can be used to control firing on that range. Permission to deviate from established SDZ requirements must be granted by the DOE cognizant security authority and supported by a safety risk analysis.
 - (8) Administrative controls such as use of the low-ready position or engineered controls such as muzzle traverse/elevation limiters can be used to control the firearm. Natural terrain such as a mountain or a hill provides an excellent backstop for firing. The terrain should be high enough to capture rounds fired at up to a maximum 15° muzzle elevation.
 - (9) To change the size and shape of an SDZ, baffles may be installed. Partial and full baffle systems consist of the following components: overhead baffles, a canopy shield over firing points, bullet impact berm, and side berms, sidewalls, or side baffles. A fully baffled range must be constructed so all direct fire can be contained within the range (see Figures 7 and 8).
- d. Support Facilities. Range planners should consider the site-specific need for the following range support facilities.
- (1) Targets.
 - (2) Target storage.
 - (3) Bunkers, trenches, and protective barriers for personnel protection.
 - (4) Range control towers.
 - (5) Toilets.
 - (6) Range poles, banners, markers, and signs.

- (7) Communication systems.
- (8) Access and range roads.
- (9) Parking areas.
- (10) Potable water.
- (11) Target maintenance.
- (12) Ammunition storage.
- (13) Power.
- (14) Sewer.
- (15) All other necessary utilities.

Table 1. Maximum Range of Small Arms Ammunition

Maximum Range of Small Arms Ammunition	
Caliber	Maximum range of small arms ammunition (distance in meters/yards)
.22 long rifle	1400/1531
.38 revolver	
Ball, M41	1600/1749
Ball PGU-12/8	1900/2077
.40 pistol	
Ball	1783/1950
JHP	1908/2086
Frangible	1000/1093
.45 pistol	1500/1640
.45 submachine gun	1600/1749
.357 magnum	2160/2362
9mm pistol	1740/1902
9mm submachine gun	1920/2099
.44 magnum	2290/2504
.50 machine gun	
Ball, M33	6500/7108
AP, M26	6100/6671
12 gauge shotgun, riot 00 buckshot	600/656
.30 rifle and machine gun	
Ball, M23	3100/3390
AP, M2	4400/4811
.30 carbine	2300/2515
5.56mm rifle	
Ball, M193	3100/3390
7.62mm rifle and machine gun	
Ball, M80	4100/4483
Match, M118	4800/5249
40mm	
M79	400/437
Mk-19 40mm	2200/2406

e. Design Criteria.(1) Firing Line Items. Provide the following components:

- (a) Floor Surface. The surface should be smooth, firm, and graded to drain away from the targets. A slight side-to-side grade of 1 percent to 2 percent should be provided for storm water runoff. Transverse firing line grading should match target line transverse grading. The distance between the firing line(s) must be sufficient to support the type of training conducted. Firing lanes must be clearly marked on the surface to match the targets. Depending on the number of personnel to be supported and the funds available, the following surfaces should be considered:

- 1 ground firmly compacted with mown grass;
- 2 sand or fine gravel;
- 3 wood decking of sufficient thickness and support to prevent movement; and
- 4 concrete topped with appropriate cushioning material.

- (b) Overhead Containment. On partially and fully baffled ranges, a ballistic canopy (see Figure 9) should be provided over all locations where a weapon may be expected to be discharged (firing line, by definition). Figure 9 represents one construction approach, but the canopy must contain the direct fire effects of the most energetic round fired on the range. This canopy should begin at least 3 feet behind the firing line. General structural requirements may dictate more distance. The canopy should extend forward a minimum distance of 13 feet minimum, which will work geometrically with the first overhead baffle to prevent a weapon from firing directly out of the range (see Figures 16 and 17). The canopy should be constructed of ballistic material with sacrificial cladding as described below. Sound reduction ceiling waffles should be considered. Weather roofing is required above the ballistic material and it must slope sufficiently to drain.

(2) Firing Point. The depth of the firing point is determined by the shooting activity; e.g., rifle firing requires more depth than pistol firing.

- (a) The minimum depth of the firing point is the area required for the shooter, shooter's equipment, scorers, and range officers. For example, a pistol range might have a firing line approximately 6 to 10 feet deep, while a rifle range would have a firing line up to 20 feet deep. This variation is based on available space, type of

shooting, size of target frames and carriers, and the spacing of target frames or carriers.

- (b) For rifle ranges, each firing point should be 9 feet wide (see Figure 10). Firing lanes for pistols and shotguns should be 5 feet center to center (see Figure 11).

(3) **Ballistic Material.** The purpose of this material is to absorb, deflect, or fragment projectiles. Material for baffles on partially and fully baffled ranges is shown in Figures 12 and 18. Wood that is used should be of middle grade exterior timber or plywood. Timber in contact with the ground must be pressure-treated for this purpose. Avoid exposed connectors if possible. Refer to Table 2, Thickness of Material for Positive Protection Against the Caliber of Ammunition Listed, for the thickness of various materials.

(4) **Sacrificial Cladding.** Provide 3/4-inch thick plywood with a 3/4-inch air gap on any surfaces (baffles, wing walls, metal connectors, etc.) that are within 11 yards of the firing line to prevent back splatter.

(5) **Firing Line Cover Material.** The firing line should be covered to protect the shooter and allow activities to be held regardless of the weather. On ranges with several firing lines, the cover is generally installed at the longest firing distance. The firing line covers described below are for shelter only and should not be confused with the ballistic firing line canopies required on baffled ranges. Material that can be used for firing line covers includes wood, concrete, steel, and plastic. Most covers are constructed from wood products and are a shed or gable roof design. In some cases, corrugated metal or fiberglass roofing material can actually increase sound levels at the firing line and in areas around the range. Therefore, to reduce noise, corrugated metal or fiberglass roofing material should not be used unless it is acoustically treated. The structure should be designed to include the following:

- (a) The shed roof should have a 6-inch cavity filled with fiberglass insulation (or equivalent) and be enclosed on the bottom with 3/4-inch plywood or insulation board. Although this will not provide a completely effective sound barrier, sound waves will strike and penetrate the inside layer of plywood, and the sound will be reduced;
- (b) A plywood shed roof should have a 6-inch hollow core enclosed with a small grid mesh screen and a six-mil polymer barrier to retain the insulation. The intervening space should be filled with blown-in insulation to trap sound waves and reduce the drum effect of an open roof; and

(c) A gable roof has a large hollow area above the joists; however, additional sound damping materials should be installed to reduce the drum effect and the sound pressure level as they are reflected onto the firing line area. The underside of the roof surface will require a minimum of 4 inches of insulation to fill in between the rafters and a minimum of 3 inches of insulation above the ceiling and between the joists. This will reduce the drum effect caused when sound waves strike surface material (e.g., corrugated metal) and will absorb a portion of the reflected sound waves.

(6) Surface Material. Positions should be hard-surfaced (e.g., concrete, gravel, wood, asphalt, or sod).

(a) For ranges where prone shooting is conducted, gravel or similar materials may cause difficulty for the shooter. When the surface material is concrete or asphalt, shooting mats or padding will be required when the kneeling or prone positions are used.

(b) For ranges with multiple firing lines, hard-surfaced firing lines located downrange of another firing line should be recessed or shielded from bullet impact to avoid ricochets off exposed edges.

(7) Landscaping. The site should be landscaped to provide for erosion control, noise abatement, maintenance, appearance, fire protection, and safety.

NOTE: Any landscaping will complicate the removal of lead in the berms, especially on impact surfaces, and will create higher maintenance costs.

(a) Berms should be planted with grass to prevent erosion. Ground cover is acceptable on existing berms that have been maintained and where erosion is not a problem.

(b) When grass is selected as a ground cover, it should be appropriate for the geographic area and should readily grow and provide good coverage. The degree of shading caused by overhead baffles will determine the type of grass for the range floor. Use grasses and cover for earth berms that will not be accessed by moving equipment so that natural growth heights will be acceptable. In areas where the soil is poor or extremely sandy, plants such as Bermuda grass, ice plant, or vine root can be used to control soil erosion.

(c) Heavy landscaping may be used to cut down on noise transmission. Plants and trees may be planted behind the firing position shelters to alleviate noise transmission problems.

Soundproofing the firing line structures should be considered in problem areas. Trees should be kept away from firing lines to allow range control officers to see all shooters.

- (d) For windbreaks, trees may be planted along the length of the range with partial side berms or wing walls where strong prevailing crosswinds are problems to shooting accuracy.
- (e) Densely planted rows of fast-growing, compact, and thorny shrubs may be planted below the trees at ranges with partial berms or wing walls to abate noise, prevent encroachment, and alleviate crosswind problems.

(8) Target Line and Mechanisms. Components must be as follows:

- (a) The target line should be a minimum of 30 feet from the toe of the impact berm. The distance between targets must be the same as the distance between firing positions.
- (b) Target line bases must match grading with the firing line. Mechanical target support bases must be protected from the direct line of fire. They may be buried flush with the ground or placed behind a protective wall. Note that a small raised earth berm at this location generates significant ricochet. The complexity of the mechanism will dictate the protection requirement. See Figure 13 for wall or trench protection of high cost target line mechanisms.
- (c) Target supports can be made of steel angles and channels, PVC pipe or wood. Do not use metal parts within 33 feet of the firing line where direct fire strikes are anticipated. Discharging weapons close to metal surfaces is extremely dangerous. Present the smallest surface area that is structurally sound to the line of fire to minimize ricochet. Design the target holders for easy and inexpensive replacement. Portable, self-supporting 2- by 4-inch wood frames or 2-inch by 2-inch wood plank placed into buried PVC pipe work well on simple ranges. The full face of the target must be visible to the shooter.
- (d) Turning targets and the display time are at the discretion of the user. Commercially available, electrically motorized target carrier and electronic scoring systems should be considered where economically feasible.
- (e) On open ranges, a single target line with multiple firing lines is preferred. On partially or fully baffled ranges, in most instances, a single firing line with multiple target lines will produce the most cost-effective range because of the firing line canopy. An

extremely advanced target mechanism may be significantly more expensive than multiple canopies.

- (9) Impact Structures. The structure varies depending on the type of range. Natural terrain such as a mountain, cliff, or steep hill may be incorporated into impact structures provided the completed structure complies with the minimum design requirements. Acceptable structures by range type are listed below.
- (a) For open ranges, the top elevation of the earth impact berm should be 26 feet above the range surface for ranges 100 yards long or longer and 16 feet above the range surface for ranges 50 yards long or less. The impact berm should extend 50 yards beyond where the target line ends for 100-yard-long ranges or until joining with the side containment, if provided for ranges 50 yards long or less.
 - (b) The suggested elevation may be met by designing a combination of earth berm and vertical baffle (see Figure 14). The earth berm portion should have a top elevation of 16 feet above the surface of the range. The vertical baffle should be constructed of ballistic material and designed to withstand local seismic and wind loads. This combination arrangement would reduce the footprint and the amount of material in the earth berm.
 - (c) The preferred slope of the impact berm face is 1 to 1 or steeper. The steeper the slope, the more likely the berm is to absorb projectiles. The top should be 10 feet wide. The impact slope should be constructed with a 3-foot layer of easily filtered soil (to reclaim the lead projectiles) free of boulders, trees, rocks, stones, or other material that will cause ricochet. The rear slope should be appropriate to the native soil and maintenance requirements.
 - (d) For partially and fully baffled ranges, the top elevation of the impact structure will vary depending on the overhead baffle and impact structure arrangement. The impact structure for a partially baffled range can be: standard impact berm, bullet trap, or hybrid. For fully baffled ranges, the impact structure must be a bullet trap. In all instances, the impact structure must connect to the side containment. The top of the berm should be at an elevation 5 feet above the point where the highest line of direct fire can strike the berm.
 - (e) Outdoor baffled bullet stops can be constructed by placing the last vertical overhead baffle over the last target line and placing a sloped baffle to connect from the top of the earth berm to the back of the last vertical baffle. The bottom of this lower-sloped overhead baffle should be 2 feet above the highest point on the

berm where direct fire might strike. See Figure 15 for material and construction details. Rainfall runoff from the sloped baffle onto the berm must be considered. (See "Use of Bullet Traps and Steel Targets" for Shoot House bullet trap information.)

- (10) Side Containment. For partially and fully baffled ranges (Figures 7 and 8), the top elevation of the side containment must geometrically mate with the overhead baffles to be high enough to prevent any direct fire from exiting the range. Full-side height containment should extend 3 feet to the rear of the firing line. Locate the side containment at least 10 feet outside of the centerline of the outermost firing lane. Construction may be in the following forms.
- (a) Earth Berm. Construct earth berms to an inside slope of 1 to 1.5. If native soil characteristics will not produce a stable slope at this angle, provide geotechnical fabric reinforcement in the fill. The top width of the berm should be at least 10 feet. No rocks are permitted in the top 3 feet of the inside surface. Generally, earth berms cannot be used on partially or fully baffled ranges; however, earth berms are permissible if the firing range is small and the overhead baffle and berm geometry intercept ricochets.
 - (b) Continuous Walls. Construct continuous walls of ballistic material to withstand local wind and seismic loads. Provide sacrificial cladding to 13 feet forward of the firing line and 3 feet behind the firing line. Continuous walls are preferred for fully baffled ranges.

Table 2. Thickness of Material for Positive Protection Against the Caliber of Ammunition Listed

Cover material	Caliber and thickness required to stop penetration		
	5.56 mm	7.62 mm and Cal. 30	Cal. 50
Concrete (5,000 lbf/in ²)	5 inches	7 inches	12 inches
Gravel-filled concrete masonry units	8 inches	12 inches	24 inches
Broken stone	14 inches	20 inches	30 inches
Dry sand	16 inches	24 inches	32 inches
Wet sand	25 inches	36 inches	48 inches
Oak logs (wired)	28 inches	40 inches	56 inches
Earth			
Packed or tamped	32 inches	48 inches	60 inches
Undisturbed compact	35 inches	52 inches	66 inches
Freshly turned	38 inches	56 inches	72 inches
Plastic clay	44 inches	65 inches	100 inches

NOTE: Figures are based on new material. Degradation may occur over time.

- (c) Wing Walls. Wing walls (side baffles) are discontinuous side protection set at 45° to the line of fire. Locate the wing walls so that they are overlapped by 6 inches based on any line of fire that may strike them. Construct the wing walls of ballistic material to

withstand wind and seismic loads. Additionally, provide sacrificial cladding on wing walls closer than 30 feet to the firing line.

- (d) End Walls. End walls may be constructed at the firing lane edge on the firing line in lieu of extending side containment 3 feet behind the firing line. Walls should be long enough to close off any line of sight between the end of the side containment and the rear 3 feet mark. The end walls should be constructed of ballistic material with sacrificial cladding extending from the canopy to the firing line surface.

- (11) Overhead Baffles. Overhead baffles must be located so that no direct fire can exit the range from any firing position. The first overhead baffle must be geometrically coordinated with the firing line ballistic canopy (see Figure 9). The elevation of the top of each succeeding baffle should be 6 inches higher than a line of fire that just clears beneath each preceding baffle (see Figure 16). Overhead baffles should be the same height and spaced apart down range to achieve the required geometry (see Figure 17). The last baffle should be placed so the line of fire will strike the impact structure no higher than 5 feet below the top elevation of the structure. On a fully baffled range, the last overhead baffle must be over the last target line.

- (a) On partially baffled ranges, overhead baffles must extend laterally to within 1 foot of the side containment. On fully baffled ranges, the overhead baffle must tie into the side containment.
- (b) The vertical dimension of an overhead baffle when it is vertical varies with the number and spacing of the baffles. Normally, the height is between 5 and 8 feet when considering structural support size and costs.
- (c) The baffles must be constructed of ballistic material. Baffles within 11 yards of the firing line should be covered with sacrificial cladding. See Figures 12 and 18 for possible configurations.
- (d) Space the structural columns as far apart laterally as possible to open firing lanes. If possible, do not construct columns within the range. Design columns or beams to withstand local wind and seismic loads, and provide protective steel plate on the faces of the columns exposed to the firing line in accordance with Figures 12 and 18. Provide sacrificial cladding if the column is within 10 yards of the firing line. Overhead baffles may be placed on a flatter slope and overlapped to function as firing line canopies if multiple firing lines are to be used (see Figure 17). This arrangement is cost-effective for baffled combat lanes.

ATTACHMENT 1 -- RANGE DESIGN FIGURES

- Figure 1. Surface Danger Zone for Small Arms Firing at Fixed Ground Targets
- Figure 2. SDZ for Small Arms Weapons Firing at Moving Ground Targets
- Figure 3. SDZ for Small Arms Firing at Fixed Ground Targets with Rocky Soil or Targets Causing Ricochet
- Figure 4. SDZ for Firing M79, M203, and M19 40mm Grenade Launchers
- Figure 5. SDZ with Impact Berm for Small Arms Firing at Fixed Ground Targets
- Figure 6. Open Range with Impact Berm and Side Protection SDZ for Small Arms Firing at Fixed Ground Targets
- Figure 7. SDZ for Partially Baffled Range (Small Arms Firing at Fixed Ground Targets)
- Figure 8. SDZ for Fully Baffled Range (Small Arms Firing at Fixed Ground Targets)
- Figure 9. Ballistic Overhead Canopy
- Figure 10. Outdoor Rifle Range Layout
- Figure 11. Pistol Range Layout
- Figure 12. Ballistic Material
- Figure 13. Ballistic Protection of Target Mechanism
- Figure 14. Impact Berm for Open and Partially Baffled Ranges
- Figure 15. Outdoor Baffled Bullet Stop
- Figure 16. Baffled Range Profile
- Figure 17. Baffled System Geometry
- Figure 18. Overhead Baffle Ballistic Designs
- Figure 19. Parallel Ranges

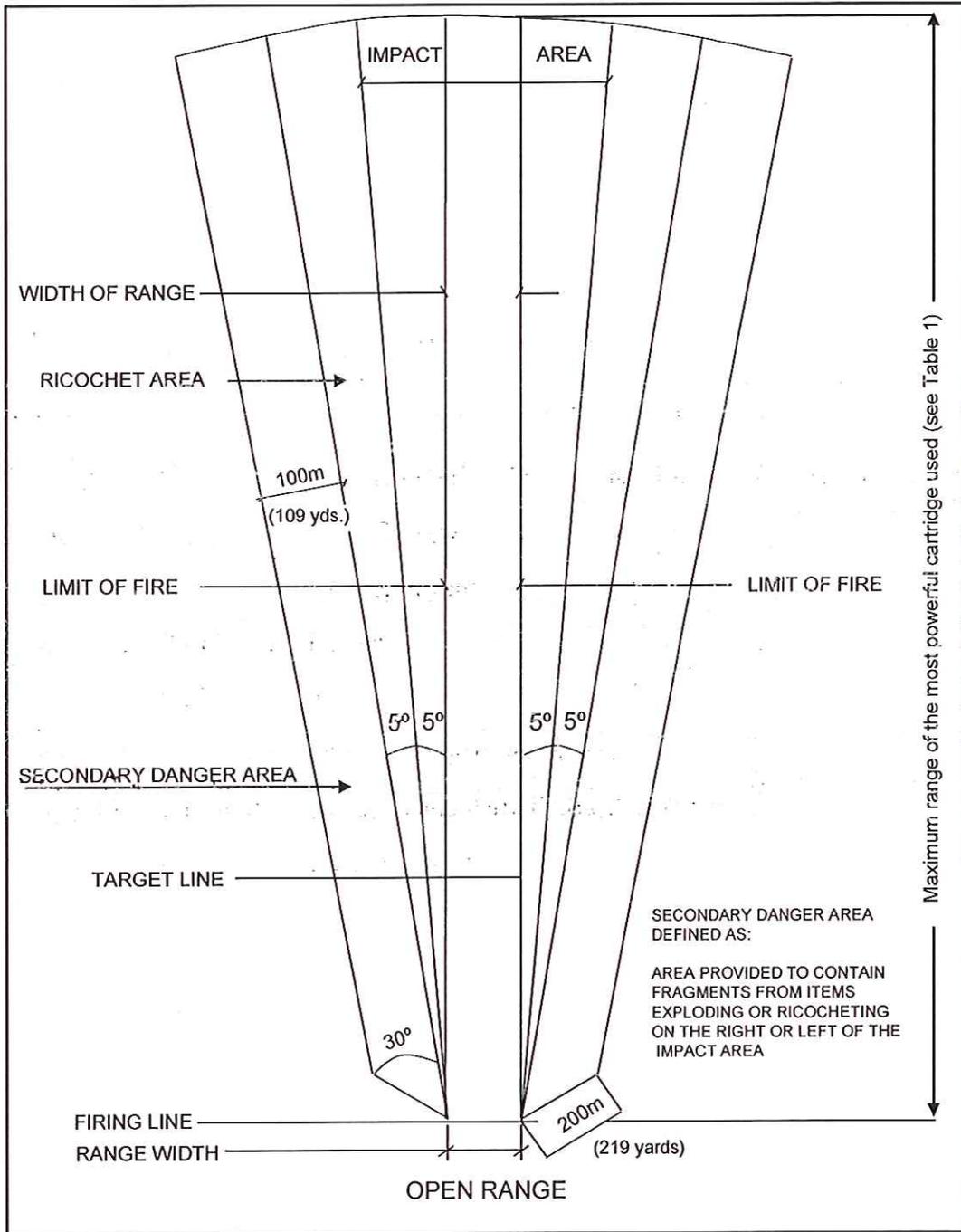


Figure 1
Surface Danger Zone for Small Arms
Firing at Fixed Ground Targets

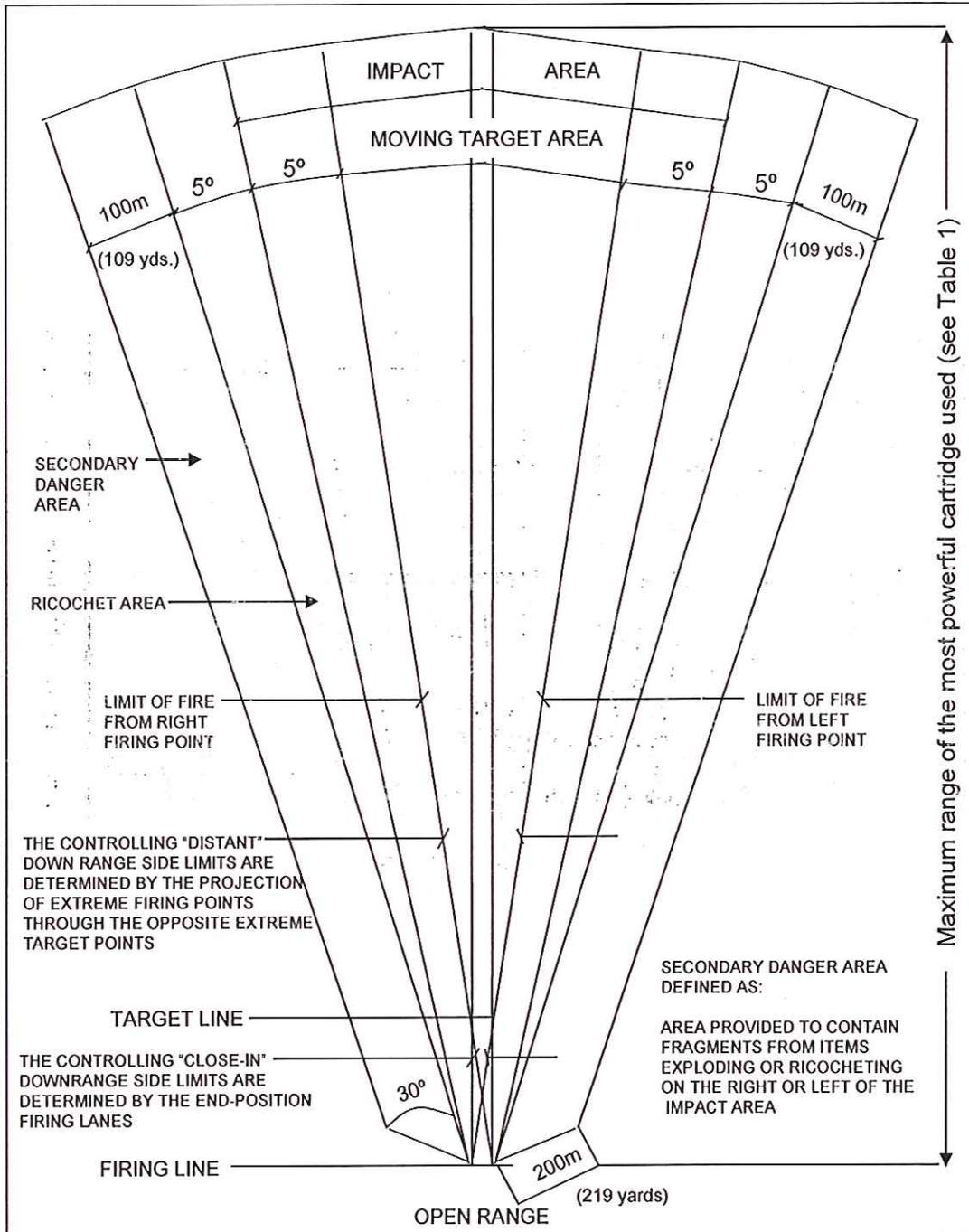


Figure 2
Surface Danger Zone for Small Arms Weapons
Firing at Moving Ground Targets

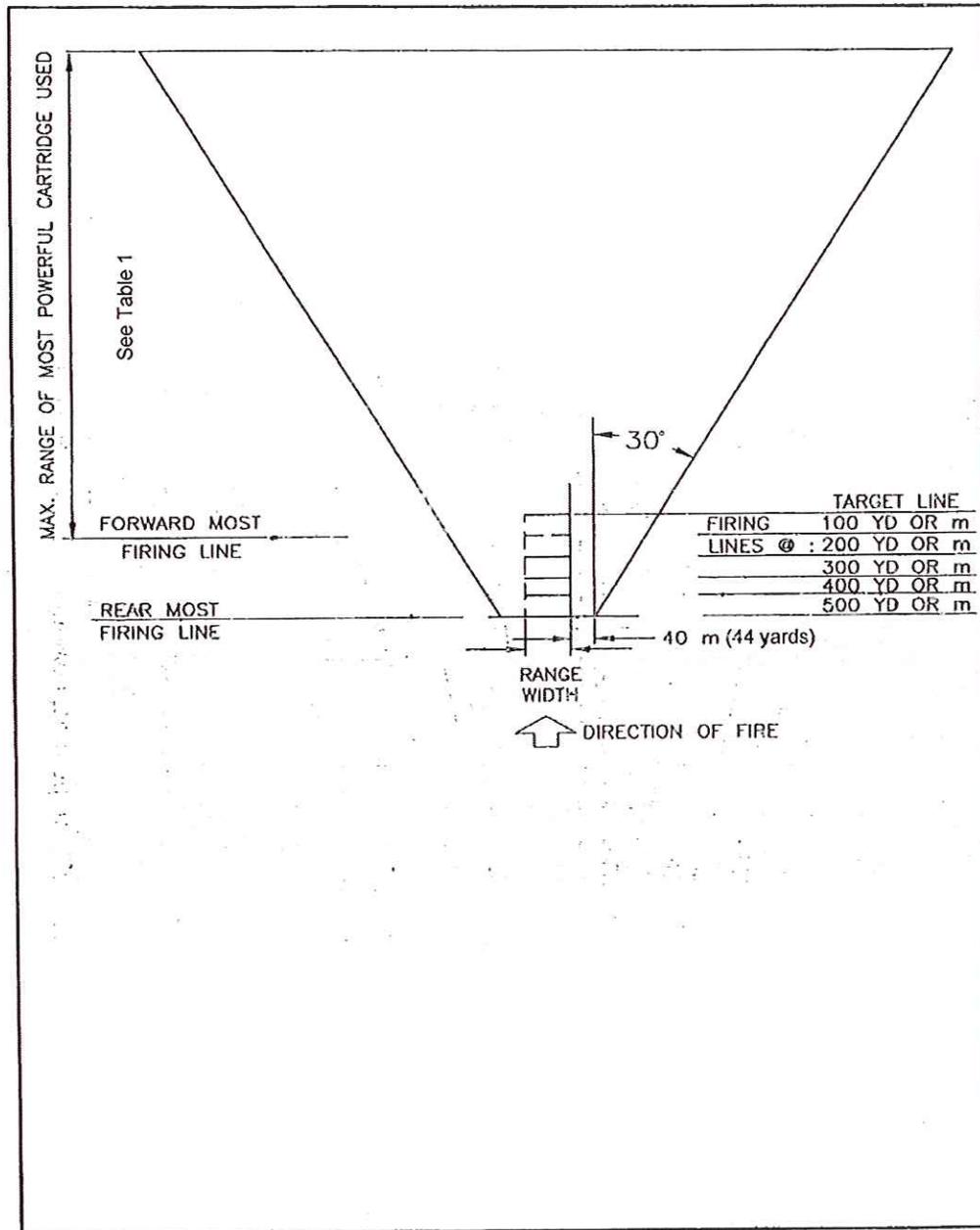


Figure 3
Surface Danger Zone for Small Arms Firing
At Fixed Ground Targets with Rocky Soil
Or Targets Causing Ricochet

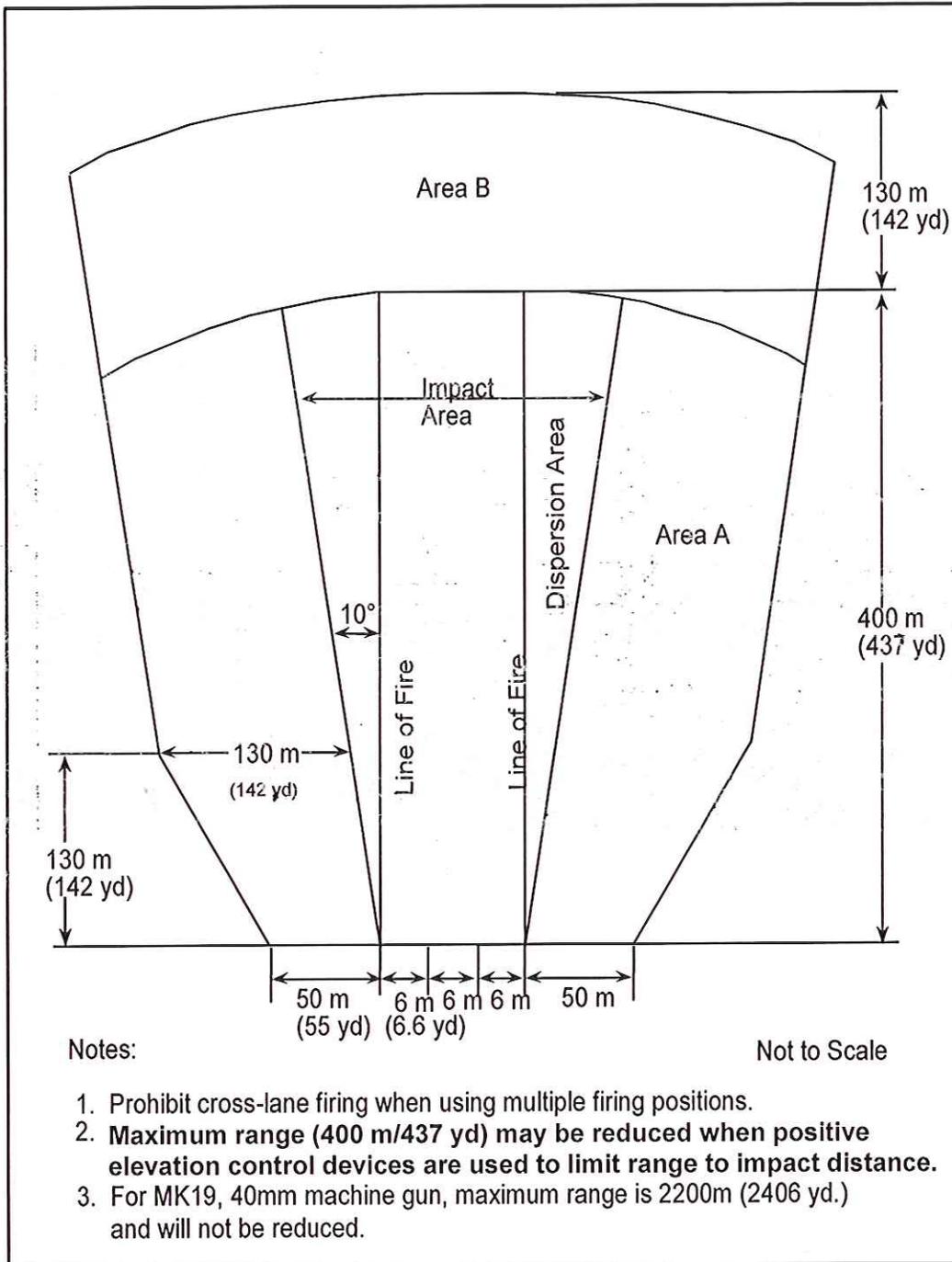


Figure 4
Surface Danger Zone for Firing
M79, M203, and M19 40mm Grenade Launchers

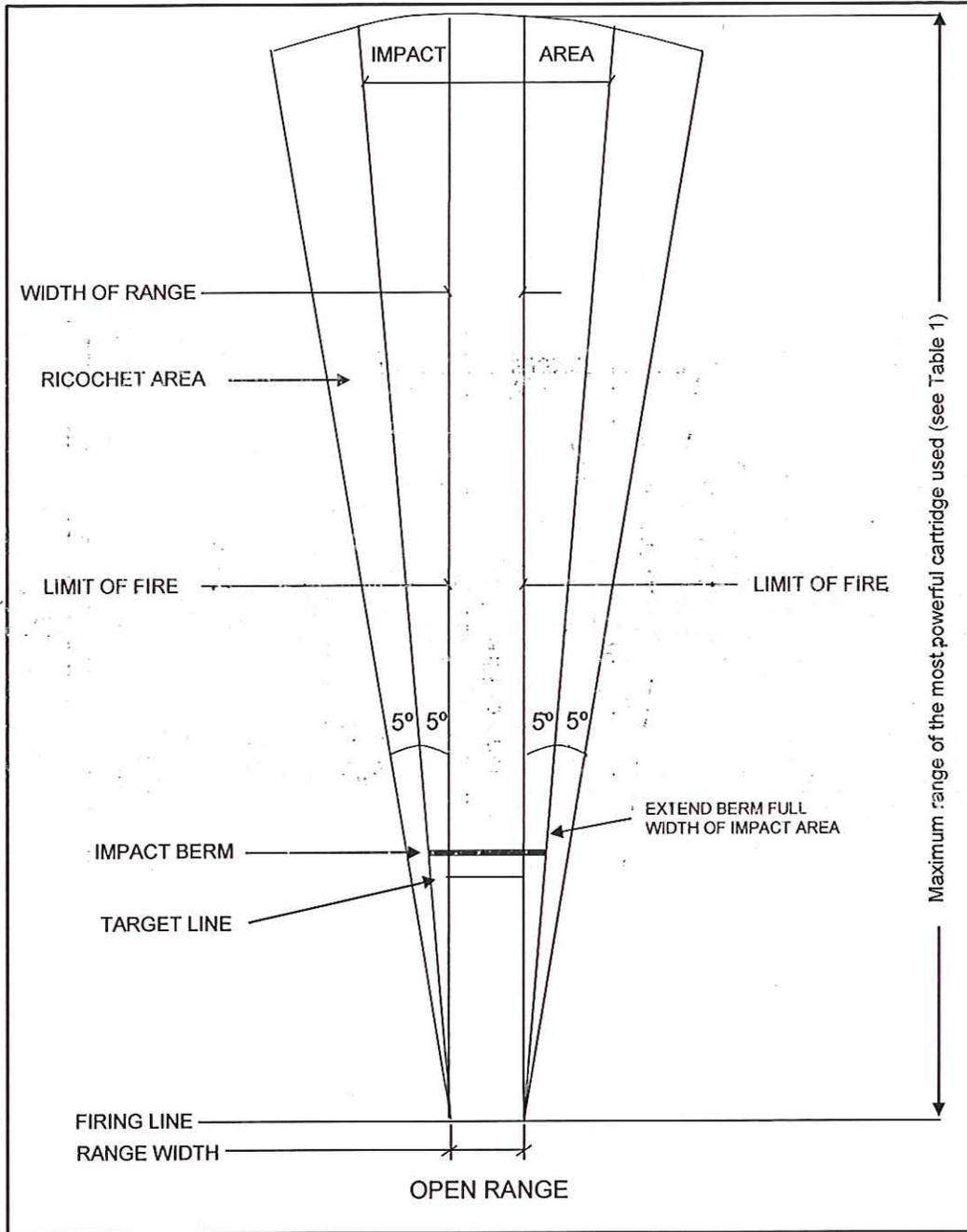


Figure 5
Surface Danger Zone with Impact Berm
for Small Arms Firing at Fixed Ground Targets

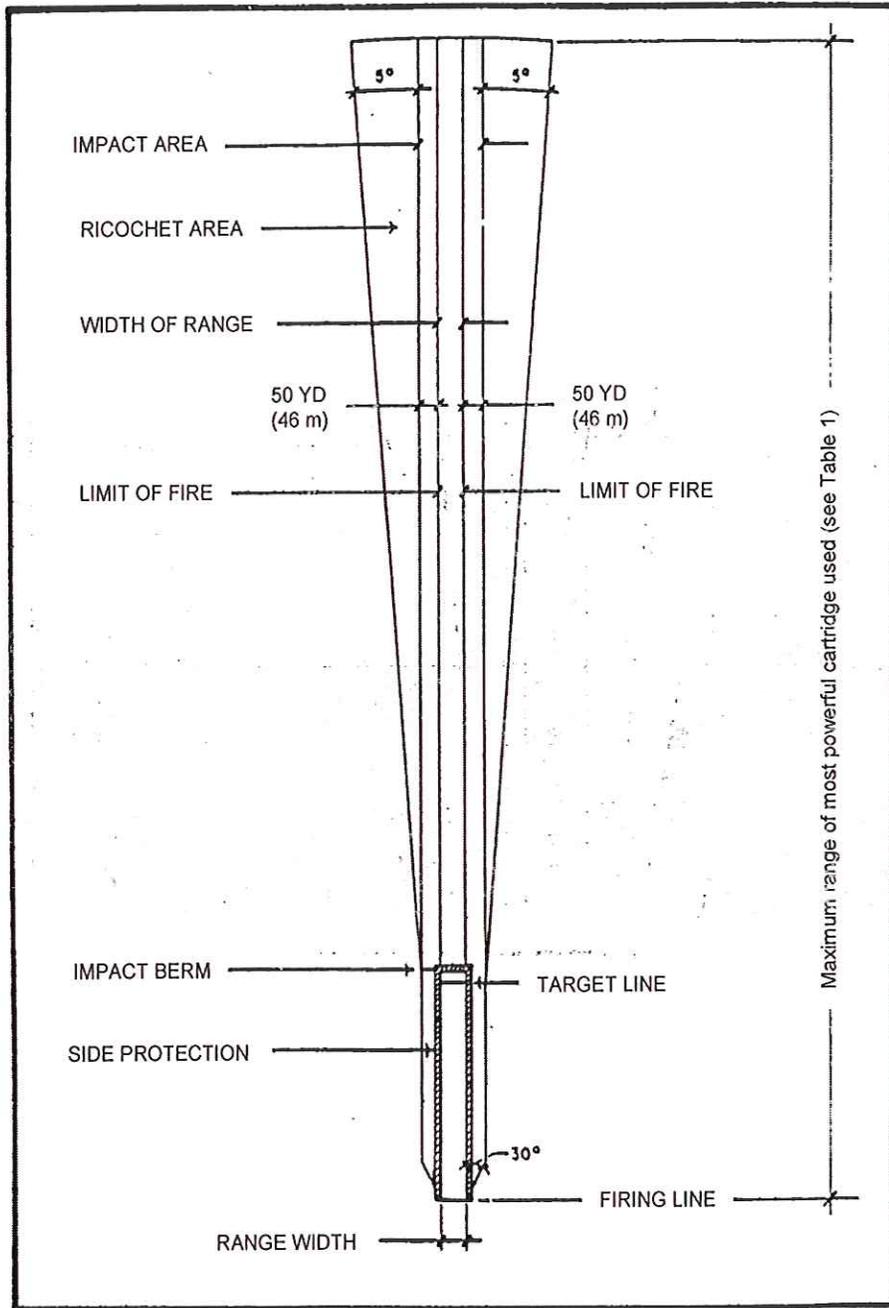


Figure 6

Open Range with Impact Berm and Side
Protection Surface Danger Zone for Small Arms
Firing at Fixed Ground Targets

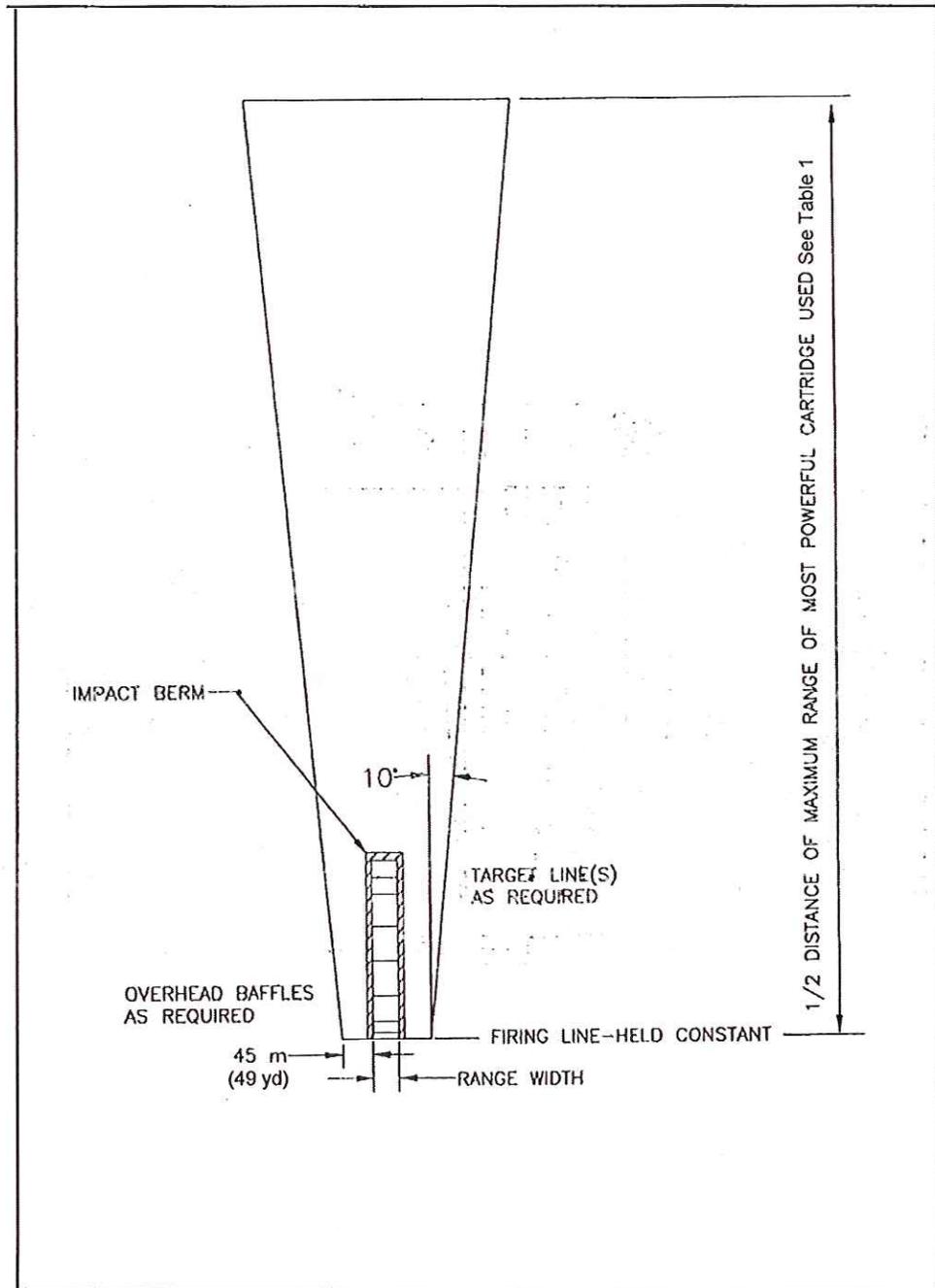


Figure 7
Surface Danger Zone for Partially Baffled Range
(Small Arms Firing at Fixed Ground Targets)

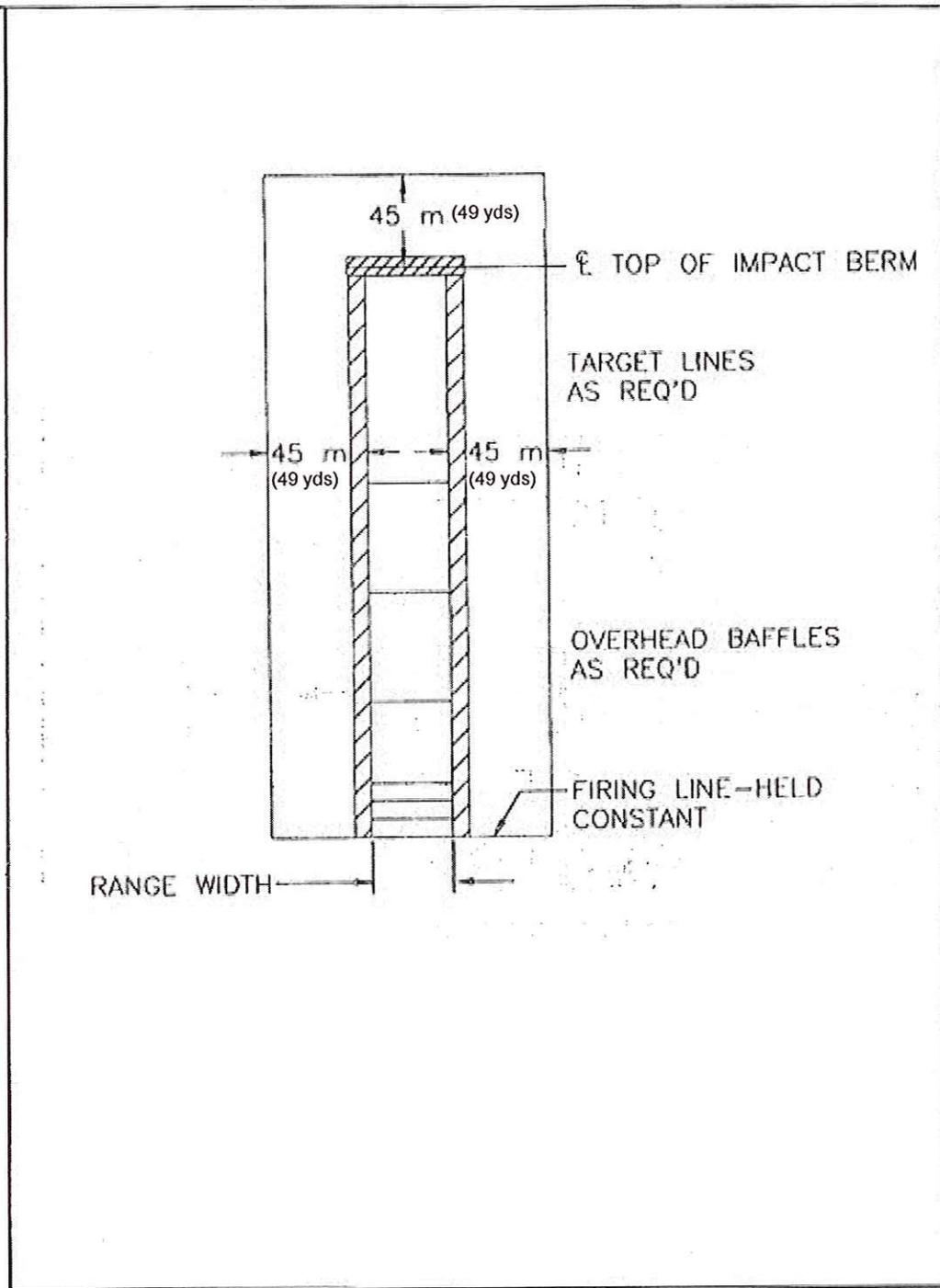


Figure 8
Surface Danger Zone for Fully Baffled Range
(Small Arms Firing at Fixed Ground Targets)

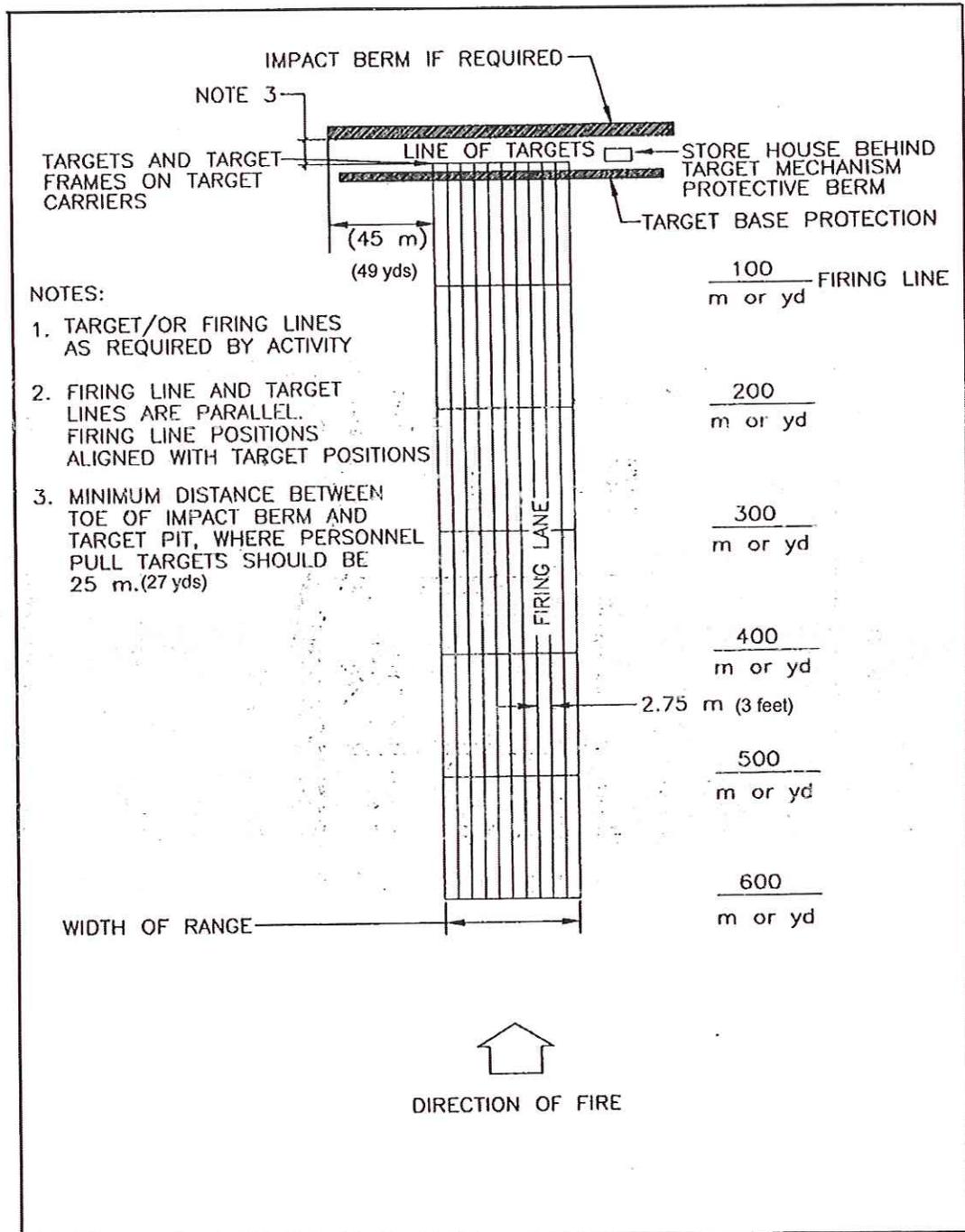


Figure 10
Outdoor Rifle Range Layout

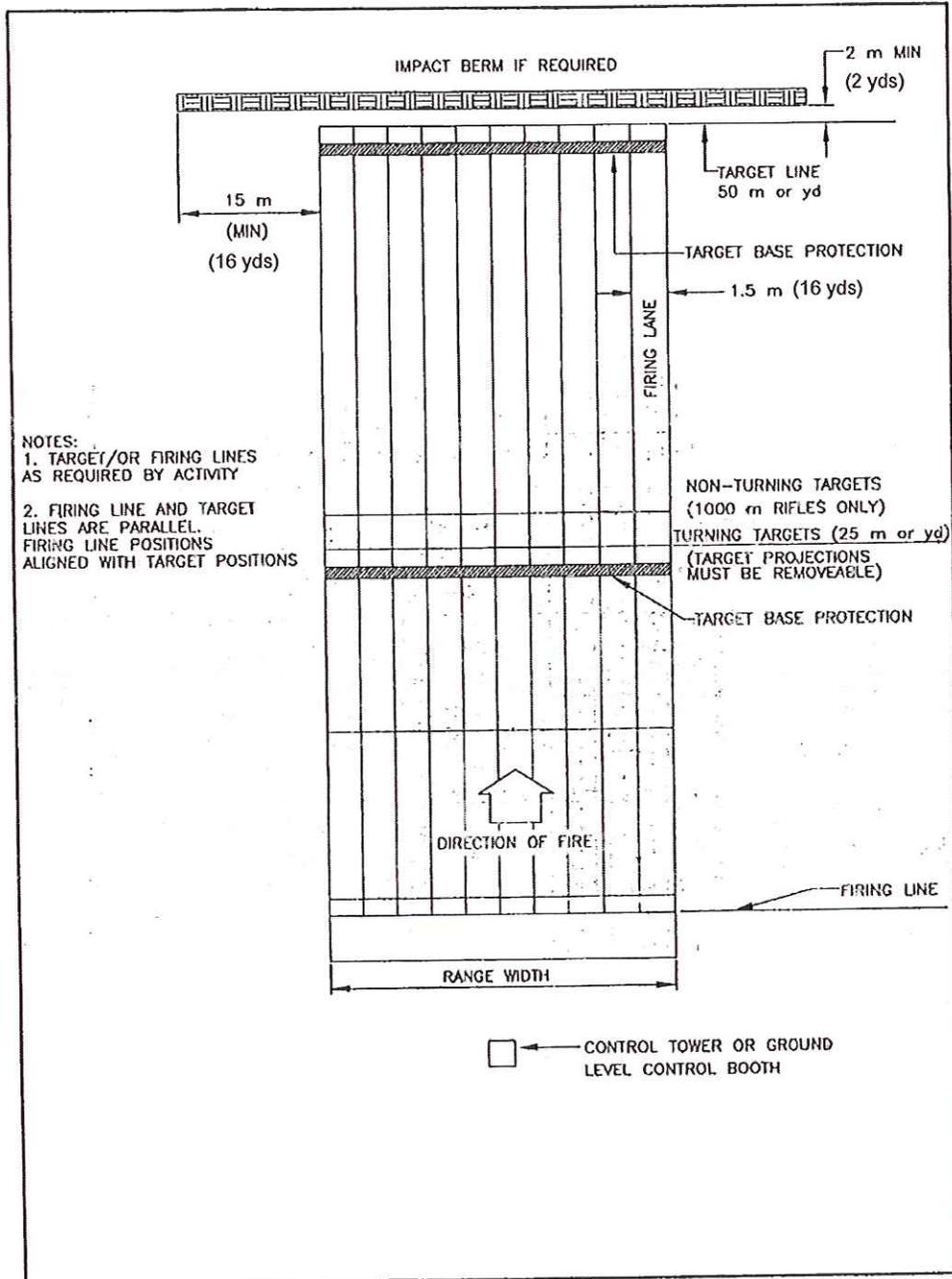


Figure 11
Pistol Range Layout

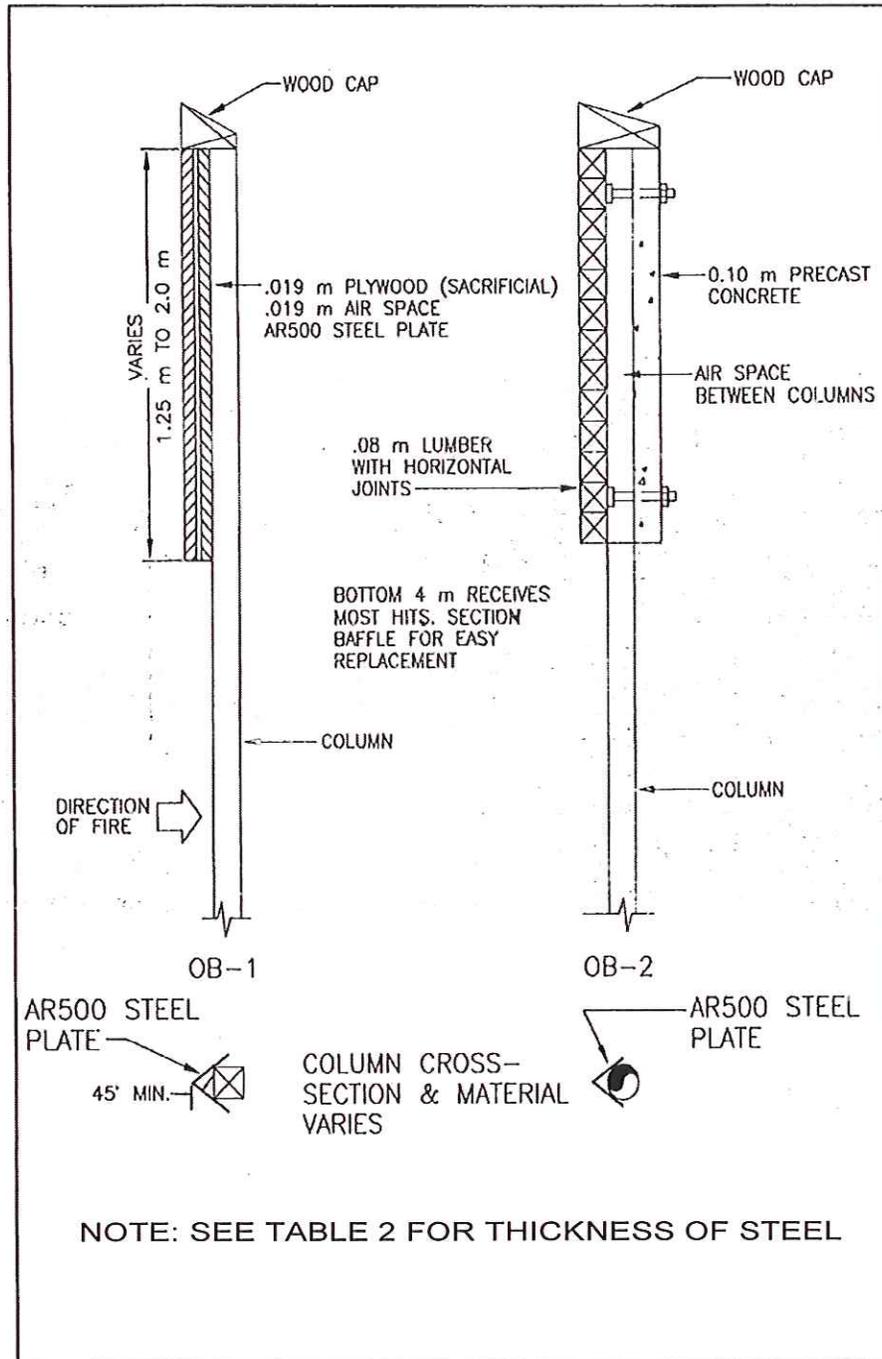


Figure 12
Ballistic Material

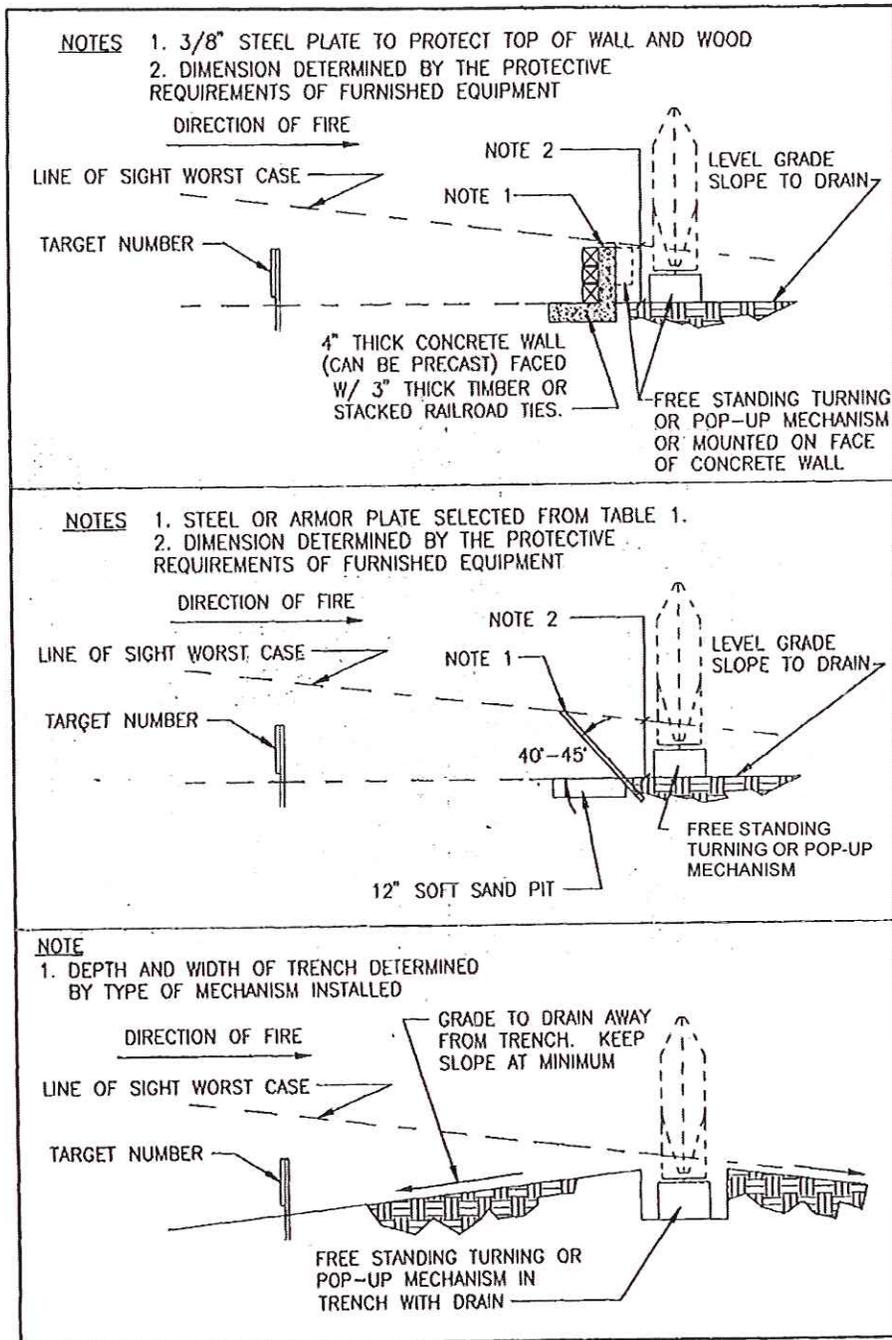


Figure 13
Ballistic Protection of Target Mechanism

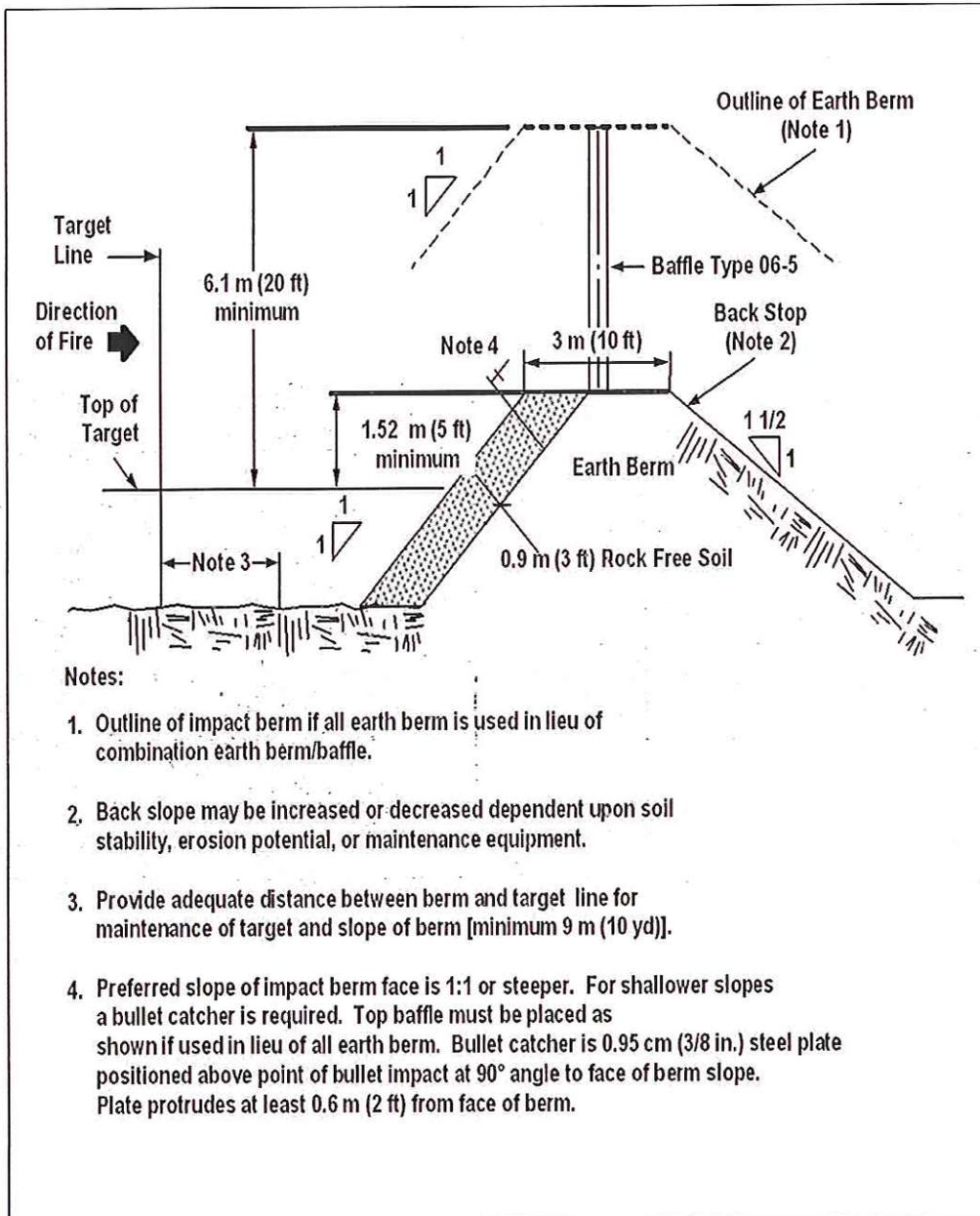


Figure 14
Impact Berm for Open and
Partially Baffled Ranges

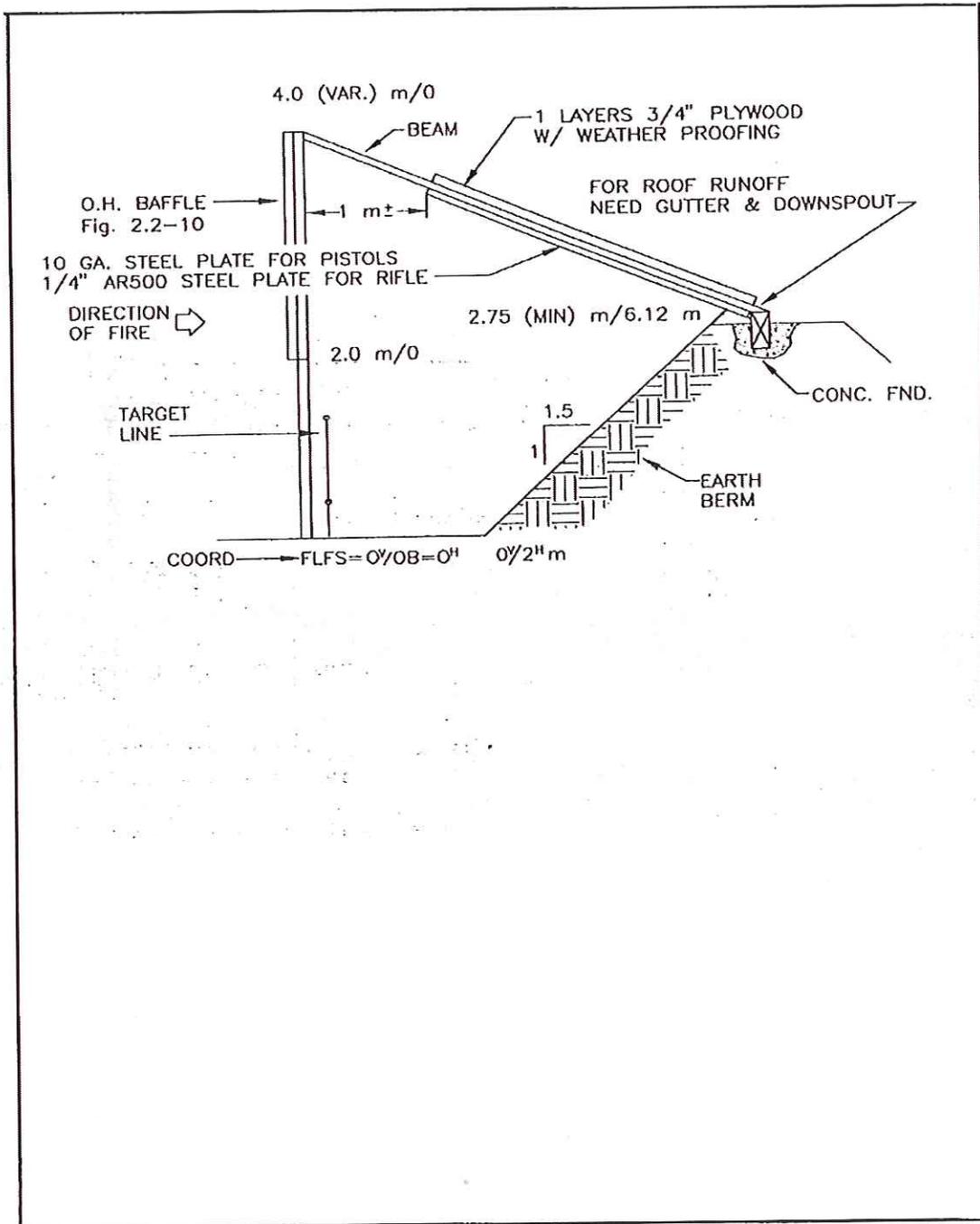


Figure 15
Outdoor Baffled Bullet Stop

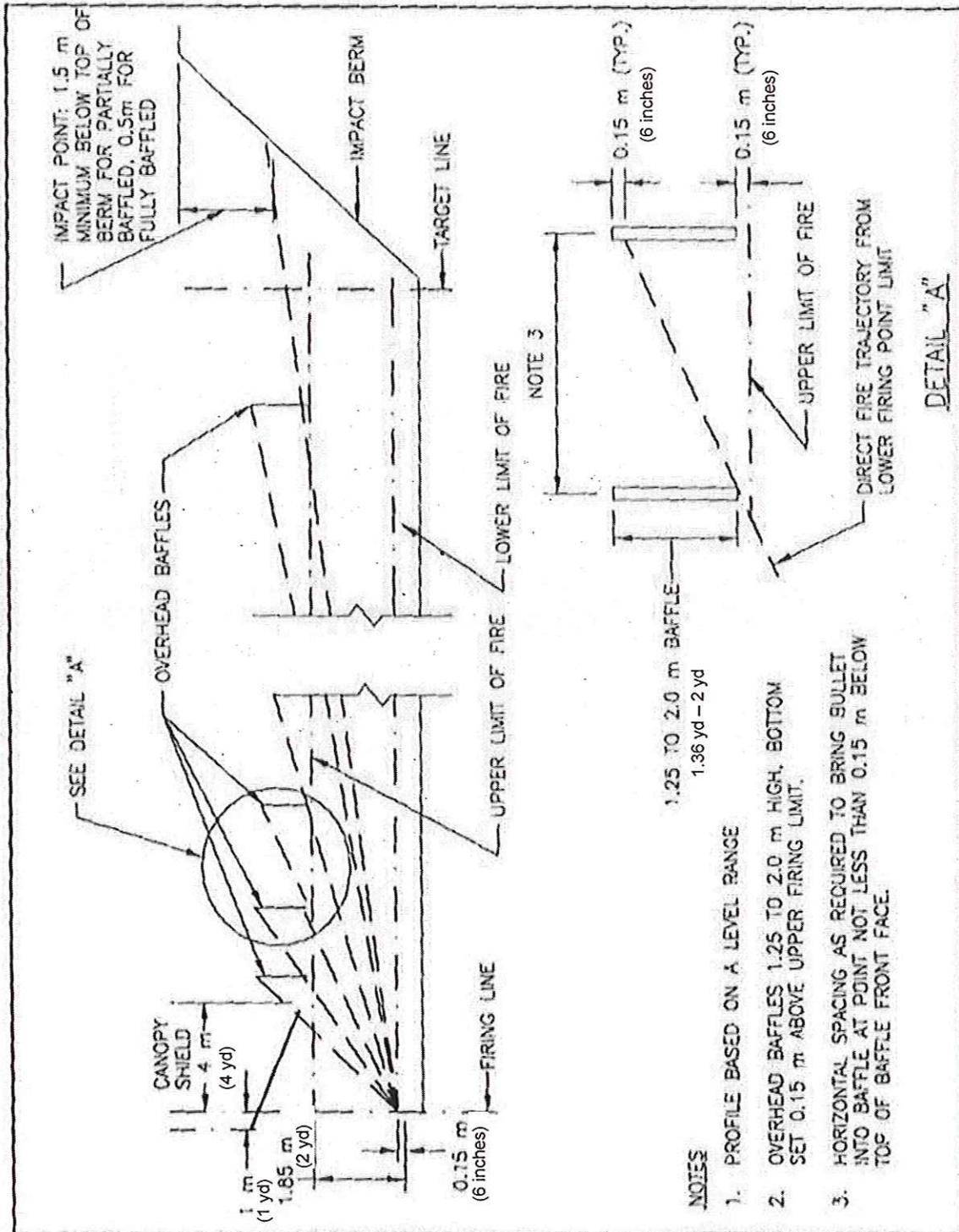


Figure 16
Baffled Range Profile

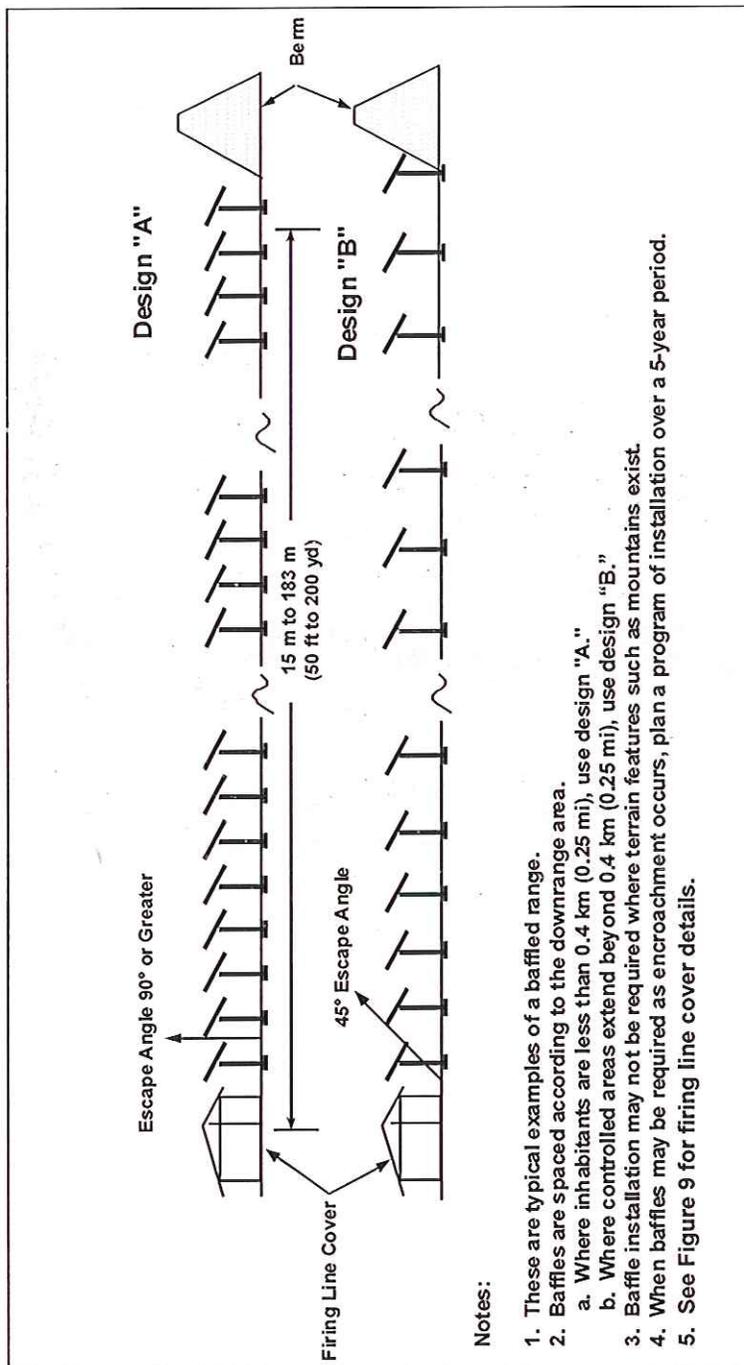


Figure 17
Baffle System Geometry

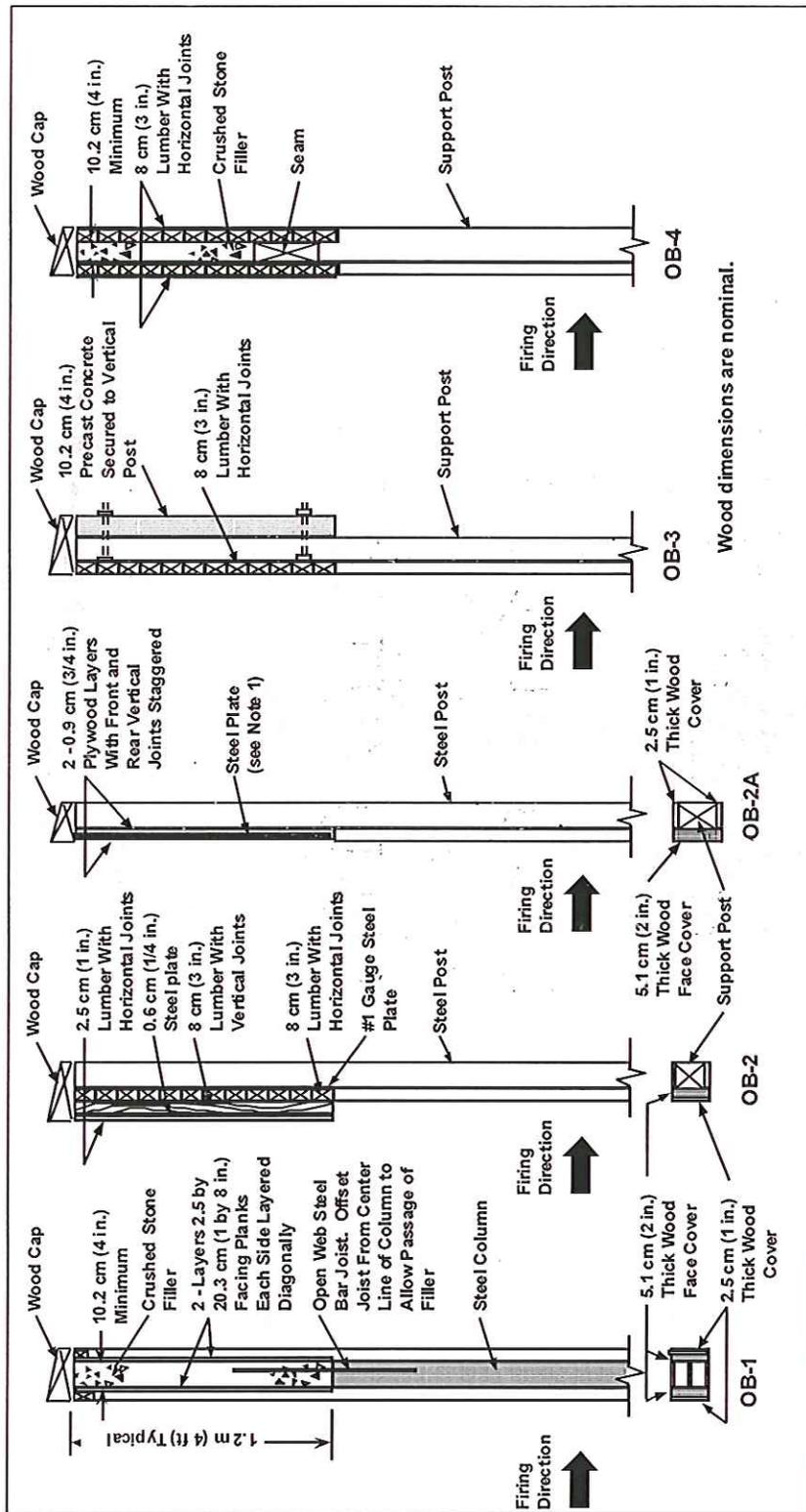


Figure 18
Overhead Baffle Ballistic Designs

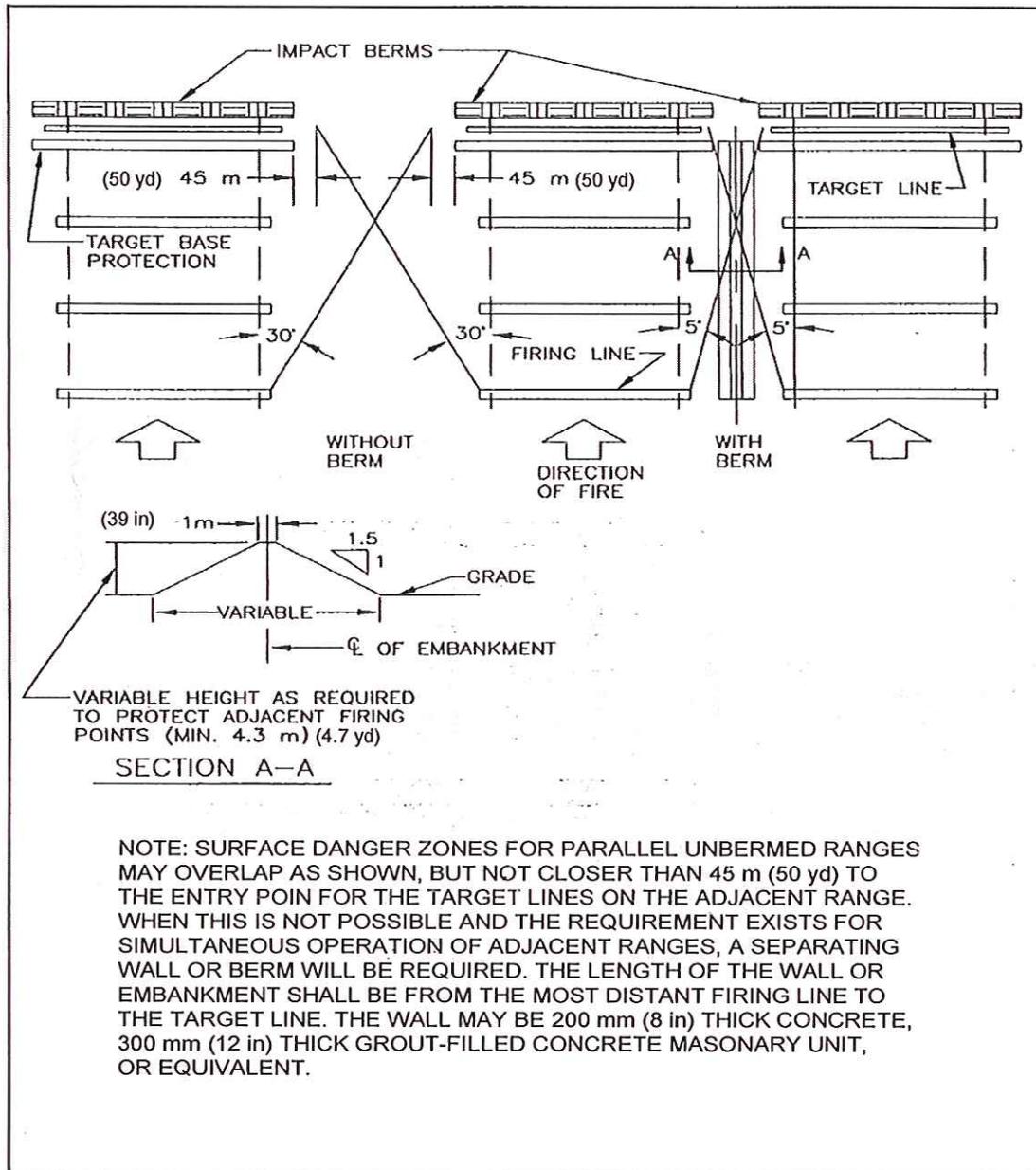


Figure 19
Parallel Ranges