



TECHNICAL MEMORANDUM

TO: Mr. Israel Lopez
Managing Director of Development
The Gutierrez Company
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FROM: William F. Lyons Jr., PE 

SUBJECT: Residences at Stone Ridge - Phase II – Milford, Massachusetts
Site Evaluation Related to Firearms Training Facility with Live Range

DATE: April 17, 2021

Fort Hill Companies LLC has conducted a detailed evaluation of the surface danger zone (SDZ) of the existing Milford Police Department Range (the "Range") and assessed its impacts on the subject site. Our evaluation has been performed based on the standards found in Military Handbook 1027, version 3A, dated 31 December 1989, entitled "Range Facilities and Miscellaneous Training Facilities Other Than Buildings." Our analysis reflects more than 30 years of combined experience planning, designing, and operating firing ranges for the US Department of Defense and the special operations community.

Background

We have gathered information from our field observations of the Range during a site visit on March 6, 2020 also attended by Milford Chief of Police James Falvey, and Town of Milford Board of Selectmen and former Milford Chief of Police Tom O'Loughlin.

The Range is approximately 640 feet long by 52 feet wide. The long axis generally runs east to west. The range is bounded by Town of Milford wooded land to the north and west. The southern portion of the Range is bounded by the subject site and by parcels of wooded land owned by the Town of Milford. The eastern side of the Range is bounded by single family residences and by town of Milford land. The land in between the Range and the subject site is wooded with brush and tree cover and generally slopes up from elevation 320' at the Range to elevation 380' at the subject site (or about 60-feet).



The Range provides two primary firing lines: one for shorter range and one for longer range targets. The western end of the Range is bounded by a protective earthen berm that spans the width of the Range and is approximately 30 feet above the surface elevation of the Range. The ground cover of the Range is grass and natural vegetation.

According to the Milford Chief of Police, use of the Range is exclusively controlled by the Milford Police Department. The Range is used for annual certification and training of the Department's officers.

According to information provided by the Milford Police Department, the maximum caliber of the weapons used on the Range is a .308 (7.62 x 51 mm) round fired from a sniper rifle with a maximum range of 4800 meters. The range is also used to fire 5.56 mm ball ammunition with a maximum range of 3100 meters. In addition, Glock 17 Pistols are also used among other handguns.

Surface Danger Zone

The SDZ is a function of two discrete components. One is the maximum range of the weapon systems fired on the Range. The other is the dispersion angle, also known as the ricochet area. A graphical representation of the SDZ is shown in Exhibit 1. The SDZ is determined by adding 100 meters (328 feet) on either side of the base of the Range firing points. The base of the SDZ is established by the rear most firing line. The ricochet area is a function of the ground within the range, which is either typical soil conditions or soil likely to cause a ricochet. The existing Range is classified as an open range (Type O) with rocky soil.

Recommendations

1. Our first recommendation is to resurface the ground between the firing line and the end impact berm to reduce the propensity of ricochets. Loaming and seeding this area with a minimum of six inches of topsoil will reduce exposure of the natural, rocky soils that tend to cause ricochets. It will also provide a safer range for the users as well.

Left untreated, the rocky soil would result in a dispersion angle of 30 degrees. However, if resurfaced with loam and seed as noted above, the rocky soil condition can be mitigated and a dispersion angle of 10 degrees can be used to determine the SDZ.

Exhibit 2 illustrates the surface danger zone and the residential development. Note that based on the longest weapon used, the SDZ extends past I-495 and is not fully shown in



Exhibit 2. However, as can be seen in Exhibit 2, the 10-degree dispersion angle does not result in an SDZ intrusion impact on the proposed development.

2. According to information provided by the Milford Police Department, the Range accommodates twelve firing lanes for simultaneous shooting. Reducing the number of lanes would narrow the base of the SDZ and thereby reduce the SDZ. The Department might consider reducing the number of lanes based on a cyclic rate of training analysis.

Conclusion

In summary, we believe that the mitigation measures proposed in this memorandum will provide the occupants of the proposed development with the reassurance necessary to feel comfortable on the property. The mitigation should prevent a negligently discharged round from reaching the proposed development. We believe, based on our expertise in the design of ranges and our personal experience operating ranges, that these mitigation measures will provide safe conditions so long as the Range is operated properly and responsibly.

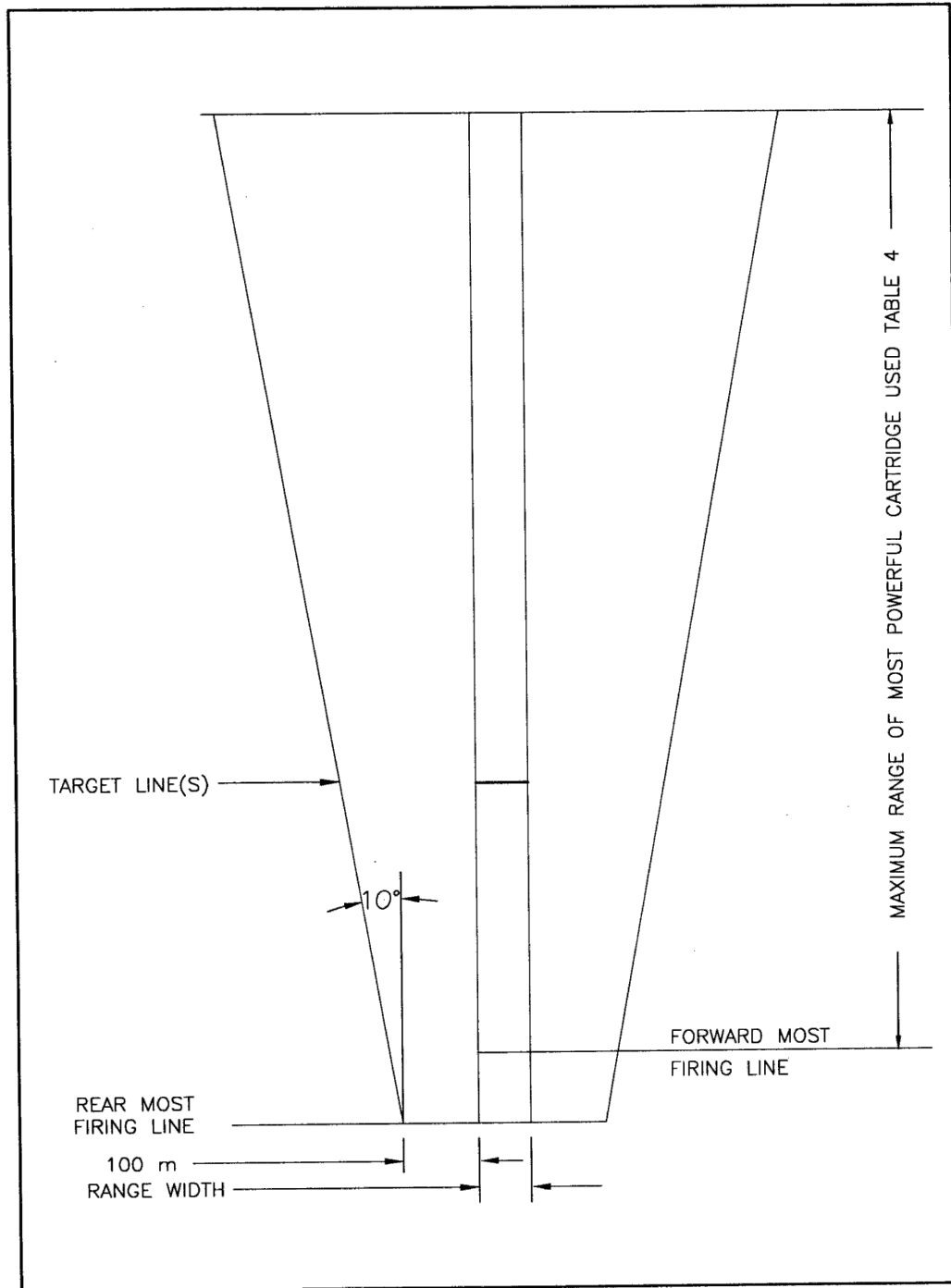
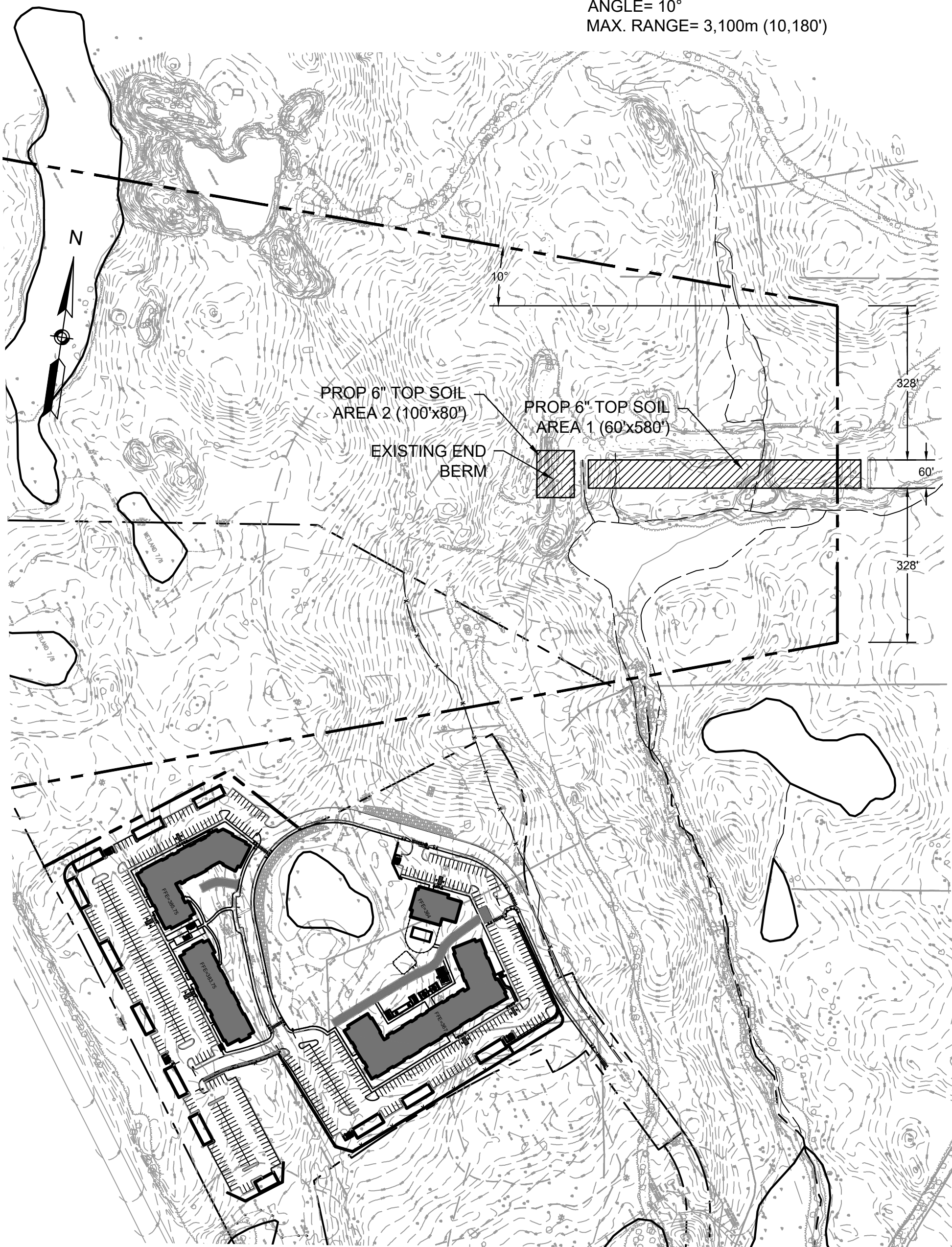


Figure 2.2-1
Surface Danger Zone for Small Arms Weapons Firing at
Fixed Ground Targets - Open Range (Type "0")

FIGURE 2.2-1
SURFACE DANGER ZONE (SDZ) FOR SMALL
ARMS WEAPONS FIRING AT FIXED GROUND
TARGETS - OPEN RANGE (TYPE "O").
ANGLE= 10°
MAX. RANGE= 3,100m (10,180')



SCALE:
1" = 200'

