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We Need More Storage Space

Calculating accurate munitions storage space requirements using the NAVFAC MSRC

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- WOSB/VOSB
- Founded in 2016
- Core services:
  - Federal Planning
  - Explosives Safety
  - Facilitation
  - Training

TYLER ROSS, PHD PE

DIRECTOR OF EXPLOSIVES SAFETY

tyler@theschreifergroup.com

801.458.5468

MATT WILSON

SENIOR EXPLOSIVES PLANNER

matt@theschreifergroup.com

515.343.9153

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Agenda

1 THE NEED

2 THE SOLUTION

3 HOW IT WORKS

4 OUTPUTS AND STRENGTHS

5 WHAT'S NEXT

6 CLOSING

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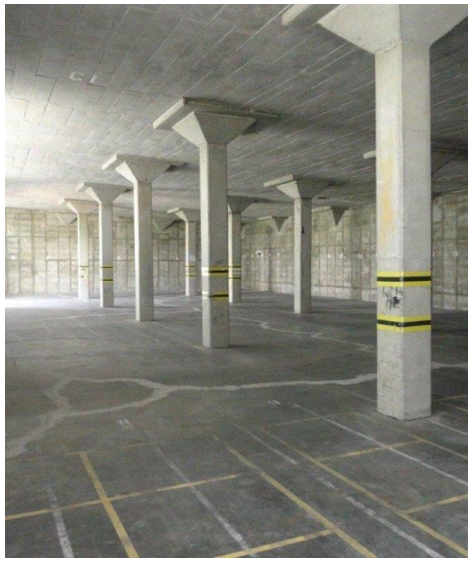
THE NEED

- Quantifying explosives storage requirements at DoD and other installations can very difficult
- Facility teams (e.g., Public Works) typically quantify in terms of square feet
- Munitions teams (e.g. MUNS, NMC) typically quantify in terms of lbs NEW

- NEITHER property alone provides enough information
    - Sqft does not speak to physical limitations of a structure, or security
    - Lbs NEW does not speak to size/volume, compatibility, or ability to stack

- Both properties can be significantly over estimated
    - “Installation X has 300,000 sqft of CATCODE 421-21….”
    - “Installation Y has an NEW capacity of 4.3 million lbs HD 1.1”



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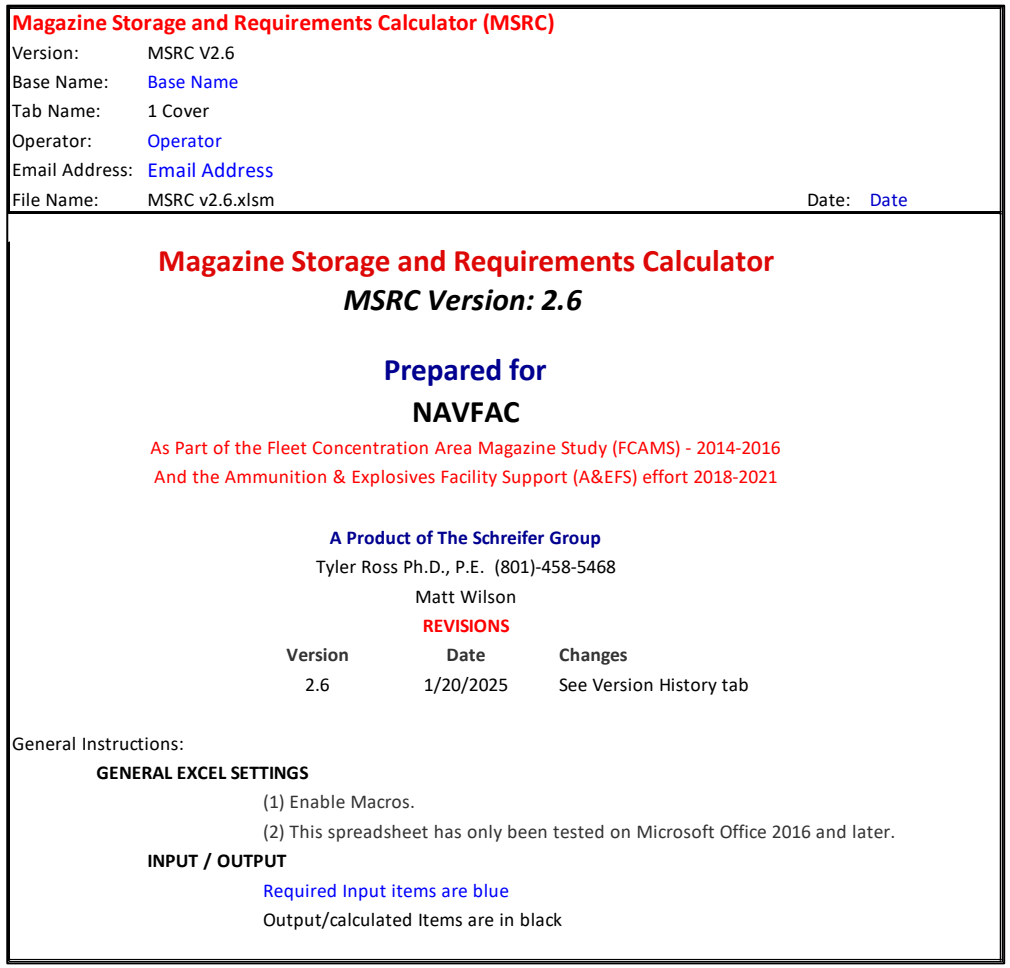
THE SOLUTION

- NAVFAC LANT, in coordination with CNIC, NOSSA and NMC contracted the development of a software tool to accurately plan for required storage space
- The Magazine Storage Requirements Calculator (MSRC) was developed in 2015 as an Excel spreadsheet
- The intent was to develop Basic Facility Requirement (BFR) documents for the US Navy
- The tool was required to maintain the requirements of NAVSEA O5 INST 8024.2 and NAVSEA OP-5, considering facility and munitions characteristics, as well as mixing rules, security, SCGs
- Both spatial and explosives utilization are calculated and optimized
- Inputs to the tool include:
    - A load plan (listing of munitions by NALC/DODIC and quantity)
    - A listing of all explosives storage facilities, noting key characteristics
    - Sited/approved NEW limits for each storage facility



Magazine Storage and Requirements Calculator (MSRC)

Version: MSRC V2.6
Base Name: Base Name
Tab Name: 1 Cover
Operator: Operator
Email Address: Email Address
File Name: MSRC v2.6.xlsm Date: Date

Magazine Storage and Requirements Calculator

MSRC Version: 2.6

Prepared for

NAVFAC

As Part of the Fleet Concentration Area Magazine Study (FCAMS) - 2014-2016
And the Ammunition & Explosives Facility Support (A&EFS) effort 2018-2021

A Product of The Schreifer Group

Tyler Ross Ph.D., P.E. (801)-458-5468
Matt Wilson

REVISIONS

Version	Date	Changes
2.6	1/20/2025	See Version History tab

General Instructions:

GENERAL EXCEL SETTINGS

(1) Enable Macros.
(2) This spreadsheet has only been tested on Microsoft Office 2016 and later.

INPUT / OUTPUT

Required Input items are blue
Output/calculated Items are in black

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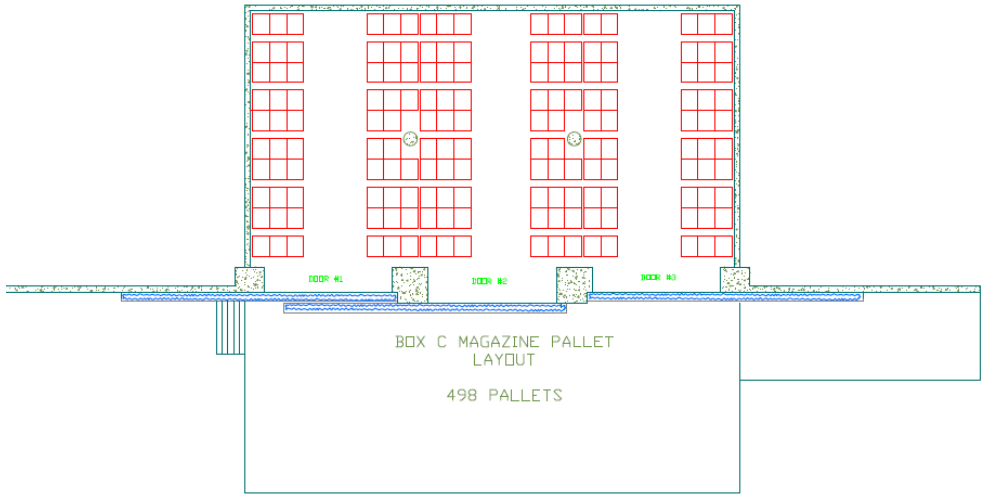
HOW IT WORKS

- The MSRC categorizes each munition into one of eight size categories
- A baseline storage capacity is defined for each magazine type
- The munitions load plan is sorted by priorities (Security, HD, Size and NEW)
- Munitions are stored using optimization algorithms
- Munitions that cannot be stored are reported



	Nominal Interior Dimensions		LXWXH 48"X40"X34"	LXWXH 53"X47"X43"	LXWXH 65"X36"X32"	LXWXH 107"X41"X24"	LXWXH 127"X43"X24"	LXWXH 159"X36"X49"	LXWXH 241"X40"X41"	LXWXH 308" X 40" X 40"
Mag type	**Width (ft)**	**epth (ft**	**Standard Pallet**	**Oversized Pallet**	**Small Bomb**	**Large Bomb**	**Small Missile**	**Medium Missile**	**Large Missile**	**Extra Large Missile**
Arch (80')	25	80	98	48	90	70				
SP&P I	101	50	432	216	288					
Box C	94.66	50	393	288	334	180	123	141	78	36
Box D	158.66	50	675	477	588	300	201	228	129	60
Box G	94.66	50	393	288	334	180	123	141	78	36
Box H	158.66	50	675	477	588	300	201	228	129	60
Box M	81	124							150	108
MSM (80') Navy	25	80	144	135	108	72	54	45	27	18
CLWS 32x117	32	114					168	126	60	48
CLWS Double (Single Bay)	50	114	504	480	408	264	252	168	120	96

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Load Plan ID	Security	HD	Sorting Index (Footprint and NEW)
1	None	1.2	1.65
2	None	1.3	1.02
3	None	1.4	1.23
4	None	1.1	0.6
5	IDS	1.1	0.3
6	CAT I	1.3	1.3
7	CAT I	1.2	1.93
8	IDS	1.3	0.7
9	CAT I	1.4	1.51
10	None	1.4	0.39
11	IDS	1.2	1.4
12	CAT I	1.4	0.67
13	CAT I	1.3	0.46
14	None	1.1	1.44
15	IDS	1.1	1.2
16	CAT I	1.1	0.88
17	IDS	1.2	0.5
18	IDS	1.1	2.0
19	IDS	1.4	0.1
20	CAT I	1.1	1.72
21	IDS	1.3	1.6
22	None	1.3	0.18
23	None	1.2	0.81
24	None	1.2	0
25	None	1.3	1.86
26	CAT I	1.2	0.25
27	IDS	1.4	1.8
28	IDS	1.4	1.0
29	CAT I	1.1	0.04
30	CAT I	1.2	1.09

Example – Sorting the Munitions List

CAT 1

IDS

None

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6	CAT I	1.3	1.3
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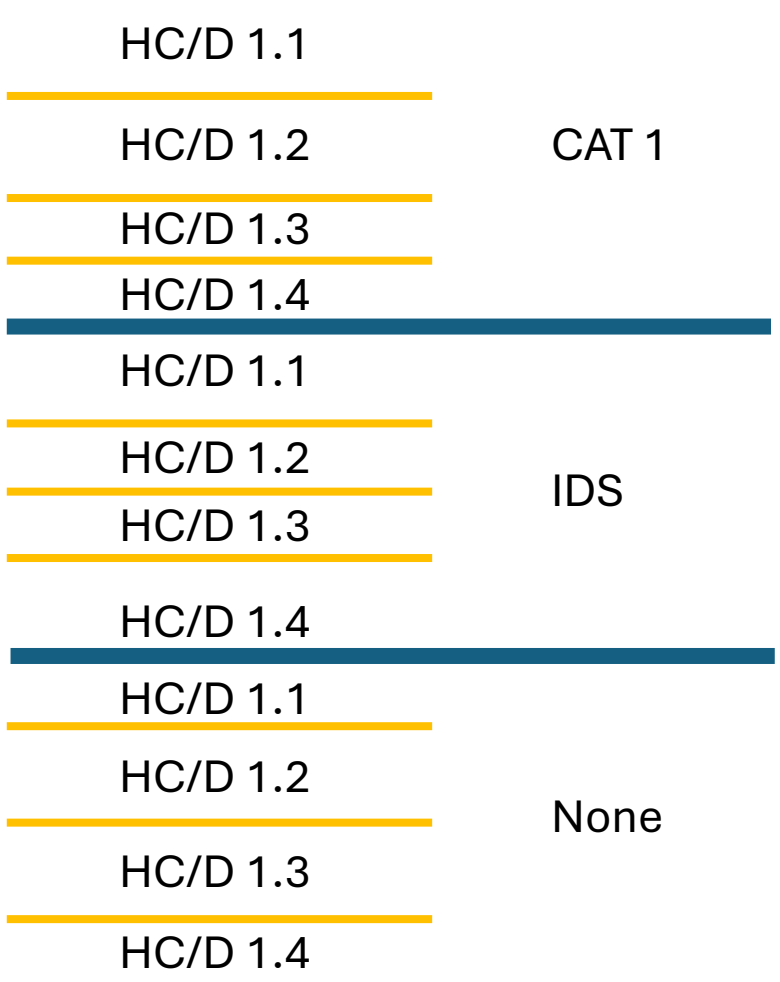

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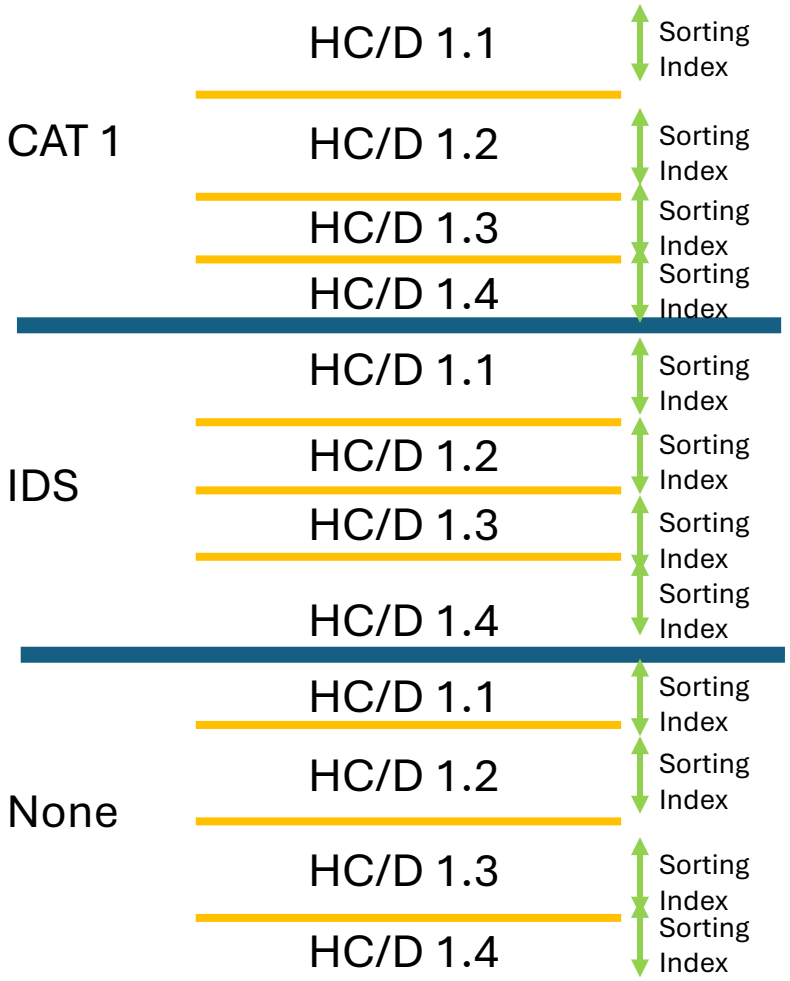

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FINDING THE RIGHT MAGAZINE

- After sorting the munitions list by priority, the MSRC attempts to store each item
- A single DODIC/NALC is selected (the full qty for that item)
- The magazines are sorted to determine available magazines and the most efficient option
- Munitions that cannot be stored are reported
- EXAMPLE – Stowing a group of 8 Small Missiles, HD 1.1, SCG D, No Security required

Facility #	Magazine Type	Accessibility	% Full by NEW	% Full by Space	SGC Assigned	Security
Mag 100	80' Arch	Pallets	0	0	None	None
Mag 105	80' Arch	Pallets	40	80	G	None
Mag 210	SP&P Type I	Pallets	25	80	H	None
Mag 230	SP&P Type I	Small Bombs	50	80	C/D/E	None
Mag 400	Box Type D	Large Missiles	95	50	C/D/E	CAT I
Mag 405	Box Type D	Large Missiles	20	50	C/D/E	CAT I
Mag 410	Box Type D	Large Missiles	20	50	J	None
Mag 430	Box Type D	Large Missiles	100	50	J	None

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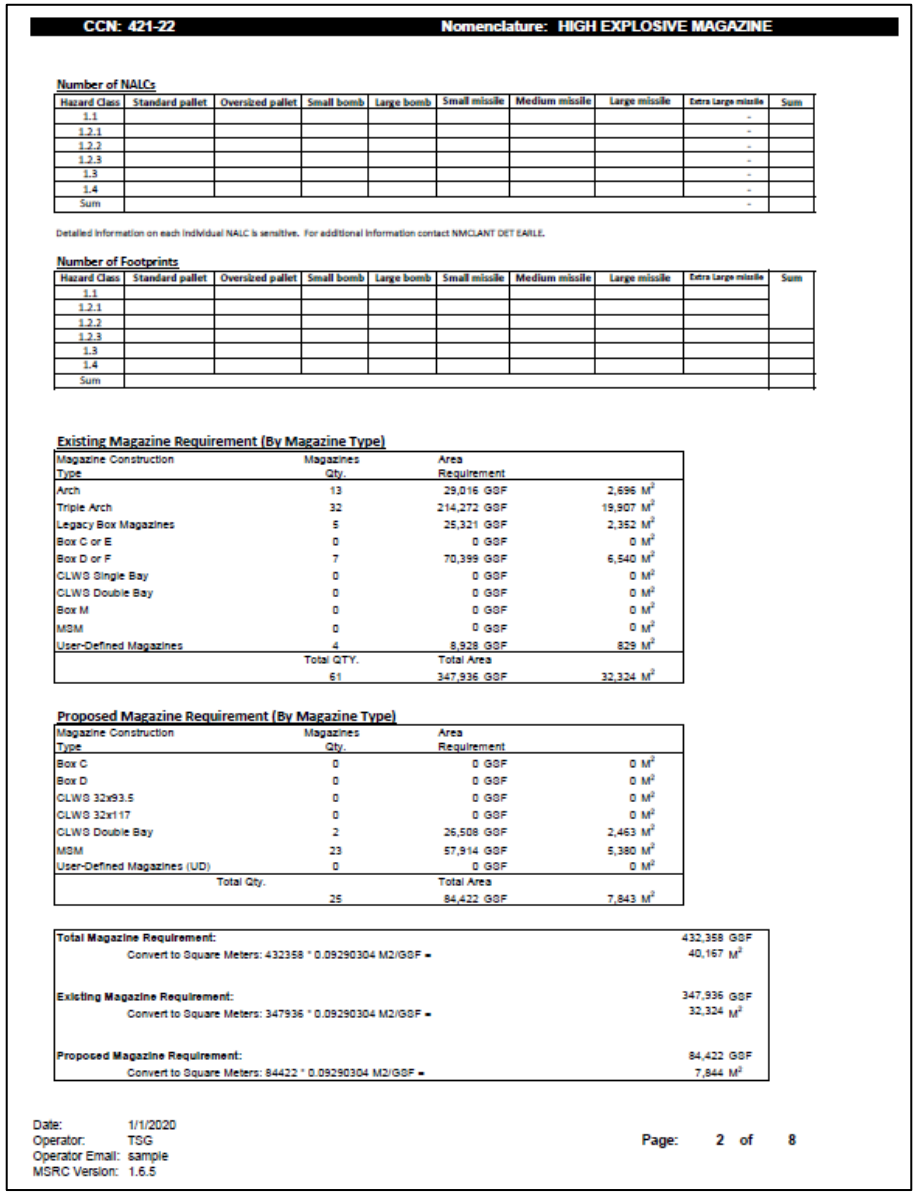
OUTPUT and STRENGTHS

- The principal output of the tool is the BFR, supporting facility requirements
- Additional uses for the tool include
  - Rapid “what-if” studies for changes in inventory, or arrival of new programs
  - Green field planning for new storage locations or expeditionary scenarios
  - Can be used to develop master storage plans and inventory tracking

- Benefits of using the MSRC include
  - Repeatable, defensible analyses
  - Account for volume, NEW and explosives storage rules simultaneously
  - Reduce human error and biases
  - Significantly faster analyses



CCN: 421-22 **Nomenclature: HIGH EXPLOSIVE MAGAZINE**

Number of NALCs

Hazard Class	Standard pallet	Oversized pallet	Small bomb	Large bomb	Small missile	Medium missile	Large missile	Extra Large missile	Sum
1.1								-	
1.2.1								-	
1.2.2								-	
1.2.3								-	
1.3								-	
1.4								-	
Sum								-	

Detailed information on each individual NALC is sensitive. For additional information contact NMCLANT DET EARLE.

Number of Footprints

Hazard Class	Standard pallet	Oversized pallet	Small bomb	Large bomb	Small missile	Medium missile	Large missile	Extra Large missile	Sum
1.1									
1.2.1									
1.2.2									
1.2.3									
1.3									
1.4									
Sum									

Existing Magazine Requirement (By Magazine Type)

Magazine Construction Type	Magazines Qty.	Area Requirement	
Arch	13	29,016 GSF	2,696 M²
Triple Arch	32	214,272 GSF	19,907 M²
Legacy Box Magazines	5	25,321 GSF	2,352 M²
Box C or E	0	0 GSF	0 M²
Box D or F	7	70,399 GSF	6,540 M²
CLWG Single Bay	0	0 GSF	0 M²
CLWG Double Bay	0	0 GSF	0 M²
Box M	0	0 GSF	0 M²
MSM	0	0 GSF	0 M²
User-Defined Magazines	4	8,928 GSF	829 M²
	Total QTY.	Total Area	
	61	347,936 GSF	32,324 M²

Proposed Magazine Requirement (By Magazine Type)

Magazine Construction Type	Magazines Qty.	Area Requirement	
Box C	0	0 GSF	0 M²
Box D	0	0 GSF	0 M²
CLWG 32x93.5	0	0 GSF	0 M²
CLWG 32x117	0	0 GSF	0 M²
CLWG Double Bay	2	26,508 GSF	2,463 M²
MSM	23	57,914 GSF	5,380 M²
User-Defined Magazines (UD)	0	0 GSF	0 M²
Total Qty.		Total Area	
	25	84,422 GSF	7,843 M²

Total Magazine Requirement:		432,358 GSF
Convert to Square Meters: 432358 * 0.09290304 M2/GSF =		40,167 M²
Existing Magazine Requirement:		347,936 GSF
Convert to Square Meters: 347936 * 0.09290304 M2/GSF =		32,324 M²
Proposed Magazine Requirement:		84,422 GSF
Convert to Square Meters: 84422 * 0.09290304 M2/GSF =		7,844 M²

Date: 1/1/2020
Operator: TSG
Operator Email: sample
MSRC Version: 1.6.5

Page: 2 of 8

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WHAT'S NEXT?

- The MSRC is owned by NAVFAC LANT
  - (https://flankspeed.sharepoint-mil.us/sites/NAVFACLANTAMMagazineCriteria/SitePages/ProjectHome.aspx)
- It is available for use in its current format by US Navy and Marine Corps installations
- The MSRC has been successfully used to support multiple Area Development Plans and District Plans for the US Air Force and Army
- Expanded use of the tool is possible through coordination with NAVFAC LANT
  - Christine Mintz
    christine.m.mintz.civ@us.navy.mil
  - Marshall Dugger
    a.m.dugger.civ@us.navy.mil

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MATT WILSON

Senior Explosives Planner

matt@theschreifergroup.com

515.343.9153

DR. TYLER ROSS

Director of Explosives Safety

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THANK YOU!

Questions, comments, and closing discussion

The Schreifer Group