



UNITED STATES MARINE CORPS
MARINE CORPS BASE
QUANTICO, VIRGINIA 22134-5001

MCBO 8020.1
B 50
5 Jan 04

MARINE CORPS BASE ORDER 8020.1

From: Commander

To: Distribution List

Subj: HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO)

Ref: (a) NAVSEA OP 3565/NAVAIR 16-1-529/NAVELEX 0967-LP-624-6010,
Volume 2, Tenth Revision
(b) Hazards of Electromagnetic Radiation to Ordnance
Assessment of MCB/MCAF, Quantico, VA, of 1 Aug 03 (NOTAL)
(c) NAVFAC 11010/31 Parts I and II

Encl: (1) General Hazards of Electromagnetic Radiation to Ordnance
(HERO) Safe Separation Distance Requirements
(2) Hazards of Electromagnetic Radiation to Ordnance (HERO)
Zones, Ordnance Transportation Routes, and Ordnance and
Data Collection Locations Map
(3) Applications for Setting Hazards of Electromagnetic
Radiation to Ordnance (HERO) Conditions
(4) Hazards of Electromagnetic Radiation to Ordnance (HERO)
Electronic Emission Condition (EMCON) Procedures
(5) Safe Separation Distances for Aircraft HF, VHF, UHF, and
Radar Transmitters, Portable and Mobile Transmitters

1. Purpose. To promulgate policy and procedures for safe handling, transportation, and stowage of ordnance with regard to HERO at MCB/MCAF, Quantico.

2. Scope. This Order is applicable any time HERO SUSCEPTIBLE or HERO UNSAFE ORDNANCE is handled, loaded, or transported by MCB/MCAF, Quantico at all ordnance locations.

3. General Discussion. As described in reference (a), electromagnetic radiation hazards stem from the functional characteristics of electrically initiated ordnance, and are a result of absorption of electromagnetic energy by the firing circuitry of electrically initiated devices (EID). The radiated energy can cause heating of the bridge wire and primary explosive, and can result in premature, unintended actuation of the EID. Such an event can pose either a safety or reliability problem. In general, ordnance is most susceptible to radio-frequency (RF) environments during assembly,

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disassembly, handling, loading, and unloading. There are three classifications pertinent to HERO: HERO SAFE ORDNANCE; HERO SUSCEPTIBLE ORDNANCE; and HERO UNSAFE ORDNANCE. Therefore, HERO EMCON and ordnance handling restrictions and procedures (see reference (b)) form a compromise that allows for the safe handling of ordnance within the existing RF environment. EMCON is derived from an analysis of the fields produced by the existing RF transmitters and the ordnance susceptibilities described in reference (a), or through a HERO survey. The following paragraphs describe the categories of ordnance.

a. HERO SAFE ORDNANCE. Items that require no RF environmental restrictions beyond general HERO requirements described in paragraph 5-4 of reference (a).

b. HERO SUSCEPTIBLE ORDNANCE. Items that are susceptible and require moderate RF environmental restrictions.

c. HERO UNSAFE ORDNANCE. Items that are extremely susceptible and require severe RF environmental restrictions.

4. HERO EMCON Bill. Provides specific guidance germane to the emitter systems at MCB/MCAF, Quantico in order to mitigate the concern for HERO. Reference (b) contains the MCB/MCAF, Quantico bill. The standard HERO precautions are listed in enclosure (1). The HERO zones for MCB/MCAF, Quantico are illustrated in enclosure (2). Enclosures (3) and (4) provide both applications and procedures for the setting of HERO EMCON. Enclosure (5) provides HERO separation distances for aircraft, portable, and mobile transmitters. The MCB/MCAF Operations Officer, upon notification, will set the appropriate HERO EMCON Condition to ensure that electromagnetic environments do not exceed acceptable levels.

5. Responsibilities. Oversight of the HERO Program will be a joint program with responsibilities shared between Director, Safety Division and AC/S G-6.

a. Director, Safety Division

(1) Be responsible for the continuing program to ensure HERO safety aboard the Base.

(2) Convene semi-annual conferences of ordnance and radiation hazard (RADHAZ) personnel who are representatives of each unit or organization to discuss and recommend changes to the instructions.

(3) Monitor the supply of HERO warning signs and order as necessary.

(4) Review RADHAZ requirements and request HERO surveys when required.

(5) Maintain and update a record of all ordnance transportation routes aboard the Base.

b. A/CS G-6

(1) Appoint an officer to serve as the Installation HERO Officer. The HERO Officer will:

(a) Provide frequency management specific expertise.

(b) Ensure all communications specialists are familiar with HERO restrictions from a RF perspective.

(c) Approve/Disapprove all new or modified transmitter installations and frequency coordination on station in coordination with the Assistant HERO Officer. Contact Naval Surface Warfare Center, Dahlgren Division (NSWCDD)(Code J52) for all questions concerning HERO.

(d) Approve/Disapprove any request to operate amateur radio equipment on station in coordination with the Assistant HERO Officer.

(e) Ensure the EOD Officer is notified of transmitter and antenna changes at MCB/MCAF, Quantico and direct that he/she provide comment as to the ordnance specific implications of these changes.

(2) Head, Electronics Maintenance Branch, G-6

(a) Ensure that all emitters under the cognizance of this Command are marked with the safe operating distance prior to issue.

(b) Inform the HERO Officer when stationary communications transmitters or radars are relocated or new equipment is obtained. These changes should be submitted for HERO review per reference (c).

(c) Affix HERO warning labels to all mobile and portable radios.

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(d) Establish check-in procedures for owners of citizen's band and other mobile radios and cellular telephones to familiarize operators with HERO.

c. EOD Officer. The EOD Officer is the central POC for determination of compliance with the appropriate references as it relates to all forms of ordnance that are handled at MCB/MCAF, Quantico. As such, the EOD Officer will assist the HERO Officer, and will act as a HERO liaison to track and monitor all future ordnance facility (or handling location) changes. The liaison will coordinate the HERO Program and account for all station and tenant command information, as presented in reference (b), concerning ordnance inventory/operations.

(1) Provide comment as to the ordnance specific implications of transmitter and antenna changes at MCB/MCAF, Quantico to the HERO Officer as required.

(2) Ensure that all ordnance personnel are familiar with HERO restrictions applicable to ordnance operations.

(3) When issuing any ordnance (or ordnance component) to a user, advise the user of its HERO status during all aspects of its life cycle (e.g., assembly, handling, loading/downloading operations).

(4) Inform the HERO Officer upon receipt of ordnance items that are categorized as HERO SUSCEPTIBLE or HERO UNSAFE ORDNANCE so that HERO issues can be mitigated to ensure both safety and reliability.

(5) Ensure that the transportation of HERO UNSAFE and HERO SUSCEPTIBLE ORDNANCE is enclosed in all-metal containers. (When transported in sealed all-metal containers, it is considered HERO SAFE ORDNANCE.) If HERO SUSCEPTIBLE ORDNANCE is transported outside of an all-metal container, observe the HERO separation distances listed in enclosure (5) for aircraft, portable, and mobile transmitters. In the event of an ordnance accident, set the appropriate HERO condition for HERO UNSAFE ORDNANCE.

(6) Place HERO warning signs prohibiting radio transmissions at the entrance to the magazine area and all ordnance handling or storage activities.

d. MCB/MCAF Operations Officer

(1) The MCB/MCAF Operations Officer will act as the central POC for the setting and monitoring of HERO EMCON, as outlined in reference (b), and will maintain a list of names and phone numbers for those activities impacted by HERO EMCON. All future emitter changes at MCB/MCAF, Quantico should be provided to the HERO liaison for inclusion into the HERO EMCON Bill.

(2) Restrict aircraft on the flight lines from indiscriminately energizing any transmitters (e.g., communications, radars, or electronic warfare equipment).

(3) Ensure that taxiing/landing aircraft are informed when HERO conditions are set.

(4) Establish and maintain liaison with all tenant activities and resolve any conflicts in HERO requirements.

(5) Include HERO EMCON radio operating training as a qualification requirement for vehicle operators on the airfield and aboard the air facility.

e. COs/OICs and Department Heads/Special Staff Assistants

(1) Ensure that all operators of communications equipment and aircrews comply with this Order.

(2) Ensure that personnel operating transmitters are properly instructed in their use during EMCON conditions.

(3) Notify the HERO Officer prior to using new electronic equipment (that radiates) at MCB/MCAF, Quantico.

(4) Promulgate supplementary instructions pertaining to their own equipment, personnel, and operating procedures as required to ensure compliance with this Order.

f. Tenant Activities

(1) Notify the HERO Officer when new communications (or radar) equipment is obtained, loaded/downloaded or transported.

(2) Notify the EOD Officer or MCAF Operations Officer prior to HERO SUSCEPTIBLE ORDNANCE being loaded/downloaded or transported.

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g. CO SctyBn. SctyBn shall be responsible for notifying station personnel and visitors who have mobile transmitters in their personal vehicles that transmission on MCB/MCAF, Quantico will be permitted only with written permission of the Comdr MCB.

6. Requirements. To ensure ordnance-handling safety, precautions must be taken to limit the radiation of RF energy in and around ordnance handling areas. Enclosure (1) contains standard HERO precautions and chapter 5 of reference (a) provides HERO requirements during ordnance operations.

a. When ordnance is being assembled, handled, or transported within the confines of the magazine area, emissions from various mobile and portable very high frequency/ultra high frequency (VHF/UHF) transmitters shall be silenced or the HERO UNSAFE and HERO SUSCEPTIBLE ORDNANCE safe separation distances, as provided in chapter 2 of reference (a) or appendix A of reference (b), should be maintained.

b. HERO SUSCEPTIBLE or HERO UNSAFE ORDNANCE cannot be moved, transported, loaded, or downloaded at MCB/MCAF, Quantico except as specified by the EOD Officer or MCAF Operations Officer, as appropriate. Reference (b) provides specific HERO EMCON guidance for MCB/MCAF, Quantico's emitter systems of concern.

c. Other conditions necessitating deviations from the requirements outlined in reference (a) shall be reported to Naval Sea Systems Command (NAVSEASYS COM) per reference (a).

7. Procedures

a. The following general procedures apply when setting HERO EMCON at MCB/MCAF, Quantico:

(1) In the event of an ordnance accident or emergency involving aircraft carrying aviation ordnance (or an ordnance carrier along the ordnance transportation route), the appropriate HERO EMCON conditions (defined in enclosures (3) and (4)) will be set by MCB/MCAF, Operations Officer and will remain in effect until EOD personnel have rendered the ordnance safe or determined that EMCON is no longer required.

Note: The EOD Officer or MCAF Operations Officer, as appropriate, will notify all ordnance accident response units to maintain a minimum separation distance of 150 feet from the accident site when 3 VHF/UHF mobile radios are in use, and 50 feet when 3 portable radios are in use.

(2) For HERO SUSCEPTIBLE ORDNANCE, when practical, the MCB/MCAF Operations Officer will be notified 24 hours prior to routine implementation of HERO requirements by using the activity's ordnance personnel. The commencement time and automatic expiration time will require a minimum of 30 minutes notice by the using activity.

(3) In all instances, the MCB/MCAF Operations Officer will contact all activities impacted by HERO (stationary transmitters to be silenced) and inform all aircraft on the ground (or inbound aircraft) to discontinue the use of HF communications and high power radars.

b. The following procedures apply when handling HERO Unsafe or HERO SUSCEPTIBLE ORDNANCE at MCB/MCAF, Quantico:

(1) Transport and store HERO UNSAFE ORDNANCE in sealed, all-metal containers.

(2) When transporting HERO SUSCEPTIBLE ORDNANCE, comply with ordnance handling requirements listed in chapter 5 of reference (a).

(3) Ensure that radios installed in ordnance handling vehicles maintain the minimum 10-foot antenna-to-ordnance separation distance required for HERO SAFE ORDNANCE. (See chapter 5, paragraph 5-4.4 of reference (a).)

(4) Emissions from various mobile and portable VHF/UHF transmitters should be silenced for the HERO Unsafe and HERO SUSCEPTIBLE ORDNANCE or safe separation distances be maintained, as provided in chapter 2 of reference (a) or appendix A of reference (b).

(5) When issuing any ordnance or component to a user, the EOD Officer will advise the user if the material becomes HERO Unsafe or HERO SUSCEPTIBLE during assembly, loading, or downloading.

c. The following procedures apply when handling HERO Unsafe or HERO SUSCEPTIBLE ORDNANCE in the magazine area.

(1) No HERO UNSAFE ORDNANCE shall be handled on-site except in an emergency.

(2) Affix HERO warning labels stating separation distances (as listed in chapter 2 of reference (a) or appendix A of reference (b)) for HERO UNSAFE or HERO SUSCEPTIBLE ORDNANCE to all mobile and portable transmitters. (Appendix F of reference (b) illustrates a recommended label.)

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(3) Ensure that radios installed in ordnance handling vehicles maintain the minimum 10-foot antenna-to-ordnance separation distance required for HERO SAFE ORDNANCE. (See chapter 5, paragraph 5-4.4 of reference (a).)

(4) No HERO UNSAFE ORDNANCE shall leave the confines of the magazine area except in a completely enclosed, all-metal container. The only exception would be in a case of extreme emergency.



R. T. BRIGHT
Chief of Staff

DISTRIBUTION: INTERNET

GENERAL HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO)
SAFE SEPARATION DISTANCE REQUIREMENTS

1. The following requirements apply to all ordnance operations at MCB/MCAF, Quantico involving the presence, handling, and loading of ordnance unless otherwise specified in NAVSEA OP 3565/NAVAIR 16-1-529/NAVELEX 0967-LP-624-6010.

a. Use HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03, for specific HERO guidance concerning HERO UNSAFE and HERO SUSCEPTIBLE ORDNANCE. HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03, provides recommendations for mitigating HERO. Enclosed is a listing of emitter systems (and safe separation distances), facility drawings (indicating emitter system and ordnance locations, as well as, HERO zones to facilitate the setting of HERO EMCON), current HERO status of ordnance stored in the magazine area, results of the 2001 HERO survey, and a complete HERO EMCON Bill for MCB/MCAF, Quantico.

b. Ordnance evolutions must be planned so that there is a minimum of exposure of ordnance to the radio-frequency (RF) environment.

c. Avoid touching any exposed firing contact, wiring, or other exposed circuitry with any part of the body or with any metallic object.

d. Ensure all open electrical connectors on the ordnance are covered with non-shorting caps.

e. Ordnance will not be assembled/disassembled in an RF environment.

f. Igniters, primers, detonators, and other items containing electrically initiated devices will not be stowed in the same magazine as electronic or electric fuses.

g. If the safe separation distance provided in appendix A of HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03, or chapter 2 of NAVSEA OP 3565/NAVAIR 16-1-529/NAVELEX 0967-LP-624-6010 must be violated for any ordnance operation, the transmitting antenna must be silenced.

ENCLOSURE (1)

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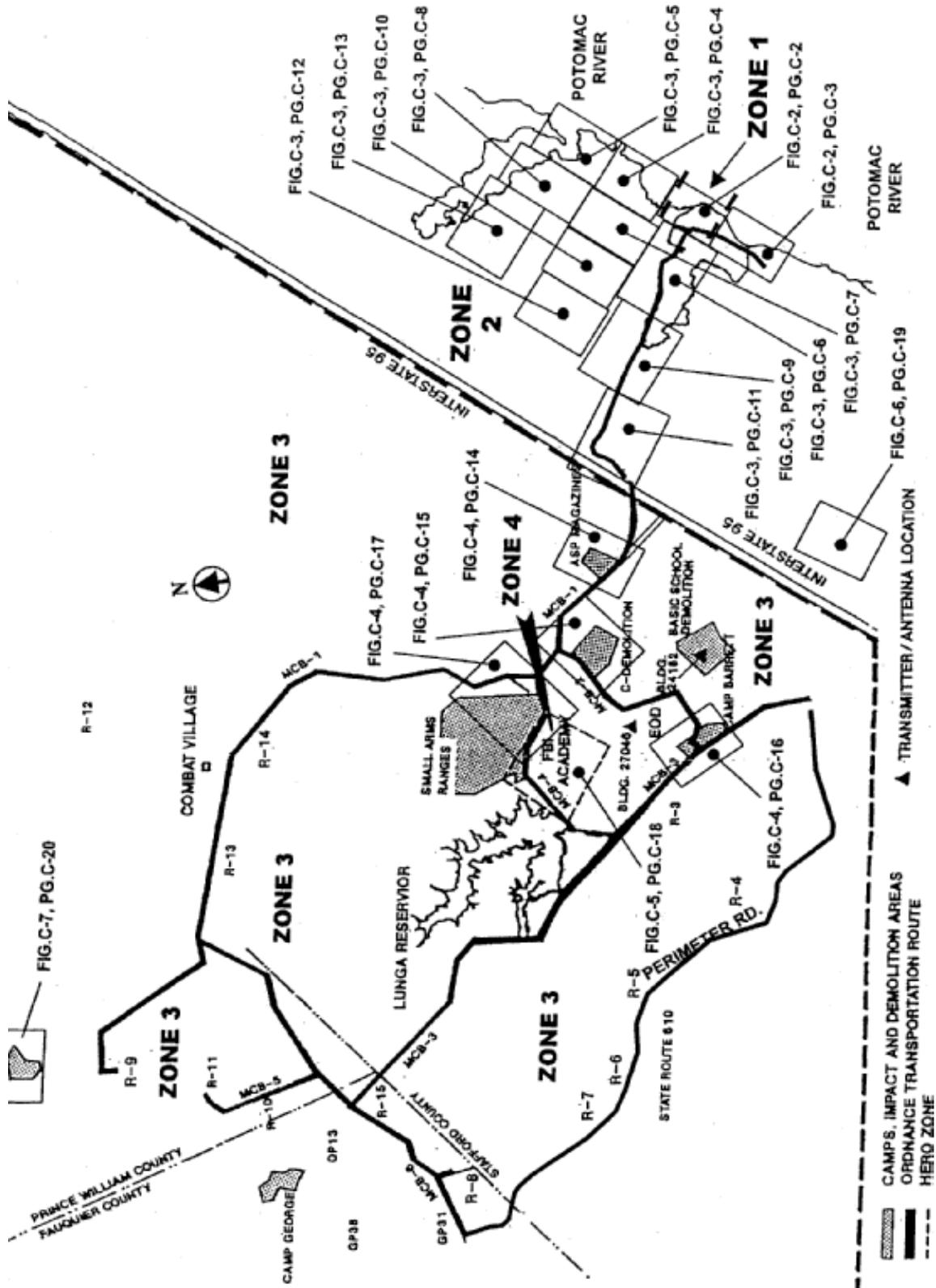
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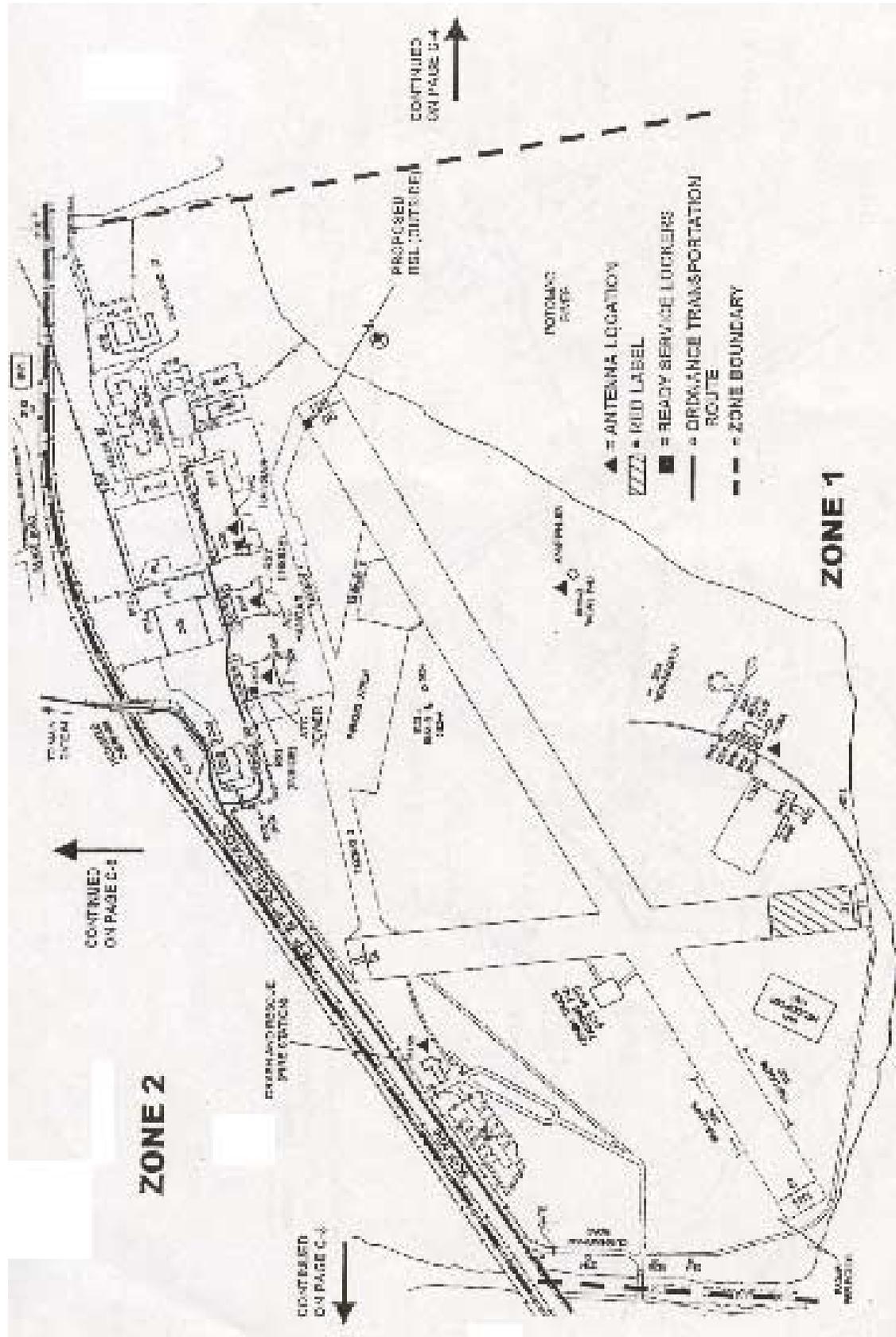
2. Transporting ordnance aboard MCB/MCAF, Quantico requires the same safety requirements and RF restrictions specified for that particular item during normal handling operations. When ordnance systems are disassembled or when they have exposed electrically initiated devices, firing circuits, or wiring during the transport operation, the HERO UNSAFE ORDNANCE restrictions of NAVSEA OP 3565/NAVAIR 16-1-529/NAVELEX 0967-LP-624-6010 apply.

3. Ensure that ordnance accident response units (Fire, Ordnance, and SctyBn) maintain a minimum separation distance of 150 feet from the accident site when 3 VHF/UHF mobile radios are in use, and 50 feet when 3 portable radios are in use. For single radio use, see the applicable separation distances listed in appendix A of the HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03.

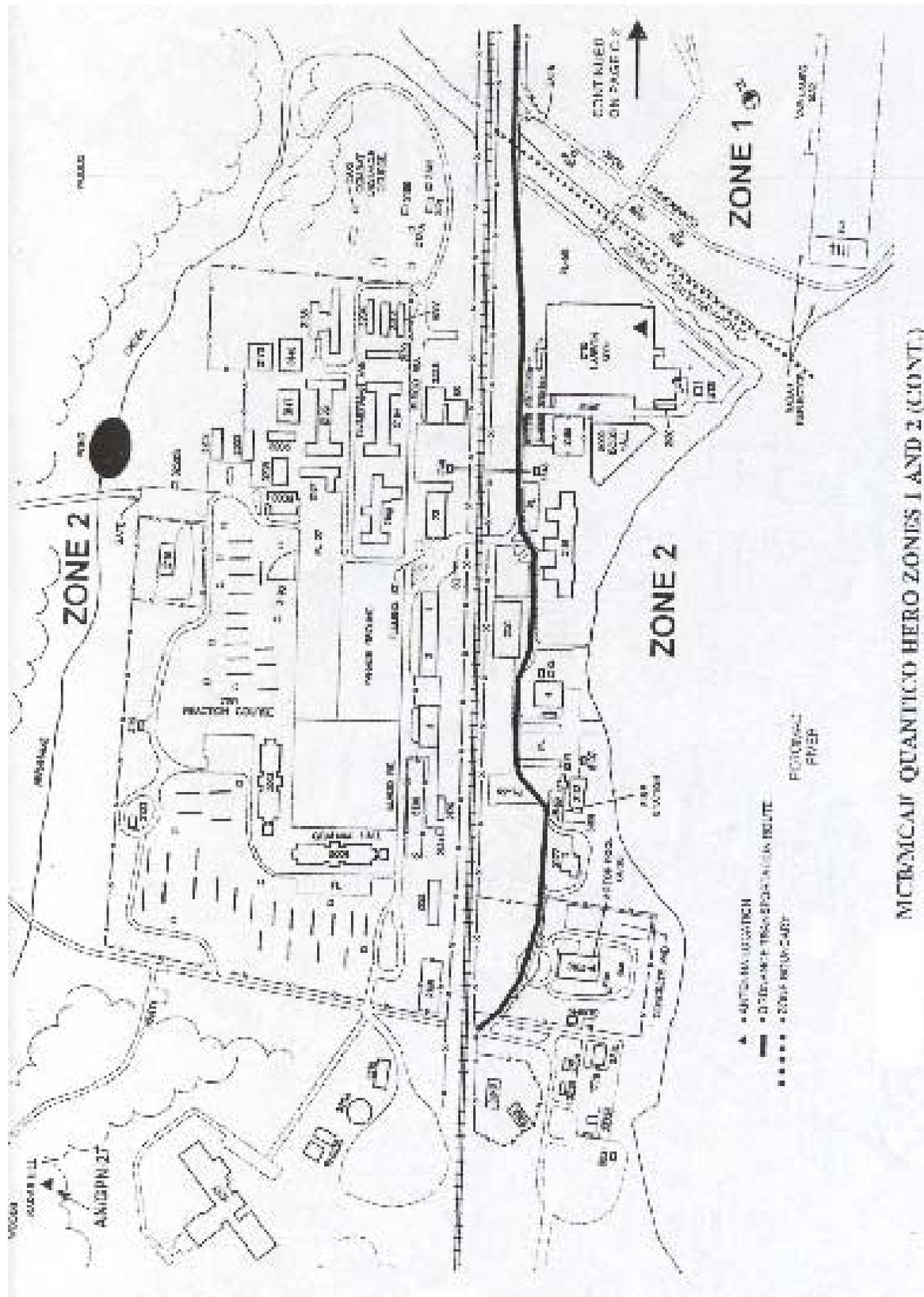
ENCLOSURE (1)

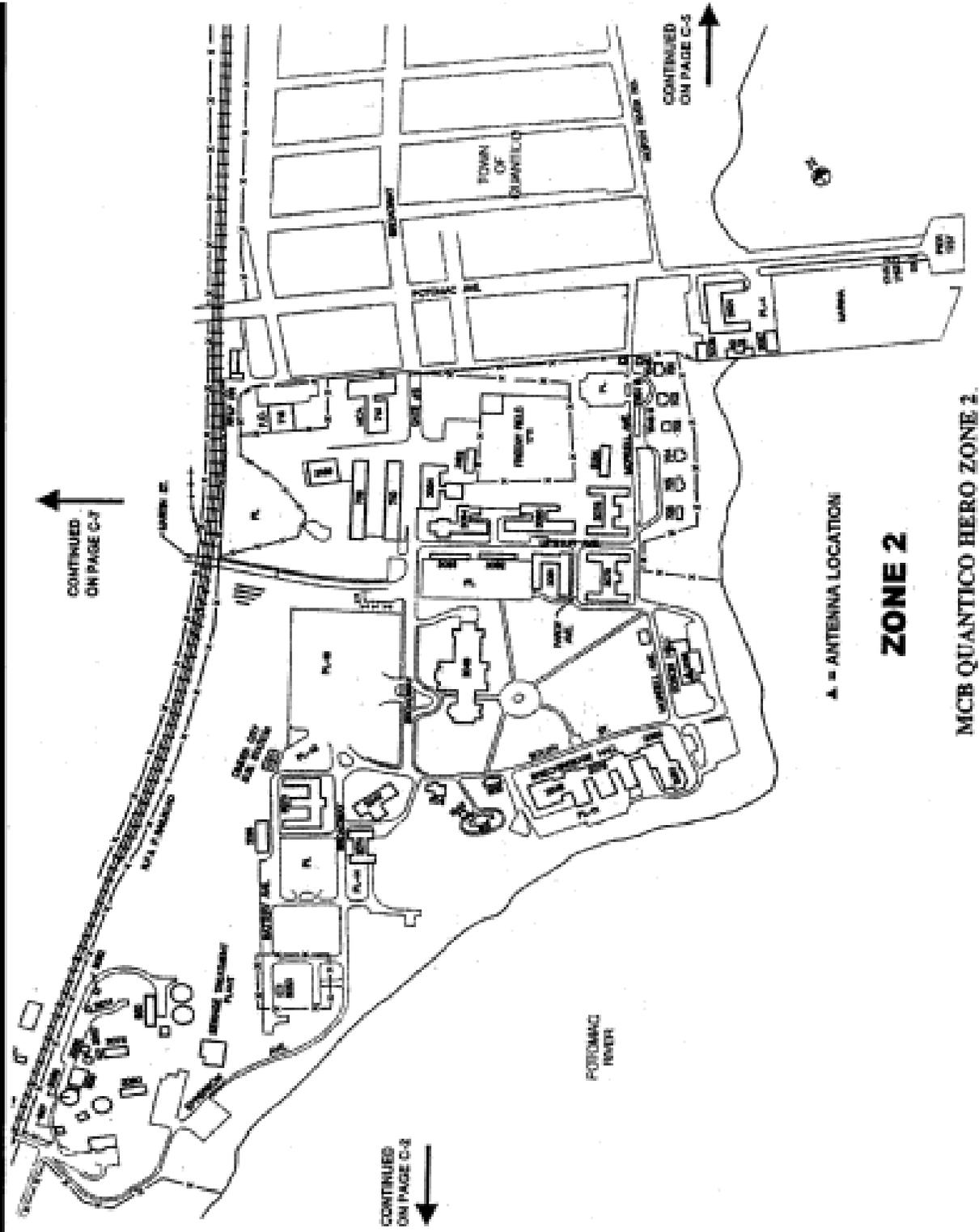
HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO) ZONES,
ORDNANCE TRANSPORTATION ROUTES, AND ORDNANCE
AND DATA COLLECTION LOCATIONS MAP



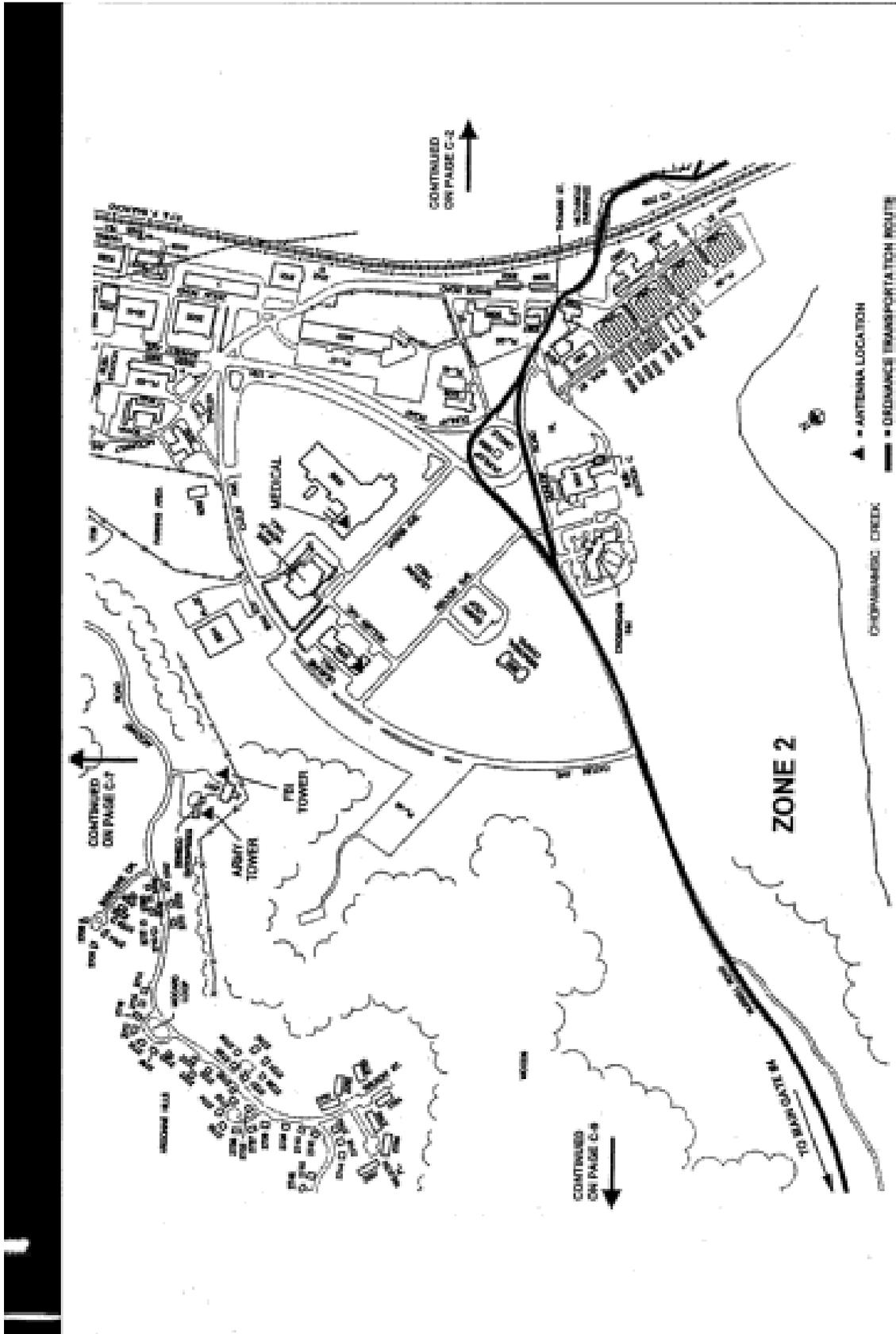


ENCLOSURE (2)

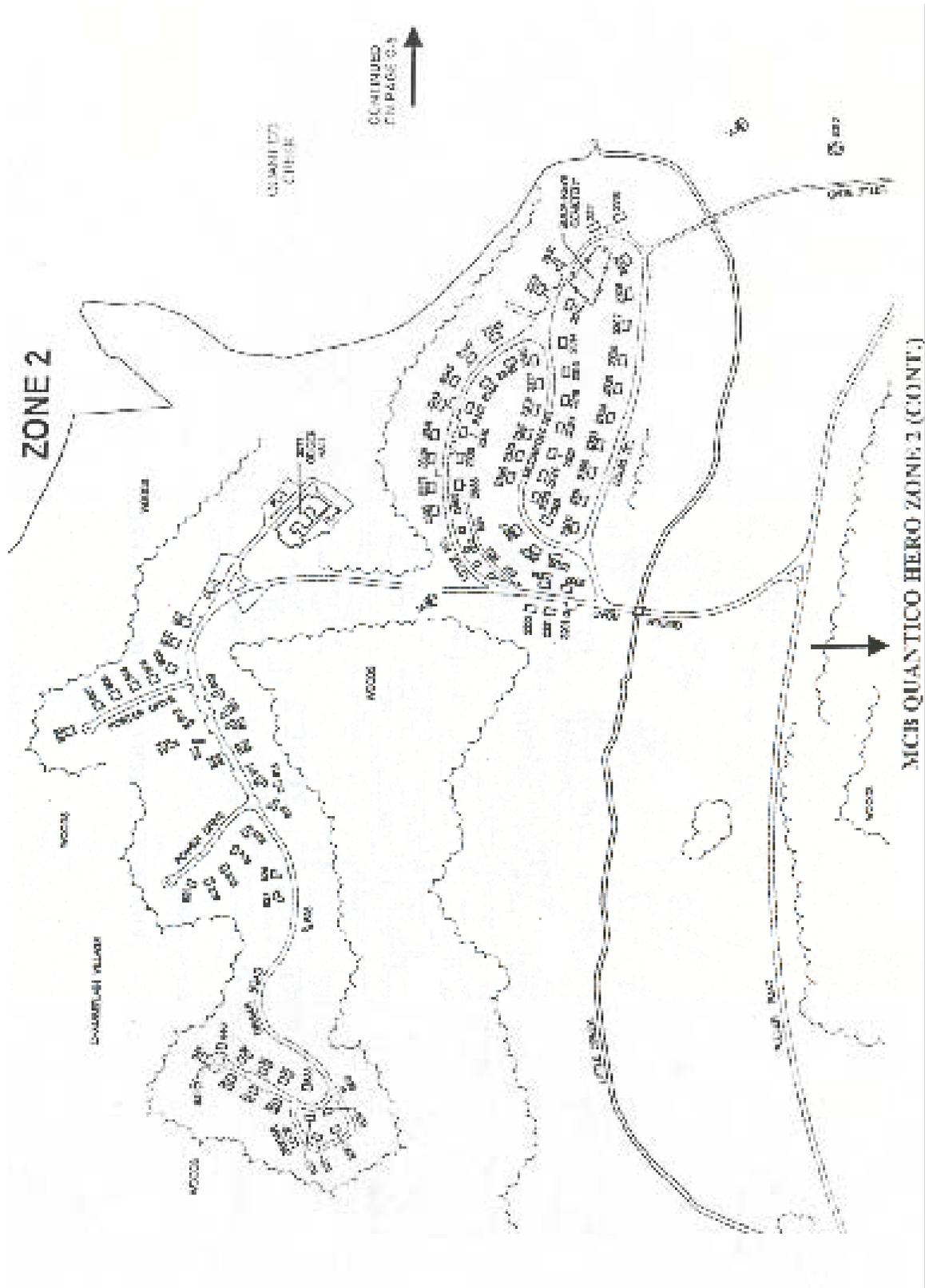




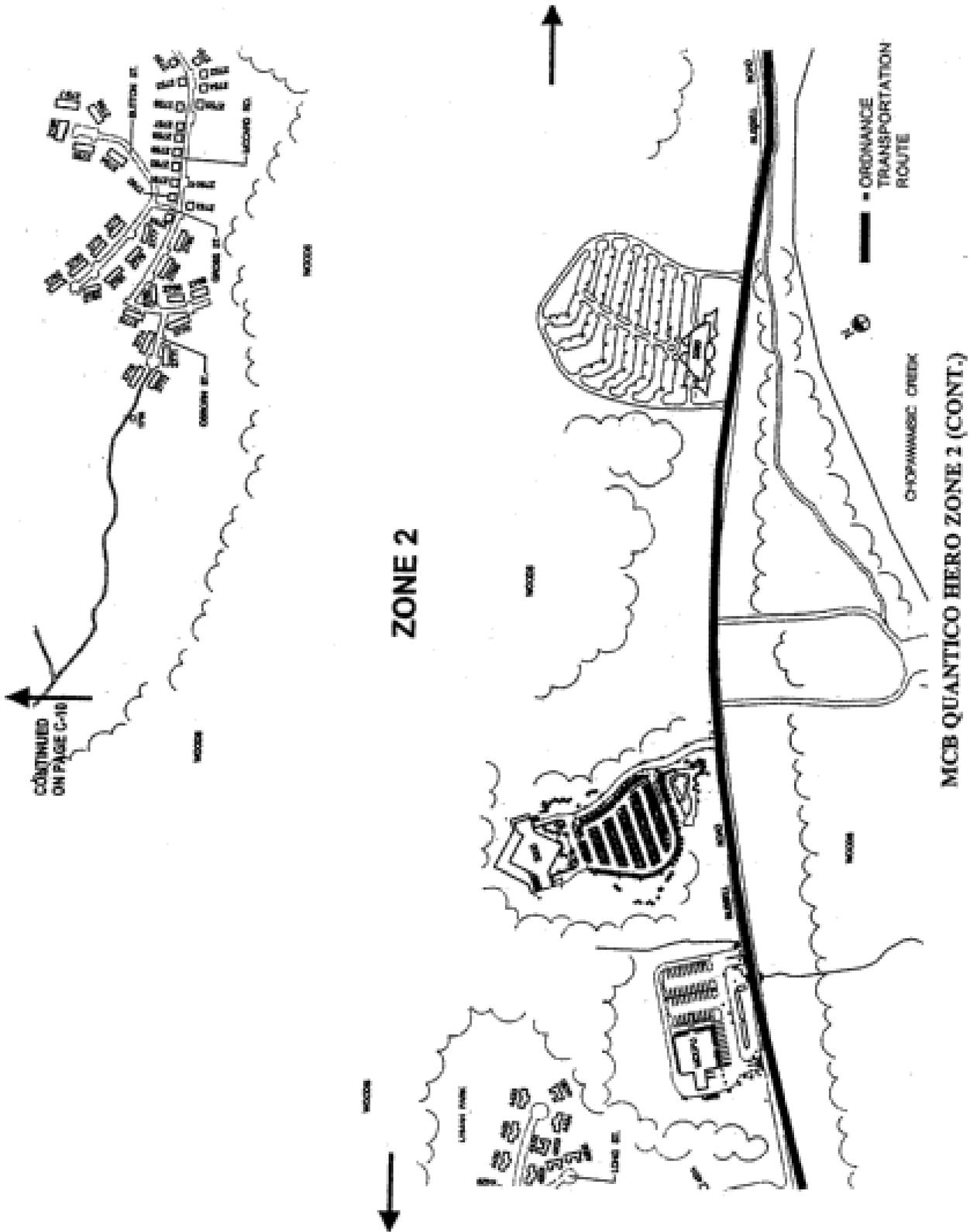
ENCLOSURE (2)

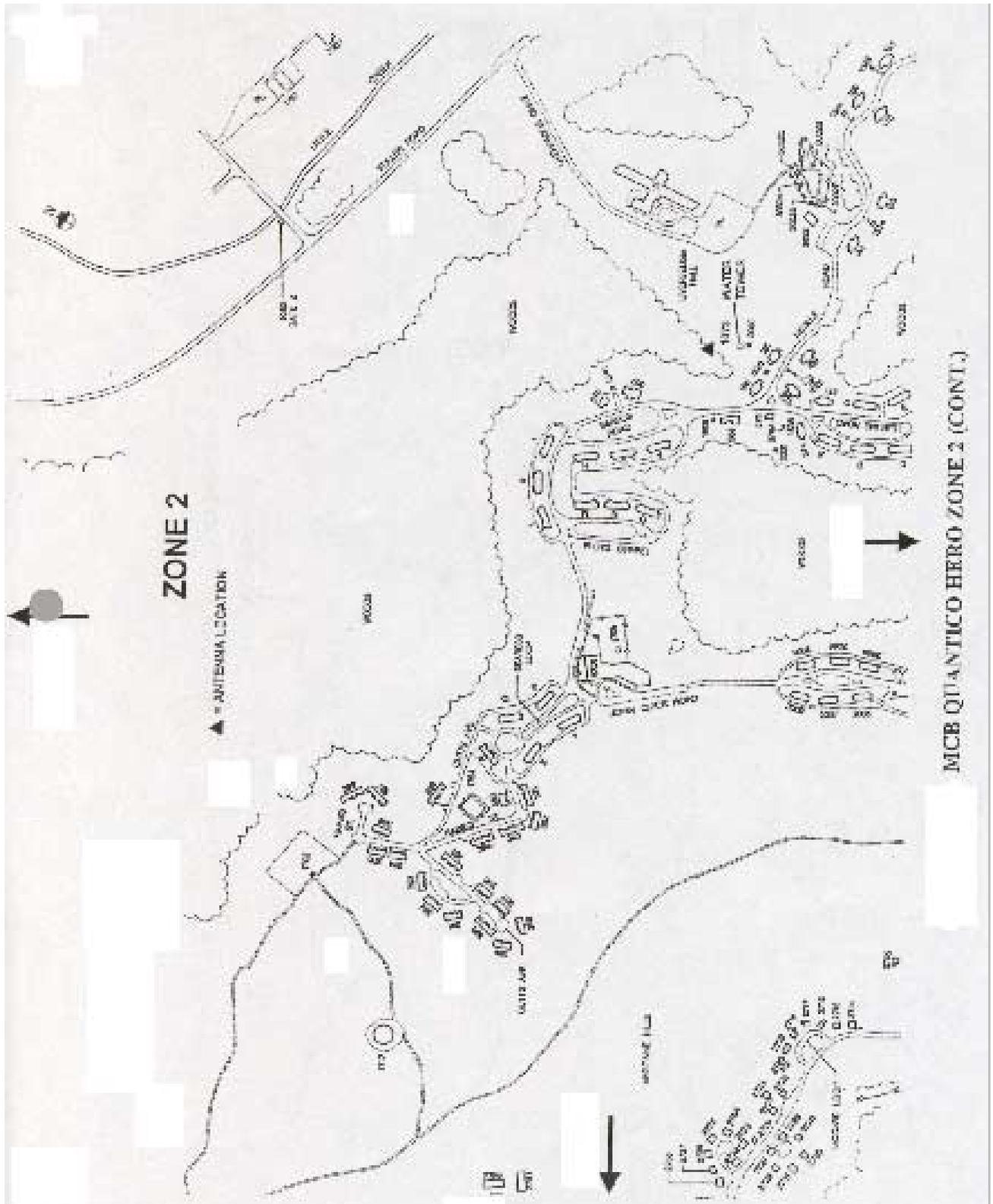


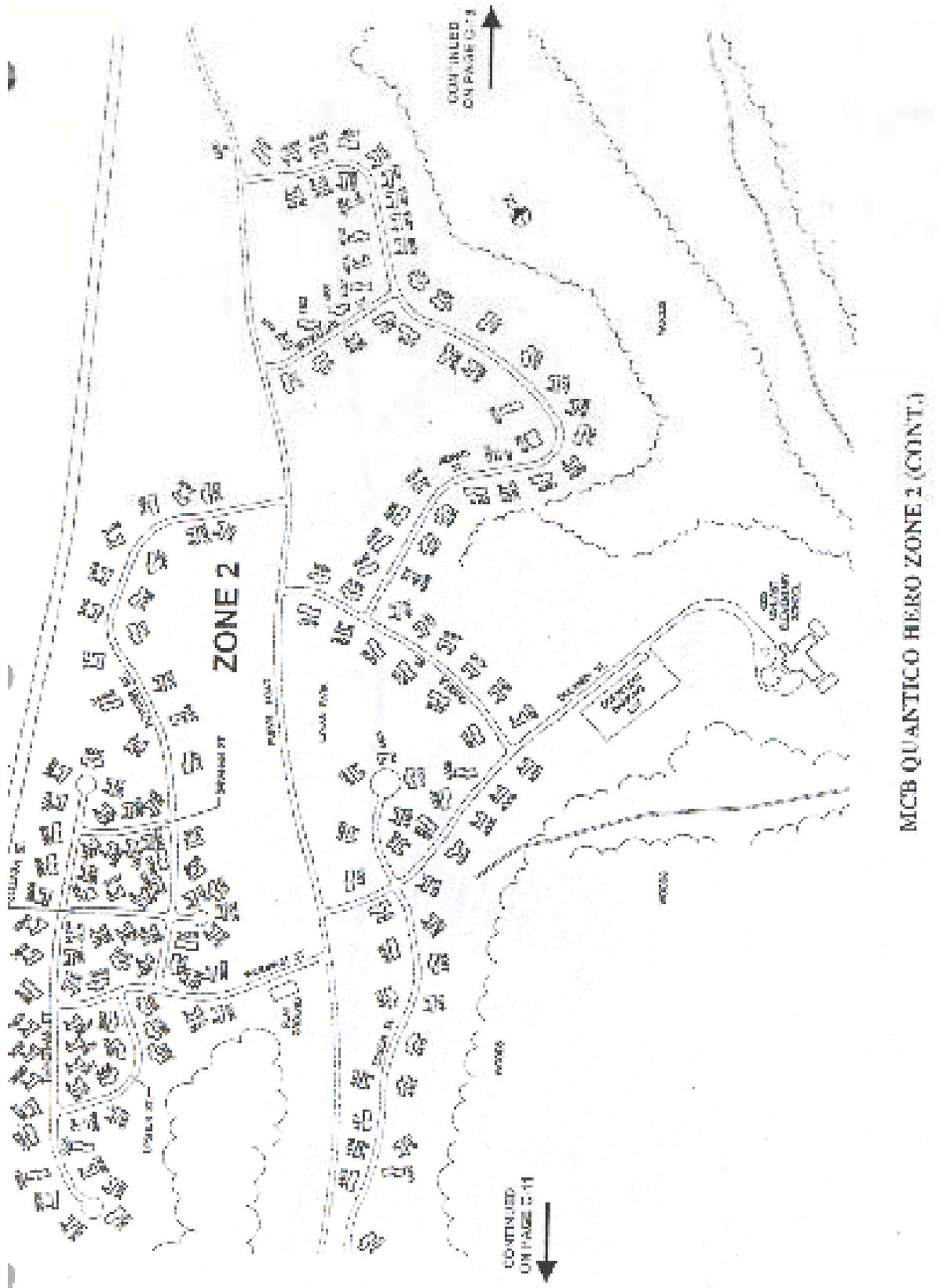
ENCLOSURE (2)



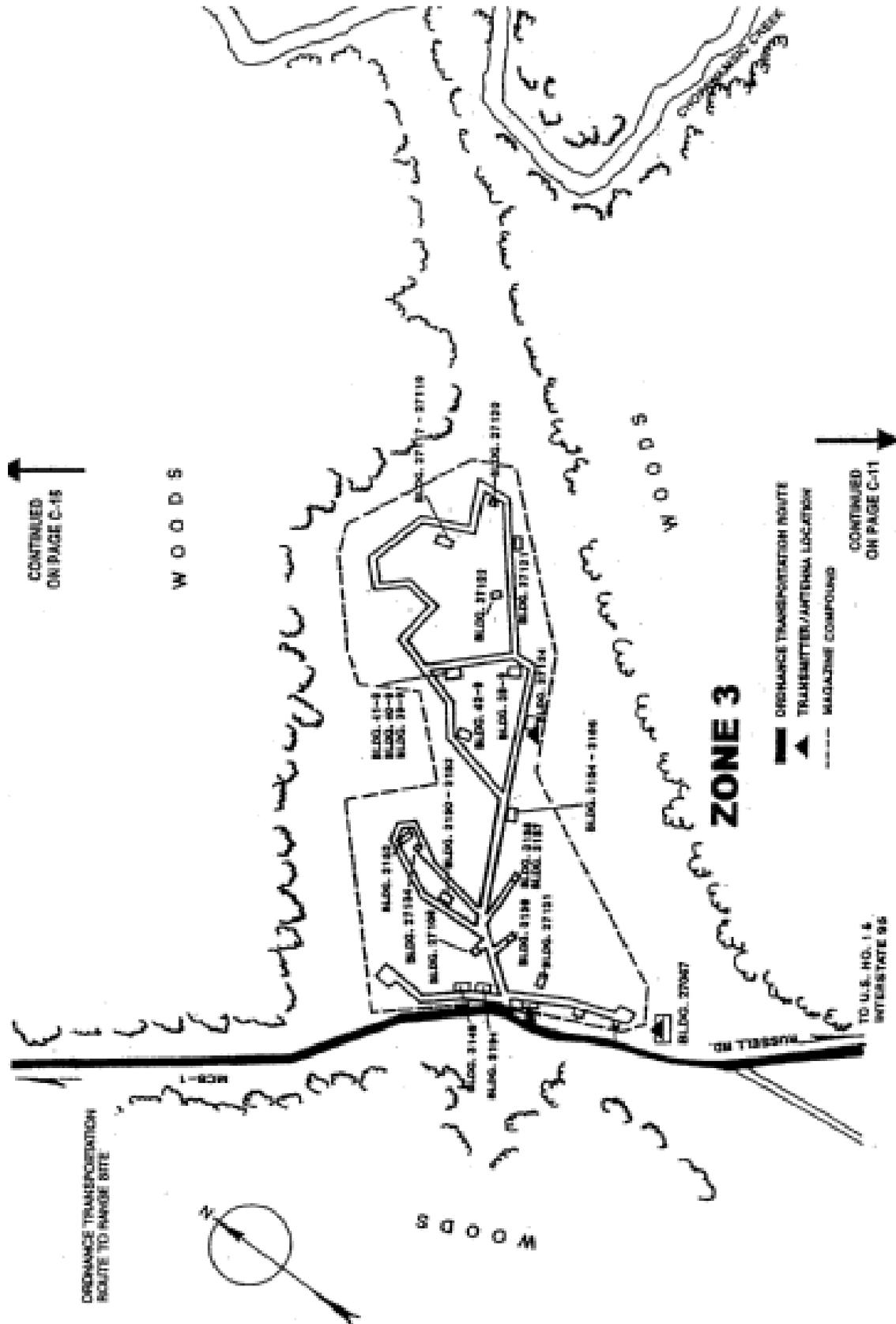
ENCLOSURE (2)



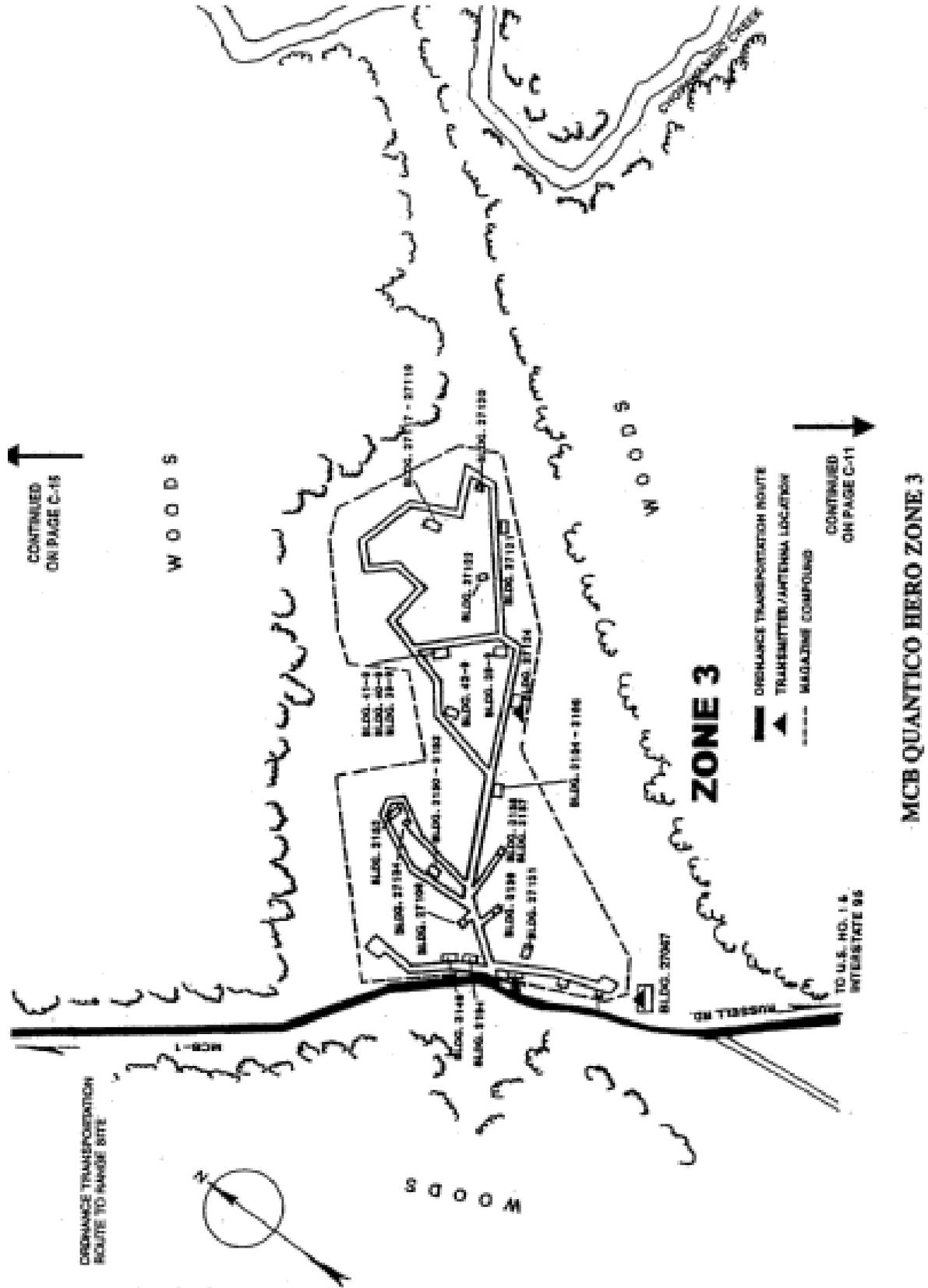




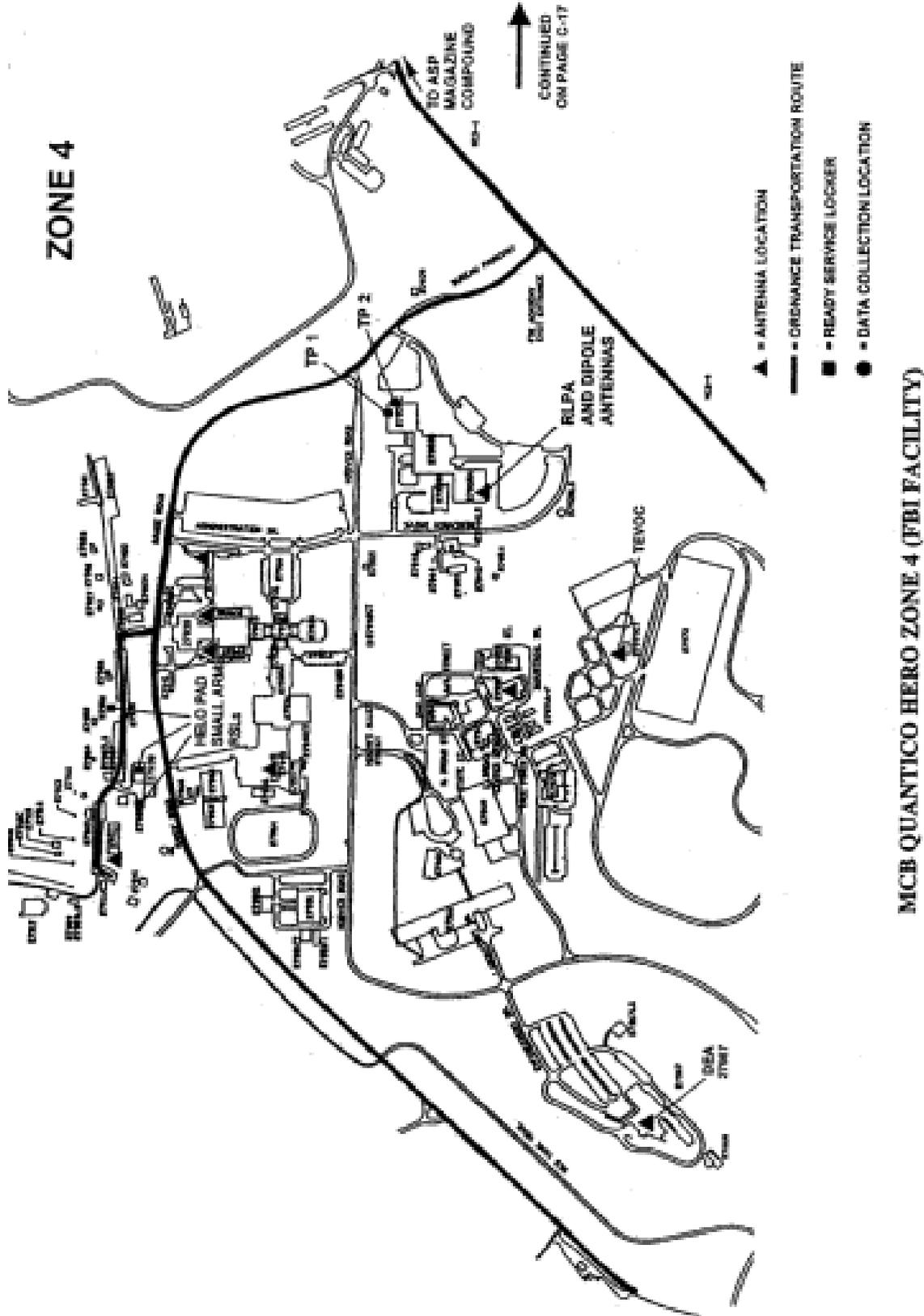
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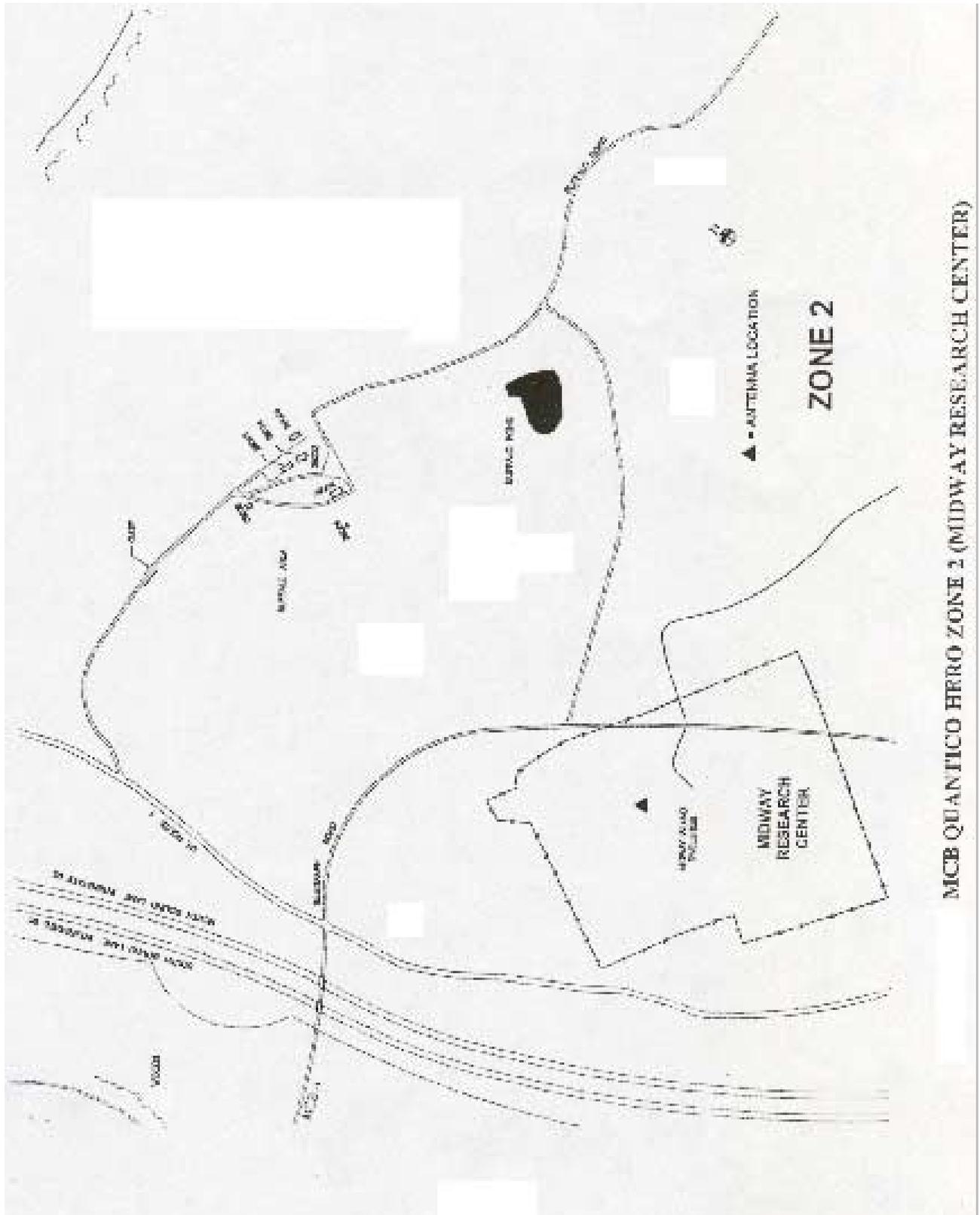


MCB QUANTICO HERO ZONE 3

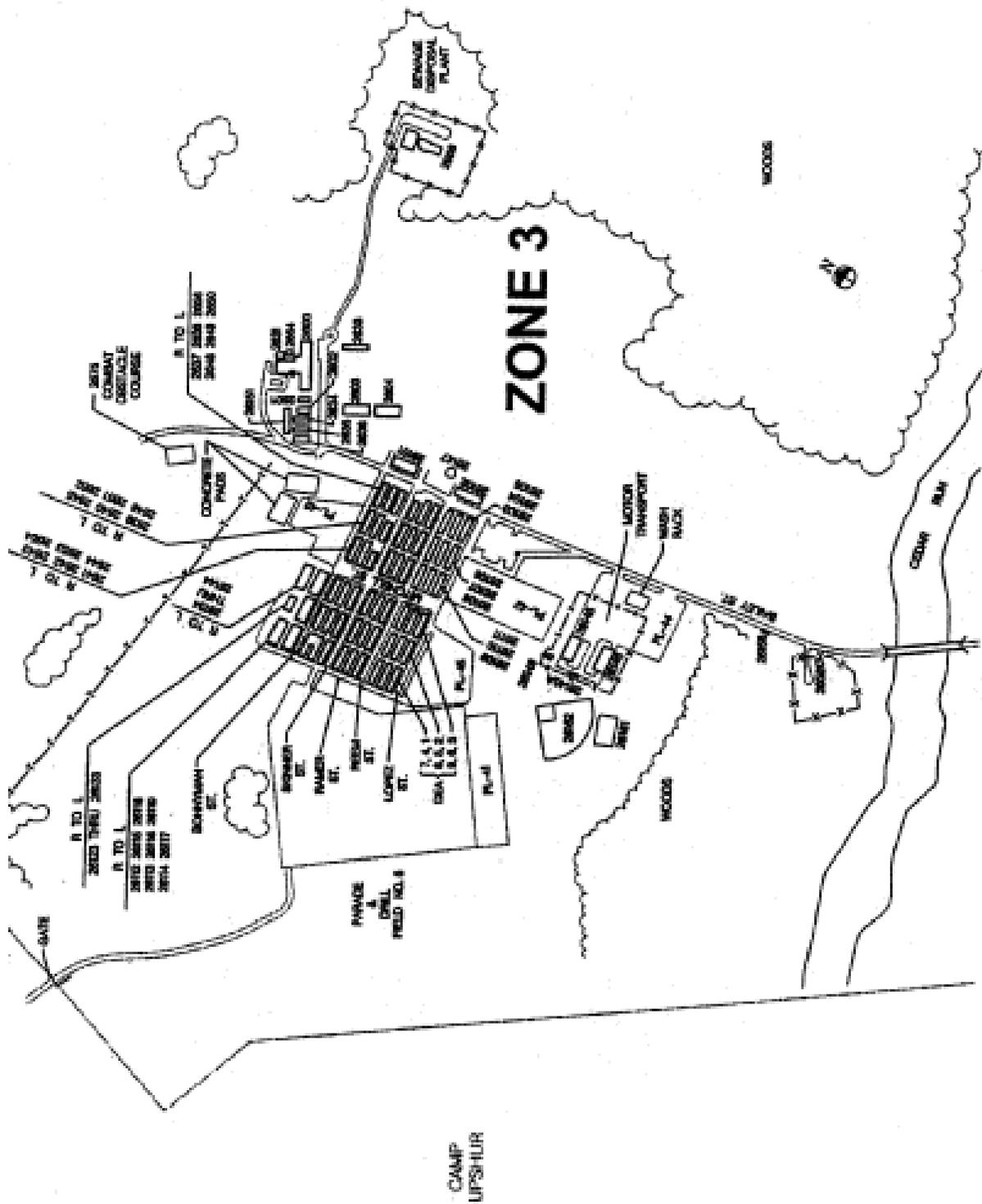


ENCLOSURE (2)





MCB QUANTICO HERO ZONE 2 (MIDWAY RESEARCH CENTER)



MCB QUANTICO HERO ZONE 3 (CAMP UPSHUR)

APPLICATIONS FOR SETTING HAZARDS OF ELECTROMAGNETIC RADIATION
TO ORDNANCE (HERO) CONDITIONS

<u>NALC</u> <u>GENERAL</u> <u>APPLICATIONS</u>	<u>ORDNANCE</u>	<u>ACTIVITY</u>	<u>SITUATION/</u> <u>LOCATION</u>	<u>HERO</u> <u>CONDITION</u>
All	HERO SAFE Ordnance	Presence, handling, and Loading	All	0
All	HERO UNSAFE Ordnance	Presence, handling, and loading	Zone 1 Zone 2 Zone 3 Zone 4	1 1 1 1
All	HERO SUSCEPTIBLE Ordnance	Presence, handling, and loading	Zone 1 Zone 2 Zone 3 Zone 4	2 2 2 2

HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE (HERO)
ELECTRONIC EMISSION CONDITION (EMCON) PROCEDURES

HERO CONDITION 0

- * HERO EMCO is not required; all transmitters (as listed in appendix A of HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03) may be operated. Observe the general HERO requirements for shore stations in chapter 5 of OPNAVINST 5100.23F.

HERO CONDITION 1

- * Maintain the HERO UNSAFE ORDNANCE separation distances for mobile and portable transmitters as listed in appendix A of HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03 or chapter 2 of OPNAVINST 5100.23F.
- * Silence all aircraft transmitters except VHF/UFH communications transmitters less than 20 watts or transmitters operating into dummy loads.
- * For an ordnance accident, emergency response units such as the Fire Department, Explosive Ordnance Disposal, and Security responding to the scene with radio equipment must maintain a minimum separation distance of 150 feet from the accident site if using 3 VHF (132-174 MHz) mobile radios; similarly, a minimum separation distance of 50 feet must be maintained when using 3 VHF portable radios. Silence all other radios at the scene; for single radio use, apply the separation distances cited in appendix A of HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03 or chapter 2 of OPNAVINST 5100.23F for that specific mobile or portable units.

HERO CONDITION 2

- * Maintain the HERO SUSCEPTIBLE ORDNANCE separation distances for mobile and portable transmitters as listed in appendix A of HERO Assessment of MCB/MCAF, Quantico, of 1 Aug 03 or chapter 2 of OPNAVINST 5100.23F.
- * Silence all aircraft transmitters except VHF/UFH communications transmitters less than 40 watts or transmitters operating into dummy loads.

SAFE SEPARATION DISTANCES FOR AIRCRAFT HF, VHF, UHF, AND RADAR TRANSMITTERS, PORTABLE AND MOBILE TRANSMITTERS

Building	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances	
							HERO UNSAFE ORDNANCE (feet/meters)	HERO SUSCEPTIBLE ORDNANCE (feet/meter)
17 BOQ	TAD 1002B	Folded coaxial	2.1	136 - 174	40	MOT L43U	71 / 22	15 / 5
17 BOQ	DB-404	Dual dipole	5.9	403 - 420	40	GE MLSU1440	37 / 11	12 / 4
69 Fire Station	MSF 5000	35-foot whip	2.1	149 - 150	110	MOT D43CU	108 / 33	24 / 7
305 Fire Admin	15-foot whip	Whip	2.1	136 - 174	40	MOT D43CU	71 / 22	15 / 5
2004 Public Works	RBA-5304	Dipole	7.0	36 - 37	60	MOT MITREK	578 / 176	73 / 23
2043 PMO/GEMU	MSF 5000	35-foot whip	2.1	149 - 150	110	MOT D43CU	108 / 33	24 / 7
2043 PMO/GEMU	DB-222E	Colinear-Offset	8.1	136 - 174	40	MOT L43U	142 / 43	30 / 9
2043 PMO/GEMU	15-foot whip	Ground plane	2.1	136 - 174	30	MOT D43EX	62 / 19	13 / 4
2043 PMO/GEMU	TDD-6072A	Colinear	6.9	136 - 174	25	MOT L43TS	98 / 30	21 / 6
2043 PMO/GEMU	TDD-6072A	Colinear	6.9	132 - 150	138	GE DM76RASS35	228 / 69	48 / 15
2045 Fire Station	MSF 5000	35-foot whip	2.1	149 - 150	110	MOT D43CU	108 / 33	24 / 7
2085 Edison Hall	JRC-11.209	Whip	2.1	136 - 162	25	JHS-32A	49 / 15	11 / 3
2103 Hangar	Quarter-wave	Ground plane	2.1	162 - 174	5	MOTT 1383	21 / 6	10 / 3
2104 Hangar	N/A	Blade	3.0	30 - 32	15	ANARC-186	492 / 150	26 / 8
			3.0	32 - 88	15		203 / 63	25 / 8
			3.0	116 - 152	10		46 / 14	10 / 3
2105 A/C Tower	TACO 2295-I	TACO	0.0	225 - 400	10	CM-200UT	17 / 5	10 / 3
2105 A/C Tower	TACO 2295-J	TACO	0.0	225 - 400	10	CM-200UT	17 / 5	10 / 3
2105 A/C Tower	TACO 4072	TACO	0.0	225 - 400	10	CM-200UT	17 / 5	10 / 3
2105 A/C Tower	TACO 4073	TACO	0.0	225 - 400	10	CM-200UT	17 / 5	10 / 3
2105 A/C Tower	TACO 4074	TACO	0.0	225 - 400	10	CM-200UT	17 / 5	10 / 3
2105 A/C Tower	AS-1729/VRC	Dipole	2.1	30 - 76	65	AN/VRC-46 (High)	924 / 282	48 / 15
			2.1	30 - 76	10	(Low)	362 / 111	19 / 6
2112 Larson Gym	AS-2809/SRC	Dipole	2.1	116 - 152	50	AN/GRT-21 (VHF)	93 / 28	19 / 6
			2.1	225 - 400	50	(UHF)	48 / 15	13 / 4
2112 Larson Gym	AS-1018/SRC	Colinear dipole	5.0	225 - 400	10	AN/GRT-22	30 / 9	10 / 3
2112 Larson Gym	N/A	Stacked dipole	5.0	225 - 400	10	AN/GRT-22	30 / 9	10 / 3
2112 Larson Gym	Dipole	Dipole	2.1	225 - 400	10	AN/GRT-22	21 / 7	10 / 3
2112 Larson Gym	Dipole	Dipole	2.1	162 - 174	5	MOT FX300S	21 / 6	10 / 3
2117 FBI Antenna	Center-fed	Inverted-V	2.1	2 - 3	1000	MIL-SPEC 1030C	3624 / 1105	362 / 111
2117 FBI Antenna	Dipole	Dipole	2.1	6 - 7	1000	DRK TR7A	3624 / 1105	362 / 111
2117 FBI Antenna	Vertical	Sleeve	2.1	7 - 12	1000	WLinear DRK L7	3624 / 1105	362 / 111
3250 Lejeune Hall	TAD-6082A	Cardioid	8.4	136 - 174	30	MOT D43CU	127 / 39	27 / 8
3259 Medical	N/A	Colinear	5.1	136 - 174	110	MOT MSR 2000	166 / 51	34 / 11
3259 Medical	Mobile	Quarter-wave	3.1	136 - 174	35	MOT SPECTRA	75 / 23	16 / 5
5103 Aero Club	AS-3972/A	Colinear array	2.1	30 - 400	5	ANARC-210(V)	256 / 78	13 / 4
5122-C Radar Pad	FA-9344	Parabolic	33.5	2755 - 2825	44	AN/FPN-63	211 / 64	149 / 45
5156 Fire Station	DB-222E	Colinear-offset	8.1	136 - 174	40	MOT L43xx	142 / 43	30 / 9
24006 Armory	N/A	Colinear	2.1	410 - 430	40	TK880	24 / 7	10 / 3
24009 CI	AS-350/SRC	Coaxial stub	2.1	29 - 89	30	CM200 UHF	628 / 191	13 / 10

N/A=Not assigned.

Building	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances	
							HERO UNSAFE ORDNANCE (feet/meters)	HERO SUSCEPTIBLE ORDNANCE (feet/meters)
24009 CI	15 Foot Whip	Ground plane	2.1	136 - 174	30	MOT D49CU	62 / 19	13 / 4
24162 Heading Plant	TDD-6072A	Collinear	6.9	136 - 174	110	MOT L73UJ	205 / 62	44 / 13
24164 Heywood Hall	15-foot whip	Ground plane	2.1	136 - 174	30	MOT D49CU	62 / 19	13 / 4
27001 Guard	N/A	N/A	3.1	136 - 174	110	GE Ranger	132 / 40	28 / 9
27046 BOD	N/A	Folded coaxial	2.1	29 - 38	110	GE NSA102	1202 / 366	64 / 19
			2.1	32 - 50	180		478 / 146	37 / 17
2046/4748 Fire Alarm	N/A	Dipole	3.5	460 - 470	4	RC-2W	10 / 3	10 / 3
27067 ASP	N/A	Dipole	2.1	136 - 174	30	MOT DESKTRAC	62 / 19	13 / 4
27067 ASP	TRAA503P	Phantom	3.5	460 - 470	4	RC-2W	10 / 3	10 / 3
27067 ASP	N/A	Dipole	3.5	460 - 470	4	RC-2W	10 / 3	10 / 3
7124Ramp Fire Alarm	N/A	Dipole	3.5	460 - 470	4	RC-2W	10 / 3	10 / 3
27211 Range	DB-201	Ground plane	2.1	138 - 141	6	GE MLSL160	27 / 8	10 / 3
27400 Fire Station	DB-222E	Collinear-offset	8.1	136 - 174	40	MOT L40xx	142 / 43	30 / 9
Radar Hill	FA-6344	Parabolic	33.5	2750 - 2825	875	ANGPN-27	940 / 287	646 / 200
27911 FBI(17)	Collinear	Collinear	12.1	901 - 945	500	MOT C73RX	185 / 56	89 / 27
27937 FBI(7)	Collinear	Collinear	12.1	901 - 945	500	MOT C73RX	185 / 56	89 / 27
27937 FBI(7)	Collinear	Collinear	12.1	167 - 171	500	MOT C73RX	647 / 197	150 / 4
27938 FBI(8)	Collinear	Collinear	12.1	901 - 945	500	MOT C73RX	185 / 56	89 / 27
27938 FBI(8)	Collinear	Collinear	12.1	413 - 417	500	MOT C73RX	262 / 80	87 / 27
27940 FBI(10)	Collinear	Collinear	12.1	901 - 945	500	MOT C73RX	185 / 56	89 / 27
27947 FBI(16)	Collinear	Collinear	12.1	901 - 945	500	MOT B844IZ	185 / 56	89 / 27
27947 FBI(16)	Collinear	Collinear	12.1	901 - 945	500	MOT B93RX	185 / 56	89 / 27
27947 FBI(16)	Vertical dipole	Dipole	9.0	931 - 932	43	SKYTEL QT-3997	38 / 11	18 / 6
27950 FBI(15)	Collinear	Collinear	12.1	901 - 945	500	MOT B93RX	185 / 56	89 / 27
27958 FBI(19)	Dipole	Dipole	2.1	3 - 30	1000	HAR RF-350 w/amp	3624 / 1103	362 / 111
27958 FBI(19)	SATCOM	Parabolic	9.0	225 - 400	18	LST-3C/AM-7175/URC	64 / 19	17 / 5
			9.0	225 - 400	3	LOS (High)	34 / 10	10 / 3
			9.0	225 - 400	2	LOS (Low)	21 / 6	10 / 3
27958 FBI(19)	Horizontal dipole	Dipole	4.1	3 - 30	1000	HAR RF-350 w/amp	4363 / 1391	436 / 139
27958 FBI(19)	Inverted L	Longwire	3.1	3 - 30	1000	HAR RF-350 w/amp	4067 / 1240	407 / 124
27958 FBI(19)	BLPA	N/A	7.0	3 - 30	1000	HAR RF-350 w/amp	6272 / 1943	627 / 194
27967 DEA	N/A	Slotted waveguide	31.0	824 - 849	-3	Cellular Telephone	138 / 42	64 / 20
27973 TEVOC	Collinear	Collinear	12.1	413 - 417	500	MOT C73RX	262 / 80	87 / 27
Portable								
N/A	STUB	Stub	0.9	403 - 512	5	MOT H445X	10 / 3	10 / 3
N/A	STUB	Stub	0.9	136 - 174	5	MOT H43YX (SABER)	22 / 7	10 / 3
N/A	SATCOM	Parabolic	9.0	225 - 400	18	LST-3C	64 / 19	17 / 5
			9.0	225 - 400	3	LOS (High)	34 / 10	10 / 3
			9.0	225 - 400	2	LOS (Low)	21 / 6	10 / 3

N/A=Not assigned.

Building	Antenna Nomenclature	Antenna Type	Antenna Gain (dB)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances	
							HERO UNSAFE ORDNANCE (feet/meters)	HERO SUSCEPTIBLE ORDNANCE (feet/meters)
Portable (Cont.)								
N/A	SATCOM	Parabolic	9.0	30 - 318	20	AN/PRC-117F	1134 / 346	59 / 18
N/A	MAG MX-2400	Parabolic	21.6	1635 - 1645	34.7	INMARSAT (A)	80 / 24	49 / 15
N/A	STUB	Stub	0.9	400 - 512	5	MOT H445X	10 / 3	10 / 3
Mobile								
3185 CCSS	AT-1011/U	32-foot whip	2.1	2 - 30	400	AN/MRC-193 (High)	2292 / 699	229 / 70
			2.1	2 - 30	100	(Low)	1146 / 349	115 / 35
3185 CCSS	AT-271A/PRC	10-foot whip	2.1	2 - 30	20	AN/PRC-104 (SSB)	513 / 156	51 / 16
3185 CCSS	AS-225WGR	NVIS	0.0	2 - 20	20	AN/PRC-104 (SSB)	402 / 123	40 / 12
3185 CCSS	AS-1729VRC	Dipole	2.1	30 - 80	50	AN/MRC-145 (High)	810 / 247	42 / 13
			2.1	30 - 80	10	(Low)	362 / 111	19 / 6
3185 CCSS	OE-254	Monopole	2.1	3 - 88	4	AN/PRC-119 (High)	229 / 70	23 / 7
			2.1	3 - 88	1.6	(Med.)	145 / 44	14 / 4
			2.1	3 - 88	0.5	(Low)	81 / 25	10 / 3
3185 CCSS	AS-3684MRC	Dipole	2.1	30 - 80	50	AN/MRC-145 (High)	810 / 247	42 / 13
			2.1	30 - 80	10	(Low)	362 / 111	19 / 6
3185 CCSS	AS-2567PSC	Open grid reflector	12.5	225 - 400	25	AN/PSC-3 (SATCOM)	133 / 41	35 / 11
			12.5	225 - 400	2	(LC8)	32 / 10	10 / 3
3185 CCSS	AS-4255	Parabolic grid	20.0	1350 - 1850	3	AN/MRC-142	24 / 7	13 / 4
3185 CCSS	ME-138	Whip	2.1	2 - 30	400	AN/MRC-138 (High)	2292 / 699	229 / 70
			2.1	2 - 30	100	(Low)	1146 / 349	115 / 35
3185 CCSS	ME-142	Whip	2.1	1350 - 1850	3	AN/MRC-142	10 / 3	10 / 3
3185 CCSS	ME-143	Whip	2.1	30 - 80	50	AN/MRC-145 (High)	810 / 247	42 / 13
			2.1	30 - 80	10	(Low)	362 / 111	19 / 6
B-3 Aircraft								
Communications	AT-741A	Blade	2.6	30 - 88	15.0	AN/ARC-182(V)	470 / 143	24 / 7
			2.6	118 - 156	10.0	AN/ARC-182(V)	43 / 13	10 / 3
			2.6	156 - 174	15.0		40 / 12	10 / 3
			2.6	225 - 400	15.0		28 / 8	10 / 3
	AS-3060/O w/AS-505	Dipole	6.0	30 - 88	15	AN/ARC-186(V)	695 / 212	36 / 11
			6.0	116 - 152	10		65 / 20	13 / 4
	AT-741A	Blade	2.6	225 - 400	40	AN/ARC-159(V)	46 / 14	12 / 4
			2.6	225 - 400	20	AN/ARC-51A	32 / 10	10 / 3
			2.6	1025 - 1150	2.5	AN/ARN-118(V)	10 / 3	10 / 3
TACAN	AT-741B/A	Blade	2.6	1090	1.69	AN/APX-72	10 / 3	10 / 3
IFF	AT-741B/A	Blade	2.6	1090	1.69	AN/APX-72	10 / 3	10 / 3
Altimeter	AS-1658/APN	Horn	13.0	4290 - 4310	3	AN/APN-171(V)	10 / 3	10 / 3
CH-46/4E								
Communications	NA	Longwire	2.1	2 - 30	400	AN/ARC-94 or	2292 / 699	229 / 70
			2.1	2 - 30	400	Collins 618T-2	2292 / 699	229 / 70
			2.1	2 - 30	400	AN/ARC-198	2292 / 699	229 / 70

N/A=Not assigned.

Building	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances	
							HERO UNSAFE ORDNANCE (feet/meters)	HERO SUSCEPTIBLE ORDNANCE (feet/meters)
CH-46D/E (Cont.)								
IFF	AS-3191/A	Blade	-18.0	30 - 88	15	AN/ARC-182(V)	44 / 13	10 / 3
			-2.0	118 - 156	10	or AN/ARC-210(V)	26 / 8	10 / 3
			-2.0	156 - 174	15		24 / 7	10 / 3
			0.0	225 - 400	10		17 / 5	10 / 3
	AT-741B/A	Blade	2.6	1090	2.5	AN/APX-72	10 / 3	10 / 3
Beacon	N/A	Stub	4.0	8500 - 9600	0.72	AN/APN-154(V)	10 / 3	10 / 3
Altimeter	AS-1858/APN	Horn	13.0	4300	0.5	AN/APN-171(V)	10 / 3	10 / 3
			28.0	4300	5	AN/APN-182(V)	24 / 7	17 / 5
TACAN	AT-741B/A	Blade	2.6	1025 - 1150	4.32	AN/ARN-118(V)	10 / 3	10 / 3
NAV Radar	Various	Horn	28.0	13250 - 13400	0.85	AN/APN-217(V)	10 / 3	10 / 3
CH-53D/E								
Communications	N/A	Longwire	2.1	2 - 30	400	AN/ARC-94 or	2292 / 699	229 / 70
			2.1	2 - 30	100	AN/ARC-174A(V)2	1146 / 349	115 / 35
IFF	AS-3191/ARC	Dipole	2.1	30 - 88	15	AN/ARC-182(V)	444 / 135	23 / 7
			2.1	118 - 156	10		41 / 12	10 / 3
			2.1	156 - 174	15		38 / 12	10 / 3
			2.1	225 - 400	15			
	AT-741B/A	Blade	2.1	1090	2.5	AN/APX-72	10 / 3	10 / 3
Beacon	N/A	Omni	3.0	8500 - 9600	0.72	AN/APN-154(V)	10 / 3	10 / 3
Altimeter	AS-1858/APN	Horn	13.0	4290 - 4310	0.5	AN/APN-171(V)	10 / 3	10 / 3
			2.1	4290 - 4310	5	AN/APN-182(V)	10 / 3	10 / 3
TACAN	M25708/1-01	N/A	4.0	1025 - 1150	3.15	AN/ARN-84(V)	10 / 3	10 / 3
UH-60 Series								
Communications	N/A	Longwire	2.1	2 - 30	100	AN/ARC-174A(V)2	1146 / 349	115 / 35
			2.1	2 - 30	400		2292 / 699	229 / 70
IFF	AS-3881/ASQ	Blade	2.1	30 - 88	15	AN/ARC-182(V)	444 / 135	23 / 7
			2.1	118 - 156	10		41 / 12	10 / 3
			2.1	156 - 174	15		38 / 12	10 / 3
			2.1	225 - 400	15		26 / 8	10 / 3
	AT-1256/ARC	Stub	3.0	225 - 400	30	AN/ARC-159(V)	41 / 13	11 / 3
Altimeter	AS-3392/ASQ	Blade	3.0	225 - 400	10		24 / 7	10 / 3
			2.8	1090	0.5	AN/APX-100(V)1	10 / 3	10 / 3
TACAN	AS-2595/APN	Horn array	10.5	4290 - 4310	0.6	AN/APN-194	10 / 3	10 / 3
Radar	AS-3392/ASQ	Blade	2.8	1025 - 1150	3.5	AN/ARN-118(V)	10 / 3	10 / 3
			AS-4035/APS	Planar	3.0	8500 - 9600	0.72	AN/APN-154(V)

/A =Not assigned.