AD-A167 543 SAN DIEGO FLEET MOORINGS UNDERWATER INSPECTION PLAN(U) 1/1
NAVAL FACILITIES ENGINEERING COMMAND WASHINGTON DC
CHESAPEAKE DIV 1982 CHES/NAVFAC-FPO-8229.5

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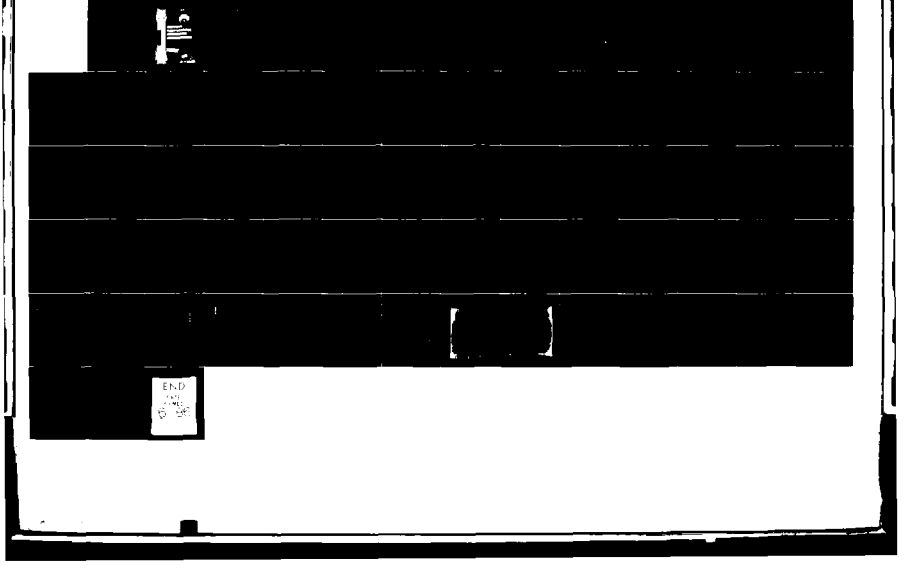

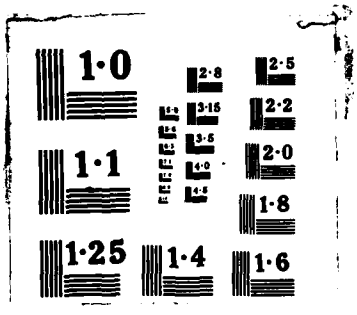
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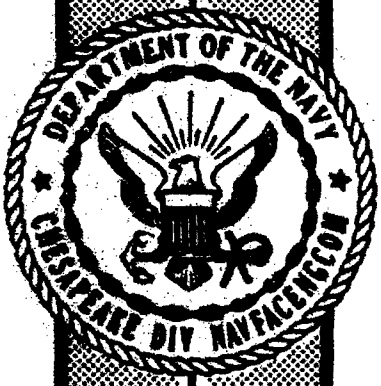

SAN DIEGO FLEET MOORINGS UNDERWATER INSPECTION PLAN

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19. ABSTRACT (Continue on reverse if necessary & identify by block number)
The purpose of this plan is to accurately define the responsibilities of the task and to provide a comprehensive plan of action for the inspection of 23 fleet moorings consisting of 33 buoy systems currently operated and maintained by PWC San Diego.

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LIST OF ILLUSTRATIONS

PWC SAN DIEGO
FLEET MOORING INSPECTION PLAN

1.0 PURPOSE

The purpose of this plan is to accurately define the responsibilities of the tack team and to provide a comprehensive plan of action for the inspection of 23 fleet moorings consisting of 33 buoy systems currently operated and maintained by PWC San Diego. Figure 1 depicts the geographical positions of the mooring sites. Underwater Construction Team Two (UCT-2) will provide underwater inspection personnel and CHESNAVFACENGCOM (code FPO-1) will provide an engineer for technical support.

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2.0 REFERENCE DATA

2.1 NAVFAC DM-26, Design Manual, Harbor and Coastal Facilities, July 1968 including change 1.

2.2 NAVFAC MO-124, Mooring Maintenance, December 1973.

2.3 Naval Facilities Engineering Command Facilities Management Expense Operating Plan for Procurement and Maintenance of Fleet Moorings, 1981.

2.4 NAVFAC Mooring Reports for PWC San Diego during the period 1981-1982.

3.0 GENERAL DESCRIPTION OF FLEET MOORINGS LOCATED IN THE SAN DIEGO HARBOR

The following classes of fleet moorings are still reported to be operational by PWC San Diego:

Class	Number
BB	5
B	2
C	2
D	4
E	2
G	1

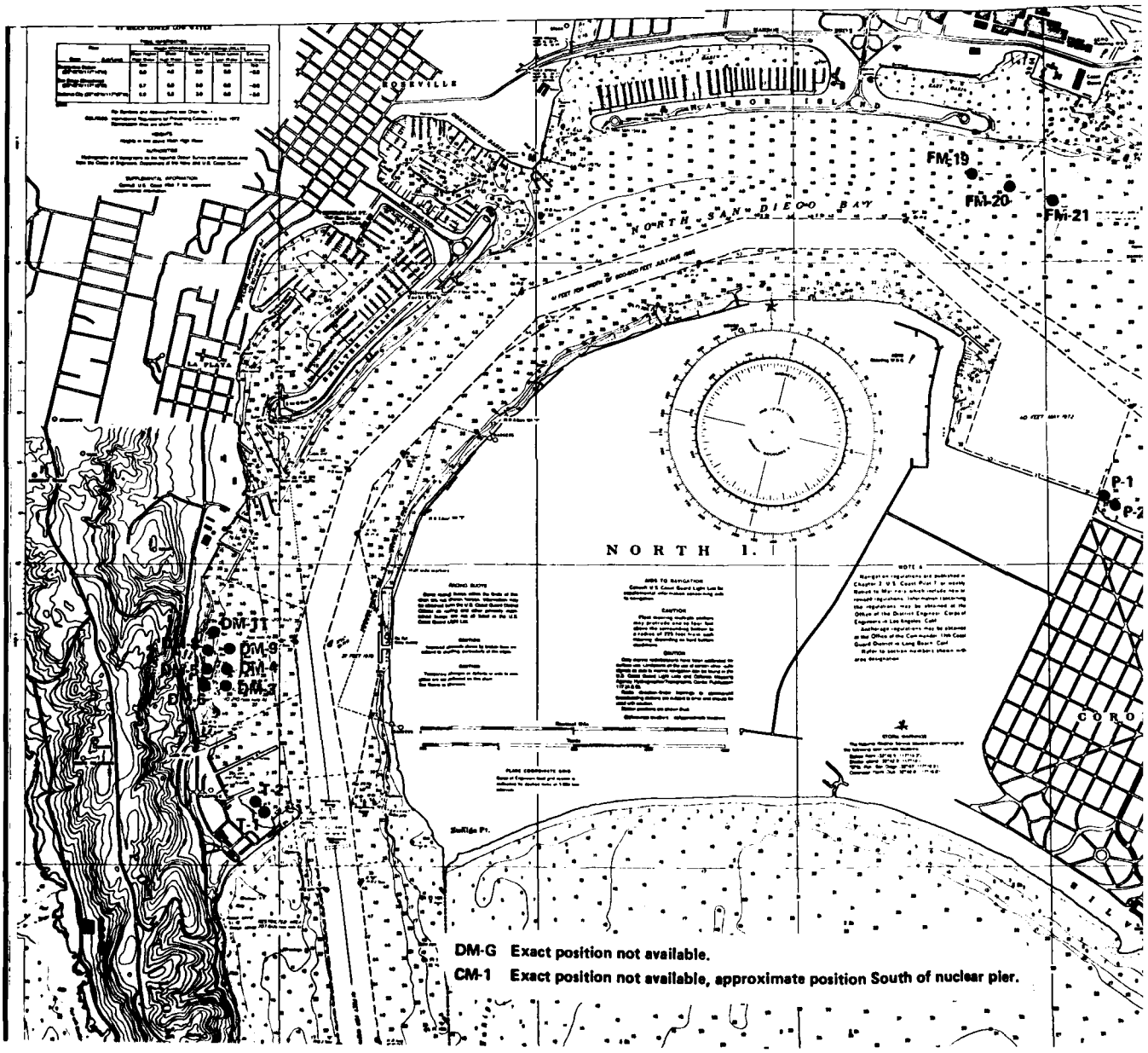

FIGURE 1. GEOGRAPHICAL POSITION O

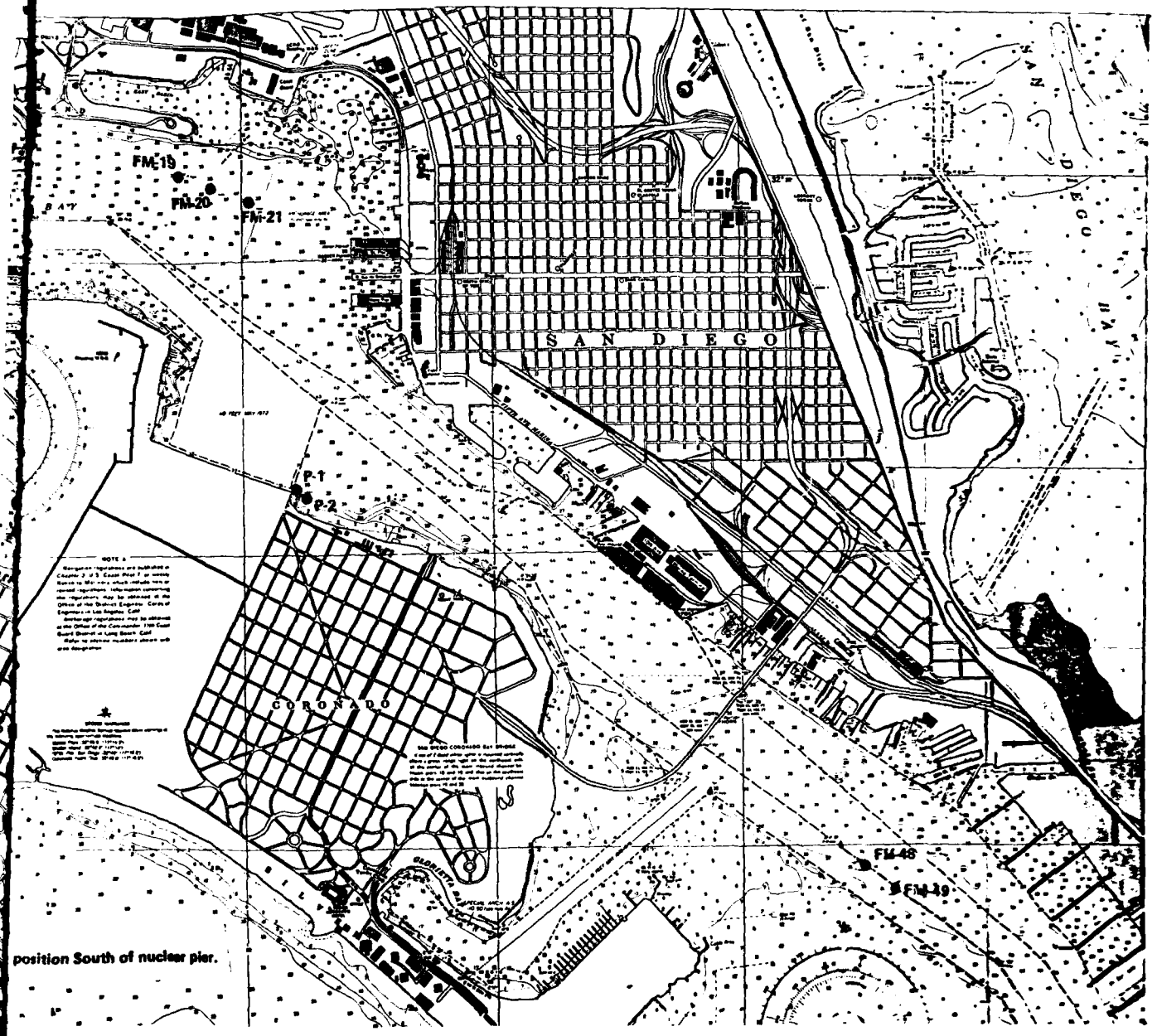

FIGURE 1. GEOGRAPHICAL POSITION OF MOORINGS

2

Class	Number
Special	2
Mediterranean	3
Not Reported	2
Total	23

fig 1 p.1

Nine of the ~~above~~ moorings, located in relatively shallow water near the deperming pier, are seldom used and consist of one to three legs attached to stockpiles and/or stockless anchors. The remaining moorings are located near the Naval Station, NAS North Island, and near Harbor Island. All of the moorings are either riser- or telephone-type moorings except for the two special and 3 Mediterranean moorings. Figures 2 and 3 depict typical riser- and telephone-type moorings respectively. Figure 4 depicts a typical Mediterranean type mooring. Appendix B contains the latest data obtained from PWC San Diego concerning the condition of these fleet moorings.

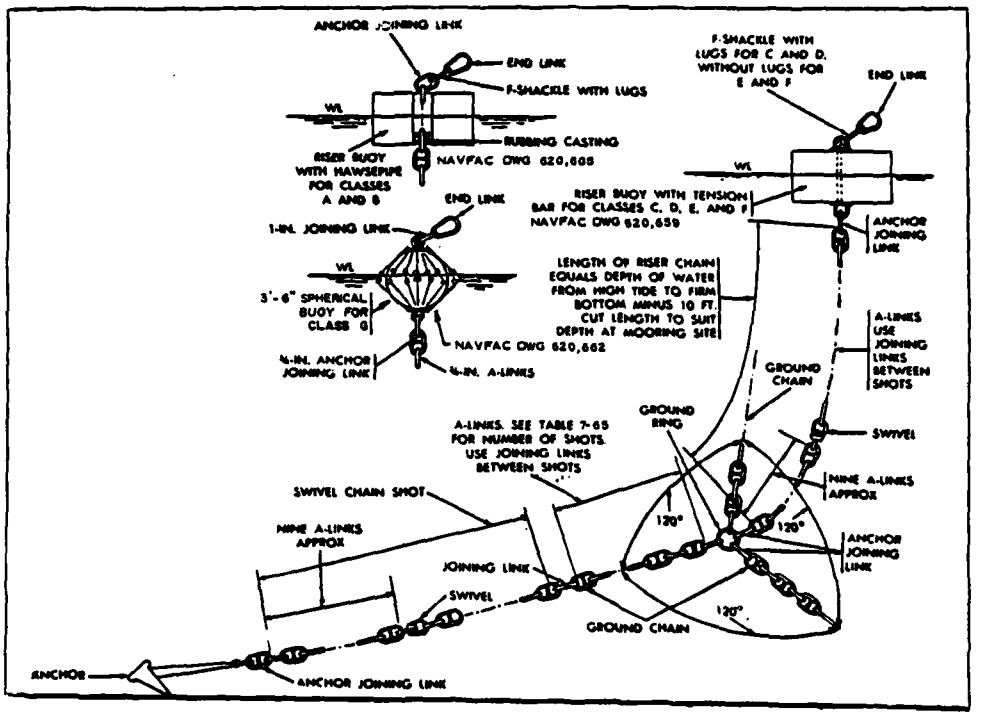

FIGURE 2. TYPICAL RISER-TYPE MOORING

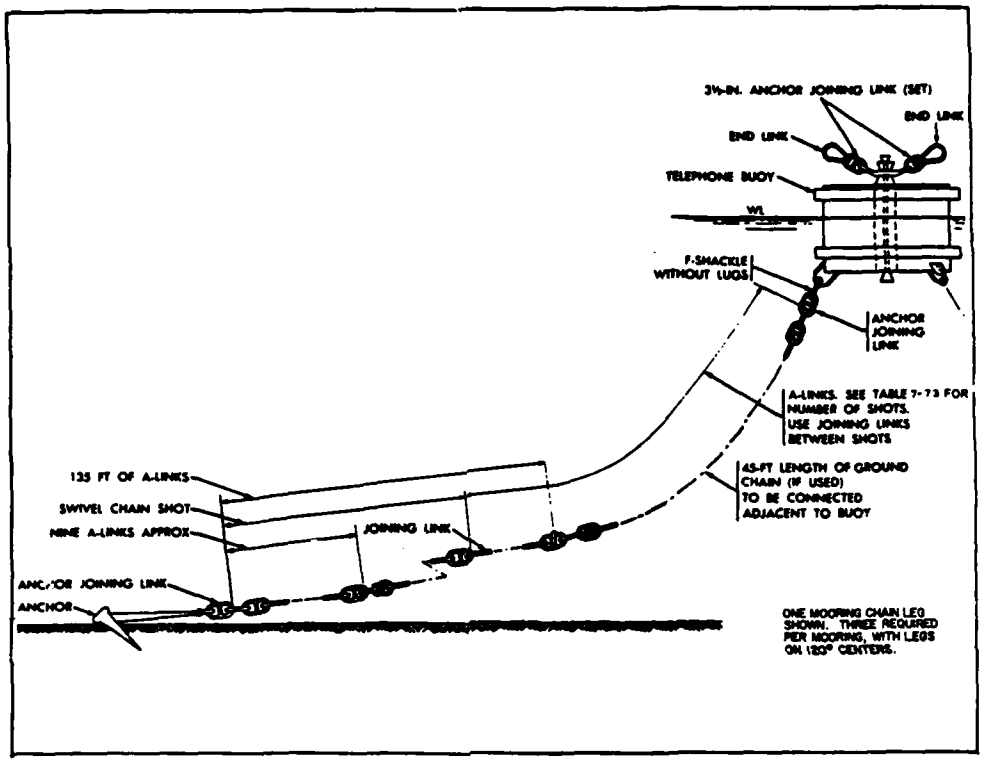

FIGURE 3. TYPICAL TELEPHONE-TYPE MOORING

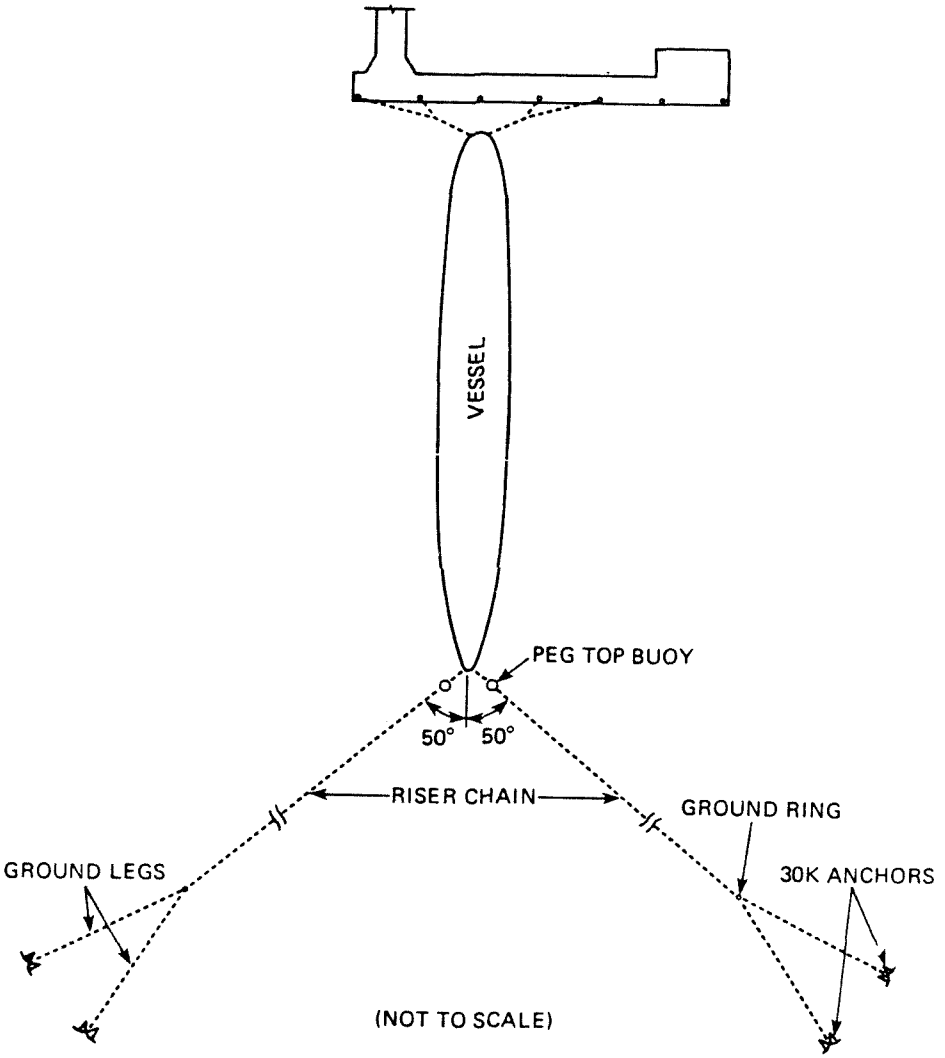

FIGURE 4. TYPICAL MED MOORING

4.0 INSPECTION PROCEDURES

The inspection scenario is to conduct a diver inspection of each of the 23 moorings using scuba equipment. Physical measurements will be taken using pre-cut gauges and calipers. Accurate position data will be generated for the buoys and the ground legs. The buoys will be sighted from known reference locations on land. The ground leg orientation will be determined by marking anchor locations, if found, with marker buoys and sighting from the mooring buoy. Potential readings will be taken using underwater voltmeters on any mooring or buoys found to be cathodically protected. See Annex A for measurement techniques.

NOTE: It is essential that all suspected trouble spots be inspected thoroughly and called to the attention of the CHESNAVFACENGCOM engineer, regardless of the scheduled sampling intervals.

The following general inspection procedures will be followed. Schematic drawings of locations to be measured in riser- or telephone-type moorings appear in Figure 5 and 6 respectively. Med moorings and special moorings will be similarly inspected.

4.1 **Site Survey:** Each buoy is to be accurately sighted from land. If a ship is moored, this is to be noted along with current and wind speeds and directions at the time of the survey. The water total depth at each mooring buoy should be recorded.

4.2 **Buoy:**

4.2.1 **Buoy Topside:** The buoy shall be observed to determine its general condition. The buoy markings shall be checked for conformance to those noted in applicable charts. The size of the buoy (diameter and height) should be recorded along with its freeboard. Physical damage such as holes, dents, or listing shall be described. If the buoy is fiberglass coated, then the fiberglass should be inspected for cracks, wear, peeling, or rust-bleeding. A check will be made to see if the hatches have been fiberglassed over. If the buoy has not been fiberglassed, then the paint will be checked for cracking, chipping, and peeling. Hatches, openings, and penetrations will be examined and broken parts and rust will be reported.

The buoy fenders and rubbing rails shall be checked for integrity and secure connection to the buoy.

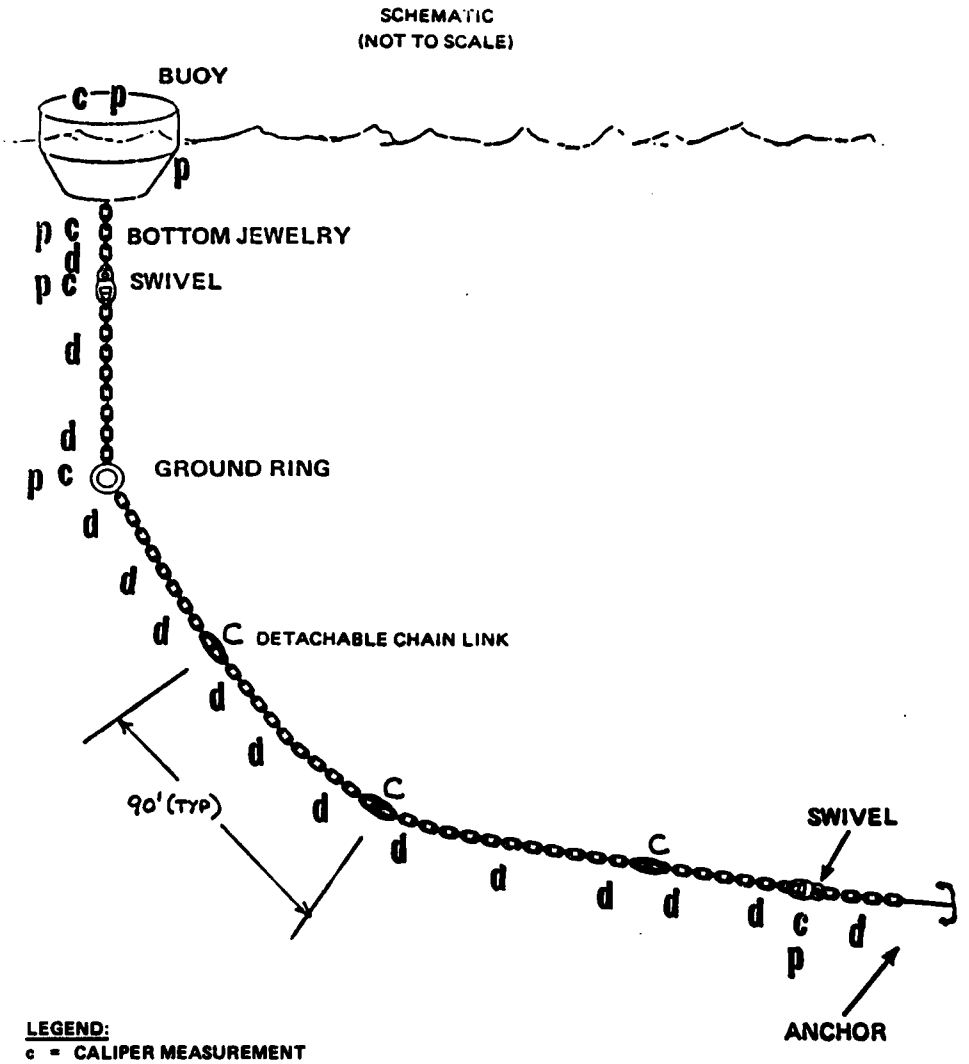

FIGURE 5. MEASUREMENT LOCATIONS RISER-TYPE MOORINGS

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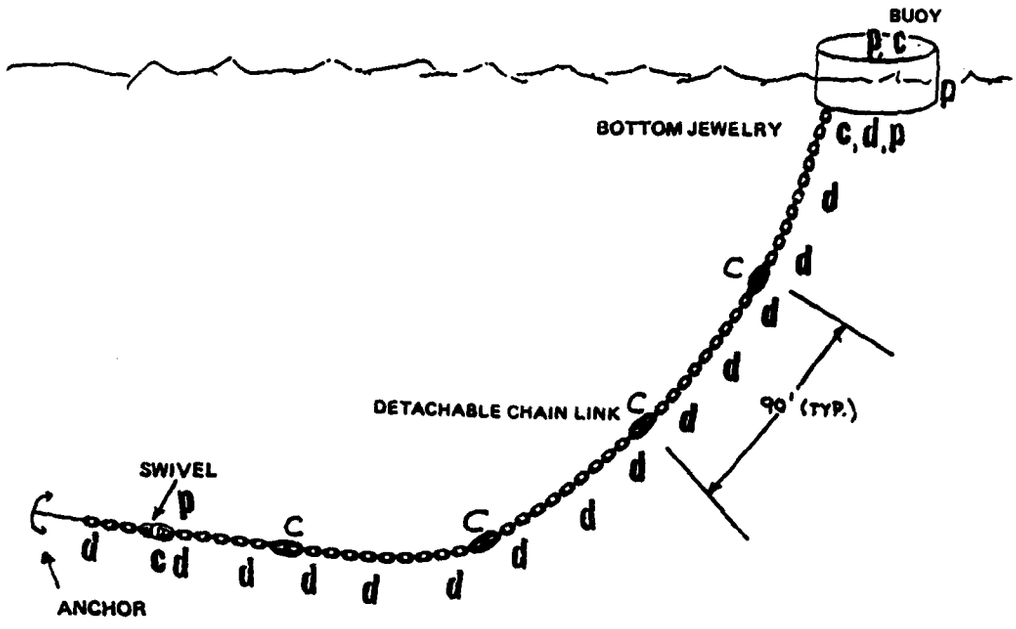


LEGEND:
c = CALIPER MEASUREMENT
d = DOUBLE LINK GAGE
p = PHOTOGRAPHS

FIGURE 6. MEASUREMENT LOCATIONS TELEPHONE-TYPE MOORING

Buoy top jewelry shall be described and measured with calipers to find the overall outside dimensions and areas of most severe reduction in wire size.

4.2.2 **Buoy Lower Portion:** Divers shall thoroughly inspect the buoy below the waterline. The thickness of marine growth shall be recorded, three one-foot-square areas shall be selected and cleared of growth without damaging the paint or fiberglass , and the condition of the paint or fiberglass will be noted. If the buoy is a riser-type with a hawse pipe, the presence and condition of the rubbing casting shall be recorded. If the buoy is cathodically protected, the condition, dimensions, and connection of anodes are to be noted. Then, electrical potential readings are to be taken with an underwater voltmeter at three locations on the buoy bottom.

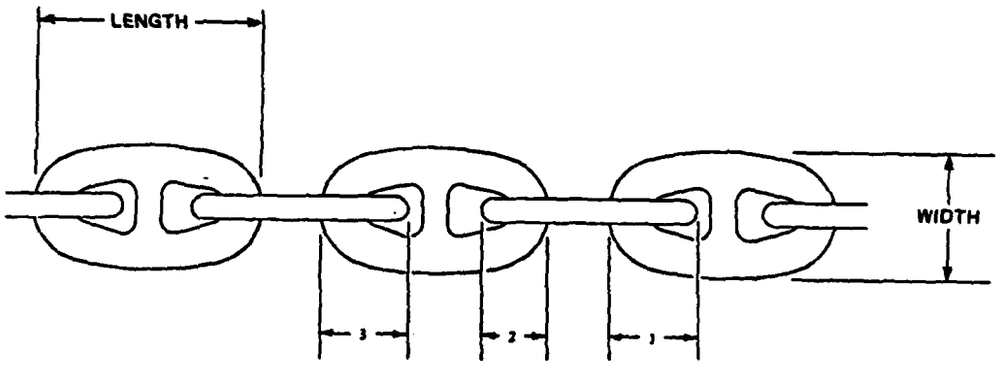
4.3 **Bottom Jewelry:** On all moorings, the bottom jewelry connecting the buoy to the riser (or to the ground legs in a telephone mooring) shall be identified and measured with calipers. Again, as in the topside jewelry, the overall dimensions and the smallest wire size will be recorded.

4.4 **Chain:** Each 90 foot shot or large portion of chain will be inspected in the manner presented in Figures 5, and 6. This consists of measuring the wire diameter of the chain and the connecting hardware to determine the amount of corrosion and wear.

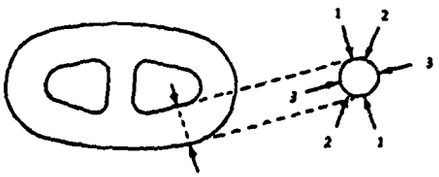
For riser chain, three (3) consecutive double-link measurements, using precut gauges, will be made at both ends and at the center of each length of chain to the ground ring.

For ground leg chain, three (3) consecutive double-link measurements will be made at both ends and at the center of each shot of chain until the anchor is reached. The shots of chain are joined with detachable links which will be marked with plastic tags for future reference. If detachable links are not easily identified due to heavy growth or poor visibility, the chain will be marked and measured at 45 foot intervals. Where a segment of chain is resting on the bottom and is not in tension, single-link measurements will replace double-link measurements. The method for taking double- and single-link measurements is given in Figure 7.

All connecting hardware including detachable links, anchor joining links, pear links, end links, swivels and shackles shall be identified and measured with calipers. Worn hardware and unusual chain joining practices shall be recorded and photographed.



Double Link Measurement



Single Link Measurement

FIGURE 7. LOCATIONS FOR TAKING CHAIN LINK MEASUREMENTS

4.5 **Ground Ring (Riser Type Only):** The ground ring shall be examined for general and localized wear. Caliper measurements shall be made of the wire size in the region of the most severe wear and across the inner diameter. Divers will record the depth of the water from the ground ring to the surface.

4.6 **Anchors:** The hardware connecting the anchors to the ground legs shall be measured by calipers in the same manner as the bottom jewelry.

When located, an anchor shall be marked with a marker buoy so that its relative position from the mooring buoy is visible from the surface. This position shall be recorded. The length of chain from the ground ring to the anchor (or to the point where the chain enters the mud) will be recorded. The condition, orientation and type of each anchor located will be recorded.

At each anchor location, a description of the bottom type shall be recorded.

4.7 **Cathodic Protection:** Available records indicate mooring FM-19 is equipped with cathodic protection. The following procedures pertain to mooring FM-19 and any other moorings found with cathodic protection.

The underwater voltmeter will be used to probe the chain every 45 feet commencing with the buoy and bottom jewelry and continuing until the anchor is reached or the chain disappears into the bottom. The wire rope continuity cable will be visually checked for breaks or kinks and for proper attachment to the chain links and anodes. Before cleaning, divers will photograph each anode and record the thickness, type and accumulation of the coating. Several anodes should be brushed to remove the oxidation and the length, width and depth of the remaining zinc measured and photographed. Anodes in poor condition should be measured, reported and photographed.

4.8 **Other Instructions:** The following information was requested by PWC San Diego.

On All Med Moorings:

Record the time and date for measurement of spring blocks.

Record distance of spring block bottom to harbor bottom.

On All Ground Rings:

Record the time and date for measurement of the ground ring.

Record distance of the ground ring bottom to the harbor bottom.

5.0 DOCUMENTATION

5.1 **Written:** The CHESNAVFACENGCOM Engineer will document the inspection procedures used and record the data obtained by the diving team. He will recommend additional alternative inspection requirements as deemed necessary during the course of the inspection.

While on site, the CHESNAVFACENGCOM Engineer will investigate the availability and cost of local mooring maintenance support.

The CHESNAVFACENGCOM Engineer will organize all data pertaining to the inspection and turn it over to the fleet mooring archives maintained at FPO-1.

The CHESNAVFACENGCOM Engineer will write a Fleet Mooring Inspection Report which will contain the results of the inspection and recommendations for corrective maintenance actions. This report, when approved by CHESNAVFACENGCOM, will be forwarded to all interested commands.

5.2 **Photographic:**

Topside: Topside photography and ashore photographs are the responsibility of the CHESNAVFACENGCOM Engineer.

Photographs will be taken of all buoys showing general conditions. Photographs of the topside jewelry and damaged buoy components will be taken as deemed appropriate by the CHESNAVFACENGCOM Engineer.

Photographs will be taken of ashore spare mooring material inventories and construction equipment as deemed necessary.

Underwater: Underwater photography shall be the responsibility of UCT-2. Buoy bottoms, anodes, bottom jewelry, worn links, working swivels, ground rings, and other hardware shall be photographed wherever required to support material conditions and when environmentally feasible. Photographs shall include clear annotation as to the location of the hardware being photographed.

6.0 MEETINGS/BRIEFINGS

The UCT-2 POIC has conducted a preinspection visit to PWC San Diego and has met with station personnel to gather the latest information concerning the moorings and establish project logistics support.

Upon the CHESNAVFACENGCOM Engineer's arrival at San Diego, the Engineer will conduct a predive briefing to familiarize all diver personnel with component design and inspection criteria and to advise them of possible modifications to this execution plan.

Prior to commencement of the inspection, another meeting will be held with station personnel to confirm logistic support.

A postinspection briefing will be provided to advise station personnel of preliminary inspection findings.

After return to Washington, D.C., presentations will be given to FPO-1 personnel.

7.0 LOGISTICS

The inspection sequence was for the UCT-2 POIC to make initial contact with a visit to San Diego in early July 1982. He obtained data concerning the moorings' history, current as-built data, existing drawings, environmental conditions, planned maintenance schedules, usage, and known fleet requirements. At that time, logistics for the proposed mid-August 1982 inspection by UCT-2 were reexamined. Exact inspection scheduling is dependent upon UCT-2 completion of earlier scheduled tasks in San Diego. The underwater inspection is tentatively planned for mid-August and is anticipated to require about two weeks of effort.

The following equipment will be provided by UCT-2 in support of the inspection:

- All diving support equipment sets

- Measuring aids
  Outside calipers 24 inch minimum
  100' tape measures
  Scales 1, 2, and 3 feet with large numbers suitable for photo documentation
  Go-no-go gauges (2 complete sets)
  Accurate depth gauges

- Survey equipment
  Compass (divers)
  Survey buoys with line (pop floats)

- Two underwater still cameras (35mm) with film (color and B&W) flash with spare batteries

- Underwater voltmeters (2) with spare batteries, reference cell, and operations manual

- Cleaning equipment - Hand tools including wire brushes, chipping hammers, and sharp chisels. Water blaster with water or hydraulic power supply and brush tool.

- Waterproof paper

- Lift bags - two (2,000 pound capacity)

- Marker tags to relocate or mark chain links

- Maintenance hand tools, including strong bars, hacksaws, puller hoists, cable cutter, shovels, rigging, wire slings.

The CHESNAVFACENGCOM Project Engineer will provide the following:

- Inspection plan

- Data sheets and log books

- 35mm surface camera and film
- Drafting supplies, graph paper, scales
- Calculator
- Full-size and 1/2-size drawings
- Predive briefing data
- DM 26

8.0 TRANSPORTATION

Transportation of personnel and equipment will be the responsibility of UCT-2 as well as arranging for on-site berthing and messing. The Project Engineer will arrange his own transportation and will meet the team on site on the date selected.

9.0 MESSAGE TRAFFIC

Summary status reports will be prepared on site by UCT-2 personnel and reported via message on a weekly basis to CHESNAVFACENGCOM and the UCT's home port.

ANNEX A

MEASUREMENT TECHNIQUES

ANNEX A

1.0 MEASUREMENT APPLICATIONS

Tables A-1 and A-2 outline the 80 and 90 percent measurements for mooring components for both the riser and telephone types of mooring classes. These tables are based on the standard moorings listed in DM-26 and can be used to preset calipers before measuring various items. For example, a class BB riser type mooring will require calipers set to 3.15" (90%) and 2.80" (80%) for single link measurements on the riser; 6.30" (90%) and 5.60" (80%) for double link on the riser; 2.25" and 2.00" for single link on the ground legs; 4.50" and 4.0" for double link on the ground legs; and for the ground ring 5.85" and 5.20".

TABLE A-1. SINGLE LINK MEASUREMENTS FOR COMPONENTS OF RISER-TYPE MOORINGS (DOUBLE VALUES FOR DOUBLE LINK MEASUREMENTS)

Class Mooring	Percent Remaining	Top of Buoy			Riser	Ground Ring			Ground Tackle	
		F-Shackle	End Link	AJL[1]	Chain	AJL[1]	Ring	Spider	Chain[1]	AJL[1]
A-A	100	5 3/8	4¼	4"	4	4"	6½	4 3	2 3/4	2 3/4"
	90	4.838	3.285	type	3.6	type	5.85	3.6 2.7	2.475	type
	80	4.3	2.92		3.2		5.2	3.2 2.4	2.2	
B-B	100	4 15/16	3 15/16	3½"	3½	3½"	6½	4 3	2½	2½"
	90	4.44	3.544	type	3.15	type	5.85	3.6 2.7	2.25	type
	80	3.75	3.15		2.8		5.2	3.2 2.4	2.0	
C-C	100	4 15/16	3 15/16	3½"	3½	3½"	6½	4 3	2¼	2¼"
	90	4.44	3.544	type	3.15	type	5.85	3.6 2.7	2.025	type
	80	3.95	3.15		2.8		5.2	3.2 2.4	1.8	
D-D	100	4 3/16	3 3/4	3"	3	3"	6		3	3"
	90	3.769	3.375	type	2.7	type	5.4	-	2.7	type
	80	3.35	3		2.4		4.8		2.4	
A	100	3 7/8	3 3/8	2 3/4"	2 3/4	2 3/4"	5½		2 3/4	2 3/4"
	90	3.488	3.038	type	2.475	type	4.95	-	2.475	type
	80	3.1	2.7		2.2		4.4		2.2	
B	100	3½	3 1/8	2½"	2½	2½"	4 3/4		2½	2½"
	90	3.15	2.813	type	2.25	type	4.275	-	2.25	type
	80	2.8	2.5		2.0		3.8			
C	100	3 1/8	2 3/4	2¼"	2¼	2¼"	4½		2¼	2¼"
	90	2.813	2.813	type	2.025	type	4.05	-	2.025	type
	80	2.5	2.5		1.8		3.6	-	1.8	
D	100	2 13/16	2½	2"	2	2"	4		2	2"
	90	2.531	2.25	type	1.8	type	3.6		1.8	type
	80	2.25	2.0		1.6		3.2		1.6	
E	100	2 7/16	2¼	1 3/4"	1 3/4	1 3/4"	3½		1 3/4	1 3/4"
	90	2.174	2.025	type	1.575	type	3 15	-	1.575	type
	80	1.95	1.8		1.4		2.8		1.4	
F	100	1 3/4	1 3/4	1¼"	1¼	1¼"	2 3/4		1¼	1¼"
	90	1.575	1.575	type	1.125	type	2.813	-	1.125	type
	80	1.4	1.4		1.0		2.5		1.0	
G	100	1 1/16	.1	3/4"	3/4	3/4"	1 7/8		3/4	1"
	90	.956	.9	type	.675	type	1.688	-	.675	type
	80	.85	.8		.6		1.5		.6	

1. AJL measurement vary according to manufacturer, see DM-26
2. Assumes firm sand bottom
3. Assumes cast steel chain

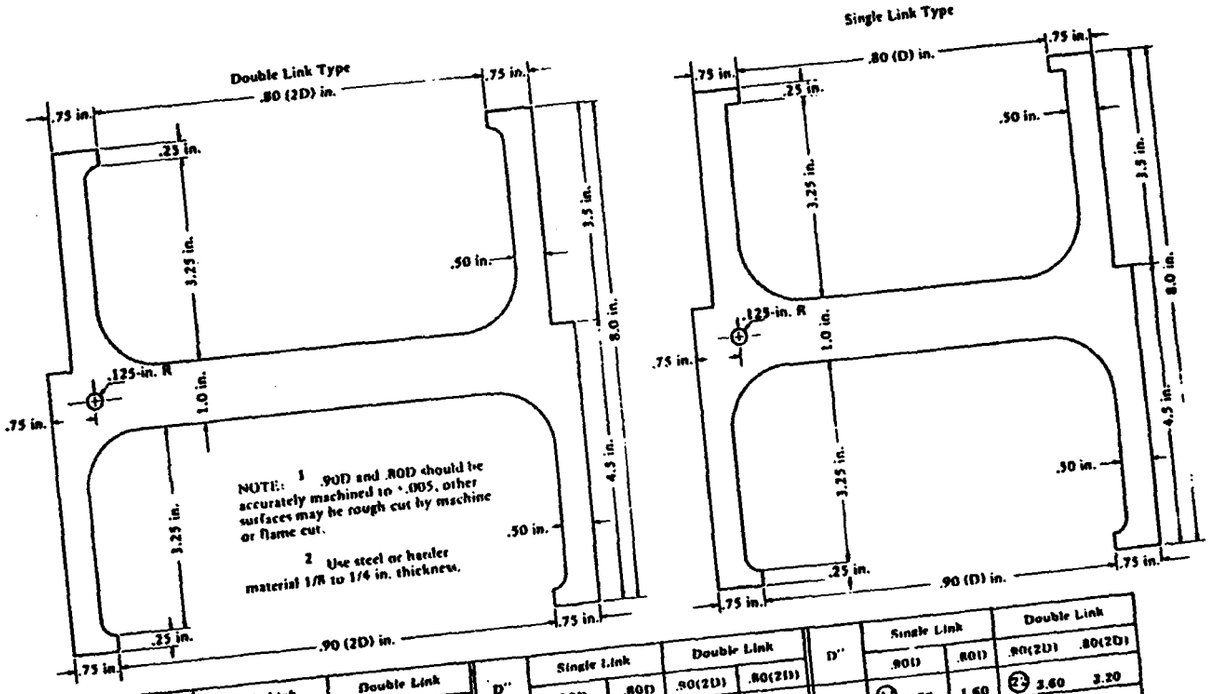
TABLE A-2. SINGLE LINK MEASUREMENTS FOR COMPONENTS OF TELEPHONE-TYPE MOORINGS
(DOUBLE VALUES FOR DOUBLE LINK MEASUREMENTS)

Class Mooring	Percent Remaining	Top of Buoy		Buoy-to-Ground Tackle				Ground Tackle	
		End Link	AJL [1]	D/F-Shackle	AJL [1]	Spider		AJL [1]	Chain
A-A	100	4¼	4"	4 11/16	4"	4	3	2 3/4"	2 3/4
	90	3.285	type	4.219	type	3.6	2.7	type	2.475
	80	2.92		3.75		3.2	2.4		2.2
B-B	100	4¼	4"	4 11/16	3½"	4	3	2½"	2¼
	90	3.285	type	4.219	type	3.6	2.7	type	2.25
	80	2.92		3.75		3.2	2.4		2.0
C-C	100	4¼	4"	4 11/16	3½"	4	3	2¼"	2¼
	90	3.285	type	4.219	type	3.6	2.7	type	2.025
	80	2.92		3.75		3.2	2.4		1.8
D-D	100	4¼	4"	4 11/16	3"			3"	3
	90	3.285	type	4.219	type			type	2.7
	80	2.92		3.75					2.4
A	100	3 3/8	3½"	3 7/8	2 3/4"			2 3/4"	2 3/4
	90	3.038	type	3.488	type			type	2.475
	80	2.7		3.1					2.2
B	100	3 3/8	3½"	3½	2½"			2½"	2¼
	90	3.038	type	3.15	type			type	2.25
	80	2.7		2.8					2.0
C	100	3 3/8	3½"	3 1/8	2½"			2½"	2¼
	90	3.038	type	2.813	type			type	2.025
	80	2.7		2.5					1.8
D	100	3 3/8	3½"	2 13/16	2"			2"	2
	90	3.038	type	2.531	type			type	1.8
	80	2.7		2.25					1.6

1. AJL measurements vary according to manufacturer, see DM-26
2. Assumes firm sand bottom
3. Assumes cast steel chain

2.0 MEASURING DEVICES

The preferred measuring devices, however, are back-to-back 80 and 90 percent "go-no go" gauges. These gauges simplify the diver's job in that, unlike calipers, they cannot be knocked out of adjustment underwater, and they do not have to be checked and reset between dives. Figure A-1 contains the drawings and data required to fabricate these gauges. Although these gauges are a quick and efficient way of sampling the wire size of chain links and some jewelry, the divers still have to carry calipers to measure ground rings and chain connecting links.



D"	Single Link		Double Link	
	.90D	.80D	.90(2D)	.80(2D)
6-1/2	① 5.85	5.20	—	—
6	② 5.40	4.80	—	—
5-1/2	③ 4.95	4.40	—	—
4-1/2	④ 4.05	3.60	—	—
4	⑤ 3.60	3.20	⑯ 7.20	6.40

D"	Single Link		Double Link	
	.90D	.80D	.90(2D)	.80(2D)
3-1/2	⑥ 3.15	2.80	⑰ 6.30	5.60
3	⑦ 2.70	2.40	⑱ 5.40	4.80
2-3/4	⑧ 2.48	2.20	⑲ 4.96	4.40
2-1/2	⑨ 2.25	2.00	⑳ 4.50	4.00
2-1/4	⑩ 2.03	1.80	㉑ 4.06	3.60

D"	Single Link		Double Link	
	.90D	.80D	.90(2D)	.80(2D)
2	⑪ 1.80	1.60	㉒ 3.60	3.20
1-7/8	⑫ 1.69	1.50		
1-3/4	⑬ 1.58	1.40	㉓ 3.06	2.80
1-1/2	⑭ 1.35	1.20	㉔ 2.70	2.40
1-1/4	⑮ 1.125	1.00		

FIGURE A-1. 10 PERCENT "GO-NO-GO" GAUGES

ANNEX B

SPECIFIC MOORING DATA

1.0 MOORING DATA SUMMARY

#	No. Legs	Depth	"Class"	Location	Other
T-1	3	28'	E(R)	Ballast Pt.	Trieste Mooring
T-2	3	28	E(R)	" "	" "
DM-11	3	——	D(R)	Deperm	
DM-9	1	42'	BB(R)	" "	Stake piles and back-up stockless anchors. Parts list is a guess.
DM-8	1	35'	BB(R)	" "	
DM-6	1	36'	BB(R)	" "	
DM-5	3	40'	D(R)	" "	One leg attaches directly to anchor.
DM-4	3	43'	D(R)	" "	
DM-3	3	50'	D(R)	" "	
FM-19	7	36'	BB(R)	Harbor Is.	Cathodic protection
FM-20	8	39'	BB(T)	" "	
FM-21	3-7?	37'	BB(R)	" "	Divers report buoy missing 4/13/78
P-1	4	35'	C(R)	North Is.	
P-2	2?	35'	C(R)	" "	Stake pile (W12x120) and backup leg with anchor.
FM-48	4	38'	B(R)	NavSta	
FM-49	4	40'	B(T)	" "	
DM-G	1	——	——	Deperm	
CM-1	——	44'	G(R)	Deperm?	
ARD-30	8	——	Special	Subbase	
YFNB-5	——	——	Med		No DWG.
USS Elk River	6?		Med	Subbase Pier 5002	
USS DIXON	——	39'	——	Ballast Pt.	6Buoys and legs.
USS Tarawa	——	——	Med		Many legs removed, 7 buoys remaining.

MOORING T-1 and T-3

RISER TYPE - CLASS "E"

3 LEGS

LEG 1 and 2 DETAILS

1½ shot 2½" C. S. Chain
25,000 # IMP Stockless Anchor
4 5/8 Ground Rings (for U/W Inspection) 4/27/78

LEG 3 DETAILS (BRIDLE)

1½ shot 2½" C. S. Chain Connecting to Ground
Rings of T-1 and T-2

RISER CHAIN DETAILS

Drum Buoy (T-1)
Plastic Drum Buoy (T-2)
24'--2½" C. S. Chain (T-1)
26' -- 2½" C. S. Chain (T-2)

HISTORY

9/75 Installed

NOTE

No Parts List available; information taken from PWC Dwg No. 20338

N
#1
011°T
T-2
249°T
#2
123°T
CUT
#3
T-1
077°T
#1
303°T
155°T
#2

MOORING DM-11

- Information uncertain
- Similar to DM-5
- 3 ea. 2 1/2" cast steel legs

DM-10, -9, -8, -7, and -6 are single leg moorings with stake piles and stockless back-up anchors (buried). No bearings taken. No parts list or maintenance history available. PWC DWG 21153 used to obtain chain size (2 3/4" CS).

MOORING DM-5

RISER TYPE - CLASS "D"

Material Cost
$32,400

RISER CHAIN DETAILS

Small Drum Buoy

2 3/4" Detachable Link

2 9/16" Pear Link

2 3/4" Detachable Link

16'-2 3/4" C.S. Riser Chain

2½" Naco A.J. Link

2 3/4" Bending Shackle

4½" x 18" I.D. Ground Ring
W/3-2 3/4" Bending Shackles

LEG "A" DETAILS

2½" Naco A.J. Link

2¼" Detachable Link

2¼" Pear Link

2 3/4" Bending Shackles

13,000 # DMP. Stockless Anchor

LEG "B" DETAILS

2½" Naco A.J. Link

2¼" Detachable Link

85' - 2" C.S. Chain

2¼" Detachable Link

2¼" Pear Link

2½" Naco A.J. Link

13,000 # DMP. Stockless Anchor

LEG "C" DETAILS

2½" Naco A.J. Link

2¼" Detachable Link

8' - 2" C.S. Chain

2¼" Detachable Link

97' - 2" C.S. Chain

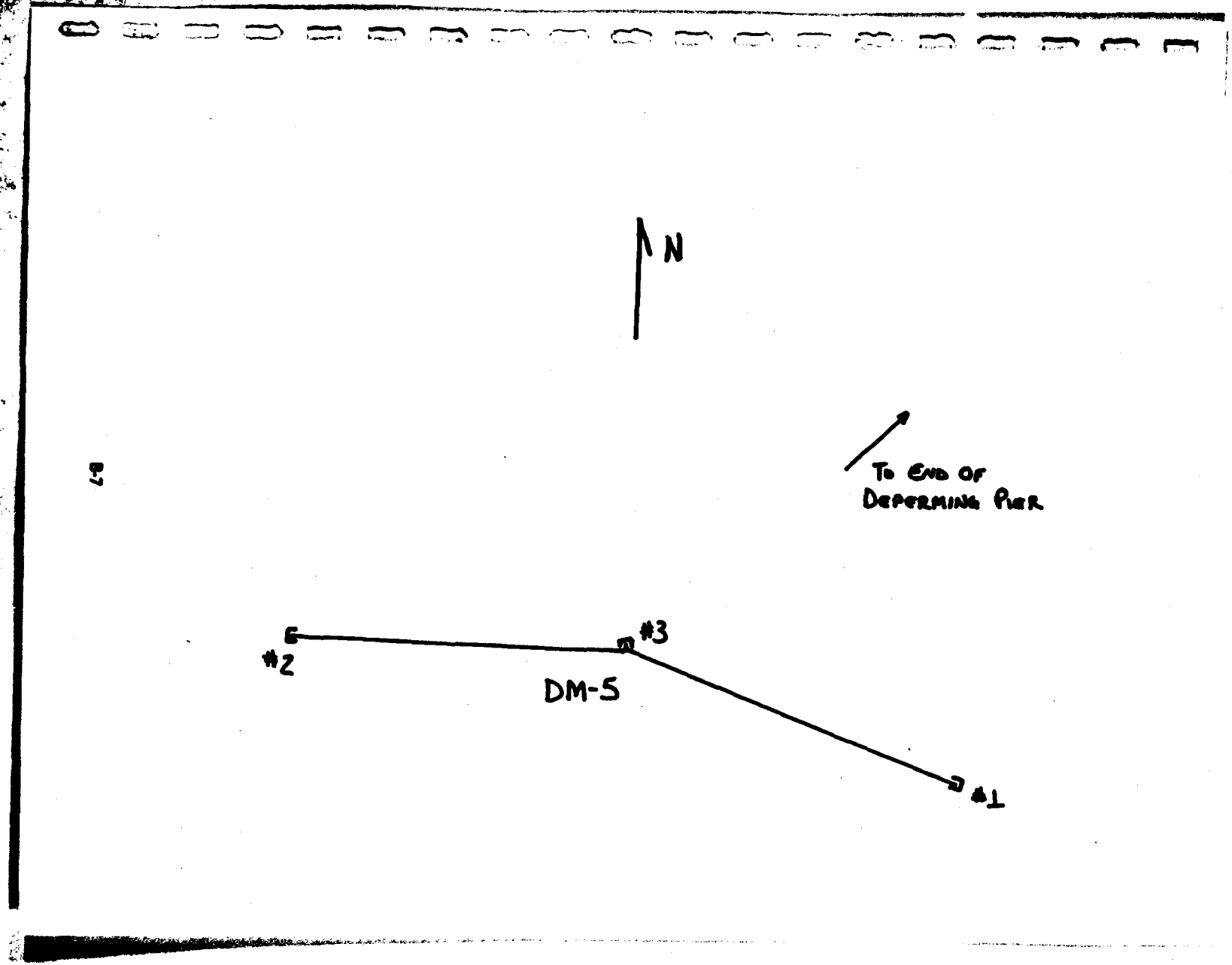
2¼" Detachable Link

2¼" Pear Link

2½" Naco A.J. Link

13,000 # DMP Stockless Anchor

HISTORY:		
	3-21-55	New Installation
	4-4-60	Reconditioned and Relaid
	1-27-64	Reconditioned and Relaid
	2-2-67	Reconditioned and Relaid
	3-70	Overhauled


N
To End of
Deperming Pier
#2
#3
DM-5
#1

MOORING DM-4

RISER CHAIN TYPE - CLASS "D"

3 LEGS

MATERIAL COST
$32,400

LEG "A" DETAILS

3 5/8" NACO A. J. Link
2 9/16" Pear Link
2¼" Detachable Link
90' -- 2" C. S. Chain
2¼" Detachable Link
90' -- 2" C. S. Chain
2¼" Detachable Link
2¼" Pear Link
2 3/4" Bending Shackle
13,000# Stockless Anchor

LEG "B" DETAILS

3 5/8" NACO A. J. Link
2 9/16" Pear Link
2¼" Detachable Link
45' -- 2" D. L. Chain
2¼" Detachable Link
90' -- 2" C. S. Chain
2¼" Detachable Link
90' -- 2" C. S. Chain
2¼" Detachable Link
2¼" Pear Link
2 5/8" NACO A. J. Link
13,000# Stockless Anchor

LEG "C" DETAILS

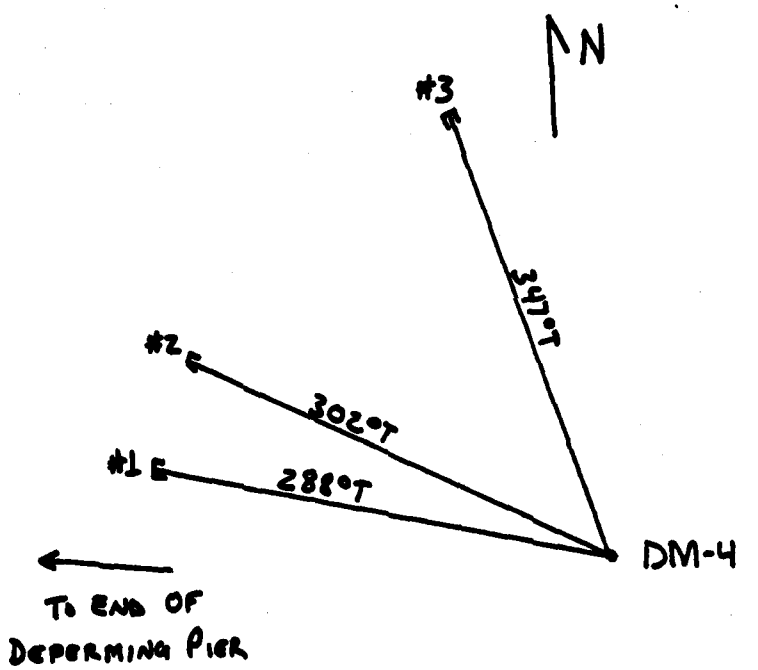
3 5/8" NACO A. J. Link
2 9/16" Pear Link
2¼" Detachable Link
2¼" Pear Link
3" Bending Shackle
13,000# Stockless Anchor

RISER CHAIN DETAILS

Small Drum Buoy
3" Detachable Link
2 9/16" Pear Link
2½" Detachable Link
2 3/4" "B" & "C" Link
3 5/8" NACO A. J. Link
5" x 15" I.D. Ground Ring

HISTORY: 3/18/55 through 11/2/66

2/18/55	New Installation
4/6/60	Reconditioned & Relaid
2/13/64	Reconditioned & Relaid
11/2/66	Reconditioned & Relaid
3/70	Overhauled (fm NAVFAC 9-11010)


N
#3
347°T
#2
302°T
#1
288°T
DM-4
TO END OF
DEPERMING PIER

MOORING DM-3

RISER TYPE - CLASS "D"

3 LEGS

MATERIAL COST
$32,700

LEG "A" DETAILS

3" Bending Shackle
2½" NACO A. J. Link
2¼" Pear Link
2¼" Detachable Link
90' --2" C. S. Chain
2¼" Detachable Link
90' --2' C. S. Chain
2¼" Detachable Link
2½" Pear Link
3" Bending Shackle
13,000# IMP. Stockless Anchor

LEG "B" DETAILS

3" Bending Shackle
2¼" Pear Link
2¼" Detachable Link
90' --2" C. S. Chain
2¼" Detachable Link
89' --2' C. S. Chain
2¼" Detachable Link
2¼" Pear Link
2½" NACO A. J. Link
13,000# IMP. Stockless Anchor

LEG "C" DETAILS

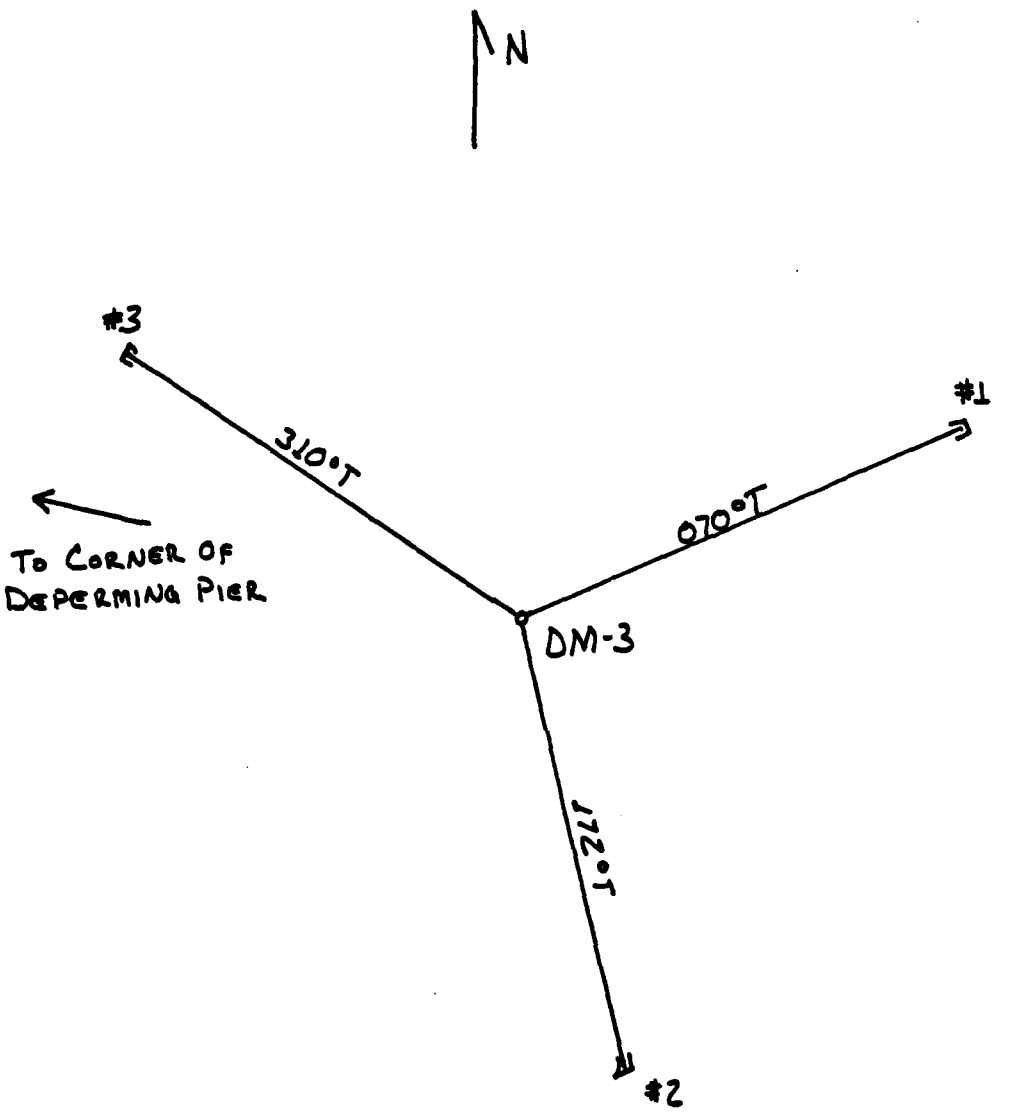
3" Bending Shackle
2½" NACO A. J. Link
2¼" Pear Link
2¼" Detachable Link
76' -- 2" C. S. Chain
2" Detachable Link
2¼" Pear Link
2½" Bending Shackle
13,000# IMP. Stockless Anchor

RISER CHAIN DETAILS

Drum Buoy (Small) W/Tension Bar
2½" NACO A. J. Link
27' --2½" C.S. Riser Chain
2½" Detachable Link
2½" E. Z. Link
2 9/16" Pear Link
3" Bending Shackle
4 3/4" x 18" I.D. Ground Ring

HISTORY:

3/15/55	New Installation
11/13/60	Reconditioned and Relaid
2/12/64	Reconditioned and Relaid
11/3/66	Reconditioned and Relaid
4/3/74	Reconditioned and Relaid


N
#3
310°T
#1
070°T
To Corner of
Deperming Pier
DM-3
172°T
#2

DEC 77

FM-19

RISER CHAIN DETAILS

Peg Top Buoy MK 2
3 1/2" Detach
2 9/16" Pear Link
2 1/2" Detach
20' - 2 3/4" Dielock Riser Chain
2 3/4" Detach
3 1/4 " BC Link
5 - 3 5/8" NACO Links
Ground Ring 4 5/8" x 15" I.D.

Each anchor has 15' stabilizer bar welded to crown. The shank is welded at 30° angle.

Leg "A"
20,000 LB Stockless Anchor
3 1/4" Chain Shackle
2 3/4" BC Link
2 1/2" Detachable Link
45' - 2 1/2" Dielock Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
2 9/16" Pear Link

Leg "B"
20,000 LB Stockless Anchor
3 1/4" A.J. Link
3" Pear Link
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
45' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
2 9/16" Pear Link

Leg "C"
20,000 LB Stockless Anchor
3 1/4" A.J. Link
3" Pear Link
2 1/2" Detachable Link
45' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc
^ 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
2 1/16" Pear Link

Leg "D"
20,000 LB Stockless Anchor
3 1/2" A.J. Link
3" Pear Link
2 1/2" Detachable Link
45' - 2 1/2" Dielock Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc
2 1/2" Detachable Link
2 9/16" Pear Link

SHEET 1 of 1

DEC. 77

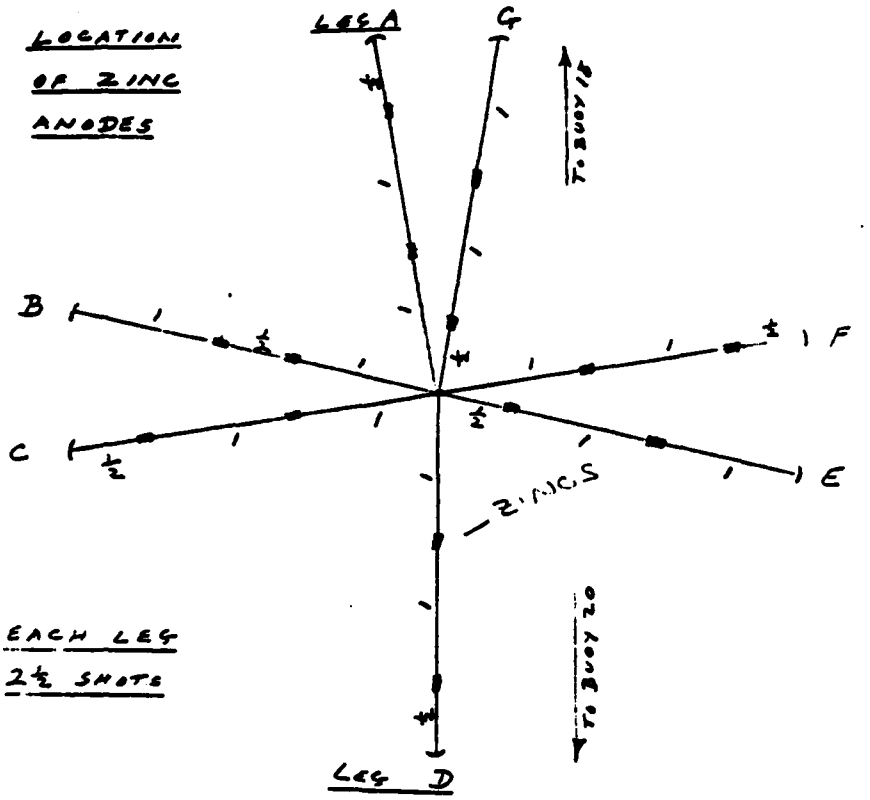
FM-19 Chain Details (Continued)

Leg "E"
20,000 LB Stockless Anchor
3 1/4" A.J. Link
3" Pear Link
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc Annode
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc Annode
2 1/2" Detachable Link
45' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
2 9/16" Pear Link

Leg "F"
20,000 LB Stockless Anchor
3 1/4" A.J. Link
3" Pear Link
2 1/2" Detachable Link
45' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc Annode
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc Annode
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
2 9/16" Pear Link

Leg "G"
20,000 LB Stockless Anchor
3 3/8" Bending Shackle
3" Pear Link
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc Annode
2 1/2" Detachable Link
90' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
Zinc Annode
2 1/2" Detachable Link
45' - 2 1/2" Cast Steel Chain
2 1/2" Detachable Link
2 9/16" Pear Link

FM-19



1. Provide one wire rope (5/8" Galv.) for each leg - start 10 feet from anchor-end at ground ring.

2. Weave rope through about every 8th link. Scrape away coating and clamp to about every 8th link.

MOORING #20

TELEPHONE TYPE - CLASS "BB"

8 LEGS — MATERIAL COST $122,171

Special Equipment - 1 - 50 Pair Tele. Cable
1 - 4" Plastic Water Line

LEG "A" DETAILS

3 ¼" Pear Link
3 ¼" Kenter Shackle
2 9/16" Pear Link
2 ½" Detachable Link
45' -- 2½" D.L. Chain
2 ½" Detachable Link
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
90' -- 2½" C.S. Chain
2 ½" Detachable Link
2 ½" Pear Link
20,000# Imp. Stockless Anchor

LEG "B" DETAILS

3 ¼" Pear Link
3 ¼" Kenter Shackle
2 9/16" Pear Link
2 ½" Detachable Link
45' -- 2½" C.S. Chain
2 ½" Detachable Link
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
5,000# Conc. Block
90' --2½" D.L. Chain
2 ½" Detachable Link
2 ½" Pear Link
20,000# Imp. Stockless Anchor

LEG "C" DETAILS

3 ¼" Pear Link
3 ¼" Kenter Shackle
2 9/16" Pear Link
2 ½" Detachable Link
45' -- 2 ½" D.L. Chain
2 ½" Detachable Link
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
5,000# Conc. Block
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
2 ½" Pear Link
25,000# Conc. Block

LEG "D" DETAILS

3 ¼" Pear Link
3 ¼" Kenter Shackle
2 9/16" Pear Link
2 ½" Detachable Link
45' --2 ½" C.S. Chain
2 ½" Detachable Link
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
5,000# Conc. Block
90' 2 ½" D.L. Chain
2 ½" Detachable Link
2 ½" N.T.G. (A.J. Link)
25,000# Imp. Stockless Anchor

LEG "E" DETAILS

3 ¼" Pear Link
3" Detachable Link
2 9/16" Pear Link
2 ½" Detachable Link
45' -- 2 ½" D.L. Chain
2 ½" Detachable Link
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
5,000# Conc. Block

LEG "F" DETAILS

3 ¼" Pear Link
3 ¼" Kenter Shackle
2 9/16" Pear Link
2 ½" Detachable Link
45' -- 2 ½" C.S. Chain
2 ½" Detachable Link
90' -- 2 ½" C.S. Chain
2 ½" Detachable Link
5,000# Conc. Block

LEG "E" DETAILS Continued

90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
2 ½" Pear Link
3" Bending Shackle
25,000# Imp. Stockless Anchor

LEG "F" DETAILS Continued

90' -- 2 ½" C.S. Chain
2 ½" Detachable Link
2 ½" Pear Link
20,000# Imp. Stockless Anchor

LEG "G" DETAILS

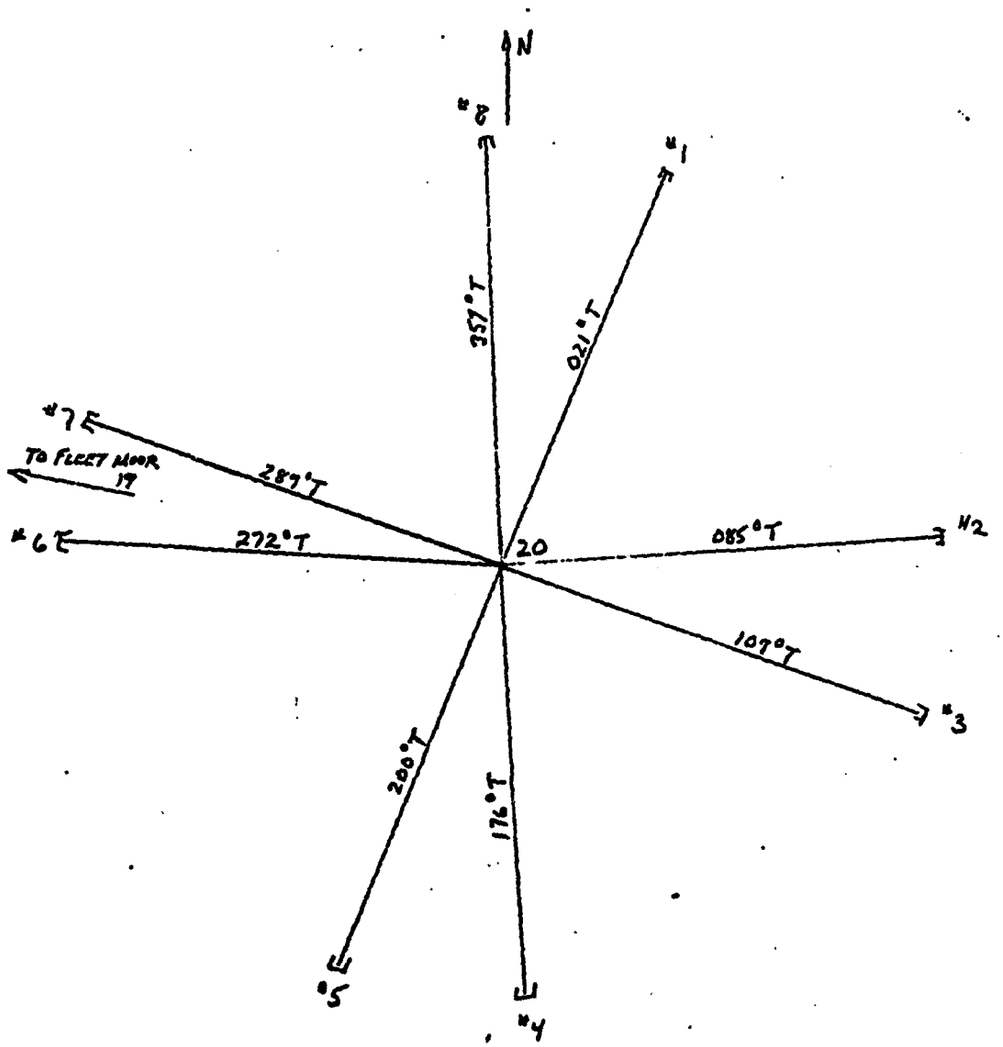
3 ½" Pear Link
3 ½" Kenter Shackle
2 9/16" Pear Link
2 ½" Detachable Link
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
45' -- 2 ½" D.L. Chain
5,000# Conc. Block
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
2 ½" Pear Link
2 ½" N.T.G. (A.J. Link)
25,000# Imp Stockless Anchor

LEG "H" DETAILS

3 ¼" Pear Link
3 ¼" Kenter Shackle
2 9/16" Pear Link
2 ½" Detachable Link
45' --2 ½" C.S. Chain
2 ½" Detachable Link
90' -- 2 ½" D.L. Chain
5,000# Conc. Block
90' -- 2 ½" D.L. Chain
2 ½" Detachable Link
2 ½" Pear Link
20,000# Imp. Stockless Anchor

HISTORY:

10/24/40	Placed as M-15
1/21/48	Reconditioned and Reinforced
5/13/54	Reconditioned
6/15/61	Renumber as M-22
5/2/62	Reconditioned
6/8/63	Reconditioned and Reinforced
6/22/65	Reconditioned and Renumbered to M-20
10/17/67	Reconditioned and Relaid
3/72	Overhauled (fm NAVFAC 9-11010)


N
#8
#1
357°T
021°T
#7
TO FLEET MOOR 19
289°T
#6
272°T
20
085°T
#2
107°T
#3
200°T
176°T
#5
#4

MOORING # 20

RISER TYPE - CLASS "BB"

7 LEGS

MATERIAL COST
$122,263

LEG "A" DETAILS

3 5/8" NACO Anchor Joining Link
2 9/16" Pear Link
2½" Detachable Link
90' -- 2½" C. S. Chain
2½" Detachable Link
45' -- 2½" C. S. Chain
2½" Detachable Link
5,600 # Concrete Block
90' -- 2½" C. S. Chain
2½" Detachable Link
2½" Pear Link
20,000 # Stockless Anchor

LEGS "B" "C" AND "D" DETAILS

Identical to Leg "A" except for large 2 9/16" Pear Links in Jew Harp

LEGS "E" "F" AND "G"

Identical to Leg "A" except for 2½" x 2 3/4" Anchor Joining Link in Jews Harp

NEW MATERIAL

1 -- 2 9/16" Pear Link

RISER CHAIN DETAILS

MK II Peg Top Buoy #185
3¼" Detachable Link
2 9/16" Pear Link
2 3/4" Detachable Link
20' -- 2 3/4 Die Lock Chain
2 3/4" Detachable Link
2 3/4" "B" and "C" Link
3 5/8" NACO Anchor Joining Link
5½" x 18" I.D. Ground Ring

HISTORY

10/29/40	Placed as M-16
1/20/45	Reconditioned and reinforced
5/18/56	Reconditioned
1/18/59	Reconditioned
6/15/61	Renumbered M-23
6/28/63	Pick up, reconditioned, Reinforced, and Relaid
6/23/65	Relocated and Renumbered to [illegible]
6/3/66	Reconditioned
9/27/68	Reconditoned
3/72	Overhauled (for NAVFAC 9-[illegible])
8/23/76	Changed Buoy (sinking)

MOORING P-1

RISER TYPE - CLASS "C"

4 LEGS

MATERIAL COST
$48,631

LEG "A" DETAILS

3 5/8" NACO A. J. Link
2 9/16" Pear Link
2¼" Detachable Link
90' -- 2¼" C. S. Chain
2¼" Detachable Link
2 9/16" Pear Link
2½" E. Z. A. J. Link
15,000 # Stockless Anchor

LEG "B"(MAIN HOLDING)

3 5/8" NACO A. J. Link
2 9/16" Pear Link
2½" Detachable Link
15' -- 2½" C. S. Chain
2½" Detachable Link
90' -- 2 7/16" C. S. Chain
2½" Detachable Link
2½" Pear Link
20,000 # Stockless Anchor

LEG "C" DETAILS

3 5/8" NACO A. J. Link
2 9/16" Pear Link
2¼" Detachable Link
70' -- 2¼" C. S. Chain
2¼" Detachable Link
2 9/16" Pear Link
2½" A. J. Link
15,000 # Stockless Anchor

LEG "D" DETAILS

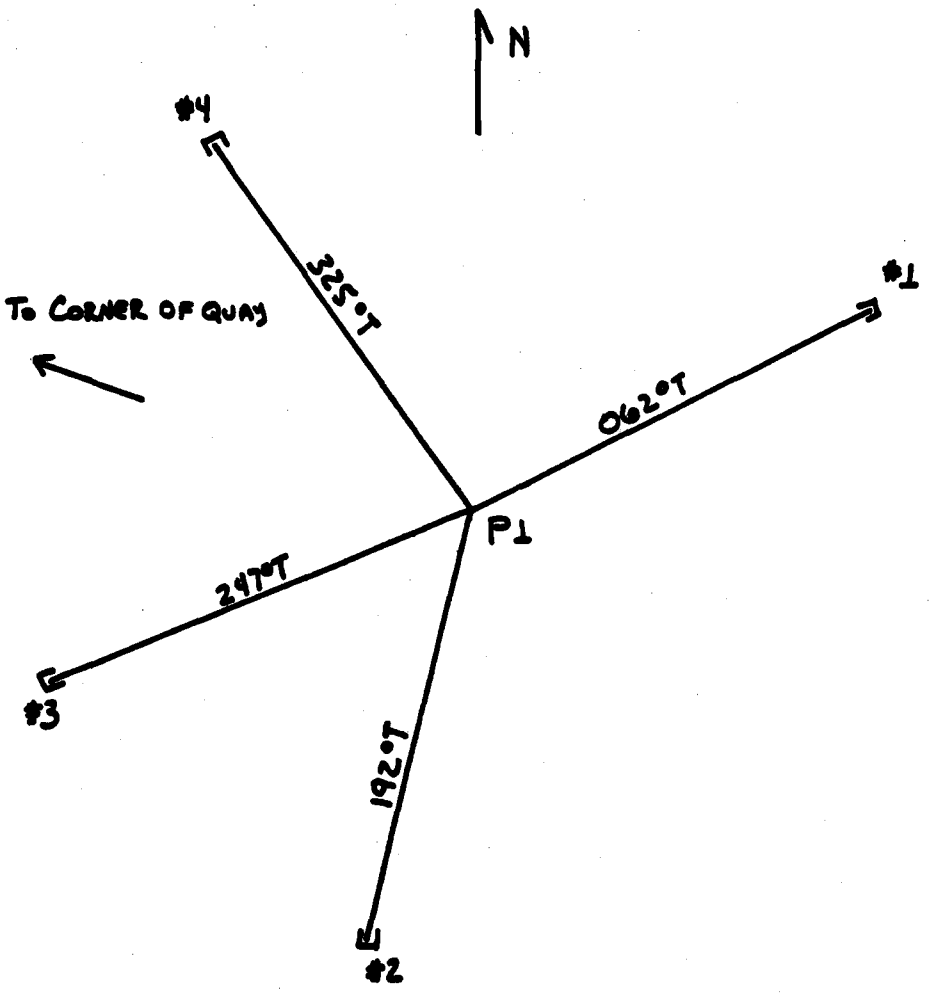
3 5/8" NACO A. J. Link
2 9/16" Pear Link
2½" Detachable Link
7' -- 2½" C. S. Chain
2½" C. S. "E" Link
2½" NACO Conn. Link
13,000 # Stockless Anchor

RISER DETAIL

MK I Peg Top Buoy
19' -- 2 3/4" C. S. Chain
2 3/4" Detachable Link
2 3/4" "B" & "C" Links
3 5/8" NACO A. J. Link
5½" x 15" I.D. Ground Ring

HISTORY

7/28/48	Placed
8/26/53	Reconditioned and Relaid
6/16/58	Reconditioned and Relaid
6/14/61	Reconditioned and Relaid
6/2/65	Reconditioned and Relaid
4/23/75	Reconditioned and Relaid


N
#4
325°T
To Corner of Quay
#1
062°T
P1
247°T
#3
192°T
#2

December 1979

MOORING P-2

Riser 50' Stake Pile (W 12 x 120)

3 5/8" NACO A. J. Link
2 9/16" Pear Link
2 3/4" Detach
42' - 2 3/4" Cast Steel Chain
2 3/4" Detach
BC Link
2 3/4" Detach
MK-2 Peg Top Bouy

Back-up Leg (Attached to NACO A. J. Link)

2 9/16" Pear Link
2 1/2" Detach
90' - 2 1/2" Cast Steel Chain
2 1/2" Detach
18,000 LB Stockless Anchor

BOUY #48 RISER TYPE

LEG "A"

20K Anchor
2-1/2' Detach to the Anchor
2 - 90' 2-1/2" Stud Link Chain (Cast Steel)
1 - 45' 2-1/2" Stud Link Chain (Cast Steel)
2 Zinc Anodes w/3/4" Galv. Wire
3 - 2-1/2" Detaches

LEGS "B", "C", & "D" - SAME AS LEG "A"

RISER

1 Ground Ring
1 2-3/4" Detach
19 Ft - 2-3/4" Stud Link Chain (Dielock)
1 2-3/4" Detach

51

MOORING # 49

TELEPHONE TYPE - CLASS "B"

4 LEGS MATERIAL COST $59,900

LEG "A" DETAILS

3½" NACO A. J. Link
2 9/16" Pear Link
2½" Detachable Link
45' -- 2½" D. L. Chain
2½" Detachable Link
90' -- 2½" C. S. Chain
2½" Detachable Link
5,000 # Conc. Block
90' -- 2½" C. S. Chain
2½" Detachable Link
2½" "B" Link
2½" Anchor Joining Link
20,000 #IMP Stockless Anchor

LEG "B" DETAILS

3 ½" Pear Link
2½" Bending Shackle
2 9/16" Pear Link
2½" Detachable Link
90' -- 2½" C. S. Chain
2½" Detachable Link
45' -- 2½" C. S. Chain
2½" Detachable Link
5,000 # Conc. Block
90' -- 2½" C. S. Chain
2½" Detachable Link
2 9/16" Pear Link
2½" Anchor Joining Link
20,000 #IMP Stockless Anchor

LEG "C" DETAILS

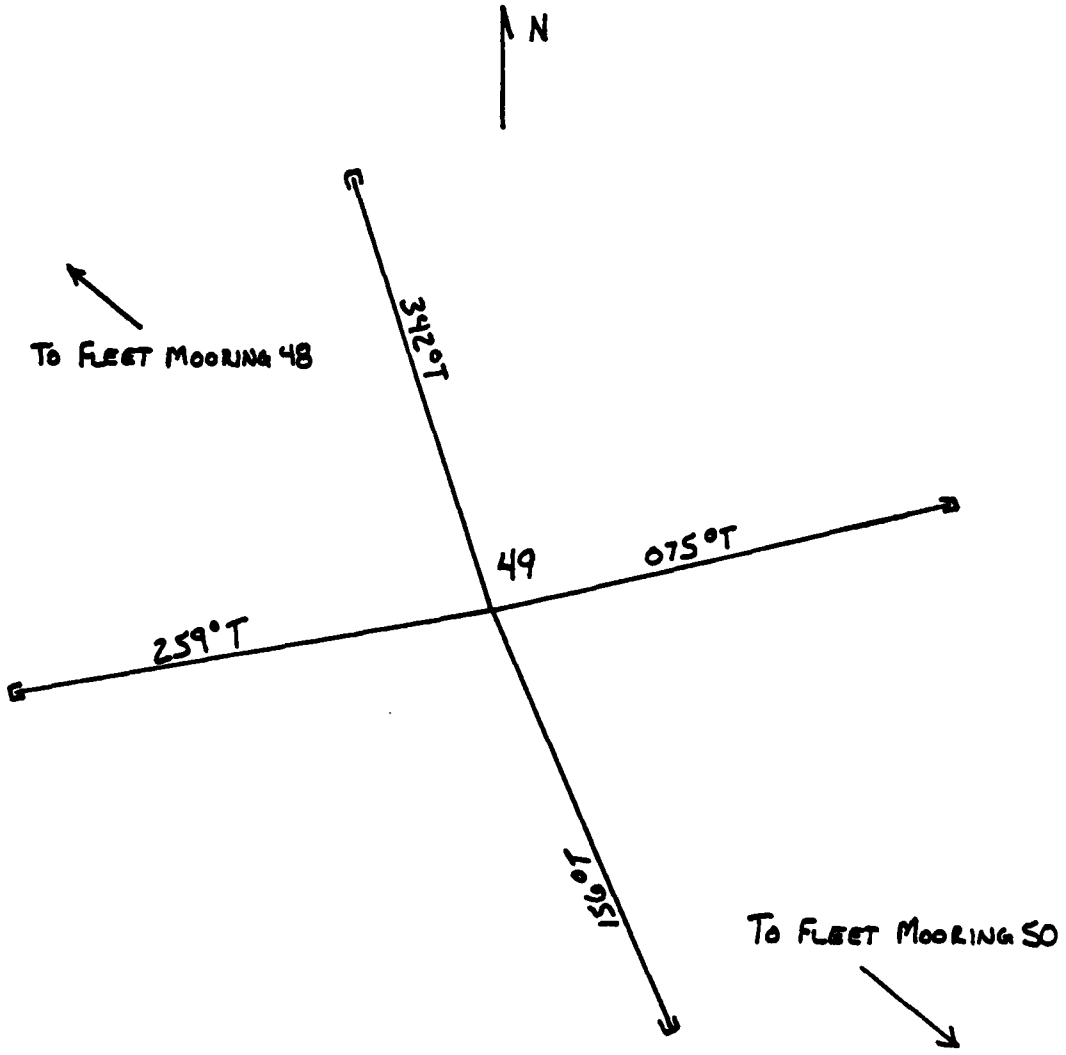
3 ½" Pear Link
2½" Bending Shackle
2 9/16" Pear Link
2½" Detachable Link
45' -- 2½" C. S. Chain
2½" Detachable Link
90' -- 2½" C. S. Chain
2½" Detachable Link
5,000 # Conc. Block
90' -- 2½" C. S. Chain
2½" Detachable Link
2 9/16" Pear Link
2½" Anchor Joining Link
20,000 # IMP Stockless Anchor

LEG "D" DETAILS

3 ½" Pear Link
2½" Bending Shackle
2 9/16" Pear Link
2½" Detachable Link
90' -- 2½" C. S. Chain
2½" Detachable Link
45' -- 2½" D. L. Chain
2½" Detachable Link
50000 # Conc. Block
90' -- 2½" C. S. Chain
2½" Detachable Link
2 9/16" Pear Link
2½" Anchor Joining Link
20,000 #IMP Stockless Anchor

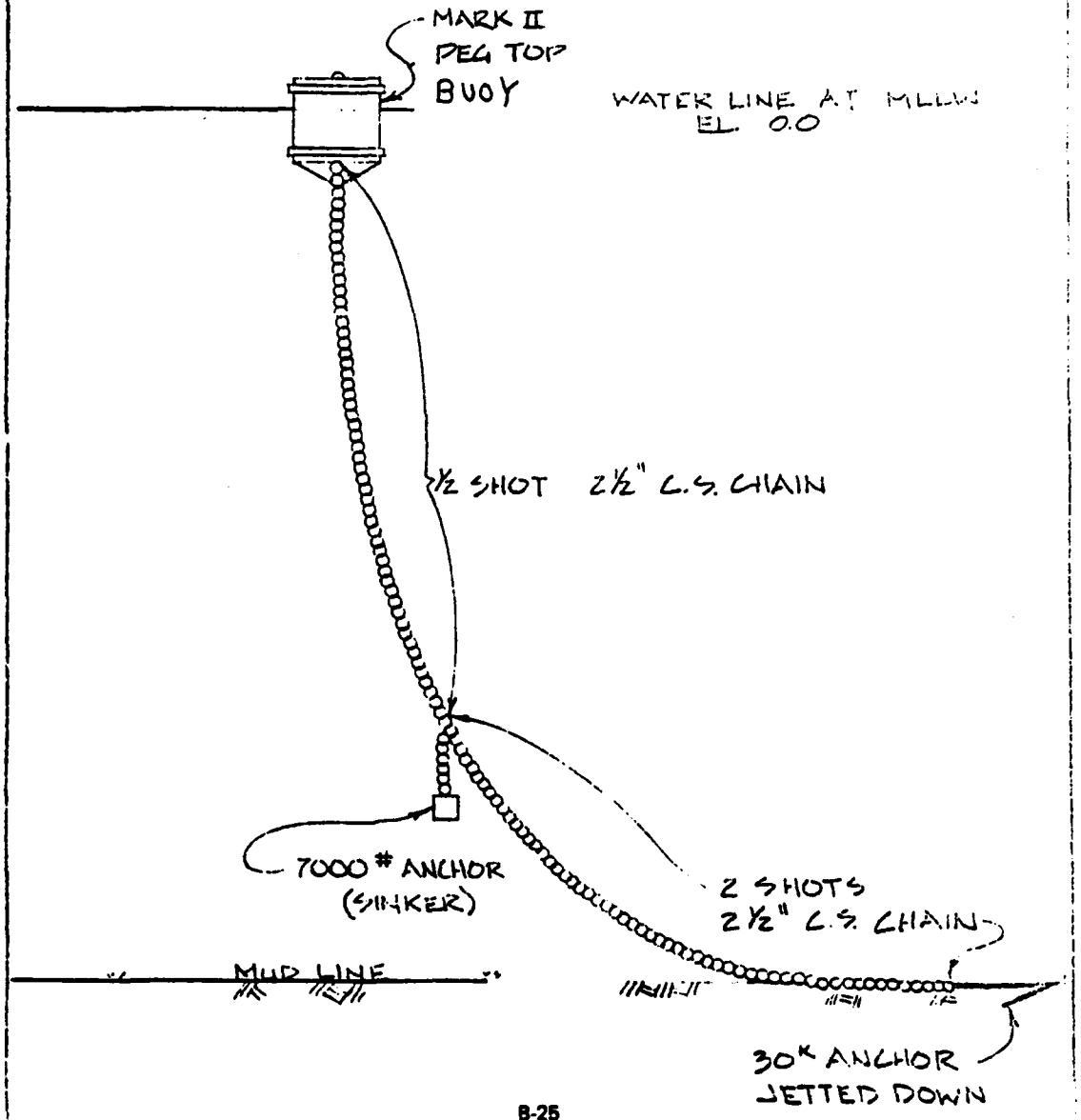
HISTORY:

2/16/42	Placed as Mooring 45
5/5/43	Relocated as Mooring 49
3/13/53	Renewed Chain and Strengthened
8/15/55	Reconditioned and Relocated
11/5/59	Reconditioned and Relaid
6/2/64	Renewed Chain, Changed to Telephone Type and Relocated
4/17/67	Reconditioned and Relaid
12/22/69	Reconditioned and Relaid
3/3/73	Picked up and Relaid
11/4/75	For Dredging
4/76	Overhauled (for NAVFAC 9-11010)


N
342°T
TO FLEET MOORING 48
49
075°T
259°T
156°T
TO FLEET MOORING 50

DEPT OF THE NAVY NAVFAC ENGR COM PUBLIC WORKS CENTER SAN DIEGO CALIFORNIA	MOORING	
SATISFACTORY TO DATE 1-12-79	EIC J.D.	BR. HD.

DM-G



CAMEL MOORING #1

Location: South Side of Nuclear Pier

Material Cost
$12,292

History: 1/64 Placed as CM #1
5/16/66 Picked Up and Relocated
9/26/66 Reconditioned and Relaid
6-5-68 Recovered, moved & relaid

RISER CHAIN DETAILS

Drum Buoy (Small) W/Rubbing Casting
2 1/2" Detachable Link
2 1/8" "A" Link
2 1/8" Cast Steel Swivel
27'--2" C.S. Riser Chain
2 1/4" Detachable Link
5,000# Conc. Block
2½" Detachable Link
24'--2" C.S. Chain (Single Leg)
2½" Detachable Link
2½" N.T.G. (A.J. Link)
5,000# Stockless Anchor

Note: New Material has been used to recondition ground tackle--9/26/66

NEW MATERIAL

2 1/8" Cast Steel Swivel

Check from C. Evans's files
7 MAR 79

DATA FROM FY-82 MANAGEMENT PLAN

ARD 30 (See drawing, page B-28)

- 9 legs
- 38' – 40' depth
- class "BB"

YFNB-5 (See drawing, page B-29)

- 40' depth

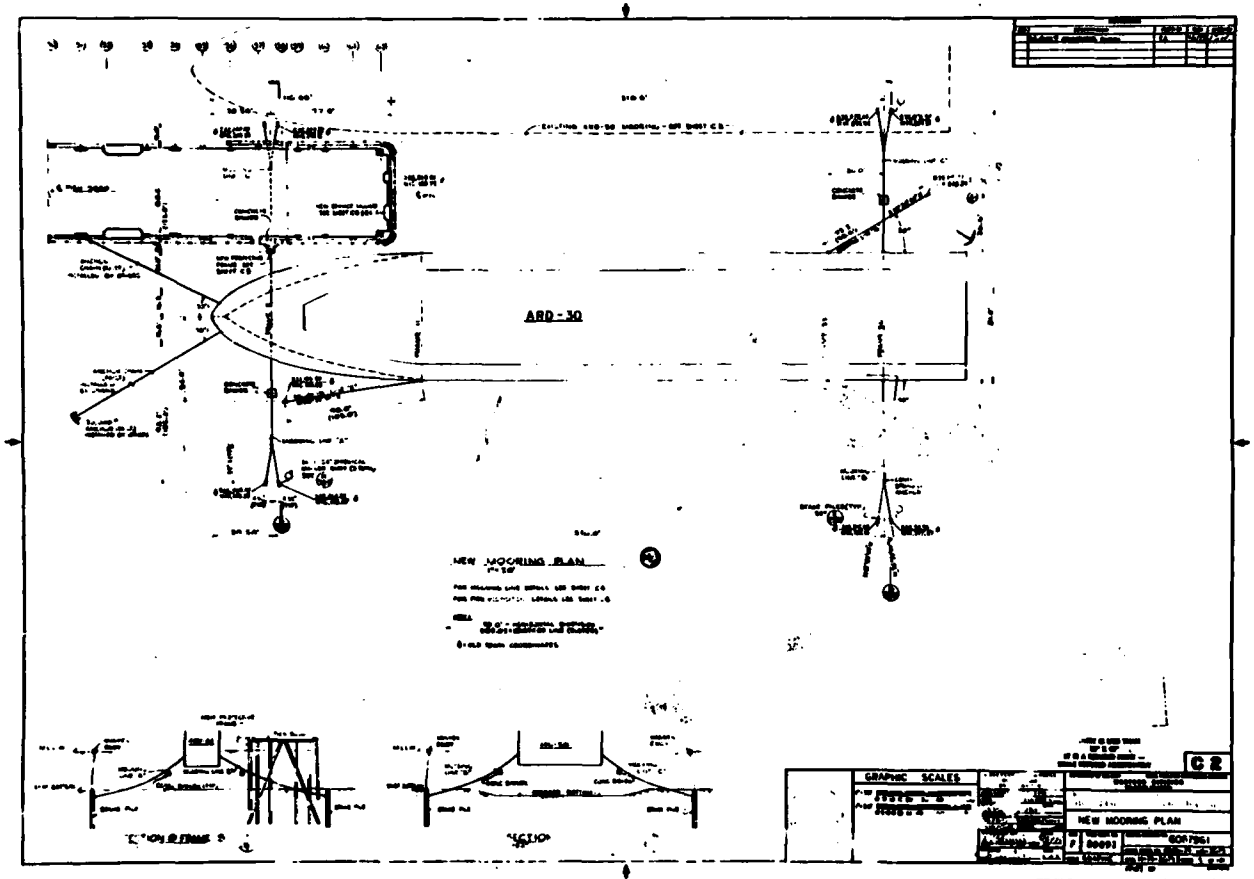
USS DIXON (See drawing, page B-30)

- 8 legs
- 39' depth
- class "BB"

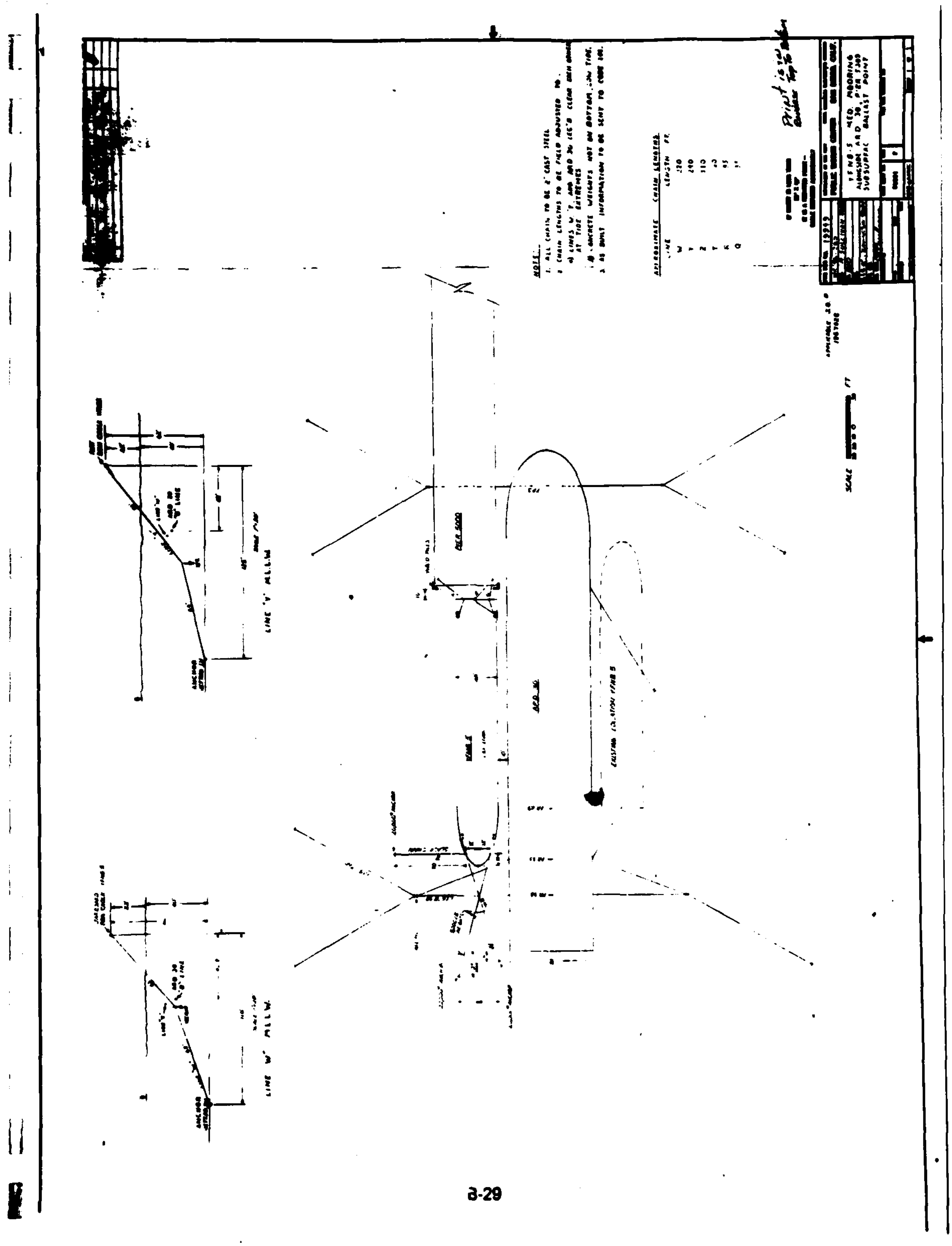
USS ELK RIVER (no drawing)

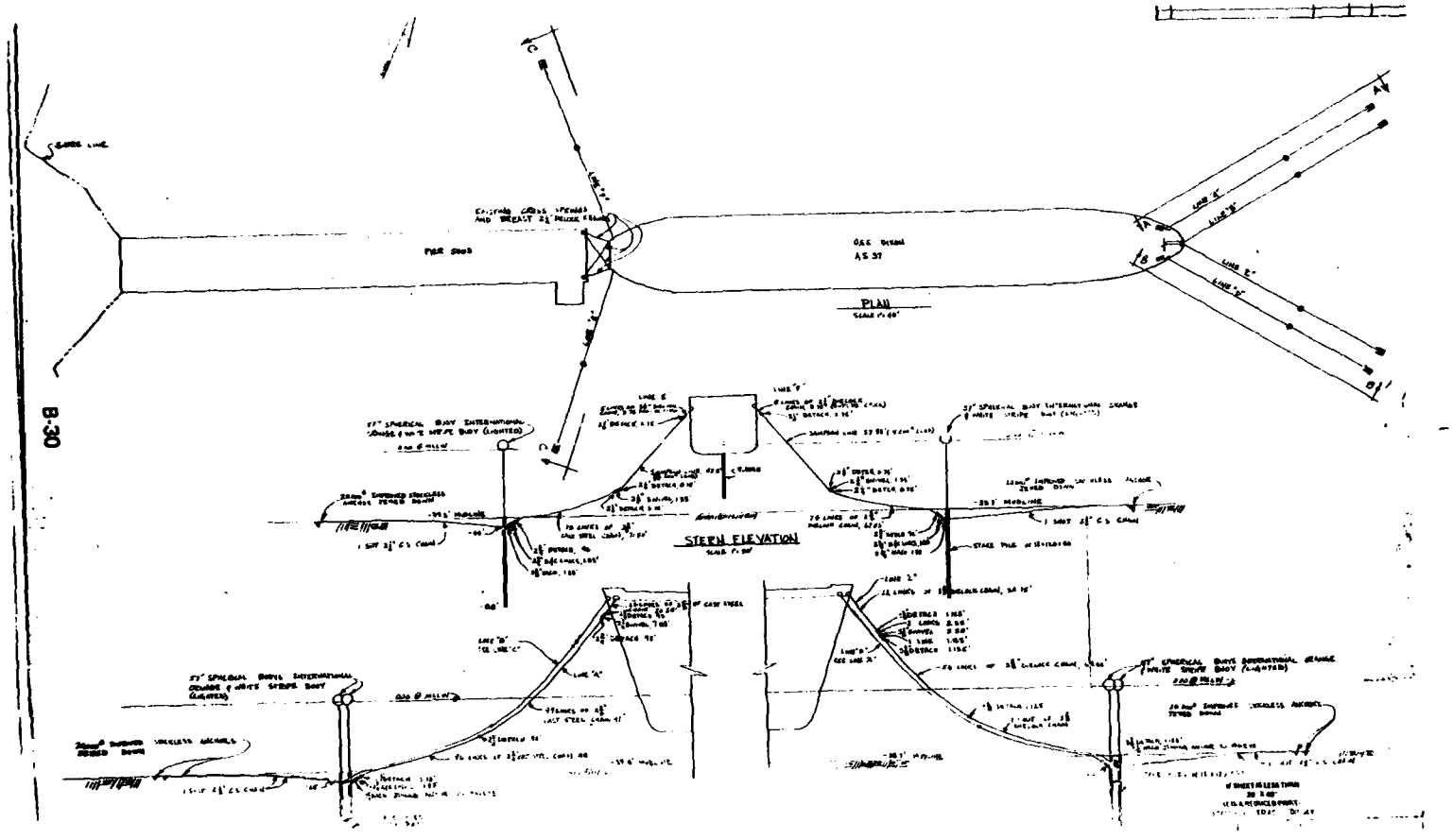
Data not available

USS TARAWA (See drawings, pages B-31, B-32)

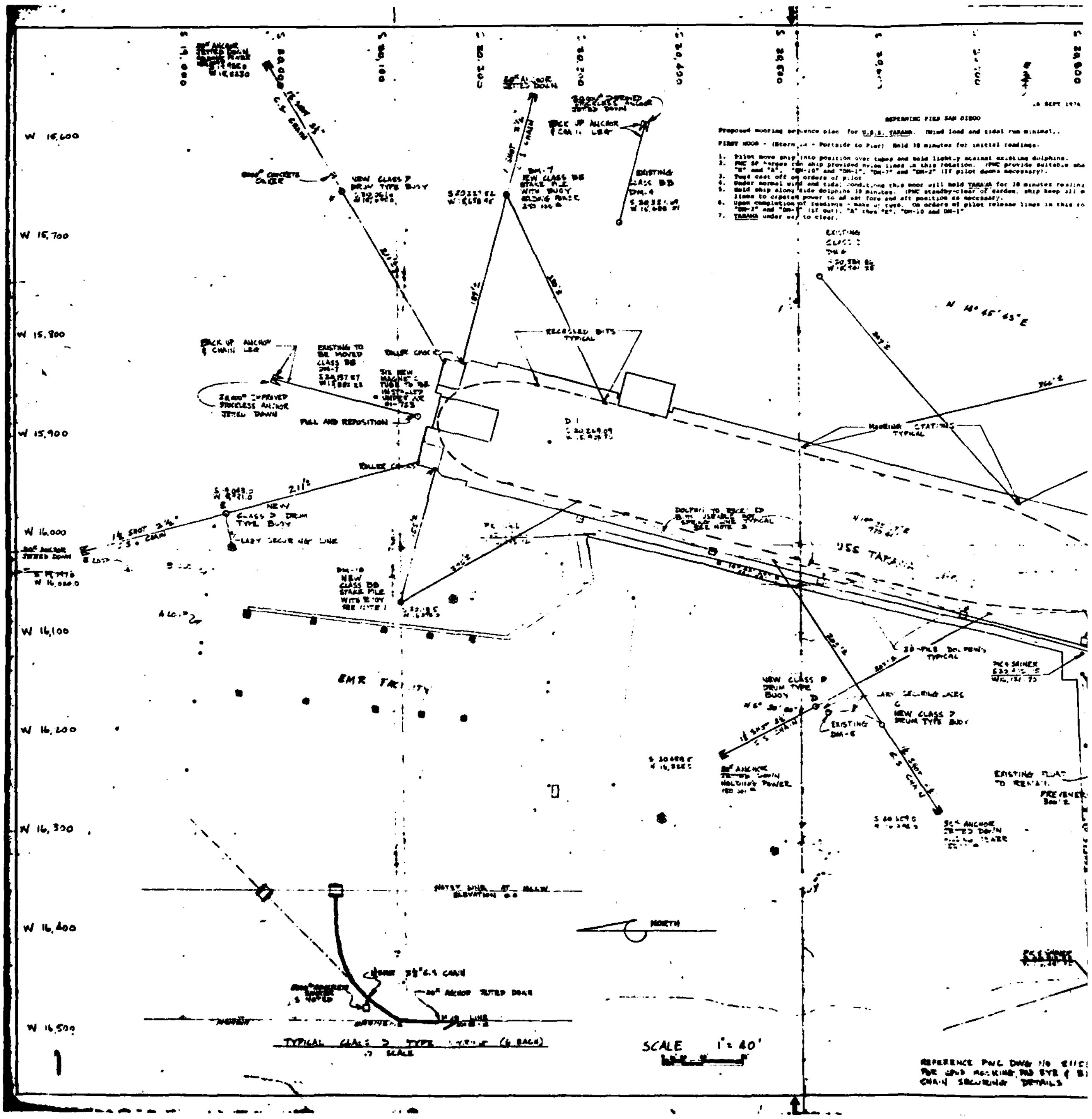

ARD - 30
NEW MOORING PLAN
GRAPHIC SCALES
C 2
NEW MOORING PLAN
6067961

6067961

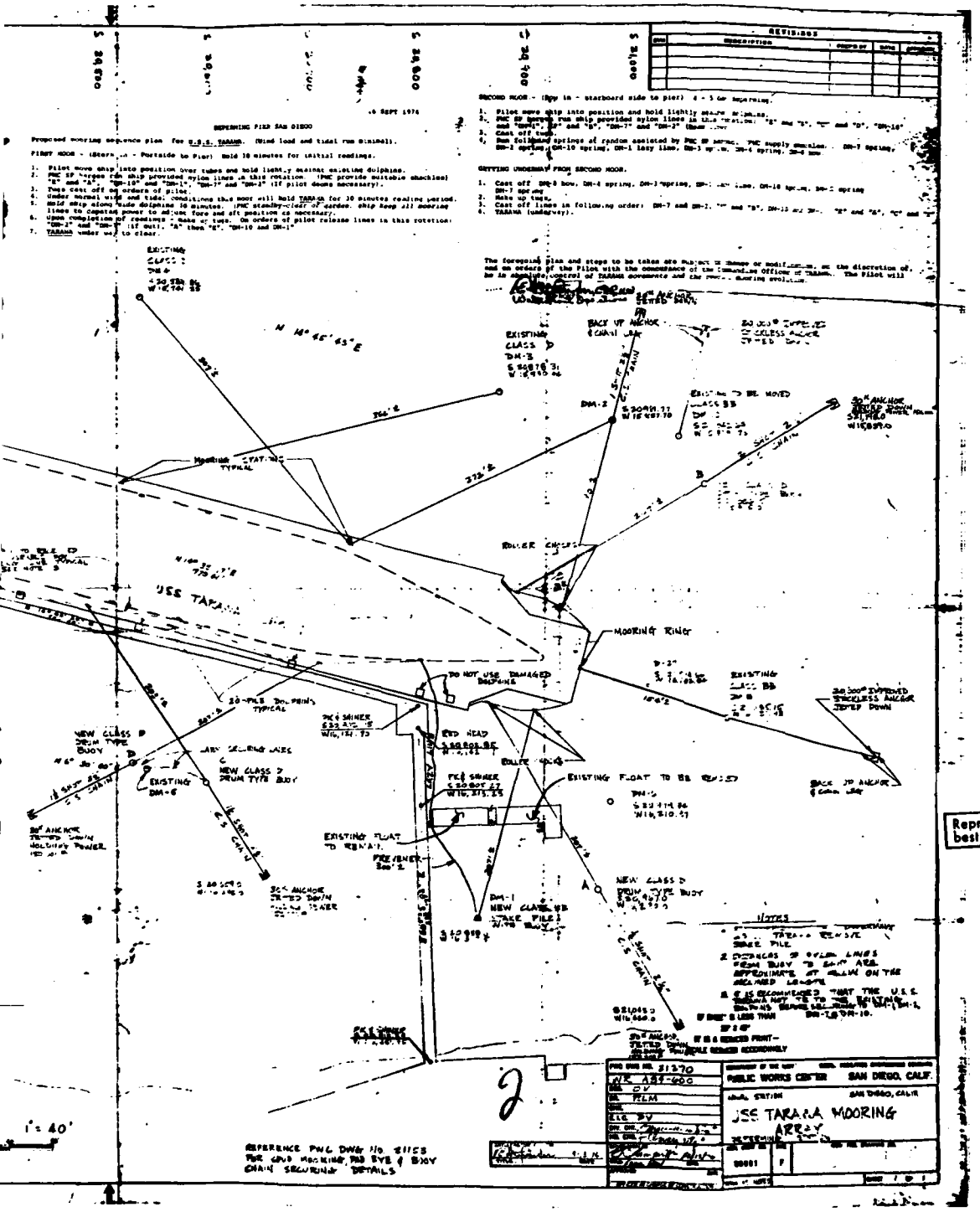




B-30



W 15,600
W 15,700
W 15,800
W 15,900
W 16,000
W 16,100
W 16,200
W 16,300
W 16,400
W 16,500
Proposed mooring sequence plan for U.S.S. TARAWA.
1. Pilot move ship into position over tubes and hold lightly against existing dolphins.
3. Tugs cast off on orders of pilot
7. TARAWA under way to clear.
EXISTING CLASS BB
NEW CLASS D DRUM TYPE BUOY
RECESSED BITS TYPICAL
MOORING STATIONS TYPICAL
PULL AND REPOSITION
USS TARAWA
20-PILE DOLPHINS TYPICAL
EXISTING FLOAT TO REMAIN
EMR FACILITY
NORTH
TYPICAL CLASS D TYPE (6 EACH)
SCALE 1" = 40'



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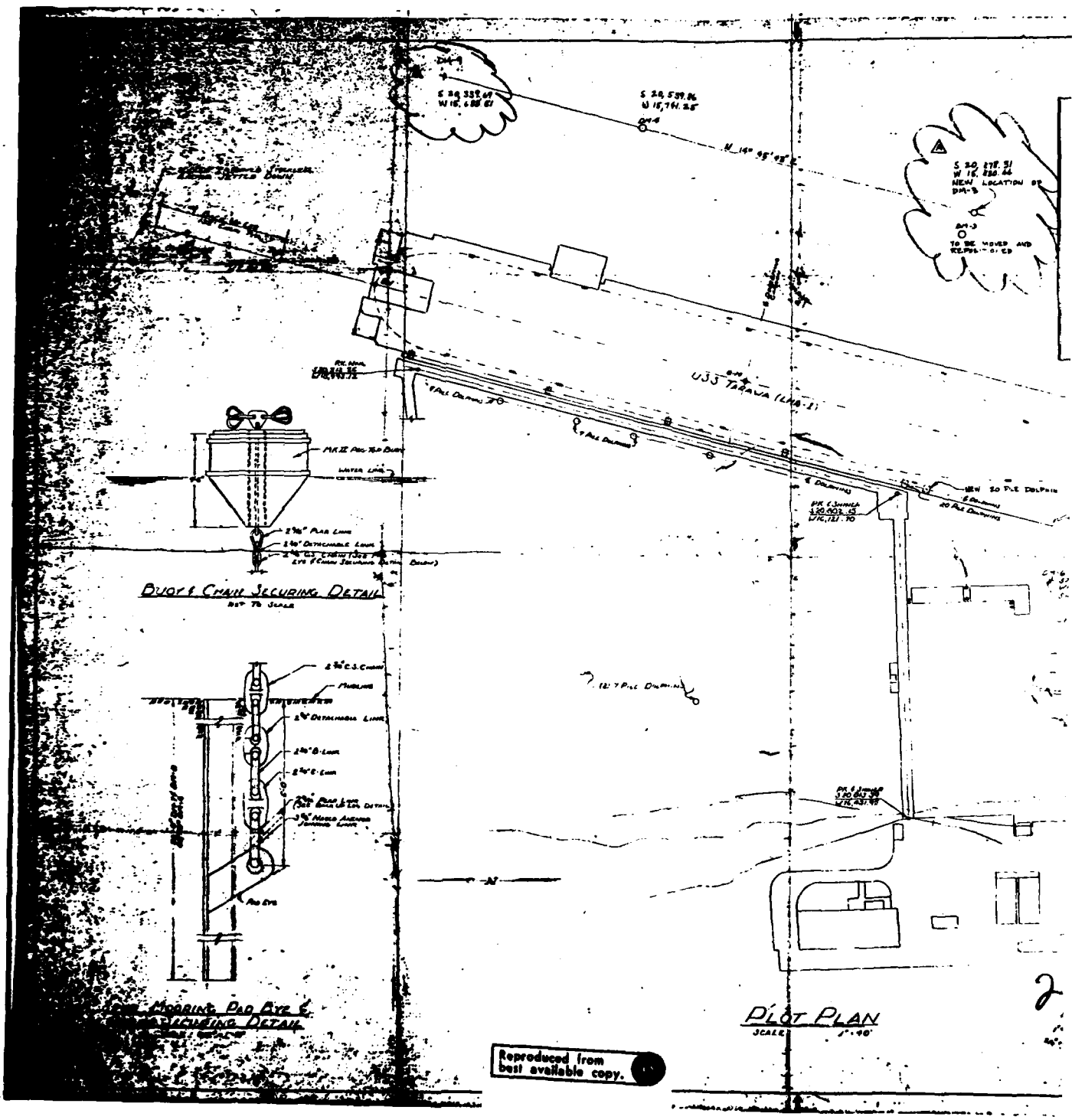
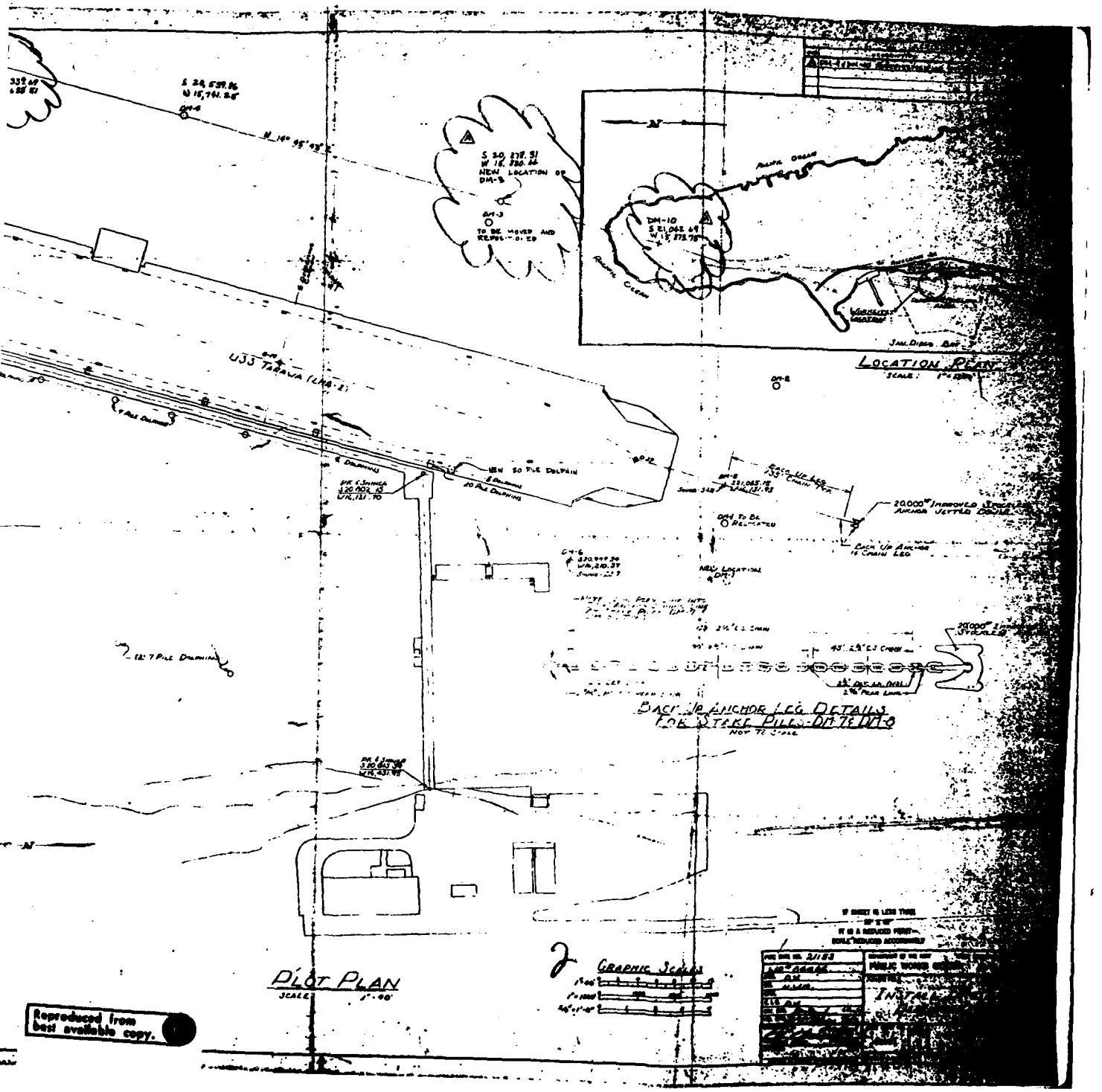

USS TARAWA (LHA-1)
NEW 50 P.E DOLPHIN
BUOY & CHAIN SECURING DETAIL
MOORING PAD EYE & CHAIN SECURING DETAIL
PLOT PLAN
Reproduced from best available copy.



2.0 UNCERTAIN DATA

T-1 & T-2	2 1/4" DieLock
FM-21	2 3/4" Riser, 2 1/2 Ground Legs, 3 - 7 Legs, 5 Legs Shown
DM-11	Similar to DM-5, Opposite Side of EMR Facility, 3 Legs, 2 1/2" Cast Steel
P-1	2 1/2" Cast Steel, 3 Legs, 4 Legs Shown
FM-49	2 3/4" Cast Steel Riser, 2 1/2 Mixed Ground Legs, 4 Legs

3.0 SUMMARY OF CHANGES TO MOORINGS SINCE 1978

T-1 & T-2	Connecting Leg Between Bouys Separated to Make Two Separate Legs (No Information)
DM-G	Deperming Add On
DM-11	Deperming Add On (No Information) Class D
FM-19	New Data Sheet
FM-21	Overhauled (No Information)
P-1	(No Information)
P-2	New Data Sheet
FM-48	New Data Sheet
FM-49	(No Information) Overhauled
CM-1	Add On
YFNB-5	Add On
Elk River	Add On
ARD-30	Add On
USS TARAWA	Add On
USS DIXON	Add On

ANNEX C

SAMPLE INSPECTION FORMS

ANNEX C

SAMPLE INSPECTION FORMS

Figures D-1 and D-2 depict two forms divers may use to record measurements and orientations respectively.

Figure D-3 is for use by the Project Engineer to summarize pertinent data.

MOORING NO.: _____ CLASS: _____ LOCATION: _____ LAT: _____ LONG: _____

WATER DEPTH: _____ TYPE MOORING: ☐ RISER ☐ TELEPHONE ANCHOR SIZE/TYPE: _____ BUOY TYPE: ____

DATE: _____ DIVER: _____ BOTTOM TYPE: ☐ SAND ☐ MUD ☐ CLAY ☐ CORAL ☐ ROCK

COMPONENTS		NI	CONDITION								U/W VOLT READING	COMMENT
			NEW	SINGLE LINK %			DOUBLE LINK %			D		
				90+	80+	80-	90+	80+	80-			
BUOY-TOP HARDWARE												
RISER	NEAR BUOY											
	MIDDLE											
	NEAR GRD RG											
GROUND RING												
GROUND LEG NO. ___	UPPER END											
	WEARPOINT											
GROUND LEG NO. ___	UPPER END											
	WEARPOINT											
GROUND LEG NO. ___	UPPER END											
	WEARPOINT											

D = destroyed; broken, or missing

NI = not inspected, inaccessible

FIGURE C-1.

TRUE BEARING Of GROUND LEGS

FIGURE C-2.

MOORING # _____ CLASS _____

INSPECTION DATE _____ TYPE _____

BOTTOM TYPE _____ WATER DEPTH _____

BUOY TYPE _____

DIMENSIONS _____

CONDITION _____

TOP HARDWARE _____

BOTTOM HARDWARE _____

RISER LENGTH _____

TYPE CHAIN _____

LINK WIDTH _____

WIRE DIAM. _____

_____

_____

_____

GROUND RING LOC. _____

OUTER DIAM. _____

WIRE DIAM. _____

CONDITION _____

LEG A LENGTH _____

EXPOSED LENGTH _____

TYPE CHAIN _____

LINK WIDTH _____

WIRE DIAM. _____

_____

_____

_____

LEG B LENGTH _____

EXPOSED LENGTH _____

TYPE CHAIN _____

LINK WIDTH _____

WIRE DIAM. _____

_____

_____

_____

LEG C LENGTH _____

EXPOSED LENGTH _____

TYPE CHAIN _____

LINK WIDTH _____

WIRE DIAM. _____

_____

_____

_____

LEG D LENGTH _____

EXPOSED LENGTH _____

TYPE CHAIN _____

LINK WIDTH _____

WIRE DIAM. _____

_____

_____

_____

RISER CONNECTIONS _____

_____

_____

_____

LEG CONNECTIONS _____

_____

_____

_____

_____

OTHER _____

_____

_____

_____

FIGURE D-3. MOORING DATA SUMMARY FOR PREPARATION OF "AS BUILTS"

END

DATE
FILMED

6-86