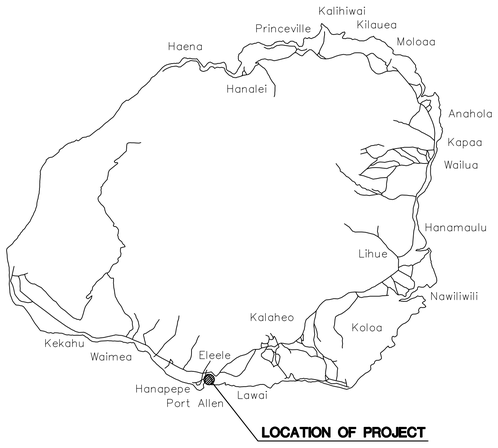
PORT ALLEN, INSTALL MOORING BOLLARDS AND CLEATS, KAUAI, HAWAII

FOR THE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

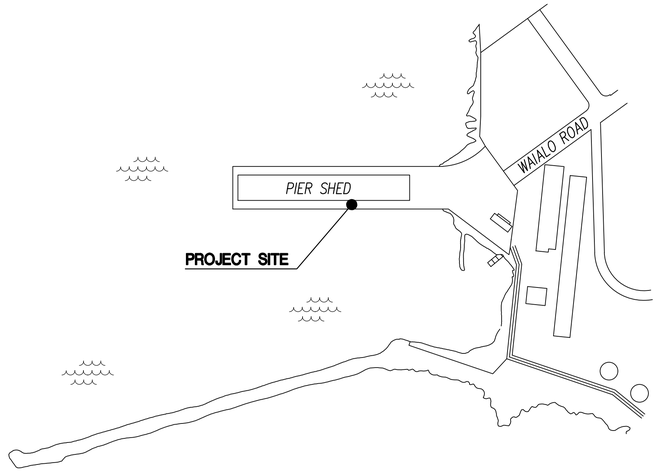
S70179



ISLAND OF KAUAI

LOCATION MAP

NOT TO SCALE



VICINITY MAP

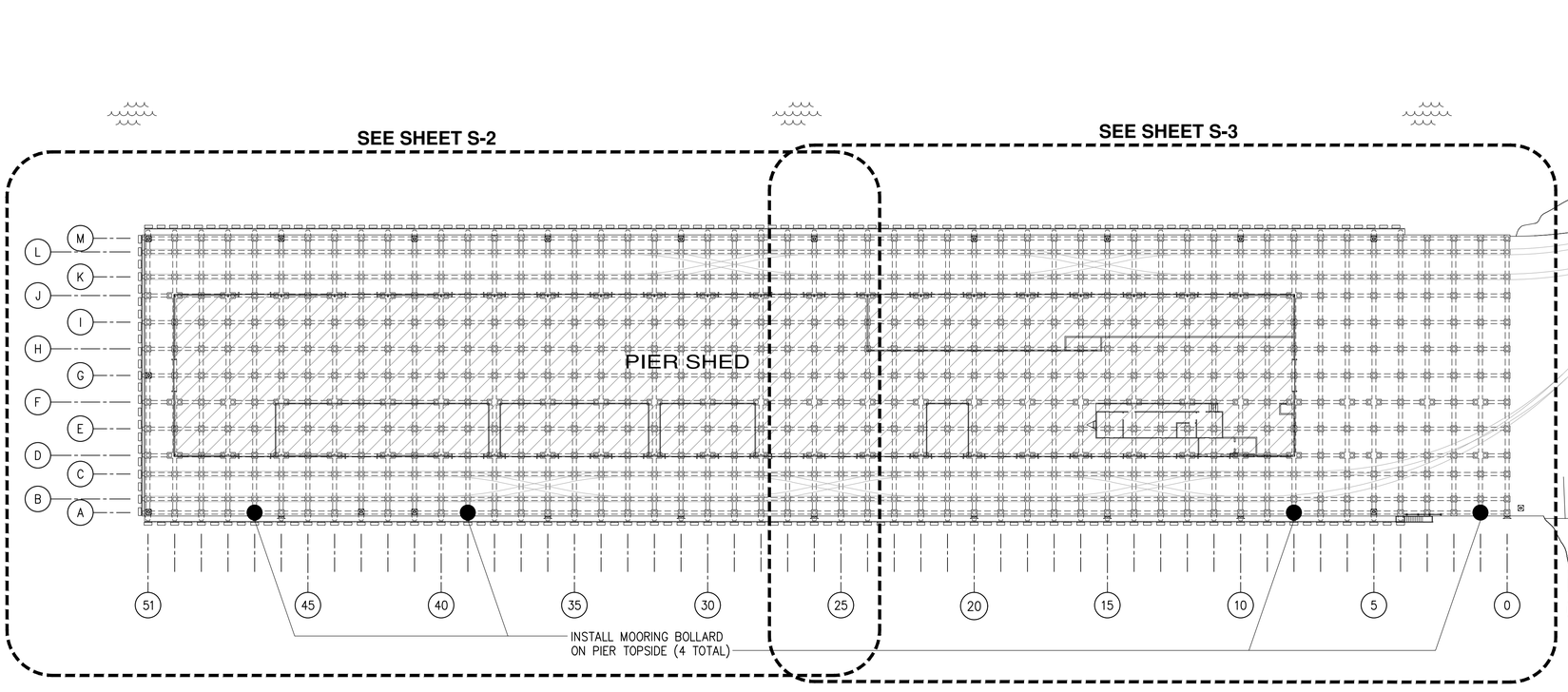
NOT TO SCALE

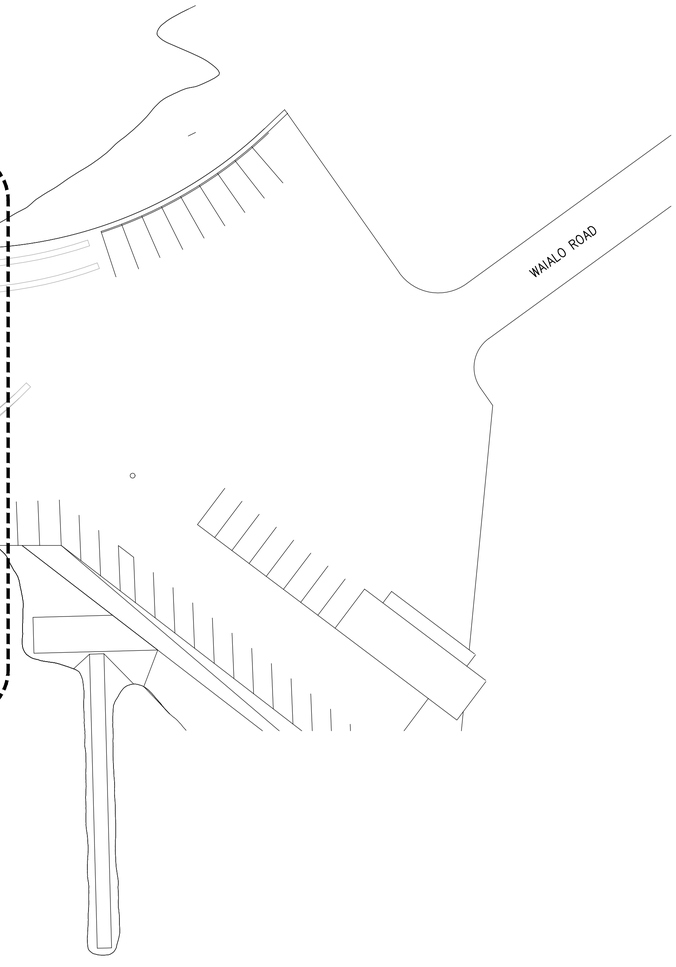
CONSULTANTS:

MKE ASSOCIATES LLC
STRUCTURAL ENGINEER

DEPARTMENT OF TRANSPORTATION STATE OF HAWAII	SHEET T-1
APPROVED BY: 04/29/2026 FOR DIRECTOR OF TRANSPORTATION DATE	1 OF 7 SHTS

INDEX TO DRAWINGS





PORT ALLEN HARBOR

NOTE:

SEE SHEETS S-2 AND S-3 FOR LOCATIONS OF MOORING CLEATS ON VERTICAL FACE.

GENERAL PLAN

SCALE: 1" = 30'-0"

NORTH

GRANT J. OKUNAGA
LICENSED PROFESSIONAL ENGINEER
No. 13001-S
HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
EXP. 4-30-28
MKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

JOB TITLE
PORT ALLEN, INSTALL MOORING BOLLARDS AND CLEATS, KAUAI, HAWAII

SHEET TITLE
INDEX TO DRAWINGS AND GENERAL PLAN

DESIGNED BY: AN
DRAWN BY: DL
CHECKED BY: GO
DATE: 04/2026
SCALE: AS SHOWN

JOB NUMBER
S70179

SHEET
T-2
2 OF 7 SHTS.

Plotted: Apr 28, 2026 - 2:43pm

STRUCTURAL NOTES:

GENERAL:

1. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE HAWAII STATE BUILDING CODE (2018 EDITION) AND THE HAWAII STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2005, FOR THE STATE OF HAWAII, UNLESS OTHERWISE INDICATED. HOWEVER, SHOULD THERE BE CONFLICTS, OR WHERE REFERENCE IS MADE TO PERFORMANCE CONFORMING TO OTHER STANDARDS THE MORE STRINGENT SHALL APPLY.
2. THE CONTRACTOR SHALL COMPARE PLANS, SPECIFICATIONS AND ALL OTHER CONTRACT DOCUMENTS WITH EACH OTHER AND REPORT IN WRITING TO THE HARBORS CONSTRUCTION ENGINEER ALL INCONSISTENCIES AND OMISSIONS.
3. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AND VERIFY FIELD CONDITIONS AND SHALL COMPARE SUCH FIELD MEASUREMENTS AND CONDITIONS WITH THE DRAWINGS BEFORE COMMENCING WORK. REPORT IN WRITING TO THE HARBORS CONSTRUCTION ENGINEER ALL INCONSISTENCIES AND OMISSIONS.
4. CONTRACTOR SHALL RESOLVE ANY DISCREPANCIES AND QUESTIONS PRIOR TO THE START OF WORK. NO EXTRA PAYMENT SHALL BE ALLOWED ON ACCOUNT OF WORK MADE NECESSARY BY CONTRACTORS FAILURE TO VISIT THE SITE AND/OR FAILURE TO RESOLVE DISCREPANCIES AND QUESTIONS.
5. THE CONTRACTOR SHALL PROTECT ALL UTILITIES AND STRUCTURES IN AND ADJACENT TO THE PROJECT SITE. ANY DAMAGE SHALL BE REPAIRED TO THE SATISFACTION OF THE HARBORS CONSTRUCTION ENGINEER AND PAID FOR BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES.
7. THE CONTRACTOR SHALL COORDINATE HIS/HER WORK WITH OTHER CONTRACTORS WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL ALSO COORDINATE WITH THE HARBORS KAUAI DISTRICT MANAGER AND CONSTRUCTION ENGINEER FOR AN APPROVED STAGING AND STORAGE AREA AND FOR RESTRICTIONS OF HARBORS OPERATIONS OVER REPAIR AREAS.
8. THE CONTRACTOR SHALL REMOVE ALL DEBRIS RESULTING FROM HIS/HER WORK AS REQUIRED FOR PUBLIC HEALTH AND SAFETY AND TO THE SATISFACTION OF THE HARBORS CONSTRUCTION ENGINEER. SHOULD THE STATE PERFORM ANY OF THE ABOVE WORK DUE TO NON-PERFORMANCE BY THE CONTRACTOR, THE CONTRACTOR AGREES TO REIMBURSE THE STATE FOR ALL COSTS INCURRED.
9. HARBOR OPERATIONS TAKE PRECEDENCE OVER CONSTRUCTION ACTIVITY. THE CONTRACTOR MUST WORK AROUND HARBOR OPERATIONS SO THAT THE PIERS WILL REMAIN OPERATIONAL. WEEKEND WORK MAY BE REQUIRED AND SHALL BE COORDINATED WITH THE HARBORS CONSTRUCTION ENGINEER AND TENANTS IN ADVANCE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR METHODS OF CONSTRUCTION, WORKMANSHIP AND JOB SAFETY. THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING AS REQUIRED FOR STABILITY OF STRUCTURAL MEMBERS AND SYSTEMS.
11. ALL WORK SPECIFIED IN THE CONTRACT BUT NOT LISTED SEPARATELY SHALL BE CONSIDERED INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.
12. NOTES AND DETAILS ON THE PLANS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. SHOULD THERE BE CONFLICTS BETWEEN THE REQUIREMENTS OF THE PLANS OR SPECIFICATIONS, THE MORE STRINGENT SHALL APPLY.
13. THE CONTRACTOR SHALL COMPLY WITH THE CLEAN WATER ACT AND THE STATE HARBORS STORMWATER MANAGEMENT PROGRAM. NO POLLUTANTS ARE ALLOWED TO BE DISCHARGED DIRECTLY OR INDIRECTLY INTO ADJACENT HARBOR WATER, THROUGH THE HARBORS SMALL MS4 OR OTHER POTENTIAL PATHWAYS.
14. THE CONTRACTOR WILL BE RESPONSIBLE FOR REGULATORY FINES OR PENALTIES THAT MAY BE IMPOSED BY ENVIRONMENTAL REGULATORY AGENCIES (USEPA AND/OR STATE DOH) IN THE EVENT OF VIOLATIONS.
15. HARBOR OPERATIONS TAKE PRECEDENCE OVER CONSTRUCTION ACTIVITY. THE CONTRACTOR MUST WORK AROUND THESE OPERATIONS SO THAT THE PIER WILL REMAIN OPERATIONAL. WEEKEND WORK MAY BE REQUIRED.
16. THE CONTRACTOR SHALL SUBMIT A SITE-SPECIFIC BEST MANAGEMENT PRACTICES (BMP) PLAN TO THE HARBORS ENGINEERING BRANCH FOR REVIEW AND ACCEPTANCE PRIOR TO THE START OF ANY CONSTRUCTION WORK. THIS BMP PLAN SHALL COMPLY WITH THE TEMPORARY WATER POLLUTION, DUST, AND EROSION CONTROL ARTICLE IN THE SPECIFICATIONS AND PROPOSAL.
17. IN CASE OF SPILL, LEAK OR OTHER RELEASE CONTAINING A HAZARDOUS SUBSTANCE OR OIL, THE CONTRACTOR SHALL NOTIFY APPROPRIATE FACILITY PERSONNEL, EMERGENCY RESPONSE AGENCIES, AND REGULATORY AGENCIES FOLLOWING NOTIFICATION PROCEDURES, AND SHALL NOTIFY THE HARBORS CONSTRUCTION ENGINEER AND ENVIRONMENTAL HOTLINE (808-587-1962) IMMEDIATELY (I.E., WITHIN 24 HOURS). SUCH CONTACT INFORMATION MUST BE IN LOCATIONS THAT ARE READILY ACCESSIBLE AND AVAILABLE.
18. TIDAL DATA MAY NOT REPRESENT CONDITIONS THAT OCCUR DURING CONSTRUCTION AND ACTUAL WATER LEVELS WILL VARY FROM LEVELS INDICATED. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN ESTIMATES OF WATER LEVELS WHICH MAY OCCUR DURING CONSTRUCTION. VARIATION FROM TIDAL LEVELS INDICATED OR CONTRACTOR'S ESTIMATION OF TIDAL LEVELS WILL NOT BE CONSIDERED AS A CLAIM FOR ADDITIONAL COMPENSATION OR DELAY OF WORK.

DESIGN CRITERIA:

1. THE INTENT OF THIS PROJECT IS TO PROVIDE ADDITIONAL MOORING BOLLARDS AND CLEATS WITHOUT SUBJECTING THE PIER TO ADDITIONAL MOORING LOADS THAT EXCEED THE ORIGINAL PIER CONSTRUCTION. PER THE STATE AND TENANT, THE VESSEL MOORING LOADS WILL REMAIN THE SAME.
2. MOORING BOLLARDS ON THE PIER TOPSIDE WILL BE USED BY THE FUEL BARGE WHICH ORIGINALLY TIED TO A SINGLE MOORING BOLLARD AT EACH END OF THE VESSEL. MULTIPLE ADJACENT MOORING BOLLARDS ARE PROVIDED TO SPREAD THE SINGLE MOORING LINE LOAD TO MULTIPLE LINES AND MULTIPLE ADJACENT MOORING BOLLARDS.
3. MOORING CLEATS ON THE PIER VERTICAL FACE WILL BE USED BY SMALL CATAMARAN VESSELS AND ARE INTENDED TO PROVIDE ADDITIONAL MOORING LOCATIONS ALONG THE PIER. THE NUMBER OF VESSELS MOORED ON THE PIER WILL REMAIN THE SAME AND MULTIPLE VESSELS WILL NO LONGER NEED TO TIE MULTIPLE MOORING LINES TO THE SAME CLEAT.

CONCRETE:

1. CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE ACI 318R-14 AND ACI 546R-14.
2. FORMED CONCRETE SHALL BE CLASS f'c=5,000 PSI WITH FLY ASH AND CORTEC MCI 2005 NS MIGRATING CORROSION INHIBITING ADMIXTURE, OR APPROVED EQUAL.
3. MAXIMUM AGGREGATE SIZE SHALL BE ⅜ INCHES AND SHALL BE COORDINATED WITH CONCRETE PREPARATION PROCEDURES FOR SPALL REPAIRS.
4. CONCRETE DELIVERY TICKETS SHALL RECORD ALL FREE WATER IN THE MIX: AT BATCHING BY PLANT, FOR CONSISTENCY BY DRIVER, AND ANY ADDITIONAL REQUEST BY CONTRACTOR IF PERMITTED BY THE MIX DESIGN.
5. MAXIMUM WATER TO CEMENTITIOUS MATERIALS RATIO SHALL BE 0.40.
6. ANTI-CORROSION COATING WITH A MINIMUM 7 DAY OPEN TIME FOR REINFORCING STEEL SHALL BE SIKA ARMATEC 110 EPOCEM BY SIKA OR APPROVED EQUAL.
7. TIE WIRE SHALL BE PLASTIC-COATED, STAINLESS STEEL, OR MADE OF DIELECTRIC OR OTHER ACCEPTABLE MATERIAL. ALL LOOSE REINFORCING STEEL SHALL BE SECURED WITH TIES AT ALL INTERSECTIONS WITH ADJACENT REINFORCING STEEL.
8. REINFORCING BARS, ANCHOR BOLTS, INSERTS, AND OTHER ITEMS TO BE CAST IN THE CONCRETE SHALL BE SECURED IN POSITION PRIOR TO PLACEMENT OF CONCRETE.
9. NON-SHRINK GROUT SHALL BE A PREMIXED NON-METALLIC FORMULA, CAPABLE OF DEVELOPING A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI IN 1 DAY AND 5,000 PSI IN 28 DAYS.

STRUCTURAL STEEL:

1. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL OF STEEL CONSTRUCTION, FIFTEENTH EDITION.
2. STRUCTURAL STEEL FOR MOORING CLEATS SHALL BE TYPE 304 STAINLESS STEEL UNLESS NOTED OTHERWISE.
3. ANCHOR BOLTS FOR MOORING CLEATS SHALL BE TYPE 304 STAINLESS STEEL UNLESS NOTED OTHERWISE.
4. WELDS AND WELDING PROCEDURES SHALL CONFORM TO THE STRUCTURAL WELDING CODES AWS D1.1 AND D1.6 OF THE AMERICAN WELDING SOCIETY.
5. WELDING SHALL BE PERFORMED BY WELDERS PREQUALIFIED FOR WELDING PROCEDURES TO BE USED.
6. WELDING ELECTRODES SHALL BE E308L FOR STAINLESS STEEL, HAVE AN ULTIMATE TENSILE STRENGTH OF 70 KSI AND SHALL BE BOTH COMPATIBLE AND PROVIDE CORROSION RESISTANCE WITH THE BASE METAL.

MOORING BOLLARD:

1. MOORING BOLLARD SHALL NOT BE SUBJECTED TO LIVE LOADS UNTIL CONCRETE HAS BEEN ALLOWED TO CURE FOR 7 DAYS OR OBTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
2. CONTRACTOR SHALL PERFORM ANY TOUCH-UP COATING. TOUCH-UP COATING SHALL BE AMERLOCK 400 AND PSX 700 BY PPG PROTECTIVE AND MARINE COATINGS, OR APPROVED EQUAL. COLOR SHALL BE OSHA YELLOW.

MOORING BOLLARD REPAIR PROCEDURE:

1. DEMOLISH EXISTING CONCRETE AND HARDWARE. AVOID DAMAGING EXISTING REINFORCING STEEL.
2. INSTALL ANCHOR HARDWARE.
3. CLEAN AND COAT EXISTING REINFORCING STEEL WITH ANTI-CORROSION COATING.
4. APPLY EPOXY BONDING AGENT AND PLACE CONCRETE.
5. INSTALL MOORING BOLLARD PLUMB.
6. INSTALL NON-SHRINK GROUT PAD.
7. FILL MOORING BOLLARD WITH CONCRETE.
8. CUT BOLTS AS NECESSARY AND FILL MOORING BOLLARD BOLT HOLES WITH POLYURETHANE SEALANT.
9. APPLY AND TOUCH-UP EPOXY COATING ON MOORING BOLLARD.

REVISION	DATE	DESCRIPTION	BY	APPROVED

GRANT J. OKUHARA
LICENSED PROFESSIONAL ENGINEER
No. 13001-S
HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
EXP. 4-30-28
MKE ASSOCIATES LLC

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

JOB TITLE
PORT ALLEN, INSTALL MOORING BOLLARDS AND CLEATS, KAUAI, HAWAII

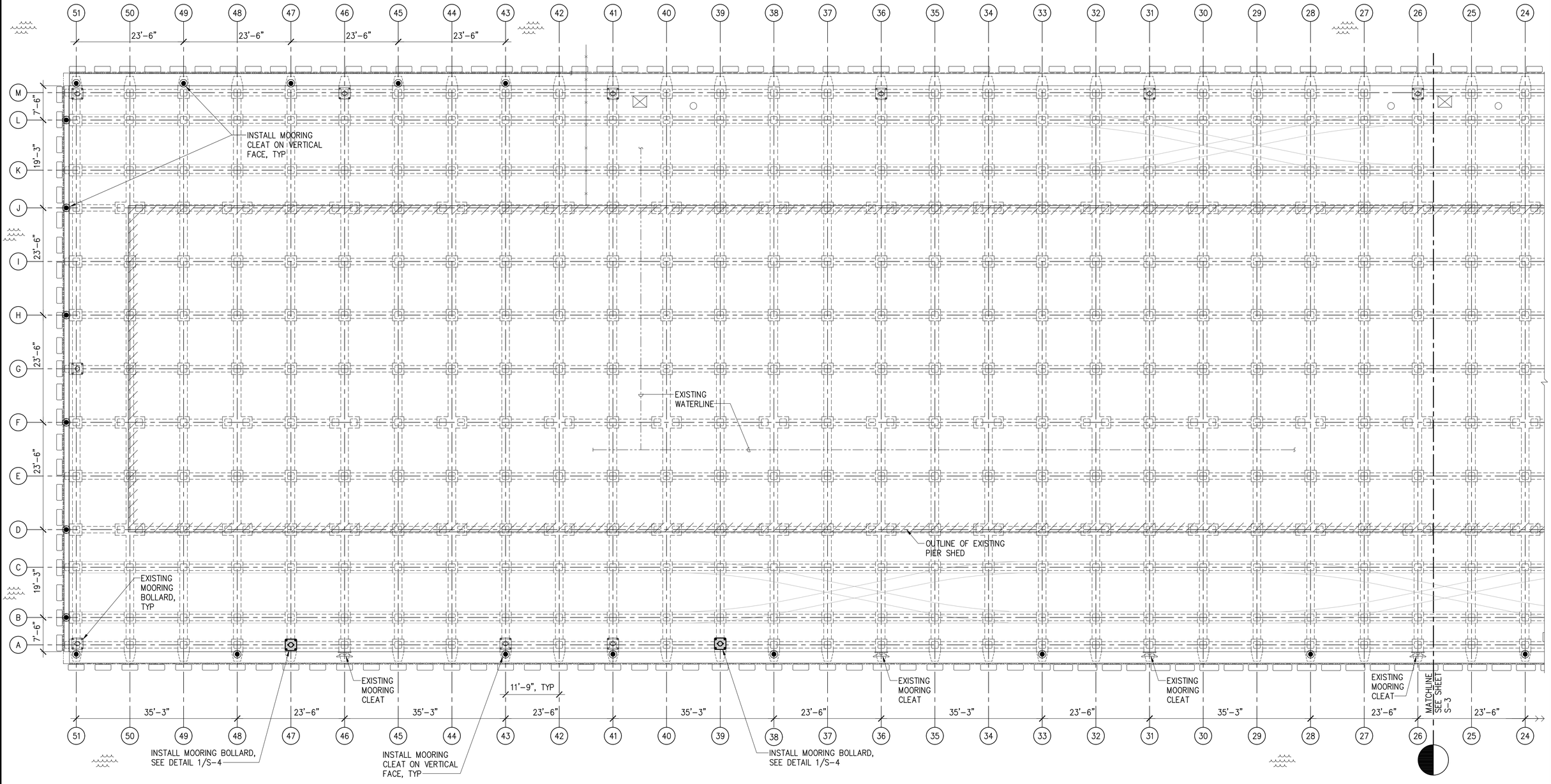
SHEET TITLE
STRUCTURAL NOTES

DESIGNED BY: AN
DRAWN BY: DL
CHECKED BY: GO
DATE: 04/2026
SCALE: AS SHOWN

JOB NUMBER
S70179

SHEET
S-1
3 OF 7 SHTS.

Plotted: Apr 28, 2026 - 4:42pm



LEGEND:

◉ INDICATES MOORING CLEAT, SEE DETAIL 1/S-5

PARTIAL PIER PLAN

SCALE: 1" = 10'

NORTH

REVISION	DATE	DESCRIPTION	BY	APPROVED

GRANT J. OKUNAGA
LICENSED PROFESSIONAL ENGINEER
No. 13001-S
HAWAII U.S.A.

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EXP. 4-30-28
MKE ASSOCIATES LLC

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

JOB TITLE
PORT ALLEN, INSTALL MOORING BOLLARDS AND CLEATS, KAUAI, HAWAII

SHEET TITLE
PARTIAL PIER PLAN

DESIGNED BY: AN
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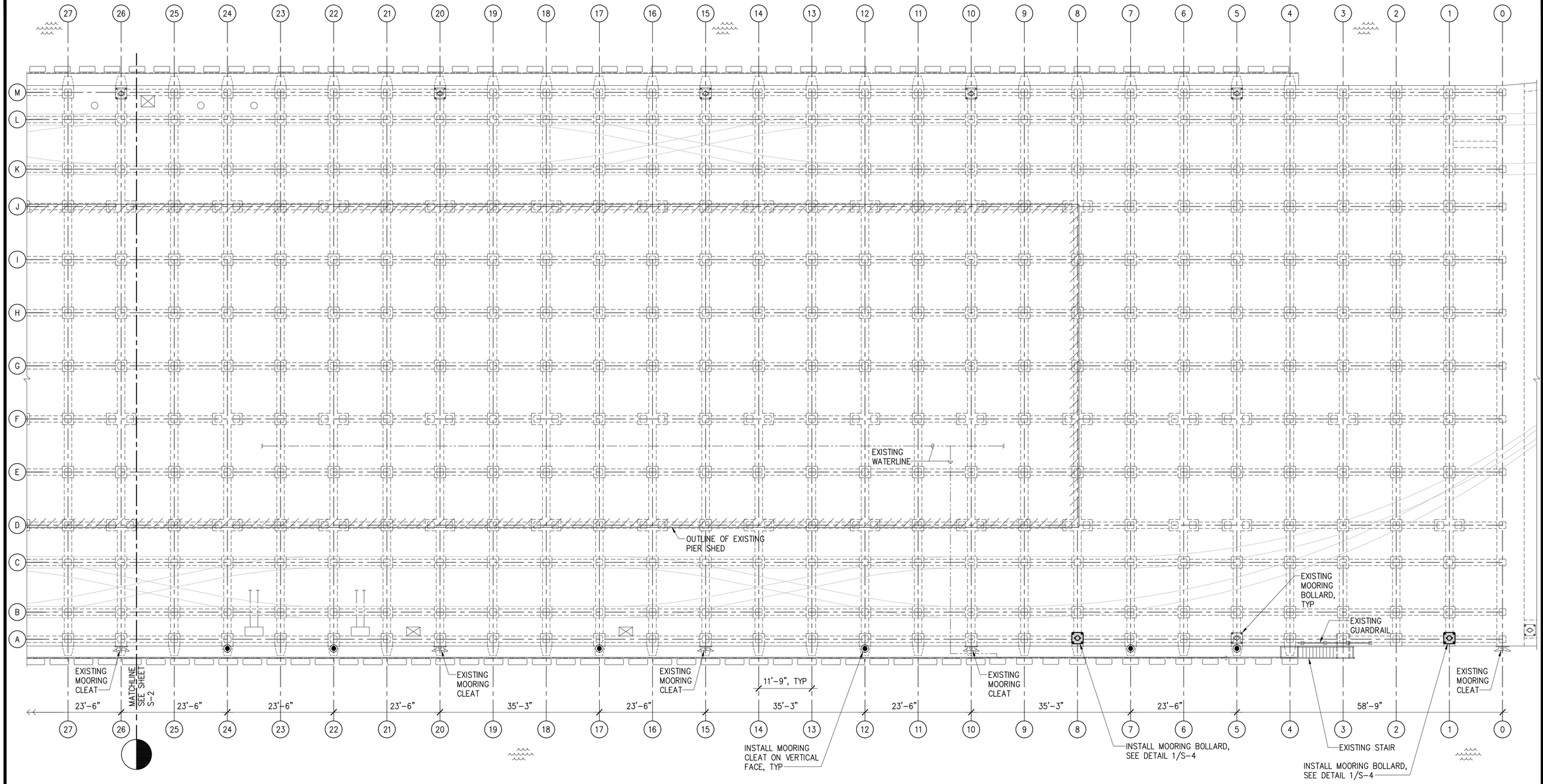
DATE: 04/2026
SCALE: AS SHOWN

JOB NUMBER
S70179

SHEET
S-2
4 OF 7 SHTS.

Plotted: Apr 29, 2026 - 2:43pm



LEGEND:

◉ INDICATES MOORING CLEAT, SEE DETAIL 1/S-5

PARTIAL PIER PLAN

SCALE: 1" = 10'

NORTH

REVISION	DATE	DESCRIPTION	BY	APPROVED

GRANT J. OKUNAGA
LICENSED PROFESSIONAL ENGINEER
No. 13001-S
HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
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MKE ASSOCIATES LLC

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

JOB TITLE
PORT ALLEN, INSTALL MOORING BOLLARDS AND CLEATS, KAUAI, HAWAII

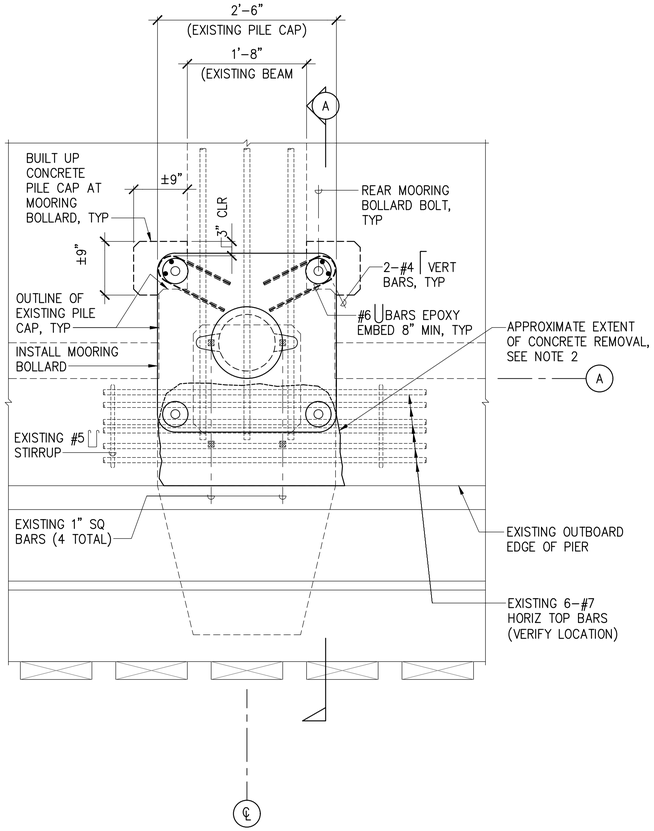
SHEET TITLE
PARTIAL PIER PLAN

DESIGNED BY:	AN
DRAWN BY:	DL
CHECKED BY:	GO
DATE:	04/2026
SCALE:	AS SHOWN

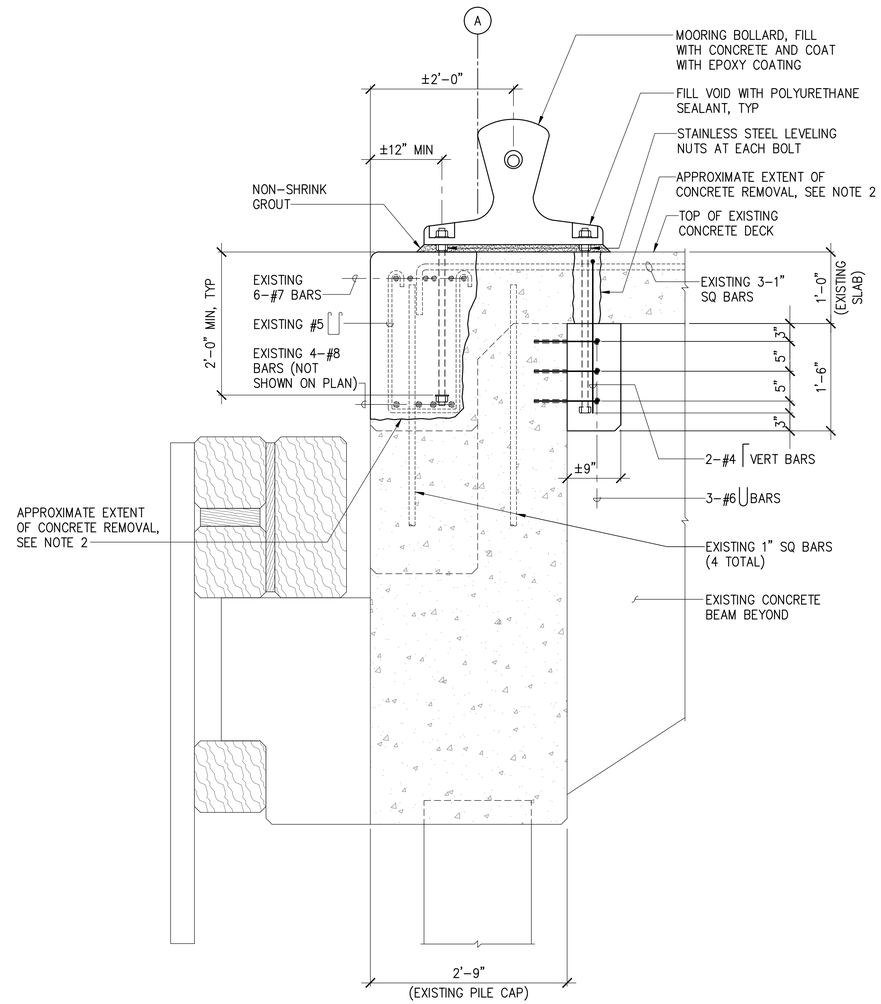
JOB NUMBER
S70179

SHEET
S-3
5 OF 7 SHTS.

Plotted: Apr 28, 2026 - 2:43pm



TOPSIDE PLAN



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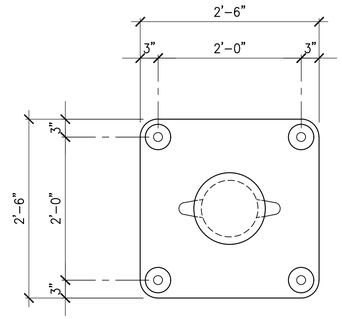

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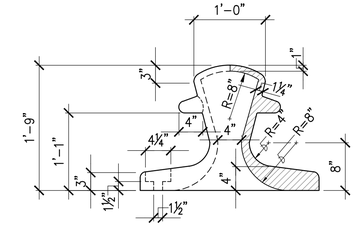


ELEVATION

MOORING BOLLARD DIMENSIONS

NOTES:

1. DRAWINGS REPRESENT THE ENGINEER'S BEST KNOWLEDGE OF THE REPAIR AREA. CONTRACTOR SHALL VERIFY FIELD CONDITIONS AND REPORT ANY DISCREPANCIES TO THE CONSTRUCTION ENGINEER BEFORE STARTING THE WORK.
2. SAVE ALL EXISTING REINFORCING STEEL AT CONCRETE REMOVAL AREAS AND APPLY BONDING AGENT JUST PRIOR TO PLACING CONCRETE.

1 / S-4 MOORING BOLLARD DETAILS
SCALE: 1" = 1'-0"

REVISION	DATE	DESCRIPTION	BY	APPROVED

GRANT J. OKUNAGA LICENSED PROFESSIONAL ENGINEER No. 13001-S HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
EXP. 4-30-28
MKE ASSOCIATES LLC

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

JOB TITLE
PORT ALLEN, INSTALL MOORING BOLLARDS AND CLEATS, KAUAI, HAWAII

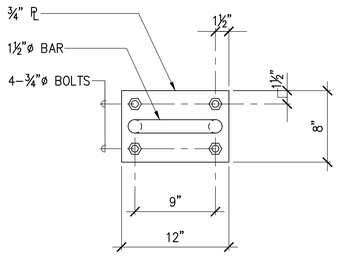
SHEET TITLE
MOORING BOLLARD REPAIR DETAILS

DESIGNED BY: AN
DRAWN BY: DL
CHECKED BY: GO
DATE: 04/2026
SCALE: AS SHOWN

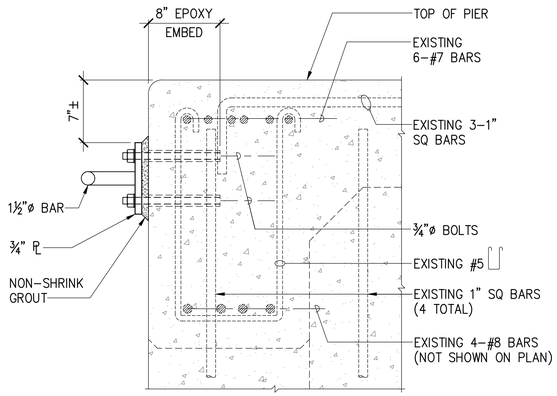
JOB NUMBER
S70179

SHEET
S-4
6 OF 7 SHTS.

Plotted: Apr 29, 2026 - 2:50pm



ELEVATION



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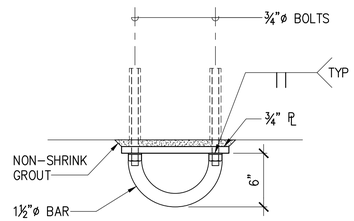

TOP VIEW

NOTE:

EPOXY COATING NOT REQUIRED ON MOORING CLEATS.

1
S–5

MOORING CLEAT DETAILS

SCALE: 1–1/2" = 1'–0"

Plotted: Apr 29, 2026 - 2:51pm

GRANT J. OKUNAGA
LICENSED PROFESSIONAL ENGINEER
No. 13001–S
HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
EXP. 4–30–28
MKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

JOB TITLE
PORT ALLEN, INSTALL MOORING BOLLARDS AND CLEATS, KAUAI, HAWAII

SHEET TITLE
MOORING CLEAT DETAILS

DESIGNED BY: AN
DRAWN BY: DL
CHECKED BY: GO
DATE: 04/2026
SCALE: AS SHOWN

JOB NUMBER
S70179

SHEET
S-5
7 OF 7 SHTS.