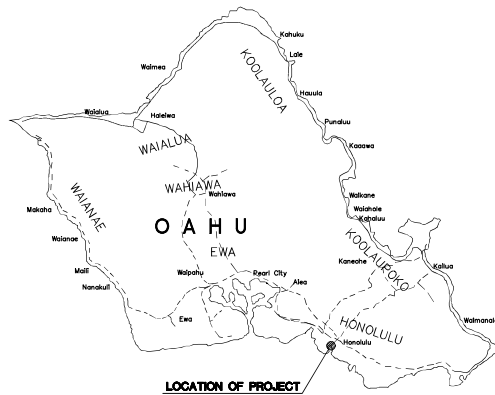


SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII

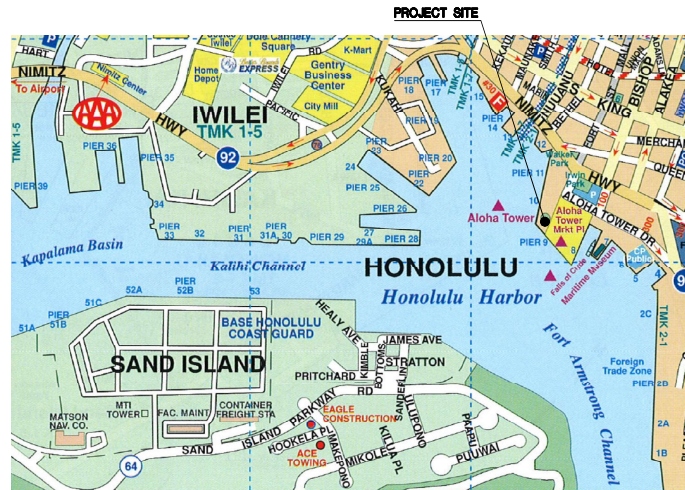
FOR THE
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS
S10921



ISLAND OF OAHU

LOCATION MAP

NOT TO SCALE



VICINITY MAP

NOT TO SCALE

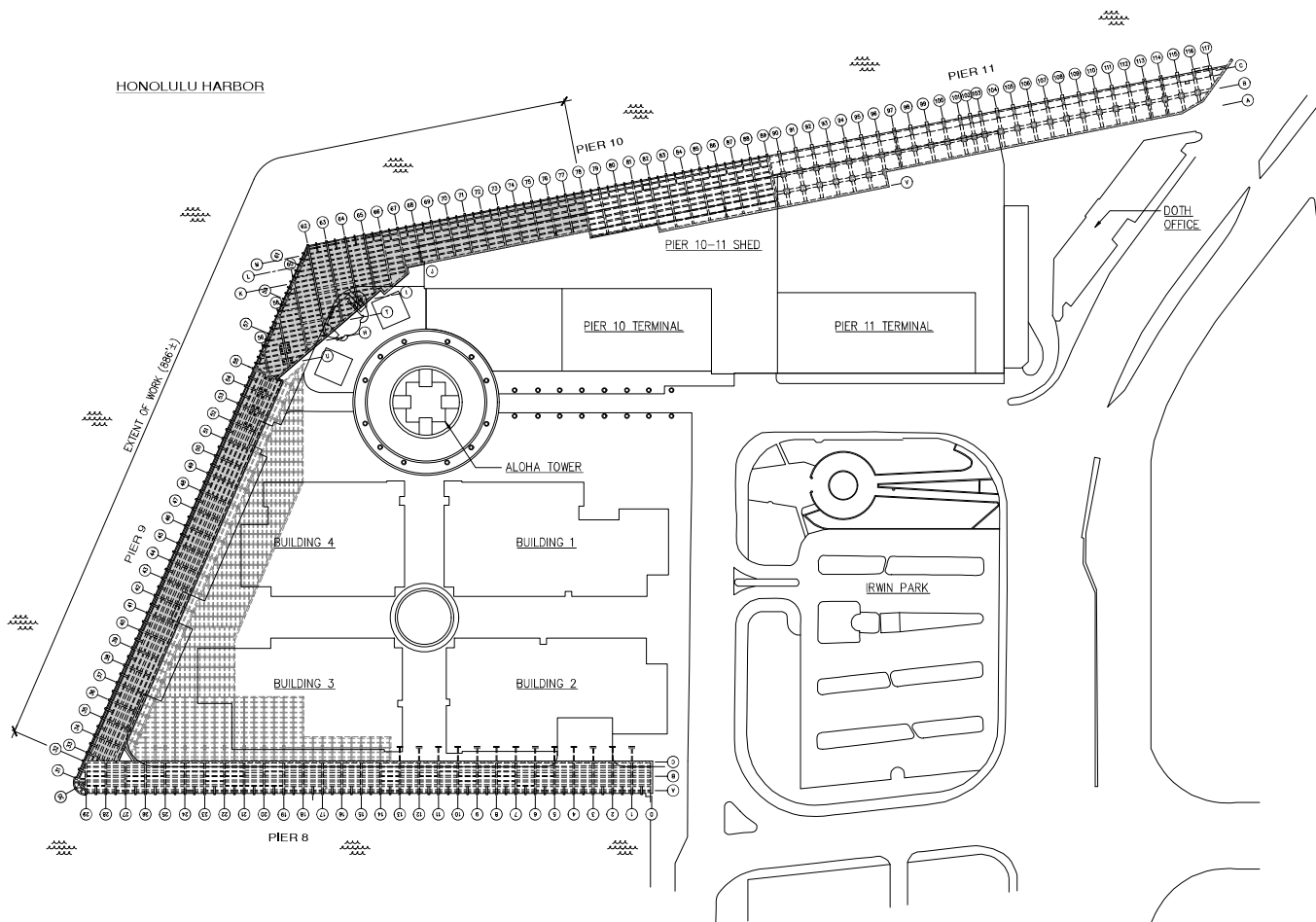


CONSULTANT:

MKE ASSOCIATES LLC
STRUCTURAL ENGINEER

DEPARTMENT OF TRANSPORTATION STATE OF HAWAII		SHEET T-1
APPROVED BY:		Aug 12, 2024
FOR DIRECTOR OF TRANSPORTATION		DATE 1 of 14 sheets

HONOLULU HARBOR



GENERAL PLAN
NOT TO SCALE



INDEX TO DRAWINGS

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	REVISION DATE DESCRIPTION BY APPROVED		
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS		
	JOB TITLE SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII		
	SHEET TITLE INDEX TO DRAWINGS AND GENERAL PLAN		
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION Exp. 4-30-26 W&E ASSOCIATES LLC	DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN	JOB NUMBER S10921	
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STRUCTURAL NOTES:

GENERAL:

- 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.
- 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.
- 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.
- 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.
- 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.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES.
- THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL ALSO COORDINATE WITH THE HARBORS OAHU DISTRICT MANAGER AND CONSTRUCTION ENGINEER FOR AN APPROVED STAGING AND STORAGE AREA AND FOR RESTRICTIONS OF HARBORS OPERATIONS OVER REPAIR AREAS.
- THE CONTRACTOR SHALL REMOVE ALL DEBRIS RESULTING FROM HIS 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.
- 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.
- ALL WORK SPECIFIED IN THE CONTRACT BUT NOT LISTED SEPARATELY SHALL BE CONSIDERED INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.
- 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.
- 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 THROUGH THE HARBORS SMALL MS4 OR OTHER POTENTIAL PATHWAY INTO HARBORS WATERS.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR REGULATORY FINES OR PENALTIES THAT MAY BE IMPOSED BY ENVIRONMENTAL REGULATORY AGENCIES (EPA AND/OR STATE DOH) IN THE EVENT OF VIOLATIONS.
- ALPHA TOWER MARKETPLACE, HAWAII PACIFIC UNIVERSITY, CRUISE SHIP AND HARBOR OPERATIONS TAKE PRECEDENCE OVER CONSTRUCTION ACTIVITY. THE CONTRACTOR MUST WORK AROUND THESE 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.
- THE CONTRACTOR SHALL PROVIDE DOCUMENTATION ON THE TYPES, SIZES, AND LOCATIONS OF ALL STRIPING AND STENCILS IN THE WORK AREA TO THE HARBORS CONSTRUCTION ENGINEER BEFORE STARTING THE WORK. REINSTALLATION OF STRIPING AND STENCILS AFTER THE WORK HAS BEEN COMPLETED SHALL BE PERFORMED BY DOT HARBORS.
- THE CONTRACTOR SHALL SUBMIT A SITE-SPECIFIC BEST MANAGEMENT PRACTICE (BMP) PLAN AND HEALTH AND SAFETY PLAN TO THE HARBOR ENGINEERING BRANCH PRIOR TO THE START OF ANY CONSTRUCTION WORK.
- IN CASE OF RELEASE OF HAZARDOUS SUBSTANCE, OIL, OR ENCOUNTER OF CONTAMINATED SOIL, THE CONTRACTOR SHALL NOTIFY APPROPRIATE FACILITY PERSONNEL, EMERGENCY RESPONSE AGENCIES, AND REGULATORY AGENCIES FOLLOWING NOTIFICATION PROCEDURES, AND SHALL NOTIFY THE HARBORS CONSTRUCTION ENGINEER IMMEDIATELY (I.E. WITHIN 24-HOURS). CONTACT INFORMATION MUST BE IN LOCATIONS THAT ARE READILY ACCESSIBLE AND AVAILABLE.
- 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.

CONCRETE MATERIALS:

- CONCRETE FOR SPALL REPAIRS SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF $f'_c=5000$ PSI WITH SILICA FUME AND CORTEC MCI 2005NS MIGRATING CORROSION INHIBITING ADMIXTURE, OR APPROVED EQUAL.
- PATCHING COMPOUND FOR REPAIRING VERTICAL AND SOFFIT SPALLS IN LIFTS SHALL BE SIKAFLOK VOH WITH LATEX R, OR APPROVED EQUAL.
- ANTI-CORROSION COATING WITH A MINIMUM 7 DAY OPEN TIME FOR EMBEDDED BARE STEEL AND NON-FACTORY COATED REINFORCING STEEL SHALL BE SIKA ARMATEC 110 EPOCOP, OR APPROVED EQUAL. PATCHING COMPOUND AND ANTI-CORROSION COATING SHALL BE FROM THE SAME MANUFACTURER.
- REINFORCING STEEL FOR WELD SPLICING SHALL BE ASTM A706 GRADE 60. WELDING ELECTRODES SHALL BE LOW HYDROGEN E70.
- REINFORCING STEEL NOT TO BE WELD SPLICED SHALL BE ASTM A706 OR ASTM A615, GRADE 60.
- SNAP TIES, TIE WIRES AND INSERTS SHALL BE PLASTIC OR STAINLESS STEEL.
- EPOXY FOR HORIZONTAL AND VERTICAL GROUTING OF DOWELS IN CRACKED OR UNCRACKED CONCRETE SHALL BE SET 3G BY SIMPSON STRONG-TIE OR APPROVED EQUAL.
- MIGRATING CORROSION INHIBITOR SHALL BE MCI-2020 V/O BY CORTEC, OR APPROVED EQUAL.

CONCRETE PLACEMENT:

- THE CONTRACTOR SHALL REMOVE ALL EXISTING SPALLED OR DELAMINATED GUNITE ON SLABS, BEAMS, HAUNCHES, GIRDERS, PILE CAPS, PILES AND THE BULKHEAD WALL WITHIN THE PROJECT AREA AS SHOWN. SOUND GUNITE MAY REMAIN.
- AFTER REMOVAL OF GUNITE, THE CONTRACTOR SHALL REPAIR CONCRETE TO SPALLS AND DELAMINATIONS.
- ALL SPALLS AT AREAS TO BE COVERED WITH REPAIR CONCRETE SHALL BE PREPARED SIMILAR TO DESIGNATED SPALLED AREAS.
- CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE ACI 318R-05.
- 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. PROVIDE CONCRETE DELIVERY TICKETS TO THE HARBORS CONSTRUCTION ENGINEER ON THE SAME DAY AS THE CONCRETE POUR.
- CLEAR CONCRETE COVER FOR REINFORCING BARS SHALL BE 3 IN. MINIMUM, UNLESS OTHERWISE NOTED.
- BAR BENDS AND HOOKS SHALL BE "STANDARD HOOKS" IN ACCORDANCE WITH ACI 318.
- REINFORCING STEEL SHALL BE SPLICED AS INDICATED ON PLANS. PROVIDE WELD LAP SPLICE LENGTH PER TYPICAL DETAILS AND SCHEDULE, UNLESS OTHERWISE NOTED.
- EXISTING CONCRETE SURFACES WITHIN THE REPAIR AREAS SHALL BE ROUGHENED TO ENSURE PROPER ADHESION WITH REPAIR CONCRETE.
- FOR EPOXY-GROUTED DOWELS DRILL HOLES INTO THE SUBSTRATE FOR ANCHORAGE OF DOWELS AS SHOWN IN THE DRAWINGS. BLOW HOLES COMPLETELY CLEAN OF ALL CONCRETE DEBRIS TO ALLOW FOR ADEQUATE BONDING OF THE EPOXY. THE HOLES SHALL BE FILLED WITH EPOXY BEFORE INSERTING AND TURNING THE SUPPLEMENTAL REINFORCEMENT TO DISPLACE THE GROUT.
- REINFORCING BARS, INSERTS, AND OTHER ITEMS TO BE CAST IN THE CONCRETE SHALL BE SECURED IN POSITION PRIOR TO PLACEMENT OF CONCRETE.
- THE CONTRACTOR SHALL NOT SECURE FORMS BY RAMSETTING. ALL HOLES AND SPALLS CAUSED BY TEMPORARY ATTACHMENTS SHALL BE PATCHED. ALL INSERTS SHALL BE REMOVED OR SHALL BE STAINLESS STEEL WITH MINIMUM 3/4 IN. COVER AFTER FORM REMOVAL.
- PRIOR TO PLACEMENT OF CONCRETE, ALL SUBSTRATE SURFACES SHALL BE WASHED WITH CLEAN WATER AND THE EXPOSED CONCRETE SURFACE SHALL BE SATURATED WITH NO WATER ACCUMULATION ON THE SURFACE.
- CONCRETE SHALL BE VIBRATED, RODDED OR TAMPED DURING PLACEMENT TO CONSOLIDATE THE POUR AND FILL ALL CORNERS OF THE PATCH OR FORM AND BENEATH THE REINFORCING.
- THERE SHALL BE NO COLD JOINTS IN THE FIELD OF THE REPAIR.
- THE REPAIRED SURFACE FINISH SHALL MATCH THE ORIGINAL SURFACE FINISH.
- VOID SPACES BEYOND THE EDGE OF THE FORM SHALL BE DRY PACKED IN LIFTS WITH PATCHING COMPOUND.
- REPAIR AREAS SHALL NOT BE SUBJECTED TO LIVE LOADS UNTIL THE CONCRETE HAS BEEN ALLOWED TO CURE FOR 7 DAYS.

PREPARATION OF SUBSTRATE AND REINFORCING STEEL FOR SPALL REPAIRS:


- ANY ELEMENT BEING REPAIRED SHALL NOT BE SUBJECTED TO LIVE LOADS DURING THE PERIOD STARTING FROM THE REMOVAL OF EXISTING CONCRETE UNTIL THE REPAIR CONCRETE HAS BEEN ALLOWED TO CURE FOR 7 DAYS.
- PREPARATION OF SUBSTRATE AND REINFORCING STEEL FOR SPALL REPAIRS SHALL BE PERFORMED IN THE ORDER LISTED BELOW.
- THE SPALLED AND DELAMINATED CONCRETE SHALL BE COMPLETELY REMOVED TO SOUND SUBSTRATE AND BEYOND THE EXTENT OF THE CORRODED REINFORCING. THE CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO AVOID DAMAGING THE UNDERLYING SOUND CONCRETE.
- THE SPALLED AND DELAMINATED EDGES SHALL BE SQUARED BY SAW-CUTTING AND CHIPPING THE CONCRETE AT THE PERIMETER BEYOND THE REMOVAL AREA AS NECESSARY TO ATTAIN A MINIMUM DEPTH OF 3/4 IN. AND TO PREVENT FEATHER EDGE CONDITIONS. EXERCISE GREAT CARE TO AVOID CUTTING OR DAMAGING ANY EXISTING EMBEDDED STEEL REINFORCING. ANGLES BETWEEN ADJACENT SAW-CUTS AROUND THE PERIMETER SHALL NOT BE LESS THAN 90 DEGREES AND THE SHAPE OF EACH PATCH SHALL NOT BE IRREGULAR.
- FOR ANY EXPOSED REINFORCEMENT WITHIN THE REPAIR AREA, ADDITIONAL CONCRETE SHALL BE REMOVED FOR A MINIMUM 3/4 IN. CLEAR SPACE MEASURED RADIALLY AROUND THE BARS.
- ALL EXPOSED CONCRETE SURFACES AND REINFORCING BARS IN THE REPAIR AREA SHALL BE SANDBLASTED OR NEEDLE GUNNED TO REMOVE ALL SCALE, LOOSE RUST, DEBRIS, AND DETRIORATED CONCRETE. ANY AREAS NOT PATCHED MORE THAN 48 HOURS AFTER SANDBLASTING SHALL BE RECLEANED.
- ANY REINFORCEMENT WHICH HAS LOST MORE THAN 20 PERCENT OF ITS CROSS-SECTIONAL AREA SHALL BE CALLED TO THE ATTENTION OF THE HARBORS CONSTRUCTION ENGINEER.
- ALL WELDING SHALL CONFORM TO AWS D1.4.
- ALL EXISTING BARS WITH CARBON EQUIVALENT (C.E.) ABOVE 0.55 PERCENT SHALL BE PREHEATED ACCORDING TO THE REQUIREMENTS SET FORTH IN AWS D1.4. IF THE C.E. IS UNKNOWN, MAXIMUM PREHEAT REQUIREMENTS, (500 DEGREES F) FOR AN ASSUMED C.E. GREATER THAN 0.75 PERCENT SHALL BE USED.
- THE PATCH AREA SHALL BE CLEANED OF ALL DUST AND DEBRIS JUST PRIOR TO PATCHING WITH HIGH PRESSURE, OIL-FREE COMPRESSED AIR AT A MINIMUM 100 PSI.

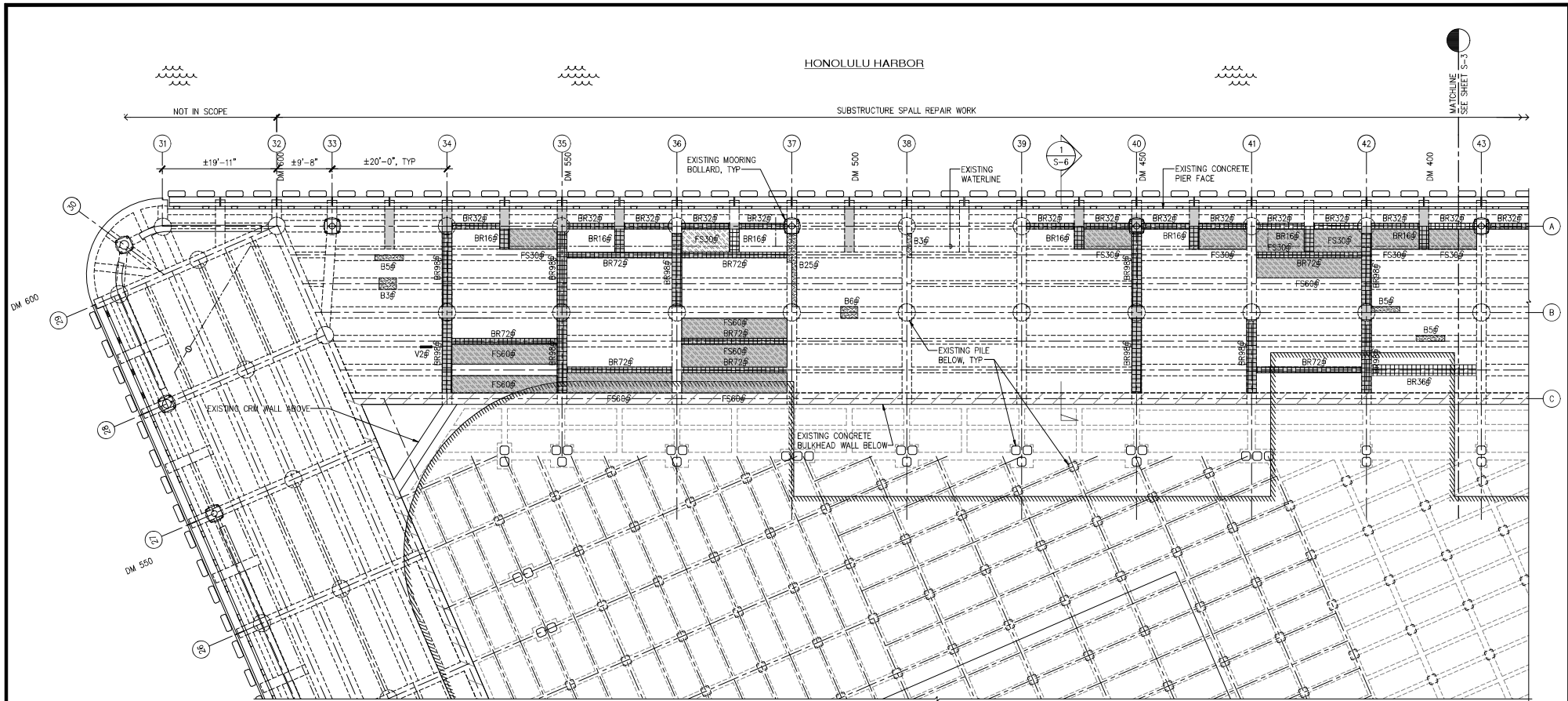
APPLICATION OF SPALL REPAIR MATERIALS:

- ALL EXPOSED STEEL SHALL BE LIBERALLY COATED WITH ANTI-CORROSION COATING PER MANUFACTURER'S RECOMMENDATIONS.
- ALL VERTICAL AND OVERHEAD REPAIRS GREATER THAN 5 SQUARE FEET SHALL BE FORMED.
- PATCHING COMPOUND MAY BE USED INSTEAD OF FORMED CONCRETE FOR VERTICAL AND OVERHEAD REPAIRS LESS THAN OR EQUAL TO 5 SQUARE FEET IN AREA. A SLURRY COAT OF THE COMPOUND SHALL BE USED TO PRIME THE SUBSTRATE AND THE MATERIAL SHALL BE APPLIED IN LIFTS PER MANUFACTURER'S RECOMMENDATIONS.
- WITH THE EXCEPTION OF TOP SURFACE OF DECK, ALL CONCRETE REPAIRS SHALL BE BUILT UP TO OR BEYOND THE ORIGINAL SURFACE AND SHALL MAINTAIN A 3 INCH MINIMUM COVER FOR REINFORCING.
- CONCRETE REPAIRS ON THE UNDERSIDE OF THE PIER SHALL BE CURED EITHER BY LEAVING FORMS IN PLACE A MINIMUM OF 7 DAYS OR IF FORMWORK IS REMOVED PRIOR TO 7 DAYS, COVERING THE SURFACE WITH A CURING COMPOUND IMMEDIATELY AFTER REMOVAL OF FORMWORK.
- CONCRETE REPAIRS ON THE TOPSIDE OF THE PIER SHALL BE CURED A MINIMUM 7 DAYS BY COVERING THE SURFACE WITH A POLYETHYLENE SHEET OVER WET BURLAP.
- APPLY ASPHALT CONCRETE TO MATCH EXISTING ASPHALT WEARING SURFACE ELEVATION AT TOP DECK SURFACE.

EPOXY COATING SYSTEM:

- EPOXY COATING SYSTEM SHALL BE TWO COATS OF AMERLOCK 400 BY PPG PROTECTIVE AND MARINE COATINGS, OR APPROVED EQUAL.
- CONCRETE SHALL BE ALLOWED TO CURE A MINIMUM OF 14 DAYS OR PER MANUFACTURER'S RECOMMENDATIONS BEFORE APPLYING EPOXY COATING SYSTEM.
- CLEAN ALL CONCRETE SURFACES TO BE COATED PER MANUFACTURER'S RECOMMENDATIONS.
- EPOXY COATING SYSTEM SHALL BE APPLIED TO ALL UNCOATED AREAS IN THE PROJECT AREA. SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- APPLY EPOXY COATING SYSTEM TO ALL CONCRETE SURFACES OF SLABS, BEAMS, GIRDERS, PILE CAPS, AND PILES ON THE UNDERSIDE OF THE PIER DOWN TO AND INCLUDING THE SOFFIT OF BEAMS AND GIRDERS IN THE PROJECT AREA.

 <p>THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION <small>Exp. 4-30-26</small> <i>Gregory J. Okunek</i> WKE ASSOCIATES LLC</p>	REVISION DATE DESCRIPTION BY APPROVED	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS
	JOB TITLE SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII	SHEET TITLE STRUCTURAL NOTES
DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN	JOB NUMBER S10921	3 of 14 SHEETS



PARTIAL PIER 9 PLAN

SCALE: 1/8" = 1'-0"



SPALL REPAIR LEGEND:

- FULL SLAB REPLACEMENT REPAIR (FS), SEE DETAIL 1/S-8
- GUNITE COVERED FULL SLAB REPLACEMENT REPAIR (FS), SEE DETAIL 1/S-8
- SLAB SOFFIT SPALL (S), SEE DETAIL 1/S-11
- SLAB SOFFIT SPALL WITH REINFORCING THAT HAS LOST MORE THAN 20% OF ITS CROSS-SECTIONAL AREA (SR), SEE DETAIL 2/S-11
- GUNITE COVERED BEAM SPALL (B), SEE DETAIL 1/S-10
- BEAM SPALL (B), SEE DETAIL 1/S-10
- BEAM SPALL WITH REINFORCING THAT HAS LOST MORE THAN 20% OF ITS CROSS-SECTIONAL AREA (BR), SEE DETAIL 2/S-10
- GUNITE COVERED BEAM SPALL WITH REINFORCING THAT HAS LOST MORE THAN 20% OF ITS CROSS-SECTIONAL AREA (BR), SEE DETAIL 2/S-10

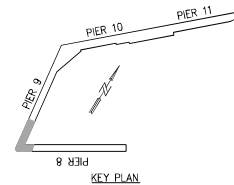
- SPALL ON VERTICAL FACE OF BEAM OR GIRDER (V) OR (VR), SEE DETAIL 3/S-11 OR 4/S-11
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ABBREVIATIONS:

- ⊠ = SQUARE FEET
- LF = LINEAL FEET

NOTE:

1. CONTRACTOR SHALL PROVIDE A 10'-0" MINIMUM TRAVEL LANE ON THE PIER APRON OR THROUGH THE PIER SHED FOR VEHICLES DURING THE ENTIRE PROJECT DURATION.



STATE OF HAWAII
LICENSED PROFESSIONAL ENGINEER
No. 13001-S
HAWAII, U.S.A.

REVISION DATE DESCRIPTION BY APPROVED

STATE OF HAWAII
**DEPARTMENT OF TRANSPORTATION
HARBORS**

JOB TITLE
**SUBSTRUCTURE REPAIRS AT PIERS 9-10
HONOLULU HARBOR, OAHU, HAWAII**

SHEET TITLE
PARTIAL PIER 9 PLAN

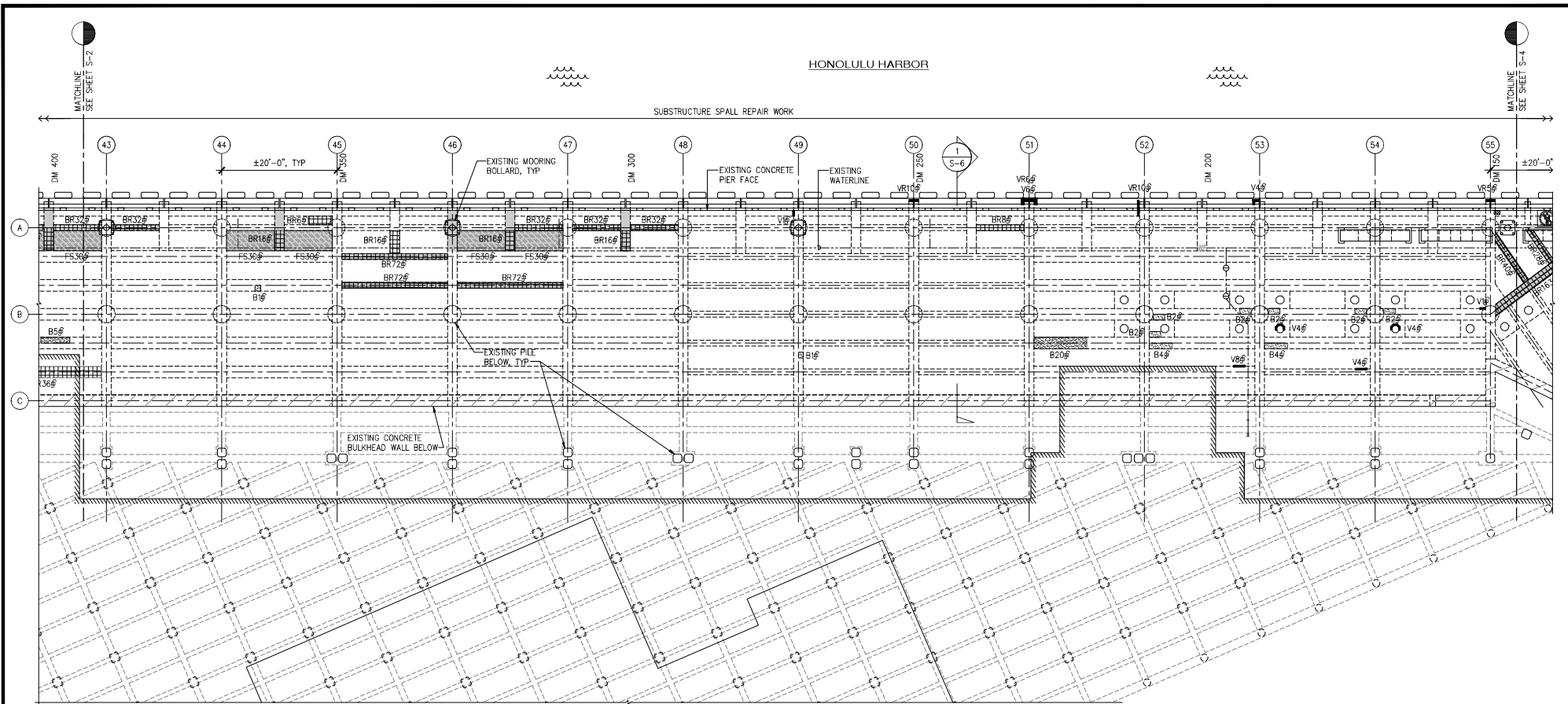
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JOB NUMBER
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WKE ASSOCIATES LLC

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PARTIAL PIER 9 PLAN

SCALE: 1/8" = 1'-0"



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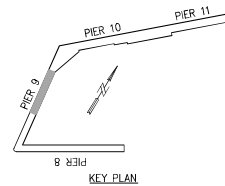
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DATE: 4-20-20
Gregory J. Okunek
WKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED

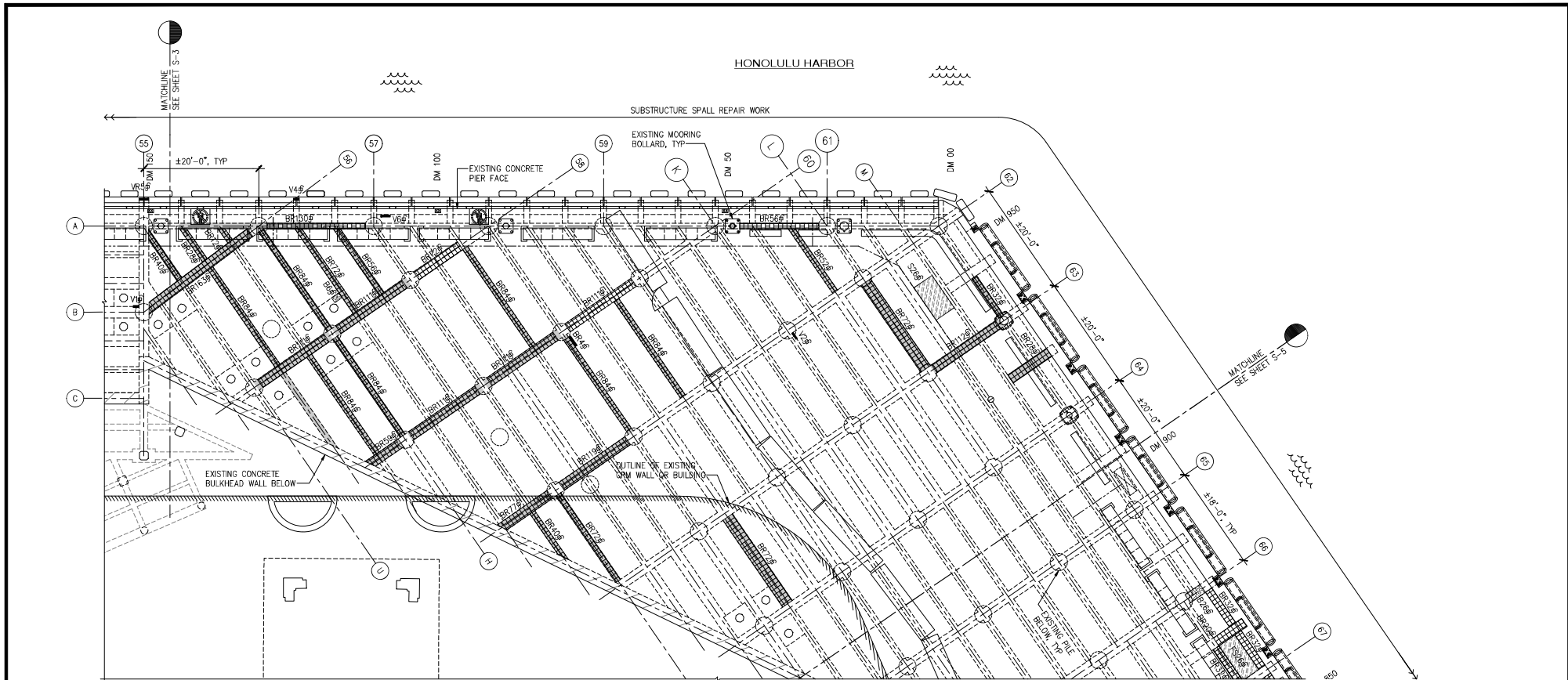
STATE OF HAWAII
**DEPARTMENT OF TRANSPORTATION
HARBORS**

JOB TITLE
**SUBSTRUCTURE REPAIRS AT PIERS 9-10
HONOLULU HARBOR, OAHU, HAWAII**

SHEET TITLE
PARTIAL PIER 9 PLAN

DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN	JOB NUMBER S10921
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SHEET
S-3
5 of 14 SHEETS



PARTIAL PIER 9 PLAN

SCALE: 1/8" = 1'-0"



SPALL REPAIR LEGEND:

- FULL SLAB REPLACEMENT REPAIR (FS), SEE DETAIL 1/S-8
- GUNITING COVERED FULL SLAB REPLACEMENT REPAIR (FS), SEE DETAIL 1/S-8
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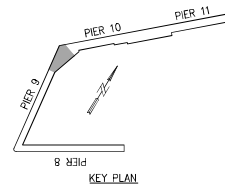
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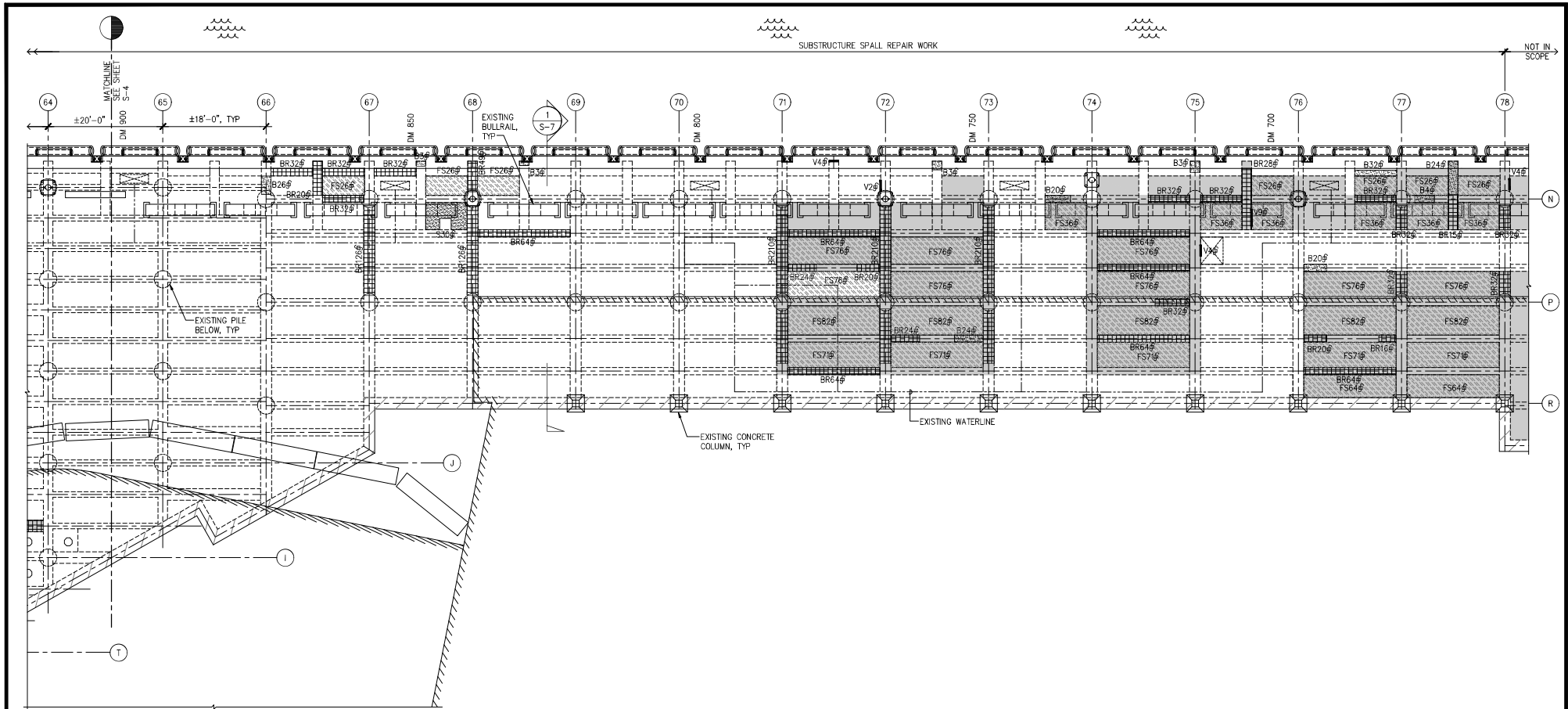
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	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS		REVISION DATE DESCRIPTION BY APPROVED
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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION DATE: 4-20-20 WAKE ASSOCIATES LLC	DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN	JOB NUMBER S10921	SHEET S-4 6 of 14 SHEETS



PARTIAL PIER 10 PLAN

SCALE: 1/8" = 1'-0"



SPALL REPAIR LEGEND:

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- GUNITE COVERED FULL SLAB REPLACEMENT REPAIR (FS), SEE DETAIL 1/S-8
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- BEAM SPALL WITH REINFORCING THAT HAS LOST MORE THAN 20% OF ITS CROSS-SECTIONAL AREA (BR), SEE DETAIL 2/S-10
- GUNITE COVERED BEAM SPALL WITH REINFORCING THAT HAS LOST MORE THAN 20% OF ITS CROSS-SECTIONAL AREA (BR), SEE DETAIL 2/S-10

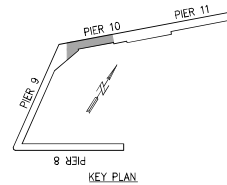
- SPALL ON VERTICAL FACE OF BEAM OR GIRDER (V) OR (VR), SEE DETAIL 3/S-11 OR 4/S-11
- SPALL ON VERTICAL FACE OF GUNITE COVERED BEAM OR GIRDER (V) OR (VR), SEE DETAIL 3/S-11 OR 4/S-11

ABBREVIATIONS:

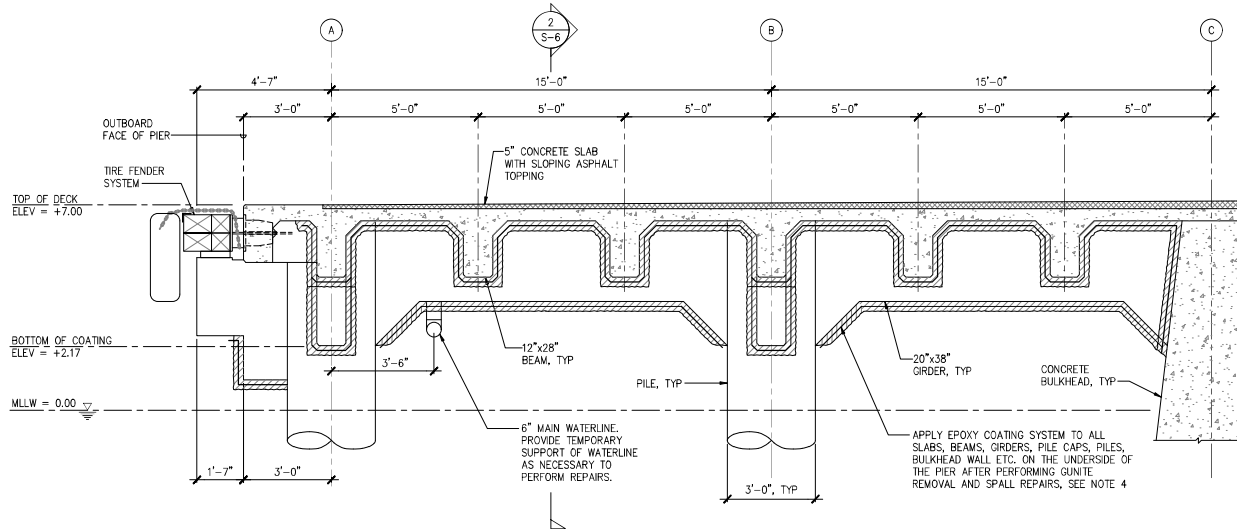
- sf = SQUARE FEET
- lf = LINEAL FEET

NOTE:

1. CONTRACTOR SHALL PROVIDE A 10'-0" MINIMUM TRAVEL LANE ON THE PIER APRON OR THROUGH THE PIER SHED FOR VEHICLES DURING THE ENTIRE PROJECT DURATION.

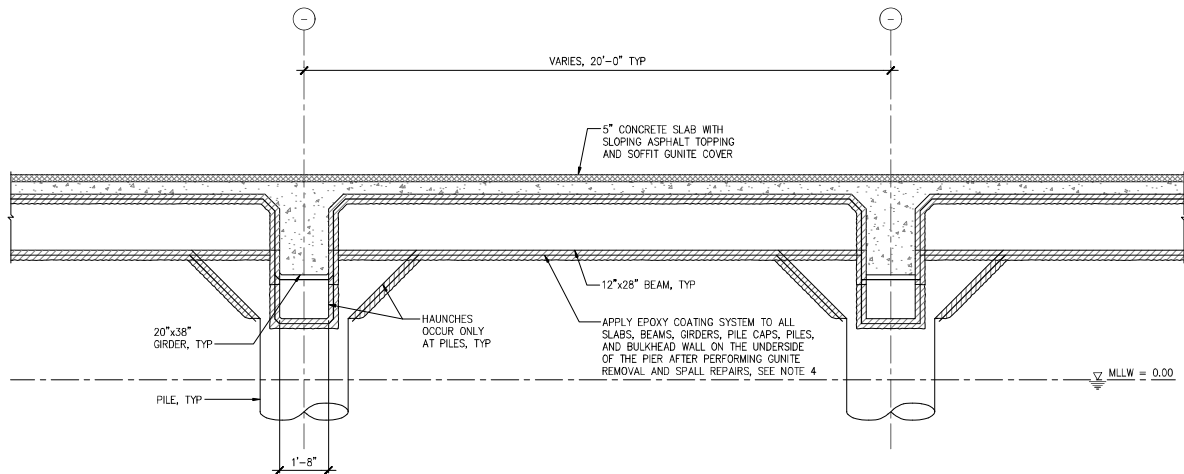


	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS		SHEET S-5
	JOB TITLE SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII		7 of 14 SHEETS
SHEET TITLE PARTIAL PIER 9-10 PLAN		JOB NUMBER S10921	
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION DATE: 4-30-20 WKE ASSOCIATES LLC		DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN	
		REVISION: DATE: DESCRIPTION: BY: APPROVED:	



- NOTES:**
1. PORTIONS OF THE UNDERSIDE OF SLABS, BEAMS, GIRDERS, PILES AND THE BULKHEAD HAVE BEEN COVERED WITH GUNITITE. SEE PLANS FOR LOCATIONS. ALL DIMENSIONS REFLECT SLAB, BEAM AND GIRDER DIMENSIONS SHOWN ON ORIGINAL DRAWINGS BEFORE GUNITITE APPLICATION.
 2. CONTRACTOR SHALL REMOVE ALL EXISTING SPALLED AND DELAMINATED GUNITITE ON SLABS, BEAMS, HAUNCHES, GIRDERS, PILE CAPS, PILES AND BULKHEAD WALL IN THE PROJECT VICINITY AND SOUND EXISTING CONCRETE FOR SPALLS. SOUND EXISTING GUNITITE NOT EASILY REMOVED BY CHIPPING AND CONFIRMED BY THE HARBORS CONSTRUCTION ENGINEER MAY REMAIN. FOR BIDDING PURPOSES, CONTRACTOR MAY ASSUME THICKNESS OF GUNITITE TO BE 4".
 3. ALL ITEMS SHOWN ON THIS SHEET ARE EXISTING, UNLESS OTHERWISE NOTED.
 4. APPLY EPOXY COATING OVER ENTIRE UNCOATED SUBSTRUCTURE IN THE PROJECT LOCATION AS SHOWN

1
S-6 PIER 9 TYPICAL TRANSVERSE SECTION
SCALE: 1/2" = 1'-0"



2
S-6 PIER 9 TYPICAL LONGITUDINAL SECTION
SCALE: 1/2" = 1'-0"

STATE OF HAWAII
LICENSED PROFESSIONAL ENGINEER
No. 13001-S
HAWAII, U.S.A.

REVISION	DATE	DESCRIPTION	BY	APPROVED

STATE OF HAWAII
**DEPARTMENT OF TRANSPORTATION
HARBORS**

JOB TITLE
**SUBSTRUCTURE REPAIRS AT PIERS 9-10
HONOLULU HARBOR, OAHU, HAWAII**

SHEET TITLE
EXISTING PIER 9 SECTIONS

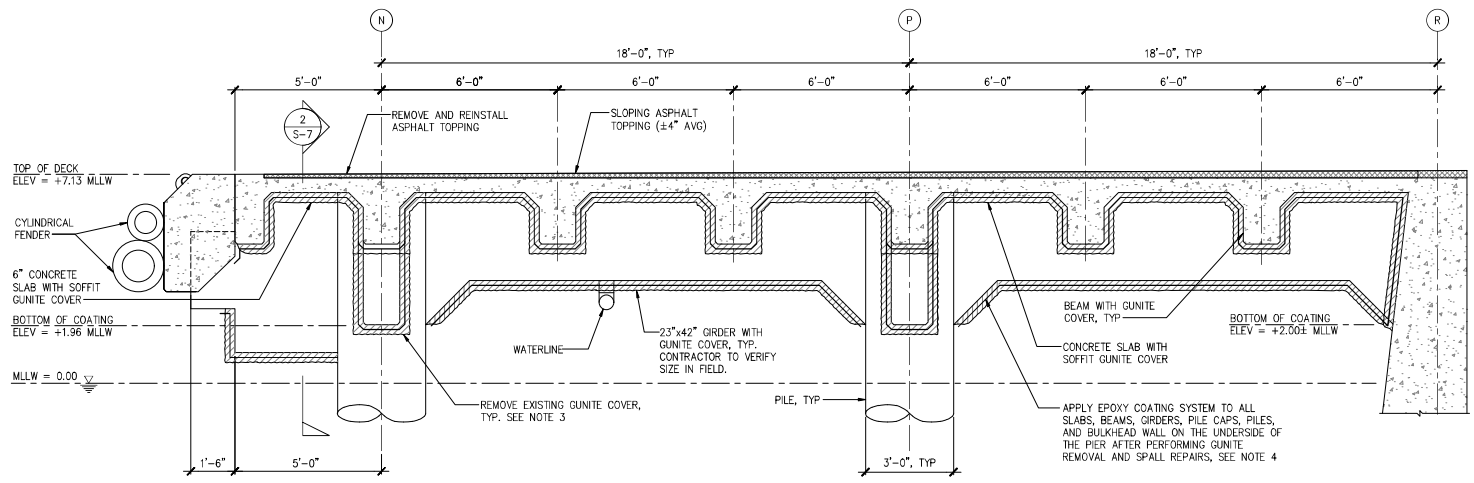
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DATE: 4-20-20

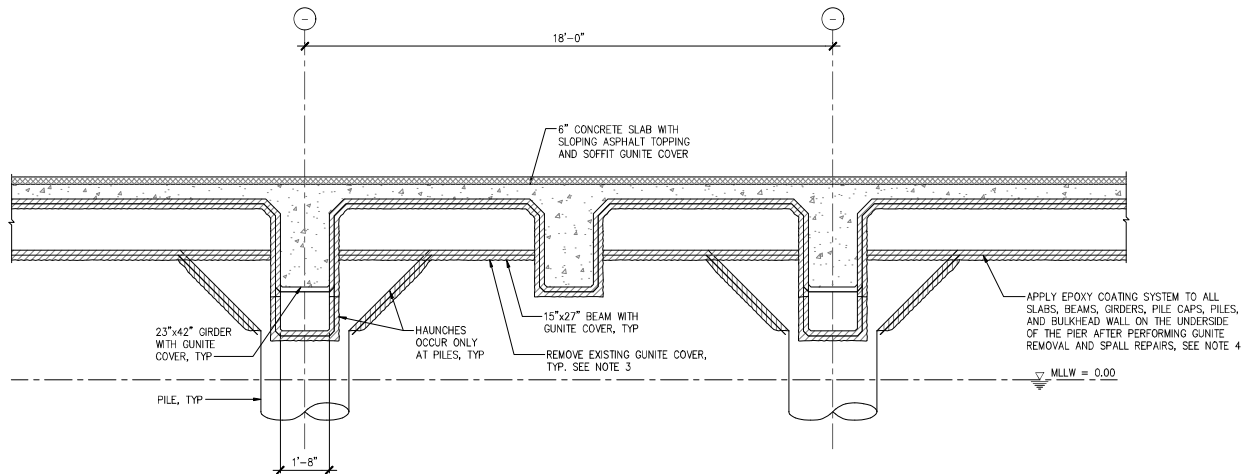
WKE ASSOCIATES LLC

DESIGNED BY: JS		<p>S-6</p> <p>8 of 14 SHEETS</p>
DRAWN BY: DL		
CHECKED BY: GO		
DATE: 08/2024		
SCALE: AS SHOWN	JOB NUMBER: S10921	

- NOTES:**
1. PORTIONS OF THE UNDERSIDE OF SLABS, BEAMS, GIRDERS, PILES AND THE BULKHEAD WALL HAVE BEEN COVERED WITH GUNITE. SEE PLANS FOR LOCATIONS. ALL DIMENSIONS REFLECT SLAB, BEAM AND GIRDER DIMENSIONS SHOWN ON ORIGINAL DRAWINGS BEFORE GUNITE APPLICATION.
 2. CONTRACTOR SHALL REMOVE ALL EXISTING SPALLED AND DELAMINATED GUNITE ON SLABS, BEAMS, HAUNCHES, GIRDERS, PILES AND THE BULKHEAD WALL IN THE PROJECT VICINITY AND SOUND EXISTING CONCRETE FOR SPALLS. SOUND EXISTING GUNITE NOT EASILY REMOVED BY CHIPPING AND CONFIRMED BY THE HARBORS CONSTRUCTION ENGINEER MAY REMAIN. FOR BIDDING PURPOSES, CONTRACTOR MAY ASSUME THICKNESS OF GUNITE TO BE 4".
 3. ALL ITEMS SHOWN ON THIS SHEET ARE EXISTING, UNLESS OTHERWISE NOTED.
 4. APPLY EPOXY COATING OVER ENTIRE UNCOATED SUBSTRUCTURE IN THE PROJECT LOCATION AS SHOWN.



1 PIER 10 TYPICAL TRANSVERSE SECTION
SCALE: 1/2" = 1'-0"



2 PIER 10 TYPICAL LONGITUDINAL SECTION
SCALE: 1/2" = 1'-0"

STATE OF HAWAII
LICENSED PROFESSIONAL ENGINEER
No. 13001-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
DATE: 08/2024
WAKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

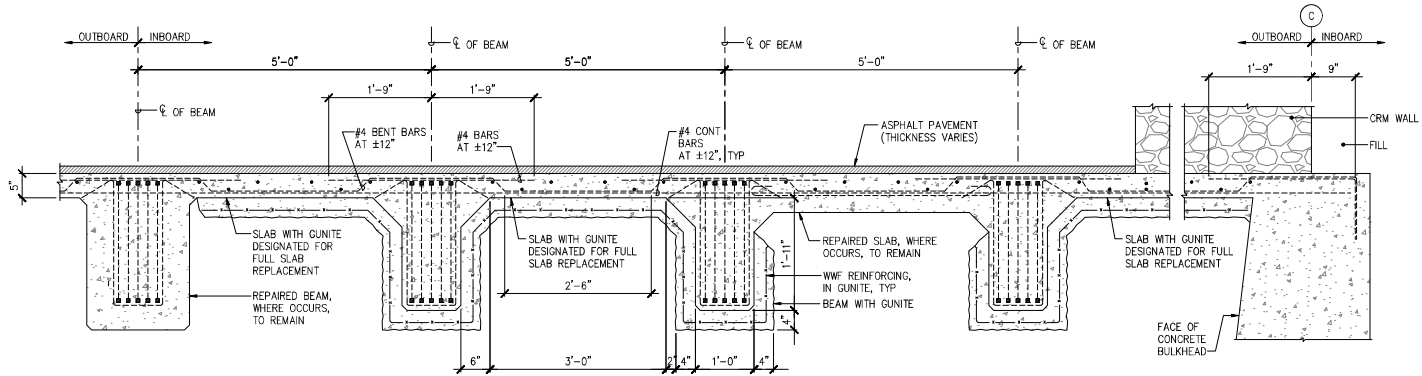
JOB TITLE
SUBSTRUCTURE REPAIRS AT PIERS 9-10
HONOLULU HARBOR, OAHU, HAWAII

SHEET TITLE
EXISTING PIER 10 SECTIONS

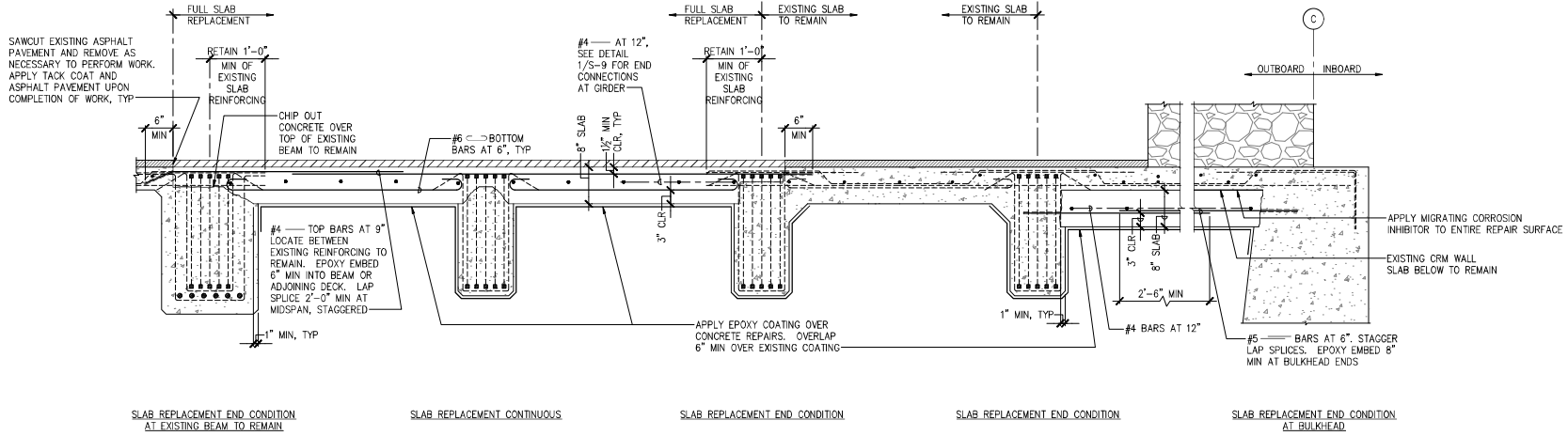
DESIGNED BY: JS
DRAWN BY: DL
CHECKED BY: GO
DATE: 08/2024
SCALE: AS SHOWN

JOB NUMBER
S10921

SHEET
S-7
9 of 14 SHEETS



EXISTING CONDITION



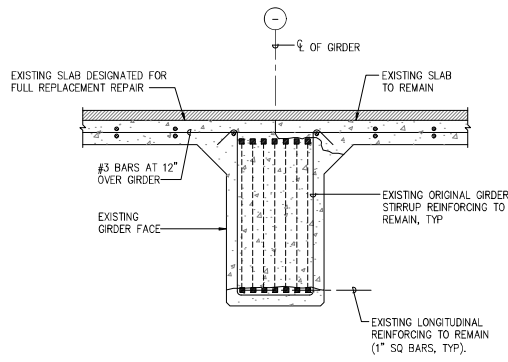
REPAIRED CONDITION

NOTE:

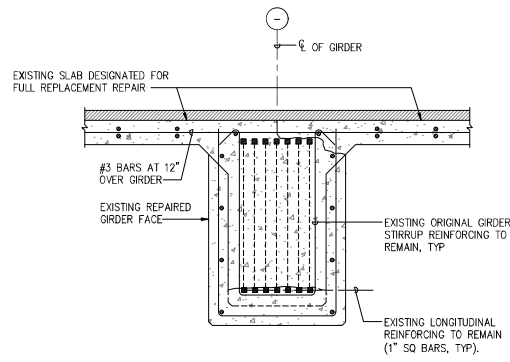
1. REMOVE EXISTING CONCRETE SLAB TO LINE AS SHOWN, LEAVING HAUNCH. SAVE ALL EXISTING REINFORCING TOP AND BOTTOM AS SHOWN. CLEAN ALL LOOSE CORROSION FROM EXISTING REINFORCING AND COAT ALL REINFORCING WITH ANTI-CORROSION COATING.

1 FULL SLAB REPLACEMENT DETAILS
S-8 SCALE: 1" = 1'-0"

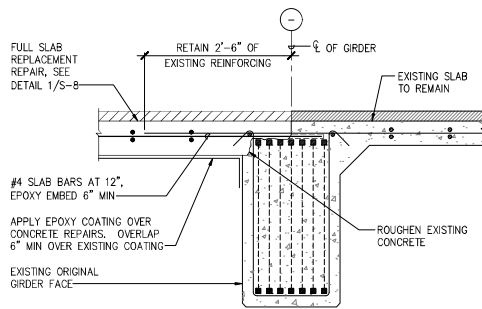
	REVISION: _____ DATE: _____ DESCRIPTION: _____ BY: _____ APPROVED: _____
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS JOB TITLE: SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII SHEET TITLE: FULL SLAB REPLACEMENT DETAILS
DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN	JOB NUMBER: S10921 SHEET: S-8 OF 14 SHEETS



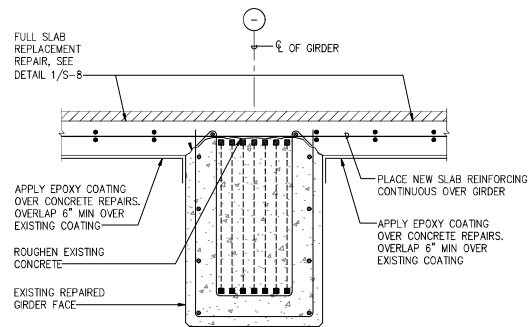
GIRDER SECTION
SLAB REPLACEMENT ON ONE END
EXISTING CONDITION



GIRDER SECTION
SLAB REPLACEMENT ON BOTH ENDS
EXISTING CONDITION



SLAB REPLACEMENT ON ONE END AT GIRDER SECTION
REPAIRED CONDITION

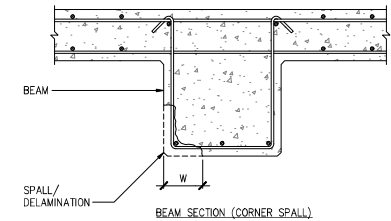
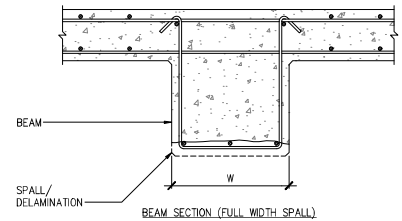
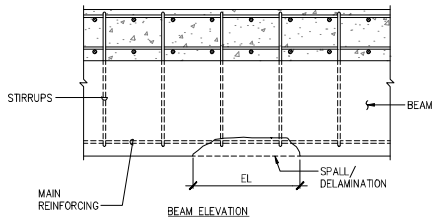


SLAB REPLACEMENT ON BOTH ENDS AT PREVIOUSLY REPAIRED
REPAIRED CONDITION

NOTE:
APPLY EPOXY COATING OVER REPAIRS. OVERLAP 6"
AT EXISTING EPOXY COATING.

1 FULL SLAB REPLACEMENT DETAILS
S-9 SCALE: 1" = 1'-0"

	REVISION DATE DESCRIPTION BY APPROVED	
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS	
	JOB TITLE SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII	
	SHEET TITLE FULL SLAB REPLACEMENT DETAILS	
DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN	JOB NUMBER S10921	SHEET S-9 11 of 14 SHEETS

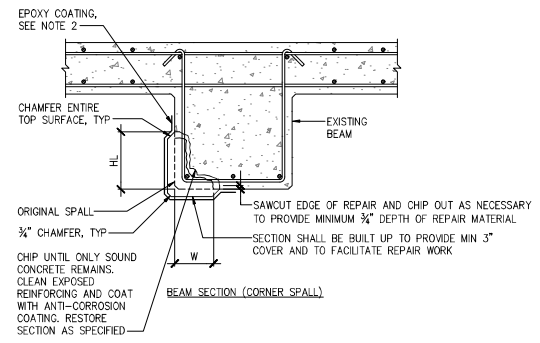
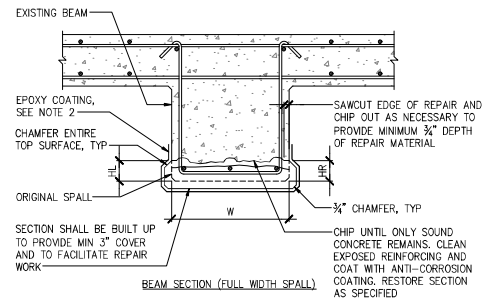
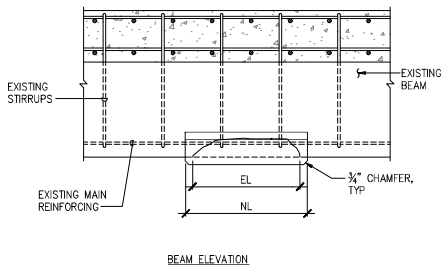


PAY AREA:
 HL = HEIGHT OF REPAIR (LEFT SIDE)
 HR = HEIGHT OF REPAIR (RIGHT SIDE)
 W = ORIGINAL WIDTH OF BEAM/GRIDER
 EL = EXISTING LENGTH OF SPALL
 NL = LENGTH OF REPAIR

PAY AREA = (HL+HR+W)NL

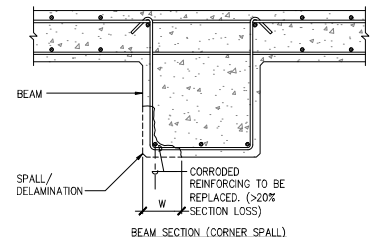
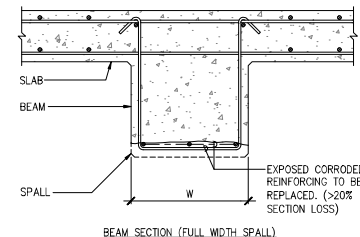
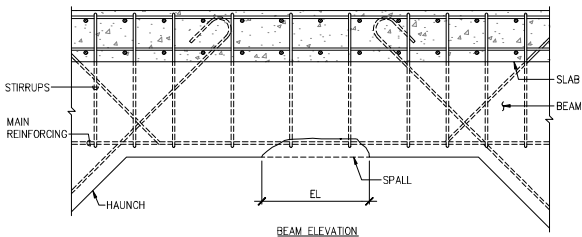
- NOTES:**
- PAY AREA SHALL BE THE TOTAL REPAIRED AREA ON ALL BEAM FACES. IF HL, HR OR W VARY ALONG THE LENGTH OF REPAIR, PAY AREA SHALL BE CALCULATED INDIVIDUALLY FOR EACH BEAM FACE.
 - APPLY EPOXY COATING OVER REPAIRS. OVERLAP 6" AT EXISTING EPOXY COATING.

EXISTING CONDITION



REPAIRED CONDITION

1 BEAM SPALL REPAIR (TYPE B)
 NOT TO SCALE

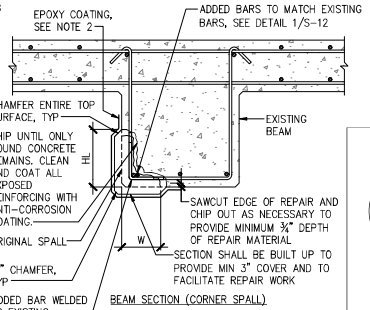
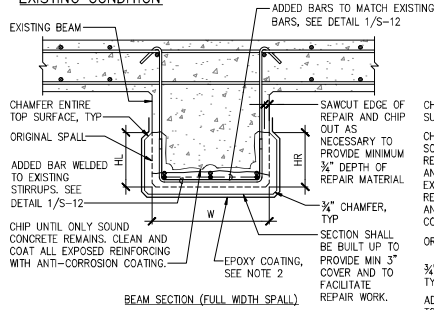
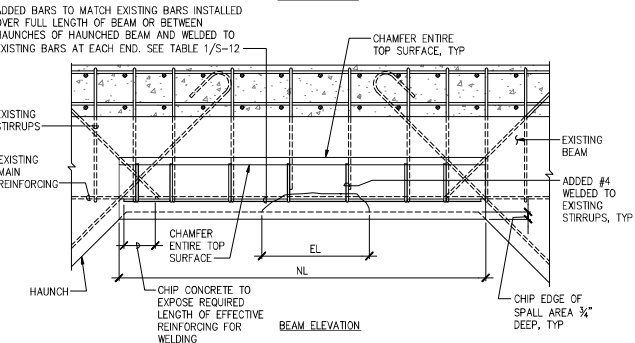


PAY AREA:
 HL = HEIGHT OF REPAIR (LEFT SIDE)
 HR = HEIGHT OF REPAIR (RIGHT SIDE)
 W = ORIGINAL WIDTH OF BEAM/GRIDER
 EL = EXISTING LENGTH OF SPALL
 NL = LENGTH OF REPAIR

PAY AREA = (HL+HR+W)NL

- NOTES:**
- PAY AREA SHALL BE THE TOTAL REPAIRED AREA ON ALL BEAM FACES. IF HL, HR OR W VARY ALONG THE LENGTH OF REPAIR, PAY AREA SHALL BE CALCULATED INDIVIDUALLY FOR EACH BEAM FACE.
 - APPLY EPOXY COATING OVER REPAIRS. OVERLAP 6" AT EXISTING EPOXY COATING.

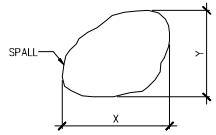
EXISTING CONDITION



REPAIRED CONDITION

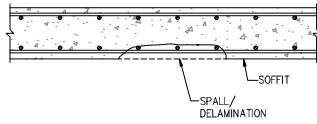
2 BEAM SPALL REPAIR WITH REINFORCING STEEL REPLACEMENT (TYPE BR)
 NOT TO SCALE

		REVISION: _____ DATE: _____ DESCRIPTION: _____ BY: _____ APPROVED: _____	
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS			
JOB TITLE SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII			
SHEET TITLE BEAM SPALL REPAIR DETAILS			
DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 06/2024 SCALE: AS SHOWN	JOB NUMBER S10921	SHEET S-10 OF 14 SHEETS	



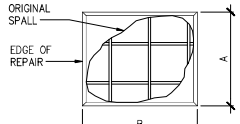
SOFFIT PLAN

EXISTING SPALL AREA = X x Y



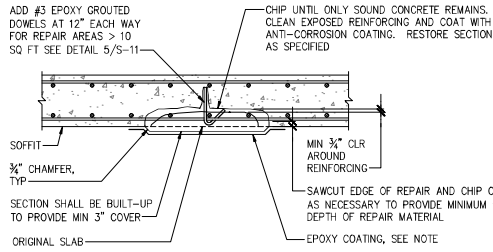
SECTION

EXISTING CONDITION



PAY AREA = A x B

SOFFIT PLAN

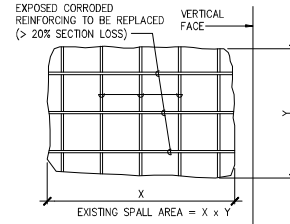


SECTION

REPAIRED CONDITION

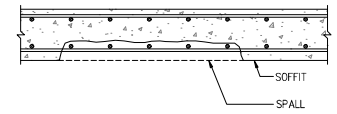
NOTE:

APPLY EPOXY COATING OVER REPAIRS. OVERLAP 6" AT EXISTING EPOXY COATING.



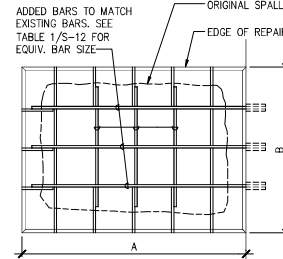
EXISTING SPALL AREA = X x Y

SOFFIT PLAN



SECTION

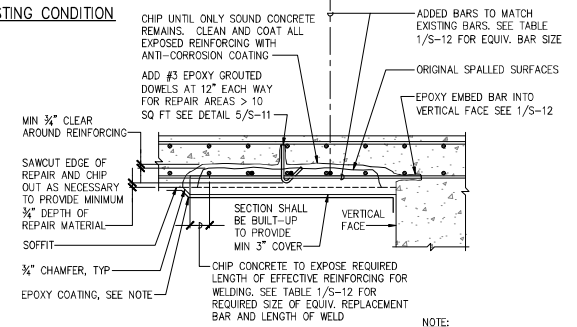
EXISTING CONDITION



PAY AREA = A x B

SOFFIT PLAN

REPAIRED CONDITION



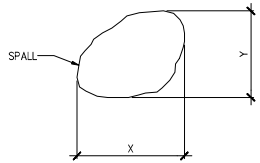
SECTION

NOTE:

APPLY EPOXY COATING OVER REPAIRS. OVERLAP 6" AT EXISTING EPOXY COATING.

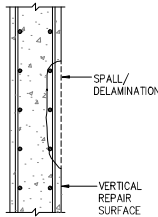
1 SLAB SOFFIT SPALL REPAIR (TYPE S)
S-11 NOT TO SCALE

2 SLAB SOFFIT SPALL REPAIR WITH REINFORCING STEEL REPLACEMENT (TYPE SR)
S-11 NOT TO SCALE



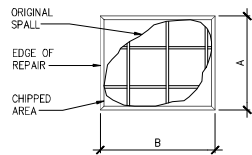
ELEVATION

EXISTING SPALL AREA = X x Y



SECTION

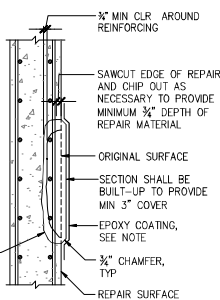
EXISTING CONDITION



ELEVATION

PAY AREA = A x B

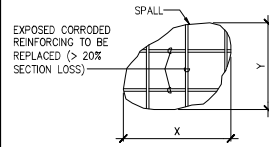
REPAIRED CONDITION



SECTION

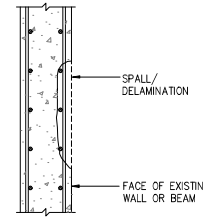
NOTE:

APPLY EPOXY COATING OVER REPAIRS. OVERLAP 6" AT EXISTING EPOXY COATING.



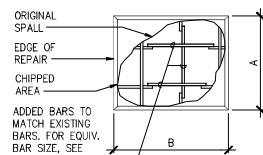
EXISTING SPALL AREA = X x Y

ELEVATION



SECTION

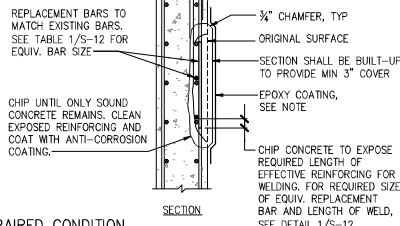
EXISTING CONDITION



PAY AREA = A x B

ELEVATION

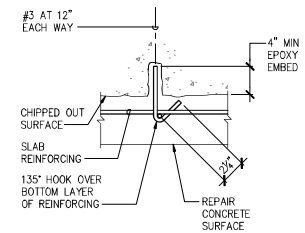
REPAIRED CONDITION



SECTION

NOTE:

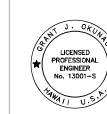
APPLY EPOXY COATING OVER REPAIRS. OVERLAP 6" AT EXISTING EPOXY COATING.



5 EPOXY GROUDED DOWEL DETAIL
S-11 NOT TO SCALE

3 VERTICAL SPALL REPAIR (TYPE V)
S-11 NOT TO SCALE

4 VERTICAL SPALL REPAIR WITH REINFORCING STEEL REPLACEMENT (TYPE VR)
S-11 NOT TO SCALE



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
DATE: 4-20-20
MKE ASSOCIATES LLC

REVISION	DATE	DESCRIPTION	BY	APPROVED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

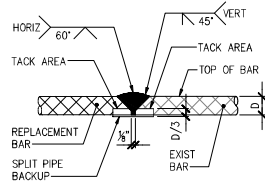
JOB TITLE
SUBSTRUCTURE REPAIRS AT PIERS 9-10
HONOLULU HARBOR, OAHU, HAWAII

SHEET TITLE
SLAB AND VERTICAL SURFACE SPALL REPAIR DETAILS

DESIGNED BY: JS
DRAWN BY: DL
CHECKED BY: GO
DATE: 08/2024
SCALE: AS SHOWN

JOB NUMBER
S10921

SHEET
S-11
13 of 14 SHEETS



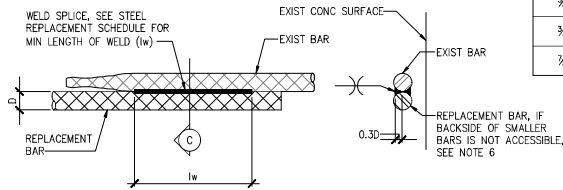
(A) BUTT SPLICE

USE DETAIL A FOR #7 BARS AND LARGER

REINFORCING STEEL WELDING NOTES:

1. CHIP, GRIND, OR GOUGE TO SOUND METAL BEFORE WELDING.
2. CLEAN EXIST REBAR AND PREPARE ACCORDING TO SPECIFICATIONS. APPLY COATING AFTER WELDING.
3. SEE STEEL REPLACEMENT SCHEDULE BELOW FOR REPLACEMENT BAR SIZE.
4. USE E70 ELECTRODES.
5. SEE AWS D1.4 FOR WELDING PROCESS AND OTHER DETAILS.
6. FOR WELDING OF #3, #4, AND #5 REPLACEMENT REINFORCING, WELDING MAY BE PERFORMED ON ONE SIDE ONLY, IF l_w IS INCREASED TO l_w1 AS FOLLOWS

STEEL REPLACEMENT SCHEDULE				
SIZE OF EXISTING REINFORCING		SIZE OF REPLACEMENT REINFORCING	MINIMUM LENGTH OF WELD EACH SIDE (l_w)	MINIMUM LENGTH OF WELD ONE SIDE l_w1
SQUARE	ROUND			
3/8"	#3, #4	#4	2"	4"
1/2"	#5	#5	2 1/2"	5"
5/8"	#6	#6	3 1/2"	-
3/4"	#7	#7	-	-
7/8"	#8	#8	-	-



NOTE:
 l_w = LENGTH OF WELD EACH SIDE
(SEE STEEL REPLACEMENT SCHEDULE)

(B) LAP SPLICE

(C) SECTION

USE DETAIL B FOR #6 BARS AND SMALLER

1 REINFORCING STEEL SPLICE DETAIL

5-12 NOT TO SCALE

	REGION: _____ DATE: _____ DESCRIPTION: _____ BY: _____ APPROVED: _____
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS
	JOB TITLE: SUBSTRUCTURE REPAIRS AT PIERS 9-10 HONOLULU HARBOR, OAHU, HAWAII
	SHEET TITLE: SPLICE DETAIL
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION 1994-2024 WAKE ASSOCIATES LLC	DESIGNED BY: JS DRAWN BY: DL CHECKED BY: GO DATE: 08/2024 SCALE: AS SHOWN
JOB NUMBER: S10921	SHEET: S-12 14 of 14 SHEETS