GENERAL CONCRETE AND STL REINF NOTES AND TYP DETAILS
S-300
FOR BLUEBEAM LABEL INGOOR:

0"
1"

CONCRETE MIX:

1. CONCRETE SPECIFICATIONS SHALL BE AS FOLLOWS:

USAGE	CONCRETE MIX DESIGN SCHEDULE										
	28 DAY STRENGTH (PSI)				MAX AGGREGATE SIZE (IN)	SLUMP (IN)	MAX W/C RATIO	MAX CURE DENSITY (PCF)	CEMENT TYPE	MAX ALLOWABLE % FLY ASH (REF CM5)	% AIR ENTRAINMENT
	3000	3500	4000	5000							
2. FOOTINGS			•		1	3-5	0.50	150	I / II	30	5
3. SLAB-ON-GRADE **			•		1	3-5	0.50	150	I / II	20	-

**** - SPECIAL GC NOTE FOR CONCRETE WHICH IS PART OF A DEPRESSED AREA. SEE CONCRETE MIX NOTE 10.**

2. PORTLAND CEMENT SHALL CONFORM TO ASTM C150, OF TYPES NOTED IN SCHEDULE. NORMAL WEIGHT AGGREGATE SHALL CONFORM TO ASTM C33. LIGHT WEIGHT AGGREGATE SHALL CONFORM TO ASTM C330. ALL AGGREGATE SHALL BE FROM A SINGLE SOURCE.
3. FLY ASH WILL NOT BE PERMITTED IN ARCHITECTURALLY EXPOSED CONCRETE. FLY ASH MAY BE USED ELSEWHERE, WITHIN THE SPECIFIED PROPORTION LIMITS, BUT THE CONTRACTOR SHALL FIRST VERIFY COMPATIBILITY WITH CURING COMPOUNDS, SEALERS, BOND BREAKER, FLOORING ADHESIVES AND OTHER MATERIALS PROPOSED TO BE IN CONTACT WITH THE CONCRETE.
4. CONCRETE MIX DESIGNS SHALL BE SUBMITTED FOR REVIEW A MINIMUM OF 7 DAYS PRIOR TO THE START OF THE WORK FOR ENGINEER AND OWNERS TESTING LABORATORY APPROVAL, PRIOR TO THE PLACEMENT OF CONCRETE. MIX DESIGNS MUST INDICATE CONFORMANCE WITH ACI 301 SPECIFICATION, SECTION 4.2.3.
5. AT THE POINT OF DISCHARGE SLUMP TESTS, CONFORMING TO ASTM C143, SHALL BE TAKEN. SEE CONCRETE NOTE NO. 5 BELOW FOR RATE OF TESTS.
6. AIR CONTENT TESTS CONFORMING TO ASTM C173 (VOLUMETRIC METHOD FOR LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE; ASTM C231 PRESSURE METHOD FOR NORMAL WEIGHT CONCRETE) SHALL BE TAKEN FOR EACH DAY'S POUR FOR ALL TYPES OF AIR-ENTRAINED CONCRETE BEING USED.
7. CONCRETE TEMPERATURE SHALL BE TESTED HOURLY WHEN THE AIR TEMPERATURE IS 40 DEG F AND BELOW, 80 DEG F AND ABOVE AND EACH TIME A SET OF COMPRESSION TEST SPECIMENS ARE MADE.
8. ONE SET OF FOUR COMPRESSION TEST SPECIMENS CONFORMING TO ASTM C31 SHALL BE MOLDED AND STORED FOR LABORATORY-CURED SPECIMENS. COMPRESSIVE STRENGTH TESTS SHALL CONFORM TO ASTM C39 AND SHALL CONSIST OF ONE SET FOR EACH DAY'S POUR EXCEEDING 5 CU. YDS. PLUS ADDITIONAL SETS FOR EACH 50 CU. YDS. MORE THAN THE FIRST 25 CU. YDS OF EACH CONCRETE CLASS PLACED IN ANY ONE DAY. ONE SPECIMEN SHALL BE TESTED AT 7 DAYS, TWO SPECIMENS SHALL BE TESTED AT 28 DAYS, AND ONE SPECIMEN SHALL BE RETAINED FOR LATER TESTING AS REQUIRED.
9. VERIFY THAT POST INSTALLED ANCHORS ARE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS.
10. **SPECIAL GC NOTE FOR CONCRETE WHICH IS PART OF A DEPRESSED AREA:**
    A. AT ALL DEPRESSIONS GREATER THAN OR EQUAL TO MINUS 6 INCHES FROM THE MAIN FINISH FLOOR THE GC SHALL PROVIDE XYPEX C-500 ADMIXTURE (AT AN ASSUMED MINIMUM RATE OF 15 LBS/CU YD) INTO ALL OF THE CONCRETE. THE ADMIXTURE SHALL BE PLACED INTO THE MIX AT THE TIME OF BATCHING AT THE PLANT, DO NOT ADD DRY BAG MIX TO THE WET CONCRETE TRUCK ON-SITE. THE GC SHALL STRICTLY FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR ADDITION, USE, HANDLING, ETC. THE ADD MIXTURE SHALL BE ADDED TO ALL OF THE CONCRETE WHICH MAKES UP ANY DEPRESSION GREATER THAN OR EQUAL TO MINUS 6 INCHES FROM THE MAIN FINISH FLOOR. THIS INCLUDES BUT IS NOT LIMITED TO: DEPRESSED SLABS (FULL THICKNESS), ALL VERTICAL STEM WALLS (FULL THICKNESS) AND/OR ANY GRADE BEAMS (FULL DEPTH AND THICKNESS) WHICH FORM ANY PORTION OF THE VERTICAL DROP AND ALL HORIZONTAL SLAB FOR THE DEPRESSED AREA. THIS DOES NOT REDUCE OR REVISE ANY WATERPROOFING TREATMENTS, LAYERS OR SUBSTRATES THAT ARE CURRENTLY REQUIRED BY THE STRUCTURAL, ARCHITECTURAL, AND/OR OTHER CONSULTANT DRAWINGS, THIS IS IN ADDITION TO TH06E CURRENT MEASURES. THE COST FOR THIS ADMIXTURE SHALL BE ACCOUNTED FOR WITHIN THE BASE BID AND SHALL INCLUDE, BUT IS NOT LIMITED TO ALL AREAS ARCHITECTURALLY LABELED AS FOLLOWS: ORCHESTRA PIT, ALL ELEVATOR PITS, AND THE BELOW GRADE FLY-LOFT RIGGING PIT. PLEASE NOTE: XYPEX C-500 HAS BEEN CHOSEN AS A NEUTRAL MIX ADDITIVE THAT IS NOT INTENDED TO CHANGE THE CURRENTLY PLANNED CONCRETE SET TIME. IF FOR SOME REASON THE SET TIME IS DESIRED TO BE INCREASED OR DECREASED XYPEX DOES HAVE ALTERNATIVE FORMULATIONS WHICH MAY BE USED; HOWEVER, THE GC MUST GET WRITTEN APPROVAL FROM THE EOR PRIOR TO ANY CHANGE IN THE XYPEX C-500 FORMULATION. THE XYPEX C-500 IS AN ADDITIONAL MOISTURE INTRUSION MITIGATION MEASURE THAT IS REQUIRED IN ADDITION TO THE SPECIFIED WATERSTOPS NOTED IN THE OTHER GENERAL NOTES AND DETAILS RELATED TO CONCRETE COLD-JOISTS AND OTHER CONCRETE TRANSITIONS OF PLANE.

CAST-IN-PLACE CONCRETE:

1. CONCRETE SUPPLIER SHALL BE AWARE OF CEMENTS THAT CAN CAUSE LATE ETTRINGITE FORMATION IN THE CEMENT PASTE AND BE PREPARED TO SHOW THAT THE CEMENTS USED WILL NOT CAUSE THIS PROBLEM.
2. ALL MIXING, TRANSPORTING, PLACING AND CURING OF CONCRETE SHALL BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE AMERICAN CONCRETE INSTITUTE; ACI 301 AND ACI 318, LATEST EDITIONS.
3. NO HORIZONTAL JOINTS WILL BE PERMITTED IN CONCRETE EXCEPT WHERE THEY NORMALLY OCCUR OR WHERE SHOWN ON THE DETAILS. VERTICAL JOINTS SHALL OCCUR AT CENTER SPANS OR AT LOCATIONS APPROVED BY THE STRUCTURAL ENGINEER.
4. ALL MIXING, TRANSPORTING, PLACING AND CURING OF CONCRETE SHALL BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE AMERICAN CONCRETE INSTITUTE; ACI 301 AND ACI 318, LATEST EDITIONS.
5. ALL BASE PLATES AND ANCHOR BOLTS SHALL BE PROTECTED WITH 3" (MIN.) OF CONCRETE. ANCHOR BOLTS SHALL BE FABRICATED FROM FULL BODIED ASTM F1554, GRADE 36 LOW CARBON STEEL RODS HAVING THE SAME DIAMETER AS THE BOLT DIAMETER AND USING CUT THREADS. ROLLED THREADS ARE NOT ACCEPTABLE. BOLTS SHALL BE SET USING RIGID TEMPLATES.
6. AT HORIZONTAL CONCRETE FRAMING, FORMS SHALL NOT BE REMOVED UNTIL THE CONCRETE HAS REACHED 70 PERCENT OF THE 28-DAY COMPRESSIVE STRENGTH INDICATED. FLOOR SLABS AND BEAMS SHALL REMAIN SHORED UNTIL THE UPPER MOST LEVEL OF CONCRETE HAS REACHED 70 PERCENT OF THE 28-DAY COMPRESSIVE STRENGTH. FOR BUILDINGS WITH MORE THAN THREE STORIES IN HEIGHT, SHORING SHALL BE MAINTAINED FOR THREE LEVELS BELOW, UNTIL THE UPPER MOST LEVEL HAS REACHED 70 PERCENT OF THE SPECIFIED 28-DAY COMPRESSIVE STRENGTH.
7. ALL CONDUITS AND PIPES EMBEDDED IN CONCRETE SHALL COMPLY WITH ALL PROVISIONS SPECIFIED IN ACI 318,SECTION 26.8, WITH THE FOLLOWING SPECIFIC REQUIREMENTS:
   A. THE MAXIMUM OUTSIDE DIAMETER OF THE CONDUITS AND PIPES SHALL BE 1 1/2". NONE PERMITTED IN SLABS THINNER THAN 4 1/2".
   B. THE MINIMUM CLEAR DISTANCE BETWEEN CONDUITS AND PIPES SHALL BE 8".
   C. NONE PERMITTED IN SLABS-ON-GRADE WHICH WILL BE PERMANENTLY EXPOSED OR SCHEDULED TO RECEIVE THIN SET TILE. PLACE ALL PIPES AND CONDUITS IN THE FILL BENEATH THE VAPOR BARRIER. RE-COMPACT AS SPECIFIED.
   D. IN NON-EXPOSED SLABS-ON-GRADE, LIMIT SIZE TO 1" O.D. IN 5" SLAB.SPACE 12" APART AND TIE TO UNDERSIDE OF REINFORCING MAT. WHERE LINES CONVERGE AT SOURCE, DOUBLE UP THE SLAB REINFORCING IN THE CONVERGENCE ZONE AND 3'-0" BEYOND. PLACE ALL LARGER LINES IN THE FILL BENEATH THE VAPOR BARRIER.
   E. NONE PERMITTED IN COLUMNS WITHOUT PRIOR APPROVAL.
   F. DO NOT DISPLACE REINFORCING STEEL FROM ITS PROPER POSITION.
8. PROVIDE SHEAR KEYS IN ALL CONSTRUCTION JOINTS IN BEAMS AND WALLS, IN ACCORDANCE WITH THE TYPICAL CONCRETE DETAILS.
9. PLACE WATERSTOPS IN ALL EXTERIOR CONSTRUCTION JOINTS BELOW GRADE AND ELSEWHERE AS CALLED FOR.
10. FLOORS ARE NOT DESIGNED TO SUPPORT FORMWORK AND WET CONCRETE WEIGHT OF NEXT LEVEL. CONTRACTOR SHALL DESIGN AND PROVIDE RE-SHORING TO PREVENT OVERSTRESSING THE STRUCTURE.
11. SET FORMS TO FOLLOW SLOPES AND GRADES DEFINED ON PLAN, KEEPING MEMBER DEPTHS CONSTANT AT DEPTHS DETAILED OR SCHEDULED, UNLESS NOTED OTHERWISE. SLOPE UNIFORMLY BETWEEN ELEVATIONS GIVEN. BUILD IN CAMBER WHERE SPECIFIED.
12. CONSTRUCTION JOINTS PERMITTED ONLY WHERE INDICATED ON DRAWINGS. WHERE NOT SPECIFICALLY INDICATED ON DRAWINGS, LOCATE THE JOINTS AS FOLLOWS:
    A. LOCATE JOINTS NOT INDICATED TO LEAST IMPAIR STRENGTH AND APPEARANCE OF STRUCTURE. LOCATE VERTICAL JOINTS IN MIDDLE THIRD OF SPANS OF NON-POST-TENSIONED SLABS, BEAMS OR GIRDERS, UNLESS A BEAM INTERSECTS A GIRDER AT MIDDLE LOCATION, IN WHICH CASE OFFSET JOINTS IN GIRDERS TWICE WIDTH OF BEAM. LOCATE VERTICAL JOINTS WITHIN THE END THIRD OF SPANS OF POST TENSIONED CONTINUOUS SLABS, BEAMS OR GIRDERS WHERE TENDON PROFILE IS AT OR NEAR THE CENTROID OF THE CONCRETE CROSS SECTION.
    B. LOCATE HORIZONTAL JOINTS IN WALLS AND COLUMNS AT UNDERSIDE OF SUPPORTED ELEMENTS AT THE TOP OF THE WALL OR COLUMN AND AT THE TOP OF FOOTINGS OR FLOOR SLABS AT THE BOTTOM OF THE WALL OR COLUMN. ROUGHEN SURFACE OF HORIZONTAL OR NEARLY HORIZONTAL CONSTRUCTION JOINTS SO THAT AGGREGATE SHALL BE EXPOSED UNIFORMLY, LEAVING NO LAITANCE, LOOSENED PARTICLES OR DAMAGED CONCRETE.
    C. REFER TO PLANS FOR JOINTS IN GRADE SUPPORTED SLABS.
    D. JOINTS ARE NOT ALLOWED BETWEEN PILASTERS AND BEAM/WALL THAT ARE MONOLITHIC.
    E. SUBMIT CONSTRUCTION JOINT LAYOUT PLANS FOR APPROVAL BY THE ENGINEER PRIOR TO CONSTRUCTION.
13. ***GC NOTE***
    A. AT ALL CONCRETE COLD JOINTS OR TRANSITIONS BETWEEN PLANES: VERTICAL TO VERTICAL POURS, HORIZONTAL TO HORIZONTAL POURS, HORIZONTAL TO VERTICAL POURS, AND VERTICAL TO HORIZONTAL POURS, THE GC SHALL PROVIDE A CONTINUOUS WATER STOP WITHIN EACH JOINT. WATERSTOP MANUFACTURERS AND TYPES SHALL BE AS APPROVED IN THE SPECS AND THE GENERAL NOTES. ALL WATER STOPS MUST BE APPROPRIATE FOR THE CONDITION BASED ON THE MANUFACTURER'S DATA. THE GC SHALL BE IN STRICT COMPLIANCE WITH ALL MANUFACTURERS' USE, HANDLING, AND INSTALLATION INSTRUCTIONS. AT A MINIMUM, THE GC SHALL ASSUME A DUMBBELL-TYPE WATER STOP WITH WINGS THAT EXTEND TO EACH SIDE OF THE CONCRETE FOR EACH JOINT UNLESS OTHERWISE NOTED WITHIN THE CD'S TO BE AN ALTERNATE ACCEPTABLE WATER STOP TYPE.
    B. ADDITIONALLY, CONCRETE USED AT A SLAB DEPRESSION WITH A DEPTH GREATER THAN 6 INCHES, THE CONCRETE ADDITIVE XYPEX C-500 SHALL BE INCLUDED IN THE CONCRETE MIX. REFER TO CONCRETE MIX SCHEDULE FOR CONCRETE MIXES WHICH MAY REQUIRE XYPEX C-500 AND CONCRETE MIX NOTE 10 FOR ADDITIONAL INFORMATION.

CONCRETE REINFORCEMENT:

1. REINFORCING STEEL SHALL CONFORM TO ASTMA615. BARS SHALL BE NEW OR RECYCLED DOMESTIC BILLET STEEL OF A DOMESTIC MANUFACTURE. REINFORCING BARS SIZE #3 THROUGH #10 SHALL BE GRADE 60. REINFORCING BARS SIZE #11 THROUGH #18 SHALL BE GRADE 75.
2. DEFORMED BAR ANCHORS SHALL CONFORM TO ASTM A496, GRADE 70.
3. ALL WELDED WIRE FABRIC SHALL BE SMOOTH WIRE FABRIC CONFORMING TO ASTM A185, AND SHALL BE FURNISHED IN FLAT SHEETS.
4. CONCRETE COVERAGE AROUND REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF ACI 318 SECTION 20.6, LATEST EDITION, AND MEET REQUIREMENTS BELOW. THE REINFORCING STEEL DETAILER SHALL ADJUST REINFORCING STEEL CAGE SIZES AT INTERSECTING REINFORCING MEMBERS AS REQUIRED TO ALLOW CLEARANCE FOR INTERSECTING BARS. SLAB ON GRADE REINFORCEMENT SHALL BE \ SUPPORTED AT EVERY THIRD BAR, NOT TO EXCEED 45-INCH INTERVALS.

FOOTINGS	3 IN
SLAB ON GRADE	1 1/2 IN TOP

5. DETAILING OF CONCRETE REINFORCEMENT AND ACCESSORIES SHALL CONFORM TO ACI 315, LATEST EDITION. ALL HOOKED BARS SHOWN SHALL HAVE STANDARD HOOKS, U.N.O.
6. REINFORCING SHALL NOT BE WELDED WITHOUT APPROVAL FROM THE STRUCTURAL ENGINEER.

CONCRETE FINISHES:

GC NOTE FOR EXPOSED CONCRETE FINISH

1. ALL SLAB AREAS WITH EXPOSED CONCRETE (INCLUDING STAINED OR SEALED CONCRETE, EPOXY COATING FINISH, POLISHED CONCRETE, ETC) FINISH SHALL HAVE THE ADDITIONAL PERFORMANCE CRITERIA AS NOTED BELOW.
   - SLAB FLATNESS SHALL BE 40
   - SLAB LEVELNESS SHALL BE 35
   - THE SLAB SHALL RECEIVE SIKAFLOOR 956 LD AS A CONCRETE SURFACE DENSIFIER TO INCREASE DURABILITY OF THE SLAB SURFACE FROM IMPACTS AND SIMILAR HEAVY USE.
   - THE SLAB SHALL RECEIVE SIKAFLOOR 958 PG AS A CONCRETE SURFACE SEALER. IF SLAB FINISH IS INTENDED TO BE GROUND / POLISHED THIS WOULD BE INSTALLED AFTER POUR AND BEFORE GRINDING.
2. FOR AREAS WHERE THE FINAL ARCHITECTURAL FINISH IS STAINED OR SEALED CONCRETE, THE GC IS RESPONSIBLE FOR PLANNING OUT THE CONTRACTION JOINT / SAW-CUT JOINT LOCATIONS IN ADVANCE OF THE POUR AND PROVIDE DISCONTINUOUS BARS AT EVERY OTHER BAR ON CENTER ALONG THE JOINT. THE GC SHALL ENSURE THE JOINT FORMS A STRAIGHT LINE FOLLOWING THE PLANNED SAW-CUT, AND THE GC SHALL ONLY HOLD BACK THE REINFORCEMENT 1" FROM EACH SIDE OF THE JOINT. THIS PROCEDURE MUST BE FOLLOWED FOR ALL JOINTS IN BOTH DIRECTIONS FOR THE SLABS THAT WILL BE STAINED OR SEALED CONCRETE AS THE FINAL FINISH. THE GC SHALL FOLLOW IN STRICT COMPLIANCE WITH ALL MANUFACTURER'S INSTALLATION PROCEDURES, BOTH FOR PREP AND INSTALLATION FOR ANY PRODUCT THAT IS USED.
3. FOR AREAS WHERE THE FINAL ARCHITECTURAL FINISH IS EPOXY COATING DIRECTLY APPLIED ON TOP OF THE CONCRETE, THE GC MUST PLAN TO ROUTE OUT AND INFILL ALL CRACK LOCATIONS WITH A FULLY RIGID FILLER MANUFACTURED FOR THE PURPOSE OF FILLING TYPICAL SHRINKAGE CRACKS IN CONCRETE. IT MUST BE AT THE CONTRACTOR'S DISCRETION WHETHER TO PROVIDE 1/2 THE SLAB BARS AS DISCONTINUOUS AT THESE EPOXY CONDITIONS OR TO RUN ALL BARS THROUGH AND THEN ROUTE AND FILL SHRINKAGE CRACKS. THE GC SHALL FOLLOW IN STRICT COMPLIANCE WITH ALL MANUFACTURER'S INSTALLATION PROCEDURES, BOTH FOR PREP AND INSTALLATION FOR ANY PRODUCT THAT IS USED.
4. FOR AREAS WITH A POLISHED CONCRETE FINISH, THE FOLLOWING CRITERIA MUST BE ADHERED TO: (TYP ALL AREAS)

4.1 RUN HALF OF THE REINFORCEMENT BARS DISCONTINUOUS AT CONTROL JOINTS IN THE SLAB-ON-GRADE TO HELP CONTROL CRACKING. ENSURE THAT SMOOTH DOWEL BARS ARE PROPERLY PLACED AT THESE JOINTS TO ALLOW FOR LOAD TRANSFER WHILE PERMITTING CONTROLLED MOVEMENT. SAW CUTS SHOULD BE MADE AT THE APPROPRIATE DEPTH (MINIMUM 1/4 OF SLAB THICKNESS) AND SPACING SHOULD NOT EXCEED 8'-0" TO MINIMIZE UNCONTROLLED CRACKING.

4.2 GC SHALL COORDINATE THE LOCATION OF THE EXPOSED CONCRETE FINISH WITH ARCH DRAWINGS.

4.3 GC PROVIDE 1 3/8" CONCRETE COVER AT TOP OF SLAB ON GRADE INSTEAD OF 2 " CLEAR CONCRETE.

4.4. FINISHING PROCESS:
- INITIAL SCREEDING AND BULL FLOATING TO MAINTAIN UNIFORMITY
- AVOID EXCESSIVE TROWELLING-MACHINE FINISH BEFORE SLAB BEGINS SETTING.
- NO HARD TROWELLING, WHICH CAN SEAL THE SURFACE AND AFFECT POLISHING.

4.5 CURING PROCESS METHOD FOR POLISHED CONCRETE AREAS:

PREFERRED OPTION: CURING COMPOUND & DENSIFIER COMBO
- APPLY A LITHIUM SILICATE CURING COMPOUND IMMEDIATELY AFTER FINISHING TO HELP WITH MOISTURE RETENTION.
- DENSIFIER (LITHIUM SILICATE OR SODIUM SILICATE) SHOULD BE APPLIED AFTER THE SLAB CURES FOR 14-28 DAYS. THIS HELPS HARDEN THE SURFACE BEFORE POLISHING.

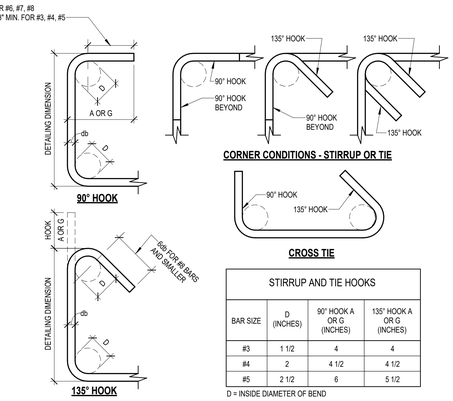
ALTERNATIVE: WET CURING
- 7 DAYS OF WET CURING VIA FLOODING WITH WATERPROOF FORMS, A MINIMUM OF 3" ABOVE THE SLAB
- AVOID UNEVEN WATER EXPOSURE TO PREVENT DISCOLORATION IN POLISHED AREAS.

AVOID THESE METHODS:
- TRADITIONAL CURING COMPOUNDS THAT LEAVE A THICK FILM, AS THEY INTERFERE WITH POLISHING.

4.6 MAXIMUM ALLOWABLE GRIND DEPTH: 1/4"

4.7 AGGREGATE SIZE: A UNIFORM AGGREGATE SIZE OF 3/8" TO 1/2" IS RECOMMENDED. THIS SIZE ENSURES A CONSISTENT AND AESTHETICALLY PLEASING EXPOSURE WHILE MAINTAINING DURABILITY. GC COORD WITH ARCH. IF THE PROJECT REQUIRES A FULL AGGREGATE EXPOSURE, LARGER AGGREGATES (UP TO 3/4") CAN BE USED, BUT THEY REQUIRE DEEPER GRINDING. FOR SALT-AND-PEPPER EXPOSURE, SMALLER AGGREGATES (AROUND 3/8") ARE PREFERABLE. GC COORDINATE WITH ARCH REGARDING DESIRED AGGREGATE SIZE. ADDITIONALLY, WELL-GRADED AGGREGATES (PER ASTM C33) RECOMMENDED TO MINIMIZE SHRINKAGE AND CRACKING.

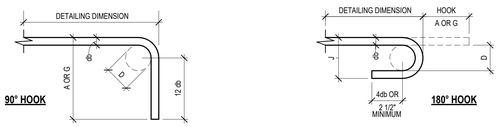
4.8 FINAL POLISH: PROGRESSIVELY FINER GRITS (E.G., 200, 400, 800, 1500, 3000) PER ARCHITECT'S SPECIFICATION.



STIRRUP AND TIE HOOKS			
BAR SIZE	D (INCHES)	90° HOOK A OR G (INCHES)	135° HOOK A OR G (INCHES)
#3	1 1/2	4	4
#4	2	4 1/2	4 1/2
#5	2 1/2	6	5 1/2

D = INSIDE DIAMETER OF BEND

1 TYPICAL STIRRUP AND TIE HOOK TYPES
NO SCALE



END HOOK DIMENSIONS				
BAR SIZE	FINISHED BEND DIAMETER D, (INCHES)	180° HOOKS		90° HOOK
		A OR G, (INCHES)	J, (INCHES)	A OR G, (INCHES)
#3	2 1/4	5	3	6
#4	3	6	4	8
#5	3 3/4	7	5	10
#6	4 1/2	8	6	12
#7	5 1/4	10	7	14
#8	6	11	8	16
#9	9 1/2	15	11 3/4	19
#10	10 3/4	17	13 1/4	22
#11	12	19	14 3/4	24
#14	18 1/4	27	21 3/4	31
#18	24	36	28 1/2	41

D = INSIDE DIAMETER OF BEND

2 TYPICAL END HOOK TYPE
NO SCALE

DEVELOPMENT LENGTHS OF STANDARD HOOKS IN TENSION GRADE 60 REINFORCEMENT. NORMALWEIGHT CONCRETE							
BAR SIZE	f'c=3000 PSI		f'c=4000 PSI		f'c=5000 PSI		BAR SIZE
	Lhb	0.7 Lhb	Lhb	0.7 Lhb	Lhb	0.7 Lhb	
#3	9	7	8	6	7	6	#3
#4	11	8	10	7	9	7	#4
#5	14	10	12	9	11	8	#5
#6	17	12	15	11	13	10	#6
#7	20	14	17	12	15	11	#7
#8	22	16	19	14	17	12	#8
#9	25	18	22	16	20	14	#9
#10	28	20	25	18	22	16	#10
#11	31	22	27	19	24	17	#11
#14	38	-	33	-	29	-	#14
#18	50	-	43	-	39	-	#18

NOTES:
1. Ldh = DEVELOPMENT LENGTH OF STANDARD HOOKS IN TENSION (INCHES).
2. Ldh = Lhb UNLESS CONDITIONS OF NOTE 3 ARE SATISFIED.
3. Ldh = 0.7Lhb FOR #11 BARS AND SMALLER WHEN SIDE COVER (NORMAL TO PLANE OF HOOK) IS NOT LESS THAN 2 1/2 INCHES AND FOR 90° HOOKS COVER ON BAR EXTENSION BEYOND HOOK IS NOT LESS THAN 2 INCHES.
4. HOOKS ARE NOT CONSIDERED EFFECTIVE FOR DEVELOPING BARS IN COMPRESSION.
5. Ldh SHALL BE MULTIPLIED BY 1.2 FOR EPOXY-COATED HOOKED REINFORCING BARS.

3 TYPICAL DEVELOPMENT LENGTHS OF STANDARD HOOKS IN TENSION
NO SCALE

TENSION DEVELOPMENT AND LAP SPLICE LENGTHS (CLASS B) GRADE 60 REINFORCEMENT NORMAL WEIGHT CONCRETE						
BAR SIZE	f'c=3000 PSI		f'c=4000 PSI		f'c=5000 PSI	
	TYP. BARS	OTHER BARS	TYP. BARS	OTHER BARS	TYP. BARS	OTHER BARS
#3	28"	22"	24"	19"	22"	17"
#4	37"	29"	32"	25"	29"	22"
#5	47"	36"	40"	31"	36"	28"
#6	56"	43"	48"	37"	43"	33"
#7	81"	63"	70"	54"	63"	49"
#8	93"	72"	80"	62"	72"	55"
#9	105"	81"	91"	70"	81"	63"
#10	118"	91"	102"	79"	91"	70"
#11	131"	101"	113"	87"	101"	78"

NOTES:
1. THE CLASS B TENSION LAP SPLICE SCHEDULE SHOWN IS FOR NORMAL WEIGHT CONCRETE AND GRADE 60 NON-EPOXY-COATED REINFORCING.
2. TYPICAL BARS ARE FOR BEAM TOP AND INTERMEDIATE BARS, WALL TOP AND HORIZONTAL BARS, AND SLAB/FOOTING TOP BARS FOR SLAB/FOOTING THICKNESS GREATER THAN 13". OTHER BARS ARE FOR ANY BAR THAT DOES NOT HAVE MORE THAN 12" OF FRESH CONCRETE BELOW THE BAR. ALL TYPICAL BARS SHALL HAVE MORE THAN 12" OF FRESH CONCRETE BELOW THE BAR.
3. FOR EPOXY-COATED BARS, MULTIPLY THE TABULATED SPLICE LENGTHS OF TYPICAL BARS BY 1.3 AND THE TABULATED SPLICE LENGTHS OF OTHER BARS BY 1.5.
4. FOR LIGHTWEIGHT CONCRETE, MULTIPLY THE TABULATED SPLICE LENGTHS BY 1.33.
5. FOR GRADE 75 BARS, MULTIPLY THE TABULATED SPLICE LENGTHS BY 1.25.
6. FOR #7 TO #11 SLAB OR WALL REINFORCING WITH CLEAR COVER LESS THAN 1 BAR DIAMETER, MULTIPLY THE TABULATED SPLICE LENGTHS BY 1.5.
7. SPLICE LENGTH FOR BARS OF DIFFERENT SIZE SHALL BE THE GREATER OF SPLICE LENGTH/1.3 OF THE LARGER BAR AND SPLICE LENGTH OF THE SMALLER BAR.
8. FOR CONCRETE STRENGTH IN BETWEEN THOSE SHOWN IN THE SCHEDULE, USE SPLICE LENGTHS OF THE LOWER CONCRETE STRENGTH.
9. THE SCHEDULED LAP SPLICE LENGTH WITH THE APPLICABLE MODIFICATION FACTORS SHALL NOT BE LESS THAN 12".

4 TYPICAL DEVELOPMENT AND LAP SPLICE LENGTHS
NO SCALE

PBK
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GRIFFIN, GA

SRO Offices - Warhawk Fieldhouse Modifications
47 LEMON STREET MCDONOUGH, GA 30253

FINAL DOCUMENTS

HENRY COUNTY SCHOOLS

NORTH

GEORGIA REGISTERED STRUCTURAL ENGINEER No. SE000360 SEMANTH BAJPAI
03/12/2026

CLIENT	
DATE 03 / 12 / 2026	PROJECT NUMBER 250306

DRAWING HISTORY

No.	Description	Date

CHECKED BY: Checker
DRAWN BY: Author

GENERAL CONCRETE AND STL REINF NOTES AND TYP DETAILS

S-300

Plot Stamp:
3/26/2026 3:41:28 PM