ARCHITECTURAL D 24" x 36"

GENERAL
HEL-001

1. DESIGN HAS BEEN COMPLETED IN ACCORDANCE WITH THE CAN/CSA S6-06 OF THE CANADIAN HIGHWAY BRIDGE DESIGN CODE (CHBDC), INCLUDING ALL ADDENDA.
2. ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH THE CHBDC, INCLUDING ALL ADDENDA, ALL REFERENCED CODES AND ALL FEDERAL AND MUNICIPAL REGULATIONS AND BY-LAWS.
3. ALL REFERENCED CODES AND STANDARDS SHALL BE AS REFERENCED IN THE GOVERNING EDITION OF THE BRITISH COLUMBIA BUILDING CODE
4. DESIGN CRITERIA: kPa (psf)

NANAIMO							
SNOW LOADS		SPECTRAL ACCELERATION					
Ss	2.3 kPa (48.0 psf)	Sa (0.2)	Sa (0.5)	Sa (1.0)	Sa (2.0)	PGA	
Sr	0.4 kPa (8.40 psf)	1.0	0.69	0.35	0.18	0.50	
Is	ULS -/SLS 0.90						
WIND LOADS		SEISMIC LOADS		SITE CLASS			
q10	0.39kPa (8.14 psf)	Rd	3.0	-	SEE GEOTECHNICAL REPORT		
q50	0.50kPa (10.44 psf)	Ro	1.7				
Iw	ULS -/SLS 0.75	Ie	ULS -				

5. THESE DRAWINGS INCLUDING DIMENSIONS SHALL BE READ IN CONJUNCTION WITH ALL OTHER PROJECT DRAWINGS AND SPECIFICATIONS. CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE STRUCTURAL ENGINEER FOR CLARIFICATION PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL BE FAMILIAR WITH ALL PROJECT DRAWINGS INCLUDING THOSE OF OTHER DISCIPLINES AND SHALL MAKE ALLOWANCES FOR ALL ITEMS SHOWN ON OTHER DRAWINGS THAT AFFECT THIS CONTRACTOR'S WORK.
6. THESE DRAWINGS SHOW THE COMPLETED STRUCTURE ONLY. PROVIDE TEMPORARY BRACING AND SHORING FOR THE CONSTRUCTION LOADING CONDITIONS AND STABILITY OF THE STRUCTURE DURING CONSTRUCTION. CONSTRUCTION LOADS SHALL NOT EXCEED DESIGN LOADS.
7. THE CONTRACTOR SHALL RETAIN A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA TO DESIGN AND TAKE RESPONSIBILITY FOR ANY TEMPORARY SHORING, BRACING OR OTHER DESIGNS REQUIRED TO COMPLETE CONSTRUCTION.
8. THE CONTRACTOR SHALL SUBMIT WRITTEN RECOMMENDATIONS FOR FLATWORK PERFORMED DURING COLD (BELOW +5°C) AND HOT (ABOVE +25°C) WEATHER. THE RECOMMENDATIONS SHALL BE PREPARED, SEALED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA. A SCHEDULE 'S' SHALL ALSO BE SUBMITTED UPON REQUEST. FLATWORK INCLUDES SLABS ON GRADE, SUSPENDED SLABS, TILT-UP PANELS, MASONRY AND CONCRETE TOPPING.
9. UNDER NO CIRCUMSTANCES SHALL DRAWINGS BE SCALED.
10. CONTRACTOR AND ALL SUB-TRADES SHALL VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCING FABRICATION.
11. HYDROLOGY DESIGN INCLUDING BUT NOT LIMITED TO GROUND WATER FLOW AND LABYRINTH GEOMETRY COMPLETED BY GOLDER ASSOCIATES LTD.
12. SECANT PILE WALL LOADING AND GEOTECHNICAL ANALYSIS COMPLETED BY GOLDER ASSOCIATES LTD.

SUBMITTALS
HEL-002

1. WHERE SHOP DRAWINGS ARE REQUESTED IN THE GENERAL NOTES THE CONTRACTOR SHALL PROVIDE THEM IN EITHER HARD COPY OR DIGITAL FORMAT TO THE FOLLOWING REQUIREMENTS FOR THE ENGINEER'S REVIEW PRIOR TO FABRICATION. THE SHOP DRAWINGS SHALL INDICATE DETAILS, DIMENSIONS, MATERIALS AND DESIGN LOADS.
2. IF HARD COPY FORMAT IS USED FIVE PAPER COPIES SHALL BE SUBMITTED. UNLESS NOTED OTHERWISE THEY SHALL BE SIGNED AND SEALED BY A SPECIALTY ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA.
3. DRAWINGS NOT SEALED BY THE SPECIALTY ENGINEER SHALL BE ACCOMPANIED BY A LETTER WITH A DRAWING LIST IDENTIFYING ALL DRAWING NUMBERS, TITLES, MOST RECENT REVISION NUMBERS AND DATES. THE LETTER AND DRAWING LIST ARE TO BE SIGNED AND SEALED BY THE SPECIALTY ENGINEER.
4. IF A DIGITAL SUBMISSION IS MADE THE FILES SHALL BE IN PDF FORMAT ON A DISC OR TRANSMITTED VIA E-MAIL. THE SUBMISSION SHALL CONTAIN A LETTER WITH A DRAWING LIST AS DESCRIBED ABOVE SIGNED AND SEALED BY THE SPECIALTY ENGINEER. THE FINAL SUBMISSION SHALL BE MADE AS A HARD COPY BEARING THE ORIGINAL SEAL AND SIGNATURE OF THE SPECIALTY ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA.
5. THE FOLLOWING SUBMISSIONS ARE REQUIRED FOR THIS PROJECT:
   - CONCRETE MIX DESIGNS
   - REINFORCING BAR MILL CERTIFICATES IF REQUESTED
   - WELDABLE REINFORCING BAR MILL CERTIFICATES IF REQUESTED
   - EPOXY REINFORCING BAR PERFORMANCE TEST CERTIFICATES IF REQUESTED
   - REINFORCEMENT SHOP DRAWINGS
   - MISCELLANEOUS METAL FABRICATIONS*
   - PRECAST CONCRETE CAP SHOP AND ERECTION DRAWINGS*
   - CWB PRE-QUALIFIED WELDING CERTIFICATES IF REQUESTED*

   * INDICATES THE REQUIREMENT THAT SUBMISSION BE SEALED BY A SPECIALTY ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA AND PROVIDE A SCHEDULE 'S' UPON COMPLETION OF THE WORK.
6. SHOP DRAWINGS WHICH ARE REQUIRED TO, BUT DO NOT HAVE THE APPROPRIATE ENGINEERS SEAL AND SIGNATURE WILL NOT BE REVIEWED.
7. SHOP DRAWINGS WILL BE REVIEWED ONLY FOR GENERAL CONFORMITY WITH THE PROJECT DRAWINGS AND SPECIFICATIONS. QUANTITIES AND DETAILED DIMENSIONS ARE THE CONTRACTORS RESPONSIBILITY. THE REVIEW SHALL NOT RELIEVE THE CONTRACTOR FROM COMPLYING WITH ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS INCLUDING COORDINATION WITH OTHER TRADES AND DISCIPLINES. THE CONTRACTOR IS RESPONSIBLE FOR ERRORS AND OMISSIONS ON THE SHOP DRAWINGS.
8. SHOP DRAWING SUBMISSIONS FOR THE WORK OF SPECIALTY ENGINEERS SHALL BE AS SET OUT IN THIS SECTION.
9. THE QUALITY ASSURANCE FOR MATERIALS, FABRICATION AND INSTALLATION IS THE RESPONSIBILITY OF THE CONTRACTOR AND HIS SPECIALTY ENGINEER.
10. THE SPECIALTY ENGINEER OR HIS REPRESENTATIVE SHALL VISIT THE SITE AND REVIEW THE COMPLETED WORK DESIGNED AND DETAILED ON HIS SHOP DRAWINGS TO SATISFY HIMSELF THAT THE FINISHED COMPONENTS AND ASSEMBLIES ARE IN COMPLIANCE WITH THE ENGINEERED DESIGN. THE SPECIALTY ENGINEER SHALL THEN PROVIDE THE PROJECT ENGINEER OF RECORD WITH A COMPLETED SCHEDULE 'S' FOR THIS WORK ALONG WITH ANY SKETCHES SHOWING FIELD MODIFICATIONS. THESE SKETCHES SHALL BEAR THE SEAL AND SIGNATURE OF THE SPECIALTY ENGINEER.

FIELD REVIEWS
HEL-004

1. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A MINIMUM OF 24 HOURS (1 WORKING DAY) ADVANCE NOTICE FOR FIELD REVIEWS.
2. THE FOLLOWING FIELD REVIEWS ARE CONSIDERED TO BE THE MINIMUM NUMBER OF STRUCTURAL FIELD REVIEWS REQUIRED FOR THE PROJECT:

   SECANT PILES: STRUCTURAL ENGINEER SHALL BE ALLOWED TO OPPORTUNITY TO REVIEW THE REINFORCING INSTALLATION FOR PRIMARY PILE INSTALLATION.

   CONCRETE: REINFORCING STEEL SHALL BE REVIEWED PRIOR TO PLACING CONCRETE. REINFORCING IN CONCRETE WALLS SHALL BE REVIEWED PRIOR TO "BUTTONING UP" WALL FORMS.

   MASONRY: REINFORCING STEEL SHALL BE REVIEWED PRIOR TO POURING ALL BOND BEAMS. BOND BEAM AND VERTICAL REINFORCING SHALL BE IN PLACE AT THE TIME OF FIELD REVIEW.

   TIMBER: FRAMING SHALL BE REVIEWED PRIOR TO COVERING ANY FRAMING AND BEFORE ADDITIONAL LOADS SUCH AS CONCRETE TOPPING AND MECHANICAL EQUIPMENT ARE APPLIED.

   STEEL: STRUCTURAL STEEL SHALL BE REVIEWED AFTER THE MEMBERS HAVE BEEN FABRICATED AND ARE IN THEIR FINAL POSITION WITH ALL CONNECTIONS COMPLETE AND ALL BOLTS INSTALLED AND TIGHTENED.

   METAL DECK: METAL DECK SHALL BE REVIEWED AFTER ALL SHEETS AND PERIMETER ANGLES ARE INSTALLED, FASTENING IS COMPLETE AND PRIOR TO COVERING.
3. IF THE ENGINEER IS NOT PROVIDED WITH THE OPPORTUNITY TO PERFORM THE REQUIRED FIELD REVIEWS, FINAL CERTIFICATION OF THE PROJECT WILL NOT BE ISSUED.

FOUNDATIONS
HEL-005

REFER TO GEOTECHNICAL REPORT PREPARED BY: GOLDER ASSOCIATES LTD.

1. DESIGN VALUES:

	FACTORED BEARING RESISTANCE	BEARING PRESSURE FOR SETTLEMENT
	925 kPa (18500 psf)	617 kPa (12340 psf)

2. CENTRE ALL FOOTINGS UNDER COLUMNS AND WALLS UNLESS NOTED OTHERWISE.
3. FOUNDATION BEARING MATERIAL SHALL BE PROTECTED FROM RAIN, FROST, SNOW AND WATER INFILTRATION. NO FOUNDATIONS SHALL BE POURED BEFORE BEARING MATERIAL HAS BEEN REVIEWED AND APPROVED BY GEOTECHNICAL ENGINEER. THE GEOTECHNICAL ENGINEER SHALL BE PROVIDED WITH NOTICE PRIOR TO CONCRETE POURS AS DESCRIBED IN "FIELD REVIEWS".
4. FOOTING DEPTHS INDICATED ON THE DRAWINGS AND IN GEOTECHNICAL REPORT ARE GENERAL AND REPRESENT MINIMUM VALUES TO BE USED. FIRM BEARING DEPTHS FOR FOOTINGS AND FILL SHALL BE ESTABLISHED FROM THE GEOTECHNICAL REPORT AT THE TIME OF TENDERING. ANY QUERIES REGARDING THE ESTABLISHMENT OF THESE DEPTHS SHALL BE DIRECTED TO THE GEOTECHNICAL ENGINEER. VARIABLE SITE SOIL CONDITIONS, UNDERGROUND SERVICES AND EXISTING STRUCTURES MAY REQUIRE ADJUSTMENT OF FOOTING DEPTHS. THE CONTRACTOR SHALL MAKE ALLOWANCES FOR MINOR VARIATIONS IN FOOTING DEPTHS IN HIS BID. CONTACT GEOTECHNICAL AND STRUCTURAL ENGINEER FOR INSTRUCTIONS REGARDING SITE CONDITIONS THAT DIFFER FROM WHAT IS SHOWN ON DRAWINGS AND INDICATED IN THE GEOTECHNICAL REPORT.
5. FOOTINGS ARE TO BE AT ELEVATIONS INDICATED ON THE DRAWINGS, AND ARE TO BEAR ON UNDISTURBED NATIVE SOILS OR ENGINEERED FILL. BOTH CONDITIONS ARE TO BE REVIEWED AND APPROVED BY THE GEOTECHNICAL ENGINEER. FIRM BEARING DEPTHS FOR FILL SHALL BE ESTABLISHED FROM THE GEOTECHNICAL REPORT AT THE TIME OF TENDERING. ANY QUERIES REGARDING THE ESTABLISHMENT OF THESE DEPTHS SHALL BE DIRECTED TO THE GEOTECHNICAL ENGINEER. VARIABLE SITE SOIL CONDITIONS, UNDERGROUND SERVICES AND EXISTING STRUCTURES MAY REQUIRE ADJUSTMENT OF THESE ELEVATIONS. THE CONTRACTOR SHALL MAKE ALLOWANCES FOR MINOR VARIATIONS IN ELEVATIONS IN HIS BID. CONTACT GEOTECHNICAL AND STRUCTURAL ENGINEER FOR INSTRUCTIONS REGARDING SITE CONDITIONS THAT DIFFER FROM WHAT IS SHOWN ON DRAWINGS AND INDICATED IN THE GEOTECHNICAL REPORT.
6. CONTRACTOR SHALL COORDINATE CONSTRUCTION OF FOUNDATIONS WITH UNDERGROUND SERVICES AS SHOWN ON CIVIL, MECHANICAL, ELECTRICAL, AND ARCHITECTURAL DRAWINGS. CONFLICTS SHALL BE REPORTED TO THE ARCHITECT FOR RESOLUTION.
7. UNLESS NOTED OTHERWISE, THE MINIMUM ASSUMED COMPACTION UNDER ALL FOOTINGS AND SLABS FOR COMPACTED GRANULAR FILLS IS 98% CORRECTED STANDARD PROCTOR DENSITY. GEOTECHNICAL ENGINEER OR TESTING AGENCY TO CONFIRM PRIOR TO PLACING CONCRETE.
8. THE BASE COURSE BELOW SLABS ON GRADE SHALL BE COMPOSED OF INERT, CLEAN, TOUGH, DURABLE CRUSHED AGGREGATE, UNIFORM IN QUALITY AND FREE FROM SOFT OR DISINTEGRATED PIECES. THE AGGREGATE PARTICLES SHALL BE UNIFORM IN QUALITY AND FREE FROM AN EXCESS OF FLAT OR ELONGATED PARTICLES. IN THE ABSENCE OF SATISFACTORY PERFORMANCE RECORDS OVER A 5 YEAR PERIOD OF THE PARTICLE SOURCE OF AGGREGATE, IT'S SOUNDNESS SHALL BE TESTED IN ACCORDANCE WITH ASTM C88 USING MAGNESIUM SULPHATE. MAXIMUM WEIGHTED AVERAGE LOSSES FOR COURSE AGGREGATE SHALL BE 20% AND FOR FINE AGGREGATE 25%. THE SAND EQUIVALENT VALUE WHEN TESTED IN ACCORDANCE WITH ASTM D2419 SHALL NOT BE LESS THAN 40. THE LOS ANGELES ABRASION VALUE WHEN TESTED IN ACCORDANCE WITH ASTM C131 SHALL HAVE A MAXIMUM LOSS BY MASS OF 25%. THE AGGREGATE GRADATION SHALL FALL WITHIN THE FOLLOWING LIMITS WHEN TESTED IN ACCORDANCE WITH ASTM C136;

SIEVE SIZE (US STD.)	25mm	19	9.5	4.75	2.36	1.18	0.3	0.075
% PASSING BY WEIGHT	100	80-100	50-100	35-70	25-50	15-35	5-20	0-5

SUB-BASE BELOW THE BASE COURSE SHALL BE PIT RUN GRAVEL AS SPECIFIED BY THE GEOTECHNICAL ENGINEER.

CAST-IN-PLACE CONCRETE
HEL-014

1. ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA A23.1-09 AND A23.2-09.
2. CONCRETE MIXES, AGGREGATES AND CEMENTITIOUS MATERIALS, INCLUDING PORTLAND CEMENT AND PORTLAND LIMESTONE CEMENT, SHALL CONFORM TO CAN/CSA A23.1-09 AND A23.2-09 AND CAN/CSA-A3000-08 AND SHALL HAVE THE FOLLOWING PROPERTIES BASED UPON PERFORMANCE CRITERIA PROPORTIONING:

CLASS	28 DAY STRENGTH	MAX. AGG. SIZE	MAX. SLUMP	AIR CONTENT	EXPOSURE	CEMENT TYPE
FOOTINGS	35MPa (5000 psi)	19 mm (¾")	75 mm (3")	4-7%	F-2	GU
FOUNDATION WALLS & PIERS	35 MPa (5000 psi)	19 mm (¾")	75 mm (3")	4-7%	F-2	GU
EXT. SLAB ON GRADE	32 MPa (4600 psi)	19 mm (¾")	75 mm (3")	5-8%	C-2	GU
PRECAST CONCRETE	45 MPa (6500 psi) (MIN CONCRETE STRENGTH = 35 MPa @ RELEASE OF STRANDS)	19 mm (¾")	75 mm (3")	1-3%	VARIES	GU
EXTERIOR SKIM SLAB	25 MPa (3600 psi)	10 mm (⅜")	75 mm (3")	-	N	GU
PRIMARY SECANT PILES	35 MPa (5000 psi)	10 mm (⅜")	75 mm (3")	5-8%	F1	GU
SECONDARY SECANT PILES	10 MPa (1500 psi)	10 mm (⅜")	75 mm (3")	5-8%	N	GU

3. PORTLAND LIMESTONE CEMENT (PLC) SHALL MEET THE REQUIREMENTS OF CSA A3000 FOR LIMESTONE CEMENTS.
4. CONCRETE TESTING SHALL BE CARRIED OUT BY THE CONTRACTOR AND PAID FOR BY THE OWNER AND SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-09 AND A23.2-09. THE MINIMUM NUMBER OF TESTS PERFORMED SHALL BE AS PER CSA A23.2-09. ADDITIONAL TESTING SHALL BE PERFORMED AT THE DIRECTION OF THE STRUCTURAL ENGINEER. CONTRACTOR SHALL PROVIDE TESTING AGENCY WITH ADEQUATE NOTICE TO PROVIDE TESTING AS REQUIRED.
5. CHAMFER ALL EXPOSED EDGES OF CONCRETE WITH A 19mm (3/4") CHAMFER UNLESS NOTED OTHERWISE.
6. CONCRETE FINISHES SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-09 AND AS FOLLOWS UNLESS NOTED OTHERWISE:

   INTERIOR SLABS; TROWELED FINISH
   EXTERIOR SLABS; BROOM FINISH
   WALLS (TYPICAL); FILL ALL DEFECTS LARGER THAN 25mm (1") DIAMETER AND GRIND RIDGES FLUSH WITH SURROUNDING SURFACES
   EXPOSED AGGREGATE; SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS
7. ALL CONCRETE CURING SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-09. SPECIAL PRECAUTIONS SHALL BE TAKEN PER CSA A23.1 FOR PLACING AND CURING CONCRETE AT OR ABOVE 27° C AND AT OR BELOW 5° C.
8. UNLESS NOTED OTHERWISE, ALL REINFORCING STEEL SHALL HAVE THE FOLLOWING CLEAR COVER DISTANCES:

CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	75 mm (3")
FORMED SURFACES EXPOSED TO THE GROUND OR WEATHER	60 mm (2.25")
COLUMNS	60 mm (2.25")
BEAMS	60 mm (2.25")

9. CONTROL JOINTS SHALL BE PROVIDED IN BOTH DIRECTIONS IN ALL SLABS-ON-GRADE AT A MAXIMUM SPACING OF 3660mm (12'-0") FOR UNREINFORCED SLABS AND 6100mm (20'-0") FOR REINFORCED SLABS, UNLESS NOTED OTHERWISE ON DRAWINGS.
10. WATER STOPS SHALL BE INSTALLED WHERE INDICATED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS. THE STOPS SHALL BE RIGIDLY TIED IN PLACE. DO NOT DISTORT OR PUNCTURE WATER STOP. DO NOT DISPLACE REINFORCING BAR DURING PLACEMENT.
11. JOINT FILLER SHALL BE INSTALLED IN ALL EXPANSION AND CONSTRUCTION JOINTS.
12. EMBEDDED PLATES AND ANCHOR BOLTS FOR STRUCTURAL STEEL SHALL BE SECURELY TIED OR FASTENED IN PLACE PRIOR TO POURING CONCRETE. ALL ANCHOR BOLTS SHALL BE LAID OUT USING A TEMPLATE. "WET DOWELING" OF ANCHOR BOLTS AND EMBEDDED PLATES IS NOT PERMITTED.

MISCELLANEOUS METAL FABRICATIONS
HEL-025

1. MISCELLANEOUS METAL FABRICATIONS INCLUDES SUCH ITEMS AS METAL STAIRS AND LADDERS, ANGLE LINTELS, PIPE RAILINGS, CORNER GUARDS, BOLLARDS, TRENCH COVERS AND FRAMES, ETC.
2. THE STEEL FABRICATOR SHALL SUBMIT SHOP DRAWINGS AS SPECIFIED UNDER 'SUBMITTALS' TO THE PROJECT ENGINEER FOR REVIEW PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INDICATE ALL DETAILS, MATERIAL SPECIFICATIONS, FINISHES AND DESIGN LOADS.
3. A COPY OF THE FABRICATOR'S CANADIAN WELDING BUREAU CERTIFICATES SHALL BE INCLUDED WITH THE SHOP DRAWING SUBMISSION.
4. ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59-03 (R2008) AND SHALL BE PERFORMED BY FABRICATORS "FULLY APPROVED" BY THE CANADIAN WELDING BUREAU UNDER CSA W55.3-08. FABRICATING SHOP TO HAVE A MINIMUM DIVISION 2.1 CERTIFICATION BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA W47.1-09 AND CSA W55.3-08 FOR RESISTANCE WELDING OF STRUCTURAL COMPONENTS. THE FABRICATOR SHALL SUBMIT PROOF OF CERTIFICATION PRIOR TO START OF WORK.
5. PROVIDE MATERIALS TO THE FOLLOWING STANDARDS:
   - STEEL SECTIONS TO CAN/CSA-G40.21 GRADE 300W
   - STEEL PLATE TO CAN/CSA-G40.21 GRADE 260W
   - STEEL PIPE TO ASTM-A53/A53M, STANDARD WEIGHT, SCHEDULE 40, SEAMLESS, BLACK.
   - METAL BAR GRATING TO ANSI/NAAMM MBG 531
   - WELDING MATERIALS TO CSA W59
   - FILLER METALS AND ALLIED MATERIALS FOR METAL ARC WELDING TO CSA W48
   - ERECTION BOLTS TO ASTM A325-10
   - ANCHOR BOLTS TO ASTM F1554, GRADE 36 (36ksi YIELD STRENGTH) OR ASTM A193 GRADE "B7" (AS NOTED ON PLAN)
   - THREADED ROD SHALL BE TO ASTM F1554 GRADE 36 (36 ksi YIELD STRENGTH)
   - GROUT SHALL BE NON-SHRINK, NON-METALLIC, FLOWABLE, 15MPa AFTER 24 HOURS.
6. DESIGN FABRICATIONS TO CSA-S16-09, LIMIT STATES DESIGN OF STEEL STRUCTURES.
7. DESIGN AND FABRICATE METAL STAIRS TO THE MOST RECENT EDITION OF THE B.C. BUILDING CODE AND THE ARCHITECTURAL AND STRUCTURAL DRAWINGS. FABRICATION AND INSTALLATION TO BE IN ACCORDANCE WITH THE METAL STAIR MANUAL AMP 510, BY THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS.
8. FABRICATE WORK SQUARE, PLUMB, STRAIGHT AND ACCURATE TO THE REQUIRED SIZES WITH JOINTS CLOSELY FITTED AND PROPERLY SECURED. WHERE POSSIBLE SHOP FIT AND ASSEMBLE READY FOR ERECTION. EXPOSED WELDS ARE TO BE CONTINUOUS FOR THE FULL LENGTH OF THE JOINT. GRIND SMOOTH AND FLUSH. UNLESS NOTED OTHERWISE USE SELF-TAPPING, SHAKE-PROOF, FLAT HEADED SCREWS ON ITEMS REQUIRING ASSEMBLY WITH SCREWS.
9. EXCEPT PARTS OF MEMBERS TO BE EMBEDDED IN CONCRETE OR GALVANIZED OR UNLESS NOTED OTHERWISE ON THE DRAWINGS, ALL STEEL WORK SHALL BE SHOP PRIMED. PRIMING SHALL BE IN ACCORDANCE WITH CISC/CPMA-1-73a "QUICK DRYING PRIMER" WHEN NO TOP COAT IS REQUIRED AND IN ACCORDANCE WITH CISC/CPMA-2-75 WHEN A TOP COAT IS SPECIFIED. IF A TOP COAT IS SPECIFIED THE PRIMER SHALL BE SELECTED ENSURING COMPATIBILITY WITH THE SPECIFIED SYSTEM. ITEMS SPECIFIED TO BE GALVANIZED SHALL BE HOT DIPPED GALVANIZED TO CAN/CSA-G164-M92, MINIMUM ZINC COATING OF 600g/sq.m. FIELD TOUCH-UP ALL ABRASIONS, SCRATCHES, WELDS OR BOLTS WITH GALVACON OR EQUIVALENT.
10. HOT DIP GALVANIZE ALL EXTERIOR STEEL WORK AND STEEL WHICH PROTRUDES THROUGH THE BUILDING ENVELOPE.
11. ISOLATE ALUMINUM FROM DISSIMILAR METALS EXCEPT STAINLESS STEEL, ZINC OR WHITE BRONZE WITH BITUMINOUS PAINT. ALL FASTENERS TO BE COMPATIBLE WITH THE MATERIALS THROUGH WHICH THEY PASS.
12. DELIVER, STORE, HANDLE AND PROTECT MATERIALS FROM DAMAGE. INSTALL PLUMB AND TRUE IN EXACT LOCATIONS, SECURELY FASTENED TO THE BUILDING STRUCTURE AS DETAILED.
13. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACING DURING CONSTRUCTION. THE BRACING SHALL BE DESIGNED, INSTALLED AND MAINTAINED BY THE CONTRACTOR. THE BRACING SHALL BE REMOVED ONLY AFTER THE INSTALLATION IS COMPLETE.

WELDING INSPECTIONS
HEL-026

1. ALL INSPECTIONS SHALL BE PERFORMED BY A COMPANY CERTIFIED TO CSA W178.1-08 AND EMPLOYING FIELD INSPECTORS CERTIFIED TO CSA W178.2-08. BOTH SHALL BE CERTIFIED FOR THE RELEVANT CLASS OF INSPECTION AND ARE HEREAFTER REFERRED TO AS THE INSPECTOR. INSPECTION PROCEDURES SHALL BE AS OUTLINED BELOW.
2. ALL MOMENT FRAME AND BRACED FRAME WELDS SHALL BE TESTED BY NON-DESTRUCTIVE MEANS (X-RAY OR ULTRASONIC).
3. ALL WELDS ARE TO BE VISUALLY INSPECTED BY AN APPROVED TESTING COMPANY RETAINED BY THE OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING INSPECTIONS AND PROVIDING SUITABLE AND SAFE ACCESS TO THE WORK BEING INSPECTED.
4. ALL FAILURES IDENTIFIED BY THE TESTING AND INSPECTIONS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. COST OF ADDITIONAL TESTING TO CONFIRM CONFORMANCE WITH SPECIFICATIONS SHALL BE BORNE BY THE CONTRACTOR.
5. SUBMIT ALL TEST REPORTS TO THE STRUCTURAL ENGINEER FOR REVIEW. DO NOT COVER MEMBERS AND THEIR CONNECTIONS WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.

MECHANICAL AND ADHESIVE ANCHORS
HEL-041

1. ALL ANCHORS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
2. ALL ANCHORS ARE TO BE THE ADHESIVE TYPE. MECHANICAL ANCHORS ARE ONLY TO BE USED WHEN SPECIFICALLY CALLED-UP ON THE DRAWINGS. SUBSTITUTIONS MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO USE.
3. UNLESS NOTED OTHERWISE ADHESIVE ANCHORS SHALL BE HILTI 'HAS-E' OR 'HIT-Z' ROD. REFER TO DRAWINGS FOR ANCHOR LOCATIONS, SIZES, CENTRES AND EMBEDMENT LENGTH.

   USE HILTI HY200 WHEN:
   A QUICK CURE IS REQUIRED,
   CONDITIONS ARE DRY,
   HOLES ARE HAMMER DRILLED,
   HOLES ARE NOT OVER-SIZED,
   BASE MATERIAL TEMPERATURE IS ABOVE MINUS 10° CELCIUS.

   USE HILTI HIT-ICE UNDER THE SAME CONDITIONS AS HY200 BUT BASE MATERIAL TEMPERATURE IS BELOW MINUS 10° CELCIUS AND ABOVE MINUS 23° CELCIUS.

   USE HILTI HIT RE500-SD WHEN:
   EXTENDED WORKING TIME IS REQUIRED AND CURE TIME IS NOT CRITICAL,
   HOLES ARE DRILLED USING DIAMOND CORE, PNEUMATIC OR HAMMER DRILLS,
   DEEP EMBEDMENT IS SPECIFIED,
   THE APPLICATION IS UNDERWATER, OR
   HOLES ARE OVERSIZED.
4. REFER TO DRAWINGS FOR MECHANICAL ANCHOR LOCATIONS, SIZES, CENTRES AND EMBEDMENT LENGTH.
5. HOLES FOR MECHANICAL ANCHORS SHALL BE CLEANED OUT WITH HIGH PRESSURE AIR OR BRUSH PRIOR TO ANCHOR INSTALLATION.
6. INSTALLERS OF HILTI PRODUCTS SHALL HAVE RECEIVED TRAINING BY HILTI (CANADA) CORP. IN THE USE OF THE SPECIFIED PRODUCTS. THE GENERAL CONTRACTOR SHALL PROVIDE THE DESIGN ENGINEER WITH A LETTER STATING THAT THIS TRAINING HAS BEEN COMPLETED.

ISSUED FOR CONSTRUCTION

REINFORCING STEEL
HEL-013

1. REINFORCING STEEL SHALL BE DEFORMED STEEL 400 GRADE AND SHALL CONFORM TO CAN/CSA-G30.18-09
2. WELDABLE LOW ALLOY DEFORMED STEEL REINFORCING BARS, GRADE 400W, SHALL CONFORM TO CAN/CSA-G30.18-09. MILL CERTIFICATES SHALL BE SUPPLIED TO THE STRUCTURAL ENGINEER FOR ALL WELDABLE REINFORCING STEEL USED IN THE PROJECT.
3. WELDED WIRE FABRIC, DEFORMED, SHALL CONFORM ASTM A497-07.
4. WELDING OF REINFORCING STEEL SHALL CONFORM TO CSA W186-M1990 (R2012) "WELDING OF REINFORCING BARS IN REINFORCED CONCRETE CONSTRUCTION". WELDING OF REINFORCING SHALL BE ALLOWED ONLY AS NOTED ON PLANS. WHERE WELDING OF REINFORCING IS REQUIRED MILL CERTIFICATES FOR WELDABLE REINFORCING SHALL BE PROVIDED PRIOR TO WELDING. WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER IS REQUIRED FOR ANY ADDITIONAL WELDING.
5. ALL REINFORCING BARS SHALL BE TIED SECURELY TO PREVENT DISPLACEMENT.
6. UNLESS NOTED OTHERWISE ON PLANS, LAP LENGTHS FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

REINFORCING BAR LAP LENGTHS						
CONCRETE MPa	BAR SIZE					
	10M	15M	20M	25M	30M	35M
20	430 (17")	635 (25")	840 (33")	1320 (52")	1575 (62")	1855 (73")
25	380 (15")	560 (22")	760 (30")	1195 (47")	1370 (54")	1650 (65")
30	355 (14")	510 (20")	710 (28")	1065 (42")	1295 (51")	1500 (59")
35	330 (13")	480 (19")	660 (26")	990 (39")	1195 (47")	1395 (55")
40	305 (12")	455 (18")	610 (24")	940 (37")	1120 (44")	1320 (52")
45	280 (11")	430 (17")	560 (22")	890 (35")	1040 (41")	1245 (49")

NOTES;
1. MULTIPLY VALUES BY 1.3 FOR HORIZONTAL REINFORCEMENT PLACED IN SUCH A WAY THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE SPLICE.
2. MULTIPLY VALUES BY 1.5 FOR EPOXY COATED REINFORCEMENT WITH CLEAR COVER LESS THAN 3 BAR DIAMETERS OR BAR SPACING LESS THAN 7 BAR DIAMETERS.
3. MUTLIPLY VALUES BY 1.2 FOR ALL EPOXY COATED REINFORCEMENT OTHER THAN IN 2. ABOVE.
4. LAP LENGTH FOR STAINLESS STEEL BARS SEE ITEM 16 AND CHART.

7. NO SPLICES OTHER THAN THOSE NOTED ON THE DRAWINGS ARE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.
8. WHERE CONCRETE SURFACES ARE TO BE EXPOSED ONLY NON-CORROSIVE TYPE REINFORCING CHAIRS SHALL BE USED TO SUPPORT THE REINFORCING STEEL.
9. DOWELS ARE TO BE TIED IN PLACE PRIOR TO POURING CONCRETE - "WET DOWELING" OF ANY REINFORCING STEEL IS NOT PERMITTED WITHOUT THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
10. HOOKS ON ALL TIES SHALL BE BENT AT LEAST 135° AND HAVE A MINIMUM LEG OF 6 TIMES THE TIE BAR DIAMETER.
11. PROVIDE CORNER BARS TO MATCH HORIZONTAL WALL REINFORCEMENT.
12. ALL VERTICAL REINFORCING TO FOUNDATION WALLS AND PIERS SHALL HAVE A STANDARD HOOK AND BE EMBEDDED IN THE FOOTING.
13. ALL BARS SHALL BE BENT AT TEMPERATURES GREATER THAN 10°C.
14. NO BARS WHICH ARE PARTIALLY EMBEDDED IN CONCRETE SHALL BE FIELD BENT EXCEPT AS SHOWN ON THE DRAWINGS OR APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.
15. DEFORMED STAINLESS STEEL BARS SHALL BE USED WHERE CALLED FOR ON DRAWINGS AND SHALL CONFORM TO ASTM A955 WITH A MINIMUM YIELD STRENGTH OF 420MPa AND A MINIMUM TENSILE STRENGTH OF 520MPa.
16. ALL LAPS OF STAINLESS STEEL BARS SAHLL BE AS FOLLOWS UNLESS OTHERWISE NOTED:

BAR SIZE	STAINLESS STEEL BAR LAP (mm)
10M	610
15M	815
20M	1070
25M	1730
30M	2080

LIST OF ABBREVIATIONS

ALT	---	ALTERNATE	MAX	---	MAXIMUM
C/W	---	COMPLETE WITH	NF	---	NEAR FACE
℄	---	CENTRE LINE	o/c	---	ON CENTRE
CL	---	CLEAR	O/F	---	OUTSIDE FACE
CIP	---	CAST IN PLACE	OPP	---	OPPOSITE
CONC	---	CONCRETE	OWSJ	---	OPEN WEB STEEL JOIST
COL	---	COLUMN	PL	---	PLATE
CONT	---	CONTINUOUS	PP	---	PARTIAL PENETRATION
CJ	---	CONTROL JOINT	REINF	---	REINFORCE(MENT)
CP	---	COMPLETE PENETRATION	R/W	---	REINFORCE WITH
DP	---	DEEP	STIR	---	STIRRUP
DWG	---	DRAWING	STL	---	STEEL
E/E	---	EACH END	SIM	---	SIMILAR
E/F	---	EACH FACE	SW	---	SHORT WAY
E/S	---	EACH SIDE	SWL	---	SAFE WORKING LOAD
ELEV	---	ELEVATION	THK	---	THICK
EM	---	EMBEDDED PLATE	T&B	---	TOP AND BOTTOM
E/W	---	EACH WAY	TYP	---	TYPICAL
EXT	---	EXTERIOR	U/S	---	UNDERSIDE
FF	---	FAR FACE	UNO	---	UNLESS NOTED OTHERWISE
LV	---	LENGTH VARIES	VERT	---	VERTICAL
			WP	---	WORK POINT

STRUCTURAL DRAWING LIST

S101 GENERAL NOTES
S102 TYPICAL DETAILS

S201 SITE PLAN
S202 CUT-OFF WALL PLAN - SECANT PILE LAYOUT AND DETAILS
S203 SPILLWAY AND PEDESTRIAN BRIDGE FOUNDATION PLAN
S204 SPILLWAY AND PEDESTRIAN BRIDGE PLAN

S301 CONCRETE SECTIONS AND DETAILS
S302 CONCRETE SECTIONS AND DETAILS

S401 BOX STRINGER LAYOUT, SECTIONS AND DETAILS
S402 BOX STRINGER BEARING DETAILS

STRUCTURAL DRAWING ISSUE RECORD

ISSUE No.	ISSUE DATE (YYYY.MM.DD)	ISSUED FOR	S101	S102		S201	S202	S203	S204		S301	S302		S401	S402
01	2015.09.18	FOR CLIENT REVIEW	●	●		●	●	●			●			●	●
02	2015.10.15	COORDINATION	●	●		●	●	●	●		●	●		●	●
03	2015.10.20	CONSTRUCTION	●				●								

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR
01	2015.09.18	CLIENT REVIEW
02	2015.10.15	FOR COORDINATION
03	2015.10.20	CONSTRUCTION

SUB CONSULTANT

COLLIERY DAM - STRUCTURAL 2015

CITY OF NANAIMO

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GENERAL NOTES

DESIGNED: CDW
DESIGN REVIEW: GAB
DRAFTED: SJM
DRAFTING REVIEW:

ENGINEER'S SEAL: PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA C. D. WORK # 37521 OCT 20, 2015

PROJECT No.: 0017-276
CLIENT DRAWING No.: n/a
SCALE: AS SHOWN
PERMIT No.: n/a
HEL DRAWING No.: S101
REVISION: 03

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

File: H:\Projects\0017-276 Colliery Dam - Structural 2015\04S Drawings\Structural\0017-276-S101.dwg Plot Time: Oct. 20, 15 11:32 AM User: smuirhead