

GOVERNMENT OF HAITI
AND
UNITED STATES AGENCY FOR INTERNATIONAL
DEVELOPMENT



**EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
CHANNEL IMPROVEMENTS**

9 DECEMBER 2016



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ENGINEERING DESIGN
& CONSTRUCTION
SUPERVISION PROGRAM

EKAM

PROJECT TITLE:

EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

SHEET CONTENTS:

INDEX OF DRAWINGS

DESIGNED BY:	DATE:
NFC	09-DEC-2016
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NFC	TETRA TECH
CHECKED BY:	CAD FILE NAME:
JH	NHSUP-G-001

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LEGEND

LINETYPES

	EXISTING WATER LINE
	PROPOSED WATER LINE
	CHAIN-LINK FENCE
	OTHER FENCE
	DRAIN LINE
	LIMITS OF PROPOSED DRAINAGE CHANNEL
	LIMITS OF EXISTING DRAINAGE CHANNEL

SYMBOLS

	SEWER VENT
	FLOW ARROWS
	DRAINAGE CHANNEL
	HEAD WALL
	CULVERT
	DRAINAGE SWALE

ABBREVIATIONS

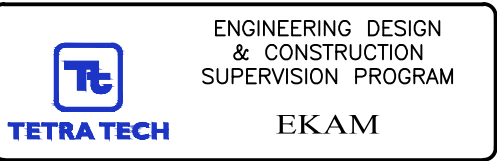
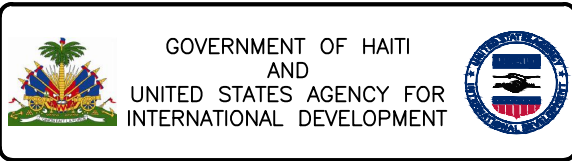
ABR:	ANAEROBIC BAFFLED REACTOR TANK
APPROX:	APPROXIMATELY
CP:	CHEMICAL METERING PUMP
DICL:	DUCTILE IRON CONCRETE-LINED
DIP:	DUCTILE IRON PIPE
DIA:	DIAMETER
EL/ELEV:	ELEVATION
FT:	FOOT OR FEET
HORIZ:	HORIZONTAL
IN:	INCH OR INCHES
MIN:	MINIMUM
MJ:	MECHANICAL JOINT
NTS:	NOT TO SCALE
P:	PUMP
PROP:	PROPOSED
PVC:	POLYVINYL CHLORIDE
RCP:	REINFORCED CONCRETE PIPE
RP:	RAW WATER INTAKE PUMP
SMH:	SEWER MANHOLE
S.S.:	STAINLESS STEEL
STA:	STATION
TYP:	TYPICAL
uPVC:	UNPLASTICIZED POLYVINYL CHLORIDE
W	WATER/WELL

GENERAL NOTES

1. THE CONTRACTOR SHALL VISIT ALL THE SITES PRIOR TO BIDDING SO AS TO BE COMPLETELY FAMILIAR WITH EXISTING CONDITIONS AND PROPOSED REQUIREMENTS.
2. THE CONTRACTOR SHALL INFORM HIM/HERSELF REGARDING FLOOD WATER LEVELS IN THE AREA IN WHICH WORK IS BEING PERFORMED AND TAKE ACTION TO MINIMIZE DAMAGE FROM INCOMING STORMS.
3. THE CONTRACTOR SHALL TAKE NOTE OF EROSION AND SEDIMENTATION CONTROL FEATURES SHOWN ON THE PLANS IN ADDITION TO THE REQUIREMENTS OF THE SPECIFICATIONS AND ALL ENVIRONMENTAL MITIGATION MANAGEMENT PLAN (EMMP) REQUIREMENTS.
4. ALL AREAS DISTURBED DURING CONSTRUCTION AND ALL NEW GRADING AREAS ARE TO BE LOAMED AND SEEDED UNLESS OTHERWISE SPECIFIED.
5. EXISTING UTILITIES, WHERE SHOWN IN THE DRAWINGS, ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY LOCATING AND COORDINATING ANY PROPOSED CONSTRUCTION ACTIVITY WITH THE APPLICABLE UTILITY OWNER. THE GOVERNMENT DOES NOT GUARANTEE THE ACCURACY OF UTILITY LOCATIONS OR THE COMPLETENESS OF THE UTILITIES SHOWN. THE LOCATIONS AND ATTRIBUTES OF SUBSURFACE AND ABOVE-GROUND UTILITIES HAVE BEEN COMPILED FROM AVAILABLE RECORD PLAN DATA AND NOTES, AS WELL AS FIELD OBSERVATIONS. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION.
6. WALLS, FENCES, SIGNS, LIGHT POLES, ETC. SHALL BE REMOVED AS NECESSARY TO PERFORM THE WORK AND BE REPLACED TO A CONDITION AT LEAST EQUAL TO THAT BEFORE CONSTRUCTION BEGAN, UNLESS OTHERWISE INDICATED. ALL SUCH WORK SHALL BE INCIDENTAL TO THE CONSTRUCTION OF THE PROJECT.
7. ALL NEW CONCRETE STRUCTURES POTENTIALLY SUBJECT TO VEHICLE LOADING SHALL BE DESIGNED FOR AASHTO HS20-44 LOADING AS A MINIMUM.
8. LOCATION AND SIZE OF SITE FEATURES SHOWN IN AN APPROXIMATE WAY ONLY AND ARE INTENDED AS A GENERAL CONFIGURATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE EXACT DIMENSIONS FOR THE IMPLEMENTATION OF THE PROPOSED WORK.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEWATERING OPERATIONS REQUIRED TO SUCCESSFULLY COMPLETE THE PROJECT IN ACCORDANCE WITH REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY AND MAINTAINING A HEALTH AND SAFETY PLAN DURING CONSTRUCTION.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING AND IMPLEMENTING AN ENVIRONMENTAL MITIGATION AND MANAGEMENT PLAN (EMMP).
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL ADJACENT TO CONSTRUCTION ZONES. ROUTE 6 SHALL NOT BE CLOSED TO TRAFFIC WITHOUT WRITTEN AUTHORIZATION FROM THE CLIENT.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE AND DISTURBANCE CAUSED BY CONSTRUCTION OPERATIONS, WHETHER INTENTIONAL OR UNINTENTIONAL. ALL ROADS, DITCHES, YARDS, AND STRUCTURES SHALL BE REPAIRED/RETURNED TO EXISTING CONDITIONS OR BETTER.
14. THE CONTRACTOR SHALL VERIFY ALL LINES, GRADES, AND INVERTS PRIOR TO CONSTRUCTION. ANY DISCREPANCIES FOUND BETWEEN THE PLANS AND THE CONTRACTORS SURVEY SHALL BE BROUGHT TO THE ATTENTION OF USAID'S TECHNICAL REPRESENTATIVE.

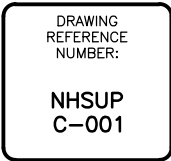
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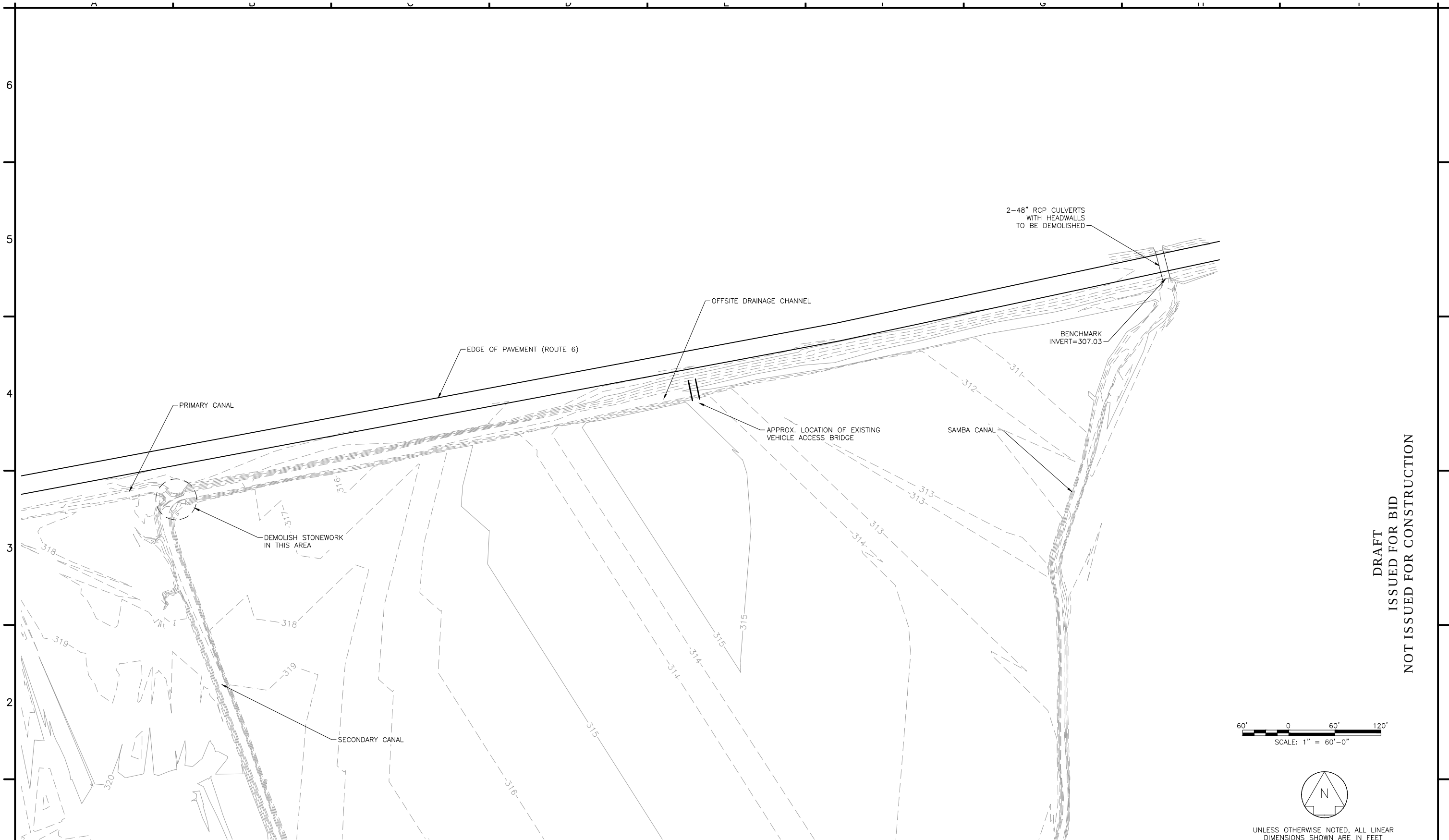


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ENGINEERING DESIGN
& CONSTRUCTION
SUPERVISION PROGRAM

EKAM

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OFFSITE DRAINAGE
127-1298-15001

SHEET CONTENTS:

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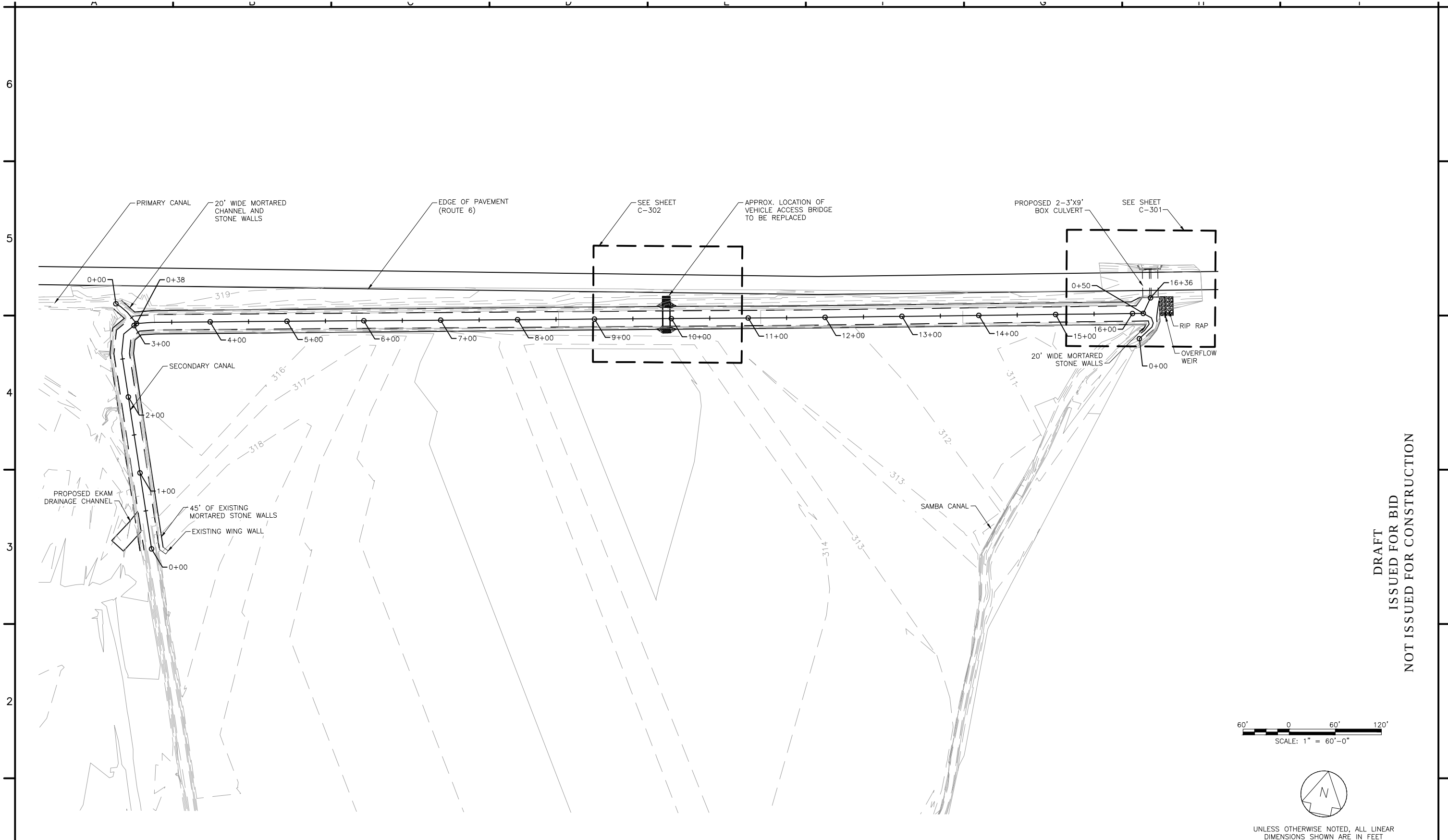
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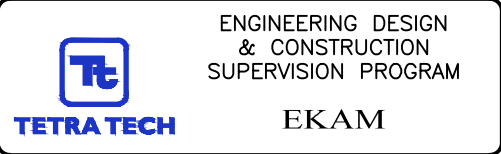


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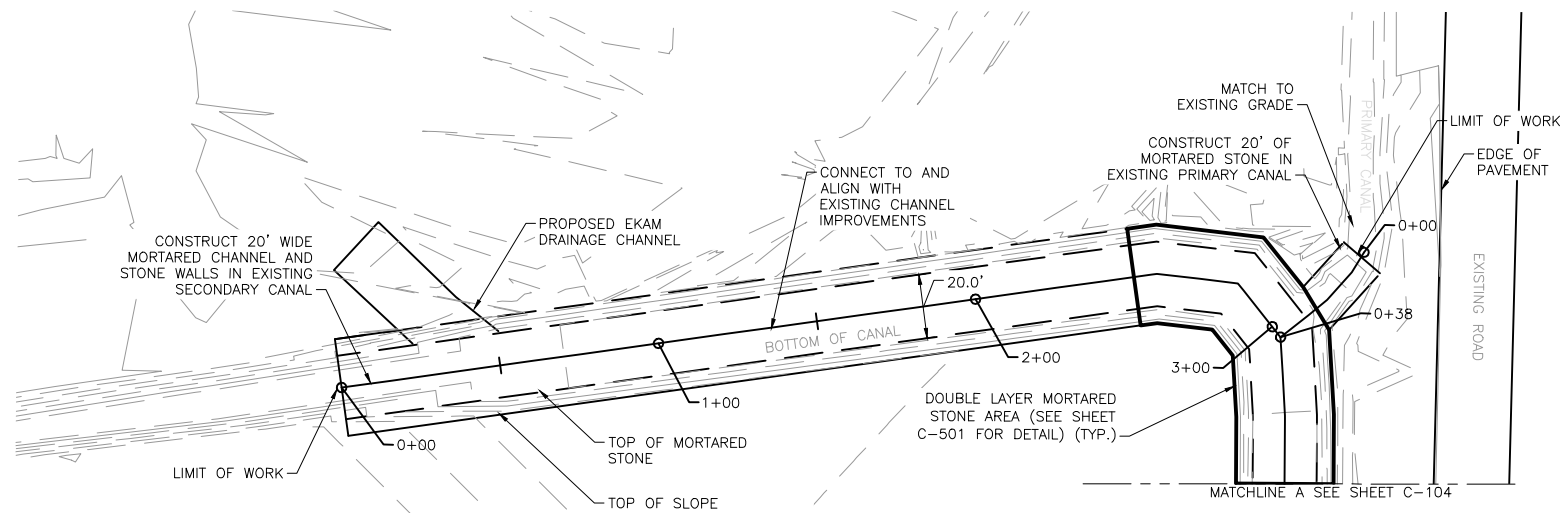
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EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

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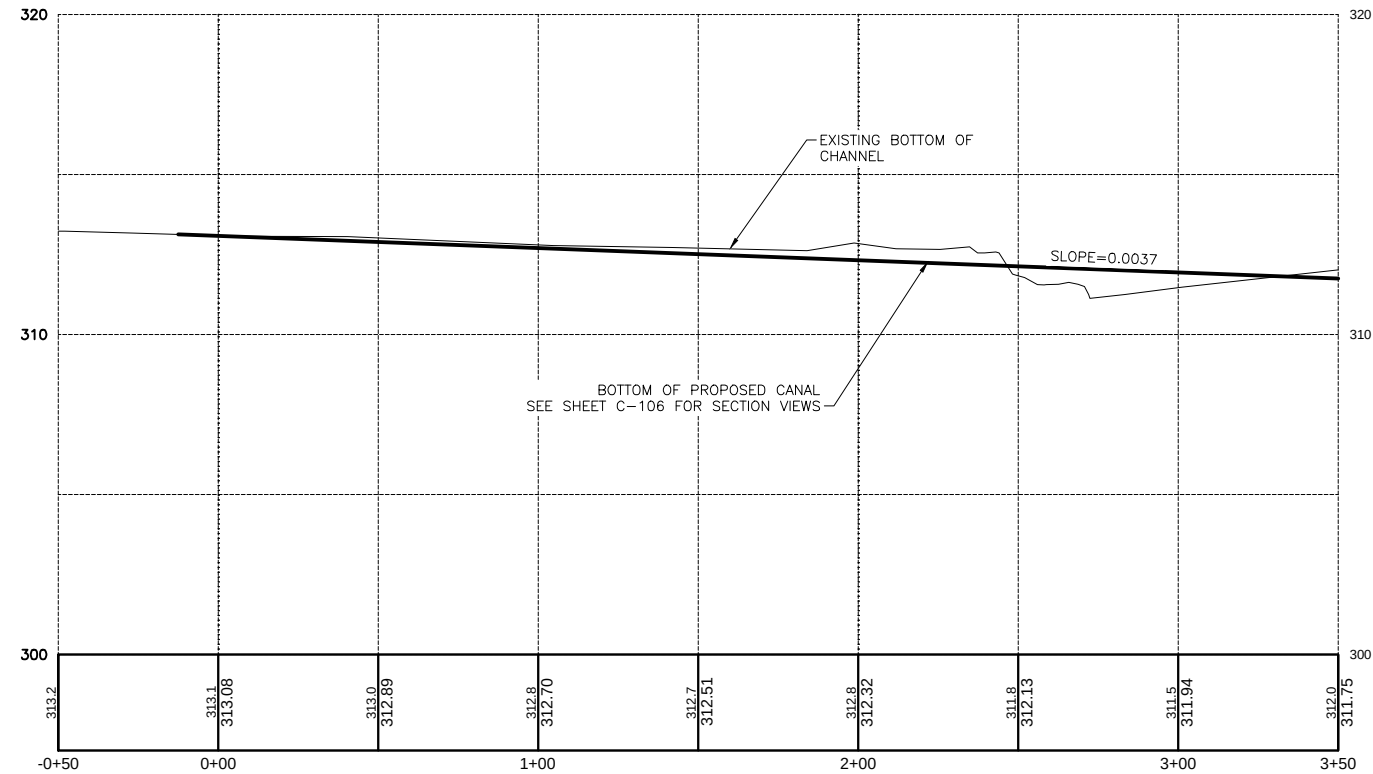
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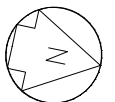
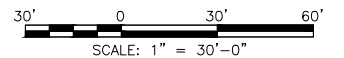
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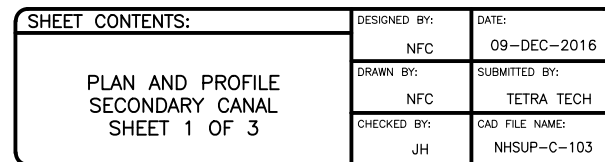
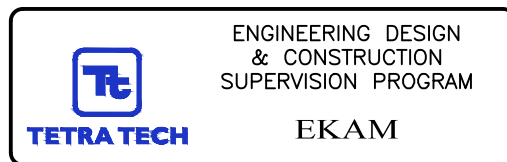
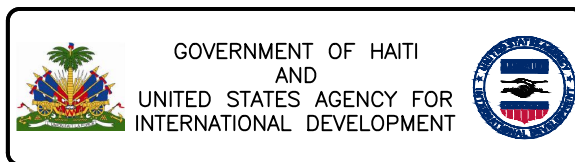
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SCALE: 30



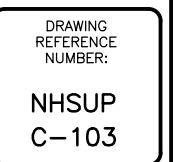
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HORIZONTAL SCALE: 30
VERTICAL SCALE 3



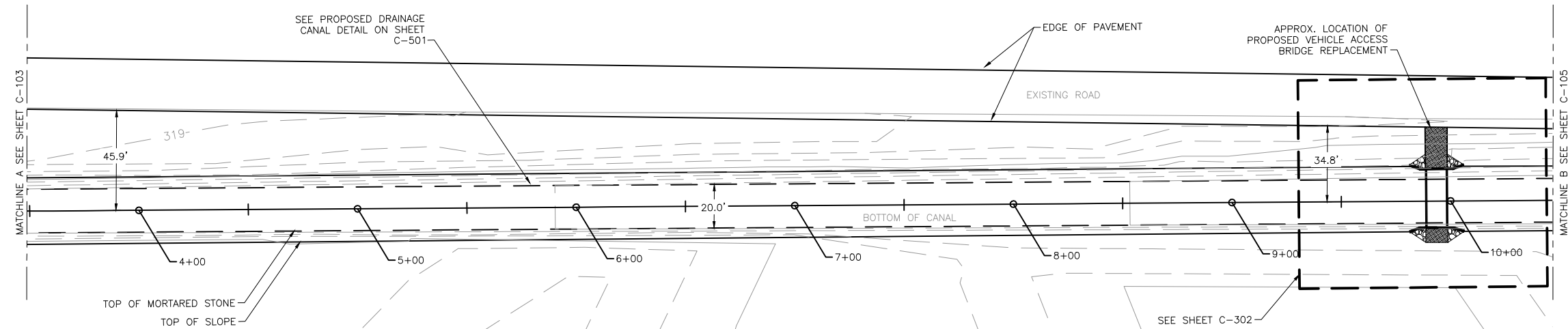
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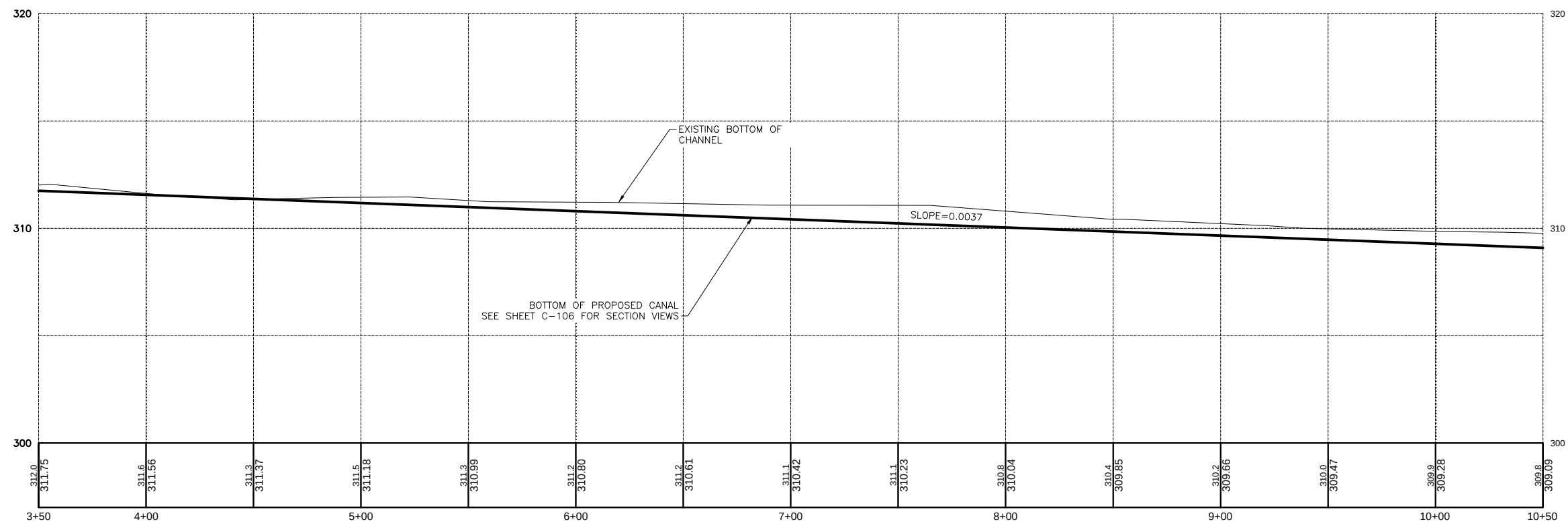
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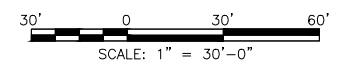
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PROPOSED OFFSITE DRAINAGE CHANNEL PLAN (PART 2)
SCALE: 30



PROPOSED OFFSITE DRAINAGE CHANNEL PROFILE (PART 2)
HORIZONTAL SCALE: 30
VERTICAL SCALE 3



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PROJECT TITLE:

EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

SHEET CONTENTS:

PLAN AND PROFILE
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SHEET 2 OF 3

DESIGNED BY:

NFC

DATE:

09-DEC-2016

DRAWN BY:

SUBMITTED BY:

NEC

TETRA TECH

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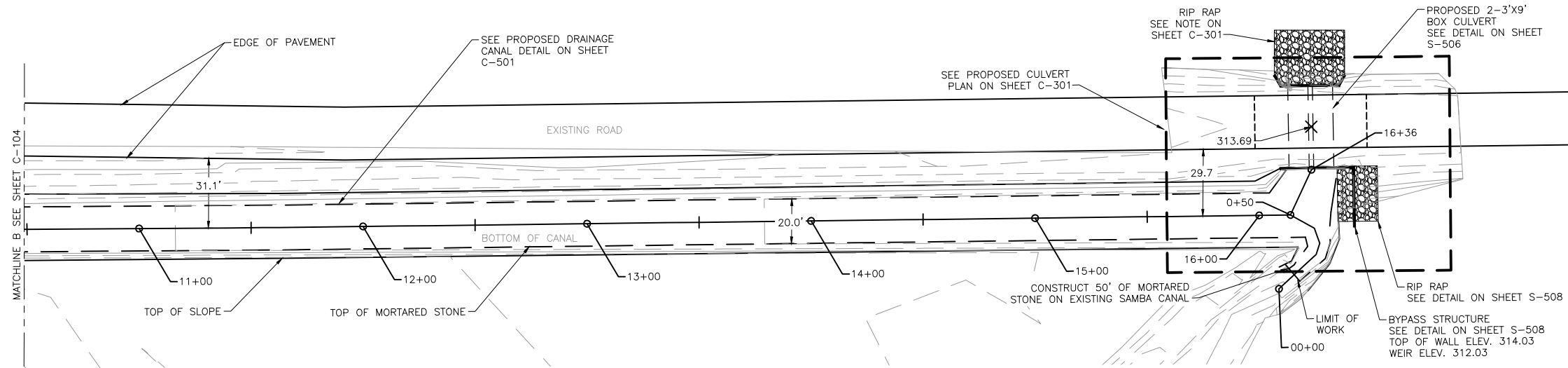
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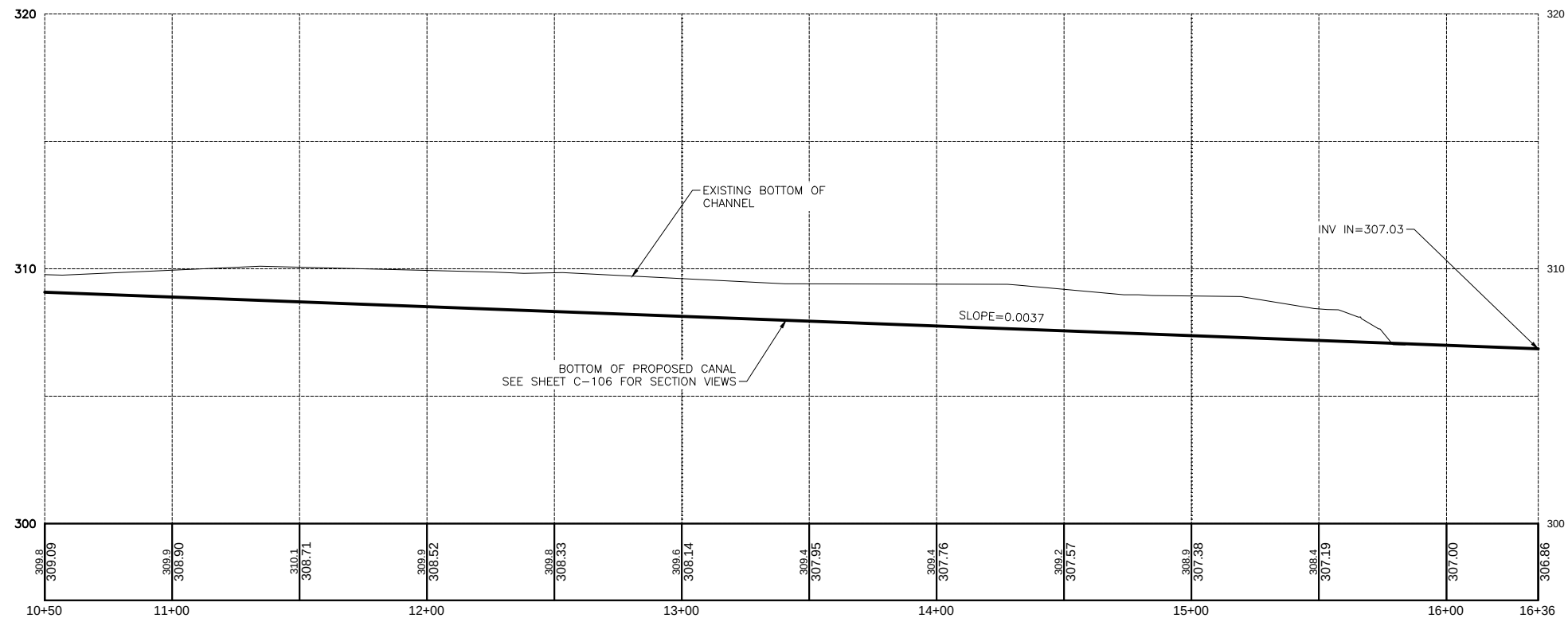
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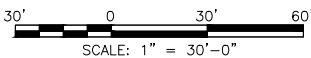
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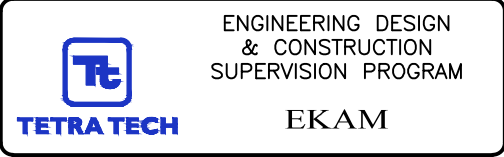
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PROJECT TITLE:
EKAM SETTLEMENT UPGRADE OFFSITE DRAINAGE 127-1298-15001

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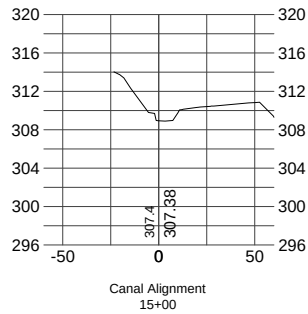
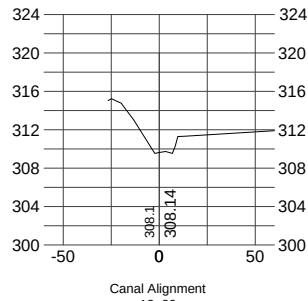
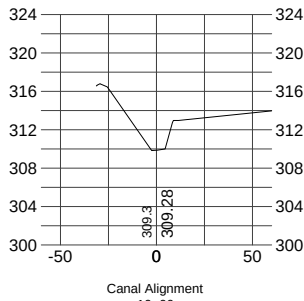
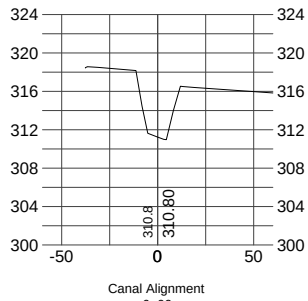
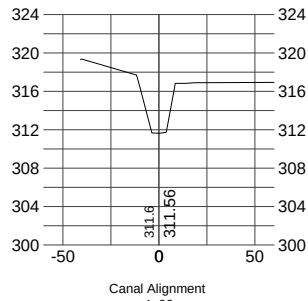
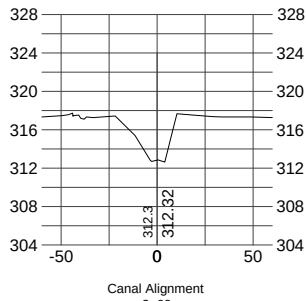
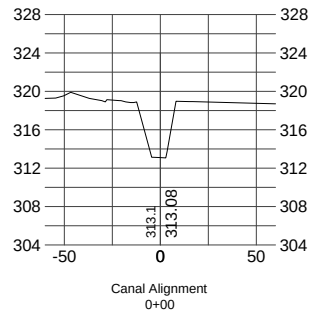
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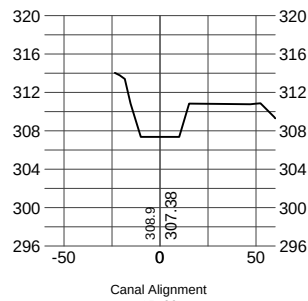
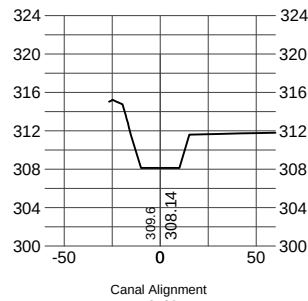
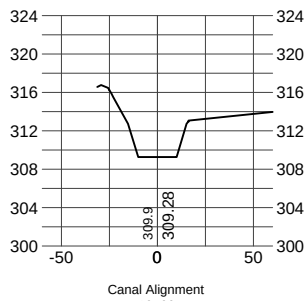
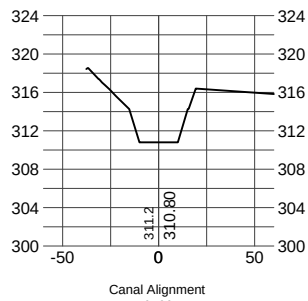
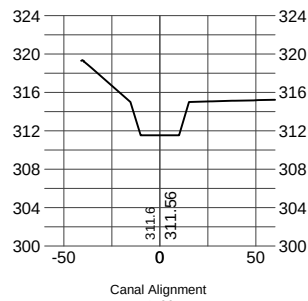
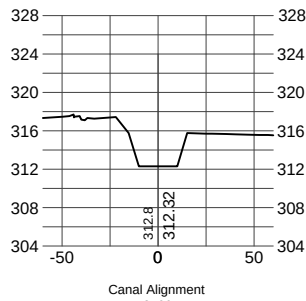
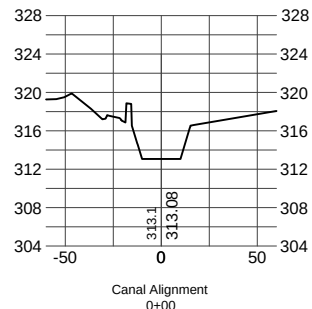
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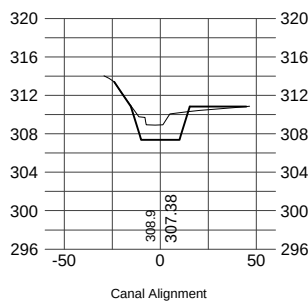
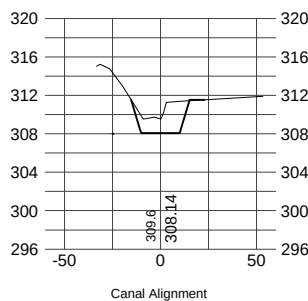
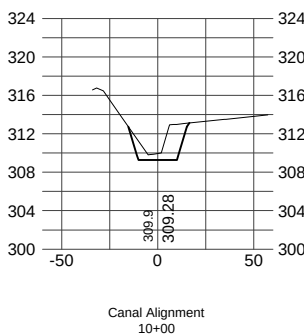
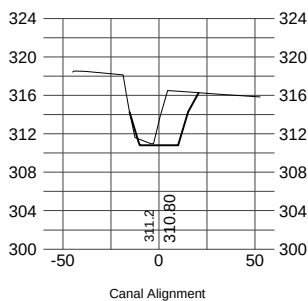
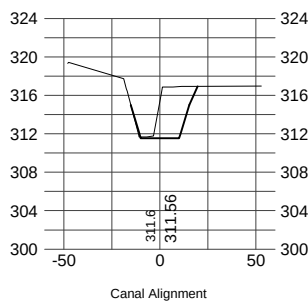
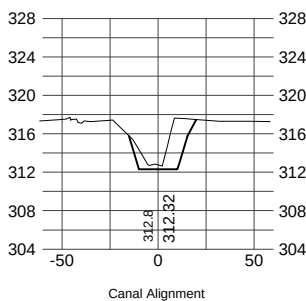
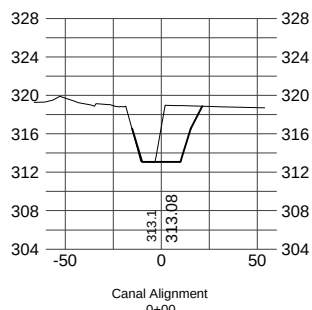
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EXISTING OFFSITE DRAINAGE CHANNEL SECTION VIEWS
HORIZONTAL SCALE: 50
VERTICAL SCALE: 5



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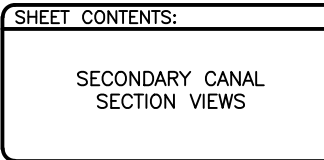
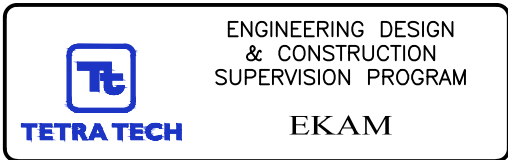
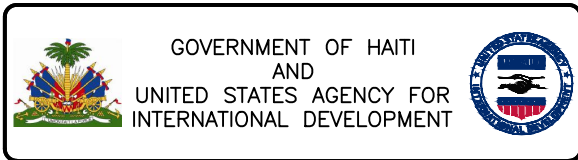
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VERTICAL SCALE: 5



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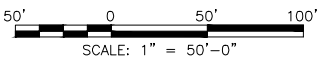
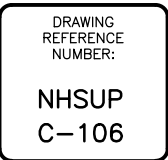
EXISTING & PROPOSED OFFSITE DRAINAGE CHANNEL SECTION VIEWS
HORIZONTAL SCALE: 50
VERTICAL SCALE: 5

2



DESIGNED BY:	DATE:
NFC	09-DEC-2016
DRAWN BY:	SUBMITTED BY:
NFC	TETRA TECH
CHECKED BY:	CAD FILE NAME:
JH	NHSUP-C-106

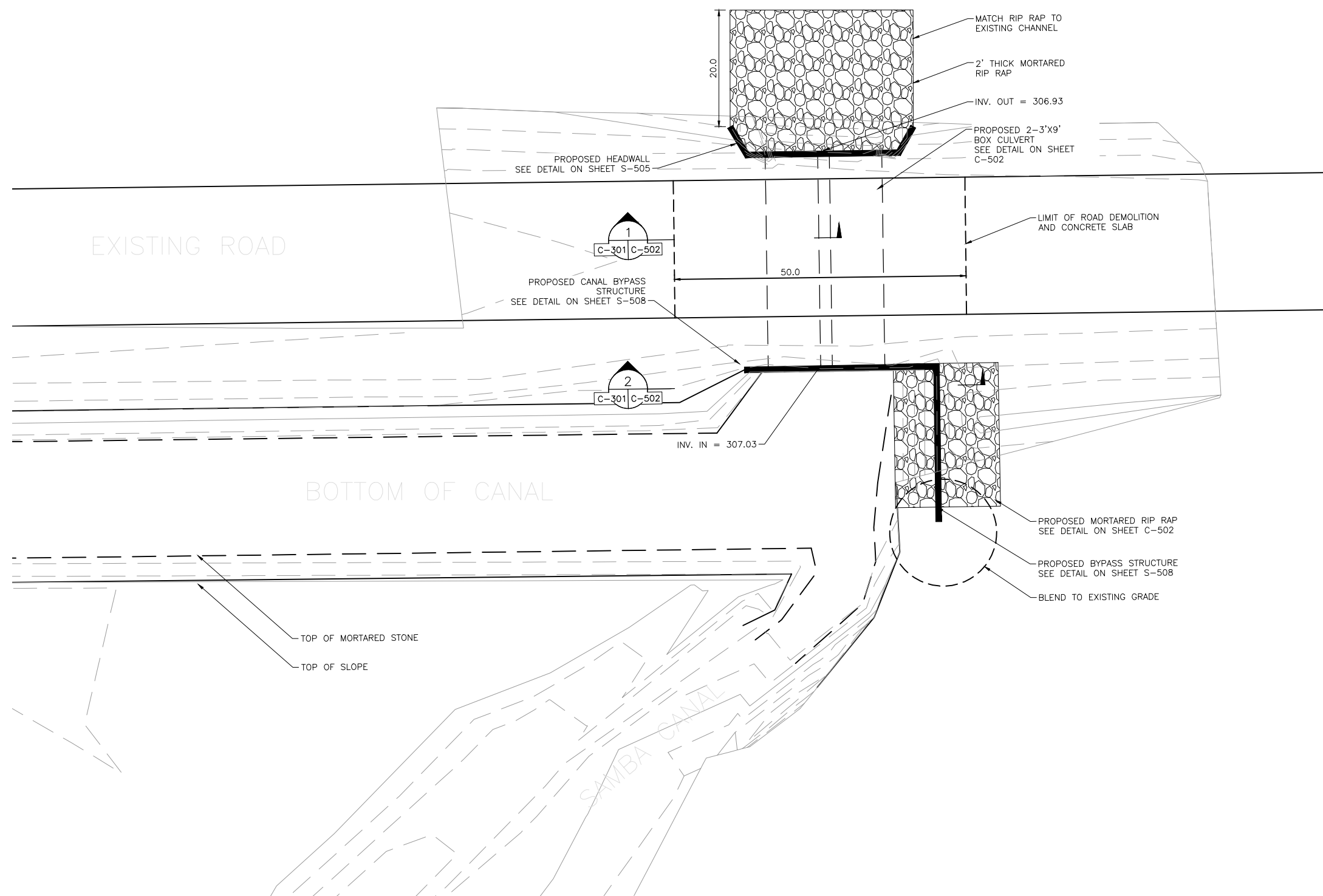
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UNLESS OTHERWISE NOTED, ALL LINEAR DIMENSIONS SHOWN ARE IN FEET

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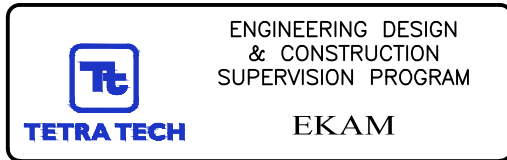
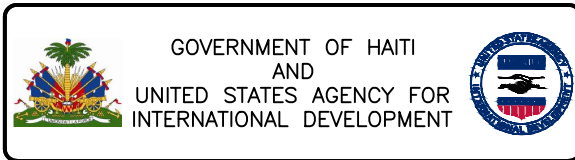


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10' 0 10' 20'
SCALE: 1" = 10'-0"



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DIMENSIONS SHOWN ARE IN FEET



PROJECT TITLE:
EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

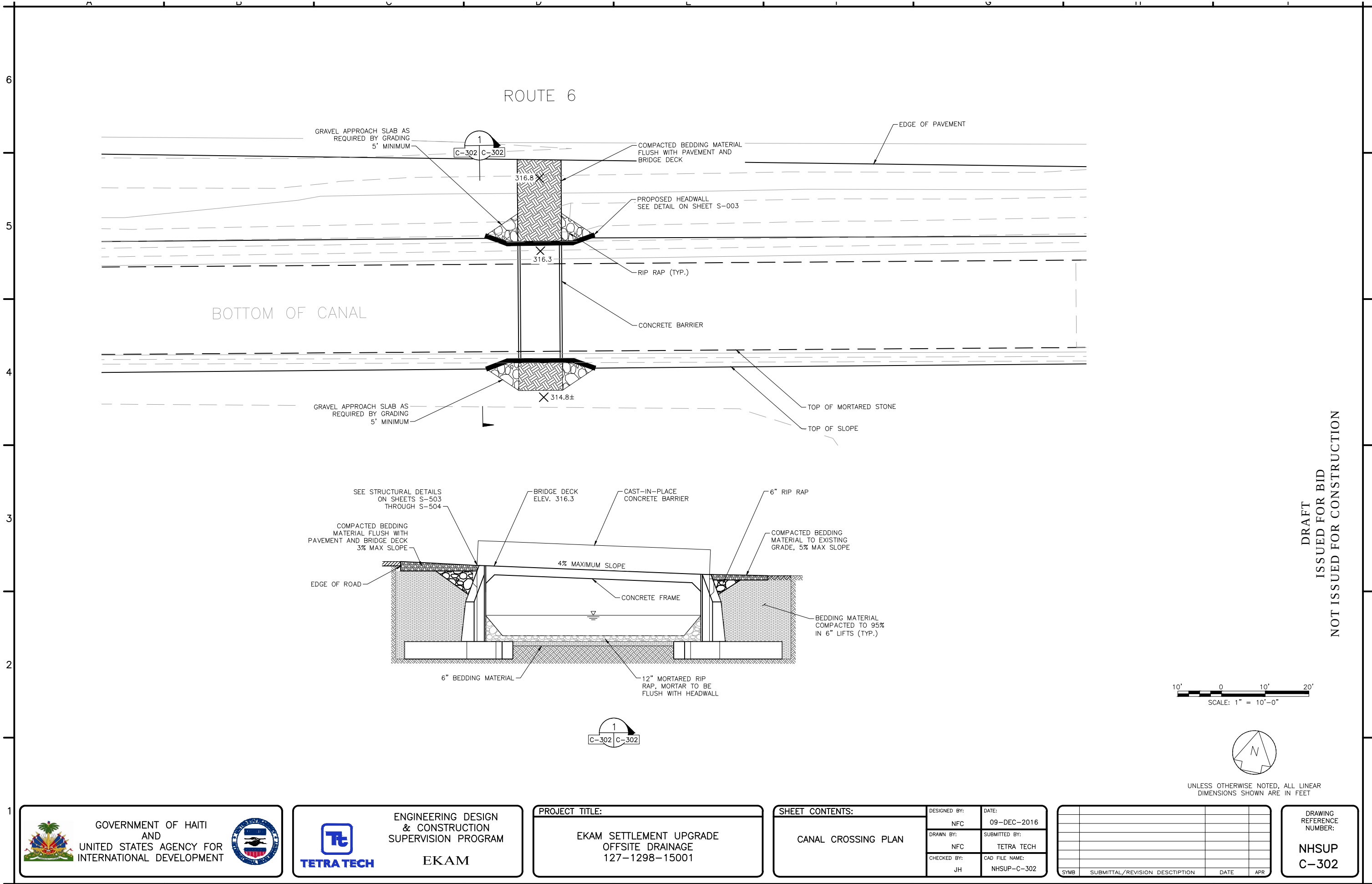
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CULVERT PLAN
ROUTE 6

DESIGNED BY:	DATE:
NFC	09-DEC-2016
DRAWN BY:	SUBMITTED BY:
NFC	TETRA TECH
CHECKED BY:	CAD FILE NAME:
JH	NHSUP-C-301

SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

DRAWING
REFERENCE
NUMBER:
NHSUP
C-301

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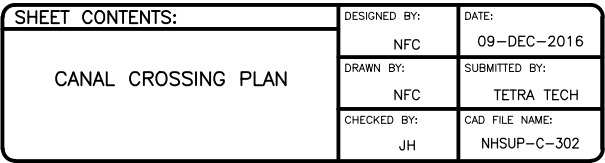
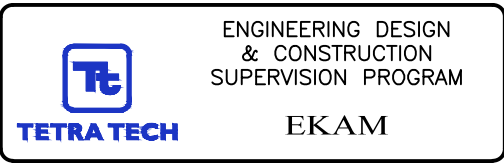
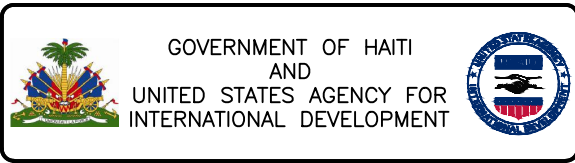


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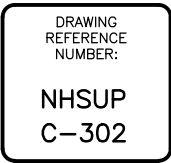
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SCALE: 1" = 10'-0"



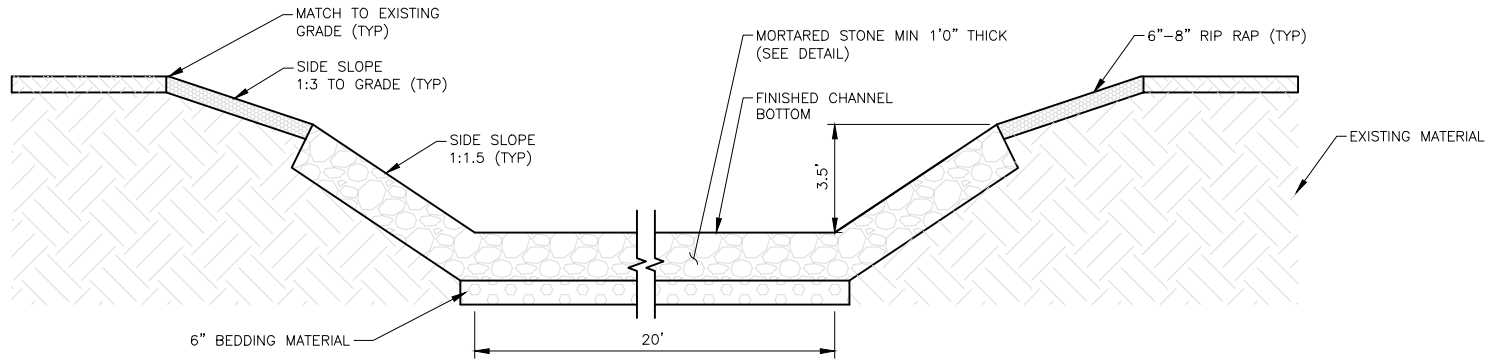
UNLESS OTHERWISE NOTED, ALL LINEAR
DIMENSIONS SHOWN ARE IN FEET



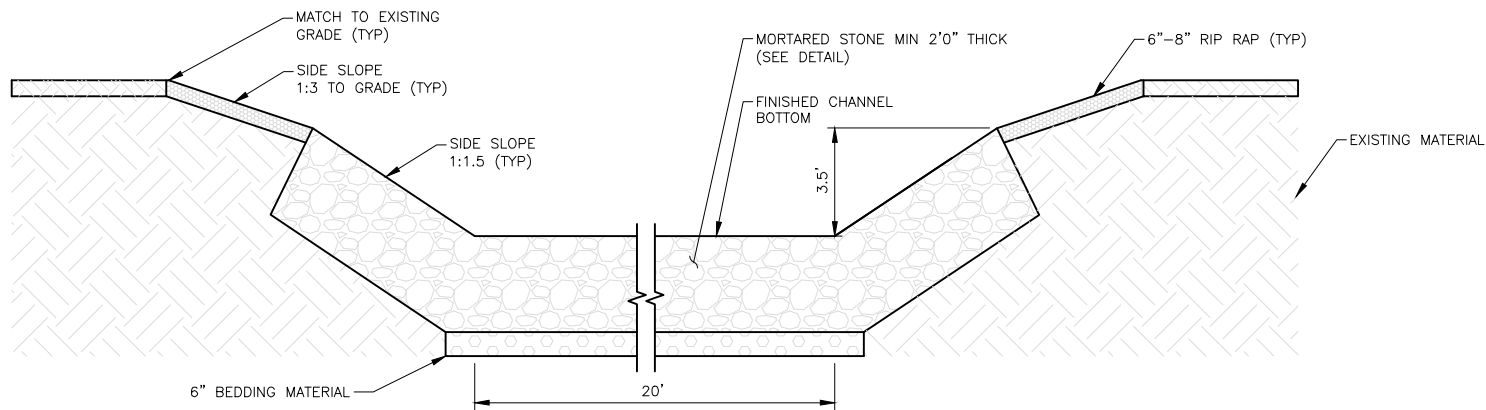
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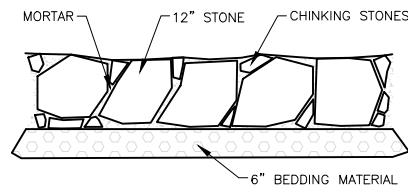
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**PROPOSED DRAINAGE CHANNEL
TYPE 1 TYPICAL DETAIL**
NTS



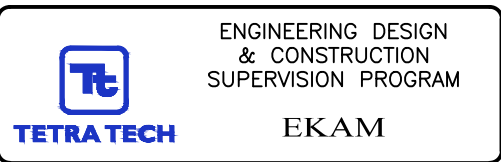
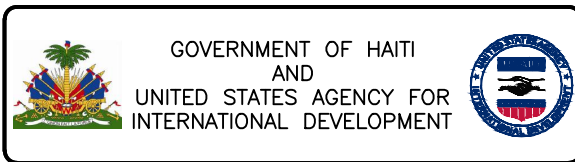
**PROPOSED DRAINAGE CHANNEL
DOUBLE LAYER MORTARED STONE**
NTS



- NOTES:
1. STONE TO BE 12" THICK AND SOLID, LOOSE STONES WILL NOT BE ACCEPTED.
 2. STONES TO BE SET IN MORTAR.
 3. MORTAR TO BE FLUSH WITH FACE OF STONE AND TROWELED SMOOTH.
 4. VOIDS OVER 6" SHALL BE CHINKED WITH SMALLER STONES.

MORTARED STONE DETAIL
NTS

UNLESS OTHERWISE NOTED, ALL LINEAR
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127-1298-15001

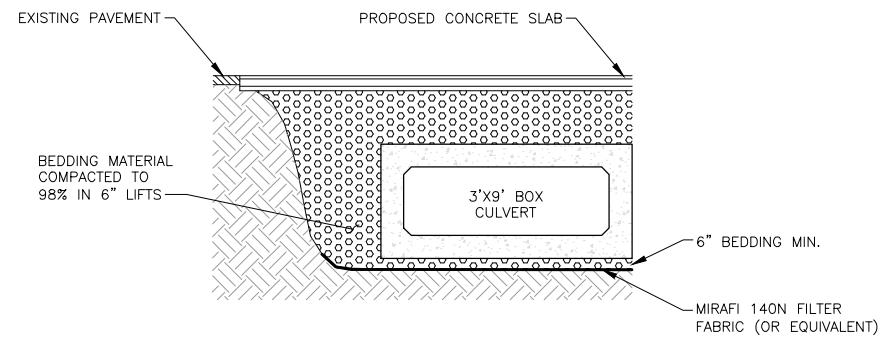
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		DRAWN BY:	SUBMITTED BY:
		ANF	TETRA TECH
		CHECKED BY:	CAD FILE NAME:
		JH	NHSUP-C-501

SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

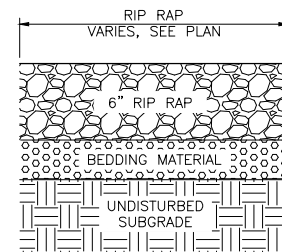
DRAWING
REFERENCE
NUMBER:
**NHSUP
C-501**

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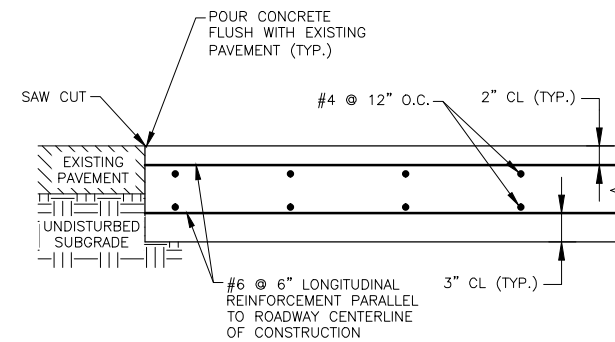
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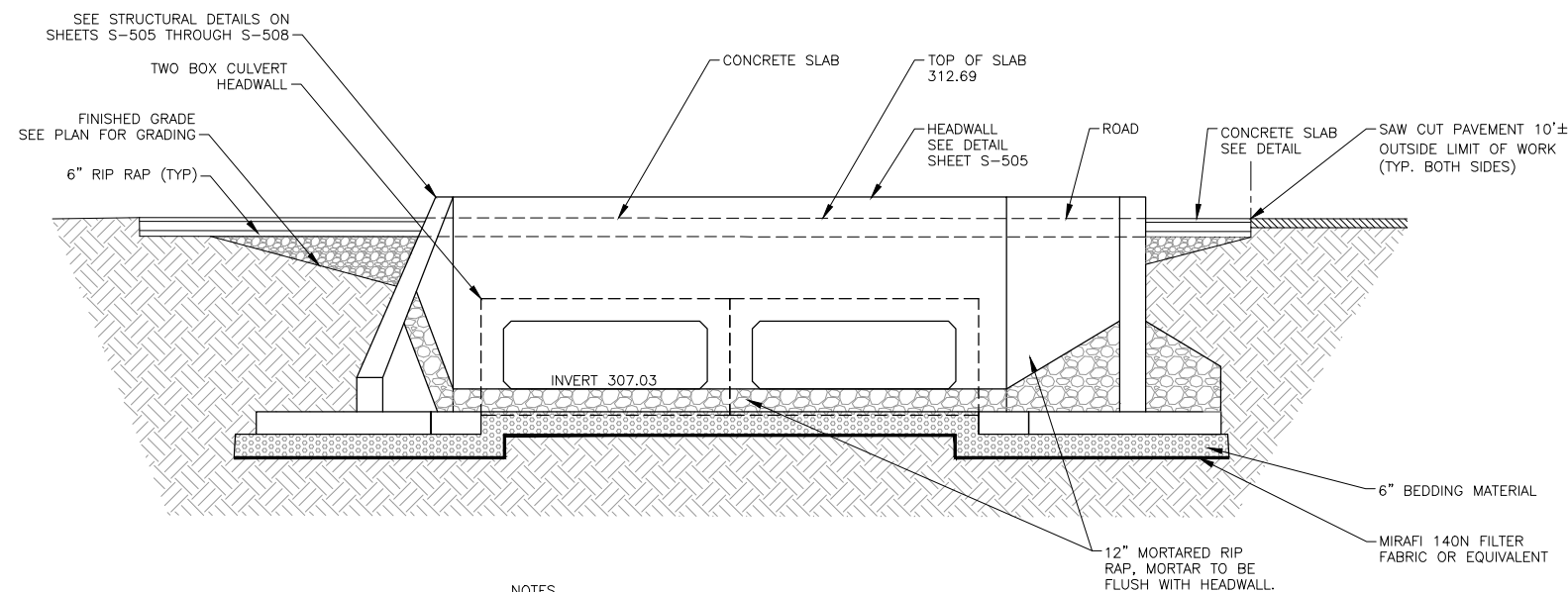
SECTION 1 SHEET C-301
SCALE: N.T.S.



RIP RAP
SCALE: N.T.S.



CONCRETE SLAB DETAIL
SCALE: N.T.S.



- NOTES
1. IF PAVEMENT SAWCUT IS UNDERMINED OR DAMAGED THE CONTRACTOR SHALL RECUT THE PAVEMENT TO PROVIDE A SMOOTH AND SOLID EDGE AT PAVEMENT SEAM.
 2. CONTRACTOR IS RESPONSIBLE TO COORDINATE ROUTE 6 CLOSURE FOR CONSTRUCTION WITH "MINISTÈRE DES TRAVAUX PUBLICS, TRANSPORTS ET COMMUNICATIONS" (MTPTC).

TYPICAL HEADWALL SECTION
MULTIPLE CULVERT
SCALE: N.T.S.

UNLESS OTHERWISE NOTED, ALL LINEAR
DIMENSIONS SHOWN ARE IN FEET



GOVERNMENT OF HAITI
AND
UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT



TETRA TECH

ENGINEERING DESIGN
& CONSTRUCTION
SUPERVISION PROGRAM
EKAM

PROJECT TITLE:

EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

SHEET CONTENTS:

HEADWALL
DETAILS

DESIGNED BY:	DATE:
TRW	09-DEC-2016
DRAWN BY:	SUBMITTED BY:
TRW	TETRA TECH
CHECKED BY:	CAD FILE NAME:
JH	NHSUP-C-502

SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

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DRAWING
REFERENCE
NUMBER:
**NHSUP
C-502**

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GENERAL:

- ALL LINEAR DIMENSIONS ARE INCHES AND FEET UNLESS NOTED OTHERWISE (U.N.O.).
- ALL DIMENSIONS AND CONDITIONS MUST BE VERIFIED BY THE CONTRACTOR IN THE FIELD AND ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ON-SITE AUTHORIZED REPRESENTATIVE BEFORE PROCEEDING WITH THE AFFECTED PORTION OF THE WORK.
- THE CONTRACTOR SHALL INFORM THE ON-SITE AUTHORIZED REPRESENTATIVE OF ALL DISCREPANCIES BETWEEN DRAWINGS OF DIFFERENT TRADES, PRIOR TO INITIATION OF ANY WORK.
- THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE AUTHORIZED ON-SITE REPRESENTATIVE WHEN, IN THE COURSE OF CONSTRUCTION, CONDITIONS ARE UNCOVERED WHICH ARE UNANTICIPATED OR OTHERWISE APPEAR TO PRESENT A DANGEROUS CONDITION.
- STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH CIVIL AND SHOP DRAWINGS.
- SECTIONS AND DETAILS SHOWN ON ANY DRAWING ARE TO BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS.
- WORK NOT INDICATED ON THE DRAWINGS, BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING LOCATIONS, SHALL BE INCLUDED.
- STRUCTURAL IMPROVEMENTS SHALL NOT INTERRUPT THE DRAINAGE OF WATER.

CAST IN PLACE CONCRETE:

- CONCRETE WORK SHALL CONFORM TO:
ACI 301-05 - SPECIFICATIONS FOR STRUCTURAL CONCRETE.
ACI 318-08 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY.
- CONCRETE SHALL HAVE A MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS, $f'_c = 28 \text{ MPa}$ (4000 PSI). THE MAXIMUM WATER-CEMENT RATIO OF 0.45 (BY WEIGHT) U.N.O. ALL CONCRETE EXPOSED TO WEATHER SHALL BE AIR-ENTRAINED, IN ACCORDANCE WITH ASTM C231.
- CONCRETE SHALL BE CONTROLLED NORMAL WEIGHT CONCRETE, PROPORTIONED, MIXED AND PLACED UNDER THE SUPERVISION OF AN APPROVED QUALITY CONTROL ENGINEER.
- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING:
A.) CONCRETE PLACED AGAINST THE EARTH 3"
B.) SIDES OF FOOTINGS, WALLS AND PIERS
18 ϕ BAR AND LARGER 2"
16 ϕ BAR AND SMALLER 1 1/2"
C.) WALLS, AND SLABS-ON-GRADE (FROM TOP) 1"
- CHAMFER EXPOSED EDGES $\frac{3}{8}$ " U.N.O.
- ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60. U.N.O. SEE SPLICE TABLE FOR LAP LENGTHS. MINIMUM YIELD STRENGTH $F_y = 60 \text{ KSI}$
- DO NOT WELD OR BEND REINFORCEMENT IN FIELD UNLESS SPECIFICALLY SHOWN OR APPROVED BY ENGINEER.
- NO BARS SHALL BE CUT OR OMITTED IN THE FIELD BECAUSE OF SLEEVES, DUCT OPENINGS OR RECESSES. BARS MAY BE MOVED ASIDE WITHOUT CHANGE IN LEVEL WITH THE APPROVAL OF THE QUALITY CONTROL ENGINEER.
- REINFORCEMENT STEEL SHALL BE CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS. ALL CONSTRUCTION JOINTS SHALL BE KEYED U.N.O.
- WHERE VERTICAL CONSTRUCTION JOINTS ARE NOT SHOWN, OR WHEN ALTERNATE LOCATIONS ARE PROPOSED, DRAWINGS SHOWING LOCATION OF CONSTRUCTION JOINTS AND CONCRETE PLACING SEQUENCE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO PREPARATION OF THE REINFORCEMENT SHOP DRAWINGS. CONSTRUCTION JOINTS SHALL BE LOCATED IN THE MIDDLE THIRD OF THE BEAM OR SLAB SPAN. CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS U.N.O.
- ALL KEYS SHALL BE 2" BY 4" NOMINAL U.N.O.
- DETAILING, FABRICATION, AND ERECTION OF REINFORCEMENT SHALL CONFORM TO ACI 318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 315 DETAILS AND DETAILING OF CONCRETE REINFORCEMENT, AND CRSI MANUAL OF STANDARD PRACTICE.
- CONTRACTOR SHALL COORDINATE LOCATIONS OF PENETRATIONS, SLEEVES, INSERTS, ETC. WITH CONCRETE CONSTRUCTION. NO PIPES SHALL PASS THROUGH CONCRETE WITHOUT THE PERMISSION OF THE AUTHORIZED REPRESENTATIVE. STEEL PIPE SLEEVES SHALL BE PROVIDED AND SPACED A MINIMUM OF THREE PIPE DIAMETERS ON CENTER. CONDUIT AND OTHER EMBEDDED ITEMS SHALL BE CLEAN AND FREE OF OIL AND OTHER FOREIGN MATTER SUCH AS LOOSE COATINGS OR RUST, PAINT AND SCALE.
- PROVIDE ALL NECESSARY CHAIRS, CHAIR BARS, SPACERS, ETC., WIRED SECURELY TO HOLD REINFORCEMENT IN POSITION. THESE ACCESSORIES SHALL BE PLASTIC BOOTED WHERE CONCRETE IS TO BE EXPOSED TO WEATHER OR MOISTURE. WIRE TIES SHALL BE 16 GAUGE (1.5mm) OR HEAVIER BLACK ANNEALED STEEL WIRE.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING REINFORCING STEEL PLACEMENT, SCHEDULES, SIZES, GRADES, AND SPLICING AND BENDING DETAILS. DRAWINGS SHALL SHOW SUPPORT DETAILS INCLUDING TYPES, SIZES AND SPACING.
- REINFORCEMENT SHALL BE STORED OFF THE GROUND ON PLATFORMS, SKIDS OR OTHER SUPPORTS.

ABBREVIATIONS AND SYMBOLS:

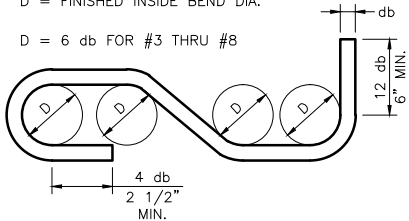
ADD'L	ADDITIONAL	FIN. GR.	FINISHED GRADE	SS	STAINLESS STEEL
ALT.	ALTERNATE	FTG	FOOTING	STD.	STANDARD
ARCH	ARCHITECTURAL	INFO	INFORMATION	STIFF	STIFFENER
BOT.	BOTTOM	JT	JOINT	STRUCT	STRUCTURAL
B.O.	BOTTOM OF	LLH	LONG LEG HORIZONTAL	T&B	TOP AND BOTTOM
CLR	CLEAR	LLV	LONG LEG VERTICAL	T.O.	TOP OF
CONT.	CONTINUOUS	MCJ	MASONRY CONTROL JOINT	T.O.S.	TOP OF STEEL
COL	COLUMN	MFR.	MANUFACTURER	TYP.	TYPICAL
COORD.	COORDINATE	MAX.	MAXIMUM	U.N.O.	UNLESS NOTED OTHERWISE
CTR.	CENTER	MIN.	MINIMUM	VERT.	VERTICAL
DEMO	DEMOLITION	N-S	NORTH-SOUTH	VIF	VERIFY IN FIELD
DIA.	DIAMETER	NO.	NUMBER	-----	CONSTRUCTION JOINT
DN	DOWN	O.C.	ON CENTER	----->	DIRECTION OF SPAN
DWG	DRAWING	O.D.	OUTSIDE DIAMETER	----->	DIRECTION OF SLOPE
E-W	EAST-WEST	OPN'G	OPENING	PL	PLATE
E.F.	EACH FACE	P.C.C.	PORTLAND CEMENT	CL	CENTERLINE
EL	ELEVATION	CONCRETE		DO	DITTO
EOD	EDGE OF DECK	PL	PLATE	SL	SIDEWALL LINE
EOS	EDGE OF SLAB	PROP.	PROPOSED		
EQ	EQUAL	PSF	POUNDS PER SQUARE FOOT		
E.W.	EACH WAY	REINF.	REINFORCING		
EXIST	EXISTING	SIM	SIMILAR		
FDN	FOUNDATION	SQ.	SQUARE		

BEND DIAMETER SCHEDULE

db = BAR DIAMETER

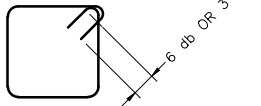
D = FINISHED INSIDE BEND DIA.

D = 6 db FOR #3 THRU #8



STANDARD HOOKS AND BENDS

WALL BARS SHALL BE TIED TOGETHER



TIES

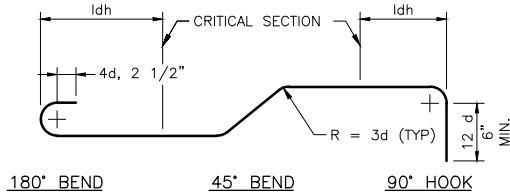
SPLICES FOR SUCCESSIVE TIES TO BE PLACED AT ALTERNATE CORNERS

TYPICAL REINFORCING BAR STIRRUPS AND TIES

SCALE: NTS

LEGEND (FOR REINFORCING SHOWN IN PLAN OR ELEVATION)

	90° HOOK IN THE PLANE OF THE DRAWING				
	90° BEND PERPENDICULAR TO THE PLANE OF THE DRAWING				
	HOOK PERPENDICULAR TO THE PLANE OF THE DRAWING				
	180° HOOK IN THE PLANE OF THE DRAWING				
	OFFSET IN THE PLANE OF THE DRAWING				
BAR SIZE	#3	#4	#5	#6	#8
ldh (in)	7 1/2	9 1/2	12	15	19



NOTE: "d" = BAR DIAMETER.

BEND IN REINFORCING BARS

SCALE: NTS

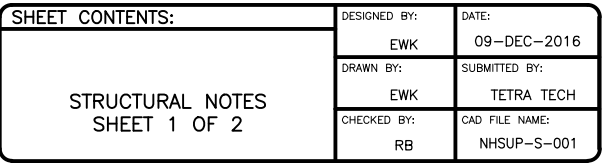
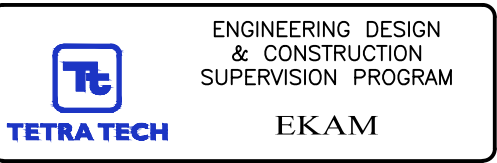
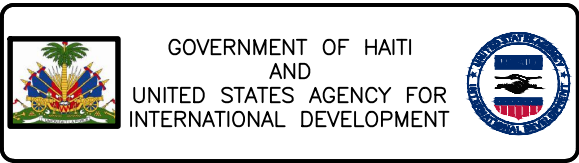
MINIMUM REBAR IN CONCRETE SPLICE LENGTHS IN. $f_y = 60 \text{ KSI}$ $f'_c = 4000 \text{ PSI}$		
BAR SIZE ϕ	TOP BARS	BOTTOM BARS
3	20	14
4	34	28
5	42	32
6	63	48
7	69	53
8	82	64

SPLICE NOTES:

- BASED ON NORMAL WEIGHT CONCRETE, UNCOATED BARS, CLEAR SPACING NOT LESS THAN FOUR BAR DIAMETERS, AND CLEAR COVER NOT LESS THAN 1 1/2".
- WHERE SPACING BETWEEN BARS IS LESS THAN FOUR BAR DIAMETERS, OR CLEAR COVER IS LESS THAN TWO BAR DIAMETERS, INCREASE SPLICE LENGTHS SHOWN BY 50%.
- BARS ARE CONSIDERED TO BE TOP BARS WHERE MORE THAN 1'0" OF CONCRETE IS CAST BELOW THE BAR. WALL HORIZONTAL BARS UNIFORMLY SPACED IN A VERTICAL PLANE AT 1'0" MAXIMUM SPACING ARE NOT CONSIDERED TOP BARS.

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6

5

4

3

2

1

FOUNDATIONS:

- IT IS ANTICIPATED THAT EXCAVATIONS FOR THE PROPOSED CONSTRUCCION CAN BE ACCOMPLISHED WITH CONVENTIONAL EARTHMOVING EQUIPMENT.
- FOUNDATIONS HAVE BEEN DESIGNED FOR AN ASSUMED NET BEARING CAPACITY OF 95.7 KPA [2000PSF) AND A MODULUS OF SUBGRADE OF 100 MPA/M [100 PSI/IN]. ACTIVE EARTH PRESSURE, Ka IS ASSUMED TO BE 0.30. VALUES MUST BE CONFIRMED TO BE CONSERVATIVE BASED ON GEOTECHNICAL INVESTIGATION. THE ALLOWABLE BEARING CAPACITY IS INCREASED BY ONE-THIRD FOR EARTHQUAKE AND WIND LOAD COMBINATIONS AS ALLOWED BY IBC FOR ALTERNATIVE BASIC LOAD COMBINATIONS.
- ALL FOOTINGS SHALL BE PLACED ON NATURAL UNDISTURBED SOIL OR ON COMPACTED SELECT GRANULAR MATERIAL FILL PREPARED AS FOLLOWS:
 - REMOVE UNSUITABLE MATERIAL BELOW THE FOOTING AND REPLACE WITH COMPACTED SELECT GRANULAR MATERIAL FILL TO A DEPTH WHERE NATURAL SOIL AND OR COMPACT FILL IS ENCOUNTERED.
 - FILL MATERIAL MUST BE PLACED IN LIFTS UP TO A MAXIMUM OF 0'6" IN THICKNESS. EACH LIFT COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 AT MOISTURE CONTENT WITHIN MINUS 1% TO PLUS 2% OF THE OPTIMUM. WHEN THERE IS A CONCERN OF INDUCING EXCESS STRESSES IN EXISTING FOUNDATION OF EITHER 2'8" OR TWICE THE EXISTING FOOTING DEPTH (IF KNOWN), WHICHEVER IS GREATER, TO A MINIMUM OF 90% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 AND TO WITHIN MINUS 1% TO PLUS 2% OF OPTIMUM MOISTURE CONTENT
- BEARING SOIL SHALL BE INSPECTED AND APPROVED BY THE QUALITY CONTROL ENGINEER BEFORE CONSTRUCTING ANY FOOTINGS. NO FOUNDATION CONCRETE SHALL BE PLACED IN WATER.
- FOUNDATIONS MAY BE ALTERED IF NECESSARY TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.
- FOOTING SUBGRADE PREPARATION SHALL BE PERFORMED IN THE DRY. DEWATERING MAY BE REQUIRED FOR CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT A DEWATERING PLAN TO THE ENGINEER FOR REVIEW.
- ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE AS DIRECTED BY THE ENGINEER.
- SEE CIVIL DESIGN FOR LAYOUT & GRADING.



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ENGINEERING DESIGN
& CONSTRUCTION
SUPERVISION PROGRAM



PROJECT TITLE:

EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

SHEET CONTENTS:

STRUCTURAL NOTES
SHEET 2 OF 2

DESIGNED BY:	DATE:
EWK	09-DEC-2016
DRAWN BY:	SUBMITTED BY:
EWK	TETRA TECH
CHECKED BY:	CAD FILE NAME:
RB	NHSUP-S-002

SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

DRAWING
REFERENCE
NUMBER:

NHSUP
S-002

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DIMENSIONS SHOWN ARE IN INCHES

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1. THE VEHICULAR BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH:
 - A) 2002 SPECIFICATIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS WITH CURRENT INTERIM SPECIFICATIONS (AASHTO).
 - B) ACI 318-08
 - C) IBC 2009
2. NO EXISTING SURVEY WAS AVAILABLE DURING THE DESIGN. ALL EXISTING DIMENSIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
3. LOADING:
 - A) DEAD LOAD: SELFWEIGHT
 - B) VEHICULAR LIVE LOAD: H15 TRUCK TWO
AXLES, SPACED AT 14FT
SEISMIC:

$S_s = 1.50g$
 $S_m = 0.60g$
PGA= USE GROUP I
SITE CLASS D
IMPORTANCE FACTOR $I = 1.0$
4. THE FOLLOWING GEOTECHNICAL PROPERTIES WERE ASSUMED FOR DESIGN AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR:
 - A) UNIT WEIGHT OF SOIL: 115 PCF
 - B) ALLOWABLE NET BEARING PRESSURE: 2000 PSF
 - C) ACTIVE EARTH PRESSURE COEFFICIENT:

FOR FRAME DESIGN: $K_a = 0.30$
FOR WALL DESIGN: $K_a = 0.45$
 - D) PASSIVE EARTH PRESSURE COEFFICIENT:

FOR FRAME DESIGN: $K_p = 3.0$
FOR WALL DESIGN: $K_p = 6.1$
5. SEE NOTES ON S-001 & S-002.



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GOVERNMENT OF HAITI
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EKAM

EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

PLAN, ELEVATION
AND GENERAL NOTES

DESIGNED BY:	DATE:
JZ	09-DEC-2016
DRAWN BY:	SUBMITTED BY:
AC	TETRA TECH
CHECKED BY:	CAD FILE NAME:
SWG	NHSUP-S-003

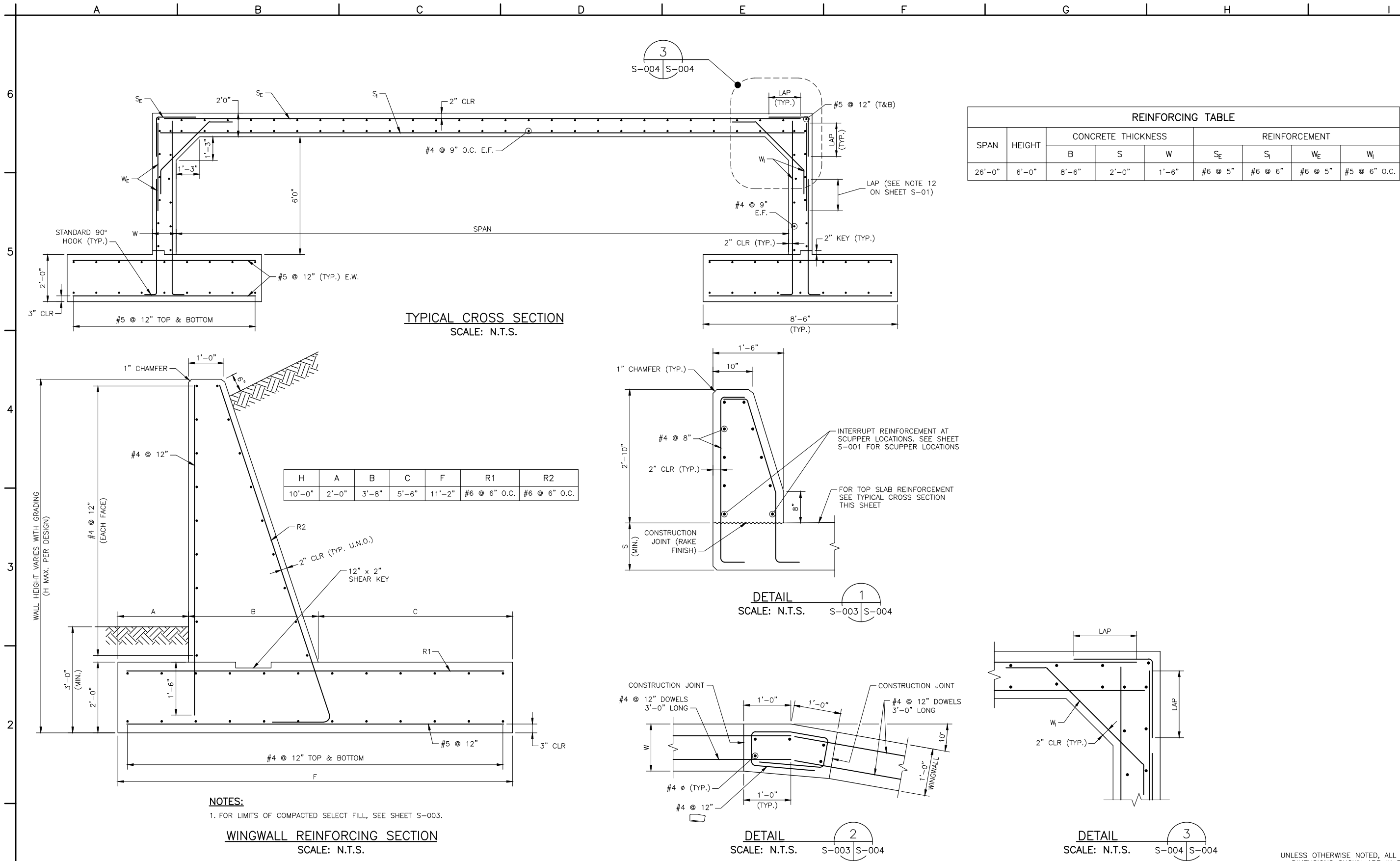
SUB	SUBMITTAL /REVISION DESCRIPTION	DATE	APP

DRAWING
REFERENCE
NUMBER:

NHSUP
S-003

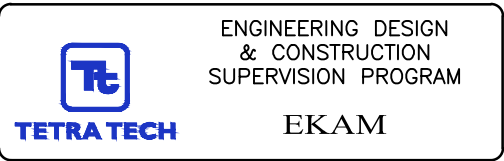
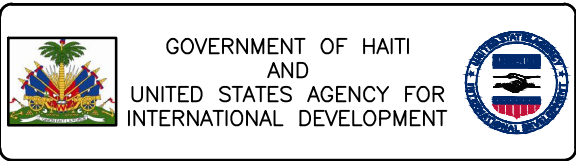
UNLESS OTHERWISE NOTED, ALL LINEAR
DIMENSIONS SHOWN ARE IN FEET

\\NES011FS1\Projects\1298\127-1298-15001\CAD\SheetFiles\OFFSITE DRAINAGE_PKG\07_Structural\NHSUP-S-004.dwg 12/7/2016 11:04:29 AM



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DIMENSIONS SHOWN ARE IN FEET



PROJECT TITLE:
EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

SHEET CONTENTS:
REINFORCEMENT DETAILS

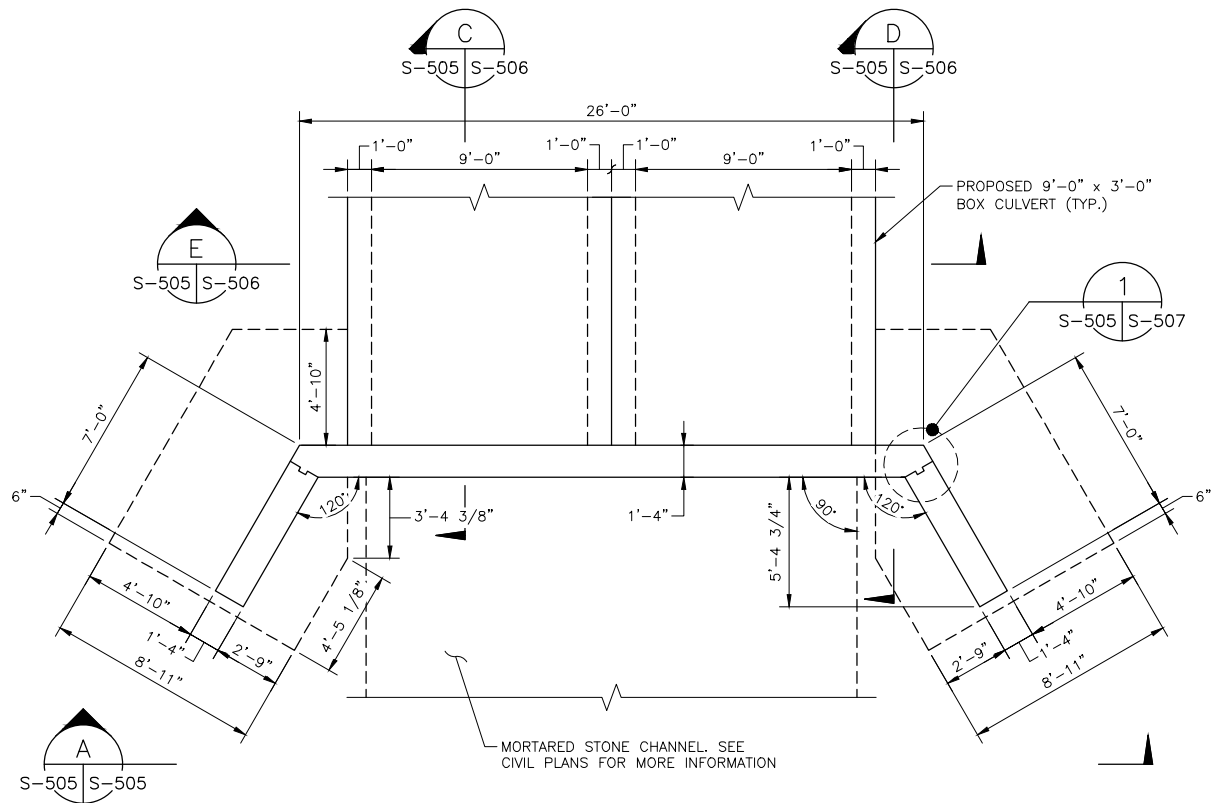
DESIGNED BY: JZ	DATE: 09-DEC-2016
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SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

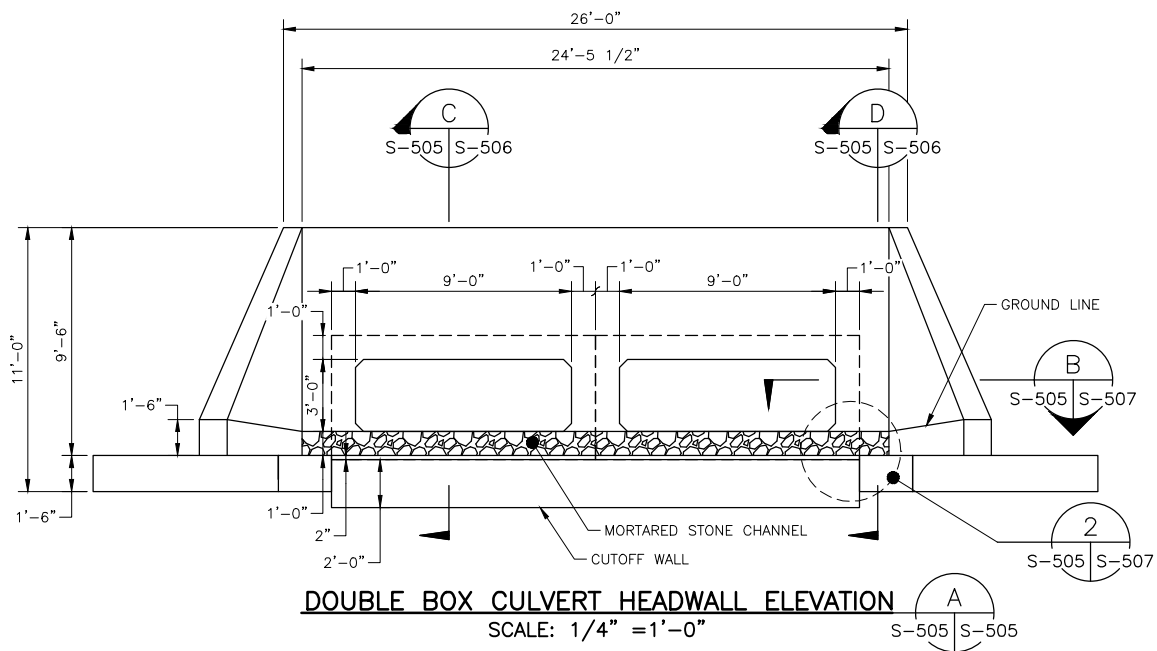
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NHSUP
S-004

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DOUBLE BOX CULVERT HEADWALL PLAN
SCALE: 1/4" = 1'-0"



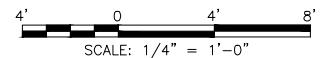
DOUBLE BOX CULVERT HEADWALL ELEVATION
SCALE: 1/4" = 1'-0"

NOTES:

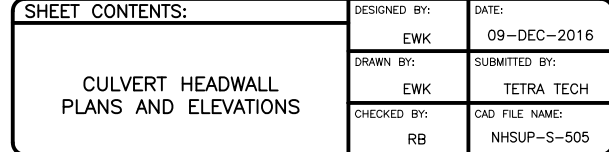
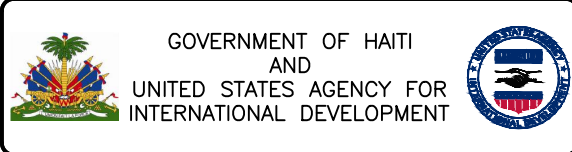
1. SEE NOTES ON SHEETS S-001 AND S-002.
2. SEE CIVIL PROJECT AREA PLAN AND PROFILE SHEETS FOR LOCATIONS AND ELEVATIONS.

DESIGN LOADS:

1. ALL LOADS ARE IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE, IBC 2009 U.N.O. ALL LATERAL LOADS IN ACCORDANCE WITH THE MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, ASCE 07-05.
 - A.) DEAD LOADS: WEIGHT OF BUILDING COMPONENTS
 - B.) VEHICULAR LIVE LOAD = H20 LOADING
 - C.) SEISMIC DESIGN: CAP HAITEN, HAITI IS THE SEISMIC BASIS OF DESIGN. SPECTRAL ACCELERATION BASED ON $S_s=1.5G$ AND $S_1=0.60G$ OCCUPANCY CATEGORY II, SITE CLASS D, IMPORTANCE FACTOR, $(I)=1.0$. DIRECTION OF SEISMIC LOAD IS IN ACCORDANCE WITH ASCE 7-05.



UNLESS OTHERWISE NOTED, ALL LINEAR DIMENSIONS SHOWN ARE IN INCHES

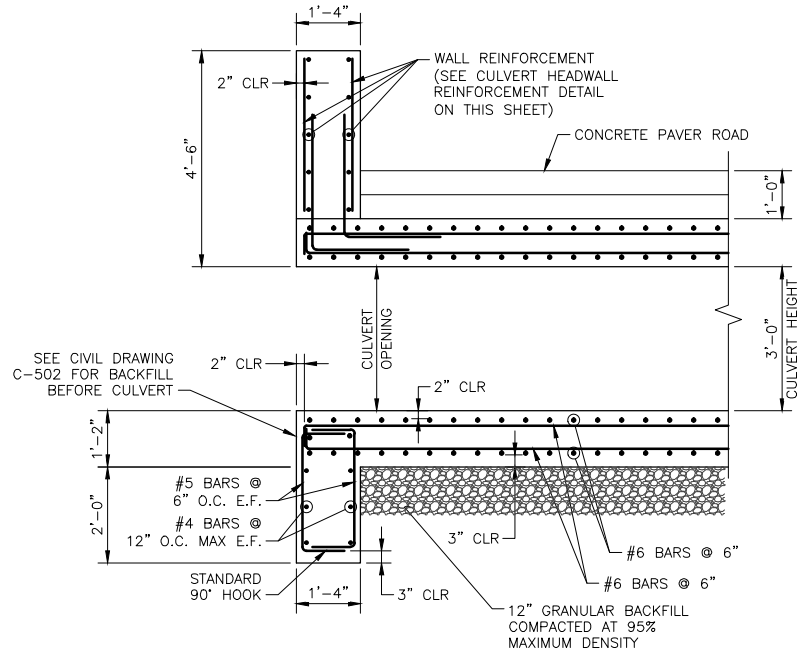


SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

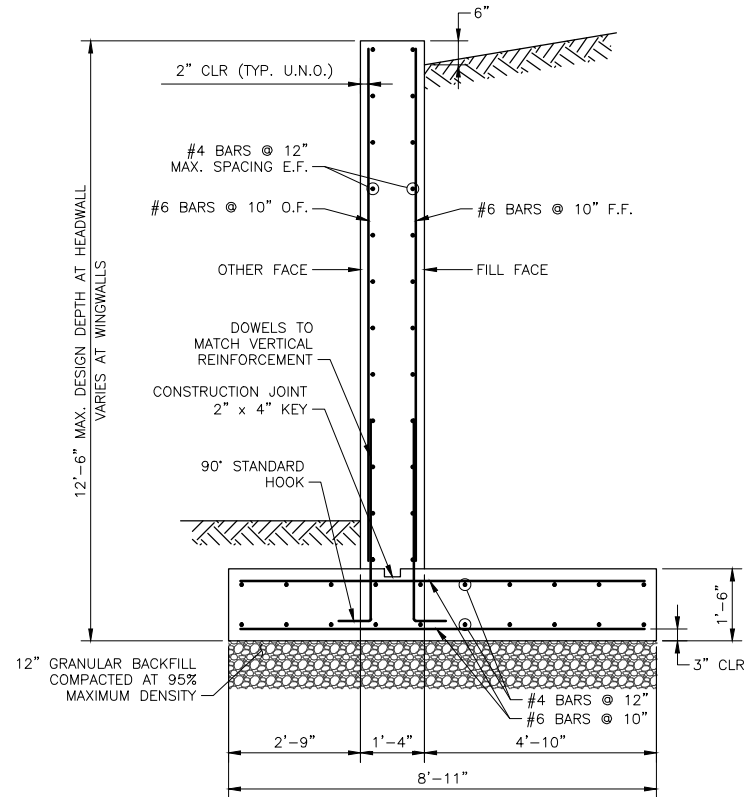


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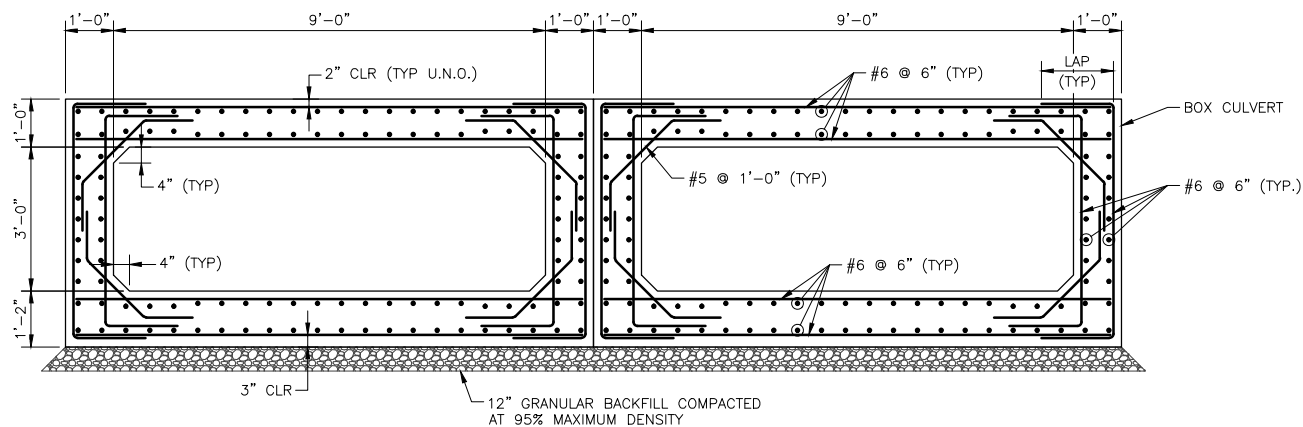
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**CULVERT HEADWALL
REINFORCEMENT SECTION**
SCALE: 1/2" = 1'-0" C
S-505 | S-506

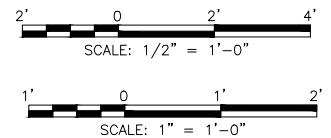


SECTION
SCALE: 1/2" = 1'-0" D
S-505 | S-506

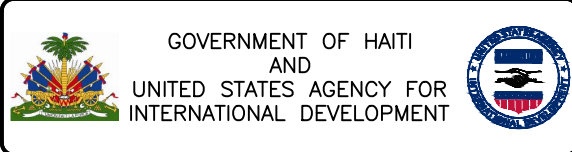


DOUBLE BOX CULVERT SECTION
SCALE: 1/2" = 1'-0" E
S-505 | S-506

- NOTES:**
1. SEE GENERAL AND CONCRETE NOTES ON SHEET S-001.
 2. SEE CIVIL PROJECT AREA PLAN AND PROFILE SHEETS FOR LOCATIONS AND ELEVATIONS.



UNLESS OTHERWISE NOTED, ALL LINEAR
DIMENSIONS SHOWN ARE IN INCHES



PROJECT TITLE:
EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

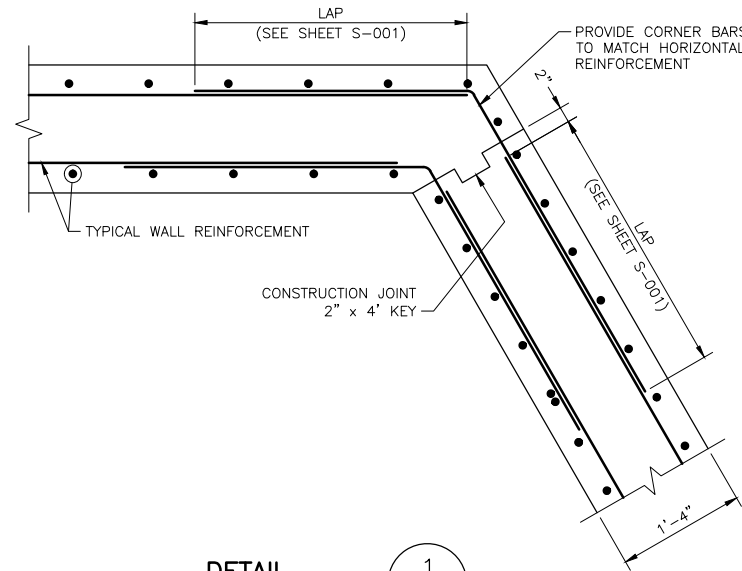
SHEET CONTENTS:		DESIGNED BY:	DATE:
CULVERT HEADWALL DETAILS SHEET 1 OF 2		EWK	09-DEC-2016
		DRAWN BY:	SUBMITTED BY:
		EWK	TETRA TECH
		CHECKED BY:	CAD FILE NAME:
		RB	NHSUP-S-506

SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

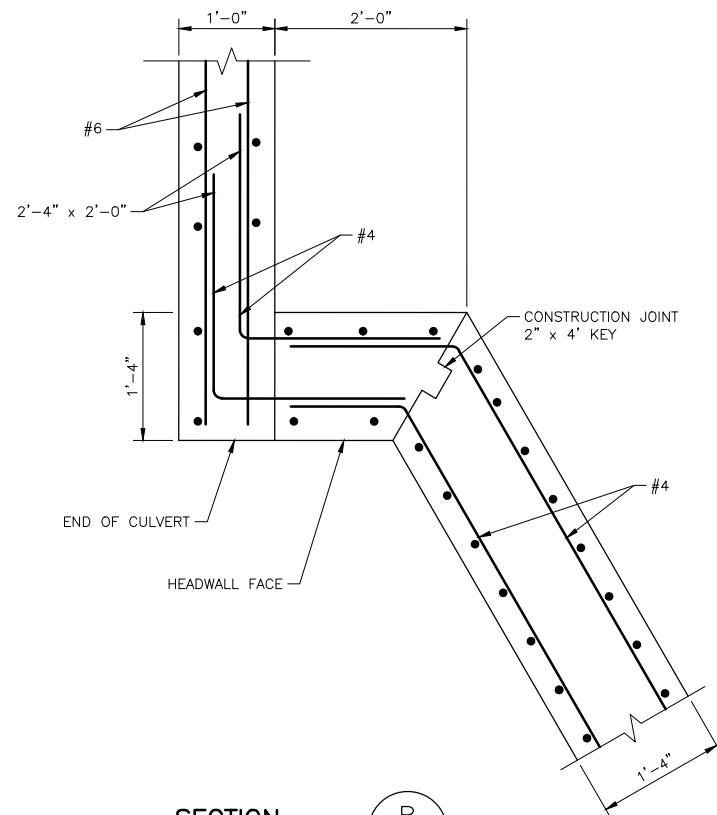
**DRAWING
REFERENCE
NUMBER:**
NHSUP
S-506

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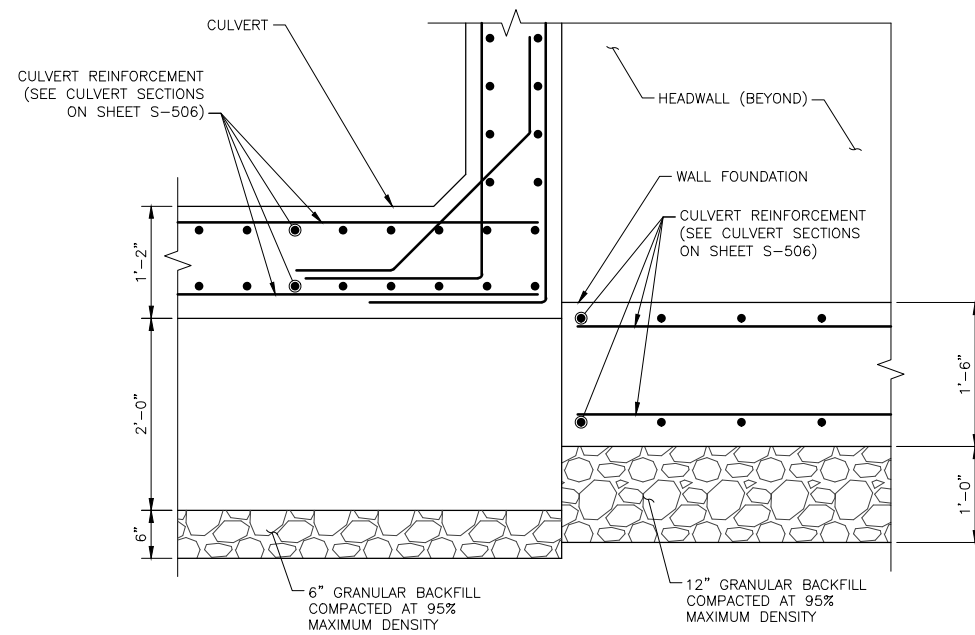
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DETAIL
SCALE: 1" = 1'-0" S-505 S-507



SECTION
SCALE: 1" = 1'-0" S-505 S-507

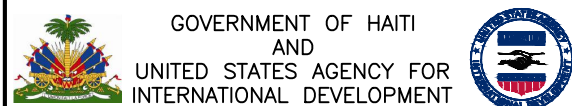


DETAIL
SCALE: 1" = 1'-0" S-505 S-507

- NOTES:**
1. SEE GENERAL AND CONCRETE NOTES ON SHEET S-001.
 2. SEE CIVIL PROJECT AREA PLAN AND PROFILE SHEETS FOR LOCATIONS AND ELEVATIONS.
 3. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF STRUCTURE CONFIRMING DIMENSIONS AS BASED ON CURRENT FIELD CONDITIONS.

2' 0 2' 4'
SCALE: 1/2" = 1'-0"

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ENGINEERING DESIGN
& CONSTRUCTION
SUPERVISION PROGRAM
EKAM

PROJECT TITLE:
**EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001**

SHEET CONTENTS:
**CULVERT HEADWALL
DETAILS SHEET 2 OF 2**

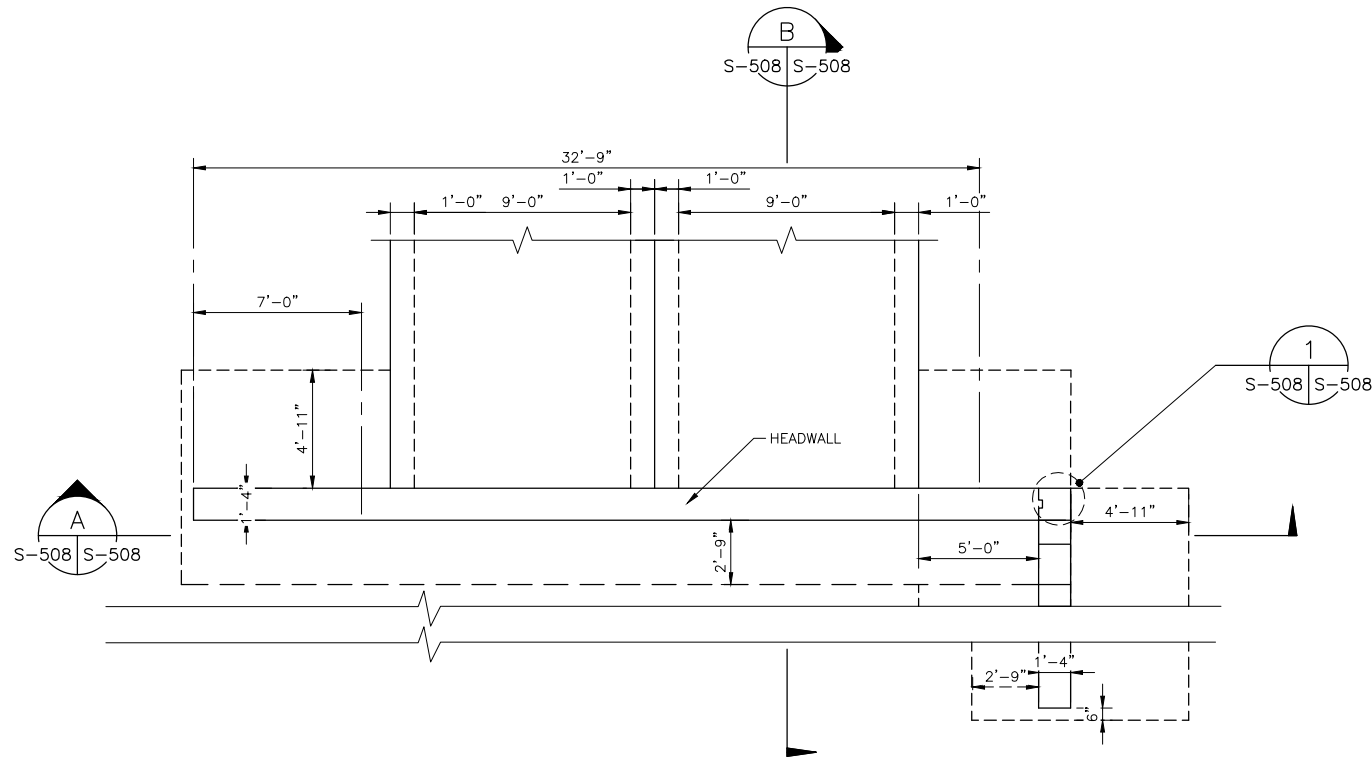
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EWK	09-DEC-2016
DRAWN BY:	SUBMITTED BY:
EWK	TETRA TECH
CHECKED BY:	CAD FILE NAME:
RB	NHSUP-S-507

SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

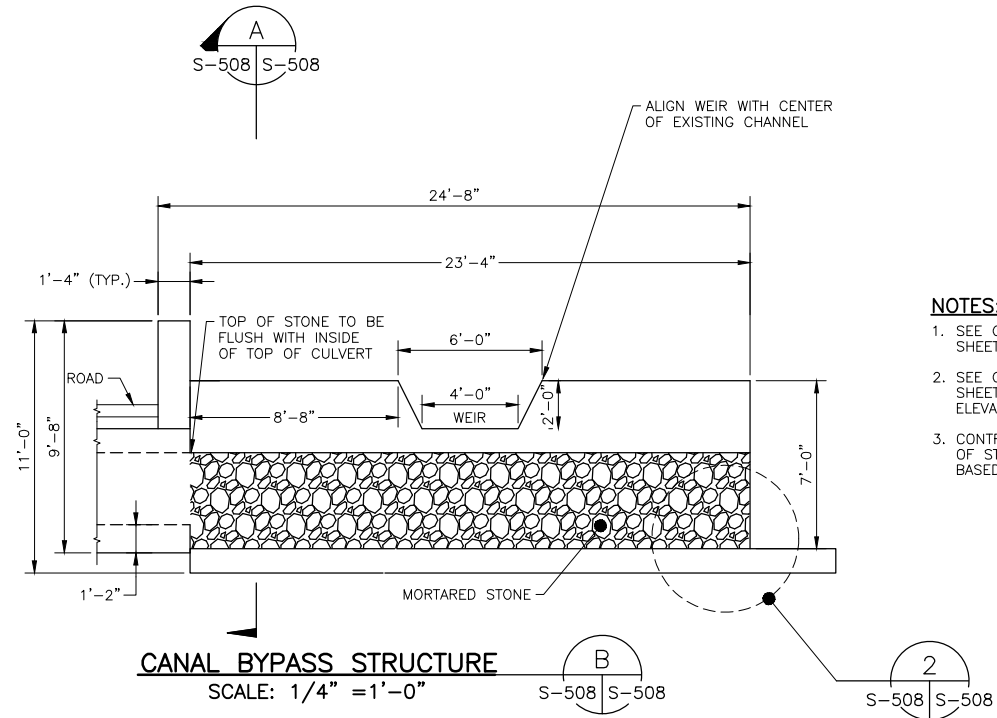
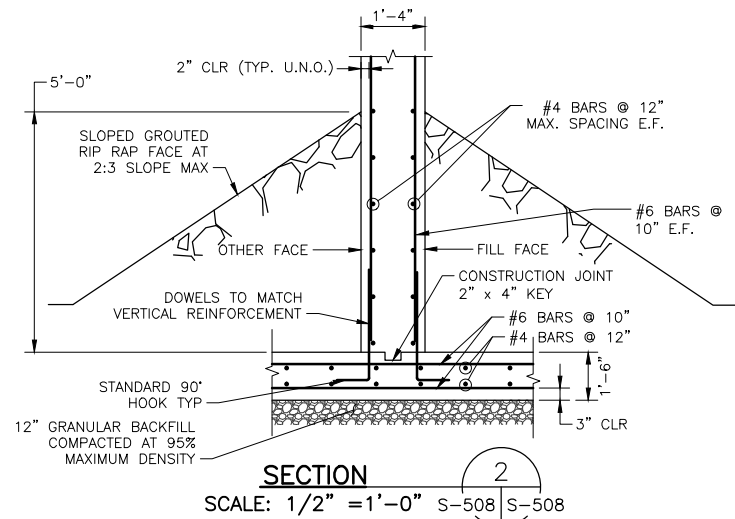
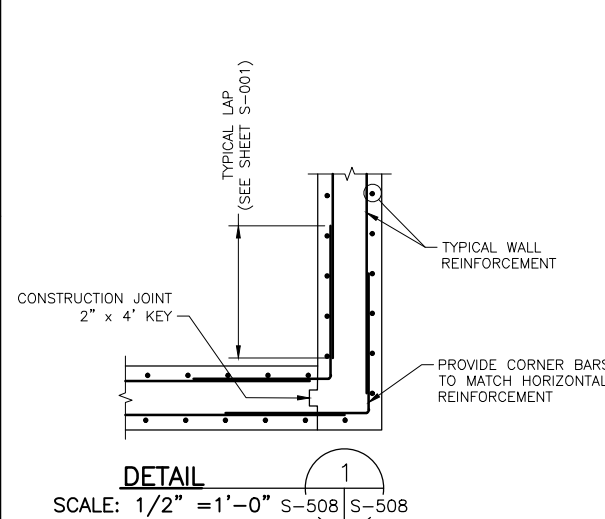
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REFERENCE
NUMBER:
**NHSUP
S-507**

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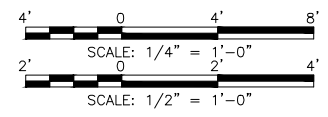
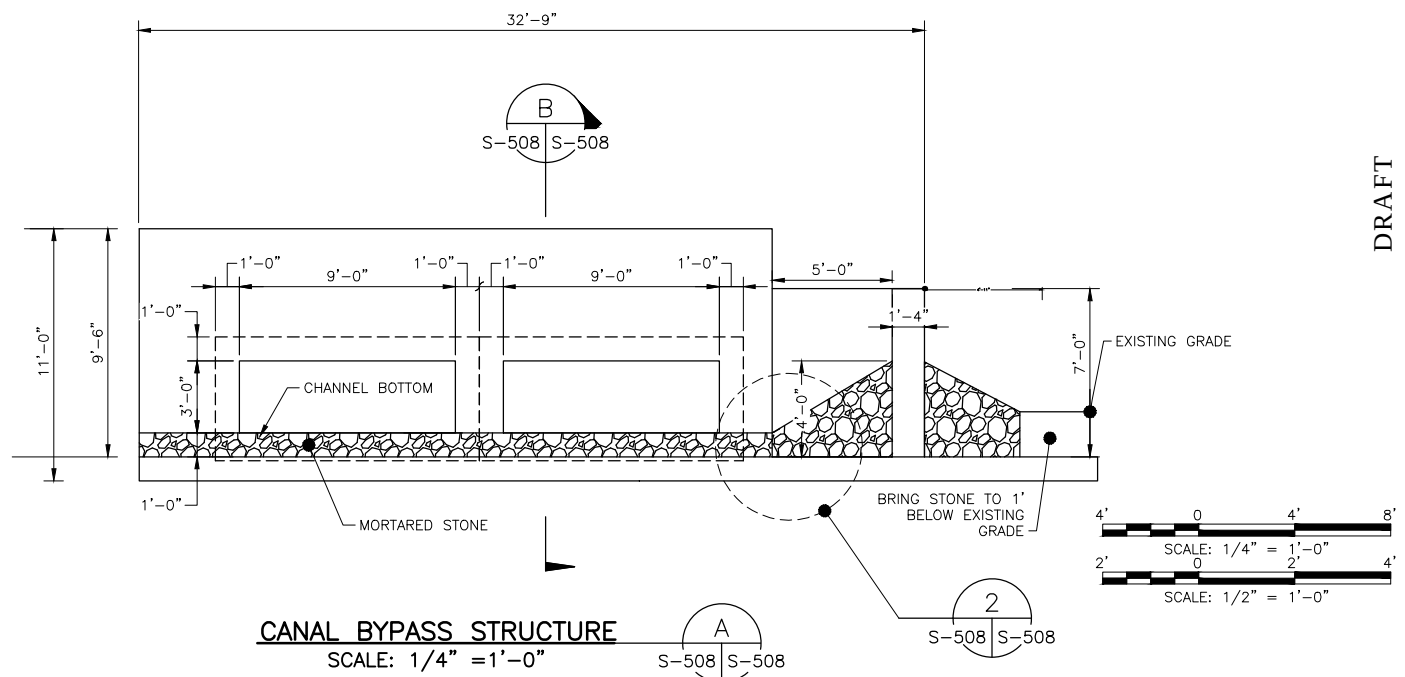
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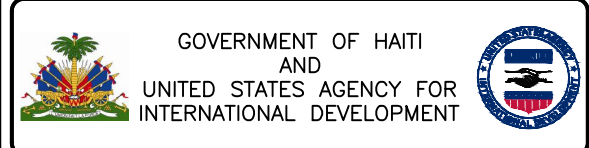
CANAL BYPASS STRUCTURE PLAN
SCALE: 1/4" = 1'-0"



- NOTES:
1. SEE GENERAL AND CONCRETE NOTES ON SHEET S-001.
 2. SEE CIVIL PROJECT AREA PLAN AND PROFILE SHEETS FOR PIPE SIZES, LOCATIONS, AND ELEVATIONS.
 3. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS OF STRUCTURE CONFIRMING DIMENSIONS AS BASED ON CURRENT FIELD CONDITIONS.



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PROJECT TITLE:
EKAM SETTLEMENT UPGRADE
OFFSITE DRAINAGE
127-1298-15001

SHEET CONTENTS:		DESIGNED BY:	DATE:
CANAL BYPASS STRUCTURE PLANS AND DETAILS		EWK	09-DEC-2016
		DRAWN BY:	SUBMITTED BY:
		EWK	TETRA TECH
		CHECKED BY:	CAD FILE NAME:
		RB	NHSUP-S-508

SYMB	SUBMITTAL/REVISION	DESCRIPTION	DATE	APR

DRAWING
REFERENCE
NUMBER:
NHSUP
S-508

UNLESS OTHERWISE NOTED, ALL LINEAR
DIMENSIONS SHOWN ARE IN INCHES